

# Weight Management for People with Type 2 Diabetes

Evidence for Weight Loss Diets and Practical Tips

Laura McCann, MS, RD, LD



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## Disclosures

- None to report

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## Learning Objectives



Identify evidence-based eating patterns effective for weight loss in PWD



Discuss benefits of Mediterranean, DASH, Low Carb and Plant-Based eating patterns with patients



Gather practical dietary counseling tips to share with PWD

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## Diabetes and Weight Management

- 89% of PWD have overweight or obesity
  - 27.6% with overweight
  - 61.3% with obesity
- Obesity management has benefits
  - Improves glycemic control
  - Reduces need for glucose-lowering meds
  - Improves lipids and blood pressure

U.S. Department of Health and Human Services Centers for Disease Control and Prevention. (2020). *National Diabetes Statistics Report 2020*. Centers for Disease Control and Prevention. <https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf>

American Diabetes Association. 8. Obesity Management for the Treatment of Type 2 Diabetes: Standards of Medical Care in Diabetes-2019. *Diabetes Care*. 2019 Jan;42(Suppl 1):S81-S89. doi: 10.2337/dc19-S008. PMID: 30559254.

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## Diabetes and Weight Management

- 5-10% weight loss reduces diabetes-related complications
  - Look AHEAD Study
- More weight loss has greater benefits
  - DiRECT Study

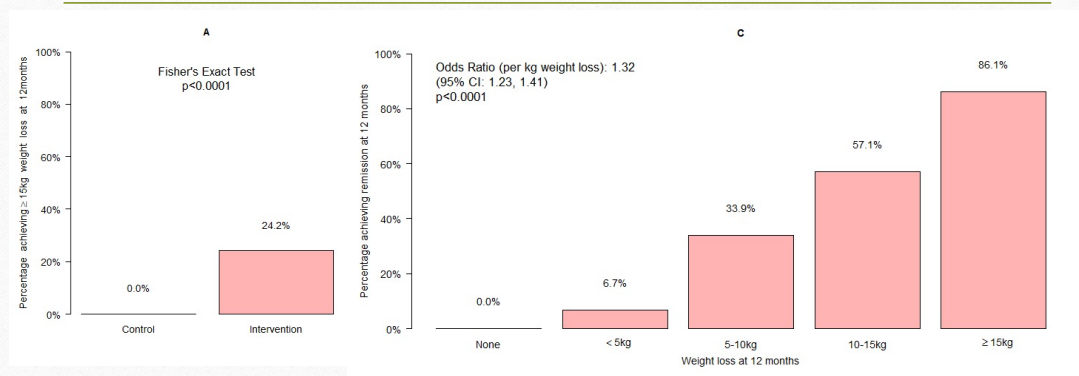
American Diabetes Association. 8. Obesity Management for the Treatment of Type 2 Diabetes: Standards of Medical Care in Diabetes-2019. Diabetes Care. 2019 Jan;42(Suppl 1):S81-S89.

Look AHEAD Research Group. Eight-year weight losses with an intensive lifestyle intervention: the look AHEAD study. Obesity (Silver Spring). 2014 Jan;22(1):5-13.

Lean ME, Leslie WS, Barnes AC, Brosnahan N, Thom G, McCombie L, Peters C, Zhyzhneuskaya S, Al-Mrabeh A, Hollingsworth KG, Rodrigues AM, Rehackova L, Adamson AJ, Snichotta FF, Mathers JC, Ross HM, McIlvenna Y, Stefanetti R, Trenell M, Welsh P, Kean S, Ford I, McConnachie A, Sattar N, Taylor R. Primary care-led weight management for remission of type 2 diabetes (DiRECT): an open-label, cluster-randomised trial. Lancet. 2018 Feb 10;391(10120):541-551.

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## DiRECT Study Outcomes



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## How To Achieve Weight Loss

- No single approach is superior over another
- Calorie deficit necessary
- No ideal percentage of calories from macronutrients
- We have choices!

Evert AB, Dennison M, Gardner CD, Garvey WT, Lau KHK, MacLeod J, Mitri J, Pereira RF, Rawlings K, Robinson S, Saslow L, Uelmen S, Urbanski PB, Yancy WS Jr. Nutrition Therapy for Adults With Diabetes or Prediabetes: A Consensus Report. *Diabetes Care*. 2019 May;42(5):731-754.

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## Effective Eating Patterns

Vegetarian or Vegan

Low-fat or very low-fat

Low-carb or very low-carb

DASH

Mediterranean

Evert AB, Dennison M, Gardner CD, Garvey WT, Lau KHK, MacLeod J, Mitri J, Pereira RF, Rawlings K, Robinson S, Saslow L, Uelmen S, Urbanski PB, Yancy WS Jr. Nutrition Therapy for Adults With Diabetes or Prediabetes: A Consensus Report. *Diabetes Care*. 2019 May;42(5):731-754.  
American Diabetes Association. 5. Lifestyle Management: *Standards of Medical Care in Diabetes-2019*. *Diabetes Care*. 2019 Jan;42(Suppl 1):S46-S60.

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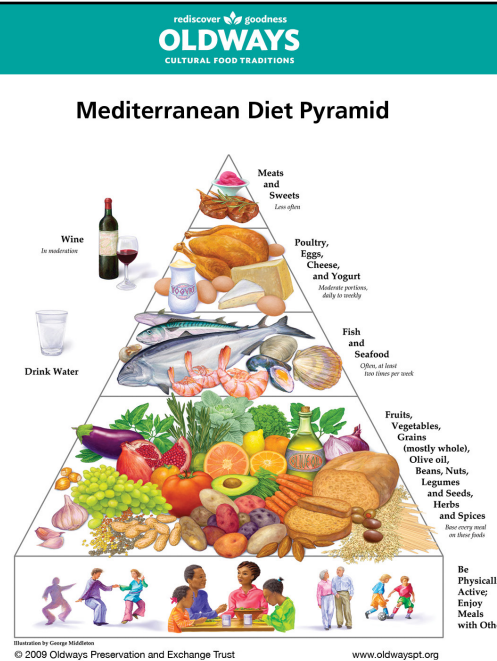
## Key Factors

- Emphasize non-starchy vegetables
- Minimize refined grains and added sugars
- Whole foods vs. highly processed foods
- Reduce overall carb intake

Evett AB, Dennison M, Gardner CD, Garvey WT, Lau KJHC, MacLeod J, Mint J, Pereira RP, Rawlings K, Robinson S, Siskow L, Uhlman S, Urbanski PH, Yancy WS Jr. Nutrition Therapy for Adults With Diabetes or Prediabetes: A Consensus Report. Diabetes Care. 2019 May;42(5):733-754.

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## Mediterranean Diet



Mediterranean Diet. Oldways Cultural Food Traditions. <https://oldwayspt.org/traditional-diets/mediterranean-diet>. Accessed April 19, 2021.

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## Impact of a Mediterranean Dietary Pattern and Its Components on Cardiovascular Risk Factors, Glucose Control, and Body Weight in People with Type 2 Diabetes

- n=2,568
- Higher adherence to Med Diet had lower LDL, triglycerides, higher HDL, lower BP, lower A1c, lower BMI
- Dietary characteristics:
  - MORE fruit, vegetables, legumes, cereals, fish, olive oil and alcohol
  - LESS: meat and dairy
  - Lower sodium intake higher intake polyphenols

Vitale M, Masulli M, Calabrese I, et al. Impact of a Mediterranean Dietary Pattern and Its Components on Cardiovascular Risk Factors, Glucose Control, and Body Weight in People with Type 2 Diabetes: A Real-Life Study. *Nutrients*. 2018;10(8):1067.

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## PREDIMED-Plus Trial

- Assessment at 6 and 12 months in participants with OW/OB (n=626)
- Intervention: Energy-restricted Med Diet
- Significant difference in total weight loss
- More lost at least 5-10% of initial weight
- More reduced BMI from  $\geq 30 \text{ kg/m}^2$  to  $< 30 \text{ kg/m}^2$
- No evidence of weight regain
- Beneficial effect on A1c, fasting glucose and insulin levels

Salas-Salvadó J, Díaz-López A, Ruiz-Canela M, Basora J, Fitó M, Corella D, Serra-Majem L, Wärnberg J, Romaguera D, Estruch R, Vidal J, Martínez JA, Arós F, Vázquez C, Ros E, Vioque J, López-Miranda J, Bueno-Cavanillas A, Tur JA, Tinahones FJ, Martín V, Lapetra J, Pintó X, Daimiel L, Delgado-Rodríguez M, Matía P, Gómez-Gracia E, Díez-Espino J, Babio N, Castañer O, Sorlí JV, Fiol M, Zulet MÁ, Bulló M, Goday A, Martínez-González MÁ; PREDIMED-Plus investigators. Effect of a Lifestyle Intervention Program With Energy-Restricted Mediterranean Diet and Exercise on Weight Loss and Cardiovascular Risk Factors: One-Year Results of the PREDIMED-Plus Trial. *Diabetes Care*. 2019 May;42(5):777-788.

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## MedWeight Study

- Participants: people whose starting BMI was  $\geq 25 \text{ kg/m}^2$  and had maintained intentional weight loss of  $\geq 10\%$  for over 1 year (n=565)
- Higher adherence to Med Diet → twice as likely to maintain weight loss
- Ate more whole grains, fruits, vegetables, legumes, potatoes, fish, olive oil
- Less meat, poultry, full fat dairy

Poulimeneas D, Anastasiou CA, Santos I, Hill JO, Panagiotakos DB, Yannakoulia M. Exploring the relationship between the Mediterranean diet and weight loss maintenance: the MedWeight study. Br J Nutr. 2020 Oct 28;124(8):874-880.

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## DASH Diet



How the DASH Diet can lower your blood pressure. Ohio Health Blog. <https://blog.ohiohealth.com/dash-diet-lower-blood-pressure/>. Accessed April 22, 2021.

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## DASH and Weight Loss

- 31 people with T2D followed DASH for 8 weeks
  - Significantly reduced weight and waist circumference
  - Decreased FBG and A1c
  - Increased HDL, decreased LDL
  - Decreased BP

Azadbakht L, Fard NR, Karimi M, Baghaei MH, Surkan PJ, Rahimi M, Esmailzadeh A, Willett WC. Effects of the Dietary Approaches to Stop Hypertension (DASH) eating plan on cardiovascular risks among type 2 diabetic patients: a randomized crossover clinical trial. *Diabetes Care*. 2011 Jan;34(1):55-7.

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## DASH and Cardiometabolic Benefits

- Improved insulin sensitivity
- Decreased fasting insulin
- Decreased systolic and diastolic BP
- Decreased total and LDL cholesterol
- Decreased diabetes and cardiovascular mortality

Hashemi R, Rahimlou M, Baghdadian S, Manafi M. Investigating the effect of DASH diet on blood pressure of patients with type 2 diabetes and prehypertension: Randomized clinical trial. *Diabetes Metab Syndr*. 2019 Jan-Feb;13(1):1-4.  
 Kahleova H, Salas-Salvado J, Rahelić D, Kendall CW, Rembert E, Sievenpiper JL. Dietary Patterns and Cardiometabolic Outcomes in Diabetes: A Summary of Systematic Reviews and Meta-Analyses. *Nutrients*. 2019;11(9):2209.  
 Gadgil MD, Appel LJ, Yeung E, Anderson CA, Sacks FM, Miller ER 3rd. The effects of carbohydrate, unsaturated fat, and protein intake on measures of insulin sensitivity: results from the OmniHeart trial. *Diabetes Care*. 2013 May;36(5):1132-7.

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## Low Carb Diets



Photo from UChicago Medicine. <https://www.uchicagomedicine.org/forefront/health-and-wellness-articles/ketogenic-diet-what-are-the-risks>. Accessed April 22, 2021.

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## Fat Versus Carbohydrate-Restricted Diets for Weight Loss in Patients with Type 2 Diabetes

- Weight loss can be achieved regardless of difference in macros
- Similar weight loss at 1 year when comparing low-fat and low-carb
- No difference in A1c or BP

Hamdy O, Tasabehji MW, Elseaidy T, Tomah S, Ashrafzadeh S, Mottalib A. Fat Versus Carbohydrate-Based Energy-Restricted Diets for Weight Loss in Patients With Type 2 Diabetes. Curr Diab Rep. 2018 Oct 17;18(12):128.

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## Keto Diet vs. Plate Method

- Pilot study, RCT, n=25
- Keto lowered A1c more
  - -0.8% vs -0.3%, p=.002
- Keto lost more weight
  - (-12.7kg vs -3.0kg, p<.001)
- Keto lowered triglycerides more, no difference in HDL and LDL

Saslow LR, Mason AE, Kim S, Goldman V, Ploutz-Snyder R, Bayandorian H, Daubenmier J, Hecht FM, Moskowitz JT. An Online Intervention Comparing a Very Low-Carbohydrate Ketogenic Diet and Lifestyle Recommendations Versus a Plate Method Diet in Overweight Individuals With Type 2 Diabetes: A Randomized Controlled Trial. J Med Internet Res. 2017 Feb 13;19(2):e36.

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## Keto vs. Moderate Carb Diet

- RCT, n=34, people with T2D and overweight
- Keto had lower A1c, more weight loss, decreased med use more than control
- A1c under 7% at baseline

Saslow LR, Daubenmier JJ, Moskowitz JT, Kim S, Murphy EJ, Phinney SD, Ploutz-Snyder R, Goldman V, Cox RM, Mason AE, Moran P, Hecht FM. Twelve-month outcomes of a randomized trial of a moderate-carbohydrate versus very low-carbohydrate diet in overweight adults with type 2 diabetes mellitus or prediabetes. Nutr Diabetes. 2017 Dec 21;7(12):304.

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## DIETFITS Study

- Healthy low-fat vs. healthy low-carb
- No difference in weight change at 12 months

Gardner CD, Trepanowski JF, Del Gobbo LC, Hauser ME, Rigdon J, Ioannidis JPA, Desai M, King AC. Effect of Low-Fat vs Low-Carbohydrate Diet on 12-Month Weight Loss in Overweight Adults and the Association With Genotype Pattern or Insulin Secretion: The DIETFITS Randomized Clinical Trial. JAMA. 2018 Feb 20;319(7):667-679.

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## Vegetarian Diets



Aamulya/Stock / Getty Images Plus/Getty Images. Food & Nutrition. <https://foodandnutrition.org/blogs/stone-soup/celebrate-vegetarian-awareness-month/>. Accessed April 22, 2021.

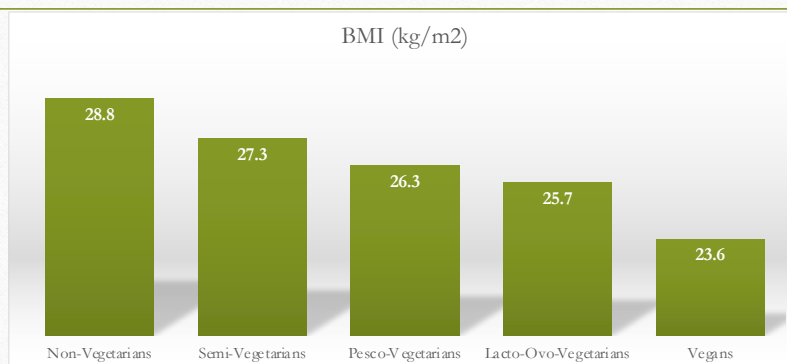
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## Types of Plant-Based Diets

	Plants	Dairy	Eggs	Fish	Meat
Omnivore	✓	✓	✓	✓	✓
Flexitarian/ Plant-Based	✓	✓	✓	Maybe	Maybe
Vegetarian	✓	Maybe	Maybe	×	×
Vegan	✓	×	×	×	×

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## Adventist Health Study-2

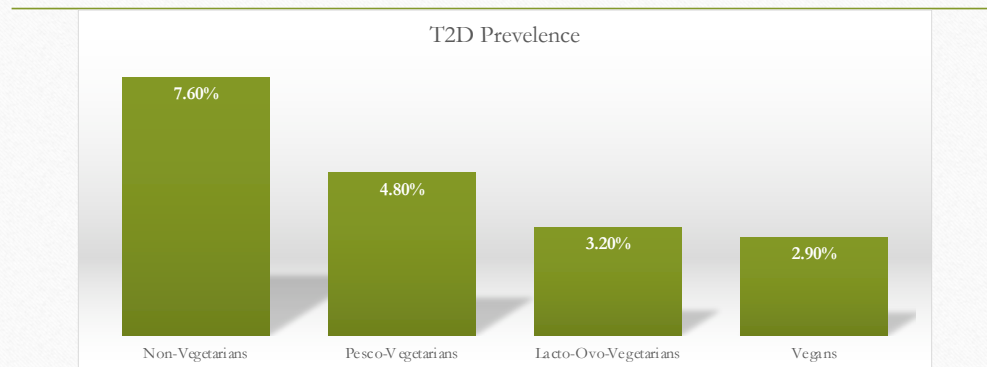


Tonstad S, Butler T, Yan R, Fraser GE. Type of vegetarian diet, body weight, and prevalence of type 2 diabetes. *Diab Care*. 2009;32(5):791-6.

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## Adventist Health Study-2



Tonstad S, Butler T, Yan R, Fraser GE. Type of vegetarian diet, body weight, and prevalence of type 2 diabetes. *Diab Care*. 2009;32(5):791-6.

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## Low-fat Vegan vs. “Diabetes Diet”

- 74 week RCT, n=99
- Vegan and vegetarian eating patterns reduce A1c, lipids and weight
- Low-fat vegan without carb or calorie counting showed greater improvement in A1c, LDL and weight loss than control

Barnard ND, Cohen J, Jenkins D, et al. A low-fat vegan diet and a conventional diabetes diet in the treatment of type 2 diabetes: a randomized, controlled, 74-wk clinical trial. *Am J Clin Nutr*. 2009;89(5):1588S-1596S.  
Barnard ND, Cohen J, Jenkins DJA, et al. A low-fat vegan diet improves glycemic control and cardiovascular risk factors in a randomized clinical trial in individuals with type 2 diabetes. *Diabetes Care*. 2006;29(8):1777-1783.

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## Vegetarian Diets and Weight Loss

- Increasing unrefined carb intake can improve insulin sensitivity
- Improved insulin sensitivity may impact weight
- Greater reduction in fat in those following plant-based diet compared to isocaloric non-vegetarian diet
- The effect of fiber on the microbiome may reduce appetite, reduce weight
  - Digestion of fermentable fiber produces SCFAs → stimulate peptide YY and GLP-1

Najjar RS, Feresin RG. Plant-based diets in the reduction of body fat: physiologic effects and biochemical insights. *Nutrients*. 2019;11(11):2712.

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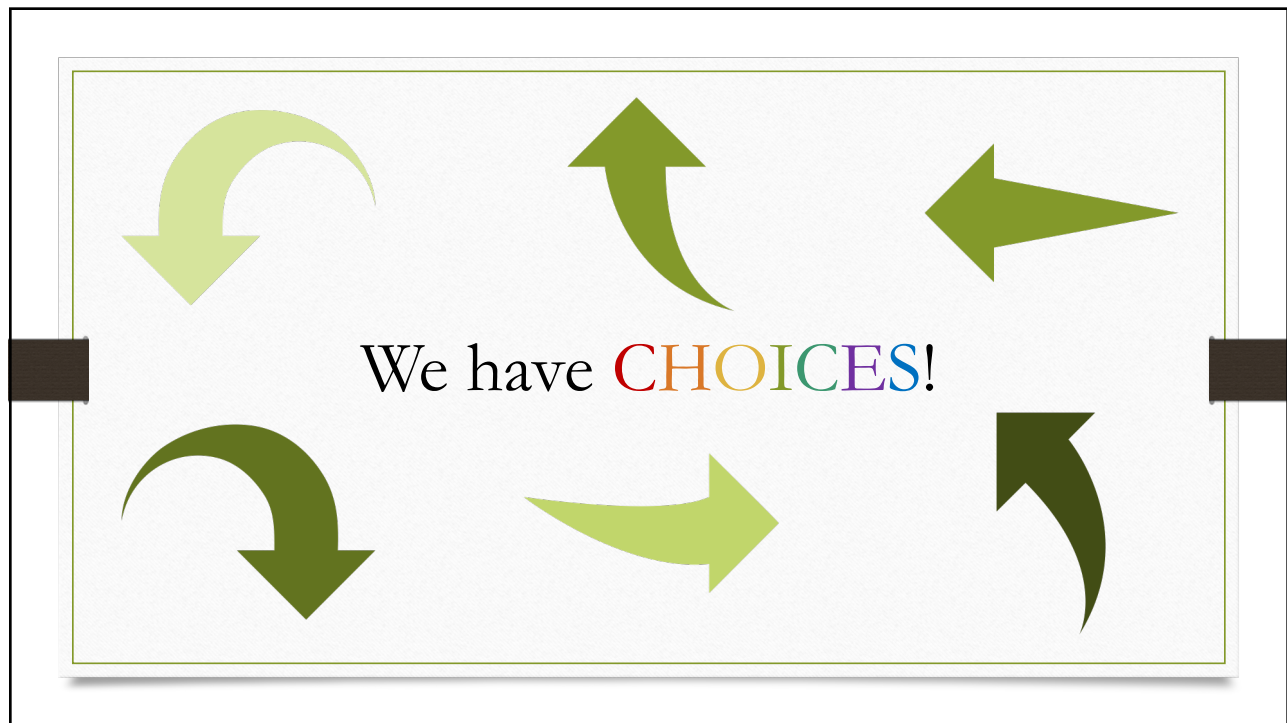
## ADA 2019 Consensus Report— Vegetarian or Vegan Eating Patterns

- Studies reviewed show mixed results on glycemia and CVD risk factors, but result in weight loss
- Controlled trials show lower A1c, reduce weight, waist circumference and LDL

Evert AB, Dennison M, Gardner CD, Garvey WT, Lau KHK, MacLeod J, Mitri J, Pereira RF, Rawlings K, Robinson S, Saslow L, Uelmen S, Urbanski PB, Yancy WS Jr. Nutrition Therapy for Adults With Diabetes or Prediabetes: A Consensus Report. *Diabetes Care*. 2019 May;42(5):731-754.

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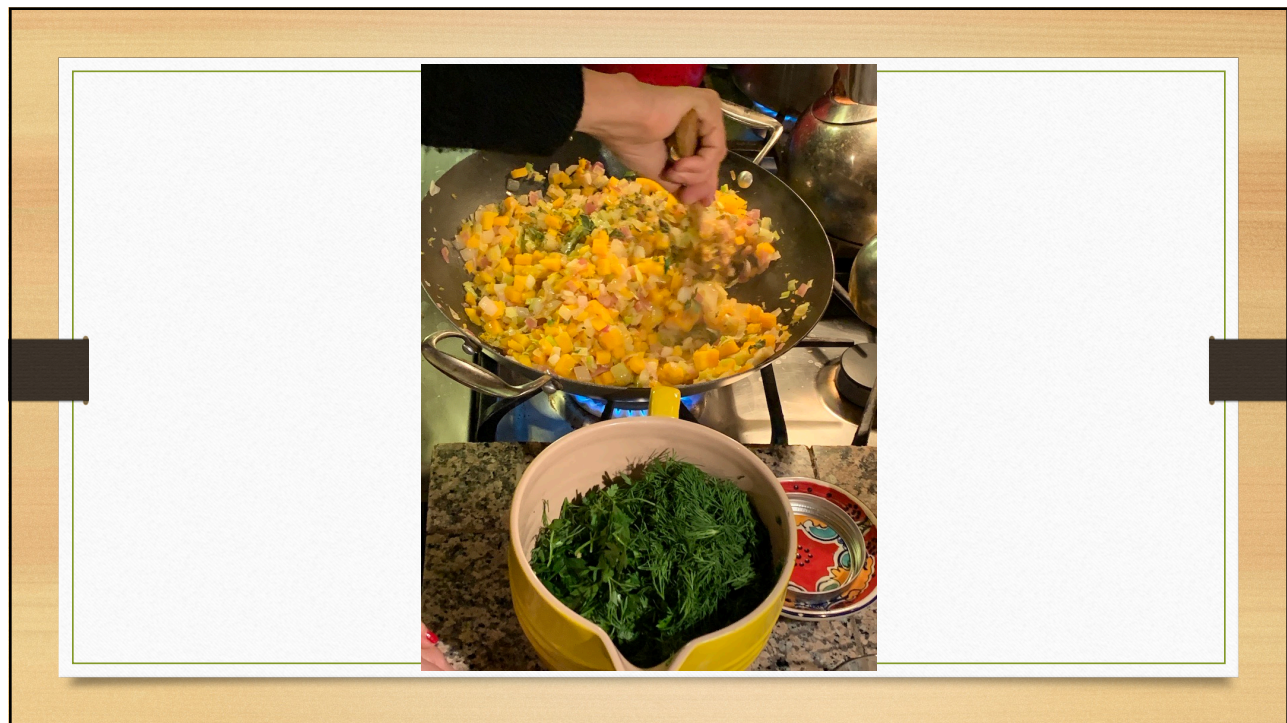
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## Mediterranean Diet

- Base meals on vegetables
- Add unprocessed whole grains
- Choose healthy fats
- Pick lean proteins
- Herbs for flavor
- Fruit for dessert

Brown-Riggs, C. (2018). Manage diabetes with the med diet. Today's Dietitian, 20(5), 20-23.

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## Mediterranean Diet

Breakfast Ideas:

- Eggs and spinach simmered in tomato sauce, whole grain toast
- Plain Greek yogurt topped with fruit and walnuts

Lunch Ideas:

- Tuna grain bowl
- Roasted veggie toast

Dinner Ideas:

- Whole grain pasta with sauteed mushrooms, garlic, spinach and tomatoes; grilled chicken
- Grilled fish with veggie kabobs and brown rice

Helwig, J., Smith, C. (2021). Hungry for healthy. Real Simple, 116-121

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Mediterranean  
Diet

Snack Ideas:

- Nuts
- Fruit
- Olives
- Hummus and veggies
- Sliced veggies with herbs and feta
- Roasted chickpeas

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## DASH Diet

Sodium: 2,300 mg/day

1. Identify sources of sodium
2. Find new flavors



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## DASH in a Day

10 servings Vegetables and Fruits

6 servings Grains

2 servings Low-fat Dairy

6 servings or less Poultry, Fish, Lean Meat

4 servings (per week) Legumes, Nuts/Seeds

2-3 servings Fats

5 servings or less Sweets

National Heart, Lung, and Blood Institute. DASH Eating Plan. <https://www.nhlbi.nih.gov/health-topics/dash-eating-plan>. Accessed April 26, 2021.

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## DASH Diet

Breakfast Ideas:	Lunch Ideas:	Dinner Ideas:
<ul style="list-style-type: none"> <li>Whole wheat toast with peanut butter, orange, coffee with milk</li> <li>Mixed fruits with yogurt and walnuts, bran muffin, unsweetened almond milk</li> <li>Oatmeal with cinnamon, apples, pecans</li> </ul>	<ul style="list-style-type: none"> <li>Spinach salad with pear, slivered almonds, vinaigrette, whole grain crackers</li> <li>Curried chicken wrap made with plain yogurt and apples, whole wheat tortilla, baby carrots</li> <li>Tuna salad made with celery and grapes in lettuce cups, Melba crackers</li> </ul>	<ul style="list-style-type: none"> <li>Herb-crusted cod with brown rice pilaf, green beans, berries with fresh mint</li> <li>Whole wheat spaghetti with marinara sauce, turkey meatballs and salad</li> <li>Beef and vegetable kebabs, wild rice, pineapple</li> </ul>

Mayo Clinic. Sample menus for the DASH diet. <https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/dash-diet/art-20047110>. Accessed April 26, 2021.

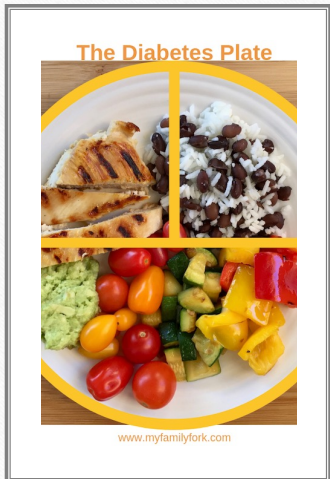
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## DASH Diet

### Snack Ideas:

- Yogurt and fruit
- Trail mix
- Unsalted pretzels and cheese stick
- Apple and unsalted almonds
- Popcorn with salt-free seasoning
- Graham crackers and peanut butter

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## Low-Carb Diet

- Identify sources of carbohydrates
- Know portions
- Find low-carb alternatives to high-carb foods
- Choose healthy high-protein foods
- Identify low-carb sources of dairy
- Use healthy fats

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## Low-Carb Diet: Simple Swaps

Collard wrap	Spaghetti squash	Zucchini boats	Spiralized carrot noodles	Portabella "bun"
Lettuce cups	Cauliflower or broccoli rice	Shirataki noodles	Almond or coconut flour	Mashed cauliflower

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Photo credit Ricki Heller

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Photo credit Amy Casey

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Photo credit Laura McCann

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## Low Carb Diet

### Breakfast:

- Eggs scrambled with spinach, mushrooms and feta, grapefruit

### Lunch:

- Cobb salad (greens, avocado, egg, bacon, cheddar, vinaigrette)

### Dinner:

- Pesto zoodles with chicken breast

### Snacks:

- Celery and cream cheese
- Plain Greek yogurt and strawberries

Rochl K, Sewak SL. Practice Paper of the Academy of Nutrition and Dietetics: Classic and Modified Ketogenic Diets for Treatment of Epilepsy. J Acad Nutr Diet. 2017 Aug;117(8):1279-1292.

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## Low Carb Diet

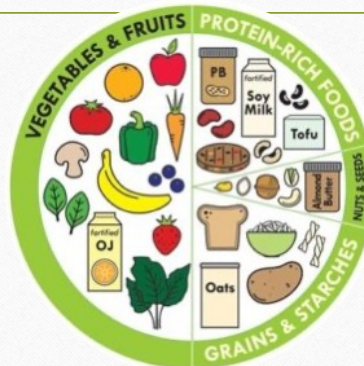
Snack Ideas:

- Deviled eggs
- Jerky
- Mini peppers and guacamole
- Carrots and ranch
- Turkey cheese roll-ups
- Sliced cucumber and string cheese
- Celery and peanut butter
- Caprese salad bites
- Mixed nuts
- Flavored tuna pouch

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## Vegetarian/Vegan Diet

- Use whole foods ingredients
  - Minimally processed grains
  - Legumes, soy foods
  - Nuts/seeds
  - Vegetables
  - Fruits
  - Healthy fats



Messina, G. The vegan for life food guide. The Vegan RD. <https://www.theveganrd.com/vegan-nutrition-101/food-guide-for-vegans/>. Accessed April 26, 2021.

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## Vegan Diet

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B<sub>12</sub>

Calcium

Vitamin  
D

Iron

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## Vegetarian/Vegan Diet

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### Breakfast Ideas:

- Tofu scramble with sauteed veggies, whole grain toast
- Chia pudding with fruit
- Vegan pancakes with banana and peanut butter

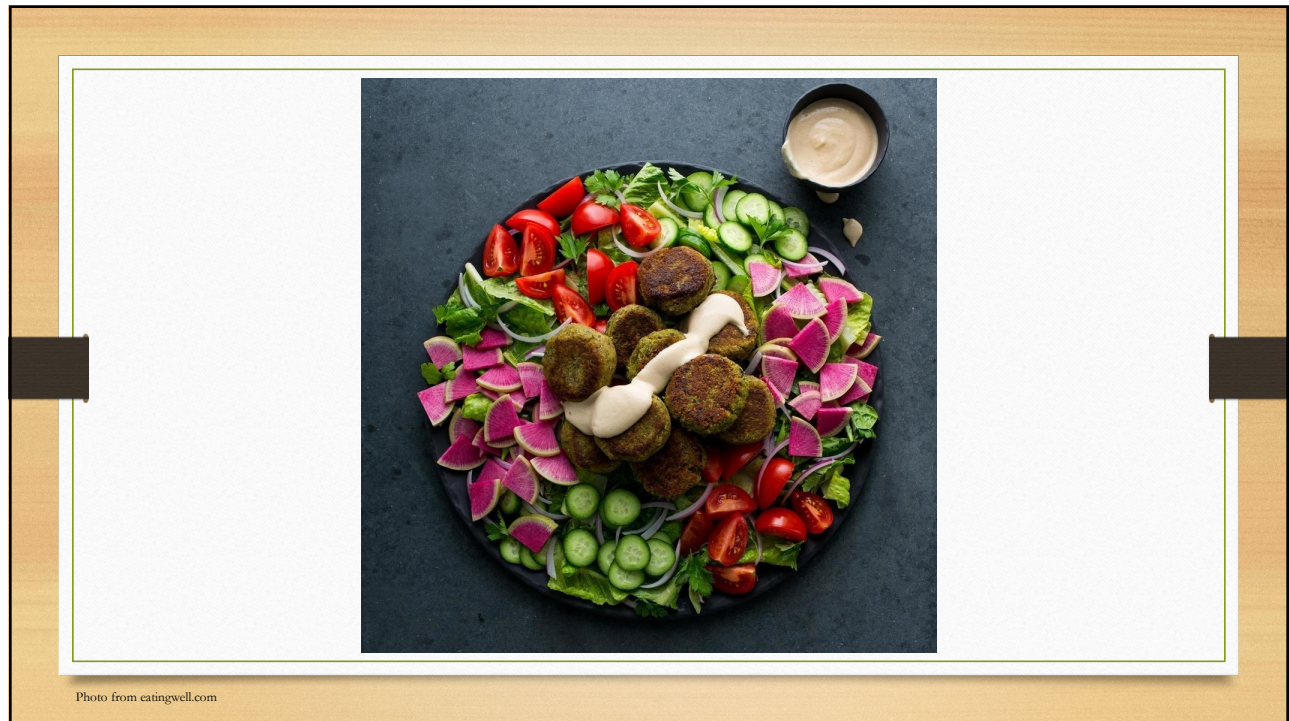
### Lunch Ideas:

- Avocado chickpea salad with tomatoes and sprouts in whole wheat pita
- Lentil and carrot soup with side salad
- Salad with edamame, sesame seeds and beets

### Dinner Ideas:

- Falafel plate with hummus, roasted vegetables and tabbouleh
- Black bean quinoa burrito bowl
- Thai spaghetti squash with peanut sauce

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Photo credit Laura McCann

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## Vegetarian/ Vegan Diet

### Snack Ideas:

Fruit

Air-popped popcorn with olive oil  
and nutritional yeast

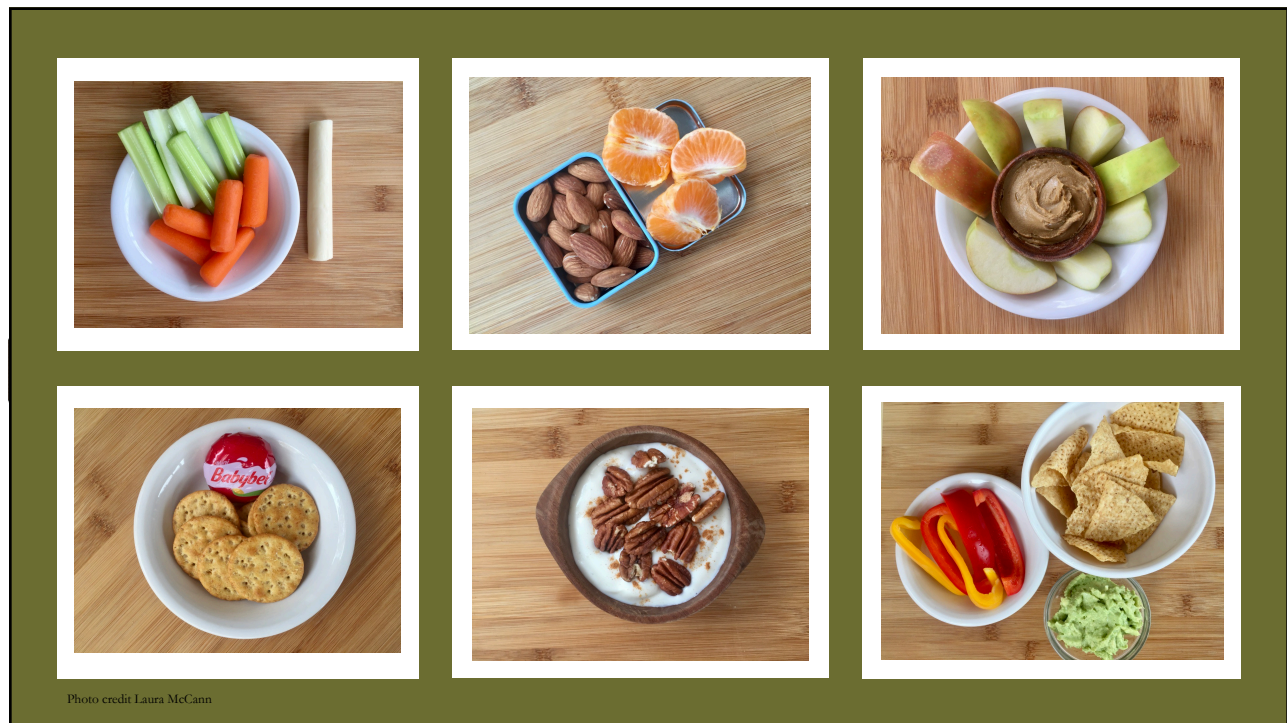
Edamame

Trail mix

Cheese stick

Carrots and hummus

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## Resources

- Mayo Clinic
  - <https://www.mayoclinic.org/healthy-lifestyle/recipes>
- Eating Well
  - <https://www.eatingwell.com>
- ADA Diabetes Food Hub
  - <https://www.diabetesfoodhub.org>
- MyPlate
  - <https://www.myplate.gov>

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Thank you!

[laura@lmmnutrition.com](mailto:laura@lmmnutrition.com)

[lmccann@lfmctr.org](mailto:lmccann@lfmctr.org)

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Questions

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