S·A·F·E

Stroke Alliance For Europe

THE STROKE PATIENT VOICE IN EUROPE

How can I improve my nutrition after stroke?

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EUROPEAN LIFE AFTER STROKE FORUM

10 MARCH 2023

Stroke
Volume 48, Issue 8, August 2017; Pages 2046-2051
https://doi.org/10.1161/STROKEAHA.117.016815

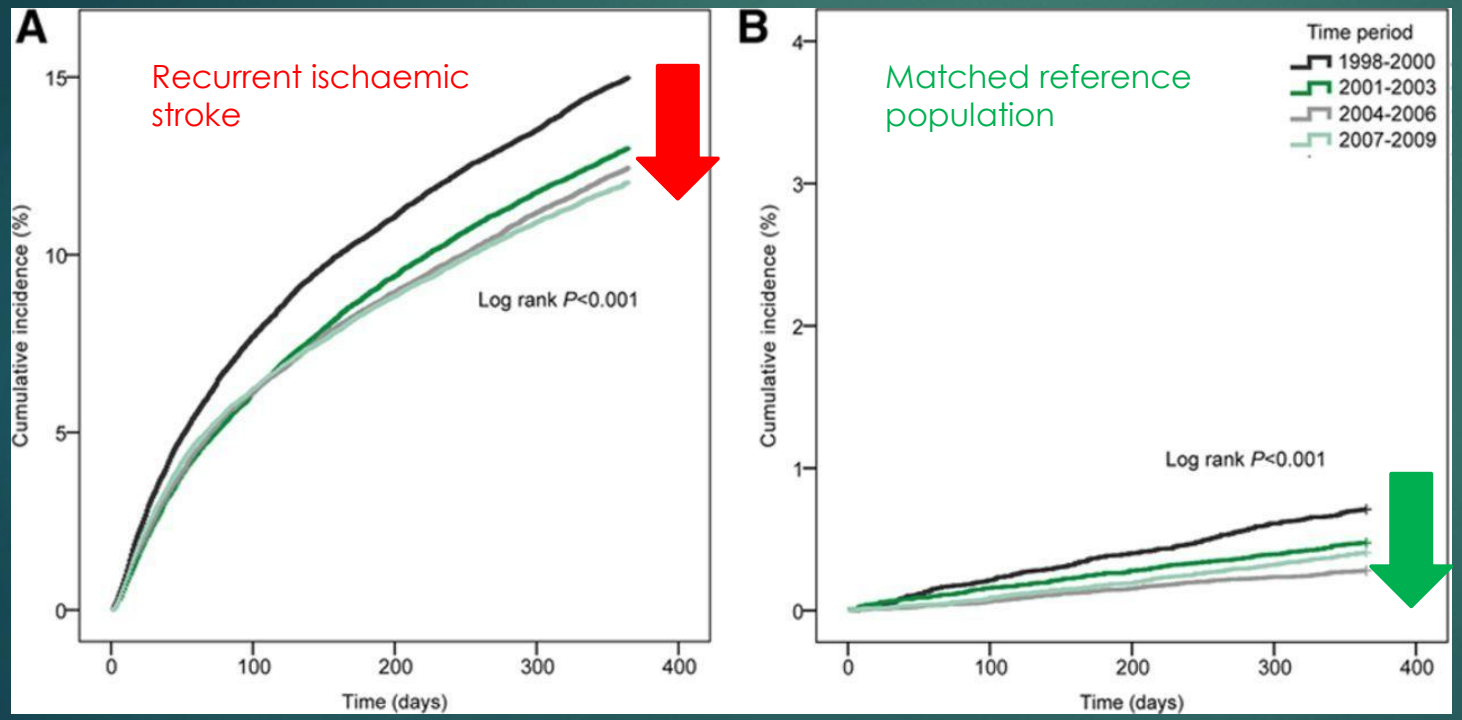
ORIGINAL CONTRIBUTIONS

One-Year Incidence, Time Trends, and Predictors of Recurrent Ischemic Stroke in Sweden From 1998 to 2010

An Observational Study

Lisa Bergström, MD, Anna-Lotta Irewall, MD, PhD, Lars Söderström, MSc, Joachim Ögren, MD, Katarina Laurell, PhD, and Thomas Mooe, PhD

10-15% recurrence of ischemic stroke at 1 year



Risk of recurrent ischaemic stroke decreased from 1998 to 2010.

CV risk factors = higher risk of recurrence

Secondary preventive drugs = reduced risk of recurrence

Bergstrom et al, 2017 www.ahajournals.org/doi/10.1161/STROKEAHA.117.016815

INTERSTROKE study: 13 447 cases of acute first stroke vs. 13 472 age- vs. sex-matched controls without stroke

Diet quality = 1 of 10 modifiable risk factors for ALL strokes

	Prevalence in controls (%)	All stroke	OR (99% CI)	PAR, % (99% CI)	Ischaemic stroke	OR (99% CI)	PAR, % (99% CI)	Intracerebral haemorrhage	OR (99% CI)	PAR, % (99% CI)
Self-reported history of hypertension	35·4		2·56 (2·33 to 2·80)	34·4 (32·0 to 36·9)		2·34 (2·10 to 2·60)	32·0 (29·1 to 35·1)		3·71 (3·19 to 4·31)	42·8 (38·9 to 46·8)
Self-reported history of hypertension or blood pressure ≥140/90 mm Hg	47·4		2·98 (2·72 to 3·28)	47·9 (45·1 to 50·6)		2·78 (2·50 to 3·10)	45·7 (42·4 to 49·0)		4·09 (3·51 to 4·77)	56·4 (52·0 to 60·6)
Current smoking	22·4		1·67 (1·49 to 1·87)	12·4 (10·2 to 14·9)		1·93 (1·69 to 2·21)	15·1 (12·8 to 17·8)		1·14 (0·95 to 1·36)	3·6 (0·9 to 13·0)
Waist-to-hip ratio										
T2 *vs* T1	34·1		1·24 (1·11 to 1·39)			1·31 (1·14 to 1·49)			1·16 (0·98 to 1·38)	
T3 *vs* T1	32·9		1·44 (1·27 to 1·64)	18·6 (13·3 to 25·3)		1·44 (1·25 to 1·67)	20·4 (14·3 to 28·2)		1·33 (1·09 to 1·62)	13·1 (6·4 to 25·1)
Diet (mAHEI score)										
T2 *vs* T1	34·0		0·77 (0·69 to 0·86)			0·75 (0·66 to 0·85)			0·80 (0·68 to 0·94)	
T3 *vs* T1	33·0		0·60 (0·53 to 0·67)	23·2 (18·2 to 28·9)		0·59 (0·52 to 0·68)	22·4 (17·0 to 29·0)		0·61 (0·50 to 0·74)	24·5 (16·5 to 34·8)
Regular physical activity	16·3		0·60 (0·52 to 0·70)	35·8 (27·7 to 44·7)		0·63 (0·53 to 0·74)	33·4 (24·2 to 44·0)		0·63 (0·48 to 0·81)	34·6 (21·3 to 50·7)
Self-reported history of diabetes or HbA_{1c} ≥6·5%	22·0		1·16 (1·05 to 1·30)	3·9 (1·9 to 7·6)		1·33 (1·18 to 1·50)	7·5 (5·0 to 11·1)		0·72 (0·60 to 0·87)	−7·0 (−11 to −3·0)
Alcohol										
Low or moderate	25·2		1·14 (1·01 to 1·28)			1·07 (0·93 to 1·23)			1·43 (1·17 to 1·74)	
High or heavy episodic	2·5		2·09 (1·64 to 2·67)	5·8 (3·4 to 9·7)		2·14 (1·62 to 2·82)	4·6 (2·0 to 10·0)		2·44 (1·64 to 3·63)	9·8 (6·4 to 14·8)
Psychosocial factors	..		2·20 (1·78 to 2·72)	17·4 (13·1 to 22·6)		1·98 (1·56 to 2·52)	15·1 (10·3 to 21·5)		2·84 (1·98 to 4·08)	24·7 (18·1 to 32·8)
Cardiac causes	5·0		3·17 (2·68 to 3·75)	9·1 (8·0 to 10·2)		3·49 (2·91 to 4·18)	11·4 (10·1 to 12·8)		1·58 (1·09 to 2·28)	1·4 (0·6 to 3·4)
ApoB/ApoA1 ratio										
T2 *vs* T1	34·0		1·28 (1·14 to 1·42)			1·41 (1·24 to 1·60)			0·94 (0·79 to 1·11)	
T3 *vs* T1	33·0		1·84 (1·65 to 2·06)	26·8 (22·2 to 31·9)		2·19 (1·92 to 2·49)	34·0 (29·0 to 39·3)		1·10 (0·92 to 1·31)	1·2 (0·0 to 98·3)
Composite PAR*				**90·7 (88·7 to 92·4)**			**91·5 (89·4 to 93·2)**			**87·1 (82·2 to 90·8)**

0·1 0·2 0·5 1·0 2·0 5·0 10·0
OR (99% CI)

Modified Alternative Healthy Eating Index (AHEI) = based on daily servings of fruits, vegetables, nuts and soy protein, fish, meat, eggs, whole grain, and fried foods.

O'Donnell et al 2016. Lancet 388(10046), 761–775. https://doi.org/10.1016/S0140-6736(16)30506-2

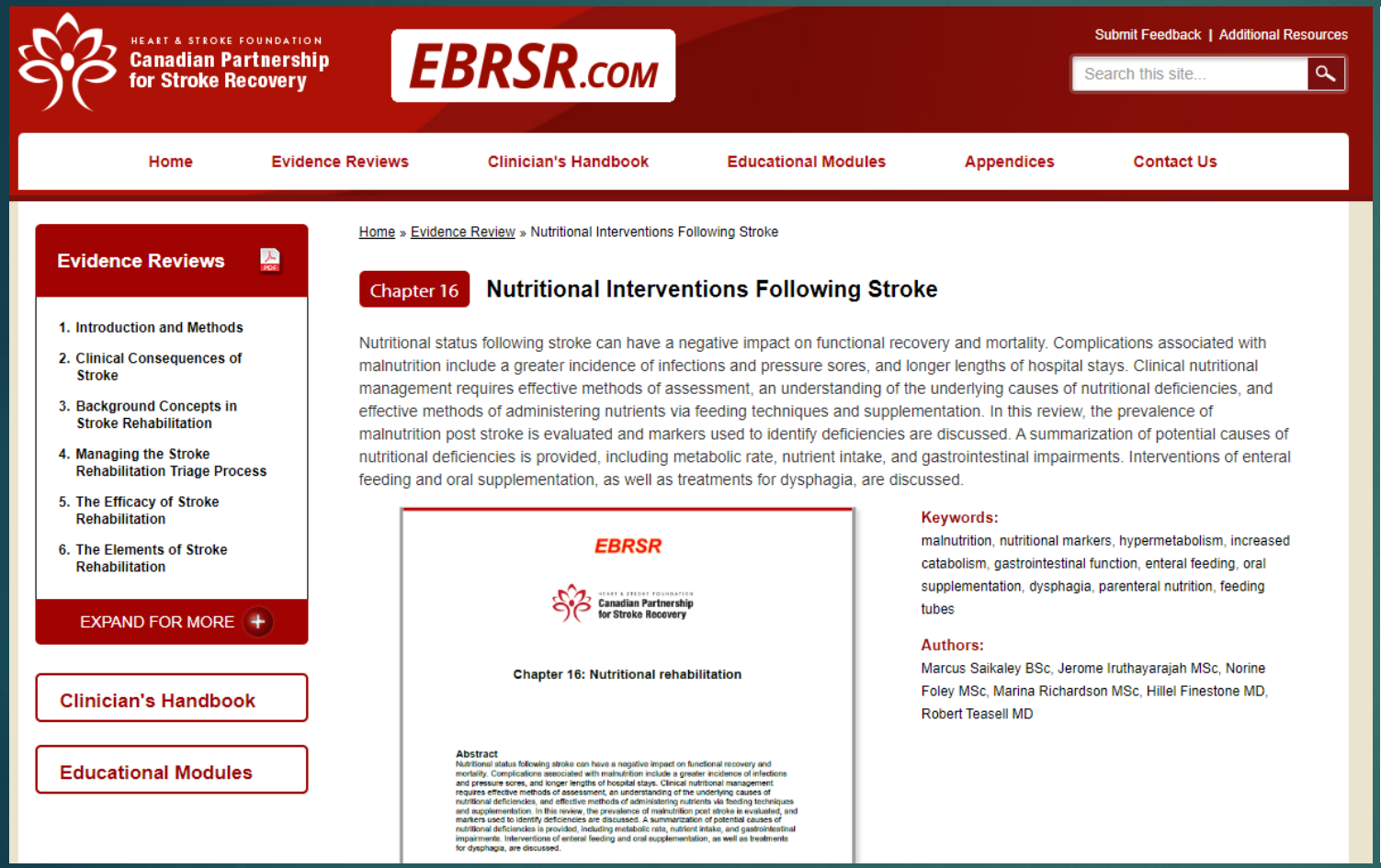
Global burden of stroke and risk factors in 188 countries, during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013

*Valery L Feigin, Gregory A Roth, Mohsen Naghavi, Priya Parmar, Rita Krishnamurthi, Sumeet Chugh, George A Mensah, Bo Norrving, Ivy Shiue, Marie Ng, Kara Estep, Kelly Cercy, Christopher J L Murray, Mohammad H Forouzanfar, for the Global Burden of Diseases, Injuries, and Risk Factors Study 2013 and Stroke Experts Writing Group**

DALY = disability-adjusted life years

	DALY (millions)	%
All stroke	**113**	**100**
All risk factors	**102**	**91**
5 top nutritional factors:		
1. Low in fruits <200g/d	**40**	**36**
2. High in sodium >5g/d	**25**	**23**
3. Low in vegetables <350g/d	**23**	**20**
4. Low in whole grain <100g/d	**17**	**15**
5. High in sugary beverages >63g/d	**0.32**	**0.3**

Feigin et al 2016. Lancet. Neurology, 15(9), 913–924. https://doi.org/10.1016/S1474-4422(16)30073-4



Chapter 16: Nutritional rehabilitation Table of contents

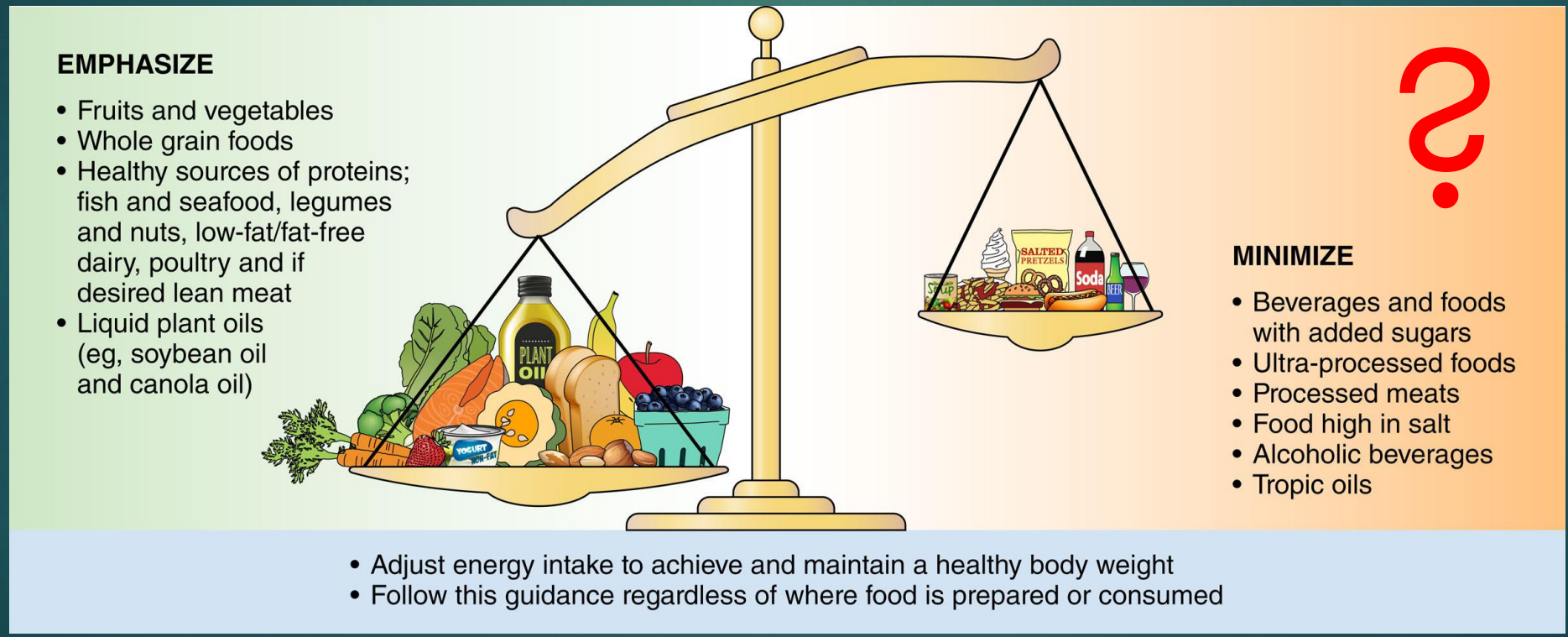
www.ebrsr.com/evidence-review/16-nutritional-interventions-following-stroke

Circulation
Volume 144, Issue 23, 7 December 2021; Pages e472-e487
https://doi.org/10.1161/CIR.0000000000001031

American Heart Association.

AHA SCIENTIFIC STATEMENT

2021 Dietary Guidance to Improve Cardiovascular Health: A Scientific Statement From the American Heart Association



www.ahajournals.org/doi/10.1161/CIR.0000000000001031

Stroke
Volume 48, Issue 11, November 2017; Pages 3168-3174
https://doi.org/10.1161/STROKEAHA.117.016993

TOPICAL REVIEWS

The Role of Nutrition in the Risk and Burden of Stroke

An Update of the Evidence

Graeme J. Hankey, MD, FRACP

Since last reviewed,[1] several epidemiological studies have reported the substantial role of suboptimal nutrition in the risk and burden of stroke and illustrated the potential for dietary modification to reduce the global burden of stroke.

Dietary pattern recommendations

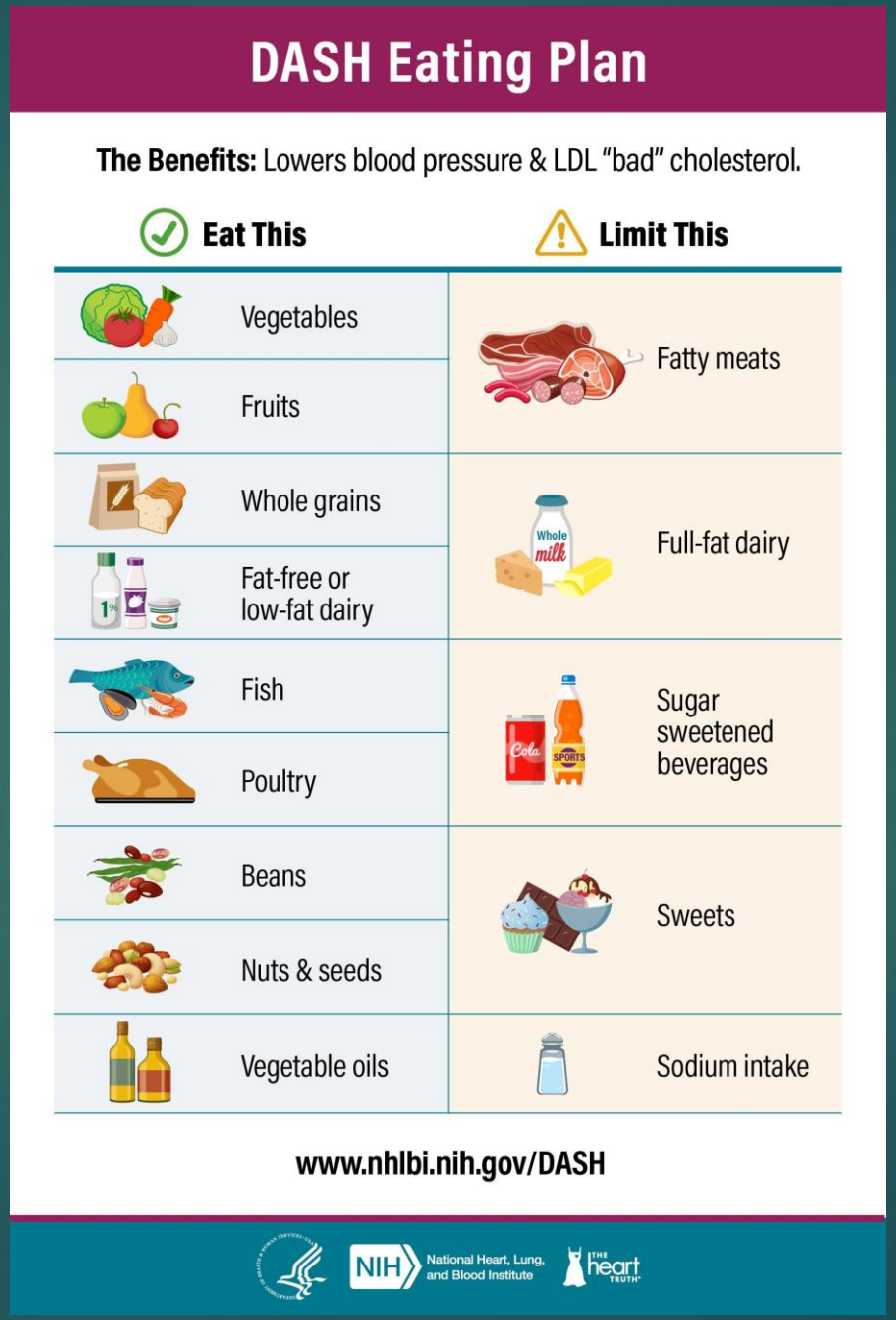
- DASH diet = Dietary Approaches to Stop Hypertension
- www.dashdiet.org

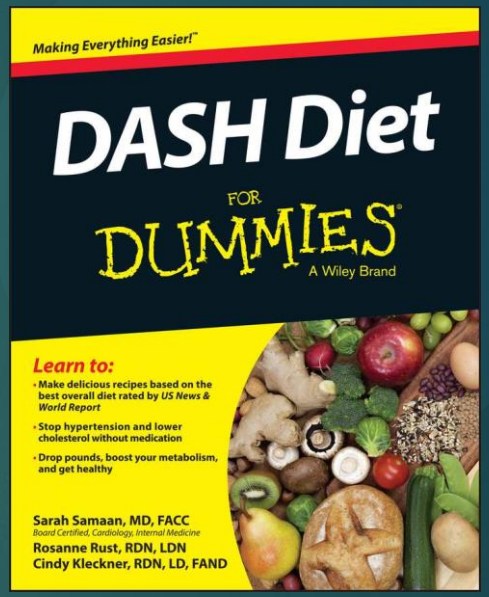
- Mediterranean diet

DASH Diet

Low in

- Saturated fat
- Sodium





How much is too much salt?

NUTRITION

GUIDELINE DAILY AMOUNT (GDA)

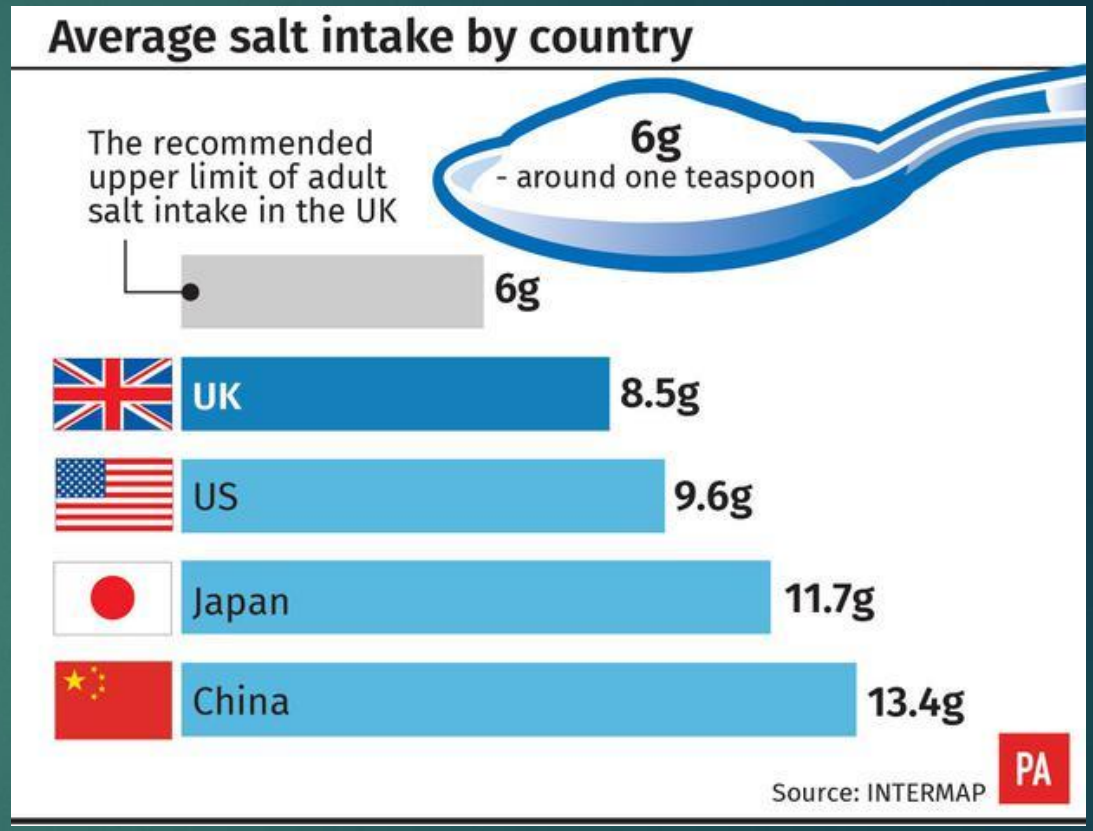
	MEN	WOMEN	CHILDREN		
			CHILD aged 5-10	GIRL 11-14	BOY 11-14
CALORIES	2,500	2,000	1,800	1,850	2,200
SUGAR (g)	120	90	85	90	110
FAT (g)	95	70	70	70	85
SATURATED FAT (g)	30	20	20	25	25
SALT (g)	6	5	4	6	6

EURODIET (2001) Nutrition & Diet for Healthy Lifestyles in Europe

NUTRITION

GUIDELINE DAILY AMOUNT (GDA)

	MEN	WOMEN	CHILDREN		
			CHILD aged 5-10	GIRL 11-14	BOY 11-14
CALORIES	2,500	2,000	1,800	1,850	2,200
SUGAR (g)	120	90	85	90	110
FAT (g)	95	70	70	70	85
SATURATED FAT (g)	30	20	20	25	25
SALT (g)	6	5	4	6	6

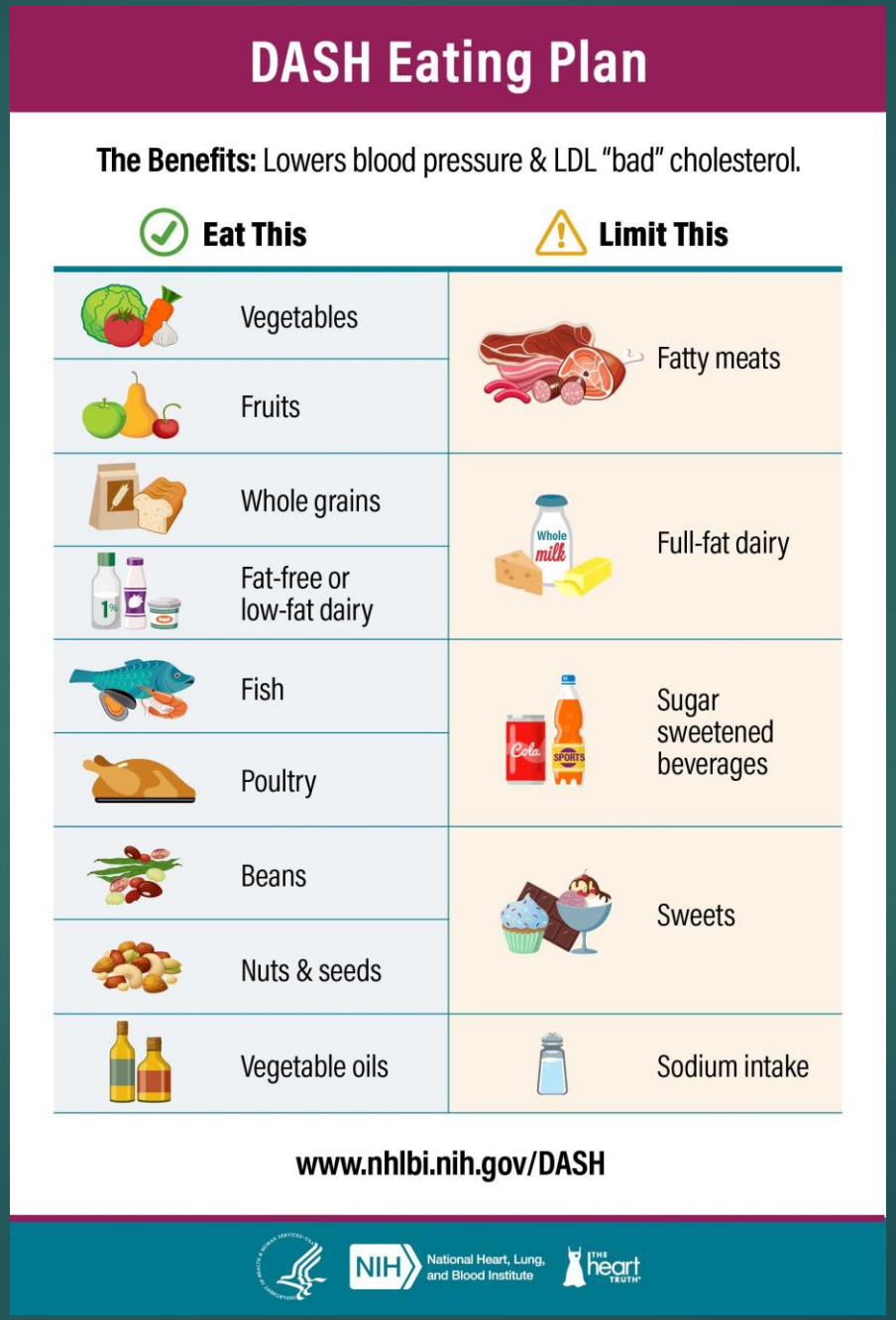


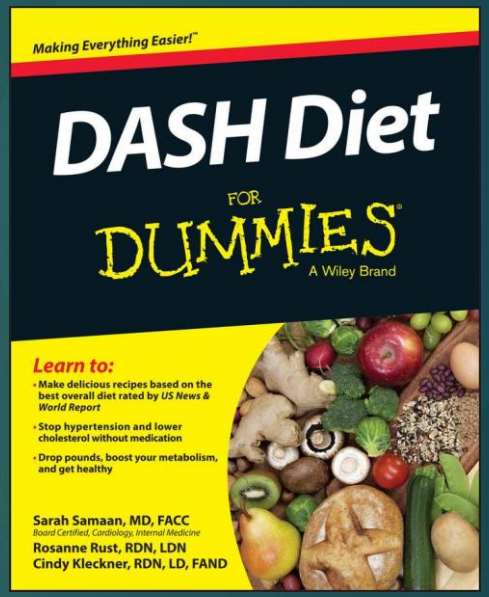
EURODIET (2001) Nutrition & Diet for Healthy Lifestyles in Europe

DASH Diet

Low in
- Saturated fat
- Sodium

Rich in
- Potassium
- Calcium
- Magnesium
- fiber
- Protein





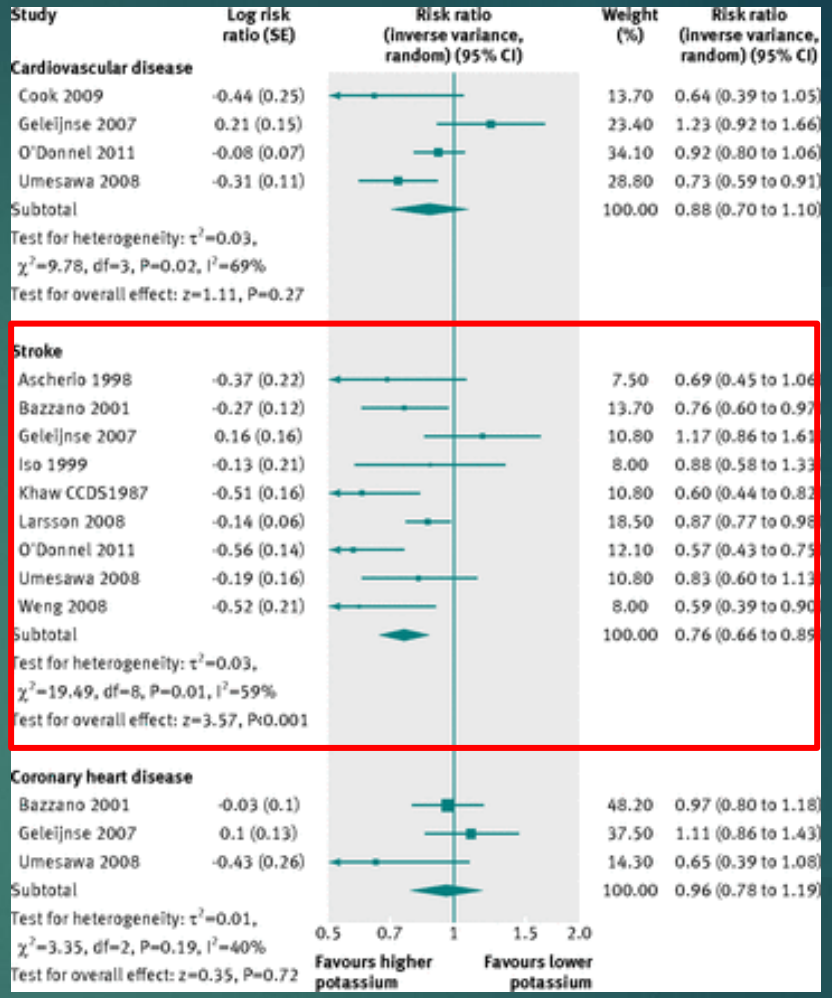
BMJ

BMJ 2013;346:f1378 doi: 10.1136/bmj.f1378 (Published 5 April 2013)

RESEARCH

Effect of increased potassium intake on cardiovascular risk factors and disease: systematic review and meta-analyses

Nancy J Aburto *scientist*[1], Sara Hanson *intern*[1], Hialy Gutierrez *independent consultant*[2], Lee Hooper *senior lecturer in research synthesis and nutrition*[3], Paul Elliott *professor*[4], Francesco P Cappuccio *Cephalon professor of cardiovascular medicine & epidemiology*[5]



Lower K+ intake associated with higher blood pressure / stroke

Higher K+ intake may be protective against these conditions

= RRR by 24% for stroke

https://doi.org/10.1136/bmj.f1378

HIGH POTASSIUM FOOD

Fruits

Serving size: ½ cup fresh or canned or 1 small piece
1/4c dried fruit


Oranges &
Oranges Juice


Bananas


Kiwi


Mango


Cantaloupe


Nectarines


Dried Fruits


Raisins


Pomegranate

Vegetab les

Serving size: ½ cup cooked or 1 cup raw


Greens
(Beet / Spinach)


White & Sweet
Potatoes


Tomatoes &
Tomato Juice


Artichoke


Avocado


Broccoli


Squash
Winter & Summer


Pumpkin


Bok Choy

Other


Chocolate


Nuts & Seeds


Milk & Soy Milk

Yogurt


Raisin Bran


French Fries &
Potato Chips


Salt Substitute


Coconut Water
& Coconut Milk

Following the DASH Eating Plan

Use this chart to help you plan your menus—or take it with you when you go to the store.

Food Group	Servings Per Day			Serving Sizes	Examples and Notes	Significance of Each Food Group to the DASH Eating Plan
	1,600 Calories	2,000 Calories	2,600 Calories			
Grains*	6	6–8	10–11	1 slice bread 1 oz dry cereal† ½ cup cooked rice, pasta, or cereal	Whole wheat bread and rolls, whole wheat pasta, English muffin, pita bread, bagel, cereals, grits, oatmeal, brown rice, unsalted pretzels and popcorn	Major sources of energy and fiber
Vegetables	3–4	4–5	5–6	1 cup raw leafy vegetable ½ cup cut-up raw or cooked vegetable ½ cup vegetable juice	Broccoli, carrots, collards, green beans, green peas, kale, lima beans, potatoes, spinach, squash, sweet potatoes, tomatoes	Rich sources of potassium, magnesium, and fiber
Fruits	4	4–5	5–6	1 medium fruit ¼ cup dried fruit ½ cup fresh, frozen, or canned fruit ½ cup fruit juice	Apples, apricots, bananas, dates, grapes, oranges, grapefruit, grapefruit juice, mangoes, melons, peaches, pineapples, raisins, strawberries, tangerines	Important sources of potassium, magnesium, and fiber
Fat-free or low-fat milk and milk products	2–3	2–3	3	1 cup milk or yogurt 1½ oz cheese	Fat-free (skim) or low-fat (1%) milk or buttermilk; fat-free, low-fat, or reduced-fat cheese; fat-free or low-fat regular or frozen yogurt	Major sources of calcium and protein
Lean meats, poultry, and fish	3–6	6 or less	6	1 oz cooked meats, poultry, or fish 1 egg‡	Select only lean; trim away visible fats; broil, roast, or poach; remove skin from poultry	Rich sources of protein and magnesium
Nuts, seeds, and legumes	3 per week	4–5 per week	1	⅓ cup or 1½ oz nuts 2 Tbsp peanut butter 2 Tbsp or ½ oz seeds	Almonds, hazelnuts, mixed nuts, peanuts, walnuts, sunflower seeds, peanut butter, kidney beans, lentils, split peas	Rich sources of energy, magnesium, protein, and fiber

"Heart disease is one third of USA, barely any cancer on the island....

The basic foods for the modern Cretan diet are probably the same as during the Minoan period ~ 2000 B.C."

~ Leland Allbaugh 1950

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 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., Fernando Arós, M.D., Ph.D., Enrique Gómez-Gracia, M.D., Ph.D., Valentina Ruiz-Gutiérrez, Ph.D., Miquel Fiol, M.D., Ph.D., José Lapetra, M.D., Ph.D., Rosa Maria Lamuela-Raventos, D.Pharm., Ph.D., Lluís Serra-Majem, M.D., Ph.D., Xavier Pintó, M.D., Ph.D., Josep Basora, M.D., Ph.D., Miguel Angel Muñoz, M.D., Ph.D., José V. Sorlí, M.D., Ph.D., José Alfredo Martínez, D.Pharm, M.D., Ph.D., and Miguel Angel Martínez-González, M.D., Ph.D., for the PREDIMED Study Investigators*

ABSTRACT

BACKGROUND

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.

METHODS

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 (advice 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 nonfood gifts. The primary end point was the rate of major cardiovascular events (myocardial 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.

RESULTS

A total of 7447 persons were enrolled (age range, 55 to 80 years); 57% were women. The two Mediterranean-diet groups had good adherence to the intervention, according to self-reported intake and biomarker analyses. A primary end-point event occurred in 288 participants. The multivariable-adjusted hazard ratios were 0.70 (95% confidence interval [CI], 0.54 to 0.92) and 0.72 (95% CI, 0.54 to 0.96) for the group assigned to a Mediterranean diet with extra-virgin olive oil (96 events) and the group assigned to a Mediterranean diet with nuts (83 events), respectively, versus the control group (109 events). No diet-related adverse effects were reported.

CONCLUSIONS

Among persons at high cardiovascular risk, a Mediterranean diet supplemented with extra-virgin olive oil or nuts reduced the incidence of major cardiovascular events. (Funded by the Spanish government's Instituto de Salud Carlos III and others; Controlled-Trials.com number, ISRCTN35739639.)

The authors' affiliations are listed in the Appendix. Address reprint requests to Dr. Estruch at the Department of Internal Medicine, Hospital Clinic, Villarroel 170, 08036 Barcelona, Spain, or at restruch@clinic.ub.es, or to Dr. Martínez-González at the Department of Preventive Medicine and Public Health, Facultad de Medicina–Clínica Universidad de Navarra, Irunlarrea 1, 31008 Pamplona, Spain, or at mamartinez@unav.es.

*The PREDIMED (Prevención con Dieta Mediterránea) study investigators are listed in the Supplementary Appendix, available at NEJM.org.

Drs. Estruch and Martínez-González contributed equally to this article.

This article was published on February 25, 2013, at NEJM.org.

N Engl J Med 2013;368:1279-90.
DOI: 10.1056/NEJMoa1200303

MEDITERRANEAN DIET

- PERIMED study recruited 7447 participants free of CVD at baseline (but at high risk for CVD) and randomized 1:1:1 to 3 groups

  1. Caloric-unrestricted Med Diet group receiving ~1L per week of extra-virgin olive oil (EVOO)

  2. Caloric-unrestricted Med Diet groups receiving 30g of mixed nuts per day

  3. Control group followed a low-fat diet (AHA 2000)

- Primary outcome = acute myocardial infarction, stroke, or death from CV causes

N Engl J Med. 2018 Jun 21;378(25):e34. PMID: 23432189

PERIMED STUDY

Mediterranean diet	
Recommended	
Olive oil*	≥4 tbsp/day
Tree nuts and peanuts†	≥3 servings/wk
Fresh fruits	≥3 servings/day
Vegetables	≥2 servings/day
Fish (especially fatty fish), seafood	≥3 servings/wk
Legumes	≥3 servings/wk
Sofrito‡	≥2 servings/wk
White meat	Instead of red meat
Wine with meals (optionally, only for habitual drinkers)	≥7 glasses/wk
Discouraged	
Soda drinks	<1 drink/day
Commercial bakery goods, sweets, and pastries§	<3 servings/wk
Spread fats	<1 serving/day
Red and processed meats	<1 serving/day

Low-fat diet (control)	
Recommended	
Low-fat dairy products	≥3 servings/day
Bread, potatoes, pasta, rice	≥3 servings/day
Fresh fruits	≥3 servings/day
Vegetables	≥2 servings/wk
Lean fish and seafood	≥3 servings/wk
Discouraged	
Vegetable oils (including olive oil)	≤2 tbsp/day
Commercial bakery goods, sweets, and pastries§	≤1 serving/wk
Nuts and fried snacks	≤1 serving /wk
Red and processed fatty meats	≤1 serving/wk
Visible fat in meats and soups¶	Always remove
Fatty fish, seafood canned in oil	≤1 serving/wk
Spread fats	≤1 serving/wk
Sofrito‡	≤2 servings/wk

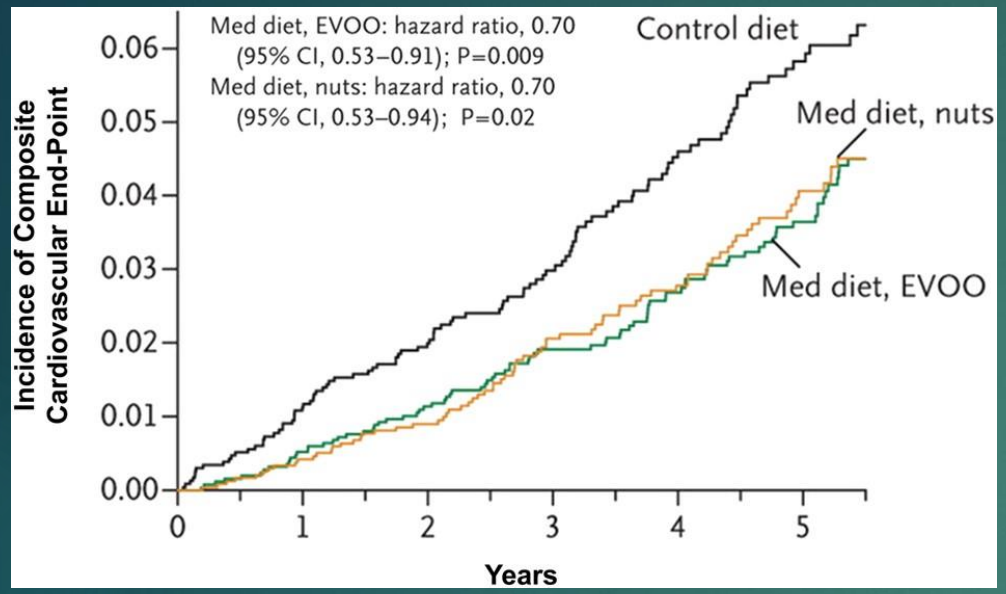
Processed and red meat was restricted in both groups

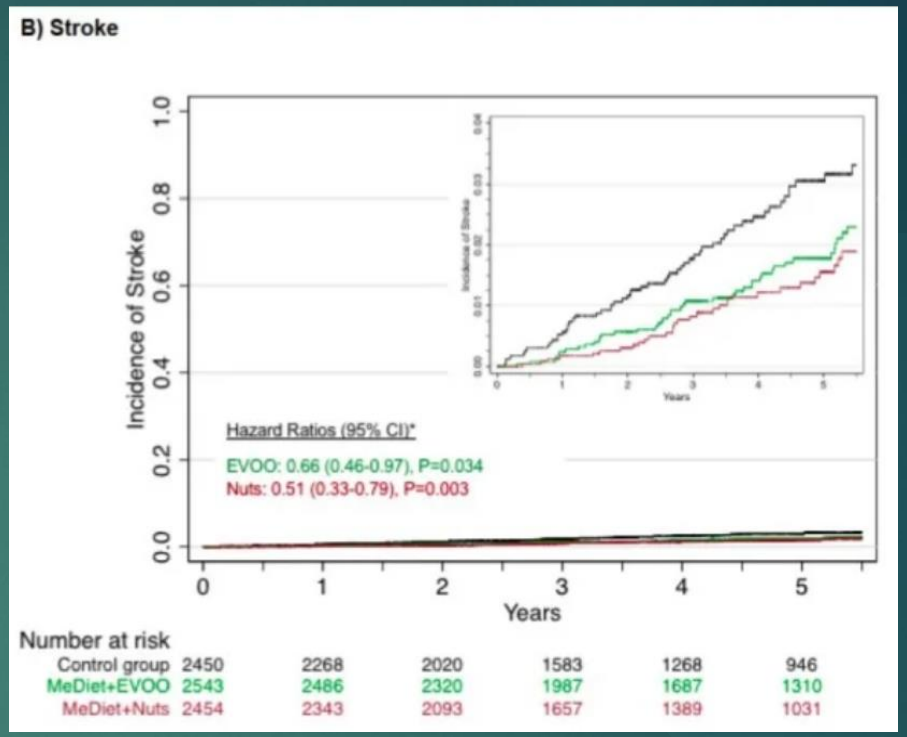
Diets

- A) American Heart Association diet (version from year 2000) without any free delivery of food items
- B) Mediterranean Diet (Med Diet) with free extra virgin olive oil (minimum use per day is 4 teaspoons)
- C) Mediterranean Diet with free nut mix , 30 g/day (walnuts 15 g, almonds 7,5 g & hazelnuts 7.5 g)
- Diet were constructed and patients informed by study dietitians

N Engl J Med. 2018 Jun 21;378(25):e34. PMID: 23432189

PERIMED STUDY





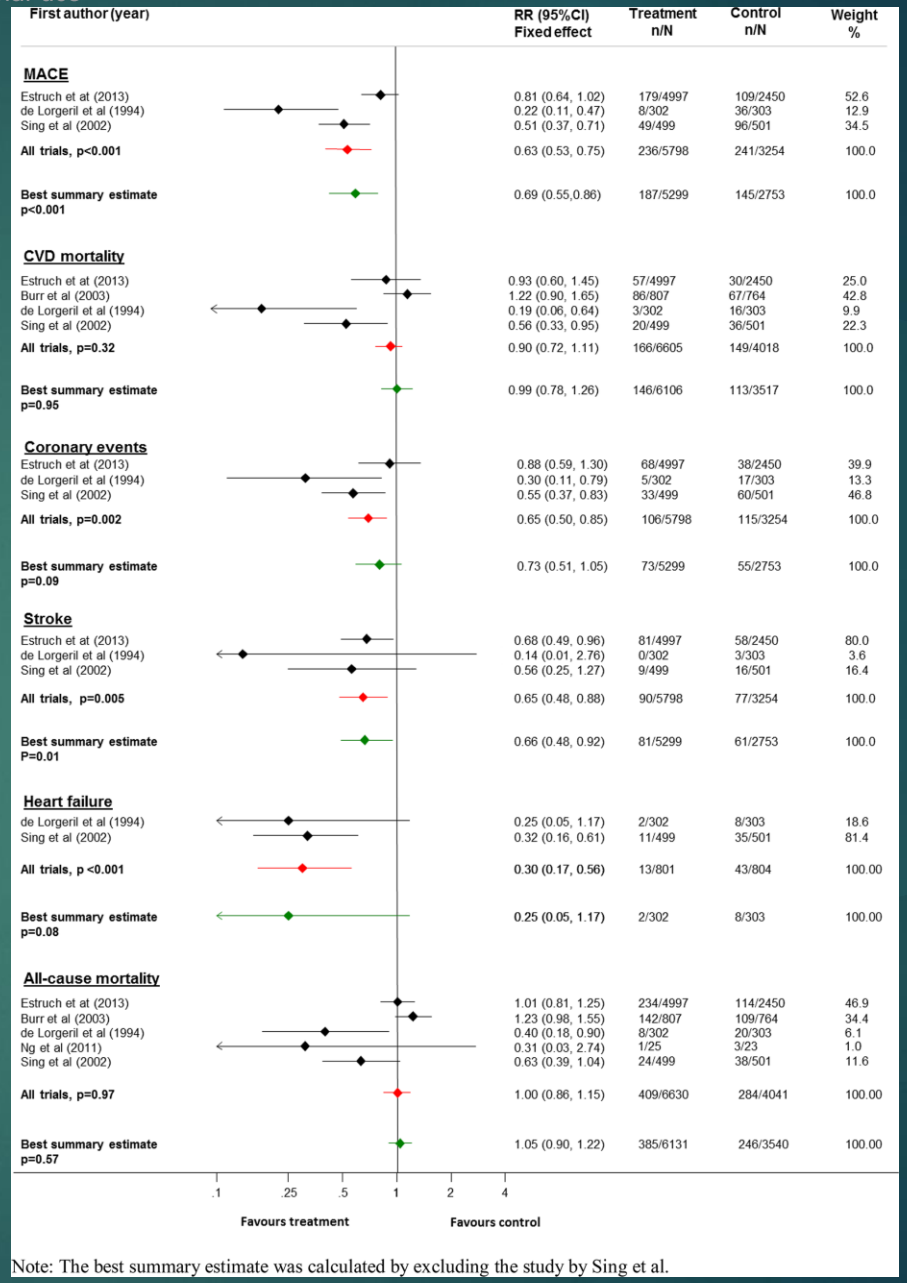
- RCT terminated early due to divergence for the primary outcome between 3 groups at median follow-up of 4.8 years
- Results: 30% RR reduction in primary outcome for both Med Diet groups vs. low-fat control diet group
- **49% RR reduction of stroke for MD + nuts group and 36% for MD + EVOO group**

N Engl J Med. 2018 Jun 21;378(25):e34. PMID: 23432189

Effects of the Mediterranean Diet on Cardiovascular Outcomes—A Systematic Review and Meta-Analysis

Thaminda Liyanage[1,2], Toshiharu Ninomiya[1]*, Amanda Wang[1], Bruce Neal[1], Min Jun[1,3], Muh Geot Wong[1,2], Meg Jardine[1,4], Graham S. Hillis[1], Vlado Perkovic[1]

- Meta-analysis of 3 RCTs comparing the Mediterranean to control diets in a total of 9052 participants
- Mediterranean diet protects against stroke (1.55% diet versus 2.37% control
- Risk ratio = 0.65 (95% CI, 0.48–0.88; *P*=0.005)



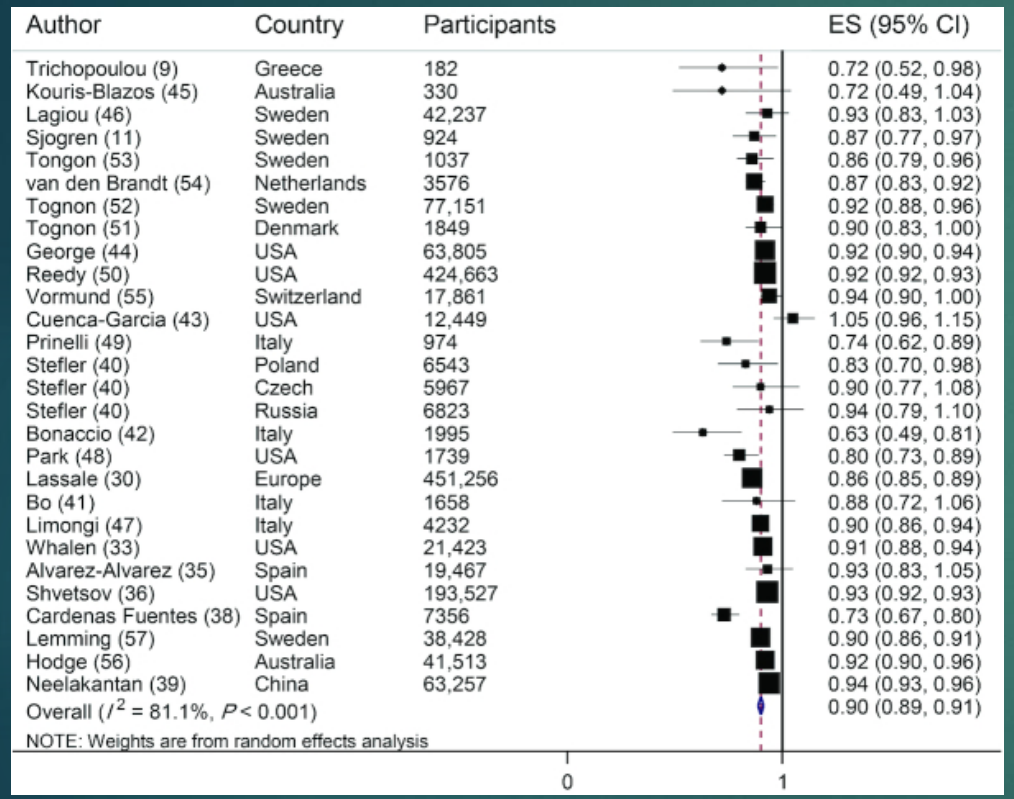
Note: The best summary estimate was calculated by excluding the study by Sing et al.

Liyanage, T. PloS one, 11(8), e0159252. https://doi.org/10.1371/journal.pone.0159252

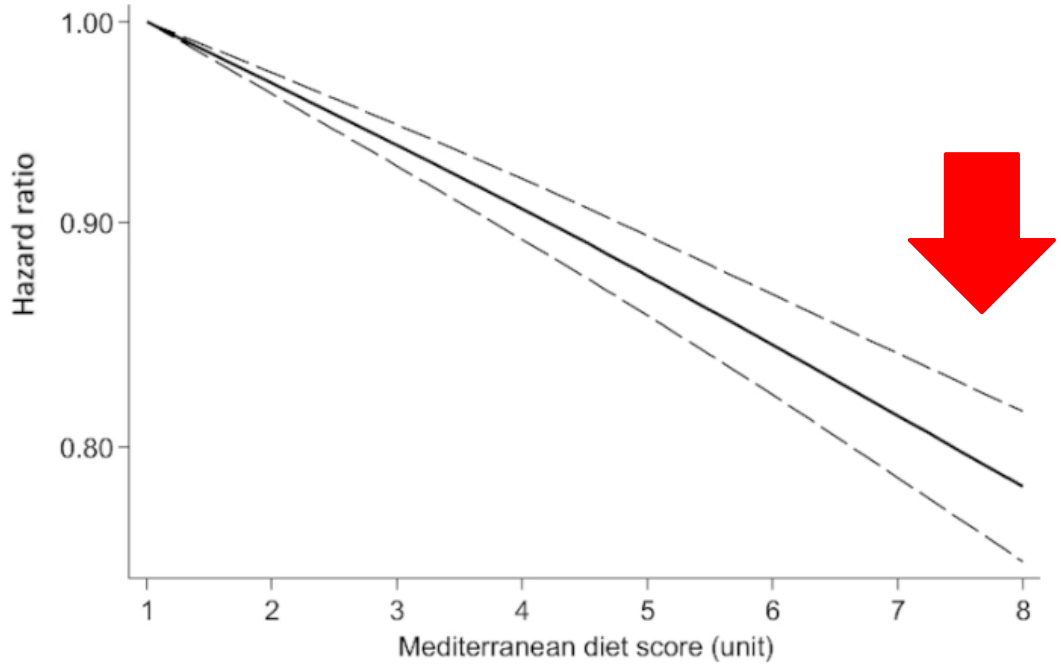
Adv Nutr. 2019 Nov; 10(6): 1029–1039.
Published online 2019 May 21. doi: 10.1093/advances/nmz041
PMCID: PMC6855973
PMID: 31111871

Adherence to the Mediterranean Diet in Relation to All-Cause Mortality: A Systematic Review and Dose-Response Meta-Analysis of Prospective Cohort Studies

Sepideh Soltani,[1] Ahmad Jayedi,[2] Sakineh Shab-Bidar,[3] Nerea Becerra-Tomás,[4,5] and Jordi Salas-Salvadó[4,5]



Death



Dose-response analysis of risk of all-cause mortality and adherence to a Mediterranean diet. The solid line and the long-dashed line represent the estimated HR and its 95% CI; the solid line represents the linear relation.

- Included 29 prospective studies = >1.6M participants with >220K cases of all-cause mortality
- Pooled HR of all-cause mortality = 0.90 (95% CI: 0.89, 0.91) for each 2-point increase in adherence to the Mediterranean Diet

Meta-analyses of prospective cohort studies of dietary patterns and risk of stroke

Diet	Studies	Subjects	Events	Unit	RR	95% CI
Beneficial						
Mediterranean diet[24]	5	159 995	2444	High vs low	0.76	0.60–0.96
Mediterranean diet[25]	1	20 197	565	High vs low adherence	0.83	0.70–1.00
Mediterranean diet[26]	1	32 921	1270 IS	High vs low adherence	0.78	0.65–0.93 IS
			262 HS		0.88	0.61–1.29 HS
DASH diet[27]	3	150 191	not stated	Highest vs lowest adherence	0.81	0.72–0.92
Modified DASH diet[28]	1	74 404	3896 (IS)	Highest vs lowest quartile	0.86	0.78–0.94
Modified DASH diet[28]	1	74 404	560 (ICH)	Highest vs lowest quartile	0.81	0.63–1.05
Nordic diet[29]	1	55 338	2283	High vs low adherence	0.86	0.76–0.98

Mediterranean diet = high intake of plant foods (fruit, vegetables, nuts, legumes), olive oil, and cereals; high ratio of monounsaturated to saturated fat; moderate intake of fish and poultry; low intake of dairy products, red meat, processed meats, and sweets; moderate wine consumption, with meals.

DASH diet = high intake of plant foods (fruit, vegetables, nuts, legumes); high intake of low-fat dairy products; low intake of sweets and sugar-containing beverages, red and processed meat, saturated fat, total fat, and cholesterol.

Nordic diet = high intake of fish, apples and pears, cabbages, root vegetables, rye bread, and oatmeal.

nutrients

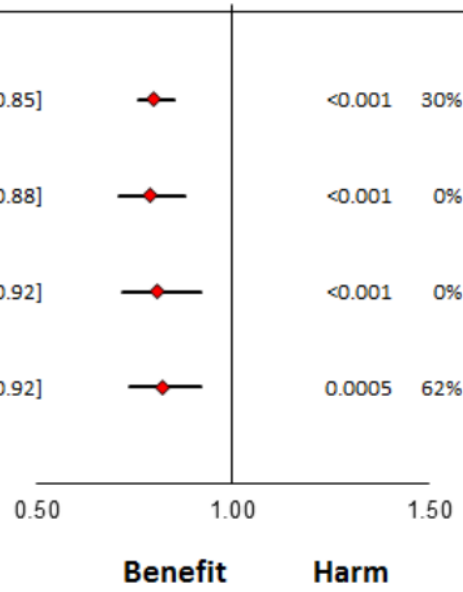
MDPI

Review

DASH Dietary Pattern and Cardiometabolic Outcomes: An Umbrella Review of Systematic Reviews and Meta-Analyses

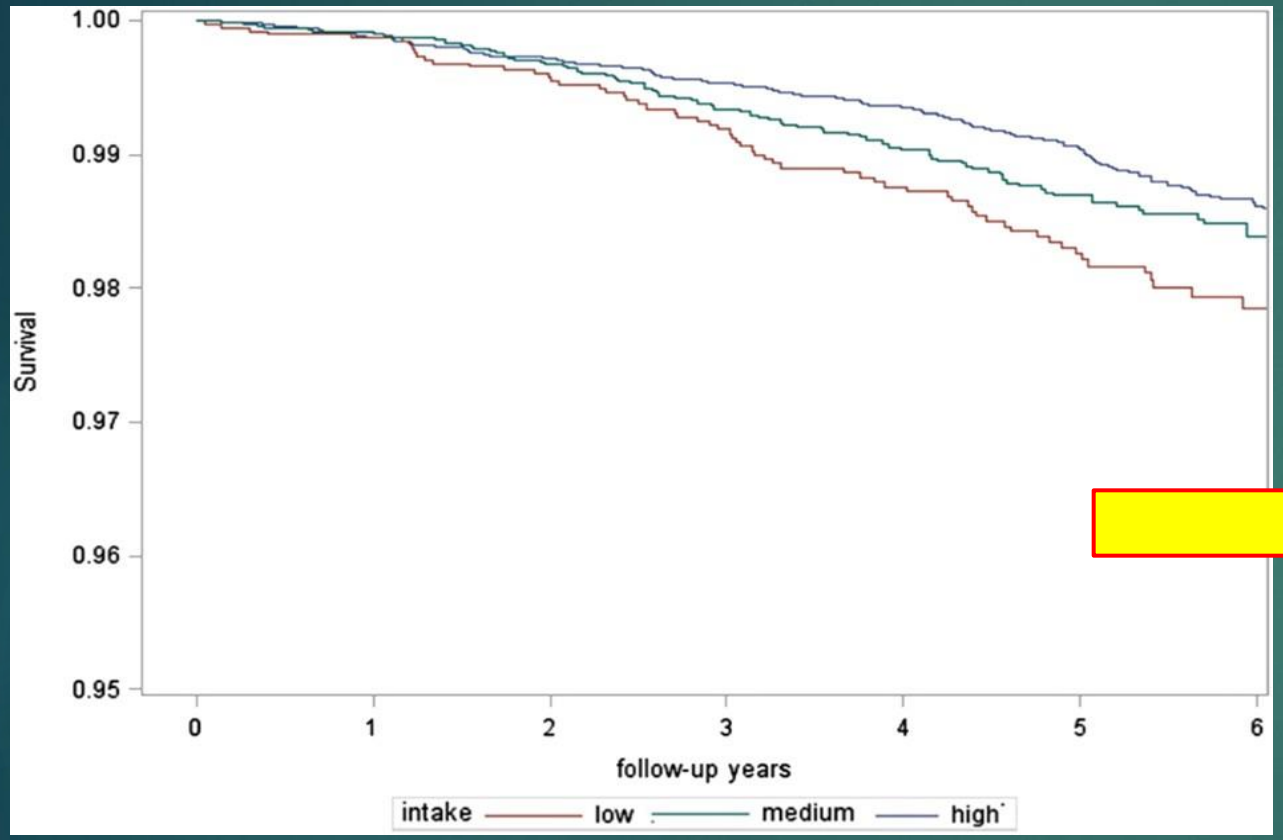
Laura Chiavaroli [1,2], Effie Viguiliouk [1,2], Stephanie K Nishi [1,2], Sonia Blanco Mejia [1,2], Dario Rahelić [3,4], Hana Kahleová [5,6], Jordi Salas-Salvadó [7,8], Cyril WC Kendall [1,2,9] and John L Sievenpiper [1,2,10,11,*]

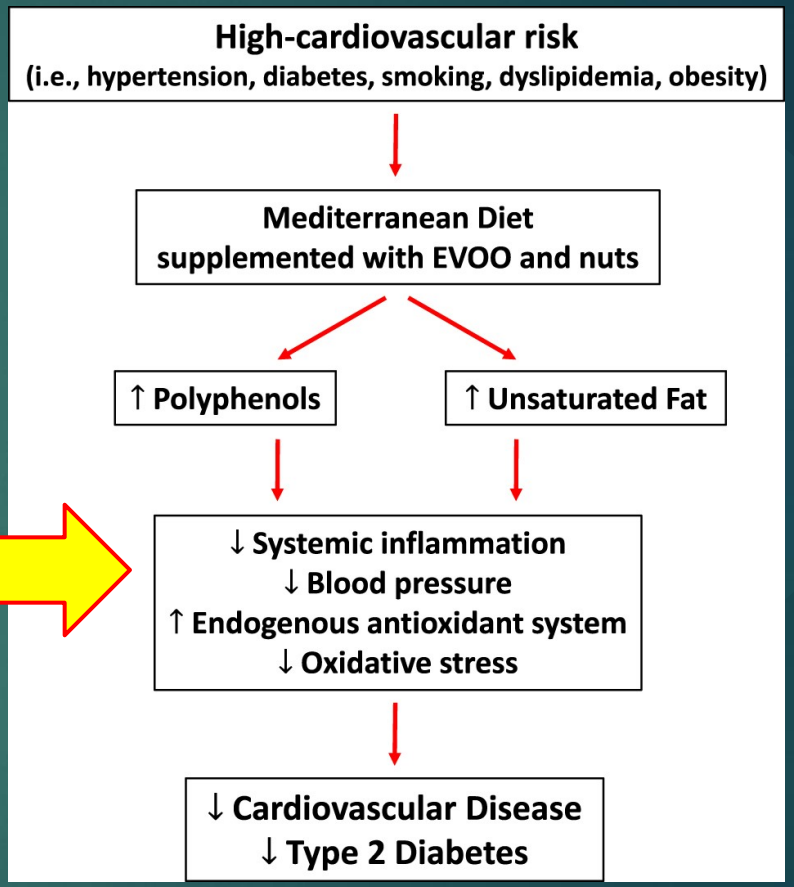
CVD Outcome	Systematic review and meta-analysis	No. Cohort Comparisons	No. Cases	Participants	Risk ratio [95% CIs]	Heterogeneity P	Heterogeneity I^2	Heterogeneity P	GRADE: Downgrade: Risk of Bias	Inconsistency	Indirectness	Imprecision	Publication bias	Upgrade: Dose response	Large effect size	Attenuation	Certainty of the Evidence
CVD Incidence	Schwingshackl et al. 2015 [13]	11	32,927	783,732	0.80 [0.76, 0.85]	<0.001	30%	0.16	□	□	□	□	□	□	□	□	⊕⊕◯◯ Low
CHD Incidence	Salehi-Abargouei et al. 2013 [43]	3	7,260	144,337	0.79 [0.71, 0.88]	<0.001	0%	0.58	□	□	■	□	□	□	□	□	⊕◯◯◯ Very Low
STROKE Incidence	Salehi-Abargouei et al. 2013 [43]	3	4,413	150,191	0.81 [0.72, 0.92]	<0.001	0%	0.91	□	□	□	□	□	□	□	□	⊕⊕◯◯ Low
DIABETES Incidence	Jannasch et al. 2017 [12]	5	23,612	158,408	0.82 [0.74, 0.92]	0.0005	62%	0.03	□	■	□	□	□	□	□	□	⊕◯◯◯ Very Low



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6413235

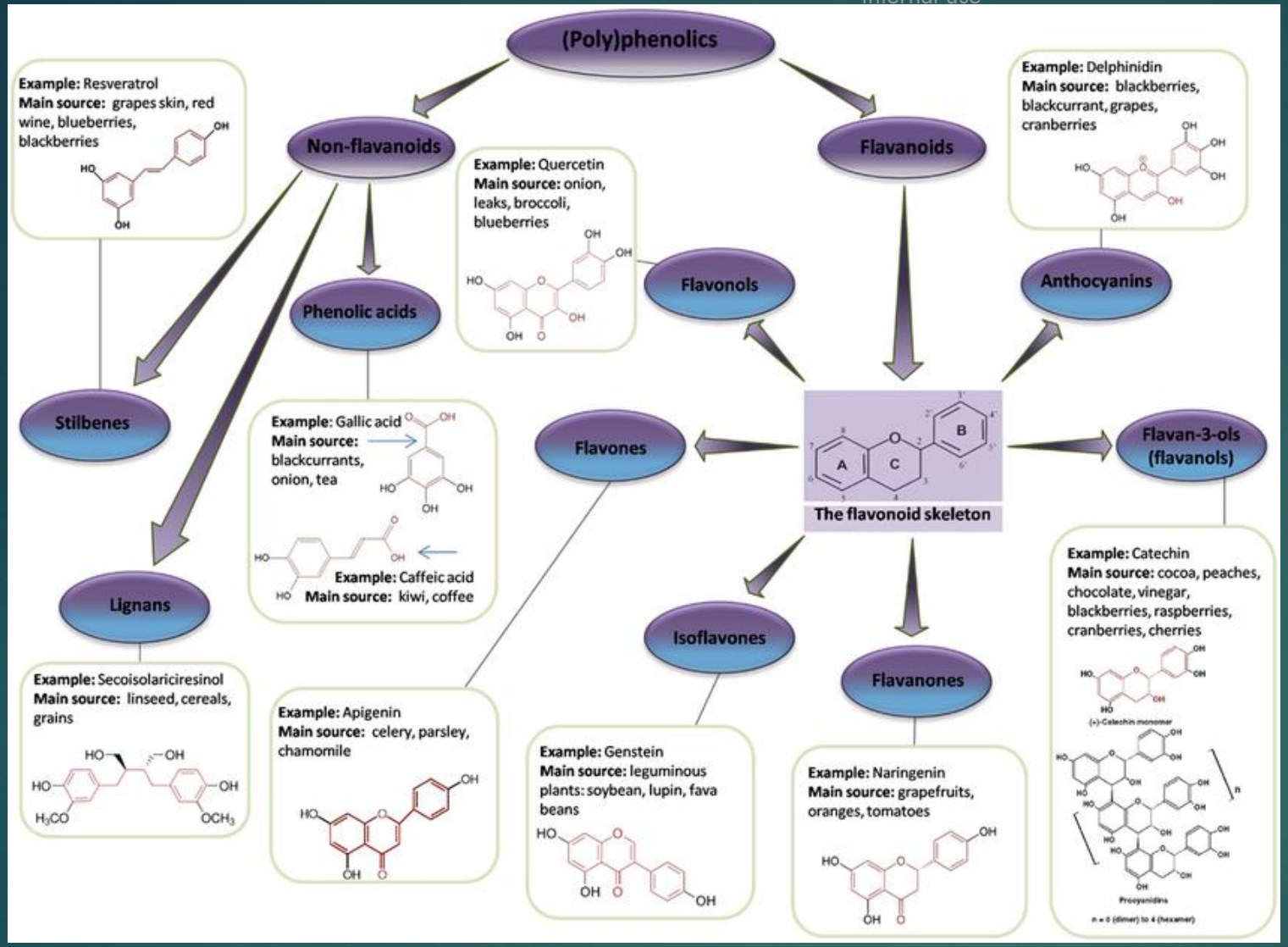
Polyphenol consumption





Highest chance of survival for the highest level of polyphenol consumption, amongst PERIMED participants

N Engl J Med. 2018 Jun 21;378(25):e34. PMID: 23432189



Polyphenol rich foods:

- Berries
- Grapes
- Tomatoes
- Cherries
- Oranges / grapefruit
- Broccoli / onions
- Cocoa / chocolate
- Tea / coffee
- Red wine

POLYPHENOLS = antioxidant, anti-apoptosis, anti-aging, anticarcinogen, anti-inflammation, anti-atherosclerosis, cardiovascular protection, improvement of the endothelial function, inhibition of angiogenesis and cell proliferation activity.

Meta-analyses of prospective cohort studies of foods and risk of stroke

Food	Studies	Subjects	Events	Unit	RR	95% CI
Beneficial						
Chocolate[13]	5	116 664	4260	Highest vs lowest category	0.79	0.70–0.87
Fruits[14]	16	964 142	46 203	Per 200 g (2 servings)/d	0.82	0.74–0.90
Vegetables[14]	13	441 670	14 973	Per 200 g (2 servings)/d	0.87	0.79–0.96
Fish[15]	8	394 958	16 890	≥5 vs 1 serving/wk	0.88	0.81–0.96
				2–4 vs <1 serving/wk	0.94	0.90–0.98
Milk[16]	14	603 920	25 269	per 200 g/d increment	0.93	0.88–0.98
				125 g/d milk intake	0.86	0.82–0.89
Eggs[17]	7	308 000	8889	High (1 egg/d) vs low (<2/wk)	0.88	0.81–0.97
Tea[18]	8	307 968	11 329	Each 1 serving/d (1 cup)	0.94	0.90–0.97
Coffee[19]	17	1 283 685	12 030	Highest vs lowest category	0.95	0.84–1.07
				2nd highest vs lowest category	0.80	0.75–0.86
				3rd highest vs lowest category	0.89	0.84–0.94
Neutral						
Whole grains[20]	6	245 012	2337	per 90 g/d (≤120–150 g/d)	0.88	0.75–1.03
Nuts[21]	11	396 768	9272	per 28 g/d increment	0.93	0.83–1.05
				High vs low	0.89	0.82–0.97
Cheese[16]	8	282 439	9919	per 40 g/d	0.97	0.94–1.01
Legumes[22]	6	254 628	6690	Each 4 servings/wk (400 g)	0.98	0.84–1.14
Butter[16]	3	173 853	5299	per 10 g/d increment	1.00	0.99–1.01
Harmful						
Red meat processed[23]	17	2 079 236	21 730	>50 g (1 serving)/d	1.14	1.05–1.24
				>0 g/d	1.17	1.09–1.27

Hankey G. The Lancet Neurology, 11(1), 66–81. https://doi.org/10.1016/S1474-4422(11)70265-4

Meta-analyses of prospective cohort studies of nutrients and risk of stroke

Nutrient	Studies	Subjects	Events	Unit	RR	95% CI
Beneficial						
Dietary potassium[4]	16	639 440	19 522	Highest vs lowest*	0.87	0.80–0.94
Omega-3 polyunsaturated fat[5]	14	514 483	9065	High vs low	0.87	0.79–0.95
Total dietary fiber[6]	8	277 537	9931	Per 7 g/d	0.93	0.88–0.98
Neutral						
Monounsaturated fat[7]	10	314 511	5827	higher intake	0.86	0.74–1.00
Omega-3-plant sources[8]	3	98 410	1300	high vs low	0.96	0.78–1.17
Calcium[9]	10	371 495	10 408	highest vs lowest quintile	0.96†	0.89–1.04
Saturated fat[10]	12	339 090	6226	high vs low	1.02	0.90–1.15
Total transfat[10]	3	190 284	1905	high vs low	1.07	0.88–1.28
Glycemic index[11]	7	225 205	3046	high vs low	1.10	0.99–1.21
Total carbohydrate[11]	4	170 348	1851	high vs low	1.12	0.93–1.35
Harmful						
Glycemic load[11]	6	222 308	2951	high vs low	1.19	1.05–1.36
Dietary sodium[12]	10	72 878	not stated	higher intake vs low	1.24	1.08–1.43

Median potassium intake =100 mmol/d in the highest category vs. 50 mmol/d in the lowest one

Pooled RR lowest at 90 mmol = 3.5g/d of potassium daily intake (RR 0.78; 95% CI, 0.70–0.86)

Hankey G. The Lancet Neurology, 11(1), 66–81. https://doi.org/10.1016/S1474-4422(11)70265-4

Meta-analyses of randomized controlled trials of dietary interventions and risk of stroke

Intervention	RCTs	RR	95% CI
Beneficial			
Diets			
Mediterranean[24,31]	3	0.65	0.48–0.88
Supplements			
Folic acid[32]	22	0.89	0.84–0.96
Neutral			
Nutrients			
Reduced saturated fat intake[33]	8	1.00	0.89–1.12
Supplements			
Omega-3 PUFAs[34–36]	9	1.05	0.93–1.18
Vitamin B6[37]	12	0.93	0.85–1.01
Vitamin B12[37]	5	0.91	0.80–1.03
Vitamin C[37,38]	4	0.98	0.88–1.09
Vitamin D[39]	11	1.09	0.92–1.30
Vitamin E[37]	12	1.00	0.93–1.09
β carotene[37]	2	0.98	0.89–1.07
Selenium[37]	1	1.09	0.68–1.72

Hankey G. The Lancet Neurology, 11(1), 66–81. https://doi.org/10.1016/S1474-4422(11)70265-4

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May 09, 2017; 88 (19) ARTICLE

Meta-analysis of folic acid efficacy trials in stroke prevention

Insight into effect modifiers

Min Zhao, Guangliang Wu, Youbao Li, Xiaobin Wang, Fan Fan Hou, Xiping Xu, Xianhui Qin, Yefeng Cai

First published April 12, 2017, DOI: https://doi.org/10.1212/WNL.0000000000003909

Objective: To examine the efficacy and effect modifiers of folic acid supplementation in the prevention of stroke in regions without folic acid fortification based on relevant, up-to-date published randomized trials.

Methods: Relative risk (RR) was used to measure the effect of folic acid supplementation on risk of stroke using a fixed effects model.

Findings: Overall, folic acid supplementation significantly reduced the stroke risk by 11% (22 trials, n = 82,723; RR 0.89, 95% confidence interval [CI] 0.84–0.96). The effect was greater in low folate regions (2 trials, n = 24,020; Asia, 0.78, 0.67–0.90) compared to high folate regions (7 trials, n = 14,655; America, 1.05, 0.90–1.23), and among patients without folic acid fortification (11 trials, n = 49,957; 0.85; 0.77–0.94) compared with those with folic acid fortification (7 trials, n = 14,655; 1.05, 0.90–1.23). In further stratified analyses among trials without folic acid fortification, a larger beneficial effect was found in those trials that used a low dosage of folic acid (≤0.8 mg: 0.78, 0.69–0.88) or low baseline vitamin B_{12} levels (<384 pg/mL: 0.78, 0.68–0.89). In the corresponding comparison groups, the effect sizes were attenuated and insignificant (p for interaction <0.05 for both). Although the interaction tests were not significant, there might be a higher benefit in trials with a low dosage of vitamin B_{12}, a low prevalence of statin use, but a high prevalence of hypertension.

Conclusions: Folic acid supplementation could reduce the stroke risk in regions without folic acid fortification, particularly in trials using a relatively low dosage of folic acid and with low vitamin B_{12} levels.

Folic acid supplementation reduces stroke risk by 11% (RR 0.89)

FATS

THE GOOD, THE BAD & THE UGLY

American Heart Association | American Stroke Association
life is why

Monounsaturated & Polyunsaturated Fats

- Can lower bad cholesterol levels
- Can lower risk of heart disease & stroke
- Can provide essential fats that your body needs but can't produce itself

SOURCE

Plant-based liquid oils, nuts, seeds and fatty fish

EXAMPLES

- **Oils** (such as canola, olive, peanut, safflower and sesame)
- **Avocados**
- **Fatty Fish** (such as tuna, herring, lake trout, mackerel, salmon and sardines)
- **Nuts & Seeds** (such as flaxseed, sunflower seeds and walnuts)

Saturated Fats

- Can raise bad cholesterol levels
- Can raise good cholesterol levels
- Can increase risk of heart disease & stroke

SOURCE

Most saturated fats come from animal sources, including meat and dairy, and from tropical oils

EXAMPLES

- **Beef, Pork & Chicken Fat**
- **Butter**
- **Cheese** (such as whole milk cheeses)
- **Tropical Oils** (such as coconut, palm kernel and palm oils)

Hydrogenated Oils & *Trans* Fats

- Can raise bad cholesterol levels
- Can lower good cholesterol levels
- Can increase risk of heart disease & stroke
- Can increase risk of type 2 diabetes

SOURCE

Processed foods made with partially hydrogenated oils

EXAMPLES

- **Partially Hydrogenated Oils**
- **Some Baked Goods**
- **Fried Foods**
- **Stick of Margarine**

American Heart Association Recommendation

Eat a healthy dietary pattern that:

Includes **good fats** | *Limits* **saturated fats** | *Keeps trans fats* as **LOW** as possible

For more information, go to **heart.org/fats**

TRANS FAT
is found in many foods

TEN OILS LOWEST IN SATURATED FAT

1 Canola	3 Sunflower	5 Grape seed	7 Olive	9 Soya bean
2 Flaxseed	4 Avocado	6 Corn	8 Sesame	10 Peanut

SOURCES: ANNELIE SMITH CONSULTING DIETICIANS (021-531-8302); HEARTFOUNDATION.CO.ZA (086-014-3278); HEART.ORG.

POLY-UNSATURATED

Eat fish at least twice a week and oils and seeds daily.

OMEGA 3
- sardines
- salmon
- tuna
- herring
- flaxseed
- walnuts
- canola oil
- leafy green vegetables

OMEGA 6
- sunflower, grapeseed, soya bean, cottonseed and corn oil.
- sunflower & sesame seeds
- soft margarines made from poly-unsaturated fats

OMEGA 9
- olive oil
- macadamia oil

SARDINES

GREEN LEAFY VEGETABLES

SUNFLOWER SEEDS

OLIVE OIL

TRANS FATS

Avoid these products at all times:

- hard margarine
- commercially baked products such as:
  - biscuits
  - pastries
  - crisps

Trans fats are manmade and don't occur naturally. Look for the words "partially hydrogenated" on packaging to see if food contains this type of fat.

PASTRIES

PROCESSED MEAT

HARD MARGARINE

TEN OILS LOWEST IN SATURATED FAT

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Yuan et al. Nutrition Journal (2020) 19:70
https://doi.org/10.1186/s12937-020-00582-4

Nutrition Journal

RESEARCH Open Access

Roles for circulating polyunsaturated fatty acids in ischemic stroke and modifiable factors: a Mendelian randomization study

Tonghui Yuan[1,2], Shucheng Si[1,2], Yunxia Li[1,2], Wenchao Li[1,2], Xiaolu Chen[1,2], Congcong Liu[1,2], Jiqing Li[1,2], Bojie Wang[1,2], Lei Hou[1,2], Yanxun Liu[1,2*] and Fuzhong Xue[1,2*]

Abstract

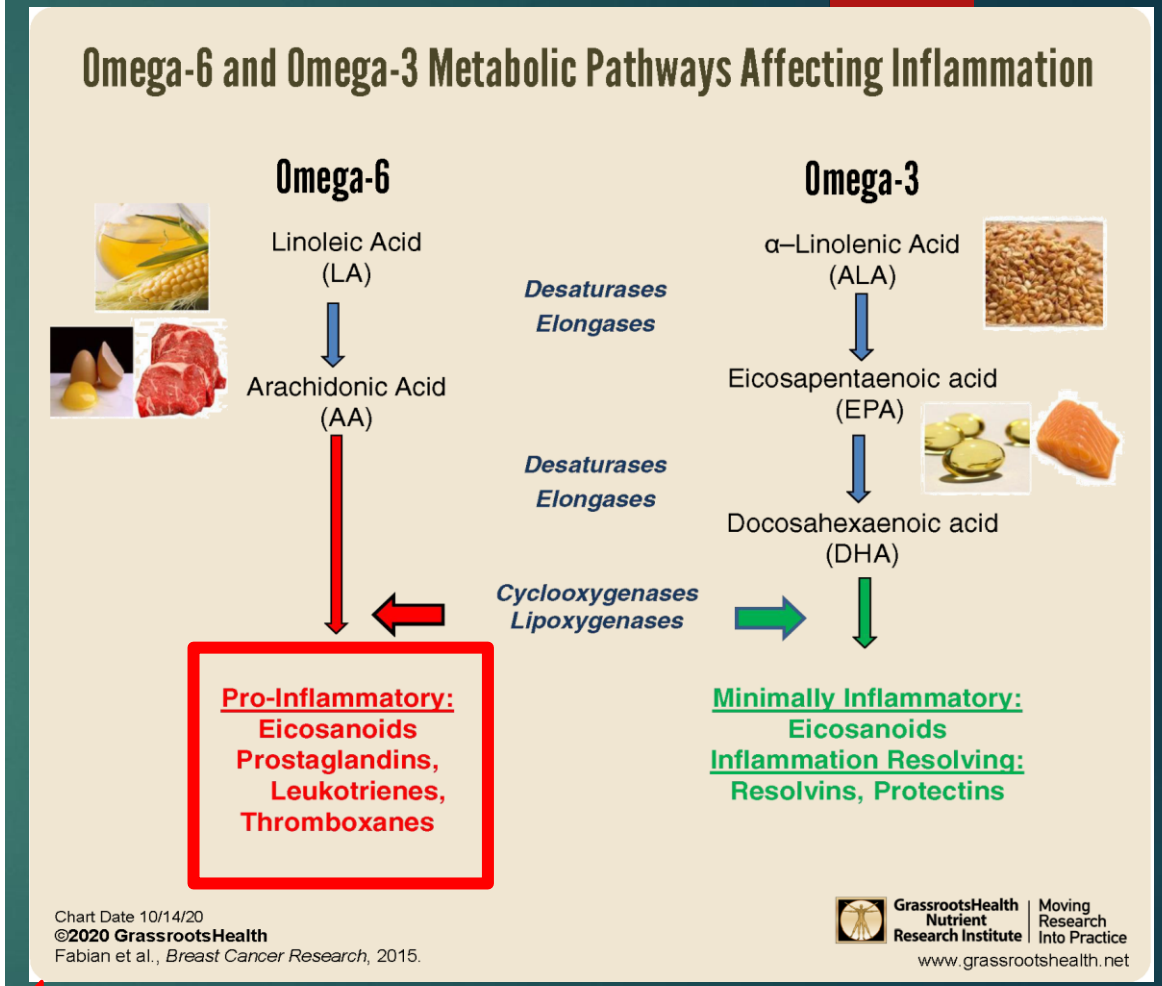
Background: Available data about the effects of circulating polyunsaturated fatty acids (PUFAs) on ischemic stroke (IS) and its main risk factors remains limited and conflicting. Therefore, we conducted Mendelian randomization (MR) to assess whether genetically predicted PUFA affected IS, lipids and blood pressure (BP).

Methods: Genetic instruments associated with IS were derived from ISGC Consortium ($n = 29,633$), with lipids were derived from GLGC($n = 188,577$), with BP were derived from Neale Lab($n = 337,000$). The inverse-variance weighted method was the main analysis to estimate the effect of exposure on outcome. Sensitivity analyses included principal components analysis, MR-Egger, weighted median, and weighted mode.

Results: Per SD increases in serum α-linolenic acid (ALA) were associated with lower IS risk, with odd ratio (OR) of 0.867(0.782,0.961), arachidonic acid (AA) were associated with higher IS risk (OR: 1.053(1.014,1.094)). Likewise, Per SD increases in ALA were associated with the lower-level low-density lipoprotein cholesterol(LDL-C), high-density lipoprotein cholesterol (HDL-C), total cholesterol (TC) (β:-0.122(− 0.144, − 0.101), − 0.159(− 0.182, − 0.135), − 0.148(− 0.171, − 0.126), respectively), AA were associated with the higher-level of LDL-C, HDL-C and TC (β:0.045(0.034,0.056), 0.059(0.050,0.067), 0.055(0.046,0.063), respectively). Linoleic acid (LA), eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA) and docosapentaenoic acid (DPA) had little or no association with IS, lipids or BP at Bonferroni-corrected significance. Different analytic methods supported these findings. The intercept test of MR-Egger implied no pleiotropy.

Conclusions: High-level plasma ALA was protective for IS but AA was the opposite. LA, EPA, DHA, and DPA had no effects on IS.

Keywords: Blood pressure, Ischemic stroke, Lipids, Mendelian randomization, Omega-3 fatty acids, Omega-6 fatty acids



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Keywords: Blood pressure, Ischemic stroke, Lipids, Mendelian randomization, Omega-3 fatty acids, Omega-6 fatty acids

Oil	Omega-6 Content	Omega-3 Content
Safflower	75%	0%
Sunflower	65%	0%
Corn	54%	0%
Cottonseed	50%	0%
Sesame	42%	0%
Peanut	32%	0%
Soybean	51%	7%
Canola	20%	9%
Walnut	52%	10%
Flaxseed	14%	57%
Fish*	0%	100%

DrJockers.com

Nuts & Seeds

	Protein	Carb	Fiber	Sat. Fat	Mono Fat	w-3 Fat	w-6 Fat	Calories
Almonds	6.0	6.1	3.5	1.1	8.8	0.2	3.4	163
Brazil	4.1	3.5	2.1	4.3	7.0	0.05	5.8	186
Cashew	5.2	8.6	0.9	2.2	6.7	0.2	2.2	157
Peanut	7.0	4.5	2.4	1.9	6.8	0	4.4	159
Hazelnut	4.2	4.7	2.7	1.3	12.9	0.24	2.2	178
Macademia	2.2	3.9	2.4	3.4	16.7	0.06	0.36	204
Pecan	2.6	3.9	2.7	1.8	11.6	0.28	5.8	196
Pistachio	5.8	7.8	2.9	1.6	6.8	0.71	3.7	159
Walnut	4.3	3.9	1.9	1.7	2.5	2.5	10.7	185
Pine	3.8	3.7	1.0	1.4	5.3	0.31	9.4	188
Pumpkin	9.3	5.0	1.1	2.4	4.0	0.51	5.8	151
Flax	1.8	8.1	7.6	1.0	2.1	6.3	1.7	150
Chia	4.4	12.3	10.6	0.9	0.6	4.9	1.6	137
Sesame	5.0	6.6	3.3	1.9	5.3	0.11	6.0	160
Sunflower	5.5	5.6	2.4	1.2	5.2	0.21	6.5	164

Omega-3 fish oil supplement?
> Trials do not show benefit

Circulation
Volume 135, Issue 15, 11 April 2017; Pages e867-e884
https://doi.org/10.1161/CIR.0000000000000482

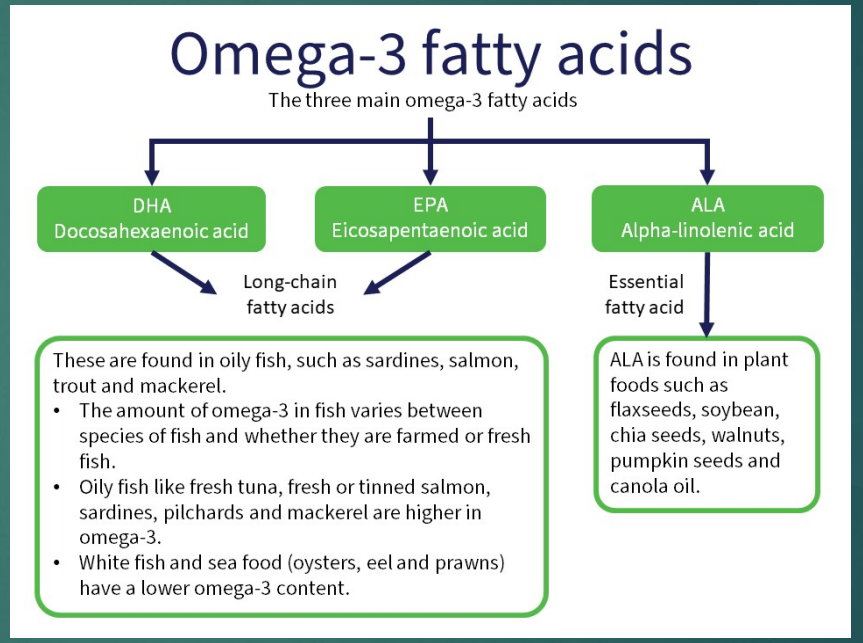
American Heart Association.

CLINICAL STATEMENTS AND GUIDELINES

Omega-3 Polyunsaturated Fatty Acid (Fish Oil) Supplementation and the Prevention of Clinical Cardiovascular Disease

A Science Advisory From the American Heart Association

David S. Siscovick, MD, MPH, FAHA, Chair, Thomas A. Barringer, MD, FAHA, Amanda M. Fretts, PhD, MPH, Jason H.Y. Wu, PhD, MSc, FAHA, Alice H. Lichtenstein, DSc, FAHA, Rebecca B. Costello, PhD, FAHA, Penny M. Kris-Etherton, PhD, RD, FAHA, Terry A. Jacobson, MD, FAHA, Mary B. Engler, PhD, RN, MS, FAHA, Heather M. Alger, PhD, Lawrence J. Appel, MD, MPH, FAHA, Dariush Mozaffarian, MD, DrPH, FAHA, and On behalf of the American Heart Association Nutrition Committee of the Council on Lifestyle and Cardiometabolic Health; Council on Epidemiology and Prevention; Council on Cardiovascular Disease in the Young; Council on Cardiovascular and Stroke Nursing; and Council on Clinical Cardiology



CONCLUSIONS

"We do <u>not</u> recommend treatment to prevent incident stroke among patients at high CVD risk and recurrent AF"

Cochrane Library

Cochrane Database of Systematic Reviews

Reduction in saturated fat intake for cardiovascular disease (Review)

Hooper L, Martin N, Jimoh OF, Kirk C, Foster E, Abdelhamid AS

Hooper et al. 2020
doi:10.1002/14651858.CD011737.pub2

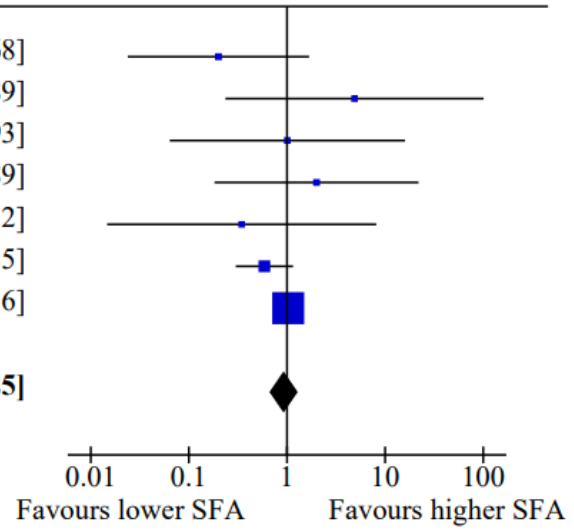
Analysis 2.35. Comparison 2: SFA reduction vs usual diet - secondary health events, Outcome 35: STROKE

Study or Subgroup	Lower SFA Events	Lower SFA Total	Higher SFA Events	Higher SFA Total	Weight	Risk Ratio M-H, Random, 95% CI
Ley 2004	1	88	5	88	2.0%	0.20 [0.02 , 1.68]
MRC 1968	2	199	0	194	1.0%	4.88 [0.24 , 100.89]
Moy 2001	1	117	1	118	1.2%	1.01 [0.06 , 15.93]
Oslo Diet-Heart 1966	2	206	1	206	1.6%	2.00 [0.18 , 21.89]
STARS 1992	0	27	1	28	0.9%	0.35 [0.01 , 8.12]
Veterans Admin 1969	13	424	22	422	16.4%	0.59 [0.30 , 1.15]
WHI 2006 (1)	435	19541	634	29294	76.9%	1.03 [0.91 , 1.16]
Total (95% CI)		**20602**		**30350**	**100.0%**	**0.92 [0.68 , 1.25]**
Total events:	454		664			

Heterogeneity: $Tau^2 = 0.03$; $Chi^2 = 6.59$, df = 6 (P = 0.36); $I^2 = 9\%$

Test for overall effect: Z = 0.52 (P = 0.60)

Test for subgroup differences: Not applicable



7 RCTs, 50,952 participants, 1118 people with stroke

No effect of SFA reduction vs. usual diet on any stroke, RR 0.92, 95% CI 0.68 to 1.25

Ultra-processed food intake and risk of cardiovascular disease: prospective cohort study (NutriNet-Santé)

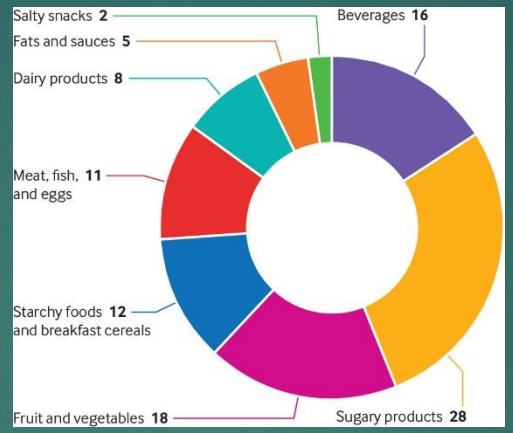
BMJ 2019 ; 365 doi: https://doi.org/10.1136/bmj.l1451 (Published 29 May 2019)
Cite this as: *BMJ* 2019;365:l1451

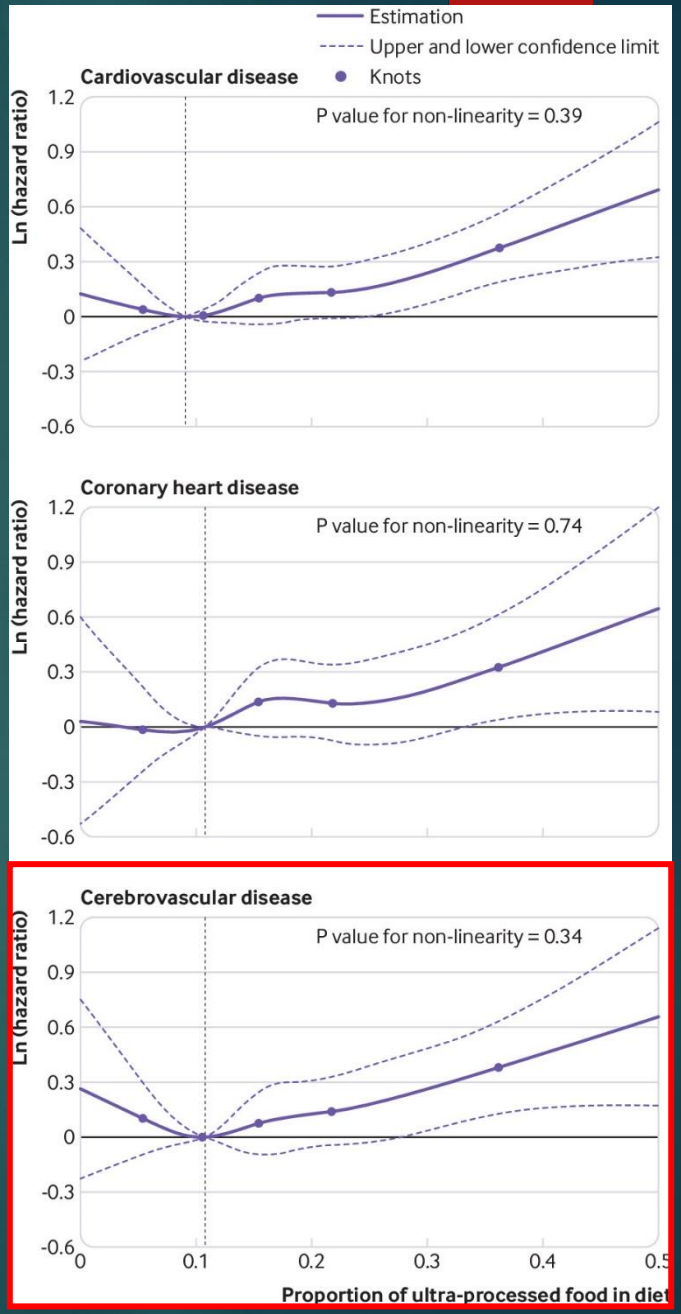
Prospective observation of 105K participants for 5.2 years

Intake of ultra processed foods significantly increased risk of:

- **Cardiovascular D: HR 1.12**
- **Coronary HD: HR 1.13**
- **Cerebrovascular D: HR 1.11**

Results remained statistically significant after adjustment for several markers of the nutritional quality of the diet (saturated fatty acids, sodium and sugar intakes, dietary fibre, or a healthy dietary pattern





The Pillars of Lifestyle Medicine

Healthy Eating

Lifestyle Medicine supports people to reduce consumption of ultra-processed foods by teaching the knowledge and skills required to follow healthier eating patterns of people's own choosing.

Mental Wellbeing

Lifestyle medicine teaches proven techniques to reduce stress and help people with relaxation. Practitioners support people to find purpose in life and improve health through connection with nature.

Healthy Relationships

Lifestyle medicine supports people to develop and sustain healthy and meaningful relationships and increase social connection to reduce stress and promote both physical and mental health.

Physical Activity

Lifestyle Medicine supports people to choose ways they could incorporate more physical activity in their lives, as well as reducing time spent sitting down.

Minimising Harmful Substances

Lifestyle Medicine supports people to stop smoking, reduce excessive alcohol consumption, avoid addictive substances and behaviours such as gambling or harmfully excessive internet or social media use.

Sleep

Lifestyle Medicine supports people to achieve good quality sleep and avoid behaviours which can impair sleep quality.

https://bslm.org.uk

Conclusion

- Nutrition is important in reducing stroke risk
- Follow a Mediterranean and DASH style diets
- Don't calorie count – extra virgin olive oil & nuts

- Focus on high potassium food / omega-3 oils
- Eat more white meat / polyphenol-rich foods
- Eggs (1/d) are good!

- Avoid high salt & glycaemic index foods / trans fats
- Eat less red meat / omega-6 oils / ultra processed foods

- Nutritional optimization as part of a comprehensive lifestyle modification plan
- It's never too late to develop a healthy eating habit & lifestyle


Thank you
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