A s diabetes becomes more prevalent, there are also an increasing number of books and Web sites devoted to diets that claim to control it. Typing “eating for diabetes” into the “Books” section of Amazon’s search engine will retrieve more than 1,500 results. Just as there is more than one way to lose weight, there are multiple eating plans to manage diabetes. Of the many options, low-carbohydrate diets have been around the longest, and over the years considerable research has demonstrated their effectiveness in controlling blood glucose levels. However, they are still controversial.

Before the discovery of insulin in 1921, doctors tried numerous types of diets, including diets with less than 10 grams of carbohydrate per day, to try to manage blood glucose levels in their patients with diabetes. For people with milder diabetes (the terms Type 1 and Type 2 were not yet used), a diet that was very low in carbohydrate and high in fat and calories could result in reasonably good health, sometimes for many years. But this diet was not helpful for people (particularly children) with severe diabetes. For them, it was found that cutting back severely on all food kept them alive longer, but their quality of life was low due to constant hunger and emaciation. Once injectable insulin was available, carbohydrate—and food generally—could be consumed in greater amounts.

Over the years, recommendations from various health organizations have called for consuming a larger percentage of daily intake from carbohydrate based on research suggesting that high intakes of dietary cholesterol and saturated fat may lead to heart disease. Since people with diabetes are at increased risk for cardiovascular disease, many dietitians and doctors began recommending low-fat, higher-carbohydrate diets for these patients.

Currently, for example, MyPlate (www.choosemyplate.gov), which is based on the 2010 Dietary Guidelines for Americans, is promoted as a healthy meal-planning tool for people with and without diabetes. The Dietary Guidelines advise consuming 45% to 65% of one’s calories from carbohydrate (225–325 grams of carbohydrate on a 2,000-calorie diet). But individuals with diabetes have impaired carbohydrate metabolism and may struggle to achieve blood glucose and A1C goals when following this advice.

Up until recently, the American Diabetes Association (ADA) did not recommend carbohydrate-restricted diets, saying there was not enough evidence to support their safety or efficacy. In 2008, however, based on a study comparing a low-fat diet to a low-carbohydrate diet, the ADA changed its position, stating that either diet may be used for weight management purposes for up to one year and, more recently, two
An eating plan is generally considered “low carbohydrate” if it contains less than 130 grams per day.

years. And in October 2013, the ADA issued a position statement on nutrition recommendations for people with diabetes in which carbohydrate restriction was listed as one of several eating patterns that could be used for diabetes management.

Currently, however, many dietitians and certified diabetes educators recommend that their patients with diabetes base their meals on MyPlate, which specifies that half the plate contain higher-carbohydrate foods (fruits and grains), along with additional carbohydrate from a serving of dairy (unless cheese is selected as the dairy choice).

Among the reasons dietitians give for not recommending low-carbohydrate diets are that such diets are too restrictive and difficult to maintain long term, that they are nutritionally inferior to higher-carbohydrate meal plans, or that they are dangerous because of the high fat content and reliance on ketones (by-products of fat metabolism) as a source of energy. Some dietitians also feel strongly that people with diabetes should be able to eat the same foods as healthy people—including cake and other desserts on occasion—as long as they take enough insulin or oral diabetes medicine to prevent high blood glucose levels.

Defining a low-carbohydrate diet

What level of carbohydrate classifies a diet as low carbohydrate? Although there is no formal definition, an eating plan is generally considered “low carbohydrate” if it contains less than 130 grams per day, which is the amount of glucose needed to meet the brain’s energy needs. Fortunately, glucose is not the only fuel the brain can use. Most of the brain can also use ketone bodies, which, as mentioned earlier, are by-products of fat metabolism, as an alternative source of energy (as can many other tissues in the body). When carbohydrate intake is decreased, the liver responds by increasing ketone production.

In addition to ketones, most organs can also use fatty acids for energy in place of glucose. For the few structures that cannot use ketones or fatty acids, the liver can make glucose from amino acids and other molecules in a process called gluconeogenesis, or “creating new glucose.” However, even very-low-carbohydrate diets typically provide a small amount of glucose. In most of the studies that have been conducted on carbohydrate restriction for diabetes, subjects consumed about 20–50 grams of carbohydrate per day.

Nutritional ketosis, or the state of having elevated blood ketone levels, should not be confused with diabetic ketoacidosis, a serious and potentially fatal condition that can occur in people with diabetes, particularly Type 1, in response to illness or other stressors. In diabetic ketoacidosis, the level of ketones in the blood is much higher than in nutritional ketosis, and blood glucose level is also extremely elevated as a result of insufficient insulin.

What’s the evidence?

Since carbohydrate is the nutrient primarily responsible for raising blood glucose, it follows that decreasing the amount eaten may lead to lower postmeal blood glucose levels among people with diabetes and prediabetes (a condition in which blood glucose levels are higher than normal but not high enough for a diagnosis of diabetes). Indeed, Eric Westman, MD, and William Yancy, MD, of Duke University have conducted studies on very-low-carbohydrate diets in people with Type 2 diabetes in which as many as 95% of participants were able to discontinue or reduce their doses of oral diabetes medicines and insulin due to significant improvements in blood glucose control.

There is research supporting carbohydrate restriction in the management of Type 1 diabetes as well. A team of researchers in Sweden led by Dr. Jorgen V. Nielsen found lower A1Cs, fewer incidents of hypoglycemia (low blood glucose), and more favorable lipid (blood fat) profiles in subjects with Type 1 diabetes following a low-carbohydrate diet for up to four years. There are some early animal studies suggesting that certain complications of diabetes—primarily kidney damage—may be reversed with a very-low-carbohydrate, moderate-protein diet.

Most low-carbohydrate diets contain more saturated fat than the ADA’s recommendation of less than 7% of total calories, and in the past this was thought to increase cardiovascular disease risk. But looking at new studies and revisiting older research suggests that saturated fat has been unfairly linked to heart disease. A recent review of 23 studies found no correlation between saturated fat intake and heart attacks, and other research indicates that inflammation rather than saturated fat plays the largest role in the development of atherosclerosis and coronary artery disease. There is a growing body of research suggesting that restricting carbohydrate not only improves blood glucose control but also results in a more favorable lipid profile despite a higher percentage of calories from fat and saturated fat.

Many people with diabetes, particularly those with Type 2, struggle to maintain a healthy body weight. Following a lower-carbohydrate diet often results in weight loss in addition to improvement in blood glucose control. In studies conducted
Carbohydrate-restricted diets have been found to be at least as effective as low-fat diets for weight loss.

within the past 10 years, carbohydrate-restricted diets have been found to be at least as effective as low-fat diets, if not more so, for weight loss.

Low-carbohydrate diets in practice
Richard K. Bernstein, MD, is a well-known advocate of carbohydrate restriction. Diagnosed with Type 1 diabetes in 1946 at age 12, he developed a very-low-carbohydrate diet in the early 1970’s after years of struggling with large blood glucose fluctuations, vision problems, early kidney disease, and pain from neuropathy (nerve damage). He found that by consuming 30 grams of carbohydrate per day—6 grams for breakfast and 12 grams each for lunch and dinner—and consequently needing only small amounts of insulin to “cover” such small amounts of carbohydrate, his blood glucose could kept in the normal range.

Dr. Bernstein has continued to follow this regimen for the past 40 years and prescribes it to the patients he treats with both Type 1 and Type 2 diabetes at his practice in New York City. In his book Dr. Bernstein’s Diabetes Solution, he writes, “If the kinds of foods you’re eating give you consistently unpredictable blood glucose levels, then it will be impossible to normalize blood sugars.” To prevent such unpredictability, Dr. Bernstein recommends that dietary carbohydrate come only from nonstarchy vegetables, nuts, and other slow-digesting carbohydrate sources.

Steven Parker, MD, is the author of Conquer Diabetes and Prediabetes: The Low-Carb Mediterranean Diet and owner of the Diabetic Mediterranean Diet Web site (http://diabeticmediterraneandiet.com). Both the book and Web site provide low-carbohydrate and ketogenic versions of the traditional Mediterranean diet. Parker’s low-carbohydrate version contains 60–100 grams of carbohydrate per day, and his ketogenic version 20–40 grams. The ketogenic version is so named because while some people develop higher blood ketone levels with a “regular” low-carbohydrate diet, many people need to keep their carbohydrate intake under 50 grams per day to see higher ketone levels.

Dr. Parker does not treat people with diabetes on an outpatient basis, but he discusses low-carbohydrate eating plans with the patients he encounters in his job as a hospitalist in Scottsdale, Arizona. He believes carbohydrate restriction can play a valuable role in blood glucose control. And although he recognizes the effectiveness of Dr. Bernstein’s plan, Dr. Parker recommends 60–80 grams of net carbohydrate per day for long-term management because he feels it is more acceptable and easier to maintain. (Parker defines net carbohydrate as total carbohydrate minus grams of fiber.)

Helen Hilts, MD, has been prescribing a low-carbohydrate diet to her patients with diabetes for several years. She is the medical director of the DiabeVita medical practice in Scottsdale, Arizona. After being diagnosed with Type 2 diabetes nine years ago, she began following a very-low-carbohydrate diet based on her own research as well as a mentorship with Dr. Bernstein.

“I have a few hundred patients who have followed a very-low-carbohydrate diet for at least two years,” she says. “I recommend no more than 30–45 grams of carbs a day, and those only come in low-carbohydrate vegetables, Greek yogurt, nuts, small portions of berries or tomatoes, etc. No roots, fruits, grains, or liquid milk.” Dr. Hilts follows the same eating plan and maintains an A1C under 5% without medication.

“I see more doctors and diabetes educators reluctantly accepting very-low-carb as viable because they have seen such good results in their patients,” she says, noting that cardiologists seem to accept carbohydrate restriction faster than endocrinologists. “They understand carbohydrates’ effects on insulin resistance, hyperinsulinemia, lipids, and the metabolic syndrome.”

After being diagnosed with Type 1 diabetes in 1998, Keith Runyan, MD, had a difficult time controlling his blood glucose levels on the low-fat diet he was advised to follow. While preparing for his first Ironman triathlon in 2011, he began researching dietary strategies to keep his blood glucose stable for long periods. By February 2012, he had devised the very-low-carbohydrate,
Diabetes is an individualized disease, and a way of eating that works for one person may not work as well for another.

Giving low-carb eating a try
It is important to speak with your physician or medical provider before starting a low-carbohydrate diet and to follow up frequently, particularly if you take insulin or insulin-stimulating oral medicines. These include sulfonylureas (glipizide, glyburide, and glimepiride) and meglitinides (repaglinide and nateglinide).

Once you have your health-care provider’s OK to try a low-carbohydrate meal plan, how low should you go? Even among advocates of carbohydrate restriction, there is no universal agreement as to the ideal amount of carbohydrate to consume. Most would agree that this varies somewhat from person to person. Generally speaking, most people on carbohydrate-restricted diets consume somewhere in the range of 30–100 grams of carbohydrate daily. How to count the fiber in the carbohydrate foods you consume is another area of debate. Some experts recommend counting all the fiber as digestible carbohydrate, while other recommend subtracting grams of indigestible fiber. Because certain types of fiber may have a small impact on blood glucose, while others do not, counting half the grams of fiber you consume as carbohydrate may be the most accurate method.

Balanced meal planning. To get all of the nutrients you need, it’s important to have a balance of fat, protein, and carbohydrate from plant and animal sources. Aim for whole foods rather than processed foods whenever possible. A typical dinner meal might consist of 4–6 ounces of grilled meat or fish, 2 cups of vegetables sautéed in olive oil, and half a cup of raspberries with whipped cream and chopped nuts for dessert. Typically people report being less hungry on a carbohydrate-restricted meal plan due to the satiety (feeling of fullness) provided by higher levels of fat and protein, but if hunger strikes between meals, a handful of nuts or a piece of string cheese are good, low-carbohydrate options.

Fluid and sodium. In the initial stage of a very-low-carbohydrate diet, dietary sodium needs are increased because the kidneys excrete larger amounts of this mineral. Therefore, the addition of 1–2 cups of broth (providing 1,000–2,000 milligrams of sodium) is recommended for people consuming less than 60 grams of carbohydrate per day, along with at least 64 ounces (8 cups) of water. However, increasing sodium and fluid may not be safe for people who are taking a diuretic drug for the treatment of high blood pressure or congestive heart failure. People in this situation should speak with their doctor before increasing their sodium and fluid intake.

Diabetes medicines. To reduce the risk of hypoglycemia when adopting a low-carbohydrate diet, insulin or insulin-stimulating medicines will need to be reduced. Any medication adjustment should be done in coordination with a doctor, nurse practitioner, or other health-care professional.

Support. While it is important to be followed by a doctor or other medical professional, there are several Web sites that provide information as well as moral support to people with diabetes who chose to consume a carbohydrate-restricted diet, including Dr. Bernstein’s forum at www.diabetes-book.com and Active Low Carber forums at http://forum.lowcarber.org.

Is low-carb right for everyone?
Following a low-carbohydrate diet can result in improved blood glucose control for some, but it may not be right for all people with diabetes or prediabetes. Some people may find it too difficult to adhere to on a consistent basis. TuDiabetes (www.tudiabetes.org), an online diabetes community, provides a forum for its thousands of members to discuss various issues related to diabetes. Carbohydrate restriction is a perennial topic, with some members reporting that it is the only way they are able to control their blood glucose, and others stating that they actually do better with higher carbohydrate intake. Diabetes is an individualized disease, and a way of eating that works for one person may not work as well for another. Having a number of dietary options, including carbohydrate restriction, gives you the opportunity to try different approaches and find out what works well for you.

Franziska Spritzler is a dietitian in private practice and a freelance writer in Huntington Beach, California.