Nutrition Practice Guidelines for Diabetes Type 1 and 2

QUALITY COMMITTEE ADOPTION DATE: MARCH 2007
LAST REVIEW DATE: SEPTEMBER 2013
NEXT SCHEDULED REVIEW DATE: SEPTEMBER 2015
PROVIDER/STAFF DISTRIBUTION DATE: SEPTEMBER 2013
GUIDELINE METHODOLOGY: EVIDENCE-BASED METHOD
CONTACT PERSON(S): ALICE TOGUCHI-MATSUO
DEPARTMENT(S): REGIONAL DIETICIANS
FOOD AND NUTRITION SERVICES
TELEPHONE: 808-432-2360

DISCLAIMER
Adherence to this clinical recommendation is voluntary. The recommendations provided should not be considered inclusive of all proper methods of care or exclusive of other methods of care reasonably directed to obtaining the same results. The ultimate judgment regarding the propriety of any specific procedures must be made by the physician in light of the individual circumstances presented by the patient.

Copyright 2013
All rights reserved.
Nutrition Practice Guidelines for Diabetes Type 1 and 2

Introduction
These evidence-based Nutrition Practice Guidelines (NPGs) include guidelines for type 1 and type 2 diabetes. These NPGs are based upon separate protocols for diabetes type 1 and 2 originally published in 1996 by the American Dietetic Association (1) and revised in 2001 (2). Kaiser Permanente Hawaii Region (KPHI) RDs have modified these protocols to align them with KPHI’s operations and systems.

The NPGs consist of five parts -
1. Description of the NPGs (Purpose, assumptions, healthcare team context, referral process, frequency of dietitian visits, summary of nutrition recommendations, nutrition recommendations for acute complications, co-morbid conditions, and special populations, dietitian role in the instruction and monitoring of patients' self-management effectiveness, expected nutrition outcomes, and methods of evaluation).
2. Medical Nutrition Protocol for Diabetes Mellitus Type 1
3. Medical Nutrition Protocol for Diabetes Mellitus Type 2
4. Appendices
5. References

Nutrition Practice Guidelines for gestational diabetes mellitus (GDM) and pre-diabetes are addressed in separate documents.

Purpose
Nutrition Practice Guidelines (NPGs):
• provide systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances (3),
• are based on a synthesis of scientific literature, expert opinion and clinical practice,
• define MNT shown to improve metabolic abnormalities (glucose, lipids, and blood pressure, if present), provide optimum nutrition and reduce complications of diabetes,
• are not intended to replace a clinician’s judgment.

Assumptions
• MNT is essential to achieving glycemic control.
• The RD is the healthcare provider best prepared to provide MNT.
• Metabolic control can prevent or delay the onset of complications in individuals with either type 1 or type 2 diabetes mellitus.
• The RD will work in collaboration with other health care providers and maintain appropriate communication.
• The NPGs will be implemented at all Kaiser Permanente Hawaii Region outpatient clinics.

Components of MNT for Diabetes
Six key components of MNT for diabetes are:
• improving health through healthy food choices and physical activity,
• integration of blood glucose monitoring, MNT, and changes in therapy (nutrition and medical) to improve clinical outcomes,
• adjustment of food intake and physical activity to improve blood glucose and HbA1C control,
• modification of nutrient intake and lifestyle for the prevention and treatment of co-morbid conditions of diabetes,
• integration of insulin regimens (and other medications) into the lifestyle of persons with diabetes, and
• timing of office visits for nutrition intervention and the evaluation of MNT outcomes.
Referral Guidelines to a Dietitian

The medical doctor who is caring for the patient’s diabetes must make the MNT referral. The minimum information to be provided to the dietitian is:

- Reason for referral including diagnoses, for example: “MNT for DM type 2.”
- Exercise restrictions.

Other information includes the following list. If these data are not provided, the RD should obtain it through the medical record or by contacting the referring physician.

- Diabetes therapy, duration, and control.
- Current medical condition and medications.
- Pertinent laboratory data (HbA1C, lipids, blood pressure, renal function if applicable).
- Pertinent/relevant impressions of patient.
- Patient care goals.

Appendix 1. Referral Process to Outpatient RDs for Medical Nutrition Therapy.

Referral from the Dietitian to Other Health Care Providers

If the person referred lacks the physical, mental, and/or economic capability necessary to self-manage his/her diabetes condition, the RD will offer a referral to support the patient’s management goals with the approval of the patient’s PCP. The referral will be communicated to the primary care physician and/or the health care team to prevent duplication of services or confusion to the patient. Some disciplines may require a physician’s referral.

Once the need is identified, a determination is to be made as to whether the support services should be provided in conjunction with nutrition therapy or prior to initiation of MNT. The person or department to whom the referral is made will be informed of this decision. For example, if the person with diabetes is unable to self-manage due to stress or emotional difficulties, these problems or situations must be addressed. The RD may:

- Work in tandem with a behavioral specialist to resolve issues.
- Provide basic reinforcement of diabetes care principles while the individual receives psycho/social therapy or behavioral therapy.
- Provide simplified nutrition guidelines.
- Focus on obtaining needed services and lessen emphasis on nutrition changes.
- Delay further intervention until the situation is improved/resolved.

Table 1. Possible Disciplines & Services for Referring Patients with Diabetes

<table>
<thead>
<tr>
<th>Disciplines</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCP for medical management</td>
<td>Drug and alcohol support services</td>
</tr>
<tr>
<td>Nurse diabetes specialist/RN case manager*</td>
<td>Rehabilitation services for the blind</td>
</tr>
<tr>
<td>Behavioral Health Services</td>
<td>Vision loss services</td>
</tr>
<tr>
<td>Social Services</td>
<td>Emergency food services</td>
</tr>
<tr>
<td>Clinical pharmacist</td>
<td>Public health services</td>
</tr>
<tr>
<td>Foot care specialists*</td>
<td>Family planning-women of reproductive age</td>
</tr>
<tr>
<td></td>
<td>Dental Exam</td>
</tr>
</tbody>
</table>

*MD referral required
Nutrition Practice Guidelines for Diabetes Type 1 and 2

Recommended visit schedule for MNT

Visits for MNT intervention and evaluation are critical components of these NPGs.

Table 2. Summary of Recommended Time to Provide Medical Nutrition Therapy (4)

<table>
<thead>
<tr>
<th>Encounter</th>
<th>Length of Encounter</th>
<th>Time Between Encounters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>45-90 minutes</td>
<td>1 to 4 weeks*</td>
</tr>
<tr>
<td>2nd</td>
<td>30-45 minutes</td>
<td>2 to 6 weeks</td>
</tr>
<tr>
<td>3rd</td>
<td>30-45 minutes</td>
<td>2 to 6 weeks</td>
</tr>
<tr>
<td>4th, 5th</td>
<td>30-45 minutes</td>
<td>3 to 6 months</td>
</tr>
<tr>
<td>6th etc.</td>
<td>30-45 minutes</td>
<td>As indicated by clinical data and/or changes in medication</td>
</tr>
</tbody>
</table>

Minimum of 1 annual follow up visit.

*Newly diagnosed patients and hospital discharges to be seen within 1-2 weeks of referral.

Frequency of Laboratory Monitoring (6)

The RD has a role in ensuring that laboratory values are monitored at recommended intervals. Last results should be reviewed prior to the patient visit; as necessary, the RD will work with the physician to order the necessary tests.

- HbA1C: every three to six months.
- Fasting blood glucose: three months after initiation of MNT to assess effectiveness of regimen. (optional)
- Fasting lipid panel: annually.
- Urine microalbumin/urine protein: annually for Type 2. Annually for patients over age 12 or with diabetes for over 5 years for Type 1.
- Liver function tests annually
- Serum creatinine and calculated GFR annually
- TSH for type 1, dyslipidemia, women over 50 years of age annually

Special considerations for medication use:

- Metformin:
  - Check annually: lipid profile, spot microalbumin, creatinine, CBC
  - Check Vitamin B12 levels every 2-3 years for deficiency.
- Miglitol:
  - Baseline Cr, AST, ALT, alk, Phos, T. Bili and continue to monitor if elevated.
- Lovastatin:
  - Baseline ALT and at 1 month after initiation of therapy.
- Lisinopril:
  - Potassium and creatinine at baseline and at 1-2 weeks after initiation of therapy

Others:

- Dilated eye examination: annually
- Foot examination: annually
Nutrition Practice Guidelines for Diabetes Type 1 and 2

Clinical Outcomes
Clinical outcomes of Medical Nutrition Therapy in Diabetes (5)

- Blood glucose levels in the target range to the greatest extent possible to prevent the complications of diabetes.
- Lipid and lipoprotein profiles that reduces the risk for cardiovascular disease.
- Blood pressure levels that reduce risk for vascular disease.

Blood Glucose Goals

Table 3. Blood Plasma (6)

<table>
<thead>
<tr>
<th>Preprandial</th>
<th>2 hours postprandial</th>
<th>Pre-bedtime</th>
<th>Hemoglobin A1c</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-130 mg/dl</td>
<td>≤180 mg/dl</td>
<td>110-150 mg/dl</td>
<td>&lt;7%</td>
</tr>
</tbody>
</table>

Treatment Goals for Hypertension and Dyslipidemia

Since individuals with diabetes are at high risk for cardiovascular disease, identification and treatment of hypertension and dyslipidemia are important in decreasing the morbidity and mortality in individuals with diabetes (7-10). The 2001 Adult Prevention and Treatment Guidelines for treating hyperlipidemia are also appropriate for those with diabetes. Recommendations of the DASH (Dietary Approaches to Stop Hypertension) diet- 10 servings of fruits and vegetables, 3 servings of low fat dairy products, whole grain breads and cereals and nuts is also appropriate for persons with diabetes (11,12).

Table 4. Treatment Goals in adults with diabetes (13, 14)

<table>
<thead>
<tr>
<th>LDL-Cholesterol, mg/dL</th>
<th>&lt;100</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDL-Cholesterol, mg/dL</td>
<td>&gt;45*</td>
</tr>
<tr>
<td>Triglyceride, mg/dL</td>
<td>&lt;150</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>&lt;140/&lt;90</td>
</tr>
</tbody>
</table>

*For women, the HDL cholesterol values should be increased by 10 mg/dL.

Treatment Decisions Based on LDL-Cholesterol

Dyslipidemia needs to be treated more aggressively in individuals with diabetes. The American Diabetes Association and Kaiser Care Management Institute (CMI) Adult Diabetes Guidelines recommends the following treatment guidelines (14,15).

Table 5. Therapeutic Approaches to LDL Cholesterol Lowering in Persons with Diabetes (13)

<table>
<thead>
<tr>
<th>LDL-Cholesterol Level</th>
<th>Initiate Therapeutic Lifestyle Changes (TLC)?</th>
<th>Initiate LDL-Lowering Drugs?</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;130 mg/dL</td>
<td>Yes</td>
<td>Start simultaneously with TLC</td>
</tr>
<tr>
<td>100-129 mg/dL</td>
<td>Yes</td>
<td>Consider drug options</td>
</tr>
<tr>
<td>&lt;100 mg/dL</td>
<td>Yes</td>
<td>LDL-lowering drugs not required</td>
</tr>
</tbody>
</table>
Goals of Medical Nutrition Therapy for Diabetes (5)

Goals of medical nutrition therapy that apply to all persons with diabetes are as follows:

1. Attain and maintain optimal metabolic outcomes including
   • Blood glucose levels in the target range or as close to target as is safely possible to prevent or reduce the risk for complications of diabetes.
   • A lipid and lipoprotein profile that reduces the risk for macrovascular disease.
   • Blood pressure levels that reduce the risk for vascular disease.
2. Prevent and treat the chronic complications of diabetes. Modify nutrient intake and lifestyle as appropriate for the prevention and treatment of obesity, dyslipidemia, cardiovascular disease, hypertension, and nephropathy.
3. Improve health through healthy food choices and physical activity.
4. Address individual nutritional needs taking into consideration personal and cultural preferences and lifestyle while respecting the individual’s wishes and willingness to change.

Goals of medical nutrition therapy that apply to specific situations include the following:

1. For youth with type 1 diabetes, to provide adequate energy to ensure normal growth and development, integrate insulin regimens into usual eating and physical activity habits.
2. For youth with type 2 diabetes, to facilitate changes in eating and physical activity habits that reduces insulin resistance and improves metabolic status.
3. For pregnant and lactating women, to provide adequate energy and nutrients needed for optimal outcomes.
4. For older adults, to provide for the nutritional and psychosocial needs of an aging individual.
5. For individuals treated with insulin or insulin secretagogues, to provide self-management education for treatment (and prevention) of hypoglycemia, acute illnesses, and exercise-related blood glucose problems.

Summary of Nutrition Recommendations

1. Macronutrients (2)
   • Macronutrient percentages: the RD should encourage consumption of macronutrients based on the Daily Reference Intakes (DRI) for healthy adults. Research does not support any ideal percentage of energy from macronutrients for persons with diabetes.

2. Carbohydrates (2)
   • Carbohydrate Intake Consistency: In persons with either MNT along, glucose-lowering medications or fixed insulin doses, meal and snack carbohydrate intake should be kept consistent on a day-to-day basis. Consistency in carbohydrate intake results in improved glycemic control.
   • Carbohydrate Intake and Insulin Dose Adjustment: In persons with type 2 or type 2 diabetes who adjust their mealtime insulin doses or who are on insulin pump therapy, insulin doses should be adjusted to match carbohydrate intake (insulin-to-carbohydrate ratio). This can be accomplished by comprehensive nutrition education and counseling on interpretation of blood glucose patterns, nutrition-related medication management and collaboration with the healthcare team. Adjusting insulin dose based on planned carbohydrate intake improves glycemic control and quality of life without any adverse effects.

3. Sucrose and Diabetes (2)
   • Sucrose Intake: If persons with diabetes choose to eat foods containing sucrose, the sucrose-containing foods should be substituted for other carbohydrate foods. Sucrose intakes of 10 to 35 percent of total energy intake do not have a negative effect on glycemic or lipid responses when substituted for isocaloric amounts of starch.

4. Non-nutritive Sweeteners and Diabetes (2)
   • Non-nutritive sweeteners: if persons with diabetes chose to consume products containing RDA-approved non-nutritive sweeteners, at levels that do not exceed the DIs, the RD should advise that some of these
products may contain energy and carbohydrate from other sources that need to be accounted for. Research on non-nutritive sweeteners reports no effect on changes in glycemic response.

Table 6. Accepted Daily Intakes (ADIs) of Nonnutritive Sweeteners (23)

<table>
<thead>
<tr>
<th></th>
<th>ADI (mg/kg body weight)</th>
<th>Average amount (mg) in 12-oz can of soda*</th>
<th>Cans of soda to reach ADI for 60 kg (132 lb.) persons</th>
<th>Amount (mg) in packet of sweetener</th>
<th>Packets to reach ADI for 60 kg (132 lb.) person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acesulfame K</td>
<td>15</td>
<td>40**</td>
<td>25**</td>
<td>50</td>
<td>18</td>
</tr>
<tr>
<td>Aspartame</td>
<td>50</td>
<td>200</td>
<td>19</td>
<td>35</td>
<td>86</td>
</tr>
<tr>
<td>Saccharin</td>
<td>5***</td>
<td>140</td>
<td>2</td>
<td>40</td>
<td>7.5</td>
</tr>
<tr>
<td>Sucralose</td>
<td>5</td>
<td>70</td>
<td>4.5</td>
<td>5</td>
<td>60</td>
</tr>
<tr>
<td>Neotame****</td>
<td>18 mg/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Fountain drinks may have different amounts and may contain a sweetener blend.

**Based on most typical blend with 90 mg aspartame. ADIs are independent. With this sweetener blend, it takes 35 cans to reach the ADI of aspartame.

***Set by World Health Organization’s Joint Expert Committee on Food Additions (24)

****No ADI based on body weight set for neotame (19)

5. Glycemic Index and Diabetes (2)
   • If the use of glycemic index is proposed as a method for meal planning, the RD should advise on the conflicting evidence of effectiveness of this strategy. Studies comparing high versus low GI diets report mixed effects on A1c.

6. Fiber and Diabetes (2)
   • Fiber intake and glycemia: Recommendations for fiber intake for people with diabetes are similar to the recommendations for the general public (DRI): 14 grams per 1,000 kcal). While diets containing 44 to 50 grams of fiber daily are reported to improve glycemia; more usual fiber intakes (up to 24 grams daily) have not shown beneficial effects on glycemia. It is unknown if free-living individuals can daily consume the amount of fiber needed to improve glycemia.
   • Fiber Intake and Cholesterol: Include foods containing 25-30 grams of fiber per day, with special emphasis on soluble fiber sources (7-13 grams). Diets high in total and soluble fiber, as part of cardioprotective nutrition therapy, can further reduce total cholesterol by 2-3% and LDL cholesterol up to 7%.

7. Protein and Diabetes (2)
   • Protein Intake and Normal Renal Function: In persons with type 1 or type 2 diabetes with normal renal function, the RD should advise that usual protein intake of approximately 15-20% of daily energy intake does not need to be changed. Although protein has an acute effect on insulin secretion, usual protein intake in long-term studies has minimal effects on glucose, lipids, and insulin concentrations.
   • Protein intake and Nephropathy: In persons with diabetic nephropathy, a protein intake of one gram or less per kg body weight per day is recommended. Diets with less than one gram protein per kg body weight per day have been shown to improve albuminuria in persons with nephropathy; however, they have not been shown to have significant effects on glomerular filtration rates (GFR).
   • Protein Intake and Late Stage Nephropathy: For persons with late stage diabetic nephropathy (Chronic Kidney Disease [CKD] Stages 3-5), hypoalbuminemia (an indicator of malnutrition) and energy intake must be monitored and changes in protein and energy intake made to correct deficits. A protein intake of approximately 0.7 grams per kg body weight per day has been associated with hypoalbuminemia, whereas a protein intake of approximately 0.9 grams per kg body weight per day has not.
8. Fat and Diabetes (5)
   • <7% of daily energy from saturated fats.
   • Dietary cholesterol intake <200 mg/day.
   • Trans fatty acid intake is minimized.
   • Polyunsaturated fat intake ~10% of daily energy intake.
   • Encourage 2-3 servings of fish consumption per week to increase omega-3 fatty acid intake.

9. Alcohol and Diabetes (5)
   • Limit to 1 drink/day for adult women and 2 drinks/day for adult men. One drink is defined as 12-oz beer, 5-oz wine, or 1.5-oz ~80 proof spirits.
   • Excessive alcohol intake can have both hypoglycemic and hyperglycemic effects in patients with diabetes.
   • To reduce the risk of hypoglycemia, alcohol should be consumed with food.
   • For patients with hypertriglyceridemia, abstaining from alcohol should be encouraged.

10. Micronutrients and Diabetes (5)
    • No clear evidence of benefit from vitamin or mineral supplementation if there are no underlying deficiencies. Exceptions include folic acid for prevention of birth defects and calcium for prevention of bone disease.
    • Routine supplementation with antioxidants is not advised because of uncertainties related to long-term efficacy and safety.

11. Prevention and Treatment of CVD (2)
    • CVD and Cardioprotective Nutrition Therapy: Cardioprotective nutrition interventions for the prevention and treatment of cardiovascular disease (CVD) should be implemented in the initial series of encounters. Diabetes is associated with an increased risk for CVD and glycemic control may improve the lipid profile.

12. Weight Management (2)
    • The Rd should advise that glycemic control is the primary focus for diabetes management. While decreasing energy intake may improve glycemic control, it is unclear whether weight loss alone will improve glycemic control. Sustained weight loss interventions lasting 1 year or longer reported inconsistent effects on A1c.

13. Physical Activity (2)
    • Type 2 Diabetes and Physical Activity: In persons with type 2 diabetes, 150 minutes of accumulated moderate-intensity aerobic physical activity per week as well as resistance/strength training three times per week is recommended. Both aerobic and resistance training improve glycemic control, independent of weight loss. Physical activity also improves insulin sensitivity and decreases risk for cardiovascular disease and all-cause morbidity.
    • Type 1 Diabetes and Physical Activity: Individuals with type 1 diabetes should be encouraged to engage in regular physical activity. Although exercise is not reported to improve glycemic control in persons with type 1 diabetes, individuals may receive the same benefits from exercise as the general public—decreased risk for cardiovascular disease and improved sense of well-being.
    • Physical Activity and Insulin/Insulin Secretagogue Use: The RD should instruct individuals on insulin or insulin secretagogues on the safety guidelines to prevent hypoglycemia (frequent blood glucose monitoring and possible adjustment in insulin dose or carbohydrate intake). Research indicates that the incidence of hypoglycemia during exercise may depend on baseline glucose levels. (See Appendix 2. Exercise and Food Adjustments.)
Nutrition Practice Guidelines for Diabetes Type 1 and 2

Nutrition Recommendations for Special Populations (5)

Children and adolescents with diabetes

- Use individualized food/meal plans and intensive insulin regimens to provide flexibility and to accommodate irregular meal times and schedules, varying appetite, and varying physical activity levels.
- Withholding food or having a child eat consistently without an appetite for food in an effort to control blood glucose should be discouraged.
- Use glucose data to integrate an insulin regimen into the meal/snack and exercise schedules.
- Nutrient requirements are similar to other same age children and adolescents.
- The ideal method for estimating a child’s or adolescent’s energy needs is a food/nutrition history of a typical daily intake, providing that growth and development are within normal limits.
- Behavior modification strategies to decrease high-energy high-fat food intake while encouraging healthy eating habits and regular physical activity for the entire family should be considered.

Pregnancy and lactation with prior onset diabetes

- Nutrition recommendations are similar for women with and without diabetes.
- The Food and Drug Administration has approved 5 nonnutritive sweeteners for general use in the United States: aspartame, acesulfame potassium (acesulfame K), sucralose, saccharin, and neotame. Saccharin can cross the placenta and may remain in fetal tissue due to slow fetal clearance, although there is no evidence that this is harmful. Nonnutritive sweeteners are rigorously tested to determine effects during pregnancy and lactation in animals. No adverse effects have been reported.
- The distribution of the energy intake and carbohydrates in the meal plan should be based on the woman’s food and eating habits, blood glucose records, and the expected physiological effects of pregnancy on her body.
- Regular meals and snacks are important to avoid hypoglycemia due to the continuous fetal draw of glucose from the mother.
- An evening snack is usually necessary to decrease the potential for overnight hypoglycemia and fasting ketosis.
- Blood glucose monitoring and daily food records provide valuable information for insulin and meal plan adjustments.

Older adults

- Energy requirements are less than for younger adults.
- Physical activity should be encouraged.
- In the elderly, under-nutrition is more likely than over-nutrition; use caution when prescribing weight loss.
- Food restrictions for elderly residents in long-term facilities are not warranted. Residents with diabetes should be served regular (unrestricted) menus, with consistency in the amount and timing of carbohydrate.
- No evidence to support diets such as “no concentrated sweets” or “no sugar added.”

Nutrition Recommendations for Acute Complications and Co-Morbid Conditions of Diabetes (5)

Hypoglycemia

- Glucose is the preferred treatment for hypoglycemia; however, any form of carbohydrate that contains glucose may be used.
- 15 to 20 grams of glucose is an effective temporary treatment for hypoglycemia.
- Initial response to treatment should be seen in 10-20 minutes. Glucose levels begin to fall at approximately 60 minutes after glucose ingestion (40).

Illness

- During acute illnesses, testing blood glucose and urine ketones, drinking adequate amounts of fluids, and ingesting carbohydrate are important.
Nutrition Practice Guidelines for Diabetes Type 1 and 2

Hypertension

- The goal should be to limit sodium intake to 2,300 mg per day (41). Some patients may benefit from a sodium restriction as low as 1,500 mg per day (42).
- A modest amount of weight loss beneficially affects blood pressure.

Dyslipidemia

- Elevated LDL-cholesterol: limit saturated fat intake to <7% of energy. Intake of trans fatty acids should be minimized. Energy from saturated fat can be reduced if weight loss is desirable or replaced with either carbohydrates or monounsaturated fats if weight loss is not a goal.
- Elevated plasma triglycerides, reduced HDL cholesterol, and small dense LDL cholesterol (the metabolic syndrome): improved glycemic control, modest weight loss, dietary saturated fat restriction, increased physical activity and incorporation of monounsaturated fats may be beneficial. Energy intake should be monitored if monounsaturated fats are added.
- Add plant stanols/sterols and increase soluble fiber to enhance lowering of LDL cholesterol.

Nephropathy

1. Microalbuminuria: reduce protein to 0.8 to 1.0 g/kg/day (7, 24, 25).
2. Overt nephropathy: reduce protein to 0.8 g/kg/day.
3. Pre-dialysis: reduce protein to 0.8 g/kg/day.

Nutrition Assessment (2)

1. Nutrition Assessment: The RD should assess food intake (focusing on carbohydrate), medication, metabolic control (glycemia, lipids, and blood pressure), anthropometric measurements and physical activity to serve as the basis for implementation of nutrition prescription, goals and intervention. Individuals who have diabetes should receive MNT tailored by the RD.
2. Assessment of Glycemic control: the RD should assess glycemic control and focus on medical nutrition therapy to achieve and maintain blood glucose levels in the target range. Studies evaluating the effectiveness of diabetes MNT at three to six months reported reductions in A1C ranging from 0.25% to 2.9%.
3. Assess Relative Importance of Weight Management: the RD should assess the relative importance of weight management for persons with diabetes who are overweight or obese. While modest weight loss has been shown to improve insulin resistance in overweight and obese insulin-resistant individuals, research on sustained weight loss interventions lasting 1 year or longer reported inconsistent effects on A1C.

Meal Planning Approaches

Nutrition Guidelines and nutrient needs that apply to all healthy Americans also apply to persons with diabetes and their family members (26, 27)

There are several approaches to meal planning. The approaches vary in the complexity of understanding and skills that must be mastered for nutrition self-management. Different learning styles and learning abilities among patients dictate that the RD selects the approach best suited to the patient. The approach can be varied from time to time to teach concepts highlighted more in a different approach, to maintain or recapture the patient’s interest, or to provide less or more structure. Sometimes the patient simply needs some variety.

Eight broad areas of meal-planning approaches are:

- A 3-day cycle of menus for a specific calorie level.
- Various methods for visualizing kinds and amounts of food including food models, plate method and “Hand Jive.”
- Carbohydrate choices or counting.
- Exchange Lists for Meal Planning.
Nutrition Practice Guidelines for Diabetes Type 1 and 2

- Counting plans for calories and fat.
- Carbohydrate gram counting (carbohydrate-to-insulin ratios).

Food Plan

The RD designs, with input from the individual with diabetes, a food plan to achieve clinical outcomes based on the individual's:

1. Lifestyle (work schedule, current eating habits, ethnic food beliefs and preferences, social and economic factors).
2. Physical activity.
3. Home situation and support system.
4. Learning style.
5. Ability and/or willingness to learn/use a specific meal planning approach.
6. Level of motivation to make the needed changes.
7. Nutrition therapy goals.
9. Insulin regimen-conventional and fixed or intensive and adjusted to carbohydrate intake.
10. Other medications.

Nutrition Monitoring and Evaluation (2)

1. Monitoring and Evaluation: the RD should monitor and evaluate food intake, medication, metabolic control (glycemia, lipids, and blood pressure), and anthropometric measurements and physical activity. Research reports sustained improvements in A1C at 12 months and longer with long-term follow-up encounters with an RD.
2. Evaluation of Glycemic Control: The RD should primarily use blood glucose monitoring results in evaluating the achievement of goals and effectiveness of MNT. Glucose monitoring results can be used to determine whether adjustments in foods and meals will be sufficient to achieve blood glucose goals or if medication additions or adjustments need to be combined with MNT.

Communication & Documentation

Two-way communication between the primary care provider, other health care team members, and the RD is essential. Verbal communication is preferred, followed up by written documentation. This ensures that patients do not receive conflicting information. It also facilitates support from the other team members to the patient in regard to food and physical activity recommendations and support from the RD regarding medical goals.
Appendix 1. Referral Process to Outpatient RDs for Medical Nutrition Therapy

**Referral from MD**
Documentation required:
1. Reason for referral (diagnosis).
2. Exercise restrictions, if any.

Clinic appointment center to schedule appointment (Consult). Appointment center notes in comment field on appointment screen referring provider’s name.

*Associate provider needs to obtain co-signature or cite protocol under which referral is made.

**Patient self-referral**
Appointment center to inform patient that he/she needs to obtain a doctor’s referral.

**Transfer from another outpatient RD**
Patient to call appropriate clinic’s appointment center to schedule appointment (Recheck)

**Referral from Inpatient RD**
1. Alert outpatient RD via email/staff message for high risk patients needed to be seen within 14 days. Outpatient RD to contact patient to schedule the appointment.

**Proper documentation of referral?**
- **Yes**
- **No**

RD to obtain verbal order from physician

**Patient showed for appointment with RD?**
- **Yes**
- **No**

Patient visit with RD

See “No Show Process” Protocols
### Appendix 2. Exercise and Food Adjustments (16)

<table>
<thead>
<tr>
<th>Expected Length of Exercise</th>
<th>Blood sugar level before exercise</th>
<th>Carbohydrate amount to consume (example foods)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-30 minutes</td>
<td>&lt;80 mg/dL</td>
<td>15 grams (8 oz sports drink or milk or 4-6 oz juice)</td>
</tr>
<tr>
<td></td>
<td>80-150 mg/dL</td>
<td>15 grams (fresh fruit)</td>
</tr>
<tr>
<td></td>
<td>&gt;150 mg/dL</td>
<td>None</td>
</tr>
<tr>
<td>30-120 minutes</td>
<td>&lt;80 mg/dL</td>
<td>30 grams (8 oz sports drink and ½ sandwich)</td>
</tr>
<tr>
<td></td>
<td>80-150 mg/dL</td>
<td>30 grams (8 oz milk and fresh fruit)</td>
</tr>
<tr>
<td></td>
<td>&gt;150 mg/dL</td>
<td>15 grams (1/2 sandwich)</td>
</tr>
<tr>
<td>2-4 hours</td>
<td>&lt;80 mg/dL</td>
<td>45 grams (8 oz sports drink and 1 sandwich)</td>
</tr>
<tr>
<td></td>
<td>80-150 mg/dL</td>
<td>45 grams (8 oz milk, 1 sandwich)</td>
</tr>
<tr>
<td></td>
<td>&gt;150 mg/dL</td>
<td>30 grams (1 sandwich)</td>
</tr>
</tbody>
</table>

Patients should also drink water, Gatorade or other fluids before or during exercise to prevent dehydration. One cup for 15-30 minutes of exercise, two cups for 30-120 minutes of exercise and 3 cups for 2-4 hours exercise.

This table is for moderate exercise (e.g., walking, bicycling leisurely, shooting a basketball or mowing the lawn). If heavier exercise (e.g., jogging, bicycle race or basketball game) is to be done for the same amount of time, more food may need to be added.

Amounts vary for different people. Patients should check their blood glucose levels before, during, and after exercise.
Nutrition Practice Guidelines for Diabetes Type 1 and 2

References


American Dietetic Association Medical Nutrition Therapy Evidence Based Guides for Practice Nutrition Practice Guideline for Type 1 and Type 2 Diabetes Mellitus. American Dietetic Association, 2001.


Chase HP. Understanding Diabetes, 10 Edition. Barbara Davis Center for Childhood Diabetes, Department of Pediatrics, University of Colorado Health Sciences Center.


Nutrition Practice Guidelines for Diabetes Type 1 and 2


