DIABETES AND NUTRITION: APPLICATION OF THE 2019 STANDARDS

Melinda D. Maryniuk, MEd, RDN, CDE, FADA
Senior Consultant; Melinda Maryniuk & Associates
Boston, MA

Presenter Disclosure Information

Research Support: none
Employee: self-employed
Board Member/Advisory Panel: Foodicine Health
Stock/Shareholder: none
Consultant: Diabetes – What to Know; Day Two
Other:
Objectives

• 1. Identify the 2019 evidence-based recommendations for nutrition management in diabetes from the American Diabetes Association

• 2. Review the nutrition strategies for reducing risks for diabetes (prediabetes)

• 3. Discuss applications for clinical practice

ADA Professional Practice Committee

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• Christopher P. Cannon, MD
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• Guillermo E. Umpierrez, MD, CDE, FACE, FACP
• Jennifer Wyckoff, MD

• Melinda Maryniuk, MEd, RD, CDE
  (Nutrition Consensus report liaison)
Standards of Care- 2019

1. Improving Care and Promoting Health in Populations
2. Classification and Diagnosis of Diabetes
3. Prevention or Delay of T2D
4. Comprehensive Medical Evaluation and Assessment of Comorbidities
5. Lifestyle Management
6. Glycemic targets
7. Diabetes technology
8. Obesity Management for treatment of T2D
9. Pharmacologic Approaches to Glycemic Treatment
10. CVD and Risk Management
11. Microvascular Complications and Foot Care
12. Older Adults
13. Children and Adolescents
14. Management of Diabetes in Pregnancy
15. Diabetes Care in the Hospital
16. Diabetes Advocacy

Patient-centered care

- **4.1** A patient-centered communication style that uses person-centered and strength-based language and active listening, elicits patient preferences and beliefs, and assesses literacy, numeracy, and potential barriers to care should be used to optimize patient health outcomes and health-related quality of life. **B**

- **4.2** Diabetes care should be managed by a multidisciplinary team that may draw from primary care physicians, subspecialty physicians, nurse practitioners, physician assistants, nurses, dietitians, exercise specialists, pharmacists, dentists, podiatrists, and mental health professionals. **E**
A language movement

Recommendations

Use language that:
• 1. is neutral, nonjudgmental, and based on facts, actions, or physiology/biology
• 2. is free from stigma
• 3. is strengths based, respectful, inclusive, and imparts hope
• 4. fosters collaboration between patients and providers
• 5. is person centered
### Becoming aware of and changing our words

<table>
<thead>
<tr>
<th>Problematic</th>
<th>Preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic</td>
<td>Person living with diabetes</td>
</tr>
<tr>
<td>Test (blood glucose)</td>
<td>Check / monitor</td>
</tr>
<tr>
<td>Control (verb)</td>
<td>Manage; describe what the person is doing</td>
</tr>
<tr>
<td>Control (noun)</td>
<td>Define what you mean by control and use that instead (blood glucose level, A1C)</td>
</tr>
<tr>
<td>Good/Bad/Poor</td>
<td>Safe/unsafe levels; target levels; use numbers and focus on facts instead of judgmental terms</td>
</tr>
<tr>
<td>Compliant / Adherent</td>
<td>Takes medicine about half the time; Eats vegetables a few times a week; engagement; participation</td>
</tr>
</tbody>
</table>

### Resources

Learn more
DiabetesEducator.org/Language
DSMES

• **5.1** 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. Diabetes self-management support is additionally recommended to assist with implementing and sustaining skills and behaviors needed for ongoing self-management. B

• **5.2** There are four critical times to evaluate the need for diabetes self-management education and support: at diagnosis, annually, when complicating factors arise, and when transitions in care occur. E
4 Critical Times for DSMES

MNT Recommendations:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Recommendations</th>
<th>Evidence rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness of nutrition therapy</td>
<td>5.6 An individualized medical nutrition therapy program as needed to achieve treatment goals, preferably provided by a registered dietitian, is recommended for all people with type 1 or type 2 diabetes, prediabetes, and gestational diabetes mellitus.</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>5.7 A simple and effective approach to glycemia and weight management emphasizing portion control and healthy food choices may be considered for those with type 2 diabetes who are not taking insulin, who have limited health literacy or numeracy, or who are older and prone to hypoglycemia.</td>
<td>B, A, E</td>
</tr>
<tr>
<td></td>
<td>5.8 Because diabetes nutrition therapy can result in cost savings and improved outcomes (e.g., A1C reduction), A1C management should be reviewed.</td>
<td>E</td>
</tr>
<tr>
<td></td>
<td>5.9 Weight loss (-5%) achievable by the combination of reduction of calorie intake and lifestyle modification benefits overweight or obese adults with type 2 diabetes and also those with prediabetes. Intervention programs to facilitate weight loss are recommended.</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>5.10 There is no single ideal dietary distribution of calories among carbohydrates, fats, and proteins for people with diabetes; therefore, meal plans should be individualized while keeping total calorie and metabolic goals in mind.</td>
<td>E</td>
</tr>
<tr>
<td></td>
<td>5.11 A variety of eating patterns are acceptable for the management of type 2 diabetes and prediabetes.</td>
<td>B</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>5.12 Carbohydrate intake should emphasize nutrient-dense carbohydrate sources that are high in fiber, including vegetables, fruits, legumes, whole grains, as well as dairy products.</td>
<td>B, A</td>
</tr>
<tr>
<td></td>
<td>5.13 For people with type 1 diabetes and those with type 2 diabetes who are prescribed a flexible insulin therapy program, education on how to use carbohydrate counting A and in some cases how to consider fat and protein content B to determine mealtime insulin dosing is recommended to improve glycemic control.</td>
<td>A, B</td>
</tr>
<tr>
<td></td>
<td>5.14 For individuals whose daily insulin dosing is fixed, a consistent pattern of carbohydrate intake with respect to time and amount may be recommended to improve glycemic control and reduce the risk of hypoglycemia.</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>5.15 People with diabetes and those at risk are advised to avoid sugar-sweetened beverages, including fruit juices, in order to control glycemia and weight and reduce their risk for cardiovascular disease and fatty liver B and should minimize the consumption of foods with added sugar that have the capacity to displace healthier, more nutrient-dense food choices.</td>
<td>A</td>
</tr>
</tbody>
</table>

Lifestyle Management:

Standards of Medical Care in Diabetes - 2019, Diabetes Care 2019;42(Suppl. 1):S46-S60
ADA Nutrition Guidelines – Update in Process

Co-chairs: Alison Evert, RD, CDE and Will Yancy, MD
Members:
• Raquel Perira, RD
• Tim Garvey, MD
• Kelly Rawlings
• Joanna Mitri, MS, MD
• Christopher Gardner, PhD
• Janice McLeod, RD
• Patti Urbanski, RD
• Laura Saslow, PhD
• Michelle Dennison-Farris, RD
• Karen Lau, RD
ADA Staff:
• Sacha Uelmen RD, and Shamera Robinson, RD

Eating Patterns

• 5.10 There is no single ideal dietary distribution of calories among carbohydrates, fats, and proteins for people with diabetes; therefore, individualize meal plans while keeping total calorie and metabolic goals in mind. (E)

• 5.11 A variety of eating patterns are acceptable for the management of type 2 diabetes and prediabetes. (B)
Current Eating Patterns in the United States
Percent of the U.S. Population Ages 1 Year and Older Who are Below, At, or Above Each Dietary Goal or Limit (Figure 2-1)

Note: The center (0) line is the goal or limit. For most, those represented by the orange sections of the bars, shifting toward the center line will improve their eating pattern.

Data Source: What We Eat in America, NHANES 2007-2010 for average intakes by age-sex group. Healthy U.S.-Style Food Patterns, which vary based on age, sex, and activity level, for recommended intakes and limits.

2019 Diet Rankings
Top 3:

**Overall:**
- Mediterranean
- DASH
- Flexitarian

**Weight loss:**
- WW (Weight Watchers)
- Volumetrics
- Flexitarian / Jenny Craig / Vegan

**Diabetes:**
- Mediterranean
- DASH, Mayo, Flexitarian, Volumetrics
CARB qualities *(for quality carbs!)*:

- **Colorful** (fruits and veggies, whole grains)
- **All-natural** (fresh, frozen, minimally processed)
- **Rich in fiber**
- **Balanced** (have a variety)
Carbohydrate

- **5.12** Carbohydrate intake should emphasize nutrient-dense carbohydrate sources that are high in fiber, including vegetables, fruits, legumes, whole grains, as well as dairy products.

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Carbs or Fat?

Be clear on definitions

- Usual carb intake: 45%
- Low carb: 30-45%
- Very low carb: 10-20%
- Ketogenic: <50 g/day
VLCD reduces A1C

Mean and individual HbA1c for the two groups at baseline and at 6 and 12 months. Bars represent standard 95% confidence intervals of the mean. Dashed lines reflect individual participant observations; darker lines represent each group mean.

Saslow et al. Nutrition and Diabetes (2017) 7:304

Low-fat and Low-carb both effective in reducing weight

Gardner, C. JAMA January 2018
Diet Intervention Examining the Factors Interacting with Treatment Success (DIETFITS)

- 609 overweight adults (equal distribution men/women)
- Age 18-50 without diabetes; BMI 28-40
- Randomized to:
  - HLF - Healthy low fat
  - HLC – Healthy low carb
- Both groups emphasized “Healthy” choices
- Less sugar, less refined, more veggies, more whole grains
- No significant difference in weight loss at one year:
  - HLF – 5.3 kg
  - HLC – 6.0 kg
- No association between genotype pattern or baseline insulin levels and outcomes

**Bottom line:** Focus on quality… making healthy choices.

It’s being used… so understand it!

**Survey data:**
- T1D: n=316
  - Mean intake: 36±15 g
  - Duration: 2.2±3.9 yrs
  - Mean A1C: 5.67%
  - Adverse events: 7
  - Talk w/HCP? 27% no

Management of Type 1 Diabetes With a Very Low–Carbohydrate Diet

Lennerz et al. Pediatrics 2018; 141(6) e20173349
What do the Standards say?

- Low Carb eating plans
  - Benefits for T2D; inadequate research for T1D
  - Improve glycemia and lipids reduce medications
  - Individualize; may be difficult to sustain
- Not recommended for
  - Pregnant/lactating women
  - At risk for disordered eating
  - Renal disease
  - Taking an SGLT2 inhibitor

Non-nutritive sweeteners

- 5.23 The use of nonnutritive sweeteners may have the potential to reduce overall calorie and carbohydrate intake if substituted for caloric (sugar) sweeteners and without compensation by intake of additional calories from other food sources. For those who consume sugar-sweetened beverages regularly, a low-calorie or nonnutritive-sweetened beverage may serve as a short-term replacement strategy, but overall, people are encouraged to decrease both sweetened and nonnutritive-sweetened beverages and use other alternatives, with an emphasis on water intake.
Low Calorie Sweeteners –
*What is moderation?*

<table>
<thead>
<tr>
<th>No-and low-calorie sweeteners</th>
<th>ADI mg/kg BW</th>
<th>EDI mg/kg BW</th>
<th>Packets mg</th>
<th>Diet drinks mg/ounce</th>
<th>Amount to reach ADI for 150 lb (68 kg) person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acesulfame K</td>
<td>15</td>
<td>0.2-1.7</td>
<td>50</td>
<td>4</td>
<td>1020 total mg 20 packets 240 ounces</td>
</tr>
<tr>
<td>Aspartame</td>
<td>50</td>
<td>0.2-4.1</td>
<td>34</td>
<td>16</td>
<td>3400 total mg 100 packets 213 ounces</td>
</tr>
<tr>
<td>Saccharin</td>
<td>5</td>
<td>0.1-2.0</td>
<td>23</td>
<td>3</td>
<td>340 total mg 15 packets 113 ounces</td>
</tr>
<tr>
<td>Sucralose</td>
<td>5</td>
<td>0.1-2.0</td>
<td>11</td>
<td>5</td>
<td>340 total mg 31 packets 68 ounces</td>
</tr>
<tr>
<td>Stevia (steviol glycosides)</td>
<td>4*</td>
<td>1.3-3.4</td>
<td>27</td>
<td>3</td>
<td>272 total mg 10 packets 91 ounces</td>
</tr>
</tbody>
</table>

*No ADI established by U.S. Food and Drug Administration. This is the value set by the Joint Expert Committee on Food Additives of the European Union*

Blog: The Everyday RD

http://theeverydayrd.com/tag/acceptable-daily-intake/

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**Obesity**

- **8.2** Diet, physical activity, and behavioral therapy designed to achieve and maintain >5% weight loss should be prescribed for patients with type 2 diabetes who are overweight or obese and ready to achieve weight loss. A

- **8.3** Such interventions should be high intensity (≥16 sessions in 6 months) and focus on diet, physical activity, and behavioral strategies to achieve a 500–750 kcal/day energy deficit. A

- **8.4** Diets should be individualized, as those that provide the same caloric restriction but differ in protein, carbohydrate, and fat content are equally effective in achieving weight loss. A
## Overweight/Obesity Treatment Options in T2DM

<table>
<thead>
<tr>
<th>Body Mass Index (BMI) Category (kg/m²)</th>
<th>Treatment</th>
<th>25.0-26.9 (or 23.0-26.9*)</th>
<th>27.0-29.9</th>
<th>30.0-34.9 (or 27.5-32.4*)</th>
<th>35.0-39.9 (or 32.5-37.4*)</th>
<th>≥40 (or ≥37.5*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet, physical activity &amp; behavioral therapy</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Pharmacotherapy</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Metabolic surgery</td>
<td></td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

* Cutoff points for Asian-American individuals.
† Treatment may be indicated for selected, motivated patients.

Obesity Management for the Treatment of Type 2 Diabetes: Standards of Medical Care in Diabetes - 2018. Diabetes Care 2018; 41 (Suppl. 1): S65-S72

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## Diabetes Remission

- Glycemia below the diabetes range in the absence of active pharmacologic therapy for at least one year
  - Partial – A1C < 6.5%; FPG 100-125
  - Complete - “Normal” measures - A1C < 5.7; FPG < 100

Weight loss surgery:
Remission: 30-63%
However: 35-50% experience recurrence

Diabetes Care 2009 Nov; 32(11): 2133-2135
Look AHEAD

- Can T2D be reversed?
- Over 5,000 adults; 16 centers
- Intensive Lifestyle Group (ILI)
  - Weekly 1:1 sessions for 6 months, plus more!
  - Meal replacements and diet coaching

<table>
<thead>
<tr>
<th>ILI Results</th>
<th>Year 1</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss</td>
<td>-8%</td>
<td>-4%</td>
</tr>
<tr>
<td>Remission</td>
<td>11%</td>
<td>7%</td>
</tr>
</tbody>
</table>

Gregg e al. JAMA 2012. Dec 19;308(23):2489

Joslin’s Why WAIT Program

- Modeled after Look AHEAD
- Medication management toward weight loss
- Low calorie, structured meal plan and exercise program
### Percentage Weight Reduction in Patients with Diabetes in the Real-World Clinical Practice over 5 years (Joslin Why WAIT Program)

- **Total Group n=129**
- **Group 1 n=61** (Participants maintained <7% weight loss at 1 year)
- **Group 2 n=68** (Participants maintained ≥7% weight loss at 1 year)

**14% Remission**  
21% Stopped insulin  
50-60% Reduction in Medications

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### DiRECT Trials in UK: Diabetes Reversed in Community Settings

- Apply research to primary care clinics
- 49 clinics, 306 adults with T2D diagnosed in past 6 years
- Meal replacements and structured diets
  - 800 calories/day for 3-5 months
  - Food reintroduction phase - 2-8 weeks
- At 1 year – 46% remission

Remission Rates Increase with Pounds Lost

<table>
<thead>
<tr>
<th>Remission</th>
<th>Total</th>
<th>Kg Lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (7%)</td>
<td>89</td>
<td>0-5 kg</td>
</tr>
<tr>
<td>19 (34%)</td>
<td>56</td>
<td>5-10 kg</td>
</tr>
<tr>
<td>16 (57%)</td>
<td>28</td>
<td>10-15 kg</td>
</tr>
<tr>
<td>31 (86%)</td>
<td>36</td>
<td>≥15 kg</td>
</tr>
</tbody>
</table>

Lifestyle therapy

• 3.2 Refer patients with prediabetes to an intensive behavioral lifestyle intervention program modeled on the Diabetes Prevention Program (DPP) to achieve and maintain 7% loss of initial body weight and increase moderate-intensity physical activity (such as brisk walking) to at least 150 min/week. A

National Diabetes Prevention Program

Eating Patterns and Foods Associated with Diabetes Prevention

Eating Patterns:
• Mediterranean diet
• DASH diet
• Plant-based, vegetarian and vegan diets

Foods:
• Whole grains ex. oats
• Dairy products, yogurt
• Unsweetened beverages, tea
• Green leafy vegetables
• Fish and seafood
• Red grapes, apples, blueberries
• Nuts ex. walnuts

Mediterranean Diet and Relative Risk for T2DM

<table>
<thead>
<tr>
<th>Author</th>
<th>RR (95% CI)</th>
<th>Weight (%)</th>
<th>Events</th>
<th>Country of origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. G.</td>
<td>0.17 (0.04, 0.72)</td>
<td>0.31</td>
<td>33</td>
<td>Spain</td>
</tr>
<tr>
<td>S.-S.</td>
<td>0.48 (0.27, 0.86)</td>
<td>8.02</td>
<td>54</td>
<td>Spain</td>
</tr>
<tr>
<td>M.</td>
<td>0.65 (0.49, 0.85)</td>
<td>12.11</td>
<td>998</td>
<td>Italy</td>
</tr>
<tr>
<td>K.</td>
<td>0.75 (0.66, 0.86)</td>
<td>15.30</td>
<td>2795</td>
<td>USA</td>
</tr>
<tr>
<td>T.</td>
<td>0.91</td>
<td>81</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>R.</td>
<td>0.93</td>
<td>130</td>
<td>Greece</td>
<td></td>
</tr>
<tr>
<td>R.</td>
<td>0.88 (0.75, 0.97)</td>
<td>12.80</td>
<td>11994</td>
<td>Europe</td>
</tr>
<tr>
<td>B.</td>
<td>1.04 (0.75, 1.43)</td>
<td>6.82</td>
<td>410</td>
<td>UK</td>
</tr>
<tr>
<td>A.</td>
<td>1.09 (0.80, 1.49)</td>
<td>6.70</td>
<td>412</td>
<td>USA</td>
</tr>
<tr>
<td>C.</td>
<td>-1.10 (0.70, 1.70)</td>
<td>4.00</td>
<td>146</td>
<td>Spain</td>
</tr>
<tr>
<td>Combined</td>
<td>0.77 (0.66, 0.89)</td>
<td>100.00</td>
<td>146</td>
<td>Spain</td>
</tr>
</tbody>
</table>

Combined effect suggests a 23% risk reduction of developing type 2 diabetes

Meta-analysis of 9 prospective cohort studies and 1 clinical trial

Boucher, Diabetes Spectrum 2017 May; 30(2): 72-76.
Legumes Associated with Reduced Risk for T2DM

Substituting legumes for

~50% lower risk when substituting legumes for other carbohydrate foods

Becerra-Tomás et al., Clinical Nutrition, 2017

Consistent evidence linking dairy consumption to reduced risk for type 2 diabetes

<table>
<thead>
<tr>
<th>Type of Studies</th>
<th>Total # studies (published 2009-2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy and Type 2 Diabetes</td>
<td></td>
</tr>
<tr>
<td>Meta-Analysis/Systematic Reviews</td>
<td>5</td>
</tr>
<tr>
<td>Prospective Cohort Trials</td>
<td>14</td>
</tr>
<tr>
<td>Trials</td>
<td>0</td>
</tr>
</tbody>
</table>

Meta-analyses show consistent beneficial associations:
- Total dairy associated with 3% - 14% risk reduction
- Yogurt intake associated with 14 – 17% risk reduction

### Meta-analyses of observational studies: Effect of dairy consumption on diabetes incidence

<table>
<thead>
<tr>
<th>Studies</th>
<th># of studies</th>
<th>Total dairy</th>
<th>Milk</th>
<th>Cheese</th>
<th>Yogurt</th>
<th>Low Fat</th>
<th>High fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gijsbers et al. (2016)</td>
<td>22</td>
<td>Inverse</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Inverse</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>Gao et al. (2013)</td>
<td>14</td>
<td>Inverse</td>
<td>Low fat</td>
<td>Inverse</td>
<td>Inverse</td>
<td>Inverse</td>
<td>Neutral</td>
</tr>
<tr>
<td>Aune et al. (2013)</td>
<td>17</td>
<td>Inverse</td>
<td>Neutral</td>
<td>Inverse</td>
<td>Inverse</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>Tong et al. (2011)</td>
<td>7</td>
<td>N/A</td>
<td>Low fat</td>
<td>Inverse</td>
<td>NA</td>
<td>Inverse</td>
<td></td>
</tr>
<tr>
<td>Elwood et al. (2010)</td>
<td>5</td>
<td>Inverse</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chen 2014</td>
<td>11</td>
<td>Neutral</td>
<td>N/A</td>
<td>N/A</td>
<td>Inverse</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### % US Adults Meeting Dietary Goals

<table>
<thead>
<tr>
<th></th>
<th>% meeting goal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of US</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Women</th>
<th>Men</th>
<th>Pre-diabetes</th>
<th>Non pre-diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>My Plate Recommendations 2015</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit (cup)</td>
<td>1.5-2</td>
<td>2</td>
<td>21.4</td>
<td>21.8</td>
</tr>
<tr>
<td>Vegetables (cup)</td>
<td>2-2.5</td>
<td>2.5-3</td>
<td>29.1</td>
<td>28.3</td>
</tr>
<tr>
<td><strong>Dairy (cup)</strong></td>
<td>3</td>
<td>3</td>
<td><strong>12.2</strong></td>
<td><strong>14</strong></td>
</tr>
<tr>
<td>Total Grain (oz)</td>
<td>5-6</td>
<td>6-8</td>
<td>51.5</td>
<td>51.6</td>
</tr>
<tr>
<td>Whole grain (oz)</td>
<td>2.5-3</td>
<td>3-4</td>
<td>18.1</td>
<td>18.6</td>
</tr>
<tr>
<td>Meat and Beans (oz)</td>
<td>5-5.5</td>
<td>5.5-6.5</td>
<td>55.1</td>
<td>53.6</td>
</tr>
<tr>
<td>Oils (tsp)</td>
<td>5-6</td>
<td>5-7</td>
<td>39.6</td>
<td>41.3</td>
</tr>
</tbody>
</table>

Siegel, Diabetes Care, 2018 May;41(5):1032-1039
Full-fat dairy & Type 2 Diabetes

Trans-palmitoleic acid (found only in dairy fat) is associated with higher HDL, lower triglycerides and blood pressure.

Malmö Diet and Cancer cohort: 26,930 men and women; 45-74 y. “Decreased T2D risk with high fat dairy (≥3.6 serv/d) - but not of low-fat dairy products suggests that dairy fat partly could have contributed to previously observed protective associations between dairy intake and T2D.”


“Higher plasma dairy fatty acid concentrations were associated with lower incident diabetes...Our findings highlight need to better understand potential health effects of dairy fat; and dietary and metabolic determinants of these fatty acids.”

Yakoob et al. Circulation 2016

Summary: low fat vs high fat dairy

- **Total dairy intake** has been associated with lower incidence of diabetes in prospective studies.
- **Yogurt, cheese and low-fat dairy** have been associated with lower incidence of diabetes in prospective studies.
- **High-fat dairy** was not associated with diabetes in prospective studies.
- **Recommendations for low-fat vs high-fat** should consider:
  - Preferences / Satiety
  - Total calorie intake
  - Lipid profile
Food sources of saturated fats

Food category sources of saturated fats in the U.S. population ages 2 years and older

Information adapted from the 2015-2020 Dietary Guidelines for Americans. Available at dietaryguidelines.gov

Can a meal be low in saturated fat and use whole milk dairy products?

Cereal with milk
Hard boiled egg
Chef salad
Milk
Chicken stir fry
Brown Rice
Apple / PB
Milk / Almonds
Yes, but it requires effort

Breakfast:
- 1 cup whole milk
- ¾ cup unsweetened cereal
- 1 hard-boiled egg

Morning snack:
- 1 medium apple
- 1 tbsp peanut butter

Nutrition Facts:
- Total kcal: 1802
- Total carbs: 163g, % carbs: 36.03%
- Total protein: 119, % protein: 26.22%
- Total fat: 76g, % fat: 37.75%
- Saturated fat: 22g, % sat fat: 10.88%

Lunch:
- 1 cup whole milk
- Chef salad:
  - 3 cups garden salad
  - 3 oz deli turkey, low-sodium
  - 2 tbsp light ranch dressing

Afternoon snack:
- 1 cup whole milk
- 12 almonds

Dinner:
- 1 cup brown rice
- Chicken stir fry:
  - 6 oz cooked chicken breast
  - ½ cup mandarin oranges in juice (canned)
  - ½ cup fresh snow peas
  - ½ cup sliced water chestnuts (canned)
  - ¼ cup chopped green onion
  - 1 clove garlic, minced
  - 1 tbsp canola oil
  - 1 tbsp low-sodium soy sauce

Joslin’s Nutrition Guideline --as related to dairy foods

- Dairy foods are listed as a recommended source of protein and carbohydrate (milk and yogurt are noted as having a low glycemic index)
- Noted that saturated fat (SFA) from dairy foods (milk, yogurt, cheese) may be acceptable within total calorie intake
  - Aim for <10% SFA; source more important than amount.
- Dairy on list of foods associated with diabetes prevention

Choose a healthy **placemat**!
**“Personalized Nutrition” recommendations**

- Different people have different BG responses to the same meal.
- Designed algorithm to customize recommendations based on:
  - Age, BMI
  - Lifestyle
  - Medical conditions /labs
  - Food intake
  - Microbiome
- www.daytwo.com

_Zeevi et al. Cell 2015 163, 1079-1094_
Individual variation to same foods

Key messages

- Your words matter - Join the language movement.
- Spread the word - There are 4 critical times for referrals.
- Nutrition is integral to the ADA Standards
  - Many approaches can work
  - Individualize
  - Quality foods - of high importance
  - Weight management – structured diets most effective
  - Promote those foods linked with reduce risk for T2D
- Coming soon: ADA 2019 Nutrition Consensus Paper
Resources

• American Diabetes Association
  • Plates/placemats – 7 versions  diabetes.org
  • Diabetes Food Hub  diabetesfoodhub.org/
• Diabetes Care & Education Practice Group (DCE)
  • Handouts / webinars  dce.org
• AADE – www.diabeteseducator.org

Thank you

Melinda@MelindaMaryniuk.com