

# Finding Truth in the Failed Theories of Heart Disease

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@DrJimPainter

# Speaker Disclosure

## Board Member/Advisory Panel/Consultant

- **Present**

- Chic-fil-A, Sun-Maid Raisins, National Dairy Council, Tree Top Apples, Bush's Beans, United Sorghum Checkoff Board.

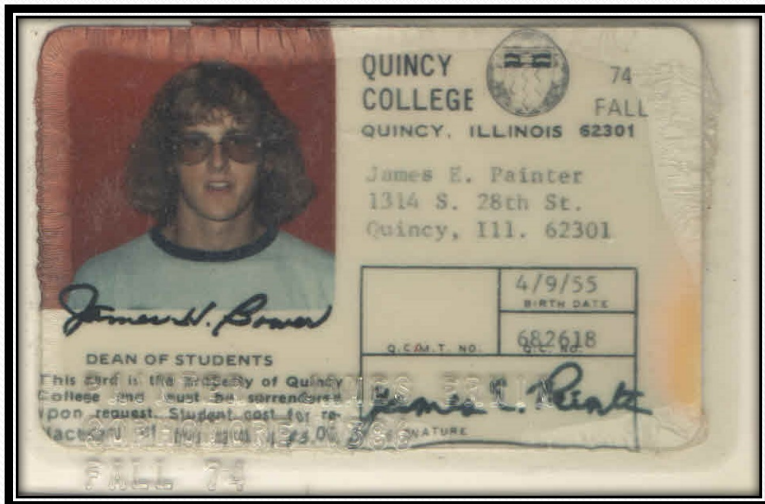
- **Past**

- American Heart Association Eat Well Task Force, California Raisin Marketing Board, Wonderful Pistachios, White Wave Foods, Davidson's Safest Choice Eggs

- **Honoraria**

- Honorarium underwritten by United Sorghum Checkoff Board
- Dietitians of Canada, Exxon Mobil, Frito Lay, Midwest Dairy Council, Pennsylvania Nutrition Network, California Raisin Marketing Board, Alaska Tanker Company, Dairy Max, Texas AND, California AND, Florida AND, MINK, NY AND, South Carolina AND, Iowa AND, Nebraska AND, Manitoba Dairy Farmers, Dairy Farmers of Canada, Davidsons Safest Choice Eggs, National Dairy Council, New Products Conference, the Flavor Experience, BNP Media, and Cooper Vision.

# Speaker Credentials





# The Fat Theory of Heart Disease Etiology

- Four pillars of the prevention of heart disease
  1. Reduce total dietary fat
  2. Reduce dietary saturated fat
  3. Reduce dietary cholesterol
  4. Reduce sodium
  5. Reduce weight, if over weight
- Which of these are true in practice
  - – only 5
- Which are partially true
  - 2 & 4



## I.) Total Fat

- Its not relevant, don't focus on this.

## DIETARY GOALS FOR THE UNITED STATES

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

# Select Committee on Nutrition Dietary Goals

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

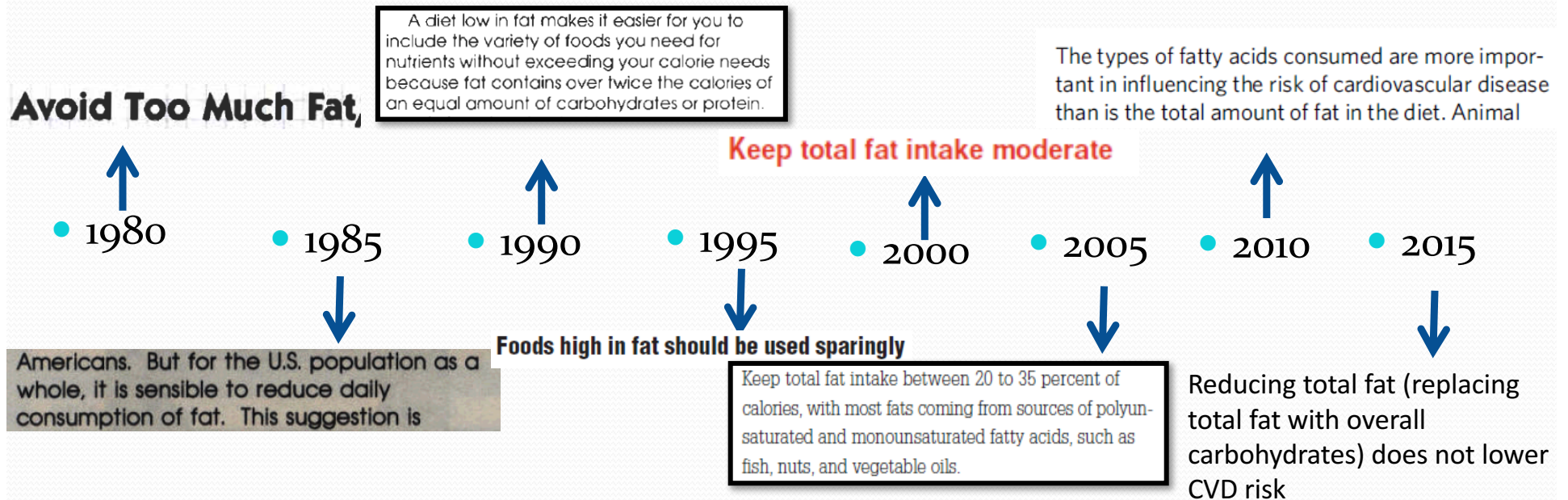
1. Increase carbohydrate consumption to account for 55 to 60 percent of the energy (caloric) intake.
2. Reduce overall fat consumption from approximately 40 to 30 percent energy intake.
3. Reduce saturated fat consumption to account for about 10 percent of total energy intake; and balance that with poly-unsaturated 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

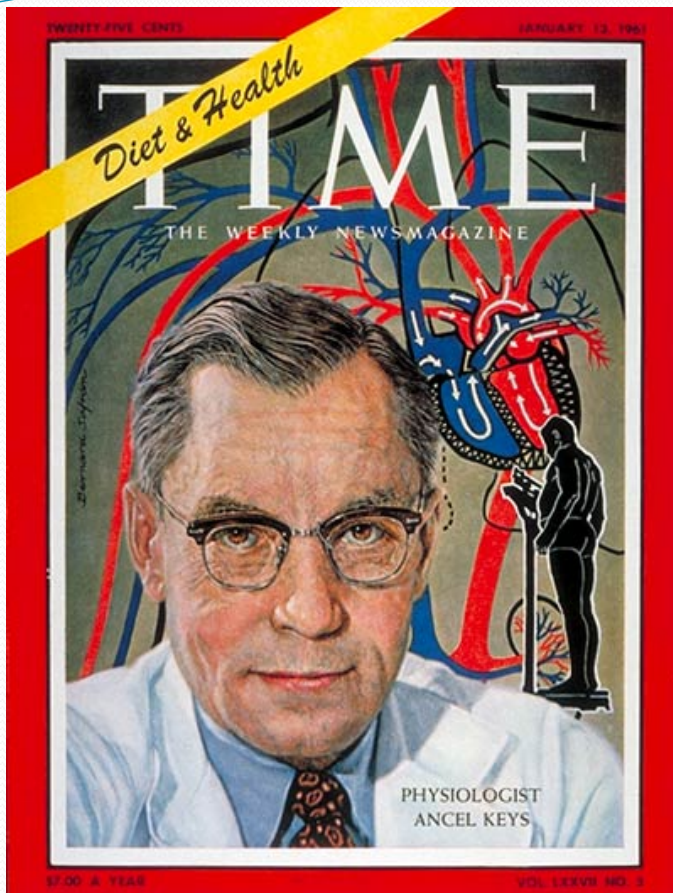
1. Increase consumption of fruits and vegetables and whole grains.
2. Decrease consumption of meat and increase consumption of poultry and fish.
3. Decrease consumption of foods high in fat and partially substitute poly-unsaturated fat for saturated fat.
4. Substitute non-fat milk for whole milk.
5. 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



# The Big Fat Lie: Politics vs Sound Science

- Dr. Ancel Keys –influential, Seven Countries Study
- 1961 Keys persuaded AHA to release 1<sup>st</sup> guidelines targeting saturated fat
- 1970 –Congressional hearings on low-fat anti-saturated fat campaign; many scientists opposed it
- Why do we still have fat recommendations?
  - Keys aggressively discredited opposition (sugar causes HD)
  - Current health authorities are too embarrassed or too loyal
  - Based on Key's research, drug companies created the most lucrative drug ever: statins



January 1963

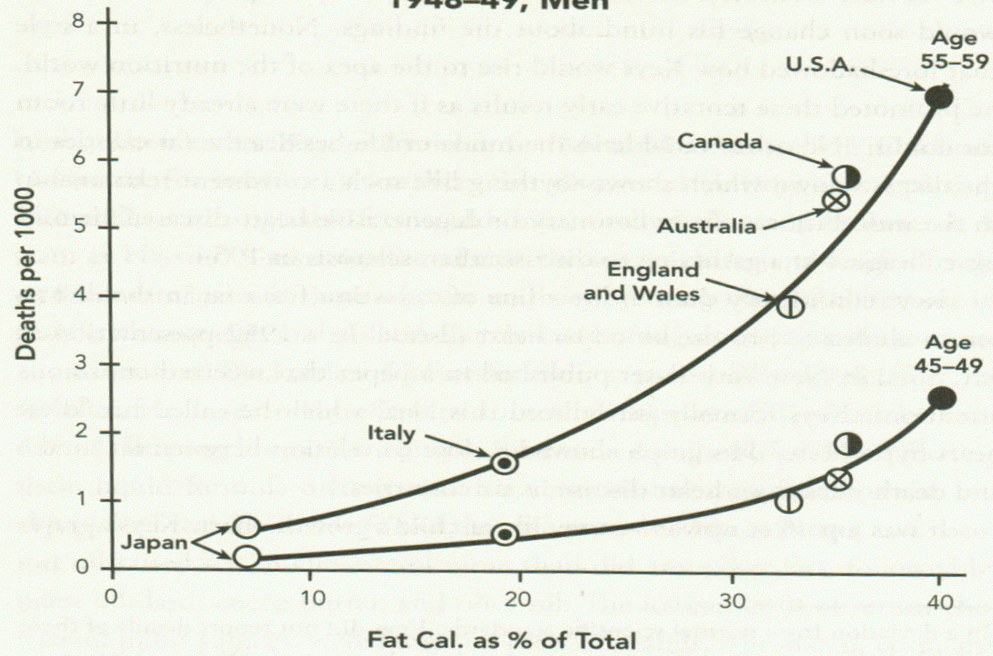


June 2014



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

**Degenerative Heart Disease  
1948-49, Men**



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



**The Seven Countries Study is the cornerstone of current cholesterol and fat recommendations and official government policies**

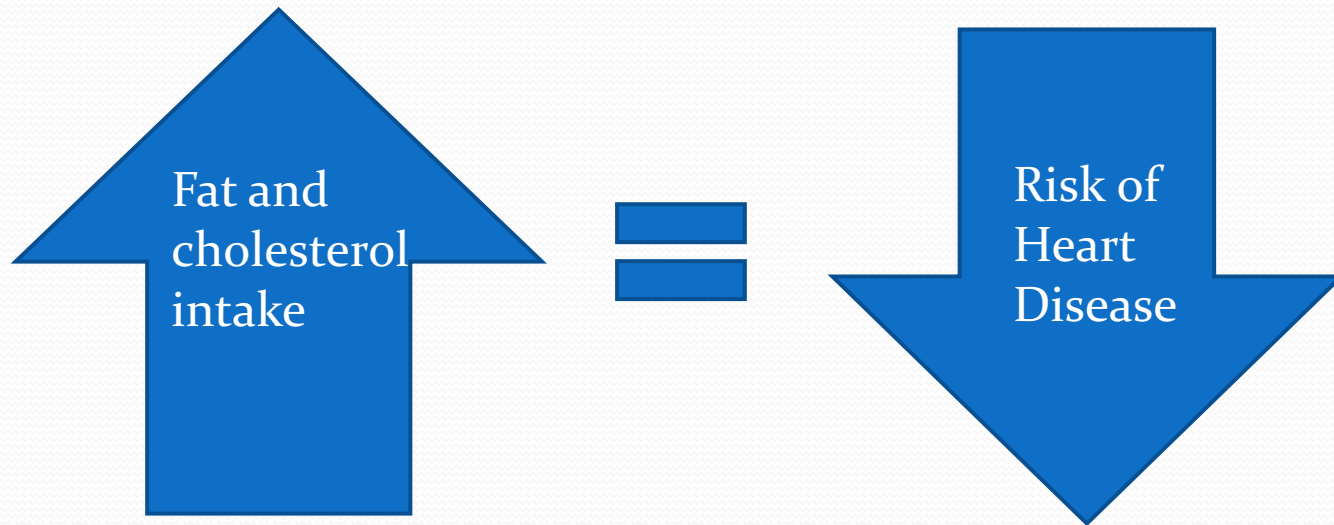
Keys had data available from 22 countries----- only used data from 7 countries that supported his hypothesis



Bowden, J., & Sinatra, S. (2012). *The Great Cholesterol Myth*. Beverly, MA: Fair Winds Press.

British physician Malcolm Kendrick used same data available to Keys and discovered that by choosing different countries you can prove an inverse relationship

Bowden, J., & Sinatra, S. (2012). *The Great Cholesterol Myth*. Beverly, MA: Fair Winds Press.

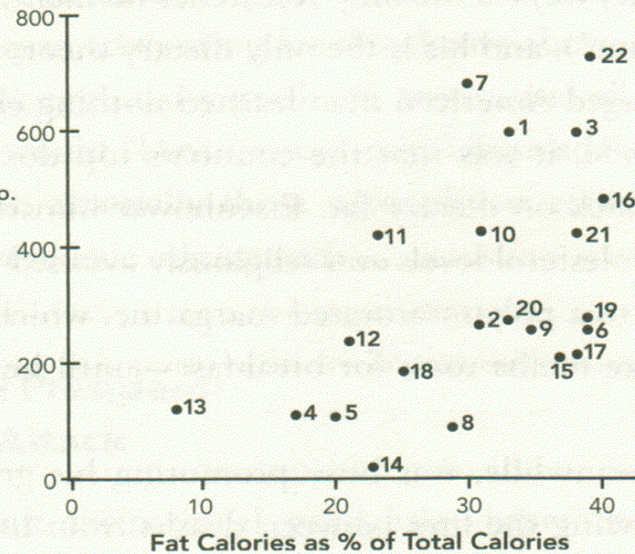


## Yerushalmy and Hilleboe: Data from Twenty-Two Countries

### Mortality from Arteriosclerotic and Degenerative Heart Disease and Percent of Total Calories from Fat – Males age 55–59, 1950

#### Country

1. Australia
2. Austria
3. Canada
4. Ceylon
5. Chile
6. Denmark
7. Finland
8. France
9. German Fed. Rep.
10. Ireland
11. Israel
12. Italy
13. Japan
14. Mexico
15. Netherlands
16. New Zealand
17. Norway
18. Portugal
19. Sweden
20. Switzerland
21. United Kingdom
22. United States



Source: Yerushalmy, J. and Herman E. Hilleboe, "Fat in the Diet and Mortality from Heart Disease: A Methodologic Note," *New York State Journal of Medicine* 57, no. 14 (July 1957): 2346.



## The Snackwell Phenomenon

Food companies rushed to create low-fat versions of all foods and market it as “heart healthy”

Butter was replaced with margarine which is high in trans fat!



Vegetable oils were aggressively promoted as a healthy alternative to saturated fat most vegetable oils are highly processed, pro-inflammatory, and easily damaged when reheated repeatedly



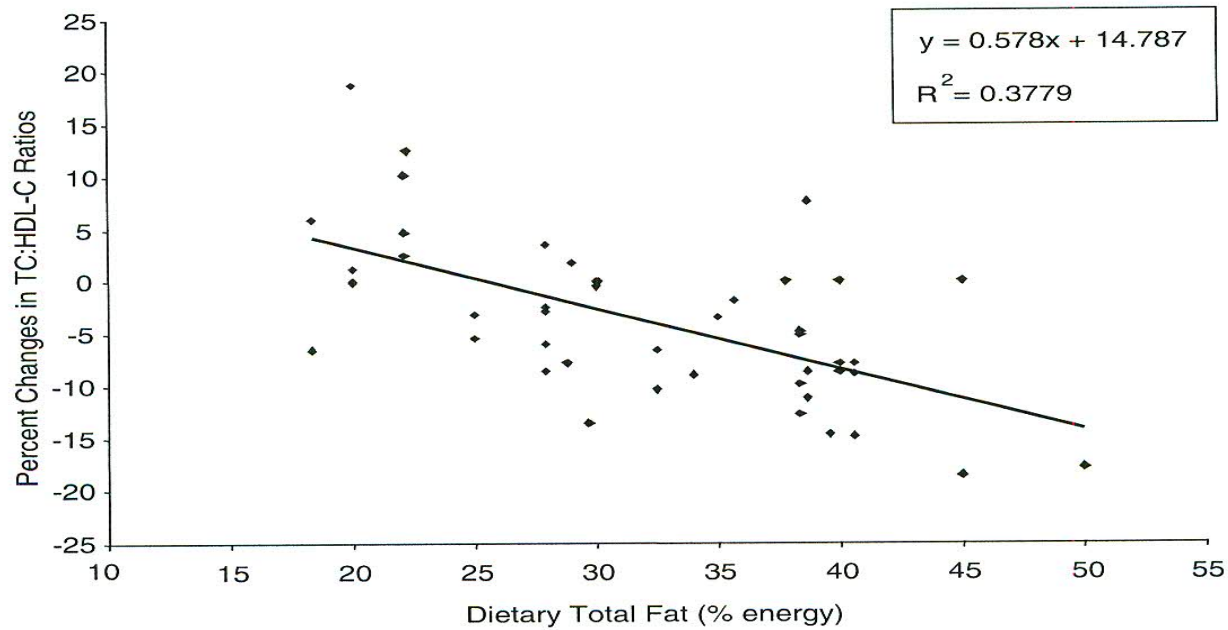
## Dietary Fat and Heart Disease

- Removing total fat is generally harmful (doesn't lower CVD risk)
  - Why
    - Replaced with refined CHO and sugar
    - 2015 Dietary Guidelines:  
“... Dietary advice should put the emphasis on optimizing types of dietary fat and not reducing total fat.” (DGAC Grade: Strong)
  - If done correctly it can be positive Pritikin, Ornish

# DRI for Energy... Fatty Acids & Cholesterol

782

DIETARY REFERENCE INTAKES



IOM, 2002





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**Annals of Internal Medicine**

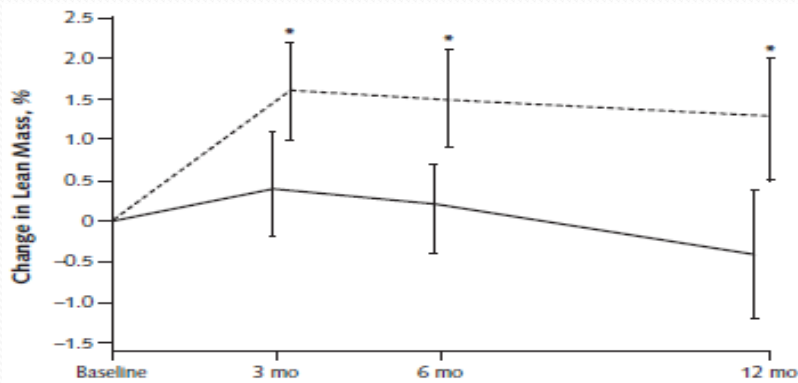
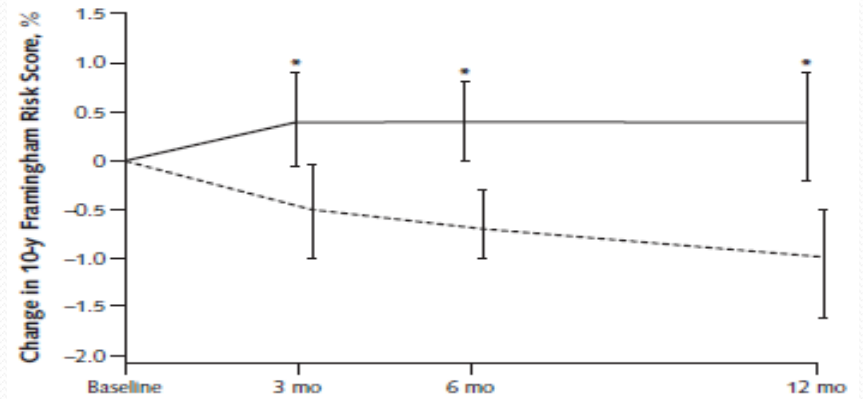
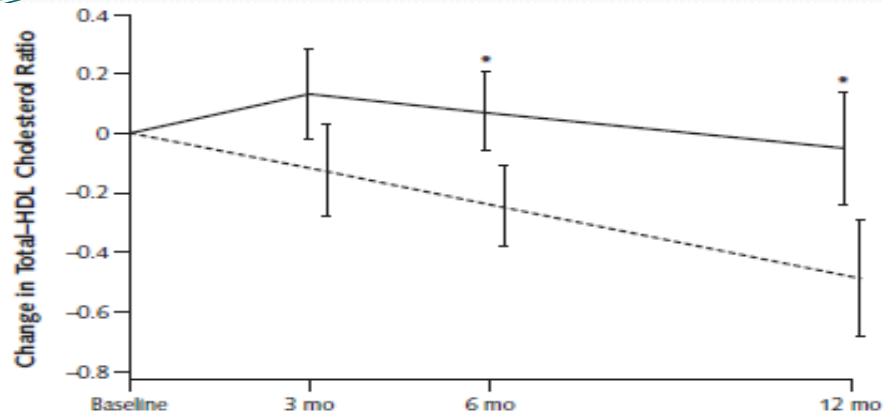
ORIGINAL RESEARCH

## **Effects of Low-Carbohydrate and Low-Fat Diets**

**A Randomized Trial**

Lydia A. Bazzano, MD, PhD, MPH\*; Tian Hu, MD, MS\*; Kristi Reynolds, PhD; Lu Yao, MD, MS; Calynn Bunol, MS, RD, LDN; Yanxi Liu, MS; Chung-Shiuan Chen, MS; Michael J. Klag, MD, MPH; Paul K. Whelton, MD, MSc, MB; and Jiang He, MD, PhD

2014



— Low-fat diet  
 - - - Low-carbohydrate diet

At 12 months:

Low-carbohydrate diet:

- 42% calories from fat
- Showed overall -1.4% risk reduction in 10-year Framingham CHD risk score

Low-fat diet:

- 30.8% calories from fat



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JOURNAL *of* MEDICINE

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APRIL 4, 2013

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Primary Prevention of Cardiovascular Disease  
with a Mediterranean Diet

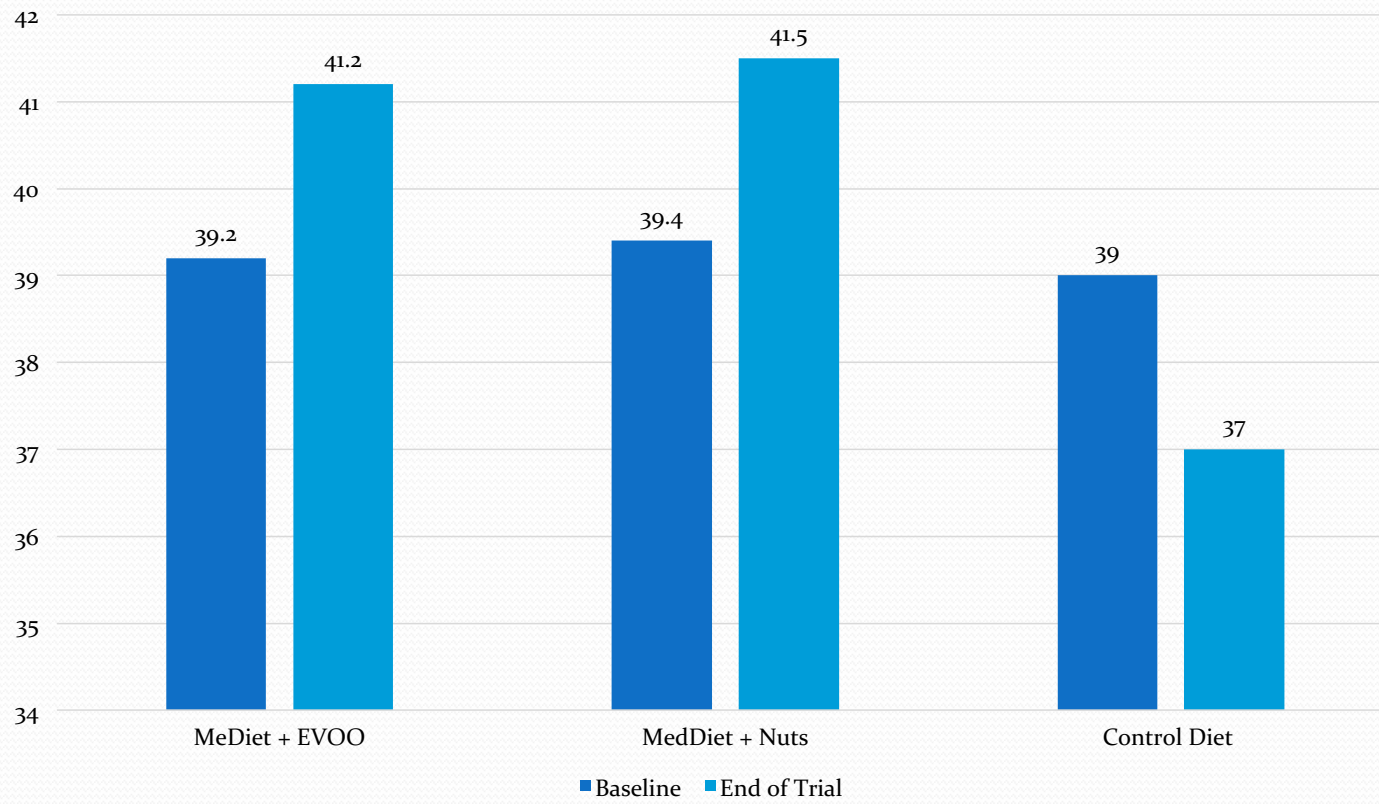
Ramón Estruch, M.D., Ph.D., Emilio Ros, M.D., Ph.D., Jordi Salas-Salvadó, M.D., Ph.D.,  
Maria-Isabel Covas, D.Pharm., Ph.D., Dolores Corella, D.Pharm., Ph.D., Fernando Arós, M.D., Ph.D.,  
Enrique Gómez-Gracia, M.D., Ph.D., Valentina Ruiz-Gutiérrez, Ph.D., Miquel Fiol, M.D., Ph.D.,  
José Lapetra, M.D., 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\*

The US Federal Guidelines recommend for heart health:

- Following a Mediterranean style diet
- Limiting total fat to 20-35% of total calories

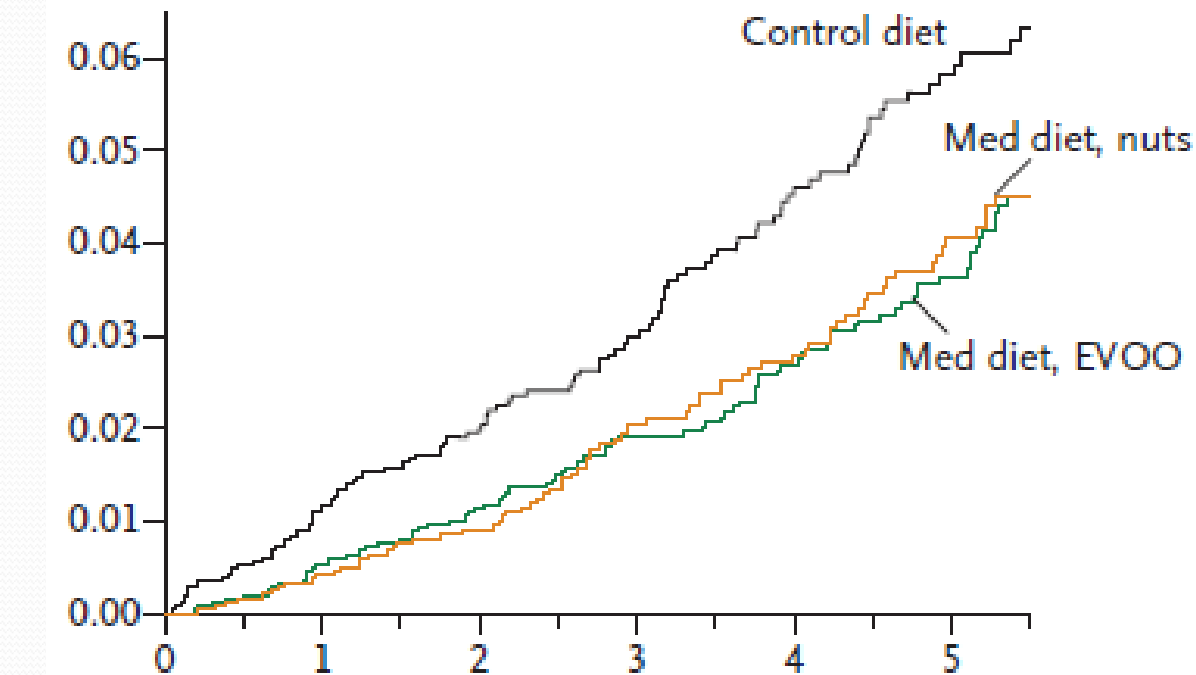


## Intake of Energy



# Primary End Point (Acute Myocardial Infarction, Stroke, or Death from Cardiovascular Causes)

Incidence of Composite Cardiovascular End Point



No. at Risk	0	1	2	3	4	5
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



## Dietary fats and coronary heart disease

■ W. C. Willett

From the Department of Nutrition, Harvard School of Public Health, Boston, MA, USA

**Abstract.** Willett WC (Harvard School of Public Health, Boston, MA, USA). Dietary fats and coronary heart disease (Review). *J Intern Med* 2012; **272**: 13–24.

The relation of dietary fat to risk of coronary heart disease (CHD) has been studied extensively using many approaches, including controlled feeding studies with surrogate end-points such as plasma lipids, limited randomized trials and large cohort studies. All lines of evidence indicate that specific dietary fatty acids play important roles in the

... But total fat as a percent of energy is unimportant...

clear adverse effects and should be eliminated. Modest reductions in CHD rates by further decreases in saturated fat are possible if saturated fat is replaced by a combination of poly- and mono-

unsaturated fat, and the benefits of polyunsaturated fat appear strongest. However, little or no benefit is likely if saturated fat is replaced by carbohydrate, but this will in part depend on the form of carbohydrate. Because both N-6 and N-3 polyunsaturated fatty acids are essential and reduce risk of heart disease, the ratio of N-6 to N-3 is not useful and can be misleading. In practice, reducing red meat and dairy products in a food supply and increasing intakes of nuts, fish, soy products and nonhydrogenated vegetable oils will improve the mix of fatty acids and have a markedly beneficial effect on rates of CHD.

**Keywords:** coronary heart disease, trans fat, saturated fat, polyunsaturated fat, monounsaturated fat, blood cholesterol.

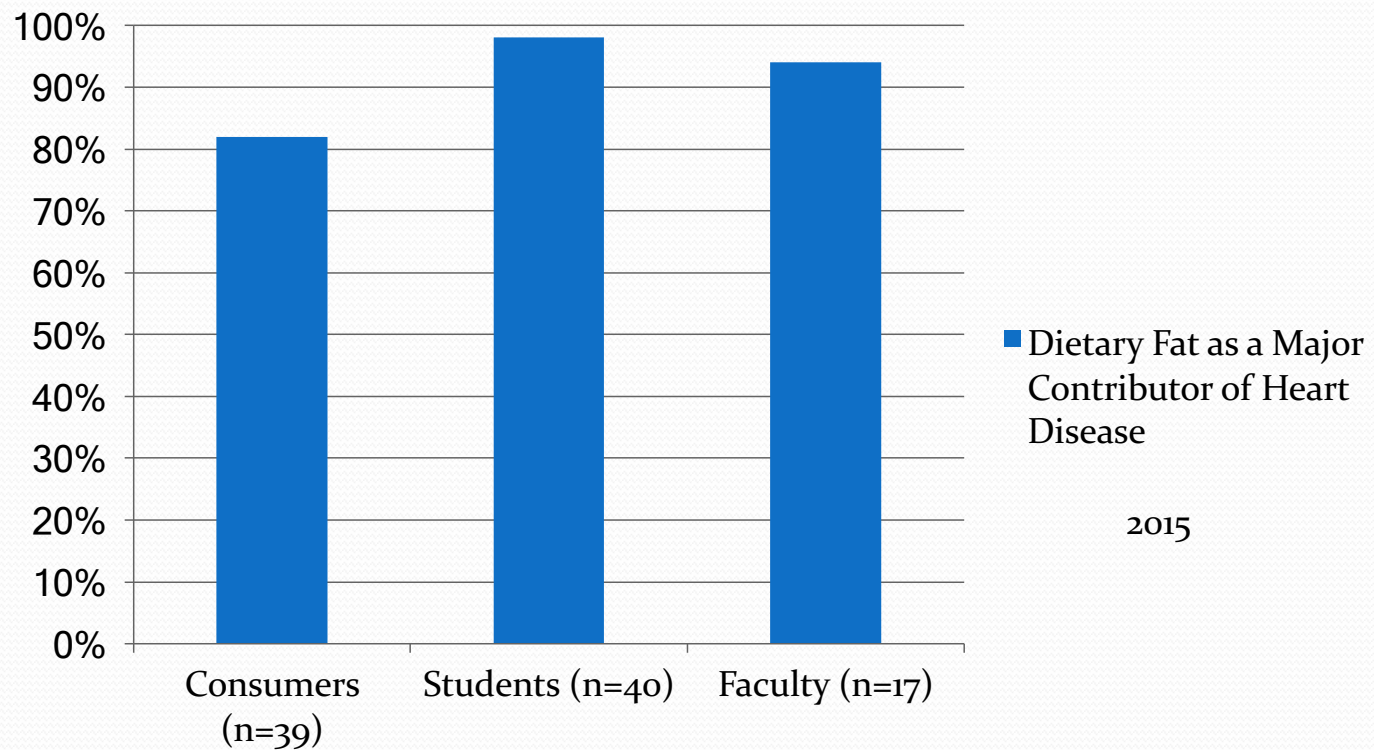


## Conclusion:

- 2015 Dietary Guidelines: Relationship between Consumption of Total Fat and Risk of CVD:
  - “...these results suggest that simply reducing SFA or total fat in the diet by replacing it with any type of carbohydrates is not effective in reducing risk of CVD.”
  - But the panel left the 20%-35% guideline
  - Mixed message

## 2015 Heart Disease Risk Factors Perceptions- Total Dietary Fat

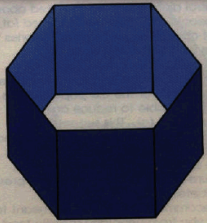
### Dietary Fat as a Major Contributor of Heart Disease



## II.) Dietary Cholesterol

- Relatively unimportant
- Don't focus here





**Avoid Too Much Fat, Saturated Fat, and Cholesterol**



**Choose a diet low in fat, saturated fat, and cholesterol**

### FATS

#### Key Recommendations

- Consume less than 10 percent of calories from saturated fatty acids and less than 300 mg/day of cholesterol, and keep *trans* fatty acid consumption as low as possible.

## History of Cholesterol Dietary Guidelines

1980

1985

1990

1995

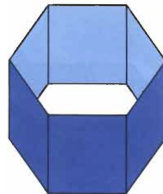
2000

2005

2010

**3**

**Avoid Too Much Fat, Saturated Fat, and Cholesterol** page 11



Choose a Diet Low in Fat, Saturated Fat, and Cholesterol

### CHOOSE SENSIBLY...

- Choose a diet that is low in saturated fat and cholesterol and moderate in total fat.

less than 300 mg per day of cholesterol can help maintain normal blood cholesterol levels. Consuming less than 200 mg per day can further help individuals at high risk of cardiovascular disease.



**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.<sup>2, 35</sup> 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,<sup>[24]</sup> 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 Reference Intakes (DRIs): Additional Macronutrient Recommendations**  
Food and Nutrition Board, Institute of Medicine, National Academies

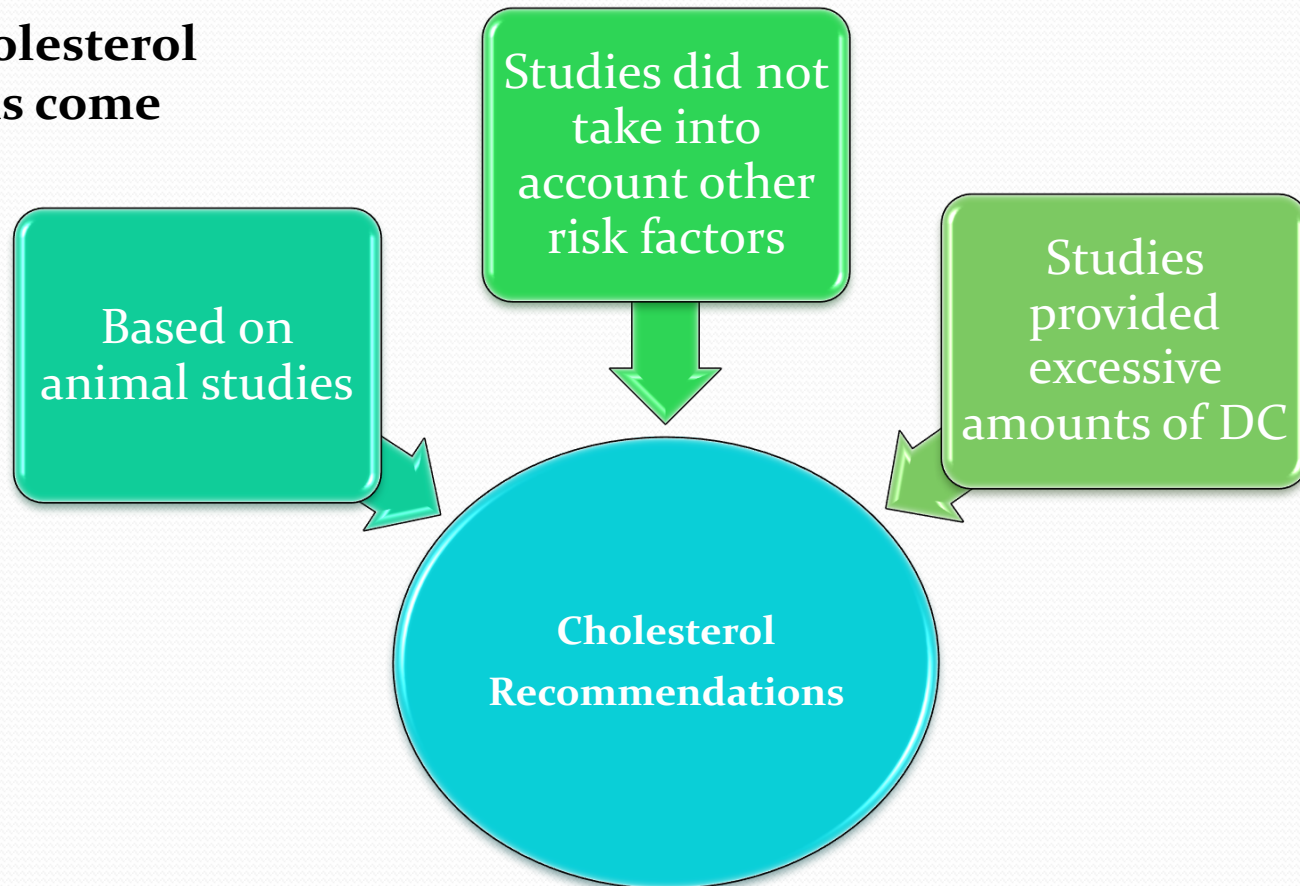
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Macronutrient	Recommendation
Dietary cholesterol	As low as possible while consuming a nutritionally adequate diet
Trans fatty acids	As low as possible while consuming a nutritionally adequate diet
Saturated fatty acids	As low as possible while consuming a nutritionally adequate diet
Added sugars	Limit to no more than 25% of total energy

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SOURCE: *Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids* (2002/2005).

## Where did the Cholesterol Recommendations come from?



In 1912 Anichkov discovered that feeding cholesterol to rabbits led to atherosclerosis.

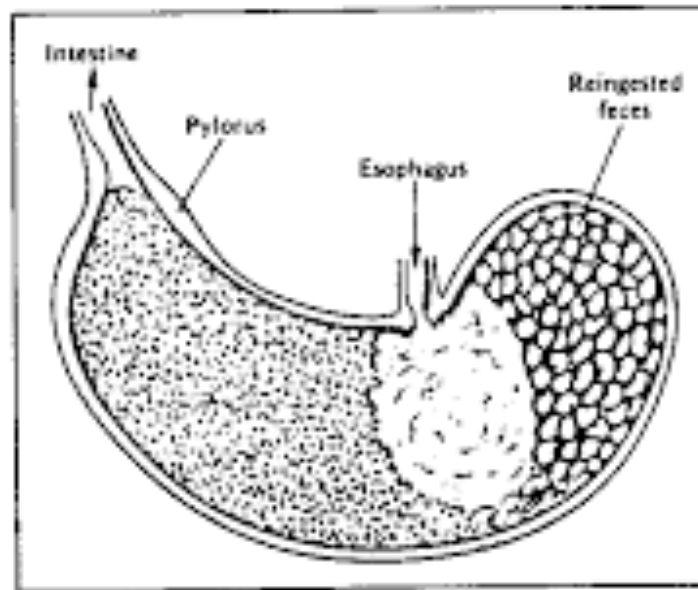
\* Rabbits are herbivores- metabolize cholesterol differently



Konstantinov, I., Mejevoi, N., & Anichkov, N. (2006). Nikolai N. Anichkov and his theory of atherosclerosis. *Texas Heart Institute Journal*, 33(4), 417-423.

# Rabbit's Digestion

**FIGURE 5.5** In the stomach of the rabbit ingested food is located in the pyloric part (left), which contains digestive glands. Reingested fecal pellets are located in the large fundus (right), where they remain separate from the food material while fermentation continues. [Harder 1949; Grassé 1955]





## Revisiting Dietary Cholesterol Recommendations: Does the Evidence Support a Limit of 300 mg/d?

Maria Luz Fernandez · Mariana Calle

Published online: 4 August 2010  
© Springer Science+Business Media, LLC 2010

**Abstract** The perceived association between dietary cholesterol (DC) and risk for coronary heart disease (CHD) has resulted in recommendations of no more than 300 mg/d for healthy persons in the United States. These dietary recommendations proposed in the 1960s had little scientific evidence other than the known association between saturated fat and cholesterol and animal studies where cholesterol was fed in amounts far exceeding normal intakes. In contrast, European countries, Asian countries, and Canada do not have an upper limit for DC. Further, current epidemiologic data have clearly demonstrated that

### Introduction

The American Heart Association (AHA) recommends no more than 300 mg/d of dietary cholesterol (DC) for healthy persons to prevent increased risk for coronary heart disease (CHD) [1]. These recommendations are mostly based on the presence of both saturated fat and cholesterol in many foods and on data derived from animal studies where supraphysiologic doses of cholesterol, ranging from the equivalent of 1,000 mg to 20,000 mg/d for humans, were fed in order to produce atherosclerosis [2].



In the 2000 the AHA states that there is no precise basis for selecting a target level for dietary cholesterol for all individuals but recommends 300 mg/day on average.



## The three deciding opinions:

1. **American Heart Association- 2014**
2. **USDA Dietary Guidelines- 2015**
3. **Most recent meta analysis- 2015**

**All three agree there isn't enough evidence to make a recommendation.**

# EGG STUDIES

Eggs are often used to study cholesterol due to their high content of cholesterol and low content of saturated fat



# Egg Consumption and the Effect on LDL:HDL Ratio

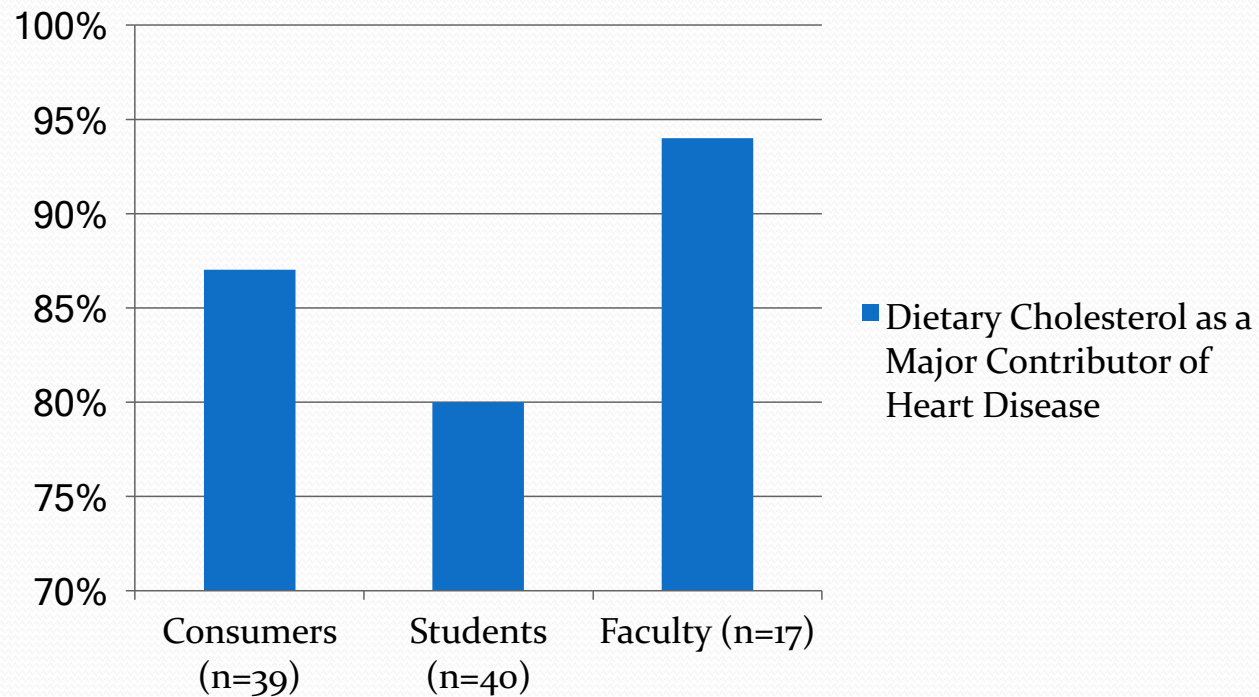


	Cholesterol (mg/dL)		LDL:HDL Ratio	
	LDL	HDL	LDL:HDL	% Change
Baseline	130	50	2.60	
+ 1 egg/day	134	51	2.63	1.2%
Baseline	150	50	3.00	
+ 1 egg/day	154	51	3.02	0.7%
Baseline	170	50	3.40	
+ 1 egg/day	174	51	3.41	0.3%



## 2015 Heart Disease Risk Factors Perceptions- Cholesterol

### Dietary Cholesterol as a Major Contributor of Heart Disease



# Cholesterol conclusion!

- Eggs are back
  - No more suffering through egg replacement.
  - You are free to soufflé, meringues, build structure once again!!
- Sauces are back
  - Hollandaise sauce is in
  - Cream can add creaminess to cream sauce
  - Forego the low or no fat marinara; Ask for the Alfredo sauce.



## III.) Saturated Fat:

- The mix of fatty acids is relevant
- But don't focus here



# 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.



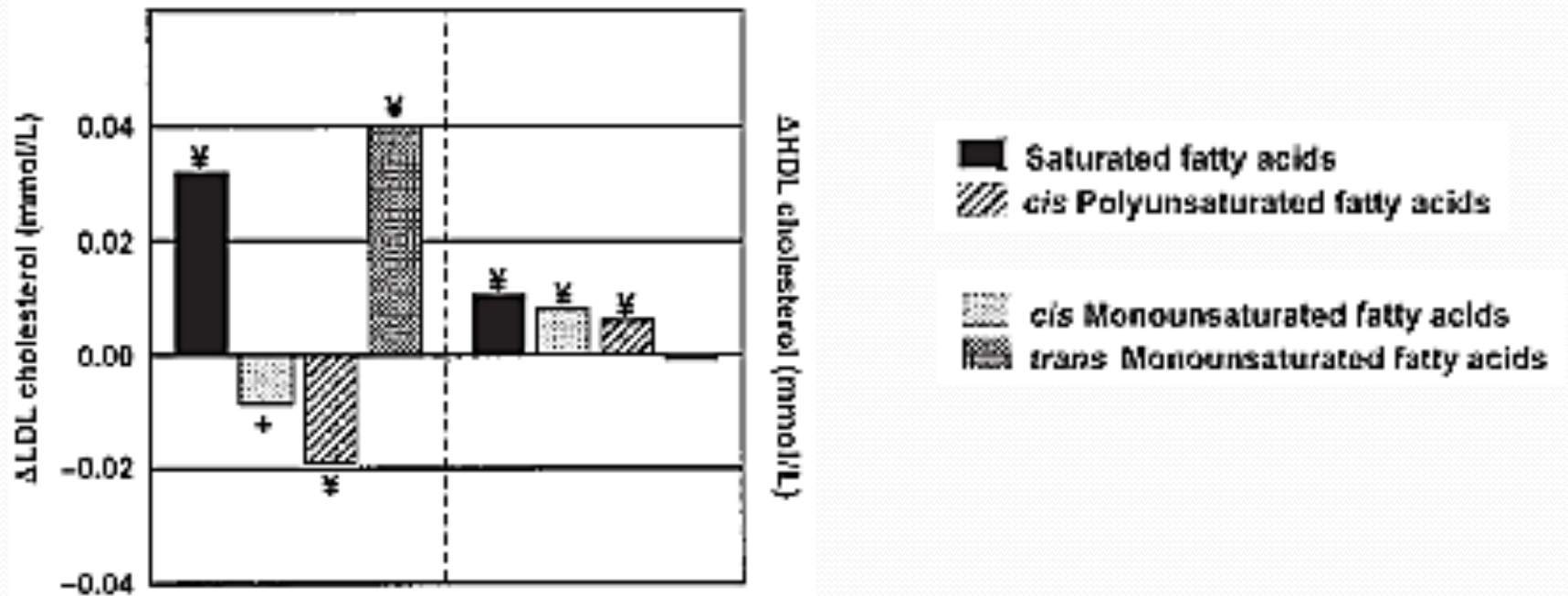
Effects of dietary fatty acids and carbohydrates on the ratio of serum total to HDL cholesterol and on serum lipids and apolipoproteins: a meta-analysis of 60 controlled trials<sup>1-3</sup>

*Ronald P Mensink, Peter L Zock, Arnold DM Kester, and Martijn B Katan*

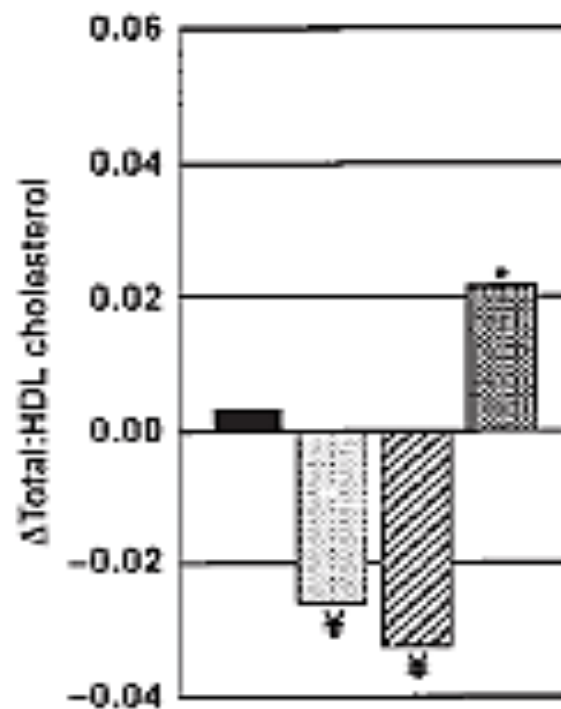
2003



Change in:  
Bad Cholesterol: LDL      Good Cholesterol: HDL



## Total : HDL Cholesterol Change



■ Saturated fatty acids

▨ cis Polyunsaturated fatty acids

▤ cis Monounsaturated fatty acids

▧ trans Monounsaturated fatty acids



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DOI: 10.1093/aje/kwi085

## Dietary Fat Intake and Risk of Coronary Heart Disease in Women: 20 Years of Follow-up of the Nurses' Health Study

Kyungwon Oh<sup>1</sup>, Frank B. Hu<sup>1,2,3</sup>, JoAnn E. Manson<sup>2,3,4</sup>, Meir J. Stampfer<sup>1,2,3</sup>, and Walter C. Willett<sup>1,2,3</sup>

<sup>1</sup> Department of Nutrition, Harvard School of Public Health, Boston, MA.

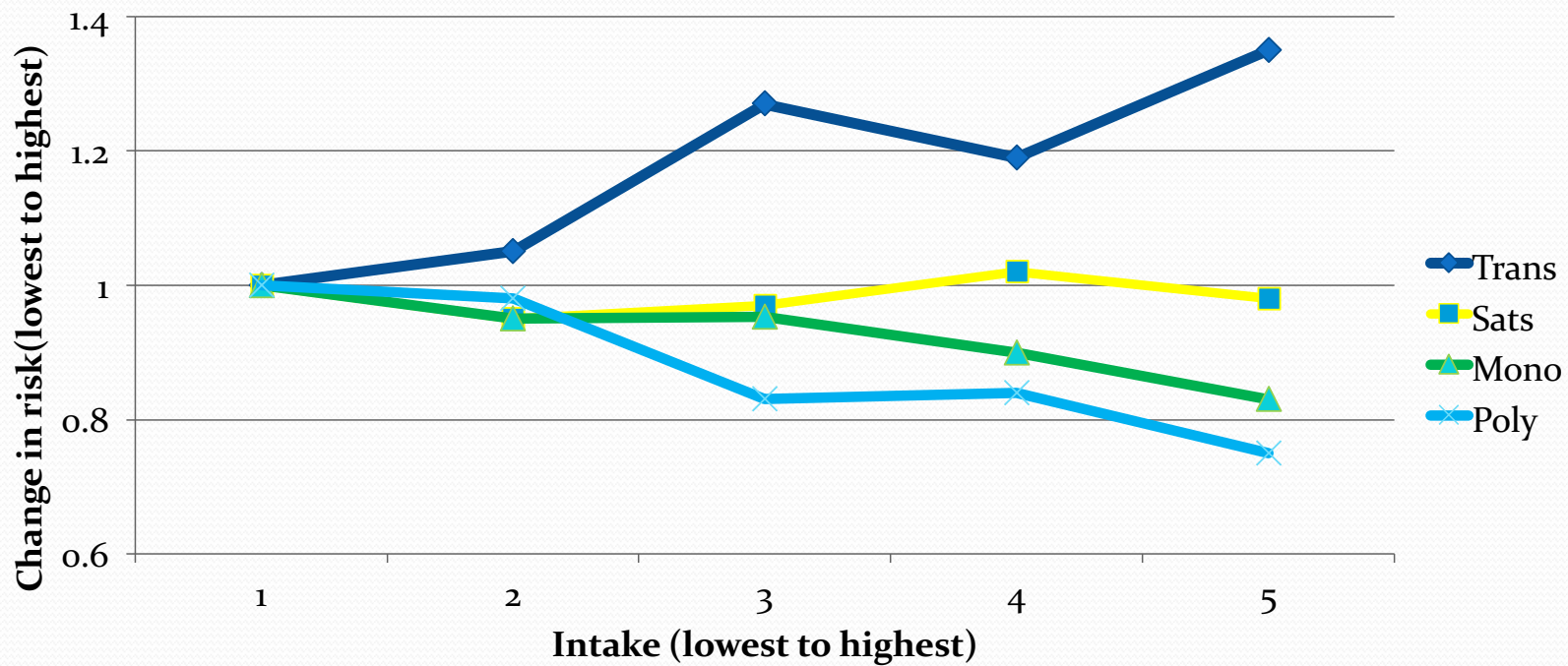
<sup>2</sup> Department of Epidemiology, Harvard School of Public Health, Boston, MA.


<sup>3</sup> The Channing Laboratory, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA.

<sup>4</sup> Division of Preventive Medicine, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA.

*Received for publication July 16, 2004; accepted for publication November 10, 2004.*

# Nurses Health Study





Lipids (2010) 45:893–905  
DOI 10.1007/s11745-010-3393-4

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REVIEW

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

**Renata Micha · Dariush Mozaffarian**

Received: 3 December 2009 / Accepted: 27 January 2010 / Published online: 31 March 2010  
© The Author(s) 2010. This article is published with open access at Springerlink.com



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

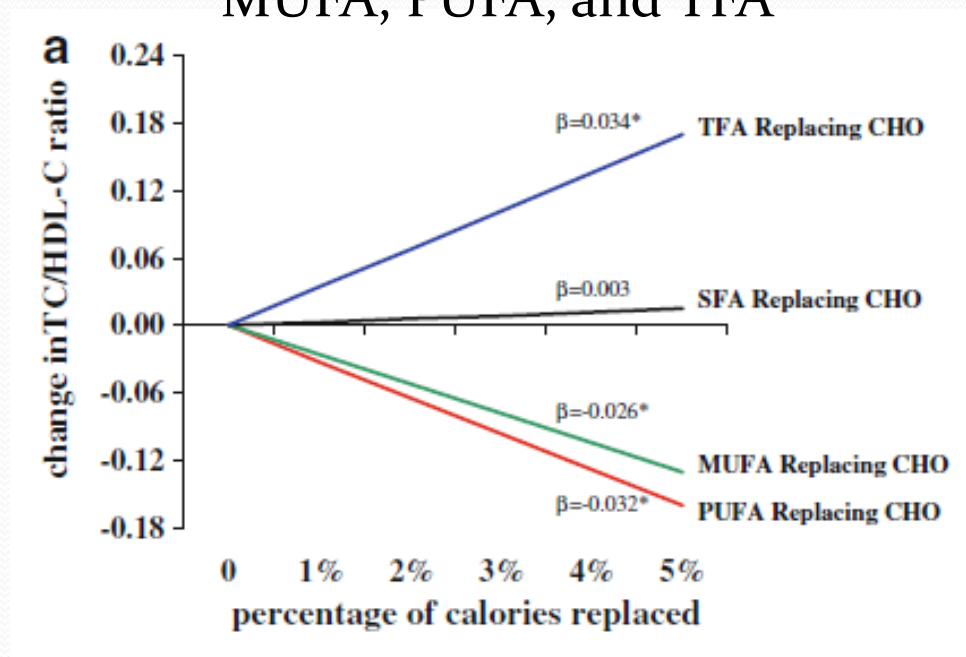



Fig. 2 Changes in blood lipid levels for consumption of saturated fatty acids (SFA), monounsaturated fatty acids (MUFA), polyunsaturated fatty acids (PUFA), or trans fatty acids (TFA) as an isocaloric

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

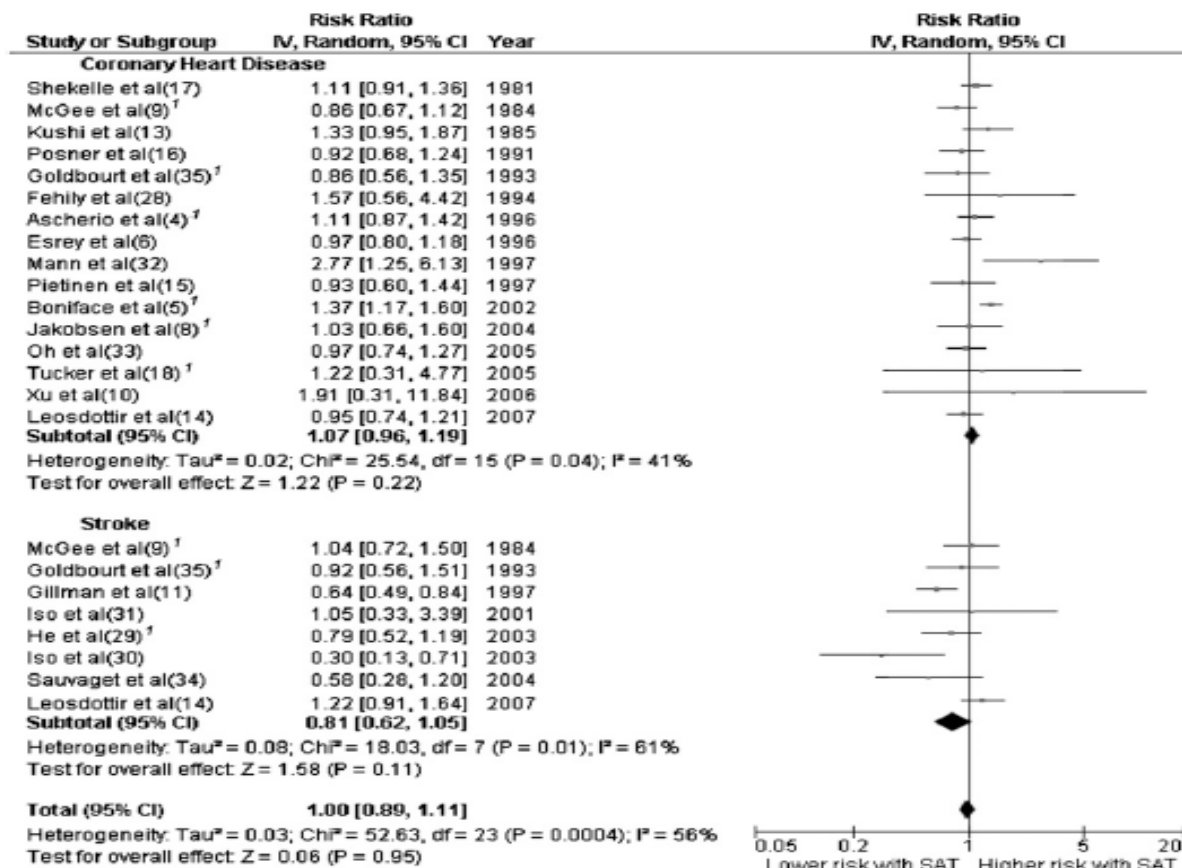


See corresponding editorial on page 497.

Meta-analysis of prospective cohort studies evaluating the association of saturated fat with cardiovascular disease<sup>1-5</sup>

*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. <sup>†</sup>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.

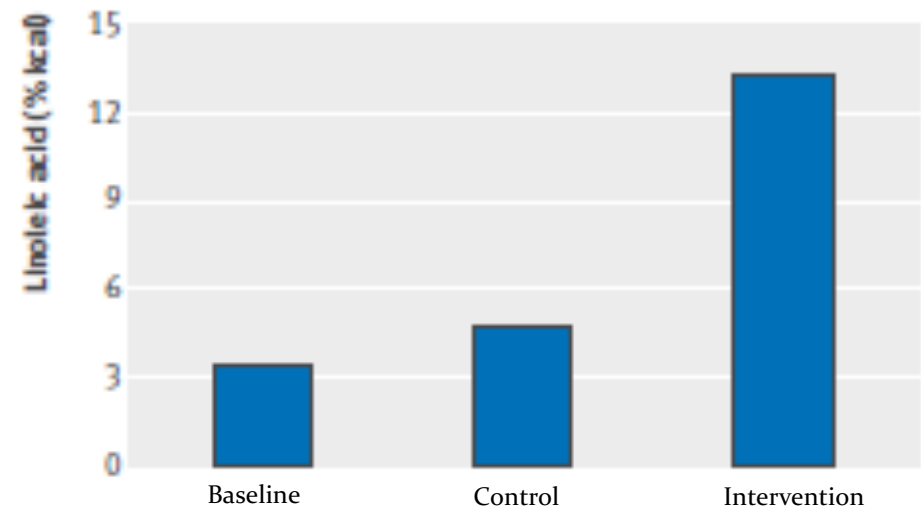
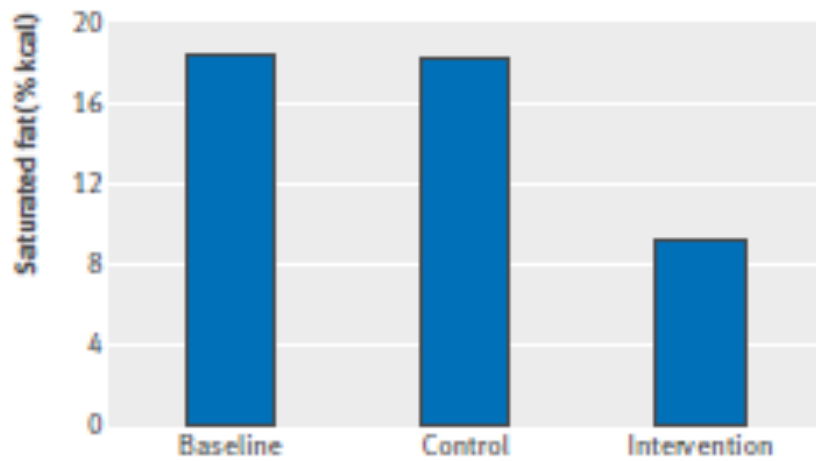
## Re-evaluation of the traditional diet-heart hypothesis: analysis of recovered data from Minnesota Coronary Experiment (1968-73)

Christopher E Ramsden,<sup>1,2</sup> Daisy Zamora,<sup>3</sup> Sharon Majchrzak-Hong,<sup>1</sup> Keturah R Faurot,<sup>2</sup> Steven K Broste,<sup>4</sup> Robert P Frantz,<sup>5</sup> John M Davis,<sup>3,6</sup> Amit Ringel,<sup>1</sup> Chirayath M Suchindran,<sup>7</sup> Joseph R Hibbeln<sup>1</sup>

2016



# Linoleic Acid and Saturated Fat Composition of MCE Control and Intervention Group Diets



# Changes in Serum LDL

**Table 2 | Predicted and observed changes in serum cholesterol in intervention and control groups**

	Observed dietary changes*		Serum cholesterol % changes	
	LA (% change)	SFA (% change)	Predicted based on Keys equation†	Observed in MCE (n=2355)‡
Intervention diet	288	-51	-18.1%	-13.8% (SD 13.0%), P<0.001
Control diet	38	-1	-1.1%	-1.0% (SD 14.5%), P<0.001

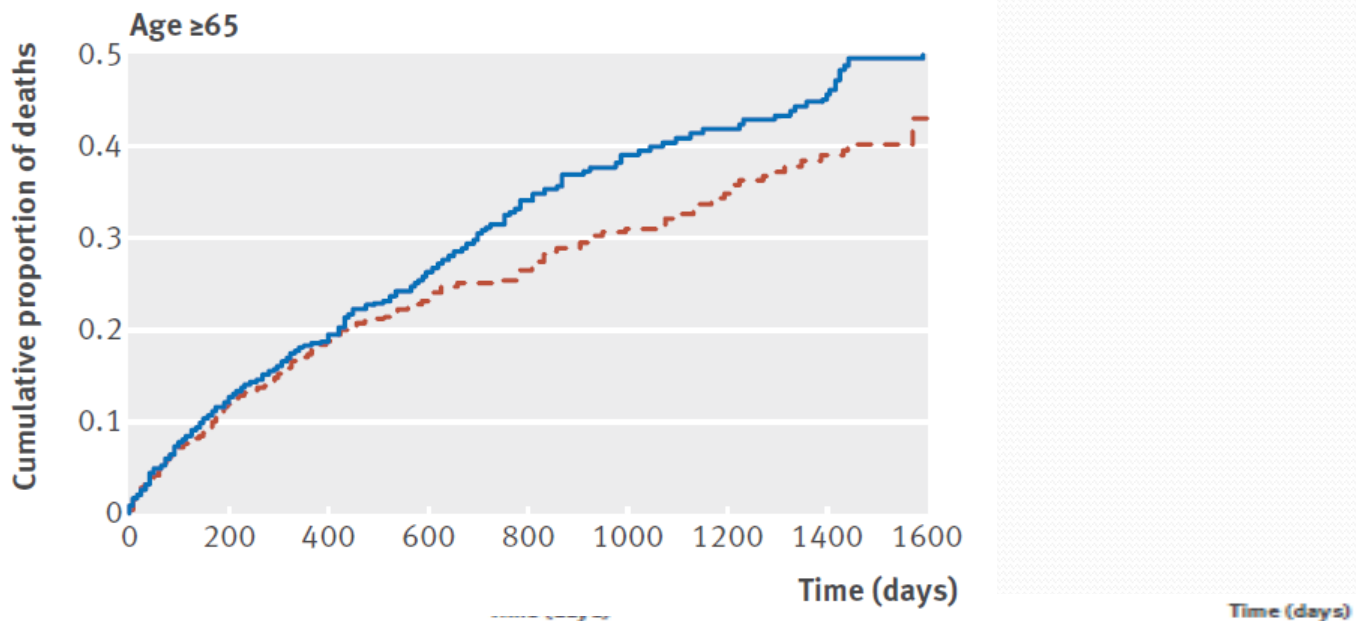
LA=linoleic acid; SFA=saturated fat.

\*Changes from baseline hospital diet calculated from 1975 abstract, with LA estimated by multiplying total polyunsaturated fatty acids by 0.9.

† $\Delta\text{Chol}=1.3(2\Delta\text{S}-\Delta\text{P})$  where S and P are percentage of calories from saturated and polyunsaturated fatty acids, respectively.

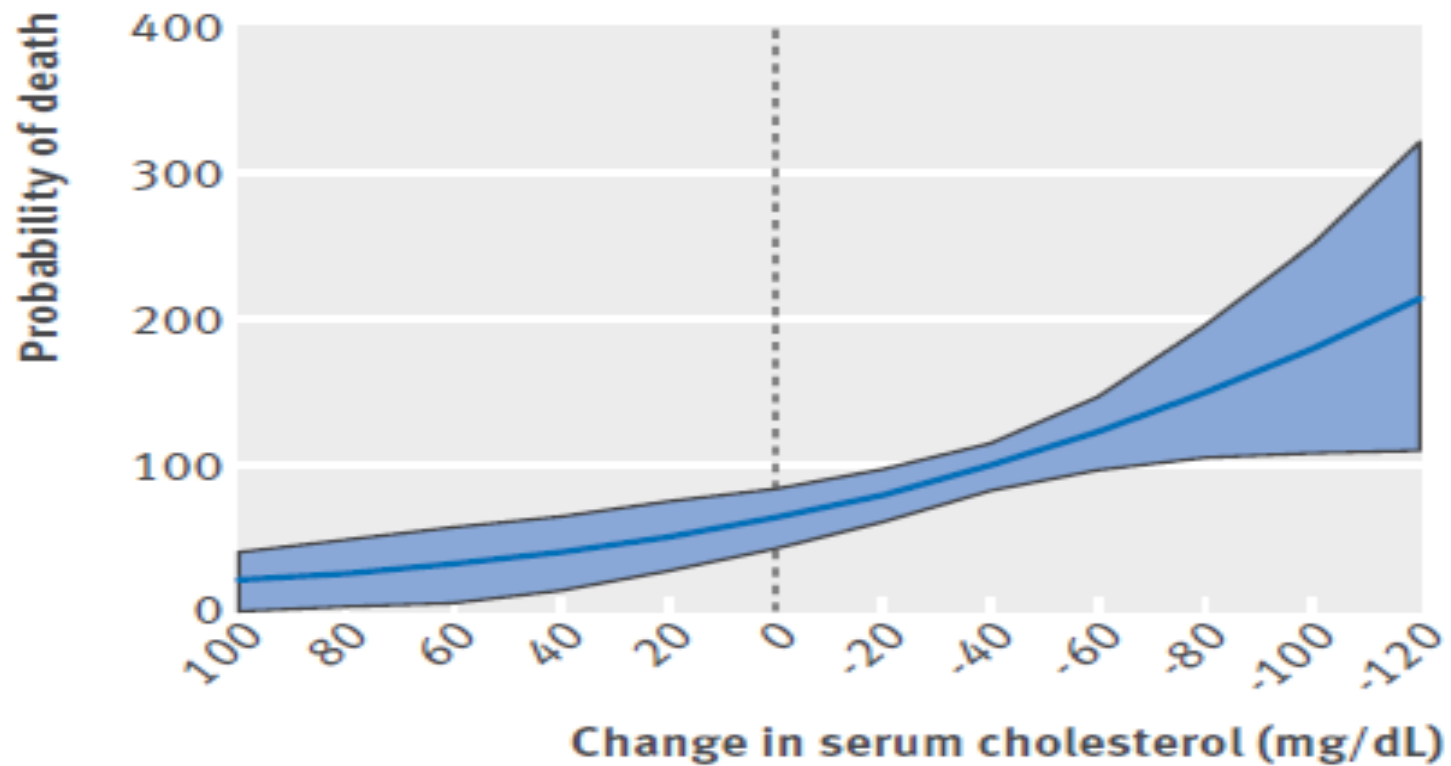
‡Percent change in serum cholesterol concentration calculated for each individual in cohort that received diet for one year or more. P values from paired t test comparing concentrations before and after randomization.





**Fig 5 | Risk of death from any cause by diet assignment in full MCE cohort and prespecified subgroups (Kaplan Meier life table graphs of cumulative mortality). Graphical depiction of cumulative mortality in full MCE cohort (n=9423) and prespecified subgroups in 1981 Broste thesis<sup>7</sup> showed no indication of benefit and suggested possibility of unfavorable effects of serum cholesterol lowering intervention among participants aged ≥65. Patient level data needed to repeat this analysis were not recovered**

# Change in Serum Cholesterol and Probability of Death





## Here is the answer

- When someone asks if \_\_\_\_\_ is good for me to eat.
- Compared to what?



## Conclusion saturated fat!

- Full fat milk and cream are back
  - No more ice milk. Eat Haagen-Dazs!
  - Remember the power of cheese!!
- Meat is in
  - No need to keep the 80/20 hamburger, make it a butter burger
  - No more lean dry meat, put some pan-dripping gravy on that juicy steak!

## IV: Reduce sodium



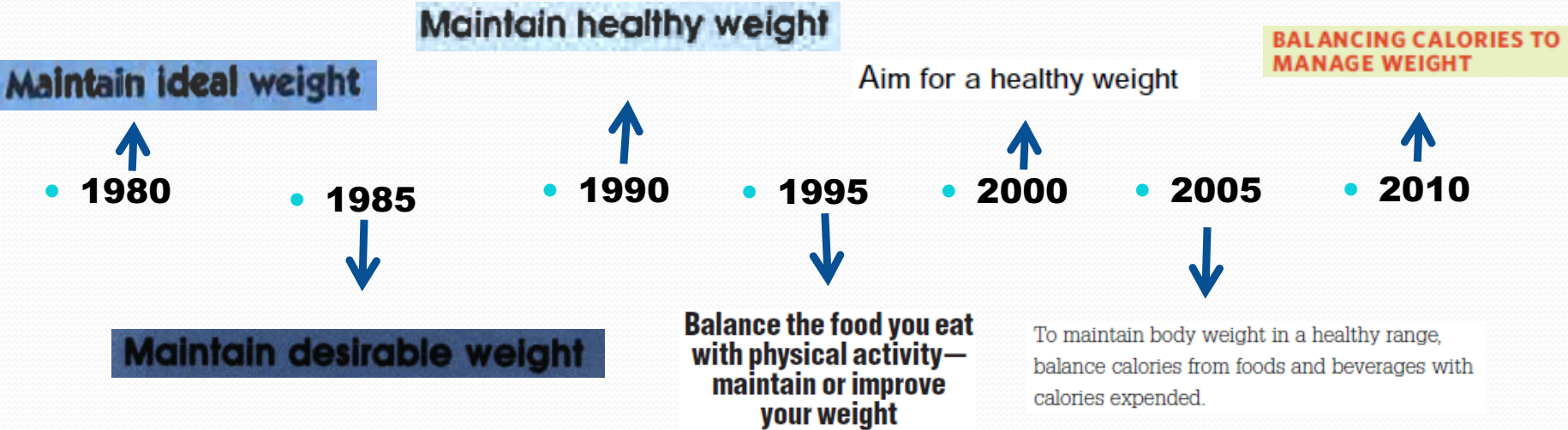
# Sodium

- 10% of population is sodium sensitive
  - For public health recommendations, everyone reduce
  - But for the individual, if BP is normal it is not an issue



**V: Maintain Ideal Weight**

# History of Maintain Ideal Weight Guidelines



# How to reduce/maintain weight

- Don't restrict
- Change the dining environment
  - Small plates bowls glasses
  - Smaller portion pack snacks
  - Make low nutrient dense foods less visible and assessable
  - What we say about food makes a difference
- Be aware of visual cues to satiety
- Reduce refined carbs

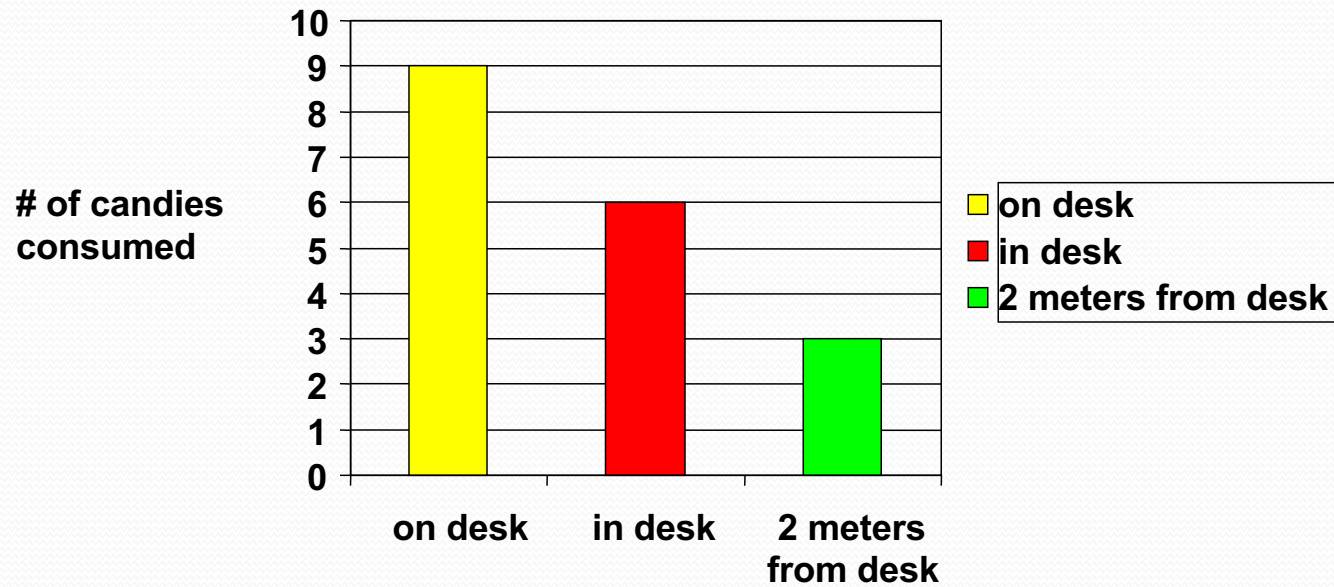
## CBS Features Portion Size Me

[video](#)



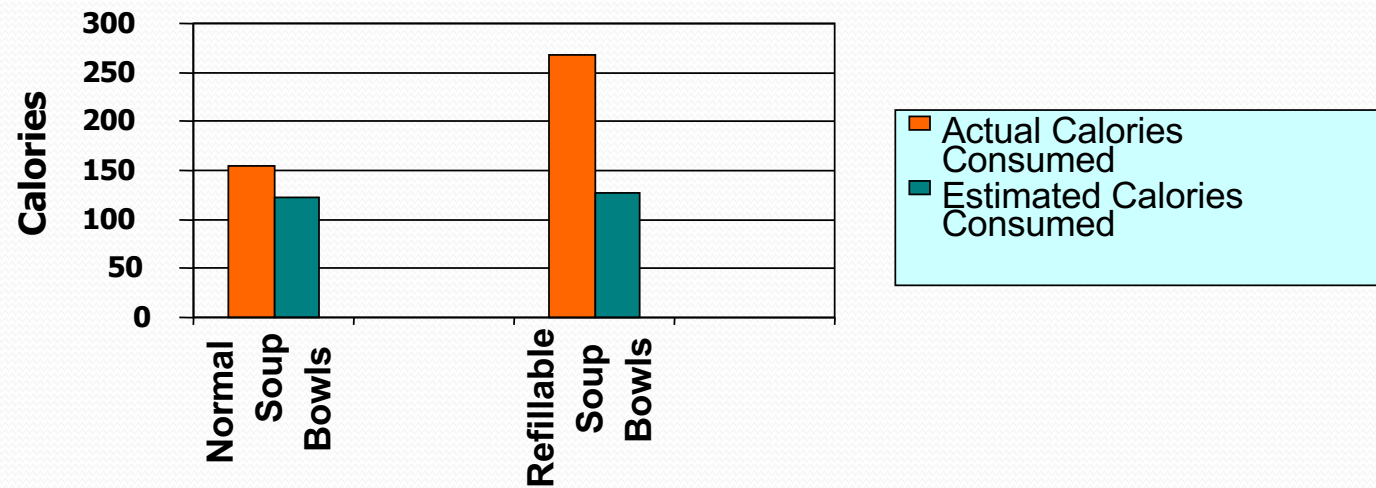
**CBS NEWS**

# Amount of Candy Consumption According to Condition



Painter, J., Wansink, B., Hieggelki, J. (2002). *How Visibility and Convenience Influence Candy Consumption*. *Appetite* 38, 237-238.

## Refillable Soup Bowls Increase Consumption, but Not Perception of Consumption

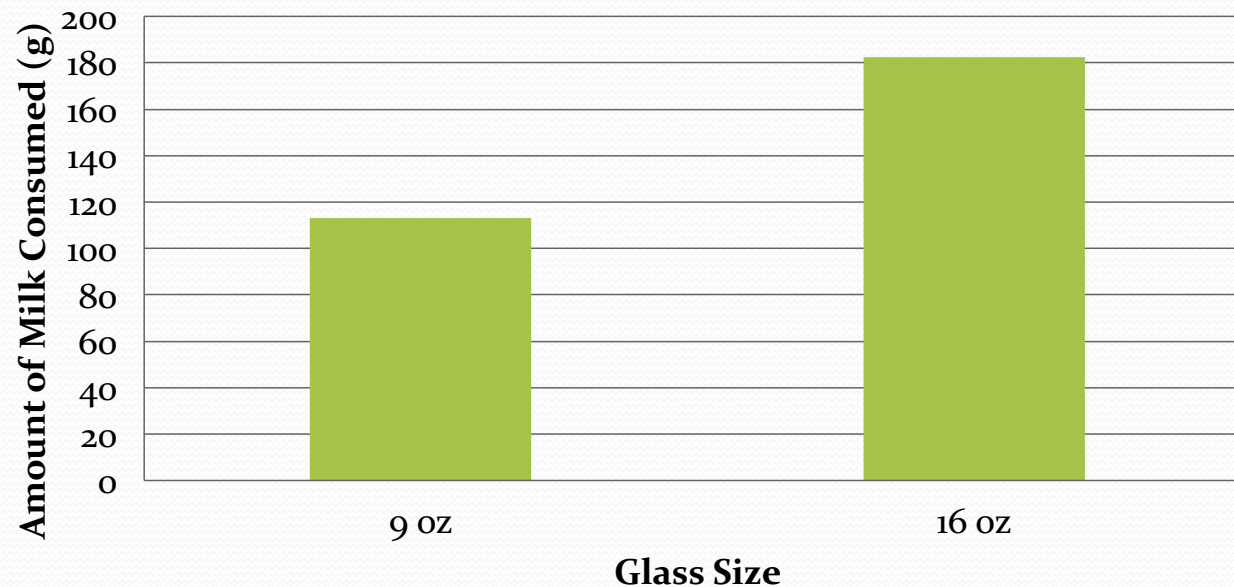


Wansink, B., Painter, J.E., North, J. 2005. *Bottomless Bowls: Why Visual Cues of Portion Size May Influence Intake*. *Obesity Research*, 13,1, 93-100.



# Effect of Glass Size on Milk Consumption in Children 3 to 5 Years Old

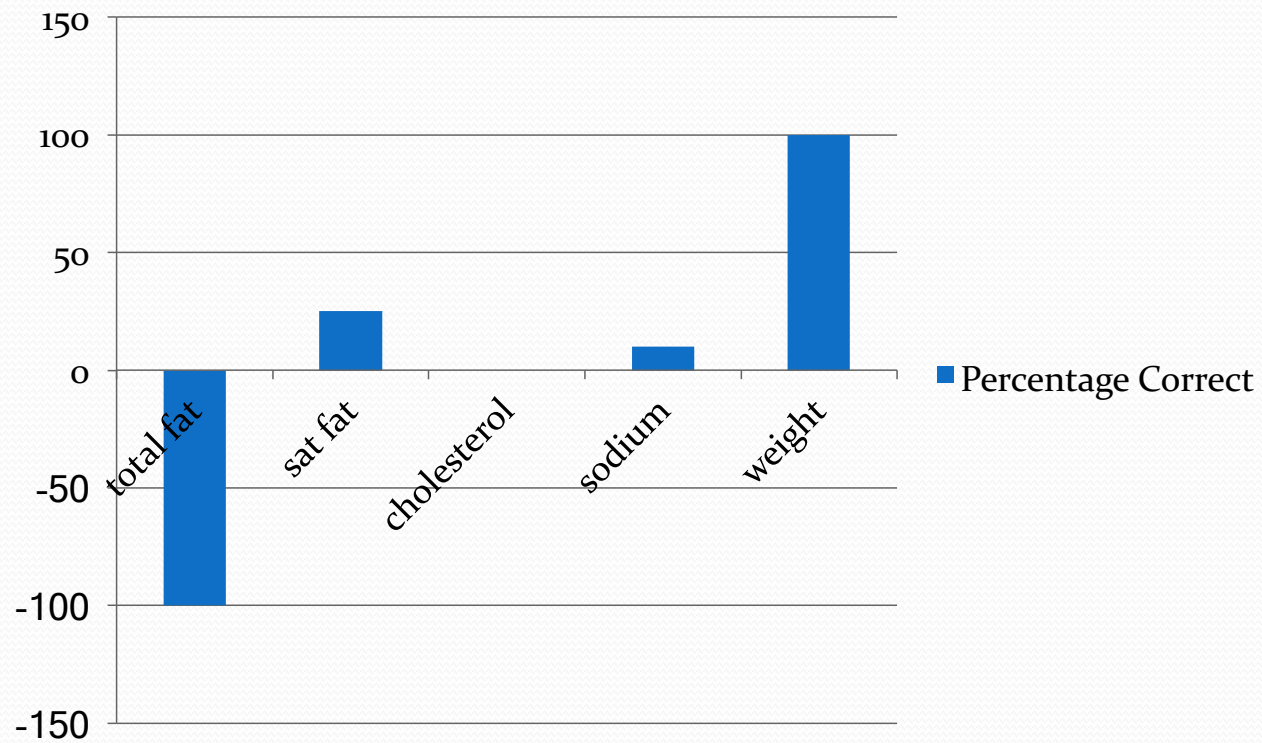
Figure 1. Milk Consumption

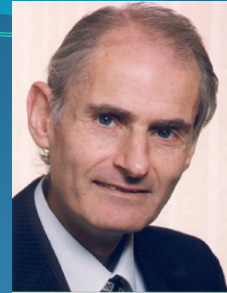


Smith, S. R., Barnes, J. L., Knoll, S. E., Rhodes, K., & Painter, J. E. (2011). Effect of Glass Size on Milk Consumption in Children 3 to 5 Years Old. *Journal of the American Dietetic Association*, 111(9), A106-A106.

# Take Home Messages

Percentage Correct





**So What Works?**

**Adding a portfolio of LDL and  
inflammation reducing foods**

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

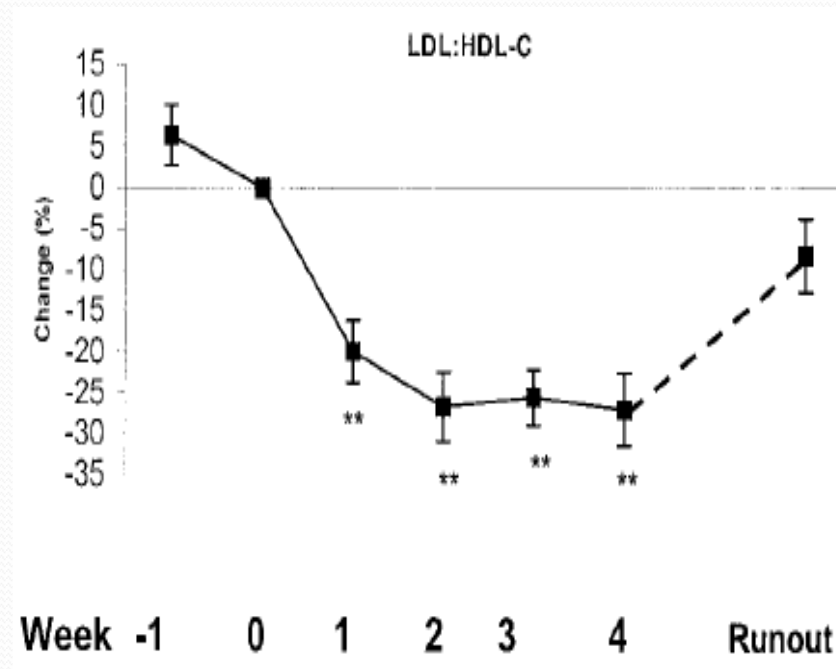
David J.A. Jenkins, Cyril W.C. Kendall, Dorothea Faulkner, Edward Vidgen, Elke A. Trautwein, Tina L. Parker, Augustine Marchie, George Koumbriidis, Karen G. Lapsley, Robert G. Josse, Lawrence A. Leiter, and Philip W. Connelly

A portfolio of four foods + a very low SFA diet. After one week on the very low SFA diet, the test diet was initiated for 1 month in duration before returning to the very low SFA diet on week 4.

The intervention diet included:

- 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).



# Dyslipidemia Intervention

- **Vegetable** modified diet
  - 2.5 cup equivalents/day:
  - Pulses > 130 g/day (beans, peas, chickpeas and lentils)
  - Legumes > 4 serv/wk have shown benefit
- **Fruit**-modified diet
  - 2 cup equivalents/day
  - Fruits high in soluble fiber (pectin) greater than 7 g/day to 13 g/day have shown efficacy
- **Grains:** Decreased simple carbohydrate diet/Consistent carbohydrate diet
  - 6 oz equivalents/day at least 50% whole grain
  - Soluble fiber greater than 7 g /day to 13 g/day (psyllium, oats, and barley)
  - Whole grains >3 servings/day.
  - Total fiber intake of 25 g to 30 g per day



# Dyslipidemia Intervention

- Dairy 3 cup equivalents/day
  - Plain, sugar free, reduced sugar
- Protein foods 5.5 oz equivalents/day, shift servings toward,
  - Nuts >1.5 oz per day have shown a benefit
  - Soy protein > 25 g/day
  - Pulses > 130 g/day (beans, peas, chickpeas and lentils)
  - Legumes > 4 serv/wk
- Oils 27g/day
  - Plant stanol/sterol rich spreads and foods (2-3X/day) to equal (2 g/day to 3 g/day) have been shown to be effective (>3 g/day no added benefit)
  - Reduction or elimination of trans fats
    - Mainly accomplished by avoiding fried foods and processed pastries and sweets
  - Omega-3 fatty acids (2 or more servings/week, fatty fish)

# Dyslipidemia Intervention

Other

- **Saturated fat**

- For patients eating more than 10% of energy from saturated fat, encourage a reducing highly processed food that are high in saturated fat.
- This can be accomplished by reducing consumption of processed meats (Sausage, franks, bacon, and ribs) grain based and dairy desserts, beef and chicken mixed dishes, pizza and Mexican dishes. Encourage increasing foods high in mixed unsaturated fatty acids including; fatty fish, nuts, seeds and avocados.

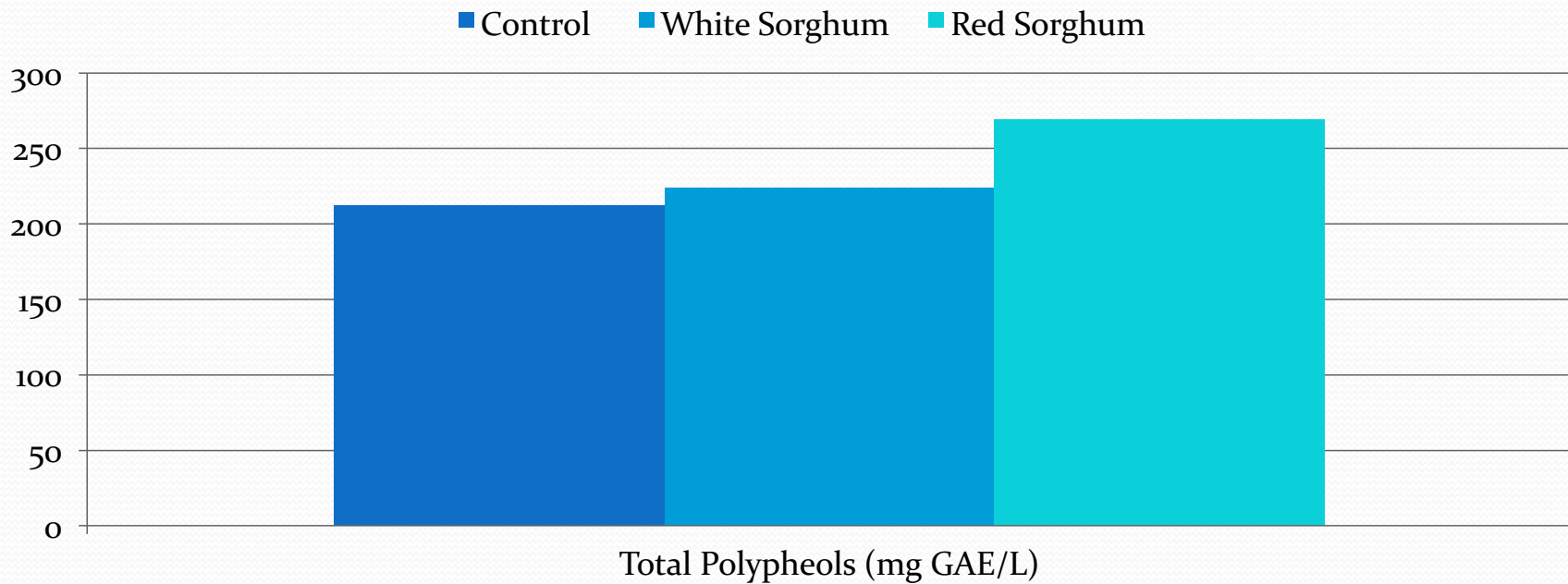
- **Added sugar**

- For patients eating a diet characterized by more than 10% of energy from added sugars, encourage a diet with total added sugar less than 10% of energy

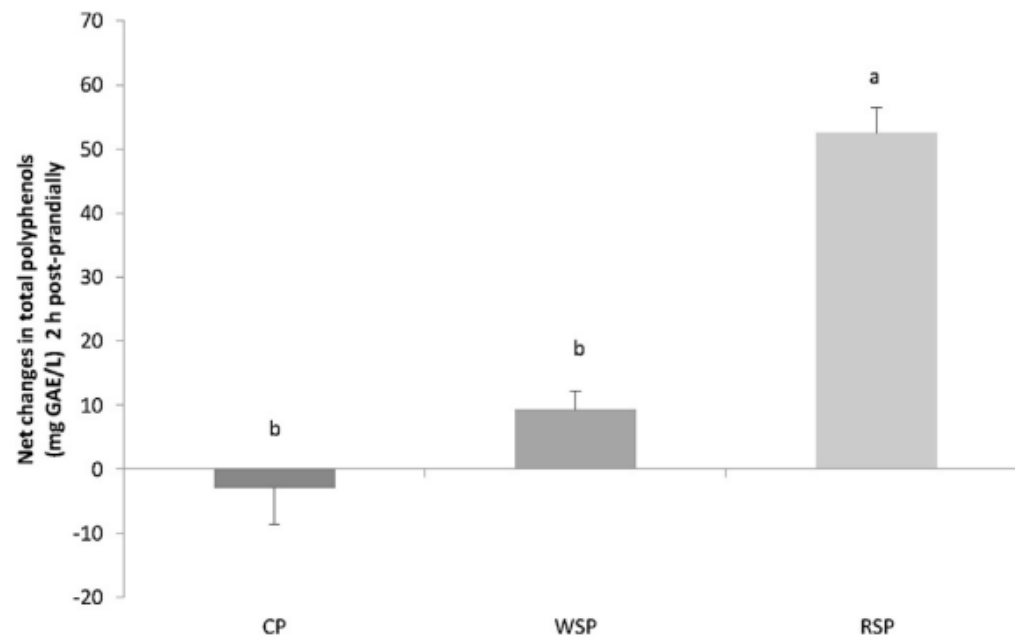
Clin Nutr. 2015 Jun;34(3):415-21. doi: 10.1016/j.clnu.2014.08.005. Epub 2014 Aug 14.

**Acute effect of sorghum flour-containing pasta on plasma total polyphenols, antioxidant capacity and oxidative stress markers in healthy subjects: A randomised controlled trial.**

Khan J<sup>1</sup>, Yousif AM<sup>2</sup>, Johnson SK<sup>3</sup>, Gamlath S<sup>2</sup>.

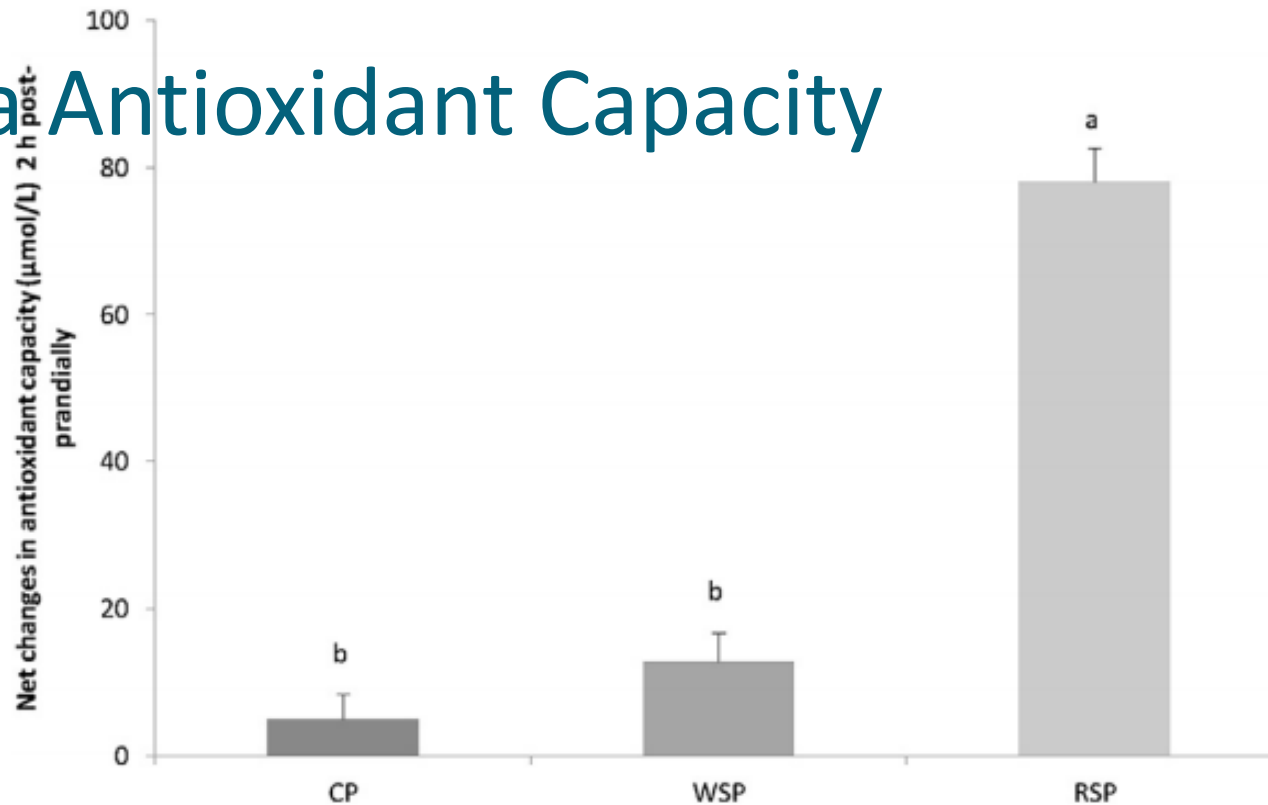


# Plasma Total Polyphenols



**Fig. 2.** Plasma total polyphenols (net change, post meal – pre meal; mean  $\pm$  SEM) in healthy subjects ( $n = 20$ ) after consumption of pasta meals (CP: control pasta; WSP: 30% white sorghum pasta; RSP: 30% red sorghum pasta). Bars with different letters are significantly different.  $P < 0.05$  (one-way repeated ANOVA, Bonferroni adjustment).

# Plasma Antioxidant Capacity



**Fig. 3.** Plasma antioxidant capacity (net change, post meal – pre meal; mean  $\pm$  SEM) in healthy subjects ( $n = 20$ ) after consumption of pasta meals (CP: control pasta; WSP: 30% white sorghum pasta; RSP: 30% red sorghum pasta). Bars with different letters are significantly different.  $P < 0.05$  (one-way repeated ANOVA, Bonferroni adjustment).

# Changes in Superoxide Dismutase (SOD) Activity

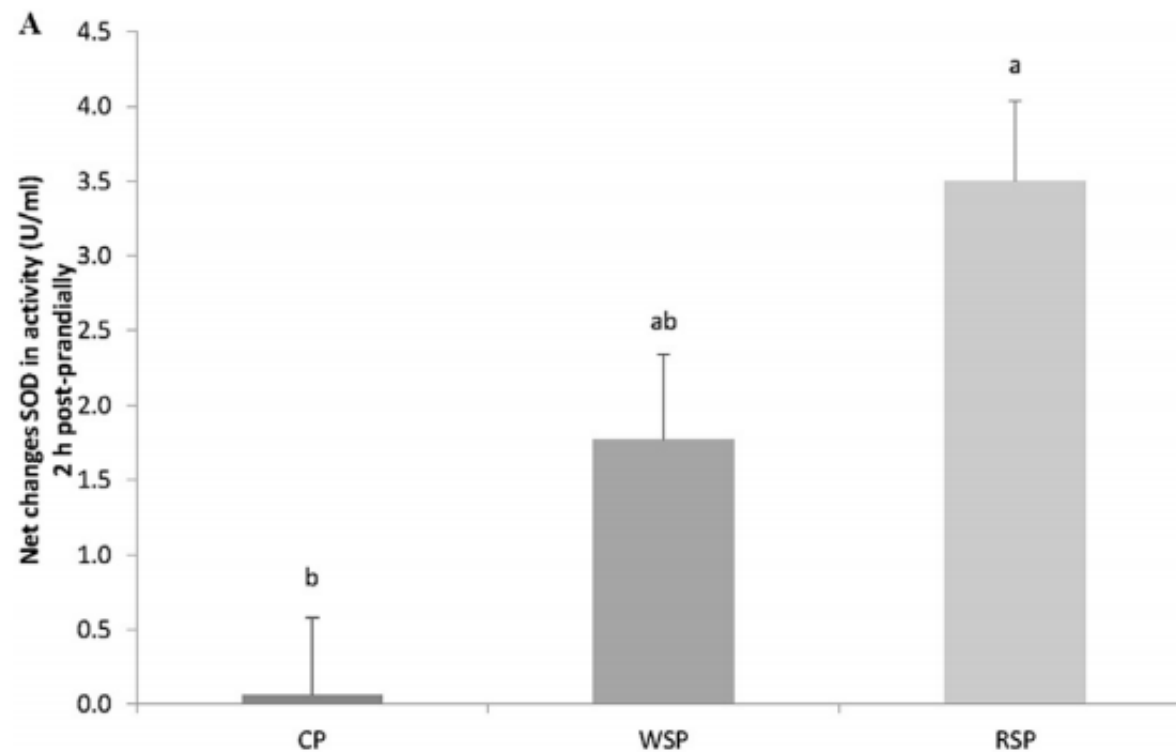


Fig. 4. (A) SOD activity; mean  $\pm$  SEM) in healthy subjects (n = 20) after consumption of pasta meals (CP: control pasta; WSP: 30% white sorghum pasta; RSP: 30% red sorghum pasta). Bars with different letters are significantly different.  $P < 0.05$  (one-way repeated ANOVA, Bonferroni adjustment).



## ***Nutrient Metabolism***

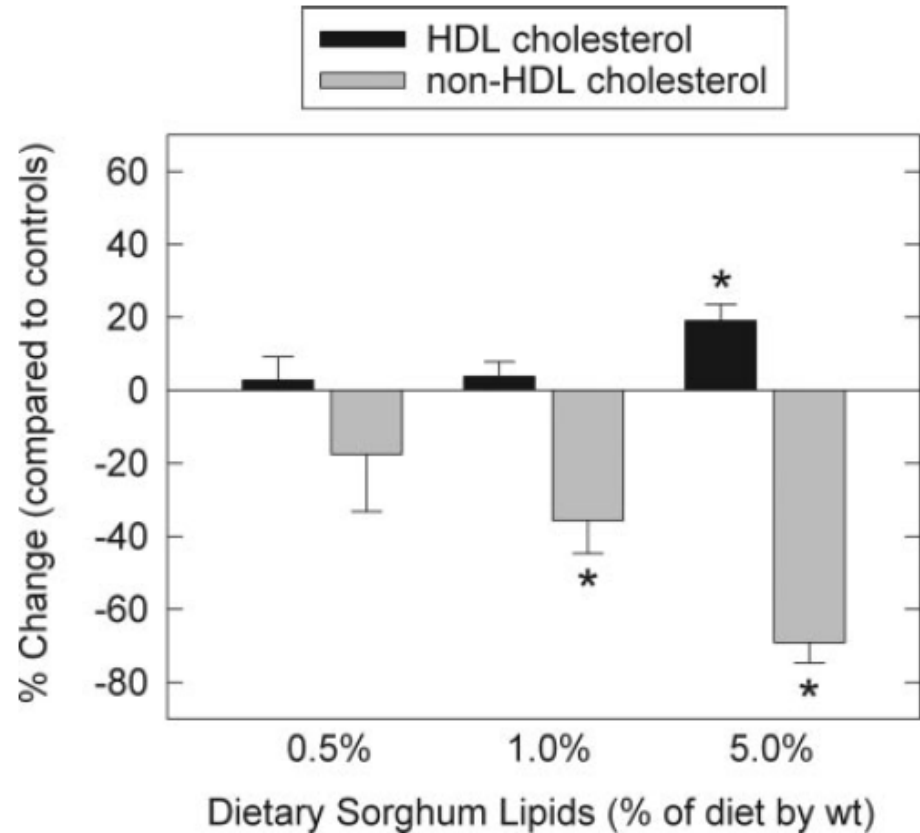
### **Grain Sorghum Lipid Extract Reduces Cholesterol Absorption and Plasma Non-HDL Cholesterol Concentration in Hamsters<sup>1,2</sup>**

Timothy P. Carr,<sup>\*3</sup> Curtis L. Weller,<sup>†\*\*</sup> Vicki L. Schlegel,<sup>\*\*</sup> Susan L. Cuppett,<sup>\*\*</sup>  
David M. Guderian, Jr.,<sup>\*</sup> and Kyle R. Johnson<sup>\*</sup>

*Departments of \*Nutrition and Health Sciences, <sup>†</sup>Biological Systems Engineering,  
and \*\*Food Science and Technology, University of Nebraska, Lincoln, NE*

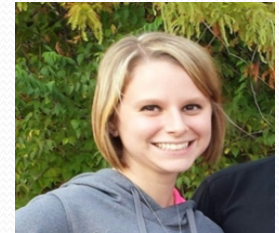


# Animals fed a certain % of diet from Lipids from Whole Kernel White and Red Grain Sorghum



**FIGURE 2** The percentage of change in plasma HDL and non-HDL cholesterol concentrations in hamsters fed 0.5, 1.0 or 5.0% grain sorghum lipids compared with controls. Values are means  $\pm$  SEM,  $n = 7-8$ . \*Different from control,  $P < 0.05$ .

# Thank You!





# Take Home Messages for heart health

1. Don't consider total fat
2. Total dietary cholesterol is not the focus
3. Don't focus on saturated fat. But consider balance of the types of fat
4. Eliminate trans fat
5. Reduce added sugar
6. Substitute whole grains for refined.
7. Focus on foods to add to reduce risk and teach how to find and use them
  1. Soluble fiber, Phyto sterols, nuts, legumes, vegetables, fruits,

# Questions?

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jimpainterphd@gmail.com