Annals of Internal Medicine

EDITORIAL

Reducing Diabetes Risk Through the Mediterranean Diet

Since the original PREDIMED (Prevención con Dieta Mediterránea) randomized controlled trial was published (1), scholars, clinicians, and health advocates have been fascinated with the potential for the Mediterranean diet (MedDiet) to reduce cardiovascular disease (CVD) events (for example, myocardial infarction, stroke, CVD mortality) and CVD risk factors (for example, hypertension, dyslipidemia, type 2 diabetes) substantially. The MedDiet focuses on high intake of plant-based foods; moderate consumption of fish, poultry, and dairy (along with optional red wine); and low intake of red meats, sweets, and sugar-sweetened beverages (2). Key components include extra-virgin olive oil, fruits, vegetables, legumes, nuts, and whole grains, which are known for their high-fiber, anti-inflammatory, and antioxidant properties, the mechanisms by which the MedDiet is presumed to decrease CVD risk (3).

Given the relatively high amount of dietary fat recommended in the MedDiet, the original PREDIMED study revealed that it only minimally reduced body weight though it reduced diabetes incidence by 30% (4). In 2013, the PREDIMED-Plus trial was launched to investigate the impact of an energy-reduced MedDiet (erMedDiet) plus physical activity and behavioral strategies delivered via dietician-led groups and 1:1 sessions on reducing body weight and CVD events in 6874 Spanish adults with overweight or obesity and metabolic syndrome (5). In their article, Ruiz-Canela and colleagues conducted a prespecified secondary analysis of the PREDIMED-Plus trial to examine the effect of the erMedDiet compared with an ad libitum MedDiet on diabetes incidence at the end of 6 years among the 4746 participants without diabetes at baseline (6).

After 6 years, the adjusted absolute risk difference for incident diabetes between the erMedDiet intervention and the ad libitum MedDiet control group was −2.4% (95% CI, −3.1% to −1.8%), corresponding to a 31% (CI, 18% to 41%) relative risk reduction in the intervention group compared with the control group (6). Of note, a greater effect was observed in men compared with women. Although the seminal Diabetes Prevention Program (DPP) reported greater reductions in absolute (−14.4%) and relative (58%) risks for incident diabetes from a low-fat diet with physical activity compared with placebo for 3 years (7), PREDIMED-Plus's longer duration of follow-up, use of a strong comparator (an ad libitum MedDiet), and older mean age of participants may in part explain the effect size differences. Weight loss was also greater in DPP than in PREDIMED-Plus, 7% versus 3.7%, respectively. This smaller reduction in weight, however, provides further evidence to clinicians and patients alike that even smaller reductions in body weight can lead to meaningful reductions in diabetes incidence.

Despite the promising findings in this study, the study design precludes the ability to disentangle key intervention components (that is, erMedDiet adherence, physical activity, number of dietetic contacts) and their individual versus synergistic effects on outcomes. It is also important to acknowledge that this study was conducted in Spain, and consumption of an erMedDiet may be particularly challenging in the United States where prevalence of CVD events, prediabetes, and type 2 diabetes remain critically high among adult populations, especially for those patients living in underresourced neighborhoods where healthy food options are limited (8). Participants in the study received extra-virgin olive oil to support adherence and retention; in the United States, prices of extra-virgin olive oil have nearly doubled since 2021 due to a combination of factors including climate change, rising production costs, supply chain disruptions, and now tariffs (9). Furthermore, the large number of dietician contacts during the study may prove difficult to scale broadly in the United States given challenges with health care access and reimbursement for prevention services. As the investigators acknowledge, more studies will be needed to replicate these results using a lower-intensity intervention to ensure adequate reach among the populations that need it most.

Because of the recent excitement around medications to treat obesity and diabetes and reduce CVD events (10), the tried-and-true effects of diet and physical activity have lost some of their popularity. The study by Ruiz-Canela and colleagues shows us that diet quality is still important to consider and adds to the large body of literature demonstrating the important role that dietary intake and lifestyle modification can play in chronic disease prevention (1, 6). Ultimately, this study contributes to the strong evidence base in support of the MedDiet as an optimal dietary pattern for long-term health (3).

Sharon J. Herring, MD, MPH
Program for Maternal Health Equity, Center for Health Justice and Bioethics, Department of Urban Health and Population Science, Lewis Katz School of Medicine at Temple University, Philadelphia; Department of Medicine, Lewis Katz School of Medicine at Temple University, Philadelphia; and Center for Obesity Research and Education, College of Public Health, Temple University, Philadelphia, Pennsylvania

Gina L. Tripicchio, PhD, MSEd
Center for Obesity Research and Education, College of Public Health, Temple University, Philadelphia; and Department of Social and Behavioral Sciences, College of Public Health, Temple University, Philadelphia, Pennsylvania

This article was published at Annals.org on 26 August 2025.

Disclosures: Disclosure forms are available with the article online.

Corresponding Author: Sharon J. Herring, MD, MPH, Temple University, 3223 North Broad Street, Suite 175, Philadelphia, PA 19140; e-mail, herris01@temple.edu.

Ann Intern Med. doi:10.7326/ANNALS-25-02748

References

1. **Estruch R, Ros E, Salas-Salvadó J, et al; PREDIMED Study Investigators.** Primary prevention of cardiovascular disease with a Mediterranean diet supplemented with extra-virgin olive oil or nuts. N Engl J Med. 2018;378:e34. [PMID: 29897866] doi:10.1056/NEJMoa1800389
2. **Davis C, Bryan J, Hodgson J, et al.** Definition of the Mediterranean diet; a literature review. Nutrients. 2015;7:9139-9153. [PMID: 26556369] doi:10.3390/nu7115459
3. **Schwingshackl L, Morze J, Hoffmann G.** Mediterranean diet and health status: active ingredients and pharmacological mechanisms. Br J Pharmacol. 2020;177:1241-1257. [PMID: 31243760] doi:10.1111/bph.14778
4. **Estruch R, Martínez-González MA, Corella D, et al; PREDIMED Study Investigators.** Effect of a high-fat Mediterranean diet on bodyweight and waist circumference: a prespecified secondary outcomes analysis of the PREDIMED randomised controlled trial. Lancet Diabetes Endocrinol. 2019;7:e6-e17. [PMID: 31003626] doi:10.1016/S2213-8587(19)30074-9
5. **Martínez-González MA, Buil-Cosiales P, Corella D, et al; PREDIMED-Plus Study Investigators.** Cohort profile: design and methods of the PREDIMED-Plus randomized trial. Int J Epidemiol. 2019;48:387-388o. [PMID: 30476123] doi:10.1093/ije/dyy225
6. **Ruiz-Canela M, Corella D, Martínez-González MÁ, et al.** Comparison of an energy-reduced Mediterranean diet and physical activity versus an ad libitum Mediterranean diet in the prevention of type 2 diabetes: a secondary analysis of a randomized controlled trial. Ann Int Med. 26 August 2025. [Epub ahead of print]. doi:10.7326/ANNALS-25-00388
7. **Knowler WC, Barrett-Connor E, Fowler SE, et al; Diabetes Prevention Program Research Group.** Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. N Engl J Med. 2002;346:393-403. [PMID: 11832527] doi:10.1056/NEJMoa012512
8. **Kris-Etherton PM, Petersen KS, Velarde G, et al.** Barriers, opportunities, and challenges in addressing disparities in diet-related cardiovascular disease in the United States. J Am Heart Assoc. 2020;9:e014433. [PMID: 32200727] doi:10.1161/JAHA.119.014433
9. **Moskin J.** American Kitchens Face an Uncertain Mix: Olive Oil and Tariffs. NY Times. Accessed at www.nytimes.com/2024/12/18/dining/olive-oil-tariffs.html on 14 July 2025.
10. **Anderer S.** Obesity drugs considered first-line option for cardiovascular risk. JAMA. 11 July 2025. [Epub ahead of print]. [PMID: 40643905] doi:10.1001/jama.2025.10324