
بسم الله الرحمن الرحيم

DASH Diet & Mediterranean Diet

Hanieh Malmir, PhD by research student

Nutrition and Endocrine Research Center

Research Institute for Endocrine Sciences

Shahid Beheshti University of Medical Sciences

Autumn 1403


DASH
diet

Dietary Approaches to Stop Hypertension (DASH diet)

- **What is the DASH Diet?**
  - **Goal:** A dietary plan designed to lower blood pressure.
  - **Origin:** Developed through research by the National Institutes of Health (NIH).
  - **Core component:** Emphasizes fruits, vegetables, whole grains, and low-fat dairy, while limiting sodium and saturated fat.

Challa HJ, Ameer MA, Uppaluri KR. DASH Diet To Stop Hypertension. 2023

DASH Diet Recognition and Effectiveness

- U.S. Department of Agriculture: Recommended as one of three healthy diets in the 2015–20 U.S. Dietary Guidelines
- The American Heart Association : Demonstrated effectiveness across diverse groups “specific and well-documented across age, sex and ethnically diverse groups.“
- Results:
  - “Pre-hypertension“ → Reduced systolic blood pressure: 6 mm Hg; Reduced diastolic blood pressure: 3 mm Hg
  - “Hypertension” → Reduced systolic blood pressure: 11 mm Hg; Reduced diastolic blood pressure: 6 mm Hg

Van Horn L. Et al. Circulation. 2016

DASH Diet Goals and key Nutrients

- **Main Objective:**
  - To reduce high blood pressure (hypertension).
  - Helps in reducing cholesterol and promoting heart health.

- **Key Nutrients:**
  - High in potassium, magnesium, calcium, fiber.
  - Low in sodium and saturated fats.

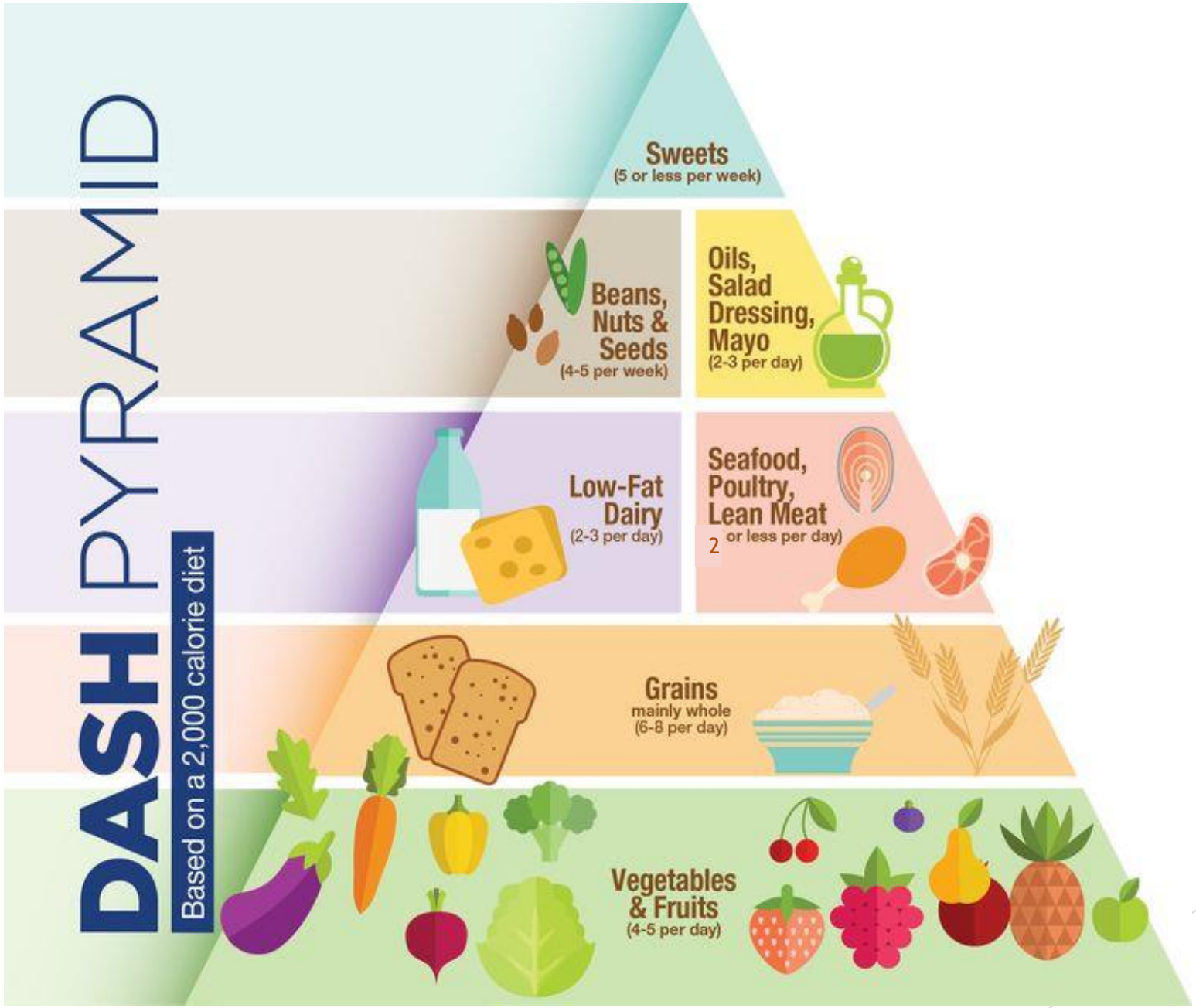
Van Horn L. Et al. Circulation. 2016

DASH Diet: Daily Serving Recommendations

- **Fruits:** 4-5 servings per day.
- **Vegetables:** 4-5 servings per day.
- **Whole Grains:** 6-8 servings per day.
- **Low-fat Dairy:** 2-3 servings per day.
- **Lean Protein:** 2 or fewer servings per day (lean meats, fish).
- **Sodium Limit:** Less than 2,300 mg per day (ideally 1,500 mg for more impact).

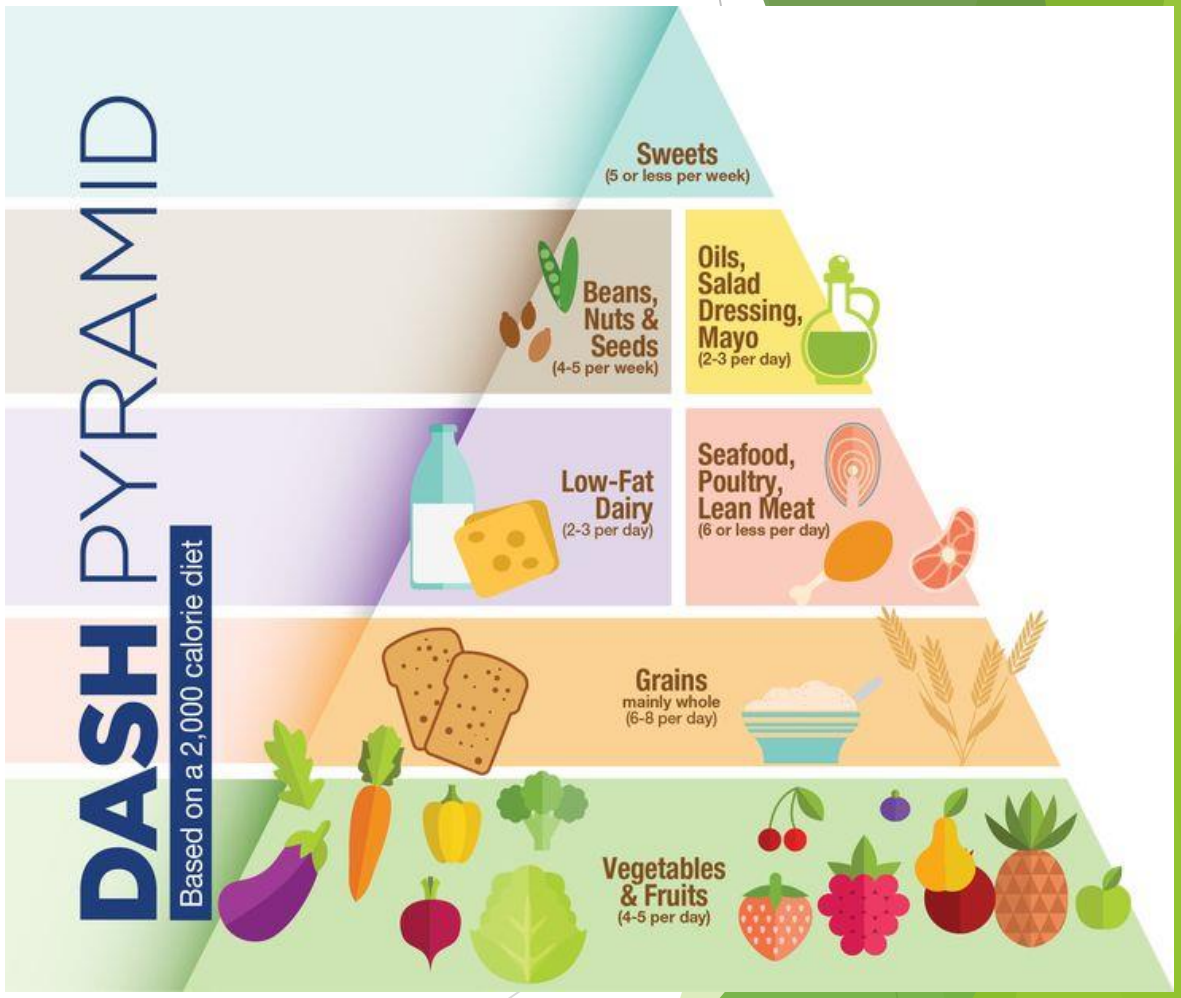
- **Nuts, Seeds, Legumes:** 4-5 servings per week.
- **Sweets:** <5 servings per week.

https://www.nhlbi.nih.gov/education/dash-eating-plan


DASH PYRAMID
Based on a 2,000 calorie diet
Sweets
(5 or less per week)
Beans, Nuts & Seeds
(4-5 per week)
Oils, Salad Dressing, Mayo
(2-3 per day)
Low-Fat Dairy
(2-3 per day)
Seafood, Poultry, Lean Meat
or less per day)
2
Grains
mainly whole
(6-8 per day)
Vegetables & Fruits
(4-5 per day)

DASH Diet Nutritional Composition

- Carbohydrate: 55%
- Total Fat: 27% (Saturated Fat: 6%)
- Fiber: 30 gr
- Cholesterol: 150 mg
- Sodium: 2300 mg
- **Key Minerals:**
  - Potassium: 4700 mg
  - Calcium: 1250 mg
  - Magnesium: 500 mg



https://www.nhlbi.nih.gov/education/dash-eating-plan

DASH Diet: Clinical Studies Overview

- DASH Study (1994-1997)
- A multi-center, randomized, Clinical trials
- Aim: Control hypertension without medicine
- Participants: 459 adults, SBP<160 mmHg, DBP= 80-95 mmHg
- Interventions
  - 3 weeks run in period: 37% fat, low in fruit, vegetables and dairy
  - 8 weeks intervention:
    - 1-Control
    - 2- High fruit and vegetable → Reduced SBP=2.8 mmHg & DBP=1.1 mmHg
    - 3- High fruit, vegetable and low fat dairy → Reduced SBP=5.5 mmHg & DBP=3 mmHg

Conlin PR. Cardiol Rev. 1999 Sep-Oct;7(5):284-8.

DASH Diet: Clinical Studies Overview

- DASH-Sodium Study
- Aim: Assess impact of varied sodium levels on BP.
- Participants: 412 adults, SBP=120-159 mmHg, DBP=80-95 mmHg
- 3 month intervention:
  - 1- Control diet + 3 level of sodium intake each 30 days

    (3.5 gr/ 2.3 gr/ 1.2 gr)

  - 2- DASH diet+ 3 level of sodium intake each 30 days

    (3.5 gr/ 2.3 gr/ 1.2 gr)
- Results: Lower sodium combined with DASH diet had the most significant BP reduction.

Svetkey LP, et al. J Clin Hypertens (Greenwich). 2004 Jul;6(7):373-81

DASH Diet: Clinical Studies Overview

- OmniHeart Study
- Aim: Examine effects of DASH diet with modified macronutrient ratios
- Participants: 164 adults, SBP=120-159 mmHg, DBP=80-95 mmHg
- Results: Improved cholesterol and triglyceride levels, with higher protein/unsaturated fat versions showing best results.

	Carbohydrate Diet	Protein Diet	Unsaturated Diet
Carbohydrate (% kcal)	**58**	48	48
Protein (% kcal)	15	**25**	15
Fat (% kcal)	27	27	**37**
Monounsaturated (% kcal)	13	13	**21**
Polyunsaturated (% kcal)	8	8	10
Saturated (% kcal)	6	6	6

Kovell, et al. International Journal of Cardiology. 2019

Benefits of the DASH Diet

- **Health Outcomes:**
  - Lowers systolic and diastolic blood pressure.
  - Reduces LDL cholesterol
  - Reduces risk of heart disease, stroke, and kidney disease.
  - Can also aid in weight loss and diabetes management.

https://www.healthline.com/nutrition/dash-diet

DASH Diet and Insulin Sensitivity

- The DASH diet positively impacts insulin sensitivity, a critical factor in diabetes prevention, through its nutrient profile:
  - **Low Sodium**: Reducing sodium helps mitigate insulin resistance by enhancing blood vessel function and reducing vascular strain.
  - **High Fiber and Low Glycemic Load**: Fiber-rich foods help to slow glucose absorption, stabilize blood sugar, and improve insulin response.
  - **Antioxidants and Anti-inflammatory Nutrients**: Fruits, vegetables, and whole grains contain bioactive compounds that reduce oxidative stress, a contributor to insulin resistance.

Campbell A. F R O M R E S E A R C H T O P R A C T I C E; 2017.

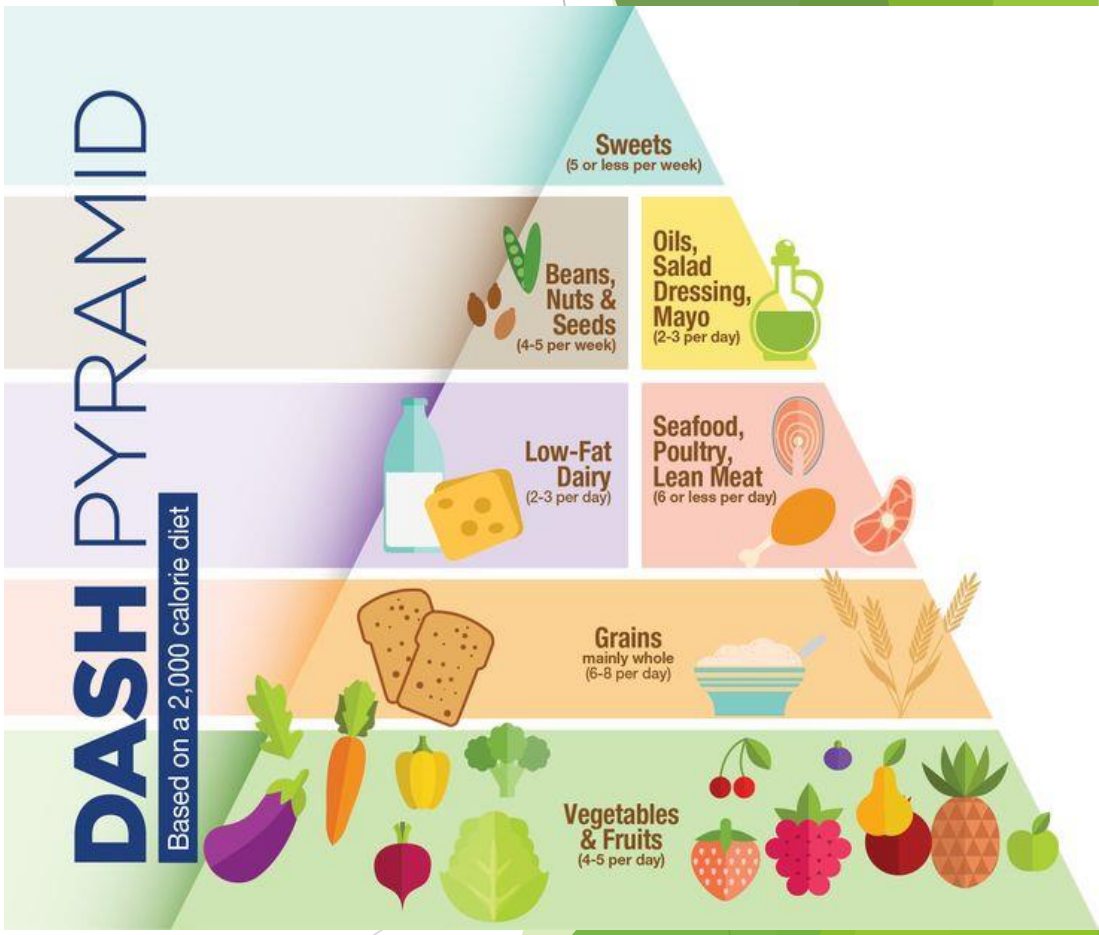
DASH Diet for Diabetes Management

- **Insulin Sensitivity:** Nutrients like potassium, magnesium, and fiber play roles in improving insulin function.
- **Glycemic Control:** The diet's emphasis on complex carbohydrates (whole grains, vegetables) and low glycemic index foods helps regulate blood glucose levels.
- **Weight Management:** Supports weight loss and abdominal fat reduction, which are important for managing insulin resistance.

Campbell A. F R O M R E S E A R C H T O P R A C T I C E; 2017.

Practical Tips for Implementing the DASH Diet

- **Tips for Success:**
  - Gradually reduce sodium by choosing low-sodium versions of foods.
  - Incorporate fruits and vegetables into every meal.
  - Choose whole grains instead of refined grains.
  - Use herbs and spices instead of salt for seasoning.
  - Prepare meals at home to control ingredients.



Different DASH diet score

- **Dixon, 2007:** 7 food groups, saturated fat, and alcohol
- **Mellen, 2008**: 9 nutrients
- **Fung, 2008:** 7 food groups and sodium
- **Gu¨nther, 2009:** 8 food groups

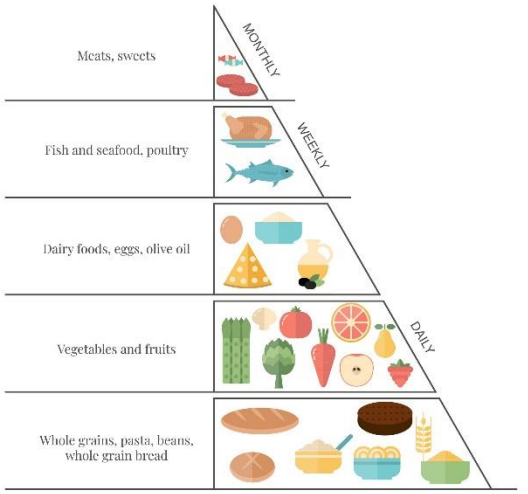
Miller et al. Am J Clin Nutr 2013

Individual components	Dixon's DASH index[2]	Mellen's DASH index[3]	Fung's DASH index[4]	Günther's DASH index[5,6]
	Sex-specific (men/women)	Same standards for men and women	Sex-specific	Standards based on sex, age, and activity level
Dietary components for which greater intakes receive higher scores				
Total fruit	≥4 servings/d[7]	—	Fifth quintile	≥4 servings/d[7]
Total vegetables	≥4/≥3 servings/d[7,8]	—	—	≥4 servings/d[7]
Vegetables without potatoes	—	—	Fifth quintile	
Total grains	—	—	—	≥6 servings/d[7]
Whole grains	≥4.7/≥4 servings/d[7,8]	—	Fifth quintile	—
High-fiber grains	—	—	—	≥50% of total grain servings/d[7,9]
Total dairy products	≥2 servings/d[7]	—	—	≥2 servings/d[7]
Low-fat dairy products	—	—	Fifth quintile	≥75% of total dairy servings/d[7,9]
Nuts, seeds, legumes	≥4/≥3 servings/d[7]	—	Fifth quintile	≥4 servings/wk[7]
Protein	—	≥18% of total daily kcal	—	—
Fiber	—	≥14.8 g/1000 kcal per day	—	—
Magnesium	—	≥238 mg/1000 kcal per day	—	—
Calcium	—	≥590 mg/1000 kcal per day	—	—
Potassium	—	≥2238 mg/1000 kcal per day	—	—
Dietary components for which lower intakes receive higher scores				
Meat/meat equivalents	<6 oz (170 g)/d[7]	—	—	—
Meat, poultry, fish, eggs	—	—	—	≤2 servings/d[7]
Red and processed meat	—	—	First quintile	—
Sugar-sweetened beverages	—	—	First quintile	—
Sweets				≤5 servings/wk[7]


Mediterranean
Diet

What is the Mediterranean Diet?

- **Definition:** A dietary pattern inspired by traditional eating habits of Mediterranean regions, particularly Greece and Italy
- **Core Focus:** High consumption of plant-based foods, lean protein, and healthy fats.
- **Key Emphasis:** Promotes heart health and longevity.

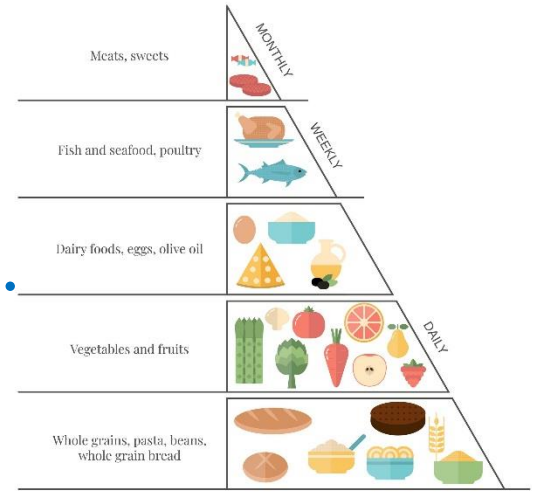


Mediterranean Diet

Trichopoulou A, et al. BMC Med. 2014 Jul 24;12:112.

Mediterranean diet history

- Formulated in the early1960s; the French paradox
- Firstly invented in 1975 by the American biologist Ancel Keys and chemist Margaret Keys
- The most commonly understood version of the Mediterranean diet was presented by, Walter Willett and colleagues of the Harvard University School of Public Health since the mid-1990s.



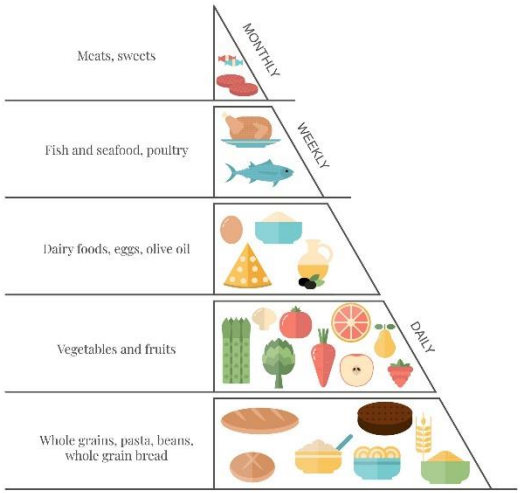
Mediterranean Diet

Lăcătuşu CM, et al. Int J Environ Res Public Health. 2019 Mar 15;16(6):942.

Mediterranean Diet Recognition and Effectiveness

- The Mediterranean diet is one of three healthy diets recommended in the 2015–2020 Dietary Guidelines for Americans, along with the DASH diet and vegetarian diet.

- Since about 2016, the American Heart Association and American Diabetes Association have recommended the Mediterranean diet as a healthy dietary pattern that may reduce the risk of cardiovascular diseases and type 2 diabetes, respectively

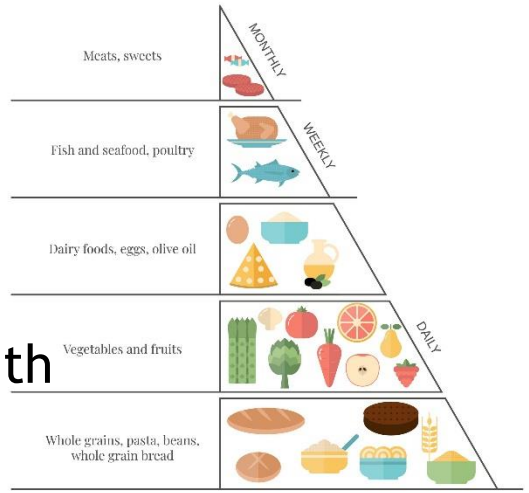


Mediterranean Diet

Lăcătuşu CM, et al. Int J Environ Res Public Health. 2019 Mar 15;16(6):942.

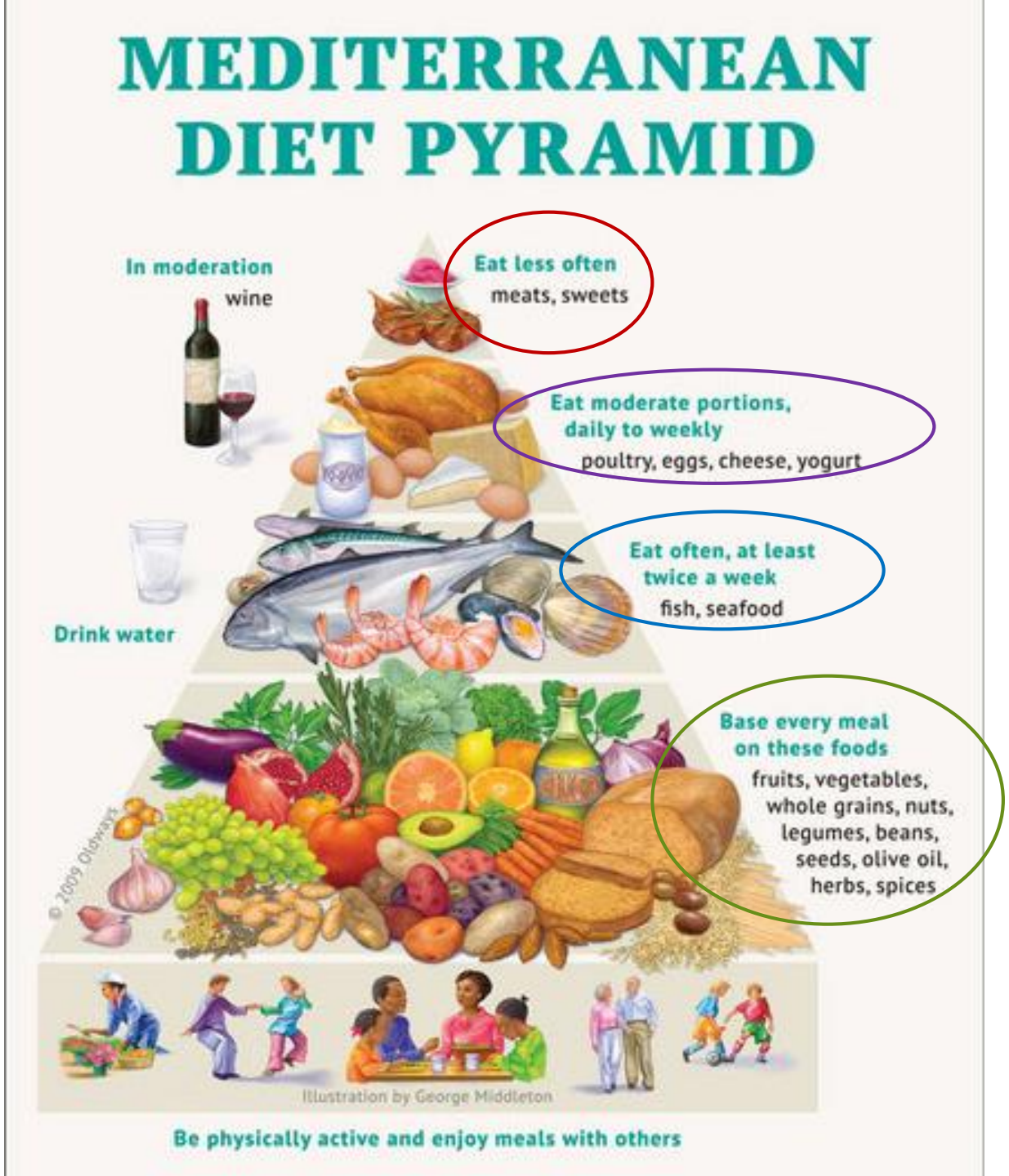
Key Components of the Mediterranean Diet

- **Fruits & Vegetables**: High intake (especially leafy greens, tomatoes, and citrus).
- **Whole Grains**: Frequent inclusion of barley, oats, whole-wheat products.
- **Healthy Fats**: Primary source is olive oil; other sources include avocados, nuts.
- **Protein Sources**:
  - **Fish**: Rich in omega-3 (e.g., salmon, sardines) consumed at least twice a week.
  - **Poultry & Eggs**: Moderate amounts.
  - **Red Meat**: Limited intake, often substituted with plant proteins.
  - **Legumes & Nuts**: Significant source of plant protein.
- **Dairy**: Moderate amounts, primarily as yogurt and cheese.
- **Beverages**: Water as primary hydration source; wine in moderation, often with meals.



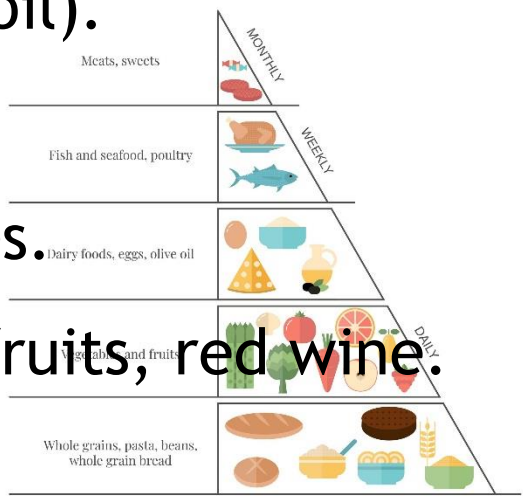
Mediterranean Diet

Widmer RJ, et al. Am J Med. 2015 Mar;128(3):229-38.


MEDITERRANEAN DIET PYRAMID
In moderation
wine
Eat less often
meats, sweets
Eat moderate portions, daily to weekly
poultry, eggs, cheese, yogurt
Eat often, at least twice a week
fish, seafood
Drink water
Base every meal on these foods
fruits, vegetables, whole grains, nuts, legumes, beans, seeds, olive oil, herbs, spices
© 2009 Oldways
Illustration by George Middleton
Be physically active and enjoy meals with others

Nutritional Composition of the Mediterranean Diet

- **Carbohydrates**: 50–60% (mainly complex, from whole grains, fruits, vegetables).
- **Fats**: 25–35% (primarily monounsaturated, especially from olive oil).
- **Protein**: ~15–20% (from plant sources, fish, moderate dairy).
- **Fiber**: High intake from fruits, vegetables, whole grains, legumes.
- **Antioxidants**: Rich in polyphenols, flavonoids from vegetables, fruits, red wine.



Mediterranean Diet

Widmer RJ, et al. Am J Med. 2015 Mar;128(3):229-38.

Health Benefits of the Mediterranean Diet

- **Cardiovascular Health:**

  Lowers risk of heart disease by reducing LDL cholesterol and inflammation.

  Associated with lower blood pressure.

- **Cognitive Benefits:**

  Linked to reduced risk of cognitive decline and Alzheimer's disease.

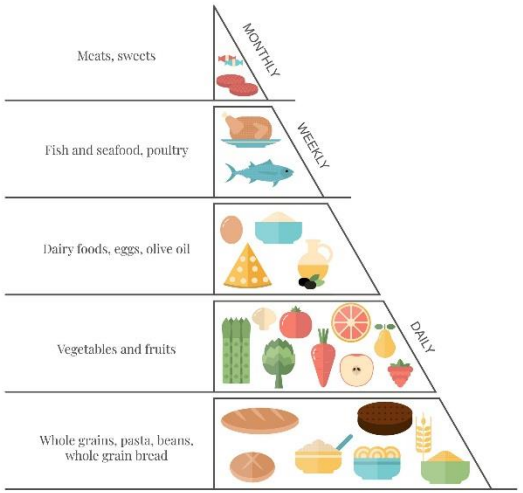
- **Diabetes Management:**

  Supports better blood sugar control due to high fiber and low glycemic load.

- **Other Benefits:**

  Promotes weight management.

  Associated with reduced risk of certain cancers.

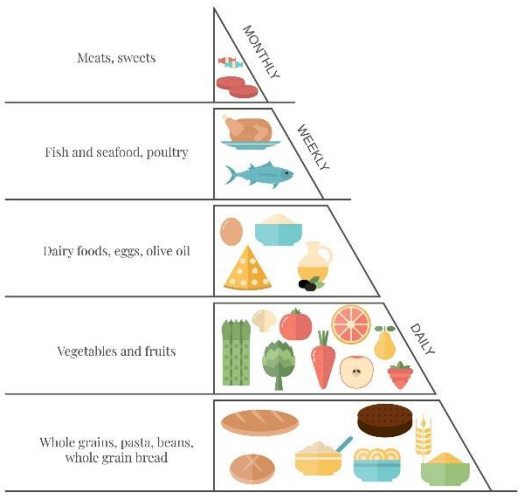


Mediterranean Diet

Tosti V, et al. J Gerontol A Biol Sci Med Sci. 2018 Mar 2;73(3):318-326.

Scientific Evidence Supporting the Mediterranean Diet

- PREDIMED Study
- **Objective**: Assess cardiovascular effects of the Mediterranean diet supplemented with olive oil or nuts.
- **Participants**: 7,447 adults 55 to 80 years at high cardiovascular risk.
- **Intervention:**
  - a Mediterranean diet + extra-virgin olive oil
  - a Mediterranean diet + mixed nuts
  - a control diet (advice to reduce dietary fat)
- **Results**: Reduced incidence of major cardiovascular events by 30%.

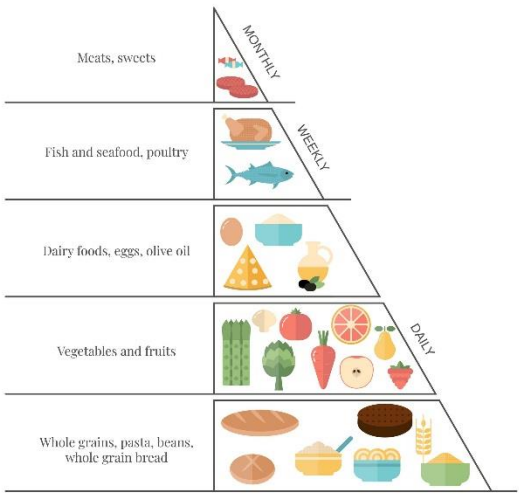


Mediterranean Diet

Estruch R, et al. N Engl J Med. 2018 Jun 21;378(25):e34.

Scientific Evidence Supporting the Mediterranean Diet

- Lyon Diet Heart Study
- **Objective**: Compare Mediterranean diet to standard post-heart-attack diet.
- **Participants**: 605 patients with previous heart attacks.
- **Results**: 50–70% reduction in recurrent heart disease events.

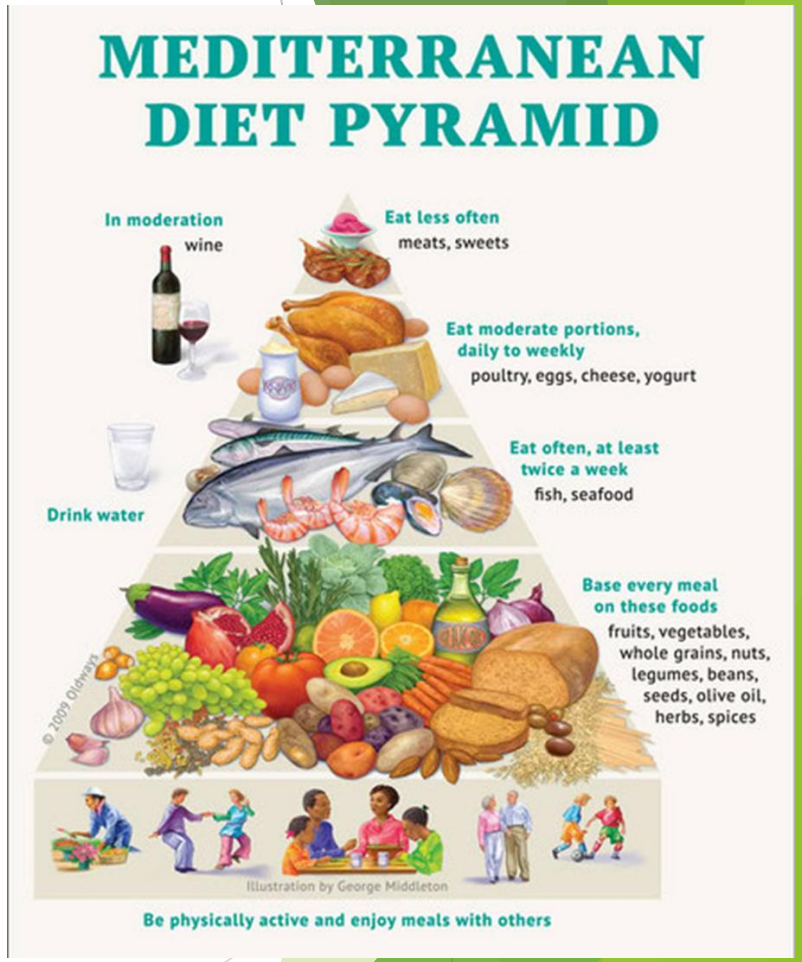


Mediterranean Diet

https://www.acc.org/Latest-in-Cardiology/Clinical-Trials/2010/02/23/19/10/Lyon-Heart-Study

Practical Tips for Adopting the Mediterranean Diet

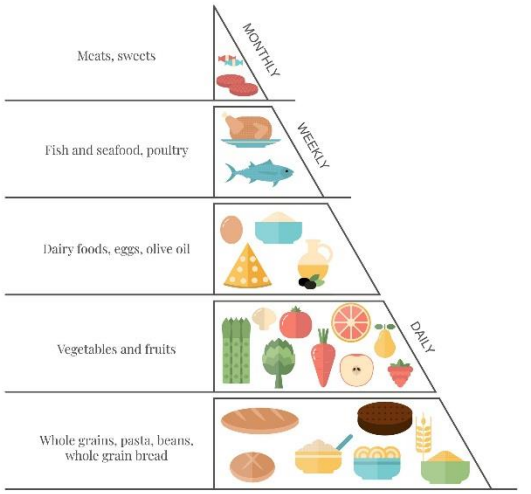
- **Switch to Olive Oil**: Use as the main source of fat.
- **Increase Vegetable Intake**: Make vegetables a core component of every meal.
- **Include Fish Regularly**: Aim for two or more servings per week.
- **Choose Whole Grains**: Replace refined grains with whole versions.
- **Use Herbs and Spices**: Flavor foods naturally without added salt.
- **Practice Portion Control**: Especially with red meat and high-fat dairy.



Widmer RJ, et al. Am J Med. 2015 Mar;128(3):229-38.

Different Mediterranean diet score

- **Mediterranean diet scale (MDScale):** Trichopoulou, 1995, updated 2003
- **Mediterranean food pattern (MFP):** Martínez-Gonzalez, 2002
- **MD score system (MDS):** Leighton, 2009
- **Short Mediterranean diet questionnaire (SMDQ):** Zito, 2016
- **MedDiet score:** Panagiotakos, 2015



Mediterranean Diet

Aoun C, et al. Nutr Res Pract. 2019 Aug;13(4):333-343.

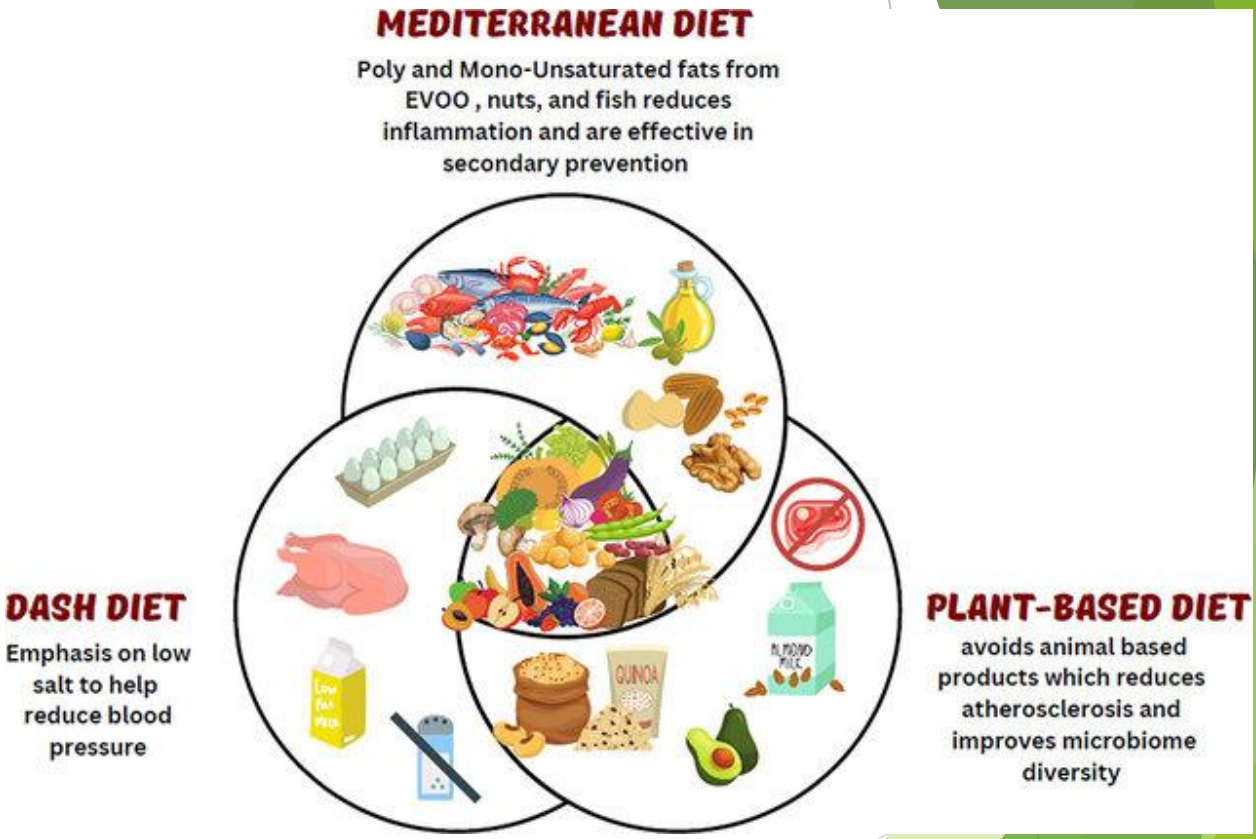
Table 1. Description of five dietary indexing methods used to assess adherence to the Mediterranean diet.

Mediterranean diet components	MDScale		MFP		MedDiet score			MDS			SMDQ	
						Portion / cut-off			Portion / cut-off			
	Included in the index	Portion / cut-off	Included in the index	Portion / cut-off	Included in the index	Criteria for minimum score 0 point	Criteria for maximum score 5 points	Included in the index	Criteria for minimum score 0 point	Criteria for maximum score 1 point	Included in the index	Portion / cut-off
Vegetables	Yes	1 if consumption at or above the sex-specific median	Yes	≥ 2 serv/d	Yes	Never	> 18 serv/m	Yes	< 1 ser/d	≥ 3 serv/d	Yes	≥ 1 serv/d
Fruits	Yes (fruits and nuts together)	1 if consumption at or above the sex-specific median	Yes	≥ 3 serv/d	Yes	Never	> 18 serv/m	Yes	< 1 serv/d	> 2 serv/d	Yes	≥ 1 serv/d
Nuts	Yes (fruits and nuts together)	1 if consumption at or above the sex-specific median	Yes	≥ 3 serv/week	No			Yes (nuts and legumes together)	< 1 serv/week	≥ 2 serv/week	No	
Legumes	Yes	1 if consumption at or above the sex-specific median	Yes	≥ 3 serv/week	Yes	Never	> 18 serv/m	Yes (nuts and legumes together)	< 1 serv/week	≥ 2 serv/week	Yes	≥ 2 serv/d
Cereals	Yes, but without any specification about the type of cereal	1 if consumption at or above the sex-specific median	No		Yes (Only non-refined cereals)	Never	> 18 serv/m	Yes (whole-grain cereals only)	< 1 serv/day	≥ 2 serv/day: 1 point	Yes (white bread with rice or whole-grain bread)	White bread (≤ 1 serv/d) AND Rice (≤ 1serv/week) or whole-grain bread (≥ 5 serv/week)
Fish	Yes	1 if consumption at or above the sex-specific median	Yes	≥ 3 serv/week	Yes	Never	> 18 serv/m	Yes	< 1 serv/week	> 2 serv/week	Yes	≥ 3 serv/d
Meat	Yes (red meat and poultry together)	1 if consumption below the median	Yes (red meat and processed meat)	≤ 7 serv/week 1 serv = 100-150 g)	Yes (red meat and products)	> 18 serv/m	Never	Yes (separating fatty meat and lean meat)	Fatty and processed meat: > 2 serv/week Lean meat:	Fatty and processed meat: < 1 serv/week Lean meat:	Yes	≤ 1 serv/d

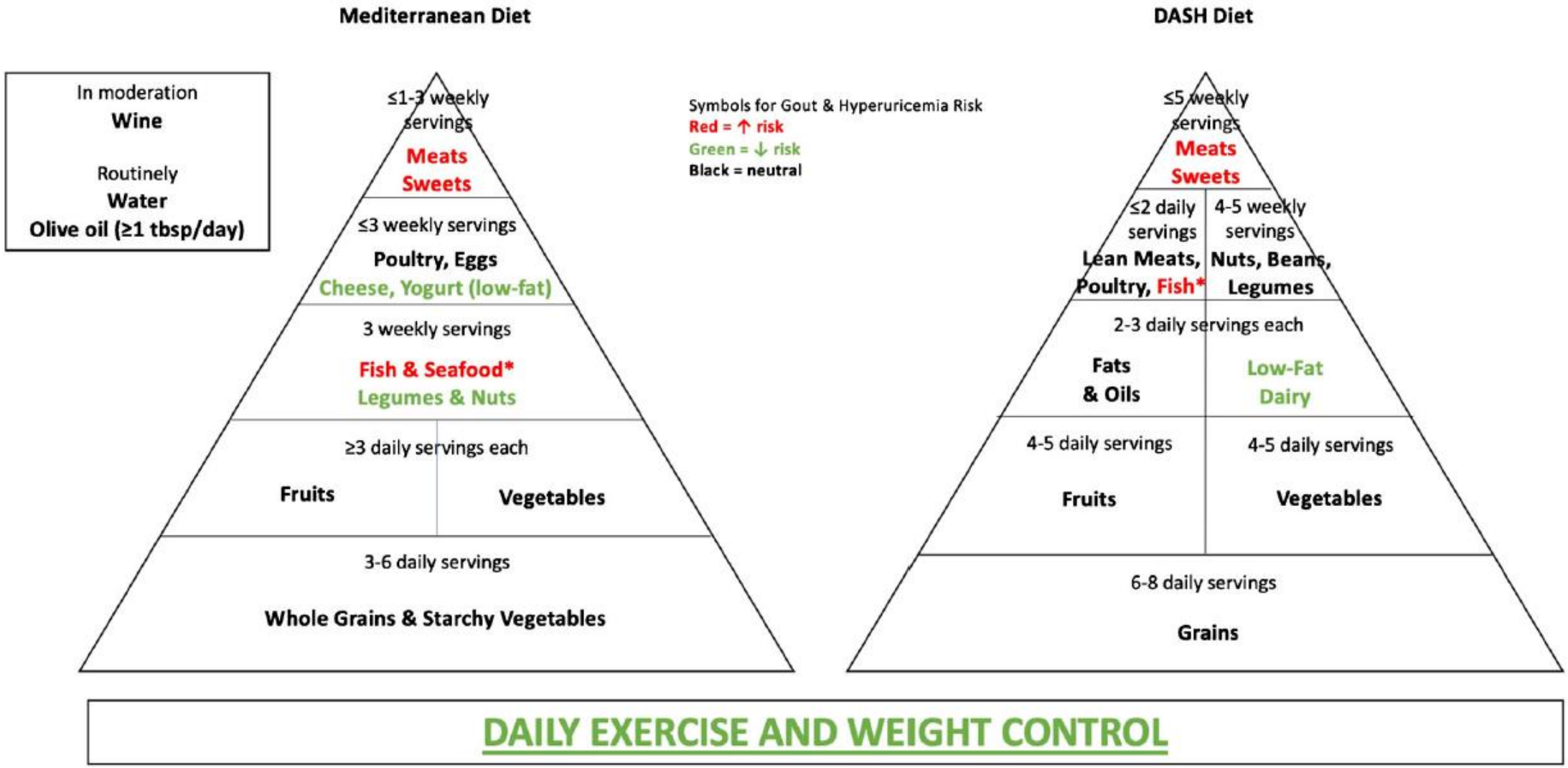
Mediterranean Diet vs. DASH Diet

- **Shared Benefits:**

  Both diets improve insulin sensitivity and help regulate blood glucose, offering significant protection against type 2 diabetes.



https://chefsforseniors.com/blog/dash-diet-vs-mediterranean-diet/



Diab A. et al.Vascular Health and Risk Management.2023 19. 237-253.

Mediterranean Diet vs. DASH Diet

- **Unique Mechanisms:**
  - **DASH Diet:** Reduces diabetes risk through high intake of potassium, magnesium, and low-fat dairy, which support blood pressure control and improved insulin action. Lower sodium intake may reduce insulin resistance indirectly by enhancing vascular health.
  - **Mediterranean Diet:** Emphasizes anti-inflammatory foods like olive oil, nuts, and fatty fish rich in omega-3s, which reduce chronic inflammation—a key contributor to insulin resistance. Its high fiber and low glycemic index components help stabilize blood glucose levels.

https://chefsforseniors.com/blog/dash-diet-vs-mediterranean-diet/

Mediterranean Diet vs. DASH Diet

- **Clinical Evidence:**
  - **DASH Diet:** Studies indicate improved fasting glucose levels and insulin sensitivity, especially in hypertensive individuals
  - **Mediterranean Diet:** Shown to reduce HbA1c levels and incidence of diabetes among high-risk individuals, such as those in the PREDIMED study, by focusing on healthy fats and fiber-rich foods.

https://chefsforseniors.com/blog/dash-diet-vs-mediterranean-diet/

Mediterranean Diet vs. DASH Diet

- **Practical Applications:** Both diets offer adaptable frameworks for improving glycemic control and can be tailored to individual preferences to support sustainable diabetes management and prevention.

- **Final Thought:** The DASH and Mediterranean diets are both powerful tools in preventing and managing diabetes through improved insulin sensitivity, with the choice depending on personal health needs, dietary preferences, and lifestyle.


The End