

The Triangle of Diabetes Care: Diet, Exercise, and Medications

Pattie Lueyot, MS,RDN,LD,CDCES

Certified Diabetes Care and Education Specialist

Cray Diabetes Self-Management Center



AADE 7TM

Self-Care Behaviors

- Healthy Eating
- Being Active
- Monitoring
- Taking Medication
- Problem Solving
- Healthy Coping
- Reducing Risks



Learning Objectives of *Healthy Eating in Diabetes Care*

- **Current guidelines**
- **Goals of nutrition education**
- **Eating patterns**
- **Nutrition education in clinical setting**
- **Emerging diet trends:**
 - Low Carb and Very-Low Carb (Ketogenic Diet) Plans
 - Intermittent Fasting



Meet John- He needs help with his meal plan because he does not want to take pre-meal insulin

- 70 y/o M, diagnosed T2D 15 years ago during routine blood work
- PMH: HTN, hyperlipidemia
- BMI 32 A1C 9.8% (10.2%, 6 months ago) BP 140/90
- Medications: Lantus 12 units HS+ TTT, glimepiride 10 mg , Ozempic 1 g weekly, wearing CGM: Free Style Libre
- What would you discuss with John?

The Current Guidelines

“Providers should ensure coordination of the medical nutrition therapy plan with the overall management strategy, including the DSMES plan, medications, and physical activity on an ongoing basis.”¹

Strong evidence supports the effectiveness of MNT interventions provided by RDNs for improving A1C, with absolute decreases up to 2.0%. Ongoing MNT support is helpful in maintaining glycemic improvements.²

Initial series of Medical Nutrition Therapy (MNT) : 3-6 visits during the first 6 months following diagnosis
Additional visit (s) may be needed based on an individualized assessment.

MNT follow-up: a minimum of one annual MNT follow-up encounter; 2 hours per year

¹*Diabetes Self-management Education and Support in Adults With Type 2 Diabetes: A Consensus Report*. The Diabetes Educator, Volume 46, Number 4, August 2020

²Franz MJ, MacLeod J, Evert A, 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;117:1659–1679 10. Lacey K, Pritchett E.

The Goals of Nutrition Education

- ***To promote and support healthful eating patterns, emphasizing a variety of nutrient-dense foods in appropriate portion sizes, in order to improve overall health*** and specifically to :
 - Improve A1C, blood pressure, and cholesterol levels
 - Achieve and maintain body weight goals
 - Delay or prevent complications of diabetes
- ***To address individual nutrition needs***
- ***To maintain the pleasure of eating***
- ***To provide practical tools for day-to-day meal planning***

Weight Loss Goal:

People With Pre-Diabetes

Individualized eating plan to promote energy deficit in combination with enhanced physical activity

Weight loss goal is 7–10% for preventing progression to type 2 diabetes

Medication-assisted weight loss: for people at risk for type 2 diabetes when needed to achieve and sustain 7–10% weight loss.

Healthy weight individuals: recommend aerobic and resistance exercise and a healthy eating plan such as a Mediterranean-style eating plan

Screen and evaluate for eating disorders: MNT should accommodate these disorders.

People with Diabetes (PWD)

Individualized eating plan to promote energy deficit in combination with enhanced physical activity

Recommend 5% weight loss, but the optimal outcomes is 15%

Medication-assisted weight loss/or metabolic surgery: when needed to achieve and sustain 7–10% weight loss.

A simple and effective approach: emphasizing appropriate portion sizes and healthy eating for PWD (no insulin) with limited health literacy or numeracy, older and prone to hypoglycemia

Screen and evaluate for disordered eating: MNT should accommodate these disorders.

Eating Patterns: No More One Size Fits All!

Features of Best Diet¹

- More whole foods, less processed foods
- High intake of non-starchy vegetables
- Meet dietary fiber recommendations
- Minimize added sugars
- Avoid sugary and sugar substitute beverages (drink water!)
- Sustainable- can enjoy eating the food everyday!



Type of eating pattern	Potential benefits reported
Mediterranean-Style	<ul style="list-style-type: none"> - Reduced risk of diabetes - Lowered triglycerides - Cardiovascular events - A1C reduction - Reduced risk of major
Vegetarian or Vegan	<ul style="list-style-type: none"> - Reduced risk of diabetes - Weight loss - A1C reduction - Lowered LDL-C and non-HDL-C
Low-Fat	<ul style="list-style-type: none"> - Reduced risk of diabetes - Weight loss
DASH	<ul style="list-style-type: none"> - Reduced risk of diabetes - Lowered blood pressure - Weight loss
Low-Carbohydrate or Very Low- Carbohydrate	<ul style="list-style-type: none"> - A1C reduction - Lowered blood pressure - Increased HDL-C - Weight loss - Lowered triglycerides

Sweetener

- Replace sugar-sweetened beverages with water as often as possible
- When sugar substitutes are used to reduce overall calorie and carbohydrate intake: avoid compensating with other food sources

Nutrition Supplements

- ***An annual assessment of vitamin B12*** for people ***taking metformin***
- Without underlying deficiency, ***multivitamins or mineral supplements is not recommended***
- **The routine use of chromium or vitamin D or any herbal supplements, including *cinnamon, curcumin, or aloe vera* is not recommended**

Alcohol

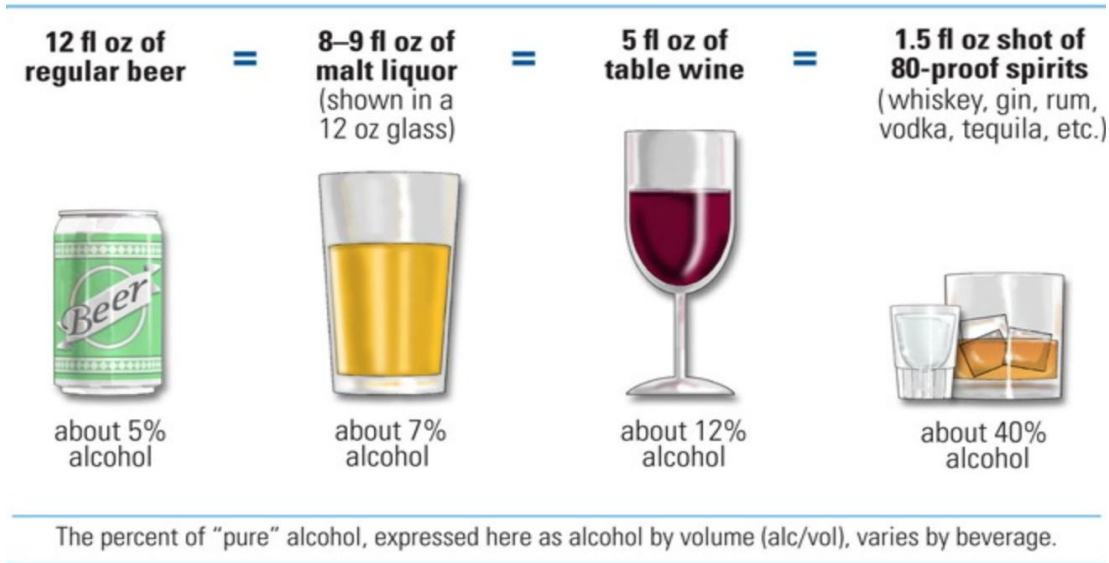


Image from: <https://nutrition.ucdavis.edu/outreach/nutr-health-info-sheets/consumer-alcohol>

•Keys Nutrition Education:

- Limit alcoholic drinks to:
1 drink/day/women and
2 drinks/day/men
- Reduce hypoglycemia risk – Eating carb while drinking alcohol
- Testing BG after drinking alcohol
- Educate PWD about: Signs, symptoms and self-management of delayed hypoglycemia after drinking alcohol

Application in Clinical Setting: Things to keep in mind

- **Provide eating plans that create an energy deficit and are customized to fit the person's preferences and resources that can help with long-term sustainability**
- **Assess and monitor medication changes** in relation to the nutrition care plan
- **Provide guidance on adjusting insulin based on dietary intake, recent/expected physical activity, and glucose data**
- **PWD and on intensive insulin therapy: carb counting is recommended**
 - Fixed dose insulin: consistent CHO intake
 - Mixed meal that contains carbohydrate and is high in fat and/or protein: dose for CHO, protein and fat
- **Help patients set realistic goal:**
 - **“Small change is still better than no change at all”**

Emerging Diet Trends in Diabetes Management

- Low carb diet and Very-Low Carb or Ketogenic diet
- Intermittent Fasting

Safety First!

Manage Diabetes With Low Carb and Very-Low Carb Diet Plans: What's Your Role?

“For individual with type 2 diabetes not meeting glycemic targets or whom reducing glucose-lowering drugs is a priority, reducing overall carbohydrate with a low-or very low carbohydrate eating pattern is a viable option”.^{1, 2}

- Provide close monitoring and support patients who already initiated the diet on their own to ensure that they are using the diet safely and effectively
- Clinician can recommend low carb or very low carb diet plans to a patient and prescribe it essentially like a medication; discussing its use, benefits, and risks, and provide logistical support for success

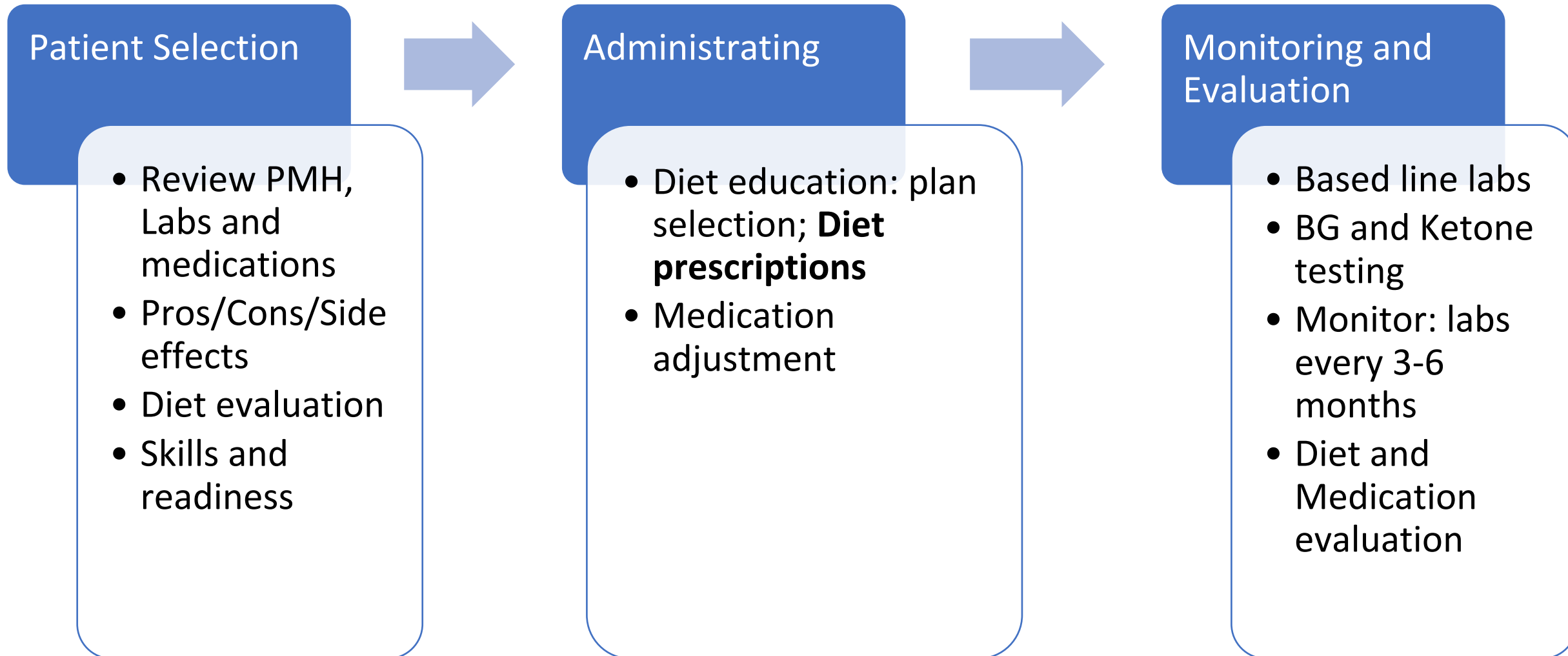
<https://www.lowcarbusera.org/blog-clinical-guidelines/>

1 Nutrition Therapy for Adults With Diabetes or Prediabetes: A Consensus Report Diabetes Care 2019;42:731–754 |

<https://doi.org/10.2337/dci19-0014>

2 American Diabetes Association Standard of Medical Care 2020

Manage Diabetes With Low Carb and Very-Low Carb Diet Plans



Low Carb Diet Prescriptions¹


1. Very-low-carbohydrate diet	2. Moderate-low-carbohydrate diet	3. Liberal low-carbohydrate diet
< 20 grams Net CHO*/day	20-50 grams Net CHO*/day	50-100 grams Net CHO*/day
Protein 1.2-1.7 g/kg of ideal body weight ~ 75-100 grams /day		
Fat: consume until satiety Include PUFA, MUFA, saturated fat (limit processed/industrialized Transfat)		

Net CHO* = Total CHO - fiber

NOTE: The values below are NET carbohydrates = total carbohydrates minus fibre. Fibre from real food (not products) is great!


**Whole Food
Less Processed
Foods**

Low (< 20 g carbs per day)²



6 g carbs. Steak, broccoli, cherry tomatoes, leafy greens, herbed butter (white pats).

Moderate (20-50 g per day)²



16 g carbs. Carrots and red pepper added.

Liberal (50-100 g per day)²



37 g carbs. Sweet potato fries added, no broccoli.

¹Therapeutic Carbohydrate Restriction CME: <https://www.cmeuniversity.com/courses/118891/CMEU.Slides.118891.pdf>

Medication Adjustment for Ketogenic Meal Plans

Medication Recommendations for Ketogenic Eating¹

Drug Class	Mechanism	Hypo Risk?	Suggested Action
Insulin	Exogenous insulin	Yes	Reduce/stop
Sulfonylureas	Increases pancreatic insulin secretion	Yes	Stop
Meglitinides	Increases pancreatic insulin secretion	Yes	Stop
Biguanide	Reduces hepatic glucose production	No	Ok to continue
GLP-1 agonist	Slows gastric emptying, glucose-dependent insulin secretion, promotes satiety	No	Ok to continue
SGLT-2 inhibitor	Increases renal glucose secretion	No	Stop
Thiazolidinedione	Increases peripheral insulin sensitivity	No	Usually stop, concern over side effects including weight gain
DPP-4 inhibitor	Glucose dependent insulin secretion	No	Ok to continue
Alpha glucosidase inhibitors	Reduce digestion of starch and glucose	No	Stop, no benefit

¹Medication Adjustments for Ketogenic Meal Plans. ADCES in Practice, May 2020, p 34-37.

<https://journals.sagepub.com/doi/10.1177/2633559X20904677>

Intermittent Fasting

Type of Fast	Description
Complete alternate-day fasting	Alternating fasting days with eating
Modified fasting regimens	5:2 (severe energy restriction for 2 day: consume 20-25% of energy needs on fasting days)
Time restricted feedings (TRF)	Fasting during specific time frames: <ul style="list-style-type: none">- 13 (fasting) : 11(feasting)- 16 (fasting) : 8 (feasting)- 18 (fasting): 6 (feasting)- 20 (fasting) :4 (feasting)

Safe and healthy Intermittent Fasting

Patient

Clinician

Reasons and Goal

- Types of fasting
- Evidence based information

Identify, prevent and treat complications

- Education: risks and complications
- Monitoring and treating complications

Healthy feasting

- How to break the fast
- Healthy diet during feasting

https://www.diabeteseducator.org/docs/default-source/practice/educator-tools/fasting_tip_sheet.pdf?sfvrsn=2

John needs help with his meal plan because he does not want to take pre-meal insulin

- 70 y/o M, diagnosed T2D 15 years ago during routine blood work
- PMH: HTN, hyperlipidemia
- BMI 32 A1C 9.8% (10.2%, 6 months ago) BP 140/90
- Medications: Lantus 12 units HS+ TTT, glimepiride 10 mg , Ozempic 1 g weekly, wearing CGM: Free Style Libre
- Retiree; used to be a computer engineer, has a dog
- Lives with wife, stopped going to the gym because of COVID 19
- Current diet: eats 2 meals in afternoon and late-night snack
- Libre data showed hyperglycemia after meals and before bedtime
- Losing weight is hard because he is a “picky eater” and “too lazy to exercise”; he doesn’t like to cook
- What would you discuss with John?

Resources:

- Diabetes Self-management Education and Support in Adults With Type 2 Diabetes: The Census Report 2020: <https://journals.sagepub.com/doi/full/10.1177/0145721720930959>
- Nutrition Therapy for Adults With Diabetes or Prediabetes: A Consensus Report Diabetes Care 2019;42:731–754 | <https://doi.org/10.2337/dci19-0014>
(<https://care.diabetesjournals.org/content/42/5/731>)
- CME course: Treating metabolic syndrome, type 2 diabetes, and obesity with therapeutic carbohydrate restriction:
<https://www.dietdoctor.com/cme?fbclid=IwAR37SW55Vh1V-1Vo6TFQGZj71NiU7ltusHMrRP4Nj8FPQEUUA8aD47uXdM>
- **Clinical Guidelines:** For the Prescription of Carbohydrate Restriction as a Therapeutic Intervention:
<https://www.lowcarbusa.org/standard-of-care/clinical-guidelines/>
- Medication Adjustments for Ketogenic Meal Plans. ADCES in Practice, May 2020, p 34-37.
<https://journals.sagepub.com/doi/10.1177/2633559X20904677>
- **Fasting with diabetes:**
https://www.diabeteseducator.org/docs/default-source/practice/educator-tools/fasting_tip_sheet.pdf?sfvr_sn=2
- **ADCES podcast:** The Huddle episode 46: Fasting and Diabetes by **Barbara Eichorst and Joy Pape**
- **For patients on low carbohydrate plans:**
 - <https://www.dietdoctor.com/low-carb/keto>