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Nutrition care and education of the patient with diabetes in the Joslin Clinic

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Abstract

The Joslin Clinic has more than eighty years of experience in providing high-quality nutrition care and education to its patients. A wide variety of educational programs, classes, and individual appointments are available to patients in order to improve their nutrition and diabetes self-care knowledge. Nutrition care follows the guidelines of the American Diabetes Association as well as the Joslin Diabetes Center's Clinical Nutrition Guidelines. Nutrition professionals in the clinic utilize innovative educational methods tailored to the medication regimens and individual characteristics of the patients to help them optimize their eating patterns and meal planning.

Keywords: diabetes mellitus, therapeutic education, nutrition.

The Joslin Diabetes Center is a world-renowned center for research, clinical care, and education in diabetes. Its work in all these areas contributes to excellence in patient care. This article reviews nutrition education in the Joslin Clinic. It begins with a historical perspective on patient education and then describes the educational programs currently offered. It later focuses on the nutrition guidelines and meal planning methods used with Joslin Clinic patients.

A brief history of education in the Joslin Clinic

Dr. Elliott P. Joslin made the support of education for people with diabetes a central tenet of his career; his

obituary mentions that "Joslin was best known for his inauguration of education for the diabetic patient".^{1,2} He believed that the best way to care for patients with diabetes was to teach them how to care for themselves, stating, "Teaching is cheaper than nursing". He saw education as a good way to avoid dealing with costly and painful complications later on. This approach is now common and known as diabetes self-management education (DSME).

Although Joslin began his practice in 1898, the role of education as a separate, supporting discipline did not emerge prominently until the clinical use of insulin began. In the 1920s, the "wandering" diabetes teaching nurse was introduced. These nurses traveled to the homes of patients with diabetes to instruct them on a variety of topics from insulin injection technique to methods for measuring food accurately for appropriate meal planning. In 1957, another innovation in diabetes education was introduced: the diabetes treatment unit (DTU). The DTU was a hospital inpatient unit where patients would stay for a week or two in order to learn how to care for their diabetes. The DTU included classrooms, a kitchen, and a gymnasium so that the patients could learn in as practical and realistic a setting as possible. Dr. Joslin believed that group education was extremely beneficial, stating, "We can only scratch one back at a time, but we can teach many patients together and each is likely to teach another".

In 1979, the Joslin Clinic began to offer education to its patients on an outpatient basis. A dietitian, or specialist in the meal planning aspects of diabetes, was added to the education team. In 1989, an exercise physiologist was also added to the education team. This same year, the DTU was closed because of an inability to obtain medical insurance reimbursement for the intensive education services it offered. Diabetes patient education was

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Abbreviations:

ADA: American Diabetes Association; DO IT: Diabetes Outpatient Intensive Treatment Program; DTU: diabetes treatment unit.

then primarily given on an outpatient basis. In 1990, the Joslin Clinic began the Diabetes Outpatient Intensive Treatment Program, or DO IT, in response to the lack of an intensive inpatient experience. This program aims to provide the same intensive education in diabetes self-management training, but on an outpatient basis.

Current educational programs

The educational offerings of the Joslin Clinic are constantly evolving to meet the changing needs of its patients. Currently it offers a wide variety of educational opportunities to help its patients improve their diabetes self-management.

Diabetes Today and related group classes

Diabetes Today is a set of classes designed to help newly diagnosed and other patients with knowledge deficits acquire basic knowledge necessary for self-care (figure 1).

- *First Steps* is designed to teach patients about the pathophysiology of diabetes, medications used to treat it, prevention of complications, and other basic information about the disease.
- *What Can I Eat?* and *Foods That Fit* are basic nutrition classes that cover such topics as what constitutes a healthy diet, methods for carbohydrate counting, basic meal planning, handling the challenges of eating out, and the importance of record-keeping for blood glucose levels and foods eaten.

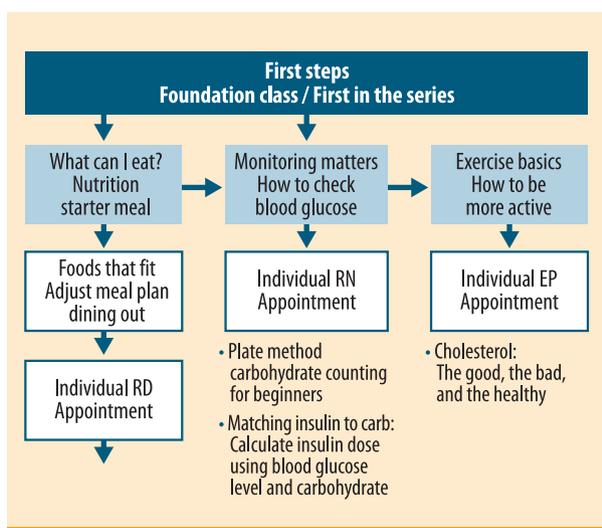


Figure 1. Joslin Care. *Diabetes Today* program

- *Exercise basics* teaches patients both practical tips and motivational techniques for becoming more active or managing their activity better in conjunction with their diabetes.
- Additional classes are available for more specific topics, such as how to match insulin dose to carbohydrate intake or how to reduce high cholesterol.

After taking the basic classes of *Diabetes Today*, patients receive individualized education sessions with nurse educators, dietitians, and exercise physiologists.

DO IT (Diabetes Outpatient Intensive Treatment Program)

DO IT is a three and a half day intensive program for outpatients with type 1 or type 2 diabetes. Patients and family members have access to a multidisciplinary team consisting of a doctor, teaching nurses, a dietitian, an exercise physiologist, and a social worker. They receive a complete assessment from each team member and then are offered daily visits with the doctor as well as a variety of individual and group diabetes education experiences. These experiences are very practical and include not only classroom discussions, but also real-life decisions that participants make during the program for exercise, meals, and insulin adjustments. Documented results of the *DO IT* program include:³

- Patients' A1C values have improved by an average of almost 1.5 points.
- Those patients with A1Cs of greater than 10 reduced their levels by an average of 2.75 points in the first 3-6 months after the program.
- The patients' emergency room visit and hospitalization rates were reduced by 50% in the first year post-program.
- Time lost from school or work was reduced by 43% in the first year.

Why WAIT?

Why WAIT? is a twelve-week comprehensive weight reduction and diabetes management program. The *Why WAIT?* program includes nutrition education classes and a meal plan consisting of a meal replacement shake for breakfast; another shake with salad for lunch; snacks of fruits, vegetables, nuts or yogurt; and balanced dinner menus based on the Joslin Nutritional Guidelines. Participants also receive a complete assessment, constant monitoring and adjustment of medications, a personalized fitness plan and weekly exercise sessions with an exercise

physiologist, and group sessions with a psychologist focusing on behavior change. Patients have the opportunity to participate in monthly support groups once they have finished the program to help them maintain their weight loss.

Insulin pump and continuous glucose monitoring system programs

Education is essential to the Joslin Clinic's insulin pump program, which is the largest in the world. Patients considering the insulin pump may take the class *Insulin Pumping – Is It Right for You?* to learn basic information about insulin pump function and the advantages and disadvantages of an insulin pump. Potential pump patients will then have an assessment with a pump educator to determine if a pump is appropriate for them and whether there are any knowledge deficits that must be resolved before they can start on a pump.

Once patients have acquired their insulin pump, they attend the *Foundations of Pump Therapy* class in order to learn practical information about how to use and troubleshoot the specific pump they have chosen. At the end of this class, patients begin pump usage with saline solution. Patients have individual follow-up appointments with pump educators to start the pump on insulin, to troubleshoot any problems that may come up, and to focus on the challenges of eating and physical activity while on a pump.

Sensor Logic is a class that is available to users of continuous glucose monitoring systems (CGMS). Patients learn how to interpret and act on CGMS data in order to improve their glycemic control.

Easy Start Exercise Club

This club offers biweekly exercise sessions of two hours each supervised by an exercise physiologist. Physical activity in this accepting and comfortable environment provides an excellent opportunity for education about physical activity and diabetes. The program's objectives include increasing physical activity levels safely, improving hemoglobin A1C through a reduction of insulin resistance, controlling body weight, and learning to recognize, prevent, and treat exercise-related hypoglycemia.

Behavioral health services

The Joslin Clinic's Behavioral Health Unit offers counseling for individuals who are coping with stress and

psychological issues related to their diabetes. The department is staffed with psychologists, clinical social workers, and psychiatrists who specialize in chronic diseases. The Behavioral Health Unit also offers Blood Glucose Awareness Training workshops, where patients who are hypoglycemia-unaware receive cognitive training to become aware of subtler neuroglycopenic symptoms of hypoglycemia in order to detect and prevent hypoglycemia.

Latino Initiative in diabetes

The objective of the *Latino Initiative* is to improve the lives of Latinos with diabetes or at high risk of developing the disease. The Initiative achieves its objective through culturally appropriate clinical care and patient education, community outreach, and clinical research. Patient education consists of individualized appointments with culturally competent diabetes educators fluent in Spanish as well as a version of *Diabetes Today* designed for Latino patients. The Latino classes are geared toward the educational, linguistic, and cultural characteristics of the Latino population. They include *The Plate Method* and *Carbohydrate Counting for Beginners*, two classes designed specifically for low-literacy patients that are not included in the general clinic education program.

The Joslin Diabetes Center's Latino Initiative also offers the opportunity for physicians, medical residents, or fellows from Spanish-speaking countries to participate in a structured visitor program. In this program, visitors observe clinical care and patient education, participate in medical conferences, and assist with current research activities.

Other programs

The Joslin Clinic offers a variety of specialized clinics in order to better coordinate diabetes care by working together as a team in one institution. These specialized clinics include nephrology, geriatric medicine, neurology, pregnancy, sexual function, lipids, obesity, and the Asian American Initiative. Joslin Clinic educators specializing in these areas are available to the patients in these clinics.

Nutrition guidelines

In all educational programs and individual nutrition appointments, Joslin nutrition educators employ nutrition

guidelines to provide a common basis for care. The Joslin Clinic's guidelines for nutrition education are based on the American Diabetes Association's (ADA) Nutrition Recommendations and the Joslin Diabetes Center's Clinical Nutrition Guidelines for Overweight and Obese Adults with Type 2 Diabetes, Prediabetes, or Those at High Risk for Developing Type 2 Diabetes.^{4,5} The guidelines for the three macronutrients of protein, fat, and carbohydrates are reviewed below.

Protein

Protein-rich foods are essential for a variety of reasons, including building and repairing muscle tissue as well as immune function. ADA recommends that proteins constitute 15-20% of total caloric intake in those patients with normal renal function. For those with chronic kidney disease, 0.8-1 grams of protein per kilogram of body weight are recommended. The Joslin Obesity Guidelines recommend 20-30% of total calories as protein for patients with normal renal function. This increased protein percentage is suggested because protein helps to increase satiety and therefore reduce caloric consumption to promote weight loss. Protein also assists in maintaining the body's lean muscle mass during weight loss. Protein-rich foods that are also low in saturated fat should be used, including fish, skinless poultry, low-fat dairy products, beans, and soy products.

Fat

ADA recommends limiting saturated fat to less than 7% of total caloric consumption for improved cardiac health, and total fat to 20-35% of total calories. Trans fats should be avoided as much as possible, and dietary cholesterol limited to 200 milligrams per day. Two servings of fish per week are suggested because it is a rich source of omega 3 fatty acids. The Joslin Obesity Guidelines suggest 30-35% of total caloric intake as fat, distributed as less than 10% polyunsaturated fat, 15-20% monounsaturated fat, and less than 7% saturated fat. This higher percentage of fat intake may help the patient to lower carbohydrate consumption in order to improve glycemic control. The Joslin Obesity guidelines suggest increasing consumption of foods high in heart-healthy fats like olive and canola oils, nuts, seeds, and fish while limiting consumption of foods high in saturated fat like lamb, beef, pork, and high-fat dairy products. They also recommend avoiding products with trans fat like fast food, packaged baked goods, and some margarines.

While adding heart-healthy fats can be beneficial for a variety of reasons, it is still important to limit fat consumption. Fat is the most calorie-dense nutrient, at nine kilocalories per gram versus only four per gram of carbohydrate or protein. Thus it is easy to ingest too many calories from fats and interfere with weight control if total fat consumption is not limited.

Carbohydrates

Many patients with diabetes are conflicted about carbohydrate consumption. It is the principal source of energy for the body and the preferred fuel for the brain, but can easily cause hyperglycemia when consumed in excess. Patients need to be taught that starch and sugar, two types of carbohydrate, can significantly affect their blood glucose level while fiber, a third type, passes through the digestive system mostly undigested and thus has minimal effect on blood glucose.

ADA guidelines do not support the use of low carbohydrate diets of less than 130 grams per day in people with diabetes. They recommend approximately 40-65% of calories as carbohydrate, but also reinforce the importance of some type of planning for carbohydrate consumption in order to maintain good glycemic control. This method may include carbohydrate counting, the exchange lists, food groups, or other techniques. Sucrose may be included in a healthy diet for someone with diabetes, as with any source of carbohydrate. However, its consumption must be limited in order to prevent weight gain. Fiber intake is encouraged at the level of approximately 14 grams per 1000 calories consumed, as is suggested for the general American population.

The Joslin Obesity Guidelines recommend a lower carbohydrate intake than ADA, approximately 40% of total calories but no lower than a minimum of 130 grams per day. They suggest that the glycemic index and glycemic load are useful tools for achieving glycemic control by encouraging the selection of higher quality carbohydrate foods. These foods include vegetables, fruits, legumes, and whole grains. In addition, the guidelines discourage consumption of higher glycemic index foods like refined pasta, white bread, low-fiber cereal, and white potatoes. The Joslin Guidelines recommend a minimum consumption of 20-35 grams of fiber per day, and up to 50 grams per day if tolerated. Fiber supplements like psyllium or β -glucan may be used if necessary to achieve these goals.

Table 1. Build Skills for Diabetes Meal Planning

- Refine skills/Glycemic Index
- Use Insulin: Carb Ratio
- Count carbohydrate grams
- Count portions: 1 portion = 15 grams of CHO
- Portions, weigh and measure foods
- Identify carbohydrates (4 groups: starch, fruits, milk, sweets)
- Physical Activity. Principles of healthy eating - low fat

Table 2. The type of medication determines the nutritional plan

Type of treatment	Nutrition plan
Lifestyle changes or oral hypoglycemic agents (not sulfonylureas)	Weight loss using portion control and physical activity; avoid excessive carbohydrate consumption
NPH Insulin and Regular	Consistent carbohydrate consumption; fixed schedule
Glargine/detemir insulin with a fixed of rapid-acting insulin; or Sulfonylureas; or Sliding scale of rapid-acting insulin	Consistent carbohydrate consumption; more flexible schedule
Adjust rapid-acting insulin to carbohydrate intake with multiple daily injections or an insulin pump	Advanced carbohydrate counting – flexible consumption of carbohydrates and flexible schedule

Techniques for meal planning

The above nutrition guidelines are an important basis for the guidance given to Joslin patients seeking to improve their nutritional intake. However, educational techniques for meal planning, especially in reference to carbohydrate consumption, are also essential in order to enable patients to achieve their goals for glycemic control.

The selection of the patient’s medication regimen and nutrition plan is always influenced by his or her cognitive abilities, motivation level, and other personal characteristics. A focus on appropriate levels of physical activity and heart healthy eating principles is beneficial for all patients. As patients progress in their understanding and motivation, they may be able to utilize more sophisticated information, even as far as incorporating the glycemic index into their selection of foods (table 1).

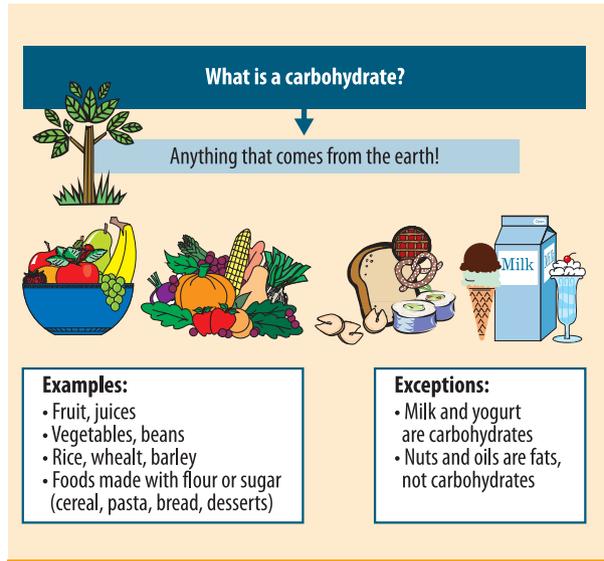


Figure 2

The optimal nutritional plan for someone with diabetes depends on what medication regimen he or she is following (table 2). For those patients who are managing their diabetes with only lifestyle changes or with most oral hypoglycemic agents, meal planning should focus on the promotion of weight loss using portion control and physical activity, as well as on avoidance of excessive carbohydrate consumption. For those on less flexible insulin regimens, like those using NPH and regular insulins, a fixed eating schedule and consistent carbohydrate intake at meals and snacks are essential. With sulfonylureas, meglitinides, or long-acting insulin and either a fixed dose or sliding scale of rapid-acting insulin at meals, meal planning is slightly more flexible. Carbohydrate intake at meals still needs to be consistent in order to achieve optimal glycemic control but meal schedules may vary somewhat more. Those patients adjusting their doses of rapid-acting insulin with meals or using an insulin pump must learn to master advanced carbohydrate counting in order to achieve good glycemic control, but they also have great flexibility in terms of schedule and carbohydrate intake.

Basic methods of meal planning

The most basic level of understanding necessary for glycemic control is to be able to identify the food groups that contain carbohydrates. These groups include starches, fruits, milk, and sweets (figure 2). Easy mnemonic devices like “Carbohydrates are anything that comes

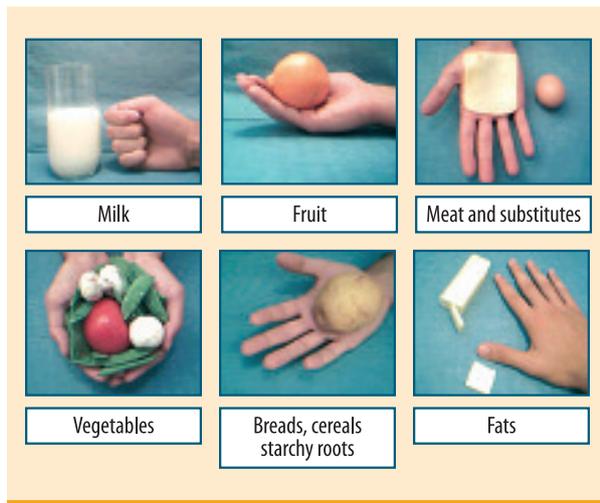


Figure 3. Appropriate portions

from the earth” can help patients who are having difficulty remembering these basic concepts. These patients benefit from such basic knowledge even if they do not progress further. Knowing which foods contain carbohydrates may encourage them to reduce their carbohydrate consumption if it is currently excessive.

Once identifying carbohydrate-containing foods has been mastered, incorporating the notion of portion size into meal planning has additional benefits for improving glycemic control. A simplified method for estimating appropriate portions is to use the hand (figure 3). For example, a portion of fruit, milk or unsweetened yogurt is equivalent to the size of an average woman’s fist while a portion of starch or meat and other protein foods is equivalent to the size of the palm of her hand. One of the greatest benefits of this method is that a person’s hands are always with him or her, so this measurement tool is available at all eating occasions.

The Plate Method is a meal planning technique that is easy to use and helps to maintain nutritionally balanced eating as well as aids in glycemic control (figure 4). The plate is half-filled with non-starchy vegetables that are extremely low in carbohydrates and calories. One quarter of the plate is filled with carbohydrate options such as starches. The last quarter is filled with protein-rich food like fish, chicken, beef, egg or cheese. In addition, the plate has one or two carbohydrate servings on the side, like a piece of fruit or a glass of low-fat milk or a whole grain dinner roll.

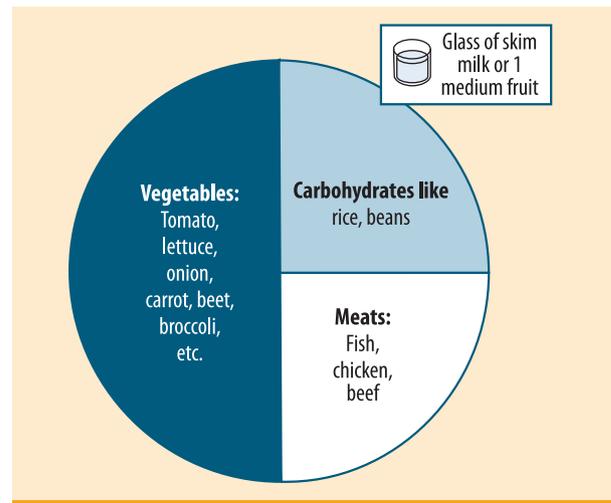


Figure 4. The Plate Method

The Plate Method accomplishes several goals: it limits the ingestion of carbohydrate portions to three to four in order to aid in glycemic control; it encourages increased vegetable consumption; and it promotes nutritional balance amongst the food groups. When using this tool, it is important to remember to encourage patients to choose the best options from each category, i.e. whole grains for starches and leaner meats for proteins. The Plate Method can be used as the basis for low-literacy and easy-to-understand programs.⁶

Basic carbohydrate counting

Although the Plate Method and using the hand to estimate portions may improve glycemic control for the patient who is currently not using any meal planning technique, they are not as accurate as other methods such as carbohydrate counting. For those patients on basal-bolus insulin regimens or sulfonylureas, setting specific goals for number of carbohydrate portions or carbohydrate grams per meal greatly improves glycemic control. In the United States, a carbohydrate portion is estimated to be equivalent to 15 grams of carbohydrate (table 3).

Patients utilizing basic carbohydrate counting as a meal-planning tool work with their nutrition educator to set goals for carbohydrate consumption for each meal and snack. The patients need to attempt to stay as consistent as possible with this daily plan to reduce variations in blood glucose (table 4). These goals for carbohydrate intake take into account the patient’s habits as well as metabolic goals like weight loss. However, it is best for car-

Table 3. One portion = 15 grams of carbohydrate

Starch
<ul style="list-style-type: none"> • 1 slice bread • 1/3 cup pasta • 3/4 cup cereal • 4 - 6 crackers • 1/3 cup rice
Fruits
<ul style="list-style-type: none"> • 1 small fruit • 1/2 cup juice
Milk
<ul style="list-style-type: none"> • 1 cup skim/low-fat • 1 cup plain yogurt
Desserts / Other
<ul style="list-style-type: none"> • 2 cookies • 1 Tbsp jam, honey • 1/2 cup ice cream

bohydrate to equal at least a minimum of 130 grams per day. In addition, many patients benefit from having carbohydrate goals between 30-75 grams per meal in order to spread their allotment for the day more evenly amongst their three meals.

Once patients have agreed upon goals for carbohydrate consumption, the next challenge is providing the tools for awareness of the quantity of carbohydrates in foods. Measuring foods accurately is an essential component of effective carbohydrate counting. Therefore, measuring cups or scales are indispensable tools for carbohydrate counting. There are also many other tools that make carbohydrate counting easier and more accurate. One source of excellent information is the food label on packaged items. Another example is the many lists and books available with carbohydrate values of numerous foods, allowing for easier estimation of the carbohydrate in these items. The internet has many websites that contain extensive databases of food values, recipe analysis tools, and weekly menu planners.

In addition, many American fast food chains and chain restaurants now have nutrition facts for their menu items listed on their websites. This information can be very helpful given how difficult it is to estimate carbohydrate content in restaurant portions that are usually large and made with unknown ingredients. However, this information should be used cautiously, since the portions listed

Table 4. Consistent carbohydrate (grams)

	Mon	Tues	Wed
Breakfast	30 - 45	30 - 45	30 - 45
Lunch	45 - 60	45 - 60	45 - 60
Dinner	45 - 60	45 - 60	45 - 60
Snack	15 - 30	15 - 30	15 - 30

on the websites are not always the same size as the portions served in the restaurant.

Advanced carbohydrate counting

Once the patient has mastered accurate estimation of carbohydrate content, advanced carbohydrate counting is the next level of meal planning. This method involves adjusting the dose of rapid-acting insulin both to the amount of carbohydrate to be consumed as well as to the current blood glucose level. This technique can be very beneficial for glycemic control in those patients on multiple daily insulin injections or insulin pump treatment. However, successful advanced carbohydrate counting requires a patient with a high level of understanding, as well as the ability to do mathematical calculations, troubleshoot problems, and keep detailed records. It also requires a willingness to take multiple injections or boluses each day, as well as measure blood glucose throughout the day.

Advanced carbohydrate counting calculations involve three numbers that are different for each individual patient:

1. The insulin to carbohydrate ratio represents the number of grams of carbohydrate that are covered by one unit of insulin for that person.
2. The sensitivity (or correction) factor is the number of points that the blood glucose will be reduced by taking one unit of insulin.
3. A specific blood glucose target.

These numbers are necessary to calculate the amount of mealtime insulin needed to reach a desirable post-prandial blood glucose or to correct high blood glucose between meals. Since sensitivity to insulin may vary by time of day, each of these numbers may also vary depending on the time of day for each patient.

While this meal planning method is demanding for the patient, it gets easier as the patient gains more experi-

ence with it. Advanced carbohydrate counting is worth the extra effort, because it is the best way to maintain optimal glycemic control for intensive insulin regimens.

Conclusion

The Joslin Clinic's long history of innovative patient education has enabled it to maintain a high level of nutrition care. The guidelines and principles of the Joslin educational programs and tools may be adapted for use in a variety of other diabetes outpatient facilities. Adaptation of these ideas according to the resources and individual characteristics of other sites has the potential to yield great benefits.

These guidelines and principles embrace a multidisciplinary approach, including doctors, nurse practitioners, nurse educators, registered dietitians, exercise physiologists, psychologists, and social workers. A variety of group classes, programs, and individual counseling sessions are used to teach patients about diabetes, its treat-

ment and complications, nutrition, and exercise. Nutrition guidelines and techniques for meal planning are emphasized. All patients are supported in developing their individual knowledge and abilities to manage their diabetes and improve their outcomes. ■

References

1. Allen NA. The history of diabetes nursing, 1914-1936. *The Diabetes Educator*. 2003;29:976-89.
2. Barnett DM, Elliott P. Joslin, MD. A Centennial Portrait, Boston, MA, Joslin Diabetes Center, 1998.
3. Diabetes education. DO IT: Diabetes Outpatient Intensive Treatment Program [online], 2007. Available from http://www.joslin.org/755_1409.asp. Accessed 10 Jan 2008.
4. American Diabetes Association. Nutrition recommendations and interventions for diabetes: a position statement of the American Diabetes Association. *Diabetes Care*. 2008;31:S61-S78.
5. Joslin Diabetes Center. Clinical nutrition guideline for overweight and obese adults with type 2 diabetes, prediabetes, or those at risk for developing type 2 diabetes [guidelines online], 2007. Available from http://www.joslin.org/Files/Nutrition_Guideline_Graded.pdf. Accessed 10 Jan 2008.
6. Raidl M, Spain K, Lanting R, Lockard M, Johnson S, Spencer M, et al. The healthy diabetes plate. *Prev Chronic Dis*. 2007;4:1-7.