

*Call your  
healthcare  
provider if you  
have questions  
or concerns.*

## Chronic Kidney (Renal) Disease

Kidney disease means that 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, kidney disease can be slowed down or even stopped from getting worse. This booklet explains:

- Risk Factors
- Kidney Function
- Chronic Kidney Disease, Testing and Staging
- Symptoms
- Care and Treatment
- Blood and Urine Tests

### 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)
- Obstructions in the urinary tract. These may be caused by kidney stones or tumors, unusually shaped ureters, or an enlarged prostate.

Managing these conditions may also help control your kidney disease.

In addition to those listed above, other risk factors include:

- Being over 60 years of age.
- Having used certain medicines or drugs that affect kidney function over time.
- Being African American, Hispanic, Asian, Native American, or Native Pacific Islander.

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

## Kidney Function

Your kidneys are located on the right and left sides of your back, below your ribs. Normally, kidneys:

- Remove waste and extra fluid from the blood.
- Regulate certain chemicals and hormones in the blood.
- Help control blood pressure.
- Help make red blood cells.
- Help to keep bones healthy.

The kidneys act as filters, keeping important things inside your body and removing those things not needed (waste). Wastes are by-products of what we eat and drink, including the medicines we take. Wastes also occur from normal body functions, such as muscle activity.

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

## Chronic Kidney Disease

When the kidneys do not work well, then blood pressure, fluids, and waste products can rise to unsafe levels. Examples of waste products in the blood include urea and creatinine. Certain chemicals (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, bones may become weak and prone to break (osteoporosis). Chronic kidney disease may increase the risk of heart disease.

## Testing for Kidney Disease

Tests are done to understand the cause of kidney disease. The results are used to help plan the best care or treatment for you. Tests may include:

- Renal Ultrasound (US)
- CT scan
- Biopsy
- Blood and urine tests

A **US or CT** will show what your kidneys and urinary system look like. It can show if your kidneys are of an unusual size or shape. It will also show if there are any tumors, cysts, or stones present.

For a **biopsy**, a tiny sample of the kidney is taken for special testing. This will show what, if any, changes are happening to the kidney and how severe.

**Blood tests** are done routinely. They show the levels of many blood components that may affect your health and kidney function. Some of these include: red blood cells, electrolytes, cholesterol, and waste products such as creatinine. Knowing this helps your health care provider plan your care to keep you as healthy as possible.

From the blood test results, a GFR (glomerular filtration rate) is calculated. This shows the severity of the kidney disease and is used to “stage” it. The worse the kidney disease, the lower the GFR.

**Urine tests** may also be done to check how well the kidneys filter protein or creatinine. More information about blood and urine test results is located in the section on ***Blood and Urine Tests***.

## Staging of Chronic Kidney Disease

Your care and treatment plan depends on the staging of kidney disease. The GFR is used to determine this. Kidney disease may be staged as:

**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 your blood. This can cause more health problems.

## Symptoms

In the early stages of chronic kidney disease, there may be no symptoms. This makes 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 difficulty breathing
- Loss of appetite
- Difficulty sleeping
- Dry, itchy skin
- Muscle cramping, especially at night
- Frequent urination, especially at night
- Swelling of the ankles and feet
- Puffiness or swelling around the eyes, especially after waking up
- Numbness, tingling, or other signs of nerve damage

## Care and Treatment

By carefully following the treatment plan, your kidney function may stay where it is. Or, your kidney disease may progress more slowly. Follow the guidelines below to help you care for yourself.

- **Regular checkups.** This helps your kidney care team plan your care.
- **Tobacco.** Tobacco 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 are a smoker or take tobacco products. (The NM brochure ***A Tobacco-Free Future*** offers a list of resources to help you.)
- **Alcohol.** Limit your alcohol intake. Alcohol can put a strain on your kidneys and increase your blood pressure. Ask for help if this is hard for you.
- **Blood pressure.** High blood pressure can lead to strokes, heart attacks, blood vessel disease, and kidney failure. Strategies to control blood pressure may include:
  - Regular blood pressure checks.
  - Taking medicines as prescribed. You may need to take blood pressure medicines called ACE inhibitors or ARBs even if your blood pressure is normal. Taken as directed, these may slow the loss of kidney function.
  - Following a low salt diet. Your dietitian can give you information about how to choose and prepare foods low in salt (sodium.)
  - Regular exercise. Walking or other activity is helpful.
  - Keeping a normal body weight. Plan to lose weight if you are obese. Your healthcare providers can suggest a diet and exercise program to help you.
- **Diabetes.** If you have high blood sugar, be sure to follow the 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.
- **Cholesterol.** High blood cholesterol levels often occur with kidney disease. Follow recommended diet, medicine, and exercise guidelines to keep it within a normal range. This helps to prevent heart disease and slow down kidney disease.
- **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 ESAs (erythropoietin stimulating agents). ESAs help your body produce more RBCs.
- **Mineral and bone disorders.** Calcium and phosphorus are minerals that build up in the blood with kidney disease. They may cause the arteries to stiffen and become narrow, leading to heart attack or stroke. Medicine may be prescribed 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.

- **Weight.** Keeping your weight in a normal range helps prevent or minimize many problems related to kidney and heart disease. Ask if you need help to get started.
- **Medications.** Take **only** those medicines, herbal supplements, and vitamins that your healthcare provider has approved.

Also, long term use of certain pain medicines can affect kidney function. This includes NSAIDs (Non-Steroidal Anti-Inflammatory Drugs). NSAIDs can be bought without a prescription and may include medications such as ibuprofen (Motrin<sup>®</sup>, Advil<sup>®</sup>), Naproxen (Naprosyn<sup>®</sup>, Aleve<sup>®</sup>) and Aspirin. Talk with your kidney specialist about what is safe to take.

- **Diet and Nutrition.** Many foods can affect your kidney function. Some need to be limited or avoided. A dietitian can help you learn how to:
  - Choose and prepare the right foods.
  - Plan meals to ensure you are getting the right amount of protein, calories and other nutrients.

Following their guidelines can help slow or halt chronic renal 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 present. It can also help you plan your serving size.
  - **Protein:** Avoid high protein foods. Too much protein may put a strain on your kidneys. Use plant proteins (dried beans, nuts, soy products) instead of meat when possible.
  - **Sodium (Salt):** Don't add salt when cooking or when eating. Use lemon juice, herbs or other salt-free spices to season foods. Limit high-sodium foods like: frozen dinners, canned soups, smoked or processed meats. If using canned foods, rinse before serving.
  - **Potassium, phosphorus:** If your blood levels are high, you may need to limit foods that are high in these. Your dietitian can help you understand your specific needs.
  - Plan meals in advance to help you stay within any recommended guidelines.
  - Plan for special occasions to make sure you stay within your diet guidelines when eating out.
- **Nutrition Assessment.** Some dietitians use a SGA (Subjective Global Assessment) 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.

## Blood and Urine Tests

Regular testing is important to track your kidney function. This section explains key tests and what they mean.

### *Blood Tests*

- **Creatinine.** This tells how well your kidney is working. Creatinine is a normal “waste” product. If the kidneys cannot remove it in the urine, it builds up in the blood. The creatinine level is used to calculate GFR.
- **GFR.** Glomerular Filtration Rate (GFR) measures kidney function. It is used to stage the degree of kidney disease. If GFR is between 15 and 30, your healthcare provider will talk with you about your treatment options. This includes diet, medicine and ways to prevent kidney function from getting worse. If it falls below 15, other treatments such as dialysis or transplant may need to be considered.
- **Potassium.** Potassium is important to keep your 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 bones healthy. In kidney disease, phosphorus builds up in the blood and the bones can become weak. Diet or medication may help keep phosphorus levels in the proper balance.
- **Calcium.** Calcium levels will determine if you have a mineral or bone disorder.
- **Cholesterol.** A low Total cholesterol level may mean you are not eating well enough to stay healthy. There are two types of cholesterol: HDL (“good”) cholesterol, and LDL (“bad”) cholesterol.
  - A high HDL protects the heart against heart disease.
  - A high LDL may increase your risk of heart disease. If your level is high, changing your diet and increasing your activity may help.
- **Triglyceride.** This is a type of “bad” fat. High levels increase the risk of heart and blood vessel disease.
- **Hemoglobin.** Hemoglobin in the 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 medicine called ESA (Erythropoiesis Stimulating Agent).
- **Iron.** TSAT and ferritin are two ways to measure the iron in your body. If your blood levels are low, you may be anemic and need to take extra iron.
- **Parathyroid Hormone (PTH).** Your PTH reflects the balance between calcium and phosphorus in your body. This is important for bone health. If your levels are low, supplements may be needed.
- **Vitamin D.** Vitamin D helps your body use calcium to keep your bones healthy. In kidney disease, special supplements are needed. (Do not buy vitamin D without a prescription if you have kidney disease.)
- **A1C.** A1C is a test for diabetes. If you do have diabetes, the A1C is done to see how well your diabetes is being controlled.

## Urine Tests

- **Creatinine Clearance.** This test measures how much creatinine is in your urine. If less than 15, treatments such as dialysis or transplant may need to be considered.
- **Urine Albumin (ACR).** 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. Two types of tests can be done to check for this:
  - **Dipstick test.** This is a quick and simple test for albumin. Inserting the dipstick into the urine either shows:
    - Albumin in the urine (positive test result), or
    - No albumin in the urine (negative test result)If the test is positive, the ACR test should be done.
  - **ACR (Albumin-to-Creatinine Ratio).** This test may be done several times over 3 months. The amount of albumin in the urine is compared to the amount of creatinine. The higher the albumin, the larger the ratio and the greater the kidney disease.

If kidney failure develops, then advanced treatments such as dialysis or a transplant are needed. Ask your healthcare provider for the NM brochures:

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

Living with chronic kidney disease can be challenging. However, your healthcare team can provide help and support. Don't be afraid to:

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

## Resource

**National Kidney Foundation Cares**—Patient Help Line. Toll free: 855.NKF.Cares (855.653.2273).

### Northwestern Medicine—Health Information Resources

For more information, contact Northwestern Memorial Hospital's Alberto Culver Health Learning Center (HLC) at [hlc@nm.org](mailto:hlc@nm.org), or by calling 312.926.5465. You may also visit the HLC on the 3rd floor, Galter Pavilion at 251 E. Huron St., Chicago, IL. Health information professionals can help you find the information you need and provide you with personal support at no charge.

For more information about Northwestern Medicine, please visit our website at [nm.org](http://nm.org).

*Para asistencia en español, por favor llamar al Departamento de Representantes para Pacientes al 312.926.3112.*

The entities that come together as Northwestern Medicine are committed to representing the communities we serve, fostering a culture of inclusion, delivering culturally competent care, providing access to treatment and programs in a nondiscriminatory manner and eliminating healthcare disparities. For questions, please call either Northwestern Memorial Hospital's Patient Representatives Department at 312.926.3112, TDD/TTY 312.926.6363, the Northwestern Lake Forest Patient Relations manager at 847.535.8282 and/or the Northwestern Medical Group Patient Representatives Department at 312.695.1100, TDD/TTY 312.926.6363.

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