

FOOD

What the Heck Should I Eat?

Mark Hyman, MD
Director, Cleveland Clinic Center for Functional Medicine
IHS February 2018





EGG YOLKS

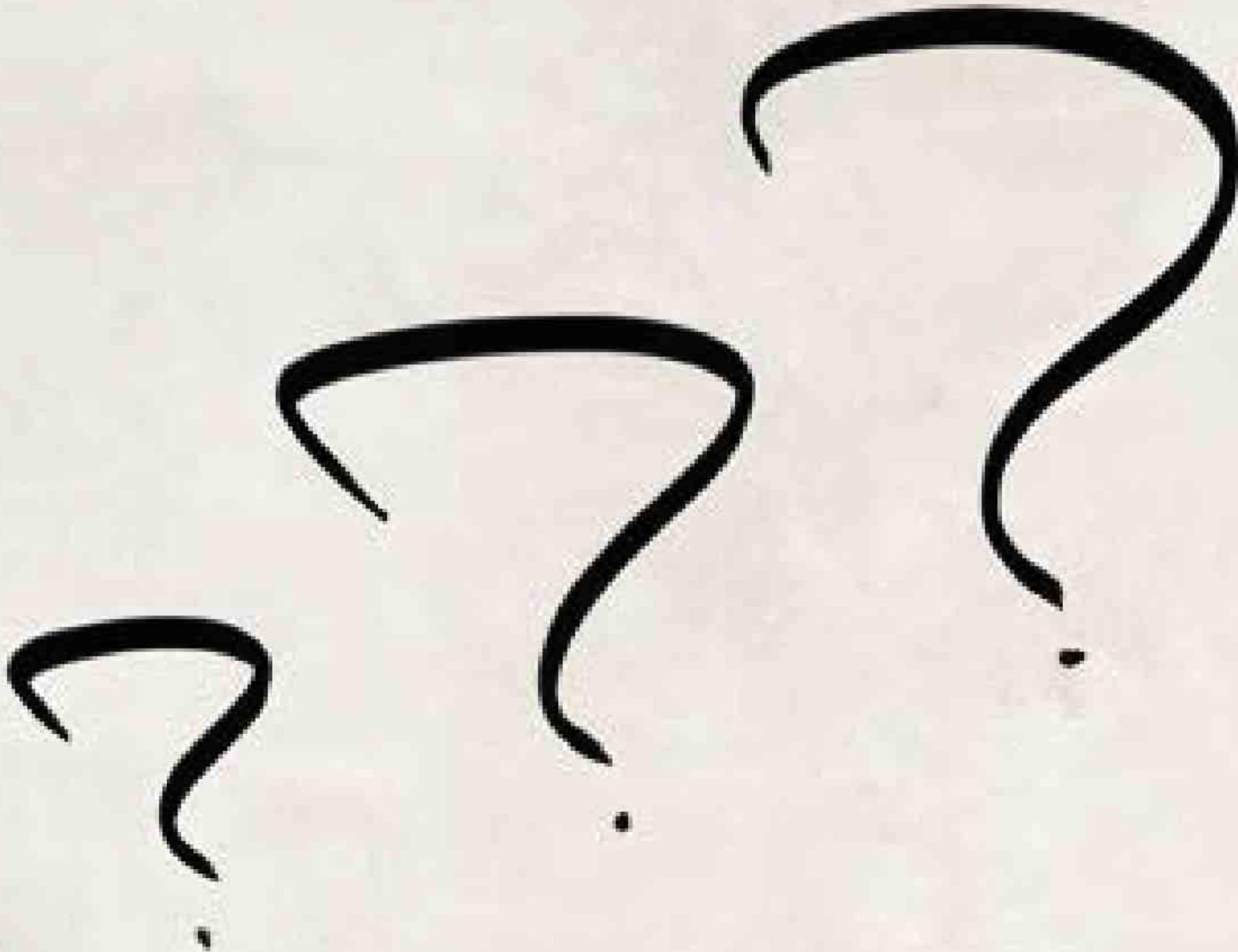
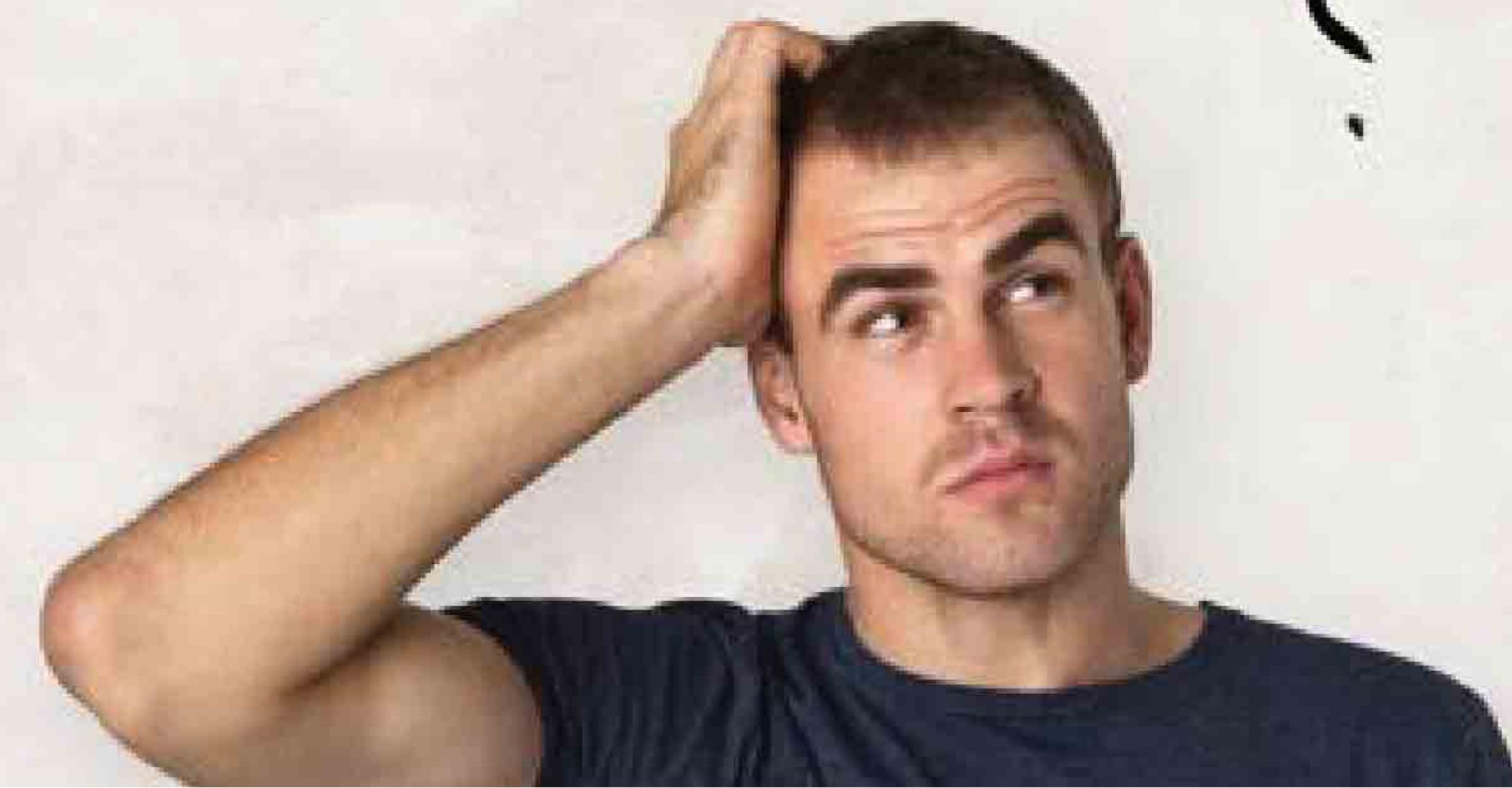
OR

EGG WHITES?

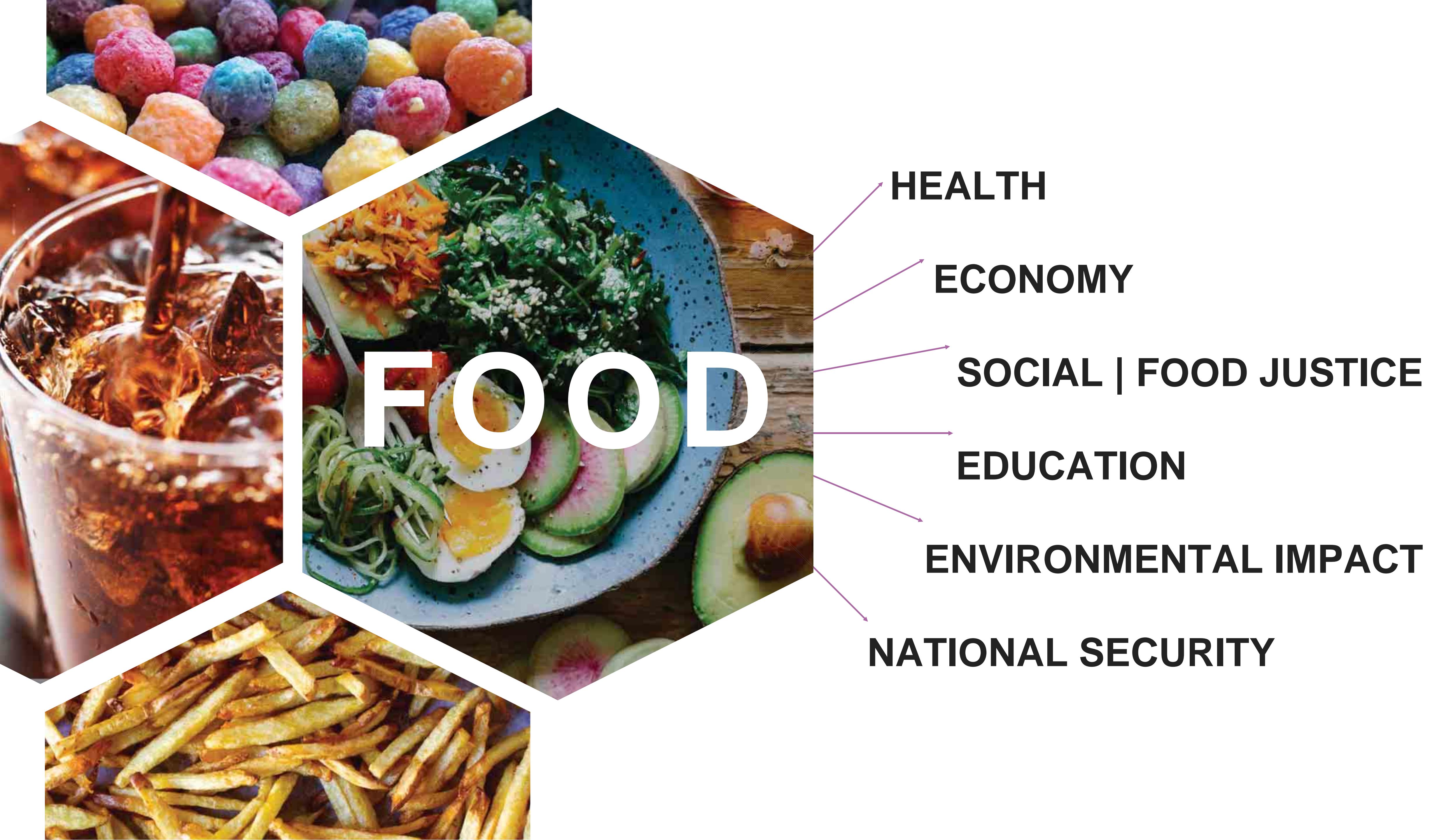












HEALTH

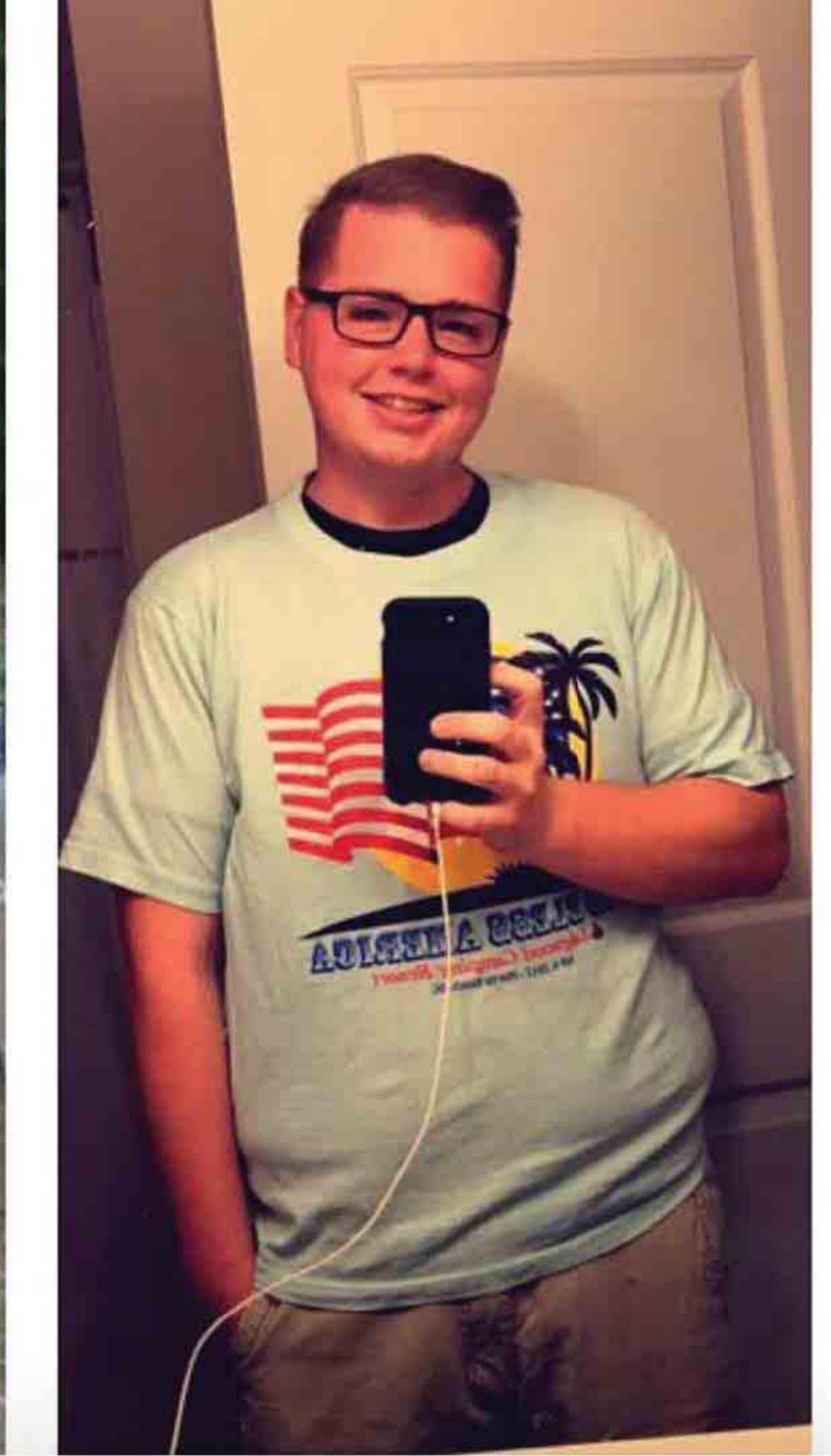
ECONOMY

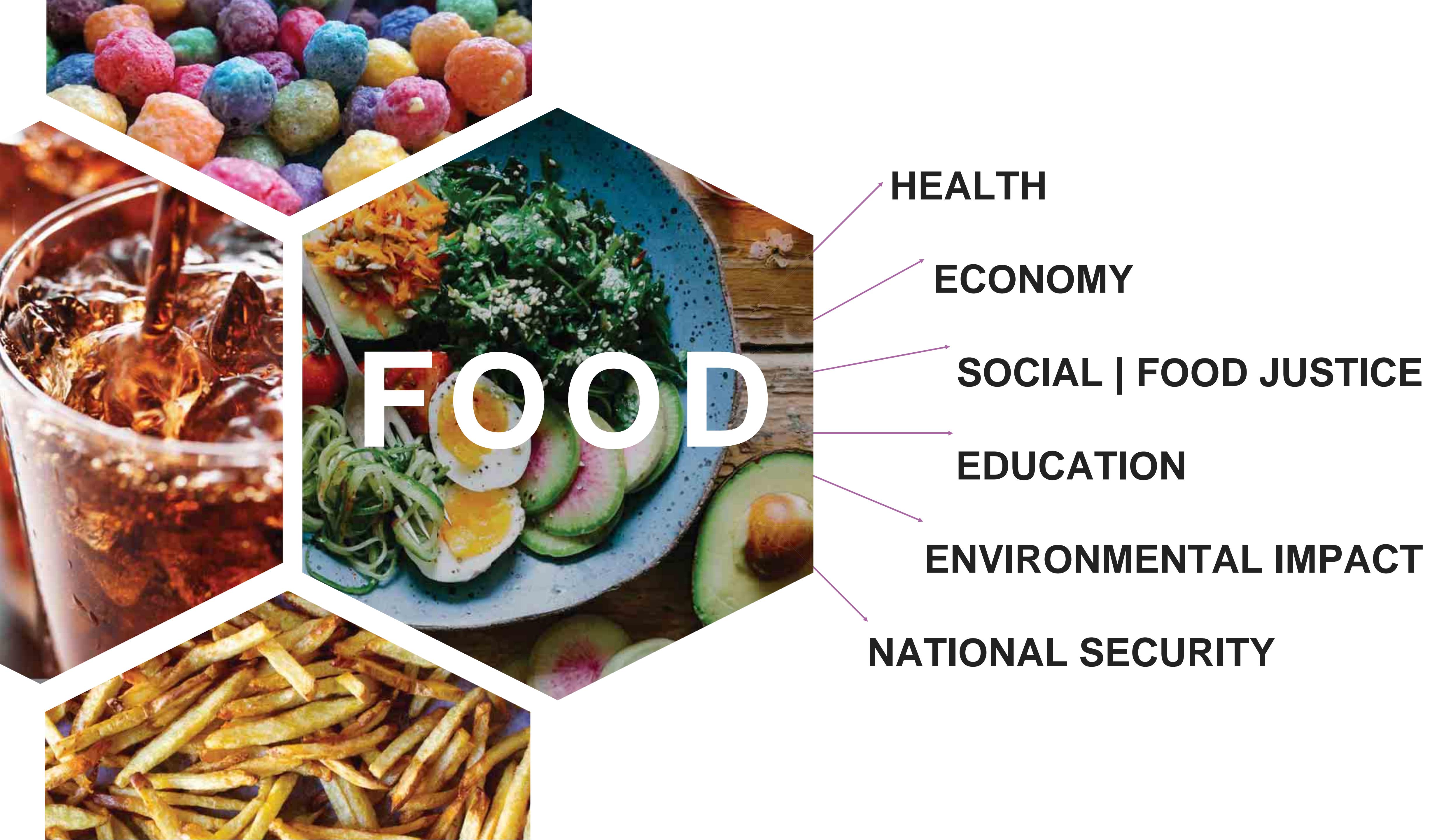
SOCIAL | FOOD JUSTICE

EDUCATION

ENVIRONMENTAL IMPACT

NATIONAL SECURITY





HEALTH

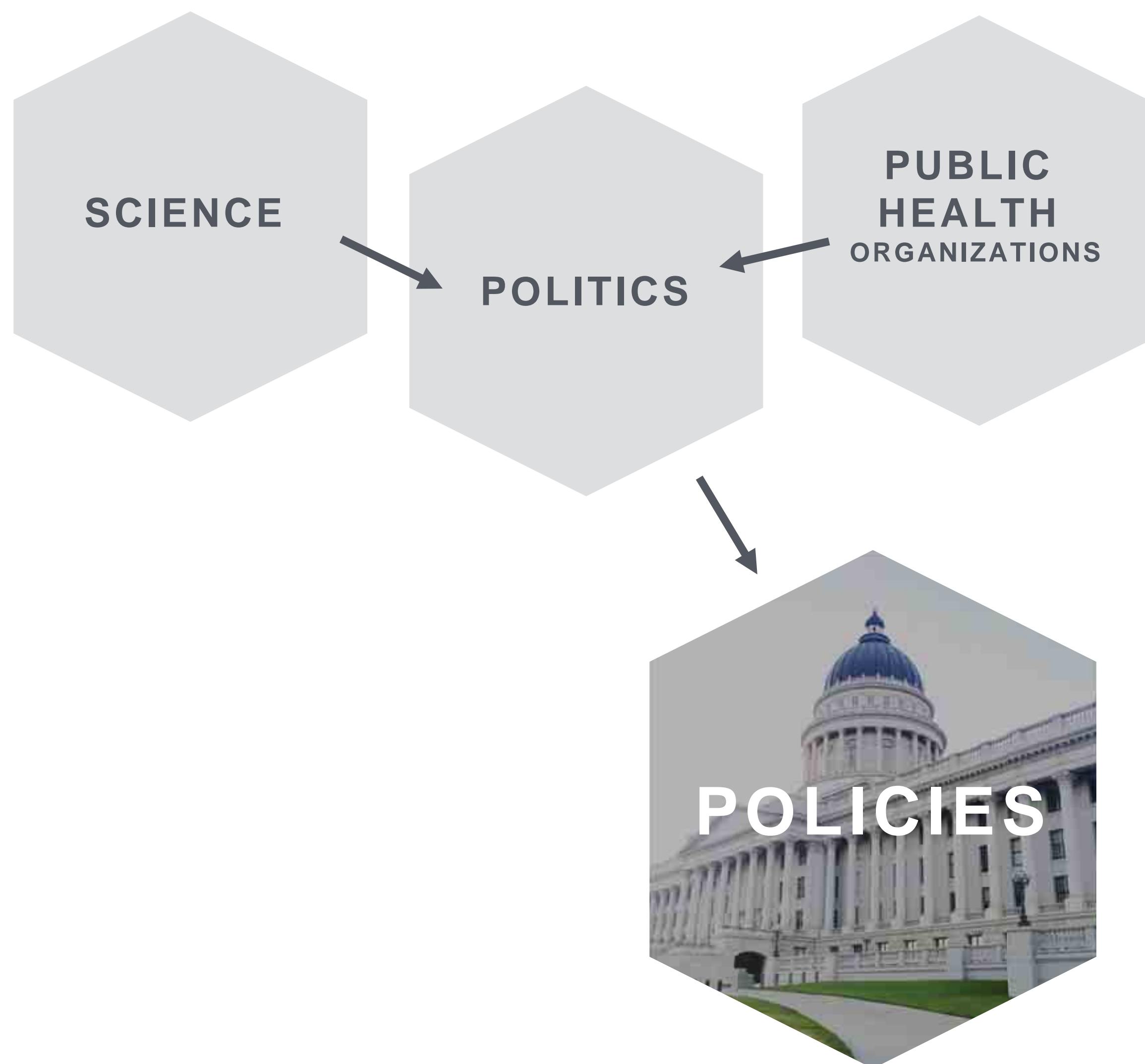
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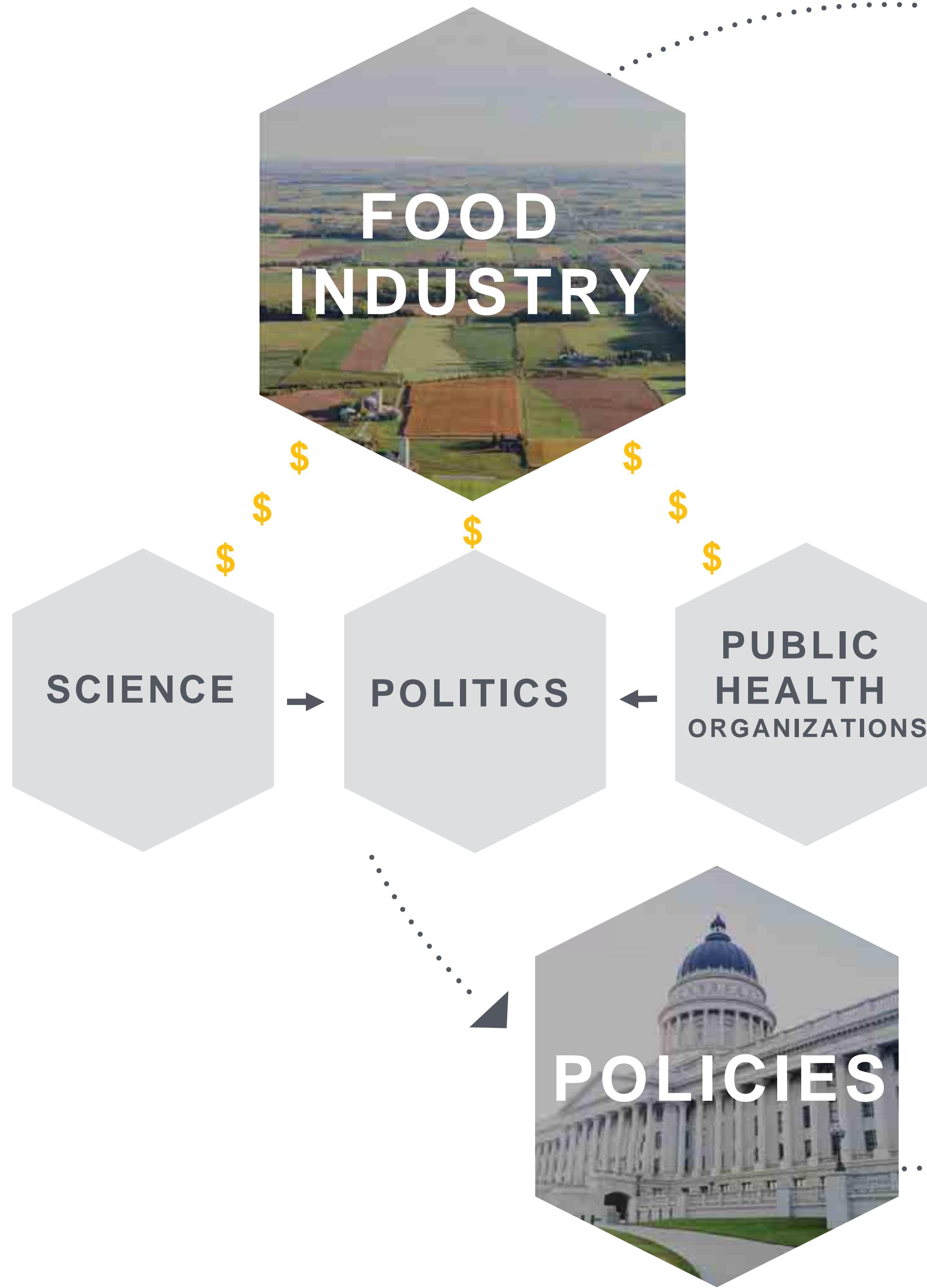
SOCIAL | FOOD JUSTICE

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NATIONAL SECURITY







USDA Dietary
Guidelines

Food
Marketing

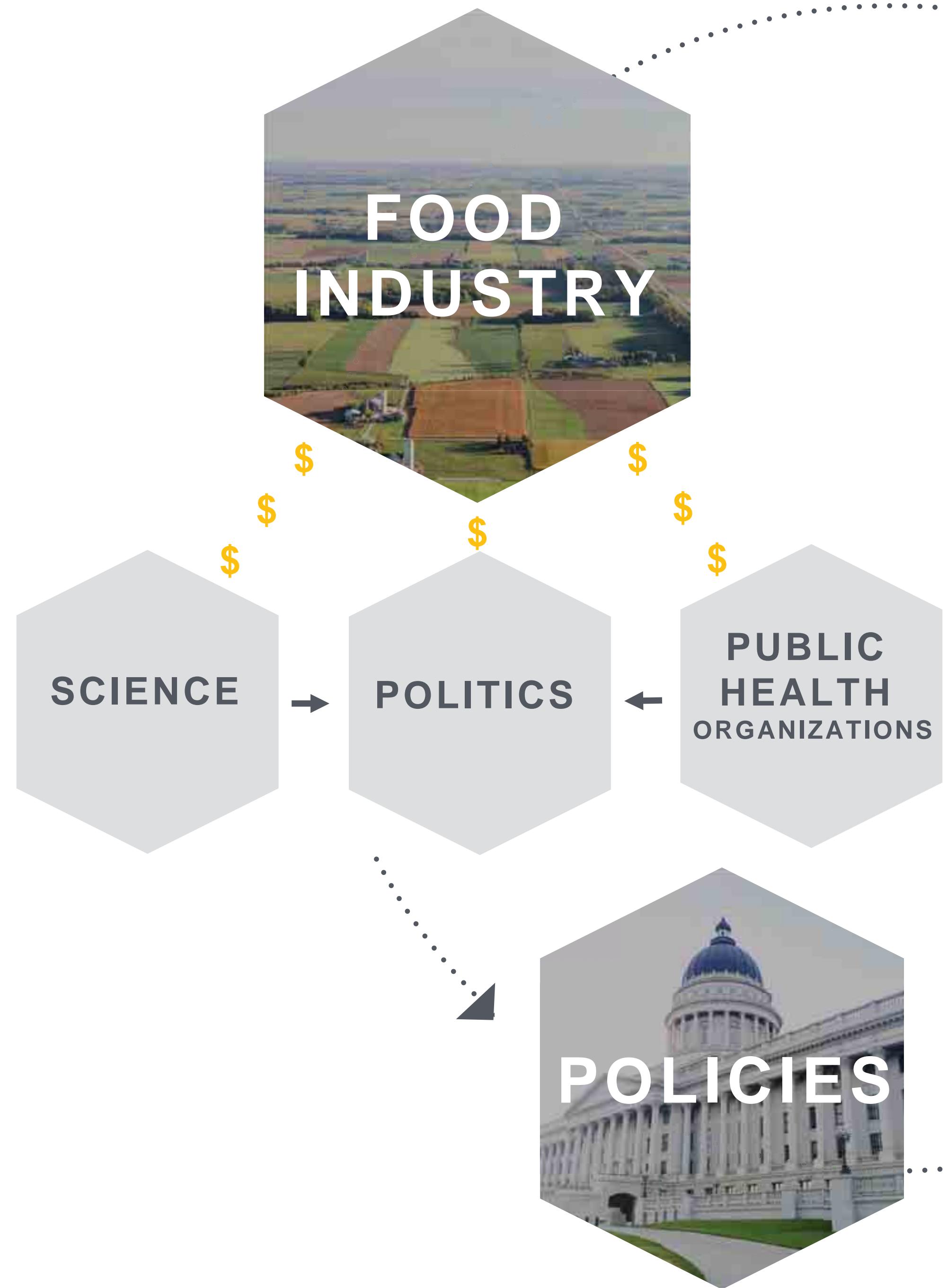
Food
Programs
(SNAP, WIC,
School Lunch)

Food
Taxation

Food
Labels

Agricultural
Subsidies

Agricultural
Policy



Money and Food

- Science – Funding of Scientists, Global Energy Project, Industry Sponsored Research 8-50x more likely to find + outcome
- Public Health Organizations – AHA, ADA, AND, NAACP, King Center, etc.
- Crop Subsidies - 99% for commodities, 1 % specialty crops
- Farm Bill 600 lobbyists spend \$500,000,000 (half a billion)
- Food system = #1 cause of climate change
- US Dietary Guidelines – NAS report conflicts of interest, neglect of data)
- SNAP – 80% of farm bill, \$7 billion/year in soda



American
Heart
Association®



American
Diabetes
Association®



Academy of
Nutrition
and Dietetics

DIETARY GUIDELINES FOR AMERICANS

2015-2020

EIGHTH EDITION

Money & Food

- Food Labels – FDA vs. European stop light system
- Food Marketing to Children - FTC and 6000 ads/year, stealth marketing via SM
- Media – Soda tax in Columbia, ad revenue, headlines
- Legal and Media Campaigns (Soda Tax, Billboards, etc.)
- Exporting diet globally (Planet Fat: Ghana, Columbia, Brazil, etc.)

Media Reports

- Coconut Oil and AHA
- Cholesterol/Eggs
- Butter vs. Low Cholesterol (Ancel Keys)
- NEJM report on 50% headlines wrong

Sugar Industry and Coronary Heart Disease Research

A Historical Analysis of Internal Industry Documents

Cristin E. Kearns, DDS, MBA; Laura A. Schmidt, PhD, MSW, MPH; Stanton A. Glantz, PhD

Early warning signals of the coronary heart disease (CHD) risk of sugar (sucrose) emerged in the 1950s. We examined Sugar Research Foundation (SRF) internal documents, historical reports, and statements relevant to early debates about the dietary causes of CHD and assembled findings chronologically into a narrative case study. The SRF sponsored its first CHD research project in 1965, a literature review published in the *New England Journal of Medicine*, which singled out fat and cholesterol as the dietary causes of CHD and downplayed evidence that sucrose consumption was also a risk factor. The SRF set the review's objective, contributed articles for inclusion, and received drafts. The SRF's funding and role was not disclosed. Together with other recent analyses of sugar industry documents, our findings suggest the industry sponsored a research program in the 1960s and 1970s that successfully cast doubt about the hazards of sucrose while promoting fat as the dietary culprit in CHD. Policymaking committees should consider giving less weight to food industry-funded studies and include mechanistic and animal studies as well as studies appraising the effect of added sugars on multiple CHD biomarkers and disease development.

JAMA Intern Med. doi:[10.1001/jamainternmed.2016.5394](https://doi.org/10.1001/jamainternmed.2016.5394)

Published online September 12, 2016.

In the 1950s, disproportionately high rates of coronary heart disease (CHD) mortality in America were attributed to a variety of dietary factors, including total fat, saturated fat, trans fat, cholesterol, and refined carbohydrates. Several scientists were championing divergent theories about the causes of CHD. In 1950, Dr. Ancel Keys identified added sugars as a significant risk factor for CHD, while Dr. John Yudkin identified total fat, saturated fat, and cholesterol as the primary culprits.

However, by the 1980s, few scientists believed that added sugars played a significant role in CHD, and the first 1980 *Dietary Guidelines for Americans*⁴ focused on reducing total fat, saturated fat, and dietary cholesterol for CHD prevention.

Although the contribution of dietary sugars to CHD is still

We located correspondence between the SRF and D. Mark Heg-

JAMA Internal Medicine,
Sept 12, 2016

contextualizing scientific debates in the 1950s and 1960s on dietary factors causally related to CHD published by the National Academy of Sciences-National Research Council (NAS-NRC), US Public Health Service, the American Heart Association (AHA), and American Medical Association (AMA). Findings were assembled chrono-

Sugar, Fat and CVD

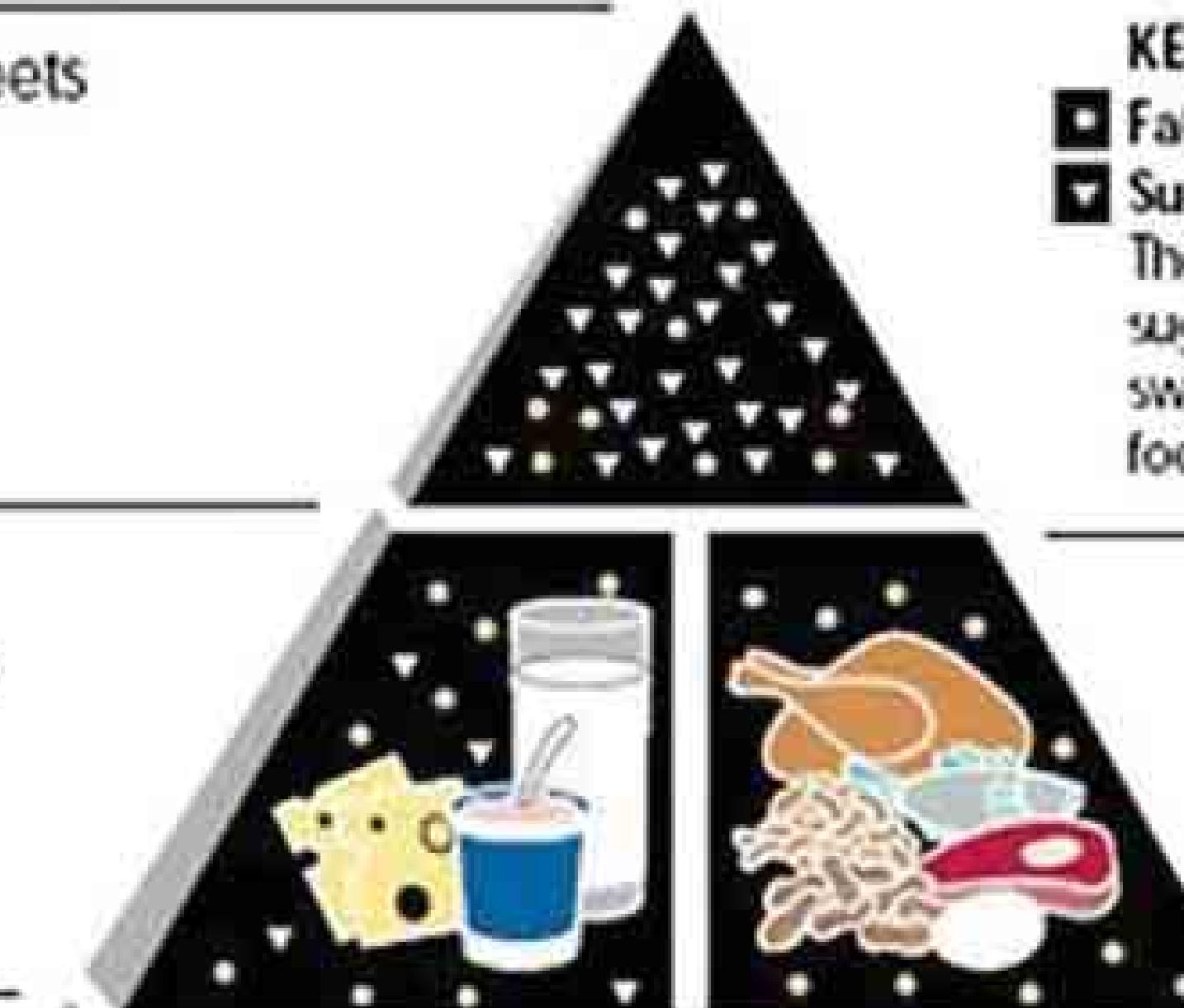
- Large meta-analysis of 72 studies on fat show no link with CVD except trans fats
 - *Ann Intern Med.* 2014;160(6):398-406.
- Large meta-analysis on sugar found significant link to CVD
 - HR for CVD 1.3 for lowest and 2.75 for highest sugar consumption
 - *JAMA Intern Med.* 2014;174(4):516-52
- Large meta-analysis found sugar CVD risk factor independent of weight gain
 - *American Journal Clinical Nutrition* 2014 May 7

**Fats, Oils, & Sweets
Use Sparingly**

- KEY**
- Fat (naturally occurring and added)
 - Sugars (added)

These symbols show that fat and added sugars come mostly from fats, oils, and sweets, but can be part of or added to foods from the other food groups as well.

**Milk, Yogurt,
& Cheese Group
2-3 Servings**



**Meat, Poultry, Fish,
Dry Beans, Eggs,
& Nuts Group
2-3 Servings**

**Vegetable
Group
3-5 Servings**



**Fruit Group 2-4
Servings**



**Bread, Cereal,
Rice, & Pasta
Group
6-11
Servings**

**FOOD IS
MEDICINE**



1%



FAST FOOD
\$6.20



HEALTHY SALAD
\$9.95



A woman in a white lab coat is working in a laboratory. She is wearing a white head covering and a mask. She is looking at a computer screen and holding a test tube. There are various pieces of equipment and supplies in the background.

3000

Health Claims on Labels

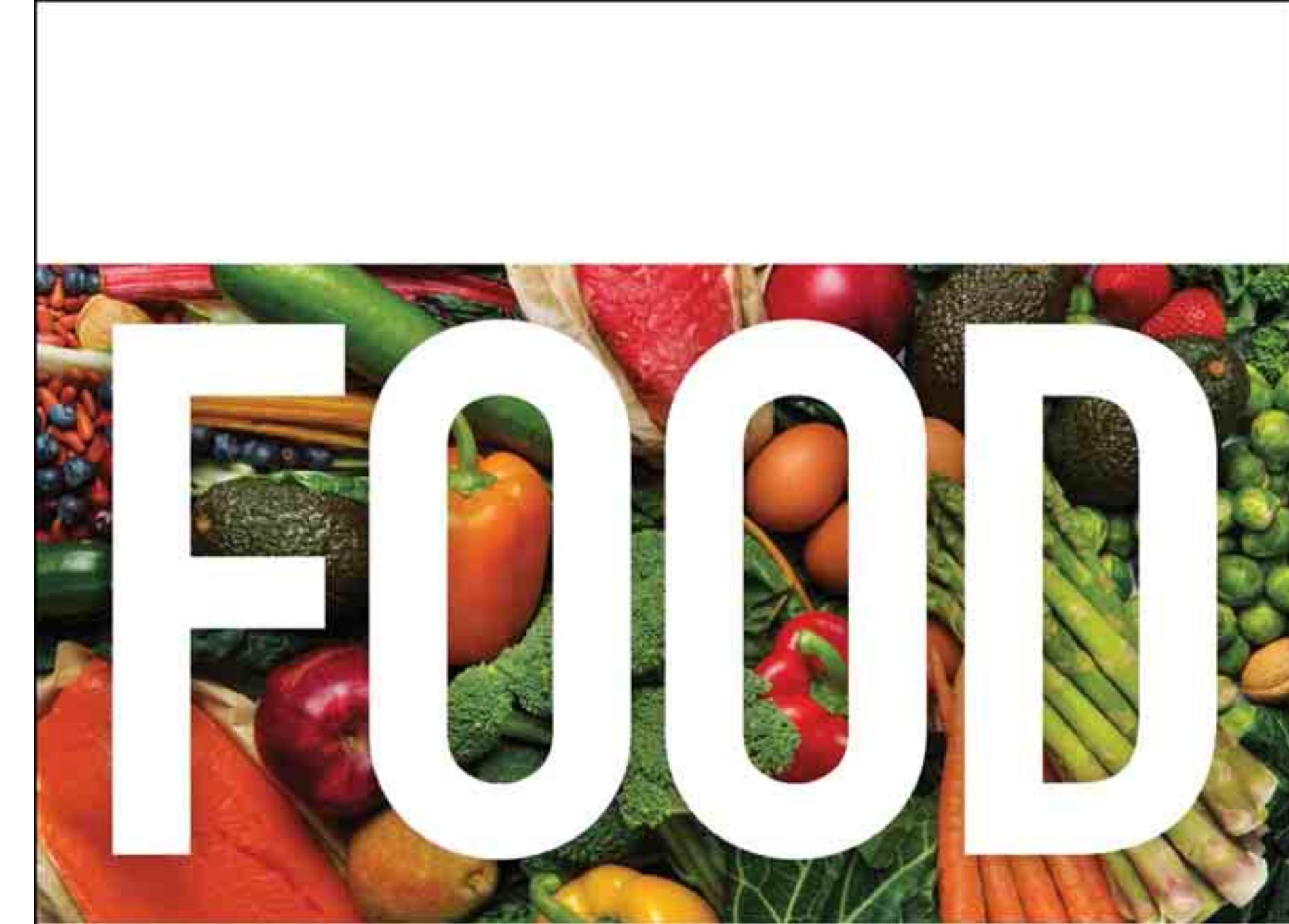






WHAT IS THE BEST DIET FOR US HUMANS?

**WHAT THE HECK
SHOULD I EAT?**



WHAT THE HECK SHOULD I EAT?

*The no-nonsense guide
to achieving optimal weight
and lifelong health*

Mark
Hyman, MD

BESTSELLING AUTHOR OF
EAT FAT, GET THIN



Challenges of Nutrition Research

- Observational Data and Food Frequency Questionnaires
- Healthy User Effect
 - (Nurse's Health Study vs. Women's Health Initiative re HRT)
- RCT's – limited
- Basic Science
- Funding Source

Energy Balance vs. Quality/Composition

Global Energy Balance Network

Vegan vs. Paleo
Are they really that different?

INGREDIENTS: ENRICHED BLEACHED WHEAT FLOUR [FLOUR, REDUCED IRON, "B" VITAMINS (NIACIN, THIAMINE MONONITRATE (B1), RIBOFLAVIN (B2), FOLIC ACID)], WATER, CORN SYRUP, SUGAR, HIGH FRUCTOSE CORN SYRUP, PARTIALLY HYDROGENATED VEGETABLE AND/OR ANIMAL SHORTENING (SOYBEAN, COTTONSEED AND/OR CANOLA OIL, BEEF FAT), MONO AND DIGLYCERIDES, POLYSORBATE 60, SOY LECITHIN, DEXTROSE, CORN STARCH, WHOLE EGGS. CONTAINS 2% OR LESS OF: MODIFIED CORN STARCH, GLUCOSE, LEAVENINGS (SODIUM ACID PYROPHOSPHATE, BAKING SODA, AND MONOCALCIUM PHOSPHATE), WHEY, GLYCERIN, SOYBEAN OIL, BANANA PUREE, SALT, SORBIC ACID (TO RETAIN FRESHNESS), CELLULOSE GUM, SODIUM STEAROYL LACTYLATE, POTASSIUM SORBATE, XANTHAN GUM, NATURAL AND ARTIFICIAL FLAVOR, CALCIUM SULFATE, ENZYMES, YELLOW 5, RED 40. 521012
CONTAINS WHEAT, SOY, EGGS AND MILK





EAT REAL
FOOD

FOOD:
What We Can All Agree On?

Basic Principles to Change the Food System (and Your Health)

- Avoid processed foods, refined sugar & carbohydrates, refined oils
- Avoid factory farmed animals
- Avoid food that contributes to climate change and environmental degradation
- Minimizes the use of fossil fuels (Big Ag currently 1/5 of global consumption)
- Avoid foods that affect kids ability to learn, threatens national security or promotes violence and poverty
- Avoid additives, artificial ingredients, hormones, pesticides, antibiotics, GMO



Basic Principles

- Whole real foods, mostly plants
- Low glycemic load diet
- Healthy fats (EVVO, avocado, nuts, seeds, fish (n3), +/- saturated fats?)
- Sustainably and humanly raised or harvested animal foods (fish, poultry, meat, etc.)
- Supports regenerative agriculture, soil health, water resources
- Supports farm worker's rights

Areas of Controversy

- Saturated fats vs. omega 6 PUFA's
- Meat and animal protein vs. vegetable protein (chicken, fish, eggs, etc.)
- Grains and Beans
- Dairy



Meat: To Eat or Not To Eat?





You Wouldn't Let Your Child Smoke.

Like smoking, eating meat increases
the risk of heart disease and cancer.

Go vegan!

Meat Issues

- Saturated fat
- Inflammation
- Cancer risk?
- Diabetes risk?
- TMAO production (dysbiosis)
- Polycyclic aromatic hydrocarbons and heterocyclic amines, advanced glycation end products (AGE's)

Plains Indians





SEVENTH-DAY
ADVENTIST
CHURCH

Am J Clin Nutr. 2005
Feb;81(2):341-54. Review.

Meat Research

- Observational nutritional studies
- Food frequency questionnaires
- Nature of population: Meat eater characteristics – unhealthy habits
- Healthy user effect (meat seen as bad so health conscious people at less)
 - *J Gen Intern Med.* 2011 May;26(5):546–50.

ORIGINAL ARTICLE

Food consumption and the actual statistics of cardiovascular diseases: an epidemiological comparison of 42 European countries

Pavel Grasgruber*, Martin Sebera, Eduard Hrazdira, Sylva Hrebickova and Jan Cacek

Faculty of Sports Studies, Masaryk University, Brno, Czech Republic

Abstract

Background: The aim of this ecological study was to identify the main nutritional factors related to the prevalence of cardiovascular diseases (CVDs) in Europe, based on a comparison of international statistics.

Design: The mean consumption of 62 food items from the FAOSTAT database (1993–2008) was compared with the actual statistics of five CVD indicators in 42 European countries. Several other exogenous factors (health expenditure, smoking, body mass index) and the historical stability of results were also examined.

Results: We found exceptionally strong relationships between some of the examined factors, the highest being a correlation between raised cholesterol in men and the combined consumption of animal fat and animal protein ($r = 0.92, p < 0.001$). The most significant dietary correlate of low CVD risk was high total fat and animal protein consumption. Additional statistical analyses further highlighted citrus fruits, high-fat dairy (cheese) and tree nuts. Among other non-dietary factors, health expenditure showed by far the highest correlation coefficients. The major correlate of high CVD risk was the proportion of energy from carbohydrates and alcohol, or from potato and cereal carbohydrates. Similar patterns were observed between food consumption and CVD statistics from the period 1980–2000, which shows that these relationships are stable over time. However, we found striking discrepancies in men's CVD statistics from 1980 and 1990, which can probably explain the origin of the 'saturated fat hypothesis' that influenced public health policies in the following decades.

Conclusion: Our results do not support the association between CVDs and saturated fat, which is still contained in official dietary guidelines. Instead, they agree with data accumulated from recent studies that link CVD risk with the high glycaemic index/load of carbohydrate-based diets. In the absence of any scientific evidence connecting saturated fat with CVDs, these findings show that current dietary recommendations regarding CVDs should be seriously reconsidered.

Keywords: prevention; BMI; smoking; food consumption

To access the supplementary material to this article, please see [Supplementary files](#) under 'Article Tools'.

Received: 22 March 2016; Revised: 12 July 2016; Accepted: 9 August 2016; Published: 27 September 2016

The relationship between nutrition and the prevalence of diseases is a very controversial and hotly debated topic, and the research conducted during the last decades has often produced conflicting results. For example, recent meta-analyses seriously challenge the role of saturated fat as the fundamental trigger of cardiovascular diseases (CVDs) (1–6), which was a prevailing hypothesis for several decades. The most complex analysis of Mente et al. (1) identified 'Mediterranean' and 'high-quality' dietary patterns, vegetables, nuts, 'prudent diets' (including a lot of vegetables, fruit, legumes, whole grains and fish), and monounsaturated fatty acids (MUFAs) as the only dietary components, which are strongly and consistently related to low risk of coronary heart disease (CHD) in

observational or clinical studies. Trans-fatty acids, high glycaemic index/load, and the 'Western' diet (including processed and red meat, butter, high-fat dairy products, eggs, and refined cereals) were strongly and consistently related to high CHD risk. However, there was only weak evidence for any connection between CHD and saturated fat, individual animal products (meat, eggs, milk), and fat as a whole.

The heterogeneity of results is not very surprising because long-term observational surveys routinely rely on self-reported consumption rates of selected food items and may be distorted by the existence of many hidden confounding factors. For change, controlled clinical trials are usually too short. Therefore, the fundamental weak point of all

- 42 European Countries
- 62 Food Items
- FAOSTAT database 1993–2008

- **Highest correlate with CVD:**

- **Carbohydrates and cereal grains**

- **Lowest correlate with CVD:**

- **Animal fat and animal protein**

"Our results do not support the association between CVD and saturated fat.. Instead they agree with data accumulated from recent studies that link CVD risk with high glycemic index and load of carbohydrates"

**Food & Nutrition Research 2016,
60: 31694**

Vegan vs. Omnivore

- PURE Study - 135,000, 10 years, 5 continents
 - No increase in morbidity or mortality with animal protein, total fat, saturated fat but increased morbidity and mortality with cereal grains
 - *The Lancet*, Volume 390, Issue 10107, 2050 - 2062
- Vegetarian/vegan/omnivore study
 - 245,000 people no difference in disease or mortality
 - [Prev Med.](#) 2017 Apr;97:1-7.
- Food Consumption patterns – 42 European Countries
 - No CVD risk with total fat, saturated fat or animal protein
 - Increased risk with cereal grains and potatoes
 - *Food & Nutrition Research* 2016, 60: 31694



NIH-AARP Diet and Health Study

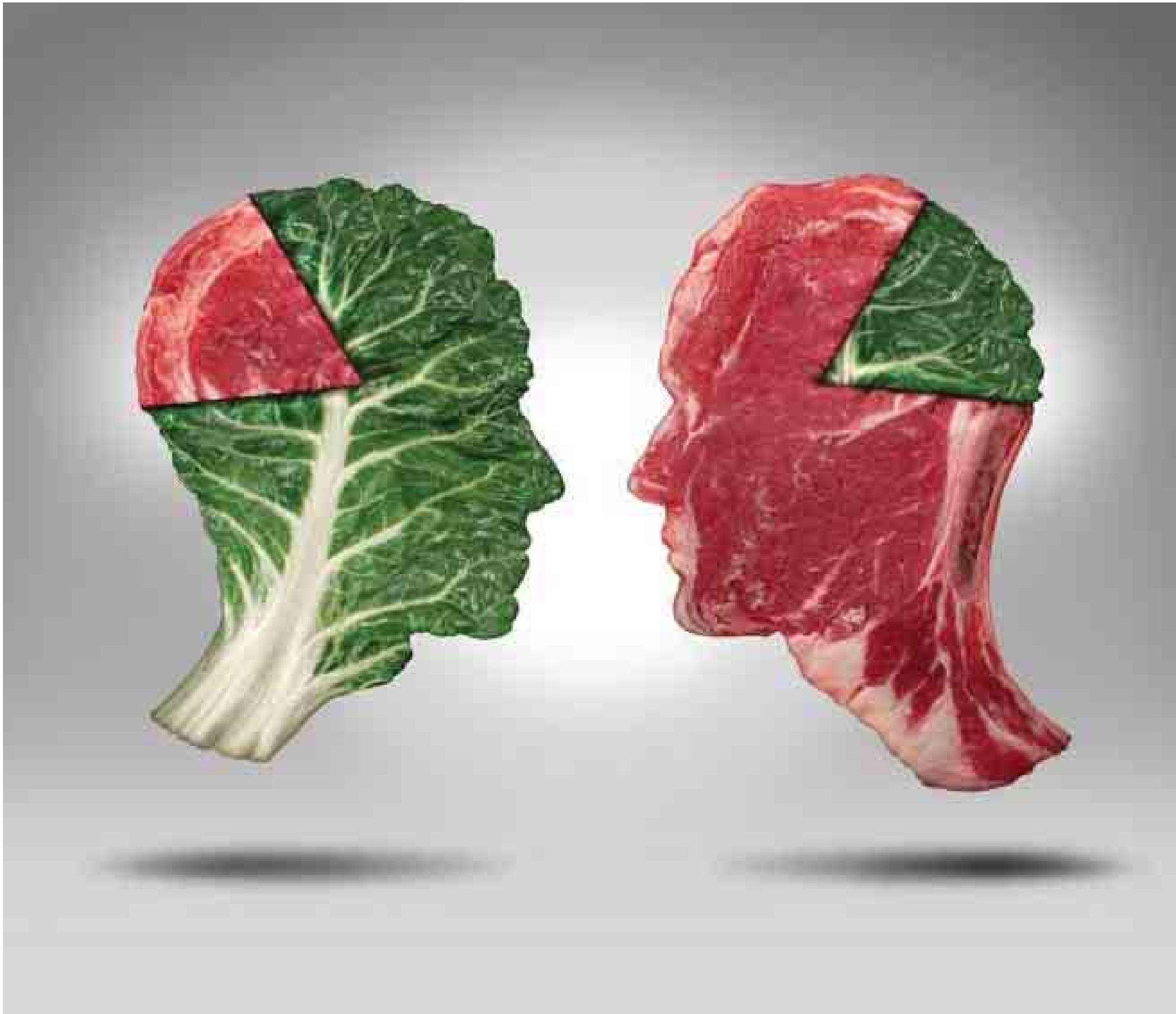
Archives of Internal Medicine, 169(6), 562–571.

500,000 people higher risk of heart disease, cancer and death

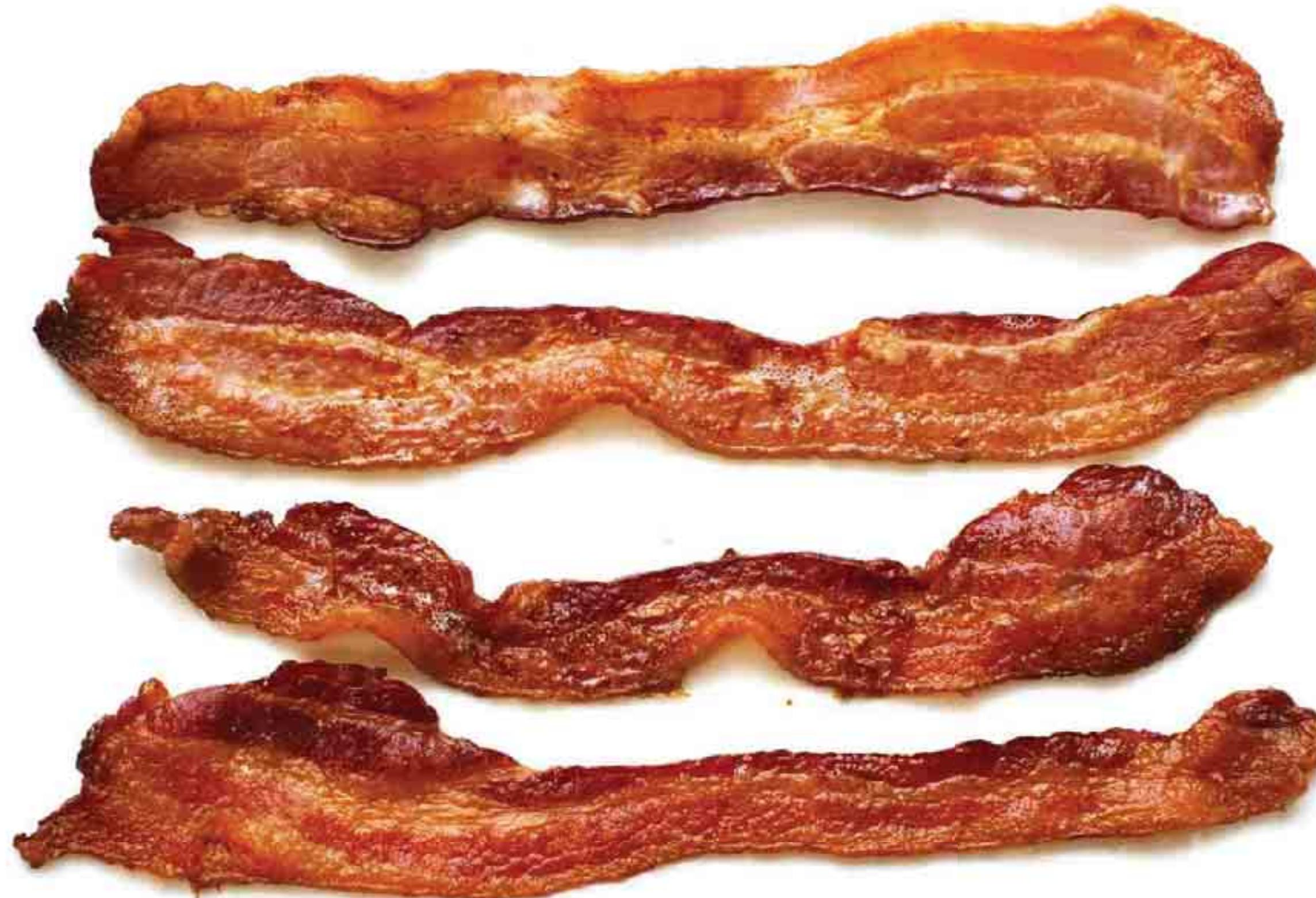


Healthy Meat Eaters?

BMJ. 1996 Sep 28;313(7060):775-9.



4 pieces of bacon
Colon cancer risk increases from 5 to 6%





Meat: What the Heck Should I Eat?

- Grass fed meats – beef, lamb, bison, venison, elk
- Leucine rich for protein synthesis
- Avoid: factory farmed CAFO animal foods
- What Should I Avoid?
 - CAFO meat
 - Antibiotic, hormone treated meat



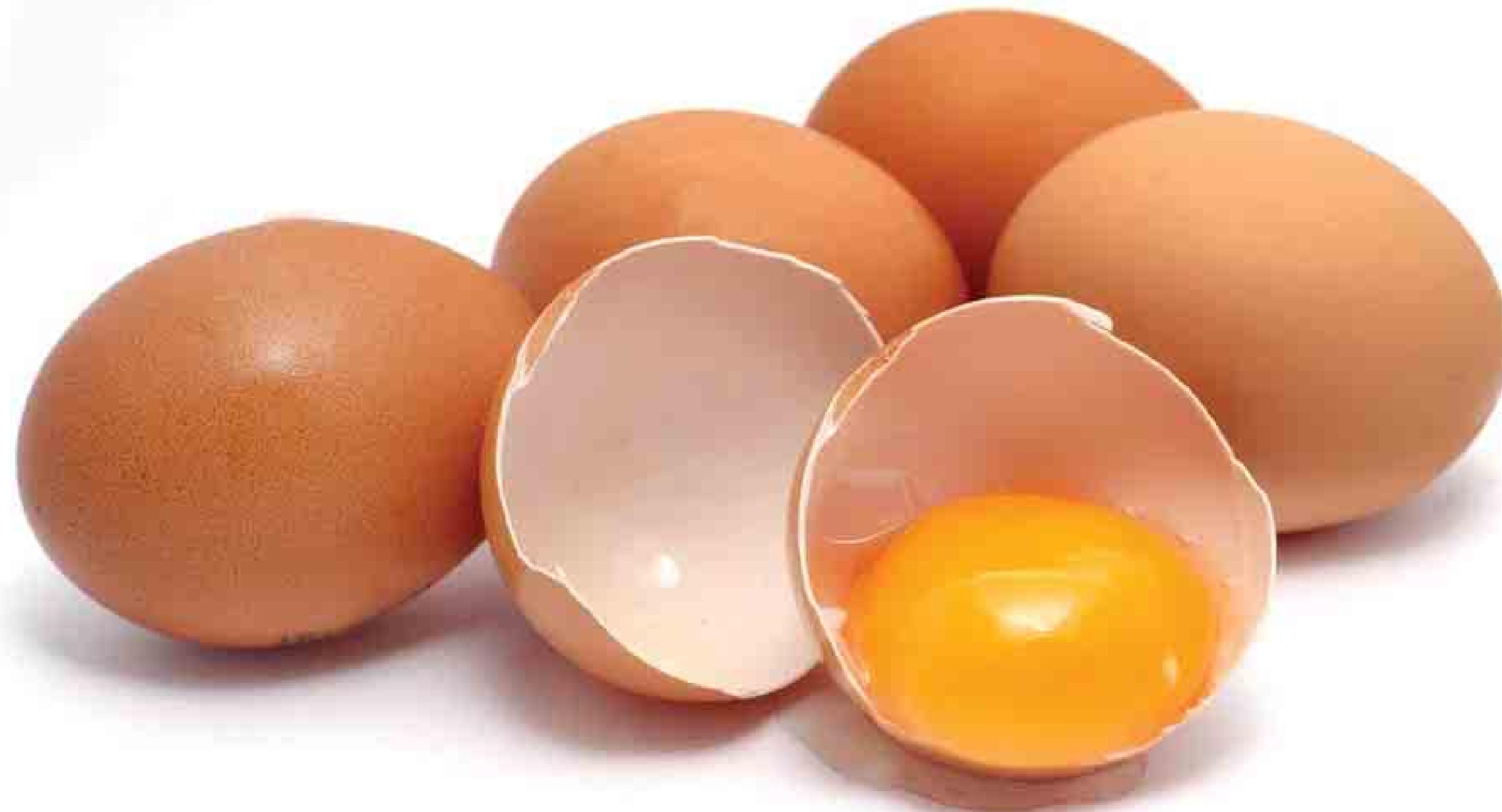
Poultry

- Chicken consumption increased from 35 to 92 pounds per person per year over the last half century
- Factory Farms
 - Animal abuse, pollution. Tyson 104 million pounds of pollutants dumped into waterways
- Arsenic in feed (mold prevention)
- Antibiotic use for growth and disease prevention & antibiotic resistant Superbugs
- Grain fed – higher levels of omega 6 fats, less minerals, vitamins, antioxidants and CLA)

Poultry: What Should I Eat?

- Pasture raised poultry (chicken, turkey, duck)
- Pasture Raised Eggs
- With hormones and antibiotics
- Avoid: CAFO poultry or eggs

Eggs?



Emma Morano

- 117 years old
- 3 eggs a day – 100,000 eggs
- 2015 Dietary Guidelines: “Cholesterol is no longer a nutrient of concern.”



Eggs: The Data

- Physician's Health Study: no link to heart disease
- Meta-analysis 16 studies, 90,000 people no link to heart disease
- Prevent LDL oxidation and increase LDL and HDL particle size
- Nutrient dense: B vitamins, A, E, D, minerals (Cu, Fe, Mn, K, Se, Zn), choline, lutein, zeaxanthin
 - Am J Clin Nutr. 2013;98(1):146-59
 - Am J Clin Nutr. 2008 Apr;87(4):964-9.
 - Nutr Res. 2010 Feb;30(2):96-103.

Eggs: What the Heck Should I Eat?

- Pasture raised eggs
- Organic eggs
- Omega 3 eggs



Fish: Is Sushi a Health Food?

- Unsustainable overfishing
- Factory fish farms (50% of our consumption)
 - 10lbs by catch for 1lb of fish, wheat, corn, soy, canola oil, etc.)
- Oceanic pollution – mercury, PCB's etc.
- River and lake pollution – mercury, etc.
- Large fish and mercury burden (swordfish, tuna, Chilean sea bass, halibut, etc.)
- Sushi contains large amounts of rice prepared with sugar and tuna is high in Hg

Fish: Nutritional Benefits

- Omega 3 fats –EPA/DHA
 - (SMASH fish – salmon, mackerel, anchovies, sardines, herring)
- Iodine, selenium, vitamin D and B12
- Clean protein
- Preformed EPA/DHA from fish vs. ALA from walnuts, flax, etc.
- Only 10% conversion rate or less
- Algae contains pre-formed DHA for neurodevelopment
- Important for neurodevelopment, mood, cardiovascular disease prevention, inflammation

Fish: What the Heck Should I Eat?

- SMASH fish
 - Wild Salmon, mackerel, anchovies, sardines, herring
 - Shellfish (shrimp, scallops, oysters, mussels)
- Sustainably harvested or raised fish (www.cleanfish.com)
- NRDC, Monterey Bay Aquarium and EWG.org for guides on fish selection
- What Should I Avoid?
- Tuna, swordfish, Chilean sea bass, halibut, grouper (see guides)
- Farmed fish that is no organic or sustainably raised)



Got Milk. Got Proof?

- 2015 US Dietary Guidelines:
 - 3 glasses of milk a day for adults and 2 glasses for children.
- Funding for school lunch only if children receive milk at every lunch meal
- Ludwig and Willett review in JAMA - no evidence of need for dairy
- Evidence of Harm
 - Skim milk increases weight gain
 - Increase fracture rates
 - Increase cancer risk
 - Autoimmune disease – type 1 DM
 - Allergies, eczema, IBS, lactose intolerance
 - A1 vs. A1 casein – goat vs. cow dairy



Dairy: What the Heck Should I Eat?

- Grass fed dairy (which is always organic) as a treat
- Heirloom dairy (grass fed)
- Goat and Sheep Dairy
- Grass fed butter or ghee
- Avoid: CAFO dairy

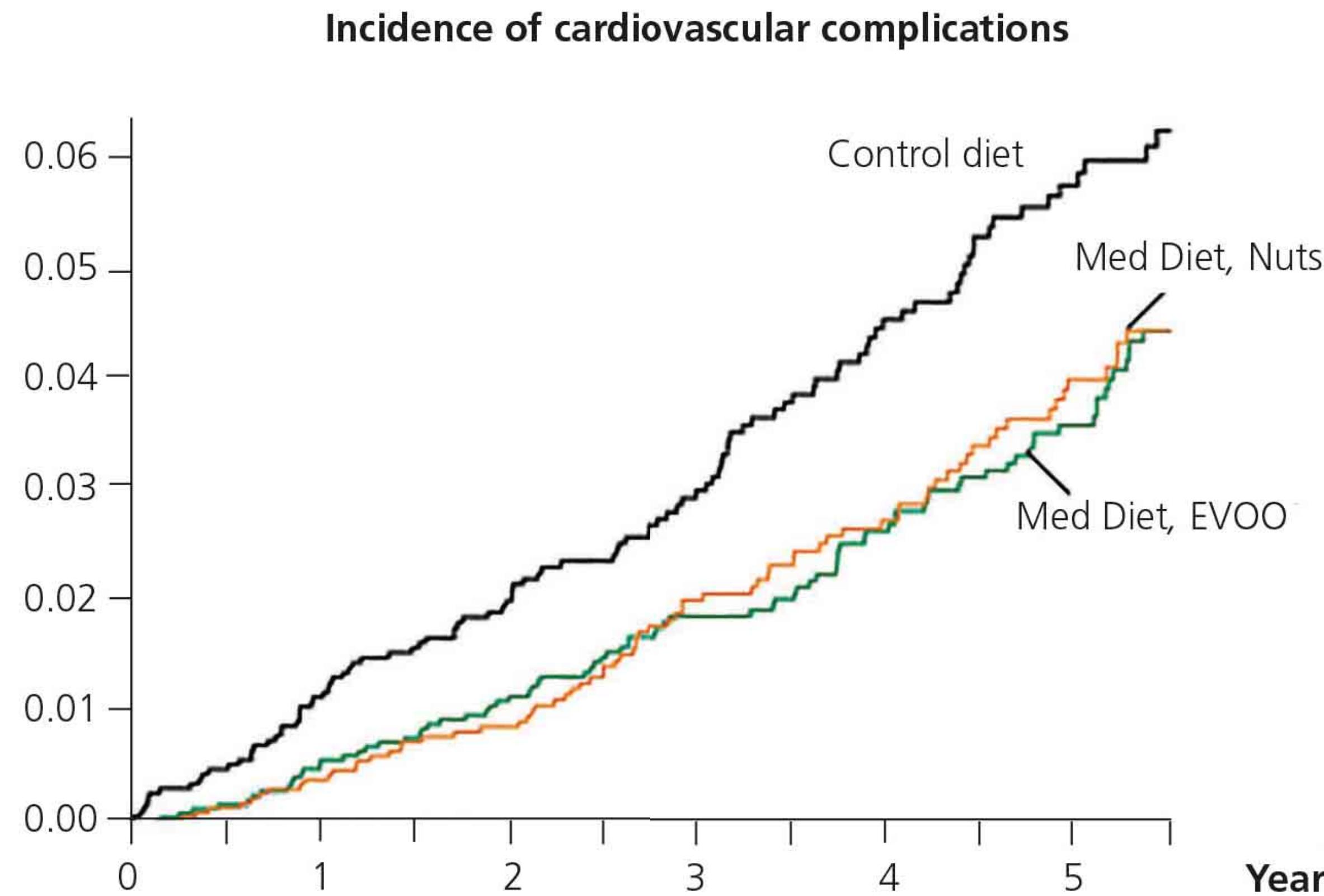


EAT GOOD FATS

Fats and Oils: What the Heck Should I Eat?

- 2015 Dietary Guidelines - no limit on total fat or dietary cholesterol
- Saturated fat - limit to less than 10% of calories
- Congress commissioned NAS to review US Dietary Guidelines process and found many flaws including limited research reviews and conflicts of interest
- Trans fat non GRAS – phasing in slowly
- Agree: monounsaturated fats are good, omega 3 fats are good
- Disagree: Saturated fat? Good or bad. Omega 6 PUFA's good or bad?
- Fats and veggies vs. refined grains or starchy carbs: Dangers of Sweet Fat
- Coconut oil: Good or Evil
- Ketogenic Diets and Intermittent Fasting: What's the deal?

PREDIMED Study N Engl J Med.
2013 Apr 4;368(14):1279-90



Hazard ratios (95 % IC)^a

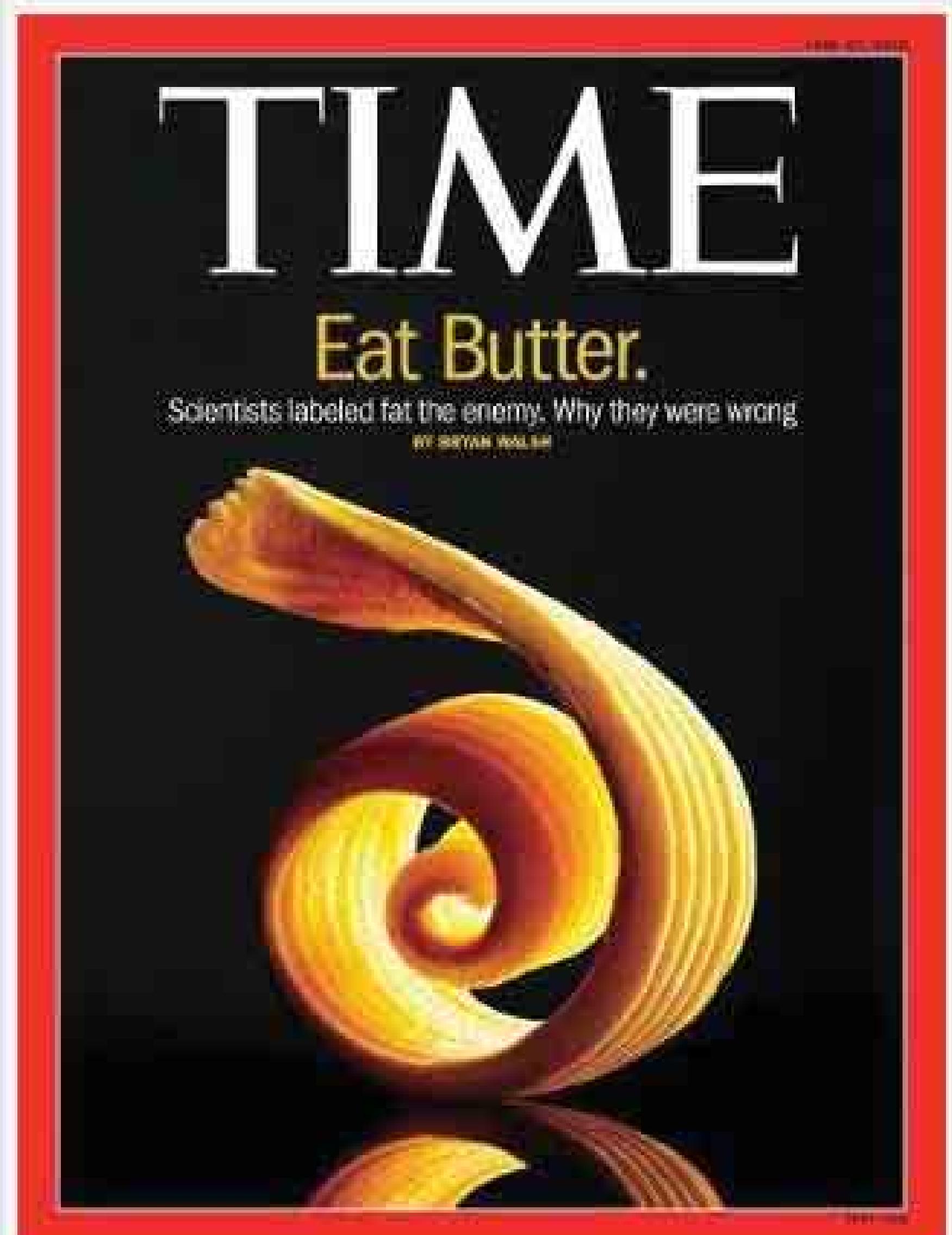
EVOO: 0.70 (0.53-0.91); $P = 0.009$

Nuts: 0.70 (0.53-0.94); $P = 0.016$





Ancel Keys on the cover of Time Magazine in 1961. He claimed that saturated fats in the diet clogged arteries and caused heart disease.



Time Magazine cover story in 2014. Scientists were wrong about saturated fats. They don't cause heart disease after all.

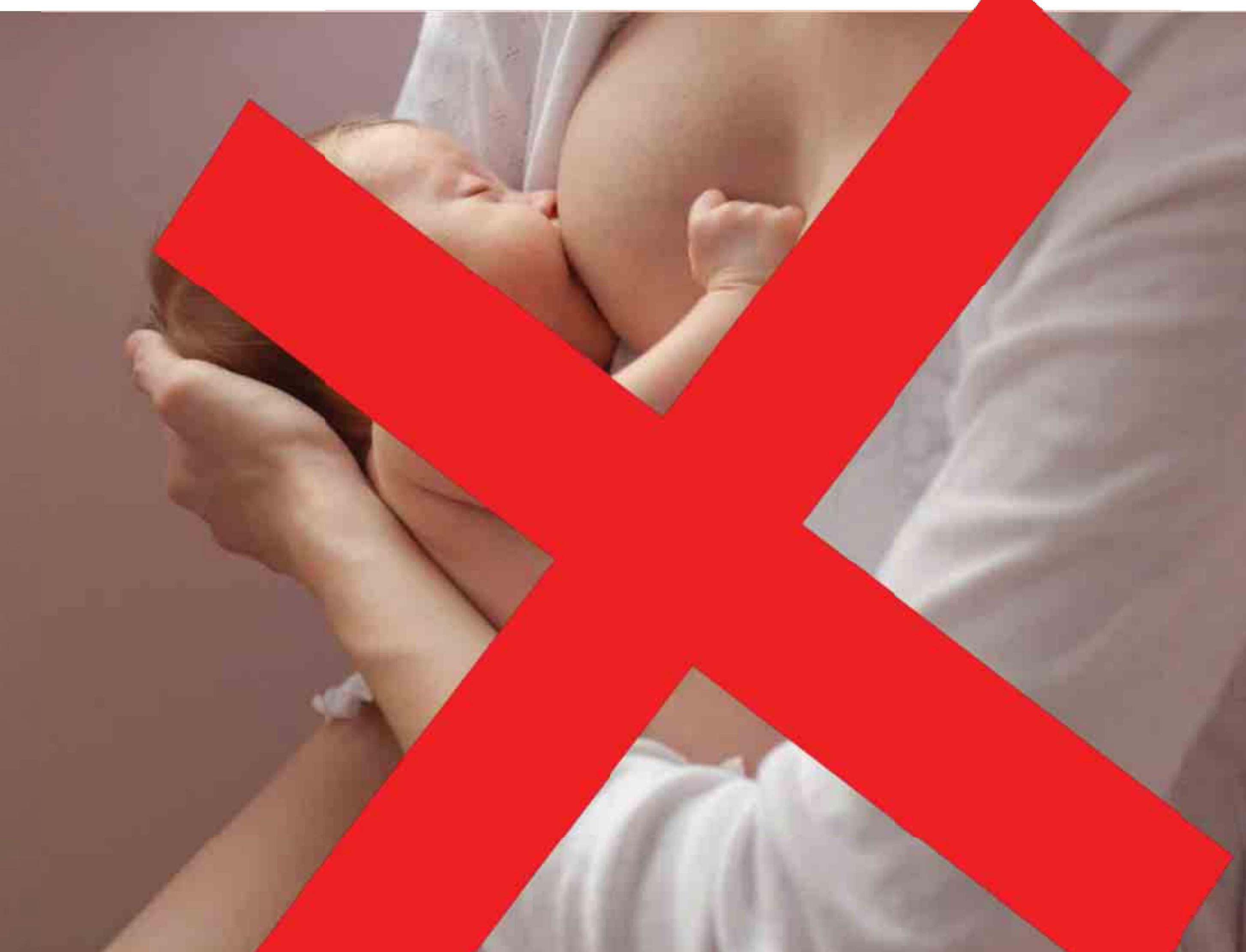


American
Heart
Association®

Consume less than 5% of calories as saturated fat



Breast milk 25% of calories as saturated fat?



Breast milk < 5% of calories as saturated fat?

Saturated Fat and CVD

Ann Intern Med. 2014 Mar 18;160(6):398-406.

- Meta-analysis 72 studies, > 600,000 people from 19 countries
- RCT's, observational studies, measurement of plasma fatty acids
- Conclusions: *Current evidence does not clearly support cardiovascular guidelines that encourage high consumption of polyunsaturated fatty acids and low consumption of total or saturated fats.*"

Effect of Low Fat Diets on Weight Loss: Review and Meta-analysis

Lancet Diabetes Endocrinol 2015

- Review of 53 RCT's lasting a year more
- Higher fat diets out performed low fat diets head to head
- Low fat diet only led to weight loss compared to standard American diet
- Weight loss greatest when high fat group diet differed by > 5% of calories

Full Fat Dairy and Diabetes

Circulation. 2016 Mar 22.



Saturated Fat and Stroke

Neurol Sci. 2016 Mar15



RESEARCH ARTICLE

Is Butter Back? A Systematic Review and Meta-Analysis of Butter Consumption and Risk of Cardiovascular Disease, Diabetes, and Total Mortality

Laura Pimpin¹, Jason H. Y. Wu², Hila Haskelberg², Liana Del Gobbo^{1,3}, Dariush Mozaffarian^{1*}

1 Friedman School of Nutrition Science & Policy, Tufts University, 150 Harrison Avenue, Boston, MA, United States of America, **2** The George Institute for Global Health, University of Sydney, Sydney, Australia, **3** Cardiovascular Medicine, Stanford School of Medicine, Palo Alto, CA, United States of America

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Abstract

Background

Dietary guidelines recommend avoiding foods high in saturated fat. Yet, emerging evidence suggests cardiometabolic benefits of dairy products and dairy fat. Evidence on the role of butter, with high saturated dairy fat content, for total mortality, cardiovascular disease, and type 2 diabetes remains unclear. We aimed to systematically review and meta-analyze the association of butter consumption with all-cause mortality, cardiovascular disease, and diabetes in general populations.

Methods and Findings

We searched 9 databases from inception to May 2015 without restriction on setting, or language, using keywords related to butter consumption and cardiometabolic outcomes. Prospective cohorts or randomized clinical trials providing estimates of effects of butter intake on mortality, cardiovascular disease including coronary heart disease and stroke, or diabetes in adult populations were included. One investigator screened titles and abstracts; and two reviewed full-text articles independently in duplicate, and extracted study and participant characteristics, exposure and outcome definitions and assessment methods, analysis methods, and adjusted effects and associated uncertainty, all independently in duplicate. Study quality was evaluated by a modified Newcastle-Ottawa score. Random and fixed effects meta-analysis pooled findings, with heterogeneity assessed using the I^2 statistic and publication bias by Egger's test and visual inspection of funnel plots. We identified 9 publications including 15 country-specific cohorts, together reporting on 636,151 unique participants with 6.5 million person-years of follow-up and including 28,271 total deaths, 9,783 cases of incident cardiovascular disease, and 23,954 cases of incident diabetes. No RCTs were identified. Butter consumption was weakly associated with all-cause mortality ($N = 9$

Competing Interests: The authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and Dr. Mozaffarian

Is Butter Back?

- 6.5 million person years, 636,000 people, 9 studies
- No evidence of link with butter and heart disease
- Lower risk of diabetes with butter consumption

PLoS One. 2016 Jun 29;11(6):e0158118.



Omega 6 Fat Facts

- 10 percent of calories from soybean oil
 - 5% linoleic acid
- 18 billion pounds per year consumed
- GMO (Round Up Ready and Glyphosate)
 - Gerrior S, Bente L. Nutrient content of the U.S. food supply, 1909-1999: a summary report. Washington, DC: U.S. Department of Agriculture, Center for Nutrition Policy and Promotion, 2002.



Vegetable Oil vs. Butter

BMJ 2016;353:i1246

 OPEN ACCESS

RESEARCH

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

Christopher E Ramsden,^{1,2} Daisy Zamora,³ Sharon Majchrzak-Hong,¹ Keturah R Faurot,² Steven K Broste,⁴ Robert P Frantz,⁵ John M Davis,^{3,6} Amit Ringel,¹ Chirayath M Suchindran,⁷ Joseph R Hibbeln¹

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Additional material is published online only. To view please visit the journal online.

Cite this as: *BMJ* 2016;353:i1246
<http://dx.doi.org/10.1136/bmj.i1246>

Accepted: 19 February 2016

ABSTRACT
To examine the traditional diet-heart hypothesis through recovery and analysis of previously unpublished data from the Minnesota Coronary Experiment (MCE) and to put findings in the context of existing diet-heart randomized controlled trials through a systematic review and meta-analysis.

DESIGN
The MCE (1968-73) is a double blind randomized controlled trial designed to test whether replacement of saturated fat with vegetable oil rich in linoleic acid reduces coronary heart disease and death by lowering serum cholesterol. Recovered MCE unpublished documents and raw data were analyzed according to hypotheses prespecified by original investigators. Further, a systematic review and meta-analyses of randomized controlled trials that lowered serum cholesterol by providing vegetable oil rich in linoleic acid in place of saturated fat without confounding by concomitant interventions was conducted.

SETTING
One nursing home and six state mental hospitals in Minnesota, United States.

PARTICIPANTS
Unpublished documents with completed analyses for the randomized cohort of 9423 women and men aged 20-97; longitudinal data on serum cholesterol for the 2355 participants exposed to the study diets for a year or more; 149 completed autopsy files.

INTERVENTIONS
Serum cholesterol lowering diet that replaced saturated fat with linoleic acid (from corn oil and corn oil polyunsaturated margarine). Control diet was high in saturated fat from animal fats, common margarines, and shortenings.

MAIN OUTCOME MEASURES
Death from all causes; association between changes in serum cholesterol and death; and coronary atherosclerosis and myocardial infarcts detected at autopsy.

RESULTS
The intervention group had significant reduction in serum cholesterol compared with controls (mean change from baseline -13.8% v. -1.0% ; $P<0.001$). Kaplan Meier graphs showed no mortality benefit for the intervention group in the full randomized cohort or for any prespecified subgroup. There was a 22% higher risk of death for each 30 mg/dL (0.78 mmol/L) reduction in serum cholesterol in covariate adjusted Cox regression models (hazard ratio 1.22, 95% confidence interval 1.14 to 1.32; $P<0.001$). There was no evidence of benefit in the intervention group for coronary atherosclerosis or myocardial infarcts. Systematic review identified five randomized controlled trials for inclusion ($n=10\,808$). In meta-analyses, these cholesterol lowering interventions showed no evidence of benefit on mortality from coronary heart disease (1.13, 0.83 to 1.54) or all cause mortality (1.07, 0.90 to 1.27).

CONCLUSIONS
Available evidence from randomized controlled trials shows that replacement of saturated fat in the diet with linoleic acid effectively lowers serum cholesterol but does not support the hypothesis that this translates to a lower risk of death from coronary heart disease or all causes. Findings from the Minnesota Coronary Experiment add to growing evidence that incomplete publication has contributed to overestimation of the benefits of replacing saturated fat with vegetable oils rich in linoleic acid.

Introduction
The traditional diet-heart hypothesis^{1,2} predicts that the serum cholesterol lowering effects of replacing saturated fat with vegetable oil rich in linoleic acid will diminish deposition of cholesterol in the arterial wall,^{3,4} slow progression of atherosclerosis,⁵ reduce coronary heart disease events, and improve survival.^{6,7} This diet-heart paradigm is supported by evidence from randomized controlled trials showing that replacement of saturated fat with linoleic acid lowers serum total cholesterol and low density lipoprotein⁸⁻¹² and by observational evidence linking serum cholesterol to coronary heart disease events and deaths (fig 1).¹³ Despite these

WHAT IS ALREADY KNOWN ON THIS TOPIC
The traditional diet-heart hypothesis predicts that replacing saturated fat with vegetable oils rich in linoleic acid will reduce cardiovascular deaths by lowering serum cholesterol. This paradigm has never been causally demonstrated in a randomized controlled trial and thus has remained uncertain for over 50 years. Key findings from landmark randomized controlled trials including the Sydney Diet Heart Study and the Minnesota Coronary Experiment (MCE) were not fully published.

WHAT THIS STUDY ADDS
Though the MCE intervention lowered serum cholesterol, this did not translate to improved survival. Paradoxically, MCE participants who had greater reductions in serum cholesterol had a higher, rather than lower, risk of death. Results of a systematic review and meta-analysis of randomized controlled trials do not provide support for the traditional diet heart hypothesis.

the *bmj* | *BMJ* 2016;353:i1246 | doi: 10.1136/bmj.i1246

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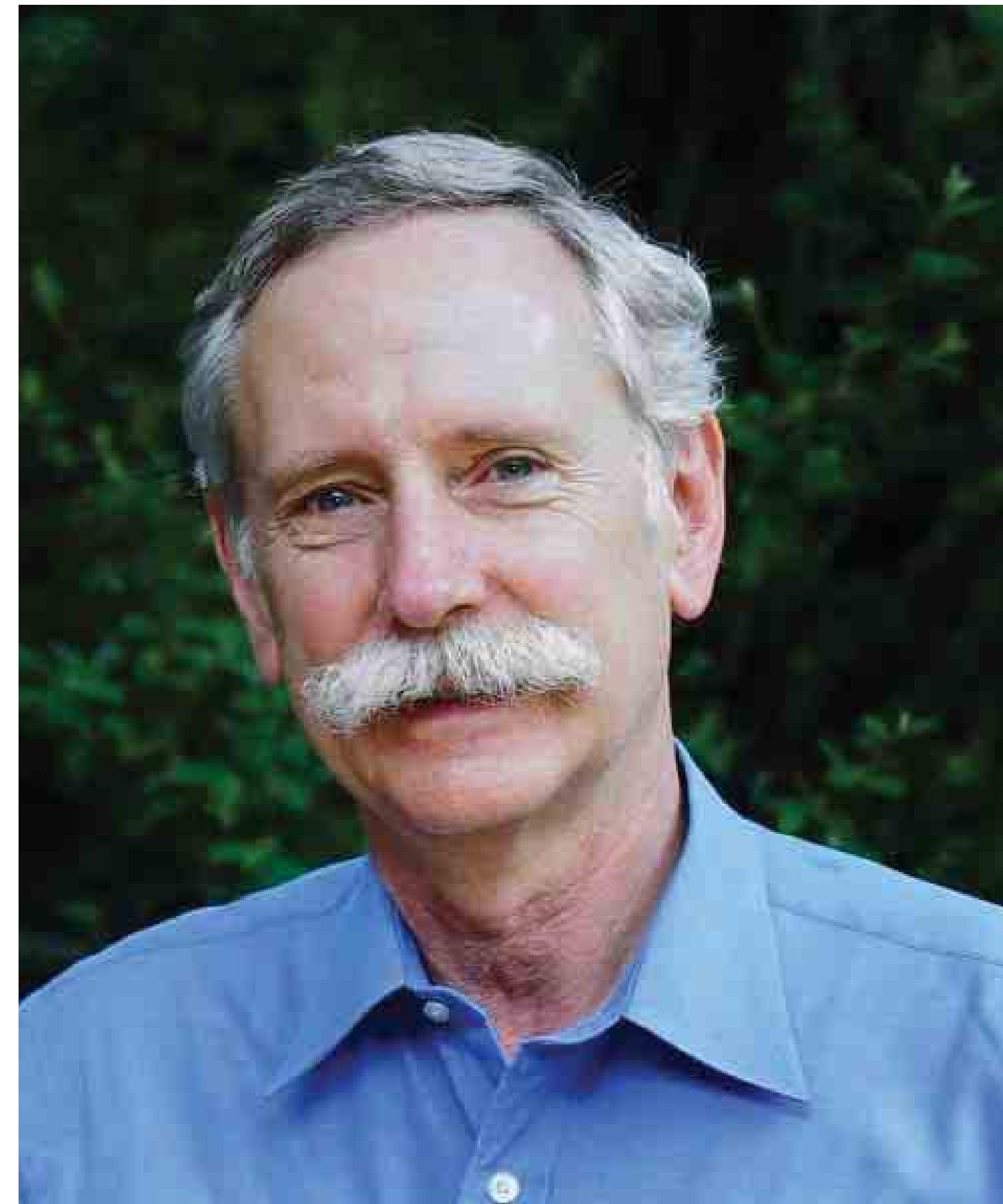
- Minnesota Coronary experiment 1968-73
- 9000+ RCT
- Vegetable oil lowered LDL but had highest risk of heart attacks and deaths and on autopsy more CVD
- For each 30 mg/dl lower LDL risk of heart attack increased by 22%

Omega 6: Other Risks

- OXLAMs – Oxidized LDL
- Heat damage
- Solvents
 - *Vascul Pharmacol.* 2014 Apr;61(1):1-9. Review.
- Dysbiosis – metabolic endotoxemia
 - *Br J Nutr.* 2013 Aug 28;110(3):515-23
- GMO soybeans: Glyphosate residue
 - Agricultural Sciences, 2015, 6, 630-662

Opposing View

- Review by Willet, et. Al found benefit to replacing SFA with PUFA's
- Not clear if combination or just n6
 - Circulation. 2014 Oct 28;130(18):1568-78.



Coconut Oil?



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AHA PRESIDENTIAL ADVISORY

Dietary Fats and Cardiovascular Disease: A Presidential Advisory From the American Heart Association

Frank M. Sacks, Alice H. Lichtenstein, Jason H.Y. Wu, Lawrence J. Appel, Mark A. Creager, Penny M. Kris-Etherton, Michael Miller, Eric B. Rimm, Lawrence L. Rudel, Jennifer G. Robinson, Neil J. Stone, Linda V. Van Horn, On behalf of the American Heart Association

Coconut Oil: The Data

- South Pacific up to 40% of calories from coconut oil (90% saturated fat)
 - *Int J Epidemiol.* 1974 Sep;3(3):225-32.
- Increased LDL particle size and increases HDL but lower TC/HDL ratio, lower triglycerides, lower insulin
 - *Eur J Clin Nutr.* 2009 Jul;63(7):879-86.
 - *J Clin Nutr.* 2011;20(2):190-5
 - *Metabolism.* 1999 Oct;48(10):1216-9.
- Some Pacific Islanders 63% calories from coconut oil without heart disease, obesity or stroke
 - *American Journal of Clinical Nutrition.* 1981. 34:1552-61.
- Other benefits: immune boosting, antimicrobial, sports performance, brain function
 - *Dermatitis.* 2008 Nov-Dec.19(6):308-15
 - *Journal of Medicinal Food.* 2007 Jun. 10(2)384-7.)

MCT Oil Benefits

- MCT oil benefits
 - Thermic effects (increase metabolism)
 - Absorbed through portal system and burned
 - Decreases visceral fat
 - Weight loss
 - Enhanced cognitive function

Obes Res. 2003 Mar;11(3):395-402. *Am J Clin Nutr.* 1986 Nov;44(5):630-4, *Lipids.* 2009 Jul. 44(7):593-601, *Eur J Clin Nutr.* 2009 Jul;63(7):879-86.

Fats: What the Heck Should I Eat?

- Plant based whole food fats
- Avocados, nuts, seeds
- Coconut oil, EVVO, avocado oil
- Whole pasture raised eggs
- Wild small fish or SMASH fish (omega 3's)
- Grass fed meats
- Pasture raised eggs
- Grass fed butter or ghee
- Tallow, lard or duck fat
- Avoid: refined seed and bean oils and trans fats



GLUTEN FREE



Grains

- New to diet last 10,000 years
- Refined grains 200 years -- now 133 pounds of flour per person per year
- Dwarf hybridized wheat –high amylopectin A, more inflammatory gliadin proteins, gluteomorphins
- Glycemic index of flour/bread > table sugar
- Glyphosate spray before harvest
- Flour - Calcium propionate vs. butyrate and neurodevelopmental disease
- PURE Study and 42 country food consumption study
- Lectins?



Grains: What the Heck Should I Eat?

- Whole grains (not whole grain flour)
- Gluten free grains (black rice, red rice, etc.)
- Non-grain grains quinoa, wild rice, amaranth, buckwheat, etc.
- Gluten grains: Rye, barley, etc. sparingly
- Avoid: Flour, dwarf wheat, gluten grains if sensitive.
- Avoid: Gluten free foods (made with refined grains and sugar)





Beans

- Source of protein?
- 6 ounce fish vs. 3 cups beans with 125 grams carbs
- Leucine poor – for muscle synthesis as we age
- Fiber rich, good source of minerals and vitamins
- Lectins?
- Soy beans – mostly GMO with glyphosate
- Isolated soy protein – increases cancer risk

Beans: What the Heck Should I Eat?

- Low glycemic beans (smaller beans such as lentils, aduzki, navy, etc.)
- Avoid kidney, lima or fava beans
- Lectins – pressure cooking and kombu
- Avoid if type 2 DM or GI issues



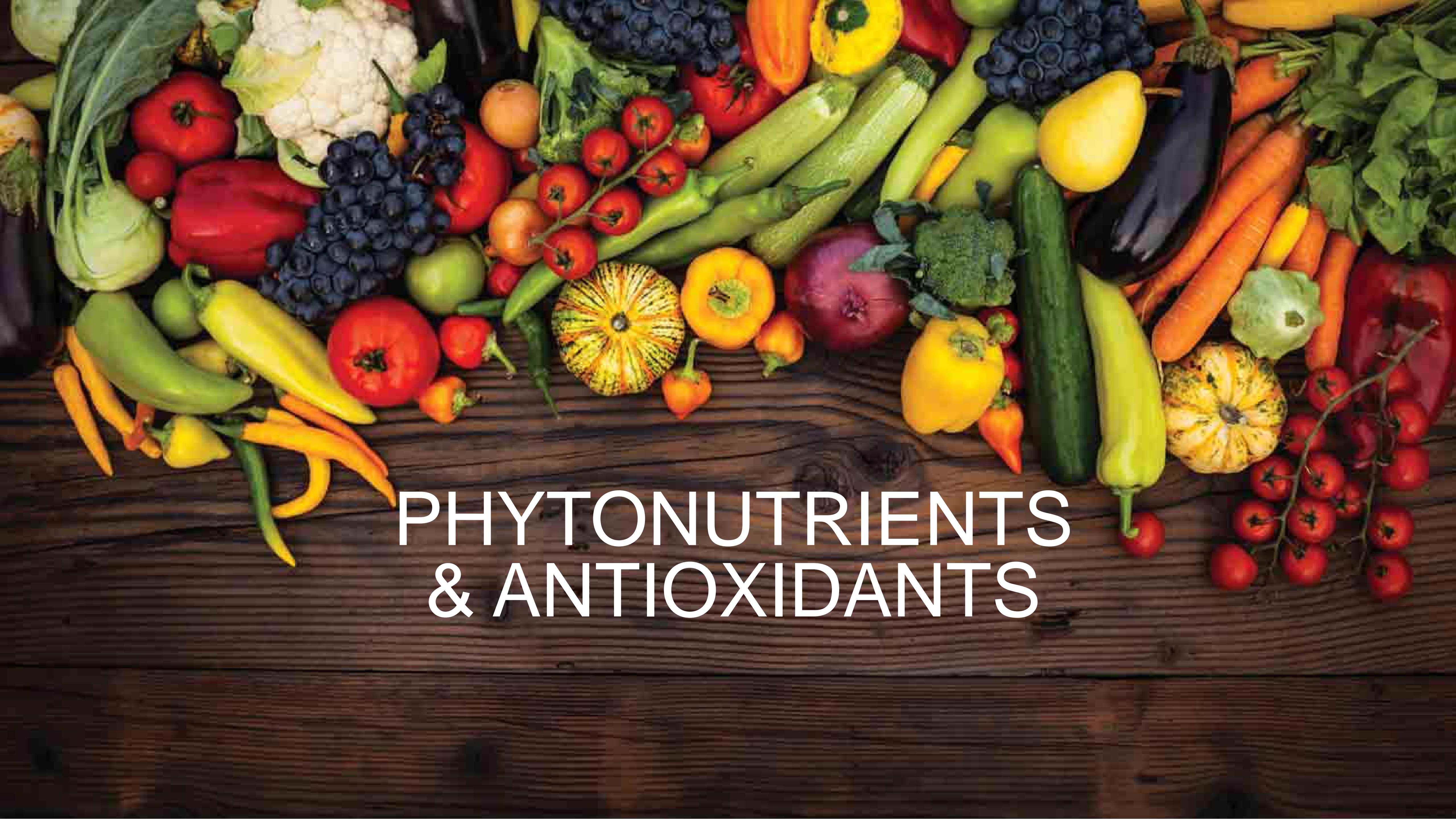


Nuts and Seeds: What the Heck Should I Eat?

- Combination of fats, protein, carbohydrates, fiber, vitamins and minerals
- Nuts are not fattening
- Reduce risk of type 2 diabetes, obesity, heart disease, cancer
- PREDIMED Study – RCT 7000 people reduced CVD by 30% vs. low fat diet
- Seeds: powerful sources of lignans, omega 3 fats, vitamins and minerals
- Peanuts – nut or bean, aflatoxins and refined oils
- Lectins and inflammations? Soaking?
- Almonds and the environment – California drought and bee issues

Nuts and Seeds: What the Heck Should I Eat?

- Walnuts, almonds, macadamia nuts, pecans, cashews, Brazil nuts, hazelnuts
- Pumpkin, hemp, flax, chia seeds, sesame seeds
- Limit peanuts (especially fried in oil and salted)
- Soaked vs. sprouted vs. raw vs. toasted?



PHYTONUTRIENTS & ANTIOXIDANTS

Vegetables: What the Heck Should I Eat?

- General consensus in nutrition that vegetables are healthy (5-9 servings)
- Source of powerful disease fighting, antioxidant, anti-inflammatory, detoxifying, gene modifying, microbiome regulating phytochemicals
- Rich sources of vitamins, minerals and fiber
- Generally low glycemic and health promoting
- Two most common “veggies” consumed in America – French fries and tomato sauce on pizza!
- Five top veggies: French fries, tomatoes, sweet corn, onions and iceberg lettuce

Vegetables: What the Heck Should I Eat?

- 50-75% of your plate should be non-starchy veggies
- Eat the rainbow – it's where' the phytochemical powerhouses live
- Eat brassicas daily
- Eat organic: EWG Dirty Dozen and Clean Fifteen (www.ewg.org)
- Eat wild
- Eat heirloom
- Eat weird vegetables (Spanish black radish, gooseberries, etc.)
- Try fermented foods (sauerkraut, kim chee)
- Try sea vegetables (rich in iodine and minerals)
- Cooking them right matters (lightly, crunchy, preserves nutrients)

Vegetables: What Should I Avoid?

- Limit starchy veggies to $\frac{1}{2}$ to 1 cup a day (tubers like potatoes, cassava, yucca, sweet potatoes, winter squash)
- Trial of nightshade free diet for arthritis/inflammation
- Avoid alfalfa sprouts – potential toxin
- Raw white button mushrooms
- Iceberg lettuce



www.morfo.com/1408702

Fruit: What the Heck Should I Eat?

- 5-9 servings of fruits and veggies?
- How much fruit? What if I have diabetes or am obese?
- Fructose with fiber and nutrients vs. free fructose
- Juice vs. whole fruit
- Low glycemic fruit
- Focus on berries
- Focus on organic – Dirty Dozen
- Frozen may be more nutritious
- Eat “FAT fruit: Avocados, olives, coconut



Sugar and Sweeteners

- Sugar is addictive
- Consumer 152 pounds of sugar a year per person
- # 1 contributor to obesity, heart disease, type 2 DM, dementia and cancer
- SSB #1 contributor to obesity
- HFCS 15% of our calories
- Artificial sweeteners: increase obesity and type 2 DM via impact on microbiome and neuro-hormonal regulation of appetite
- Sugar alcohols, including erythritol
- Many names of sugar

Sugar & Sweeteners: What the Heck Should I Eat?

- Consider sugar and sweeteners as recreational drug
- Eat small amounts of sugar, honey, maple syrup, etc.
- Avoid artificial sweeteners and sugar added to processed foods
- Consider whole plant stevia in small amounts not Reb A (Coca Cola and Pepsi)



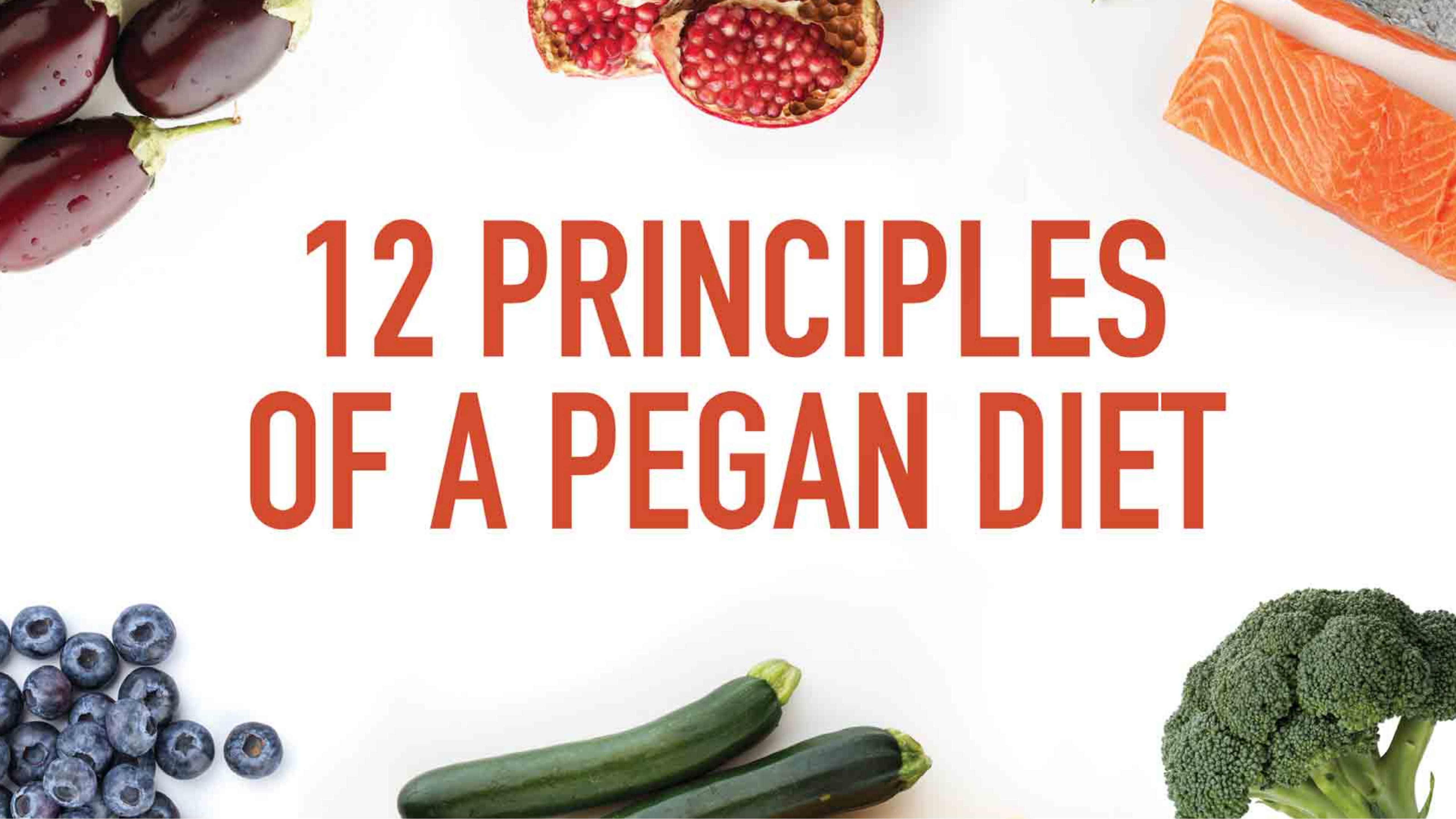
Beverages: What the Heck Should I Drink?

- Water, filtered, or sparkling
- Flavored with lemon
- Green tea
- Coffee
- Unsweetened green juices (minimal or no fruit, carrots or beets)
- Alcohol – 2-3 drinks a week (1 ounce of liquor, 5 ounces wine, 10 ounces beer)
- What to Not Drink?
 - Sugar sweetened beverages, energy drinks, sports drinks, flavored or sugared coffees or teas

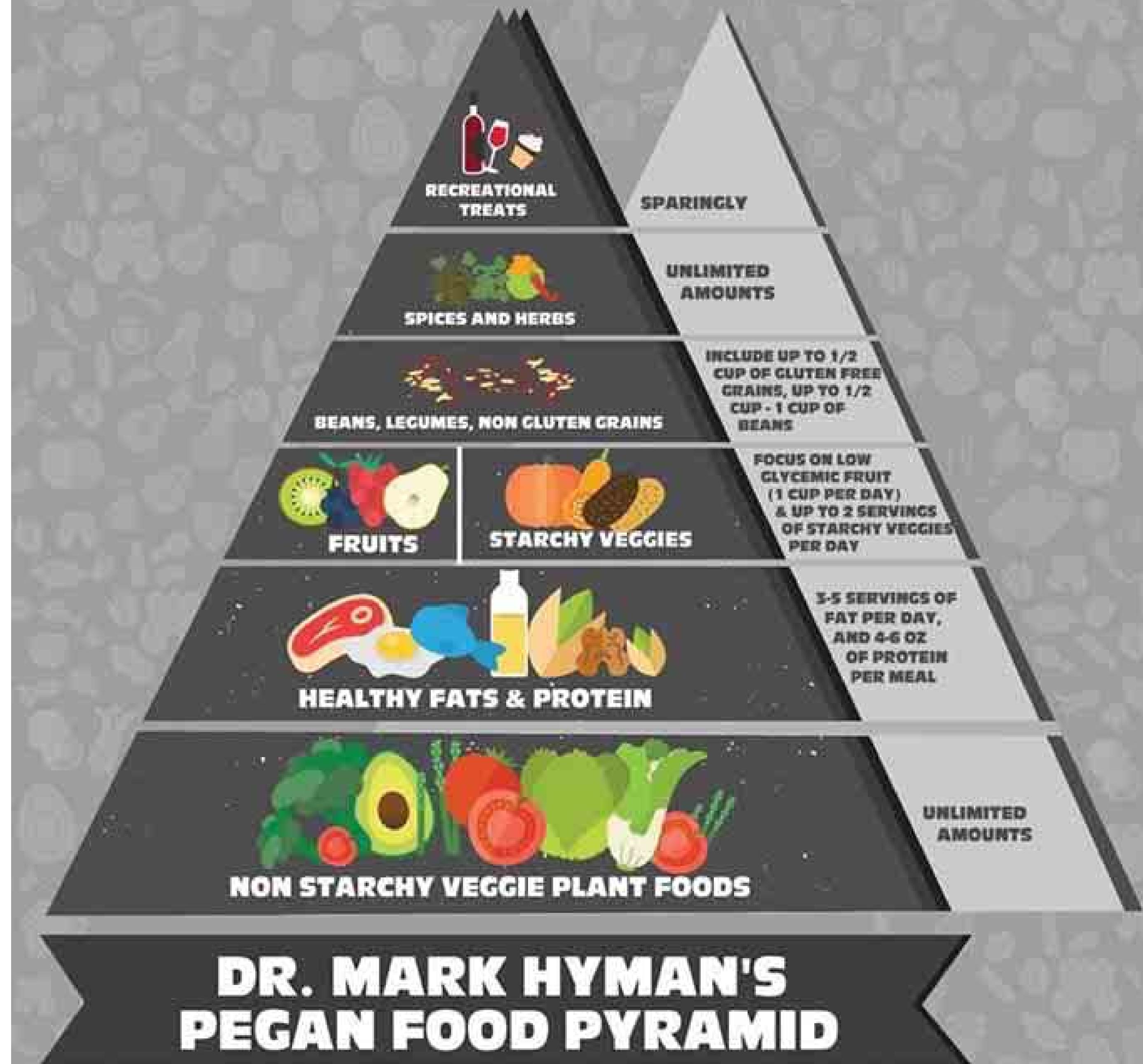
What the Heck Should I Not Eat?

- Additives (3000 + on the market, average consumption 3-5 lbs a year)
- Antibiotics
- Hormones
- Pesticides
- GMO
- Processed food with non-food ingredients
- Packaging – cans and plastics with BPA and Phthalates +
- ADD: spices, condiments, fermented foods,

12 PRINCIPLES OF A PEGAN DIET







The 12 Principles of The Pegan Diet

1. Very low glycemic load
2. Very high in vegetables
3. Eat lower glycemic fruit
4. Higher in good quality fats: omega 3, olive oil, nuts and seeds
5. Low in refined omega 6 oils (soy, safflower, etc.)
6. Avoid or limit dairy (or stick with grass fed goat, sheep)

The 12 Principles of The Pegan Diet

1. Ideally organic, whole, fresh, local
2. Animal food: sustainably and humanely raised (grass fed, etc.)
3. Fish: low mercury fish, sustainable fisheries and farmed fish
4. Avoid gluten grains, moderate non-gluten grains
5. Beans as a side dish: small lower glycemic beans
6. Low or no pesticides, antibiotics or hormones, chemicals, additives, preservatives and GMO foods



**"I FELT SO MUCH
BETTER AFTER
10 DAYS THAT
I DECIDED TO
COMMIT TO 30
MORE DAYS..."**



FOOD





WHAT THE HECK SHOULD I EAT?

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to achieving optimal weight
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FOOD: WTF SHOULD I EAT?

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