

# Diabetes and Nutrition

## INTRODUCTION

According to the Center for Disease Control and Prevention (CDC), the rates of type 2 diabetes has tripled in the last 30 years. During the period of 1980-1994 there was a 33% increase in diabetes in the United States. African Americans have a 60% higher rate of developing diabetes than Caucasians and Latinos have a 90% increased risk.

One of the reasons for the dramatic increase in diabetes, especially in ethnic populations is lifestyle. Poor eating habits and lack of exercise has contributed to significant obesity in many ethnic populations. Presently, over 60% of Americans are classified as overweight. Only 5% of all Americans who go on a “diet” and achieve their ideal body weight are able to keep it off after one year.

## WHAT IS DIABETES?

Diabetes is a condition in which the body can't use the food you eat in the proper way. When you eat, food is digested and changed into glucose, a sugar the body uses for fuel. Insulin is a hormone that is produced by the pancreas and helps the glucose enter the cells. With diabetes your body does not make enough insulin or does not use it properly. Without insulin, your body cannot use the food you eat. Therefore, the glucose build up in the blood and cells can't get the energy they need because insulin is not available. There are two types of diabetes; type 1 (formally know as juvenile onset) and type 2 (formally known as adult onset).

## HOW IS DIABETES MANAGED?

There are three components to successful management of diabetes: food, physical activity and medication. Food raises the blood sugar and blood fat levels. Physical activity and medication lower blood sugar and fat levels. A balance of these three parts lead to good management of your diabetes.

## WHAT IS THE ROLE OF FOOD AND NUTRITION IN TREATING DIABETES?

Food gives use the energy we need to live. Our body changes most of the food we eat into sugar called glucose that our cells need for energy. You can make a difference in your blood sugar control through your food choices. If you have diabetes it is important that you understand that you **DO NOT** need to eat or purchase special foods. Foods that are good for everyone are good for someone with diabetes.

## WHAT IS THE ROLE OF EXERCISE IN THE MANAGEMENT OF DIABETES?

Regular exercise is a key component to a successful weight loss program. The best way to maintain weight loss is to include some type of physical activity on a daily basis. The addition of exercise not only helps with controlling your blood sugar but also lowers your body fat. For those people with either Diabetes or “Pre-Diabetes”, following a balanced, low-fat, high fiber diet is essential.

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The control of blood glucose through diet is called Medical Nutrition Therapy (MNT). The goals of MNT include:

1. maintaining near-normal blood glucose levels by balancing your food intake with medications (either insulin or oral hypoglycemia agents) and physical activity;
2. achieving optimal serum cholesterol levels;
3. maintaining adequate calorie intake to control weight gain and to achieve weight loss if necessary;
4. preventing and treating acute and long term complications of diabetes;
5. improving your overall health.

Currently there are two popular food management programs that are used as part of MNT for people with diabetes. *Carbohydrate Counting* or the *Exchange System*.

*Carbohydrate Counting* is an easy concept to understand. The main nutrient in food that affects blood glucose levels is carbohydrate. Carbohydrates are composed of starches and sugars. They account for most of the glucose in the bloodstream. Only the amount of carbohydrate intake per meal is counted. Usually this is 45-60 grams per meal. Carbohydrates provide 4 calories of energy per gram. The down side to using this method is that the focus is on carbohydrates and fat and weight management is not initially addressed. In many ethnic populations, weight loss is essential to the prevention of future complications so carbohydrate counting **MAY NOT** be the best method for some ethnic populations.

### FOOD ITEMS THAT ARE HIGH IN CARBOHYDRATE CONTENT

Breads (rolls, pancakes, biscuits)	Desserts (cakes, pies and cookies)
Pasta (noodles and spaghetti)	Candy
Peas	Sodas, Punch, Kool-Aide
Potatoes	Ice Cream
Rice	Frozen Yogurt
Dry beans (pinto, kidney, lima and black eye peas)	Jams and Jellies
Lentils	Syrup
Milk	
Starchy vegetables	

### WHAT IS THE EXCHANGE SYSTEM?

The six Exchange lists help to make your meal plan work. Foods are grouped together on a list because they are alike. Every food on the list has about the same amount of carbohydrates, protein, fat and calories. In the amount given, all the choices on each list are equal. Any food on a list can be exchanged or traded for any other food on the same list. The six lists are starch/bread, meat and substitute, vegetables, fruit, milk and fat.

Using the exchange lists and following your meal plan will provide you with a great variety of food choices and will control the distribution of calories, carbohydrates, protein and fat throughout the day, so that your food and your insulin will balance. The balance is what gives you “good” blood glucose control. Some of the common exchanges are shown in Table 1.

### PROTEIN

## PROTEIN

The body uses protein for growth, maintenance of muscle, skin and energy. Protein provide 4 calorie per gram.

### FOOD ITEMS THAT ARE HIGH IN PROTEIN CONTENT

Meat	Eggs
Poultry	Nuts
Fish	Peanut Butter
Cheese	Soy
Starches and vegetables have small amount	Dry beans and peas

## FATS

Fats are a concentrated energy source. Fat provides 9 calories per gram, more than two times the calories you get from carbohydrates and proteins. There are different types of fat:

Monounsaturated , Polyunsaturated, and Saturated. Saturated fats have been linked to heart disease and have been found to increase your cholesterol levels. The “best” fats are monounsaturated and are found in olive oil, canola oil and peanut oil.

### FOOD ITEMS THAT CONTAIN HIGH AMOUNTS OF FAT

Margarine	Regular Milk
Butter	Regular Cheese
Oils	Meats
Salad Dressings	Poultry
Bacon	Fish
Nuts	Peanut Butter
Sour cream	Avocado

## WATER

Drinking sufficient amounts of water every day is important to a well-balanced diet. Water is another nutrient that the body needs. It is recommended to drink 8 glasses of water daily, unless otherwise indicated by your doctor.

## SALT (SODIUM CHLORIDE)

Americans generally eat more salt than they need. Studies have shown that the average American eats 25 grams of sodium per day. Practically everything you eat contains salt. Make sure you read food labels carefully for the salt or sodium content. Avoid deli foods and processed foods. People with heart disease or high blood pressure should limit their sodium intake.

## FIBER

There are two types of fiber insoluble and soluble. Soluble fiber helps to lower blood cholesterol levels, control blood sugar levels and may also help to control weight.

<b>Insoluble Fiber</b>	<b>Soluble Fiber</b>
Bran cereals	<b>Oat Bran</b>
Popcorn	Oatmeal
Whole grain bread and cereal	Rice bran
Fresh fruit	Barley

Whole grain bread and cereal	Rice bran
Fresh fruit	Barley
<b>Fresh vegetables</b>	Dried beans and peas
	Fresh Fruit
	Fresh vegetables

## ALCOHOL USE AND DIABETES

If you have questions about alcohol use you need to discuss this with your doctor. Alcohol

- Provides calories and has no nutritional value. If approved by your doctor it may be included in your meal plan but should be used sparingly to avoid weight gain
- Can raise or lower blood sugar in some people with diabetes
- When mixed with diabetes medications can cause unpleasant side effects such as nausea, flushing, sweating, or headache.
- Can dramatically lower the blood sugar when the person is on insulin
- Should not be used if the person is taking Metformin

The following guidelines should be followed if your doctor says that alcohol **CAN** be included in your meal plan.

- Drink occasionally and only if your diabetes is “well controlled” (Note: Blood sugar goal should be 90-130mg/dL)
- Use your blood glucose monitor frequently (2 times a day unless at goal)
- Limit your alcohol intake to one drink once or twice a week
- Have alcohol with a meal or snack to prevent low blood sugar reactions
- Avoid sweet drinks, sweet wines, liqueurs
- Alcohol should not be substituted for food if you are taking insulin

## IF YOU HAVE DIABETES, THE FOLLOWING TIPS ARE IMPORTANT:

- You should eat small portions of a well balanced, low fat diet
- Eat about the same amount of food at the same time each day.
- Try not to skip meals and incorporate small snacks into your meal plan. Skipping meals and snacks may lead to large swings in your blood sugar levels, especially if you use medication to control your blood sugar.
- The number of calories you need depends on your weight, height, age and activity level.
- Avoid “fad diets” since some of them may actually cause you to have problems with your kidneys or may adversely affect your blood sugar.

## HOW DO I GET STARTED EATING A HEALTHY DIET AND CONTROLLING MY DIABETES?

The first step is to talk with a registered dietician to determine your daily nutritional need and help you work out your own nutritional prescription. This plan will match the calories, carbohydrates, protein and fat you eat with your own physical activity level and with the insulin in your body. You and the dietitian will work out a specific meal plan for you. Your meal plan is a guide which shows the number of food choices you can eat at each meal and snack. As mentioned earlier the major reason for obesity in the U.S. stems from the fact that we eat **TOO MANY CALORIES** at each meal. Most women can achieve their ideal body weight by consuming 1200-1500 calories per day. Most men require 1800-2000 calories per day. You can eat more calories if you have a very active



Amount Per Serving	Cereal with 1/2 cup	
	Cereal	Skim Milk
<b>Calories</b>	220	260
Calories from Fat	25	25
<b>% Daily Value**</b>		
<b>Total Fat</b> 2.5g*	<b>4%</b>	<b>4%</b>
Saturated Fat 1g	<b>5%</b>	<b>5%</b>
<b>Cholesterol</b> 0mg	<b>0%</b>	<b>0%</b>
<b>Sodium</b> 130mg	<b>5%</b>	<b>7%</b>
<b>Potassium</b> 40mg	<b>1%</b>	<b>7%</b>
<b>Total Carbohydrate</b> 46g	<b>15%</b>	<b>17%</b>
Dietary Fiber 4g	<b>12%</b>	<b>12%</b>
Sugars 16g		
<b>Protein</b> 4g		

In summary, the key to a healthy lifestyle begins with good nutrition. It is important for you and your family to begin eating a low calorie, low fat, balanced diet with an emphasis on increasing your fruits and vegetables. Here are some helpful hints that will help you begin to eat a more healthy diet and achieve your weight loss goals.

1. Set a weight loss goal. Focus on dietary and exercise goals that will give you long term, sustained weight loss.

2. Weight loss goal should be to reduce your body weight by 10 percent from where you started. A weight loss goal should be about 1 to 2 pounds per week for a period of 6 months. Try to decrease your current dietary intake by 500-1000 calories per day to lose 1-2 pounds per week. In order to control your weight you should:

- a. Reduce intake of high fat foods such as fried foods, gravies, salad dressing and other fats
- b. Control portion sizes

3. Eat a well-balanced diet.

- a. Plan to eat meals 4-5 hours apart or have a snack if your meal will be delayed.
- b. Include a variety of foods according to your meal plan.
- c. Distribute foods evenly throughout the day.

4. Eat at least five servings of fruits and vegetables a day Here are some suggestions to help you eat more servings of fruits and vegetables.

- a. Buy frozen, dried, canned and fresh fruits and vegetables
- b. Keep a fruit bowl or small packs or applesauce, carrots or raisins near you at all times
- c. Add berries or sliced fresh fruit to you breakfast cereal
- d. Enjoy ½-¾ cup of 100% fruit juice every morning
- e. Add thinly grated carrots or succini to soups, sauces and casseroles for a light, sweet taste and extra nutrient punch
- f. Choose fruit for dessert. Top low-fat yogurt or sherbet with berries

5. Eat high-fiber foods, aiming for a total fiber intake of 25-30 grams per day.

6. Limit fat

- a. Limit saturated fats such as butter, lard, whole milk, cream cheese, and fatty meats. Use skim or 1 percent milk
- b. Control amount of fat: trim the fat from meat and remove the skin from chicken. When eating meat, poultry, or fish, limit you portion to 2 or 3 ounces (the size of the palm of your hand).
- c. Replace saturated fats with vegetable oil

7. If you have high blood pressure you need to decrease your salt intake to 2000mg of sodium per day.

8. Use low fat cooking techniques like grilling, broiling, baking and steaming

7. If you have high blood pressure you need to decrease your salt intake to 2000mg of sodium per day.
8. Use low-fat cooking techniques like grilling, broiling, baking and steaming. Avoid fried foods.
9. Have no more than one glass of alcohol per day (1 glass = 4 oz or wine, 12 oz. of beer, or 1 ½ oz or 80 proof spirits)

Table 1– Exchange list. Each item listed is one serving

<p><b>STARCH/BREADS</b></p> <p>Starch -1 serving – 80 calories</p> <p>Cereal / Beans / Grains / Pasta</p> <p>Cereal (cooked) ½ cup</p> <p>Beans (cooked or canned) 1/3 cup</p> <p>Rice (cooked) 1/3 cup</p> <p>Pasta (cooked) ½ cup</p> <p>Breads – 1 serving – 80 calories</p> <p>Bagel or English Muffin ½ or 1oz.</p> <p>Bread (slice or roll) 1oz.</p> <p>Crackers, snack 4-5</p> <p>Graham crackers 3 squares</p> <p>Hamburger or hot dog bun ½ or 1oz.</p> <p>Popcorn (plain, unbuttered) 3 cups</p>	<p><b>MILK/ DAIRY PRODUCTS</b></p> <p>Milk – 1 serving = 90-100 calories</p> <p>Low-fat or non fat milk 8 oz.</p> <p>Low-fat or nonfat buttermilk 8 oz.</p> <p>Yogurt (nonfat plain or artificially sweetened) 8 oz</p> <p>Hot cocoa mix (artificially sweetened) 1 envelope</p>
	<p><b>MEATS/ MEAT SUBSTITUTES</b></p> <p>Lean Meats/ Meat Substitutes – 1 serv – 35-55 calories</p> <p>Cheese (1-3 grams of fat) 1 oz.</p> <p>Chicken (white, no skin) 1 oz.</p> <p>Cottage Cheese ¼ cup</p> <p>Fish (tuna, cod, flounder) 1 oz</p> <p>Lean beef (flank, round, sirloin) 1 oz.</p> <p>Turkey (white, no skin) 1 oz</p> <p>Medium/High-fat Meats – 1 serving 75-100 calories</p> <p>Beef 1 oz.</p> <p>Chitterlings 1 oz.</p> <p>Chicken (dark meat, no skin) 1 oz</p> <p>Eggs 1</p> <p>Pork (spareribs, barbecue, chops, cutlets) 1 oz</p> <p>Sausage 1 oz.</p> <p>Weiners 1 oz.</p>
<p><b>FRUIT</b></p> <p>Fruit – 1 serving 60 calories</p> <p>Fruit – 1 serving 60 calories</p> <p>Apple (raw – 2” across)</p> <p>Banana (medium) ½</p> <p>grapefruit juice ½ cup</p> <p>Cherries 12</p> <p>juice 1/3 cup</p> <p>Dried Fruit ¼ cup</p> <p>Canned fruit in juice or water ½ cup</p> <p>Grapes 12-15</p> <p>Apple, orange or</p> <p>Cranberry, grape or prune</p>	
<p><b>Free Foods have less than 20 calories and have very little affect on your blood sugar</b></p> <p>Club soda – (Note: avoid if you have high blood pressure)</p> <p>Drink Mixes</p> <p>Mineral water</p> <p>Tea</p> <p>Gelatin desserts</p> <p>Sugar substitutes</p> <p>Garlic or garlic powder</p> <p>Herbs</p> <p>Mustard</p> <p>Vinegar</p> <p>Salsa</p>	<p><b>FATS</b> – 1 serving – 5 grams fat, 45 calories</p> <p>Avocado (4” across) 1/8</p> <p>Bacon 1 slice</p> <p>Tbsp</p> <p>Oil 1 tsp</p> <p>2 Tbsp</p> <p>Butter 1 tsp</p> <p>Pesto Sauce 2 tsp</p> <p>Margarine 1 tsp</p> <p>Mayonnaise 1 tsp</p> <p>Cream (light, table coffee, sour) 4 tsp</p> <p>Nondairy creamer (liquid) 2</p> <p>Cream (light, table coffee, sour)</p> <p>Nuts or seeds 1 Tbsp</p> <p>Cream Cheese 1 Tbsp</p> <p>Salad Dressing (reduced calorie) 2 Tbsp</p>

Table 2. Calories in daily meal plans

Calorie Meal Plans (Daily)	1,200	1,500	1,800	2,000
Starch	5	7	9	11

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Starch	5	7	8	9
Fruit	3	3	4	4
Milk	2	2	3	3
Vegetables	2	2	3	4
Meat / Meat Substitutes	4	4	6	6
Fat	3	4	4	5

Table 3. Sample Menus for each calorie level

1,200 Calories	1,200 Sample Menu	1,500 Calories	1,800 Calories	2,000 Calories
Breakfast 1 Starch 1 Fruit 1 Milk	English muffin ½ Banana (medium) ½ Hot Cocoa Mix (artificially sweetened) 1 envelope	Add 1 starch	Add 1 Starch	Add 1 Starch 1 Fat
Lunch 1 Starch 2 Meat 1 Vegetable 1 Fruit 1 Fat	1 wheat roll 1 oz. Chicken 1 oz Cheese 1oz Beans Apple (raw – 2” across) Salad dressing (reduced calorie) 2 Tbsp	1 Starch	1 Starch 1 Meat 1 Milk	1 Starch 1 Milk 1 Fat 1 Vegetable
Afternoon Snack Nothing				1 Starch
Dinner 2 Starch 2 Meat 1 Vegetable 1 Fruit 2 Fat	Rice 1/3 cup Peas (cooked) ½ cup Turkey 2 oz. Onions Butter 1 tsp Oil 1 tsp Canned fruit in juice ½ cup			
Evening Snack 1 Starch 1 Milk	Low-fat or nonfat milk 8 oz. Popcorn 3 cups			

Table 4. Glycemic Index.

Cake	90	Waffles	109
Doughnut	108	All Bran Cereal	60
Oat Bran	50	Special K Cereal	77
Cocoa Puffs	110	Brown Rice	79
Oatmeal Cookies	79	White Rice	126
Apple	52	Banana	78
Orange Juice	74	Macaroni & Cheese	92
Orange	62	Carrots	101
French Fries	107	Sweet Potato	77



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French Fries	107	Sweet Potato	77