

Meal Planning for Diabetics

What Is Diabetes?

Diabetes mellitus is a disease characterized by hyperglycemia, or high blood sugar, caused when the body does not produce insulin or does not properly use insulin. **Insulin** is a hormone that is required to convert sugar, starches, and other food into energy needed for daily life and activities.

- **Type 1** diabetes results from the body's failure to produce insulin, the hormone that "unlocks" the cells of the body and allows glucose to enter and fuel the cells. Type 1 diabetes cannot be prevented and in most cases develops in children. Individuals with type 1 diabetes must take insulin by either a series of daily injections or an insulin pump. Type 1 diabetes accounts for only 5–10 percent of all cases of diabetes.
- **Type 2** diabetes results from insulin resistance, a condition in which the body fails to properly use the insulin that is made. After diagnosis, individuals may or may not have to take insulin injections. Type 2 diabetes often can be controlled through diet and exercise alone; however, if blood sugar levels are too high, your doctor may suggest additional medications to better control your blood sugar. Type 2 diabetes accounts for 90–95 percent of all cases of diabetes.
- **Gestational diabetes** occurs when a woman who has never been diagnosed with diabetes suddenly becomes

unable to control her blood sugar during pregnancy. Many times a woman's blood sugar levels will return to normal after pregnancy; however, she may have a higher risk of developing gestational diabetes during subsequent pregnancies or type 2 diabetes later on in life. Gestational diabetes occurs in about 4 percent of all pregnant women.

According to the American Diabetes Association, 7 percent of children and adults have diabetes. Unfortunately, while 14.6 million Americans have been diagnosed, the remaining 6.2 million people are undiagnosed and unaware they have the disease.

What Is Pre-diabetes?

Pre-diabetes is when an individual's blood glucose levels are higher than normal but not high enough to be diagnosed as diabetes. It is possible that individuals with pre-diabetes may later be diagnosed with type 2 diabetes. Pre-diabetes is also called **Impaired Glucose Tolerance (IGT)** and **Impaired Fasting Glucose (IFT)**.

Individuals with pre-diabetes are at a 50 percent higher risk for heart disease or stroke than people with normal blood glucose levels. Treatment for pre-diabetes usually consists of moderate weight loss (5–10 percent of current total body weight) through a weight management plan combining diet modification with a modest amount of daily physical activity.

Goals for Managing Your Diabetes and Keeping Blood Sugar in the 'Healthy Range'

Keeping your blood glucose levels as close to normal as possible can save your life and provide you with an overall higher quality of life. Good control can slow or even prevent many complications of diabetes. Good control means keeping your blood glucose levels as close to normal levels as you safely can. Ideally, this means a blood glucose level between 70 and 130 mg/dl before meals, and lower than 180 mg/dl 2 hours after starting a meal.

Monitoring your blood glucose levels requires a **blood glucose monitor** or meter that you can administer yourself. Typically, your health-care provider will give you a schedule and instructions on how and when to test your blood sugar. Your health-care provider also may ask you to keep a log or record of your test results, so he or she can have a better picture of your blood sugar levels. It is important that you keep your blood glucose meter with you at all times in case your blood sugar levels fall too low (hypoglycemia).

Hemoglobin A1C Test (also known as glycosylated hemoglobin) is a test that gives you and your health-care provider a good picture of your average blood glucose control during the past 2 to 3 months. The results from such a test give important information on how well your diabetes treatment plan is working for you. Remember that diabetes is very different from individual to individual, so treatment plans will be different as well. For a person with diabetes, an A1C result of 7 percent or lower is good glucose control. Your physician can help you determine A1C levels that are best for you.

Long-Term Complications of Poor Diabetes Management

Most people with diabetes often have other health-related risk factors such as high blood pressure and high cholesterol, which increase their risk of cardiovascular disease (CVD). Long-term high blood sugar levels or poorly managed blood sugar levels can damage the kidneys and lead to kidney disease and dialysis; cause severe eye problems that can lead to possible blindness; or cause diabetic neuropathy or nerve damage. If you have diabetes or care for someone with diabetes, it is important that you work now to manage your diabetes to avoid complications from the disease later in life.

Diabetes Meal Planning Goals

As mentioned earlier, the primary goal in managing diabetes is keeping your blood glucose levels in a healthy range. Your eating habits are very important in helping you reach this goal. Combining the right foods in the right amounts with appropriate physical activity and any medications your doctor has prescribed can help you meet this goal. Your goals for meal planning should include these:

- Maintain healthy blood glucose levels to help you feel better and reduce your risk of complications from the disease.
- Keep your blood fats (cholesterol and triglycerides) in healthy ranges to lower your risk of heart disease.
- Consume the proper amount of calories from healthy foods to help you maintain, gain, or lose weight, based on your age, gender, and level of physical activity.
- Consume a variety of healthy foods each day to get all the vitamins, minerals, water, protein, carbohydrates, and fats your body needs to be healthy.



Eating healthy, exercising regularly, and taking your diabetes medications as directed by your doctor will help you keep your blood glucose levels within your target range.

How Does Carbohydrate Counting Work?

Carbohydrate counting is a simple method that allows you to “count” the amount of carbohydrates found in different foods. With this number, you can make healthy choices that will allow you to better manage your diabetes. Your doctor and health-care team will work together to give you a set number of carbohydrate choices per day and per meal to help you best meet your goals. This number of carbohydrate choices is based on several factors, including your current health, weight, physical activity level, age, gender, and medical regimen.

Why Should I Count Carbohydrates?

Foods contain nutrients that are needed by your body for good health. There are three primary nutrients that contribute calories your body turns into energy. Those nutrients are carbohydrates, proteins, and fats. Following is the estimated amount of energy (calories) that is provided by the different nutrients:

- 1 gram of carbohydrate has 4 calories**
- 1 gram of protein has 4 calories**
- 1 gram of fat has 9 calories**

Carbohydrates are the nutrients in food that affect your blood sugar levels the most. Carbohydrates turn into 100 percent glucose (the type of sugar used by your body) and will raise your blood sugar levels. Counting the number of carbohydrates in the foods you eat can help you manage your blood glucose levels.

The following food groups are primarily composed of carbohydrates:

- fruit and fruit juice
- milk and yogurt
- breads
- starches (including starchy vegetables and peas)
- concentrated sweets such as candy and regular sodas

All of these carbohydrates have a similar effect on blood sugar. Foods such as whole grains, fruits, vegetables, and low-fat dairy products should be your main carbohydrate sources. It is wise to choose high-fiber and low-fat foods as the foundation of your meal plan. About half of your calories should come from carbohydrates. Your caloric needs will depend on your gender, age, and physical activity level, along with your current weight and height.

Exchange Lists vs. Carbohydrate Counting

Exchange lists also can help you determine how many carbohydrates and calories you need to consume. Exchange lists often are based on a set number of calories and a set number of carbohydrates, proteins, and fats to meet that caloric number. In planning meals, you can use exchange lists to help choose which foods to select for your meal plan. With the exchange lists, you may substitute, or exchange, any food on the list for any other food in the same list.

Counting carbohydrates offers a more flexible plan for managing your blood sugar. Counting carbohydrates helps you keep track of your carbohydrates, which affect your blood glucose levels most quickly. If you are counting carbohydrates, food labels can provide you with the information you need for meal planning. Carbohydrates, including both sugars and starches, have the biggest effect on blood sugar.

On the Nutrition Facts label, you can look at the grams of **total carbohydrate** to determine how many carbohydrate choices a serving of a particular food contains. Total carbohydrates on the label include sugar, complex carbohydrates, and fiber. When you only look at sugars, you may end up excluding nutritious foods such as fruits or milk because you think they are too high in sugar. The key is to remember the amount of carbohydrates you eat (whether sugars or starches) determines how high your blood sugar level will be after the meal or snack. Looking at sugars alone also might cause you to overeat foods (such as cereals and grains) that have no natural or added sugar but are high in carbohydrates.



If a food has 5 grams of fiber or more in a serving, subtract the fiber grams from the total grams of carbohydrate for a more accurate estimate of the carbohydrate content in that particular food.

What Are the Benefits of Carbohydrate Counting?

1. It is easier to learn and remember than exchange lists or the point system.
2. It offers a wider variety of foods to choose from.
3. It provides a more accurate guess of how blood sugar will rise after a meal or snack.
4. The carbohydrate information on Nutrition Facts food labels makes it easier to plan meals and choose foods that contain carbohydrates.
5. You occasionally can swap a high-sugar food (even though it may contain fewer nutrients) for other carbohydrate-containing foods. This allows you more freedom, but be sure to use sound judgment when making food choices.

How Many Grams of Carbohydrates (CHO) Equal One Carbohydrate Choice?

One “carbohydrate choice” is approximately 15 grams of carbohydrates. That doesn’t mean that every serving is the same size or has the same number of carbohydrates. One serving from the bread/starch, fruit, or milk group contains 12 to 15 grams of carbohydrates. Fifteen grams of carbohydrates could be a cup of milk, a slice of white bread, two pancakes, or half of a banana. Vegetables and meats contribute little or no carbohydrates and are not counted as carbohydrate choices.

When you know how many grams of carbohydrates, or “carbohydrate choices,” you need for each meal, you can choose foods from any of the three carbohydrate-containing food groups to meet your allowance. When using the Nutrition Facts label, you may notice a lot of variety in the number of carbohydrates between different foods—even foods in the same group. For instance, one slice of Brand A whole wheat bread may have 20 grams of carbohydrates, while a slice of whole wheat bread from Brand B only has 14 grams. Below is a chart that you can use to help if you are not sure about what counts as a carbohydrate choice. Giving a range allows you as a consumer to be more flexible in your meal plan and still make correct choices to properly manage your blood sugar levels.

CHO Choices	Total Grams of CHO	Range of Total Grams of CHO
1	15 grams	8–22 grams
2	30 grams	23–37 grams
3	45 grams	38–52 grams
4	60 grams	53–65 grams

As you can see from this chart, Brand A wheat bread (20 grams per slice) and Brand B wheat bread (14 grams per slice) are both considered one carbohydrate choice and would easily fit into your meal plan.

What Counts as the Correct ‘Serving Size’ for the Different Foods I Eat?

With MyPyramid, we do not focus on a set number of “servings” as with the old Food Guide Pyramid. Instead, MyPyramid looks at the needs of each person based on height, weight, and physical activity level (PAL). Within the different food groups, each food is given a set weight or volume that is equivalent or similar in nutrients to all other foods within that particular food group. In the breads and grains group, MyPyramid uses ounce equivalents. In the meat and beans group, it is a combination of ounces and cups. In the vegetable, fruit, and milk groups, cups are used as the standard measure. These standards help you know how much food you are selecting. Below is a description of each food group and what counts as a “serving” from each group.

Grains and Starches

Foods in this group are composed primarily of carbohydrates and are primarily grains, such as wheat, rye, and oats. For people with diabetes, this group also contains starchy vegetables like potatoes, peas, and corn because of the amount of carbohydrates that are found in these foods.

Dry beans such as black-eyed peas and pinto beans also are high in carbohydrates and are counted as grain or carbohydrate choices. When adding these foods into your eating pattern, you should count grains and other starchy vegetables as carbohydrate choices for your meals or snacks because of the effect that these foods will have on your blood sugar levels.

It is also important to remember that serving sizes are based on the amount of carbohydrates in each serving, which will vary between foods. Below is a guide for how much of each food counts as one carbohydrate choice.

A Serving of Grains and Starches Is...

1 slice bread
 ¼ bagel (1 ounce)
 ½ English muffin or pita bread
 1 6-inch tortilla
 ¾ cup dry cereal
 ½ cup cooked cereal (such as oatmeal)
 ½ cup potatoes, yams, peas, corn, winter squash, or cooked beans (excluding green beans, which are considered nonstarchy)
 ⅓ cup rice or pasta

Vegetables

All vegetables are naturally low in fat and are good choices to include in your meals or as low-calorie snacks. Vegetables are full of vitamins, minerals, and fiber. This group includes spinach, broccoli, cabbage, collard greens, turnip greens, Brussels sprouts, cauliflower, kale, carrots, tomatoes, cucumbers, green peppers, green beans, squash, and lettuce. These non-starchy vegetables will not affect your blood glucose levels if they are not fried or used in casseroles that contain starches or breads.

Starchy vegetables such as potatoes, corn, peas, and lima beans should be counted as part of the starch and grain group for diabetes meal planning because of the amount of carbohydrates they contain.

A Serving of Vegetables Is...

1 cup raw vegetables
 ½ cup cooked vegetables

Fruits

Fruits also are composed primarily of carbohydrates. Fruits offer plenty of vitamins, minerals, and fiber. This group includes blackberries, cantaloupes, strawberries, oranges, apples, bananas, peaches, pears, apricots, and grapes.

When considering “carbohydrate choices” during your meals and snacks, you should count fruit as a carbohydrate choice because of the amount of carbohydrates. You can choose fresh, frozen, canned, or dried fruits; however, be sure to select sources that have little or no added sugar to reduce the number of total carbohydrates found in the product.

A Serving of Fruit Is...

1 small fresh fruit
 ½ cup canned fresh fruit or unsweetened fruit juice
 ¼ cup or 2 tablespoons dried fruit
 1¼ cups whole strawberries or cubed cantaloupe

Milk

Milk products contain a lot of protein and calcium as well as many other nutrients. Choose nonfat or low-fat dairy products for the great taste and nutrition without added saturated fat and extra calories.

Selecting no-added-sugar ice cream or plain yogurt can reduce the number of added sugars when carbohydrate-counting your milk choices. Remember that when counting carbohydrates, your choices come from grains and other starches, fruits, and milk, including yogurt and ice cream.

A Serving of Milk and Dairy Is...

1 cup nonfat or low-fat milk

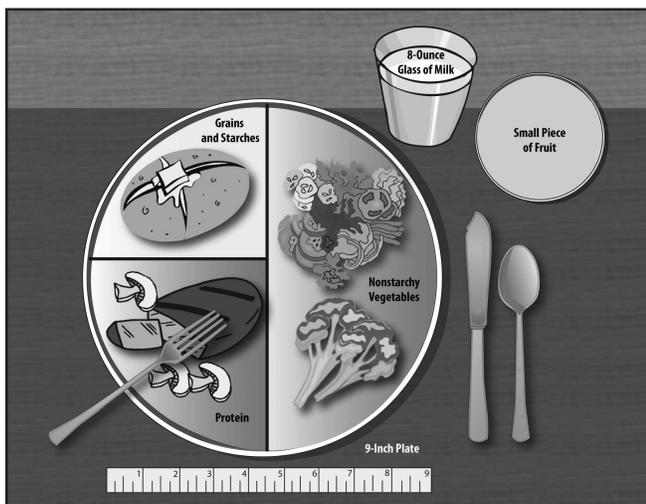
$\frac{3}{4}$ cup yogurt

$\frac{1}{2}$ cup ice cream

Using the Healthy Plate Method To Make Healthful Choices

Another way to determine if your meals are within your recommended diabetes meal plan is using your dinner plate to determine what you are eating and what you should be eating.

The next time you sit down to enjoy a meal, try drawing an imaginary line through the center of your plate. Next, draw a line to divide one section into two different sections. About one-fourth of your plate should be filled with grains or starchy foods such as rice, pasta, potatoes, corn, peas, or rolls. Another fourth should be foods rich in protein such as meat, fish, poultry, or tofu. For the other half of your plate, you can choose nonstarchy vegetables such as broccoli, carrots, cucumbers, salad, tomatoes, or cauliflower. Finally, add a glass of nonfat milk and a small piece of fruit and you are ready to eat!



Remember that if you want, you can substitute water for your milk and add another carbohydrate choice like a whole-wheat roll. Because your foods from the fruit, milk, and grains groups are similar in carbohydrate content, you are able to substitute one food group for another group as long as you do not exceed your total number of choices for that particular meal or snack. Vegetables, meats, and other protein sources do not count as carbohydrate choices.

The total number of carbohydrate choices you are allowed to eat during meals and snacks is based on a variety of factors, which are determined by your physician and health-care team members. Typically, a woman is allowed three carbohydrate choices during each meal, and a man is allowed four carbohydrate choices during each meal.

A Sample Menu for a Day

Breakfast: Three carbohydrate choices

Vegetable juice

1 scrambled egg

1 slice whole-wheat toast (**one carbohydrate choice**)

Low-sugar jelly (because it is low-sugar, it does not count as a carbohydrate choice)

$1\frac{1}{4}$ cantaloupe (**one carbohydrate choice**)

$\frac{3}{4}$ cup fat-free yogurt (**one carbohydrate choice**)

Snack: One carbohydrate choice

1 tablespoon peanut butter

3 graham crackers (**one carbohydrate choice**)

Lunch: Three carbohydrate choices

3 ounces lean turkey

1 slice whole-wheat bread (**one carbohydrate choice**)

1 tablespoon reduced-fat or fat-free mayonnaise

8 ounces (1 cup) skim milk (**one carbohydrate choice**)

1 small apple (**one carbohydrate choice**)

Snack: One carbohydrate choice

15 small grapes (**one carbohydrate choice**)

Dinner: Three carbohydrate choices

$\frac{1}{2}$ baked potato (**one carbohydrate choice**)

Reduced-fat sour cream

Low-fat margarine

$\frac{1}{2}$ cup green beans

$\frac{1}{2}$ cup grilled squash

3 ounces grilled catfish

8 ounces skim milk (**one carbohydrate choice**)

1 whole-wheat roll (**one carbohydrate choice**)

What Happens If My Blood Sugar Level Gets Too High or Falls Too Low?

Complications from diabetes occur when individuals fail to properly maintain their blood sugar levels. These problems can occur if blood sugar levels are too low (hypoglycemia) or too high (hyperglycemia).

As a person with diabetes, it is important that you manage your diabetes to keep your blood glucose levels from being either too high or too low. Maintaining an appropriate eating schedule, participating in a regular physical activity program, taking any prescribed medications as recommended, and regularly checking your blood glucose levels can help you keep your blood sugar levels from being too high or too low.

Hypoglycemia (Low Blood Sugar)

When you check your blood glucose, it's important to know what to do if the results are outside your target range. When your blood glucose is below your target range, you are probably experiencing **hypoglycemia**, which can be very serious and requires immediate attention.

Hypoglycemia (also known as an "insulin reaction" or "low blood sugar") occurs when your blood glucose level gets too low. Many things can cause hypoglycemia, including too much insulin, not eating enough food, too much exercise, eating late, or eating too few carbohydrates. Basically, it occurs when the insulin in your body and your blood glucose levels are out of balance.

People who do not have diabetes typically do not get hypoglycemia. Their bodies can tell when they have enough insulin and will automatically stop the release of insulin into their blood stream. But people with diabetes have to figure out how much insulin their bodies will need. Once the insulin is injected, it keeps working until it is all gone, even if the blood glucose falls too low.

Mild or moderate hypoglycemia is fairly common for children and adults who take insulin, but it can be very dangerous if it is not treated immediately. It is also important to note that mild or moderate hypoglycemia can become very dangerous very quickly, and symptoms can occur with little or no warning. If blood glucose levels become too low, the result could be a coma.

The quickest way to raise your blood glucose is with some form of sugar, such as three glucose tablets (you can buy these at the drug store), half a cup of fruit juice, or five to six pieces of hard candy. Once you've checked your blood glucose and treated your

hypoglycemia, wait 15–20 minutes and check your blood glucose again. If your blood glucose is still low and your symptoms of hypoglycemia have not decreased or disappeared, repeat the treatment.

After you feel better, be sure to eat your regular meals and snacks as planned to maintain your blood glucose levels, and also continue your normal medical regimen. It is important that you always make sure you have at least one type of sugar with you in the event of a low blood sugar episode because they can occur with little or no warning.

Hyperglycemia

Hyperglycemia (or high blood sugar) can occur anytime blood glucose is above the target range. Hyperglycemia is caused by having too much sugar and/or not enough insulin in the body. The symptoms of diabetes are the same as the symptoms for hyperglycemia because diabetes itself is hyperglycemia.

The two main reasons for having hyperglycemia are poor blood glucose management and illness. If your blood glucose levels are frequently above your target range, it may be time to talk with your health-care provider about your current diabetes treatment plan.

It is very important that you talk to your doctor and health-care team about what you can do to better manage your blood glucose. Poor management over a long time period can lead to increased risk of diabetes-related complications like blindness, poor wound healing, limb amputations, and kidney failure. Properly controlled blood glucose levels can help reduce or delay these types of complications.

Foot Care

Foot care is very important if you have diabetes. Inspect your feet daily for any cuts, scrapes, or calluses, and ask your health-care provider what you should do about any open sores.

Diabetes causes blood vessels to narrow and can cause poor blood flow in feet, which is why people with diabetes are prone to foot complications. Diabetes can cause nerve damage, which can decrease the sensation in your feet. Any cuts or open sores have the potential to develop into ulcers if not treated properly. Diabetics are far more likely to have feet or legs amputated because of ulcers or infections than people who do not have diabetes.

Diabetes can cause changes in the skin on your feet. At times, your feet may become very dry. The skin may peel and crack. The problem is the nerves that control the oil and moisture in your feet no longer work.

After bathing, dry your feet thoroughly and seal in the remaining moisture with a thin coat of plain petroleum jelly, unscented hand cream, or a similar product. You do not want to put oils or creams between your toes because the extra moisture can lead to infection. Also, do not soak your feet, which can excessively dry your skin and lead to additional foot problems.

Calluses, if not trimmed, can become very thick, break down, and turn into ulcers or open sores. Never try to cut calluses or corns yourself because this could cause ulcers or infections. Only your health-care provider should remove your calluses. Also, do not try to remove calluses or corns with any type of chemical agent. These products can burn your skin, which can be severe for people with diabetes.

You may use a pumice stone every day to help keep calluses under control. You should use the pumice stone while your skin is still wet. Immediately after using the pumice stone, put lotion on your feet to seal in moisture.

The Last Step: Exercise and Weight Control

Exercise, also called physical activity, includes anything that gets you moving, such as walking, dancing, or working in your yard.

You can be physically active without going to a gym, playing sports, or using special equipment. When you are physically fit, you have the strength, flexibility, and endurance needed to complete your daily activities. Being physically active also helps you feel better both physically and mentally.

People with pre-diabetes and diabetes, as well as the majority of the adult population, should aim to be physically active for at least 30 minutes most days of the week. Walking, gardening, working in the yard, swimming, or cleaning the house all will work to meet this goal.

If you have not been physically active or are considering changing your physical activity regimen, you must first discuss the changes with your health-care provider. Significant changes to your daily activities may require your physician to make changes in your eating plan or medical regimen to make sure your blood sugar levels remain within your target range.

If you are overweight, there are many benefits to losing weight. These benefits are listed below. Some of the benefits will improve your health, while others will help you feel better. If you have diabetes, weight

loss from appropriate exercise and a nutritious meal plan can help lower your blood sugar and help you control your diabetes.

Write a list of reasons you want to lose weight, and place it where you will see it regularly. Reviewing this list daily will motivate you to keep trying.

Weight Loss Benefits

- Lowers blood glucose if your blood glucose levels are too high
- Lowers blood pressure if your blood pressure is too high
- Improves your blood fats if they are not in a healthy range
- Lightens the stress on your hips, knees, ankles, and feet
- Makes moving around easier
- Makes breathing easier
- Gives you more energy
- Allows you to have more fun in life

What Is My Next Step?

If you have been keeping your blood glucose levels under control, it is important that you continue to do so. If you have not been managing your diabetes properly, you should begin to do so immediately.

Be sure to keep all appointments with your physician and other health-care team members. Talk with them about your concerns and what you need to do to be healthy.

For more information, contact your local hospital, the Mississippi State Department of Health, or the Mississippi State University Extension Service. Ask about programs or support groups in your area.

References

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Centers for Disease Control and Prevention
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