

*Talk with your physician if you have questions or concerns.*

## Chronic Kidney Disease

If you have kidney (renal) disease, your kidneys no longer work as well as they should. This can seriously affect your health. It usually happens over time and may lead to kidney failure. If found early, it is possible to slow down or even stop kidney disease from getting worse. This handout explains:

- Kidney function
- Chronic (long-term) kidney disease
- Risk factors
- Symptoms
- Testing and staging
- Care and treatment

### Kidney function

Your kidneys are on the right and left sides of your back, below your ribs. Normal kidney function includes:

- Removing waste and extra fluid from the blood
- Regulating certain chemicals and hormones in the blood
- Helping to manage blood pressure
- Helping to make red blood cells
- Helping to keep bones healthy

Your kidneys act as filters. They keep important things inside your body and remove what is not needed (waste). Wastes are byproducts of what you eat and drink, including the medications you take. Wastes also come from normal body functions, such as muscle activity.

Normally, your kidneys filter the waste and extra fluid out from your blood into urine. The urine flows down from the kidneys through 2 tubes called ureters into your bladder. Your bladder stores the urine until you pass it when you urinate.

### Chronic kidney disease

When the kidneys do not work well, blood pressure, fluids and waste products can rise to unsafe levels. Examples of waste products in the blood include urea and creatinine. Certain elements (electrolytes) in your blood, such as potassium and phosphorus, may also rise to dangerous levels if your kidneys cannot remove them. Other changes can lead to low red blood cell counts in your blood (anemia). Over time, your bones may become weak and prone to break (osteoporosis). Chronic kidney disease may increase your risk of heart disease.

## Risk factors

Kidney disease may have many different causes. Medical problems that increase the risk of getting kidney disease include:

- Diabetes
- High blood pressure
- Kidney infections (such as glomerulonephritis)
- Recurring bladder infections
- Diseases of the immune system (such as lupus)
- Polycystic kidney disease (or other inherited diseases of the kidneys)
- Blockages in the urinary tract (caused by kidney stones or tumors, unusually shaped ureters, or an enlarged prostate)

Managing these conditions may also help manage kidney disease.

Other risk factors include:

- Being older than 60 years old
- Having used certain medications or drugs that affect kidney function over time
- Being Black, Hispanic, Asian, American Indian or Pacific Islander

The more risk factors you have, the greater the chance of getting kidney disease.

## Symptoms

In the early stages of chronic kidney disease, there may be no symptoms. Therefore, it important to have regular checkups that can test your kidney function. In the later stages, symptoms may include:

- Feeling tired or fatigued
- Shortness of breath or trouble breathing
- Loss of appetite
- Trouble sleeping
- Dry, itchy skin
- Muscle cramping, especially at night
- Frequent urination, especially at night
- Swollen ankles and feet
- Puffiness or swelling around the eyes, especially after waking up
- Numbness, tingling or other signs of nerve damage

## Testing for kidney disease

Tests can help your care team find the cause of kidney disease. The physician uses the results to plan the best care or treatment. Tests may include:

- Renal ultrasound (US)
- Computerized tomography (CT) scan
- Biopsy
- Blood and urine tests

A US or CT scan will show what the kidneys and urinary system look like. They can show if the kidneys have an unusual size or shape. They will also show if there are any tumors, cysts or stones.

For a biopsy, the physician takes a tiny sample of the kidney tissue for special testing. This will show any changes that are happening to the kidney and how severe they may be.

## Blood and urine tests

Regular testing is important for tracking kidney function. This section explains common tests and what they mean.

### ***Blood tests***

Blood tests are routine. They show the levels of many blood components that may affect health and kidney function. Some of these include red blood cells, electrolytes, cholesterol and waste products such as creatinine. Blood test results help your care team plan care to keep you as healthy as possible. Blood tests include:

- **Creatinine.** This shows how well the kidneys are working. Creatinine is a normal “waste” product. If the kidneys cannot remove it in the urine, it builds up in the blood. The lab uses the creatinine level to calculate GFR.
- **Glomerular filtration rate (GFR).** GFR measures kidney function. The lab calculates a glomerular filtration rate (GFR) from the blood test results. The physician uses it to stage the degree of kidney disease. The worse the kidney disease, the lower the GFR. If the GFR is between 15 and 30, the physician may recommend treatment options. This includes diet, medication and other ways to prevent your kidney function from getting worse. If the GFR falls below 15, a physician may recommend other treatments such as dialysis or a transplant.
- **Potassium.** Potassium is important to keep the heart and muscles working correctly. In kidney disease, potassium may build up to dangerous levels. Treatment may include following a special diet to keep your potassium levels balanced.
- **Phosphorus.** Along with calcium, phosphorus helps keep your bones healthy. In kidney disease, phosphorus builds up in the blood. It may cause your bones to weaken. Diet or medication may help keep phosphorus levels in the right balance.
- **Calcium.** Calcium levels will show if there is a mineral or bone disorder.

- **Cholesterol.** A low total cholesterol level may mean a person is not eating well enough to stay healthy. There are 2 types of cholesterol:
  - High density lipoprotein (HDL) is the "good" cholesterol. A high HDL protects your heart against heart disease.
  - Low density lipoprotein (LDL) is the "bad" cholesterol. A high LDL may increase your risk of heart disease. If the level is high, changing your diet and being more active may help.
- **Triglyceride.** This is a type of "bad" fat. High levels increase your risk of heart and blood vessel disease.
- **Hemoglobin.** Hemoglobin in red blood cells (RBCs) carries oxygen to the body. A low hemoglobin level is a sign of anemia. You may feel weaker or more tired than usual. Treatment may include taking iron or a medication called an erythropoiesis stimulating agent (ESA).
- **Iron.** Transferrin saturation (TSAT) and ferritin levels are 2 ways to measure the iron in your body. If blood levels are low, you may be anemic and need to take extra iron.
- **Parathyroid hormone (PTH).** The PTH level shows the balance between calcium and phosphorus in your body. This is important for bone health. If PTH levels are low, your physician may prescribe supplements.
- **Vitamin D.** Vitamin D helps your body use calcium to keep bones healthy. People with kidney disease may need special supplements. Do not buy vitamin D without a prescription if you have kidney disease
- **A1C.** A1C is a test for diabetes. It shows how well diabetes is managed.

### ***Urine tests***

Urine tests show how well the kidneys filter protein or creatinine.

- **Creatinine clearance.** This test measures how much creatinine is in the urine. If it is less than 15 mL/min, the physician may recommend treatments such as dialysis or transplant.
- **Urine albumin.** Healthy kidneys filter the urine to keep the albumin (a protein) in the body. Albumin in the urine for 3 or more months is likely a sign of kidney disease. There are 2 types of tests to check for this:
  - **Dipstick test.** This is a quick and simple test for albumin. Inserting the dipstick into the urine shows if there is albumin in the urine (positive test result). If the test shows albumin in the urine, the ACR test should be done.
  - **Albumin-to-creatinine ratio (ACR).** This test compares the amount of albumin to the amount of creatinine in the urine. The higher the albumin, the larger the ratio and worse the kidney disease likely is. Your care team may do this test several times over 3 months.

## Staging of chronic kidney disease

The care and treatment plan depends on the staging of kidney disease. The physician uses the GFR to determine this. Kidney disease staging can be the following:

**Stage 1:** There are some signs of early kidney damage such as protein in the urine. However, the GFR is normal (90 or higher).

**Stage 2:** The GFR is between 60 to 89. Kidney damage starts to get worse.

**Stage 3:** The GFR is between 30 to 59. Kidney disease is moderate.

**Stage 4:** The GFR is between 15 to 29. Kidney disease is severe.

**Stage 5:** The GFR is less than 15. Kidney disease has progressed to kidney failure.

The higher the stage, the worse the kidney disease. As kidney function worsens, wastes, electrolytes and fluids build up in the blood. This can cause more health problems.

## Care and treatment

By carefully following the treatment plan, kidney function may stay where it is. Or, kidney disease may progress more slowly. These guidelines will help you care for yourself:

### ***Have regular checkups***

This helps your kidney care team plan your care.

### ***Stop using tobacco***

Tobacco use can lead to blood vessel disease that can make your kidney function worse. It can also lead to many other health problems. Ask for help to quit if you use tobacco products. The Northwestern Memorial Hospital brochure, *A Tobacco-Free Future*, offers a list of resources to help you.

### ***Limit your alcohol intake***

Drinking alcohol can put a strain on your kidneys and increase your blood pressure. If limiting the alcohol you drink is hard, ask for help.

### ***Manage your blood pressure***

High blood pressure can lead to strokes, heart attacks, blood vessel disease and kidney failure. Do the following to help manage your blood pressure:

- Check your blood pressure regularly.
- Take your medications as prescribed. You may need to take blood pressure medications known as angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs) even if your blood pressure is normal. These may slow the loss of kidney function if you take them as directed.
- Follow a low salt diet. Your dietitian can give you information about how to choose and prepare foods low in salt (sodium).
- Exercise. Walking or other activity is helpful.
- Keep a normal body weight. Plan to lose weight if you are overweight. Your care team can suggest a diet and exercise program to help you.

### ***Manage your diabetes***

If you have high blood sugar, follow diet, exercise, glucose monitoring and medication guidelines to keep your blood sugar at an even level. This helps to slow the loss of kidney function.

### ***Manage your cholesterol***

High blood cholesterol levels often happen with kidney disease. Follow recommended diet, medication and exercise guidelines to keep it within a normal range. This helps to prevent heart disease and slow down kidney disease.

### ***Address anemia***

Your kidneys may not make enough red blood cells (RBCs). This leads to anemia, and can make you feel weak and tired. You may need to take iron supplements or erythropoietin stimulating agents (ESAs). ESAs help your body produce more RBCs.

### ***Address mineral and bone disorders***

In kidney disease, calcium and phosphorus are minerals that build up in the blood. They may cause the arteries to stiffen and shrink. This can lead to a heart attack or stroke. Your physician may prescribe medication to help treat this. Following a diet low in calcium and phosphorus also helps. In general, avoid dairy products, nuts, seeds, peas and dried beans. For more information about other foods to limit, talk with your dietitian.

### ***Keep a healthy weight***

Keeping your weight in a healthy range helps prevent or minimize many problems related to kidney and heart disease. If you need help getting started, ask your care team.

### ***Take approved medications***

**Only** take medications, herbal supplements and vitamins approved by your physician or advanced practice provider.

Also, long-term use of certain pain medications can affect kidney function. This includes non-steroidal anti-inflammatory drugs (NSAIDs). You can buy NSAIDs without a prescription. They include medications such as ibuprofen (Motrin<sup>®</sup>, Advil<sup>®</sup>), naproxen (Naprosyn<sup>®</sup>, Aleve<sup>®</sup>) and aspirin. Talk with your physician about what is safe to take.

### ***Follow proper diet and nutrition***

Many foods can affect your kidney function. You should avoid or limit some foods.

A dietitian can help you learn how to:

- Choose and prepare the right foods.
- Plan meals to make sure you are getting the right amount of protein, calories and other nutrients.

Following nutrition guidelines can help slow or halt chronic kidney disease. Here are a few tips to help you get started:

- Avoid enhancements or supplements used for bodybuilding. These may put a strain on your kidneys.
- Learn how to read food labels. You can tell how much protein, sodium, fat or other ingredients are in food. It can also help you plan your serving size.

- Avoid high protein foods. Too much protein may strain your kidneys. Use plant proteins, such as soy products, instead of meat when possible.
- Do not add salt when you cook or eat. Use lemon juice, herbs or other salt-free spices to season foods. Limit high-sodium foods like frozen dinners, canned soups and smoked or processed meats. If you use canned foods, rinse it before serving.
- If your blood levels are high in potassium or phosphorous, you may need to limit foods that are high in these. Your dietitian can teach you about your specific needs.
- Plan meals in advance to help you stay within the recommended guidelines.
- Plan for special occasions to make sure you stay within your diet guidelines when you eat out.

### ***Get a nutrition assessment***

Some dietitians use a subjective global assessment (SGA) score to see if you need special nutrition guidance. The score is based on your weight, diet and muscle stores in your body. The higher the score, the better. If it is low, your dietitian may give you specific guidelines to improve your diet.

## **Kidney failure**

Chronic kidney disease can sometimes lead to kidney failure. If kidney failure develops, your physician will talk with you about advanced treatments such as dialysis or kidney transplant.

Ask for the Northwestern Memorial Hospital brochures:

- *Kidney Failure: Choosing a Treatment*
- *Hemodialysis*
- *Peritoneal Dialysis*

## **Support**

Living with chronic kidney disease can be hard. However, your care team can provide help and support. Do not be afraid to:

- Ask questions about your condition.
- Ask for help if you feel overwhelmed or do not understand something.
- Ask about support groups. Sharing your concerns with others may be helpful.
- Learn all you can about your medications, treatment options and diet.

For more information, call:

### **National Kidney Foundation Cares**

Patient help line. Toll free: 855.653.2273 (855.NKF.CARES).