

The Nutrition Front-Runners: The evidence behind meal planning methods for diabetes

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Faculty Disclosure

- Sanofi – speakers bureau
- American Diabetes Association – ERP auditor

Need/Practice Gap & Supporting Resources

With over 30 million people with diabetes in the US, behavior change is the one way that there will be an improvement in diabetes self-care. Meal planning can aid in reducing the A1C by 1-2%. In order to empower all healthcare professionals who come in contact with people with diabetes, it is crucial that the same meal planning messages are given out regardless of discipline.

Objectives

- List at least three of the current meal plan methods used for diabetes and their benefits
- Explain the current research that supports the claims of the current meal plan methods for diabetes
- Describe the uses of the Mediterranean Diet, the research behind it and practical methods to use with people with diabetes
- Identify at least two reputable and up-to-date sources of nutrition information for health care professionals

Expected Outcome

- Increased knowledge of current meal plan methods used for diabetes and their benefits
- Increased knowledge of current research that supports the claims of the current meal plan methods for diabetes
- Knowledge of the uses of the Mediterranean Diet, the research behind it and practical methods to use with people with diabetes
- Identification and use of reputable and up-to-date sources of nutrition information for health care professionals

What are the key recommendations for meal planning for diabetes?

- A. reducing carbohydrate
- B. reducing fat
- C. increasing protein
- D. eliminating regular soft drinks

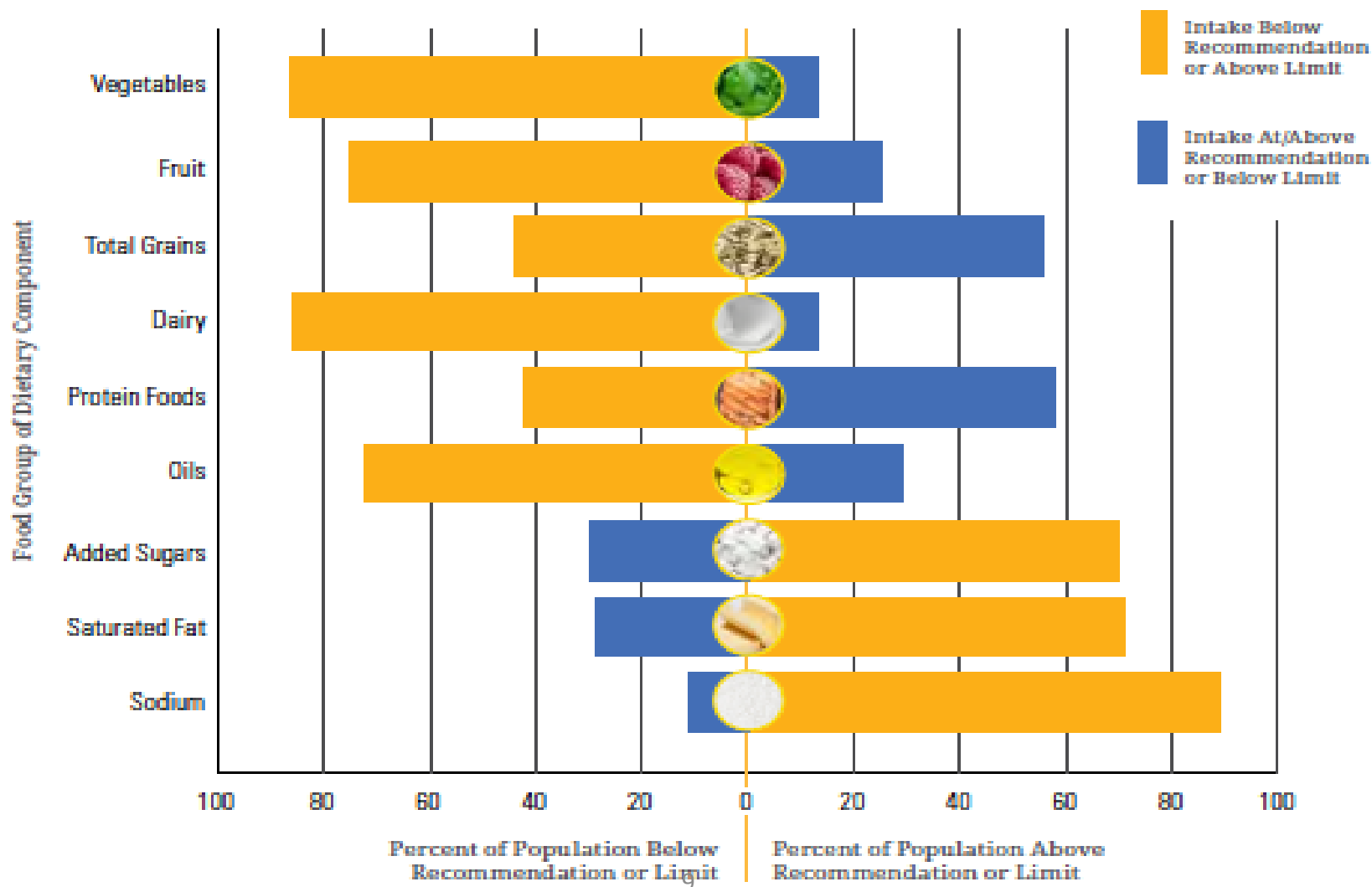
What are the key recommendations for meal planning for diabetes?

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How do Americans eat?

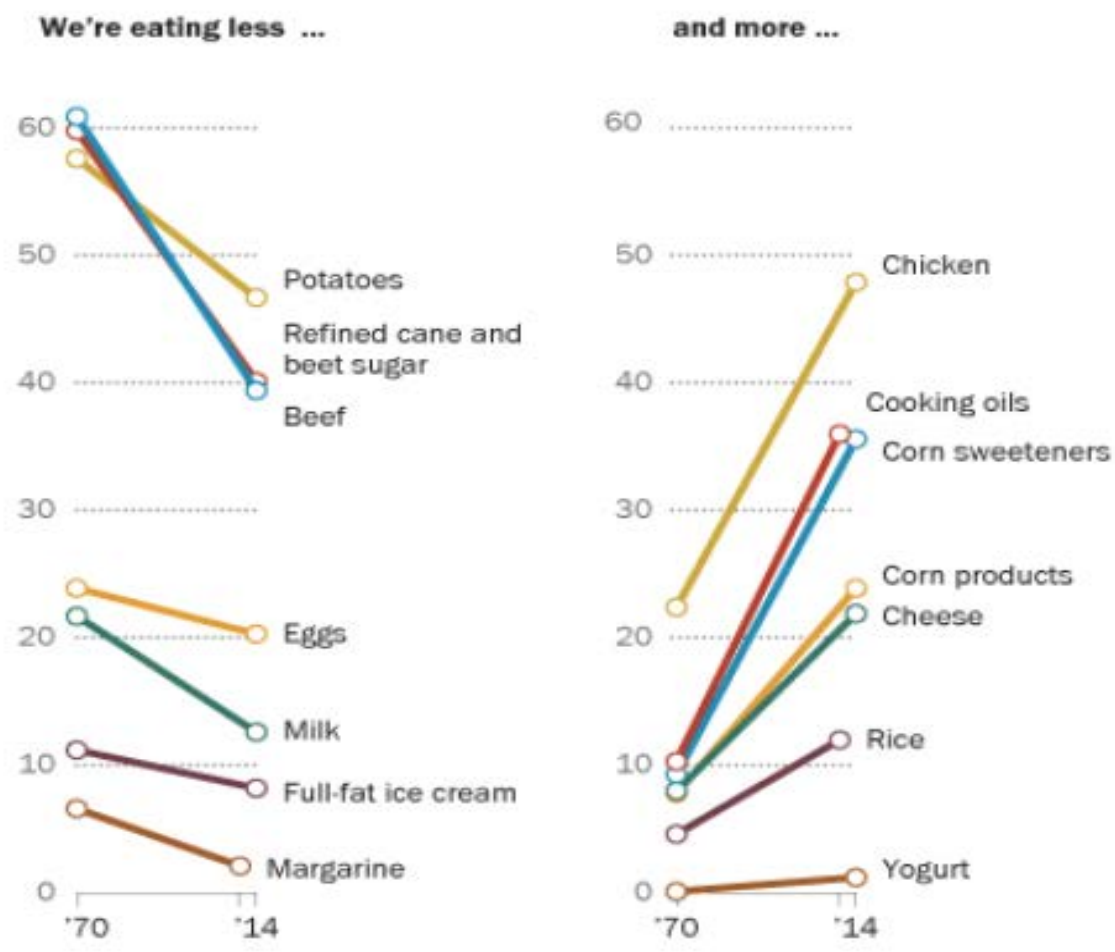
- STILL too many:
 - ***CALORIES***
- Too much:
 - Solid fat
 - Added sugars
 - Refined grains
 - Sodium
- Too little:
 - Potassium
 - Dietary fiber
 - Calcium
 - Vitamin D
 - Unsaturated fat from nuts, oils, seafood

Dietary Intakes Compared to Recommendations



How the American Diet Has Changed since 1970

Average annual per capita availability, in pounds



The Average American Eats Too Little:

- A. Vegetables
- B. Fruit
- C. Dairy
- D. Oils
- E. All of the Above

The Average American Eats Too Little:

- A. Vegetables
- B. Fruit
- C. Dairy
- D. Oils
- E. All of the Above

Meal plans and health – the evidence

- **Alignment of Healthy Dietary Patterns and Environmental Sustainability: A Systematic Review, Adv Nutr, 2016**
 - Across studies, consistent evidence indicated that a dietary pattern higher in plant-based foods (veg, fruit, legumes, seeds, nuts, whole grains) and lower in animal-based foods (esp red meat) as well as lower in total calories, is both HEALTHIER and associated with LESSER IMPACT on environment
 - Following diets that are vegetarian, dietary guidelines-related, Mediterranean, DASH promotes greater health
- **Trending Cardiovascular Nutrition Controversies, JACC, 2017**
 - Review of popular dietary patterns and foods
 - Bottom line: evidence supports the use of olive oil, blueberries/strawberries, nuts, green leafy veg, plant-based proteins
 - Inconclusive evidence: coconut oil, antioxidant supplements, juicing, gluten-free foods in the absence of celiac disease
 - Eating pattern evidence: DGA, Mediterranean, DASH, Vegetarian

Meal plans and health

- Recommended Dietary Pattern to Achieve Adherence to the AHA/ACC Guidelines, A Scientific Statement, Circulation, 2016
 - Summarizes evidence, offers practical tips, tools and dietary approaches to help people adapt the guidelines
 - There are many options for successful adaptation of any one of the recommended dietary patterns that in general advocate emphasis on veg, fruit, whole grains; include low-fat dairy, poultry, fish, legumes, nontropical veg oils, and nuts; and limit intake of sweets, SSB, red meats, and processed foods.
 - DASH
 - Mediterranean
 - Vegetarian

Meal timing and Frequency

- **AHA Scientific Statement, 2017**
- Skipping meal and breakfast has become more prevalent
- **Breakfast**
 - Association between skipping breakfast and low nutritional adequacy
 - May not affect weight as much as we think, but it does improve eating habits
- **Intermittent Fasting**
 - Alternate-day vs periodic (1-2 d/wk)
 - Short-term weight loss – question sustainability
- **Meal frequency**
 - Unless you are altering calorie intake, the # of meals eaten is not useful
 - Increased frequency **MUST** be associated with calorie focus to avoid overeating
- **Meal timing**
 - Late night eating associated with greater risk of weight gain
 - Late night eating plus skipped breakfast had greater risk of obesity, MetS
 - Eating majority of total calories earlier in the day may reduce risk of DM
 - Irregular patterns tend to have an adverse effect

Intentional Approach to Eating – AHA Recommendations

Develop an intentional approach to eating that focuses on the timing and frequency of meals and snacks as the basis of a healthier lifestyle and improved risk factor management

Understand the patient's frame of reference in how he or she may define meals and snacks

Recommend distributing calories over a defined portion of the day

Recommend eating a greater share of the total calorie intake earlier in the day to have positive effects on risk factors for heart disease and diabetes

Promote consistent overnight fast periods

Link eating episodes to influence subsequent energy intake (if longer period time between any meal, place a snack prior to it in order to reduce overeating)

Include intermittent fasting approaches as an option to help lower calorie intake and to reduce body weight

Use added eating episodes to introduce a wider variety of healthful food options and to displace less healthful foods

Use planned meals and snacks throughout the day to help manage hunger and to achieve portion control

Effect of Current Dietary Recommendations on Weight Loss and Cardiovascular Risk Factors

- JACC, 2017
- 919 overweight Canadian men and women
- Randomized to of of the following interventions:
 - Health Canada's food guide
 - Dietary advice consistent with DASH and dietary portfolio principles
 - Weekly food provision following the above guidelines
 - Food delivery plus above meal planning advice
- Provision of foods provided increased retention
- The data demonstrated the difficulty in effectively promoting fruit, vegetable, and whole grains in the general public
- Suggestions:
 - Success of dietary advice may be influenced by perception of immediate benefit
 - Further emphasis needed on the long term advantages of maintaining a healthier meal plan
 - More emphasis placed on overcoming barriers, esp to food preparation
 - Use multiple forms of communication to make healthier shifts in diet

Food groups and risk of all-cause mortality

- Am J Clin Nutr, 2017;105:1462-73
- Systematic review and meta-analysis – n=103
 - Focused on 12 major food groups
 - **Whole grains**
 - **Refined grains**
 - **Vegetables**
 - **Fruits**
 - **Nuts**
 - **Legumes**
 - **Eggs**
 - **Dairy**
 - **Fish**
 - **Red meat**
 - **Processed meat**
 - **Sugar-sweetened beverages**
 - Increasing intake of whole grains, veg, fruits, nuts, fish reduced the risk of all-cause mortality
 - Higher intake of red meat and processed meat increased risk of all-cause mortality
 - Optimal consumption of risk-reducing foods results in a 56% reduction of all-cause mortality (at least 3 svg/d of fruit, veg, whole grains each; 2 svg fish/d; 1 svg of legumes and nuts/d)

Association Between Dietary Factors and Mortality From Heart Disease, Stroke, and Type 2 Diabetes in the US

- JAMA, 2017
- NHANES review – 1999-2012
- Consumption of **10 foods/nutrients** associated with cardiometabolic diseases:
 - Fruits
 - Veg
 - Nuts/seeds
 - Whole grains
 - Unprocessed red meats
 - Processed meats
 - Sugar-sweetened beverages
 - Polyunsaturated fats
 - Seafood omega-3 fats
 - Sodium

Which dietary factors are associated with risk of death from CHD, stroke, T2D?

- Largest numbers of diet-related deaths related to:
 - High sodium
 - Low nuts/seeds
 - High processed meats
 - Low seafood omega-3 fats
 - Low vegetables
 - Low fruits
 - High sugar-sweetened beverages
 - Low whole grains

Meal plans and diabetes

- Dietary patterns and type 2 diabetes: a systematic literature review and meta-analysis of prospective studies, 2017 (J Nutrition)
 - Adherence to **Mediterranean diet, DASH** was associated with risk reduction
 - Patterns that included processed meat, refined grains, high-fat dairy, eggs, sugar-sweetened beverages and fried products were positively associated with DM
 - Patterns including vegetables, legumes, fruits, poultry and fish were inversely associated with DM

Meal plans and diabetes

- Systematic review and meta-analysis of different dietary approaches to the management of type 2 diabetes, 2013 (Am J Clin Nutr)
 - Low-carbohydrate, low-GI, Mediterranean and high-protein diets are effective in improving various markers of cardiovascular risk in people with diabetes and should be considered in the overall strategy of diabetes management
 - There was a significant decrease in A1C with low carb diet, low GI, Mediterranean and high-protein
 - Mediterranean had weight loss benefit
 - HDL increases with low-GI, low-carb
 - Mediterranean reduced triglycerides

Meal planning and diabetes

- Nutrition therapy recommendations for the management of adults with diabetes, 2013 (Diabetes Care)
- 2017 Standards of Medical Care -- Foundations of Care
 - Evidence suggests there is not an ideal percentage of calories from carbohydrate, protein and fat for all people with diabetes.
 - Macronutrient distribution should be based on individualized assessment of current eating patterns, preferences, and metabolic goals.
 - A variety of eating patterns are acceptable for the management of diabetes. Personal preferences (tradition, culture, religion, health beliefs and goals, economics) and metabolic goals should be considered when recommending one eating pattern over another.
 - Substituting low-glycemic load foods for higher-glycemic load foods may modestly improve glycemic control.

Dietary Guidelines for Americans (DGA)

**DIETARY
GUIDELINES
FOR AMERICANS
2015-2020
EIGHTH EDITION**

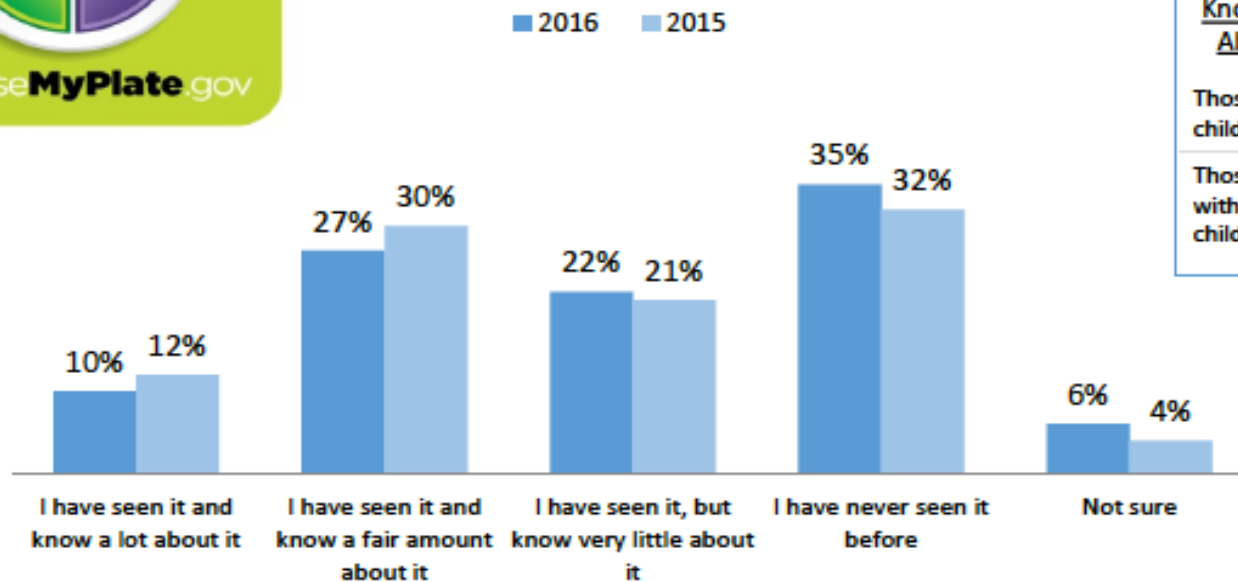
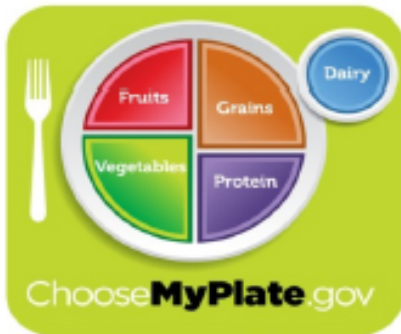


International Food and Information Council 2016 Survey

More than a third know at least a fair amount about the MyPlate graphic, although familiarity is down slightly from 2015.



How familiar are you, if at all, with the following graphic?



37% ↓

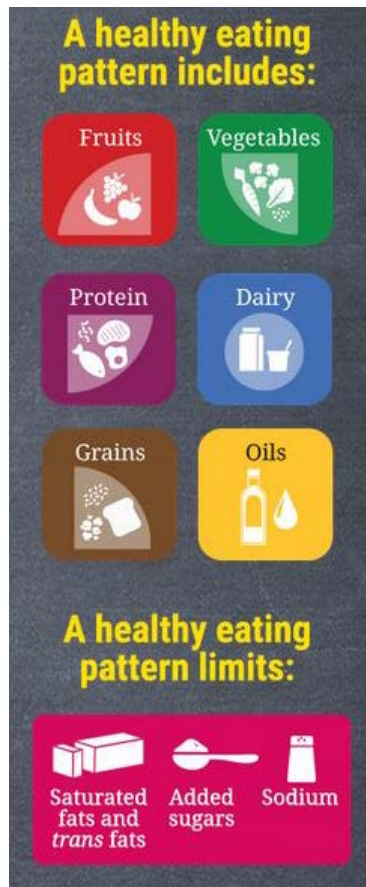
KNOW SOMETHING ABOUT MYPLATE GRAPHIC

Know Something About Graphic	
Those with children	49%
Those without children	33%

2016 n=1,003; 2015 n=1,007

Arrows indicate significant (.95 level) differences vs. 2015

Dietary Guidelines 2015-2020



- Follow a healthy eating pattern across the lifespan
- Focus on variety, nutrient density and amount.
- Limit calories from added sugars and saturated fats and reduce sodium intake
- Shift to healthier food and beverage choices
- Support healthy eating patterns for all.

DGA 2015

- Common elements of healthy eating patterns
 - Increased **fruits**
 - Increased **vegetables**
 - Many emphasize **whole grains**
 - Moderate amounts and a variety of foods high in protein
 - Limited amounts of foods high in added sugars
 - May include **more oils** than solid fats
 - Low in full-fat milk and dairy products
 - Wine is included at meals in some patterns
 - Higher unsaturated to saturated fatty acid ratio
 - Higher dietary fiber
 - Higher potassium
 - Lower in sodium

The best meal patterns follow includes:

- A. Reducing carbohydrates
- B. Eating very low fat
- C. Eliminating all sugars
- D. A variety of foods

The best meal patterns follow includes:

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DASH diet

- This plan recommends:
- Eating **vegetables, fruits, and whole grains**
- Including **fat-free or low-fat dairy products, fish, poultry, beans, nuts, and vegetable oils**
- **Limiting foods** that are high in saturated fat, such as **fatty meats, full-fat dairy products, and tropical oils** such as coconut, palm kernel, and palm oils
- **Limiting sugar-sweetened beverages and sweets.**
- **Limit alcohol**
- **Limiting added sodium -- <2300 mg/d**

DASH Diet – the evidence

- 20th anniversary of the landmark NEJM article showing its BP lowering effects
- Benefit for HTN is widely accepted
 - [Adv Nutr 2016](#)
 - Systematic Review – Dietary Patterns and BP in Adults
 - [Br J Nutr, 2015](#) – review
 - Effective strategy to reduce CV risk
- DM and metabolic syndrome/pre-diabetes
 - [J Clin HTN, 2017](#)
 - DASH+ walking in adults with T2D and HTN
 - Improved BP, but weight change was not significant
 - [Obesity Rev, 2016](#)
 - Good choice for weight mgmt

Why hasn't the DASH diet caught on?

- *Apr 4, 2017 -- Washington Post commentary*
- **Speculation:** if people are left to their own devices, they typically do not realize the resources available
- While the guide is very helpful, it DOES require explanation by a professional initially AND on an ongoing basis
- For DASH to work, patients will need guidance

DASH resources

- Wide variety of recipes
- Getting started guide
- Larger PDF guide on NHLBI website

- http://www.nhlbi.nih.gov/files/docs/public/heart/dash_brief.pdf

- https://www.nhlbi.nih.gov/files/docs/public/heart/new_dash.pdf

- <https://healthyeating.nhlbi.nih.gov/default.aspx>

- http://dashdiet.org/dash_diet_recipe_links.asp

Health Article

DASH DIET

Studies showed that following Dietary Approaches to Stop Hypertension (DASH) eating plan combined with low sodium intake (2300mg or 1500mg sodium per day) can significantly lower and prevent high blood pressure. DASH eating plan is a balanced and flexible diet that you can enjoy to follow. It is rich in potassium, magnesium and fiber while low in total fat, saturated fat and cholesterol.

Choose whole grains
Choose whole grain foods for at least two thirds of your grain servings to get more nutrients and fiber.
Compare whole grain products such as brown rice, whole wheat bread and oat, barley, cereal instead of white, bread, white rice, pasta.
You are encouraged to eat brown rice together with white rice if you are unable to tolerate brown rice alone.

5-8 Vegetables and fruits
5 servings of vegetables and 3 servings of fruits per day are required.
Eat dark green, leafy vegetables everyday and consume a variety of other vegetables such as carrots, melons, tomatoes, bell peppers, corn, mushrooms, cabbage and so on.
Enjoy salad with heart-healthy dressings, low-fat yogurt with fruits as a snack, or consume vegetable with rice in order to increase the intake of vegetables and fruits.

Choose low-fat dairy products
Choose low-fat over full-fat varieties when eating milk, yogurt, cheese, ice cream and other dairy products.
A serving of low-fat or non-fat dairy products can be the recommended amount.
Low-fat dairy products are significantly better for preventing, such as corn, corn paste, milk servings with butter.

ASH stands for Dietary Approaches to Stop Hypertension
Moderate hypertension, which simply means high blood pressure, is one of the major risk factors for heart disease, stroke and kidney failure. If you are one of the millions of Americans with hypertension by the age of 65, eating the DASH diet may help lower blood pressure within just two weeks.

DASH at a glance
The DASH eating plan is based on science and research, and encourages a variety of nutrients to help manage blood pressure. Check the chart to find the DASH recommended number of servings from each food group.

Instead of red meat, eat white meat
Instead of beef, lamb and pork, choose leaner varieties such as chicken, fish and tofu.
Choose lean meat, remove the visible fat and trim the fat to reduce fat.
Do not eat more than 4 eggs a week as egg yolk is high in cholesterol.
Only foods such as tuna, kidney beans are high in cholesterol and therefore should limit the intake of these foods.
Limit the intake of processed meats (bacon, bologna, ham, sausage) as they are high in saturated fat and trans fat.

Consuming 4 servings of nuts per week, also vegetable oils
Nuts such as peanut, sesame, almond or macadamia nut are rich in monounsaturated fatty acid, polyunsaturated fatty acid and or unsaturated oils in order to help manage blood pressure.
Spread nuts into salad or dress or eat directly.
Use vegetable oils such as canola oil and olive oil which are high in good fat instead of using animal oils such as butter, margarine which are high in saturated fat.

DASH Menu
* Foods that suffer from obesity, chronic kidney disease and gastrointestinal disease are not suitable for DASH diet.
** You are allergic to nuts, consume seed or legumes (such as lentils, peas) instead.
*** Foods with sodium intake are suggested to consume less than 1,500 mg sodium per day.
**** DASH eating plan is a high fiber diet. Therefore you are encouraged to increase vegetables, fruits and whole grain foods gradually to prevent bloating and diarrhea. Only a serving of fiber with your fiber to help ease the fiber through your digestive system.

www.dashdiet.com 1-800-485-7111

Nutrition file

DASH TO BETTER HEALTH

Dietary Approaches to Stop Hypertension

Food group	Daily servings	Examples of one serving	Are you getting enough?*
Vegetables	4-5	<ul style="list-style-type: none"> 1/2 cup of cooked or canned vegetables 200 g of raw leafy vegetables 1/2 cup of raw or cooked beans/vegetable past 	□ □ □ □ □
Fruit	4-5	<ul style="list-style-type: none"> 1/2 cup of fruit 1 medium apple 1/2 cup of 100% fruit juice 1/2 cup of frozen fruit 	□ □ □ □ □
Whole grain products	4-6	<ul style="list-style-type: none"> 1 slice of bread 1/2 cup of cooked rice or pasta 1/2 cup of cereal 1/2 cup of oatmeal 1/2 cup of whole wheat flour 	□ □ □ □ □
Low-fat milk products	2-3	<ul style="list-style-type: none"> 1/2 cup of milk 1/2 cup of yogurt 1/2 cup of cottage cheese 	□ □ □ □ □
Meat	4-6 oz	<ul style="list-style-type: none"> 3 oz of cooked lean meat, poultry or fish 1 egg 1/2 cup of tofu 	□ □ □ □ □
Nuts, seeds and legumes	4-5 servings	<ul style="list-style-type: none"> 1/4 cup of nuts 1/4 cup of seeds 1/2 cup of legumes 	□ □ □ □ □

* Compare your daily intake to the DASH way of eating. In the last column check a box for each food group serving you had. Are you getting enough? What changes do you need to make? Track your intake regularly to know how to succeed.

Get your way to a healthier blood pressure by making every meal a DASH diet meal. **Put your plate on the DASH diet on your plate with a serving of 4-6 oz milk products.**

1-800-485-7111

DASH diet

6-8 servings per day of whole grains

4-5 servings per day of vegetables

4-5 servings per day of fruits

2-3 servings per day of fat-free or low-fat dairy

4-5 servings per week of nuts, seeds, legumes

Less than 6 servings per day of lean meat, poultry, fish

Less than 5 servings per week of sweets

2-3 servings per day of fats and oils

Source: National Heart, Lung and Blood Institute

The DASH diet (Dietary Approaches to Stop Hypertension) has been shown to help lower blood pressure and prevent heart disease, stroke, diabetes and even some forms of cancer. It focuses on eating more fresh fruits and vegetables.

This is a guide to how much of each food group you should eat every day, based on eating 2,000 calories per day.

UKHealthCare, Gill Heart Institute

DASH- Dietary Approaches to Stop Hypertension

Recommended Servings From The Various Food Groups For A DASH Diet (For 1,600 Calories)

Food Group:	Daily Servings:
Whole Grains.....	6 ounces
Vegetables.....	3-4 1/2 cups
Fruits.....	4 1/2 cups
Low-fat/No-fat Milk.....	2-3 cups
Lean Meats, Fish or Poultry.....	3-6 ounces
Nuts, Seeds & Dried Beans.....	3 ounces per week
Oils.....	2 teaspoons
Sweets & Added Sugars.....	None

Mediterranean Diet -- diversities



Mediterranean Diet

Mediterranean Diet Pyramid



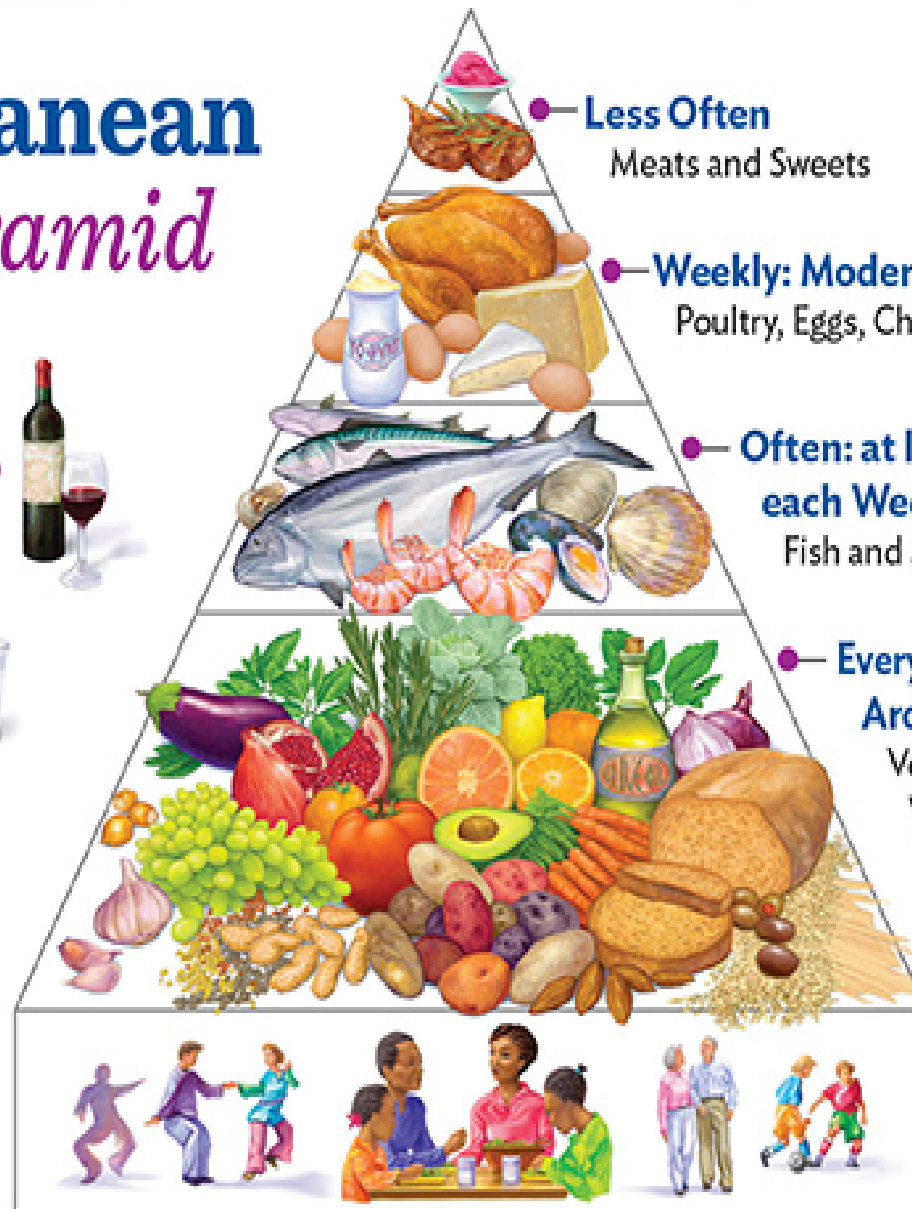
- An eating pattern practiced by **18 countries** that border the Mediterranean Sea
- Mediterranean Diet Pyramid created in 1993 by Oldways, Harvard School of Public Health, and the European Office of the WHO
- Meal plan components:
 - Increased fruits and vegetables, nuts/seeds, legumes, whole grains, olive oil, fish twice weekly
 - Increase fresh/locally grown food, increased herbs and spices
 - Minimize processed foods
 - Moderate intake of poultry, cheese, yogurt, eggs (<7/week), red wine
 - Reduced red meat (12-16 oz/month)
 - Decreased added sugar and saturated fat

Mediterranean Diet Pyramid

In Moderation
Wine



Every Day
Water



Less Often
Meats and Sweets

Weekly: Moderate Portions
Poultry, Eggs, Cheese and Yogurt

Often: at least Twice
each Week
Fish and Seafood

Every Day: Base Each Meal
Around these Foods
Vegetables, Fruits, Whole
Wheat Grains, Olive Oil,
Beans, Nuts, Legumes
and Seeds, Herbs
and Spices

Every Day
Be Physically Active;
Enjoy Meals with
Others

Illustration by George Mollinari

Pirámide de la Dieta Mediterránea: un estilo de vida actual

Guía para la población adulta

Medida de la ración basada en la frugalidad y hábitos locales



Vino con moderación y respetando las costumbres



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Edición 2010

r = Ración

Med Diet – the evidence

- PREDIMED (<http://www.predimed.es/publications.html> -- 2006 through 2016)
 - Ann Intern Med, 2006
 - 1st published paper re: PREDIMED
 - Short term effects of Med Diet vs low fat – 3 months
 - Med Diet with nuts and olives had beneficial effects on CV risk factors (LDL, BP, glucose)
 - NEJM, 2013
 - Primary prevention of CVD with Med Diet
 - 7447 participants randomized to Med Diet or low fat – 4.8 years
 - Med Diet with nuts and olive oil reduced CVD risk
 - The Lancet, Diabetes and Endo, 2016
 - 5 year trial, 11 hospitals in Spain
 - Comparing Med diet with olive oil, Med diet with nuts or low fat diet
 - unrestricted-calorie, high-vegetable-fat Med diet associated with:
 - decreases in body weight
 - less gain in central adiposity
- Med Diet and wt loss
 - Am J Med, 2016 – systematic review
 - Med diet showed similar wt loss as low-carb, low fat ADA recs

Med Diet – the evidence

- Adherence based on cultural differences
 - **Eur J Pub Health, 2015 – Med Diet changes in Greece and Cyprus**
 - Shift to a more westernized version of Med Diet since 50s and 60s but if still followed basic principles, it had a protective effect
 - **Eur J Nutr, 2015 – Med Diet in Switzerland**
 - Larger dairy food consumption
 - Did not have a negative impact in conjunction with Med Diet properties
 - Adherence to Med Diet with increased dairy had an inverse effect on mortality
 - **BMC Medicine, 2016 – Med Diet in non-Med population**
 - UK-based EPIC-Norfolk study -- >23,000 participants followed for >12 years
 - Greater adherence to the Mediterranean diet was associated with lower CVD incidence and mortality
 - **Curr Opin Clin Nutr Metab Care 2016 – Specific foods vs the diet concept**
 - The adequate transferability of the Med Diet to non-Mediterranean countries requires us to incorporate olive oil as the main source of fat

Med Diet – the evidence

- Nutr Res Reviews, 2016
 - Med Diet components can prevent metabolic syndrome
- Critical Rev Food Sci Nutr, 2016
 - Med Diet and DASH reduces risk of obesity, T2D, CV Dz, Asthma, Mental Health
- Intl J Obes, 2016
 - 3,397 women with h/o GDM followed for up to 20 years
 - Those who followed Med Diet and DASH had a reduced risk of wt gain and DM
- Am J Epid, 2016
 - Multiple diet patterns can reduce risk of T2D in women
- Curr Vasc Pharmacol, 2016
 - Review of diets on CV prevention
 - Med Diet – solid evidence
- Food and Nutr Res, 2016
 - Use of DASH and Med Diet in Middle East and Northern Africa can reduce CV disease

PREDIMED Plus: the next chapter – Is it diet alone or lifestyle?

- Assesses the effect of an intensive intervention with weight loss goals, based on the consumption of the Med diet, promotion of physical activity and behavioral therapy in the prevention of cardiovascular diseases
- 6,919 participants have been recruited in 22 centers and hospitals along with 7 support groups from all over Spain
- **Control group:** similar to that performed in PREDIMED-1
 - Med diet supplemented with extra virgin olive oil and nuts, without caloric restriction or promotion of physical activity or weight loss goals.
- **Intervention group:**
 - consumption of a hypocaloric Med diet (with a caloric restriction of 30%) supplemented with extra virgin olive oil and nuts
 - intensive lifestyle program with promotion of physical activity (45 minutes of walking a day or equivalent)
 - weight loss goals that include behavioral therapy.

Med Diet in US

- May 2016 – National Heart, Lung, and Blood Institute Workshop
 - In conjunction with Natl Cancer Institute and Office of Disease Prevention created a work group
 - “Toward testing the effects of a Med dietary pattern on CV and other diseases in the US”
 - How to conduct a lower cost study to test the effects of Med Diet
 - Are there foods that can be substituted? (Olive oil?)
 - Control group should be usual diet group not an active diet tx

Med Diet evidence -- CV, MetS, Cognition, Depression

Mediterranean Diet, Traditional Risk Factors, and the Rate
of Cardiovascular Complications After
Myocardial Infarction

Final Report of the Lyon Diet Heart Study
Circulation. 1999;99:779-785

Mediterranean Diet Inversely Associated With the Incidence of Metabolic Syndrome

The SUN prospective cohort *DIABETES CARE*, VOLUME 30, NUMBER 11, NOVEMBER 2007

**Mediterranean Diet and Incidence of and Mortality From
Coronary Heart Disease and Stroke in Women**

Circulation. 2009;119:1093-1100

Mediterranean Diet and Risk for Alzheimer's
Disease

Ann Neurol 2006;59:912-921

Reduction in the Incidence of Type 2 Diabetes With the Mediterranean Diet

Diabetes Care 34:14-19, 2011

Results of the PREDIMED-Reus nutrition intervention randomized trial

Association of the Mediterranean Dietary Pattern
With the Incidence of Depression

*The Seguimiento Universidad de Navarra/University of Navarra Follow-up
(SUN) Cohort*

Arch Gen Psychiatry. 2009;66(10):1090-1098

The NEW ENGLAND
JOURNAL of MEDICINE

ESTABLISHED IN 1812

APRIL 4, 2013

VOL. 368 NO. 14

Primary Prevention of Cardiovascular Disease
with a Mediterranean Diet

Mediterranean Diet and DM

Multiple studies highlighting benefits of Med diet and prevention

- **Br J Nutr, 2017 – Med Diet can reduce risk of T2D associated with obesity**
 - >18,000 people in Spain – followed for 9.5 years – those with an increased fruit, veg, whole grain, olive oil diet had reduced rate of T2D and obesity by 43%
- **J Nutr, 2016 – Strong support for use in DM and prevention**
- **BMJ Open, 2015 – Review of Mediterranean diet and T2D**
 - Associated with better glycemic control and CV risk factors
- **Br J Nutr, 2015 – Strong support of Med Diet**
 - Effect of macronutrients on glycemic control
 - Comparing low GI, Mediterranean, vegan
 - Weight loss: no one diet is superior – all had impact
- **Annals of Internal Medicine, 2014 – Prevention of DM with Med Diets**
 - 3,541 older adults at risk for heart disease – followed for 4 years, randomized to Mediterranean diet with olive oil or nuts vs. low fat diet
 - Mediterranean diet reduces risk of developing DM
- **Diabetologia, 2013 – Mediterranean and GL in relation to incidence of T2DM**
 - 22,295 participants actively followed for ~11 years
 - Those who followed low GL Med diet - 12% less likely to develop DM

TABLE 1. Outcomes From Implementation of the MEP in People With Diabetes

Study	Population/Study Duration (Completion Rate)	Interventions (Type of Study)	Reported Dietary Intake	Outcome
Toobert, 2003 (11)	<i>n</i> = 279 women with type 2 diabetes/ 6 months (88%)	MLP vs. UC (RCT)	Not reported	MLP vs. UC: A1C ↓ 0.4% vs. no change (SS); BMI ↓ 0.37 vs ↑ 0.2 kg/m ² (SS); lipids: NS changes
Esposito, 2009 (9)	<i>n</i> = 215 people with newly diagnosed type 2 diabetes/ 4 years (57%)	Low-CHO (<50% kcal) MEP vs. LF diet (<30% kcal); 1,500 kcal/day for women, 1,800 kcal/day for men (RCT)	MEP: CHO intake 41–44% kcal; LF: CHO intake 51–54% kcal	MEP vs. LF (4-year): A1C ↓ 0.9 vs. ↓ 0.5% (SS); ↑ insulin sensitivity, ↑ HDL-C, ↓ TG, all SS; diabetes medications 40 vs. 70%, SS; no weight difference
Ellhayany, 2010 (10)	<i>n</i> = 259 people with type 2 diabetes/ 12 months (75%)	Low-CHO (35% kcal) MEP vs. Trad MEP (50–55% CHO) vs. 2003 ADA (50% CHO); 20 kcal/kg (RCT)	Mean reported kcal similar (~2,300 kcal); CHO: ADA 45.4%, Trad 45.2%, Low-CHO 41.9%	Mean weight loss 8.3 kg (NS between groups); A1C: Low-CHO ↓ 2 vs. ADA ↓ 1.6% (SS); HDL ↑ 3.9 mg/dL (SS); TG and LDL-C: all SS ↓
Itsiopoulos, 2011 (12)	<i>n</i> = 27 people with type 2 diabetes/2 weeks on each diet (100%)	Ad libitum MEP vs. usual diet (crossover RCT)	Not reported	MEP: A1C ↓ from 7.1 to 6.8% (SS); NS difference in weight and lipids
Toobert, 2011 (13)	<i>n</i> = 280 Latina women with type 2 diabetes/ 24 months (61.4%)	MLP (cultural adaptation of program in Toobert, 2003 (11) vs. UC (RCT)	Not reported	MLP and UC: NS changes in A1C and CHD risk score

CHO, carbohydrate; HDL-C, HDL cholesterol; LDL-C, LDL cholesterol; LF, low fat; NS, nonsignificant; RCT, randomized clinical trial; SS, statistically significant; TG, triglycerides; Trad, traditional; UC, usual care.

14 Points of the Med Diet Score (MDS)

- 2 points Olive oil – use abundantly in cooking and dressings
- 1 point Vegetables -- At least 2-3 servings per day
- 1 point Fruits – At least 2-3 servings per day
- 1 point Beans – 3 or more servings per week
- 1 point Fish/seafood – 3 or more servings per week
- 1 point Nuts/seeds – at least 1 serving per week
- 1 point If you eat meat or poultry, choose lean or skinless
- 1 point pasta, rice or other dishes with a sauce of tomato, garlic, onion, leeks and olive oil (sofrito) – 2 or more servings per week
- 1 point If you drink alcohol, drink moderately
- 4 points Limit or eliminate – cream, butter, margarine, red meat, sugary beverages, premade desserts and baked goods, french fries, potato chips, cured or fatty cheeses

Alternative MDS – 9 Point System

- 1 point Vegetables – 3-5 servings/day
- 1 point Legumes – 4 or more servings/day
- 1 point Fruit -- 3 or more servings/day
- 1 point Nuts -- 4-5 servings/week
- 1 point Whole grains – 2-3 servings/day
- 1 point Fish – 2 or more servings/week
- 1 point MUFA/SFA ratio – 1.5:1 plant:animal
- 1 point Red/processed meats -- <2/week
- 1 point Red wine – F: <2-7 drinks/week
 M: <4-7 drinks/week

Med Diet and Socioeconomic Status

- [Int J Epidemiology 2017 \(doi:10.1093/ija/dyx145\)](#)
 - Prospective analysis of 18,991 M/F > age 35
 - Adherence to Med Diet using MDS
 - Over 4.3 years of f/u, 252 CVD events occurred
 - 2 point increase in MDS was associated with 15% reduced CVD risk
 - Higher income groups had CVD reductions

How to Use Med Diet in The Real World

- Replace butter and margarine with olive (or canola) oil
 - In cooking; dip bread in flavored olive oil; lightly spread olive oil on whole grain breads
 - Eat more skinless chicken and turkey, fish, beans, and nuts.
 - Eat fish twice per week
 - Tuna, salmon, trout, mackerel, herring
 - 3-5 servings veg/day
 - Choose whole grain breads, cereals, pastas, rice
 - Season meals with herbs and spices
 - Snack on nuts/seeds
 - Almonds, cashews, pistachios, walnuts – 1 OZ
 - Have fruit for dessert
 - Eat small portions of cheese (<1 oz)
 - Balance the meals – if you want to use a higher sodium item (feta)
 - make sure you are having lower sodium meals for the rest of the day

How to adhere to Med Diet on a Tight Budget

- Choose produce that is on sale
- Buy in-season fresh fruits and vegetables
- For ANY produce, DO NOT OVERCOOK
- Supplement with frozen vegetables and fruits
- Use canned fish
- Increase beans and legumes

12 Steps to Mediterranean Living

- Use **olive oil** as a substitute for butter and margarine.
- Snack on **nuts, seeds and fruit**, rather than processed snack foods.
- Include a generous variety of **fresh, local produce** (like leafy greens) with your daily main meal.
- Select **whole grain** breads, rice and pastas, along with other grains.
- Eat at least a few **vegetarian** meals each week.
- Serve dishes that include **legumes like beans and lentils**.
- Try fish, poultry, beans, nuts and eggs as **alternatives to red meat**.
- **Limit red meat** to small, occasional servings (a maximum of 12 to 16 ounces per month).
- If you drink **red wine**, include **no more than a glass or two daily** (1 for women, 2 for men).
- Enjoy **fresh fruit for dessert**.
- Set aside enough time to **savor and enjoy** each and every bite.
- Integrate **physical activity** to promote a healthy weight, fitness and sense of wellbeing into everyday habits.

Vegetables

Fresh veggies are important for weight control and good health. Frozen and low-sodium canned veggies are also good choices.

- Artichokes
- Beets
- Bell Peppers
- Broccoli
- Cabbage
- Carrots
- Eggplant
- Garlic
- Green Beans
- Leafy Greens
- Leeks
- Mushrooms
- Olives
- Onions
- Peas
- Squash
- Tomatoes (Fresh, Canned, Sauce)
- _____
- _____
- _____
- _____
- _____

Fruits

Fresh fruits are important for weight control and good health. Frozen and canned fruit without added sugars are also good choices.

- Apples
- Apricots
- Avocados
- Bananas
- Berries
- Cherries
- Dates
- Figs
- Grapes
- Lemons
- Melon
- Oranges
- Peaches
- Plums
- Pomegranates
- _____
- _____
- _____
- _____
- _____

Beans

Beans are a great way to add fiber and protein to a meal. Eat them in place of red meat at least once a week. If using canned, rinse and drain them before use to remove some of the sodium.

- Black Beans
- Chickpeas (Garbanzo)
- Hummus
- Lentils
- Pinto Beans
- White Beans (Cannellini)
- _____
- _____

Nuts and Seeds

Both are a great source of protein, fiber, and healthy fats. Stick to just a handful a day because they are high in calories.

- Almonds
- Cashews
- Flax
- Peanuts
- Pine Nuts
- Pumpkin Seeds (Pepitas)
- Sunflower Seeds
- Walnuts
- _____
- _____
- _____

Healthy Oils/Fats

Store oils in a cool, dark place to preserve their nutrients.

- Extra-Virgin Olive Oil
- Avocado Oil
- Canola Oil
- Grape Seed Oil
- _____
- _____

Grains

Choose mostly whole-grain products, specifically those with the word "whole" as the first ingredient, e.g. "whole wheat."

- Barley
- Bread (e.g. Loaf, Pita)
- Bulgur
- Couscous
- Oatmeal
- Pasta
- Polenta
- Quinoa
- Rice
- _____
- _____

Seafood

White fish is a great lean protein. Oily fish like salmon contain healthy omega-3s.

- Clams
- Cod
- Crab
- Salmon
- Scallops
- Shrimp
- Tilapia
- Tuna
- _____
- _____

Herbs and Spices

Herbs and spices add great flavor without extra fat or salt.

- | | |
|-------------------------------------|-----------------------------------|
| <input type="checkbox"/> Basil | <input type="checkbox"/> Sage |
| <input type="checkbox"/> Bay Leaves | <input type="checkbox"/> Tarragon |
| <input type="checkbox"/> Chiles | <input type="checkbox"/> Thyme |
| <input type="checkbox"/> Cilantro | <input type="checkbox"/> Oregano |
| <input type="checkbox"/> Coriander | <input type="checkbox"/> Pepper |
| <input type="checkbox"/> Cumin | <input type="checkbox"/> _____ |
| <input type="checkbox"/> Mint | <input type="checkbox"/> _____ |
| <input type="checkbox"/> Parsley | <input type="checkbox"/> _____ |
| <input type="checkbox"/> Rosemary | <input type="checkbox"/> _____ |

Dairy/Eggs

Choose real traditional cheese, not processed cheese foods, and enjoy in moderation.

- Cheese
- Low-Fat Milk
- Plain or Greek Yogurt
- Eggs
- _____

Educational Handouts on Med Diet

GRAPES from California

Make It Mediterranean

For thousands of year, modern kitchens, juicy more colorful and flav

MAKE YOUR MEALS MEDITERRANEAN

What is the Mediterranean diet? Fresh, flavorful food. The Mediterranean diet is not a prescribed "diet" in the usual sense, but rather an approach to eating, where fruits and vegetables, whole grains, legumes, nuts and seeds and healthy fats such as olive are to be enjoyed at every meal. Fish and shellfish are included. "Seafood" foods. Of equal importance is that eating traditional foods from a physically active and enjoying.

Salute!
Get inspired by the Mediterranean diet.
Boost your fruits and veggies your plate at lunch and dinner.
Feed in omega-3s. Fatty fish, salmon and sardines are rich in omega-3s, which are beneficial for heart health. Swap your regular fish for salmon or sardines.
Focus on good fats. Extra-virgin olive oil, nuts, seeds and avocados are sources of fat in a Mediterranean diet. Use these in place of – not in addition to – butter, margarine and oil.

ORIGINAL: SPAGHETTI and bread



ORI 16-cup pot

Original 1 Saturated Fiber: 6g

ORI Sats Fibe



OLDWAYS HEALTH THROUGH HERITAGE

12 Great Ways to Use...

Healthful Eating, Mediterranean Style

What You Can Learn From This Handout...
Mediterranean style food choices... benefits of Mediterranean style eating... tips for healthful eating

High amounts of olive oil, fruits, nuts, legumes, seeds, vegetables, beans, grains (such as bread, pasta, and rice) and herbs and spices.

- Bring chop roast
- Serve olive
- Use oil fish, s
- Drizzle
- Four small with heart
- Toast them a crisp appet
- Roast mash
- Comb beans
- Serve favor

The Mediterranean Diet

Based on how people eat and drink in the 16 countries that border the Mediterranean Sea, this healthy eating plan can reduce your risk of developing heart disease, cancer, high blood pressure, type 2 diabetes, Parkinson's disease, and Alzheimer's disease.

- Natural:** Focus on minimally processed — less than 5 ingredients in any product.
- Flexible:** Plan for variety — eat different foods each week to make this diet work for your family.
- Lower Cost:** Save money by buying less red meat, refined grain, fast food each month.
- A Healthy Lifestyle:** Be fit and active to reduce your risk of disease, and have fun!



Be Active: Exercise at least 150 minutes a week (walking, swimming, bicycling).



Choose fresh fruit for dessert or snacks

Flavor your food with herbs, garlic, onions and olive oil

Making the Move to the Mediterranean Diet

- Clean out your pantry! Remove any highly processed foods. Focus on real, whole grains with this new pantry. Try fruit instead of sweets for dessert.
- Shop up! Add more beans and eggs to your weekly meal (see Sample Bagel). Use olive oil, herbs, and spices for flavor instead of salt and butter. Drink water for lunch instead of soda.
- Start using grain bread from 100% of the time. Cook a handful of nuts or heart for a snack.
- Limit your dairy to low-fat milk, yogurt, and cheese. Prefer brown rice and whole-grain bread.



Canned Foods Help Close Nutrient Gaps

Spotlight: Healthy Mediterranean-Style Eating Pattern

The typical American diet falls short of several key nutrients — 10 of them to be exact — while often exceeding recommended amounts of saturated fats, added sugars, sodium and total calories.

Menu modeling analysis* shows how canned fruits, vegetables, beans and lean meats/wheat can fit into the three dietary eating patterns spotlighted in the 2025 Dietary Guidelines for Americans — U.S.-style, Mediterranean and Vegetarian — to offer an easy and affordable way to close nutrient gaps.



	Typical American Diet	Shortfall Nutrients Increased	Suggested Meal
Breakfast	<ul style="list-style-type: none"> 2 medium bananas 2 slices whole toast 1 cup panned butter Coffee with 1/2 cup 2% milk 	<p>45% increase in Fiber</p>	<ul style="list-style-type: none"> 2 eggs, scrambled 1 slice whole-wheat toast 1 cup panned superior beans 1 cup water
Lunch	<ul style="list-style-type: none"> 2 oz. grilled chicken 2 oz. tortilla 1 cup romaine lettuce 1/2 cup sliced cucumber 2 slices tomato 1 cup water 	<p>82% increase in Calcium</p>	<ul style="list-style-type: none"> 3 oz. Tuna (increased in water) 1 slice whole-grain bread 1 cup spinach 2 tbsp. mayonnaise 1 cup chopped celery 1 cup water
Snack	<ul style="list-style-type: none"> 1/2 cup pretzels 1 tsp. hummus 1 cup low-fat milk 	<p>95% increase in Vitamin C</p>	<ul style="list-style-type: none"> 2 tbsp. hummus 1/2 whole wheat cracker 1 cup canned pears 1 cup low-fat milk
Dinner	<ul style="list-style-type: none"> 2 oz. ground turkey 1/2 cup spaghetti 1 medium dinner roll 1 medium baked potato 1/2 cup chocolate pudding 1 cup low-fat milk 	<p>98% increase in Iron</p>	<ul style="list-style-type: none"> 3 oz. salmon 1/2 cup brown rice 1/2 cup canned chickpeas 1 whole-wheat dinner roll 1/2 cup shredded cheddar cheese 1 cup canned beans 1 cup low-fat milk

*Analysis conducted by National Register of Dietitians, July 1-31, 2024. Based on a 2,000-calorie diet. All nutrient percentages are per 100g unless otherwise noted.

The Canned Food Alliance, a National Organic Partner of the U.S. Department of Agriculture and Promotes, is a coalition of manufacturers, processors and distributors. For more information about national food research, visit www.cannedfoods.org.



Brought to you by Oldways
Always a nutritious food and a nutrition education organization with a mission to help people to good health through heritage.

Make Each Day Mediterranean, an Oldways/Mediterranean Foods Alliance education campaign, has been designed specifically to introduce you to the remarkable health benefits, fresh flavors and taste, and affordability of eating the Mediterranean way.

Developed by Oldways, you deserve leadership with the Mediterranean Diet, this is to include bananas, reference materials, plus a number of free materials you can download and share with others. Eat Your Way to Health!



CHOOSE Non-Fat & Low-Fat Dairy Products

A couple times a month, add roast beef, lamb chop, or pork tenderloin and barley for your half plate of vegetables. For a treat, try fruit-based desserts like a low-sugar cobble or berries with beneficial toppings.

Variety in Med Diet, Depending upon country

- **Italy** -- pulses in vegetable soups: pasta e fagioli (bean and pasta) and minestrone
- **France** -- white beans -- main ingredient of cassoulet (soup with duck or pork)
- Fasolada, a white bean soup, is the national dish of both **Greece and Cyprus**, while the **Turkish** equivalent, kuru fasulye, is the national dish of Turkey.
- Hummus, a creamy dip made with chickpeas and tahini (sesame paste), has **Arab roots** but is now revered throughout the Eastern Mediterranean and beyond.
- Chickpeas also can be ground with spices and shaped into balls or patties to make falafel, a delicious **Middle Eastern** street food.
- Moudammas is a cooked fava bean dish popular in **Middle Eastern** cuisine, while favas also play a significant role in Italian cooking (both in pasta dishes and vegetable sides).
- Lentils can be puréed with spices to make mujaddara, a **Middle Eastern** hummus-like dip.
- In **Tuscany**, lentils are cooked with pork sausage and are a staple of the New Year's Day meal, as lentils symbolize good luck and prosperity in **Italy** due to their coin-like shape.

Med Diet resources

- <https://oldwayspt.org/traditional-diets/mediterranean-diet/mediterranean-diet-resources>
- <http://oldwayspt.org/mediterranean-diet-pyramid>
- <https://oldwayspt.org/shopping-and-cooking-resources>
- <http://www.med-diet.eu/P42A0C0S884/Resources.htm>
- <http://www.diabetes.org/mfa-recipes/meal-plans/mediterranean-meal-plan.html?referrer=https://www.google.com/>
- <https://www.nhlbi.nih.gov/research/reports/national-heart-lung-and-blood-institute-workshop-toward-testing-effects-mediterranean-dietary>

The Mediterranean Diet should include:

- A. Less fruit
- B. More nuts
- C. More dairy
- D. Whatever you would like to eat!

The Mediterranean Diet should include:

- A. Less fruit
- B. More nuts
- C. More dairy
- D. Whatever you would like to eat!

Summary

- New diet plans are introduced on a frequent basis
 - Our role as diabetes educators is to help our patients navigate their benefits and which one would be right for each individual
- There are a variety of meal plan options available for people with diabetes
- No one plan will be best for everyone
 - Using components of certain diets may be the best first step for some PWD
- Individualizing is key to sticking to a plan
 - Also, need to realize that if it does not work, there are others that may be beneficial
 - The best diet for any one person is the one they will continue to follow
 - Success is dictated by a gradual shift toward healthier eating habits
- As diabetes educators, it is our role to help our patients navigate the meal plans available and help them choose the one (or several) that may fit into their lives
- The Mediterranean Diet is a proven meal plan that can reduce risk of CVD, pre-DM regardless of geographic location with a plethora of resources to use

Additional Resources

- DGA 2015-2020 should be a staple resource for everyone
 - [https://health.gov/dietaryguidelines/2015/resources/2015-2020 Dietary Guidelines.pdf](https://health.gov/dietaryguidelines/2015/resources/2015-2020_Dietary_Guidelines.pdf)
- MyPlate resources for all ages
 - <https://www.choosemyplate.gov>
 - Find a plate visual from the hundreds online to use with your patients
- DASH
 - http://www.nhlbi.nih.gov/files/docs/public/heart/dash_brief.pdf
 - https://www.nhlbi.nih.gov/files/docs/public/heart/new_dash.pdf
 - <https://healthyeating.nhlbi.nih.gov/default.aspx>

Additional Resources

- Use the approaches and tools in the AHA statement

- <http://circ.ahajournals.org/content/134/22/e505.long>
- 2 day sample menu

Appendix 7. Healthcare Providers' Guide to Dietary Assessment and Counseling

1. Assess current diet/eating behavior (see Table 6 for assessment tools)
2. Calculate BMI and energy needs based on goals: weight loss, weight maintenance (see http://www.heart.org/HEARTORG/HealthyLiving/WeightManagement/BodyMassIndex/Body-Mass-Index-In-Adults-BMI-Calculator-for-Adults_UCM_307849_Article.jsp#)
3. Use Super Tracker and/or other tools (http://www.choosemyplate.gov/supertracker-tools/supertracker.html)
4. Discuss calorie-based AHA diet recommendations (see Table 2)
5. Discuss recommended physical activity levels
6. Using motivational interviewing techniques, encourage patient/client to set realistic goals for diet and physical activity adherence
7. Encourage patient/client to choose a self-monitoring plan
8. Set date for follow-up

Appendix 8. Dining Out Checklist

Eating out can be challenging when trying to follow a heart-healthy diet. Here are some suggestions to help you stay on track:
<ul style="list-style-type: none">• Call ahead or go online to check out the menu of a restaurant you wish to consider
<ul style="list-style-type: none">• Review dietary changes with wait staff (eg, broiled, baked, not fried)
<ul style="list-style-type: none">• One serving of meat/chicken should be about the size of a deck of cards; a baked potato serving is about the size of a computer mouse; 1 cup is about the size of a baseball; 1 tsp is about the size of your thumb
<ul style="list-style-type: none">• Consider what you would do if cooking this at home (remove butter sauce, use olive oil, add fresh lemon)
<ul style="list-style-type: none">• Send back anything that is not what you requested (too salty? butter added?)
<ul style="list-style-type: none">• Watch out for salads that sound healthy but include bacon, cheese, fried tortilla strips, or high-fat calorie dressing
<ul style="list-style-type: none">• If all else fails, request a vegetable plate with all the vegetables they are serving that day

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