

Introduction

According to the American Diabetes Association (ADA), Medical Nutrition Therapy (MNT) is an integral component of diabetes management and diabetes self-management training (DSMT) (ADA 2008b). MNT has been shown, through clinical trials and outcome studies, to demonstrate decreases in A1C of approximately 1% in type 1 diabetes and 1–2% in type 2 diabetes (Pastors et al. 2002; Pastors, Franz, et al. 2003). By helping patients choose foods and plan meals to monitor their carbohydrate intake and achieve their MNT and diabetes care goals, carbohydrate counting is an attractive meal-planning approach (ADA 2008b).

The following MNT goals for diabetes management (ADA 2008b) are to:

1. Achieve and maintain (refer to Table I-1 for these goals):
 - a. Blood glucose levels in the normal range or as close to normal as is safely possible.
 - b. A lipid and lipoprotein profile that reduces the risk for vascular disease.
 - c. Blood pressure levels in the normal range or as close to normal as is safely possible.
2. Prevent, or at least slow, the rate of development of the chronic complications of diabetes by modifying nutrient intake and lifestyle.
3. Address individual nutrition needs, taking into account personal and cultural preferences and willingness to change.
4. Maintain the pleasure of eating by limiting food choices only when indicated by scientific evidence.

Table I-1. Target Glycemic Goals for Adults with Diabetes

A1C	<7.0%*
Preprandial capillary plasma glucose	70–130 mg/dl (3.9–7.2 mmol/l)
Peak postprandial capillary plasma glucose†	<180 mg/dl (<10.0 mmol/l)
Key concepts in setting glycemic goals:	
<ul style="list-style-type: none">• A1C is the primary target for glycemic control• Goals should be individualized based on:<ul style="list-style-type: none">• duration of diabetes• pregnancy status• age• comorbid conditions• hypoglycemia unawareness• individual patient considerations• More stringent glycemic goals (i.e., a normal A1C, <6%) may further reduce complications at the cost of increased risk of hypoglycemia• Postprandial glucose may be targeted if A1C goals are not met despite reaching preprandial glucose goals.	

*Referenced to a nondiabetic range of 4.0–6.0% using a DCCT-based assay.
†Postprandial glucose measurements should be made 1–2 h after the beginning of the meal, generally peak levels in patients with diabetes.
Source: Reprinted by permission from *American Diabetes Association: Clinical Practice Recommendations 2008* (American Diabetes Association, 2008), S18, table 8

Regarding glycemic goals for infants, children, and adolescents, the ADA position statement *Care of Children and Adolescents with Type 1 Diabetes* states that near-normalization of blood glucose levels in children and adolescents is generally the same as that for adults (ADA 2005). However, the position statement details a number of caveats that discuss the greater risks of hypoglycemia and the difficulty of achieving tight glycemic control in this age population. The position statement specifies A1C goals that differ from the adult A1C goal for three age groups as follows:

- Children <6 years old: 7.5–8.5%
- Children 6–12 years old: < 8%
- Adolescents: 7.5%

Making the necessary lifestyle changes to eat healthy with diabetes, in addition to acquiring and utilizing the knowledge to both prospectively and retrospectively manage glycemic control acutely and chronically, is one of the most challenging aspects of diabetes care. Helping people with diabetes achieve these goals is also challenging for their providers. Many factors contribute to the challenge of glycemic control, including those listed in Table I-2. Yet, it has been shown that people at varying levels of ability and motivation, as well as people implementing various diabetes therapies, can use carbohydrate counting to achieve short- and long-term glycemic and health goals (Anderson et al. 1993; DAFNE Study Group 2002).

Table I-2. Interrelated Factors That Determine Plasma Glucose Concentration

Numerous interrelated factors determine plasma glucose concentration in people with diabetes*, including:

1. Carbohydrate composition of food
2. Rate of gastric emptying
3. Rate of glucose absorption
4. Concurrent magnitude of endogenous glucose production
5. Concurrent rate of glucose disposal
6. Diurnal change in insulin sensitivity
7. Activity of counterregulatory hormones
8. Change in the magnitude and type of exercise
9. Ambient insulin concentration
10. Consumption of alcohol
11. Acute illness
12. Emotional stress

*This list constitutes a lengthy, yet incomplete, list of interrelated factors that affect plasma glucose. Several were listed in reference (Schade and Valentine 2006).

To help facilitate these established health outcomes, *Practical Carbohydrate Counting: A How-to-Teach Guide for Health Professionals* is designed to:

1. Provide educators with the concepts to cover when teaching Basic and Advanced Carbohydrate Counting
2. Help educators learn how to assess preexisting knowledge and abilities and determine if and when a person is ready to progress their level of carbohydrate counting

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3. Discuss related dietary and nondietary factors, beyond the carbohydrate content of foods, that affect blood glucose control
4. Utilize case studies for Basic and Advanced Carbohydrate Counting that illustrate the use of this meal planning approach
5. Offer educators a variety of carbohydrate counting resources