

Kidney disease - tests

Chronic (ongoing) kidney disease can be diagnosed using urine tests, blood tests, imaging studies and biopsy. Early diagnosis and prompt treatment can often prevent kidney damage from becoming worse and reduce the risk of kidney failure. Chronic kidney disease can be caused by diabetes and high blood pressure as well as glomerulonephritis and inherited disorders such as polycystic kidney disease.

The diagnostic tests chosen by the doctor depend on factors including the person's symptoms, age, medical history, lifestyle and general health. Chronic kidney disease often has very few or only general symptoms such as tiredness, feeling sick and headaches. The doctor may begin by reviewing the person's medical history and performing a physical examination.

The range of tests

Tests used in the diagnosis of kidney disease may include:

- Urine tests
- Blood pressure checks
- Blood tests
- Imaging studies
- Biopsy.

Urine tests – in the surgery

Damaged or inflamed kidneys 'leak' substances such as blood or protein into the urine. Urine tests (urinalysis) can check for the presence of these substances. A simple test that can be performed in the doctor's surgery involves placing a special dipstick into a container of the person's urine. The chemicals on the dipstick change colour when they come in contact with certain substances, such as:

- **Blood (haematuria)** – in some cases, the blood is only visible under a microscope. In other cases, the amount of blood causes the urine to be dark or brownish in colour.
- **Glucose (glucosuria)** – in most cases, diabetes is the cause of glucose in the urine.
- **Ketones (ketonuria)** – ketones are waste substances created when the body breaks down (metabolises) fat. Conditions such as diabetes and alcoholism may increase the amount of ketones in the urine.
- **Leukocyte esterase** – this is an enzyme of the immune system. High levels in the urine usually indicate inflammation.
- **Nitrites (nitrituria)** – high amounts of nitrites in the urine usually mean there is an infection.
- **Protein (proteinuria)** – may be a sign of chronic kidney disease.

Urine tests – in the laboratory

Some urine tests (urinalysis) may involve sending a sample of the person's urine to a laboratory for examination. Laboratory tests check the sample for signs of disease, including:

- **Ability to concentrate the urine** – generally, diseased kidneys lose their ability to concentrate urine so checking the concentrating power (usually by withholding water for 12 hours or more) is sometimes helpful.
- **Urine culture** – involves culturing the urine sample to see if bacteria grow. This test is used to diagnose infection.
- **Sediment** – to check the amount of sediment in the urine. Urine usually contains a small percentage of cells shed from the urinary tract. A person with urinary tract disease may shed more cells than normal.

Blood tests

The function of the kidneys is to get rid of waste products and excess water and to regulate the make-up of the body fluids. Blood tests can assess how well the kidneys work by measuring the amounts of various compounds in the blood.

The best test is one that checks the blood for creatinine, which is a waste product made by muscle tissue. From the creatinine result, an 'estimated glomerular filtration rate' (eGFR) can be calculated. This filtering rate is directly related to the amount of kidney tissue that is working properly and can be used to diagnose kidney damage. A normal eGFR is higher than 90mL/min. If the eGFR is persistently less than 60 mL/min, this confirms that the person has kidney damage.

Blood tests can reveal other abnormalities of kidney function, such as:

- High levels of acids (acidosis)
- Anaemia (insufficient red blood cells or haemoglobin, the protein in red blood cells that transports oxygen)
- High levels of potassium
- Low levels of salt (hyponatraemia).

Imaging studies

Tests that create various pictures or images may include:

- **X-rays** – to check the size of the kidneys and look for kidney stones.
- **Cystogram** – bladder x-ray.
- **Voiding cystourethrogram** – the bladder is x-rayed before and after urination.
- **Ultrasound** – sound waves are 'bounced' off the kidneys to create a picture. Ultrasound may be used to check the size of the kidneys. Abnormalities, such as kidney stones and blood vessel blockages, may be visible on ultrasound.
- **Intravenous urography** – involves an injected dye that shows up the urinary tract on x-ray examination. Contrast dye should not be used if the doctor suspects that the kidneys may have trouble filtering out the dye. This test is not often used now. Newer imaging studies including computed tomography and magnetic resonance imaging are more commonly used.
- **Computed tomography (CT)** – x-rays and digital computer technology are used to create an image of the urinary tract including the kidneys.
- **CT urography** – a contrast dye is injected prior to the CT scan. Once again, contrast dye isn't used if the doctor suspects that the kidneys may have trouble filtering the dye.
- **Magnetic resonance imaging (MRI)** – a strong magnetic field and radio waves are used to create a three-dimensional image of the urinary tract including the kidneys.

Biopsy

A biopsy means that a small piece of tissue is taken for testing in a laboratory. Biopsies used in the investigation of kidney disease may include:

- **Bladder biopsy** – the doctor inserts a thin tube (cystoscope) into the bladder via the urethra. This allows the doctor to view the inside of the bladder and check for abnormalities. This procedure is called a cystoscopy. The doctor may take a biopsy of bladder tissue for examination in a laboratory.
- **Kidney biopsy** – the doctor uses a special needle inserted into the back under local anaesthesia to obtain a small sample of kidney tissue. Ultrasound or CT may be used to guide the needle. The sample is sent to a laboratory for examination. A kidney biopsy can confirm a diagnosis of chronic kidney disease.

Other tests

The doctor may arrange other tests depending on the suspected cause of your kidney disorder.

Where to get help

- Your doctor
- Kidney Health Australia Information Line Tel. 1800 4 KIDNEY (543 639), TTY 1800 005 881

Things to remember

- Tests to diagnose kidney disease may include urine tests, blood tests, imaging studies and biopsy.

- The tests chosen by the doctor depend on factors including the person's symptoms, age, medical history, lifestyle and general health.
- In most cases, early diagnosis and prompt treatment can prevent a condition from worsening and reduce the risk of kidney failure.

This page has been produced in consultation with, and approved by:

Kidney Health Australia

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