

The Mediterranean Diet

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A growing body of research is connecting the old ways of eating, such as traditional Mediterranean diets, with a large spectrum of health benefits. Experts generally agree that a beneficial diet has a variety of fruits, vegetables, whole grains, lean proteins, and healthful fats and is low in highly processed junk food.

Most patients today, however, don't know how to put those pieces together into a coherent diet. They can visualize healthful foods, but may find it difficult to see the big picture of what a healthful diet and lifestyle look like. The Mediterranean diet provides a framework for this knowledge. The recipes, traditions, and food pairings all show ways people can incorporate these healthful foods (such as vegetables, beans, whole grains, nuts, fruit, and fish) into a delicious diet.

This continuing education course explores the key characteristics of the Mediterranean diet, provides a research update on the health benefits of the diet, and indicates how the Mediterranean diet fits into existing MNT.

History of the Mediterranean Diet

The Mediterranean diet is one of the most studied and appreciated eating patterns in the world, and is considered by many to be the gold standard of healthful eating. This nutrient-rich diet is based on the dietary patterns of the people from the Greek island of Crete in the 1950s, whom physiologist Ancel Keys studied for their exceptionally low levels of chronic disease and long life expectancy. While modern research into the diet started with Keys, the Mediterranean diet represents eating patterns that stretch back centuries and were enjoyed by a broad range of cultures and cuisines, such as Italian, Turkish, Moroccan, Croatian, Cypriot, and Spanish.

It wasn't until the mid-1990s that the Mediterranean diet became more well known outside of the academic community. When the USDA introduced its first Dietary Pyramid in 1992, many experts felt that it did not reflect the best of nutrition science. In 1993, a group of scientists, with input from Walter Willett of the Harvard School of Public Health and Keys, detailed the key elements of the Mediterranean diet and partnered with Oldways, a nonprofit nutrition education organization that promotes health through heritage, to create the first Mediterranean diet pyramid. Following are the guidelines of the Mediterranean diet, based on the scientific consensus of these experts:¹

- A foundation of plant foods (fruits, vegetables, grain foods, pulses, nuts, and seeds);
- Foods that are minimally processed, seasonal, and locally grown, if possible;

- Olive oil as the primary fat, replacing butter, margarine, and other fats and oils;
- A wide acceptable range of total fat, but a low proportion of saturated fat (less than 8% of energy);
- Low to moderate amounts of traditionally produced cheese and yogurt daily;
- Low to moderate amounts of fish and poultry each week (favoring fish over poultry) and up to four eggs per week (including those used in baking);
- Desserts with sugar and saturated fat only up to few times per week, with the typical daily dessert being fresh fruit;
- Less than one pound of red meat per month (favoring small portions and lean cuts);
- Regular daily movement and activity; and
- For those that choose to drink alcohol, moderate consumption of wine with meals (about one to two glasses per day for men and one glass per day for women).

As these guidelines suggest, the Mediterranean diet is a mostly plant-based diet rich in antioxidants and phytochemicals in which foods such as fish, cheese, and yogurt play supporting roles, adding flavor and energy without pushing vegetables off the plate.

Beneficial Components of the Mediterranean Diet

It's important for both RDs and patients to remember that the Mediterranean diet is a dietary pattern, so just adding one or two food components from this coastal region isn't going to help much if the overall eating pattern is still primarily Western (eg, favoring olive oil flavored potato chips or takeout fast food with a glass of red wine on the side).

While some diet plans stress single foods or nutrients, the Mediterranean diet is based on a foundation of plant-based, nutrient-rich foods that work in synergy. A lot of individual components of the diet have been well studied for their role in health, but the Mediterranean diet includes all of these foods and is not about one superfood.

Whole grains, along with other plant foods, make up the core of the diet. Eating whole grains regularly is linked with a reduced risk for type 2 diabetes,² heart disease,³ breast cancer,⁴ and premature death.⁵ A March 2015 study in *JAMA Internal Medicine* found that every 28-g serving of whole grains was linked with a 5% lower risk of total death, or a 9% lower risk of death from heart disease.⁶

Olive oil is a well-recognized component of the Mediterranean diet; it's been studied for its anticancer⁷ and anti-inflammatory⁸ properties and its role in heart disease prevention⁹ and treatment¹⁰ and blood glucose control.¹¹ Nuts, another important source of energy in the diet, are most famously associated with longevity. In a 2013 study published in *The New England Journal of Medicine*, researchers following more than 100,000 adults for nearly 30 years found that increasing nut intake may improve longevity and is also linked with a lower risk of death from specific causes, such as cancer, heart disease, and respiratory disease.¹²

Moderate red wine intake has been shown to offer protection against risk factors for cardiovascular disease. In a 2015 study in the *Annals of Internal Medicine*, researchers assigned more than 200 patients with well-controlled type 2 diabetes who don't normally drink alcohol to eat a Mediterranean diet and drink 5 oz of either red wine, white wine, or mineral

water with dinner for two years. The red wine group significantly increased their HDL and apolipoprotein A, and the white wine group significantly decreased fasting blood sugar. “Slow alcohol metabolizers” (based on whether they carry the ADH1B*1 allele) benefited from both red and white wine’s effect on their blood sugar control.¹³ Moderate red wine intake can also be protective postheart attack, as it is associated with lower LDL and total cholesterol and increased antioxidant status.¹⁴

The health benefits of fruits and vegetables, a key component of Mediterranean cuisine, are well established. According to the Scientific Report of the 2015 Dietary Guidelines Advisory Committee, “Vegetables and fruit are the only characteristics of the diet that were consistently identified in every conclusion statement across the health outcomes.”¹⁵ In a study of more than 100,000 adults, Harvard researchers found that eating at least eight servings of fruits and vegetables daily is linked with a 30% lower risk of heart attack or stroke than eating fewer than two servings.¹⁶

While traditional Mediterranean diets limited red meat and sweets because those foods weren’t as widely available as they are today, emerging research makes a convincing case for cutting back on these foods. Harvard researchers have found that eating red meat, especially processed red meat, daily is linked to an increased risk of heart disease, stroke, and mortality, and that replacing red meat with Mediterranean staples such as legumes and fish can reduce these risks.^{17,18} For example, in a 2012 study following approximately 120,000 adults for more than two decades, every additional 3-oz serving of unprocessed red meat per day was linked with a 13% higher risk of dying from cardiovascular disease.¹⁹ Similarly, excess refined sweets and sugary beverages are linked with an increased risk of diabetes,^{20,21} death from heart disease,²² and many other conditions.¹⁵

So while whole grains, olive oil, moderate red wine intake, fruits, and vegetables each might have something special, put together, they build a nutritious diet. Additionally, researchers are discovering more about the synergistic effects of food; a combination of foods or nutrients can have an even greater health benefit than do these foods when eaten alone. For example, cooking tomatoes in olive oil, as is traditionally done in the Mediterranean region, increases the absorption of lycopene.²³ Similarly, the combination of unsaturated fats (such as nuts or olive oil) and vegetables rich in nitrites and nitrates (such as green vegetables) produces a group of fatty acids called nitro fatty acids. These nitro fatty acids induce vasodilation, which helps lower blood pressure, by acting as soluble epoxide hydrolase inhibitors.²⁴

Health Benefits

The Mediterranean diet has been associated with a number of health benefits, including the prevention of heart disease, cancer, Alzheimer’s dementia, and diabetes, along with healthy aging and a reversal of metabolic syndrome. The following research update illustrates how the Mediterranean diet may help patients prevent a wide variety of diseases while managing existing chronic disease.

PREDIMED Study

Most nutrition studies are observational; they track eating patterns and disease outcomes from participants but don't test intervention diets. That changed when the results of the PREDIMED study, a landmark clinical trial of nearly 7,500 people, were released in 2013.²⁵

In this study, participants with type 2 diabetes or at least three other risk factors for heart disease (eg, smoking, high blood pressure, high LDL cholesterol, low HDL cholesterol, family history of heart disease, and/or overweight or obesity) were assigned to one of three diets: a Mediterranean diet with 4 tablespoons olive oil daily, a Mediterranean diet with 1 oz nuts daily, or a low-fat diet.

In accordance with Mediterranean diet guidelines, the two Mediterranean diet groups were able to enjoy five servings of fruits and vegetables daily, three or more servings of fish and legumes each week, white meat instead of red, and wine daily (for those who drank), while avoiding commercial cookies and cakes, dairy products, and processed meats.

The low-fat group members had difficulty sticking to their low-fat diet, and the scientists reported that actual "changes in total fat were small." The low-fat group members also consumed significantly less legumes and fish than did those in the Mediterranean diet groups, with fewer changes in their dietary pattern scores than those in the Mediterranean groups during follow-up. After nearly five years on their respective diets, the patients most closely following a Mediterranean diet had a 30% lower risk for heart disease and a significantly lower risk of stroke.

Since then, research has continued to build a strong case for the diet as an effective therapy for heart disease prevention.

More Recent Evidence for Heart Disease Prevention

In a European study following more than 2,500 Greek adults for more than a decade, the Mediterranean diet was associated with a nearly 50% drop in heart disease risk, even after controlling for lifestyle factors, age, and family history.²⁶ In fact, this study indicated that the Mediterranean diet may lower heart disease risk even more than physical activity.

Other observational studies of the diet give insight into the mechanisms for its cardioprotective effect. In a study of more than 1,700 adults, the Mediterranean diet was associated with a 4% smaller left ventricular mass. Given that enlarged heart ventricles appear to be a risk factor for heart disease, this 4% difference indicates a potential protective effect of the Mediterranean diet.²⁷

Cancer Prevention

Using data from the aforementioned PREDIMED study, scientists analyzed the eating patterns and health outcomes of more than 4,200 women aged 60 to 80. During the median 4.8-year follow up period, those groups following a Mediterranean diet reduced their breast cancer risk considerably.²⁸ Similarly, in a 2014 study in the *British Journal of Cancer*, researchers found that the Mediterranean diet was associated with a significantly lower risk of breast cancer and triple negative tumors in particular, while low-fat diets did not affect breast cancer risk.²⁹

In another study of more than 5,000 European women, researchers found that Mediterranean diets were linked with a significantly lower risk of endometrial cancer than non-Mediterranean diets, and that “the Mediterranean diet as a whole is a stronger determinant of endometrial cancer risk than the single dietary components.”³⁰

Disease Reversal

Many patients are beyond the point of prevention and are suffering from chronic diseases. While the prevalence of observational studies highlight the protective effects of the Mediterranean diet, clinical controlled trials have shown that the Mediterranean diet can offer some relief to those suffering from chronic disease.

In a randomized controlled trial of 215 Italian adults recently diagnosed with diabetes, the Mediterranean diet was able to slow diabetes progression more than did a low-fat diet over a six-year period.³¹ In fact, 14.7% of those eating a Mediterranean diet were able to delay the need for diabetes medication for at least two years, compared with none of the patients on a low-fat diet. Subjects in the Mediterranean diet group also tended to lose more weight and maintain the diet even after the trial ended.

The Mediterranean diet might also improve and reverse markers of disease. Metabolic syndrome, a dangerous cluster of three or more conditions (central obesity, high blood pressure, high triglycerides, high LDL cholesterol, low HDL cholesterol, and/or high blood sugar), greatly increases the risk of heart disease and diabetes. Reviewing data from the PREDIMED study, scientists found that a reversal of the condition (ie, decrease in central obesity and/or high blood sugar) occurred in nearly one-third of patients eating either version of the Mediterranean diet.³²

Healthy Aging

It is no surprise that the Mediterranean diet is followed in two of the five “Blue Zones,” pockets around the world with the highest concentration of centenarians (people older than 100), since research into healthy aging makes a strong case for the diet.³³ Using data from more than 4,600 healthy nurses in the Nurses’ Health Study, Harvard researchers found that those most closely following the Mediterranean diet had the longest telomeres, the end parts of DNA that protect chromosomes. Because longer telomeres can better defend cells from damage, long telomeres are a good indicator of healthy aging.³⁴

The benefits of eating well show up not only in our DNA but also in our brains. In a nine-year study of 146 older French adults (average age 73), the brains’ white matter appeared to be significantly more preserved in those following a Mediterranean diet.³⁵ In other words, according to the scientists, “higher adherence to the [Mediterranean diet] appeared to delay cognitive aging by up to 10 years.”

The Mediterranean diet is also associated with a lower risk for Alzheimer’s disease. In a Chicago study of nearly 1,000 retired adults, those most closely adhering to the Mediterranean diet were 54% less likely to develop Alzheimer’s dementia over the 4.5 year study. Other diet groups that emphasized similar Mediterranean diet foods (like whole grains and leafy vegetables) also saw substantial improvements. Those most closely following the

Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND) diet, a combination of the Mediterranean Diet and the Dietary Approaches to Stop Hypertension (DASH) diet, were not far behind, with a 53% lower risk of developing Alzheimer’s dementia. Although very similar to the Mediterranean diet, the MIND diet emphasizes specific foods associated with brain health (such as berries) rather than overall food groups (such as fruit).³⁶

While the MIND diet has made a splash in headlines for its brain health properties and catchy name, this detail-oriented eating pattern is remarkably similar to the Mediterranean diet. However, the less restrictive Mediterranean diet also emphasizes variety (for example, promoting a diverse spectrum of vegetables, rather than just leafy greens) and the pleasures of the table (such as enjoying meals in the company of friends and family).

Healthful Fats

While decades of research have built on Keys’ first investigation of the Mediterranean diet, including large randomized controlled trials, media outlets continue to report on the latest fad diets or contradictory studies. Patients are now asking RDs whether butter and whole milk are healthful, whether coconut oil is good or bad, and whether sugar is poisonous. It’s up to RDs to educate patients about what is known about dietary patterns and chronic disease, that the Mediterranean diet is a time- and research-tested healthful eating pattern. In fact, the 2015–2020 Dietary Guidelines for Americans recognizes a Mediterranean-style diet as an example of a healthful eating pattern.

In a study published October 2015 in the *Journal of the American College of Cardiology*, Harvard researchers found that replacing 5% of calories from saturated fat with polyunsaturated fats, monounsaturated fats, or whole grains may reduce risk of heart disease by up to 25%, 15%, and 9%, respectively. Additionally, replacing added sugars and refined grains with whole grains or polyunsaturated fats was also shown to significantly reduce heart disease risk.³⁷ The results of this study indicate that while replacing saturated fats with refined grains and added sugars might not be a wise idea, replacing them with certain plant oils and whole grains can be very beneficial. The Mediterranean diet, which spotlights whole grains, fish, olive oil, nuts, and seeds, puts these lessons into practice.

The Mediterranean Diet and Existing MNT

Following are primary guidelines for MNT for cardiovascular disease from the Academy of Nutrition and Dietetics’ Evidence Analysis Library for cardiovascular disease prevention, based on “strong” evidence.³⁸ The goal of these recommendations is to get blood lipids to desirable levels and reduce the risk of a heart attack.

- Fat: 25% to 35% calories;
- Saturated and trans fat: <7% calories;
- Cholesterol: <200 mg;
- Sodium: ≤2,300 mg;
- Fiber: 25 g to 30 g; and
- Rich in fruits and vegetables

The Mediterranean diet, with its emphasis on fruits, vegetables, grains, and monounsaturated fats, and sparing use of dairy and meat, fits neatly into these recommendations.

Role of the RD: Patient Education

In America, many patients mistake the westernized, affluent version of Mediterranean cuisine for a true, scientifically backed Mediterranean diet. Many countries along the Mediterranean, including Italy, Greece, and Spain, have a distinct and delicious culinary heritage. Even for dietitians with well-traveled clients, it's important to remind them that the Mediterranean diet focuses on foods from a simpler time. Because animal products, such as meats and cheese, were more expensive in the past, they tended to be used as garnishes. Vegetables, whole grains, and legumes made up the base of the meal, and inexpensive meats such as sardines were more commonly eaten.

RDs are adept at communicating the subtle differences in these food choices, especially given that more than 86% of doctors surveyed don't feel sufficiently trained to talk to their patients about nutrition.³⁹ Among these 236 physicians, the Mediterranean diet was widely recognized as protective against heart disease, but many had trouble identifying foods high in various nutrients, such as which fish are high in omega-3 fatty acids. These data highlight the important role of RDs in communicating evidence-based nutrition advice to their patients.

When recommending the Mediterranean diet, it's important for RDs to help clients understand exactly what a healthful Mediterranean diet is. Just because a dish is readily available at Italian restaurants or Greek kebab stands, this doesn't mean it's representative of the healthful traditional Mediterranean diet pattern.

Mediterranean Meals: Recognizing the Real Thing

Like most humble cuisines, the Mediterranean diet is centered on staple grain foods, with seasonal vegetables, cheeses, and other toppings adding additional flavor and energy. Pasta has a long tradition in Italian cuisine and the cuisine of many other Mediterranean countries. In fact, many are surprised to learn that due to the starch structure in pasta (even white pasta), it is actually a low-glycemic index food. But instant macaroni and cheese and family-sized platters of creamy carbonara are not equivalent to penne tossed with olive oil, tomatoes, herbs, and a small scoop of shredded chicken or Parmesan cheese.

The Mediterranean diet pyramid, like many health guidelines, recommends seafood at least twice per week. To really honor the spirit of the Mediterranean tradition, seafood should be served alongside plant foods for a colorful, flavorful meal. Similarly, Mediterranean cooks utilized a variety of cooking methods, including boiling, baking, and pan-frying. Fried foods are usually prepared in olive oil, on the stove, and not in the deep fat fryers common in fast food restaurants today.

Animal foods do not make up the center of the plate in traditional Mediterranean cookery. Traditionally, beef, poultry, and pork were expensive—a luxury—and red meat in particular was rarely eaten. Rather, when recommending the Mediterranean diet, RDs should encourage more nourishing plant-based Mediterranean foods. Preparing a baked veggie falafel in a whole grain pita, tabbouleh (a bulgur and parsley salad), whole-wheat linguine with clams and

tomatoes, and bountiful veggies drizzled with olive oil are all delicious and nutritious ways to follow a Mediterranean diet.

Finally, the diet includes moderate alcohol (preferably wine) consumption for individuals who choose to drink. According to the Dietary Guidelines for Americans, moderate alcohol consumption is defined as up to one glass of wine per day for women, and up to two glasses per day for men. Greater consumption of alcohol is not recommended.

Outside of providing comprehensive patient education, clinical and foodservice dietitians can extend the health benefits of Mediterranean diets to their patients by encouraging cafeterias to serve Mediterranean-inspired dishes. Fletcher Allen Health Care, associated with University of Vermont, developed its room service menus in alignment with the Mediterranean diet years ago, and other communities, such as Norwalk Hospital in Westport, Connecticut, and Senior Living Residences in Boston, are following suit.

RDs can share their knowledge of the delicious and nutritious Mediterranean diet to help their patients make the connection that good food and good health go hand in hand.

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Quiz

1. Which of the following nations did Ancel Keys study in the 1950s through the 1970s to form his hypothesis on the Mediterranean diet's role in disease prevention?

- A. Greece
- B. Italy
- C. Spain
- D. Morocco

2. The Mediterranean diet is a low-fat diet.

- A. True
- B. False

3. Which of the following foods is commonly eaten in traditional Mediterranean diets?

- A. Butter
- B. Refined sweets
- C. Red meat
- D. Cheese and yogurt

4. Which of the following statements is true about the Mediterranean diet and healthy aging?

- A. A Mediterranean diet can reverse Alzheimer's dementia.
- B. Those most closely following the Mediterranean diet have more gray matter in the brain.
- C. Olive oil is the most important component of the Mediterranean diet with regard to healthy aging.
- D. The Mediterranean diet is associated with longer telomeres, which are markers of healthy aging.

5. Which of the following statements is true of the PREDIMED study?

- A. It took place in the United States.
- B. It's a clinical controlled trial.
- C. It's an observational trial.
- D. Participants were healthy adults.

6. Describe the intervention diet(s) of the PREDIMED study.

- A. Five servings of fruits and vegetables, fish daily; avoid commercial cookies
- B. Five servings of fruits and vegetables, white meat instead of red, moderate dairy
- C. Five servings of fruits and vegetables, legumes daily; no meat
- D. Five servings of fruits and vegetables, fish, and legumes three or more times per week; avoid dairy

7. Is the Mediterranean diet able to reverse or delay disease?

- A. Yes, it's been linked with a decrease in central obesity and/or high blood sugar in patients with metabolic syndrome.
- B. Yes, it alone will reverse type 2 diabetes.
- C. No, it's associated with disease prevention only.
- D. No, it hasn't been studied in patients with chronic disease.

8. Which of the following statements is true regarding dietary fats?

- A. Low-fat diets are the most effective for preventing heart disease.
- B. Replacing unsaturated fats (such as nuts) with saturated fats (such as butter) can reduce heart disease risk.
- C. Replacing saturated fats (such as butter) with unsaturated fats (such as nuts) can reduce heart disease risk.
- D. Coconut oil is the preferred fat of the Mediterranean diet.

9. Which of these dishes might you suggest to a patient interested in the Mediterranean diet?

- A. Pasta tossed with olive oil, tomatoes, and shellfish
- B. Baked macaroni and cheese
- C. Lamb kebabs
- D. Meatball sandwich

10. How can RDs help clients gain the benefits of the Mediterranean diet?

- A. Encourage them to eat alone to avoid being tempted by unhealthful food.
- B. Encourage patients and/or foodservice staff to make plant foods (such as fruits, vegetables, legumes, and whole grains) the star of meals.
- C. Encourage them to avoid fats.
- D. Encourage them to choose leafy greens over other vegetables, and berries over other fruits.