Diabetes Nutrition Standards of Care 2018

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“Ongoing patient self-management education and support are critical to preventing acute complications and reducing the risk of long-term complications.”
Patient Empowerment

The person with diabetes and his/her family is at the center of the care model, working in collaboration with health care professionals.

DSMES focuses on supporting patient empowerment by providing people with diabetes the tools to make informed self-management decisions.
In accordance with the national standards for diabetes self-management education and support, all people with diabetes should participate in diabetes self-management education to facilitate the knowledge, skills, and ability necessary for diabetes self-care and in diabetes self-management support to assist with implementing and sustaining skills and behaviors needed for ongoing self-management.
DSMES
Four critical times to evaluate the need:

- At diagnosis
- Annually
- When complicating factors (health conditions, physical limitations, emotional factors, or basic living needs arise that influence self-management)
- When transitions in care occur
Patients who participate in DSMES are more likely to follow best practice treatment recommendations, particularly among the Medicare population. (18, 35)

Reports indicate that only 5-7% of individuals eligible for DSMES through Medicare or a private insurance plan actually receive it. (37, 38)
Reimbursement

• Medicare reimburses DSMES when that service meets the national standards (7) and is recognized by the American Diabetes Assn.
• DSMES is also covered by most insurance plans.
• Medicare mandates recipients receive 2 hours of Medical Nutrition Therapy (MNT) annually (3 hours the first year of diagnosis)
Medical nutrition therapy (MNT)

• “What do I eat”? 
• Menu 
• ADA position: no one-size fits all: Meal planning should be individualized (41, 42)
Goals of MNT for adults with diabetes

• Healthful eating in appropriate portion sizes to improve health and:
  • Achieve/maintain weight goals, especially in type 2
  • Attain blood glucose, blood pressure and lipid goals
  • Delay/prevent complications
• Address nutrition needs based on:
  • personal & cultural preferences
  • health literacy and numeracy
  • access to healthful foods
  • willingness and ability to make changes
  • barriers to change
• Maintain pleasurable eating without judgment about food choices
• Provide practical tools for healthful eating patterns, not focusing on individual macronutrients, micronutrients, or single foods (42, 51)
Weight management

• Modest weight loss: 5% and sustained
  • improves glycemic control
  • may reduce need for diabetes medications
• Loss ≥ 7% is optimal (64)
• Lifestyle programs: intensive with frequent follow-up is best.
  ↓ calories by 500-750/day or:
  • For women 1,200-1,500 calories/day, adjusted for baseline weight
  • For men 1,500-1,800 calories/day, adjusted for baseline weight
• Diet based on health status & preferences
Gestational Diabetes

• Test for undiagnosed diabetes at the first prenatal visit in those with risk factors, using standard diagnostic criteria.

• Test for gestational diabetes mellitus at 24–28 weeks of gestation in pregnant women not previously known to have diabetes.

• Test women with gestational diabetes mellitus for persistent diabetes at 4–12 weeks’ post partum, using the oral glucose tolerance test and clinically appropriate non pregnancy diagnostic criteria.

• Women with a history of gestational diabetes mellitus should have lifelong screening for the development of diabetes or prediabetes at least every 3 years.

• Women with a history of gestational diabetes mellitus found to have prediabetes should receive intensive lifestyle interventions or metformin to prevent diabetes.
Gestational Diabetes targets

- Fasting blood sugar: $< 95$
- 1 hour post prandial $< 140$
- 2 hour post prandial $< 120$

**Treatment:**
- Lifestyle: MNT, PA, weight management
- Insulin
- Metformin
- Glyburide
RD delivered MNT

- ↓ A1c 0.3-1% type 1
- ↓ A1c 0.5-2% in type 2
- Weight management assistance:
  - Helps ↓ progression from pre-diabetes to type 2
  - benefits type 2 diabetes treatment
MNT Recommendations

• RD provides individualized MNT for all with type 1 or type 2 diabetes
• Teach Carbohydrate (CHO) counting & I:C ratio to Type 1 and type 2 if using Multiple Daily Injections (MDI)
• Consistent pattern of CHO intake for fixed insulin dosing
Academy of Nutrition & Dietetics (AND) Evidence-based nutrition practice guidelines

• 3-4 RD encounters 45-90 minutes
• Start at diagnosis or first referral to RD and completed within 3-6 months
• RD determines if more MNT encounters are needed
• Annual follow-up recommended to reinforce lifestyle changes
• Evaluate outcomes that indicate the need for changes in MNT or meds
• RD should determine if more MNT is needed
Eating patterns & macronutrient distribution

- No ideal % of CHO, fat and protein
- Individualize: keep calories & metabolic goals in mind
- CHO: vegetables, fruits, legumes, dairy products, whole grains, high fiber
- Avoid sugar-sweetened beverages:
  - helps control weight
  - reduces risk for CVD & fatty liver
- Minimize sucrose-containing foods to avoid displacing healthier foods
No Ideal mix

• Macronutrient proportions should be individualized.
• On average, caloric intake in people with diabetes:
  ~ 45% CHO, ~ 36-40% fat & ~ 16-18% protein
• Total calories for weight management goals
Eating patterns

• An eating (dietary) pattern describes combinations of foods or food groups contributing nutrition for health promotion & disease prevention.

• People eat combinations of foods, not single nutrients.

• ‘Reviewed’ eating patterns: Mediterranean style, Vegetarian & vegan, Low fat, Low CHO and DASH.

• Conclusion: No “ideal” eating pattern for all with diabetes. Calories are important no matter what eating pattern is chosen.
Carbohydrate (CHO)

- Amount of CHO intake is inconclusive
- Monitor BG and CHO intake for improving post prandial glucose
- CHO and available insulin important for pp BG & need to be considered in meal planning
Low Carbohydrate Diets

The role remains unclear.

Much is due to wide range of definitions of low carbohydrate, from 20g/day to <45% of caloric intake. Improvements tend to be in the short term; these effects are not maintained.

While some studies have shown modest benefits of very low-carbohydrate or ketogenic diets (<50g/day) this approach may only be appropriate for short-term implementation (up to 3-4 mos) if desired by patient. There is little long-term research citing benefits or harm.
Dietary fiber and whole grains

• Research has shown fiber improves glycemic control if > 50 g/day
• Total fiber intake, from natural sources (vs supplements) seems to benefit effect on serum cholesterol levels and blood pressure.
• Recommendations: 25 g/day for women & 38 g/day for men
• Whole grains not associated with improved glucose, although
• May reduce systemic inflammation
• Consume at least half of all grains as whole grains.
Resistant starch & fructans

• Resistant starch: physically enclosed within cells as in some legumes, raw potato & specially formulated cornstarch.

• For resistant starch, no published long-term studies showing hypoglycemia prevention and reduction of hyperglycemia.

• Fructans are indigestible fiber thought to lower glucose. Inulin (chicory root) is added to many foods. No published long-term studies showing benefit in diabetes.
Fructose

• Compared with isocaloric intake of sucrose or starch, free fructose (occurring naturally in foods like fruit) results in better glycemic control.

• Not likely to have detrimental effects on triglycerides if intake is \( \leq 12\% \) energy. For 1800 calories = 54 grams of fructose.

• Some foods, like agave nectar, marketed to people with diabetes, contain significant fructose. Large amounts should be avoided due to excess calories & fructose intake.

• In diabetes & at risk should limit/avoid sugar sweetened beverages to ↓ risk for weight gain and worsening of cardiometabolic risk profile.
## Fructose content of some foods

<table>
<thead>
<tr>
<th>Item</th>
<th>Size</th>
<th>Grams Fructose</th>
<th>Grams CHO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agave nectar</td>
<td>2 Tbsp.</td>
<td>17</td>
<td>30</td>
</tr>
<tr>
<td>Apple, Fuji</td>
<td>Med.</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>Banana</td>
<td>Med.</td>
<td>8.2</td>
<td>27</td>
</tr>
<tr>
<td>Blueberries</td>
<td>1 cup</td>
<td>7.36</td>
<td>21</td>
</tr>
<tr>
<td>Cherries</td>
<td>1 cup</td>
<td>7.41</td>
<td>22</td>
</tr>
<tr>
<td>Clementine</td>
<td>1 avg.</td>
<td>1.21</td>
<td>9</td>
</tr>
<tr>
<td>Grapes</td>
<td>1 cup</td>
<td>12.28</td>
<td>27</td>
</tr>
<tr>
<td>Honey</td>
<td>2 Tbsp.</td>
<td>17.2</td>
<td>34</td>
</tr>
<tr>
<td>Mango, sliced</td>
<td>1 cup</td>
<td>7.72</td>
<td>25</td>
</tr>
<tr>
<td>Melon, cantaloupe</td>
<td>1 cup</td>
<td>3.31</td>
<td>14</td>
</tr>
<tr>
<td>Peach, fresh</td>
<td>Med.</td>
<td>2.36</td>
<td>15</td>
</tr>
<tr>
<td>Pear, fresh Bartlett</td>
<td>Med.</td>
<td>9.46</td>
<td>21</td>
</tr>
<tr>
<td>Pineapple, fresh</td>
<td>1 cup</td>
<td>3.5</td>
<td>22</td>
</tr>
<tr>
<td>Raisins</td>
<td>¼ cup</td>
<td>12.25</td>
<td>32</td>
</tr>
<tr>
<td>Raspberries</td>
<td>1 cup</td>
<td>2.89</td>
<td>15</td>
</tr>
<tr>
<td>Regular cola soda</td>
<td>12 oz.</td>
<td>22</td>
<td>40</td>
</tr>
</tbody>
</table>

From USDA National Nutrient Database, Release 28
What ‘ose’ recommended for Hypoglycemia?

• Glucose is already glucose (monosaccharide)
• Sucrose (table sugar) is glucose & fructose (disaccharide)
• Fructose is fructose (monosaccharide)
• In comparison study, fructose was least effective, therefore, sucrose or glucose (tablets, liquid or gel) may be preferred over fruit juice.
Protein

• If no diabetic kidney disease, no ‘ideal’ protein recommendation for glycemic control or improving CVD risk measures.

• In type 2: protein ↑‘s insulin response without ↑‘ing plasma glucose.

• Therefore: If hypoglycemia, use CHO sources not high in protein.
• If albuminuria and ↓ ’ed glomerular filtration rate (GFR), 0.8 g/kg body weight/day of protein.

• Further reduction does not alter glycemic measures, CVD risk or GFR decline rate.

• Meals with > 75g protein can raise post prandial glucose at 3-5 hours.

• The effect of protein & fat is additive (high fat increases insulin resistance)
Red meat consumption recommendations
From the American Institute for Cancer Research (AICR)

• Reduce cancer risk: no more than 18 oz. (cooked weight) per week of red meats, like beef, pork and lamb. There is strong evidence of relationship between > 18 oz./week and colon cancer risk.

• Also evidence that consuming processed meat, (ham, bacon, salami, pastrami, hot dogs and sausages) ↑’s chance of colorectal cancer. Risk starts to increase with any portion.
Dietary fat

• Total fat content for people with diabetes is inconclusive.

• Monounsaturated and polyunsaturated fats may improve glucose metabolism and lower CVD risk. Good alternative to a diet low in total fat but relatively high in CHO.

• Eating foods rich in Omega-3 fatty acids (fatty fish, nuts and seeds) is recommended to prevent or treat CVD (but not supplements).
• The Institute of Medicine (IOM) considers (for adults) total fat of 20%-35% of energy as acceptable with no tolerable upper intake level defined.

• Type of fat is more important than total amount when looking at metabolic goals and CVD risk. Mono- & poly-unsaturated fats are recommended over saturated fat.

• In diabetes, follow general population guidelines for saturated fat, dietary cholesterol and trans fat.

• In general, *trans* fat should be avoided.
Dietary fats and diabetes

- In animal & observational studies, higher intakes of total dietary fat produce greater insulin resistance.
- In clinical trials saturated & trans fats showed ↑’ed insulin resistance.
- Mono-, poly- & omega-3 fatty acids don’t have an adverse effect.
- Polyunsaturated fats as beneficial as monounsaturated fats.
Saturated fat

• Somewhat controversial
• AHA says no more than 5%-6% of caloric intake.
• 2015 guidelines for Healthy Americans says < 10% of calories
• The newest ADA recommendations say those with diabetes should use the same guidelines as those without diabetes so agree with < 10%
• For 1800 calories: 5%-6% = 10-12 g  < 10% = < 20 g saturated fat
• 1.6-3 g/day of plant stanols or sterols may reduce total & LDL cholesterol. They are typically found in enriched foods.

• Cholesterol limitations have been eliminated in the recommendations.
Micronutrients & herbal supplements

• No clear evidence vitamins, minerals, herbs or spices can improve diabetes.
  • Insufficient evidence for chromium, magnesium & vitamin D to improve control
  • Insufficient evidence to use cinnamon for diabetes treatment
• Safety concerns for long-term use of antioxidant supplements (vitamin E, vitamin C and carotene)
Alcohol

• Moderation:
  • No > 1 drink per day for women
  • No > 2 drinks per day for men

• Risk of delayed hypoglycemia, especially if using insulin or an insulin secretagogue. Educate on recognition & management.
Sodium

• Limit to < 2300 mg/day
• Even lower (1500 mg) in DM & hypertension
• A teaspoon of salt = 2300 mg sodium
• Consider palatability, availability, affordability, and the difficulty of achieving low-sodium recommendations in a nutritionally adequate diet.
Nonnutritive Sweeteners

• May have the potential to reduce overall calorie and CHO intake (if substituted for caloric sweeteners and without compensation by intake of additional calories from other food sources.

• Most reviews and meta-analyses show benefits for their use in weight loss.

• However some research suggests an association with weight gain. (121)

• Regulatory agencies set acceptable daily intake levels for sweeteners, defined as the amount that can be safely consumed over a lifetime.
<table>
<thead>
<tr>
<th>Sweetener</th>
<th>Brand names</th>
<th>Sweetness vs sugar</th>
<th>ADI per kg body wt/day</th>
<th>Packets for 132 lbs. (60 kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acesulfame potassium (Ace-K)</td>
<td>Sweet One Sunett</td>
<td>200 x</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>Aspartame</td>
<td>Nutrasweet, Equal Sugar Twin</td>
<td>200 x</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td>Neotame</td>
<td>Newtame</td>
<td>8,000 x</td>
<td>0.3</td>
<td>23</td>
</tr>
<tr>
<td>Saccharin</td>
<td>Sweet’n low</td>
<td>300 x</td>
<td>15</td>
<td>45</td>
</tr>
<tr>
<td>Luo Han Guo</td>
<td>Nectresse, Monk Fruit, Pure Lo</td>
<td>300 x</td>
<td>Not specified</td>
<td>ND</td>
</tr>
<tr>
<td>Stevia rebaudiana</td>
<td>Truvia, Pure Via Enliten</td>
<td>300 x</td>
<td>4**</td>
<td>9</td>
</tr>
<tr>
<td>Sucralose</td>
<td>Splenda</td>
<td>600 x</td>
<td>5</td>
<td>23</td>
</tr>
</tbody>
</table>

**ADI established by the joint FAO/WHO expert committee on Food Additives (JECFA)**
Nutrition Summary

• Carbohydrate distribution: no set amount
• Protein: No particular recommendation but large amounts need insulin for metabolism so may affect blood glucose
• Fat: Type is more important than amount
  • High intake can increase insulin resistance
  • Up to 10% of calories in saturated fat, avoid trans fat
• Calories: Appropriate for weight management
• Fiber: from foods, per day: 25g women, 38g men
• Fructose: no >12% of calories (can affect triglycerides)
• Red meat (beef, lamb, pork): no >18 oz. per week
• Sodium: 1500-2300 mg/day
• Alcohol: No >2 drinks/day for men, 1 for women
What’s the Best nutrition therapy for diabetes?  In the words of Marion Franz, MS, RDN, CDE

• In an ‘ideal’ world:
  • All with type 2 would:
  • Lose 5% - 10% baseline weight
  • Eat a nutrient dense diet in appropriate portions
  • Perform 150 min/week of regular Physical activity
  • All with type 1 would:
  • Count CHO
  • Use I:C ratio and correction factors

• In the ‘real’ world:
  • Facilitate behavior changes that individuals are willing and able to make based on proven lifestyle interventions.
  • A variety of nutrition therapy and physical activity interventions can be implemented
  • Nutrition therapy for diabetes is effective
References

• Diabetes Care, Volume 41, Supplement 1, January 2018 (the numbers in () are references cited in this volume)


• Franz, M, Boucher JL, Evert, AB. Evidence-based diabetes nutrition therapy recommendations are effective: the key is individualization. Diabetes, Metabolic Syndrome and Obesity: Targets & Therapy 2014: 7 65-72.


• http://health.gov/dietaryguidelines/2015/guidelines

• American Institute for Cancer Research & American Heart Association