

National Kidney
Foundation™

Diabetes and Chronic Kidney Disease

Stages 1–4



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)*
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 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.



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 older (65 and up)
- Have high blood pressure
- Have a family member who has chronic kidney disease
- Are African American, Hispanic American, 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
- Check your blood pressure as often as your doctor recommends
- 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		
Stage	Description	Glomerular Filtration Rate (GFR)*
1	Kidney damage (e.g., protein in the urine) with normal GFR	90 or above
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*Your GFR number tells your doctor how much kidney function you have. As chronic kidney disease progresses, your GFR number decreases.

Transplant recipient

Dialysis Patient
(hemodialysis, peritoneal dialysis)

■ Ordering a kidney biopsy if needed

Your doctor may also order a kidney biopsy. This can help your doctor find the underlying 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 (DKD)*.

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. For most people, the result should be less than 7 percent. Daily blood sugar levels should also be checked so that your medication doses can be adjusted.

■ *Controlling high blood pressure*

High blood pressure can increase your chances of getting kidney failure. For most people with diabetes and kidney disease, blood pressure should be less than 130/80. 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 anti-inflammatory pain relieving medicines such as ibuprofen)
- 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 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. Some women may also have a higher risk for kidney failure during pregnancy. You should:

- Keep your blood sugar levels at target
- 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 health care and careful blood sugar control, it is possible to have a healthy pregnancy.



Key points to remember about diabetes and the kidneys

- 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 anti-inflammatory pain relieving medicines such as ibuprofen).
- 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 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 a free copies of the following NKF booklets:

- *Are You At Increased Risk for Chronic Kidney Disease?*
Order # 11-10-1814 [Spanish: 11-10-1816]
- *High Blood Pressure and Chronic Kidney Disease (Stages 1-4)*
Order # 11-10-0204
[Spanish: 11-10-0214]
- *What You Need to Know About Urinalysis*
Order # 11-10-1815 [Spanish: 11-10-1817]
- *GFR (Glomerular Filtration Rate): A Key to Understanding How Well Your Kidneys Are Working*
Order # 11-10-1813
- *Warning Signs of Kidney and Urinary Tract Disease*
Order # 11-10-0203

- *About Chronic Kidney Disease: A Guide for Patients and Their Families* Order # 11-50-0160 [Spanish: 11-10-0166]
- *What You Need to Know When You Have Chronic Kidney Disease* Order # 11-50-0132
- *Diabetes and Your Eyes, Heart, Nerves, Feet and Kidneys* Order # 11-10-0216

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

Sample meal plan for diabetes and kidney disease

Here is a sample meal plan for people with diabetes and kidney disease in stages 1–4. Nutritional recommendations vary according to the stage of kidney disease you have, so before using this meal plan or any of the recipes, be sure to check with your dietitian.

MENU¹

Breakfast

Peanut Butter Oatmeal
Fresh Sliced Pears
Very Berry Smoothie

Lunch

Baked Salmon on a Toasted Hamburger Bun
Roasted Asparagus Spears With a Spicy Tofu Hollandaise²
Sliced Pineapple With Strawberry Lemon Thyme³ Sorbet⁴

Snack

Cucumbers With Horseradish and Dill Dip
Mixed Nuts

Dinner

Grilled Vegetables on Bulgur⁵ Pilaf
Sliced Avocado
Rum-Baked Apples

¹ The potassium content of this meal plan may be too high for some people with CKD stages 3 and 4

² Hollandaise is traditionally a butter, egg yolk, and lemon juice emulsified sauce.

³ Lemon thyme is a fresh herb that has a lemon wood like flavor.

⁴ Sorbet is frozen fruit juices or fruit puree with no milk product.

⁵ Bulgur is a wheat berry with the bran removed, steam-cooked, dried, and ground.

RECIPES

Peanut Butter Oatmeal

- 1 1/3 cups uncooked oatmeal
- 4 tablespoons peanut butter
- 1/4 cup honey

Cook oatmeal in water following the directions on the package, omitting the salt. Divide cooked oatmeal into 4 bowls and dollop 1 tablespoon of peanut butter and 1 tablespoon of honey in each bowl.

Analysis

4 servings per recipe, serving size 2/3 cup, calories 258, total fat 10 g, saturated fat 1.7 g, monounsaturated fat 4.5 g, polyunsaturated fat 0.53 g, omega-3 fat 0 g, cholesterol 0 mg, calcium 1.3 mg, sodium 76 mg, phosphorus 123 mg, potassium 210 mg, total carbohydrates 39 g, dietary fiber 3.7 g, sugar 19 g, protein 7 g.

Very Berry Tofu Smoothie

- 1 lb fresh strawberries, cleaned and hulled
- 2 cups blueberries
- 9 oz tofu, silken, extra firm
- 1/2 teaspoon ground ginger
- 2 pinches of red pepper flakes
- 1/4 teaspoon rum extract
- 1 tablespoon honey
- 1 teaspoon lemon juice
- 1/2 cup ice

Blend all together and serve.



Analysis

4 servings per recipe, serving size 1 cup, calories 125, total fat 1.8 g, saturated fat 0.2 g, monounsaturated fat 0.3 g, polyunsaturated fat 0.8 g, omega-3 fat 0.1 g, cholesterol 0 mg, calcium 44 mg, sodium 42 mg, phosphorus 100 mg, potassium 339 mg, total carbohydrates 22 g, dietary fiber 6 g, sugar 15.5 g, protein 6 g.

Baked Salmon With Roasted Asparagus on Cracked Wheat Bun

16 oz. fresh salmon fillet

1 tablespoon lemon juice

1 tablespoon Butter Buds®

12 oz. fresh asparagus spears (woody stems removed),
washed

1 tablespoon olive oil

4 cracked wheat or whole grain hamburger buns, toasted

Preheat oven to 400°F. Place asparagus spears on a cookie sheet and spray with olive oil. Roast in the oven for 10 minutes or until tender and slightly brown. Remove from the oven and allow to cool.

Spray baking dish with olive oil. Place salmon filets in baking dish and drizzle lemon juice over the top of each filet. Bake 15 to 20 minutes until the salmon is flaky to the touch. Serve salmon on a toasted hamburger bun, sprinkle with Butter Buds, roasted asparagus and habanero hollandaise sauce (recipe next page).

Habanero Hollandaise Sauce

6 oz tofu—silken, extra firm, drained and crumbled
1/4 cup vegetable stock
1/4 cup fresh lemon juice
1/2 teaspoon sugar
1/4 teaspoon turmeric
1/2 teaspoon diced habanero chili (out of the jar), more if
you like it spicier

Combine all ingredients in a food processor and process until smooth. Refrigerate overnight before serving.

Analysis

4 servings per recipe, serving size approximately 3 oz., calories 475, total fat 20 g, saturated fat 3 g, monounsaturated fat 10 g, polyunsaturated fat 5.5 g, omega-3 fat 2.6 g, cholesterol 62 mg, calcium 230 mg, sodium 495 mg, phosphorus 364 mg, potassium 810 mg, total carbohydrates 43 g, dietary fiber 5 g, sugar 8 g, protein 32 g

Fresh Pineapple With Strawberry Lemon Thyme Sorbet

30 oz. fresh sliced pineapple

Strawberry Lemon Thyme Sorbet

2 cups fresh ripe strawberries, hulled, washed, and dried
1 cup lemon thyme simple syrup
2 tablespoons orange juice
2 tablespoons lemon juice

In a food processor add strawberries, 1/2 cup lemon thyme simple syrup and process until smooth. Add the other 1/2 cup of simple syrup, orange and lemon juice. Mix and pour into

ice-cube trays. Freeze. When frozen, remove cubes into the food processor and mix thoroughly. Pour back into the same ice-cube trays, cover, and freeze until needed.

Arrange fresh pineapple on a chilled plate. Soften sorbet, spoon 2 tablespoons over the pineapple and allow to melt before serving.

Lemon Thyme Simple Syrup

1 cup water

1 cup sugar

6 to 8 sprigs of fresh lemon thyme

Mix water and sugar in a sauce pan, bring water and sugar to a boil, and turn down the heat to a slow simmer so that the bubbles just break the surface, and cook for 10 minutes. Remove from the heat and steep lemon thyme sprigs in the syrup as it cools to room temperature. Strain the sprigs and keep refrigerated up to 4 weeks.

Analysis

10 servings per recipe, serving size approximately 2 heaping tablespoons over 3 oz. of sliced pineapple, calories 127, total fat 0 g, saturated fat 0 g, monounsaturated fat 0 g, polyunsaturated fat 0 g, omega-3 fat 0 g, cholesterol 0 mg, calcium 20 mg, sodium 1.7 mg, phosphorus 15 mg, potassium 156 mg, total carbohydrates 33 g, dietary fiber 1.9 g, sugar 29 g, protein 1 g

Cucumbers With Horseradish Dill Dip

- 1 1/2 teaspoons shallots, minced
- 1 1/2 teaspoons dried dill
- 2 tablespoons fresh dill
- 8 oz. tofu, extra firm, drained and crumbled
- 2 teaspoons horseradish, creamy style
- Pinch of dry mustard
- 1/8 teaspoon turmeric
- 1/8 teaspoon cayenne pepper
- 1/4 cup rice milk
- 1 teaspoon Dijon mustard
- 2 teaspoons lemon juice
- 2 teaspoons Miran sweet rice wine
- 1/8 teaspoon onion powder
- 2 tablespoons white cider vinegar
- 2 English cucumbers
- Fresh dill sprigs for garnish (2 tablespoons)

Mix all ingredients except the cucumbers in a food processor. Refrigerate overnight. Slice cucumbers, serve with dip spooned over the top, and garnish with fresh dill sprigs.

Analysis

6 servings per recipe, serving size approximately 2 oz., calories 52, total fat 1 g, saturated fat 0.15 g, monounsaturated fat 0.2 g, polyunsaturated fat 0.5 g, omega-3 fat 0 g, cholesterol 0 mg, calcium 37 mg, sodium 71 mg, phosphorus 68 mg, potassium 241 mg, total carbohydrates 8 g, dietary fiber 0.7 g, sugar 4 g, protein 4 g



Bulgur Pilaf

- 2 tablespoons olive oil
- 1/2 onion, diced
- 2 medium carrots, diced
- 1 teaspoon dried basil
- 1/2 teaspoon dried oregano
- 1/2 teaspoon dried thyme
- 1 clove garlic, minced
- 1/2 cup brown rice
- 3/4 cup bulgur wheat
- 1/4 cup milled flax seeds¹
- 4 cups vegetable stock

In a medium sauce pan, heat olive oil over medium heat, add onions, carrots, and cook until onions become translucent. Add basil, oregano, thyme, and garlic; cook for another minute. Stir in rice and keep stirring until rice starts to turn brown. Add vegetable stock, bring to a boil, cover, and turn down to simmer and cook for 15 minutes. After cooking for 15 minutes stir in bulgur and flax seed and simmer for another 30 minutes or until the stock is absorbed. Fluff pilaf with fork. Let stand 10 minutes before serving.

Analysis

6 servings per recipe, serving size approximately 2/3 cup, calories 180, total fat 7 g, saturated fat 0.8 g, monounsaturated fat 3.7 g, polyunsaturated fat 1.7 g, omega-3 fat 0.8 g, cholesterol 0 mg, calcium 42 mg, sodium 24 mg, phosphorus 124 mg, potassium 266 mg, total carbohydrates 28 g, dietary fiber 8 g, sugar 1.5 g, protein 5 g

¹ Milled flax seed are ground seeds from the flax plant that have a nutty flavor; milled seeds are a source of omega-3 oils.



Grilled Vegetables

- 3 medium zucchinis, sliced
- 2 heads of anise (fennel), sliced
- 8 button mushrooms, quartered
- 4 Roma tomatoes cut into eighths
- 1 red onion, cut in half and then sliced
- 2 tablespoon fresh basil leaves, shredded
- 1 teaspoon fresh thyme
- 1 teaspoon fresh oregano

Dressing

- 1 clove garlic, minced
- 2 1/2 teaspoons Dijon mustard
- 3 tablespoons lemon juice
- 4 tablespoons olive oil
- 1/2 teaspoon fresh black pepper

Make the dressing by adding all of the ingredients together in a mixing bowl and whisking. In a large mixing bowl add all the vegetables together. Pour cup of dressing over the

vegetables and stir until all the vegetables have been lightly coated. Then cook vegetable mixture either on a grill or in your oven.

Outdoor Grilling

While your grill is heating to 400°F, oil a grill basket to cook the vegetables in and place the basket on the preheating grill. When the basket is hot, add your vegetable mixture to your basket and cook until the vegetables turn golden brown. Remember to stir them every 5 to 7 minutes to allow the browning to occur evenly with all the vegetables.

Oven Broiling

Turn your oven to broil. Spread vegetables out into a single layer on a cookie sheet and broil until vegetables begin to turn golden brown. Turn vegetables over and keep broiling until vegetables are tender.

When the vegetables are brown, pour grilled vegetables into a serving bowl and add the remaining dressing and fresh herbs.

Analysis

4 servings per recipe, serving size approximately 1/2 cup, calories 198, total fat 15 g, saturated fat 2 g, monounsaturated fat 10 g, polyunsaturated fat 2 g, omega-3 fat 0.19 g, cholesterol 0 mg, calcium 54 mg, sodium 96 mg, phosphorus 138 mg, potassium 887 mg, total carbohydrates 16 g, dietary fiber 4 g, sugar 8 g, protein 4.5 g

Rum-Baked Apples

4 Granny Smith apples, peeled, cored, and sliced

2 teaspoons lemon juice

1 teaspoon ground cinnamon

1/2 cup brown sugar

1/8 teaspoon ground nutmeg

1/4 teaspoon ground cloves

1 tablespoon all-purpose flour

6 tablespoons rolled oats

2 teaspoons honey

1 teaspoon canola oil

Sauce

2 cups rice milk

3 tablespoons cornstarch

1/4 cup cold water

1/2 teaspoon rum extract



Coat sliced apples with lemon juice. Mix dry ingredients together, cinnamon, sugar, nutmeg, cloves, flour, and oats. Mix dry ingredients with apples and place in a non-stick baking dish. Drizzle honey over the top and spray the top with canola oil. Bake in a preheated 350°F oven for 40 to 50 minutes until the apples are tender.

Sauce

Heat rice milk to a simmer, mix cornstarch in cold water together until the lumps are dissolved. Whisk the cornstarch mixture into the simmering rice milk and keep whisking until mixture thickens. Remove from heat and add rum extract. Serve warm over the baked apple mixture.

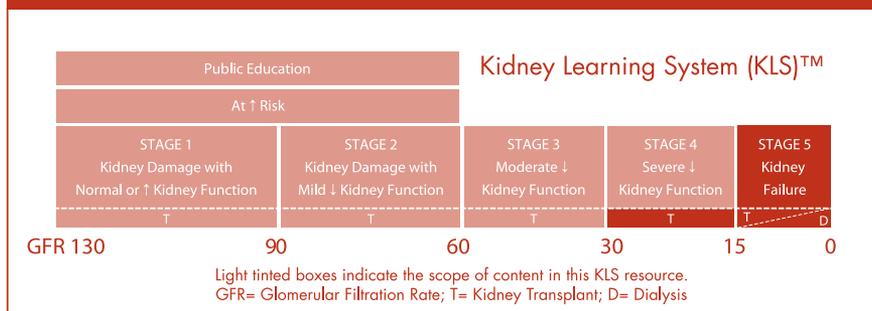
Analysis

4 servings per recipe, serving size approximately 2/3 cup, calories 283, total fat 3 g, saturated fat 0.2 g, monounsaturated fat 1.5 g, polyunsaturated fat 0.7 g, omega-3 fat 0.11 g, cholesterol 0 mg, calcium 42.7 mg, sodium 55 mg, phosphorus 86 mg, potassium 277 mg, total carbohydrates 65 g, dietary fiber 4.3 g, sugar 40.3 g, protein 2 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



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