

Don't be the type to leave it too late

Diabetes and your kidneys

People with diabetes have an increased risk of developing problems with their kidneys. Kidney disease can affect people with type 1 and type 2 diabetes.

Kidney disease is often without symptoms and in the early stages can only be detected through regular blood and urine tests. Microalbuminuria (minute leakages of protein in the urine) is an early indicator of kidney damage. If kidney disease is left untreated it can lead to kidney failure and can worsen other serious diabetes complications such as retinal (eye) disease, nerve damage and cardiovascular (heart) disease. Diabetes is the leading cause of end-stage kidney failure (ESRF); it is responsible for 25 percent of new cases of ESRF in Australia. However, through good management and regular screening this can be largely prevented.

How do the kidneys work?

The kidneys have four main functions:

- Acting as a filter - filtering waste products from the blood and removing via the urine.
- Making and controlling important hormones in the body - these hormones assist with maintenance of a healthy blood pressure, make red blood cells and help to strengthen bones.
- Removing extra fluid from the body.
- Balancing electrolytes (minerals and salts) in the body by removing excess fluids and salts via the urine.

How can diabetes affect the kidneys?

Raised blood glucose levels and elevated blood pressure over time can damage the delicate blood vessels and filters of the kidney (known as the glomeruli). This can cause leakage of protein into the urine. Protein in the urine is known as albuminuria. The Glomerular Filtration Rate (GFR) is the rate at which fluid is filtered through the kidneys and is used to measure of the level of kidney function. The GFR can be calculated based on a person's age, sex and body weight and blood creatinine level. The earlier kidney disease is detected the better the outcome for slowing any progression. In later stages, as kidney function declines, the GFR becomes too low, and the ability to remove wastes and electrolytes is affected.

Poorly controlled diabetes can cause an increase in urinary tract infections. This is due to the build up of glucose in the urine which promotes bacterial growth. Frequent infections can also damage the kidneys.

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Who's at risk of kidney damage?

Although 20 – 30% of people with diabetes will have some microalbuminuria, most people will not develop kidney failure. Kidney disease *can* be prevented or delayed. However, the risk increases with:

- **Persistently high blood glucose levels:** Well controlled blood glucose levels can prevent and delay the onset of kidney disease. **Duration of diabetes:** The risk of kidney disease increases with the duration of diabetes. Some people may have had type 2 diabetes for several years before it is diagnosed, so albuminuria may be present upon diagnosis.
- **Raised blood pressure (hypertension):** High blood pressure can cause damage to the kidneys. Raised blood pressure is often without symptoms. This can also lead to heart attacks, strokes and damage to the eyes if left untreated.
- **Age:** Over time our bodies become less efficient at filtering blood and waste products.
- **Ethnicity:** Aboriginal and Torres Strait Islanders, and people originating from Africa and the Indian subcontinent, have a higher incidence of diabetes, and risk for kidney disease. Hospitalisations due to kidney disease are many times higher in Aboriginal and Torres Strait Islanders than for other Australians.
- **Smoking:** Smoking causes narrowing of the arteries in the body. This includes the small vessels in the kidneys, resulting in reduced function.
- **Family history:** A family history of hypertension and/ or kidney disease increases the risk of developing damage to the kidneys.

How is kidney damage detected?

An annual GFR and urine test should be performed by your doctor to check for any signs of protein leakage in the urine. This should be the first urine of the day.

These tests include an Albumin Creatinine Ratio (ACR). The ACR results target aims are:

- Men ACR < 2.5 mg/mmol
- Women ACR < 3.5 mg/mmol

If there is any evidence of protein leakage in the urine, further tests are required to eliminate other sources of protein present in the urine, such as urinary tract infections. A 24 hour urine collection may also be required to check the amount of protein loss.

How to help protect your kidneys



**PREVENT type 2 diabetes
and AVOID kidney damage**

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Kidney disease is often silent, and people may have developed early stage damage to their kidneys without realising. It is never too late to start looking after yourself and your health. Regular screening by your diabetes team is essential for good management. Other important factors are:

- Good diabetes control: Aim for HbA1c of $\leq 7\%$ *
- Good blood pressure control: Current guidelines suggest target ranges $\leq 125/75$; weight reduction if carrying excess weight; exercise; reducing dietary salt intake and taking blood pressure medication are additional methods to assist a healthy blood pressure.
- Stop smoking. Ask your GP for information on QUIT line (137 848).
- Visit the diabetes team regularly. An annual urine and blood test is required.
- Medication: There are various medications which are prescribed to control high blood pressure. Long term studies indicate some medications have the additional benefit with slowing the progression of kidney disease. They may be prescribed to prevent kidney disease in the absence of raised blood pressure. These are known as:
 - Angiotensin-Converting Enzyme inhibitors (ACE inhibitors)
 - These include Captopril, Enalapril, Lisinopril, Quinapril, Trandolapril, Ramipril, Perindopril.
 - Angiotensin 2 Receptor Blockers (ARB)
 - These include Eprosartan, Losartan, Irbesartan, Candesartan, Telmisartan, Olmesartan, Valsartan.
- Monitor any signs of urinary tract infection or kidney infection. Symptoms include cloudy or blood in urine, more frequent urination and a burning sensation when passing urine.

*Unless recommended otherwise by your diabetes team.

Further information

- www.diabetesvic.org.au
- Kidney Info Line freecall 1800 4 KIDNEY (1800 4 543639)
- www.kidney.org.au