

Update on new dietary fat recommendations



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Learning objectives

1. Describe at least one common misconception about the relationship between dietary fat and health.
2. List current recommendations regarding dietary fat.
3. Plan a one day diet that follows the current recommendations.

Outline

- T/F quiz
- History of dietary fat recommendations in the U.S.
- Current recommendations
- Fitting recommendations into dietary patterns
- T/F quiz - revisited

True or False?

- Low-fat diets are the best diets for those at risk for cardiovascular disease.
- Cholesterol rich foods (like eggs) are bad for you.
- Your total and LDL cholesterol levels are the best indicators of your risk for a heart attack.
- Saturated fat raises your “bad” cholesterol and that causes heart disease.
- Low-fat options are generally “healthier” options (low fat vs. full fat yogurt, salad dressing).

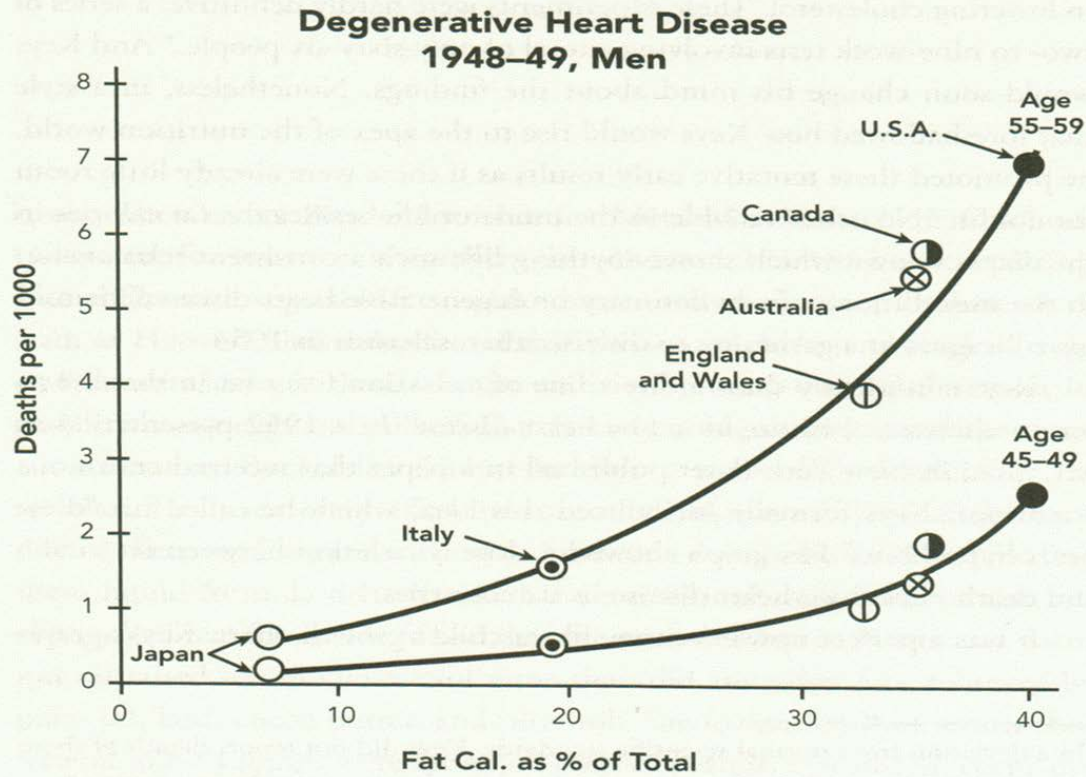
A big FAT lie?

The History of dietary guidance about dietary fat

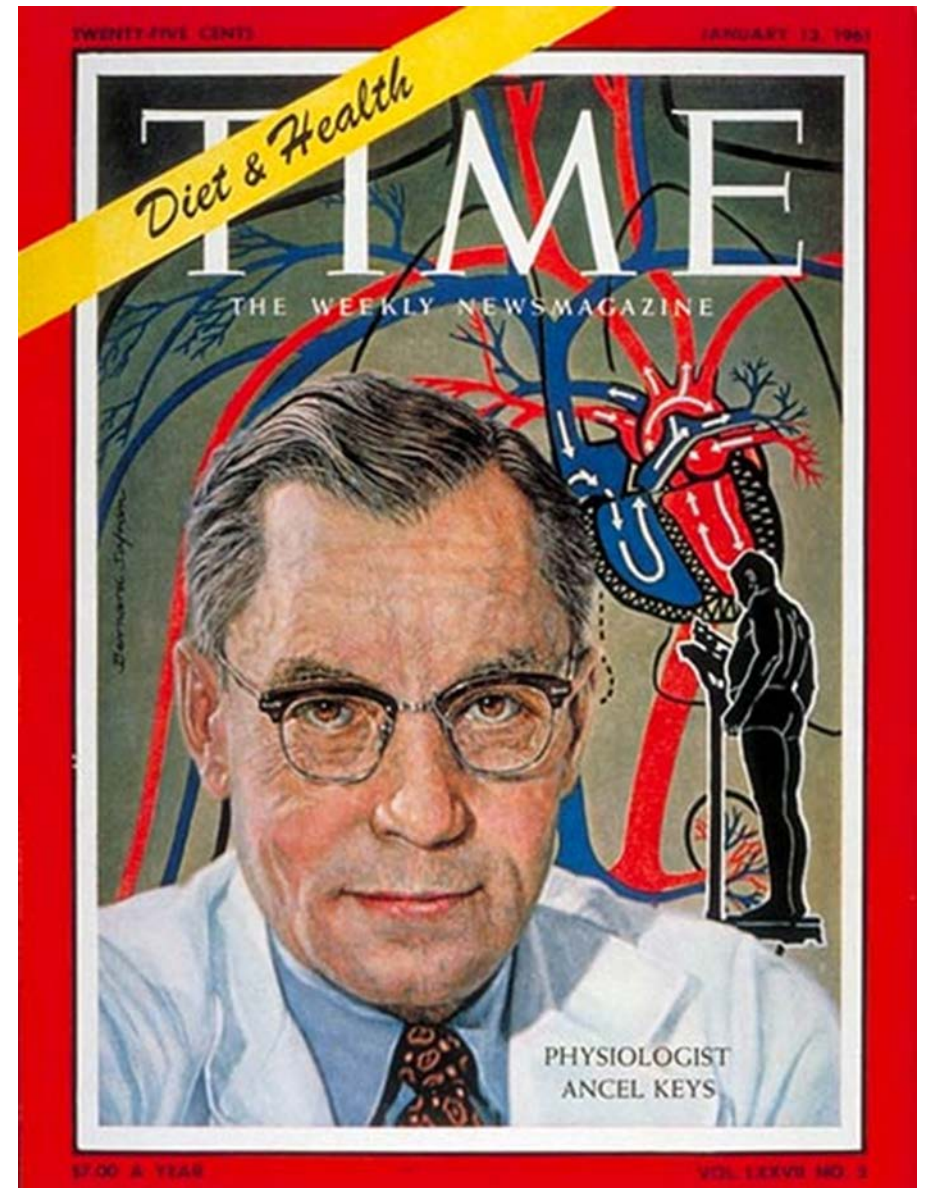
- Ancel Keys and the Seven Country Study and prior work (1958)
- Keys Diet Heat Hypothesis
- Keys persuaded the American Heart Association to release 1st guidelines targeting fat → many scientists opposed it (John Yudkin)!
- The first Dietary Goals for the United states (1977)



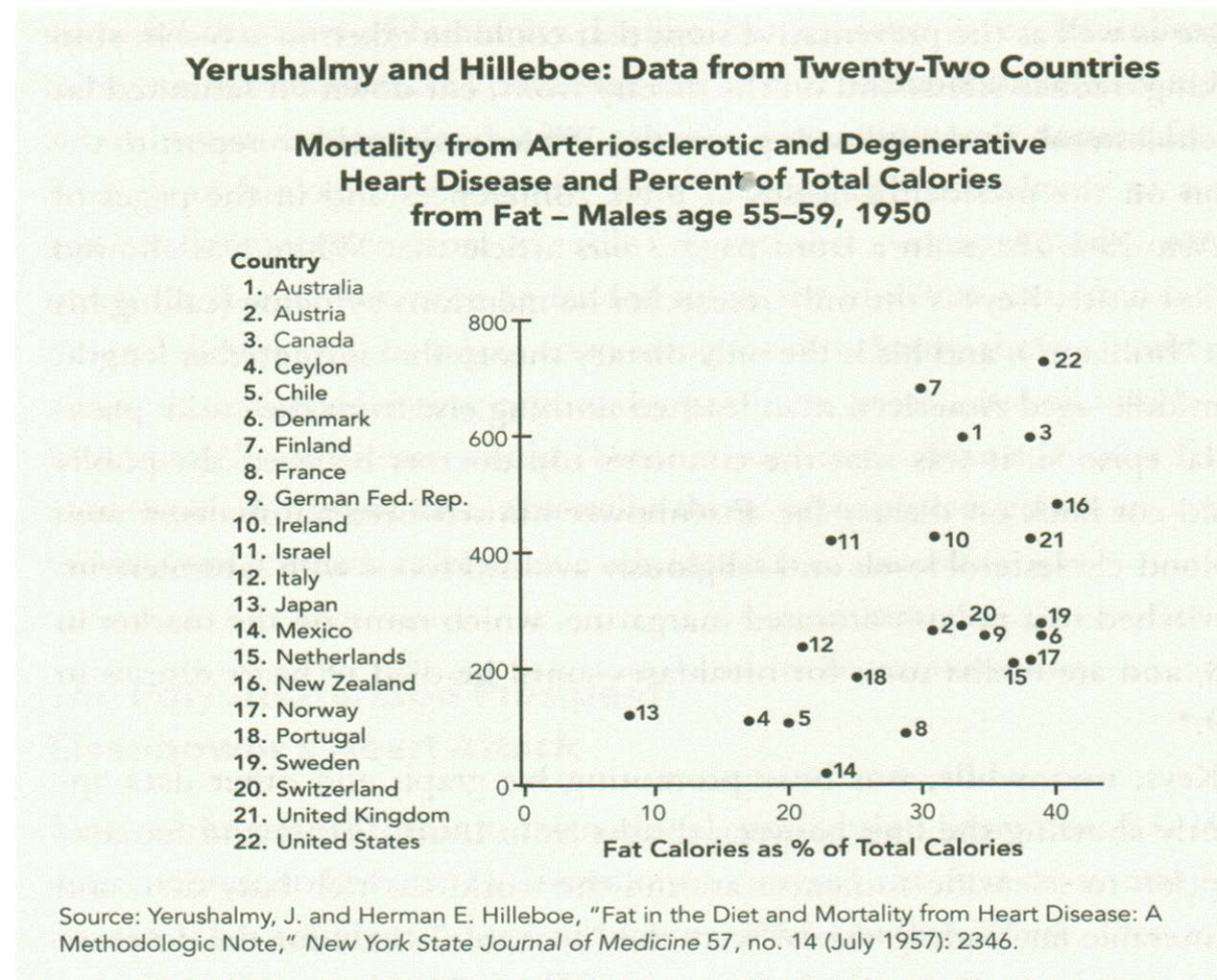
**Keys's 1952 Chart:
Fat Calories vs. Deaths from Degenerative Heart Disease**



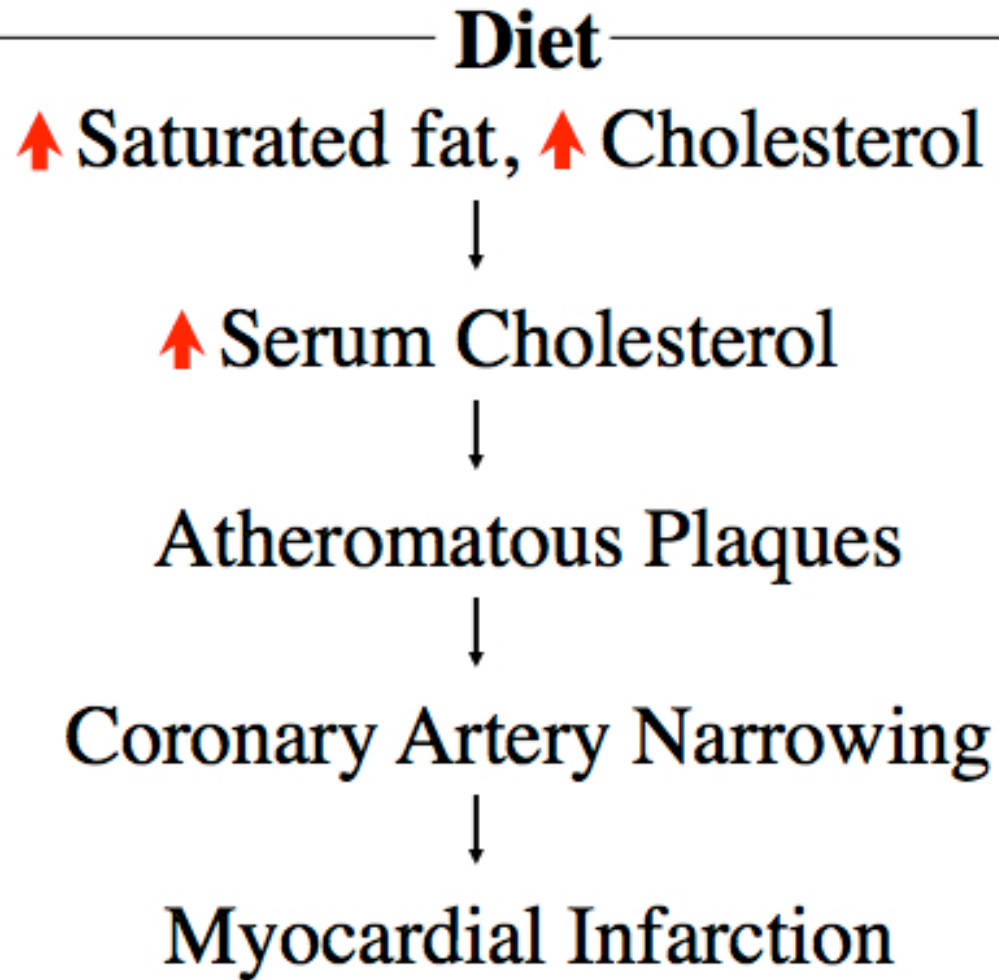
Source: Ancel Keys, "Atherosclerosis: A Problem in Newer Public Health," *Journal of Mt. Sinai Hospital, New York* 20, no. 2 (July-Aug 1953): 134.



22 countries instead of 7? Weaker association

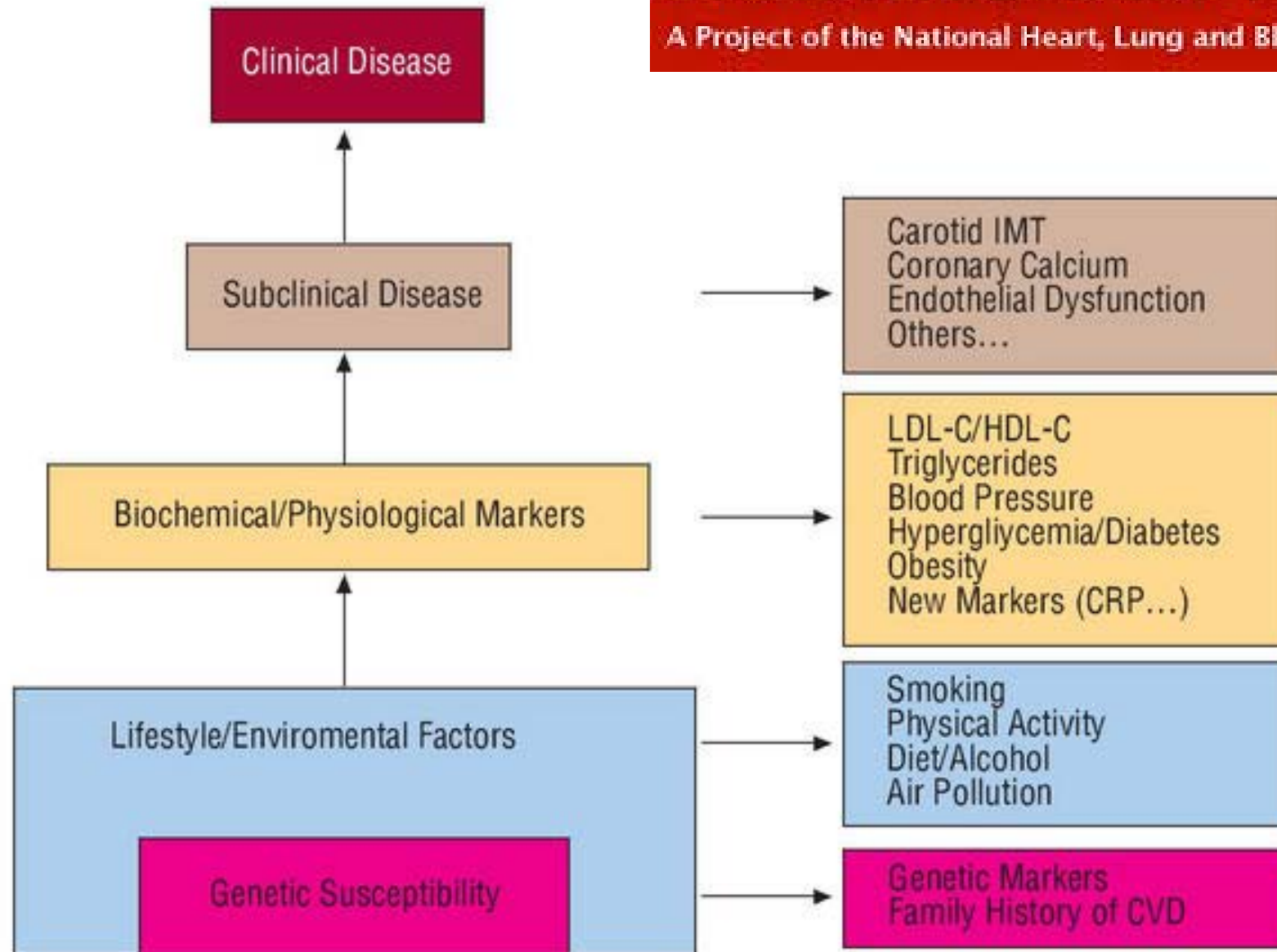


Classic Diet-Heart Hypothesis



FRAMINGHAM HEART STUDY

A Project of the National Heart, Lung and Blood Institute and Boston University



DIETARY GOALS FOR THE UNITED STATES

PREPARED BY THE STAFF OF THE
SELECT COMMITTEE ON NUTRITION
AND HUMAN NEEDS
UNITED STATES SENATE

FEBRUARY 1977

Printed for the use of the Select Committee on Nutrition
and Human Needs

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON, D.C.: 1977

U.S. DIETARY GOALS

1. Increase carbohydrate consumption to account for 55 to 60 percent of the energy (caloric) intake.
2. Reduce overall fat consumption from approximately 40 to 30 percent energy intake.
3. Reduce saturated fat consumption to account for about 10 percent of total energy intake; and balance that with poly-unsaturated and mono-unsaturated fats, which should account for about 10 percent of energy intake each.
4. Reduce cholesterol consumption to about 300 mg. a day.
5. Reduce sugar consumption by about 40 percent to account for about 15 percent of total energy intake.
6. Reduce salt consumption by about 50 to 85 percent to approximately 3 grams a day.

13

The Goals Suggest the Following Changes in Food Selection and Preparation

1. Increase consumption of fruits and vegetables and whole grains.
2. Decrease consumption of meat and increase consumption of poultry and fish.
3. Decrease consumption of foods high in fat and partially substitute poly-unsaturated fat for saturated fat.
4. Substitute non-fat milk for whole milk.
5. Decrease consumption of butterfat, eggs and other high cholesterol sources.
6. Decrease consumption of sugar and foods high in sugar content.
7. Decrease consumption of salt and foods high in salt content.

History of the Total Fat Dietary Guidelines

Avoid Too Much Fat,

A diet low in fat makes it easier for you to include the variety of foods you need for nutrients without exceeding your calorie needs because fat contains over twice the calories of an equal amount of carbohydrates or protein.

The types of fatty acids consumed are more important in influencing the risk of cardiovascular disease than is the total amount of fat in the diet. Animal

- 1980
- 1985
- 1990
- 1995
- 2000
- 2005
- 2010
- 2015

Keep total fat intake moderate

Foods high in fat should be used sparingly

Keep total fat intake between 20 to 35 percent of calories, with most fats coming from sources of polyunsaturated and monounsaturated fatty acids, such as fish, nuts, and vegetable oils.

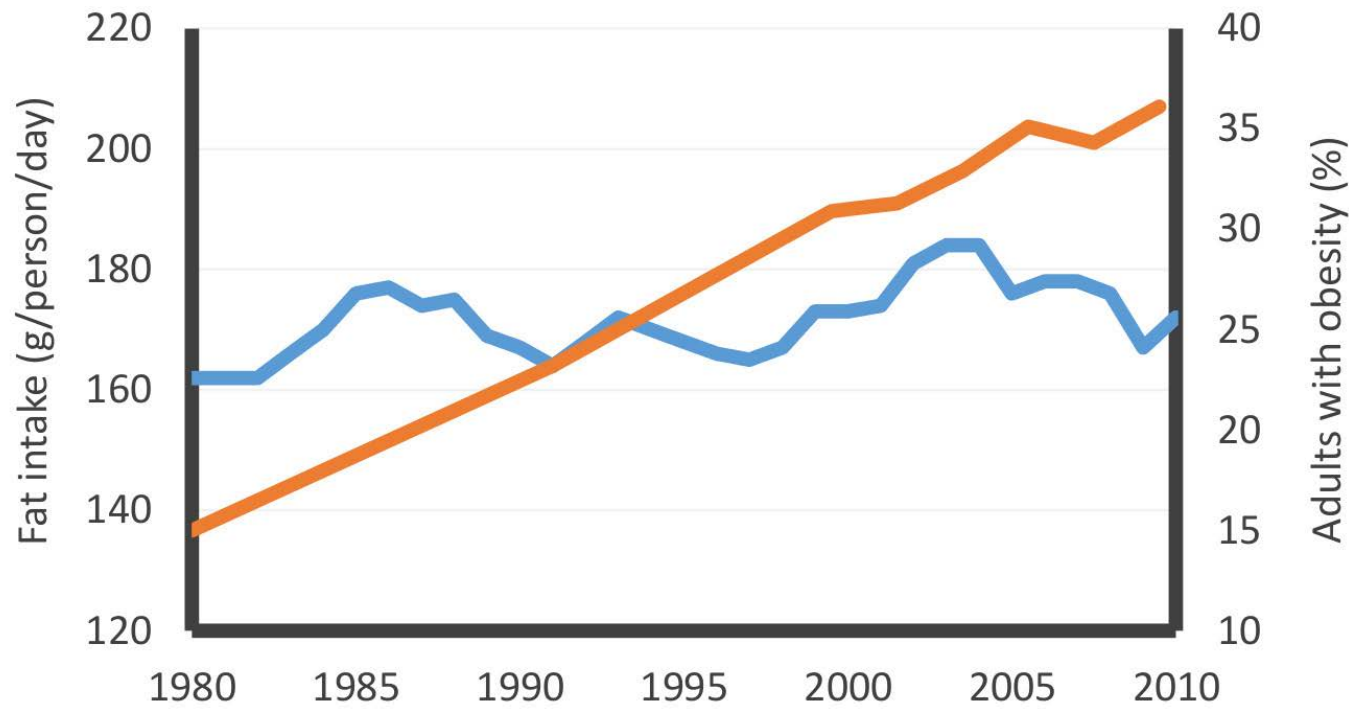
Americans. But for the U.S. population as a whole, it is sensible to reduce daily consumption of fat. This suggestion is

?

Fat intake and obesity 1980s to now

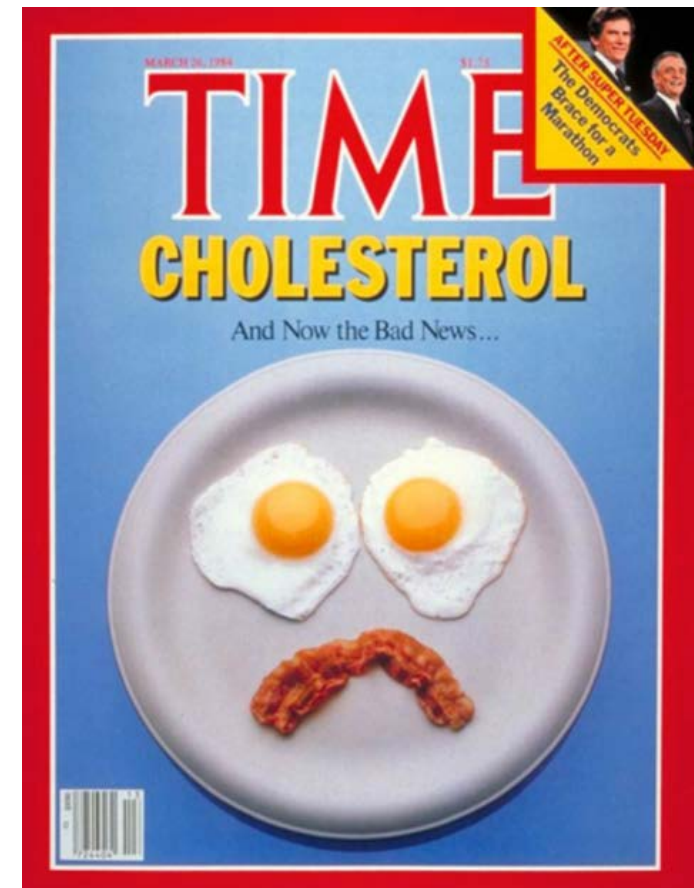


US Fat Intake vs. Obesity Prevalence, 1980-2010

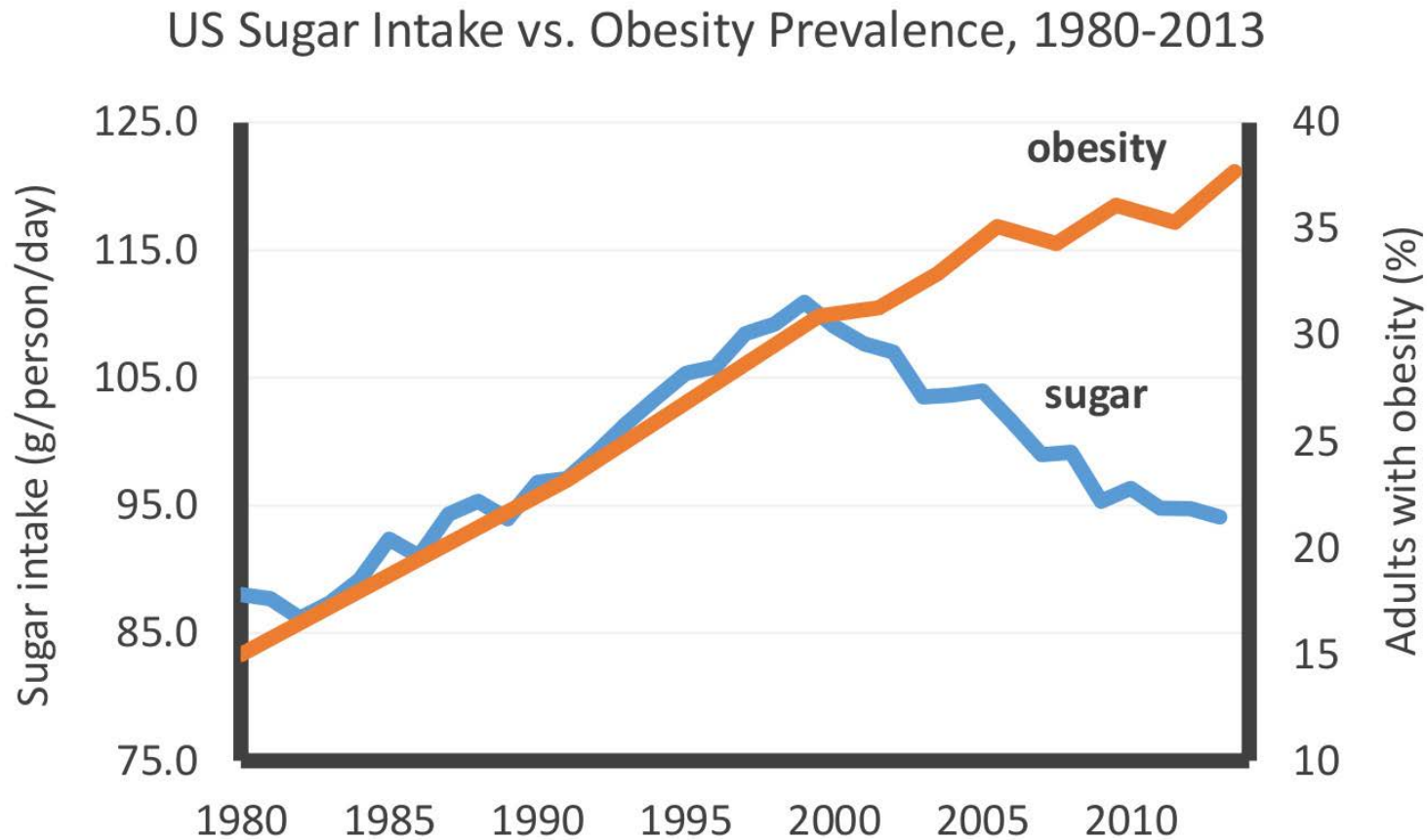


Sources: USDA Economic Research Service, CDC NHANES surveys

Prepared by Stephan J. Guyenet

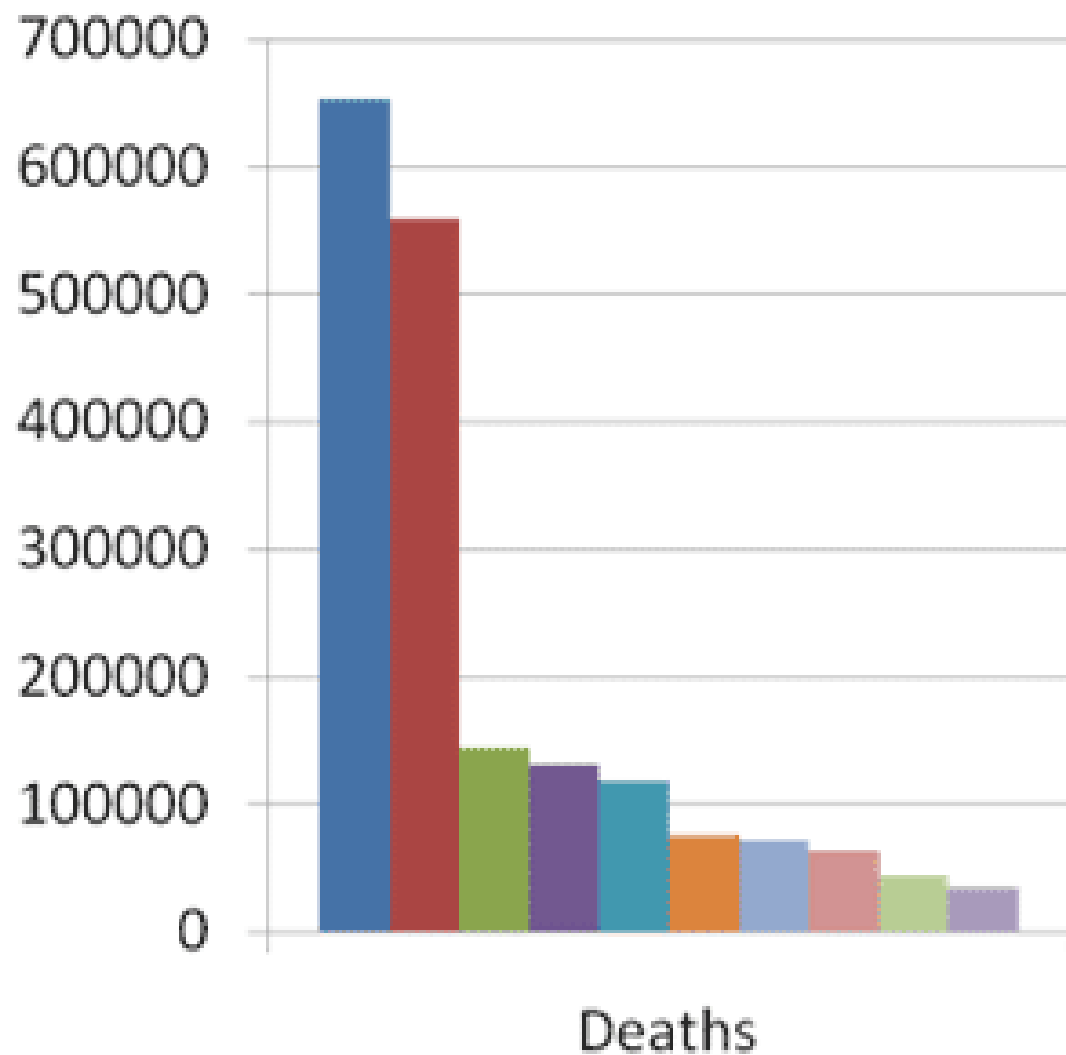


Sugar intake and obesity 1980s to now



Sources: USDA Economic Research Service, CDC NHANES surveys

Prepared by Stephan J. Guyenet

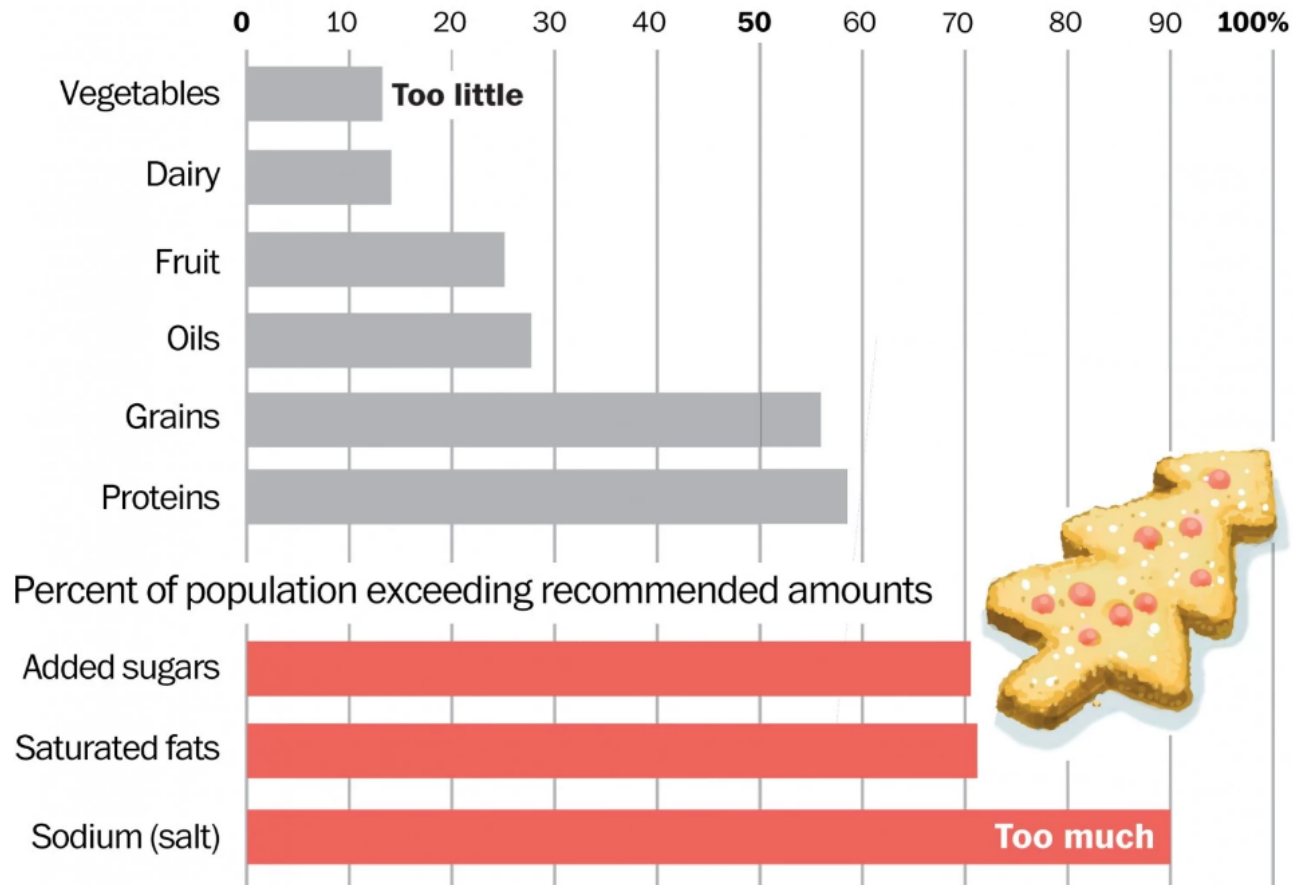


- Heart Disease
- Cancer
- Stroke
- Chronic Lung Dis.
- Accidents
- Diabetes
- Alzheimer's
- Flu/Pneum.
- Kidney Dis.
- Septicemia



The average American diet*

Percent of population eating recommended amounts



*For people older than 1, based on a 2007-2010 study

Source: Health.gov

PATTERSON CLARK/THE WASHINGTON POST

The issue of saturated fats — that is, those fats characteristic of meat and dairy products — is especially charged politically because it serves as a proxy for the arguments over the morality and health effects of meat



1 Follow a healthy eating pattern across the lifespan. All food and beverage choices matter. Choose a healthy eating pattern at an appropriate calorie level to help achieve and maintain a healthy body weight, support nutrient adequacy, and reduce the risk of chronic disease.

2 Focus on variety, nutrient density, and amount. To meet nutrient needs within calorie limits, choose a variety of nutrient-dense foods across and within all food groups in recommended amounts.

3 Limit calories from added sugars and saturated fats and reduce sodium intake. Consume an eating pattern low in added sugars, saturated fats, and sodium. Cut back on foods and beverages higher in these components to amounts that fit within healthy eating patterns.

4 Shift to healthier food and beverage choices. Choose nutrient-dense foods and beverages across and within all food groups in place of less healthy choices. Consider cultural and personal preferences to make these shifts easier to accomplish and maintain.

5 Support healthy eating patterns for all. Everyone has a role in helping to create and support healthy eating patterns in multiple settings nationwide, from home to school to work to communities.

Follow a healthy eating pattern over time to help support a healthy body weight and reduce the risk of chronic disease.

A healthy eating pattern includes:

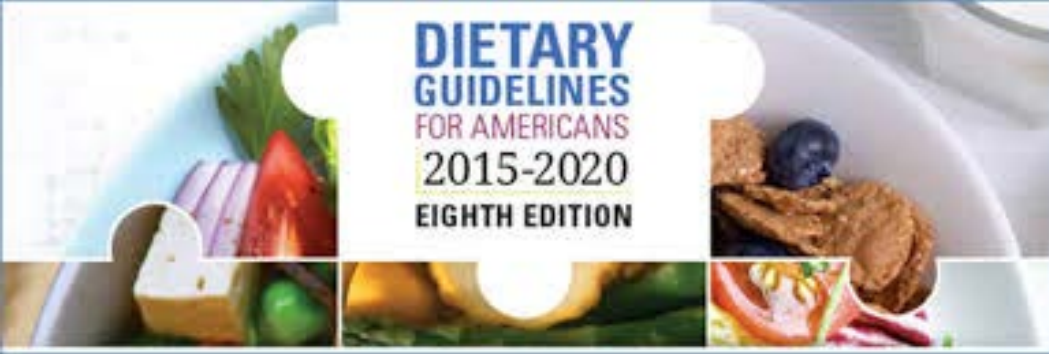


A healthy eating pattern limits:



Dietary Guidelines for Americans 2015

- ✓ Emphasis is on healthy eating patterns. Including,
 - Fat-free or low-fat dairy, including milk, yogurt, cheese, and or fortified soy beverages
 - Oils (vs. saturated and trans fat)
- ✓ Limit trans fat (same)
- ✓ Limit saturated fat to <10 percent of calories (same)
- ✓ NO quantification of cholesterol limit (different)
- ✓ Total fat? (quietly ignored)



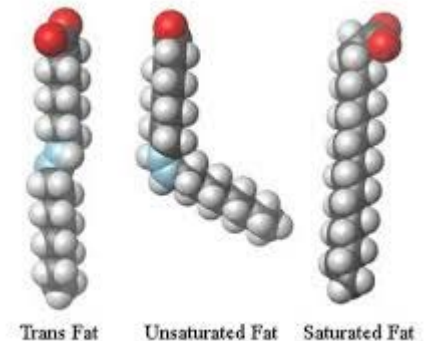
- ✓ Limit trans fat (same)
- ✓ Limit saturated fat to <10 percent of calories (same)
- ✓ NO quantification of cholesterol limit (different)
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Trans fat = partially hydrogenated vegetable oil →
look for this in ingredient lists.

FDA recently removed PHO's GRAS status (3- years from June 2015 to comply)

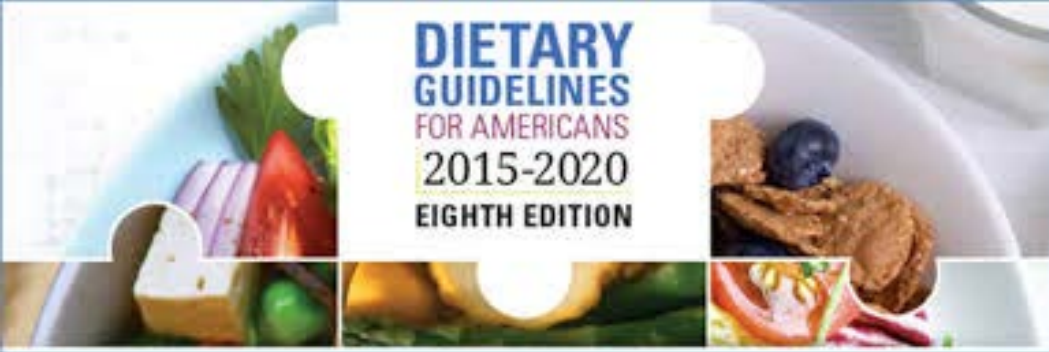


INGREDIENTS: ENRICHED FLOUR (WHEAT FLOUR), NIACIN, REDUCED IRON, THIAMINE, MONONITRATE [VITAMIN B₁], RIBOFLAVIN [VITAMIN B₂], FOLIC ACID), PARTIALLY HYDROGENATED SOYBEAN OIL, SUGAR, HIGH FRUCTOSE CORN SYRUP, LEAVENING (BAKING SODA, CALCIUM PHOSPHATE), SALT, NATURAL FLAVOR (CONTAINS SESAME), SODIUM STEAROYL LACTYLATE (DOUGH CONDITIONER), SOY LECITHIN (EMULSIFIER)



What to eat? (trans fat)

- Naturally occurring trans fat in meat and dairy is OK.
- There is **NO ROOM** for PHOs.



- ✓ Limit trans fat (same)
- ✓ Limit saturated fat to <10 percent of calories (same)
- ✓ **NO quantification of cholesterol limit (different)**
- ✓ Total fat? (quietly ignored)



Scientific Report of the 2015 Dietary Guidelines Advisory Committee

Advisory Report to the Secretary of Health and Human Services
and the Secretary of Agriculture

Dietary Guidelines- 2015?

Cholesterol. Previously, the Dietary Guidelines for Americans recommended that cholesterol intake be limited to no more than 300 mg/day. The 2015 DGAC will not bring forward this recommendation because available evidence shows no appreciable relationship between consumption of dietary cholesterol and serum cholesterol, consistent with the conclusions of the AHA/ACC report.^{2, 35} Cholesterol is not a nutrient of concern for overconsumption.

2015-2020 DGAs for Americans

Dietary Cholesterol

The body uses cholesterol for physiological and structural functions but makes more than enough for these purposes. Therefore, people do not need to obtain cholesterol through foods.

The Key Recommendation from the *2010 Dietary Guidelines* to limit consumption of dietary cholesterol to 300 mg per day is not included in the 2015 edition, but this change does not suggest that dietary cholesterol is no longer important to consider when building healthy eating patterns. As recommended by the IOM,^[24] individuals should eat as little dietary cholesterol as possible while consuming a healthy eating pattern. In general, foods that are higher in dietary cholesterol, such as fatty meats and high-fat dairy products, are also higher in saturated fats. The USDA Food Patterns are limited in saturated fats, and because of the commonality of food sources of saturated fats and dietary cholesterol, the Patterns are also low in dietary cholesterol. For example, the Healthy U.S.-Style Eating Pattern contains approximately 100 to 300 mg of cholesterol across the 12 calorie levels. Current average intake of dietary cholesterol among those 1 year and older in the United States is approximately 270 mg per day.

Dietary cholesterol and heart disease?

- In 1912 Anichkov discovered that feeding cholesterol to rabbits led to atherosclerosis.
- Rabbits are herbivores- metabolize cholesterol differently
- 80% of the cholesterol in our body is made by our body
- 1 egg = ~200 mg of cholesterol



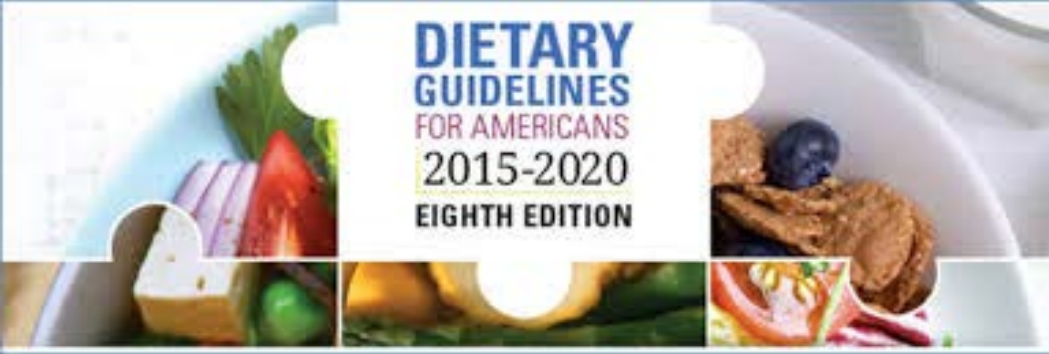
Change in LDL, HDL, and LDL Size as a Response to DC provided by Egg in Various Populations

POPULATION	DURATION	ADDT'L DC	LDL	HDL	LDL:HDL RATIO	LDL SIZE
CHILDREN	4 wk	518 mg/d	↑	↑	No Change	↑
WOMEN	4 wk	640 mg/d	↑	↑	No Change	↑
MEN	12 wk	640 mg/d	No Change	↑	↓	↑
MEN/WOMEN	12 wk	215 mg/d	No Change	↑	No Change	↑
MEN/WOMEN	4 wk	640 mg/d	↑	↑	No Change	↑
MEN/WOMEN	12 wk	250 mg/d	No Change	↑	↓	N/A
MEN/WOMEN	12 wk	400 mg/d	No Change	No Change	No Change	N/A

What to eat? (cholesterol)

- U.S. Healthy Eating Pattern
- Eggs are listed with other protein foods including meats, poultry, and eggs (10-28 oz-eq/week for a 1,000 – 2,200 kcalories diet)
- A few eggs a week is A-ok! (2-3 eggs per week)





- ✓ Limit trans fat (same)
- ✓ Limit saturated fat to <10 percent of calories (same)
- ✓ NO quantification of cholesterol limit (different)
- ✓ Total fat? (quietly ignored)

History of Saturated Fat Guidelines

Populations like ours with diets high in saturated fats and cholesterol tend to have high blood cholesterol levels. Individuals within these populations usually have greater risks of having heart attacks than people eating low-fat, low-cholesterol diets.

cancer. The higher levels of saturated fat and cholesterol in our diets are linked to our increased risk for heart disease.

therefore have no dietary requirement for saturated fatty acids. A strong body of evidence indicates that higher intake of most dietary saturated fatty acids is associated with higher levels of blood total cholesterol and low-density lipoprotein (LDL)

- 1980
- 1985
- 1990
- 1995
- 2000
- 2005
- 2010
- 2015

Choose foods low in saturated fat

Choose a diet low in saturated fat

Eating extra saturated fat, high levels of cholesterol, and excess calories will increase blood cholesterol in many people. Of these, saturated fat has the greatest influence. The

...most Americans need to decrease their intakes of saturated fat and *trans* fats,

should continue to monitor saturated fat intake. Saturated fat is still a nutrient of concern for overconsumption, particularly for those older than the age of 50 years.



Saturated Fats, *Trans* Fats, and Cholesterol

Saturated Fats

Healthy intake: Intake of saturated fats should be limited to less than 10 percent of calories per day by replacing them with unsaturated fats and while keeping total dietary fats within the age-appropriate AMDR. The human body uses some saturated fats for physiological and structural functions, but it makes more than enough to meet those needs. Individuals 2 years and older therefore have no dietary requirement for saturated fats.

Strong and consistent evidence shows that replacing saturated fats with unsaturated fats, especially polyunsaturated fats, is associated with reduced blood levels of total cholesterol and of low-density lipoprotein-cholesterol (LDL-cholesterol). Additionally, strong and consistent evidence shows that replacing saturated fats with polyunsaturated fats is associated with a reduced risk of CVD events (heart attacks) and CVD-related deaths.

Some evidence has shown that replacing saturated fats with plant sources of monounsaturated fats, such as olive oil and nuts, may be associated with a reduced risk of CVD. However, the evidence base for monounsaturated fats is not as strong as the evidence base for replacement with polyunsaturated fats. Evidence has also shown that replacing saturated fats with carbohydrates reduces blood levels of total and LDL-cholesterol, but increases blood levels of triglycerides and reduces high-density lipoprotein-cholesterol (HDL-cholesterol). Replacing total fat or saturated fats with carbohydrates is not associated with reduced risk of CVD. Additional research is needed to determine whether this relationship is consistent across categories of carbohydrates (e.g., whole versus refined grains; intrinsic versus added sugars), as they may have different associations with various health outcomes. Therefore, saturated fats in the diet should be replaced with polyunsaturated and monounsaturated fats.

Considerations: As discussed in [Chapter 2](#), the main sources of saturated fats in the U.S. diet include mixed dishes containing cheese, meat, or both, such as burgers, sandwiches, and tacos; pizza; rice, pasta, and grain dishes; and meat, poultry, and seafood dishes. Although some saturated fats are inherent in foods, others are added. Healthy eating patterns can accommodate nutrient-dense foods with small amounts of saturated fats, as long as calories from saturated fats do not exceed 10 percent per day, intake of total fats remains within the AMDR, and total calorie intake remains within limits. When possible, foods high in saturated fats should be replaced with foods high in unsaturated fats, and other choices to reduce solid fats should be made (see [Chapter 2](#)).

Foods high in SFA should be replaced with foods high in unsaturated fats, and other choices to reduce solid fats...

See corresponding editorial on page 497.

Meta-analysis of prospective cohort studies evaluating the association of saturated fat with cardiovascular disease¹⁻⁵

Patty W Siri-Tarino, Qi Sun, Frank B Hu, and Ronald M Krauss

2010

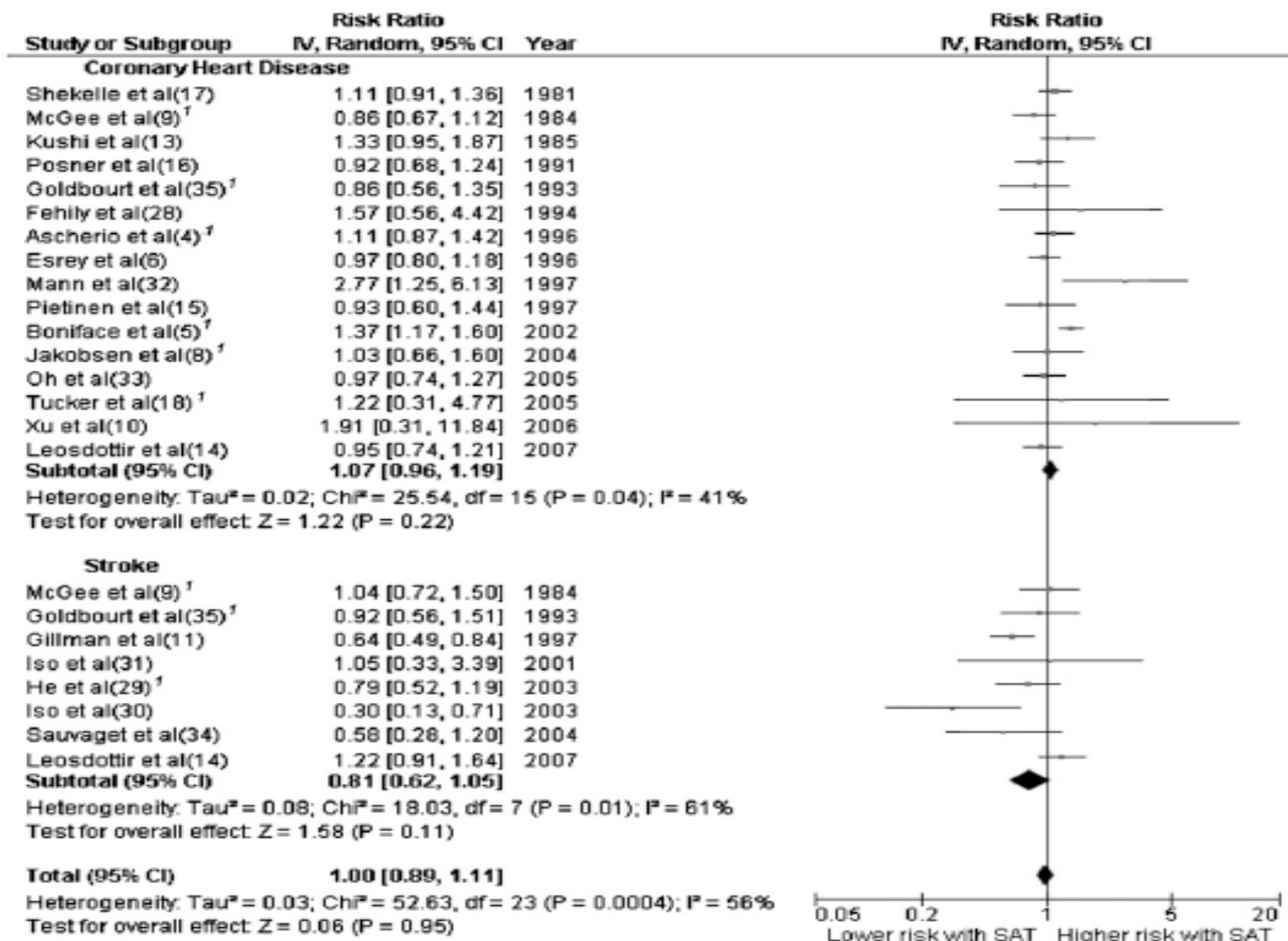


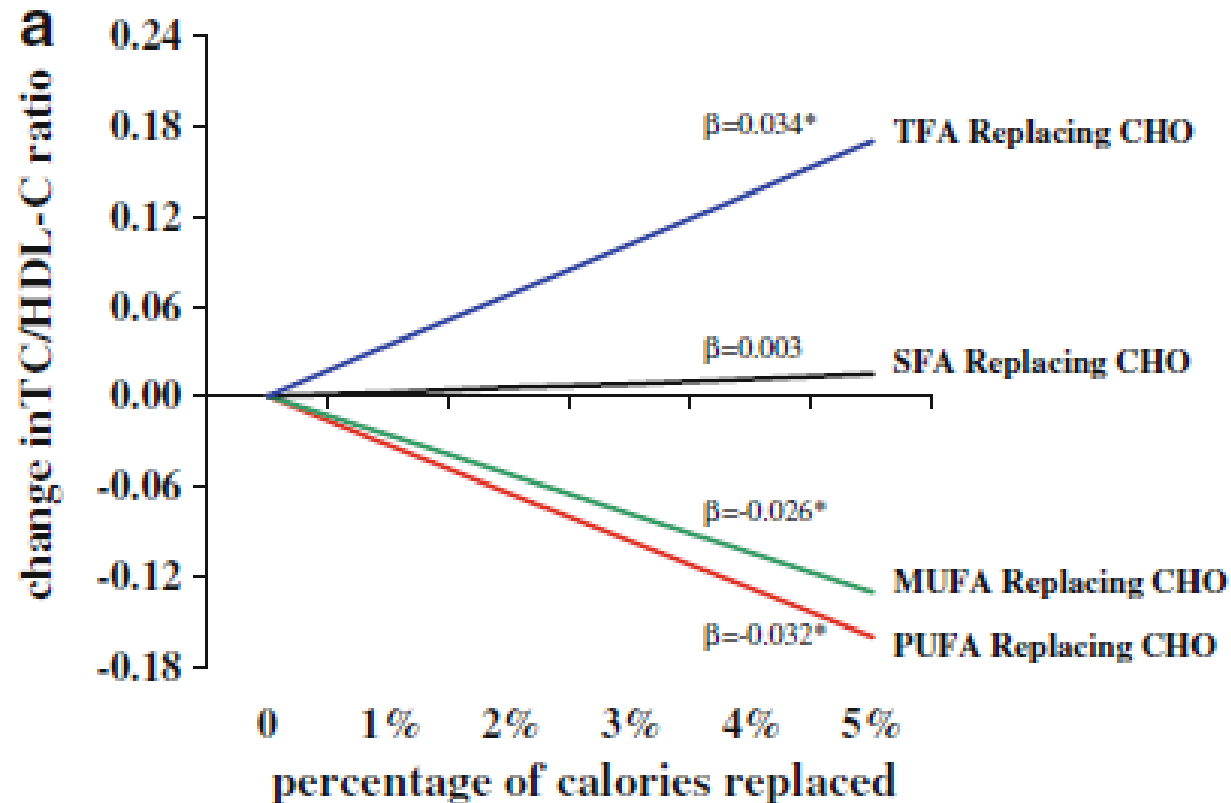
FIGURE 2. Risk ratios and 95% CIs for fully adjusted random-effects models examining associations between saturated fat intake in relation to coronary heart disease and stroke. [†]Updated data were provided by respective investigators (4, 5, 8, 18, 29, 35) or derived from a provided data set (9, 36). SAT, saturated fat intake; IV, inverse variance.

Saturated Fat and Cardiometabolic Risk Factors, Coronary Heart Disease, Stroke, and Diabetes: a Fresh Look at the Evidence

Renata Micha · Dariush Mozaffarian

A review of evidence from randomized controlled trials and prospective cohort studies.

Changes in Total Cholesterol: HDL-C Ratio for Consumption of SFA, MUFA, PUFA, and TFA



What you replace saturated fat with matters!

Fig. 2 Changes in blood lipid levels for consumption of saturated fatty acids (SFA), monounsaturated fatty acids (MUFA), polyunsaturated fatty acids (PUFA), or trans fatty acids (TFA) as an isocaloric

replacement for carbohydrate (CHO) as a reference, based on two meta-analyses of randomized controlled feeding trials [5, 6]. β reflects the change for each 1% energy isocaloric replacement; * $P < 0.05$

Effects of dietary fatty acids and carbohydrates on the ratio of serum total to HDL cholesterol and on serum lipids and apolipoproteins: a meta-analysis of 60 controlled trials.

Mensink RP¹, Zock PL, Kester AD, Katan MB.

⊕ Author information

Abstract

BACKGROUND: The effects of dietary fats on the risk of coronary artery disease (CAD) have traditionally been estimated from their effects on LDL cholesterol. Fats, however, also affect HDL cholesterol, and the ratio of total to HDL cholesterol is a more specific marker of CAD than is LDL cholesterol.

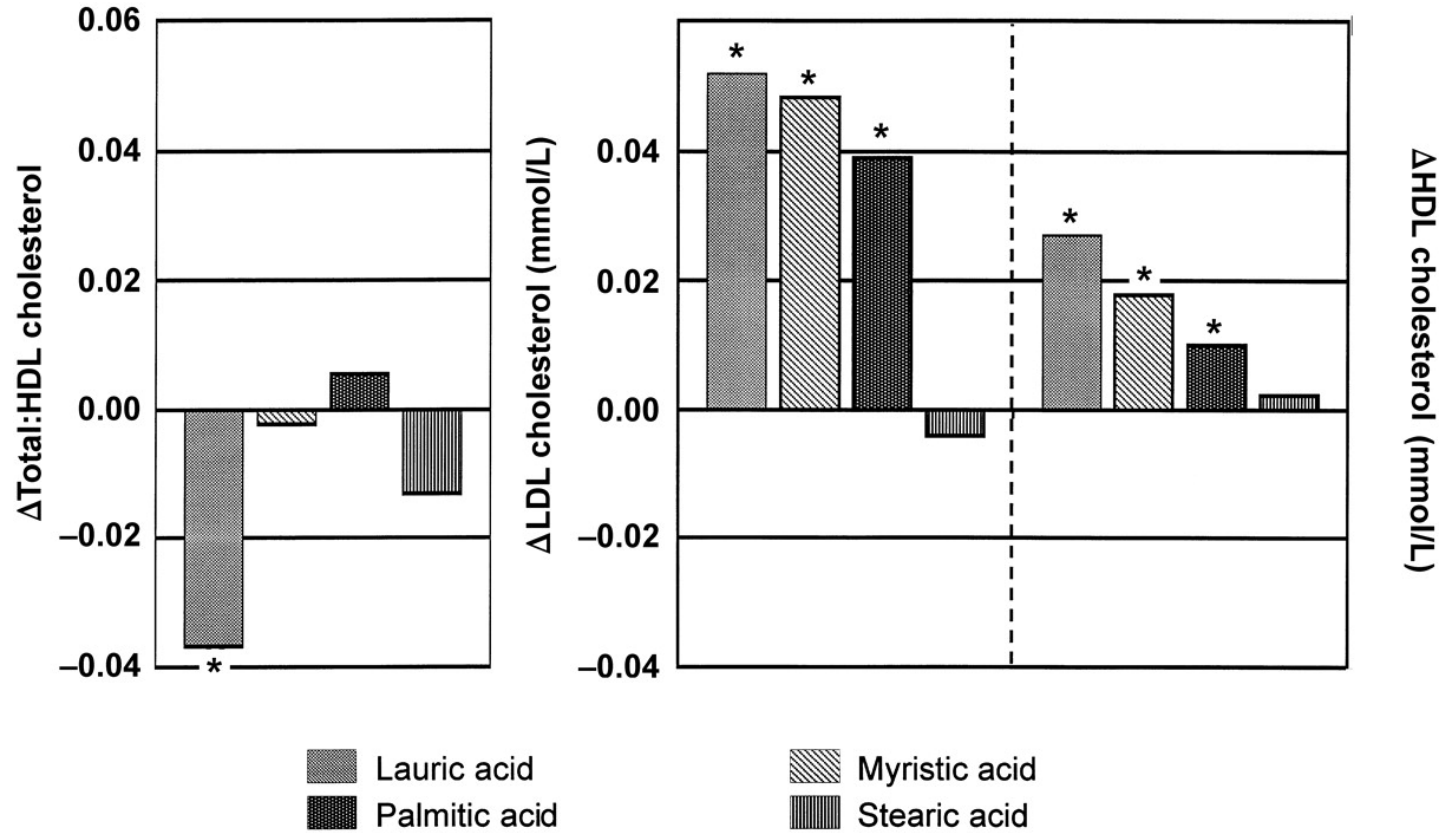
OBJECTIVE: The objective was to evaluate the effects of individual fatty acids on the ratio of total to HDL cholesterol and on serum lipoproteins.

DESIGN: We performed a meta-analysis of 60 selected trials and calculated the effects of the amount and type of fat on total:HDL cholesterol and on other lipids.

RESULTS: The ratio did not change if carbohydrates replaced saturated fatty acids, but it decreased if cis unsaturated fatty acids replaced saturated fatty acids. The effect on total:HDL cholesterol of replacing trans fatty acids with a mix of carbohydrates and cis unsaturated fatty acids was almost twice as large as that of replacing saturated fatty acids. Lauric acid greatly increased total cholesterol, but much of its effect was on HDL cholesterol. Consequently, oils rich in lauric acid decreased the ratio of total to HDL cholesterol. Myristic and palmitic acids had little effect on the ratio, and stearic acid reduced the ratio slightly. Replacing fats with carbohydrates increased fasting triacylglycerol concentrations.

CONCLUSIONS: The effects of dietary fats on total:HDL cholesterol may differ markedly from their effects on LDL. The effects of fats on these risk markers should not in themselves be considered to reflect changes in risk but should be confirmed by prospective observational studies or clinical trials. By that standard, risk is reduced most effectively when trans fatty acids and saturated fatty acids are replaced with cis unsaturated fatty acids. The effects of carbohydrates and of lauric acid-rich fats on CAD risk remain uncertain.

Predicted changes (Δ) in the ratio of serum total to HDL cholesterol and in LDL- and HDL-cholesterol concentrations when carbohydrates constituting 1% of energy are replaced isoenergetically with lauric acid (12:0), myristic acid (14:0), palmitic acid (16:0...



Different saturated fatty acids have different effects on LDL, HDL, and total cholesterol: HDL ratios!

Ronald P Mensink et al. Am J Clin Nutr 2003;77:1146-1155

Association of dietary, circulating, and supplement fatty acids with coronary risk: a systematic review and meta-analysis.

Chowdhury R, Warnakula S, Kunutsor S, Crowe F, Ward HA, Johnson L, Franco OH, Butterworth AS, Forouhi NG, Thompson SG, Khaw KT, Mozaffarian D, Danesh J, Di Angelantonio E.

Erratum in

Ann Intern Med. 2014 May 6;160(9):658.

Abstract

BACKGROUND: Guidelines advocate changes in fatty acid consumption to promote cardiovascular health.

PURPOSE: To summarize evidence about associations between fatty acids and coronary disease.

DATA SOURCES: MEDLINE, Science Citation Index, and Cochrane Central Register of Controlled Trials through July 2013.

STUDY SELECTION: Prospective, observational studies and randomized, controlled trials.

DATA EXTRACTION: Investigators extracted data about study characteristics and assessed study biases.

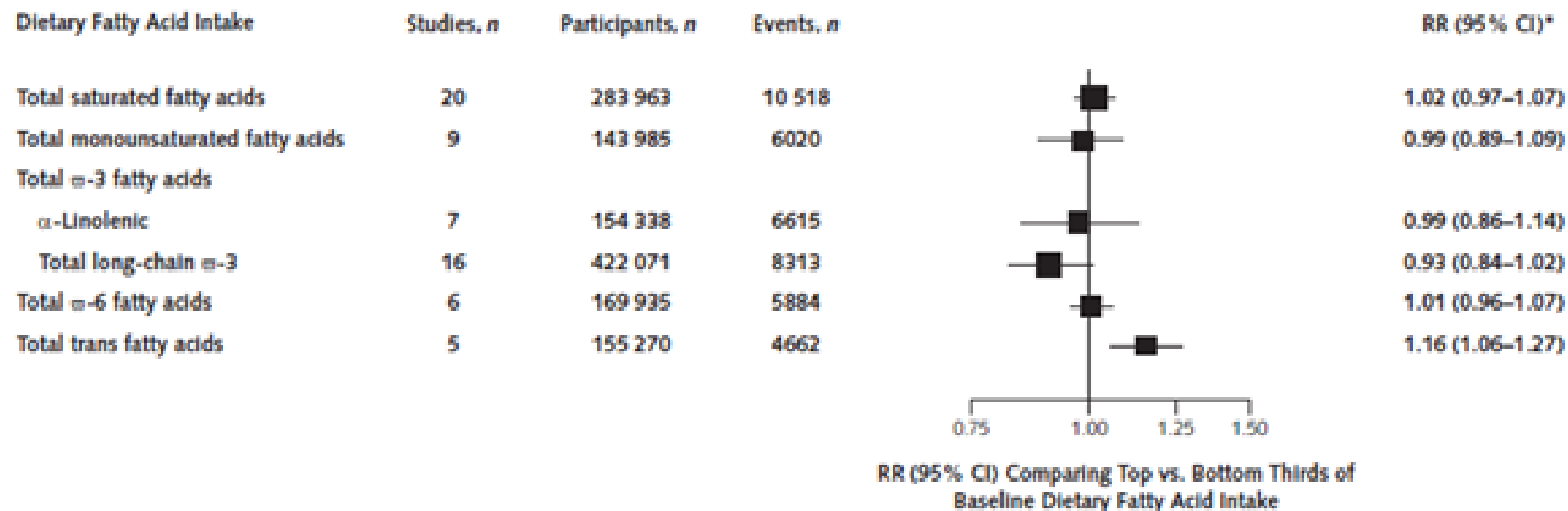
DATA SYNTHESIS: There were 32 observational studies (530,525 participants) of fatty acids from dietary intake; 17 observational studies (25,721 participants) of fatty acid biomarkers; and 27 randomized, controlled trials (103,052 participants) of fatty acid supplementation. In observational studies, relative risks for coronary disease were 1.02 (95% CI, 0.97 to 1.07) for saturated, 0.99 (CI, 0.89 to 1.09) for monounsaturated, 0.93 (CI, 0.84 to 1.02) for long-chain ω -3 polyunsaturated, 1.01 (CI, 0.96 to 1.07) for ω -6 polyunsaturated, and 1.16 (CI, 1.06 to 1.27) for trans fatty acids when the top and bottom thirds of baseline dietary fatty acid intake were compared. Corresponding estimates for circulating fatty acids were 1.06 (CI, 0.86 to 1.30), 1.06 (CI, 0.97 to 1.17), 0.84 (CI, 0.63 to 1.11), 0.94 (CI, 0.84 to 1.06), and 1.05 (CI, 0.76 to 1.44), respectively. There was heterogeneity of the associations among individual circulating fatty acids and coronary disease. In randomized, controlled trials, relative risks for coronary disease were 0.97 (CI, 0.69 to 1.36) for α -linolenic, 0.94 (CI, 0.86 to 1.03) for long-chain ω -3 polyunsaturated, and 0.89 (CI, 0.71 to 1.12) for ω -6 polyunsaturated fatty acid supplementations.

LIMITATION: Potential biases from preferential publication and selective reporting.

CONCLUSION: Current evidence does not clearly support cardiovascular guidelines that encourage high consumption of polyunsaturated fatty acids and low consumption of total saturated fats.

PRIMARY FUNDING SOURCE: British Heart Foundation, Medical Research Council, Cambridge National Institute for Health Research Biomedical Research Centre, and Gates Cambridge.

Figure 1. RRs for coronary outcomes in prospective cohort studies of dietary fatty acid intake.

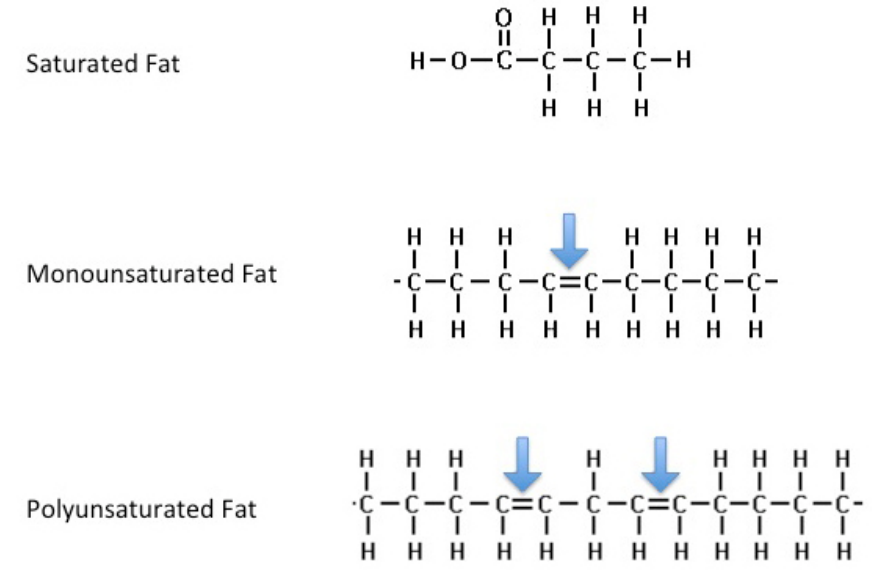
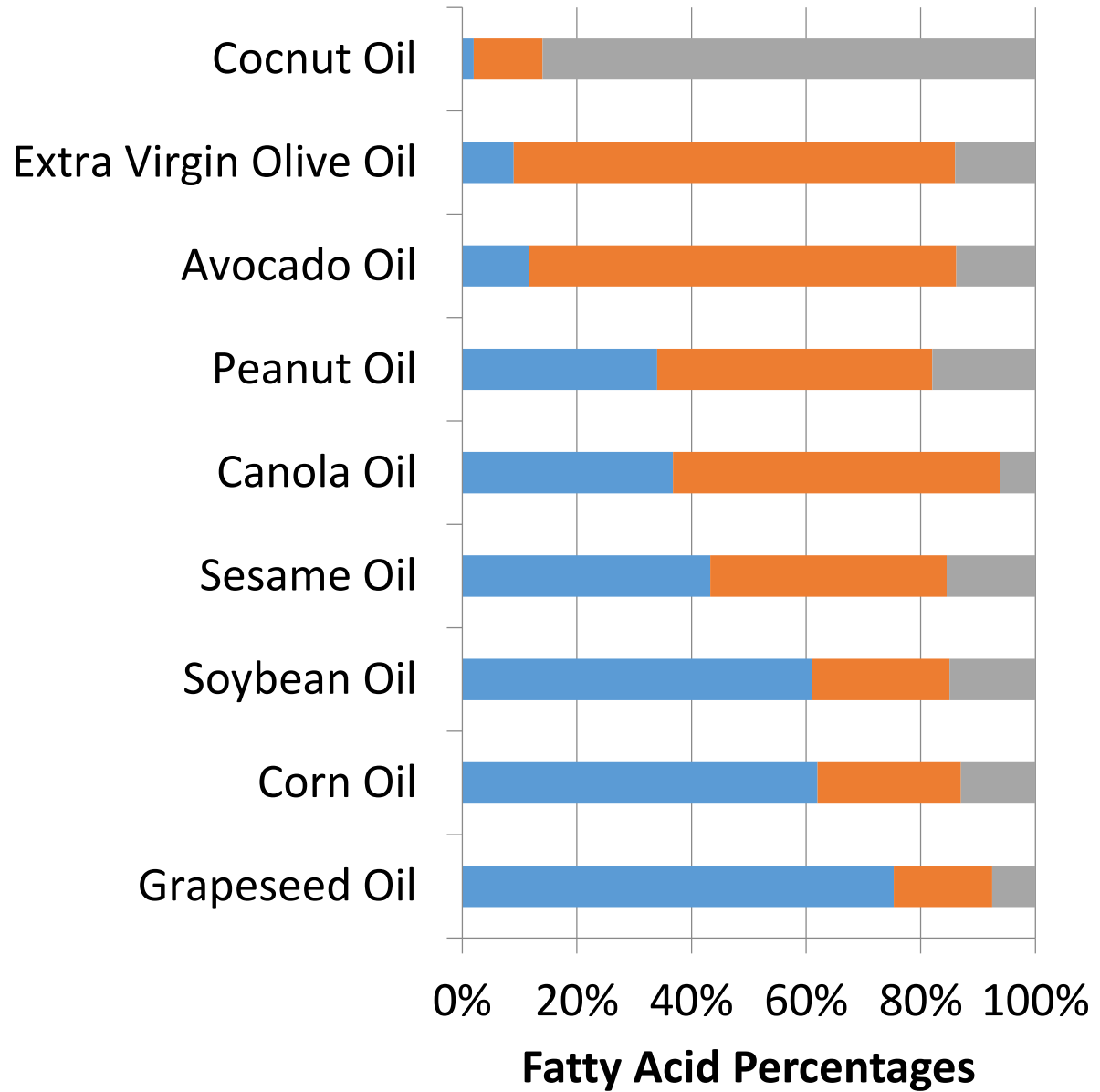


Size of the data marker is proportional to the inverse of the variance of the RR. RR = relative risk.

* Pooled estimate based on random-effects meta-analysis. Corresponding forest plots, I^2 estimates, and pooled RRs based on fixed-effects meta-analysis are provided in Supplement 1, available at www.annals.org.



Fatty Acid Composition



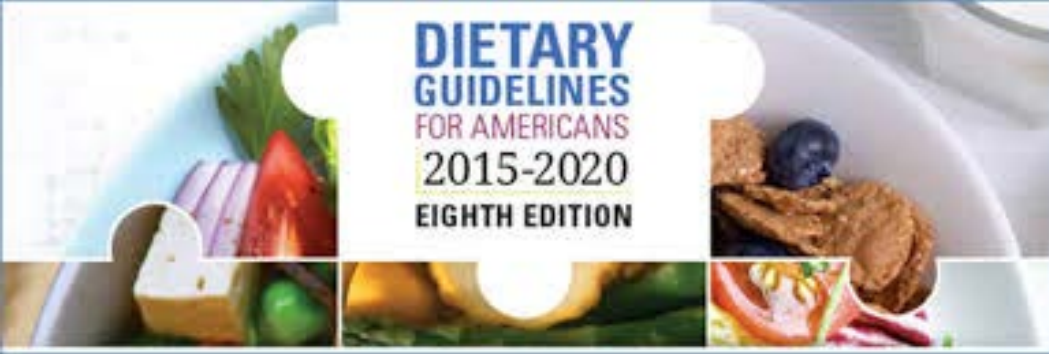
- Polyunsaturated Fat
- Monounsaturated Fat
- Saturated Fat

Saturated fat profile of common foods; Esterified fatty acids as percentage of total fat^[9]

Food	Lauric acid	Myristic acid	Palmitic acid	Stearic acid
Coconut oil	47%	18%	9%	3%
Palm kernel oil	48%	1%	44%	5%
Butter	3%	11%	29%	13%
Ground beef	0%	4%	26%	15%
Salmon	0%	1%	29%	3%
Egg yolks	0%	0.3%	27%	10%
Cashews	2%	1%	10%	7%
Soybean oil	0%	0%	11%	4%

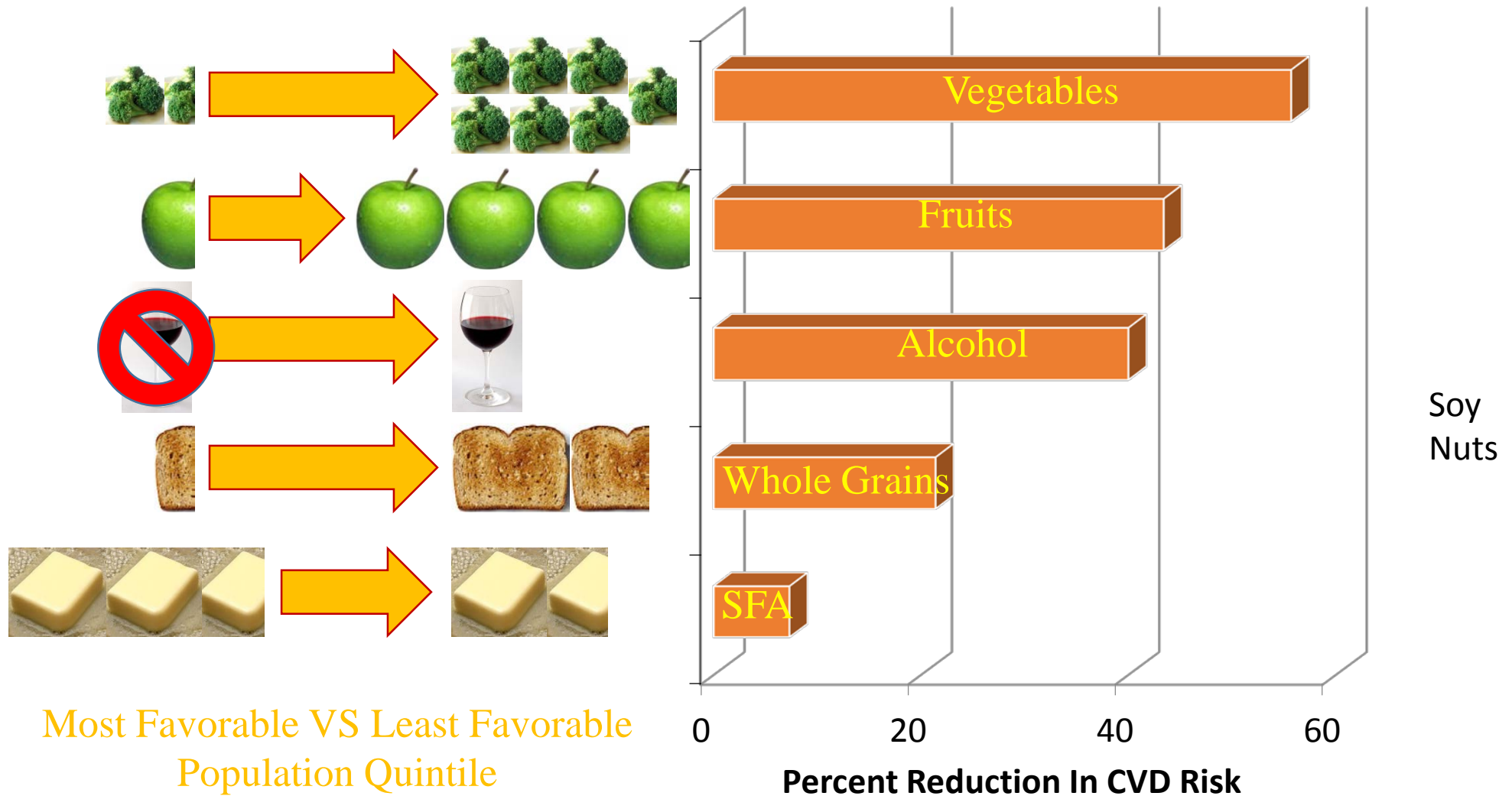
What to eat? (saturated fat)

- Limit your intake of these sources of saturated fat
 - 10% of 2,000 calories per day is 200 calories or 22 grams of saturated fat
- 3 ounces of beef = 6 grams SFA; 1 Tbsp butter = 7 grams SFA; 1 ounces of cheddar cheese = 5 grams SFA; 0.5 cup chocolate ice cream = 5 grams SFA
 - fatty beef (high in stearic acid; C18)
 - lamb,
 - pork,
 - poultry with skin,
 - lard and cream,
 - butter,
 - cheese and
 - other dairy products made from whole or reduced-fat (2 percent) milk,
 - Coconut (high in lauric acid; 12C) and palm oil



- ✓ Limit trans fat (same)
- ✓ Limit saturated fat to <10 percent of calories (same)
- ✓ NO quantification of cholesterol limit (different)
- ✓ Total fat? (quietly ignored)

What is the most important dietary factor?



Primary prevention of cardiovascular disease with a Mediterranean diet.

[Estruch R](#), [Ros E](#), [Salas-Salvadó J](#), [Covas MI](#), [Corella D](#), [Arós F](#), [Gómez-Gracia E](#), [Ruiz-Gutiérrez V](#), [Fiol M](#), [Lapetra J](#), [Lamuela-Raventos RM](#), [Serra-Majem L](#), [Pintó X](#), [Basora J](#), [Muñoz MA](#), [Sorlí JV](#), [Martínez JA](#), [Martínez-González MA](#); [PREDIMED Study Investigators](#).

Collaborators (233)

Erratum in

N Engl J Med. 2014 Feb 27;370(9):886.

Abstract

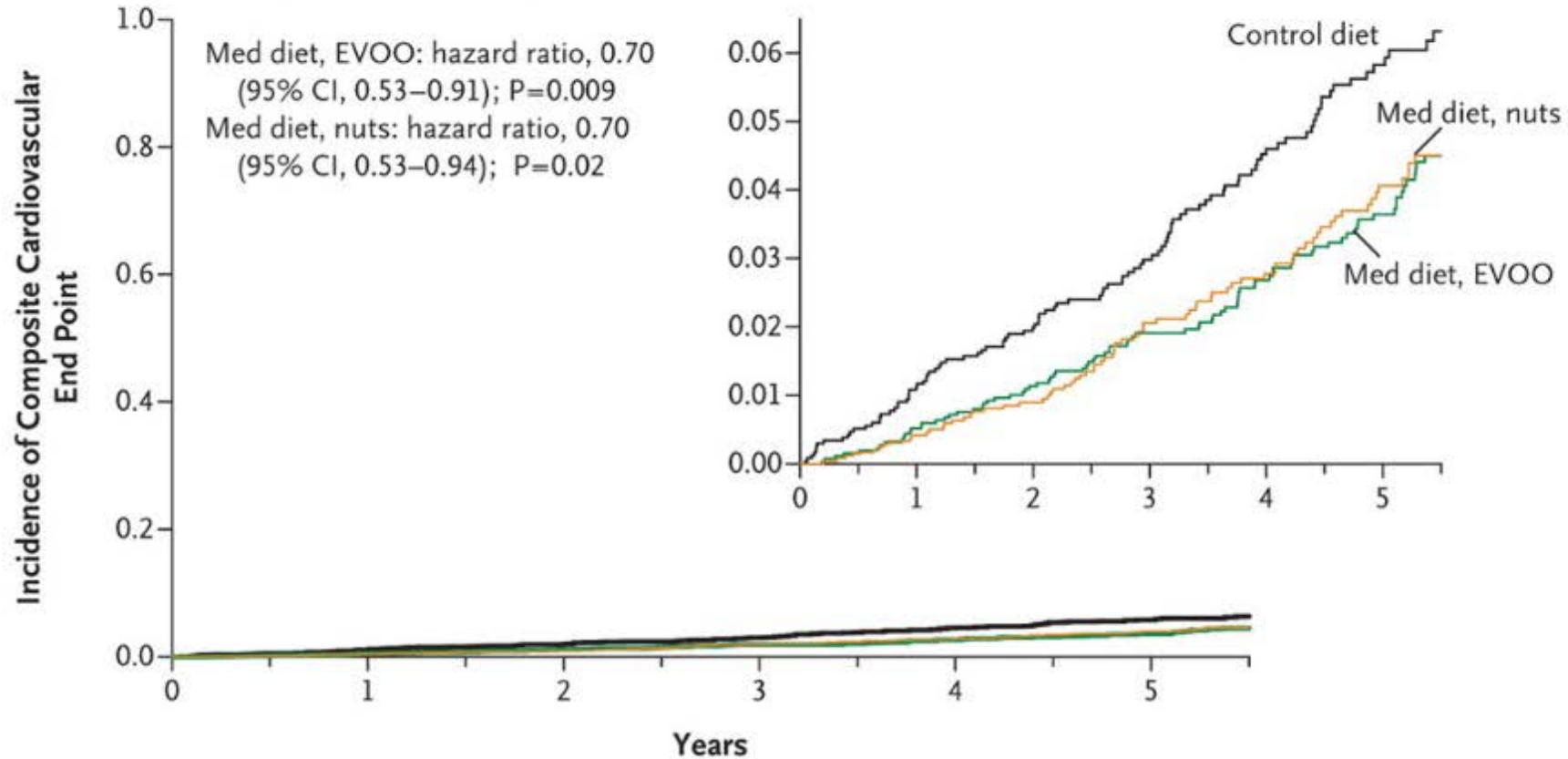
BACKGROUND: Observational cohort studies and a secondary prevention trial have shown an inverse association between adherence to the Mediterranean diet and cardiovascular risk. We conducted a randomized trial of this diet pattern for the primary prevention of cardiovascular events.

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.)

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



No. at Risk

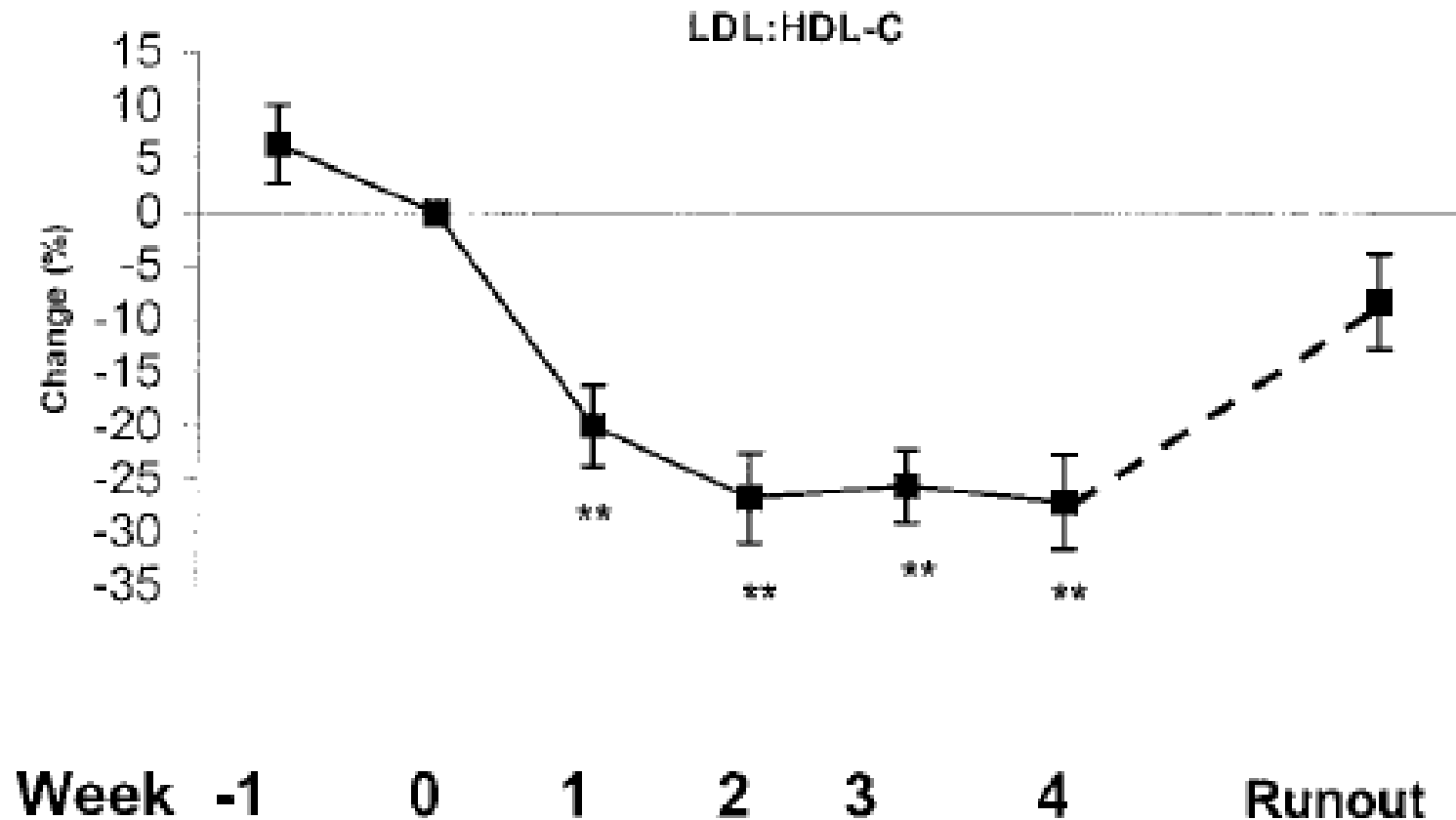
Control diet	2450	2268	2020	1583	1268	946
Med diet, EVOO	2543	2486	2320	1987	1687	1310
Med diet, nuts	2454	2343	2093	1657	1389	1031

A Dietary Portfolio Approach to Cholesterol Reduction: Combined Effects of Plant Sterols, Vegetable Proteins, and Viscous Fibers in Hypercholesterolemia

David J.A. Jenkins, Cyril W.C. Kendall, Dorothea Faulkner, Edward Vidgen, Elke A. Trautwein, Tina L. Parker, Augustine Marchie, George Koumbriidis, Karen G. Lapsley, Robert G. Josse, Lawrence A. Leiter, and Philip W. Connelly

- Jenkins first studied a portfolio of four foods in 2002 to reduce LDL-C
- The subjects were currently following a very low saturated fat diet which approximated the National Cholesterol Education Program (NCEP) Step II diet.
- After one week on the very low SFA diet, the test diet was initiated
 - plant sterols (1 g/1,000 kcal)
 - soy protein (23 g/1,000 kcal)
 - almonds (28g/day)
 - viscous fibers (9g/1,000 kcal).

Percent change from baseline in the ratio of LDL:HDL on the combination diet (n = 13).



Direct comparison of a dietary portfolio of cholesterol-lowering foods with a statin in hypercholesterolemic participants¹⁻³

David JA Jenkins, Cyril WC Kendall, Augustine Marchie, Dorothea A Faulkner, Julia MW Wong, Russell de Souza, Azadeh Emam, Tina L Parker, Edward Vidgen, Elke A Trautwein, Karen G Lapsley, Robert G Josse, Lawrence A Leiter, William Singer, and Philip W Connelly

The study was a randomized crossover design;

- 34 participants completed all three 1-month treatments,
 - Control (traditional low-fat diet),
 - 20 mg Lovastatin (drug therapy to lower cholesterol),
 - dietary portfolio of foods

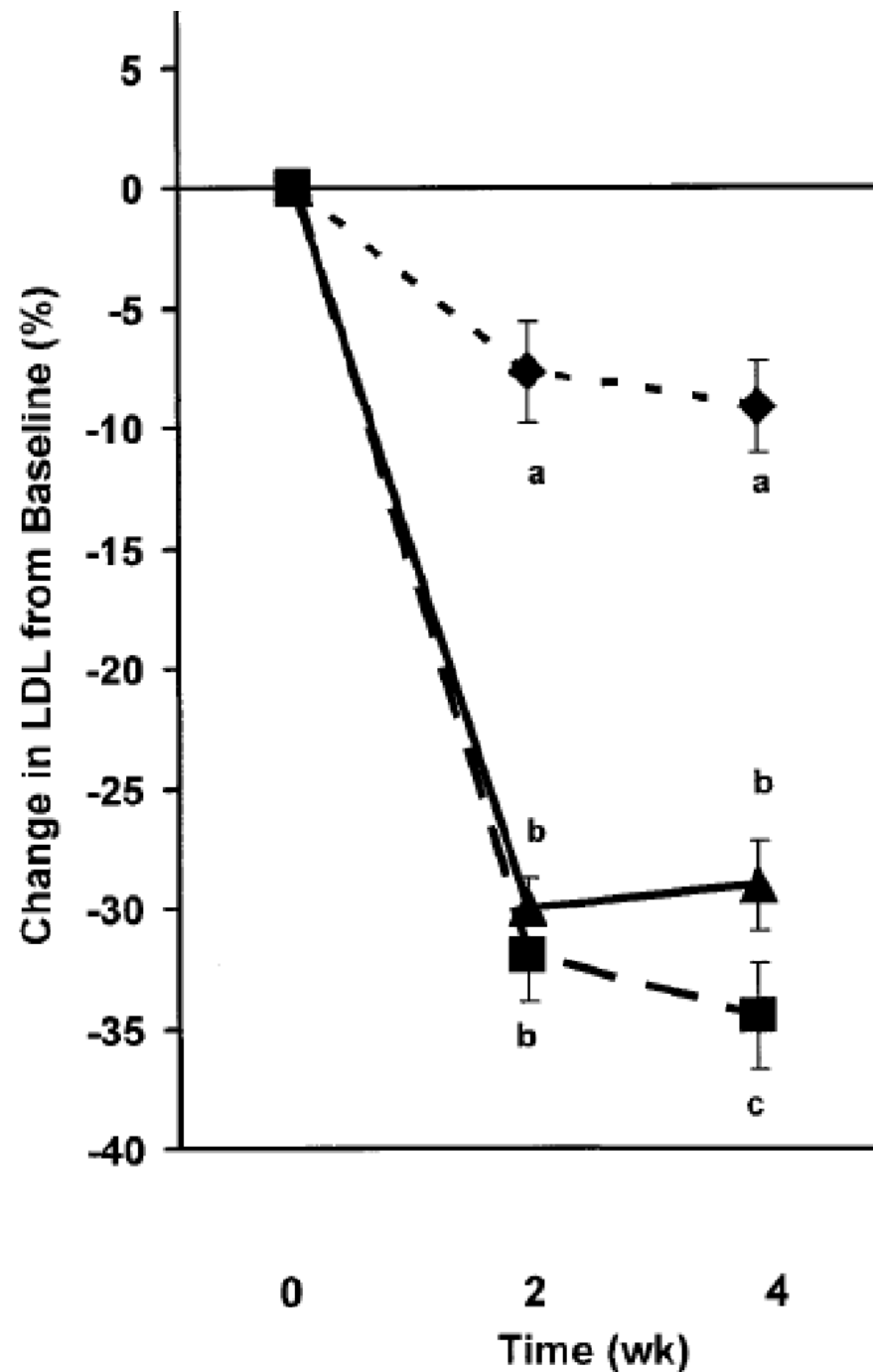


FIGURE 2. Mean (\pm SE) percentage change from baseline in LDL-cholesterol concentrations with the portfolio (\blacktriangle ; $n = 34$), control (\blacklozenge ; $n = 34$), and statin (\blacksquare ; $n = 34$) diets. Data for the 3 time points were analyzed with a two-factor repeated-measures ANOVA, with interaction based on actual data and not on the change from baseline. The diet effect and the diet-by-time interaction were significant ($P < 0.001$). Values at the same time point with different lowercase letters are significantly different, $P < 0.020$ (paired comparison by least-squares-means procedures with Tukey's adjustment).

What to eat? (total fat)

- Fruits and vegetables
- Whole grains
- Nuts
- Fatty fish and omega-3s
- Soy and plant sterols
- Soluble fiber
- Eggs
- Nut and vegetable oils



Things to avoid in heart healthy diets

- Processed foods

 - Added sugar

 - No-fat alternatives to higher fat options

 - Added fat

 - Added salt

 - Ingredients or processes that are un-recognizable

- Partially hydrogenated fats

Research

Original Investigation

Added Sugar Intake and Cardiovascular Diseases Mortality Among US Adults

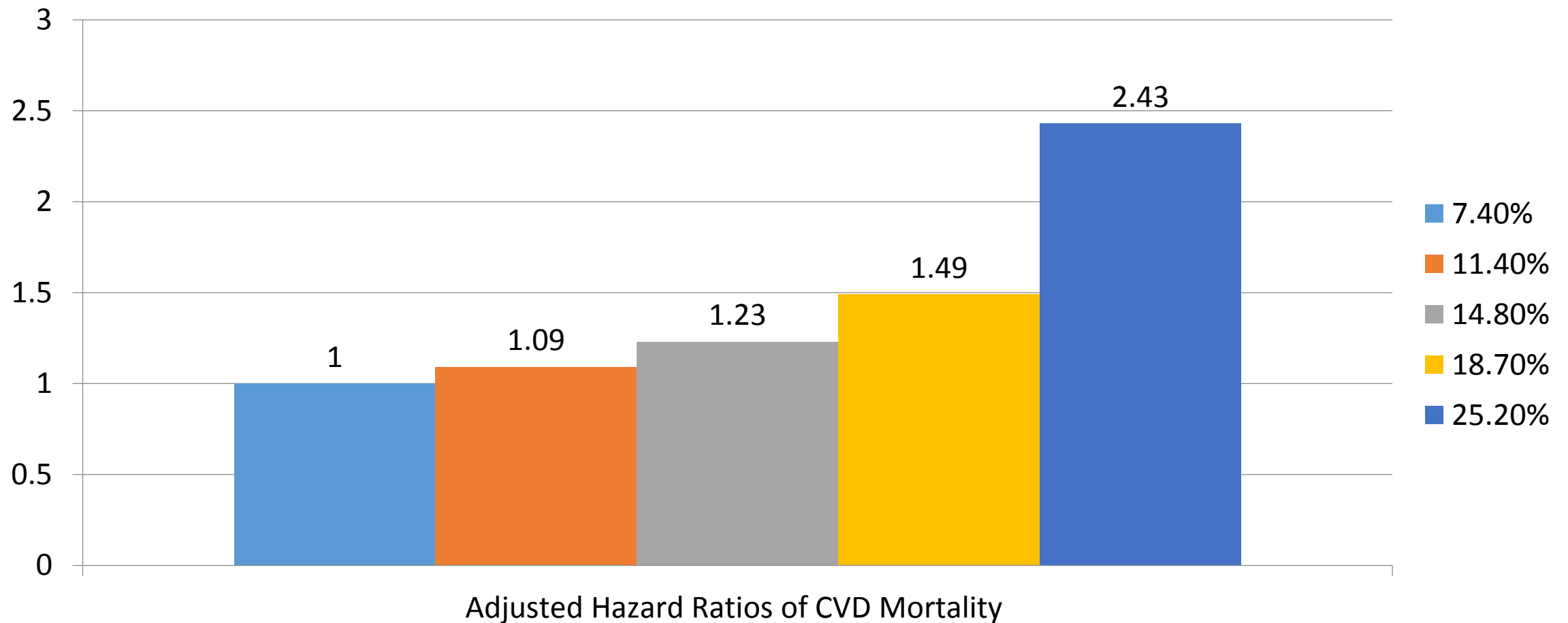
Quanhe Yang, PhD; Zefeng Zhang, MD, PhD; Edward W. Gregg, PhD; W. Dana Flanders, MD, ScD;
Robert Merritt, MA; Frank B. Hu, MD, PhD

IMPORTANCE Epidemiologic studies have suggested that higher intake of added sugar is associated with cardiovascular disease (CVD) risk factors. Few prospective studies have examined the association of added sugar intake with CVD mortality.

[← Invited Commentary pag](#)

[+ Supplemental content at
jamainternalmedicine.cor](#)

Hazard Ratios of CVD Mortality According to Usual % of Calories from Added Sugar





Which one is healthier?



21 grams of fat



15 grams of fat



21 grams of fat



1 cup cubed avocado
21 grams of fat
3 g SFA
3 g PUFA
14 g MUFA



3 ounces of steak
15 grams of fat
7 g SFA
1 g PUFA
6 g MUFA



1 donut
21 grams of fat
11 g SFA (palm oil)
17 g sugar

Which one is healthier?

Hidden Valley Ranch
Original



VS.

Hidden Valley Ranch
Original Fat-Free



Product formulations, packaging and promotions may change.
For current information, refer to packaging on store shelves.



INGREDIENTS: WATER, CORN SYRUP, MALTODEXTRIN, SUGAR, MODIFIED FOOD STARCH, BUTTERMILK*, SALT, LESS THAN 2% OF: VINEGAR, GARLIC PUREE, ONION PUREE, DRIED GARLIC, DRIED ONION, SPICE, SOUR CREAM* (CREAM, NONFAT MILK, CULTURES), XANTHAN GUM, SOY LECITHIN*, SOYBEAN OIL*, MONOGLYCERIDES*, NATURAL FLAVORS (SOY), ARTIFICIAL COLOR, MONOSODIUM GLUTAMATE, LACTIC ACID, PHOSPHORIC ACID, DISODIUM PHOSPHATE, WITH POTASSIUM SORBATE, SODIUM BENZOATE, TBHQ AND CALCIUM DISODIUM EDTA AS PRESERVATIVES, ALPHA TOCOPHEROL* (VITAMIN E). *ADDS A TRIVIAL AMOUNT OF FAT AND/OR CHOLESTEROL.

THE HV FOOD PRODUCTS CO.
1221 BROADWAY, OAKLAND, CA 94612
©2009 MADE IN THE U.S.A.



**PRODUCT MAY SETTLE
DURING SHIPMENT**
71100 00707

Nutrition Facts

Serv. Size 2 Tbsp. (32g)
Servings per container 16
Calories 30
Calories from fat 0

* Percent Daily Values (DV) are based on a 2,000 calorie diet.

Amount/Serving	% DV*	Amount/Serving	% DV*
Total Fat 0g	0%	Total Carb. 6g	2%
Sat. Fat 0g	0%	Fiber 0g	0%
Trans Fat 0g		Sugars 3g	
Cholest. 0mg	0%	Protein 0g	
Sodium 310mg	13%		
Vitamin A 0%		Vitamin C 0%	
Calcium 0%		Vitamin E 50%	
		Iron 0%	

Which one is healthier?

- Swedish fish



- Dark chocolate?





Which one is healthier?

- Fat free yogurt



- Greek yogurt, add your own fruit and nuts



Yogurt	Calories	Total Fat (g)	Cholesterol (g)	Sodium (mg)	Sugars (g)	Protein (g)
<u>Chobani Original Plain</u> (6 oz.)	240	17	65	60	6	14
Chobani Lowfat Plain (6 oz.)	130	3.5	10	70	7	17
Chobani Nonfat Plain (6 oz.)	100	0	0	70	7	18
Chobani Vanilla Nonfat (6 oz.)	120	0	0	65	13	16
Chobani Honey Nonfat (6 oz.)	150	0	0	65	20	16
Chobani Peach Nonfat (6 oz.)	140	0	0	80	19	14
Chobani Strawberry Nonfat (6 oz.)	140	0	0	80	19	14
Chobani Blueberry Nonfat (6 oz.)	140	0	0	65	20	14

Which one is healthier?

- **DEPENDS**
- Compared to what?
- How much?
- In the context of what diet?

What does a healthy balanced 2,000 calories per day heart healthy diet look like?





tip #1

a healthy diet has

balance,

variety, &

moderation!

True or False?

- Low-fat diets are the best diets for those at risk for cardiovascular disease.
- Cholesterol rich foods (like eggs) are bad for you.
- Your total and LDL cholesterol levels are the best indicators of your risk for a heart attack.
- Saturated fat raises your “bad” cholesterol and that causes heart disease.
- Low-fat options are generally “healthier” options (low fat vs. full fat yogurt, salad dressing).

What did you learn?

1. Is fat the “bad guy” of nutrition?
2. What should you replace saturated fat with in your diet?
3. What other dietary factors matter in regards to your risk for heart disease?
4. Are low-fat alternatives always healthier choices?



Summary

1. Eating a diet that contains a moderate amount (up to 35% of total calories) of fat isn't bad for health – it's good for health!
 - Fats are like fonts, it's the type that matters.
2. The current recommendation is to consume <10% of calories as saturated fat (the AHA says limit saturated fat to 5-6%) – replacing saturated fat with unsaturated fat, NOT carbohydrates.
3. A heart healthy diet includes a variety of whole and natural foods (not processed foods) – vegetables, fruits, whole grains, legumes, nuts, eggs, dairy, poultry, fish, red meat, nuts, avocados