DiabetesEd Training Conference |San Diego *

Day Three | October 11, 2024 (Pacific Time)

Medical Nutrition Therapy & Pattern Management

Time	Topic	Speaker
7:30 – 8:00am	**Breakfast & Welcome**	
8:00 – 10:00	**Medical Nutrition Therapy – Keeping it Person Centered** **Micro and Macronutrients** **Evidence based approaches to MNT**	Jessica Jones MS, RDN, CDCES
10:00 – 10:15	**Movement Break**	
10:20 -11:40	**Meal Planning- How to Eat by the Numbers**	
11:40 – 12:00	**Keeping Active with Diabetes**	

Thank you for joining us!

**Topics, Timing and Speakers Subject to Change*

Allow Me to Introduce Myself

- I am a Registered Dietitian, CDCES & Co-Founder and CEO of Diabetes Digital–an insurance-based group practice providing 1:1 nutrition counseling for people with DM & PreDM
- Worked in many institutions, from NYC Dept of Health to the University of California San Francisco to Private Practice
- Values: Culturally Humble, Accessibility, Weight Inclusivity, Promoting a Positive Relationship with Food

Healthy Eating

- Healthy Eating involves behaviors and decisions on what, when, and how much to eat
- Influences on healthy eating are complex and numerous
- Many clinicians consider healthy eating to be the most challenging of the AADE7 Self-Care Behaviors to implement successfully

Healthy Eating

- Medical Nutrition Therapy (MNT)
  - Evidence-based treatment of a condition through the modification of nutrient or whole-food intake
  - Often provided by a RD/RDN or similarly qualified professional
  - All diabetes care and education specialists must be ready and able to apply the principles of MNT

Goals of MNT for All Persons With Diabetes (PWD)

1. Decrease the risk of diabetes and cardiovascular disease with intensive lifestyle modification
   - Refer those at risk for diabetes to an intensive lifestyle program
     - Ex: Diabetes Prevention Program and/or individualized MNT

The Power of Prevention

- Diabetes Prevention Program (DPP) shows lifestyle changes may reduce risk of incident T2DM by 58% over 3 years
  - Benefit of lifestyle change is more significant in those over the age of 60 – may decrease risk of T2DM by 71%
  - Lifestyle intervention was effective in both sexes, across all racial and ethnic groups, and in people predisposed to diabetes

The Diabetes Prevention Program Research Group. (2002). Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *New England Journal of Medicine, 346*(6), 393–403. https://doi.org/10.1056/nejmoa012512

The Power of Prevention

- Lifestyle intervention/goals in DPP included:
  - Increase physical activity: goal of 150 minutes of physical activity per week
  - Decrease fat and calorie intake*
  - Decrease weight: sustained loss of 7% of initial body weight

*DPP initially encouraged a lower fat/calorie eating plan but current data suggests there is no ideal percentage of calories from carbs, protein, and fat to prevent diabetes. A variety of eating patterns may be appropriate.

Diabetes Prevention Program (DPP) Research Group. (2002). The Diabetes Prevention Program (DPP): Description of lifestyle intervention. *Diabetes Care, 25*(12), 2165-2171. doi:10.2337/diacare.25.12.2165

Having Said That!

- 10-year follow-up of DPP study, many participants regained most of the weight they initially lost
- Despite weight regain, participants in the lifestyle intervention group continued to experience a reduced risk of developing type 2 diabetes
  - Delay in development of DM by 34%
- Similar results at 15-year follow-up
  - Delay in development of DM by 27%
- Suggests that the benefits observed in the study—such as reduced diabetes risk—were not solely dependent on weight loss

10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study. (2009b). *The Lancet*, *374*(9702), 1677–1686. https://doi.org/10.1016/s0140-6736(09)61457-4

There is No "Prediabetes Diet"

- Many eating patterns may be appropriate
- Overall quality of food is associated with lower risk of type 2 diabetes

Diabetes Prevention Program (DPP) Research Group. (2002). The Diabetes Prevention Program (DPP): Description of lifestyle intervention. *Diabetes Care, 25*(12), 2165-2171. doi:10.2337/diacare.25.12.2165

Slide 8

JJ1 ADDED
Jessica Jones, 9/16/2024

The Power of Prevention

- Find a DPP in your community:
  - CDC-recognized DPP Lifestyle Change programs:
    - https://www.cdc.gov/diabetes-prevention/lifestyle-change-program/find-a-program.html
  - Medicare-enrolled CDC-recognized programs:
    - https://innovation.cms.gov/innovation-models/medicare-diabetes-prevention-program/mdpp-map

Goals of MNT for All Persons With Diabetes

1. Promote/support healthful eating patterns, emphasizing a variety of nutrient dense foods in appropriate portion sizes, to improve overall health and:
   - Achieve individualized glycemic, blood pressure, and lipid goals, achieve/maintain body weight goals, delay/prevent complications of diabetes

Goals of MNT for All Persons With Diabetes

2. Address individual nutritional needs based on:
   - Personal and cultural food preferences
   - Health literacy and numeracy
   - Access to healthful food choices
   - Willingness and ability to make changes
   - Barriers to change

Goals of MNT for All Persons With Diabetes

3. Maintain the pleasure of eating by:
   - Providing positive/nonjudgmental messages about food choices
   - Limiting food choices only when evidence-based
4. Provide practical tools for day-to-day meal planning and healthful eating patterns (rather than focusing on individual macros, micros, or single foods)

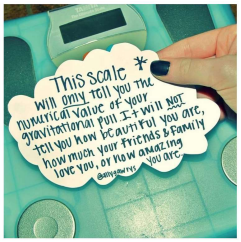
Benefit of MNT for Those With Diabetes

Decrease in A1C After 3-6 Months of Receiving MNT	
Type 1 Diabetes	1.0% - 1.9%
Type 2 Diabetes	0.3% - 2.0%

•Refer people with diabetes to RDN at dx and as needed
- Sustained A1C improvement with ongoing support from RD/RDN
- MNT is cost-effective

Franz, M. J., MacLeod, J., Evert, A., Brown, C., Gradwell, E., Handu, D., Reppert, A., & Robinson, M. (2017). Academy of Nutrition and Dietetics Nutrition practice guideline for type 1 and type 2 diabetes in adults: Systematic review of evidence for medical nutrition therapy effectiveness and recommendations for integration into the Nutrition Care Process. *Journal of the Academy of Nutrition and Dietetics*, *117*(10), 1659–1679. https://doi.org/10.1016/j.jand.2017.03.022

Rethinking Weight and Health



Introduction to Health at Every Size (HAES®)

HAES® Overview

- Developed in the late 1990s, rooted in the civil rights movements of the 1960s.
- Focuses on providing equitable healthcare without centering weight loss.
- Aims to challenge weight-based oppression and promote compassionate care for all body sizes.
- Healthcare as a Human Right: Everyone, regardless of size, deserves access to comprehensive and compassionate healthcare.
- Rejecting weight-based discrimination and ensuring care for all body sizes.

How HAES® Affects Health

Sustainability of Healthy Behaviors

- Intentional weight loss is often unsustainable, with most dieters regaining more weight than they lose, leading to weight cycling. Repeated dieting can lower resting metabolic rate, making weight regain more likely. Weight cycling is linked to higher risks of hypertension, insulin resistance, and hyperlipidemia.

Health Beyond Weight

- Health can improve through behaviors like balanced eating, regular physical activity, and stress management, regardless of weight changes.

Reducing Health Risks

- Adopting HAES®-aligned practices can reduce risks associated with chronic diseases, independent of weight loss.

JJ2

Tylka, Tracy L., et al. "The Weight-Inclusive versus Weight-Normative Approach to Health: Evaluating the Evidence for Prioritizing Well-Being over Weight Loss." *Journal of Obesity*, vol. 2014,

Slide 18

JJ2 added
Jessica Jones, 9/16/2024

Restrictive Eating Cycle

The restrict-binge cycle starts in **an attempt to control weight or "improve your health" by restricting food intake**.

1. Puhl R, Suh Y. Stigma and eating and weight disorders. Curr Psychiatry Rep. 2015 Mar;17(3):552. doi: 10.1007/s11920-015-0552-6. PMID: 25652251.
2. Levinson JA, Kirtkel-Ram S, Myers B, Hunger JM. A systematic review of weight stigma and disordered eating cognitions and behaviors. Body Image. 2024 Mar;48:101678. doi: 10.1016/j.bodyim.2023.101678. Epub 2024 Jan 25. PMID: 38278088; PMCID: PMC11180546.

How Does this Compare to 2024 ADA Standards?

	HAES	ADA
Focus on Weight	Emphasizes that health can be achieved at any size, discouraging intentional weight loss as a primary goal. It promotes body diversity and challenges the societal focus on thinness.	While the ADA does not solely focus on weight loss, it acknowledges weight management as an important factor in diabetes care. The 2024 Standards recommend weight loss for "overweight" or "obese" individuals as a means to improve glycemic control, blood pressure, and lipid levels.
Health Goals	Prioritizes overall well-being, mental health, and sustainable behaviors, such as intuitive eating and enjoyable physical activity, over weight loss. HAES® argues that these behaviors can lead to improved health outcomes regardless of changes in weight.	The ADA Standards focus on managing diabetes and preventing complications. While it does promote lifestyle changes, such as diet and exercise, these recommendations are often tied to achieving and maintaining weight loss to improve metabolic health.
Approach to Treatment	Advocates for a person-centered approach that respects individual autonomy and informed consent, without emphasizing weight loss. It calls for compassionate care, free from weight bias and discrimination.	The ADA Standards provide evidence-based guidelines for managing diabetes, including the use of medications, monitoring blood glucose, and lifestyle interventions. Weight management is recommended as part of a comprehensive treatment plan for people with diabetes or at risk for diabetes.

How Does this Compare to 2024 ADA Standards?

	HAES	ADA
Social Justice and Equity	Strongly rooted in social justice, HAES® addresses the broader social determinants of health, such as access to healthcare, food security, and environmental factors. It seeks to dismantle systemic biases, including anti-fat bias and racism, that affect health outcomes.	The ADA acknowledges disparities in diabetes care and outcomes, particularly among racial and ethnic minorities, and emphasizes the need for culturally competent care. However, it does not specifically address weight bias or promote a framework that explicitly challenges systemic oppression as HAES® does.
Research and Evidence	Questions the validity of much of the research linking weight and health, arguing that many studies are biased due to weight-centric assumptions. HAES® advocates for a broader interpretation of health data that includes social and psychological factors.	Bases its recommendations on a large body of clinical research, which often includes studies showing that weight loss can improve various health markers. The ADA uses this evidence to support its guidelines for diabetes management, including weight management as a key component.

ADA Weight Recommendations & Guidelines

•Leans on studies that suggest an increasing BMI is associated with an increasing prevalence of insulin resistance/DM, hypertension, and dyslipidemia. **These studies suggest that a 7-10% reduction in body weight can improve these markers.**

Classification*	Body Mass Index (BMI), kg/m^2
"Underweight"	<18.5
"Healthy Weight"	18.5 – 24.9
"Overweight"	25 – 29.9
"Obesity"	> 30

Overview of 2024 ADA Standards Weight Recommendations

- Nutrition, physical activity, and behavioral therapy to achieve and maintain a ≥5% weight loss are recommended for people with diabetes and overweight or obesity.
- Frequent counseling (≥16 sessions in 6 months) focusing on nutrition, exercise, and behavior strategies to achieve a 500-750 kcal/day energy deficit is beneficial and recommended if available.
- Long-term support (≥1 year) is advised for those meeting weight loss goals, offering monthly support, body weight monitoring, self-monitoring strategies, and regular physical activity (200-300 minutes/week).

Do We Need to Weigh Clients?

- ADA Standards:
  - Calculate BMI and document in medical record at medical annual visit
- If weighing is questioned or refused:
  - Be mindful of possible prior stigmatizing experiences
  - Consider the value of weight monitoring
- Situate scales in a private area or room
- Measure and report weight non-judgmentally
- Take care to regard weight and BMI as sensitive health information
- Use non-judgmental language

How Can We Help Our Clients?

- Don't assume weight loss is a goal. If weight loss is a goal, ask "what benefits do you hope weight loss will bring?"
- Ask about their goals: "If weight weren't a concern, what would healthy eating look like for you?"
- Be compassionate and listen to lived experience
- Also note that patient has autonomy over their life

HAES®-Aligned Approach To Helping Our Clients

- Nourish, Don't Restrict
  - Encourage a variety of nourishing foods without targeting specific calorie deficits.
  - Use the My Plate method as a place to start
- Focus on balanced nutrition, regular physical activity, and stress management rather than a number on the scale as a goal.
- Emphasize health-promoting habits through regular, behavior-focused counseling rather than weight as a primary outcome.

Setting Goals with a Weight-Inclusive Approach

- I will continue to care for my body by doing [x].
  - x = walking 10 minutes after lunch each day
  - x = having a vegetable with dinner every night
  - x = honoring my hunger and eating consistently
  - x = keeping all my appointments with my therapist
  - x = getting 7-8 hours of sleep each night
  - x = checking my blood sugar every morning

Review Question

Joe is 5'9" and weighs 202 lbs. (BMI 29.8). He was just diagnosed with prediabetes with an A1C at 6.3%. He does not want to start medication. What is his best option?

A. Lose 14-20 lbs
B. Focus on a nutrient-rich eating pattern, increased physical activity, and reduced stress
C. Decrease his fat intake by 5-10%
D. Reconsider medications and try Metformin

Common Eating Pattern

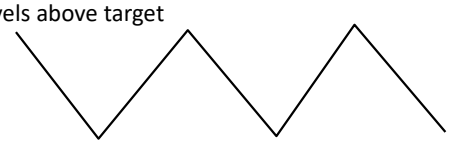
Breakfast: Skipped or just coffee
Lunch: Salad, low or no carbs, diet soda
Afternoon snack: fruit, veggies and hummus, yogurt, granola, candy
Dinner: Pizza, burger and fries, takeout
Evening snack: Cookies, ice cream, chips, cereal, sweets, crackers

Why This Common Eating Pattern Can Be Physiologically Challenging

- By 3pm, blood glucose levels dropping
- Feel hangry (hungry + angry)
- Brain seeks quick energy from high carb/calorie foods
- Eat to the point of being over full
- Blood glucose levels rise
- Elevated postprandial and fasting glucose levels

Instead of this approach …

- Sharp drops in blood glucose from under-eating early in the day can cause intense hunger and eating past point of fullness and inconsistent blood glucose levels above target



We want this…

- Slight dips in blood glucose gently signal it's time to eat
- Eat adequately and consistently, including all? food groups at each meal

Healthy Eating Patterns

- Consensus Recommendation: There is no ideal percentage of calories from carb, protein, and fat for people with diabetes.
- A healthy eating pattern includes:
  1. ↑ non-starchy vegetables, whole fruit and grains, legumes, nuts, seeds, low-fat diary
  2. ↓meat, SSBs, sweets, refined grains, ultra-processed foods
- This eating approach limits saturated and trans fats, added sugar, and sodium.

Carbohydrates

- Inconclusive evidence for ideal amount of carbohydrate per day
  - RDA is 130 g/day in people w/o diabetes. This can be fulfilled via intake or by body's metabolic processes
- Amount of carb eaten is main dietary influence on postprandial BG
  - Type/quality of carb makes a difference

Carbohydrates

- Reducing overall carbohydrate intake for individuals with diabetes shows evidence for improving glycemia
  - Low and very low carb diets lower A1C in short-term only; difficult to sustain macronutrient distribution changes long-term
  - Most PWD report moderate carb intake (44-46% of total calories)

Carbohydrates

- Focus on the "quality of carbohydrate foods selected"
  - Nutrient dense carbs with dietary fiber, vitamins, and minerals
  - Low in added sugars, fats, and sodium
  - Minimally processed

Sugars

- Types: glucose, fructose, sucrose (glucose + fructose), and others
  - Glucose: If eaten alone, has highest glycemic peak relative to other sugars
  - Fructose: metabolized mostly in the liver; goes to replenish liver glycogen & triglyceride synthesis so it has less acute impact on BG
  - Sucrose: Broken into 50% glucose and 50% fructose

Fructose as a Sweetener

- Lower postprandial response compared to other sweeteners
- Not recommended as a sweetening agent because it may adversely affect lipids

Franz, M. J., MacLeod, J., Evert, A., Brown, C., Gradwell, E., Handu, D., Reppert, A., & Robinson, M. (2017). Academy of Nutrition and Dietetics Nutrition practice guideline for type 1 and type 2 diabetes in adults: Systematic review of evidence for medical nutrition therapy effectiveness and recommendations for integration into the Nutrition Care Process. *Journal of the Academy of Nutrition and Dietetics*, *117*(10), 1659–1679. https://doi.org/10.1016/j.jand.2017.03.022

Fructose in Fruit

- No reason to avoid naturally occurring fructose in fruits and vegetables
  - "Free fructose" in fruit may result in better glycemic control compared with isocaloric intake of sucrose or starch and is not likely to have detrimental effects on triglycerides

A Unique Sugar: Allulose

- A type of sugar that is GRAS by the FDA
  - Small amounts naturally in wheat and some fruits; can be manufactured
  - ~70% as sweet as table sugar
  - Contributes few calories, produces negligible increases in blood glucose and insulin levels, does not promote dental decay
- Labeling for allulose:
  - Not included in "Total Sugars" or "Added Sugars"
  - Included in Total Carbohydrates
  - Calories calculated with 0.4 kcals/gram
  - Must be in ingredient list

A Unique Sugar: Allulose

Nutrition Facts

About 12 servings per container

Serving size 2 tbsp (30 mL)

Amount per serving

Calories 20

	% Daily Value*
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 0mg	0%
Total Carbohydrate 28g	10%
Dietary Fiber 0g	0%
Total Sugars 0g	
Includes 0g Added Sugars	0%
Allulose 26g	
Protein 0g	

* Percent Daily Values (DV) are based on a 2,000 calorie diet.

2G NET CARBS = 28G TOTAL CARBS - 26G ALLULOSE

INGREDIENTS: Besti Monk Fruit Allulose Blend (Liquid Allulose, Monk Fruit Extract), Vegetable Glycerin, Natural Flavors

Sugar Sweetened Beverages (SSBs)

- General population: SSBs should be avoided to ↓risk of type 2 diabetes, heart disease, weight gain, non-alcoholic liver disease, and tooth decay.
- In people with and without diabetes: replace SSBs with water as often as possible.
  - Helps ↓ calorie intake.

Hypoglycemia Treatment

- Treat hypoglycemia with 15g fast-acting carbs if glucose level reaches <70 mg/dl
  - Best option: pure glucose
  - Other options: glucose-containing carbs
  - Do NOT select foods with fat or protein
- Recheck 15 minutes later; retreat if still low
- If on AID system, consider less treatment (5-10g)

Non-Nutritive Sweeteners

- Also known as High Intensity Sweeteners & Artificial Sweetners
- Ingredients used to sweeten and enhance the flavor of foods
- FDA approved for consumption by the general public and PWD
- Safety is a source of concern and confusion for the public
- Very sweet, so smaller amounts are needed to achieve the same sweetness as sugar in food

FDA Response to External Safety Reviews of Aspartame

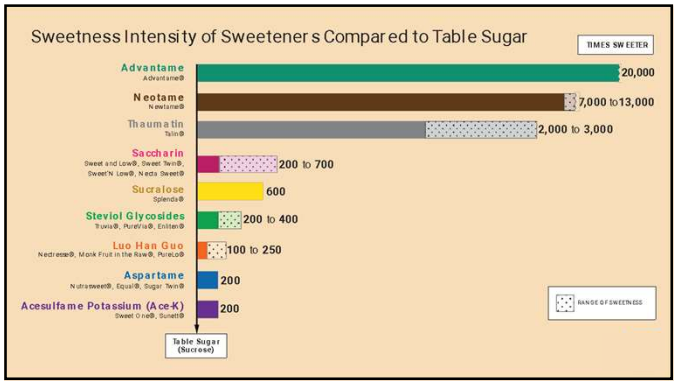
The FDA is aware of the International Agency for Research on Cancer (IARC) and Joint FAO/WHO Expert Committee on Food Additives (JECFA) conclusions about aspartame issued July 14, 2023. Aspartame being labeled by IARC as "possibly carcinogenic to humans" does not mean that aspartame is actually linked to cancer.

The FDA disagrees with IARC's conclusion that these studies support classifying aspartame as a possible carcinogen to humans. FDA scientists reviewed the scientific information included in IARC's review in 2021 when it was first made available and identified significant shortcomings in the studies on which IARC relied. We note that JECFA did not raise safety concerns for aspartame under the current levels of use and did not change the Acceptable Daily Intake (ADI).

Aspartame is one of the most studied food additives in the human food supply. FDA scientists do not have safety concerns when aspartame is used under the approved conditions. The sweetener is approved in many countries. Regulatory and scientific authorities, such as Health Canada and the European Food Safety Authority have evaluated aspartame and also consider it safe at current permitted use levels.

Non-Nutritive Sweeteners

- Six are approved by the FDA as food additives
  1. Advantame
  2. Neotame
  3. Saccharin
  4. Sucralose
  5. Aspartame
  6. Acesulfame potassium
- Plant and fruit-based GRAS Sweeteners
  1. Thaumatin
  2. Stevia
  3. Luo Han Guo (Monk Fruit)



Non-Nutritive Sweeteners

- Non-nutritive sweeteners contribute no/few calories to the diet and do not raise blood glucose levels
  - Could reduce overall calorie/carb intake as long as there is no compensatory energy increase elsewhere
  - No reduction to weight without energy restriction

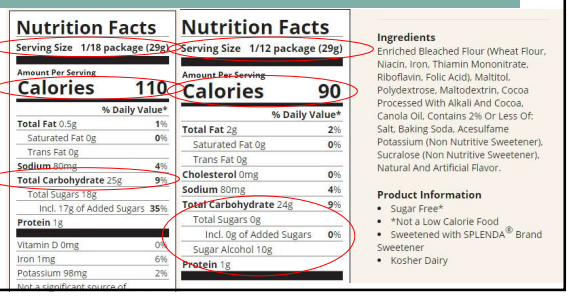
Sugar Alcohols

- Another category of sweeteners approved for consumption for general public and PWD
  - Calorie contribution is often similar to sugar
  - Associated with bloating, flatulence, and diarrhea
- Examples: Sorbitol, maltitol, erythritol, isomalt, xylitol, lactitol

Sugar Alcohols

- Little evidence on benefit for people with diabetes
- Consumption produces a small rise in blood glucose
  - Postprandial response is lower than with fructose, glucose, or sucrose
  - To carb count: consider subtracting ½ of sugar alcohol from total carb grams

Sugar Alcohols



Nutrition Facts

Serving Size 1/18 package (29g)

Amount Per Serving

Calories 110

% Daily Value*

Total Fat 0.5g 1%
Saturated Fat 0g 0%
Trans Fat 0g
Sodium 80mg 4%
Total Carbohydrate 25g 9%
Total Sugars 18g
Incl. 17g of Added Sugars 35%
Protein 1g
Vitamin D 0mg 0%
Iron 1mg 6%
Potassium 98mg 2%
Not a significant source of

Nutrition Facts

Serving Size 1/12 package (29g)

Amount Per Serving

Calories 90

% Daily Value*

Total Fat 2g 2%
Saturated Fat 0g 0%
Trans Fat 0g
Cholesterol 0mg 0%
Sodium 80mg 4%
Total Carbohydrate 24g 9%
Total Sugars 0g
Incl. 0g of Added Sugars 0%
Sugar Alcohol 10g
Protein 1g

Ingredients
Enriched Bleached Flour (Wheat Flour, Niacin, Iron, Thiamin Mononitrate, Riboflavin, Folic Acid), Maltitol, Polydextrose, Maltodextrin, Cocoa Processed With Alkali And Cocoa, Canola Oil, Contains 2% Or Less Of: Salt, Baking Soda, Acesulfame Potassium (Non Nutritive Sweetener), Sucralose (Non Nutritive Sweetener), Natural And Artificial Flavor.

Product Information
- Sugar Free*
- *Not a Low Calorie Food
- Sweetened with SPLENDA® Brand Sweetener
- Kosher Dairy

Non-nutritive Sweeteners

- For both non-nutritive sweeteners and sugar alcohols, recommend:
  - Reductions in sugar intake and calories with or without use of non-nutritive sweeteners
  - Moderation

Starch

- The digestive tract is efficient in breaking starches into glucose
- Glycemic effect of a particular starch is determined by:
  - Type/structure of starch
  - Types of processing and cooking used
  - Other macronutrients consumed with the starch
- Focus on starches with fiber, rather than refined/processed grains

Impact of Starch on BG

- Structure/type of the starch
  - Amylose vs. amylopectin

AMYLOSE
More "resistant starch"
Lesser impact on glucose levels
Example: Long grain rice, beans, lentils

AMYLOPECTIN
Greater impact on glucose levels
Example: Short grain rice, potatoes

Impact of Starch on BG

- Structure/type of the starch
  - Ripeness
    - Example: As a banana ripens, resistant starch converts into sugars

Impact of Starch on BG

- Types of processing and cooking used
  - Cooking method and time
  - Amount of heat and moisture
    - Example: The longer pasta cooks, the more water-logged its molecules become, making it easier for the body to break it down to glucose

Fiber

- A type of carbohydrate that passes through the body largely undigested, thus contributes minimal glucose to the postprandial rise
- Intake is inversely associated with risk of T2DM
- Sufficient intake is associated with lower all-cause mortality in people with diabetes

Fiber

- Sources of fiber:
  - Whole fruits, starchy and non-starchy vegetables, beans, peas, lentils, nuts, seeds, and whole grains
- Goal: 14 grams of fiber/1000 kcal
  - Typical American gets ~15 grams/day
  - Improved glycemia with ~44-50 grams/day; may be difficult due to palatability and GI side effects
- 50% of grain consumption from whole intact grains

Tips to Increase Fiber

- Real-world tips to increase fiber:
  - Eat whole fruit instead of drinking juice
  - Replace white flour products/rice with brown rice and whole grains
  - Snack on nuts, seeds, fruit, or vegetables more often
  - Substitute beans/lentils for meat in a salad, chili, or soup

Fiber & Carbohydrate Counting

- Since fiber is a type of carbohydrate that the body can't digest, it does not affect blood sugar levels like other carbs.
- On Nutrition Facts food labels, the grams of dietary fiber are already included in the total carbohydrate.
- In those who are intensively managed with insulin and carb counting, consider subtracting the grams of fiber from the total carbohydrate.

Knowledge Check

Taylor, who has type 1 diabetes, begins experiencing symptoms of hypoglycemia after a long-day of swimming. When she checks, her blood sugar is 63 mg/dl. What should she do?

A. Drink 8 oz of soda and recheck her glucose level in 15 minutes
B. Eat 4 glucose tablets and recheck her glucose level in 15 minutes
C. Drink 15g of liquid glucose and recheck her glucose level in 30 minutes
D. Eat a piece of fruit and recheck her glucose level in 30 minutes

Protein Sources

- Meat: beef, pork, lamb, veal, etc.
- Plant-based meats
- Poultry: chicken, turkey, duck, emu, goose, bush birds, etc.
- Fish and seafood: fish, prawns, crab, lobster, scallops, etc.
- Eggs
- Dairy products: milk, yogurt, cheese, cottage cheese
- Soy milk
- Nuts, seeds, nut butters
- Tofu, tempeh, edamame
- Beans, lentils, peas, hummus
- Grains: quinoa, wheat berry, millet, couscous, buckwheat, oatmeal, high protein cereal

Protein

- Recommended vs. Actual Intake
  - RDA: 0.8 g/kg body weight/day
  - Most Americans eat 1-1.5 g/kg body weight/day or 15-20% of total calories from protein
- No evidence that adjusting actual intake towards the recommended intake will improve health

Protein

- Dietary protein in diabetes management:
  - Inconclusive research regarding the ideal amount of dietary protein to optimize glycemic management or CVD risk
  - Individualize protein goals based on current eating patterns

Protein & CKD

- Dietary protein in diabetes management for persons with nondialysis-dependent CKD
  - Intake goal is 0.8g protein/kg body weight/day
    - Less doesn't provide benefits and may increase malnutrition risk
    - More is associated with an accelerated decline in kidney function

Protein & CKD

- For persons with diabetes on dialysis
  - Malnutrition is common
  - Consider intake higher than 0.8g protein/kg body weight/day to reduce the risk of under nourishment

Protein

- In someone living with T2DM, protein intake may stimulate the release of insulin
  - Therefore, use of carb sources high in protein to treat/prevent hypoglycemia should be avoided
  - Examples of foods to avoid are milk, nuts, peanut butter

Protein

- In someone living with T2DM, consuming non-starchy vegetables and protein 5-15 minutes prior to eating carbohydrate foods has been shown to lower postprandial glucose and insulin excursions

Fats

- Sources: a variety of foods including meat, poultry, fish/seafood, eggs, dairy products, nuts and seeds, avocado, butter/oil, processed and fried foods
- Dietary fat is needed for absorption of fat-soluble vitamins (A, D, E, and K), function of nerves and brain, and healthy skin and body cells.

Fats

- There is not an ideal percentage of calories from fat for people at risk for or living with diabetes
- Type of fat consumed is more important than total fat
  - Limit intake of saturated fat
  - Avoid trans fat
  - Keep cholesterol intake as "low as possible" w/o compromising adequacy of the diet

Saturated Fat

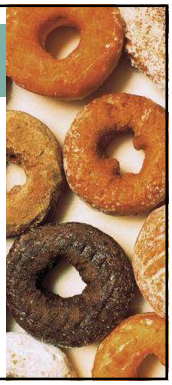
- Sometimes Fat (Less Healthy)
- Primary sources of saturated fats include:
  - Red meat (beef, lamb, pork)
  - Chicken skin
  - Whole fat dairy products (milk, cream, and cheese), butter, and ice cream
  - Lard
  - Tropical oils like coconut and palm oil
  - Processed foods

Saturated Fat

- Limit calories from saturated fat
  - Quality of fat is more important that quantity of fat
  - Replace saturated with unsaturated fat to reduce total and LDL cholesterol
  - Replace saturated with unsaturated fat; not refined carb
    - This would also reduce total and LDL cholesterol, but may increase triglycerides and reduce HDL

Trans Fat

- Avoid, considered "unhealthy fat"
- Historical sources: processed foods like baked goods, microwave popcorn, frozen pizza, refrigerated dough like biscuits and rolls, fried foods, nondairy coffee creamer
- Trans fat should be avoided; associated with all-cause mortality, total CHD, and CHD mortality.



Trans Fat

- Most trans fat in food is formulated through partial hydrogenation
  - Manufacturers added hydrogen to vegetable oil, turning the liquid into a solid fat (like shortening or hard margarine)
  - Process increases the shelf life and flavor stability of foods

Trans Fat

- The FDA's Ban of Partially Hydrogenated Oils (PHOs)
  - In 2015 the FDA determined that PHOs are not GRAS*
  - Food manufacturers were allowed time to reformulate foods and move foods already produced through distribution
  - Compliance date to move these food through distribution was January 1, 2021.

*GRAS: "generally recognized as safe"

Mono and Polyunsaturated Fats

- Always, as these fats have health promoting properties
- Eating patterns rich in these can improve glycemic control and blood lipids (Ex: Mediterranean diet)

Type of Fat	Sources
Monounsaturated	Foods: avocado, edamame, olives, nuts Oils: avocado, olive, peanut, canola
Polyunsaturated	Foods: Walnuts, sesame, flax, and sunflower seeds, fish (salmon, albacore tuna) Oils: corn, soybean, safflower, sesame

Polyunsaturated Fats

- Increasing foods with the long-chain omega-3 fatty acids (EPA and DHA) is recommended for prevention of cardiovascular disease
  - Have two servings of fatty fish per week
    - Wild salmon, mackerel, herring, anchovies
    - NOT commercially fried fish filets
  - Plant sources for vegetarian/vegan eating patterns (ALA)
    - Ground flaxseed/flax meal, chia seeds, walnuts, soybeans, mung beans, green leafy vegetables, whole grains, and beans

Polyunsaturated Fats

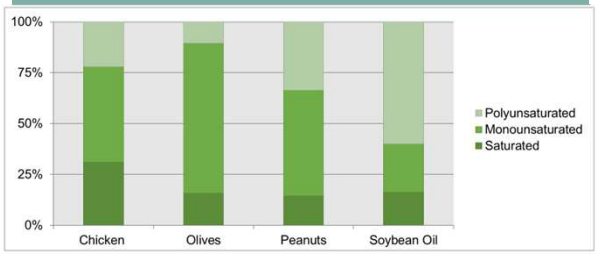
- Evidence does not conclusively support recommending omega-3 (EPA and DHA) supplements for all people with diabetes for the prevention or treatment of cardiovascular events

Knowledge Check

Which of the following food items has the highest percentage of saturated fat per ounce?

A. Chicken
B. Olives
C. Peanuts
D. Soybean oil

Knowledge Check: Answered



Knowledge Check

Olive oil and canola oil are good sources of:

A. Monounsaturated fats
B. Polyunsaturated fats
C. Saturated fats
D. Trans fats

Sodium

- Limit sodium intake to less than 2300 mg/day
  - Limit of <1500 mg/day is not recommended
- Sodium recommendations should consider palatability, availability, affordability, and the difficulty of achieving low-sodium recommendations in a nutritionally adequate diet.

Calcium & Vitamin D

- Fracture risk is higher in people with diabetes
- Advise those with diabetes on dietary or supplemental intake of intake of Calcium and Vitamin D
  - Calcium – meet age specific recommendations for intake
  - Vitamin D – aim for serum levels ≥20 or >30 ng/mL

Micronutrients & Supplements

- Nutrition therapy should include education on how to acquire adequate amounts of vitamins and minerals from food
- Typically, unless deficient, use of herbal, vitamin, or mineral supplementation in those with diabetes is not supported

Micronutrients & Supplements

- Select groups with may need a multivitamin supplement
  - Elderly
  - Women planning pregnancy, currently pregnant, lactating
  - Strict vegetarians/vegans
  - People with celiac disease
  - Those on calorie or carb-restricted diets

Micronutrients & Supplements

- Long-term metformin use may be associated with vitamin B12 deficiency
  - Consider periodic testing of of B12 status if taking Metformin chronically, especially for those with anemia or peripheral neuropathy

Micronutrients & Supplements

- Ask PWD about supplement use
- Routine supplementation with antioxidants such as vitamins E, C, and carotene is not advised
- Insufficient evidence to support the routine use of most herbal supplements and micronutrients
  - See Bev's handout for more information

Micronutrients & Supplements

Alcohol & Glycemia

- Moderate consumption has minimal acute or long-term effect on glucose and insulin concentrations
- Limit intake to:
  - 1 drink or less per day for women
  - 2 drinks or less per day for men

Alcohol & Glycemia

- What is a drink?
  - 5 ounces of wine
  - 12 ounces of beer
  - 1½ ounces of a hard alcohol
- 1 drink has approximately ~15 grams of alcohol
- 1 gram of alcohol = 7 calories
  - Consider when discussing wt. management

Alcohol & Glycemia

- Risk of hyperglycemia:
  - Consistently having 3+ drinks/day can contribute to hyperglycemia
  - Carb consumed with alcohol (e.g. mixed drink, beer, wine) may acutely raise BG

Alcohol & Glycemia

- Risk of hypoglycemia:
  - Individuals using insulin or insulin secretagogues are at risk for hypoglycemia following consumption
    - Evening drinking may increase the risk of nocturnal/fasting hypo
  - Individuals may consume food with alcohol reduce the risk

Knowledge Check

Chris has had T1D for 30 years. They use Multiple Daily Injections and wear a CGM. They are out celebrating and have 4 rum and cokes and appetizers. They take insulin for carbs. When they get home, the CGM shows a glucose at 162 mg/dl. What advice would you give?

A. The ADA recommends limiting alcohol to no more than 2 drinks a day.
B. Have you ever wondered if you are drinking too much alcohol?
C. Make sure they have glucagon rescue medication by their bed.
D. Investigate how they would usually handle this situation.

Slide 99

JJ4 The answer looks cut off here
Jessica Jones, 9/16/2024

Macronutrients: Final Thoughts

1. "People eat foods, not nutrients, and nutrient recommendations need to be applied to what people eat."
2. Macros vary in quality, not all within the group are interchangeable
    1. E.g. Carbs include legumes, whole grains, and fruits – this is the same category as candy and refined grains, yet the health impact of these is not the same

Youth with Diabetes

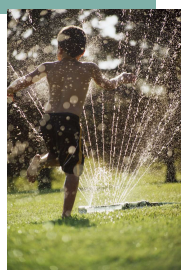
- Key concepts for youth with all types of diabetes
    - Meet energy requirements for growth and activity
    - Use *food plan* or *meal plan* not *diet*
    - Engage the child or adolescent in planning, shopping, and preparing healthy foods for the entire family

Youth with T1D

- Balance carb intake and insulin
  - Educate on impact of high-fat/protein
- Integrate insulin regimen into lifestyle
- Avoid withholding food to prevent hyperglycemia or having a child eat without an appetite to avoid hypoglycemia

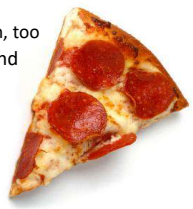
Youth with T1D

- For those on fixed insulin program, focus on consistent carb intake considering timing and amount
- For those on flexible insulin program, provide education on carb estimating/counting



T1D & Flexible Insulin Therapy

- In a mixed meal (carb + high in fat/protein), insulin need is not based on carb alone
  - Consider the glycemic impact of fat and protein, too
- Relative to a lower fat/protein meal, high-fat and high-protein meals may require:
  - More insulin
  - A different approach to insulin timing
- More research is needed to determine optimal insulin dose and delivery strategy



Youth with T2D

- Youth and family must prioritize lifestyle modifications
  - Dietary recommendations:
    - Focus on nutrient-dense, high-quality foods / decrease calorie-dense, nutrient-poor foods (particularly SSBs)
  - Increase exercise
  - ADA: Aim for a sustainable 7-10% decrease in excess weight for youth with "overweight/obesity"
    - AAP's stance is to prioritize overall health improvement and to avoid an exclusive focus on weight, recognizing the importance of addressing the broader context in which "obesity" exists.
    - Pediatricians should evaluate patients for disordered eating and unhealthy weight-control behaviors at annual health supervision visits.

Hampl, Sarah E., et al. "Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents with Obesity." *Pediatrics*, vol. 151, no. 2, 2023, publications.aap.org/pediatrics/article/151/2/e2022060640/190443/Clinical-Practice-Guideline-for-the-Evaluation-and?autologincheck=redirected, https://doi.org/10.1542/peds.2022-060640.

Youth with T2D

- With dyslipidemia, use MNT to support:
  - Limit calories from fat: 25-30%
  - Limit calories from saturated fat: <7%
  - Limit cholesterol: <200 mg/day
  - Avoid trans fat
  - Aim for ~10% of calories from monounsaturated fat
  - For elevated triglycerides: ↓ simple sugar, ↑ omega-3s

Youth with T2D

- Assess for steatosis / MASLD*
- With overweight/obesity: aim for 7-10% weight loss
- With nephropathy: protein intake at the RDA of 0.85-1.2 g/kg/day (based on age)

*metabolic associated steatotic liver disease

Pregnancy

- With pre-existing diabetes planning pregnancy, refer to RDN
- Prenatal vitamins:
  - At least 400 µg folic acid
  - 150 mg potassium iodide

Pregnancy

- For women with diabetes in pregnancy or GDM, focus on:
  - Adequate calories for appropriate weight gain (weight loss not recommended)
  - Minimize blood glucose excursions
  - Ensure nutrient-dense, safe nutrition

Pre-pregnancy BMI and Weight Gain

Weight-for-Height Category	Recommended Total Weight Gain (Singleton Gestation)
With Underweight (BMI ≤18.5)	28-40 lbs
Healthy Weight (BMI 18.6 – 24.9)	25-35 lbs
With Overweight (BMI 25.0 – 29.9)	15-25 lbs
With Obesity (BMI ≥ 30)	11-20 lbs

Moore Simas, T. A., Waring, M. E., Sullivan, G. M., Liao, X., Rosal, M. C., Hardy, J. R., & Berry Jr, R. E. (2013). Institute of Medicine 2009 gestational weight gain guideline knowledge: Survey of obstetrics/gynecology and family medicine residents of the United States. *Birth*, *40*(4), 237–246. https://doi.org/10.1111/birt.12061

DRIs and Pregnancy

- For pregnant women, dietary reference intake recommend a minimum of:
  - 175 grams/day of carbohydrates
  - 71 grams/day of protein
  - 28 grams/day of fiber
- Amount/type of carb will impact postprandial glucose levels
- Emphasize mono- and polyunsaturated fats

Knowledge Check

Sara has just been diagnosed with gestational diabetes. Her current weight is 176 lbs. and her pre-pregnancy BMI was 28. What is the total recommended weight gain for Sara's pregnancy?

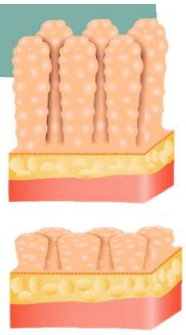
A. 15 pounds
B. 15-25 pounds
C. 25-35 pounds
D. 28-40 pounds

Knowledge Check

What are the nutrient goals for pregnant women?

A. 130 grams of carbohydrate/day, 71 grams of protein/day, 14 grams of fiber/day
B. 130 grams of carbohydrate/day, 90 grams of protein/day, 28 grams of fiber/day
C. 175 grams of carbohydrate/day, 90 grams of protein/day, 14 grams of fiber/day
D. 175 grams of carbohydrate/day, 71 grams of protein/day, 28 grams of fiber/day

Celiac Disease



- Immune-mediated disorder where destruction of the small intestine villi occurs following exposure to gluten
- Occurs more often in people with T1D
  - 1%-16% of individuals compared to 0.3%-1% in general population

Celiac Disease

When to Screen for Celiac Disease	
Pediatrics with T1D	Adults with T1D
• Within 2 years of diagnosis • Again 5 years after diagnosis or sooner if symptoms present	With suggestive • GI symptoms (diarrhea, malabsorption, abdominal pain) • Signs (Osteoporosis, vitamin deficiency, iron deficiency anemia)

Celiac Disease

- Diagnosis via blood tests and a small intestine biopsy
  - Screen for celiac by testing IgA if person with T1D has suggestive symptoms or signs:
    - If normal serum IgA, measure IgA-tTG antibodies
    - If IgA deficient, measure IgG tTg and IgG DGA

IgA: immunoglobulin A
IgG: immunoglobulin G
tTG: tissue transglutaminase
DGA: deaminated gliadin antibodies

Celiac Disease

- Treatment for celiac disease is a lifetime gluten-free diet
  - Eliminate all wheat (including durum, semolina, spelt, and farro) and the related grains of rye, barley, and triticale.
  - Caution with oats – may be contaminated with wheat
  - Remember "BROW" – Barley, Rye, (some) Oats, Wheat
- Refer to a dietitian for help with food selection/label reading

Nutrition Interventions: Celiac Disease

Gluten Free Whole Grains & Starches include:

- Quinoa
- Potatoes
- Beans & Peas
- Cassava
- Corn
- Oats*
- Flax
- Amaranth
- Millet
- Rice
- Wild rice
- Buckwheat
- Job's Tears (Hato Mugi)
- Montina (Indian rice grass)
- Sorghum
- Teff

**Oats are inherently gluten-free may be contaminated with wheat during growing or processing.*

Disordered Eating Patterns

- Estimated prevalence of disordered eating behavior and eating disorders varies in people with diabetes
- Most reported disordered eating behaviors:
  - T1D: insulin omission causing loss of glucose/calories via the urine
  - T2D: bingeing (excessive intake with sense of loss of control)

Disordered Eating Patterns

- Anorexia nervosa: restricted energy intake relative to need
  - Marked by low body weight, fear of weight gain, and disturbance in the way in which one's body weight or shape is experienced
- Bulimia nervosa: recurring binge eating and compensatory behavior
  - Binging characterized by a sense of a lack in control.
  - Compensatory behaviors vary
- Diabulimia (unofficial diagnostic term): reduction/omission of insulin doses
  - This causes hyperglycemia and loss of glucose calories through the urine.

Disordered Eating Patterns – Case Study

- MR is a 59-year-old living with type 2 diabetes who shares that their provider keeps telling them to lose weight. MR is trying to eat less and decrease portions, but then they get "so hungry, they end up bingeing on ice cream or other treats. Then, their blood glucose levels go up and they feel really bad about themselves".

- What is your first reaction when you hear MR's story?
- How would you approach this honest sharing by MR in a way that helps move MR toward healing?
- Do you want to consider any referrals?

Disordered Eating Patterns

- Screen for it along with regular medical care
  - Especially if patterns when hyperglycemia and weight loss are unexplained
- Multidisciplinary team approach to treatment is a standard of care
  - Early referral to mental health professional

Prediabetes – Case Study

CK, a 44-year-old woman currently experiencing perimenopause, has observed a steady weight gain of 30 pounds over the last five years, primarily around her midsection, without significant changes to her lifestyle. She walks most days, averaging 5,000 steps, but does not engage in weight training or other forms of structured exercise. Her diet is generally balanced, with regular meals, though she occasionally skips one and compensates later. Despite these habits, her A1C has risen to 6.0%, signaling a shift toward prediabetes. Additionally, she notes increasing difficulty with sleeping, which may be contributing to her overall health challenges.

- What is your first reaction when you hear CK's story?
- What strategies could help her address her weight gain, rising A1C, and sleep difficulties?
- Do you want to consider any referrals?

Mediterranean Eating Pattern

Description & Notes	• Encourages plant-based foods, fish and shellfish, some dairy. Olive oil is primary fat source. • Limitations: • Moderate number of eggs, minimal red meat, wine in low to moderate amount, rare use of concentrated sugars or honey.
Current Literature	• Improves CVD risk factors • Energy restricted version of these meal plans can improve weight and glycemia

Slide 124

JJ7 added this case study, goal is to show that women may need HRT as low estrogen will cause increased weight and issues w glucose metabolism and refer out to places like Midi etc
Jessica Jones, 9/16/2024

DASH Eating Pattern

Description & Notes	*Dietary Approaches to Stop Hypertension* Encouraged foods: •Fruits & Veg (8-10 servings/day), whole grains (6-8 servings/day), low-fat dairy (2-3 servings/day), poultry & fish (6 servings/week), nuts & seeds (4-5 servings/week) •Limitations: • Red meat, sweets, sugar-containing, processed food, excessive alcohol consumption
Current Literature	• Improves BP and reduces risk for CVD in people w/o diabetes • Limited evidence exists for people with diabetes but "one would expect similar results"

Plant-Based Eating Pattern

Description & Notes	• Limited/no flesh foods; may allow egg and/or dairy • Associated with lower intake of saturated fat and cholesterol
Current Literature	• Energy restricted version of these meal plans can improve CVD risk factors, weight, and glycemia

Intermittent Fasting & Time Restricted Eating

Description & Notes	• Alternate-day fasting • 5:2 diet • Time-restricted eating
Current Literature	• Results in mild to moderate weight loss over short durations • No difference vs. continuous calorie restriction • Time restricted eating may be easier to follow due to ease, no need to count calories, sustainability

Other Eating Patterns/Plans

Partial/Total Meal Replacements	• Bars, shakes, soups with set macros/micros • Shown to improve nutrient quality and glucose control • Effective short-term strategy for weight loss
Chrononutrition	• Growing specialty • Aims to understand how timing of nutrition impacts metabolic health • Early studies indicate benefit of eating earlier

Nutrition for Lipid Management

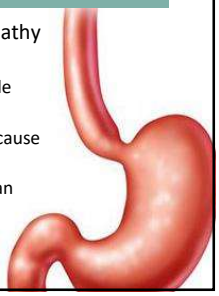
- Per ADA: Consider a calorie restriction for weight loss in people with a BMI of 25 or more
- Mediterranean-style or DASH eating pattern
- Reduce saturated and trans fat, increase omega-3 fatty acids
- Increase fiber
- Increase plant stanols/sterols
- Add physical activity

Nutrition for Hypertension

- Managing HTN reduces rate of micro/macrovascular complications
- For individuals with BP >120/80 mmHg, focus on:
  - ADA: Weight loss
  - Increase physical activity
  - Try DASH diet for healthy eating
  - Sodium restriction (~2300 mg/day)
  - Avoid excessive alcohol consumption

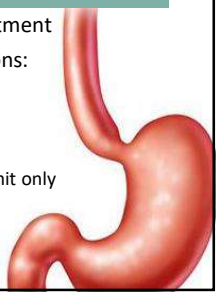
Nutrition for Gastroparesis

- Gastroparesis: a form of autonomic neuropathy that delays emptying of the stomach
  - Symptoms: nausea, vomiting, fullness with little food, bloating, and low appetite.
  - Unpredictable movement of food thru GI can cause erratic BGs
  - Timing of insulin delivery is important; hypo can result if insulin is given and gastric emptying is delayed



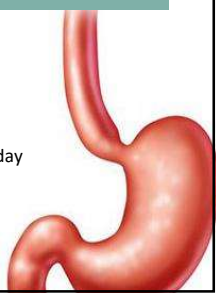
Nutrition for Gastroparesis

- Dietary changes are a high priority in treatment
- Consider the following dietary modifications:
  - Decrease fiber (may lead to bezoar formation)
  - Evaluate fat intake
    - Fat is a good/high source of calorie so limit only after other measures are exhausted
    - Liquid fats may be tolerated better



Nutrition for Gastroparesis

- Consider dietary modifications:
  - Multi supplement if intake is insufficient
  - Small and frequent meals
  - Liquid/pureed calories
    - May need to try liquid calories later in the day
  - Chew foods well
  - Sit up for 1-2 hours after eating



Nutrition for MAFLD

- Metabolic-Associated Fatty Liver Disease includes a range of liver conditions
- Studies estimate it is prevalent in >70% of people with T2DM
- Nutrition-Related Management
  - Reduce calories and add exercise for weight loss of ≥5%, preferably ≥10% to improve liver histology
  - Limit saturated fat, sugar, starch, and sugar
  - Mediterranean diet has the best evidence

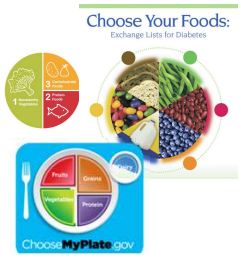
Knowledge Check

Jane has type 1 diabetes and was recently diagnosed with gastroparesis. She is a runner and has not been able to exercise recently due to nausea, vomiting, bloating, and intestinal pain. She experiences lows about 3 times a week. What hypoglycemia treatment should she use?

A. Juice
B. Fruit
C. Glucose tablets or gels
D. Peanut butter crackers

Dietary Approaches

- Practical tool(s) to develop healthy eating patterns
  - Plate Method
  - Carbohydrate exchanges
  - Carbohydrate Counting
  - DASH Diet



Dietary Approaches

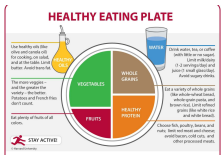
Therapy	Dietary Approach
Nutrition therapy only or on meds excluding insulin or insulin secretagogues	Consider reducing overall carb intake, portion sizes, plate method, or food exchange lists
Fixed insulin doses or insulin secretagogues	Educate on carbohydrate consistency with respect to time and amount. Consider tools like carbohydrate counting or choices, plate method, simplified meal plan, or food exchange lists
Flexible insulin therapy	Educate on carbohydrate counting and using an insulin-to-carb ratio

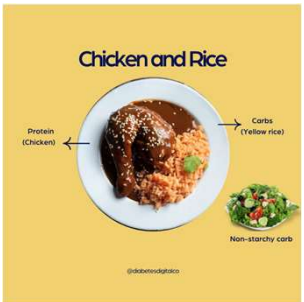
Plate Method

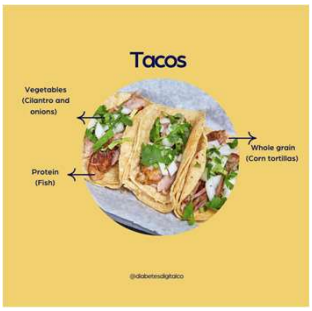
- MyPlate introduces simple nutrition
  - Emphasizes portion recommendations and healthy food choices
  - Using a small plate and filling ½ plate with fruits and veg helps with calorie management
  - Consider using with:
    - Individuals with T2D not on insulin
    - Those with limited health literacy or numeracy
    - Older adults prone to hypoglycemia

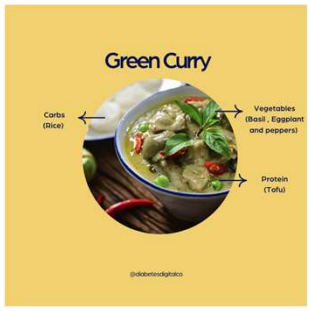
Plate Method Alternatives

- Harvard School of Public Health alternative =“Healthy Eating Plate”
  - Visit www.hsph.harvard.edu/nutritionsource
- ADA alternative = “Diabetes Plate Method”
  - Visit diabetesfoodhub.org



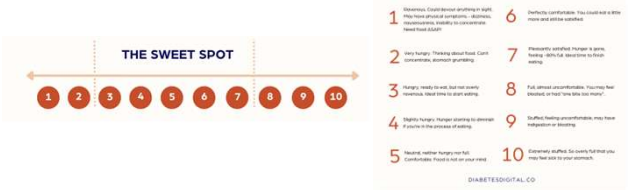






Helping Patients Meal Planning

Tool: The Hunger-Fullness Scale



Diabetes Digital Handouts

diabetesdigital.co/handouts

Exchanges

- The exchange system groups like foods that have similar nutritional value (specifically macronutrient and caloric value) into exchanges that can be swapped for another
  - Example: the "starch" category has food items in predetermined servings that are ~80 kcals, ~15g of carb, and ~3g protein
- An individual may count the number of food exchanges in each category at each meal/thru the day

Exchanges

Advantages

- Allows for flexibility and personalization
- Encourages consistency in the timing and amounts at meals and snacks

Disadvantages

- Requires learning how to fit unlisted foods into the plan (especially today with so many food choices)
- Less attention given to micronutrient content

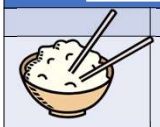
Exchanges

- Categories within the exchange system
  - Starch 
  - Fruit 
  - Dairy / Milk 
  - Sweets/ Dessert 
  - Vegetable 
  - Meat / Protein 
  - Fats 
  - "Free"

	Exchange	Carb	Prot	Fat	Cals	Examples
	Starch	15	3	0-1	80	⅓ cup beans, lentils, peas, rice, ½ cup cooked cereal, corn, potato, pasta 1 oz. bread (1 slice) or bagel (½), ½ english muffin
	Fruit	15	0	0	60	1 small apple or kiwi, ½ large banana, 1¼ cup whole strawberries, 1 cup raspberries, ¾ cup blackberries, ½ (most) to ⅓ (grape, cran) cup juice
	Dairy / Milk	12	8	0-8	90-120	1 cup milk, 8 oz. plain yogurt (any fat content)
	Sweets/ Desserts	15	Varies	Varies	Varies	¼ cup granola, 1 small granola bar, ½ cup frozen fruit yogurt, ½ cup ice cream (any flavor)

	Exchange	Carb	Prot	Fat	Cals	Examples
	Veggies	5	2	0	25	1 cup raw vegetables, ½ cup cooked vegetables of vegetable juice
	Meat / Protein	0	7	1-8	35-100	1 oz. fish, chicken, beef, pork or cheese, ½ cup tofu, 1 egg
	Fat	0	0	5	45	1 tsp. oil, butter, or mayo, 6 almonds, 2 whole walnuts
	Free	0-5	0	0	0-25	Sugar free gelatin, 1 tbsp catsup 2 tsp sugar free jam, 1-2 tbsp sugar free syrup, coffee, tea, spices

General Rules for Serving Sizes

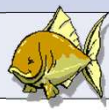


Exchange	Category	Measure
Starch	Beans/Lentils/Peas/Rice	⅓ cup
	Cooked Cereals/Pasta/Potato	½ cup
	Bread Products	1 ounce
Fruit	Fresh	1 small piece
	Dried	¼ cup
	Juice/Canned/Applesauce	½ cup
	Cubed Melon	1 cup

General Rules for Serving Sizes

Exchange	Category	Measure
Dairy / Milk	Skim, 1%, 2%, Whole	1 cup
	Ice Cream	½ cup
	Yogurt	1 cup
Sweets / Desserts	Cookies	1 small (1¾")
	Granola	¼ cup
	Cake	1½" square

General Rules for Serving Sizes



Exchange	Category	Measure
Vegetables	Raw	1 cup
	Cooked	½ cup
	Juice	½ cup
Protein	Meats/Chicken/Fish	1 ounce
	Cheese	1 ounce
	Egg	1

General Rules for Serving Sizes

	Exchange	Category	Measure
	Fat	Avocado	1/8 whole
		Butter/Margarine/Oil/Mayo	1 tsp
		Nuts/Seeds	1 tbsp
	Free	Coffee, tea	Unlimited
		SF Syrup	1-2 tbsp
		SF Jam/Jelly	2 tsp

Carbohydrate Counting

- Reading nutrition facts to carb count
  1. Look at the serving size
  2. Look at "Total Carbohydrates"
     - Consider subtracting ½ of sugar alcohols and fiber content
  3. Adjust the count depending on the number of servings that will be eaten
  4. Total the carbs for all items in the snack/meal

Nutrition Facts

8 servings per container

Serving size **2/3 cup (55g)**

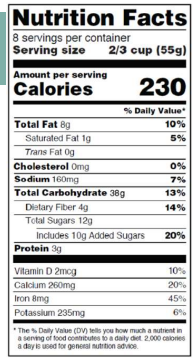
Amount per serving

Calories **230**

	% Daily Value*
Total Fat 8g	**10%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 160mg	**7%**
Total Carbohydrate 38g	**13%**
Dietary Fiber 4g	**14%**
Total Sugars 12g	
Includes 10g Added Sugars	**20%**

Carbohydrate Counting

- Things to consider:
  - Will simpler portion guidelines suffice?
  - Does the PWD have measuring tools?
  - Does the PWD feel comfortable doing the math?
  - Is the PWD motivated to learn carb counting?



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Total Carbohydrate 38g	**13%**
Dietary Fiber 4g	**14%**
Total Sugars 12g	
Includes 10g Added Sugars	**20%**
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Tips for Carb Counting

- Understanding and teaching carb counting:
  - Practice carb counting your own meals!
  - Keep foods in your office for practice
  - Encourage the PWD to bring in familiar foods into the office to practice with you
  - Encourage a "cheat sheet" with counts for regularly consumed foods

Tips for Carb Counting

- Understanding and teaching carb counting:
  - Buy measuring cups/spoons at the dollar store
  - Watch/share online tutorials on fractions
  - Encourage a calculator for math
  - Encourage the PWD practice/record using food logs; review logs prior to moving on to more complicated topics like using an ICR
  - Encourage books, phone apps, and carb counting sheets for assistance

Tools for Carbohydrate Counting

- Resources for carbohydrate counting:
  - Calorie King (book, website, smartphone app for iOS and Android – available in English & Spanish)
  - Diabetes Tracker (app $)
  - MyFitnessPal (smartphone application for iOS and Android)
  - UnderMyFork (app) Take photo of food to get nutrition info
  - Nutrition.gov (website)
  - Smart food scales

NOTE: The 1 cup measure as the serving size is for convenience only! All information provided by the Nutrition Facts label is based on the weight (the information in parentheses) of the food serving.

Tools for Carbohydrate Counting

- Smart food scales can be purchased to do the math

Kitrics Nutritional Scale

Perfect Portions Scale

Case Study: Patient L.J.

- L.J. is a 43 year old Black female dx with T2DM 8 days ago
- At dx, her PCP started her on the following medications:
  - Metformin: 1000 mg BID
  - Crestor: 10 mg per day
  - Amlodipine: 5 mg per day

Lab Work / Vitals at Dx	
BMI	29.6 kg/m^2
A1C	6.9%
Total Cholesterol	198 mg/dL
LDL	127 mg/dL
HDL	36 mg/dL
Triglycerides	207 mg/dL
BP	148/90 mm Hg

Case Study: Patient L.J.

Other important considerations:

- Eager to making dietary changes; would really like guidance on what types of foods to eat more/less of
- Has a family hx of CVD
- Has a strong family support system
- Enjoys a variety of foods, cooking with her family, and her partner's favorite dishes are chicken mole and pollo verde
- Would like to increase the nutritious foods in her children's diet, as well.

Cultural Humility

Cultural humility is a lifelong process of self-reflection and self-critique, whereby individuals continuously learn about and respect different cultures, recognizing and challenging their own biases, assumptions, and power imbalances. It involves approaching every cultural encounter with openness, humility, and a commitment to understanding the unique experiences and perspectives of others. Unlike cultural competence, which implies a mastery of knowledge about other cultures, cultural humility emphasizes the ongoing process of learning and the importance of building respectful, equitable relationships.

Cultural Humility

"...eliminates the need for a complete mastery of every group's health beliefs... because the patient, in the ideal scenario, is encouraged to communicate how little or how much culture has to do with that particular clinical encounter."

Tervalon, M., & Murray-García, J. (1998). Cultural humility versus cultural competence: a critical distinction in defining physician training outcomes in multicultural education. Journal of Health Care for the Poor and Underserved, 9(2), 117–125.

Slide 166

BT2 deleted : -)
Beverly Thomassian, 9/16/2024

JJ9 Should we have some points of reflection for these case studies?

Also the next dash slide, is that supposed to be there?
Jessica Jones, 9/16/2024

Cultural Humility in Practice

- Your patient is the expert of themselves and their cultural identities
- Prioritize listening, connecting, and learning
- Respect your patient as an individual
- Incorporate preferences, culture and boundaries
- Always involved patient in decision making
- Educate yourself on historical realities and injustices that shape today

Resources for Professional Development

- Diversify Dietetics - https://www.diversifydietetics.org/ddwebinars
- EatWell Exchange
- Culinary Nutrition Collaborative- Global Cuisine Series
- BIPOC Eating Disorder Conference
- Academy of Nutrition and Dietetics Member Interest Groups
  a. National Organization of Blacks in Nutrition and Dietetics (NOBIDAN)
  b. Latino and Hispanics in Nutrition and Dietetics (LAHIDAN)
  c. Asian Americans and Pacific Islanders (AAPI)
  d. Cultures of Gender and Age (COGA)
  e. Disabilities MIG

Social Determinants of Health (SDOH)

- **Understanding SDOH**: Social determinants of health are the conditions in which people are born, grow, live, work, and age, which can significantly influence health outcomes.
- **Impact on Diabetes Management**:
  - **Food Access:** Economic stability and neighborhood environments impact the availability and affordability of healthy food options.
  - **Healthcare Access and Quality**: Disparities in healthcare access and quality can lead to delayed diagnosis, inadequate treatment, and poor management of diabetes.
  - **Education and Health Literacy**: Patients with higher levels of education and health literacy are better equipped to manage their diabetes effectively.
  - **Social Support Networks**: Strong social connections can enhance self-care behaviors and provide emotional support for diabetes management.
  - **Economic Stability**: Financial resources affect a patient's ability to afford medications, regular healthcare visits, and healthy foods, all of which are crucial for managing diabetes.

Food Insecurity: Defined

- Unreliable availability of nutritious food and inability to consistently obtain nutritious food
- Lack of consistent access to enough food for an active, healthy life

Food Insecurity: Screening

- Assess food insecurity with two questions:
  1. "Within the past 12 months, we worried whether our food would run out before we got money to buy more."
  2. Within the past 12 months the food we bought just didn't last, and we didn't have the money to get more."
- Answers and their corresponding risk:
  - Never true: not at risk
  - Sometimes true: at risk
  - Often true: at risk

Food Insecurity: Providing Support

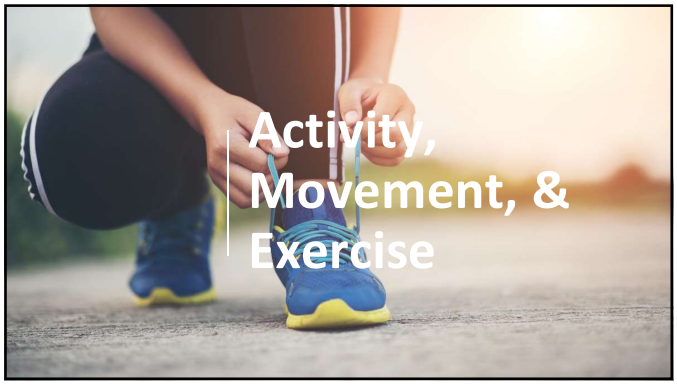
- Refer to food programs when possible
- Educate on:
  - Planning meals
  - Shopping with in season produce, frozen or canned fruits and vegetables, low-cost proteins (beans, peas, lentils, canned tuna, eggs), grains like brown rice and oatmeal are often more affordable
- Remember: eating out is often more expensive than nutrient dense home prepped options!

Healthy Eating on a Budget

Breakfast at Home		**Fast Food Breakfast**	
Bottle of water (16 oz)	$0.21	Sausage Egg Sandwich	$5.15
2 eggs	$0.45	Hash brown	$3.01
½ banana	$0.13	Orange Juice	$2.75
½ cup dry oatmeal	$0.18	**Total**	**$10.91**
Total	**$0.97**		

Healthy Eating on a Budget – How would you approach this?

- A 21-year-old Latino/Latinx college student is newly diagnosed with type 2 diabetes. Mom had GDM. Since leaving home and living in an apartment with roommates, they have been eating more fast foods and processed foods because they are “cheaper”.
- Their A1C is 9.3%, BMI 29.3 and LDL is 119 mg/dL. BP is 118/76.
- What questions would you ask regarding nutrition and health?
- What would be the end goal of this visit?

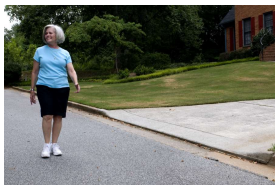


Types of Exercise: Aerobic Activity

- Aerobic, also called "Cardio"
  - Repeated/continuous movement of the same large muscle groups
  - Typically have the greatest acute impact on BG
  - Examples: walking, biking, dancing, swimming
- Studies show benefit of walking 10,000 steps a day
  - 2,000 steps = 1 mile

Impact of Aerobic Activity on DM

- BG improves for 2-72 hours after aerobic activity; thus need to do it regularly to maintain improved BGs
- Postprandial exercise can prevent/reduce the rise in BG levels that occurs after eating



Types of Exercise: Resistance Training

- Use of muscular strength to move a weight or work against a resistive load
- Increases strength, endurance, and overall calories burned in a day
- Example: weightlifting, sprinting

Impact of Resistance Training on DM

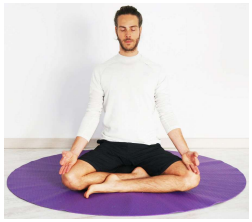
- Resistance training may improve glycemic levels more than aerobic activity in T2D
  - Best results come from mix of resistance and aerobic
  - Results are less clear for individuals with T1D

Impact of Resistance Training on DM

- Resistance exercise may weaken the exercise related decrease in BGs during and after exercise
  - In T1D: complete resistance training 1st, aerobic training 2nd to ↑ glycemic stability ↓ post exercise hypo
- Key for older adults for maintaining independence
  - Improved strength/balance reduces fall risk
  - Increases mobility

Types of Exercise: Flexibility

- Flexibility (stretching / postural):
  - The ability to move a joint through complete range of motion
  - Examples: Yoga, tai chi, or other with balance, agility, coordination



Impact of Flexibility Training on DM

- Benefits less established than other exercise types
  - Yoga and tai chi may improve glucose and lipid levels, body comp, neuropathic symptoms, and quality of life
  - May help prevent falls
- Minimal precautions needed with this type of activity

Sedentary Time: The benefit of Reducing It

- Long-periods of sedentary activity (regardless of physical activity) may be associated with the onset of T2D.
  - Encourage breaks in sedentary activity every 30 minutes
  - Small increases in activity may reduce mortality from all causes and improve insulin resistance/BG, BP, and BMI

Exercise: All Children

- Exercise Goals:
  - Aerobic: 60 minutes of moderate to vigorous-intensity activity daily
  - Resistance training: at least 3 days/week
- Other considerations if using insulin
  - Due to risk of hypo, advise frequent glucose monitoring before, during, and after. Use CGM when possible
  - Educate on targets, management of blood sugars including hypo

Exercise: Children with T1DM

- If using insulin, educate on strategies to prevent hypo before, during, and after exercise. Consider:
  - Lowering meal or snack time insulin before exercise
  - Reducing basal insulin
  - Increasing carb intake
  - Eating a bedtime snack
- Some of these recommendations may be helpful for kids with T2DM on insulin, as well.

Exercise: Adults with Prediabetes

- Exercise Goals:
  - Increase moderate-intensity physical activity to at least 150 minutes/week
    - Example: brisk walking
    - May include resistance training
  - Break-up sedentary time
- Achieving the behavioral goal of 150 minutes of physical activity per week reduces the incidence of type 2 diabetes by 44% (even w/o weight loss!)

Exercise: Adults with T1 or T2 Diabetes

- Exercise Goals:
  - Aerobic: ≥150 minutes/week of moderate to vigorous-intensity activity
    - Tips: spread over 3 or more days/week with no more than 2 consecutive days w/o activity
    - For those who achieve weight loss goals, long-term maintenance is supported by 200-300 minutes/week
  - Resistance exercise: 2-3 sessions/week on nonconsecutive days

Exercise: Adults with T1 or T2 Diabetes

- Exercise Goals:
  - Sedentary Time: All adults, particularly those with T2DM, should reduce sedentary time
    - Interrupt sitting every 30 minutes
  - Flexibility and balance training: recommended 2-3x per week for older adults

Exercise, Medications, and Hypoglycemia

- T1DM
  - Exogenous insulin can prevent the increased mobilization of glucose needed in exercise
- T2DM
  - Low risk for hypo if treated by diet and/or medications that do not cause hypo
  - Concern if on insulin, and/or insulin secretagogues
  - Anecdotal reports of hard-to-treat hypo with activity and GLP-1 agonists and pramlinitide

Hypoglycemia Risk

- Risk is high during and immediately after exercise
- Post exercise late onset hypoglycemia
  - More often seen in T1D
  - Associated with high intensity exercise >30 minutes
  - May occur at night and up to ~24 hours after exercise
- Best indicator of hypo risk is experience in the past

Hypoglycemia Prevention

- Planned exercise: reduce insulin or medications
- Unplanned exercise: eat a snack with carbohydrate
  - Consider a snack according to starting BG level and anticipated activity
  - Not recommended unless on insulin or insulin secretagogues
- Carry fast-acting carbohydrates
- Consume extra carb in the post-exercise period
- Caution use of alcohol after exercise

Hypoglycemia Prevention for those on Insulin or Secretagogues

Carbohydrate Replacement During Physical Activity			
BG Level	**Duration**	**Carb Replacement**	**Frequency**
150 or more	<30 minutes	May not be needed	
90-150	30-60 minutes	15 - 30 grams	Each hour
Less than 90	Eat carbs first	15-30 grams	Each hour

5. Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes: *Standards of Care in Diabetes—2024*

Knowledge Review

- AR ate breakfast, took 1000 mg of metformin, BG – 98, and is going to take a brisk 30 minutes walk. How much carb should they eat prior to exercise to prevent hypo?

A. 15 gms
B. 30 gms
C. 5 gms
D. none

Hyperglycemia Risk

- Hyperglycemia during exercise occurs when there is too little insulin in circulation
- T2D: Low risk of exercise worsening hyperglycemia
- T1D: Risk of hyperglycemia with exercise
  - Possible lack of insulin can impair glucose utilization
  - Excessive counter-regulatory hormones
  - Enhanced hepatic glucose production
  - Lipolysis and ketogenesis

Ketone Testing

- Type 1 – BG > 240 mg/dl
- Type 2 – BG > 300 mg/d

  Plus

- Positive ketones
  - Exercise NOT recommended
  - Can worse hyperglycemia and ketosis
- Negative ketones
  - Not necessary to postpone exercise if feels well and is adequately hydrated

Knowledge Review

CR has type 1 diabetes and uses an insulin pump. Gave 4 units bolus insulin to cover 60gms of carb, ate breakfast, post meal BG 198, took a brisk 30-minute walk. Post walk BG 324. Best action?

A. Verify results
B. Check ketones
C. Check pump patency
D. All of the above

Thank You

Thanks for joining us!
Questions?
Info@diabetesed.net
Call us at 530-893-8635
www.DiabetesEd.net