STAGES 1-5

Chronic Kidney Disease:

What you need to know

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Contents

People are usually born with two kidneys. Sometimes, people are born with just one. As long as a person has at least one kidney that's working well, they can be healthy and live a normal life.

Each kidney is about the size of your fist. They are located near the middle of your back, just below the rib cage. Healthy kidneys do many important jobs. They remove waste products and extra water from your body and help:

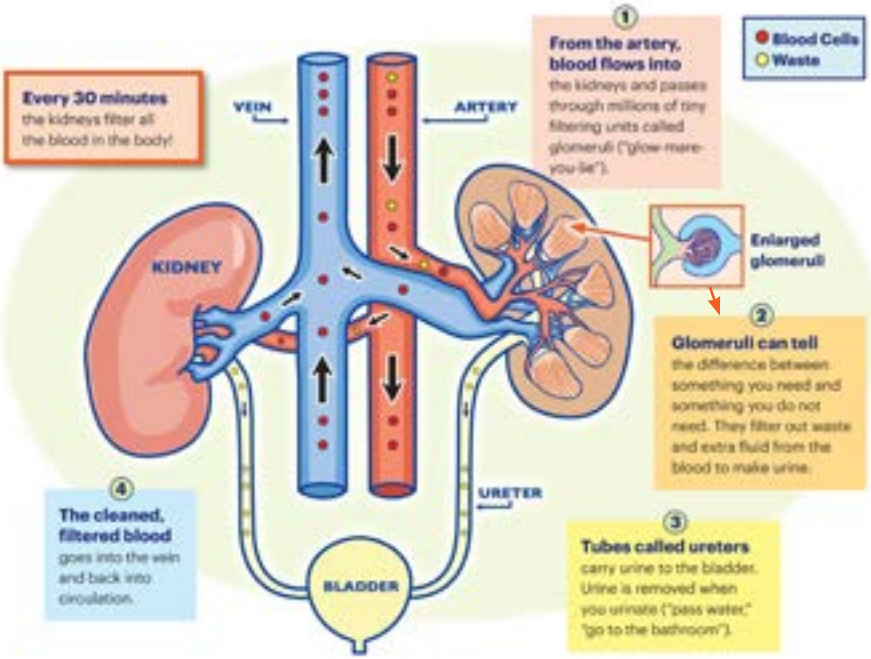
- Control blood pressure
- Make red blood cells
- Keep bones healthy

Healthy Kidneys

Think of your kidneys as a coffee filter. When you make coffee, the filter keeps the coffee grounds on one side and allows water to pass through. Your kidneys work as a filter in a similar way. They keep the things you need inside your body and filter out things you don't need.

Kidneys remove wastes and extra fluid from your blood in the form of urine (pee). The urine flows through two tubes, called ureters, to the bladder.

Urine is stored in the bladder until you urinate (pee in a toilet). Your urine contains waste products from the breakdown of what you eat and drink, the medications you take, and normal muscle activity.



Chronic kidney disease (CKD) happens when your kidneys are not filtering your blood well enough. CKD does not happen overnight. Usually, the disease develops slowly and in stages.

Most people in the early stages do not have any symptoms. They may not know that anything is wrong. That's why it's important that CKD is found and treated as early as possible so the disease can be slowed down or stopped from getting worse.

If CKD does get worse, high levels of waste can get into your blood and make you feel sick. You may also start to have other health problems like high blood pressure, a low red blood cell count (anemia), weak bones, not enough nutrition, and nerve damage. There is also a higher chance of developing heart and blood vessel diseases.

Untreated CKD can lead to kidney failure. People with kidney failure need a kidney transplant or dialysis to stay alive. A kidney transplant uses a healthy kidney from someone else to do the work that the damaged kidneys no longer can. Dialysis is a treatment that uses a machine or other equipment to filter the blood.

CKD Risk Factors

Anyone can develop CKD at any age. However, there some people are more likely than others to develop it. Key risk factors include:

- Dibetes
- High blood pressure
- Heart disease and heart failure
- A family history of CKD or kidney failure
- Being age 60 or older
- Obesity

Usually, developing kidney disease is not because of any single reason, but due to a number of physical, environmental, and social factors.

Causes of CKD

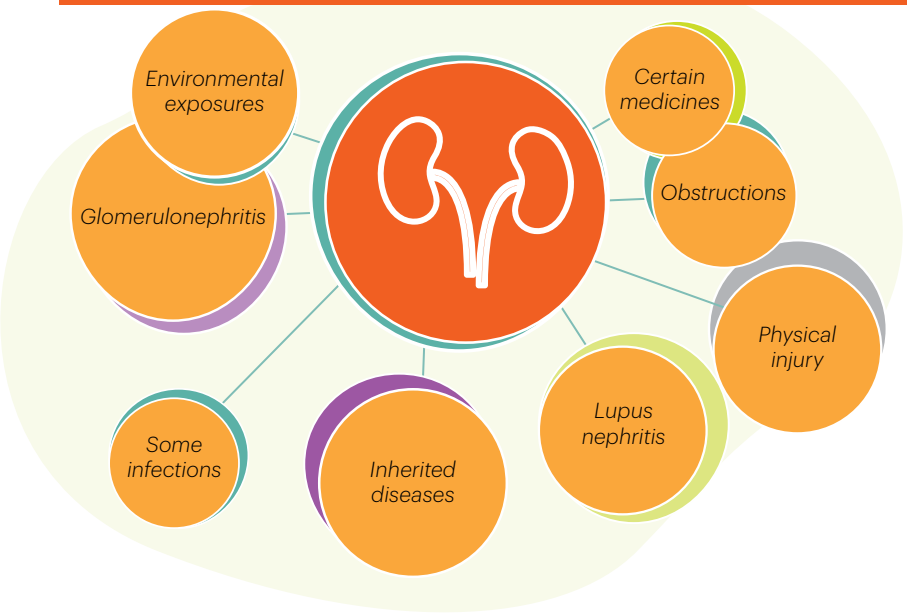
The two most common causes of CKD are:

- **Diabetes:** a disease that develops when blood sugar gets too high. Diabetes can cause damage to many organs and muscles in the body, including the kidneys, heart and blood vessels, nerves, and eyes.
- **High blood pressure:** a condition that occurs when the pressure of blood against the walls of blood vessels is high. If high blood pressure is not controlled, it can cause:
  - » CKD
  - » heart attacks
  - » strokes

Some medical conditions and other factors can also cause damage to kidneys. These include:

- **Environmental exposures** to toxic elements and chemicals including lead, mercury, asbestos, and formaldehyde.
- **Glomerulonephritis** ("glom-air-you-low-ne-fry-tis"), which is a group of diseases that hurt the filtering parts of kidneys.
- **Inherited diseases**, like polycystic ("pol-ee-sis-tic") kidney disease, which makes cysts (lumps, usually filled with fluid) in the kidneys.
- **Lupus nephritis** and other diseases that affect the body's immune system.

Causes of Kidney Damage



- **Obstructions** such as oddly-shaped ureters, kidney stones, tumors (abnormal body tissue growth), or an enlarged prostate gland.
- **Some infections,** *which include urinary tract infections (UTIs) that keep coming back*
- **Certain medicines including some:**
  - » Over-the-counter pain and fever medicines, which are called non-steroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (Advil®, Motrin®) or naproxen (Aleve®)
  - » Contrast dyes used in X-rays
  - » Bowel cleaning products
- **Physical injury** to the kidneys

CKD Symptoms

Most people with early-stage CKD do not have symptoms. In the later stages of CKD, you may:

- Feel tired or short of breath
- Have trouble thinking clearly
- Not feel like eating
- Have trouble sleeping
- Have dry, itchy skin
- Have muscle cramping at night
- Need to go to the bathroom more often, especially at night
- Have swollen feet and ankles
- Have puffiness around your eyes, especially in the morning

CKD Testing

Regular testing for CKD is a good idea, especially if you have any symptoms or have a higher chance of developing the disease. There are two simple tests to check for CKD:

- **Urine test:** Urine albumin-to-creatine ratio (uACR) is a test to check if a protein called albumin is in your urine. Your body needs albumin. But it should only be in your blood, not your urine.

  If you have a small amount of albumin in your urine, this may mean your kidneys are not filtering your blood well enough and can be an early sign of CKD. Having albumin in your urine is a medical condition called *albuminuria*.

- **Blood test:** To check the level of creatinine, which is a normal waste product the body makes. Creatinine comes from muscle tissue. When the kidneys are damaged, they have trouble removing creatinine from your blood.

  But testing for creatinine is only the first step. Your creatinine lab results – combined with other information, such as your age and gender – are used to calculate your estimated glomerular filtration rate (eGFR). Your eGFR number lets your healthcare provider know if your kidneys are working well.

You should also get your blood pressure checked regularly. Having high blood pressure makes your chances of developing CKD higher. Regular checkups with your healthcare provider are important so you can find out if you have high blood pressure. Getting treatment for high blood pressure can help to prevent or stop CKD from getting worse.

Other Kidney Tests

If you are diagnosed with CKD, your healthcare provider may want you to take some additional tests before making recommendations for treatment. Your healthcare provider may ask that you also get these tests:

- **Ultrasound or CT scan,** which shows a picture of your kidneys and urinary system. These pictures show the size of your kidneys. Tumors, kidney stones, or cysts can also be seen on a scan.
- **Biopsy** to remove a tiny piece of kidney tissue, which is then sent to a lab. The sample is looked at under a microscope to:
  - » Learn the cause of the kidney damage
  - » See how much damage has happened
  - » Help develop a treatment plan

CKD Treatments

Your healthcare provider may suggest some treatment recommendations. Often, CKD treatment is combined with recommendations you may have received for other medical conditions, including:

- **Anemia (low red blood cell count),** which is common in people with CKD. Healthy kidneys help your body make red blood cells. If you have CKD, your kidneys may not be able to do this very well and you may develop anemia. Medications called erythropoiesis-stimulating agents (ESAs) and iron supplements are used to treat anemia.
- **Controlling blood sugar** if you have diabetes. The best way to prevent or slow kidney damage is to keep your blood sugar well-controlled. This is usually done with diet, exercise, and, if needed, insulin or hypoglycemic medications.
- **Exercise program** that has been approved by your healthcare provider.

- **High blood pressure,** which can make your CKD worse. There are medications that can help control high blood pressure and keep it in the normal range. Your healthcare provider may also recommend using less salt and increasing physical activity.
- **High cholesterol,** which may be managed with diet and medication. Many people with CKD have high cholesterol levels in their blood. High blood cholesterol increases your risk for heart disease.

  Most likely, your healthcare provider will check your cholesterol levels at least once a year. If they are higher than normal, medication (along with nutritional and physical activity support) may be recommended to help lower them.

- **Kidney function protection,** such as taking blood pressure medications including ACE inhibitors or ARBs even if your blood pressure is normal. Research suggests these medicines can slow the loss of kidney function in some people—even in people with normal blood pressure.
- **Mineral and bone disorders**, which can make arteries (major veins) become hard and narrow due to having too much calcium and phosphorus in your blood. The damage to the arteries slows the blood flow to the heart and can lead to heart attack and death.

  Mineral and bone disorders are usually treated with medications. Your healthcare provider may also recommend that you eat fewer foods that contain phosphorus (typically dairy products, nuts, seeds, dried beans, and peas).
- **Weight management**, with diet and exercise.

In addition, it's important to regularly track your kidney health by checking your:

- **eGFR and uACR** to make sure your CKD is stable.
- **Nutritional health** to ensure you are getting enough protein and calories in your diet. Your healthcare provider may recommend that you follow a diet lower in protein. If so, you may need extra calories from other foods. A kidney dietitian can help you plan your meals so you can eat the the right foods in the right amounts.

Keeping CKD Stable

It may be possible to slow down or even stop CKD from getting worse. How well your treatment works will depend on:

- Your stage of CKD when you start treatment. The earlier you start, the better off you are.
- How carefully you follow your treatment plan. Learn all you can about CKD and treatment for it. Make sure to follow all the steps of your treatment.
- The cause of your CKD. Some kinds of CKD are more difficult to control.

Coping with CKD

Learning that you have CKD can be hard. But you do not need to face it alone. Your healthcare team will help you. You may also find it helpful to speak to other people who have CKD.

Learn all you can about CKD and its treatment. Knowing what to expect and what you can do to help yourself is important. You may feel better knowing you are in control of your disease.

Kidney Failure

If CKD gets worse, it can lead to kidney failure. Stage 5 CKD, also known as kidney failure, means your kidneys no longer work well enough to keep you alive. There is no cure for kidney failure. But there are treatments to replace the work of your kidneys.

Kidney Failure Treatments

There are two treatments for kidney failure–dialysis and kidney transplantation.

- **Dialysis** is a treatment that removes wastes and extra water from your blood. Two types of dialysis are available: hemodialysis and peritoneal dialysis.
- **Kidney transplantation** is an operation that places a donated kidney inside your body. The new kidney will take over the work of your original kidneys.The new kidney may come from a living donor or someone who died and wanted to be an organ donor.

Your healthcare team can discuss dialysis options and kidney transplantation with you and answer all your questions. They can help you decide which option is best for you based on your overall health, lifestyle, and the kind of treatment you prefer.

You can also call the NKF Cares Patient Help Line toll-free at **855.NKF.Cares (855.653.2273).**

Key Points To Remember

- Healthy kidneys do many important jobs. They remove waste products and extra water from your body, help your body make red blood cells, help control blood pressure, and keep your bones healthy.
- When you have CKD, your kidneys slowly lose the ability to do the important jobs that keep you healthy.
- The leading causes of CKD are diabetes and high blood pressure.
- If you have any CKD risk factors, get tested so you can start treatment sooner.

- There are two simple tests to diagnose CKD:
  - **uACR**–a urine test check for protein (albumin)
  - **eGFR**–a blood test to estimate GFR
- If you have CKD, treatment may include:
  - Taking medications
  - Restricting salt
  - Limiting certain foods
  - Increasing physical activity
- Finding and treating CKD early can help slow or even stop the disease from getting worse.
- If you have CKD, learn all you can about it. You are the most important member of your healthcare team. Carefully following your treatment plan can help your overall health over time.
- CKD that gets worse can lead to stage 5 CKD, also known as kidney failure.
- People with kidney failure must either go on dialysis or have a kidney transplant to stay alive.

Test Your Knowledge:
Take this True or False quiz

1. Kidneys only remove wastes and extra fluid from the body. True____ False____
2. People with diabetes or high blood pressure have a higher risk of developing CKD. True____ False____
3. People in the early stages of CKD have a lot of symptoms. True____ False____
4. Taking a lot of over-the-counter pain medications can lead to developing CKD. True____ False____
5. CKD can be diagnosed with a blood and urine test. True____ False____

6. Early detection and treatment may keep CKD from getting worse. True ___ False ___
7. Protein in the urine for less than 3 months is a sign of CKD. True ___ False ___
8. The best way to know how well your kidneys are working is to know your eGFR. True ___ False ___
9. Anemia and mineral and bone disorders are common in people with CKD. True ___ False ___
10. People with CKD have a low risk of getting heart disease. True ___ False ___

Answers

1. False 2. True 3. False 4. True 5. True 6. True 7. False 8. True 9. True 10. False

CKD Glossary

A1C: A simple blood test used to:

- Diagnose diabetes
- Measure how well your diabetes is being managed by averaging blood sugar levels every 2 to 3 months

Albumin: A type of protein that is in the blood. It is not normally in the urine. When it's found in the urine, it means there may be a problem with the kidneys.

Anemia: A condition where the body does not have enough red blood cells. It is detected by low levels of hemoglobin. Hemoglobin is a substance that brings oxygen to all parts of your body.

Blood glucose meter: A simple test that you do yourself, usually several times a day. It measures your blood sugar level at any time.

Blood pressure: A measure of the force of blood pushing against the walls of your blood vessels. High blood pressure happens when the pressure increases enough to cause damage. Treatment is important because high blood pressure increases your risk for heart and blood vessel disease.

Calcium: A mineral in the blood that is important for strong bones and teeth. People with CKD can develop bone and mineral disorders due to abnormal calcium levels. Testing your calcium level helps your health-care provider evaluate if you have mineral or bone disorders and need treatment.

Cholesterol:

- ***Total cholesterol:*** A fat-like substance in your blood. High cholesterol levels may increase your risk of having heart and circulation problems. However, a cholesterol level that is too low may mean you are not eating well enough to stay healthy.
- ***HDL cholesterol:*** Also known as a *good* type of cholesterol that helps to protect your heart.
- ***LDL cholesterol:*** Also known as a bad type of cholesterol. A high LDL level may increase your chance of having heart and blood vessel problems. If your LDL level is too high, your healthcare provider may recommend changing your diet, doing more physical activity, and possibly medication.
- ***Triglycerides:*** A type of fat found in the blood. A high triglyceride level, along with high levels of total and LDL cholesterol, may increase your chance of having heart and blood vessel problems.

Chronic Kidney Diease-Mineral And Bone Disorder (CKD-MBD): A condition that causes problems in the strength of your bones and the amount of minerals (like calcium) in your body. It can also affect hormones and blood vessels.

Creatinine clearance: A urine test that measures kidney function. Creatinine clearance below 15 indicates stage 5 CKD, which is also called kidney failure.

Dialysis: A treatment for kidney failure. Dialysis takes over for kidneys that are not working. It cleans wastes from the blood using a machine or other special equipment.

eGFR: A simple blood test that uses a calculation to estimate kidney function.

Glucose: A type of sugar found in the blood. When someone has diabetes, the blood glucose levels can be too high. This can damage the kidneys.

Hemoglobin: The part of red blood cells that carries oxygen from the lungs to all the tissues in the body. If your hemoglobin is too low, you have anemia, which can make you feel tired and have little energy.

Hormones: The chemical *messengers* made by organs that carry *messages* to many parts of the body. The kidneys make three important hormones and send *messages that affect* red blood cells, blood pressure, and bones.

Iron: A mineral that helps the body make red blood cells and a substance called hemoglobin, which helps carry oxygen from the lungs to different parts of the body.

Phosphorus: A mineral in the blood that helps keep cells and bones healthy. A high phosphorus level can lead to weak bones. People with CKD need to have their phosphorus levels checked so imbalances can be treated early.

Potassium: A mineral in the blood that helps your heart and muscles work properly. People with kidney disease should ask their healthcare provider if they

need to eat foods low in potassium. A potassium level that is too high (hyperkalemia) or too low (hypokalemia) can be harmful and should be treated.

Serum (blood) creatinine: A normal waste product in your blood that comes from the work done by your muscles. Healthy kidneys remove creatinine from your blood, but when kidney function slows down, creatinine levels rise. The amount of creatinine in your blood is used to calculate your estimated glomerular filtration rate (eGFR).

Subjective global assessment (SGA): An assessment used to check for signs of nutrition problems. Kidney dietitians review personal information including your diet, weight, and the fat and muscle stores in your face, hands, arms, shoulders, and legs to evaluate the nutritional needs of people on dialysis and people who have had kidney transplants.

Urine albumin: A type of protein made from the food you eat each day. It is normal for albumin to be in blood but it should not be in urine (pee). You may have CKD if albumin is found in urine for 3 months or more. Two commonly used tests for urine albumin are:

- ***Urine albumin-to-creatinine ratio (uACR):*** compares the amount of albumin to the amount of creatinine in a single urine sample. When kidneys are healthy, the urine will contain large amounts of creatinine but almost no albumin. Even a small increase in the ratio of albumin to creatinine for 3 months can be a sign of kidney damage.

- ***Albumin-specific dipstick:*** detects albumin in a single urine sample. Results can be positive or negative. A positive result means there is albumin in the urine. People with a positive dipstick result should have a uACR test.

Ureters: The tubes that carry urine from the kidneys to the bladder.

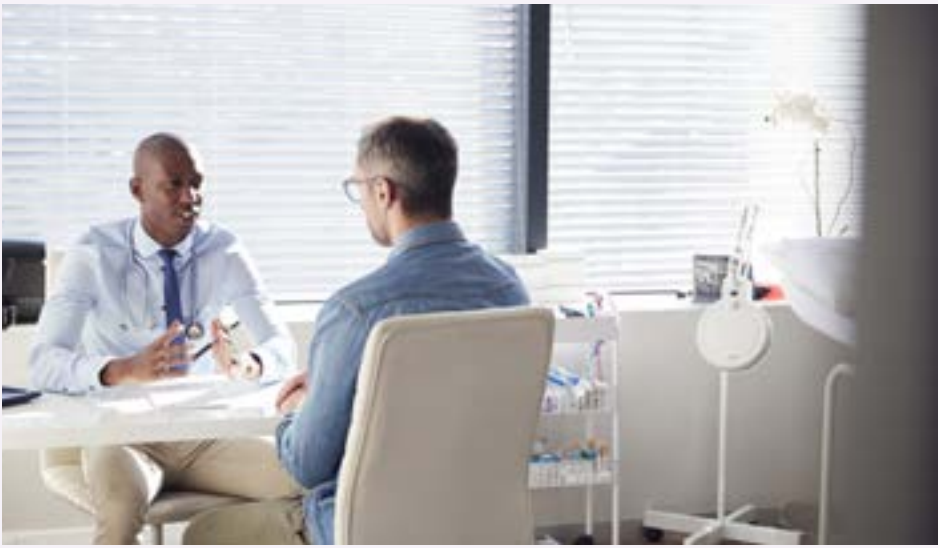
Vitamin D: A vitamin that absorbs calcium from food and sends to your bones. Kidneys take the vitamin D you get from sunlight and food and turn it into an *active* form that your body can use. When your kidneys aren't working well, they may not make enough vitamin D to keep your bones healthy and strong.

Weight: Maintaining a healthy weight is important to your overall health. A sudden weight gain or loss may be concerning. Speak to your healthcare provider if your weight changes suddenly.

Setting a Standard for Care

The National Kidney Foundation, through its *Kidney Disease Outcomes Quality Initiative* (KDOQI®), defines stages of kidney disease and offers guidelines that help your doctor and healthcare team make important decisions about your medical treatment.

The information in this booklet is based on those recommended guidelines.



The information contained in this publication is based on current data and expert guidance available at the time of publication. The information is intended to help patients become aware of their disease and its management. This publication is not intended to set out a preferred standard of care and should not be construed as one. Neither should the information be interpreted as prescribing an exclusive course of management. Patients should always consult with their healthcare providers regarding decisions about their individual plan of care.

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The National Kidney Foundation is revolutionizing the fight to save lives by eliminating preventable kidney disease, accelerating innovation for the dignity of the patient experience, and dismantling structural inequities in kidney care, dialysis, and transplantation.

30 E. 33RD ST. | NEW YORK, NY 10016 | 800.622.9010

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