JEAN MAYER USDA HUMAN NUTRITION RESEARCH CENTER ON AGING

HNRCA

Dietary Fat Phobia – *Dispelling the Myth That All Fats Are Bad*

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Director and Senior Scientist, Cardiovascular Laboratory
Tufts University, Boston, MA

Tufts UNIVERSITY

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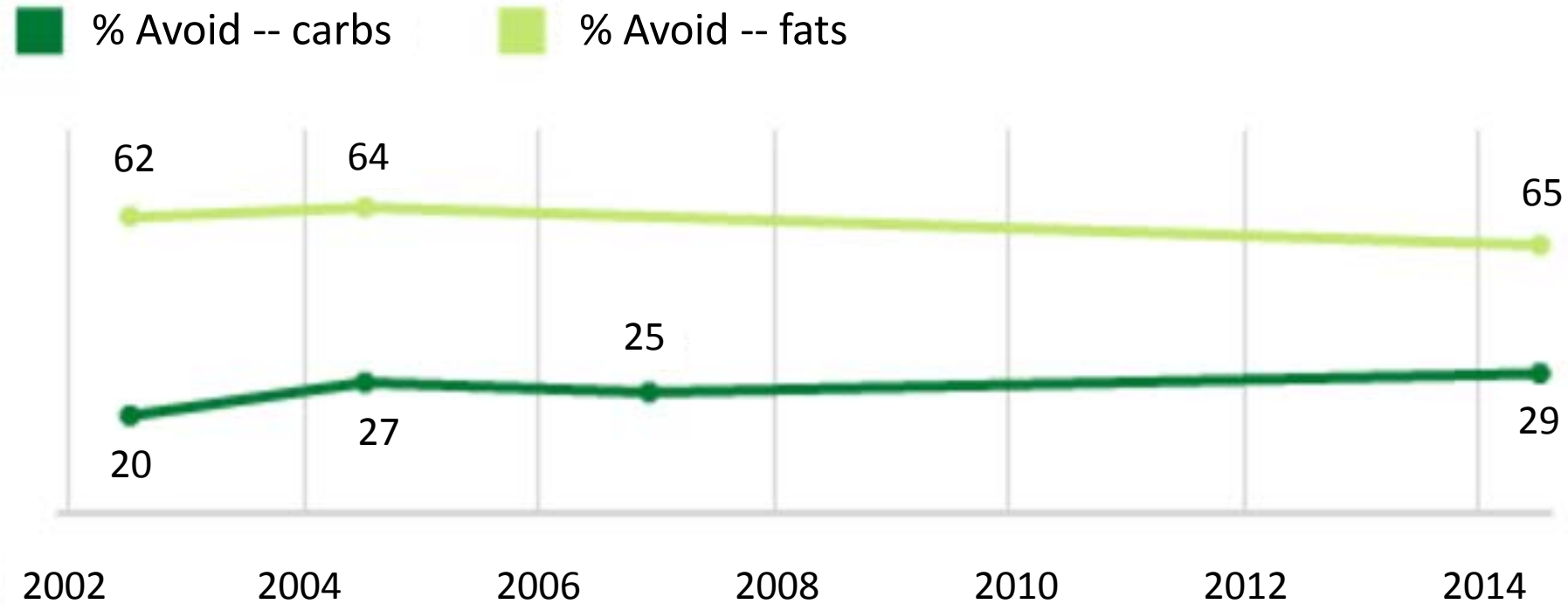
Roadmap

Dietary Fat Phobia – *Dispelling the Myth That All Fats Are Bad*

- Roots of the fat phobia
  - History of dietary guidance to the general public
  - Timeline of dietary guidance to healthcare professionals
- Dietary fat and cardiovascular disease
- Dispelling the myth

Public's Attitudes About Dietary Fat

Is There a Fat Phobia?



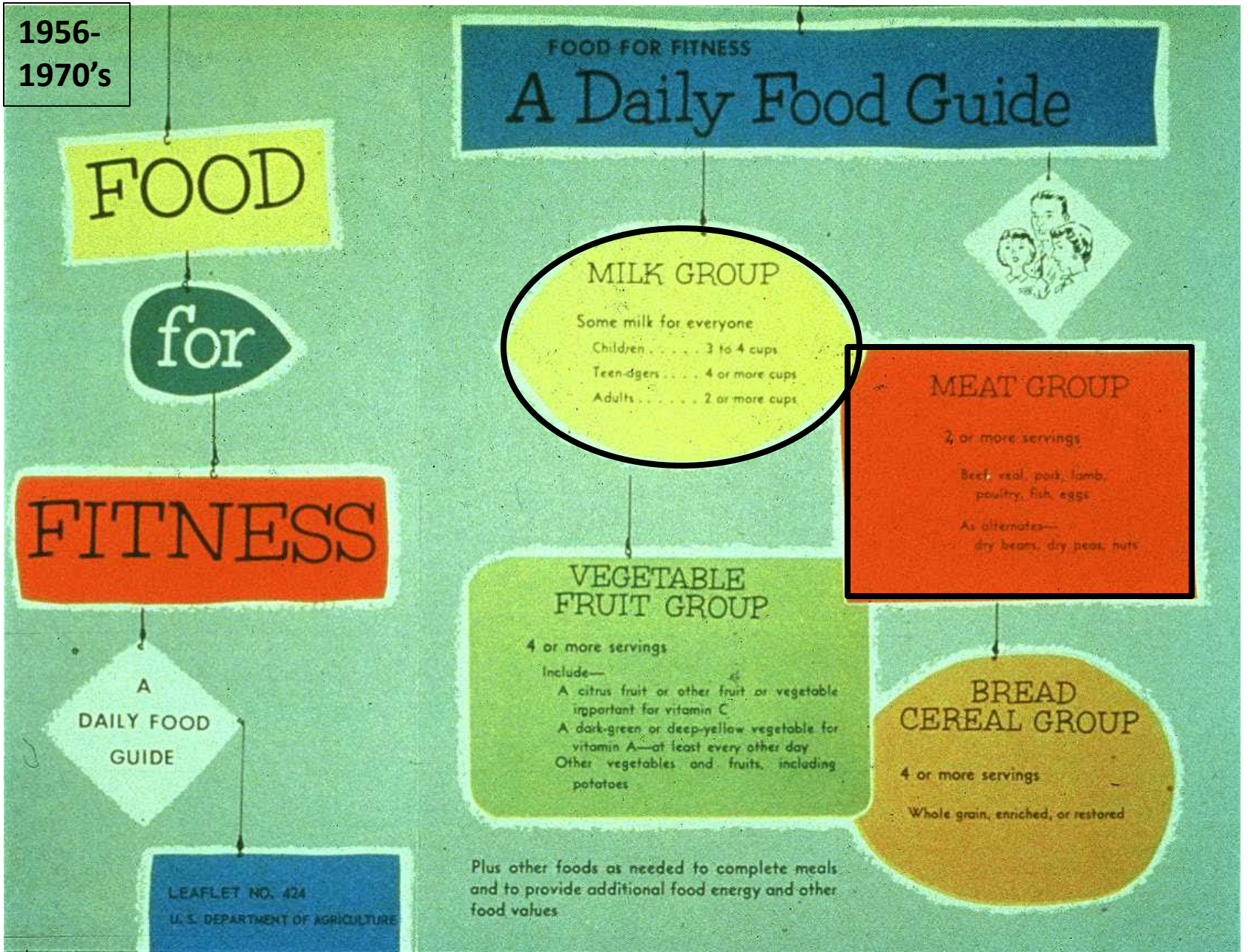
GALLUP July 29, 2014

U.S. Guidance – Eating Patterns

1940's

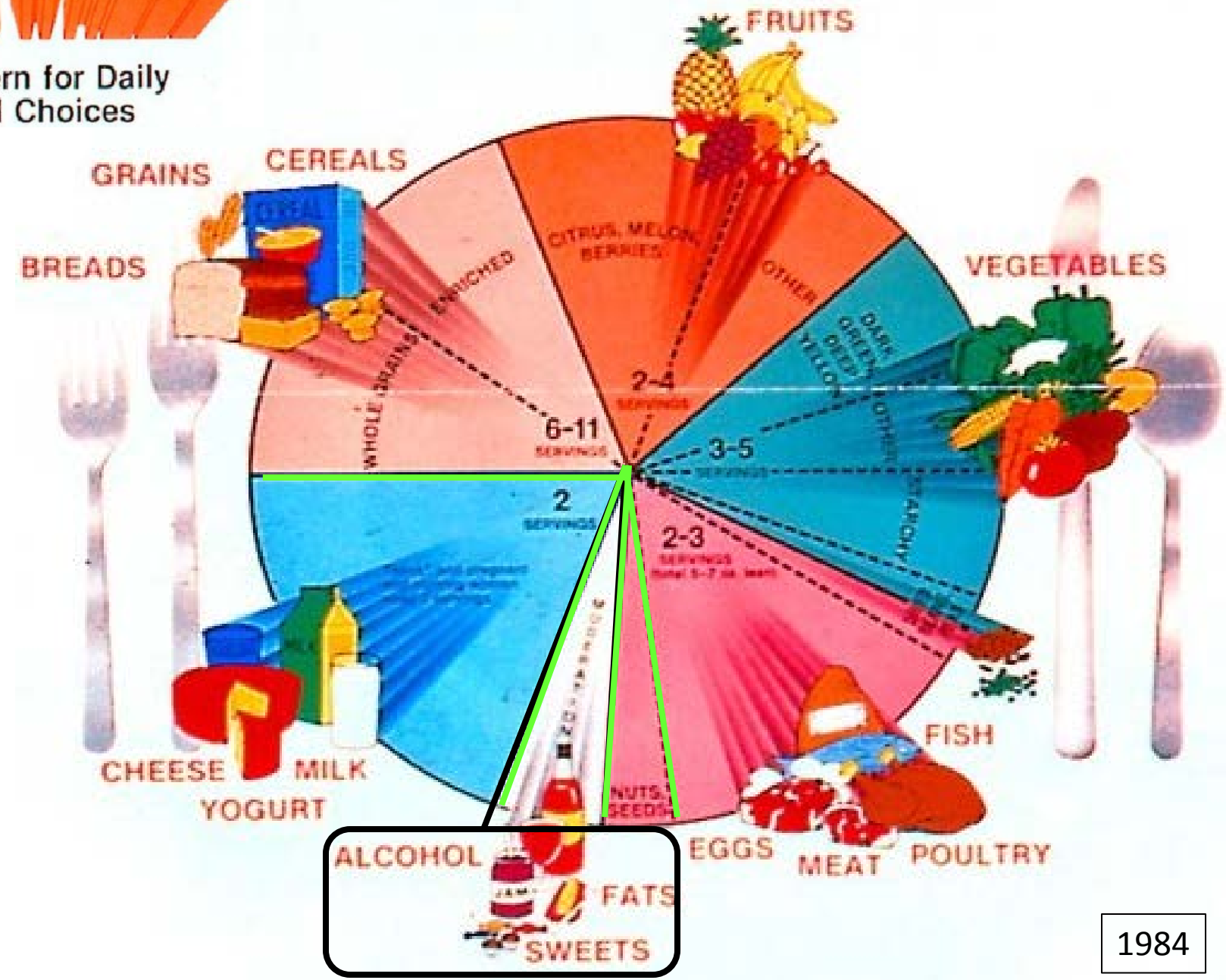
U.S. Guidance – Eating Patterns

1956-1970's



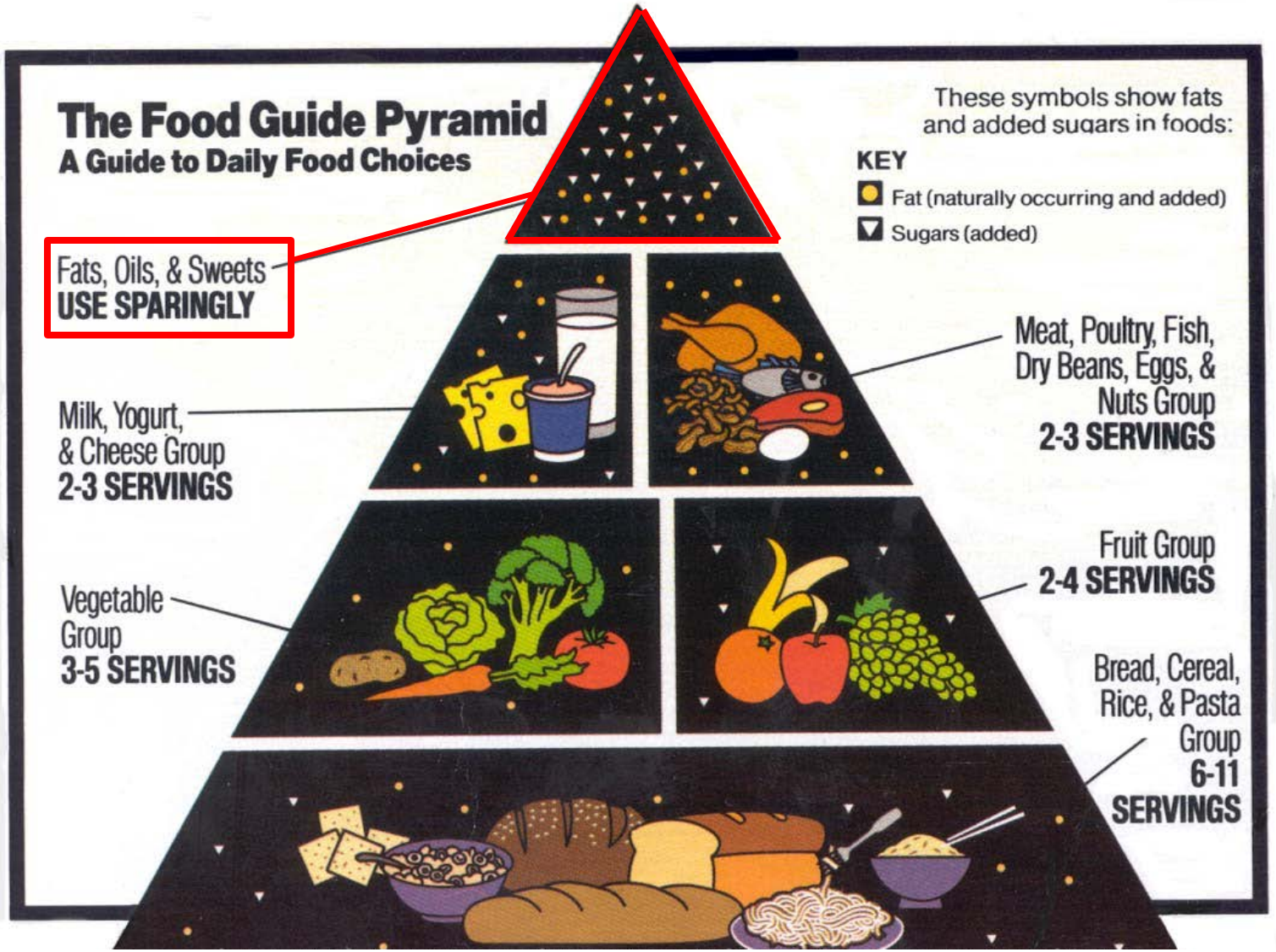
FOOD WHEEL

A Pattern for Daily Food Choices



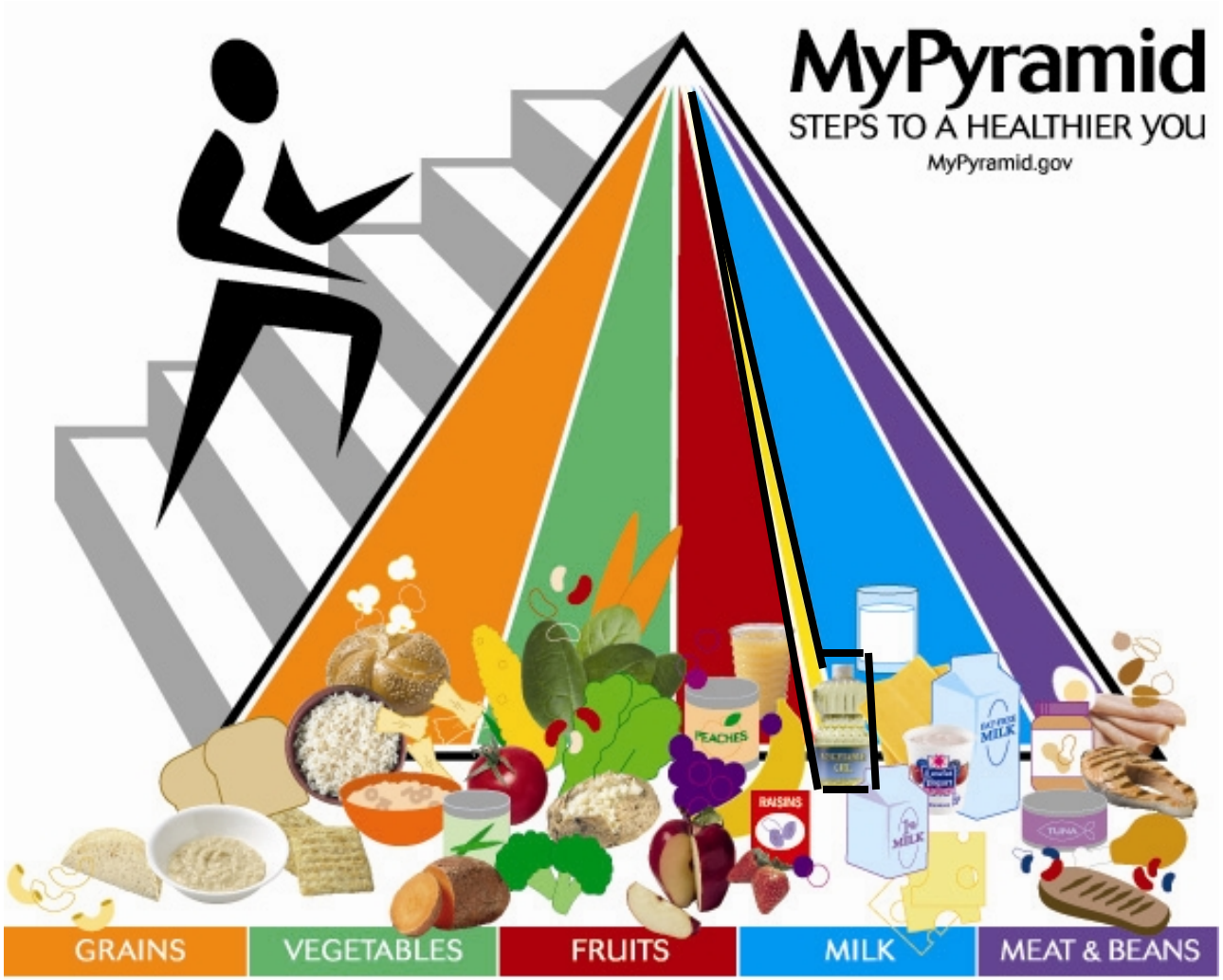
1984

U.S. Guidance – Food Guide Pyramid

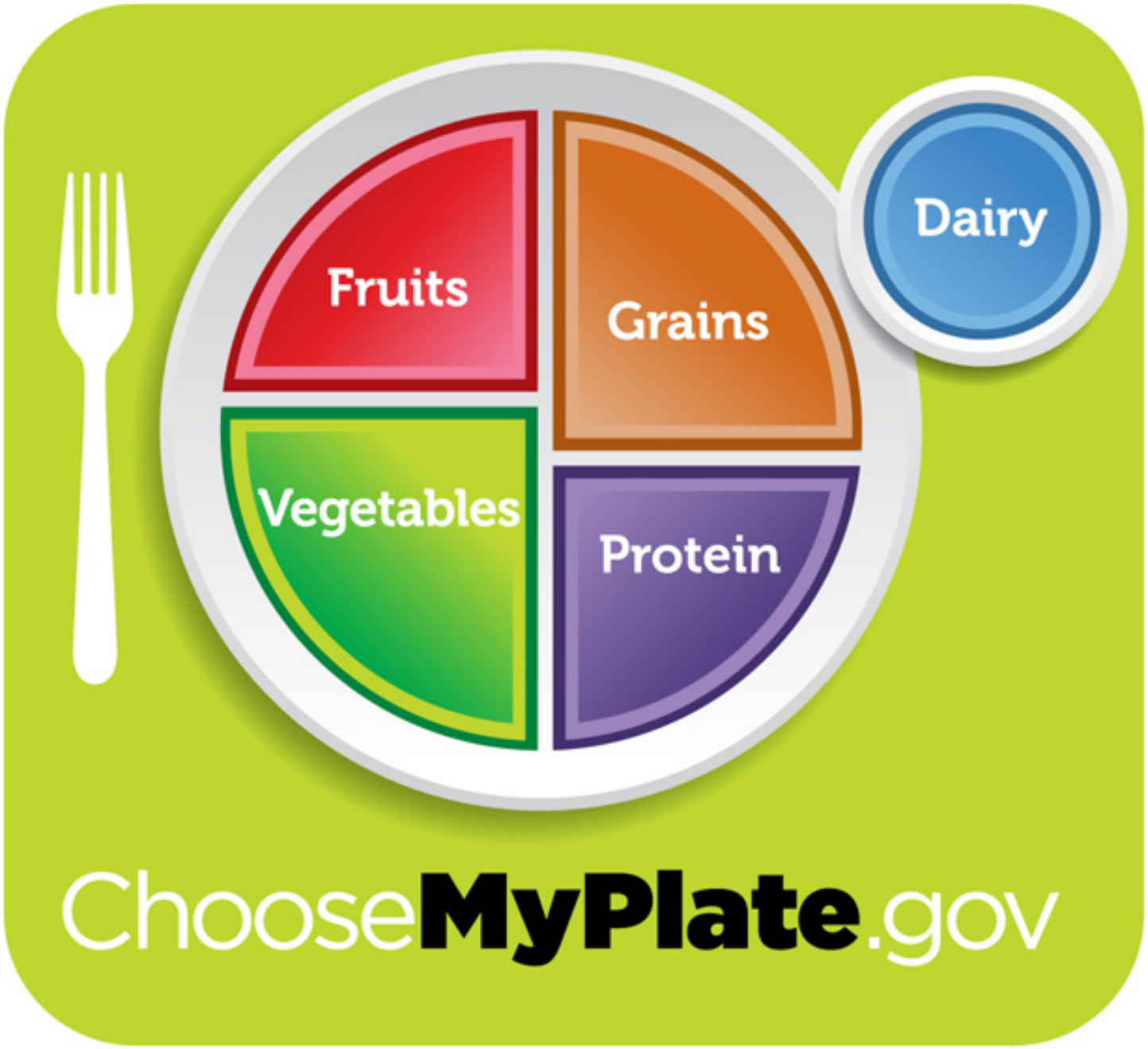


1992

U.S. Guidance – Food Guide Pyramid

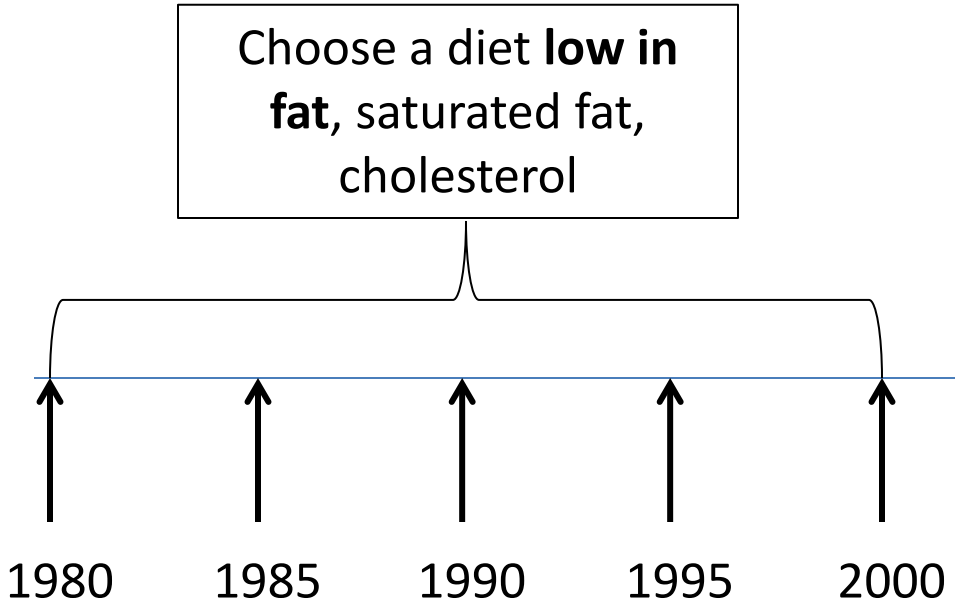


2005

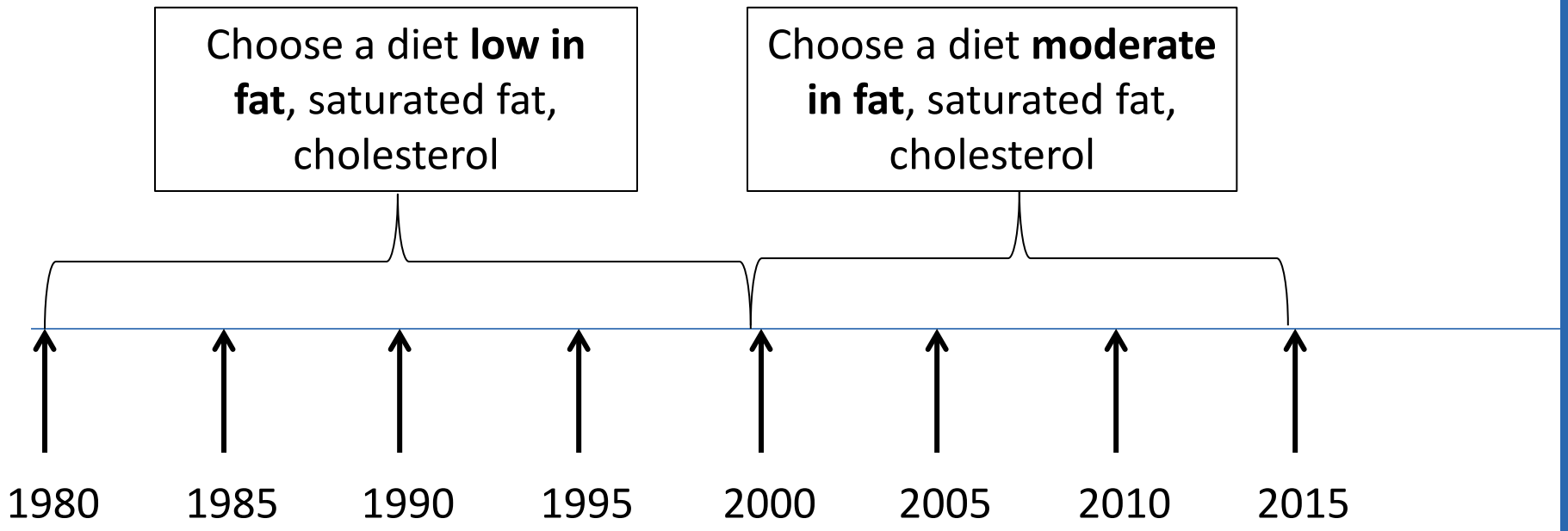

Fruits
Grains
Dairy
Vegetables
Protein
ChooseMyPlate.gov

2011

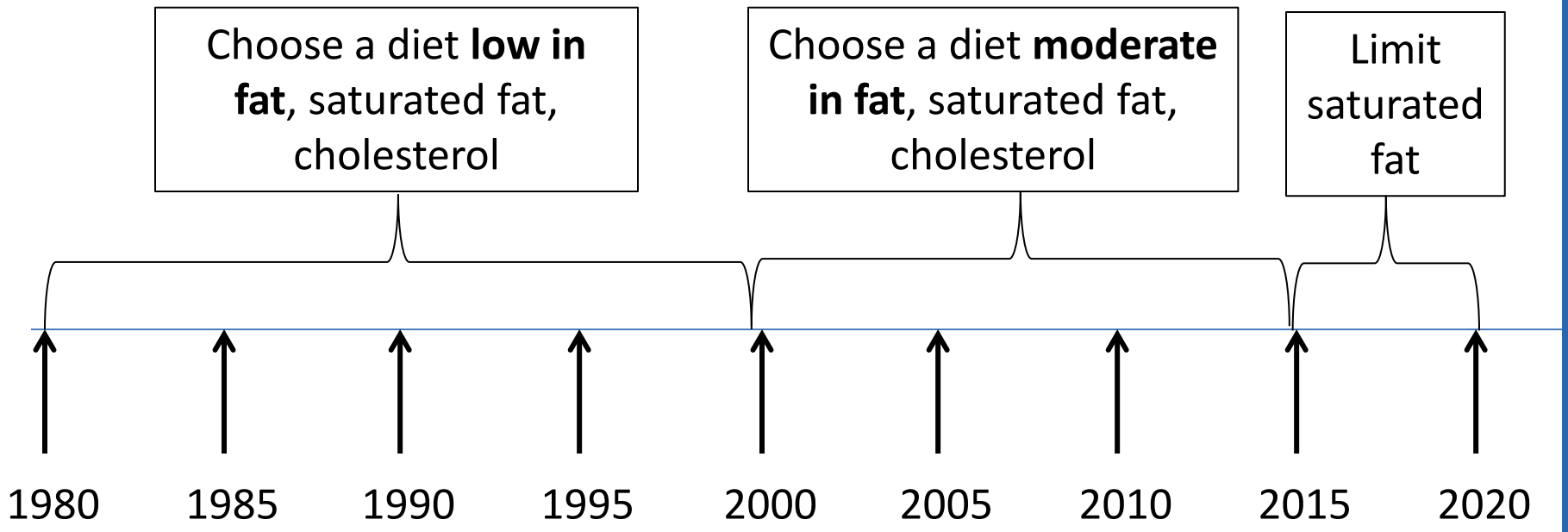
Dietary Guidelines for Americans



Dietary Guidelines for Americans



Dietary Guidelines for Americans

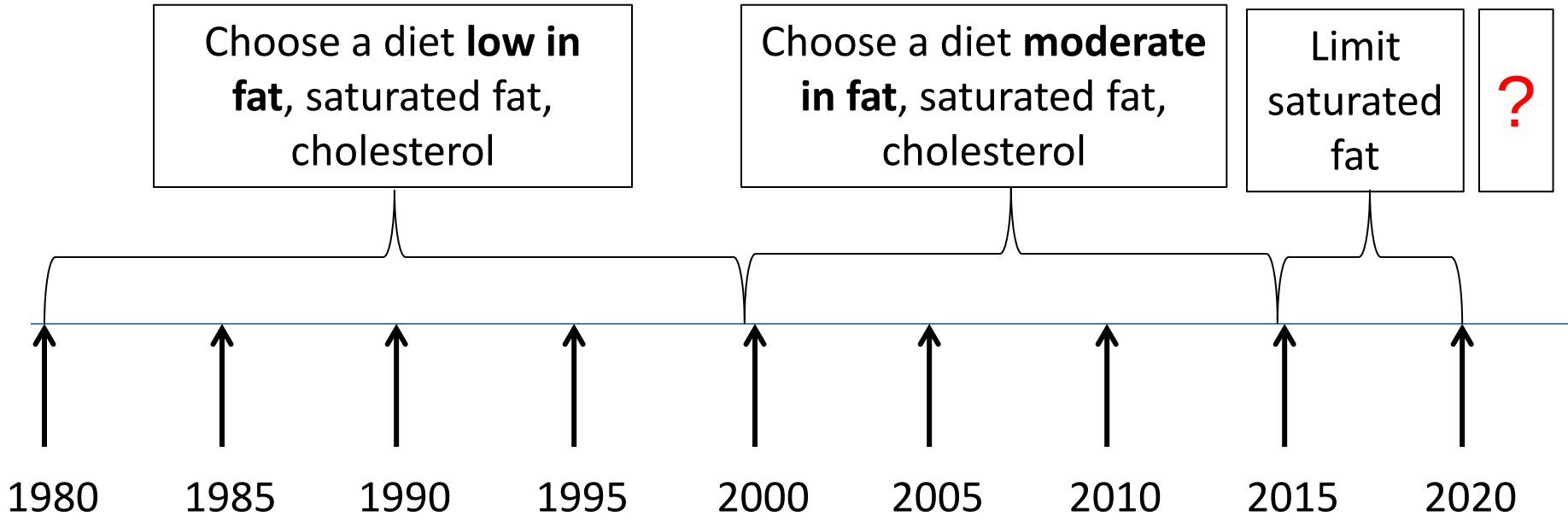


2015 Dietary Guidelines for Americans

A healthy eating pattern includes:

2015

Dietary Guidelines for Americans



U.S. Guidance Related to Dietary Fat

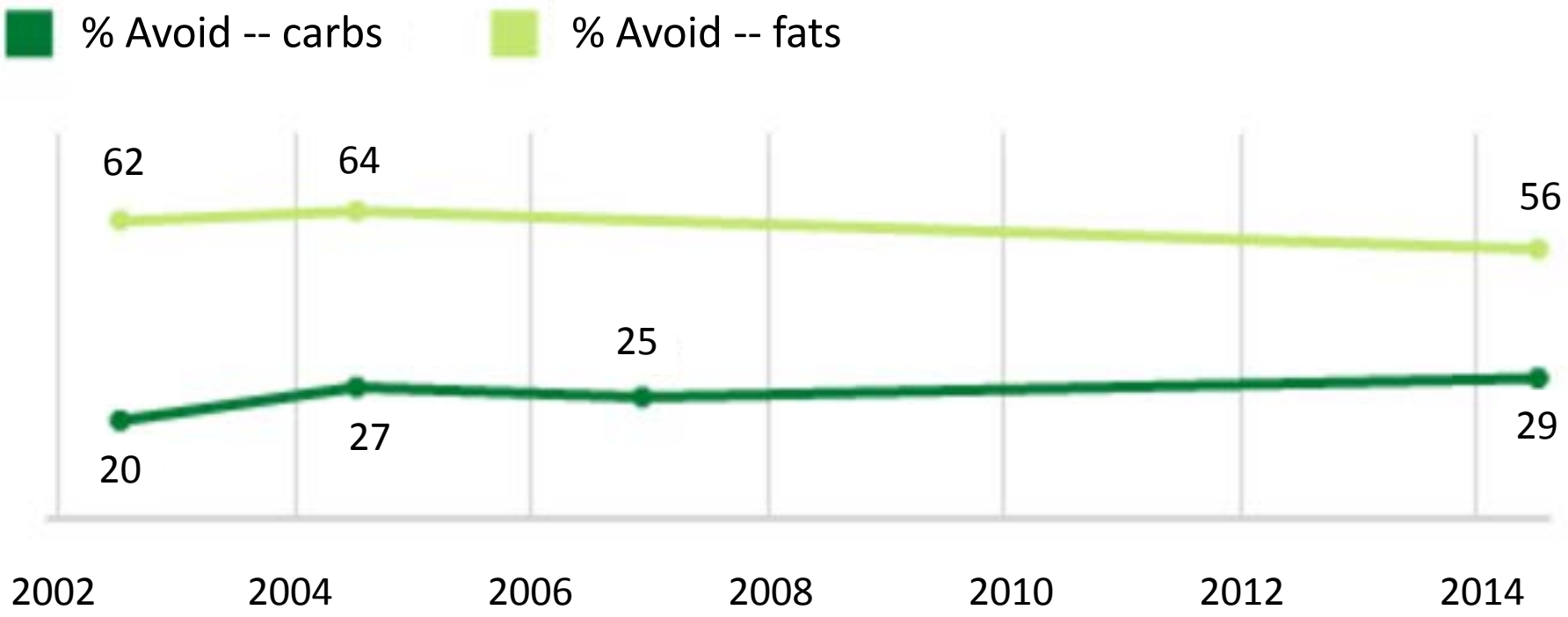
- NCEP (National Cholesterol Education Program, NHLBI)
  - Step I diet (1988)
    - **<30% energy fat**
  - Step II diet (1993)
    - **<30% energy fat**
  - TLC (therapeutic lifestyle change) diet (2002)
    - **25% to 35% energy fat**

U.S. Guidance Related to Dietary Fat

- AHA/ACC Lifestyle (2013) – Dietary Pattern

Consume a dietary pattern that emphasizes intake of vegetables, fruits, and whole grains; includes low-fat dairy products, poultry, fish, legumes, **non-tropical vegetable oils**, and nuts; and limits intake of sweets, sugar-sweetened beverages, and red meats.

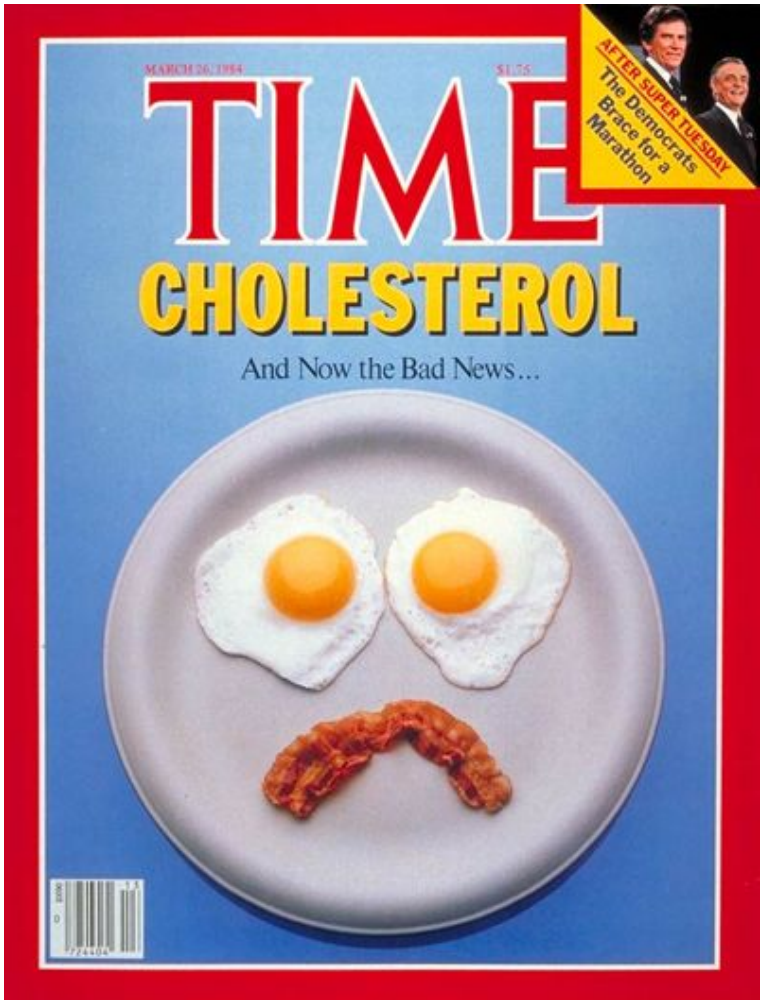
Public's Attitudes About Dietary Fat



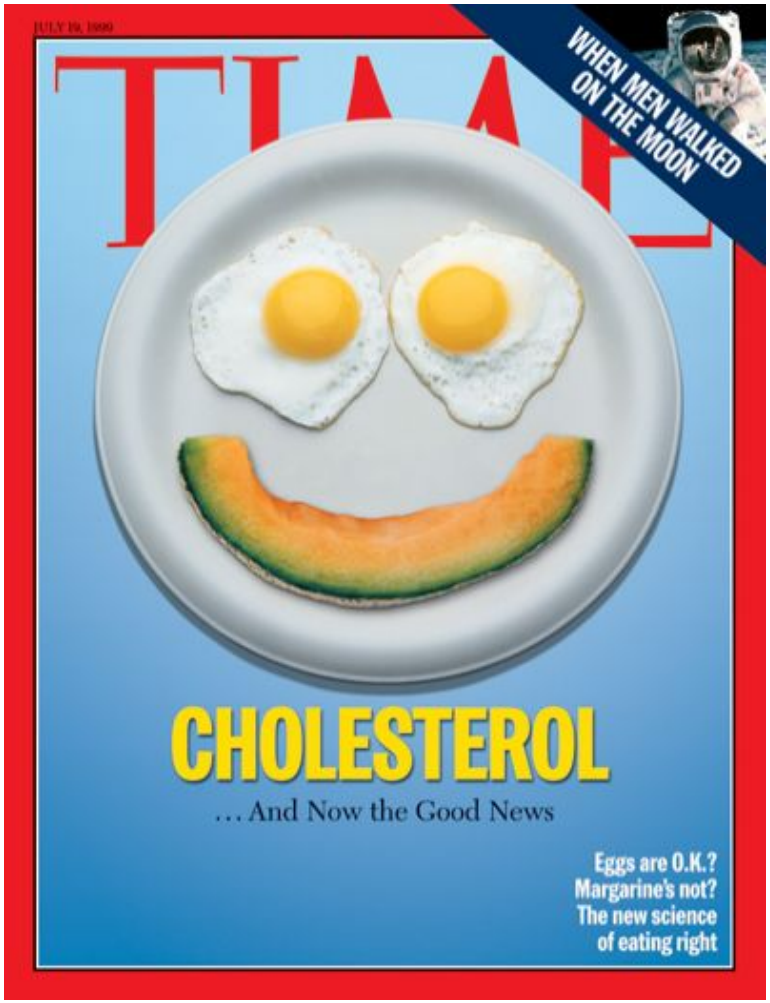
GALLUP July 29, 2014

Are Americans Confused About Dietary Fat?

Are Americans Confused About Dietary Fat?



March 26, 1984



Nov. 28, 2015

Contributors to Confusion About Dietary Fat

Terminology confusion;

- Type of fat
  - Saturated/unsaturated
  - SFA, MUFA, PUFA
- PUFA
  - N-6 FA and n-3 FA
- Unsaturated
  - MUFA and PUFA
  - *Cis*-double and *trans*-double bond containing FA

Contributors to Confusion About Dietary Fat

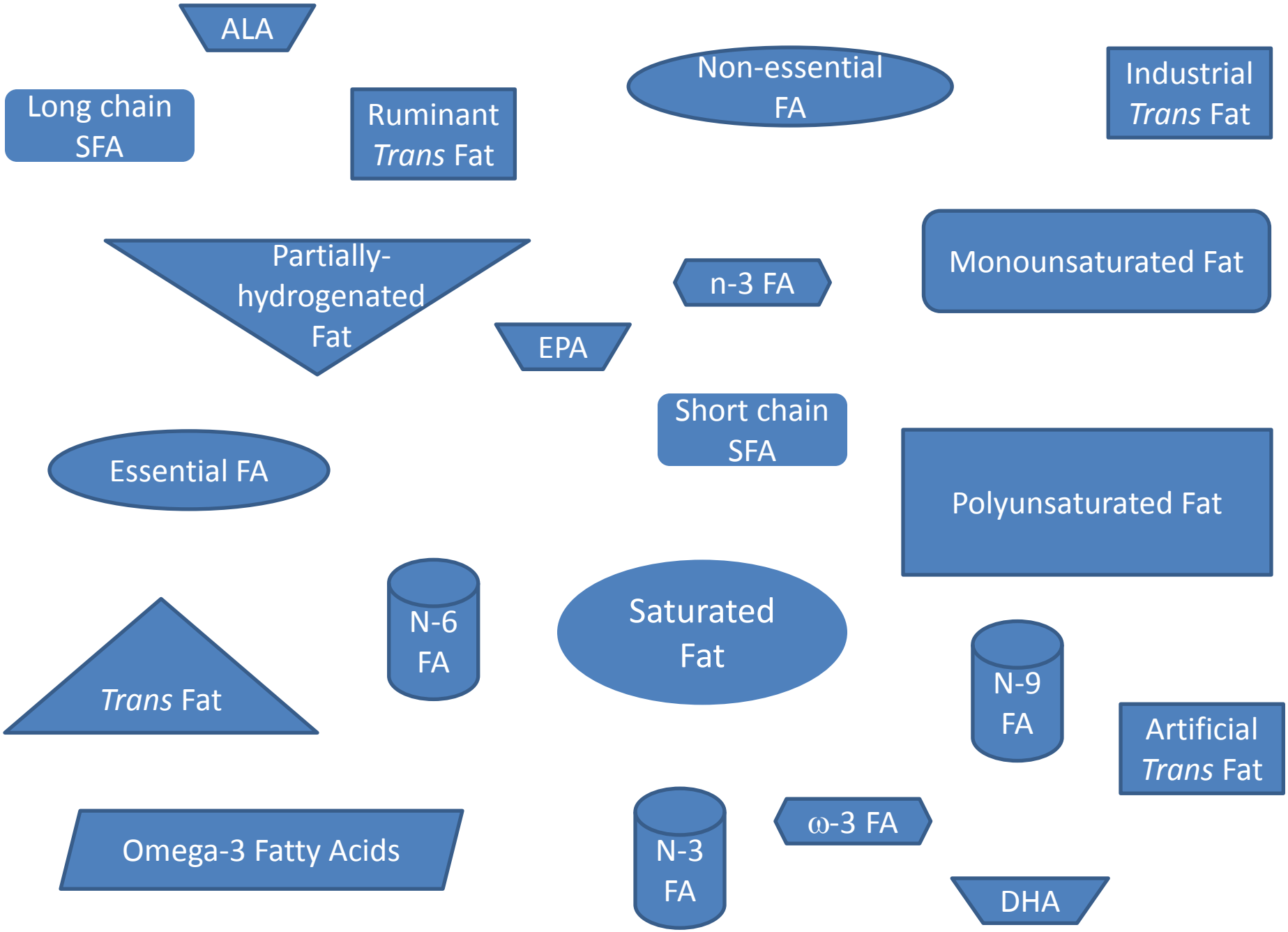
Terminology confusion;

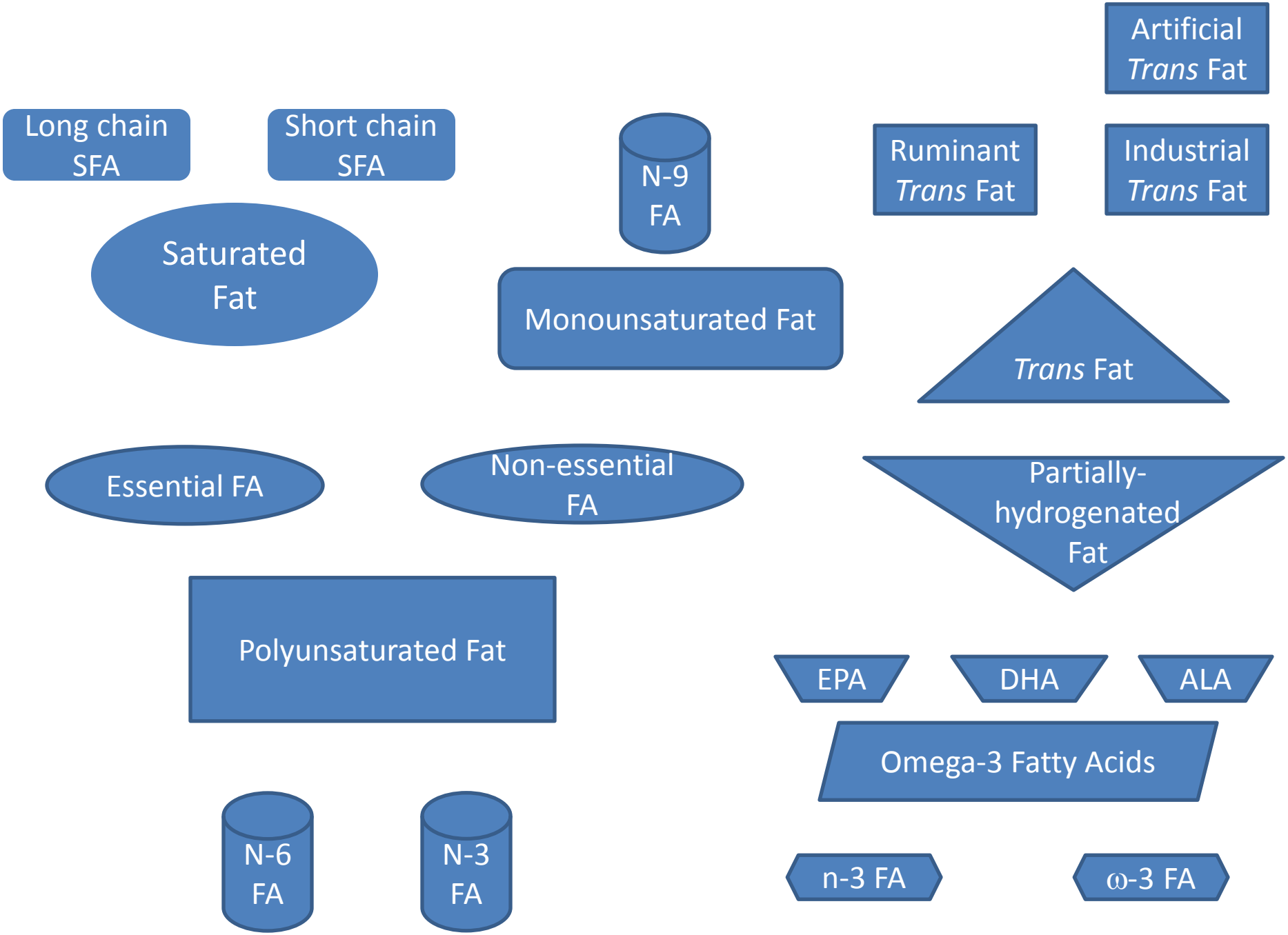
- Vegetable oils
- Plant oils
- Tropical oils
- Non-tropical vegetable oils
- Liquid vegetable oils
- Selectively breed vegetable oils
- Genetically modified oils
- Low alpha-linolenic acid oils

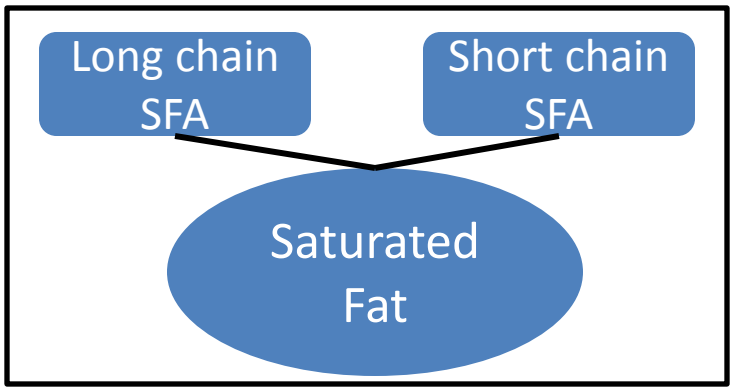
Contributors to Confusion About Dietary Fat

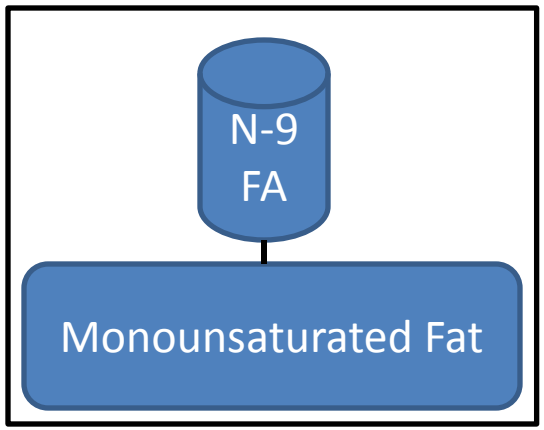
Terminology confusion;

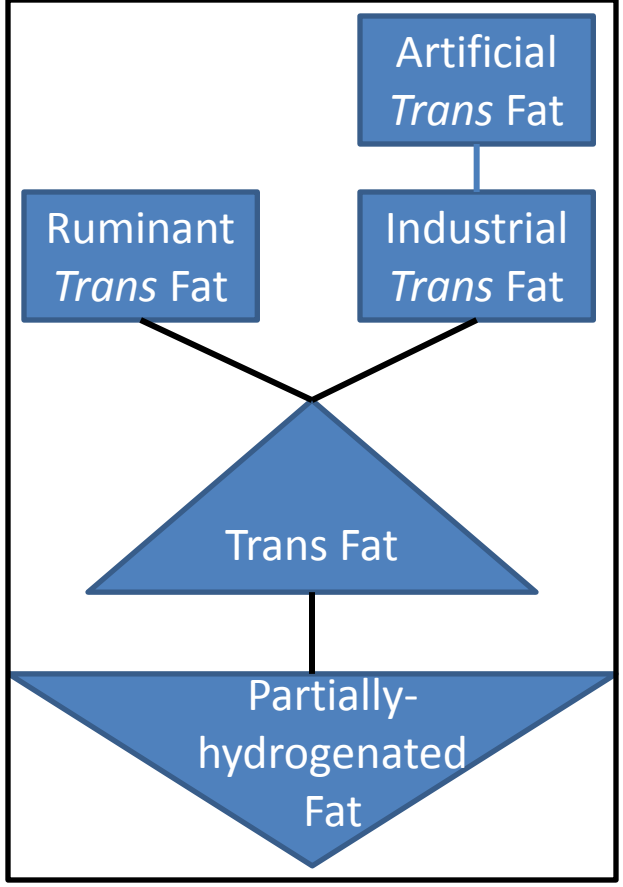
- Animal fat
- Vegetable fat
- Solid fat
- *Trans* fat

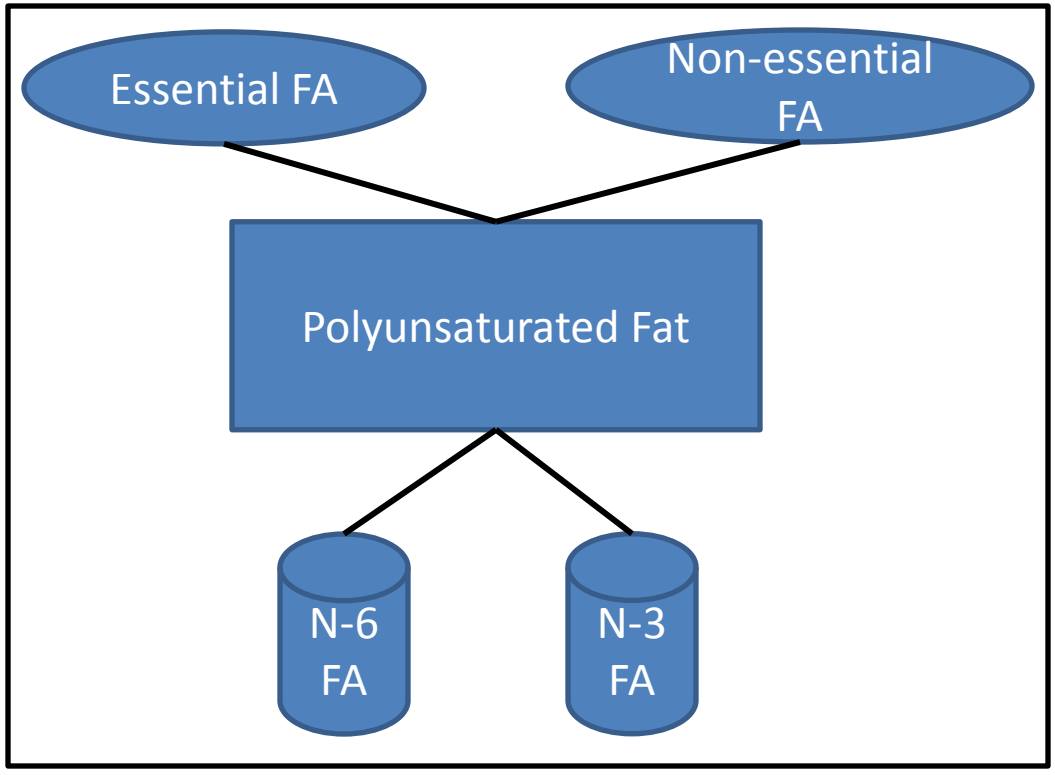

ALA
Non-essential FA
Industrial *Trans* Fat
Long chain SFA
Ruminant *Trans* Fat
Partially-hydrogenated Fat
n-3 FA
Monounsaturated Fat
EPA
Short chain SFA
Essential FA
Polyunsaturated Fat
N-6 FA
Saturated Fat
Trans Fat
N-9 FA
Artificial *Trans* Fat
Omega-3 Fatty Acids
N-3 FA
ω-3 FA
DHA

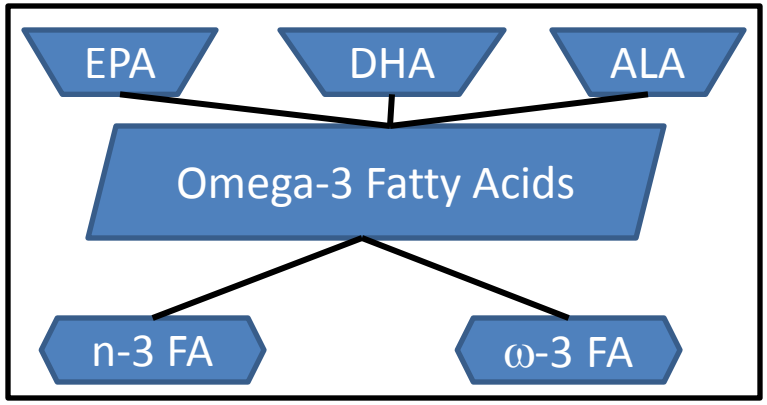

Artificial *Trans* Fat
Long chain SFA
Short chain SFA
N-9 FA
Ruminant *Trans* Fat
Industrial *Trans* Fat
Saturated Fat
Monounsaturated Fat
Trans Fat
Essential FA
Non-essential FA
Partially-hydrogenated Fat
Polyunsaturated Fat
EPA
DHA
ALA
Omega-3 Fatty Acids
N-6 FA
N-3 FA
n-3 FA
ω-3 FA


Long chain SFA
Short chain SFA
Saturated Fat


N-9 FA
Monounsaturated Fat


Artificial *Trans* Fat
Ruminant *Trans* Fat
Industrial *Trans* Fat
Trans Fat
Partially-hydrogenated Fat


Essential FA
Non-essential FA
Polyunsaturated Fat
N-6 FA
N-3 FA

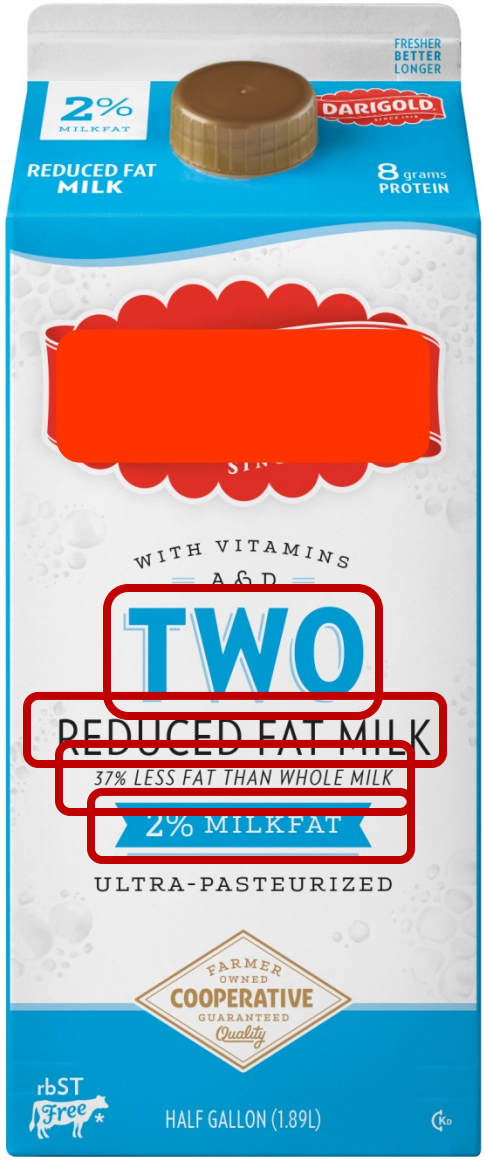

EPA
DHA
ALA
Omega-3 Fatty Acids
n-3 FA
ω-3 FA

Contributors to Confusion About Dietary Fat

Nutrient labeling –

- 2% milk
- Reduced fat

Contributors to Confusion About Dietary Fat



Nutrition Facts

Serving Size 1 Cup (240mL)

Amount per Serving	
Calories 130	Fat Cal 45
	%Daily Value
Total Fat 5g	**8%**
Saturated Fat 3g	**15%**
Trans Fat 0g	
Cholesterol 20mg	**7%**
Sodium 120mg	**5%**
Potasium 360mg	**10%**
Total Carbohydrate 12g	**4%**
Dietary Fiber 0g	**0%**
Sugars 11g	
Protein 8g	**16%**

Vitamin A 10% • Vitamin C 0%

Calcium 30% • Iron 0%

Vitamin D 25%

Why All the Confusion About?

The New York Times

The Opinion Pages | CONTRIBUTING OP-ED WRITER

Butter Is Back

MARCH 25, 2014

Mark Bittman

Replacing sat fat with polyunsaturated fats is 'questionable'

Nathan Gray, June 30, 2014
FOODNavigator.com

The Washington Post | Politics | Opinions

Health & Science

Lard may not be as bad for your health as the fat's detractors say

By Gisela Telis, Published: April 17, 2013

The New York Times

Once a Villain, Coconut Oil Charms the Health Food World

March 1, 2011 - By MELISSA CLARK

EurekAlert! The Global Source for Science News | AAAS

HOME NEWS MULTIMEDIA MEETINGS PORTALS ABOUT

PUBLIC RELEASE: 2-DEC-2016

Saturated fat could be good for you

A Norwegian study challenges the long-held idea that saturated fats are unhealthy

THE UNIVERSITY OF BERGEN

Daily News & Analysis
December 4, 2016

Systematic Review – Dietary Factors and Coronary Heart Disease

Evidence of a Causal Association From Cohort Studies	Cohort Data Only	Supported by RCTs
Weak		
Supplementary vitamin E		Yes
Supplementary ascorbic acid		Yes
Total fat		Yes
Saturated fatty acids	✔	
Polyunsaturated fatty acids		Yes
ω-3 Fatty acids, total		No[f]
Meat	✔	
Eggs	✔	
Milk	✔	

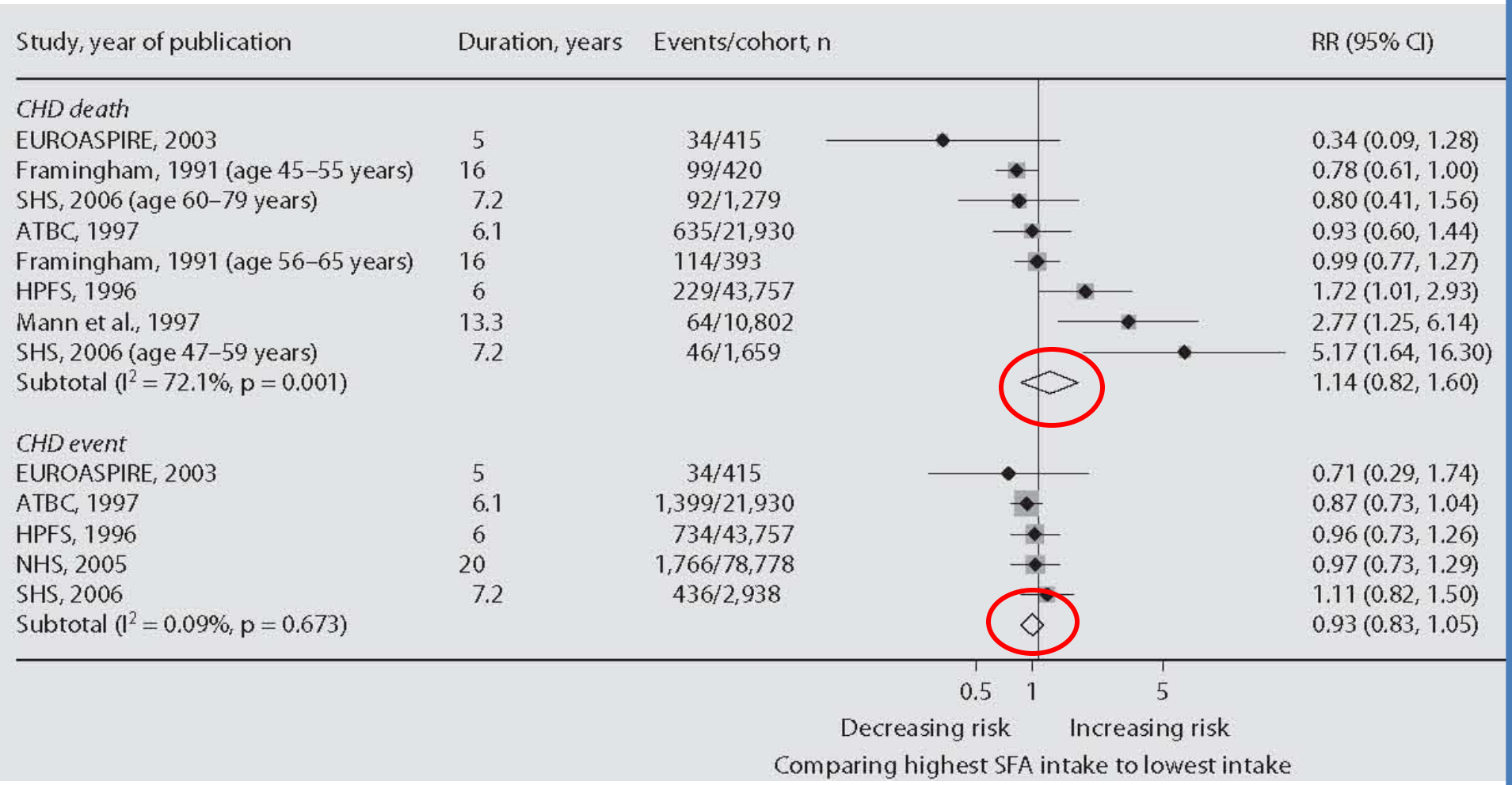
Mente A. et al. Arch Intern Med 2009;169:659-669

Systematic Review – Dietary Factors and Coronary Heart Disease

Evidence of a Causal Association From Cohort Studies	Cohort Data Only	Supported by RCTs
Strong		
"Mediterranean" diet[b]		Yes
High-quality diet	✓	
Vegetables	✓	
Nuts	✓	
Trans–fatty acids	✓	
Glycemic index or load	✓	
"Prudent" diet[c, d]	✓	
"Western" diet[d, e]	✓	
Monounsaturated fatty acids[d]	✓	

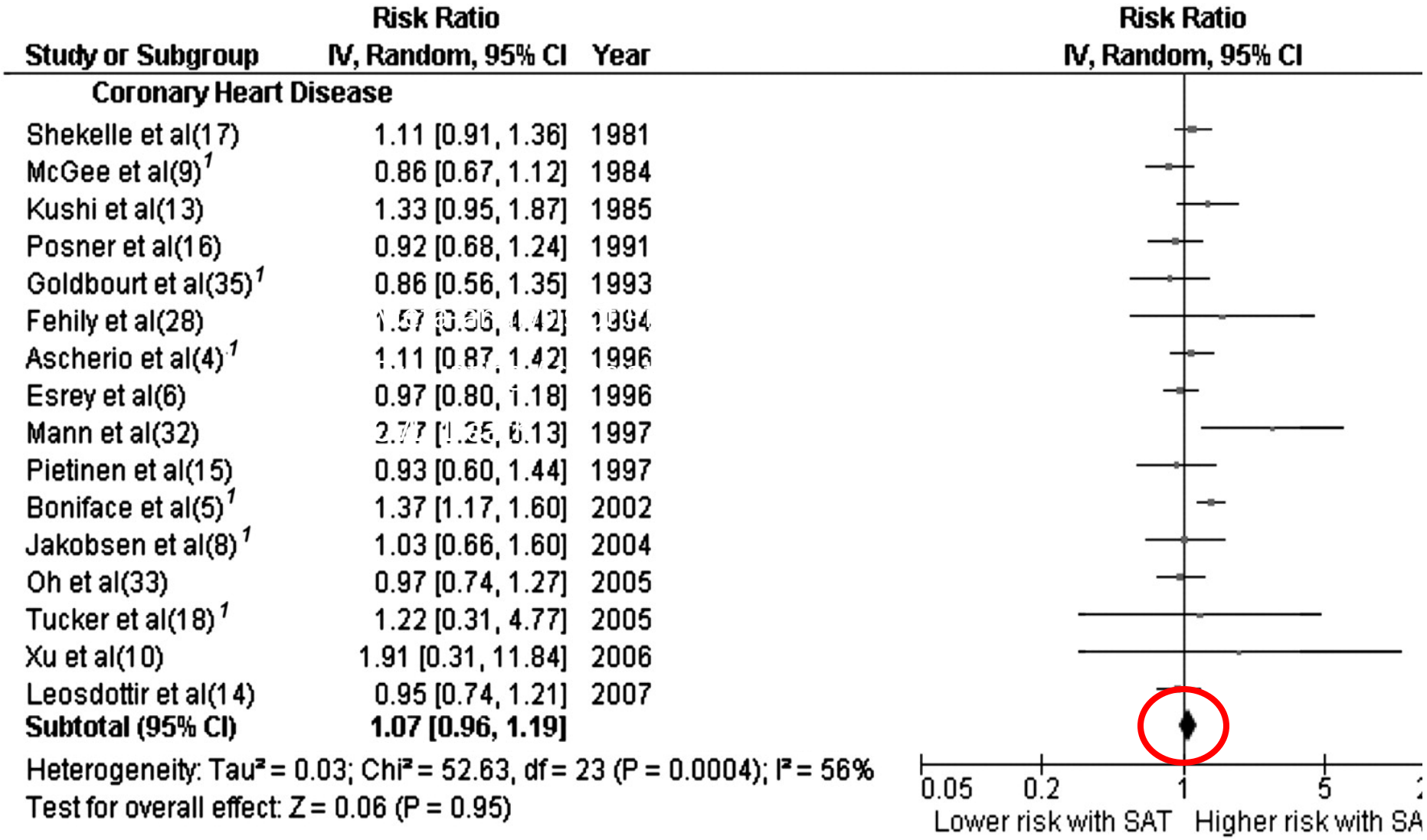
Mente A. et al. Arch Intern Med 2009;169:659-669

Meta-analysis of Prospective Cohorts for SFA and CHD



Skeaff CM, Miller J. Ann Nutr Metab 2009;55:173

Meta-analysis of Prospective Cohorts for SFA and CHD



Siri-Tarino, PW, et al. Am J Clin Nutr 2010;91:535-546

Review | Annals of Internal Medicine

Association of Dietary, Circulating, and Supplement Fatty Acids With Coronary Risk

A Systematic Review and Meta-analysis

Rajiv Chowdhury, MD, PhD; Samantha Warnakula, MPhil*; Setor Kunutsor, MD, MSt*; Francesca Crowe, PhD; Heather A. Ward, PhD; Laura Johnson, PhD; Oscar H. Franco, MD, PhD; Adam S. Butterworth, PhD; Nita G. Forouhi, MRCP, PhD; Simon G. Thompson, FMedSci; Kay-Tee Khaw, FMedSci; Dariush Mozaffarian, MD, DrPH; John Danesh, FRCP*; and Emanuele Di Angelantonio, MD, PhD*

Ann Intern Med. 2014;160:398-406

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

The New York Times

Study Questions Fat and Heart Disease Link

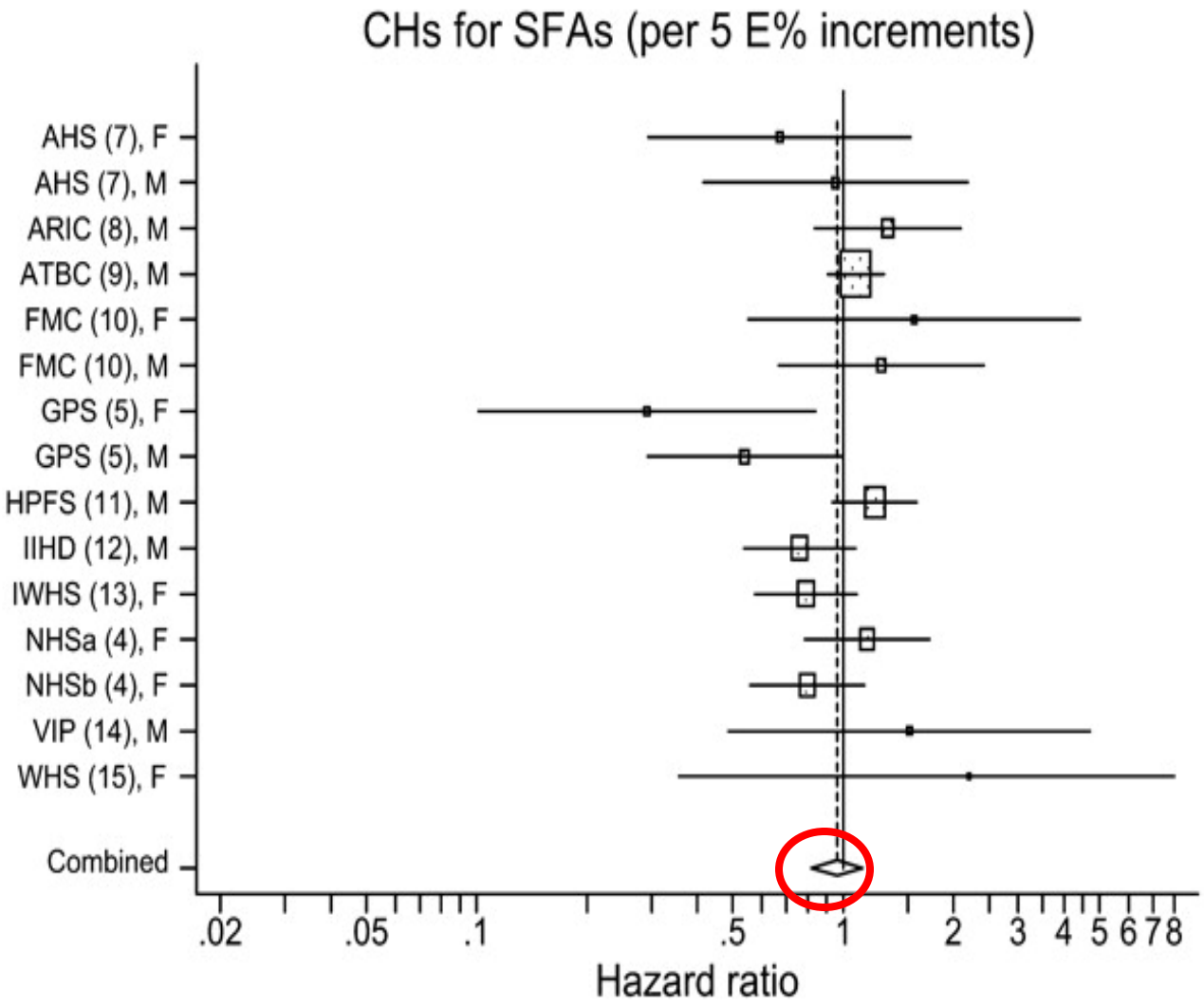
BY ANAHAD O'CONNOR MARCH 17, 2014 5:00 PM 483

CBS NEWS

By RYAN JASLOW / CBS NEWS / *March 18, 2014, 12:22 PM*

Saturated fats not so bad for heart after all?

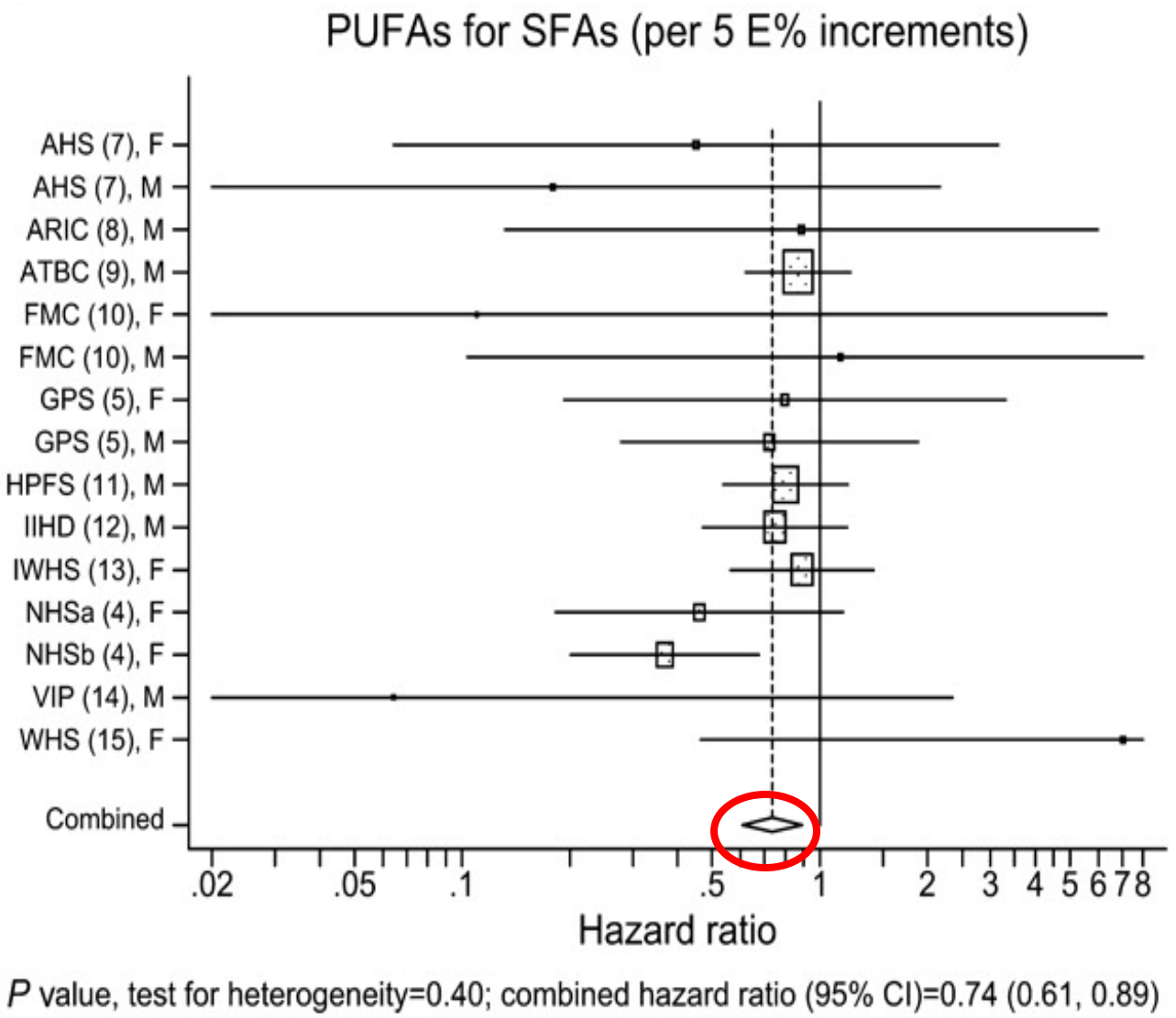
Major Types of Dietary Fat and Risk of Coronary Heart Disease: A Pooled Analysis of 11 Cohort Studies



P value, test for heterogeneity=0.05; combined hazard ratio (95% CI)=0.96 (0.82, 1.13)

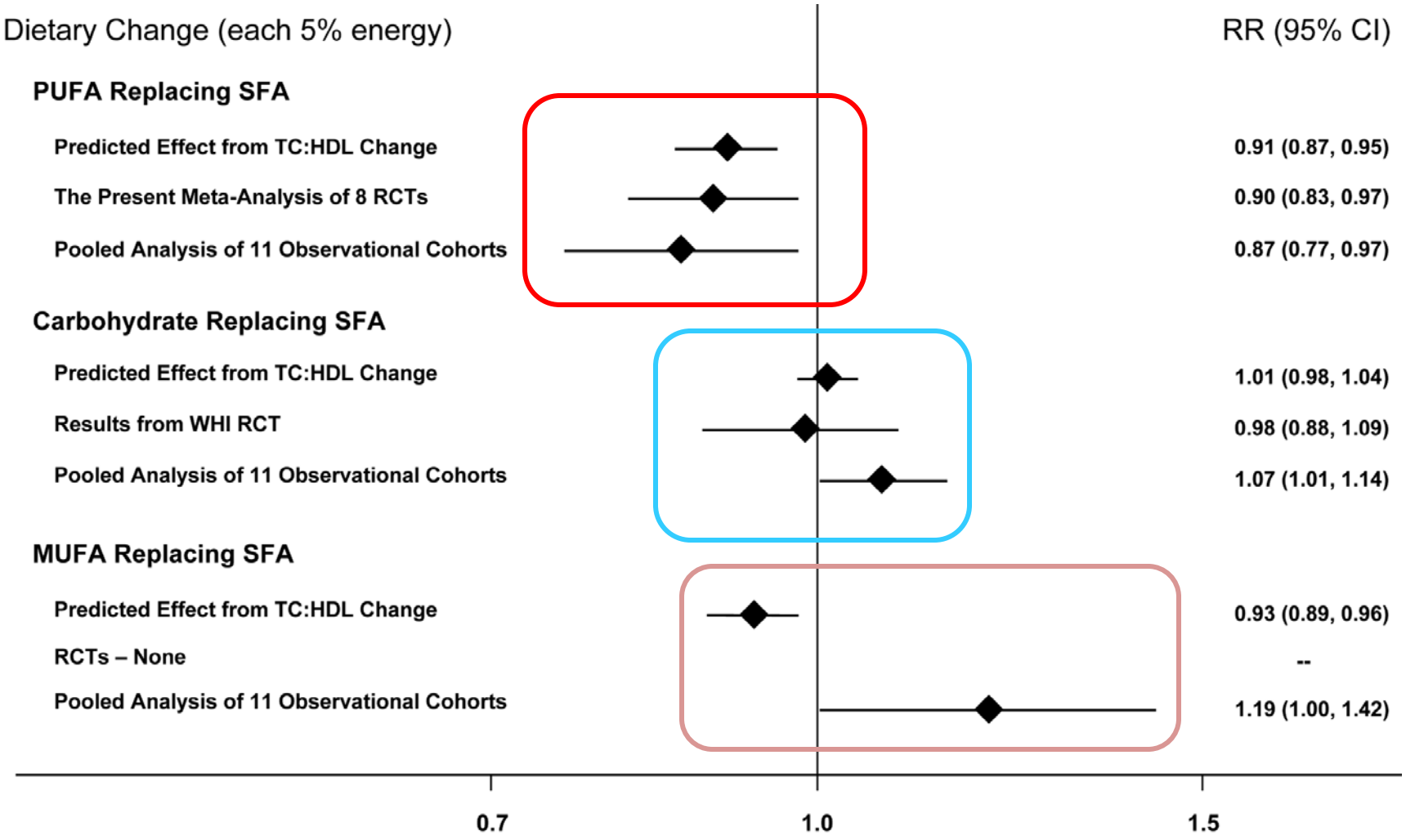
Jakobsen, M. U et al. Am J Clin Nutr 2009;89:1425-1432

Major Types of Dietary Fat and Risk of Coronary Heart Disease: A Pooled Analysis of 11 Cohort Studies



Jakobsen, M. U et al. Am J Clin Nutr 2009;89:1425-1432

Meta-analysis of Randomized Controlled Trials – Replacing With PUFA, Carbohydrate, MUFA



Mozaffarian D, et al. PLoS Med. 2010 23;7:e1000252

AHA PRESIDENTIAL ADVISORY

Circulation

Dietary Fat and Cardiovascular Disease

A Presidential Advisory From the American Heart Association

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Alice H. Lichtenstein, DSc, FAHA
Jason H.Y. Wu, PhD, MSc
Lawrence J. Appel, MD, MPH, FAHA
Mark A. Creager, MD, FAHA
Penny M. Kris-Etherton, PhD, RD, FAHA
Michael Miller, MD, FAHA
Eric B. Rimm, ScD, FAHA
Lawrence L. Rudel, PhD, FAHA
Jennifer G. Robinson, MD, MPH, FAHA, Vice Chair
Neil J. Stone, MD, FAHA
Linda V. Van Horn, PhD, RD, FAHA, Vice Chair
On behalf of the American Heart Association

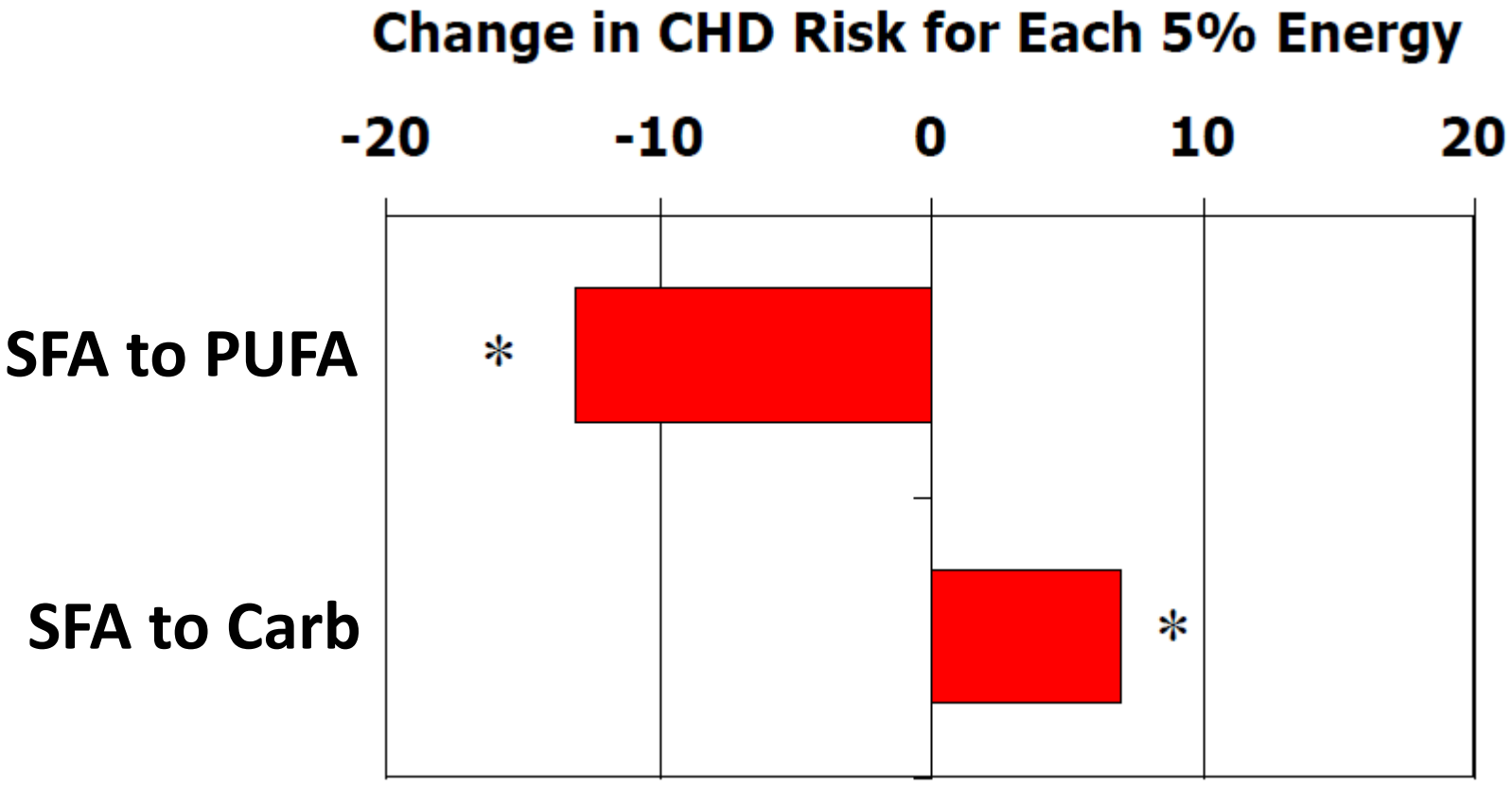
Circulation. 2017;136:e1-e23

“Core” Intervention Studies

- Compared high SFA and PUFA
- Did not use high *trans* fat as major component
- Controlled dietary intake
- At least 2 y in duration
- Biomarkers established difference between groups
- Validated “hard” CVD outcomes

Sacks FM et al. Circulation. 2017;136:e1-e23

Dietary Fat and Risk CHD
A Pooled Analysis of 11 Cohort Studies



N=344,696; CHD events = 5,249; * P<0.05

Sacks FM et al. Circulation. 2017;136:e1-e23

JAMA | Original Investigation

Effect of Low-Fat vs Low-Carbohydrate Diet on 12-Month Weight Loss in Overweight Adults and the Association With Genotype Pattern or Insulin Secretion

The DIETFITS Randomized Clinical Trial

Mean 12-month weight change ($p>0.05$);

- Low fat – 29% energy
- High fat – 45% energy

Gardner CD et al. JAMA 2018;319:667-679

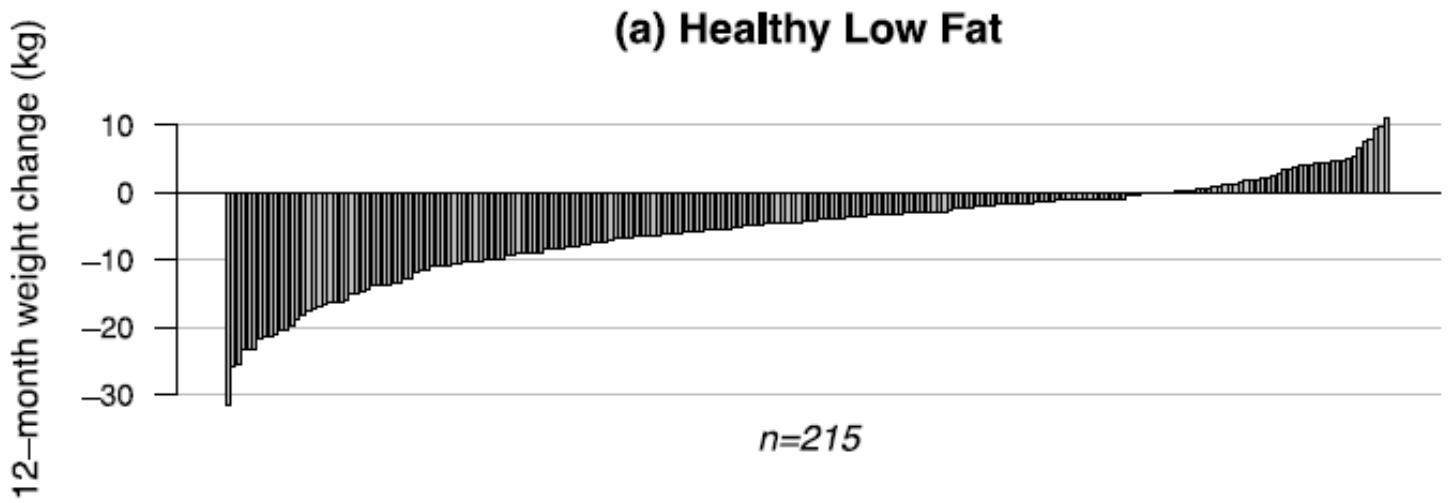
‘Healthy ‘Low Fat and High Fat Diets and Body Weight

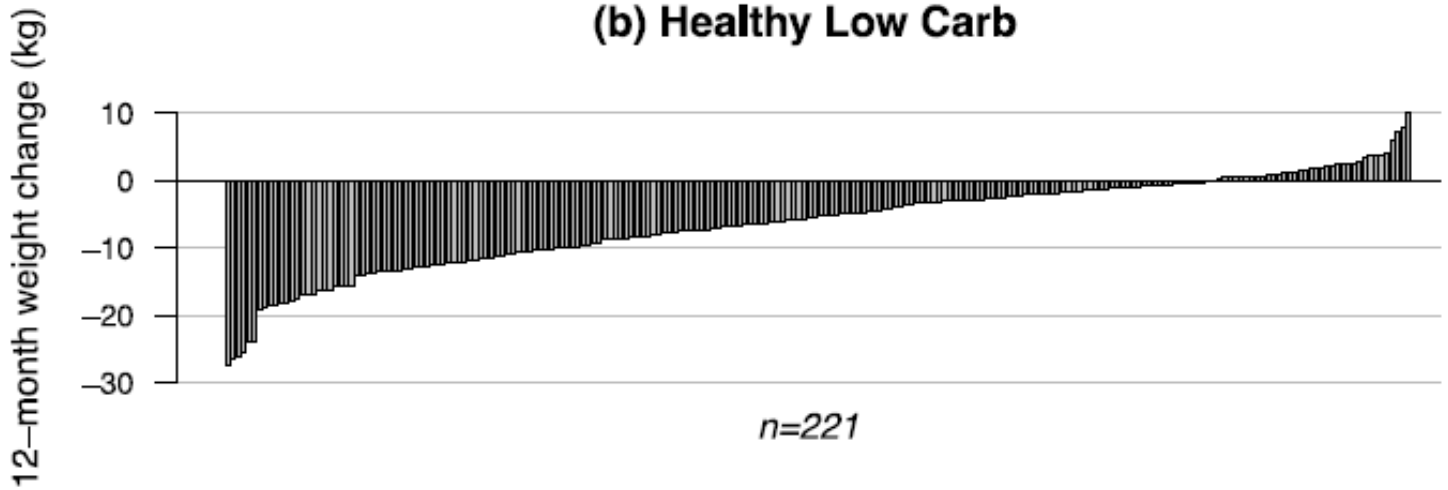
Mean 12-month weight change ($p>0.05$);

- −5.3 kg for the healthy low-fat diet group
- −6.0 kg for the healthy low carbohydrate diet group.

Similar range for weight change, approximately 40 kg, within each group (−30 kg to 10 kg).

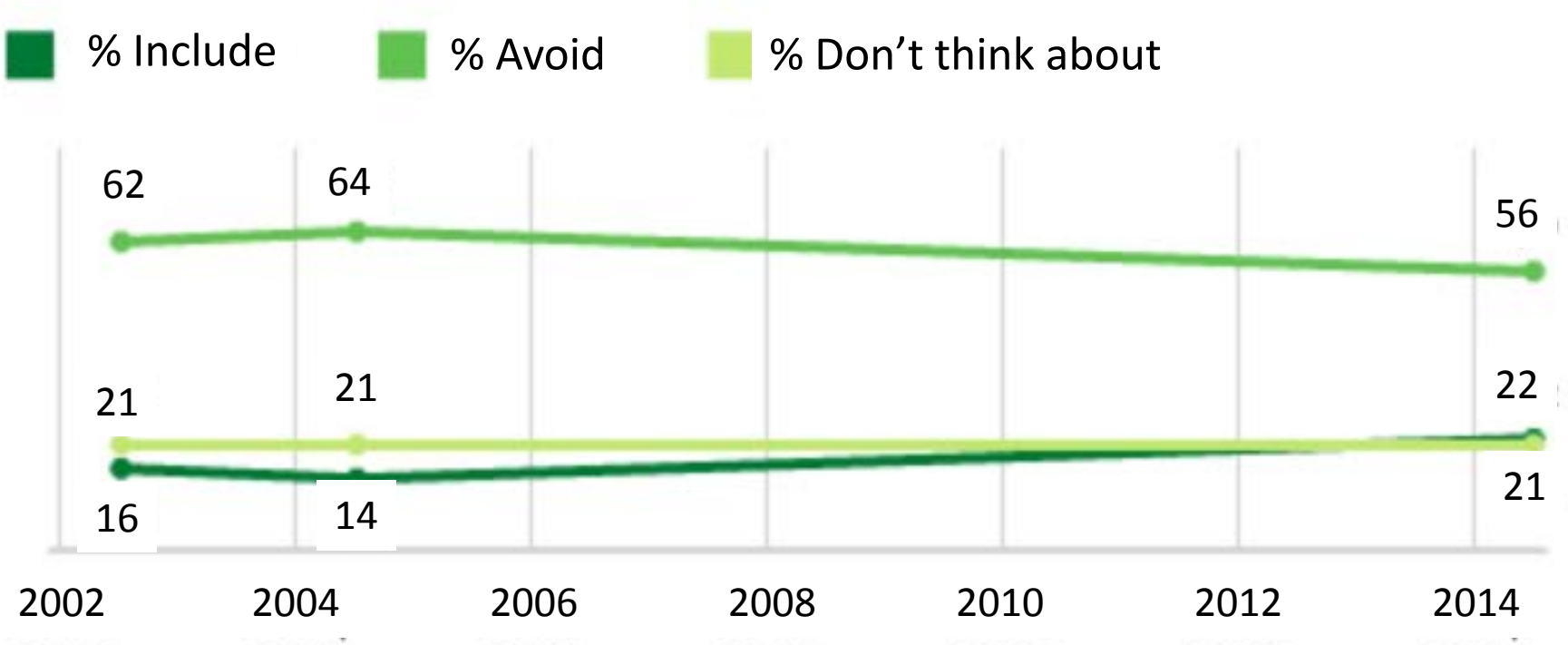
Gardner CD et al. JAMA 2018;319:667-679





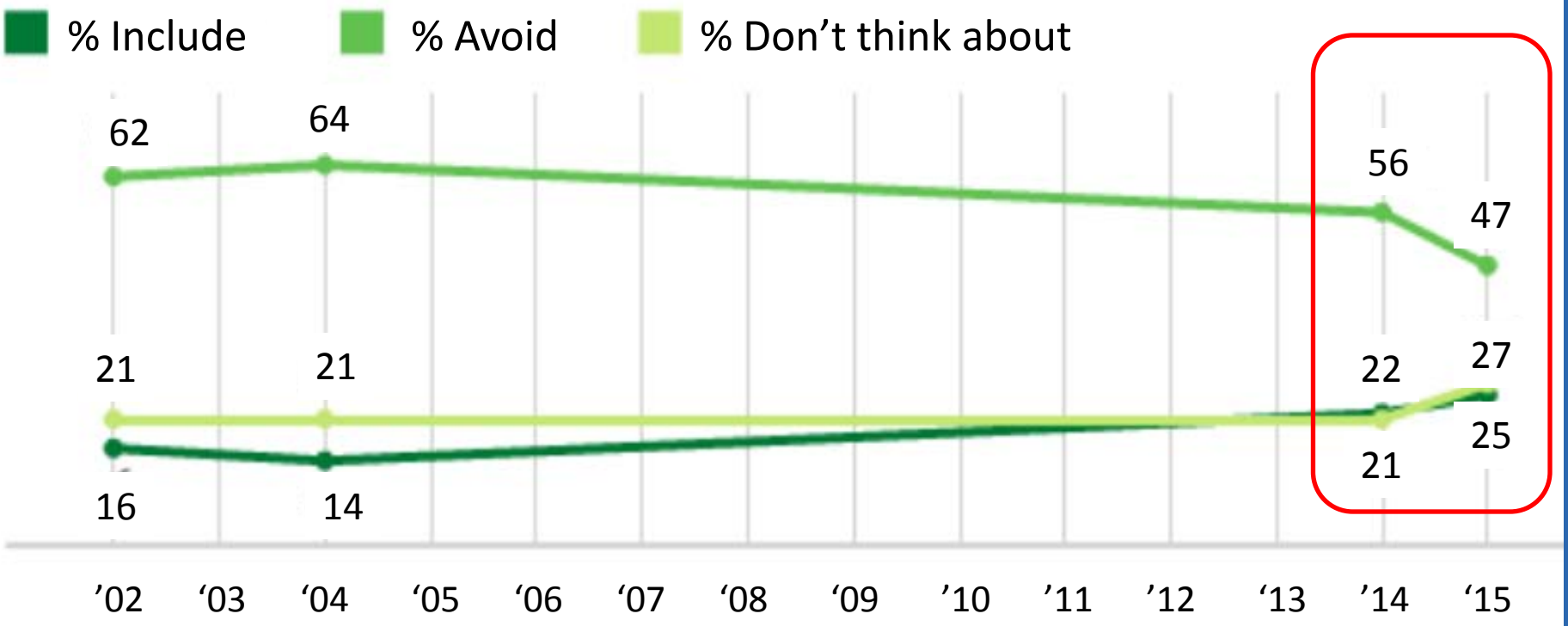
Gardner CD et al. JAMA 2018;319:667-679

Public's Attitudes About Dietary Fat



GALLUP July 29, 2014

Public's Attitudes About Dietary Fat

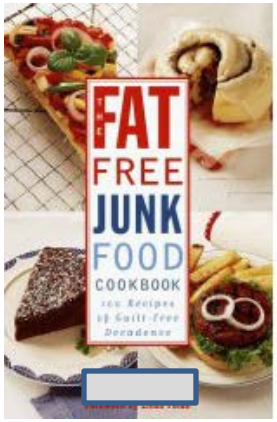


GALLUP July 27, 2015

Dietary Fat Phobia

- Replace SFA with PUFA was simplified to low SFA and later low fat

- Low fat = Low calorie



- Carbohydrate content of diets increased at the expense of PUFA

Dispelling Dietary Fat Phobia

Dietary fat

- Source essential fatty acids
- Major source fat soluble vitamins
- Critical for absorption of fat soluble nutrients

Body fat

- Role in regulation body temperature
- Cushions internal organs
- Storage from metabolic energy – short term and long term

Dispelling Dietary Fat Phobia

- What approach should we take moving forward?

Develop clear, concise unified message about dietary fat and health outcomes.

Dispelling Dietary Fat Phobia

Commentary

JAMA®
The Journal of the American Medical Association

Bring Back Home Economics Education

Alice H. Lichtenstein and David S. Ludwig

JAMA 2010;303:1857

Summary

Dietary Fat Phobia – *Dispelling the Myth That All Fats Are Bad*

- Roots of the fat phobia
  - History of dietary guidance to the general public
  - Timeline of dietary guidance to healthcare professionals
- Dietary fat and cardiovascular disease
- Dispelling the myth

Research Support

NIH
National Heart, Lung, and Blood Institute

USDA

American Heart Association | American Stroke Association
life is why

JEAN MAYER USDA HUMAN NUTRITION RESEARCH CENTER ON AGING
HNRCA

NIDDK
NATIONAL INSTITUTE OF DIABETES AND DIGESTIVE AND KIDNEY DISEASES

Study Participants