

La fruta y la verdura



MA Martínez-González

VIII Congreso Internacional de Barcelona sobre la Dieta Mediterránea

RD 06/0045: Alimentación saludable en la prevención de enfermedades crónicas: Red PREDIMED



Fondo Europeo de Desarrollo Regional
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Universidad de Navarra

La fruta y la verdura

Introducción

Cohortes y metaanálisis

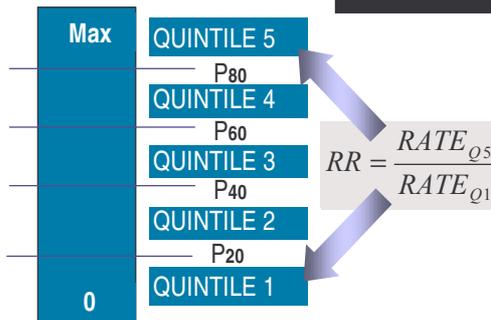
- Cáncer
- ECV (CI y ACV)
- Diabetes

Ensayos

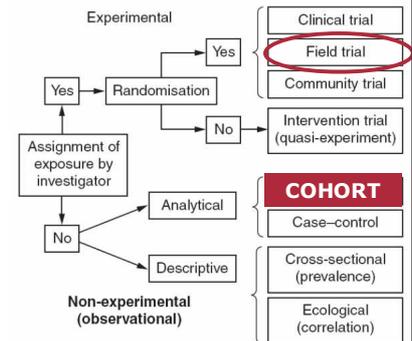
- Suplementos?
- Low-fat diets?
- Patrones completos



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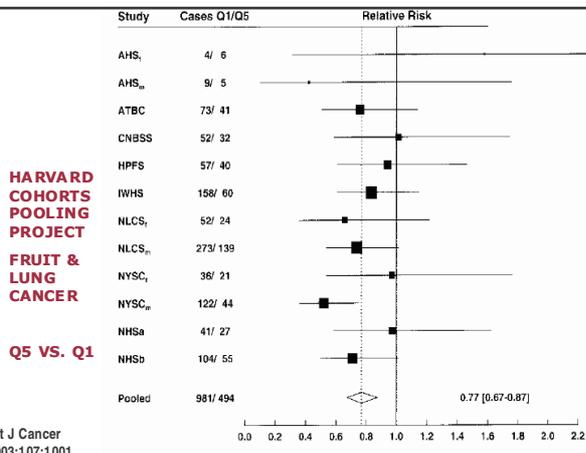


Research designs



Source: Martínez JA, Martínez-González MA. *Nutrition Research Methodology: the scientific method and nutritional research*. In: Gibney MJ, et al. *Introduction to Human Nutrition. The Nutrition Society Textbook series*. London: Blackwell Science.

Figure 13.2 Classification of epidemiological designs.



Int J Cancer
2003;107:1001

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Am J Clin Nutr 2003;78(suppl):559S-69S

TABLE 5

Summary results of the meta-analyses on fruit and vegetables and the risk of some cancers in case-control and cohort studies¹

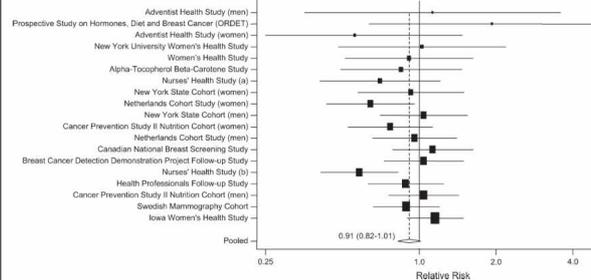
	Vegetables		Fruit	
	Case-control	Cohort	Case-control	Cohort
Mouth and pharynx	NS	?	↓	?
Larynx	NS	?	↓	?
Esophagus	↓	?	↓	?
Breast	↓	NS	NS	NS
Lung	↓	NS	↓	↓
Bladder	NS	NS	↓	↓
Stomach	↓	NS	↓	NS
Colorectum	↓	NS	↓	NS

¹ ↓, significant protective effect; NS, nonsignificant protective effect.

Pooling Project: F&V & Colon cancer

J Natl Cancer Inst 2007;99:1471

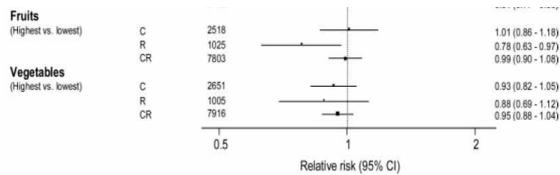
n = 756.217



Highest versus lowest quintile

Meta-analysis: 16 cohorts

Int J Cancer 2009;125:171-180



Dietary fibre in food and protection against colorectal cancer in the European Prospective Investigation into Cancer and Nutrition (EPIC): an observational study

Lancet 2003; 361: 1496-501

10 países
519.978 participantes
1.939.011 p-años
1065 casos incid.

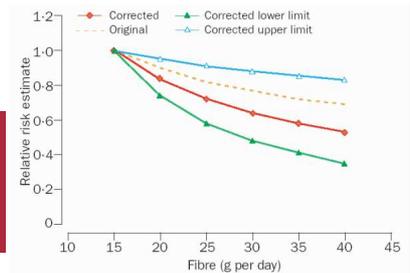


Figure 1: Relative risk for colorectal cancer according to dietary fibre intake

Calculated from Cox's regression using age, weight, height, sex, non-fat energy, energy from fat. Original estimates are calculated from the hazard ratio²⁰ for each quintile increase in energy adjusted fibre (table 3).

Oral cavity-pharynx, larynx & esophagus: EPIC

Cancer Causes Control 2006;17:957-69

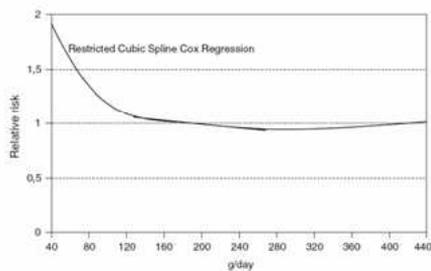


Fig. 1 Estimated relative risk of squamous cell cancer (SCC) for intake of total fruits (restricted cubic spline and linear risk functions)

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European Journal of Clinical Nutrition (2002) 56, 715-722
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www.nature.com/ejcn

ORIGINAL COMMUNICATION

Role of fibre and fruit in the Mediterranean diet to protect against myocardial infarction: a case-control study in Spain

MA Martínez-González^{1,2}, E Fernández-Jarne^{1,2}, E Martínez-Losa^{1,3}, M Prado-Santamaría^{1,3}, C Brugarolas-Brufau^{1,3} and M Serrano-Martínez^{1,3}

¹Department of Epidemiology and Public Health, University of Navarra, Pamplona, Spain; ²Department of Cardiology, University Clinic of Navarra, Navarre, Spain; and ³Navarre Primary Care Health Services, Navarre, Spain

Eur J Clin Nutr 2002;56:715-22

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OR of a 1st Myocardial infarction

Eur J Clin Nutr 2002;56:715-22

Age-, gender- and hospital-matched odds ratios, adjusted for smoking, body mass index, hypertension, high blood cholesterol, diabetes, leisure-time physical activity, marital status, occupation, educational level, ethanol, SFA, trans-fat, glycaemic load, folic acid, and olive oil intake.

RR for CHD (84,251 women, follow-up: 14 yr & 42,148 men, follow-up: 8yr)

Ann Intern Med 2001;134:1106-14

Adjusted for age, smoking, alcohol intake, family history of myocardial infarction, body mass index, vitamin supplement use, vitamin E use, physical activity, aspirin use, hypertension, hypercholesterolemia, total daily caloric intake, and postmenopausal hormone use (among women).

Women: 580 404 person-years of follow-up and 1127 cases.
Men: 164 450 person-years of follow-up and 1063 cases.

RR for Ischemic Stroke
75,596 women, follow-up: 14 yr
38,683 men, follow-up: 8yr

JAMA 1999;282:1233

Adjusted for age, smoking, alcohol, family history of myocardial infarction, BMI, vitamin supplement use, vitamin E use, physical activity, aspirin use, hypertension and hypercholesterolemia, total energy intake, and among women, postmenopausal hormone use.

Women: 581 118 person-years of follow-up and 366 cases.
Men: 166 566 person-years of follow-up and 204 cases.

Associations between dietary methods and biomarkers, and between fruits and vegetables and risk of ischaemic heart disease, in the EPIC Norfolk Cohort Study

Sheela Bingham^{1,2,3}, Robert Luben⁴, Alisa Welch⁵, Yen Ling Low⁶, Kay Tee Khaw⁷, Nick Wareham⁸ and Nick Day⁹

Int J Epidemiol 2008;37:978

Figure 1 Plasma vitamin C and fruit and vegetable intake from different methods and risk of developing IHD in 678 cases in EPIC Norfolk Cohort of 11 134 free of CHD at baseline. HR per quintile are shown

Optimal Diets for Prevention of Coronary Heart Disease

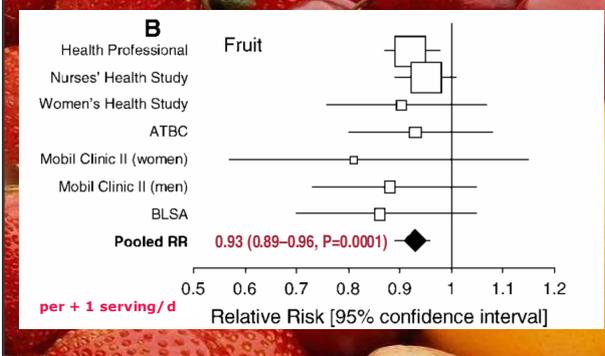
Frank B. Hu, MD, PhD
Walter C. Willett, MD, MPH

JAMA 2002;288:2569

Figure 4. Prospective Cohort Studies of Cardiovascular Disease and Consumption of Nuts, Fruits and Vegetables, or Whole Grains

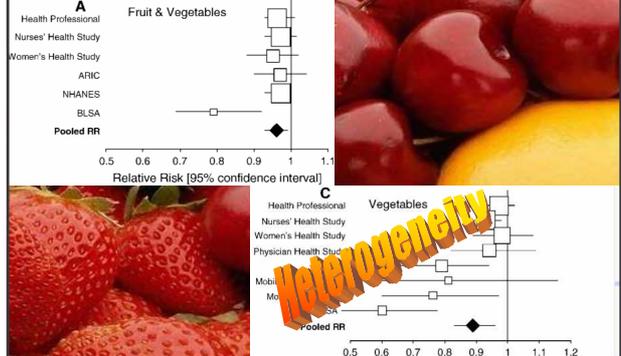
Fruit and Vegetable Consumption and Risk of Coronary Heart Disease: A Meta-Analysis of Cohort Studies¹
 Luc Drouot,^{1,2} Philippe Amoult,³ Serge Hercberg,² and Jean Dallongeville^{1,2*}
J Nutr 2006;136:2588-93

The risk of CHD is decreased by 4% for each additional portion per day of fruit and vegetables and by 7% for fruit consumption.

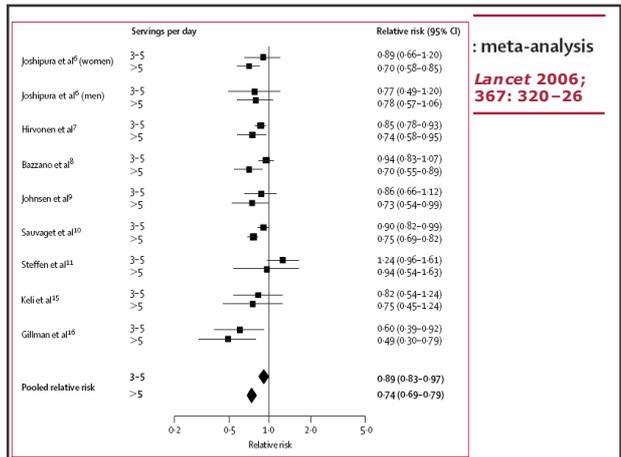
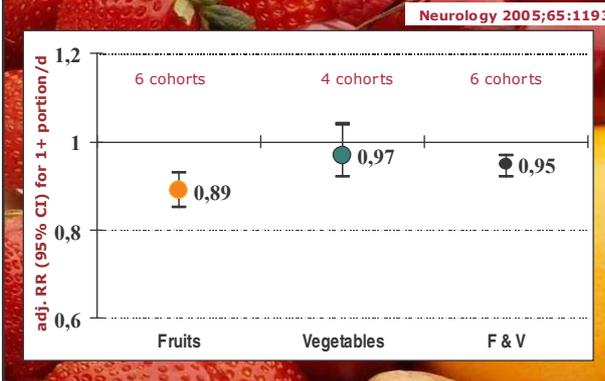


Fruit and Vegetable Consumption and Risk of Coronary Heart Disease: A Meta-Analysis of Cohort Studies¹
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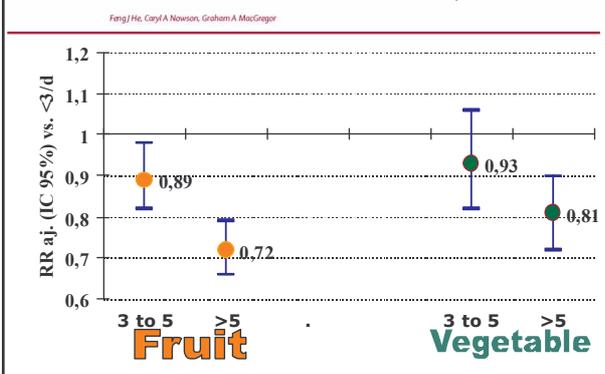
The risk of CHD is decreased by 4% for each additional portion per day of fruit and vegetables and by 7% for fruit consumption.



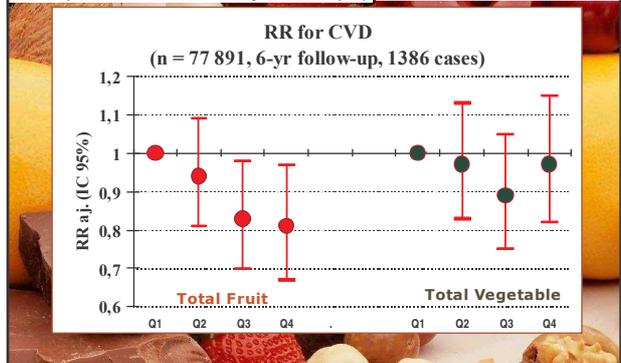
Fruit and vegetable consumption and risk of stroke
A meta-analysis of cohort studies
Neurology 2005;65:1193

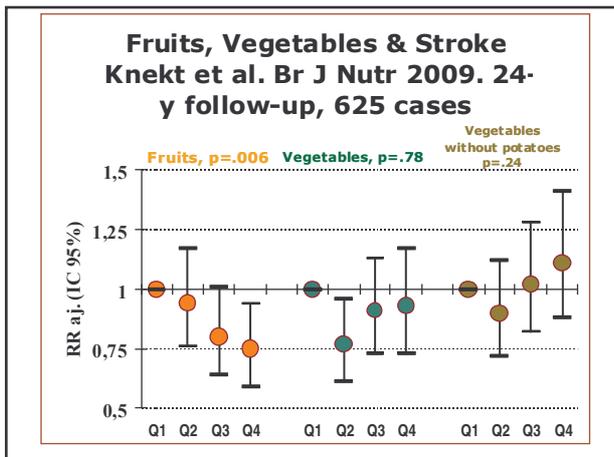


Fruit and vegetable consumption and stroke: meta-analysis of cohort studies
Lancet 2006; 367: 320-26
 Fang J He, Cary A Nowson, Graham A MacGregor



Fruit and Vegetable Intake and Risk of Total Cancer and Cardiovascular Disease
 Japan Public Health Center-based Prospective Study
 Riebeke Takachi^{1*}, Mamami Inoue², Junko Ishihara³, Norie Kurahashi⁴, Motoki Iwasaki⁵, Shizuka Senozaki⁶, Hiroyasu Imai⁷, Yoshitaka Tsukamoto⁸, and Shoichiro Tsugane⁹ for the JPHC Study Group
Am J Epidemiol 2008;167:59





The SUN cohort

Published by Oxford University Press on behalf of the International Epidemiological Association International Journal of Epidemiology 2006;35:1417-1422
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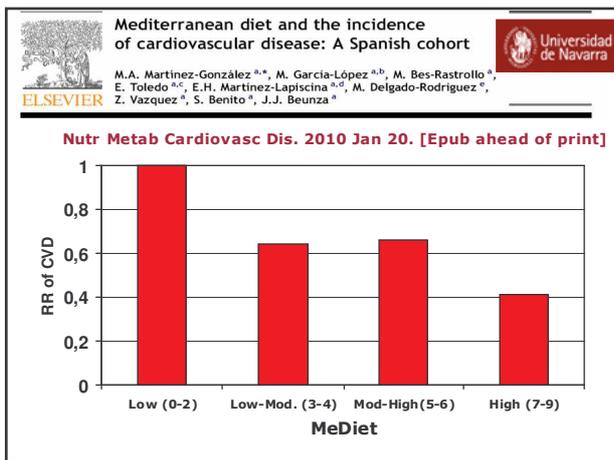
COHORT PROFILE
Cohort profile: The 'Seguimiento Universidad de Navarra' (SUN) study Int J Epidemiol 2006;35:1417.

María Seguí-Gómez,^a Carmen de la Fuente, Zenaida Vázquez, Jokin de Irala and Miguel A. Martínez-González

Public Health Nutrition: 9:1A1, 127-131 DOI: 10.1079/PHN2005935

The SUN cohort study (Seguimiento University of Navarra)
Miguel Ángel Martínez-González*
Department of Preventive Medicine and Public Health, Facultad de Medicina, Clínica Universitaria, Universidad de Navarra, Iruñeako 1, 31080 Pamplona, Spain
Public Health Nutr 2006;9:127

www.unav.es/preventiva Universidad de Navarra

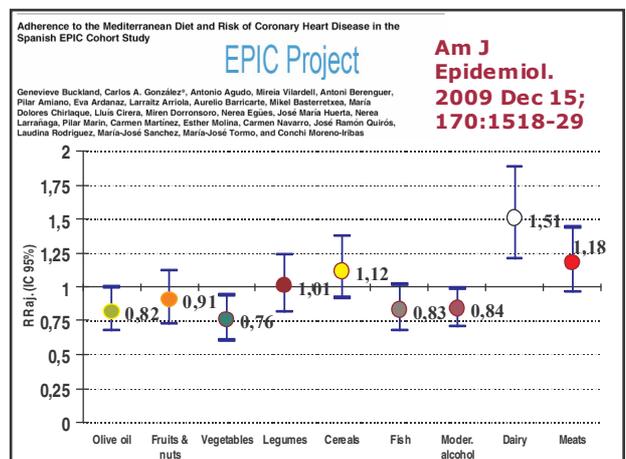
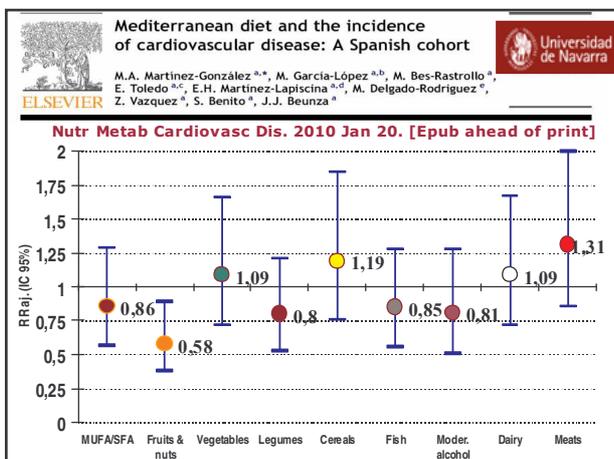


Mediterranean diet Trichopoulos's score

www.unav.es/preventiva

- 1 point if \geq sex-specific Median
 - MUFA/SFA ratio
 - Fruits & nuts
 - Vegetables
 - Cereals
 - Legumes
 - Fish
- 1 point if \leq sex-specific Median
 - Meat/meat products
 - Dairy
- Alcohol: 1 point if
 - Men: between 10-50 g/d
 - Women: between 5-25 g/d

Range: 0-9 points



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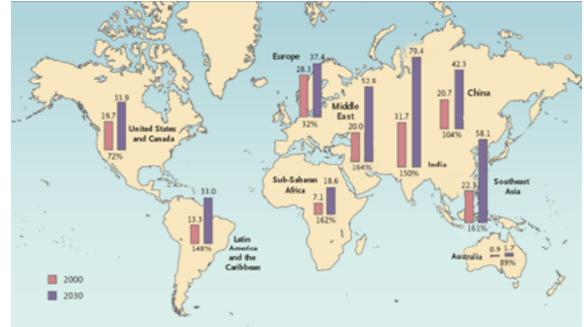
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Ensayos

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- Low-fat diets?
- Patrones completos

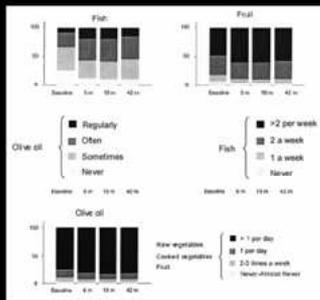


Millions of cases of diabetes in 2000 and Projections for 2030 (N Engl J Med 2007;356:214)

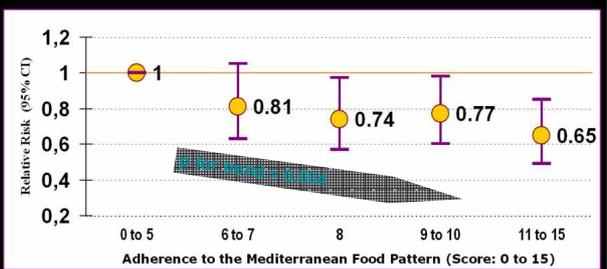


GISSI-Prevenzione study (Lancet 2007;370:667-75)

- 8 291 survivors of AMI
- Simple questionnaire
- 5-item score (0-3 points for each)
 - Fish
 - Fruit
 - Cooked vegetables
 - Raw vegetables
 - Olive oil
- Score: 0 to 15
- Mean follow-up: 3.2 yr
- 998 participants developed new-onset diabetes



GISSI-Prevenzione study (Lancet 2007;370:667-75)



*Adjusted for age, sex, smoking, time from AMI to enrolment, treatment assignment, BMI, physical activity, stress testing, NYHA class, angina class, history of hypertension, another prior AMI, use of medication, consumption of cheese, wine and coffee.



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RESEARCH

Adherence to Mediterranean diet and risk of developing diabetes: prospective cohort study

M Á Martínez-González, professor of epidemiology and chair,¹ C de la Fuente-Arrillaga, research assistant,¹ J M Nunez-Cordoba, research fellow,^{1,2} F J Basterra-Gortari, research fellow,^{1,3} J J Beunza, assistant professor,¹ Z Vazquez, research assistant,¹ S Benito, research assistant,¹ A Tortosa, research fellow,¹ M Bes-Rastrollo, assistant professor¹

Department of Preventive Medicine and Public Health, Medical School-Clinica Universitaria, University of Navarra, Pamplona, Spain

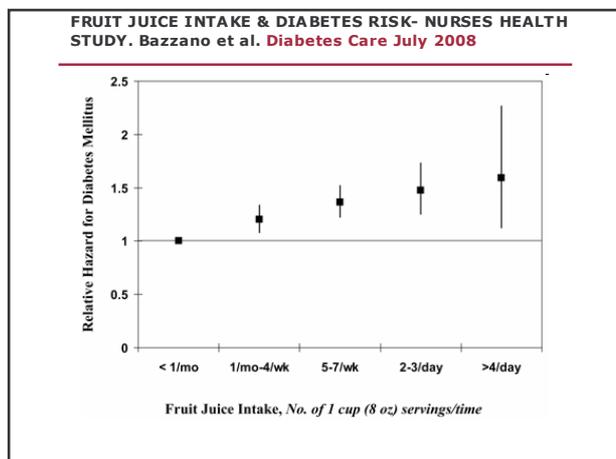
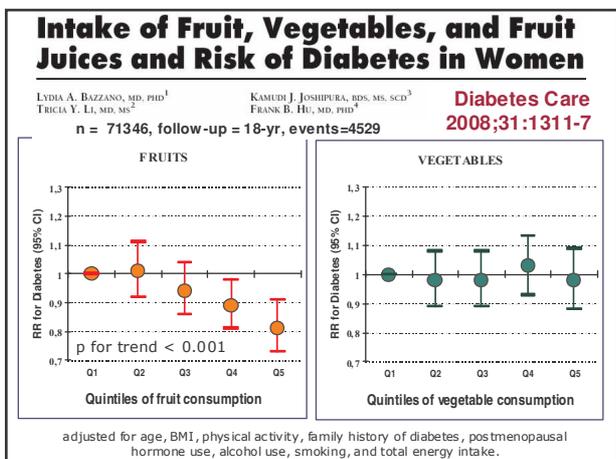
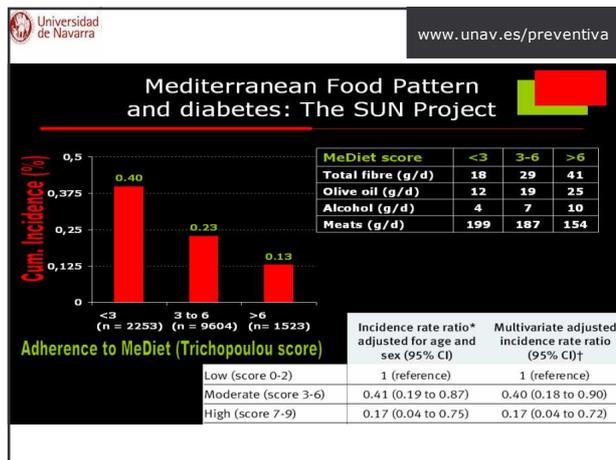
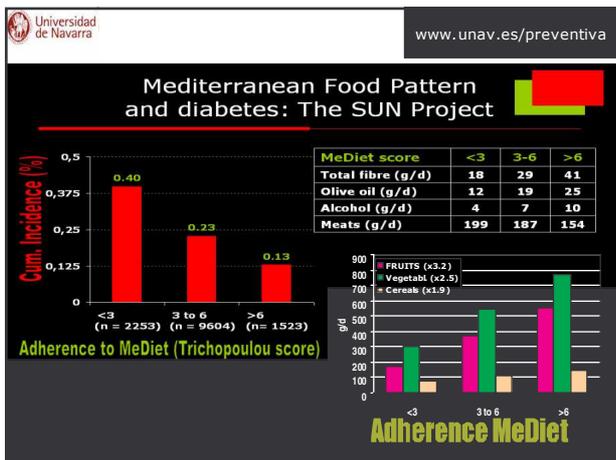
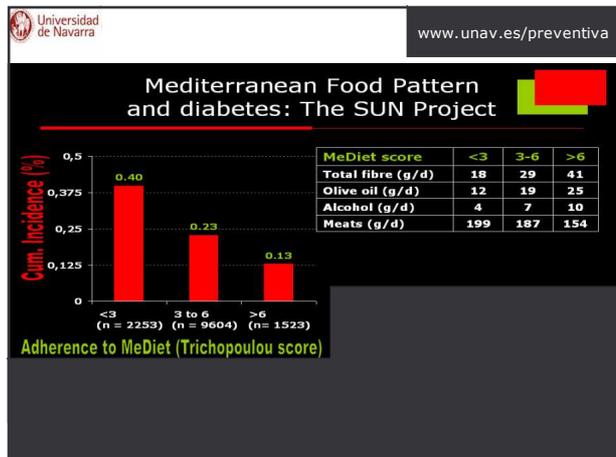
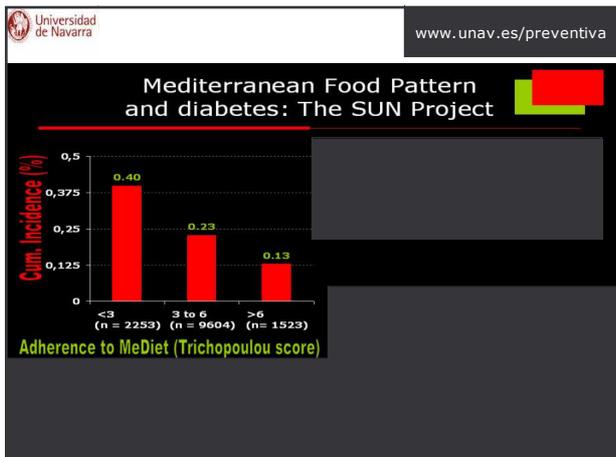
ABSTRACT
Objective To assess the relation between adherence to a Mediterranean diet and the incidence of diabetes among initially healthy participants. diabetes. Many studies have shown that the Mediterranean food pattern has a role in prevention of cardiovascular disease.^{1,2} The similarity of some risk factors and some empirical and mechanistic evidence

BMJ 2008;336:1348-51



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MeDiet (Trichopoulos score)	<3	3-6	>6
n	2258	9657	1549
% Male	40	39	45
Age	34	38	43
BMI	23.0	23.5	23.8
% Family history of diabetes	12	14	17
% history hypertension	6	9	14
% Current or ex-smoker	44	51	58
Total energy intake (kcal/d)	2286	2586	2783
Physical activity (METS-h/wk)	24	29	36



Plasma Vitamin C Level, Fruit and Vegetable Consumption, and the Risk of New-Onset Type 2 Diabetes Mellitus

Arch Intern Med
2008;168:1493-9
12-yr follow-up
735 events

The European Prospective Investigation of Cancer–Norfolk Prospective Study
Anne-Helen Harding, PhD; Nicholas J. Wareham, FRCP, PhD; Sheila A. Bingham, PhD; Kay-Tee Khaw, FRCP; Robert Luben, RS; Alice Wolk, PhD; Nita G. Forouhi, FRCM, PhD

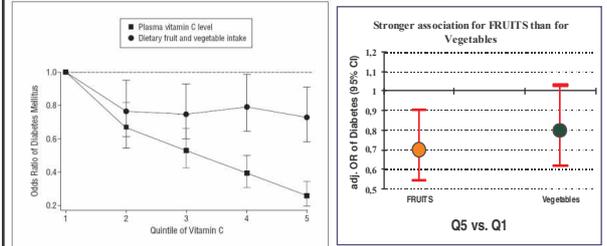


Figure. Odds ratio of diabetes mellitus by quintiles of plasma vitamin C level and fruit and vegetable intake, adjusted for age and sex: European Prospective Investigation of Cancer–Norfolk study. For plasma vitamin C analysis, the sample size was 19 246. For fruit and vegetable analysis, the sample size was 21 831. Error bars indicate 95% confidence intervals.

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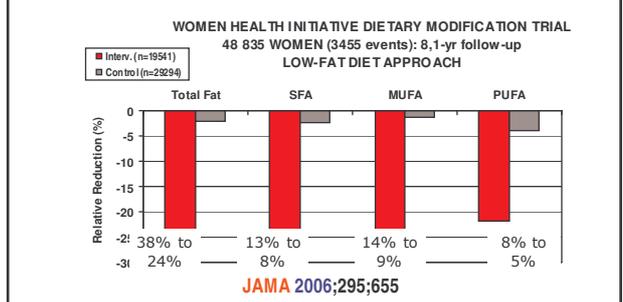


Mortality in Randomized Trials of Antioxidant Supplements for Primary and Secondary Prevention
Systematic Review and Meta-analysis

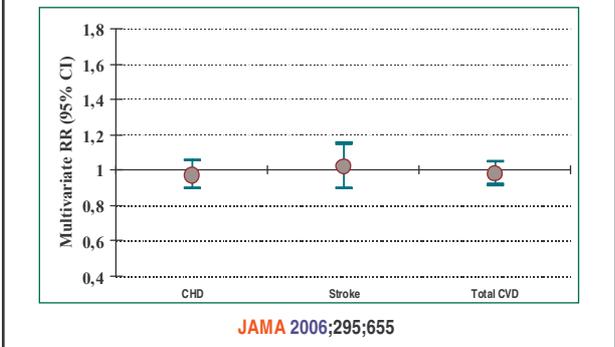
Data Synthesis When all low- and high-bias risk trials of antioxidant supplements were pooled together there was no significant effect on mortality (RR, 1.02; 95% CI, 0.98-1.06). Multivariate meta-regression analyses showed that low-bias risk trials (RR, 1.16; 95% CI, 1.05-1.29) and selenium (RR, 0.998; 95% CI, 0.997-0.9995) were significantly associated with mortality. In 47 low-bias trials with 180 938 participants, the antioxidant supplements significantly increased mortality (RR, 1.05; 95% CI, 1.02-1.08). In low-bias risk trials, after exclusion of selenium trials, beta carotene (RR, 1.07; 95% CI, 1.02-1.11), vitamin A (RR, 1.16; 95% CI, 1.10-1.24), and vitamin E (RR, 1.04; 95% CI, 1.01-1.07), singly or combined, significantly increased mortality. Vitamin C and selenium had no significant effect on mortality.

Conclusions Treatment with beta carotene, vitamin A, and vitamin E may increase mortality. The potential roles of vitamin C and selenium on mortality need further study. *JAMA*. 2007;297:842-857 www.jama.com

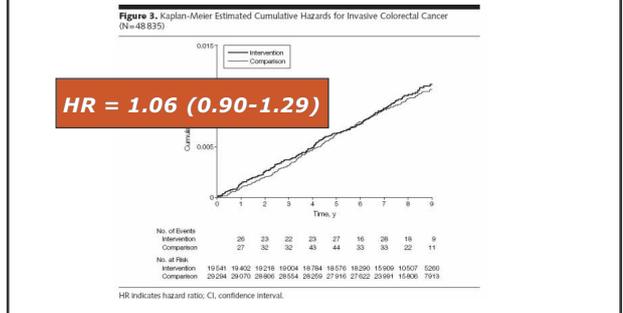
WOMEN'S HEALTH INITIATIVE
www.nhlbi.nih.gov/whi



WOMEN HEALTH INITIATIVE DIETARY MODIFICATION TRIAL
48 835 WOMEN (3455 events): 8.1-yr follow-up
LOW-FAT DIET APPROACH



Low-Fat Dietary Pattern and Risk of Colorectal Cancer
The Women's Health Initiative Randomized Controlled Dietary Modification Trial **JAMA 2006;295:643-654**

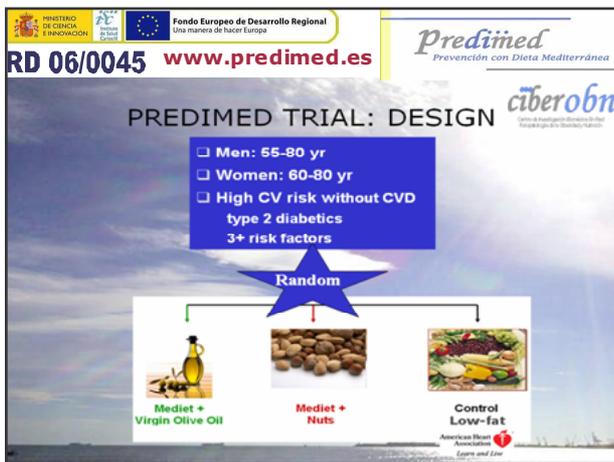


PREDIMED

RD 06/0045 www.predimed.org www.predimed.es

PREMEDIATED Participants

11 RECRUITMENT GROUPS	n	~P-Y
• Navarra- MA Martínez-González	1055	5470
• Valencia- D Corella	1042	3830
• Reus- J Salas-Salvado	870	3680
• Mallorca- M Fiol	594	2460
• Málaga- E Gomez-Gracia	540	2400
• Barcelona-1- R Estruch	667	2400
• Sevilla- J Lapetra	659	2220
• Vitoria- F Aros	641	2210
• Barcelona-2- MI Covas	570	2060
• Las Palmas- L Serra-Majem	356	690
• Barcelona-3- X Pinto	238	490
Total	7232	27,910



PREMEDIATED Participants

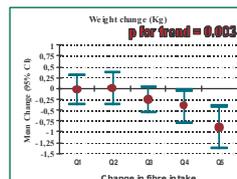
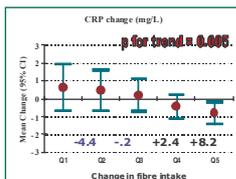
	Mediet + VOO (n= 2487)	MeDiet + Nuts (n=2396)	Control (n=2349)
Age (SD)	67 (6)	67 (6)	67 (6)
Women (%)	57	54	58
Diabetes (%)	50	47	48
Hypertension (%)	82	82	84
Current smokers (%)	14	15	14
High cholest. (%)	72	73	72
BMI (SD)	30 (4)	30 (4)	30 (4)
Waist (SD)	100 (10)	100 (10)	101 (11)
MeDiet 0-14 p (SD)	8.7 (2)	8.7 (2)	8.3 (2)

Predimed.org (www.predimed.es)

Annals of Internal Medicine Ann Intern Med 2006;145:1-11 | ARTICLE

Effects of a Mediterranean-Style Diet on Cardiovascular Risk Factors A Randomized Trial

Ramon Estruch, MD, PhD; Miguel Angel Martínez-González, MD, PhD; Dolores Corella, PhD; Jordi Salas-Salvado, MD, PhD; Valentina Ruiz-Gutierrez, PhD; Maria Isabel Covas, PhD; Miguel Fiol, MD, PhD; Enrique Gomez-Gracia, MD, PhD; Mari Carmen Lopez-Sabater, PhD; Ernest Vinayoles, MD, PhD; Fernando Aros, MD, PhD; Manuel Conde, MD, PhD; Carlos Lahoz, MD, PhD; José Lapetra, MD, PhD; Guillermo Sáez, MD, PhD; and Emilio Ros, MD, PhD, for the PREDIMED Study Investigators*

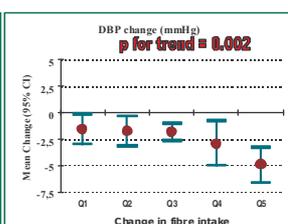
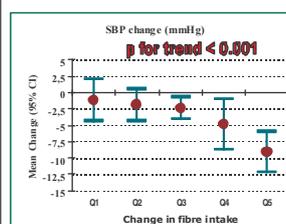


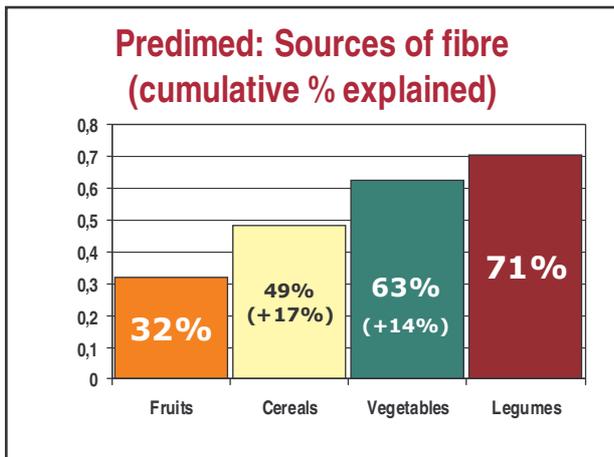
Predimed.org (www.predimed.es)

J Epidemiol Community Health 2009;63:582-588.

Effects of dietary fibre intake on risk factors for cardiovascular disease in subjects at high risk

R Estruch,^{1,2} M A Martínez-González,³ D Corella,^{2,4} J Basora-Gallissá,⁵ V Ruiz-Gutiérrez,⁶ M I Covas,^{2,7} M Fiol,^{2,8} E Gómez-Gracia,⁹ M C López-Sabater,¹⁰ R Escoda,¹ M A Pena,¹¹ J Díez-Espino,³ C Lahoz,¹² J Lapetra,^{2,13} G Sáez,¹⁴ E Ros,^{2,15} on behalf of the PREDIMED Study Investigators





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Modification of dietary habits

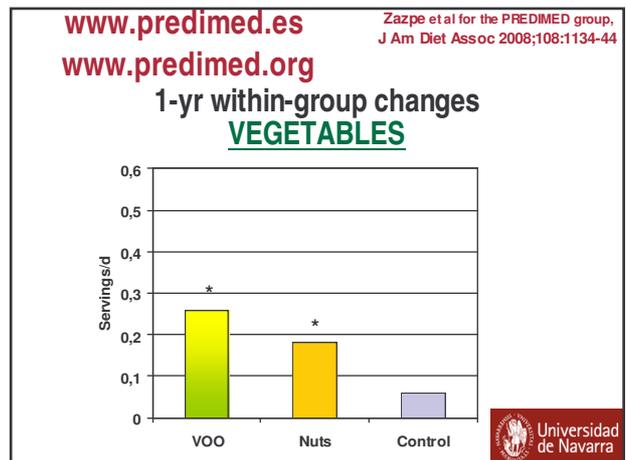
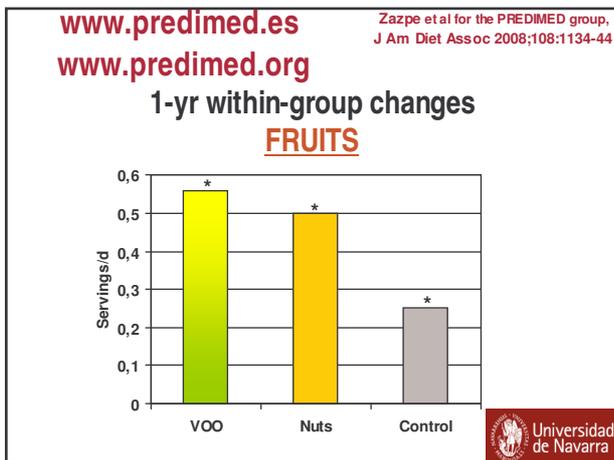
RESEARCH

Journal of the American Dietetic Association

Mediterranean-Type Diet Increases Adherence through Dietitian Intervention

A Large Randomized Individual and Group Intervention Conducted by Registered Dietitians Increased Adherence to Mediterranean-Type Diets: The PREDIMED Study

Zazpe et al for the PREDIMED group, J Am Diet Assoc 2008;108:1134-44



www.predimed.es

RD 06/0045

Predimed
Prevencción con Dieta Mediterránea

Departamento de Medicina Preventiva y Salud Pública
 MINISTERIO DE CIENCIA E INNOVACION
 FOMENTO DE ECONOMIA Y EMPLEO
 Fondo Europeo de Desarrollo Regional Una manera de hacer Europa

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Conclusiones

- **F** ↓ ca. laríngea, orofaríngea y pulmón (?)
- **F & V**: ↓↓ ECV y diabetes
- **F > V** ↓ ECV-diabetes (?)
- Necesidad ensayos aleatorizados
 - Fundamento: patrón, no suplementos
 - El enfoque "Low-fat" es equivocado
 - Lo ideal: cohortes + ensayos
 - España: EPIC + SUN + PREDIMED

VIII Congreso Internacional de Barcelona sobre la Dieta Mediterránea

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