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SCHOOL OF PUBLIC HEALTH



Points of Common Ground **FISH**

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Ted Talk



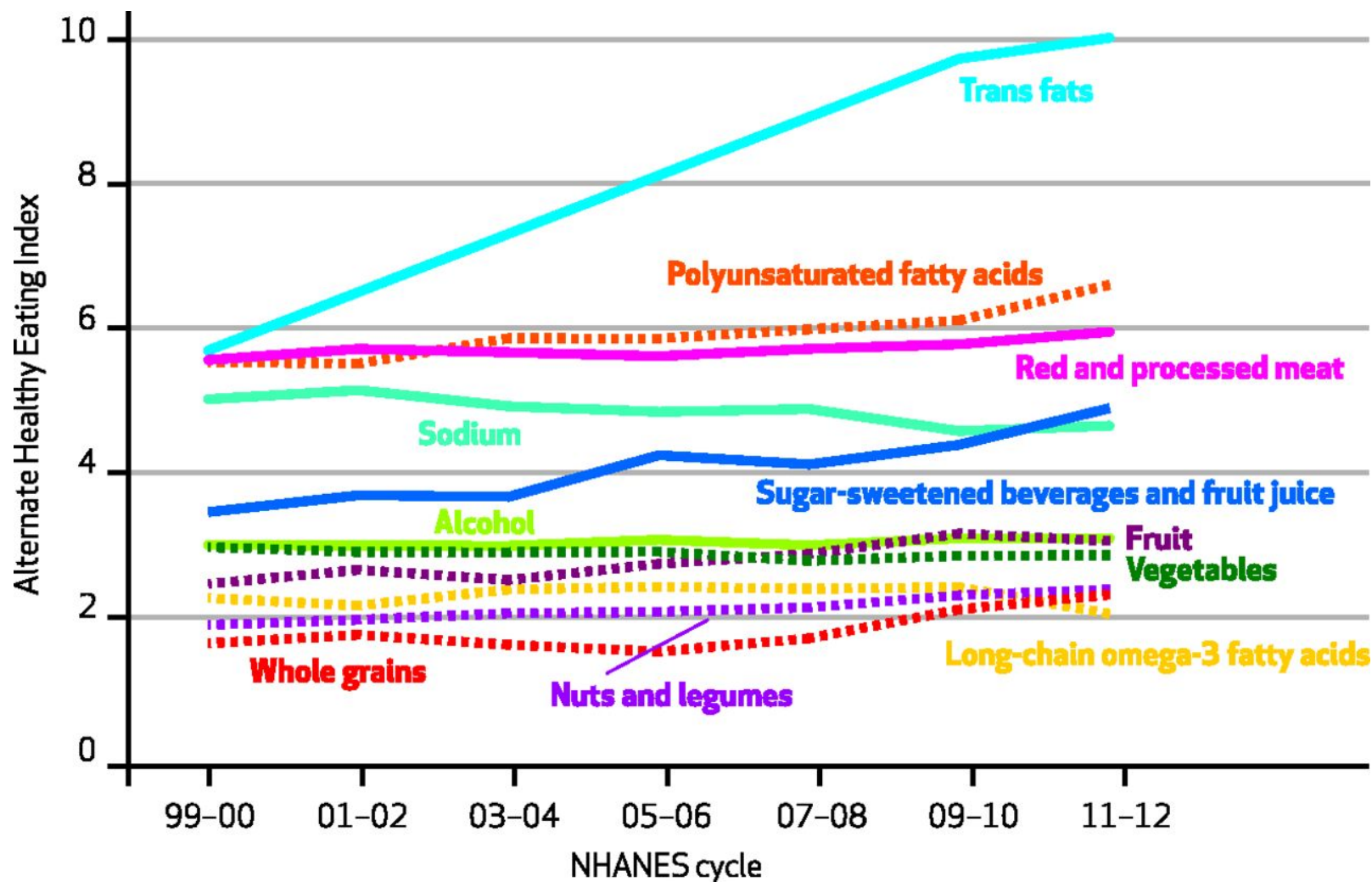
Ted Turner



Ted Kennedy



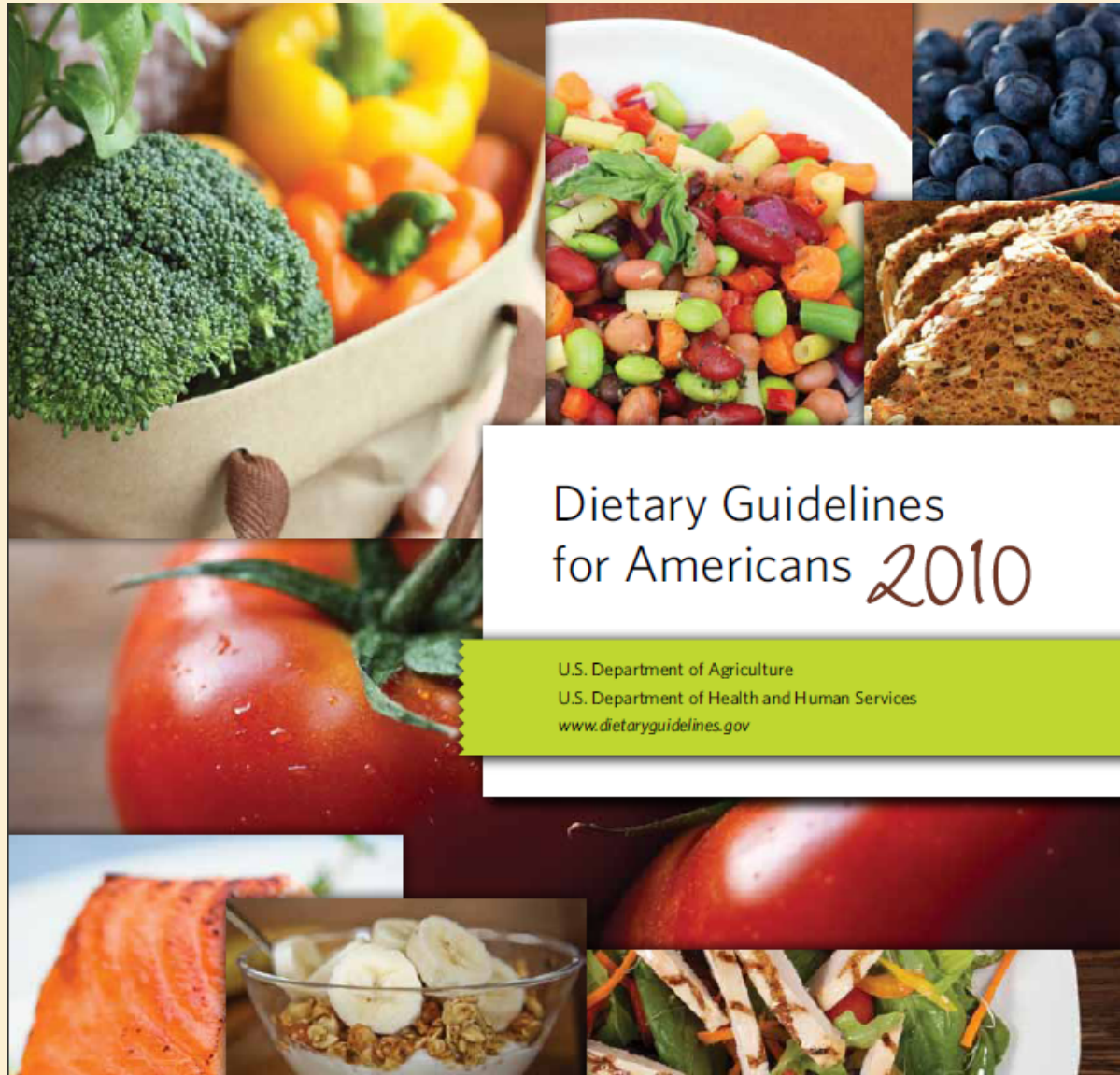
Energy-Adjusted Mean Alternate Healthy Eating Index (AHEI) Component Scores Among US Adults, By National Health And Nutrition Examination Survey (NHANES) Cycle, 1999–2012.



Dong D. Wang et al. Health Aff 2015;34:1916-1922

HealthAffairs

Government Recommendations



2010 US Dietary Guidelines

Foods and Nutrients to Increase



Key Recommendations

Individuals should meet the following recommendations as part of a healthy eating pattern and while staying within their calorie needs.

Increase vegetable and fruit intake.

Eat a variety of vegetables, especially dark-green and red and orange vegetables and beans and peas.

Consume at least half of all grains as whole grains. Increase whole-grain intake by replacing refined grains with whole grains.

Increase intake of fat-free or low-fat milk and milk products, such as milk, yogurt, cheese, or fortified soy beverages.⁵⁸

Choose a variety of protein foods, which include seafood, lean meat and poultry, eggs, beans and peas, soy products, and unsalted nuts and seeds.

Increase the amount and variety of seafood consumed by choosing seafood in place of some meat and poultry.

Use oils to replace solid fats where possible.

Choose foods that provide more potassium, dietary fiber, calcium, and vitamin D, which are nutrients of concern in American diets. These foods include vegetables, fruits, whole grains, and milk and milk products.

Dietary Guidelines
for Americans 2010



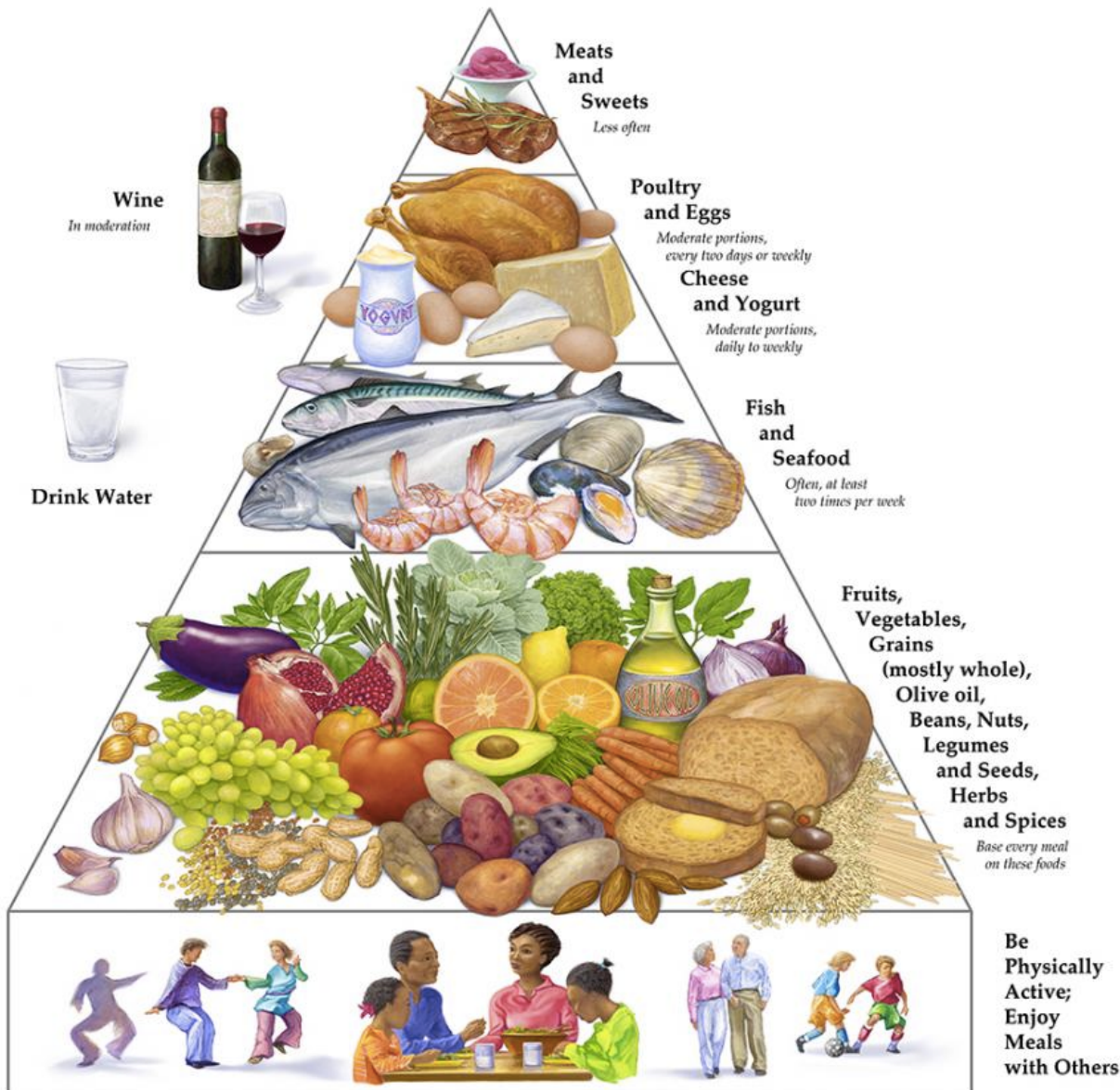
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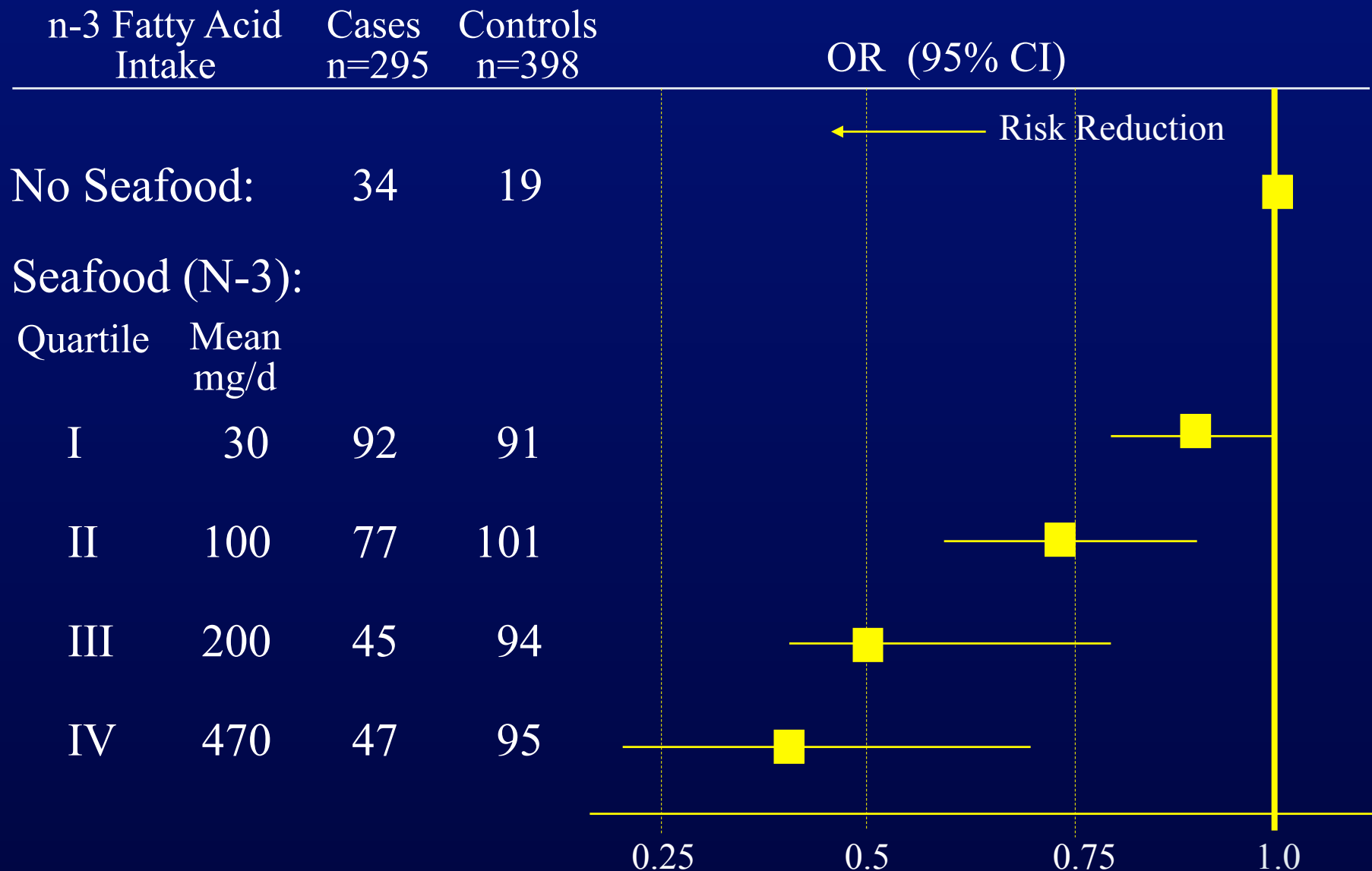
For commonly consumed fish species in the United States, such as bass, cod, trout, and salmon, farmed-raised seafood has as much or more of the omega-3 fatty acids EPA and DHA as the same species captured in the wild.

Mediterranean Diet Pyramid

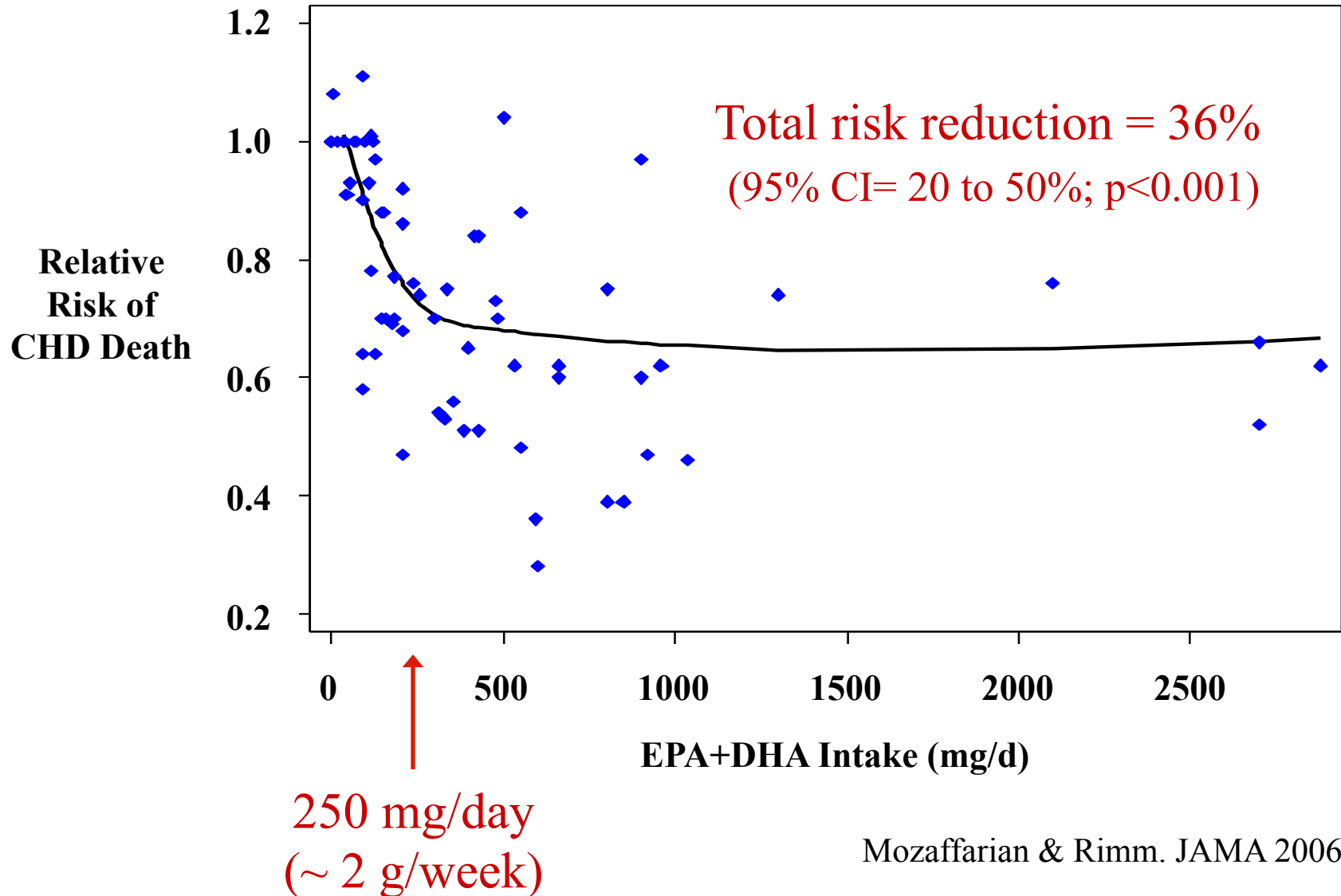
A contemporary approach to delicious, healthy eating



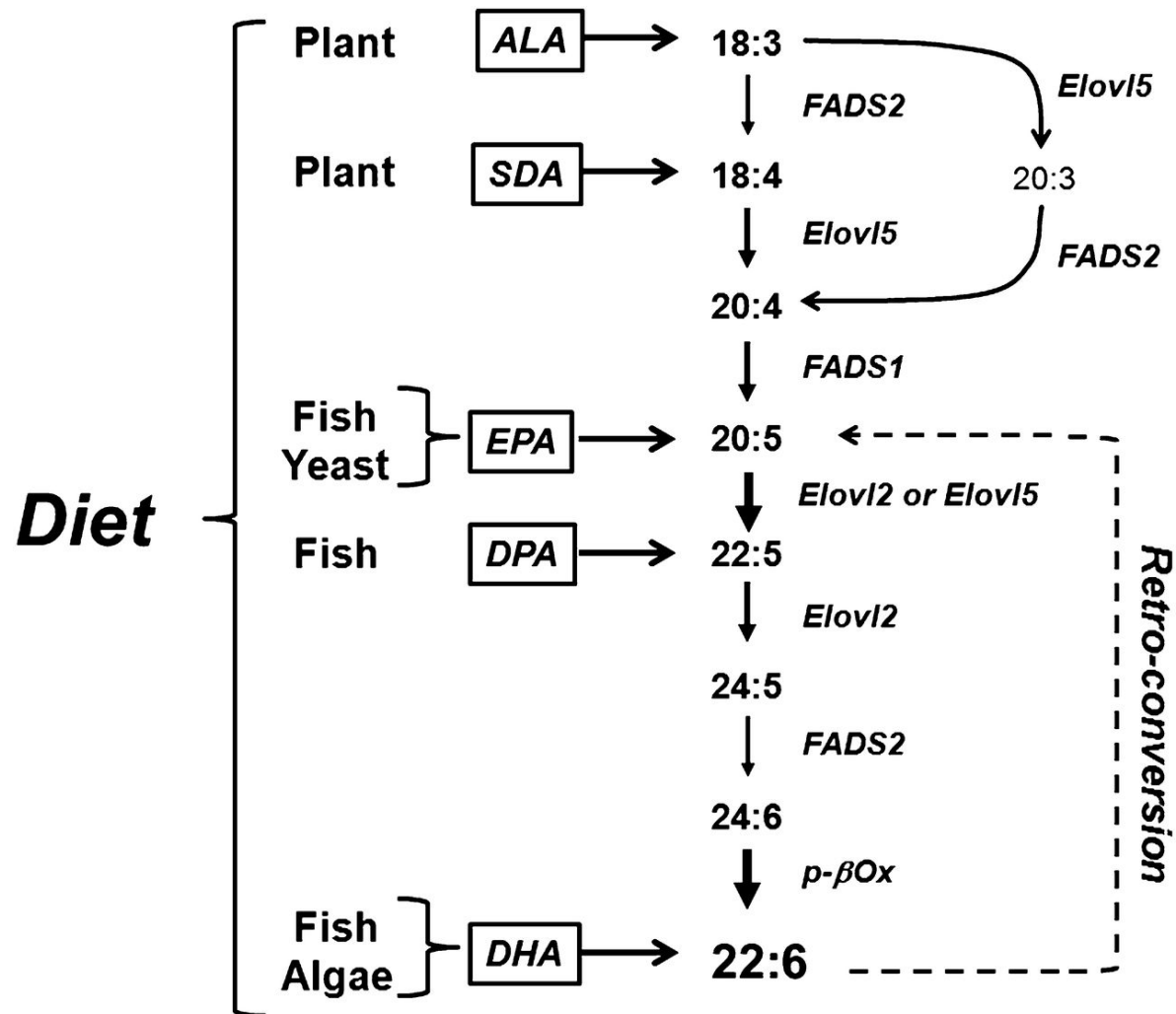
Dietary n-3 Fatty Acids and Sudden Death



Fish or Fish Oil Intake & CHD Death – Pooled Analysis of Prospective Studies and Randomized Trials



Pathways for C18 PUFA conversion to C20–22 PUFA synthesis.



Donald B. Jump et al. J. Lipid Res. 2012;53:2525-2545

Linolenic Acid (18:3) in the absence of fish

Diet and risk of ischemic heart disease in India¹⁻³

AJCN 2004

Tamujā Rastogi, K Srinath Reddy, Mario Vaz, Donna Spiegelman, D Prabhakaran, Walter C Willett, Meir J Stampfer, and Alberto Ascherio

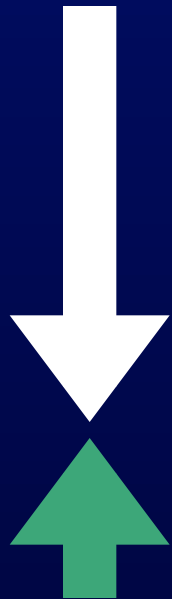
Use of mustard oil, which is rich in α -linolenic acid, was associated with a lower risk than was use of sunflower oil [for use in cooking: RR: 0.49 (95% CI: 0.24, 0.99); for use in frying, RR: 0.29 (95% CI: 0.13, 0.64)].

Contaminants in Fish

FDA Advisory

Fish Intake (2 meals/week)

CVD Risk

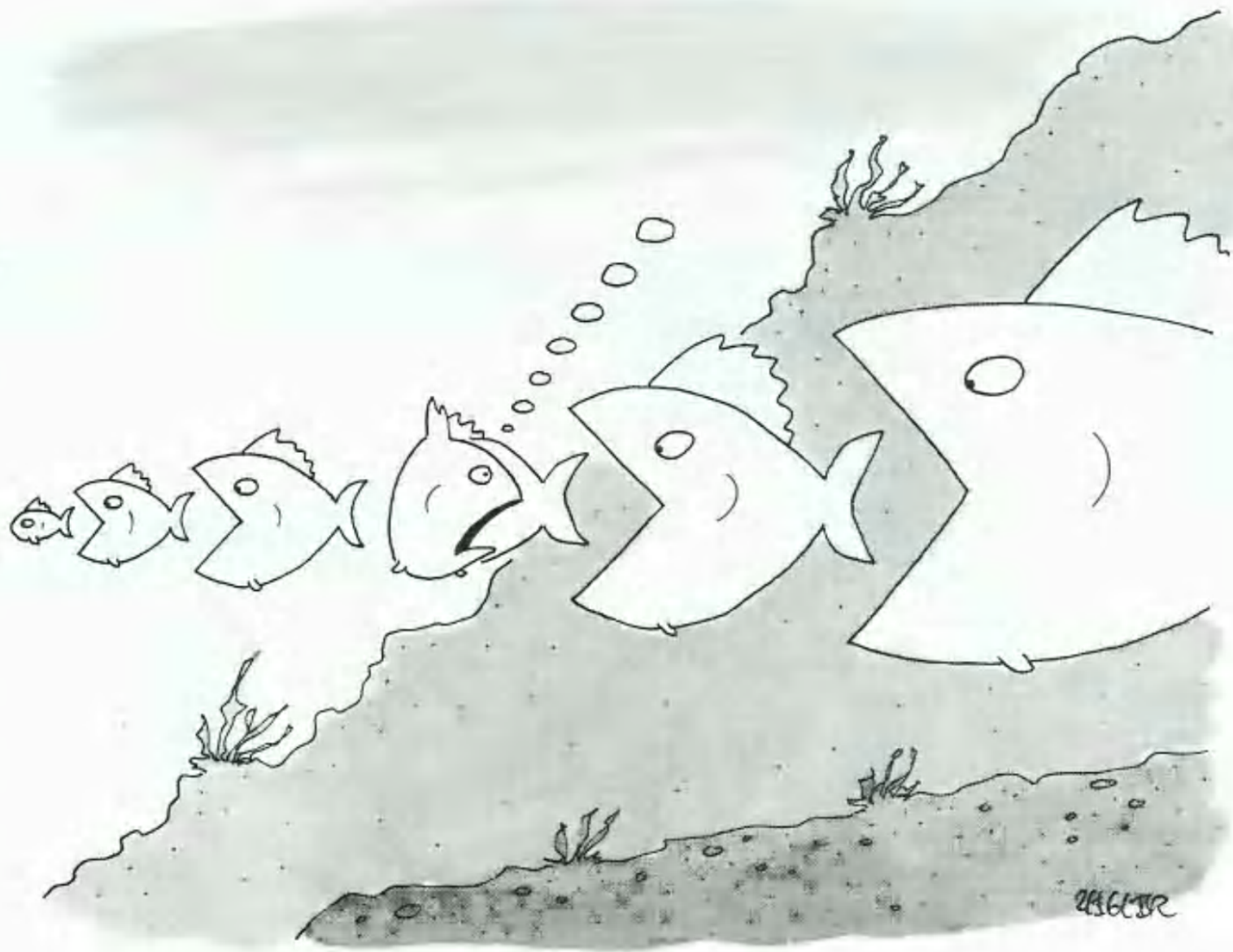


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Poor Fetal
Development



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"If you ask me, we're all the problem."

In addition to advice issued by the U.S.
federal government and states, 21
not-for-profit and other
nongovernmental organizations
provide guidelines fish and mercury
directly to consumers.

FDA/EPI Fish Guidance (After 2001 EPA Advisory)



U.S. Department of Health and Human Services
and
U.S. Environmental Protection Agency



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March 2004

EPA-823-R-04-005

What You Need to Know About Mercury in Fish and Shellfish

2004 EPA and FDA Advice For:
Women Who Might Become Pregnant
Women Who are Pregnant
Nursing Mothers
Young Children

Mercury Content of Commonly Consumed Fish

Species	Methylmercury Concentration (ppm)	
	MEAN	RANGE
Tilefish	1.45	0.65–3.73
Swordfish	1.00	0.65–3.73
King mackerel	1.00	0.10–1.67
Shark	0.96	0.05–4.54
Tuna (fresh and frozen)	0.32	ND–1.3
Pollack	0.20	ND–0.78
Tuna (canned)	0.17	ND–0.75
Catfish	0.07	ND–0.31
Salmon (fresh and canned)	ND	ND–0.18
Shrimp	ND	ND

Source: FDA

Fetal Development

- Benefit from omega-3 fatty acids
 - *In utero*
 - Infant feeding
- Harm from mercury exposure in Children
 - Faroe Islands (+)
 - New Zealand (+)
 - Seychelles (null)
 - Project Viva (+/-)
- Harm from mercury (-) weak if any in Adults (mostly in highly exposed)



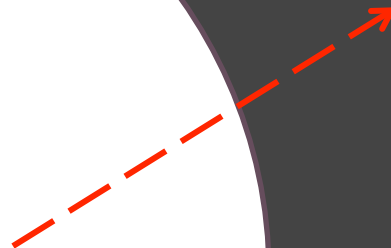
Seafood

Trans Fat

Risk



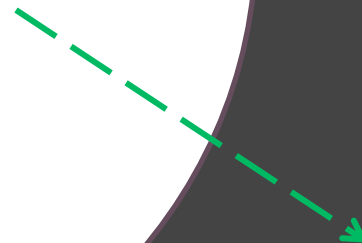
**Refined Starch,
Sugar**



Saturated Fat



Carbohydrates



**Whole
Grains**



Unsaturated Vegetable Fats

- High monounsaturated vegetable fats
- High polyunsaturated vegetable fats

fat

≠

food



≠

food



=

food

Processed Red Meat

Risk



Red Meat

Chicken

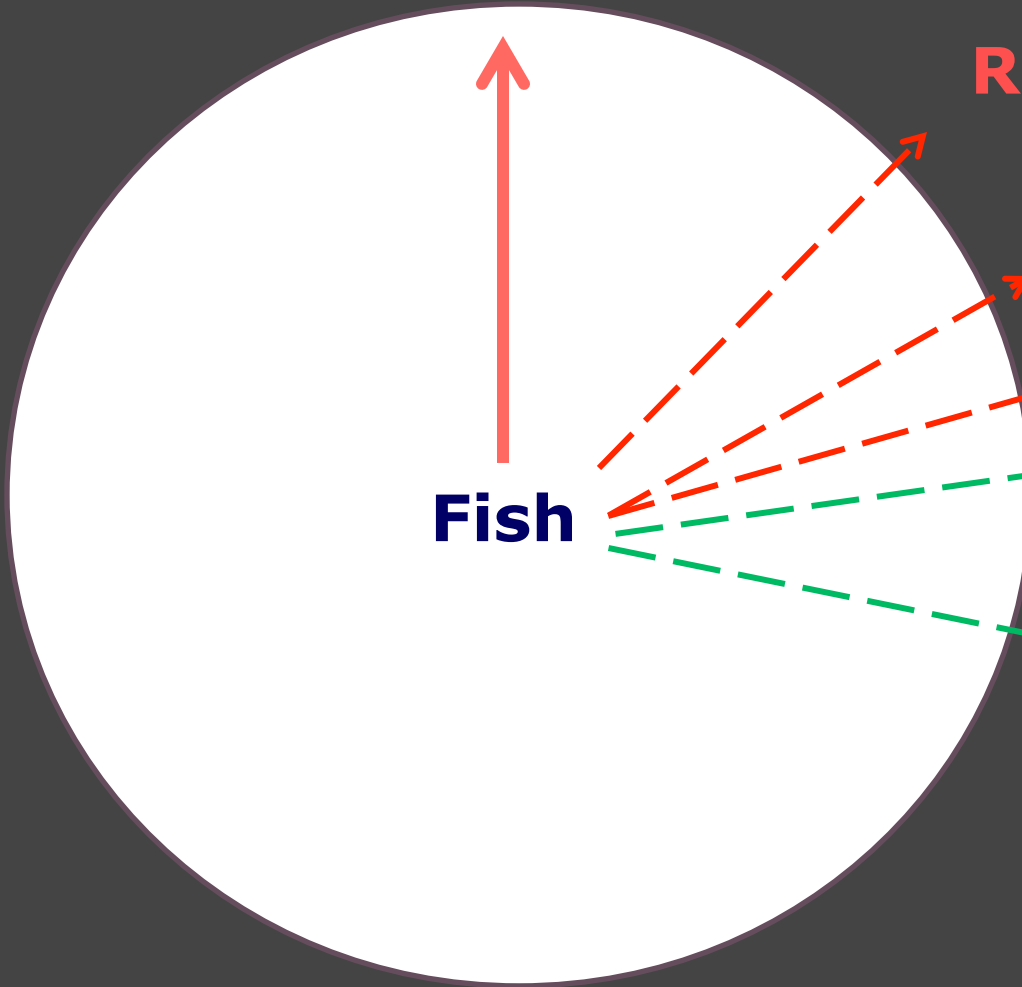
Fried Fish

**Vegetable
Protein w/
18:3**

Fish

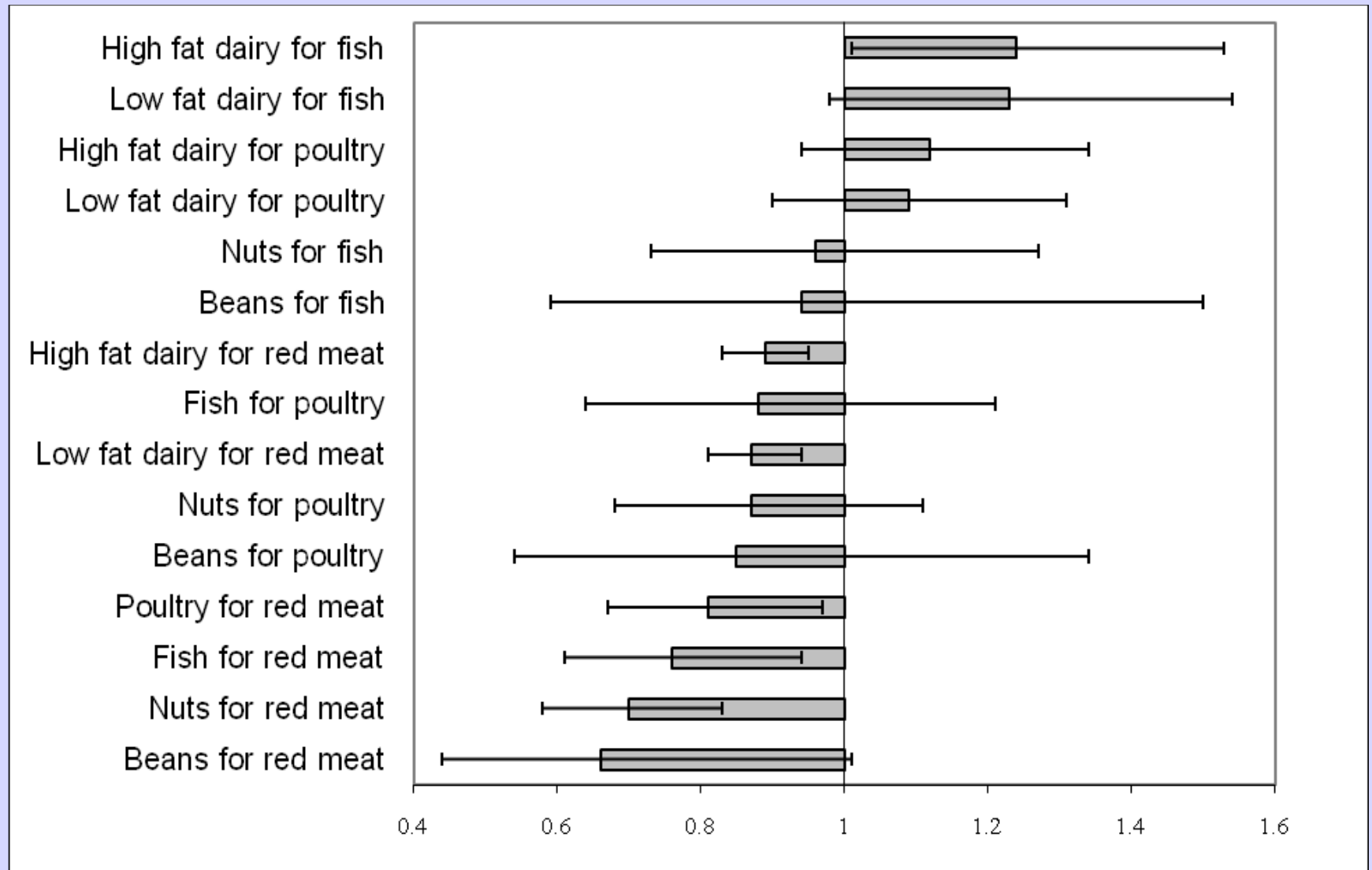


Benefit





Substitution of Protein Sources (1 sv/day) and Risk of CHD in NHS, 1980-2006 (3162 cases)



(Bernstein et al. 2010)

Isocaloric substitution of SFAs by equivalent energy from

Trans fat (2%)

MUFAs (5%)

PUFAs (5%)

Carbohydrates from refined starches/added sugars (5%)

Carbohydrates from whole grains (5%)

Isocaloric substitution of carbohydrates from refined starches/added sugars
by equivalent energy from

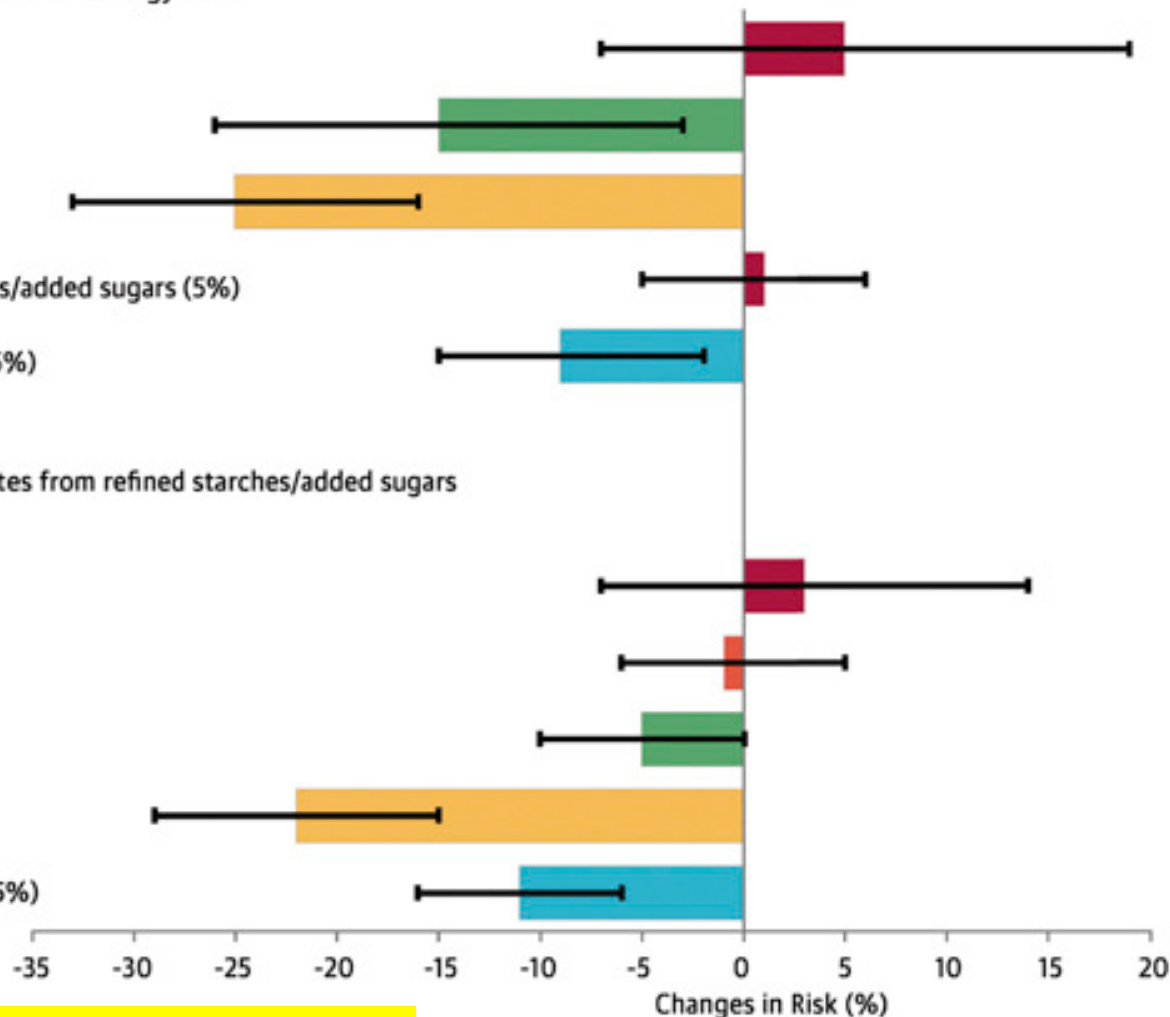
Trans fat (2%)

SFAs (5%)

MUFAs (5%)

PUFAs (5%)

Carbohydrates from whole grains (5%)



Li, Hruby et al JACC 2015



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Mercury



Emitted into atmosphere from:

- Coal burning electric plants – 40%
- Industrial boilers – 10%
- Burning hazardous waste – 5%
- Chlorine production – 5%

Methylmercury (MeHg):

- Atmospheric Hg organified by sea and sediment microorganisms to MeHg
- Main toxic form of mercury
- Bio-accumulates: smaller fish to larger predators

