

Living Well with Diabetes

Managing Carbohydrates with the Exchange Lists

People with diabetes have special dietary needs, but they do not need special foods. An overall healthy diet that is good for everyone else is also good for people with diabetes.

Carbohydrate, protein and fat are the three nutrients that provide us with energy, which is measured in calories. Foods can be divided into groups based on their carbohydrate, protein and fat contents. When we eat food, especially carbohydrate foods, it is turned into glucose. Glucose is the favorite source of energy for our body's cells. Glucose needs a hormone called insulin in order for glucose to get inside the cells. Insulin is made in the pancreas. If a person has diabetes, either their pancreas does not make any insulin, doesn't make enough insulin or the body doesn't use insulin like it should. Whatever the case, glucose cannot get into the cells and builds up in the blood. This can cause high blood sugar, which can lead to serious complications.

Blood levels can be kept near normal levels if we balance the food we eat, especially carbohydrate foods, with physical activities and the insulin the body makes or that is injected. Regularly monitoring blood glucose gives information to help with the balancing act.

It is a good idea for people with diabetes to eat about the same amount of carbohydrate around the same time every day. It is a bad idea to skip meals because it can lead to low blood sugar. Between-meal snacks are an important part of a diabetes food plan. Snacks can help keep blood sugar from going too low.

Just like everyone else, a person with diabetes needs to eat a variety of foods that contain the nutrients they need in the right amounts for good health. As a general rule, for teenagers and adults, a healthy meal plan includes *at least*:

- 2 to 3 servings (1 to 1½ cups) of non-starchy vegetables
- 2 servings (1 cup) of fruit
- 6 servings (6 ounces) of grains, beans and starchy vegetables
- 2 servings (2 cups) of low-fat or fat-free milk
- 6 ounces of meat or meat substitutes
- *Small* amounts of fat and sugar

The actual amounts from each food group will depend on a person’s calorie needs, which depend on age, gender, size and activity level. A doctor or dietitian should help decide how many calories are right for each individual.

Food exchange lists can be helpful when planning meals that meet your carbohydrate and other nutrient needs. The three main groups are based on the three energy nutrients: carbohydrates (starch, fruits, milk, sweets and non-starchy vegetables), protein (meat and meat substitutes) and fat (fats and oils). Each food list contains foods grouped together because they have similar nutrient content and serving sizes. Each serving has about the same amount of carbohydrate, protein, fat and calories as other foods on the same list.

- Foods on the **Starch** list, **Fruit** list, **Milk** list, and **Sweets, Desserts and Other Carbohydrates** list contain 12 to 15 grams of carbohydrates per specified serving.
- Foods on the **Fat** list and **Meat and Meat Substitutes** list generally do not contain carbohydrate. Exceptions are plant-based meat substitutes like beans and lentils.
- Starchy vegetables, like potatoes, corn, and peas are on the **Starch** list because they contain about 15 grams of carbohydrate per serving.
- Foods on the **Non-Starchy Vegetables** list like broccoli, tomatoes, and carrots contain only 5 grams per serving.
- Some foods have such a small amount of carbohydrates that they are considered “free” if eaten in small amounts. You will find these on the **Free Foods** list.
- Other foods, like lasagna or cheeseburgers, contain a combination of foods and are on the **Combination Food** list or the **Fast Foods** list.

As you are learning how to use the lists, talk to your health care team, especially a dietitian, about any concerns. Your meal plan can be adjusted to fit your lifestyle. The goal is for you to make healthy food choices for a lifetime.

The Food List

| | Carbohydrates (grams) | Protein (grams) | Fat (grams) | Calories (kcal) |
|--|----------------------------------|----------------------------|------------------------|----------------------------|
| Carbohydrates | | | | |
| Starch: breads, cereals, other grain foods, starchy vegetables, crackers, snacks, beans, peas, and lentils | 15 | 0-3 | 0-1 | 80 |
| Fruits | 15 | - | - | 60 |

| The Food List Continued | Carbohydrates (grams) | Protein (grams) | Fat (grams) | Calories (kcal) |
|--|----------------------------------|----------------------------|------------------------|----------------------------|
| Milk | | | | |
| Fat-free, low-fat, 1% | 12 | 8 | 0-3 | 100 |
| Reduced-fat, 2% | 12 | 8 | 5 | 120 |
| Whole | 12 | 8 | 8 | 160 |
| Sweets, Desserts, and Other Carbohydrates | 15 | varies | varies | varies |
| Non-Starchy Vegetables | 5 | 2 | - | 25 |
| Meat and Meat Substitutes | | | | |
| Lean | - | 7 | 0-3 | 45 |
| Medium-fat | - | 7 | 4-7 | 75 |
| High-fat | - | 7 | 8+ | 100 |
| Plant-based proteins | varies | 7 | varies | varies |
| Fats | - | - | 5 | 45 |
| Alcohol | varies | - | - | 100 |

Starch List

Cereals, grains, pasta, breads, crackers, snack chips, starchy vegetables, and cooked beans, peas and lentils are on the starch list. In general, 1 starch is:

- ½ cup cooked cereal, grain or starchy vegetable
- ½ cooked rice or pasta
- 1 ounce of a bread product such as 1 slice of bread
- ¼ ounce to 1 ounce of most snack foods

A choice on the **Starch** list has **15 grams of carbohydrate**, 0-3 grams of protein, 0-1 grams of fat and 80 calories. Everyone should eat 3 or more servings of whole grains each day.

Choose low-fat starches most of the time. As a general rule, a serving of starchy food is one ounce. Always check the portion size you eat. Some foods have a lot more carbohydrate than you might think. For example, a large bagel may weigh 4 ounces and equal 4 carbohydrate servings. Read the Nutrition Facts panel on food labels for specific information.

| Starch List | Serving Size |
|--|---------------------|
| Bread | |
| Bagel | 1/2 (1 ounce) |
| Bread: whole wheat, rye, white, pumpernickel | 1 slice |
| Bread (reduced-calorie) | 2 slices |
| Cornbread, 1¾ inch cube | 1 (1½ ounces) |

| Starch List Continued | Serving Size |
|--|---------------------|
| English muffin | ½ |
| Hot dog or hamburger bun | ½ |
| Pancake, 4 inches across, ¼ thick | 1 |
| Pita, 6 inches across | 1 |
| Roll, plain, small | 1 (1 ounce) |
| Stuffing | ⅓ cup |
| Taco shell | 2 |
| Tortilla, corn, 6 inches across | 1 |
| Tortilla, flour, 6 inches across | 1 |
| Waffle, 4 inches across | 1 |
| Cereals and Grains | |
| Bran, dry | |
| oat | ¼ cup |
| wheat | ½ cup |
| Barley, couscous, polenta, quinoa, pasta, rice, cooked | ⅓ cup |
| Bulgur, grits, wild rice, cooked | ½ cup |
| Granola (low-fat or regular) | ¼ cup |
| Wheat germ, dry | 3 tablespoons |
| Cereals | |
| bran | ½ cup |
| cooked | ½ cup |
| puffed | 1½ cup |
| shredded wheat, plain | ½ cup |
| sugar coated | ½ cup |
| unsweetened, ready-to-eat | ¾ cup |
| Starchy Vegetables | |
| Corn | ½ cup |
| on cob, large | ½ cob |
| Hominy, canned | ¾ cup |
| Mixed vegetables with corn, peas or pasta | 1 cup |
| Parsnips | ½ cup |
| Peas, green | ½ cup |
| Potato | |
| baked with skin | ¼ large |
| boiled | ½ cup |
| mashed with milk and fat | ½ cup |
| French fries, oven-baked | 1 cup (2 ounces) |
| Pumpkin, canned no sugar added | 1 cup |
| Spaghetti/pasta sauce | ½ cup |
| Squash, winter | 1 cup |
| Yam, sweet potato, plain | ½ cup |

| Starch List Continued | Serving Size |
|---|------------------------------|
| Crackers and Snacks | |
| Animal crackers | 8 |
| Crackers | |
| round butter type | 6 |
| saltines | 6 |
| sandwich style, cheese or peanut butter filling | 3 |
| whole wheat regular | 2-5 ($\frac{3}{4}$ ounce) |
| whole wheat lower-fat or crispbreads | 2-5 ($\frac{3}{4}$ ounce) |
| Graham cracker 2½ inch square | 3 |
| Oyster crackers | 20 |
| Popcorn | 3 cups |
| Pretzels | $\frac{3}{4}$ ounce |
| Rice cakes, 4 inches across | 2 |
| Snack chips | |
| fat-free or baked tortilla or potato, baked pita | 15-20 ($\frac{3}{4}$ ounce) |
| regular tortilla or potato | 9-13 ($\frac{3}{4}$ ounce) |
| Beans, Peas and Lentils | |
| Baked beans | $\frac{1}{3}$ cup |
| Beans, lentils, and peas, cooked (black, garbanzo, kidney, lima, navy pinto, white; black-eye, split) | $\frac{1}{2}$ cup |
| Refried beans, canned | $\frac{1}{2}$ cup |

Whole Grains

Whole grains and whole grain products contain the entire grain seed of plant. They are rich in fiber, vitamins, minerals and phytochemicals.

- Whole grain foods include whole wheat flour, whole oats/oatmeal, whole grain cornmeal, popcorn, buckwheat, buckwheat flour, whole rye, whole grain barley, brown rice, wild rice, bulgur, millet, quinoa, and sorghum.
- Choose whole grain foods most of the time.
- Read food labels. If a product says **100% whole grain**, it must contain at least 16 grams of whole grain per serving.
- A whole grain stamp identifies foods that have at least $\frac{1}{2}$ serving of whole grains(3 grams of whole grains).

Fruit List

Fresh, frozen, canned and dried fruits and fruit juices are on the **Fruits** list. In general, 1 fruit choice is:

- ½ cup of canned or fresh fruit or unsweetened fruit juice
- 1 small fresh fruit (4 ounces)
- 2 tablespoons of dried fruit

A choice on the **Fruits** list has **15 grams of carbohydrate**, 0 grams of protein, 0 grams of fat and 60 calories. Fresh frozen and dried fruits are good sources of fiber. Fruit juices contain very little fiber. Choose fruits instead of juices most of the time. Citrus fruits, berries and melons are good sources of vitamin C. It is a good idea to use a food scale to weigh fresh fruits so that you will be able to “eyeball” a proper serving.

Read the Nutrition Facts on the food label for serving size and carbohydrate content. If one serving has more than 15 grams of carbohydrate, you may need to adjust the size of the serving. Portion sizes for canned fruit are for the fruit and a small amount of juice (1-2 tablespoons). Food labels on canned fruits may contain the words “no sugar added” or “unsweetened”. This means that no table sugar has been added—it does not mean the food contains no sugar (fruits naturally contain sugar). Fruit canned in “extra light syrup” has the same amount of carbohydrate per serving as “no sugar added” or “juice pack”. The canned fruits on the **Fruits** list are based on one of those three types of pack. Avoid fruit packed in heavy syrup.

| Fruit List | Serving Size |
|---|--|
| Apple, unpeeled, small | 1 (4 ounces) |
| Apples, dried | 4 rings |
| Applesauce | ½ cup |
| Apricots canned dried fresh | ½ cup 8 halves 4 whole (5½ ounces) |
| Banana, extra small | 1 (4 ounces) |
| Blackberries, blueberries | ¾ cup |
| Cantaloupe, small | ⅓ melon or 1 cup cubed |
| Cherries sweet, canned sweet, fresh | ½ cup 12 (3 ounces) |
| Dates | 3 |
| Dried small fruits such as raisins | 2 tablespoons |

| Fruit List Continued | Serving Size |
|--|----------------------------|
| Figs dried fresh | 1½ 1½ large or 2 medium |
| Fruit cocktail | ½ cup |
| Grapefruit large sections | ½ ½ |
| Grapes, small | 17 (3 ounces) |
| Honeydew melon | 1 slice or 1 cup cubed |
| Kiwi | 1 (3½ ounces) |
| Mandarin oranges, canned | ¾ cup |
| Mango, small | ½ fruit or ½ cup |
| Nectarine, small | 1 (5 ounces) |
| Orange, small | 1 (6½ ounces) |
| Papaya | ½ fruit or 1 cup cubed |
| Peaches canned fresh, medium | ½ cup 1 (6 ounces) |
| Pears canned fresh, large | ½ cup ½ (4 ounces) |
| Pineapple canned fresh | ½ cup ¾ cup |
| Plums canned dried (prunes) small | ½ cup 3 2 (5 ounces) |
| Raspberries, fresh | 1 cup |
| Strawberries, fresh | 1¼ cup whole berries |
| Tangerines, small | 2 (8 ounces) |
| Watermelon | 1 slice or 1¼ cup cubes |

Milk List

Different types of milk products are on the **Milk** list. Two types of milk products are on other lists. For a person with diabetes, cheeses are on the **Meat and Meat Substitutes** list because they are rich in protein. Cream, cream cheese, sour cream, butter and butter spreads are on the **Fats** list.

Milks and yogurts are grouped in three categories based on fat content:

- fat-free/low-fat
- reduced-fat
- whole

The chart on page 2 shows the difference in fat and calorie content of the three types of milk. The higher the fat content, the more saturated fat and cholesterol it has. Children over the age of 2 and adults should choose lower-fat varieties such as fat-free, 1 percent, and 2 percent milks or yogurts. One cup of milk equals 8 fluid ounces or ½ pint.

| Milk List | Serving Size | Count as |
|---|------------------|----------------------------|
| Fat-free or low-fat (1%) | | |
| Milk, buttermilk, acidophilus milk, Lactaid | 1 cup | 1 fat-free milk |
| Evaporated fat-free milk | ½ cup | 1 fat-free milk |
| Yogurt, plain or flavored with and artificial sweetener | ⅔ cup (6 ounces) | 1 fat-free milk |
| Reduced-fat (2%) | | |
| Milk, acidophilus milk, kefir, Lactaid | 1 cup | 1 reduced-fat milk |
| Yogurt, plain | ⅔ cup (6 ounces) | 1 reduced-fat milk |
| Whole | | |
| Milk, buttermilk, goat's milk | 1 cup | 1 whole milk |
| Evaporated milk | ½ cup | 1 whole milk |
| Yogurt, plain | 8 ounces | 1 whole milk |
| Dairy-like foods | | |
| Chocolate milk | | |
| fat-free | 1 cup | 1 fat-free milk + 1 carb |
| whole | 1 cup | 1 whole milk + 1 carb |
| Eggnog, whole milk | ½ cup | 1 carb + 2 fats |
| Rice drink | | |
| flavored, low-fat | 1 cup | 2 carbs |
| plain, fat free | 1 cup | 1 carb |
| Smoothies, flavored, regular | 10 ounces | 1 fat-free milk + 2½ carbs |

| Milk List Continued | Serving Size | Count as |
|---|---|---|
| Soy milk light regular, plain | 1 cup 1 cup | 1 carb + ½ fat 1 carb + 1 fat |
| Yogurt and juice blends low carbohydrate (less than 6 grams/choice) with fruit, low-fat | 1 cup ⅔ cup (6 ounces) ⅔ cup (6 ounces) | 1 fat-free milk 1 carb ½ fat-free milk 1 fat-free milk + 1 carb |

Non-starchy Vegetables

Vegetables with small amounts of carbohydrates and calories are on the **Non-Starchy Vegetables** list. Vegetables contain many important nutrients. Try to eat at least 2-3 non-starchy vegetable choices every day. In general, 1 non-starchy vegetable choice is:

- ½ cup of cooked vegetables or vegetable juice
- 1 cup of raw vegetables

If you eat 3 or more cups of raw vegetables or 1½ cups of cooked vegetables in a meal, count them as 1 carbohydrate choice. A choice on the non-starchy vegetable list (½ cup cooked or 1 cup raw) equals 5 grams of carbohydrates, 2 grams of protein, 0 grams of fat and 25 calories. Fresh and frozen vegetables have less added salt than canned vegetables. Drain and rinse canned vegetables to remove some salt.

Choose dark green and dark yellow vegetables each day. Good choices are spinach, broccoli, romaine, carrots, chilies, squash, and peppers. Brussels sprouts, broccoli, cauliflower, greens, peppers, spinach, and tomatoes are good sources of vitamin C. Eat cruciferous vegetables several times a week. Cruciferous vegetables include bok choy, broccoli, Brussels sprouts, cabbage, cauliflower, collards, kale, kohlrabi, rutabaga, turnip and watercress. Salad greens are on the **Free Foods** list.

Free foods are food or drink choices that have less than 20 calories and 5 grams or less of carbohydrates per serving. It is a good idea to limit free foods to 3 servings per day and spread them throughout the day. A food or beverage listed without a serving size can be eaten whenever you like.

- Artichoke
- Artichoke hearts
- Asparagus
- Baby corn
- Bamboo shoots
- Beans (green, wax, Italian)
- Bean sprouts
- Beets
- Broccoli
- Brussels sprouts
- Cabbage (green, bok choy, Chinese, red)
- Carrots

Free Foods List Continued

- Cauliflower
- Celery
- Coleslaw, no dressing
- Cucumber
- Eggplant
- Green onions
- Jicama
- Kohlrabi
- Leeks
- Mixed vegetables *without* corn, peas or pasta
- Mung bean sprouts
- Mushrooms, all kinds, fresh
- Okra
- Onions
- Pea pods
- Peppers
- Radishes
- Rutabaga
- Sauerkraut
- Soybeans sprouts
- Spinach
- Squash (summer, crookneck, zucchini)
- Sugar snap peas
- Swiss chard
- Tomato
- Tomatoes, canned
- Tomato sauce
- Tomato/vegetable juice
- Turnips
- Water chestnut

| Free Food List Continued | Serving Size |
|--|---------------|
| Low Carbohydrate Foods | |
| Cabbage, raw | ½ cup |
| Candy, hard, regular or sugar-free | 1 piece |
| Carrots, cauliflower, green beans, cooked | ¼ cup |
| Cranberries, sweetened with sugar substitute | ½ cup |
| Cucumber, sliced | ½ cup |
| Gelatin dessert, sugar-free unflavored | |
| Gum | |
| Jam and jelly, light or no sugar added | 2 teaspoons |
| Rhubarb, sweetened with sugar substitute | ½ cup |
| Salad greens | |
| Sugar substitutes | |
| Syrup, sugar-free | 2 tablespoons |
| Condiments | |
| Barbecue sauce | 2 teaspoons |
| Catsup | 1 tablespoon |
| Honey mustard | 1 tablespoon |
| Horseradish | |
| Lemon juice | |
| Mustard | |

| Free Food List Continued | Serving Size |
|---|----------------------------------|
| Parmesan cheese, freshly grated | 1 tablespoon |
| Pickle relish | 1 tablespoon |
| Pickles dill sweet, bread and butter sweet gherkin | 1½ medium 2 slices ¾ ounce |
| Salsa | ¼ cup |
| Soy sauce, light or regular | 1 tablespoon |
| Sweet and sour sauce | 2 teaspoons |
| Sweet chili sauce | 2 teaspoons |
| Taco sauce | 1 tablespoon |
| Vinegar | |
| Yogurt, any type | 2 tablespoons |
| Drinks/Mixes | |
| Bouillon, broth, consommé, carbonated mineral water, club soda, diet soda, sugar-free drink mixes, coffee, tea, tonic water (diet), water | |

Meat and Meat Substitutes

Meat and meat substitutes are rich in protein. Whenever possible, choose lean meats. Read food labels to find “hidden” carbohydrates. Hot dogs and some processed meats, seafood and soy products contain carbohydrates. If the amount of carbohydrate is near 15 grams, count it as one carbohydrate choice. If it is more or less than 15 grams, count it accordingly or adjust the serving size. Meat and fish that is breaded contains carbohydrate. Count 3 tablespoons of cornmeal, flour or bread crumb breading as 15 grams of carbohydrate.

| Carbohydrate-Containing Meat Substitute List | | |
|--|---------------|---------------------------------------|
| Food | Amount | Count as |
| “Bacon” strips, soy-based | 3 strips | 1 medium-fat meat |
| Baked beans | ⅓ cup | 1 starch + 1 lean meat |
| Beans, cooked, black, garbanzo, kidney, lima, navy, pinto, white | ½ cup | 1 starch + 1 lean meat |
| “Beef” or “sausage” crumbles, soy-based | 2 ounces | ½ carbohydrate + 1 lean meat |
| “Chicken” nuggets, soy-based | 2 nuggets | ½ carbohydrate + 1 medium-fat meat |
| Hot dog, soy-based | 1 (1½ ounces) | ½ carbohydrate + 1 lean meat |
| Hummus | ⅓ cup | 1 carbohydrate + 1 high-fat meat |

Carbohydrate-Containing Meat Substitute List Continued

| | | |
|---|------------------|------------------------------------|
| Lentils | ½ cup | 1 carbohydrate + 1 lean meat |
| Meatless burger, soy-based | 3 ounces | ½ carbohydrate + 2 lean meats |
| Meatless burger, vegetable- and starch-based | 1 patty | 1 carbohydrate + 2 lean meats |
| Nut spreads, almond, cashew, peanut and soy nut butters | 1 tablespoon | 1 high-fat meat |
| Peas, cooked: black-eyed and split peas | ½ cup | 1 starch + 1 lean meat |
| Refried beans, canned | ½ cup | 1 starch + 1 lean meat |
| “Sausage” patties, soy-based | 1 (1½ ounces) | 1 medium-fat meat |
| Soy nuts, unsalted | ¾ ounce | ½ carbohydrate + 1 medium-fat meat |
| Tofu | 4 ounces (½ cup) | 1 medium-fat meat |
| Tofu, light | 4 ounces (½ cup) | 1 lean meat |

Combination Foods

Many of the foods we eat are mixtures with foods from one or more food groups. These combination foods do not fit into any one choice list. To figure out the amount of carbohydrate in recipes, find the carbohydrate grams for each ingredient, add them together, then divide the total by the number of servings in the recipe. A good resource for calculating the carbohydrate content of many foods is:

<http://www.nal.usda.gov/fnic/foodcomp/Data/SR18/nutrlist/sr18a205.pdf>

Adapted from: Choose Your Foods: Exchange Lists for Diabetes.
The American Diabetes Association and American Dietetic Association. 2008.