Complete Summary

GUIDELINE TITLE

Nutrition recommendations and interventions for diabetes: a position statement of the American Diabetes Association.

BIBLIOGRAPHIC SOURCE(S)

American Diabetes Association, Bantle JP, Wylie-Rosett J, Albright AL, Apovian CM, Clark NG, Franz MJ, Hoogwerf BJ, Lichtenstein AH, Mayer-Davis E, Mooradian AD, Wheeler ML. Nutrition recommendations and interventions for diabetes: a position statement of the American Diabetes Association. Diabetes Care 2008 Jan;31 Suppl 1:S61-78. [119 references] PubMed

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The evidence grading system for clinical practice recommendations (A through C, E) is defined at the end of the "Major Recommendations" field.

Major Nutrition Recommendations and Interventions

Effectiveness of Medical Nutrition Therapy (MNT)

- Individuals who have pre-diabetes or diabetes should receive individualized MNT; such therapy is best provided by a registered dietitian familiar with the components of diabetes MNT. (B)
- Nutrition counseling should be sensitive to the personal needs, willingness to change, and ability to make changes of the individual with pre-diabetes or diabetes. (E)

Energy Balance, Overweight, and Obesity

- In overweight and obese insulin-resistant individuals, modest weight loss has been shown to improve insulin resistance. Thus, weight loss is recommended for all such individuals who have or are at risk for diabetes. (A)
- For weight loss, either low-carbohydrate or low-fat calorie-restricted diets may be effective in the short term (up to 1 year). (A)
- For patients on low-carbohydrate diets, monitor lipid profiles, renal function, and protein intake (in those with nephropathy), and adjust hypoglycemic therapy as needed. (E)
- Physical activity and behavior modification are important components of weight loss programs and are most helpful in maintenance of weight loss. (B)

- Weight loss medications may be considered in the treatment of overweight and obese individuals with type 2 diabetes and can help achieve a 5% to 10% weight loss when combined with lifestyle modification. (B)
- Bariatric surgery may be considered for some individuals with type 2 diabetes and body mass index (BMI) $\geq$35 kg/m^2 and can result in marked improvements in glycemia. The long-term benefits and risks of bariatric surgery in individuals with pre-diabetes or diabetes continue to be studied. (B)

Nutrition Recommendations and Interventions for the Prevention of Diabetes (Primary Prevention)

- Among individuals at high risk for developing type 2 diabetes, structured programs that emphasize lifestyle changes that include moderate weight loss (7% body weight) and regular physical activity (150 min/week), with dietary strategies including reduced calories and reduced intake of dietary fat, can reduce the risk for developing diabetes and are therefore recommended. (A)
- Individuals at high risk for type 2 diabetes should be encouraged to achieve the United States Department of Agriculture (USDA) recommendation for dietary fiber (14 g fiber/1,000 kcal) and foods containing whole grains (one-half of grain intake). (B)
- There is not sufficient, consistent information to conclude that low–glycemic load diets reduce the risk for diabetes. Nevertheless, low–glycemic index foods that are rich in fiber and other important nutrients are to be encouraged. (E)
- Observational studies report that moderate alcohol intake may reduce the risk for diabetes, but the data do not support recommending alcohol consumption to individuals at risk of diabetes. (B)
- No nutrition recommendation can be made for preventing type 1 diabetes. (E)
- Although there are insufficient data at present to warrant any specific recommendations for prevention of type 2 diabetes in youth, it is reasonable to apply approaches demonstrated to be effective in adults, as long as nutritional needs for normal growth and development are maintained. (E)

Nutrition Recommendations for the Management of Diabetes (Secondary Prevention)

Carbohydrate in Diabetes Management

- A dietary pattern that includes carbohydrate from fruits, vegetables, whole grains, legumes, and low-fat milk is encouraged for good health. (B)
- Monitoring carbohydrate, whether by carbohydrate counting, exchanges, or experienced-based estimation, remains a key strategy in achieving glycemic control. (A)
- The use of glycemic index and load may provide a modest additional benefit over that observed when total carbohydrate is considered alone. (B)
- Sucrose-containing foods can be substituted for other carbohydrates in the meal plan or, if added to the meal plan, covered with insulin or other glucose-lowering medications. Care should be taken to avoid excess energy intake. (A)
- As for the general population, people with diabetes are encouraged to consume a variety of fiber-containing foods. However, evidence is lacking to

recommend a higher fiber intake for people with diabetes than for the population as a whole. (B)
- Sugar alcohols and nonnutritive sweeteners are safe when consumed within the daily intake levels established by the Food and Drug Administration (FDA). (A)

Dietary Fat and Cholesterol in Diabetes Management

- Limit saturated fat to <7% of total calories. (A)
- Intake of *trans* fat should be minimized. (E)
- In individuals with diabetes, limit dietary cholesterol to <200 mg/day. (E)
- Two or more servings of fish per week (with the exception of commercially fried fish filets) provide n-3 polyunsaturated fatty acids and are recommended. (B)

Protein in Diabetes Management

- For individuals with diabetes and normal renal function, there is insufficient evidence to suggest that usual protein intake (15% to 20% of energy) should be modified. (E)
- In individuals with type 2 diabetes, ingested protein can increase insulin response without increasing plasma glucose concentrations. Therefore, protein should not be used to treat acute or prevent nighttime hypoglycemia. (A)
- High-protein diets are not recommended as a method for weight loss at this time. The long-term effects of protein intake >20% of calories on diabetes management and its complications are unknown. Although such diets may produce short-term weight loss and improved glycemia, it has not been established that these benefits are maintained long term, and long-term effects on kidney function for persons with diabetes are unknown. (E)

Alcohol in Diabetes Management

- If adults with diabetes choose to use alcohol, daily intake should be limited to a moderate amount (one drink per day or less for women and two drinks per day or less for men). (E)
- To reduce risk of nocturnal hypoglycemia in individuals using insulin or insulin secretagogues, alcohol should be consumed with food. (E)
- In individuals with diabetes, moderate alcohol consumption (when ingested alone) has no acute effect on glucose and insulin concentrations but carbohydrate co-ingested with alcohol (as in a mixed drink) may raise blood glucose. (B)

Micronutrients in Diabetes Management

- There is no clear evidence of benefit from vitamin or mineral supplementation in people with diabetes (compared with the general population) who do not have underlying deficiencies. (A)
- Routine supplementation with antioxidants, such as vitamins E and C and carotene, is not advised because of lack of evidence of efficacy and concern related to long-term safety. (A)

- Benefit from chromium supplementation in individuals with diabetes or obesity has not been clearly demonstrated and therefore cannot be recommended. (E)

Nutrition Interventions for Specific Populations

Nutrition Interventions for Type 1 Diabetes

- For individuals with type 1 diabetes, insulin therapy should be integrated into an individual's dietary and physical activity pattern. (E)
- Individuals using rapid-acting insulin by injection or an insulin pump should adjust the meal and snack insulin doses based on the carbohydrate content of the meals and snacks. (A)
- For individuals using fixed daily insulin doses, carbohydrate intake on a day-to-day basis should be kept consistent with respect to time and amount. (C)
- For planned exercise, insulin doses can be adjusted. For unplanned exercise, extra carbohydrate may be needed. (E)

Nutrition Interventions for Type 2 Diabetes

- Individuals with type 2 diabetes are encouraged to implement lifestyle modifications that reduce intakes of energy, saturated and *trans* fatty acids, cholesterol, and sodium and to increase physical activity in an effort to improve glycemia, dyslipidemia, and blood pressure. (E)
- Plasma glucose monitoring can be used to determine whether adjustments in foods and meals will be sufficient to achieve blood glucose goals or if medication(s) needs to be combined with MNT. (E)

Nutrition Interventions for Pregnancy and Lactation with Diabetes

- Adequate energy intake that provides appropriate weight gain is recommended during pregnancy. Weight loss is not recommended; however, for overweight and obese women with gestational diabetes mellitus (GDM), modest energy and carbohydrate restriction may be appropriate. (E)
- Ketonemia from ketoacidosis or starvation ketosis should be avoided. (C)
- MNT for gestational diabetes mellitus focuses on food choices for appropriate weight gain, normoglycemia, and absence of ketones. (E)
- Because gestational diabetes mellitus is a risk factor for subsequent type 2 diabetes, after delivery, lifestyle modifications aimed at reducing weight and increasing physical activity are recommended. (A)

Nutrition Interventions for Older Adults with Diabetes

- Obese older adults with diabetes may benefit from modest energy restriction and an increase in physical activity; energy requirement may be less than for a younger individual of a similar weight. (E)
- A daily multivitamin supplement may be appropriate, especially for those older adults with reduced energy intake. (C)

Treating and Controlling Diabetes Complications (Tertiary Prevention)

Microvascular Complications

- Reduction of protein intake to 0.8 to 1.0 g/kg body wt/day in individuals with diabetes and the earlier stages of chronic kidney disease (CKD) and to 0.8 g/kg body wt/day in the later stages of CKD may improve measures of renal function (urine albumin excretion rate, glomerular filtration rate) and is recommended. (B)
- MNT that favorably affects cardiovascular risk factors may also have a favorable effect on microvascular complications such as retinopathy and nephropathy. (C)

Treatment and Management of Cardiovascular Disease (CVD) Risk

- Target A1C is as close to normal as possible without significant hypoglycemia. (B)
- For patients with diabetes at risk for cardiovascular disease, diets high in fruits, vegetables, whole grains, and nuts may reduce the risk. (C)
- For patients with diabetes and symptomatic heart failure, dietary sodium intake of <2,000 mg/day may reduce symptoms. (C)
- In normotensive and hypertensive individuals, a reduced sodium intake (e.g., 2,300 mg/day) with a diet high in fruits, vegetables, and low-fat dairy products lowers blood pressure. (A)
- In most individuals, a modest amount of weight loss beneficially affects blood pressure. (C)

Nutrition Interventions for Acute Complications and Special Considerations for Patients with Comorbidities in Acute and Chronic Care Facilities

Hypoglycemia

- Ingestion of 15 to 20 g glucose is the preferred treatment for hypoglycemia, although any form of carbohydrate that contains glucose may be used. (A)
- The response to treatment of hypoglycemia should be apparent in 10 to 20 minutes; however, plasma glucose should be tested again in approximately 60 minutes, as additional treatment may be necessary. (B)

Acute Illness

- During acute illnesses, insulin and oral glucose-lowering medications should be continued. (A)
- During acute illnesses, testing of plasma glucose and ketones, drinking adequate amounts of fluids, and ingesting carbohydrate are all important. (B)

Patients with Diabetes in Acute Health Care Facilities

- Establishing an interdisciplinary team, implementation of MNT, and timely diabetes-specific discharge planning improves the care of patients with diabetes during and after hospitalizations. (E)
- Hospitals should consider implementing a diabetes meal-planning system that provides consistency in the carbohydrate content of specific meals. (E)

Patients with Diabetes in Long-term Care Facilities

- The imposition of dietary restrictions on elderly patients with diabetes in long-term care facilities is not warranted. Residents with diabetes should be served a regular menu, with consistency in the amount and timing of carbohydrate. (C)
- An interdisciplinary team approach is necessary to integrate MNT for patients with diabetes into overall management. (E)
- There is no evidence to support prescribing diets such as "no concentrated sweets" or "no sugar added." (E)
- In the institutionalized elderly, undernutrition is likely and caution should be exercised when prescribing weight loss diets. (B)

Definitions:

American Diabetes Association's Evidence Grading System for Clinical Practice Recommendations

A

Clear evidence from well-conducted, generalizable, randomized controlled trials that are adequately powered, including:

- Evidence from a well-conducted multicenter trial
- Evidence from a meta-analysis that incorporated quality ratings in the analysis
- Compelling non-experimental evidence (i.e., "all or none" rule developed by the Center for Evidence Based Medicine at Oxford*)

Supportive evidence from well-conducted randomized, controlled trials that are adequately powered, including:

- Evidence from a well-conducted trial at one or more institutions
- Evidence from a meta-analysis that incorporated quality ratings in the analysis

**Either all patients died before therapy and at least some survived with therapy, or some patients died without therapy and none died with therapy. Example: use of insulin in the treatment of diabetic ketoacidosis.*

B

Supportive evidence from well-conducted cohort studies, including:

- Evidence from a well-conducted prospective cohort study or registry
- Evidence from a well-conducted meta-analysis of cohort studies

Supportive evidence from a well-conducted case-control study

C

Supportive evidence from poorly controlled or uncontrolled studies, including:

- Evidence from randomized clinical trials with one or more major or three or more minor methodological flaws that could invalidate the results
- Evidence from observational studies with high potential for bias (such as case series with comparison with historical controls)
- Evidence from case series or case reports

Conflicting evidence with the weight of evidence supporting the recommendation

E

Expert consensus or clinical experience

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Decreased risk of diabetes and cardiovascular disease through promoting healthy food choices and physical activity leading to moderate weight loss
- Normalization of blood glucose levels, lipid and lipoprotein profiles, and blood pressure
- Modification of nutrient intake and lifestyle to prevent, or at least slow, the rate of development of the chronic complications of diabetes

POTENTIAL HARMS

Exercise can pose potential risks such as cardiac ischemia, musculoskeletal injuries, and hypoglycemia in patients treated with insulin or insulin secretagogues.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

Evidence is only one component of clinical decision-making. Clinicians care for patients, not populations; guidelines must always be interpreted with the needs of the individual patient in mind. Individual circumstances, such as comorbid and

coexisting diseases, age, education, disability, and, above all, patients' values and preferences, must also be considered and may lead to different treatment targets and strategies. Also, conventional evidence hierarchies, such as the one adapted by the American Diabetes Association, may miss some nuances that are important in diabetes care. For example, while there is excellent evidence from clinical trials supporting the importance of achieving glycemic control, the optimal way to achieve this result is less clear. It is difficult to assess each component of such a complex intervention.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

In recent years, numerous health care organizations, ranging from large health care systems such as the U.S. Veteran's Administration to small private practices have implemented strategies to improve diabetes care. Successful programs have published results showing improvement in process measures such as measurement of A1C, lipids, and blood pressure. Successful interventions have been focused at the level of health care professionals, delivery systems, and patients. Features of successful programs reported in the literature include:

- Improving health care professional education regarding the standards of care through formal and informal education programs.
- Delivery of diabetes self-management education (DSME), which has been shown to increase adherence to standard of care.
- Adoption of practice guidelines, with participation of health care professionals in the process. Guidelines should be readily accessible at the point of service, such as on patient charts, in examining rooms, in "wallet or pocket cards," on personal digital assistants (PDAs), or on office computer systems. Guidelines should begin with a summary of their major recommendations instructing health care professionals what to do and how to do it.
- Use of checklists that mirror guidelines have been successful at improving adherence to standards of care.
- Systems changes, such as provision of automated reminders to health care professionals and patients, reporting of process and outcome data to providers, and especially identification of patients at risk because of failure to achieve target values or a lack of reported values.
- Quality improvement programs combining Continuous Quality Improvement (CQI) or other cycles of analysis and intervention with provider performance data.
- Practice changes, such as clustering of dedicated diabetes visits into specific times within a primary care practice schedule and/or visits with multiple health care professionals on a single day and group visits.
- Tracking systems either with an electronic medical record or patient registry have been helpful at increasing adherence to standards of care by prospectively identifying those requiring assessments and/or treatment modifications. They likely could have greater efficacy if they suggested specific therapeutic interventions to be considered for a particular patient at a particular point in time.
- A variety of non-automated systems, such as mailing reminders to patients, chart stickers, and flow sheets, have been useful to prompt both providers and patients.

- Availability of case or (preferably) care management services, usually by a nurse. Nurses, pharmacists, and other non-physician health care professionals using detailed algorithms working under the supervision of physicians and/or nurse education calls have also been helpful. Similarly dietitians using medical nutrition therapy (MNT) guidelines have been demonstrated to improve glycemic control.
- Availability and involvement of expert consultants, such as endocrinologists and diabetes educators.

Evidence suggests that these individual initiatives work best when provided as components of a multifactorial intervention. Therefore, it is difficult to assess the contribution of each component; however, it is clear that optimal diabetes management requires an organized, systematic approach and involvement of a coordinated team of health care professionals.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness
Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

American Diabetes Association, Bantle JP, Wylie-Rosett J, Albright AL, Apovian CM, Clark NG, Franz MJ, Hoogwerf BJ, Lichtenstein AH, Mayer-Davis E, Mooradian AD, Wheeler ML. Nutrition recommendations and interventions for diabetes: a position statement of the American Diabetes Association. Diabetes Care 2008 Jan;31 Suppl 1:S61-78. [119 references] PubMed

ADAPTATION

Not applicable: The guideline was not adapted from another source.

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1998 (revised 2008 Jan)

GUIDELINE DEVELOPER(S)

American Diabetes Association - Professional Association

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GUIDELINE COMMITTEE

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: American Diabetes Association. Nutrition recommendations and interventions for diabetes: A position statement of the American Diabetes Association. Diabetes Care 2007 Jan;30 Suppl 1:S48-65. [119 references]

GUIDELINE AVAILABILITY

Electronic copies: Available from the American Diabetes Association (ADA) Web site.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Introduction. Diabetes Care 31:S1-S2, 2008.
- Strategies for improving diabetes care. Diabetes Care 31:S44, 2008.

Electronic copies: Available from the American Diabetes Association (ADA) Web site.

The following are also available:

- Diagnosis and classification of diabetes mellitus. Diabetes Care 2008 Jan; 31 Suppl 1:S55-60. Electronic copies: Available from the American Diabetes Association (ADA) Web site.
- 2008 clinical practice recommendations standards of care. Personal digital assistant (PDA) download. Available from the American Diabetes Association (ADA) Web site.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI Institute on April 25, 2007. The information was verified by the guideline developer on April 30, 3007. This summary was updated most recently by ECRI Institute on April 1, 2008. The updated information was verified by the guideline developer on May 15, 2008.

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