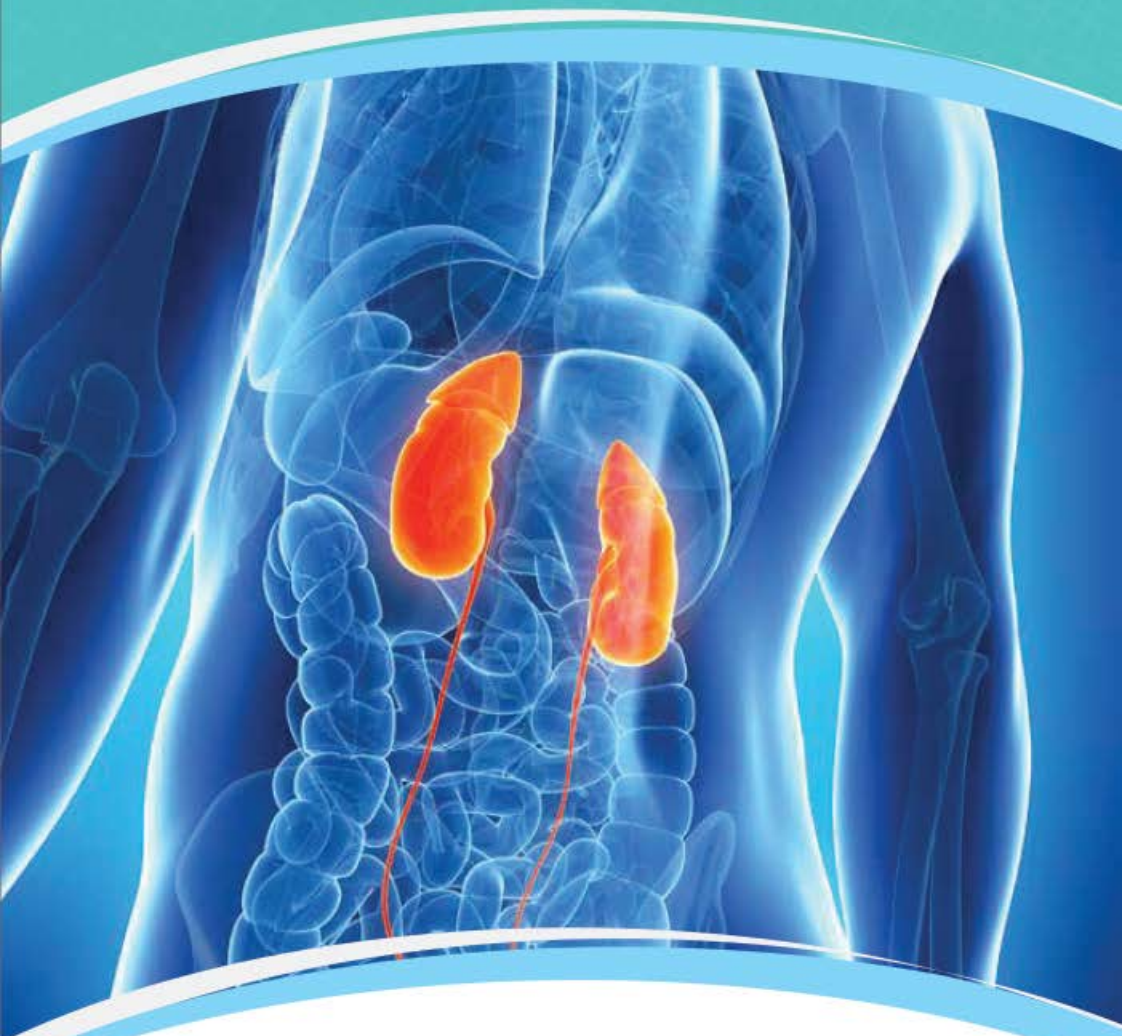


Department of Renal Medicine

# Chronic Kidney Disease



Singapore  
General Hospital  
SingHealth

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## 1. Objective of Chronic Kidney Disease Education

- To help you and your family understand your current kidney condition and treatment as recommended by your doctor
- To help slow down chronic kidney disease progression

## 2. What do Kidneys do?

- Excrete waste products
- Remove excess fluid
- Control blood pressure
- Encourage production of red blood cells
- Keep your body chemicals in balance

## 3. What is Chronic Kidney Disease (CKD)?

Chronic kidney disease includes conditions that damage kidneys or reduce the function of the kidneys.

## 4. What are the causes of Chronic Kidney Disease (CKD)?

- ***Diabetes Mellitus***

Diabetes Mellitus is a disease of high blood sugar levels which can cause damage to many organs in your body, including the kidneys, heart, blood vessels, nerves and eyes. Diabetes is the most common cause of End Stage Kidney Disease.

- ***Glomerulonephritis***

Glomerulonephritis, a group of diseases that cause inflammation and damage to the kidney & filtering units. These disorders are the second most common type of kidney disease that causes End Stage Renal Disease.

- **Hypertension**

High blood pressure damages the blood vessels in the kidneys and reduces the blood supply to the kidneys.

- **Systemic Lupus Erythematosus (SLE)**

SLE is a disorder where abnormal antibodies are formed against the body's own tissues. The inflammation subsequently leads to damage of various organs in the body, including the kidneys.

- **Polycystic Kidney Disease (PKD)**

PKD is an inherited disease in which the kidneys are enlarged because of presence of cysts.

- **Obstruction**

Obstruction may be caused by problems such as kidney stones, growths or an enlarged prostate gland in men. Stones can form anywhere along the urinary tract. The kidneys can be damaged due to the pressure of urine back flow or infection.

Early detection and treatment can often keep Chronic Kidney Disease from getting worse. When kidney disease progresses, it may eventually lead to kidney failure and will require dialysis or a kidney transplant to maintain life.

## 5. What are the symptoms of Chronic Kidney Disease (CKD)?

Most people may not have any symptoms until their kidney disease is advanced. Many without symptoms are picked up by routine screening at health checks.

In advanced disease, you may :

- feel more tired and have less energy
- have trouble concentrating
- have a poor appetite

- have nausea and vomiting
- have trouble sleeping
- have muscle cramps at night
- need to urinate more often, especially at night.
- have dry, itchy skin
- have swollen feet and ankles
- have puffiness around your eyes, especially in the morning
- have breathlessness

## **6. What are some of the common complications you may experience?**

- Accumulation of toxin
- Fluid overload
- Bone disease and high phosphorus
- Anemia
- High potassium ( Hyperkalemia)

## **7. Screening of Chronic Kidney Disease (CKD)**

This is recommended in high risk persons such as

- Elderly
- History of hypertension, diabetes and cardiovascular disease
- Family history of chronic kidney disease

## **8. What is Glomerular Filtration Rate (GFR)?**

Glomerular Filtration Rate is the best test to measure your level of kidney function and determine your stage of kidney disease.

The earlier kidney disease is detected, the better the chance of slowing or stopping its progression.



## 5 Stages of Chronic Kidney Disease

Stage	1	2	3	4	5
GFR	> = 90	60 - 89	30 - 59	15 - 29	< 15
Description	Kidney disease with normal GFR	Kidney disease with mild decrease in GFR	Kidney damage with moderate decrease in GFR	Kidney damage with moderate decrease in GFR	Kidney Failure
Treatment	Observation, Control of Blood Pressure and Risk Factor	Observation, Control of Blood Pressure and Risk Factor	Observation, Control of Blood Pressure and Risk Factor	Observation, Control of Blood Pressure and Risk Factor. Planning for Renal Replacement Therapy	Dialysis or Kidney Transplant is needed

### 9. Why is it necessary to slow down the progression of chronic kidney disease?

- Prevent end stage kidney failure and the need for dialysis or transplantation.
- Reduce the complications associated with advanced kidney disease such as heart disease and stroke.

### 10. How can we slow down the progression of kidney disease?

- Good blood pressure control
- Good blood sugar control
- Eating the right amount of protein and sodium as advised by a dietitian
- Take medications as prescribed by your renal doctor for kidney protection regularly. Try not to skip doses. Discuss with your doctor if you are having problems with any medications. Adjustments can usually be made.
- You should update your doctors on your kidney condition and to avoid substances that can further damage the weakened kidneys.

- Medication such as Non steroidal Anti-inflammatory drugs (NSAIDs) commonly used as painkiller eg. Ibuprofen, mefenamic acid
  - Certain antibiotics (mostly injectable type)
  - X-ray Contrast which is commonly used during CT scan or angiography (ballooning) procedures
- f. Avoid or manage infection through
- Receiving vaccinations as recommended by the Ministry of Health
  - Practise good health hygiene
  - Prompt treatment of any infection by seeing a doctor

#### Lifestyle Modification important for a patient with CKD

##### i. Regular exercise can

- Help insulin to work better and lower your blood sugar and the need for large amount of diabetic medication
- Lower the blood pressure and cholesterol levels
- Improve general fitness and circulation
- Reduce body fat and weight

##### ii. Quitting smoking can

- Reduce risk of heart attack
- Reduce blood pressure and improve circulation
- Have additional benefits such as reducing the risk of smoking-associated lung cancer

ii. Eating the right amount of protein, sodium, potassium or phosphorus may help control the buildup of waste and fluid in your blood.

A dietitian can help you understand more in this aspect.

## Your Results

Date: \_\_\_\_\_

Tests	Results	Why Is It Important	Treatment
Estimated Glomerular Filtration Rate (eGFR)	Your eGFR: _____	Serum Creatinine is used for calculation of GFR. As disease gets worse, the creatinine goes up and the eGFR goes down.	Dialysis is required when patient is CKD stage 5.
	CKD Stage _____		
Serum Creatinine	Normal: Male: 54-101umol/L Female: 37-75umol/L	Urea measures the amount of waste product in your blood.	Dialysis is required when patient is CKD stage 5.
	Your result:		
Urea	Normal: 2.7- 6.9mmol/L	uPCR checks for kidney damage. The lower the result, the better.	Your doctor may ask you to control your protein intake, which can be divided into two sources namely Animal: Meat, poultry, fish, eggs and dairy products. Plant: Vegetables, grains, beans and legumes. This may help to reduce protein waste from building up in blood and lessen the workload on the kidneys. Your doctor may prescribe medication to reduce this level.
	Your result:		
Urine Protein-to-Creatinine Ratio (uPCR)	Normal: Less than 0.15 g/day		
	Treatment goal: At least less than 1g/day		
	Your result:		



Tests	Results	Why Is It Important	Treatment
Haemoglobin (Hb)	Goal : More than 10g/dL	Low Hb is a sign of anemia. You may feel tired and giddy if you have anemia.	Your doctor will assess for iron deficiency and may prescribe Erythropoietin injection.
	Your result:		
Ferritin	Goal : > 100ug/L	These markers measure iron content which may be reduce due to poor appetite. Iron is needed for production of red blood cells. Poor iron absorption lead to anemia. You may feel tired, short of breath, easily feeling cold if you have anemia.	Your doctor may prescribe Iron supplement. It may cause constipation and darken the stools. Ensure adequate fibre intake which may help with your constipation. To take Iron tablets when the stomach is empty – half to one hour before. Iron tablets may be taken after meal if stomach upset occurs.
	Your result:		
Transferrin Saturation	Goal : < 20%		
	Your result:		
Triglycerides	Normal : Less than 1.7 mmol/L	Triglyceride is a type of fat in the blood.	Your doctor may prescribe cholesterol-lowering medication. Choose healthier cooking method such as steaming, baking, grilling, etc instead of deep frying. Use healthier cooking oil for cooking, such as oil higher in unsaturated fatty acids.
	Your result:		
LDL Cholesterol	Normal : Less than 2.6 mmol/L	LDL is the bad cholesterol and can clog your arteries.	
	Your result:		

Tests	Results	Why Is It Important	Treatment
Potassium	Normal: 3.6 - 5.0 mmol/L	Potassium is an essential mineral found in most foods which helps your muscles to work properly and helps to keep your heartbeat regular. Too much or too little potassium in the blood can be harmful	Your doctor will advise you to restrict potassium intake if your blood potassium is not within the acceptable range. Examples of high potassium foods include certain fruits such as bananas, jackfruit, durian, dried fruits. Certain vegetables such as potato and spinach.
	Your result:		
Bicarbonate	Normal: 19- 29 mmol/L	As kidney disease progresses, acid will accumulate. It can cause fatigue, nausea and vomiting.	Be aware of protein intake. Your doctor may prescribe you with medication.
	Your result:		
Blood Pressure	Goal: Less than 130/80mmHg	High blood pressure makes the heart work harder and can damage blood vessels in the kidneys. When your kidneys do not work well, too much sodium may affect water balance in the body. This may result in high blood pressure and swollen limbs.	Your doctor may prescribe medications to help control the blood pressure and get rid of excess fluid. Sodium is a mineral and is found naturally in most foods as salt. Aim: Sodium intake & 2gm/day Examples of high sodium foods include seasoning cubes, salt, canned and preserved food.
	Your result:		

Tests	Results	Why Is It Important	Treatment
Calcium	Normal: 2.09 - 2.46 mmol/L	Calcium keeps your bones strong and your heart rhythm steady. CKD can lower the amount of calcium in your bones.	Depending on your blood test result and kidney function, your doctor may advise you to reduce your phosphorus intake and / or prescribe phosphate binders to be taken with your meals. Examples of high phosphorus foods include milk and dairy products, organ meats, dried beans, lentils and nuts.
	Your result:		
Phosphate	Normal: 0.94 - 1.5 mmol/L	Phosphorus is important for strong bones and healthy blood vessels. High levels can cause soft bones, hard blood vessels and itchy skin.	
	Your result:		
HbA1c (for Patients with diabetes)	Goal: Less than 7%	HbA1c estimates average blood sugar levels over 2 to 3 months.	
	Your result:		

## Notes :

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### References

- [www.nkdep.nih.gov](http://www.nkdep.nih.gov)
- [http://www2.kidney.org/professionals/KDOQI/guidelines\\_anemia/](http://www2.kidney.org/professionals/KDOQI/guidelines_anemia/)

### Recommended Website

- <https://www.sgh.com.sg/patient-care/conditions-treatments/chronic-kidney-disease>
- <https://www.sgh.com.sg/patient-care/conditions-treatments/kidney-dialysis>
- <https://nkfs.org/your-guide-to-kidney-health>
- <https://www.kdf.org.sg/brochures>



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Information correct as at (jul) (2022)