DIABETES AND CHRONIC KIDNEY DISEASE

Stages 1–4

National Kidney Foundation™

www.kidney.org

National Kidney Foundation's Kidney Disease Outcomes Quality Initiative

Did you know that the National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (NKF-KDOQI™) has guidelines and commentaries that help your doctor and healthcare team make important decisions about your medical treatment? The information in this booklet is based on the NKF-KDOQI recommended guidelines and commentaries.

What is your stage of kidney disease?

There are 5 stages of kidney disease. They are shown in the table below. Your doctor determines your stage of kidney disease based on the presence of kidney damage and your glomerular filtration rate (GFR), which is a measure of your level of kidney function. Your treatment is based on your stage of kidney disease. Speak to your doctor if you have any questions about your stage of kidney disease or your treatment.

STAGES OF KIDNEY DISEASE		
Stage	Description	Glomerular Filtration Rate (GFR)*
1	Kidney damage (e.g., protein in the urine) with normal GFR	90 or above
2	Kidney damage with mild decrease in GFR	60 to 89
3	Moderate decrease in GFR	30 to 59
4	Severe reduction in GFR	15 to 29
5	Kidney failure	Less than 15

*Your GFR number tells your doctor how much kidney function you have. As chronic kidney disease progresses, your GFR number decreases.

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What is diabetes?

Diabetes is a serious disease. It occurs when your body does not make enough insulin or cannot use the insulin it makes. Insulin is a hormone. It controls the amount of sugar (called glucose) in your blood. A high blood sugar level can cause problems in many parts of your body.

Are there different types of diabetes?

Yes. There are two main types:

- Type 1 diabetes
  If you have this type of diabetes, your body does not make insulin. It usually starts when you are a child or young adult, but it can occur at any age. It is treated by taking daily insulin shots or using an insulin pump and by following a special meal plan. About 5 to 10 percent of diabetes cases are type 1.

- Type 2 diabetes
  If you have this type of diabetes, your body makes some insulin but cannot use it properly. Type 2 is partially preventable and is typically brought on by poor diet and lack of exercise. Very often heredity plays a part. It usually starts when you are over age 40, but it can happen earlier. It is treated with exercise, weight loss, and special meal planning. People with type 2 diabetes may need insulin, but in most cases medications given in pills (called hypoglycemics) are prescribed if diet and exercise alone do not control the disease. Type 2 is the most common type of diabetes.

How does diabetes affect my body?

When diabetes is not well controlled, the sugar level in your blood goes up. This is called *hyperglycemia*. High blood sugar can cause damage to many parts of your body, especially:

- kidneys
- heart
- blood vessels
- eyes
- feet
- nerves

Diabetes can also cause high blood pressure and hardening of the arteries (called arteriosclerosis). These can lead to heart and blood vessel disease.

What is chronic kidney disease?

Your kidneys are important because they keep the rest of your body in balance. They:

- Remove waste products from the body
- Balance the body's fluids
- Help keep blood pressure under control
- Keep bones healthy
- Help make red blood cells.

Chronic kidney disease (CKD) means that the kidneys have been damaged. Kidneys can get damaged from a physical injury or a disease like diabetes or high blood pressure. Once your kidneys are damaged, they cannot filter your blood or do other jobs as well as they should. There are five stages of kidney disease (see page 10). Treatment in the early stages can help keep kidney disease from getting worse.

Are people with diabetes at greater risk for getting kidney disease?

Yes. About a third of people with diabetes may get chronic kidney disease. Certain groups may have a higher risk of getting kidney disease than others. Your risk may be greater if you:

- Are age 60 or older
- Have high blood pressure
- Have a family member who has kidney failure
- Are African American, Hispanic, Asian, Pacific Islander or American Indian.

What can people with diabetes do to prevent kidney disease?

Many people with diabetes do not get kidney disease or kidney failure. Talk to your doctor about your chances of getting kidney disease. The best way to prevent getting kidney disease from diabetes is to:

- Control your blood sugar level
- Keep blood pressure under control
- Ask your doctor to test you for kidney disease at least once each year
- Take medicines to help control your blood glucose, cholesterol, and blood pressure if your doctor orders them for you
- Follow your diet for diabetes
- Get regular exercise
- Avoid alcohol
- Do not smoke
- See your doctor as often as you are told

How does diabetes harm the kidneys?

Diabetes can harm the kidneys by causing damage to:

- Blood vessels in the kidneys
  The filtering units of the kidney are filled with tiny blood vessels. Over time, high sugar levels in the blood can cause these vessels to become narrow and clogged. Without enough blood, the kidneys become damaged and albumin (a type of protein) passes through these filters and ends up in the urine where it should not be.

- Nerves in your body

  Diabetes can also cause damage to the nerves in your body. Nerves carry messages between your brain and all other parts of your body, including your bladder. They let your brain know when your bladder is full. But if the nerves of the bladder are damaged, you may not be able to feel when your bladder is full. The pressure from a full bladder can damage your kidneys.

- Urinary tract

  If urine stays in your bladder for a long time, you may get a urinary tract infection. This is because of bacteria. Bacteria are tiny organisms like germs that can cause disease. They grow rapidly in urine with a high sugar level. Most often these infections affect the bladder, but they can sometimes spread to the kidneys.

How do I know if I have kidney damage?

Most people with early kidney damage do not have symptoms. The best way to find early kidney damage is to have a **urine test** once a year. This test checks for very small amounts of protein in the urine called microalbuminuria. It helps show kidney damage at an early stage in people with diabetes.

Not everyone with kidney disease gets kidney failure. With the right treatment, you can prevent kidney disease from getting worse.

If I have kidney damage, what can be done?

First, your doctor needs to find out how well your kidneys are working. This will help in determining the best treatment for you. Your doctor will start by:

- Determining your GFR (glomerular filtration rate)
  GFR is the best way to find out how well your kidneys are working. Your doctor will begin by testing your blood for a waste product called creatinine. When the kidneys are damaged, they have trouble removing creatinine from your blood. Creatinine is stored in muscle tissue and blood. The blood test for creatinine will help your doctor find out how well your kidneys are working. But it is only the first step.

  Next, your doctor or lab will take the result of this test and put it into a math formula that includes your age, race, and sex. The number that results from this math formula is called your GFR (glomerular filtration rate). It tells your doctor how well your kidneys are working. You should have this test at least once a year.

Once your GFR is known, your doctor can tell which stage of kidney disease you have. There are five stages of kidney disease (see the chart below). Your treatment will depend on your stage of kidney disease.

STAGES OF KIDNEY DISEASE		
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5	Kidney failure	Less than 15

*Your GFR number tells your doctor how much kidney function you have. As chronic kidney disease progresses, your GFR number decreases.

- Ordering a kidney biopsy if needed

  Your doctor may also order a kidney biopsy. This can help your doctor find the main cause of your kidney disease. Not all kidney damage is caused by diabetes. Other diseases can be involved. If your kidney disease is caused by diabetes, it is called diabetic kidney disease.

Your doctor will begin treatment based on the stage of kidney disease you have and what caused it. With the right treatment, you and your doctor can keep your kidneys working as long as possible.

What can be done to keep my kidneys working as long as possible?

Your doctor should plan your treatment with you and your family. Some patients may be asked to see a kidney doctor, called a nephrologist. A dietitian may be helpful too. The following things can help your kidneys work better and last longer:

- Controlling your blood sugar
  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 pills (to lower your blood sugar level). A test called hemoglobin A1C should be done every three to six months to check your average blood sugar. Ask your doctor what your test result should be. Daily blood sugar levels should also be checked so that your medication doses can be adjusted as needed.

- Controlling high blood pressure
  High blood pressure can increase your chances of getting kidney failure. Ask your doctor what your blood pressure target should be. You will probably need a medication called an ACE (angiotensin converting enzyme) inhibitor or an ARB (angiotensin receptor blocker) to control your blood pressure. In many cases, more than one high blood pressure medicine may be needed to reach this target. Studies have shown that the use of these medicines can slow the loss of kidney function in all people with diabetes—even if your blood pressure is normal. They also help reduce heart disease in people with diabetes. In addition, your doctor may prescribe a diuretic (water pill) to help remove salt and water from your blood.

- Protecting kidney function by taking ACE inhibitors or ARBs
  Your doctor may have you take high blood pressure medicines (called ACE inhibitors or ARBs) even if your blood pressure is normal. Research suggests that these medicines can slow the loss of kidney function in all people with diabetes—even those with normal blood pressure.

- Limiting how much protein you eat
  People with diabetes and kidney disease should eat enough protein for good health, but avoid overeating it. Research suggests that eating less protein can slow kidney damage. You should talk to your doctor about this. If you need to go on a low-protein diet, you must plan this with a dietitian who specializes in kidney disease. Do not go on this type of diet without talking to a dietitian so that you have a healthy approach to dietary changes.

- Promptly reporting to your doctor any difficulty passing urine
  Early treatment for urinary tract infections is important. Some signs of urinary infection could be: frequent need to urinate, burning or pain with urination, cloudy or blood-spotted urine, or a strong odor to your urine.

- Limiting the amount of salt in your diet to help control high blood pressure and reduce body swelling

- Not using medicines that may damage the kidneys especially NSAIDs (Non-Steroidal Anti-Inflammatory Drugs) such as ibuprofen and naproxen

- Checking with your doctor before taking any herbal supplements

- Preventing further damage to larger blood vessels (such as those in the brain and heart) by keeping cholesterol and lipid levels under control.

What about cholesterol and lipids?

Many people with diabetes and kidney disease have high levels of lipids in the blood. Lipids are fatty substances like cholesterol. High blood lipid levels can cause the blood vessels to become clogged. This lessens the blood supply to the heart and brain, and raises your chance of having a heart attack or stroke. Your doctor will check your cholesterol and lipids at least once a year. If they are too high, you may need drugs called statins to help lower them.

What about pregnancy?

Having both diabetes and kidney disease is serious. It can affect your health and the health of your unborn child. If you are thinking about becoming pregnant, talk to your healthcare team. If you become pregnant, you should be under the care of a specialist in high-risk pregnancy and a specialist in kidney disease. Some women may also have a higher risk for kidney failure during pregnancy. You should:

- Keep your blood sugar levels under control
- Ask your doctor about using insulin to control your blood sugar while pregnant
- Tell your doctor about any medicines you are taking, especially medicines for high blood pressure or cholesterol.

With good healthcare and careful blood sugar control, it is possible to have a healthy pregnancy.

Key points to remember

- About a third of people with diabetes may develop kidney failure.
- Because diabetes may harm the blood vessels in the body, it can cause kidney damage.
- Early kidney damage from diabetes can be found by a test that checks for a tiny amount of protein (called microalbuminuria) in the urine. A test called GFR tells your doctor how much kidney function you have.
- Treatment with some high blood pressure medicines called ACE inhibitors or ARBs can slow the loss of kidney function in people with diabetes, even in people with normal blood pressure.

- Reducing the amount of sodium (salt) in your diet may be needed if there is kidney damage or high blood pressure. The most common form of sodium is found in table salt.
- Other things that can cause kidney damage and affect kidney function are: blocking of urine flow, urinary tract infection and certain medicines (especially NSAIDs such as ibuprofen and naproxen).
- Early kidney disease rarely has symptoms. That is why it is so important to be tested regularly by your doctor for kidney damage. An early sign of kidney damage is protein in the urine.
- If chronic kidney disease causes kidney failure, you will need hemodialysis, peritoneal dialysis or a kidney transplant to replace the work of your kidneys. The type of treatment that is best depends on overall health, lifestyle and personal preference.
- Diet is a very important part of the treatment of all patients with diabetes even if they do not have chronic kidney disease.

Diabetes: A growing epidemic

Did you know these facts about diabetes?

- Nearly 30 million people in the United States (about 8 percent of the population) have diabetes, and about a third do not even know they have the disease.
- Diabetes is the leading cause of chronic kidney disease.
- Diabetes accounts for 44 percent of kidney failure.
- Worldwide, 347 million people have diabetes.
- At least 27 percent of people older than 65 years have diabetes.

Where can I get more information?

If you have questions, speak with your healthcare team. They know you and can answer questions about you.

If you want to read more about kidney disease, the National Kidney Foundation has more than 50 other publications that cover many subjects, such as:

- CKD risk factors like high blood pressure and diabetes
- Complications of chronic kidney disease, such as cardiovascular disease, anemia or bone problems
- Nutrition for CKD patients, with information about carbohydrates, protein, sodium, phosphorus and potassium
- Treating kidney disease early
- Treating kidney failure with transplantation or dialysis

There are two ways to learn about the many free resources available to you:

- Call the NKF Cares Patient Patient Information Help Line toll-free at **855.NKF.CARES** (855.653.2273) or email **nkfcares@kidney.org**
- Learn more at **www.kidney.org**

Becoming an educated patient is very important to being healthy!

You may also want to contact:

American Association of Diabetes Educators
100 W. Monroe
Suite 400
Chicago, IL 60603
800.338.3633
www.diabeteseducator.org

American Diabetes Association
ATTN: National Call Center
1701 North Beauregard Street
Alexandria, VA 22311
800.342.2383
www.diabetes.org

Questions for my doctor

The **National Kidney Foundation** is the leading organization in the U.S. dedicated to the awareness, prevention, and treatment of kidney disease for hundreds of thousands of healthcare professionals, millions of patients and their families, and tens of millions of Americans at risk.

Help fight kidney disease.
Learn more at **www.kidney.org**

National
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New York, NY 10016
800.622.9010

Awareness. Prevention. Treatment.

National Kidney Foundation™

Diabetes and Chronic Kidney Disease

Stage 5

National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (NKF-KDOQI™)

Did you know that the National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (KDOQI™) develops guidelines that help your doctor and health care team make important decisions about your medical treatment? The information in this booklet is based on the National Kidney Foundation's KDOQI™ recommended guidelines for diabetes, and it's very important for you to know.

What is your stage of kidney disease?

There are five stages of kidney disease. They are shown in the table below. Your doctor determines your stage of kidney disease based on the presence of kidney damage and your *glomerular filtration rate (GFR)*, which is a measure of your level of kidney function. Your treatment is based on your stage of kidney disease. Speak to your doctor if you have any questions about your stage of kidney disease or your treatment.

Stages of Kidney Disease

Stage	Description	Glomerular Filtration Rate (GFR)*
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Transplant recipient

Dialysis Patient

(hemodialysis, peritoneal dialysis)

*Your GFR number tells your doctor how much kidney function you have. As chronic kidney disease progresses, your GFR number decreases.

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Diabetes is a serious disease. It occurs when your body does not make enough insulin or cannot use the insulin it makes. Insulin is a hormone. It controls the amount of sugar (called *glucose*) in your blood. A high blood sugar level can cause problems in many parts of your body.

Are there different types of diabetes?

Yes. There are two main types:

- *Type 1 diabetes*

  If you have this type of diabetes, your body does not make insulin. It usually starts when you are a child or young adult, but it can occur at any age. It is treated by taking daily insulin shots or using an insulin pump and by following a special meal plan. About 5 to 10 percent of cases of diabetes are type 1.

- *Type 2 diabetes*

  If you have this type of diabetes, your body makes some insulin but cannot use it properly. Type 2 is partially preventable and is typically brought on by poor diet and lack of exercise. Very often heredity plays a part. It usually starts when you are over age 40, but it can happen earlier. It is treated with exercise, weight loss, and special meal planning. People with type 2 diabetes may need insulin, but in most cases medications given in pills (called *hypoglycemics*) are prescribed if diet and exercise alone do not control the disease. Type 2 is the most common type of diabetes.

How does diabetes affect my body?

When diabetes is not well-controlled, the sugar level in your blood goes up. This is called *hyperglycemia*. High blood sugar can cause damage to many parts of your body, especially:

- kidneys
- heart
- blood vessels
- eyes
- feet
- nerves

Diabetes can also cause high blood pressure and hardening of the arteries (called *arteriosclerosis*). These can lead to heart and blood vessel disease.

How does diabetes harm the kidneys?

Diabetes can harm the kidneys by causing damage to:

- *Blood vessels in the kidneys*

  The filtering units of the kidney are filled with tiny blood vessels. Over time, high sugar levels in the blood can cause these vessels to become narrow and clogged. Without enough blood, the kidneys become damaged and albumin (a type of protein) passes through these filters and ends up in the urine where it should not be.

- *Nerves in your body*

  Diabetes can also cause damage to the nerves in your body. Nerves carry messages between your brain and all other parts of your body, including your bladder. They let your brain know when your bladder is full. But if the nerves of the bladder are damaged, you may not be able to feel when your bladder is full. The pressure from a full bladder can damage your kidneys.

- *Urinary tract*

  If urine stays in your bladder for a long time, you may get a urinary tract infection. This is because of bacteria. Bacteria are tiny organisms like germs that can cause disease. They grow rapidly in urine with a high sugar level. Most often these infections affect the bladder, but they can sometimes spread to the kidneys.

What is diabetic kidney disease?

Not all kidney damage is caused by diabetes. Other diseases can be involved. If your kidney disease is caused by diabetes, it is called *diabetic kidney disease (DKD)*. Your doctor may ask you to have a kidney biopsy. This can help your doctor find the basic cause of your kidney failure.

What is kidney failure?

Kidney failure means your kidneys have stopped working well enough to keep you alive. When your kidneys fail:

- Harmful wastes build up in your body
- Your blood pressure may rise
- Your body may hold too much fluid
- Your body cannot make enough red blood cells

When this happens, you need treatment to replace the work of your failed kidneys. There is no cure for kidney failure. A person with kidney failure needs treatment to live.

How is kidney failure treated?

Three types of treatment can be used if your kidneys have failed:

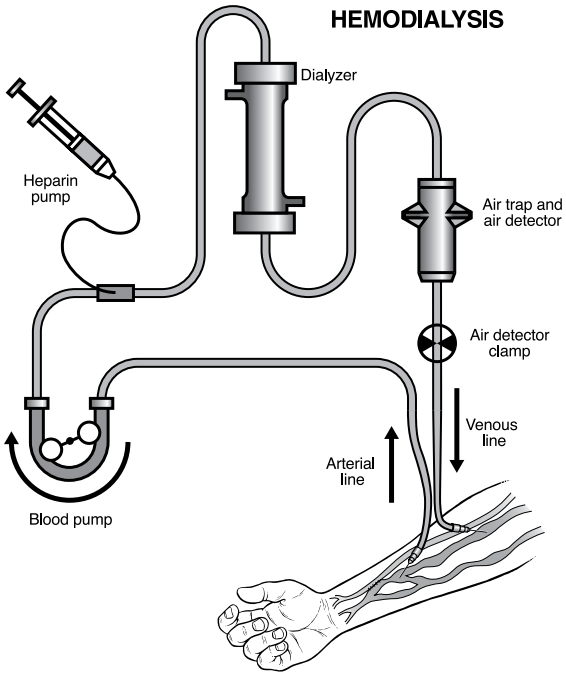
1. Hemodialysis
2. Peritoneal dialysis
3. Kidney transplantation

Your health care team will discuss these different treatments with you and answer all your questions. They will help you choose the best treatment for you based on your general health, life-style, and treatment preference. Your decision does not need to be a final decision. Many people have used each one of these treatments at different times.

What does hemodialysis involve?

In hemodialysis, your blood flows through a machine that has a filter which cleans the blood. This machine is called an artificial kidney or dialyzer. Hemodialysis is usually done three times a week, several hours each session. It can be done at a dialysis

center or at home. To get your blood into the artificial kidney, two needles are inserted into your vein during dialysis treatment. Hemodialysis is the most common form of treatment for kidney failure.

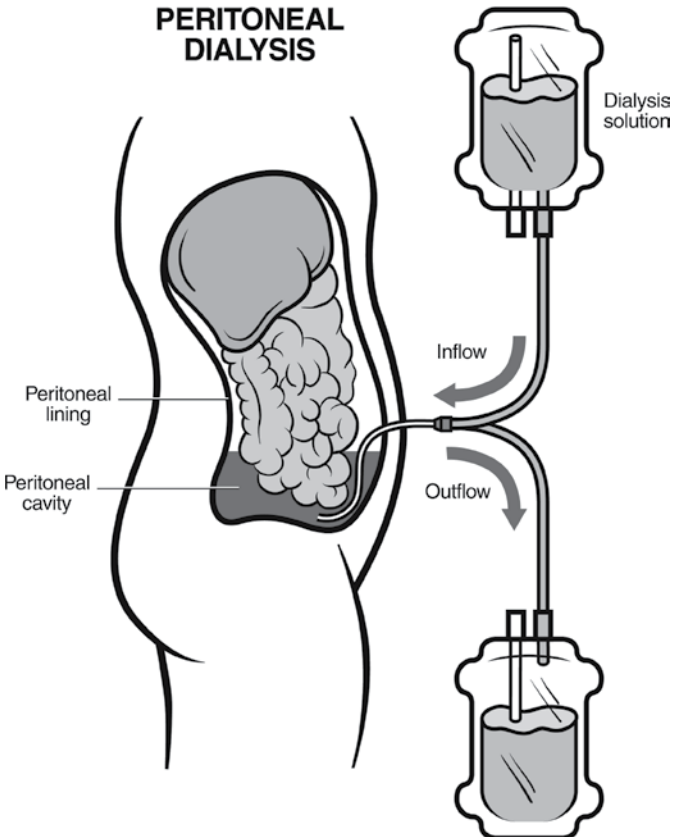


What does peritoneal dialysis involve?

In this type of dialysis, your blood is not cleaned outside the body as with hemodialysis. Instead, the blood stays in the blood vessels that line your own belly. Here's how it works:

A soft tube, called a *catheter,* is placed in your belly. This is done by minor surgery. This catheter makes it possible for you to easily connect special tubing which allows two to three quarts of a cleansing fluid to flow into your belly. The cleansing fluid is called *dialysate*.

What happens next is an amazing process. The lining of your belly (called the *peritoneal membrane*) acts as a natural filter. It lets the wastes and extra fluid in your blood pass through it into the cleansing fluid. At the same time, the lining of your belly holds back the important things your body needs, like red blood cells and nutrients. Once the process is finished, you drain the used cleansing fluid into an empty bag. You discard the bag. This process is then repeated usually four to six times during the day or night. Peritoneal dialysis can be done at home, at work, or while traveling.



Can a patient with diabetes have a kidney transplant?

Yes. A kidney can come from someone who has died or from a living person who wishes to donate a kidney. The living donor might be a close relative, friend, or even a stranger who wants to donate a kidney to someone in need. Once you get a new kidney, you may need a higher dose of insulin or hypoglycemic pills (to lower blood sugar level). This is because:

- You will be eating more
- Your new kidney will break down insulin better than your injured one
- You will be using medicines to keep your body from rejecting your new kidney and these may react less well to the insulin.

If your transplanted kidney loses function, dialysis treatment can be started and you can wait for another transplant.

What about kidney-pancreas transplants?

If you have type 1 diabetes, it may also be possible to have a pancreas transplant. This might be done at the same time as your kidney transplant or soon afterwards. The pancreas is an organ in your body that helps produce insulin. A pancreas transplant gives you the chance to stop taking insulin shots. Your doctor can advise you about this procedure.

The kidney doctor (called a *nephrologist*) will plan your treatment with you, your family and your dietitian. In addition to dialysis or a transplant, you will need to:

- Keep your blood sugar levels on target
- Control high blood pressure
- Manage cholesterol and blood lipids
- Treat anemia (low blood count), if needed
- Treat mineral and bone disorder, if needed
- Get tested regularly for heart and blood vessel disease
- Manage your diet carefully
- Follow your diabetes treatment plan of medications, diet and exercise

What does treatment involve?

- *Managing blood sugar*

  Besides your kidneys, diabetes can cause serious damage to your heart, blood vessels, eyes, feet, and nerves. The best way to protect them is by controlling blood sugar. This is usually done with diet, exercise, and, if needed, insulin shots or hypoglycemic pills. The dose of insulin often has to change when people go on dialysis or get a new kidney transplant.

  You will also need to:

  □ *Test for A1C regularly.* Your A1C test tells you what your average blood sugar has been for the past 2–3 months. It also helps your doctor know whether your diabetes is under control. You should be tested twice a year if your diabetes is under control. Otherwise you should be tested every three

months. For most people with diabetes, the result should be less than 7 percent. Depending on your overall health, a slightly higher level might be okay in some circumstances. Ask your doctor what your test result should be. Stay on goal. It will help protect your heart, blood vessels, eyes, feet, and nerves.

□ ***Use a Blood Glucose Monitor.*** You must also check your blood sugar levels every day. You can do this test at home with a blood glucose meter. The test is usually done several times a day. It tells you what your blood sugar is at any moment.

□ ***Safeguard against low blood sugar.*** Most people know that high blood sugar is dangerous. But low blood sugar (called *hypoglycemia*) can be dangerous as well. Your risk of low blood sugar is higher if you are on dialysis, especially if you have trouble eating, are often sick to your stomach, or have other digestive problems. Tell your doctor if you have any of these symptoms.

■ *Controlling high blood pressure*

For people on dialysis, your blood pressure will be slightly higher before your dialysis treatment than it is afterwards. This happens because dialysis replaces the work of your failed kidneys. It cleans your blood of harmful wastes and helps lower blood pressure. The target blood pressure for people on dialysis is:

Before dialysis: Less than 140/90

After dialysis: Less than 130/80

You must check your blood pressure as often as your doctor recommends. You may also need a medication called an ACE (*angiotensin converting enzyme*) inhibitor or an ARB (*angiotensin receptor blocker*) to control your blood pressure. In many cases, more than one high blood pressure medicine may

be needed to reach this target. Studies have shown that the use of these medicines may help reduce heart disease in people with diabetes. Your doctor may also want you to:

- ☐ Drink less fluid
- ☐ Eat less salt
- ☐ Have longer dialysis treatments
- ☐ Have more than three dialysis treatments per week
- ☐ Take drugs that lower your craving for salt
- ☐ Take blood-pressure medications at night rather than during the day

■ *Managing cholesterol and blood lipids*

Many people with diabetes and kidney disease have high levels of lipids in the blood. Lipids are fatty substances like cholesterol. High blood lipid levels can cause the blood vessels to become clogged. This lessens the blood supply to the heart and brain, and raises your chance of having a heart attack or stroke. Your doctor will check your cholesterol and lipids at least once a year. If they are too high, you may need drugs to help lower them.

■ *Treating anemia*

People on dialysis often get anemia (low blood count). Why does this happen? Healthy kidneys help your body make red blood cells. But if you have kidney failure, your kidneys are unable to do this very well. To treat anemia, you will need to take a special medicine called an *ESA* (*erythropoietin-stimulating agent*) and iron supplements to help make red blood cells.

■ *Treating mineral and bone disorder*

Many people with kidney failure have mineral and bone disorder. Mineral and bone disorder causes your arteries

to stiffen and become narrow from the extra calcium and phosphorus in your blood. This reduces blood flow to your heart and can lead to heart attack and death. You may need special medicines called phosphate binders to help treat mineral and bone disorders. You may also need to eat fewer foods that contain phosphorus, such as dairy, nuts, seeds, dried beans and peas. Your dietitian can help you plan meals that are right for you.

- *Getting tested for heart and blood vessel disease*

  Heart and blood vessel problems are common in people with both diabetes and kidney failure. In fact, half of all dialysis patients will die of heart disease. You should be tested when you first start on dialysis, and at least once every year afterwards.

- *Managing your diet*

  There are special dietary needs for people with diabetes who are also on dialysis. For example, you may need more protein than what is normally recommended for people with diabetes. You should talk to your doctor about this. Do not change your diabetes diet without first talking to a dietitian who specializes in kidney disease so that you have a healthy approach to dietary changes.

- *Following your diabetes treatment plan of medications, diet and exercise*

  You must continue to follow your diabetes treatment plan of medications, diet and exercise. This will help protect the rest of your body, including your heart, blood vessels, eyes, nerves, and feet. Ask your doctor

about which diabetes medications are best for you. Some medicines may be better than others when you are on dialysis. Others must be avoided completely.

What about pregnancy?

Having both diabetes and kidney disease is serious. It can affect your health and the health of your unborn child. If you have diabetes and are thinking about becoming pregnant, talk to your health care team. If you become pregnant, you should be under the care of a specialist in high-risk pregnancy and a specialist in kidney disease. You should:

- Keep your blood sugar levels at target
- Ask your doctor if you need to take insulin to control your blood sugar while pregnant
- Tell your doctor about any medicines you are taking, especially medicines for high blood pressure or cholesterol

Key points to remember about diabetes and kidney failure

- About a third of people with diabetes may develop kidney failure.
- Besides the kidneys, diabetes can harm the blood vessels in the body and cause permanent damage to the heart, eyes, nerves and feet. Careful control of blood sugar is the best way to protect them.
- Kidney failure is treated by hemodialysis, peritoneal dialysis or kidney transplantation. The type of treatment that is best depends on your overall health, lifestyle and personal preference.
- Get regular screenings for heart and blood vessel disease.
- Get regular exercise.
- Keep body weight under control.

- Ask your dietitian to help you create a meal plan that includes healthy food choices. Eating wisely will help you control blood sugar, blood pressure, cholesterol, and mineral and bone disorder.
- If prescribed, take medicines to help you control your blood sugar, blood pressure, cholesterol, anemia, and bone and mineral disorder.
- If you smoke, ask your health care provider about a plan to help you quit. If you don't smoke, don't start.
- Diet is a very important part of the treatment of all patients with diabetes.

DIABETES: A GROWING EPIDEMIC

Did you know these facts about diabetes?

- Nearly 21 million people in the United States (about 7 percent of the population) have diabetes, and about a third do not even know they have the disease.
- Diabetes is the leading cause of chronic kidney disease.
- Diabetes accounts for 45 percent of kidney failure.
- Worldwide, 171 million people have diabetes.
- At least 20 percent of people older than 65 years have diabetes.

Where can I get more information?

To learn more about diabetes and kidney disease, contact the National Kidney Foundation (NKF) at 800.622.9010 or visit **www.kidney.org** You may be interested in asking for free copies of the following NKF booklets:

- *GFR (Glomerular Filtration Rate): A Key to Understanding How Well Your Kidneys Are Working*
  Order # 11-10-1813
- *About Chronic Kidney Disease: A Guide for Patients and Their Families*
  Order # 11-50-0160 [Spanish 11-50-0166]
- *Diabetes and Your Eyes, Heart, Nerves, Feet and Kidneys*
  Order # 11-10-0216
- *Choosing a Treatment for Kidney Failure*
  (11-10-0352)
- *Hemodialysis: What You Need to Know*
  Order # (11-50-0214)
- *Peritoneal Dialysis: What You Need to Know*
  Order # (11-50-0215)
- *Kidney Transplant*
  (11-10-0304)
- *If You Choose Not to Start Dialysis Treatment*
  (11-10-0330)

You may also want to contact:

American Association of Diabetes Educators
100 W. Monroe
Suite 400
Chicago, IL 60603
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Sample recipe plan for diabetes and kidney failure

Here is a sample recipe for people with diabetes and kidney failure. Nutritional recommendations can vary for people with kidney failure, so before using this recipe, be sure to check with your dietitian.

Ginger Roasted Chicken with an Asian Slaw

Chicken

1/8 teaspoon Chinese five spice salt-free
1/2 teaspoon Thai or oriental salt-free seasoning
1/2 teaspoon lemon pepper salt-free seasoning
3 tablespoon minced fresh ginger
3/4 teaspoon minced garlic
1 tablespoon rice vinegar
1/4 teaspoon sesame oil
3–8 oz. skinless chicken breast, cut in half

Mix Chinese five spice, Thai or oriental seasoning, lemon pepper, minced fresh ginger, and rice vinegar into a paste. Place chicken breasts in an oiled baking dish. Spread the ginger paste over the top of the chicken breasts and bake in a preheated 350°F. oven for 45 to 55 minutes or until the chicken is cooked completely without becoming dry. Drizzle sesame oil over top of chicken before serving.

Asian Slaw

4 cups shredded or diced green and red cabbage
1 red delicious apple cored and diced
1 green onion, sliced

Dressing

1/4 teaspoon dry mustard
1 teaspoon oriental or Thai salt-free seasoning
1 teaspoon lemon juice
1 tablespoon rice vinegar
1 teaspoon honey

2 tablespoons vegetable oil
1/2 teaspoon sesame seed oil
1 teaspoon Dijon mustard

Mix all of the dressing ingredients together and microwave for 20 to 30 seconds to warm. Mix cabbage, apples, and green onions in a bowl. Pour warm dressing over the cabbage mixture, toss to coat with dressing, cover and refrigerate for several hours.

To serve chicken, place on top of salad.

Chicken

Analysis

6 servings per recipe, serving size 3/4 cup, calories 204, total fat 6.5 g, saturated fat 0.77 g, monounsaturated fat 3.18 g, polyunsaturated fat 1.9 g, omega-3 fat 4.8 g, cholesterol 65.8 mg, calcium 40.4 mg, sodium 105.6 mg, phosphorus 239.8 mg, potassium 452 mg, total carbohydrates 8.4 g, dietary fiber 1.72 g, sugar 5.3 g, protein 27.2 g

Vegetarian Substitute

22.5 oz. tofu, extra firm, sliced into 6 slices and substitute tofu for the chicken breast. Be sure to turn over tofu at least once during the baking process.

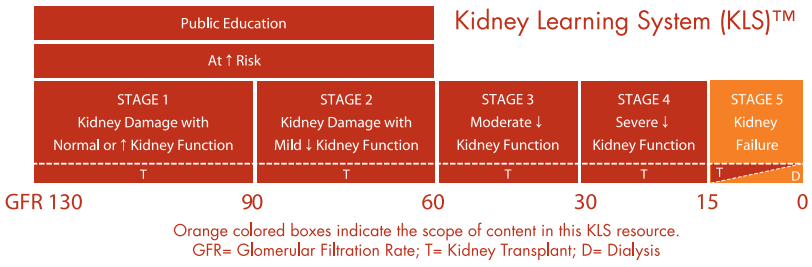
Analysis

6 servings per recipe, serving size 3/4 cup, calories 176, total fat 11.3 g, saturated fat 1 g, monounsaturated fat 7.5 g, polyunsaturated fat 2.1 g, omega-3 fat 4.6 g, cholesterol 0.0 mg, calcium 214 mg, sodium 40.4 mg, phosphorus 162 mg, potassium 303.2 mg, total carbohydrates 10.5 g, dietary fiber 2.2 g, sugar 5.9 g, protein 11.6 g

Recipes are reprinted from the National Kidney Foundation's *KDOQI™ Clinical Practice Guidelines and Clinical Practice Recommendations for Diabetes and Chronic Kidney Disease.* Am J Kidney Dis. 2007;49 (suppl 2):S1-S180.

More than 20 million Americans—one in nine adults—have chronic kidney disease, and most don't even know it. More than 20 million others are at increased risk. The National Kidney Foundation, a major voluntary health organization, seeks to prevent kidney and urinary tract diseases, improve the health and well-being of individuals and families affected by these diseases, and increase the availability of all organs for transplantation. Through its affiliates nationwide, the foundation conducts programs in research, professional education, patient and community services, public education and organ donation.

A Curriculum for CKD Risk Reduction and Care



Orange colored boxes indicate the scope of content in this KLS resource.
GFR= Glomerular Filtration Rate; T= Kidney Transplant; D= Dialysis

Support for the development of the *KDOQI Clinical Practice Guidelines and Clinical Practice Recommendations for Diabetes and Chronic Kidney Disease* was provided by: Amgen and Keryx Biopharmaceuticals.

The National Kidney Foundation gratefully acknowledges the following implementation sponsors: Merck, Novartis and sanofi-aventis.

Additional support for implementation was provided by Takeda Pharmaceuticals.

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11-10-0238