What's New in Nutrition Recommendations for People with Diabetes

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Upon completion of this activity, participants will be able to:

1. Describe expert consensus relative to nutrition therapy for adults with diabetes
2. Discuss latest expert opinion regarding nutrition recommendations for adults with prediabetes

Disclosures

No disclosures at this time

What's New?

- Prevention/Prediabetes
- Eating Patterns
- Emphasis on options for weight loss and management
- Gastroparesis
- Protein/Fat effect on insulin dosing

Nutrition Therapy for Adults With Diabetes or Prediabetes: A Consensus Report

Alison B. Evert,[1] Michelle Dennison,[2] Christopher D. Gardner,[3] W. Timothy Garvey,[4,5] Ka Hei Karen Lau,[6] Janice MacLeod,[7] Joanna Mitri,[8] Raquel F. Pereira,[9] Kelly Rawlings,[10] Shamera Robinson,[11] Laura Saslow,[12] Sacha Uelmen,[11] Patricia B. Urbanski,[13] and William S. Yancy Jr.[14,15]

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MNT is effective in improving outcomes

A1c reduction can be similar to or greater than what would be expected with treatment using currently available medication for diabetes.

- Type 2 Diabetes: Up to 2.0% decrease at 3-6 months
- Type 1 Diabetes: Up to 1.9% decrease at 3-6 months

Ongoing MNT support is helpful in maintaining glycemic improvements.

Franz MJ, et al. 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. J Acad Nutr Diet 2017.

Goals of Nutrition Therapy

To promote and support healthful eating patterns, emphasizing a variety of nutrient-dense food in appropriate portion sizes, in order to improve overall health
1. Improve A1c, blood pressure and cholesterol levels
2. Achieve and maintain body weight goals
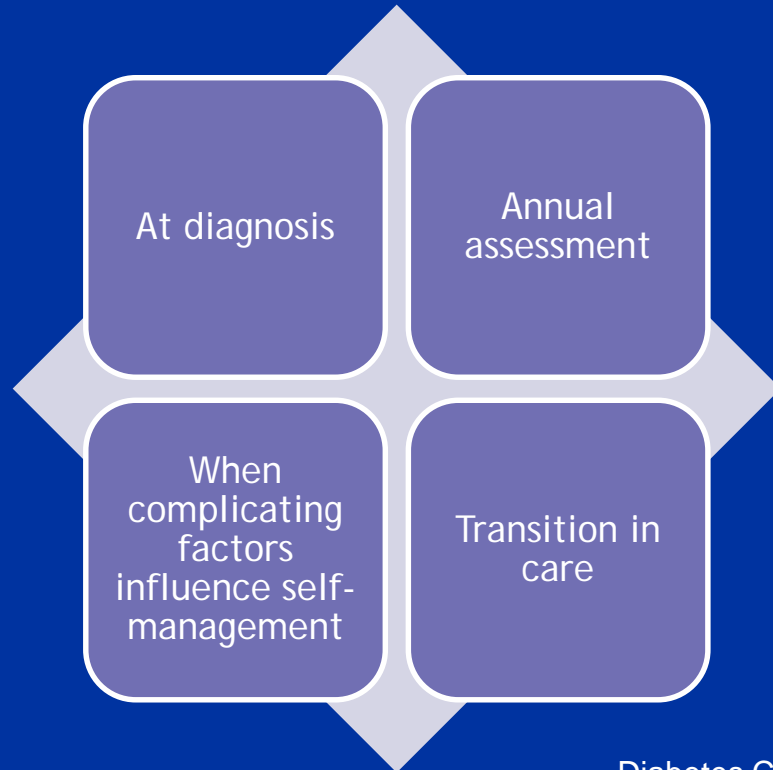3. Delay or prevent complications of diabetes

To address individual nutrition needs based on:
1. Personal and cultural preferences
2. Health literacy and numeracy
3. Access to healthful food choices
4. Willingness and ability to make behavioral changes
5. Barriers to change

To maintain the pleasure of eating by providing positive messages about food choice, while limiting food choices only when indicated by scientific evidence

To provide the individual with diabetes with practical tools for day-to-day meal planning

DSME and MNT Education Algorithm

At diagnosis

Annual assessment

When complicating factors influence self-management

Transition in care

Diabetes Care, 2015;38:1372-1382.

Macronutrients for Diabetes

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What should the breakdown be?

- No ideal percentage of calories from carbohydrate, protein and fat
- Macronutrient proportions and distribution should be individualized.
- People with diabetes consume the same macronutrient mix of the general public:
  - 45% carbohydrate
  - 36-40% fat
  - 16-18% protein

Wheeler ML, Dunbar SA, Jaacks LM, et al. Macronutrients, food groups, and eating patterns in the management of diabetes: a systematic review of the literature, 2010. Diabetes Care 2012; 35:434-445.

Carbohydrate Needs

CHO ≠ CHO ≠ CHO

NOT ALL **CARBS**
are created EQUAL

WHOLE · vs · PROCESSED

What about fiber?

- Adequate fiber intake is associated with lower all-cause mortality in people with diabetes.

- Average American gets roughly 15 grams fiber on a daily basis.

- DGA 2015-2020: Minimum of 14 g per 1,000 kcal
  - ½ grain consumption in whole intact grains

- Modest A1c ↓ with intake above 50 grams daily (0.2-0.3% ↓)

Burger, KNJ et al. Dietary fiber, carbohydrate quality and quantity, and mortality risk of individuals with diabetes mellitus. PLoS One 2012.
Post RE et al. Dietary fiber for the treatment of type 2 diabetes mellitus: a meta-analysis. J Am Board Fam Med, 2012.

Protein Needs

Limited research in people with diabetes or prediabetes without kidney disease

2013 meta-analysis

- 25-32% protein vs. 15-20% protein
- Higher protein eating plan
  - 2 kg greater weight loss
  - 0.5% greater reduction in A1c
  - No difference in FPG, serum lipid profiles, BP

Dong, JY, et al. Effects of high-protein diets on body weight, glycemic control, blood lipids and blood pressure in type 2 diabetes: meta-analysis of randomized controlled trials. BrJ Nutr 2013.

Fat and Cholesterol Needs

- 20-35% of total caloric intake
- Eating patterns that replace some CHO food with foods higher in total fat have shown improvements in glycemia and certain CVD risk factors
  - HDL-C and TG
- Synthetic sources of trans fat should be minimized.
- Cholesterol intake does not correlate with CVD events

Evert AB, et al. Nutrition Therapy for Adults With Diabetes or Prediabetes: A Consensus Report, 2019. Diabetes Care.

Nutrition Therapies for Prediabetes

- DPP demonstrated that intensive lifestyle intervention with weight loss decreased incidence of Type 2 diabetes by 58% over 3 years.

- And it's sustainable:
  - Da Quing Diabetes Prevention Study: 43% at 20 years
  - Finnish Diabetes Prevention Study (DPS): 43% at 7 years
  - U.S. Diabetes Prevention Program Outcomes Study (DPPOS):
    - 34% at 10 years
    - 27% 15 years

Goals for DPP

- Year long program

- To achieve 5 to 7% weight loss from baseline body weight

- At least 150 minutes weekly of purposeful physical activity

- Self-monitoring of diet and physical activity

Eating Patterns

- There are lots of choices out there today.
- Patients needs guidance to plan when, what and how much to eat on a daily basis.

Low fat or
Very Low fat

Vegetarian/Vegan

Paleo
Diet

DASH Diet

Low/Very Low Carbohydrate

Mediterranean

Mediterranean-Style Eating Pattern

Mixed effect on A1c, weight and lipids

Potential Benefits:
> Reduced risk of diabetes
> Lowered triglycerides
> A1c reduction
> Reduced risk of major cardiovascular events

Evert AB, et al. Nutrition Therapy for Adults With Diabetes or Prediabetes: A Consensus Report, 2019. Diabetes Care.

Mediterranean-Style Eating Pattern

PREDIMED

- Compared Mediterranean and low-fat

- Glycemic management improved and need for glucose lowering medications was lower in Mediterranean group.

- Intervention enriched with olive oil or nuts ↓ CVD incidence in people with and without diabetes.

DIRECT

- Calorie-restricted Mediterranean, calorie-restricted lower-fat or low-CHO without calorie restriction

- Fasting glucose lower in Mediterranean group

- A1c lowest in low-CHO group

Shai I, et al; Dietary Intervention Randomized Controlled Trial (DIRECT) Group. Weight loss with a low-carbohydrate, Mediterranean, or low-fat diet. N Engl J Med 2008; 359:229-241.

Esposito k, et al; Effects of a Mediterranean-style diet on the need for antihyperglycemic drug therapy in patients with new diagnosed type 2 diabetes: a randomized trial. ANN Intern Med 2009; 151:306-314.

Mediterranean-Style Eating Pattern

- Plant-based food
  - Vegetables, beans, nuts, seeds, fruit and whole intact grains
- Fish and other seafood
- Olive oil principal source of dietary fat
- Dairy in low to moderate amounts
- Fewer than 4 eggs per week
- Red meat in low frequency and quantity
- Wine in low to moderate amounts
- Concentrated sugar or honey rarely
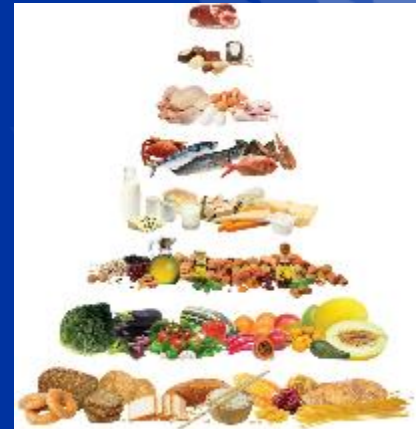
Vegetarian or Vegan Eating Pattern

Mixed results on glycemia and CVD risk factors

Potential Benefits
- ➢ Reduced risk of diabetes
- ➢ A1c reduction
- ➢ Weight loss
- ➢ Lowered LDL-C and non-HDL-C

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Vegetarian or Vegan Eating Pattern

Two large studies showed that vegetarian and vegan eating plans reduced A1c by an average of 0.3-0.4% in people with Type 2 diabetes.

Larger meta-analysis showed that plant-based eating:

Lowered	No Effect
Weight (2 kg)	Fasting insulin
Waist circumference	HDL-C
LDL-C	Triglycerides
Non-HDL-C	Blood Pressure

Yokoyama Y, et al. Cardiovasc Daign Ther 2014   Viguiliouk E; Clin Nutr, 2018

Vegetarian/Vegan Eating Pattern

	Foods Excluded
Lacto-ovo-vegetarianism	Meat, poultry, fish, seafood
Lacto-vegetarianism	Meat, poultry, fish, seafood, eggs
Vegan	Meat, poultry, fish, seafood, eggs, dairy products (All flesh foods and animal derived products)

Low Fat Eating Patterns

Low Fat

Lowering fat intake does not consistently improve glycemia or CVD risk factors in people with Type 2 diabetes.

Benefits from a low-fat eating pattern are mostly related to weight loss as opposed to the eating pattern itself.

Very Low Fat

May improve glucose levels, weight, blood pressure and HDL-C

Mixed effect on triglycerides

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Low Fat Eating Patterns

Low-Fat

- Emphasizes vegetables, fruits, starches, lean protein sources and low-fat dairy products
- ≤ 30% total fat intake and ≤ 10% saturated fat

Very Low-fat

- Emphasizes fiber-rich vegetables, beans, fruit, whole intact grains, nonfat dairy, fish and egg whites
- 70-77% carbohydrate (including 30-60g fiber)
- 10% fat and 13-20% protein

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Dietary Approaches to Stop Hypertension (DASH)

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- Reduced risk of diabetes
- Weight loss
- Lowered blood pressure

| Emphasizes vegetables, fruits, and low-fat dairy products		
Includes whole, intact grains, poultry, fish and nuts	Reduced in saturated fat, red meat, sweets, and sugar-containing beverages	May also be reduced in sodium

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Paleo Eating Pattern

- Emphasizes foods theoretically eaten regularly during early human evolution, such as lean meat, fish, shellfish, vegetables, eggs, nuts and berries

- Avoids grains, dairy, salt, refined fats and sugar
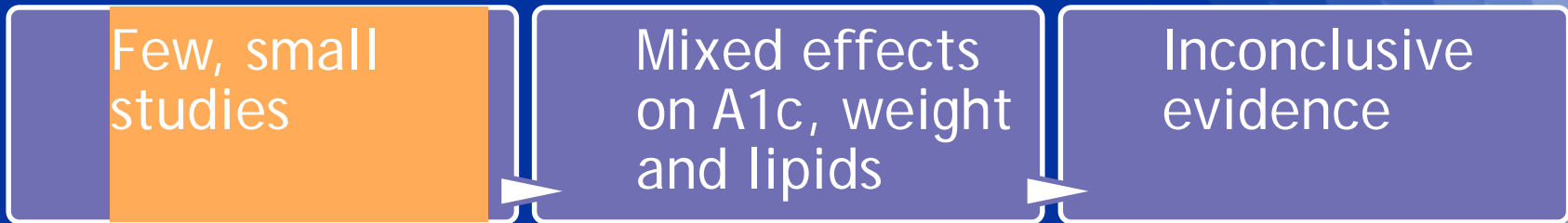
Few, small studies	Mixed effects on A1c, weight and lipids	Inconclusive evidence

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Carbohydrate Eating Patterns

Low Carbohydrate

- A1c reduction
- Weight Loss
- Lowered blood pressure
- Increased HDL
- Lowered triglycerides

Very Low Carbohydrate

- A1c reduction
- Weight Loss
- Lowered blood pressure
- Increased HDL
- Lowered triglycerides

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Low Carbohydrate Eating Pattern

- Low carbohydrate vegetables
- Salad greens, broccoli, cauliflower, cucumber, cabbage, etc.
- Fat from animal foods, oils, butter and avocado
- Protein in all forms
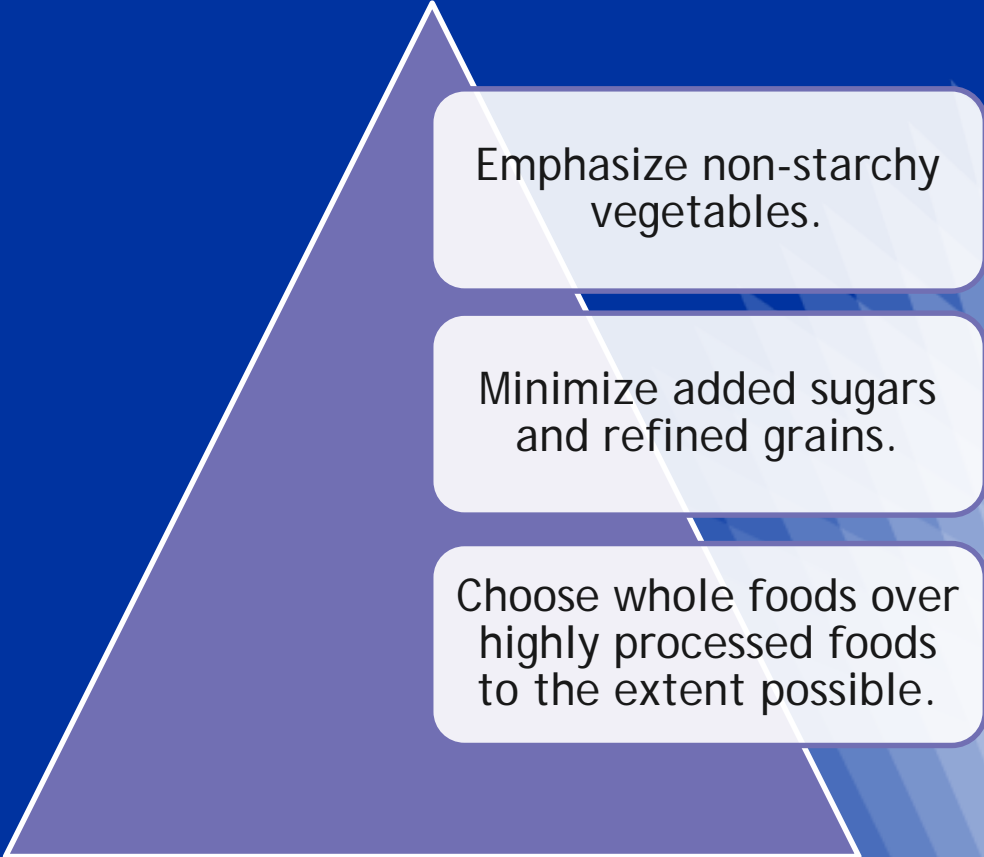 - Meat, poultry, fish, shellfish, eggs, cheese, nuts and seeds
- Some include fruit

26-45% total calories

Very Low-Carbohydrate Eating Pattern

- Further limits carbohydrate containing foods
- Derives more than ½ calories from fat
- Goal of 20-50g of nonfiber CHO/day to induce nutritional ketosis

<26% total calories

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- One size does not fit all.
- A variety of eating patterns are acceptable for the management of diabetes.
- Evidence suggests certain eating patterns may be better for specific outcomes.

Emphasize non-starchy vegetables.

Minimize added sugars and refined grains.

Choose whole foods over highly processed foods to the extent possible.

Weight Loss and Weight Management

No threshold of weight loss for maximum benefits

- 5-7% for therapeutic advantages
- 15% or more associated with better outcomes in Type 2 diabetes
- 7-10% for prediabetes

Overweight and obesity are increasing in individuals with Type 1 diabetes.

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Weight Loss and Weight Management

Question: What is the best weight loss plan for individuals with diabetes?

Answer: Creates an energy deficit

Macronutrient composition
Eating patterns

Gastroparesis Recommendations

- Correct hyperglycemia
- Smaller, more frequent meals
- Replacing solid food with a greater portion of liquid calories
- Selection of small-particle size foods may decrease symptom severity.
    - "Food easy to mash with a fork" <2mm

Olausson EA. A small particle size diet reduces upper gastrointestinal symptoms in patients with diabetic gastroparesis: a randomized controlled trial. Am J Gastroenterol 2014; 109:375-385.
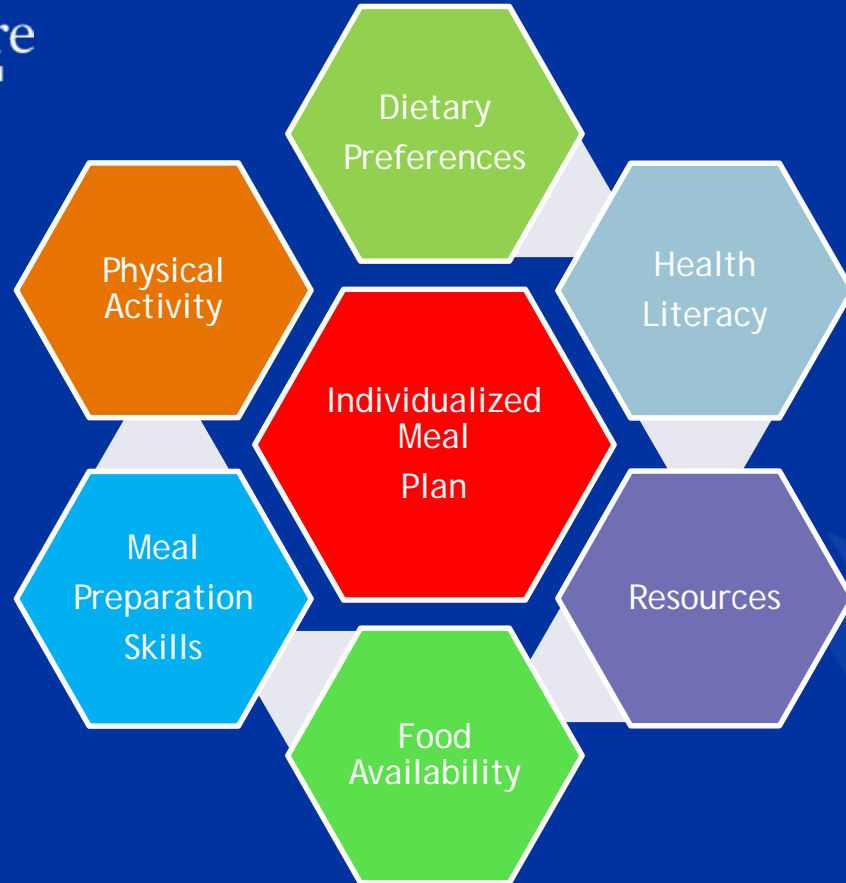
Protein/Fat Effect on Insulin Dosing

- Glucose response to mixed meals high in protein and/or fat along with carbohydrate vary among individuals.

- Insulin dosing may not be based on just carbohydrate.

- Cautious approach to increased insulin dosing for high fat and/or protein mixed meals
  - Address delayed hyperglycemia 3 or more hours
  - Split-bolusing
  - CGM

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Issues with Nutrition Research

- Large, rigorous clinical trials lacking
- Most studies short-term
- Controlling intervention arms difficult and/or costly
- Can study outcomes be implemented long-term?

Questions