



# The Mediterranean diet: a pathway to longevity

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MER

MEDITERRANEE

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# The Mediterranean Diet

- ❖ the dietary pattern found in the olive oil growing areas of the Mediterranean region in the late 1950s and early 1960s
  - ❖ In addition to olive oil, the daily intake included
    - ❖ a high consumption of cereals, fruit, nuts, vegetables and legumes
    - ❖ low intake of dairy products, meat and meat products
    - ❖ fish and seafood intake depended on the vicinity to the sea and
    - ❖ ethanol intake was moderate and mainly in the form of wine during meals
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# The health attributes

- ❖ liberal use of olive oil → increased intake of monounsaturated fatty acids and tocopherols
- ❖ fish, vegetables and nuts → n-3 and n-6 polyunsaturated fatty acids
- ❖ vegetables, fresh fruit and cereals → fiber, vitamins, minerals, polyphenols and anthocyanins
- ❖ limited consumption of meat and dairies → low intake of saturated fatty acids
- ❖ locally grown leafy vegetables → high flavonoid intake

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# The Rockefeller Study

- ❖ 1948 (The Rockefeller Foundation, LG. Allbaugh)
  - ❖ Island of Crete
  - ❖ Study to provide advice on how to raise the population's standard of living
  - ❖ Members of 128 households (collection of demographic, social, economic, health and dietary data)
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# The Rockefeller Report

"olives, cereal grains, pulses, fruit, wild greens and herbs, together with limited quantities of goat meat and milk, game, and fish consist the basic Cretan foods... no meal was complete without bread . . . Olives and olive oil contributed heavily to the energy intake ... food seemed literally to be 'swimming' in oil".

Allbaugh LG. Crete: a case study of an underdeveloped area. Princeton NJ: Princeton University Press, 1953

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# The Rockefeller Report

"the food consumption levels were surprisingly good. On the whole, their food pattern and food habits were extremely well adapted to their natural and economic resources as well as their needs".

"only one out of six of the interviewed families judged the typical diet to be satisfactory "

"meat (72%), rice, fish, pasta, butter, and cheese: foods most desired to improve their diets"

Allbaugh LG. Crete: a case study of an underdeveloped area. Princeton NJ: Princeton University Press, 1953

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# Life expectancy and disease rates in the US, Greece and Japan in the 1960s

Life expectancy and disease rates		United States	Greece	Japan
Life expectancy at age 45 (years)	(M)	27	31	27
Coronary heart disease	(M)	189	33	34
Cerebrovascular diseases	(M)	30	26	102
Breast cancer	(F)	22	8	4
Stomach cancer	(M)	6	10	48
Colorectal cancer	(M)	11	3	5
Total cancers	(M)	102	83	98

Source: Willett WC, Science, 1994



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# The Seven Countries Study



Principal Investigator:  
Ancel Keys, 1904-2004

- ❖ investigated long-term incidence and mortality from coronary heart disease
  - ❖ in total, 12,763 males, 40–59 years of age, enrolled as 16 cohorts, in seven countries, in four regions of the world
  - ❖ baseline survey was carried out between 1958 and 1964
  - ❖ information on diet was collected through food diaries in random sub-samples of the 16 study cohorts
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# Diet and overall survival in the elderly people

(Trichopoulos et al, BMJ 1995;311:1457-60)

- ❖ prospective study among 180 males and females aged 70 years and over in Greece
  - ❖ higher adherence to Mediterranean diet was significantly associated with a reduced risk of death from any cause. An one unit increase in the score was associated with 17% lower risk of premature death (95%CI: 1% to 31%).
  - ❖ individual components of the diet score had weak and generally non-significant associations with survival, whereas the overall score had a substantial and statistically significant effect.
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# The Mediterranean Diet can be thought of as having nine characteristics (components):

1. prevalent consumption of olive oil
  2. high consumption of legumes
  3. high consumption of cereals
  4. high consumption of fruit
  5. high consumption of vegetables
  6. moderate consumption of dairy products, mostly as cheese and yogurt
  7. moderate to high consumption of fish
  8. low consumption of meat and meat products
  9. moderate wine consumption, if accepted by religion and social norms.
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# Mediterranean diet: a holistic dietary approach

## **Dietary pattern analysis: a new direction in nutritional epidemiology**

Frank B. Hu

Recently, dietary pattern analysis has emerged as an alternative and complementary approach to examining the relationship between diet and the risk of chronic diseases. Instead of looking at individual nutrients or foods, pattern analysis

### **Introduction**

Traditional analyses in nutritional epidemiology typically examine diseases in relation to a single or a few nutrients or foods. Although this type of analysis has

Current Opinion in Lipidology 2002, 13:3±9

EDITORIAL COMMENT

## **Dietary patterns: time to simplify the message until we can clarify the specifics**

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similar analysis for adherence to a DASH-type diet as assessed by the DASH diet 'score' [16]. Compared with women in the bottom quintile, after adjustment for similar relevant risk factors, risk of incident coronary heart disease was reduced by 24% and 20% for women

Current Opinion in Lipidology 2009, 20(5):442-5

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# Why to study dietary patterns?

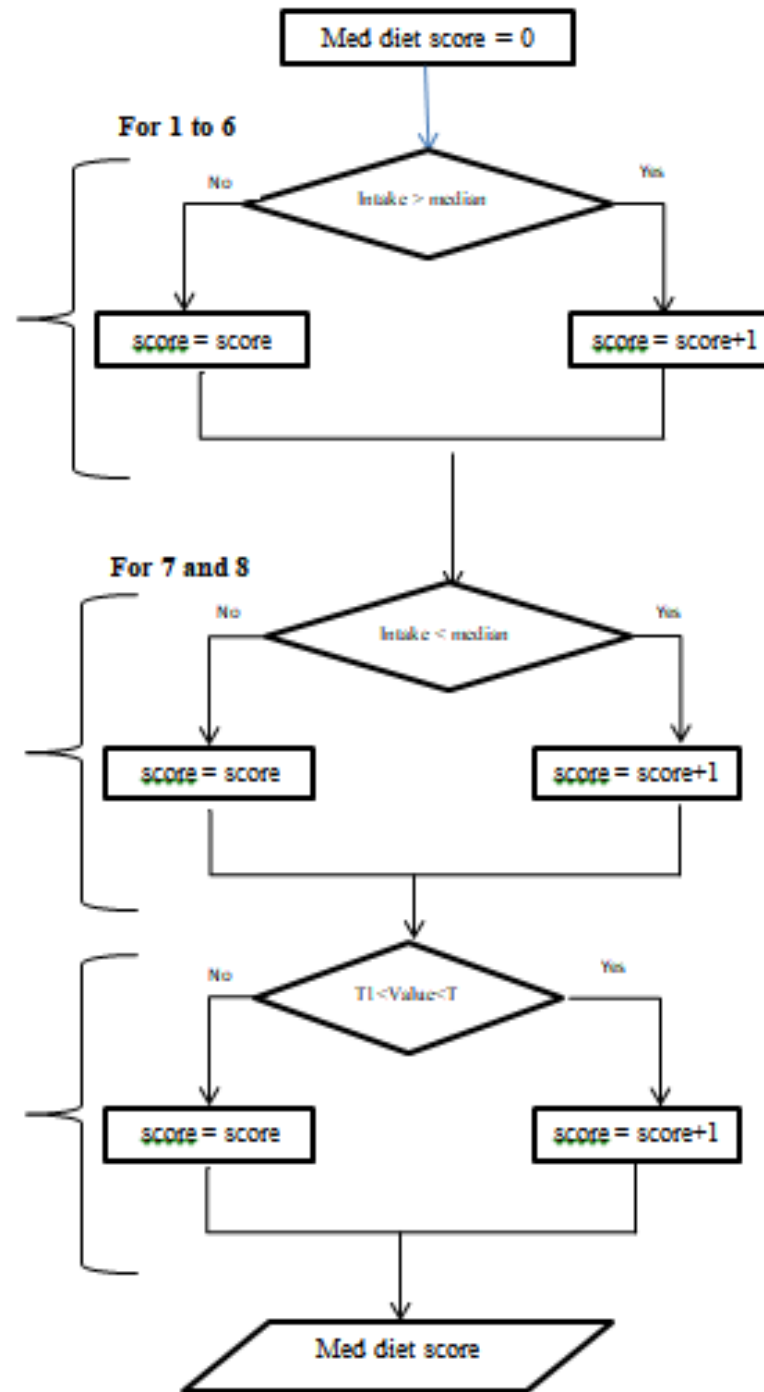
- ❖ People do not eat isolated nutrients; they eat meals consisting of a variety of foods with complex combinations of nutrients that are likely to be interactive or synergistic
  - ❖ the high level of inter-correlation among some nutrients (such as potassium and magnesium) makes it difficult to examine their separate effects
  - ❖ the effect of a single nutrient may be too small to detect, but the cumulative effects of multiple nutrients included in a dietary pattern may be sufficiently large to be detectable
  - ❖ analyses based on a large number of nutrients or food items may produce statistically significant associations simply by chance
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# The Mediterranean Diet Score

1	Vegetables
2	Legumes
3	Fruit and Nuts
4	Cereals and products
5	Fish and seafood
6	Mono-unsaturated to saturated fat ratio

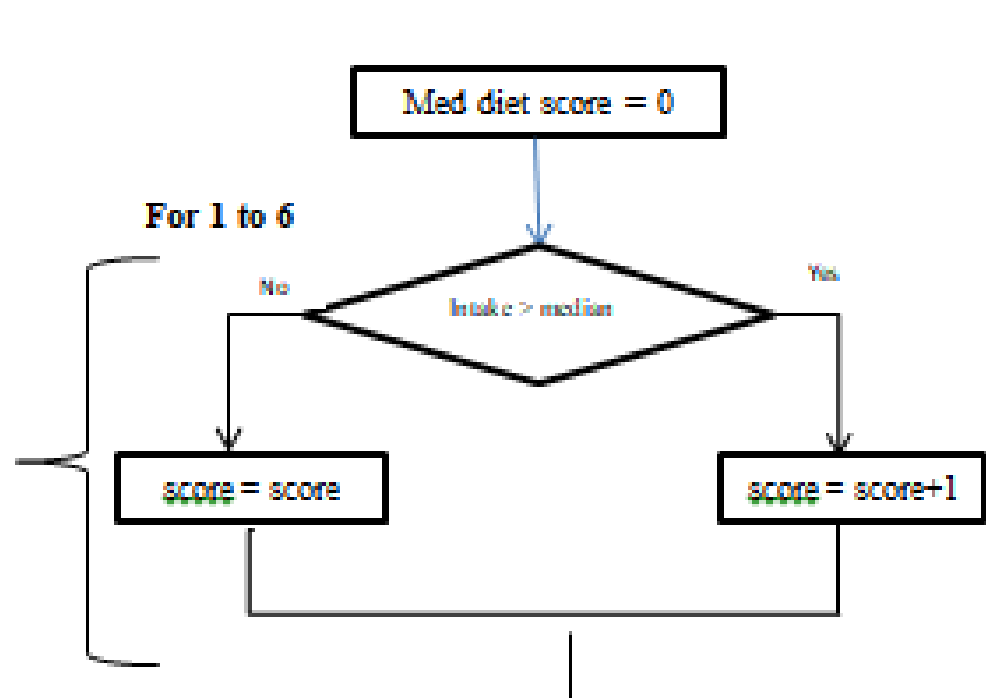
7	Meat and products
8	Milk and dairies

9	Alcohol (g/day)
Male: T1=10, T2=50	
Female: T1=5, T2=25	



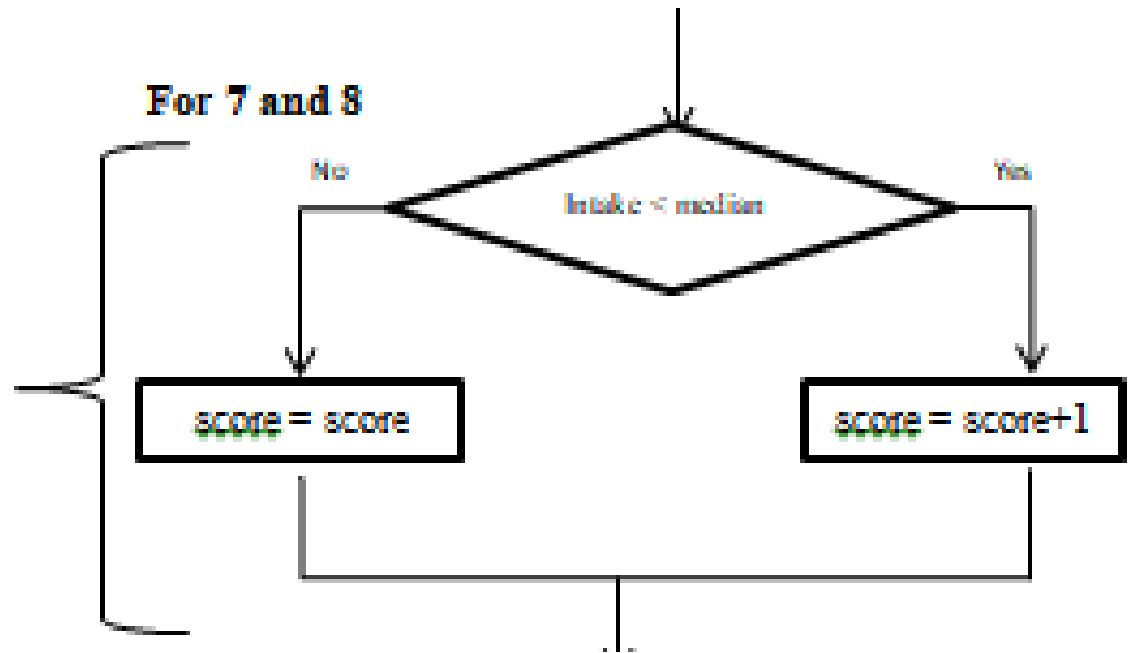
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# The Mediterranean Diet Score

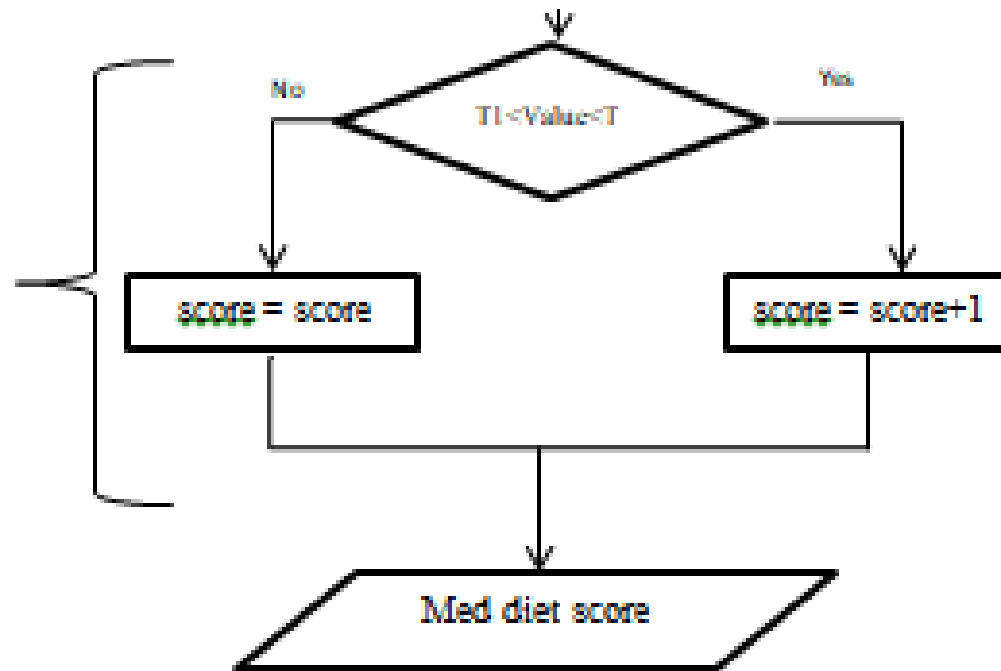
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# The Mediterranean Diet Score

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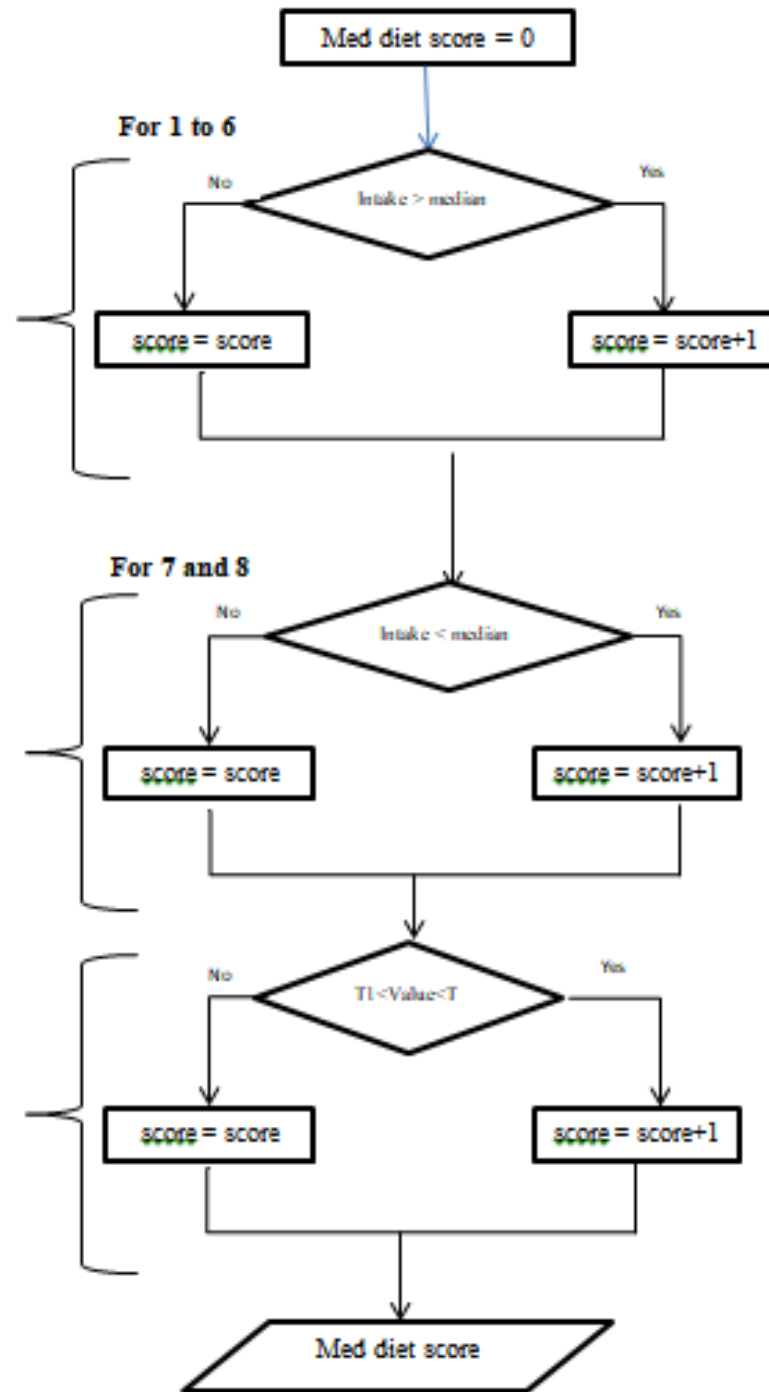


# The Mediterranean Diet Score

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# Contrary to.....



# EatingWell®

The Mediterranean diet is a **natural experiment**, a **holistic lifestyle** that **existed** in the region **for years** and was discovered in the second half of the 20th century after ecological observations that people in this region experienced **mortality rates** which were **far lower** than those of more developed and affluent countries.

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# Mediterranean Diet and its impact on health

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# Cancer and Mediterranean Dietary Traditions

Antonia Trichopoulou, Pagona Lagiou, Hannah Kuper, and Dimitrios Trichopoulos<sup>1</sup>

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countries and focusing on diet and cancer. There is no reason to expect that a Mediterranean diet is an important component of the Mediterranean diet.

## Mediterranean Diet, Lifestyle Factors, and 10-Year Mortality in Elderly European Men and Women The HALE Project

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Lisette C. P. G. M. de Groot, PhD

Daan Kromhout, PhD

Anne-Elisabeth Perrin, MD, MSc

Olga Moreira-Varela, PhD

Alessandro Menotti, MD, PhD

Wija A. van Staveren, PhD

**Context** Dietary patterns and lifestyle factors are associated with mortality from all causes, coronary heart disease, cardiovascular diseases, and cancer, but few studies have investigated these factors in combination.

**Objective** To investigate the single and combined effect of being physically active, moderate alcohol use, and nonsmoking on all-cause mortality in European elderly individuals.

**Design, Setting, and Participants** The Healthy Ageing in Europe (HALE) population, comprising individuals enrolled in the Nutrition and the Elderly: a Concerned Action (SENCA) study in the Netherlands. Elderly (INE) studies. Includes 1507 annual



### Critical Reviews in Food Science and Nutrition

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## A comprehensive meta-analysis on evidence of Mediterranean diet and cardiovascular disease: Are individual components equal?

Giuseppe Grosso, Stefano Marventano, Justin Yang, Agnieszka Micek, Andrzej Paiak, Luca Scalfi, Fabio Galvano & Stefanos N. Kales



RESEARCH

### Adherence to Mediterranean diet and health status: meta-analysis

Francesco Sofi, researcher in clinical nutrition,<sup>1,2,5</sup> Francesca Cesari, researcher,<sup>1</sup> Rosanna Abbate, full professor of internal medicine,<sup>1,5</sup> Gian Franco Gensini, full professor of internal medicine,<sup>3</sup> Alessandro Casini, associate professor of clinical nutrition<sup>2,4,5</sup>

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ABSTRACT

contribution to a favourable health status and a better

OPEN ACCESS Freely available online



## Dietary Fat Intake and the Risk of Depression: The SUN Project

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<sup>1</sup> Department of Clinical Sciences, University of Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain, <sup>2</sup> Department of Preventive Medicine and Public Health, University of Navarra, Pamplona, Spain, <sup>3</sup> Division of Human Nutrition, Wageningen University, Wageningen, The Netherlands

### Abstract

Emerging evidence relates some nutritional factors to depression risk. However, there is a scarcity of longitudinal assessments on this relationship.

**Objective:** To evaluate the association between fatty acid intake or the use of culinary fats and depression incidence in a

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# Mediterranean diet and health

Dietary intakes following the principles of Mediterranean diet have been associated with:

- ❖ reduced incidence of coronary heart disease, stroke and cancer
  - ❖ beneficial effects on cardiovascular disease related markers
  - ❖ self-perceived mental and physical health,
  - ❖ global cognitive function and
  - ❖ an overall higher quality of life
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# Adherence to Mediterranean diet and CVD

CRITICAL REVIEWS IN FOOD SCIENCE AND NUTRITION  
2017, VOL. 57, NO. 15, 3218–3232  
<https://doi.org/10.1080/10408398.2015.1107021>



Check for updates

## A comprehensive meta-analysis on evidence of Mediterranean diet and cardiovascular disease: Are individual components equal?

Giuseppe Grosso<sup>a</sup>, Stefano Marventano<sup>b</sup>, Justin Yang<sup>c,d</sup>, Agnieszka Micek<sup>e</sup>, Andrzej Pajak<sup>e</sup>, Luca Scalfi<sup>f</sup>, Fabio Galvano<sup>g</sup>, and Stefanos N. Kales<sup>c,h</sup>

<sup>a</sup>Integrated Cancer Registry of Catania-Messina-Siracusa-Enna, Catania, Italy; <sup>b</sup>Department of Medical, Surgical Sciences, and Advanced Technologies "G.F. Ingrassia," Section of Hygiene and Preventive Medicine, University of Catania, Catania, Italy; <sup>c</sup>Department of Environmental Health, Environmental & Occupational Medicine & Epidemiology, Harvard TH Chan School of Public Health, Boston, Massachusetts, USA; <sup>d</sup>St. Elizabeth's Medical Center, Tufts University School of Medicine, Boston, Massachusetts, USA; <sup>e</sup>Department of Epidemiology and Population Studies, Jagiellonian University Medical College, Krakow, Poland; <sup>f</sup>Department of Food Science, "Federico II" University Medical School, Naples, Italy; <sup>g</sup>Department of Biomedical and Biotechnological Sciences, Section of Pharmacology and Biochemistry, University of Catania, Catania, Italy; <sup>h</sup>The Cambridge Health Alliance, Harvard Medical School, Cambridge, Massachusetts, USA

### ABSTRACT

Many studies have reported that higher adherence to Mediterranean diet may decrease cardiovascular disease (CVD) incidence and mortality. We performed a meta-analysis to explore the association in prospective studies and randomized control trials (RCTs) between Mediterranean diet adherence and CVD incidence and mortality. The PubMed database was searched up to June 2014. A total of 17 studies were extracted and 11 qualified for the quantitative analysis. Individuals in the highest quantile of adherence to the diet had lower incidence [relative risk (RR): 0.76, 95% confidence intervals (CI): 0.68, 0.83] and mortality (RR: 0.76, 95% CI: 0.68, 0.83) from CVD compared to those least adherent. A significant reduction of risk was found also for coronary heart disease (CHD) (RR: 0.72, 95% CI: 0.60, 0.86), myocardial infarction (MI) (RR: 0.67; 95% CI: 0.54, 0.83), and stroke (RR: 0.76; 95% CI: 0.60, 0.96) incidence. Pooled analyses of individual components of the diet revealed that the protective effects of the diet appear to be most attributable to olive oil, fruits, vegetables, and legumes. An average reduced risk of 40% for the aforementioned outcomes has been retrieved when pooling results of RCTs. A Mediterranean dietary pattern is associated with lower risks of CVD incidence and mortality, including CHD and MI. The relative effects of specific food groups should be further investigated.

### KEYWORDS

Prevention; randomized controlled trials; prospective cohort studies; olive oil; vegetables; fruit; legumes

# Meta-analysis of prospective cohort studies

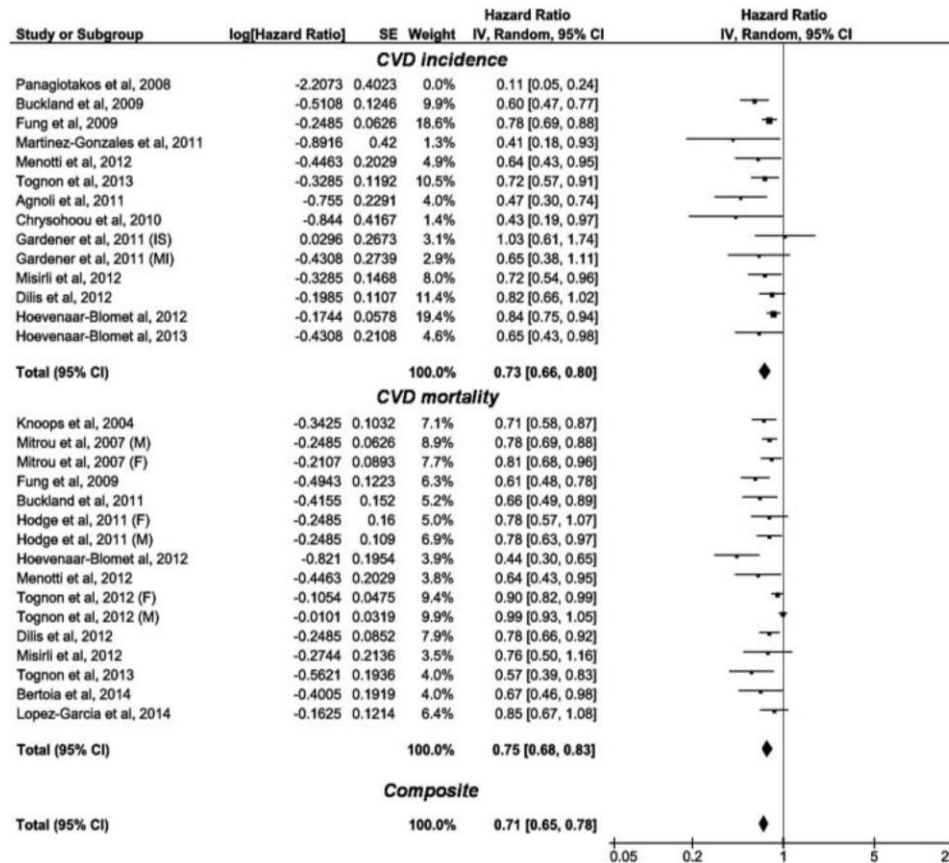
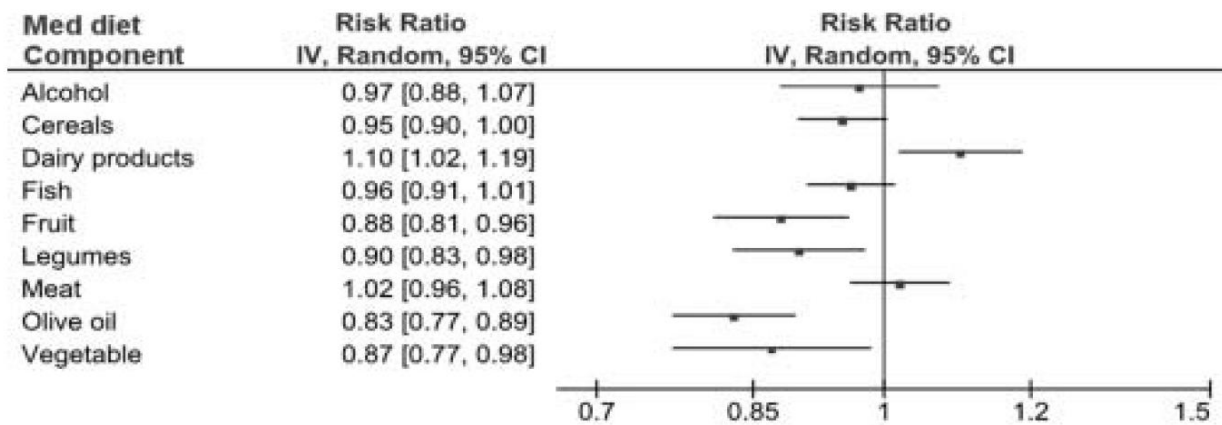


Figure 2. Meta-analysis of prospective studies evaluating Mediterranean diet adherence and cardiovascular disease (CVD) risk by using relative risk (RR) and 95% confidence intervals (CI) comparing highest diet adherence with the lowest category. Size of symbol is proportional to inverse of variance of RR; horizontal line represents 95% CI.



# The individual components



**Figure 4.** Pooled risk ratios of individual Mediterranean diet components and composite CVD outcomes.

# The anatomy of the Mediterranean diet

BMJ

RESEARCH

## Anatomy of health effects of Mediterranean diet: Greek EPIC prospective cohort study

Antonia Trichopoulou, professor,<sup>1</sup> Christina Bamia, lecturer,<sup>1</sup> Dimitrios Trichopoulos, professor<sup>2</sup>

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Cite this as: *BMJ* 2009;338:b2337  
doi:10.1136/bmj.b2337

### ABSTRACT

**Objective** To investigate the relative importance of the individual components of the Mediterranean diet in generating the inverse association of increased adherence to this diet and overall mortality.

**Design** Prospective cohort study.

**Setting** Greek segment of the European Prospective Investigation into Cancer and nutrition (EPIC).

**Participants** 23 349 men and women, not previously diagnosed with cancer, coronary heart disease, or diabetes, with documented survival status until June 2008 and complete information on nutritional variables and important covariates at enrolment.

**Main outcome measure** All cause mortality.

**Results** After a mean follow-up of 8.5 years, 652 deaths

### INTRODUCTION

The Mediterranean diet was introduced to the scientific community as a health protecting diet by the classic studies of Ancel Keys and colleagues.<sup>1</sup> In 1995 a simple score to assess adherence to the Mediterranean diet was introduced,<sup>2</sup> and this score, or variants of it, has been used to evaluate the relation of the Mediterranean diet to overall mortality, as well as to specific health outcomes, including Alzheimer's disease, diabetes mellitus, and cancer overall.<sup>3-5</sup> Most of these studies have focused on overall survival, as this is a natural priority. A recent meta-analysis summarised the results of nine cohort studies that evaluated the relation between adherence to the Mediterranean diet and overall mortality.<sup>6</sup> An inverse association was noted in all these studies, with a pooled mortality ratio (rela-

BMJ. 2009 Jun 23;338:b2337.

# Adherence to Mediterranean diet and cancer



*nutrients*



Review

## Adherence to Mediterranean Diet and Risk of Cancer: An Updated Systematic Review and Meta-Analysis

Lukas Schwingshackl <sup>1,\*</sup>, Carolina Schwedhelm <sup>1</sup>, Cecilia Galbete <sup>2</sup> and Georg Hoffmann <sup>3</sup>

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<sup>2</sup> Department of Molecular Epidemiology, German Institute of Human Nutrition Potsdam-Rehbruecke, 14558 Nuthetal, Germany; Cecilia.Galbete@dife.de

<sup>3</sup> Department of Nutritional Sciences, University of Vienna, Althanstraße 14, 1090 Vienna, Austria; georg.hoffmann@univie.ac.at

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**Abstract:** The aim of the present systematic review and meta-analysis was to gain further insight into the effects of adherence to Mediterranean Diet (MedD) on risk of overall cancer mortality, risk of different types of cancer, and cancer mortality and recurrence risk in cancer survivors. Literature search was performed using the electronic databases PubMed, and Scopus until 25 August 2017. We included randomized trials (RCTs), cohort (for specific tumors only incidence cases were used) studies, and case-control studies. Study-specific risk ratios, hazard ratios, and odds ratios (RR/HR/OR) were pooled using a random effects model. Observational studies (cohort and case-control studies), and intervention trials were meta-analyzed separately. The updated review process showed 27 studies that were not included in the previous meta-analysis (total number of studies evaluated: 83 studies). An overall population of 2,130,753 subjects was included in the present update. The highest adherence score to a MedD was inversely associated with a lower risk of cancer mortality (RR = 0.86, 95% CI 0.81 to 0.91,  $I^2 = 82%$ ;  $n = 14$  studies), colorectal cancer (RR = 0.86, 95% CI 0.81 to 0.91,  $I^2 = 82%$ ;  $n = 14$  studies).

# Mediterranean diet and cancer mortality/incidence

**Table 2.** Risk ratio/odds ratio associated with the highest adherence to Mediterranean dietary pattern.

Outcome	No. of Studies	Study Type	Risk Ratio/Odds Ratio	95% CI	I <sup>2</sup> (%)
Cancer mortality	1	RCT	0.75	0.17, 3.33	NA
	14	Cohort	0.86	0.81, 0.91	82
Colorectal cancer incidence	11	Observational	0.82	0.75, 0.88	73
	6	Cohort	0.86	0.80, 0.92	28
Breast cancer incidence	5	Case-control	0.71	0.57, 0.88	88
	1	RCT	0.43	0.21, 0.88	NA
	16	Observational	0.92	0.89, 0.96	8
Prostate cancer incidence	7	Cohort	0.94	0.90, 0.99	11
	9	Case-control	0.89	0.85, 0.94	0
	6	Combined	0.96	0.92, 1.00	0
Gastric cancer incidence	3	Cohort	0.96	0.92, 1.00	0
	3	Case-control	0.90	0.64, 1.26	52
	4	Combined	0.72	0.60, 0.86	55
Liver cancer incidence	2	Cohort	0.82	0.61, 1.10	49
	2	Case-control	0.65	0.53, 0.79	53
	2	Combined	0.58	0.46, 0.73	0
Esophageal cancer	1	Cohort	0.62	0.47, 0.82	NA
	1	Case-control	0.51	0.34, 0.77	NA
	2	Combined	0.49	0.22, 1.09	83

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# Only among Mediterraneans?

- ❖ Studies conducted in **Denmark** and the **Netherlands** in Europe, **Melbourne** in Australia, **China** and the **US** provided additional evidence that adherence to the principles of the Mediterranean diet affects the survival of elderly people
  - ❖ This evidence rejected the possibility of an association confounded by non-diet related factors and the probability of effect modifiers shaping the health promoting effects of the Mediterranean diet.
  - ❖ It is not the climatic, social and cultural conditions that shaped this association and
  - ❖ the evidence for an **independent effect of diet on overall survival** is reinforced.
-

# The PREDIMED trial (Prevención con Dieta Mediterránea)

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## Predimed Prevención con Dieta Mediterránea

### The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED 1812 APRIL 4, 2013 VOL 368 NO 14

#### Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

Ramón Estruch, M.D., Ph.D., Emilio Ros, M.D., Ph.D., Jordi Salas-Salvadó, M.D., Ph.D., Maria Isabel Covas, D.Pharm., Ph.D., Dolores Corella, D.Pharm., Ph.D., Ferran Andres, M.D., Ph.D., Enric Gómez-Cabrera, M.D., Ph.D., València Ruiz-Gutiérrez, Ph.D., Miguel Ángel Muñoz, M.D., Ph.D., José Lluís Serra, M.D., Ph.D., Rosa María Lamuela-Raventós, D.Pharm., Ph.D., Ulrik Selvin, M.D., Ph.D., Kees Hovinga, M.D., Ph.D., José Barón, M.D., Ph.D., Miguel Ángel Martínez-González, M.D., Ph.D., José Alfredo Martínez, D.Pharm., M.D., Ph.D., and Miguel Ángel Martínez-González, M.D., Ph.D., for the PREDIMED Study Investigators\*

#### ABSTRACT

**OBJECTIVE:** Observational cohort studies and a secondary prevention trial have shown an inverse association between adherence to the Mediterranean diet and cardiovascular risk. We conducted a randomized trial of this diet pattern for the primary prevention of cardiovascular events.

**DESIGN:** In a multicenter trial in Spain, we randomly assigned participants who were at high cardiovascular risk, but with no cardiovascular disease at enrollment, to one of three diets: a Mediterranean diet supplemented with extra-virgin olive oil, a Mediterranean diet supplemented with mixed nuts, or a control diet (tablets to reduce dietary fat). Participants received quarterly individual and group educational sessions and, depending on group assignment, free provision of extra-virgin olive oil, mixed nuts, or small seedbed gifts. The primary end point was the rate of major cardiovascular events (nonfatal infarction, stroke, or death from cardiovascular causes). On the basis of the results of an interim analysis, the trial was stopped after a median follow-up of 4.8 years.

The authors' disclosures are listed on the inside back cover of this issue. Address reprint requests to Dr. Estruch at the Department of Internal Medicine, Hospital Clinic, University of Barcelona, Spain, or at the corresponding author's address: Dr. Estruch, Department of Preventive Medicine and Public Health, Hospital de la Santa Creu i Sant Pau, University of Barcelona, Spain, or [estruch@clinic.ub.es](mailto:estruch@clinic.ub.es).

\*The principal investigators on this multicenter study originated or were based in the Department of Preventive Medicine and Public Health, Hospital de la Santa Creu i Sant Pau, University of Barcelona, Spain, or [estruch@clinic.ub.es](mailto:estruch@clinic.ub.es).

#### Annals of Internal Medicine

#### ORIGINAL RESEARCH

#### Prevention of Diabetes With Mediterranean Diets

##### A Subgroup Analysis of a Randomized Trial

and Ulrik Selvin, M.D., Ph.D., Emilio Ros, M.D., Ph.D., Ramón Estruch, M.D., Ph.D., María Isabel Covas, D.Pharm., Ph.D., Dolores Corella, D.Pharm., Ph.D., Ferran Andres, M.D., Ph.D., Enric Gómez-Cabrera, M.D., Ph.D., València Ruiz-Gutiérrez, Ph.D., José Lluís Serra, M.D., Ph.D., Kees Hovinga, M.D., Ph.D., José Barón, M.D., Ph.D., Miguel Ángel Martínez-González, M.D., Ph.D., José Alfredo Martínez, D.Pharm., M.D., Ph.D., and Miguel Ángel Martínez-González, M.D., Ph.D., for the PREDIMED Study Investigators\*

**Background:** Intervention promoting weight loss can reduce the incidence of type 2 diabetes mellitus. Whether dietary changes without calorie restriction also protect from diabetes has not been established.

**Objective:** To assess the efficacy of Mediterranean diets for the primary prevention of diabetes in the Prevention con Dieta Mediterránea trial, from October 2008 to December 2010 (median follow-up, 4.1 years).

**Design:** Subgroup analysis of a multicenter, randomized trial of calorie restriction (see [10.1093/ajph.2012.102.1511">10.1093/ajph.2012.102.1511](#)).

**Setting:** Primary care centers in Spain.

**Participants:** Men and women without diabetes (1041 patients) aged 55 to 80 years at high cardiovascular risk.

**Intervention:** Participants were randomly assigned and stratified by sex, sex, and age but not diabetes status to receive 1 of 3 diets: Mediterranean diet supplemented with extra-virgin olive oil (EVOO), Mediterranean diet supplemented with nuts, or a control diet (tablets) as a source of fat. The intervention to receive general advice on weight loss.

**Measurements and Main Results:** The incidence of diabetes was significantly lower in the EVOO and nut groups compared with the control group. The incidence of diabetes was significantly lower in the EVOO and nut groups compared with the control group. The incidence of diabetes was significantly lower in the EVOO and nut groups compared with the control group.

**Conclusion:** Mediterranean diets supplemented with EVOO or nuts may reduce the risk of diabetes in high-risk individuals.

**Keywords:** diabetes mellitus, diet, Mediterranean diet, primary prevention, randomized controlled trial, weight loss.

INVESTIGATORS ACCESS

GENERAL PUBLIC

THE THEMATIC NETWORK

PREDIMED PLUS

PREDIMED TRIAL DESIGN  
Presentation of the final results

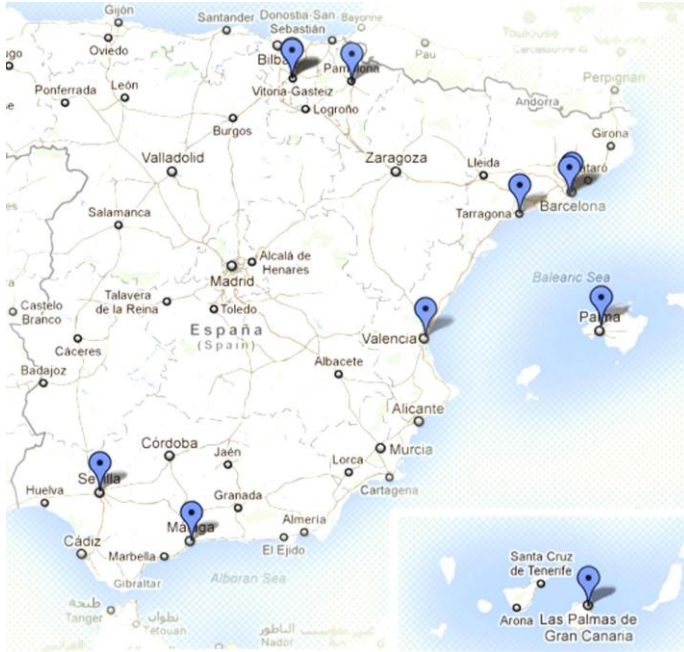
1. High CV risk without CVD

2. Hypertension

3. LDL

4. Women 60-80 yr

# The PREDIMED trial



- ❖ A multi-center randomized, 3-group parallel trial for CVD prevention
- ❖ 7447 individuals (males 55-80 yrs and females 60-80 yrs) at high CVD risk
- ❖ Assigned to 3 groups:
  - ❖ Group 1: Low-fat diet
  - ❖ Group 2: Mediterranean diet supplemented with virgin olive oil (1L per week)
  - ❖ Group 3: Mediterranean diet supplemented with nuts (30g per week)
- ❖ Primary endpoints: CVD events, including CVD death, nonfatal MI or nonfatal stroke.
- ❖ Median FU time: 4.8 years

# The PREDIMED trial



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

## Primary Prevention of Cardiovascular Disease with a Mediterranean Diet Supplemented with Extra-Virgin Olive Oil or Nuts

R. Estruch, E. Ros, J. Salas-Salvadó, M.-I. Covas, D. Corella, F. Arós,  
E. Gómez-Gracia, V. Ruiz-Gutiérrez, M. Fiol, J. Lapetra, R.M. Lamuela-Raventos,  
L. Serra-Majem, X. Pintó, J. Basora, M.A. Muñoz, J.V. Sorlí, J.A. Martínez, M. Fitó,  
A. Gea, M.A. Hernán, and M.A. Martínez-González,  
for the PREDIMED Study Investigators\*

On June 13, 2018, the NEJM retracted the 2013 publication, as a result of error in randomization procedures affecting a portion of participants in the trial. Concurrently, NEJM published a corrected version of the study with reanalyzed data

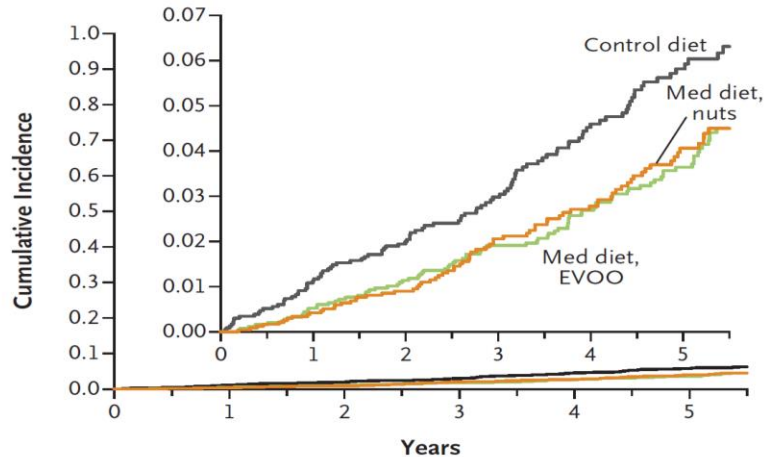
N Engl J Med. 2018;378(25):e34. doi: 10.1056/NEJMoa1800389.



# The PREDIMED trial – New results

## A Primary End Point (acute myocardial infarction, stroke, or death from cardiovascular causes)

Med diet, EVOO: hazard ratio, 0.69 (95% CI, 0.53–0.91)  
 Med diet, nuts: hazard ratio, 0.72 (95% CI, 0.54–0.95)

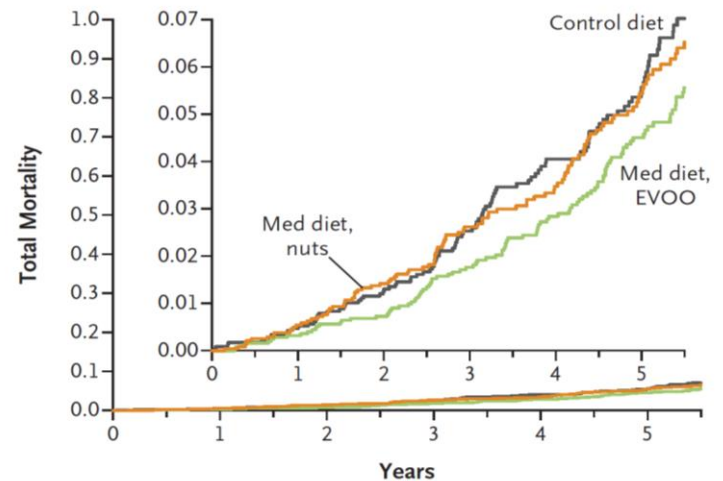


### No. at Risk

Control diet	2450	2268	2020	1583	1268	946
Med diet, EVOO	2543	2486	2320	1987	1687	1310
Med diet, nuts	2454	2343	2093	1657	1389	1031

## B Total Mortality

Med diet, EVOO: hazard ratio, 0.90 (95% CI, 0.69–1.18)  
 Med diet, nuts: hazard ratio, 1.12 (95% CI, 0.86–1.47)



### No. at Risk

Control diet	2450	2270	2027	1586	1272	949
Med diet, EVOO	2543	2486	2324	1991	1691	1310
Med diet, nuts	2454	2345	2097	1662	1395	1037

N Engl J Med. 2018;378(25):e34. doi: 10.1056/NEJMoa1800389.

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# Mediterranean Diet: a sustainable diet

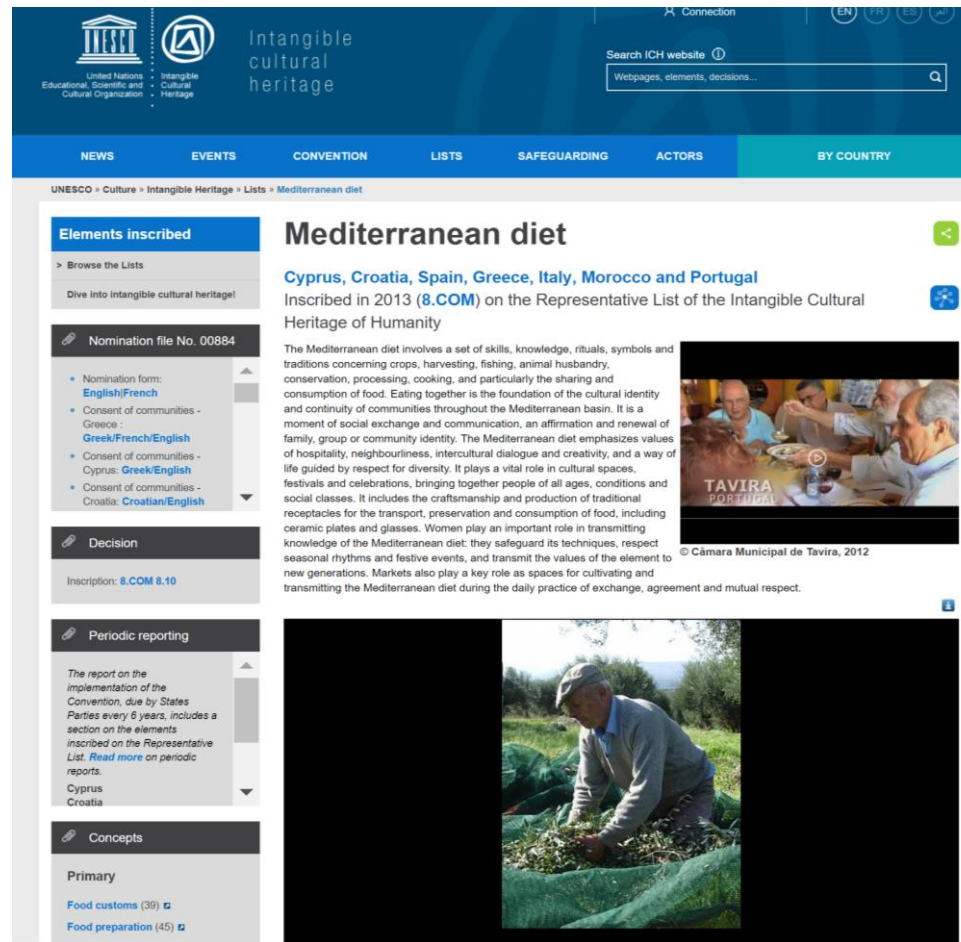
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# Mediterranean diet and sustainability

- ❖ Sustainable diets are those with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources”
  - ❖ The Mediterranean diet is a plant-centered diet which considers the overall impact on the ecosystem. Compared to Western dietary patterns, the Mediterranean diet has lower demands on soil, water and energy resources, lower greenhouse emissions and lower water footprints.
-

# Mediterranean diet recognized as UNESCO's intangible cultural heritage (2013)



The screenshot shows the UNESCO Intangible Cultural Heritage website page for the Mediterranean diet. The page is in English and features a blue header with the UNESCO logo and the text "Intangible cultural heritage". A search bar is located in the top right corner. The main navigation menu includes "NEWS", "EVENTS", "CONVENTION", "LISTS", "SAFEGUARDING", "ACTORS", and "BY COUNTRY".

The page content is organized into several sections:

- Elements inscribed:** A sidebar on the left with a "Browse the Lists" button and a search bar. Below it, a "Nomination file No. 00884" section lists nomination forms in English/French, Greek/French/English, Greek/English, and Croatian/English. A "Decision" section shows the inscription as 8.COM 8.10.
- Periodic reporting:** A section titled "The report on the implementation of the Convention, due by States Parties every 6 years, includes a section on the elements inscribed on the Representative List. Read more on periodic reports." with a dropdown menu for Cyprus and Croatia.
- Concepts:** A section with a "Primary" category, listing "Food customs (39)" and "Food preparation (45)".

The main content area features the title "Mediterranean diet" and a subtitle "Cyprus, Croatia, Spain, Greece, Italy, Morocco and Portugal". Below this, it states "Inscribed in 2013 (8.COM) on the Representative List of the Intangible Cultural Heritage of Humanity". A paragraph describes the diet as a set of skills, knowledge, rituals, and symbols, emphasizing social exchange and community identity. A video player shows a group of people eating together, with the text "TAVIRA PORTUGAL" overlaid. The video is credited to "© Câmara Municipal de Tavira, 2012".

At the bottom of the page, there is a large image of a man in a grey sweater and cap working in a field, possibly harvesting or preparing food.

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# Concluding remarks

- ❖ **Patterns of dietary intake do matter:** It is often difficult to isolate the specific effects of nutrients or foods. We cannot be certain that the effect observed is only attributed to the nutrient studied. We cannot rule out the possibility that this particular nutrient acts as a surrogate marker of an eating pattern
  - ❖ The Mediterranean diet encompasses an a priori defined dietary pattern, which **existed in the region for years**
  - ❖ Being adjusted to the cultural, climatic and other environmental characteristics of the region, the Mediterranean diet is protective and helpful to **biodiversity**; accessible and economically **affordable**; can lead to a cut down of country's **expenses for food imports**; and contributes to **food and nutrition security**, as well as to the **health** of present and future generations
-

# “Ancel Keys International Seminar on Mediterranean Diet and Sustainable Nutritional Policies” (Ascea Marina Italy, 30 September – 4 October 2019)



MEDITERRANEAN  
**DIET**  
SEMINAR  
II Edition

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## MEDITERRANEAN DIET SEMINAR

**“Ancel Keys International Seminar on Mediterranean Diet and Sustainable Nutritional Policies” (30 September – 4 October 2019)**

*Promoted by:*

- Italian Society for Human Nutrition (SINU)
- Parco del Cilento, Vallo di Diano ed Alburni
- Federico II University of Naples
- University of Salerno
- Institute of Food Science – National Research Council (Avellino)
- IRCCS NEUROMED (Pozzilli)

with the collaboration of Fondazione Alario (Ascea, SA) and Associazione per la Dieta Mediterranea Ancel Keys Pioppi (Pioppi, SA)

Key contents: “The ancestral knowledge on the most healthy, safe and sustainable among the popular...”

More information at <https://www.mediterraneandietseminar.org/>



Grazie per la vostra  
attenzione



Thank you very much for your  
attention!