"Food is an important part of a balanced diet"
Fran Lebowitz

Nutrition and the Evidence Conundrum

What we know (very little) and what we will likely never know (a lot) about nutrition

James McCormack, BSc(Pharm), Pharm D
Professor, Faculty of Pharmaceutical Sciences, UBC

"Few things are more prey to fad and fashion than alleged dietary influences on health"
Geoff Watts - BMJ

A History of Canada's Food Guide (1942-2019)

ADULTS

(servings per day unless otherwise indicated)

CANADA FOOD GUIDE	Milk	Fruit (servings)	Vegetables (servings)	Cereals/Bread (servings)	Meat or alternatives (servings)	Other
1942	1 cup	1 of tomatoes or citrus fruit AND 1 other	2	1 of whole grain cereal AND 4-6 slices of bread	1 of meat, fish or meat substitute and liver, kidney or heart once a week	3-4 eggs a week, some cheese
1944	1 cup	1 of tomatoes or citrus fruit AND 1 other	At least 1 of potatoes and 2 of other vegetables	1 of whole grain cereal AND 4 slices of bread with butter	1 of meat, fish, poultry OR alternatives (beans, peas, nuts eggs or cheese) and liver frequently	Eggs or cheese at least 3 x a week
1949	1 cup	1 of tomatoes or citrus fruit AND 1 other	At least 1 serving of potatoes AND 2 servings of other vegetables	1 of whole grain cereal AND 4 slices of bread with butter or fortified margarine	1 of meat, fish, poultry OR alternatives (beans, eggs or cheese) and liver frequently	Eggs or cheese at least 3 x a week
1961	1.5 cups	2 of fruit or juice	1 serving of potatoes AND 2 servings of other vegetables	1 of whole grain cereal, bread with butter or fortified margarine	1 of meat, fish, poultry OR alternatives (beans, peas, eggs or cheese) and liver occasionally	Eggs or cheese at least 3 x a week
	Milk and milk products (Servings = cups)	**Fruits and vegetables (servings)**		**Grains (servings)**	**Meat or alternatives (servings)**	**Other**
1977 Eat a variety of foods	2	4-5 includes at least 2 vegetables – raw or juices		3-5 of whole grains	2 of lean meat, poultry, liver or fish OR alternatives (peanut butter, pea, beans, lentils, nuts, seeds, cheese, 2 eggs)	
1982 Eat a variety of foods	2	4-5 includes at least 2 vegetables – raw or juices		3-5 of whole grains or enriched	2 of lean meat, poultry, liver or fish OR alternatives (peanut butter, peas, beans, lentils, nuts, seeds, cheese, 2 eggs)	
1992	2-4	5-10 of raw or juices		5-12	2-3 of meat, poultry or fish OR alternatives (beans, peanut butter, 1-2 eggs)	
2007	2-3	7-10 of raw or juices		6-8	2-3 of fish, shellfish, poultry, lean meat OR alternatives (legumes, tofu, 2 eggs, peanut butter, nuts/seeds)	Oils and fats - small amount of unsaturated fat
2019	**Fluid**	**Fruits and vegetables**		**Whole grains**	**Proteins (dairy and meat)**	**Other**
No longer portions but PROPORTIONS **Eat a variety of healthy foods each day**	Replace sugary drinks with water	50% plenty of vegetables and fruits		25%	25%	Limit highly processed food, be mindful of your eating habits, cook more often, enjoy your food, eat meals with others, replace saturated fats with unsaturated fats, no added sodium or free sugars

Yellow boxes are some of the interesting changes

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therapeuticseducation.org

A History of the USDA Food Guides (1940-2020)

ADULTS

(servings per day unless otherwise indicated)

1940 7 food groups	**Milk, cheese, ice cream**	**Citrus fruit, tomatoes, raw cabbage (servings)**	**Leafy, green and yellow vegetables (servings)**	**Potatoes and other vegetables and fruits (servings)**	**Bread, flour, cereals (servings)**	**Meat, poultry, fish, eggs, dried peas, beans (servings)**	**Other**
	2 or more cups	1 or more	1 or more	2 or more	Every day whole-grain, enriched or restored	1-2 SPECIFICALLY - meat, poultry, fish once a day if possible; eggs 4 or more a week; dried beans, peas, nuts, peanut butter 2 or more a	some butter and fortified margarine daily
1956 –70s 4 food groups	**Milk**	**Fruits and vegetables (servings)**			**Bread, cereal (servings)**	**Meat (servings)**	**Other**
	2 or more cups	4 or more SPECIFICALLY - citrus fruit; dark-green or deep-yellow vegetable - at least every other day; other vegetables and fruits including potatoes			4 or more whole-grain, enriched or restored	2 or more SPECIFICALLY - beef, veal, pork, lamb, poultry, fish, eggs OR dry beans, dry peas, nuts	unenriched, refined breads, cereals, flours; sugars; butter, margarine, other fats - include vegetable oil
1979 Hassle-free	**Milk, cheese (servings)**	**Fruits and vegetables (servings)**			**Bread, cereal group (servings)**	**Meat, poultry, fish, beans (servings)**	**Other**
	2 skim, nonfat, low fat milk products keep fat intake down	4 citrus fruit, melon, berries, or tomatoes daily, and a dark-green or dark-yellow vegetable frequently - for fiber eat unpeeled			4 chose whole-grain often	2 poultry and fish have less fat than red meats	CAUTION - fats, sweets, alcohol
1984 Food Wheel	**Cheese, yogurt, milk (servings)**	**Fruits (servings)**		**Vegetables (servings)**	**Breads, grains, cereals (servings)**	**Eggs, meat, poultry, fish (servings)**	**Other**
	2	2-4 citrus, melon, berries, other		3-5 dark green, deep yellow, other, starchy	6-11 whole-grains, enriched	2-3 - total 5-7 ounces lean; also nuts, seeds, dried beans. peas	MODERATION - alcohol, sweets, fats
1992 Pyramid	**Milk, yogurt, cheese (servings)**	**Fruits (servings)**		**Vegetables (servings)**	**Breads, cereal, rice, pasta (servings)**	**Meat, poultry, fish, dry beans, eggs, nuts (servings)**	**Other**
	2-3	2-4		3-5	6-11	2-3	USE SPARINGLY - fats, oil, sweets
2005 MyPyramid	**Milk**	**Fruits**	**Oils**	**Vegetables**	**Grains**	**Meat, beans**	**Other**
	3 cups low fat or fat free	2 cups eat a variety of fruits; go easy on the juices	fat should be from fish, nuts, and vegetable oils; limit solid fats like butter, margarine, lard; keep consumption of saturated fats, trans fats and sodium low	2.5 cups vary the types of vegetables	6 ounces 1/2 of all grains should be whole-grains	5.5 ounces eat lean cuts, seafood and beans; avoid frying	choose foods low in added sugars - 30 minutes a day of physical activity
2011 MyPlate	**Dairy**	**Fruits**		**Vegetables**	**Grains**	**Protein**	**Other**
	Skim or 1%; go easy on cheese skim yogurt	1/2 plate fruits and vegetables - whole fruit preferable to juice but any fruit counts: fresh, canned, 100% juice or dried		1/2 plate fruits and vegetables - vary - any vegetable, juice counts	make at least 1/2 whole-grains - whole wheat, oatmeal, brown rice	1/4 plate SPECIFICALLY - seafood, beans and peas, nuts, lean meats, poultry and eggs	cut back on foods high in solid fats, added sugars and salt; be physically active
2015-2020 ChoseMyPlate	3 cups move to low-fat or fat-free milk, yogurt, soy	2 cups focus on whole fruits that are fresh, frozen, canned or dry		3 cups - vary vegetables - fresh, frozen, canned- dark green, red and orange	8 ounces make half your grains whole-grains	6 1/2 ounces - vary protein SPECIFICALLY - seafood, beans, peas, unsalted nuts and seeds, soy products, eggs, lean meats, poultry	drink and eat beverages and food with less sodium, saturated fat, trans fat and added sugars 2 1/2 hours a week of activity

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Learning Objectives

Discuss the types of study designs used in nutrition literature, and the advantages and limitations of each type in this topic area.

Discuss the impact of eggs on development of CHD.

Discuss the risks/benefits of coffee consumption.

Discuss fruits and vegetable servings and what the evidence suggests is a beneficial number of daily servings.

Discuss the impact of alcohol and sugary drinks on cardiovascular disease and mortality.

Discuss the available evidence regarding specific diet types and their impact on health.

When do we have debate about health issues?

the answer may be impossible to know

the best available evidence is tenuous

the potential difference in outcome is “small”

there is a belief about “a mechanism”

the stakes are high - pharmaceutical and nutrition beliefs are very “marketable”

FOOD, especially with individual nutrients, HAS ALL OF THESE

Annals of Internal Medicine

IDEAS AND OPINIONS

U.S. Dietary Guidelines: An Evidence-Free Zone

2016

Steven E. Nissen, MD

"a detailed review of the new guidelines confirms a disturbing reality: the nearly complete absence of high-quality randomized, controlled clinical trials (RCTs) studying meaningful clinical outcomes for dietary interventions. The report repeatedly makes recommendations based on observational studies and surrogate end points, failing to distinguish between recommendations based on expert consensus rather than high-quality RCTs. Unfortunately, the current and past U.S. dietary guidelines represent a nearly evidence-free zone"

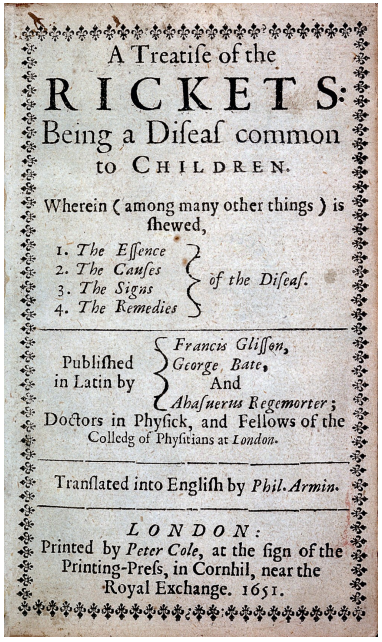
Ann Intern Med doi:10.7326/M16-0035

BIG

effects with nutrition have occurred

Vitamin deficiencies

Gross malnutrition etc


A Treatiſe of the
RICKETS:
Being a Diſeaſ common
to CHILDREN.

Wherein (among many other things) is
ſhewed,

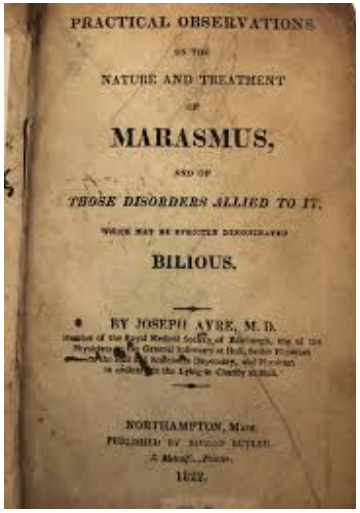
1. *The Eſſence*
2. *The Cauſes*
3. *The Signs*
4. *The Remedies*

} *of the Diſeaſ.*

Publiſhed in Latin by *Francis Gliſſon*, *George Bate*, And *Ahaſuerus Regemorter*; Doctors in Phyſick, and Fellows of the Colledg of Phyſitians at *London*.

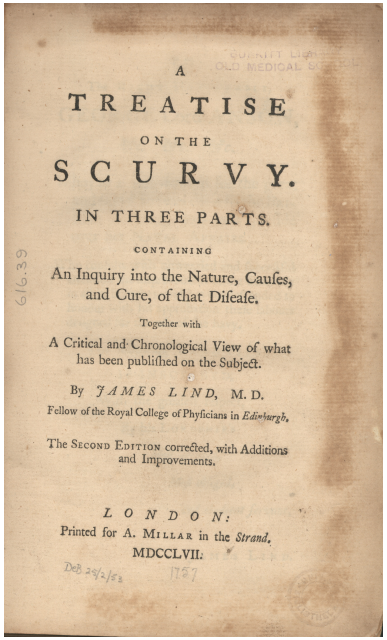
Tranſlated into Engliſh by *Phil. Armin.*

LONDON:
Printed by *Peter Cole*, at the ſign of the Printing-Preſs, in Cornhil, near the Royal Exchange. 1651.


PRACTICAL OBSERVATIONS
ON THE
NATURE AND TREATMENT
OF
MARASMUS,
AND OF
THOSE DISORDERS ALLIED TO IT,
WHICH MAY BE STRICTLY DENOMINATED
BILIOUS.

BY JOSEPH AYRE, M. D.

NORTHAMPTON, Mass.
PUBLISHED BY SIMEON BUTLER.
1822.


A
TREATISE
ON THE
SCURVY.
IN THREE PARTS.
CONTAINING
An Inquiry into the Nature, Cauſes, and Cure, of that Diſeaſe.
Together with
A Critical and Chronological View of what has been publiſhed on the Subject.
By *JAMES LIND*, M. D.
Fellow of the Royal College of Phyſicians in *Edinburgh*.
The SECOND EDITION corrected, with Additions and Improvements.
LONDON:
Printed for A. MILLAR in the *Strand*.
MDCCLVII.

Cause and Effect

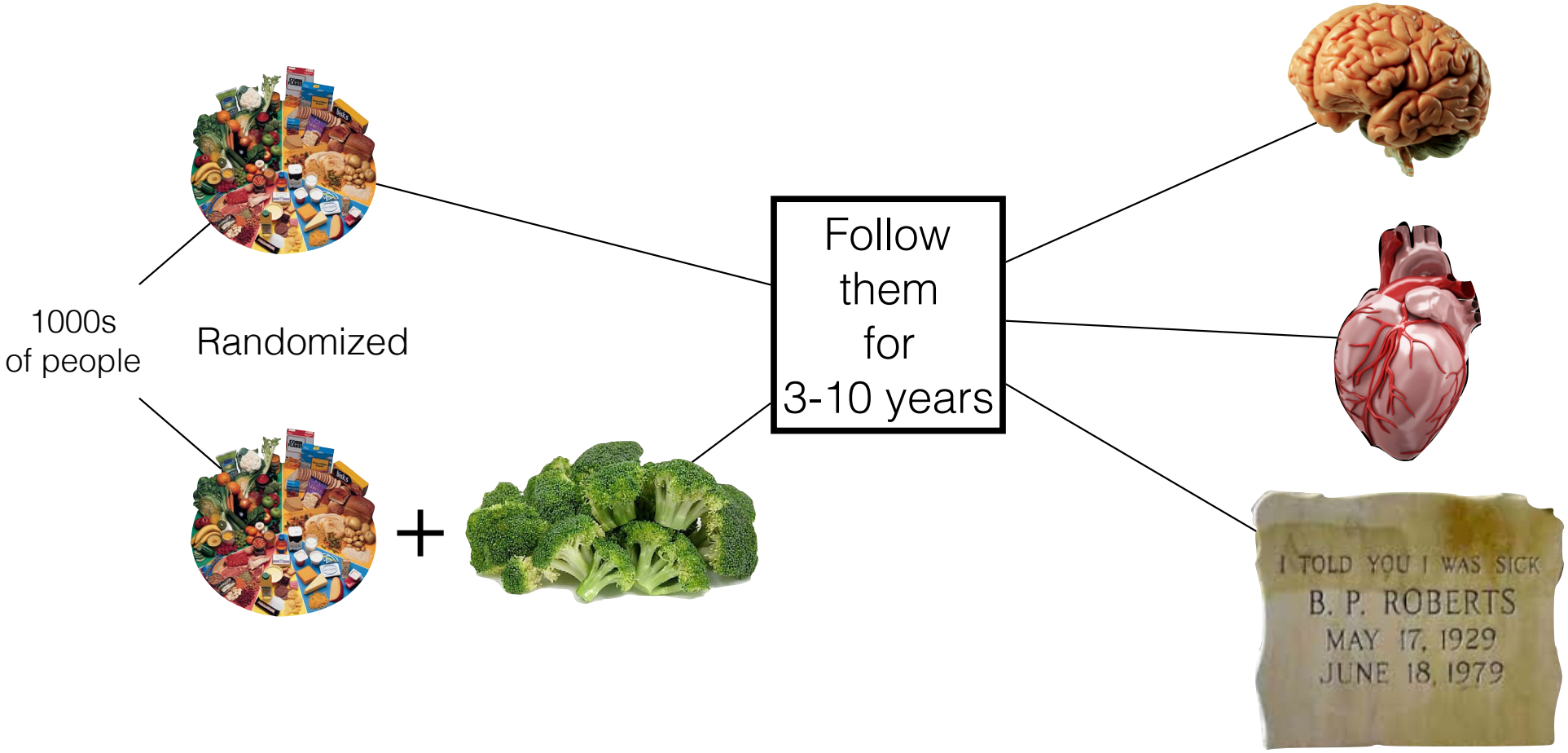
How do we figure out whether “food” is healthy
or unhealthy?

Two Questions

How do we differentiate association from causality?

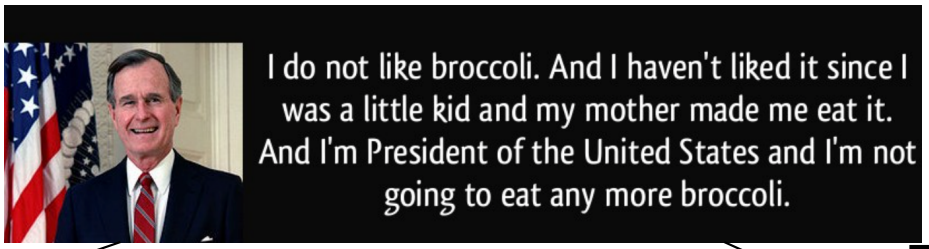
If there is an effect, then, how big is the effect?

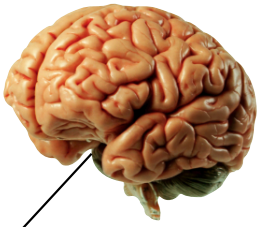
The Best Way - RCTs - <5



The OK way - Cohort Studies -100s

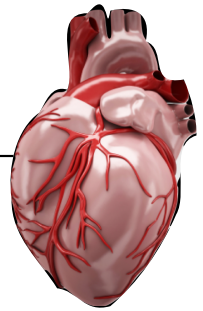
Prospective or retrospective

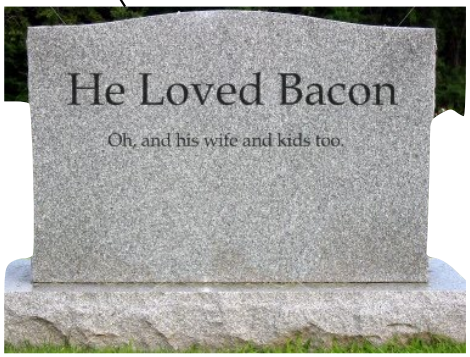




1000s of people

Follow them for 3-10 years



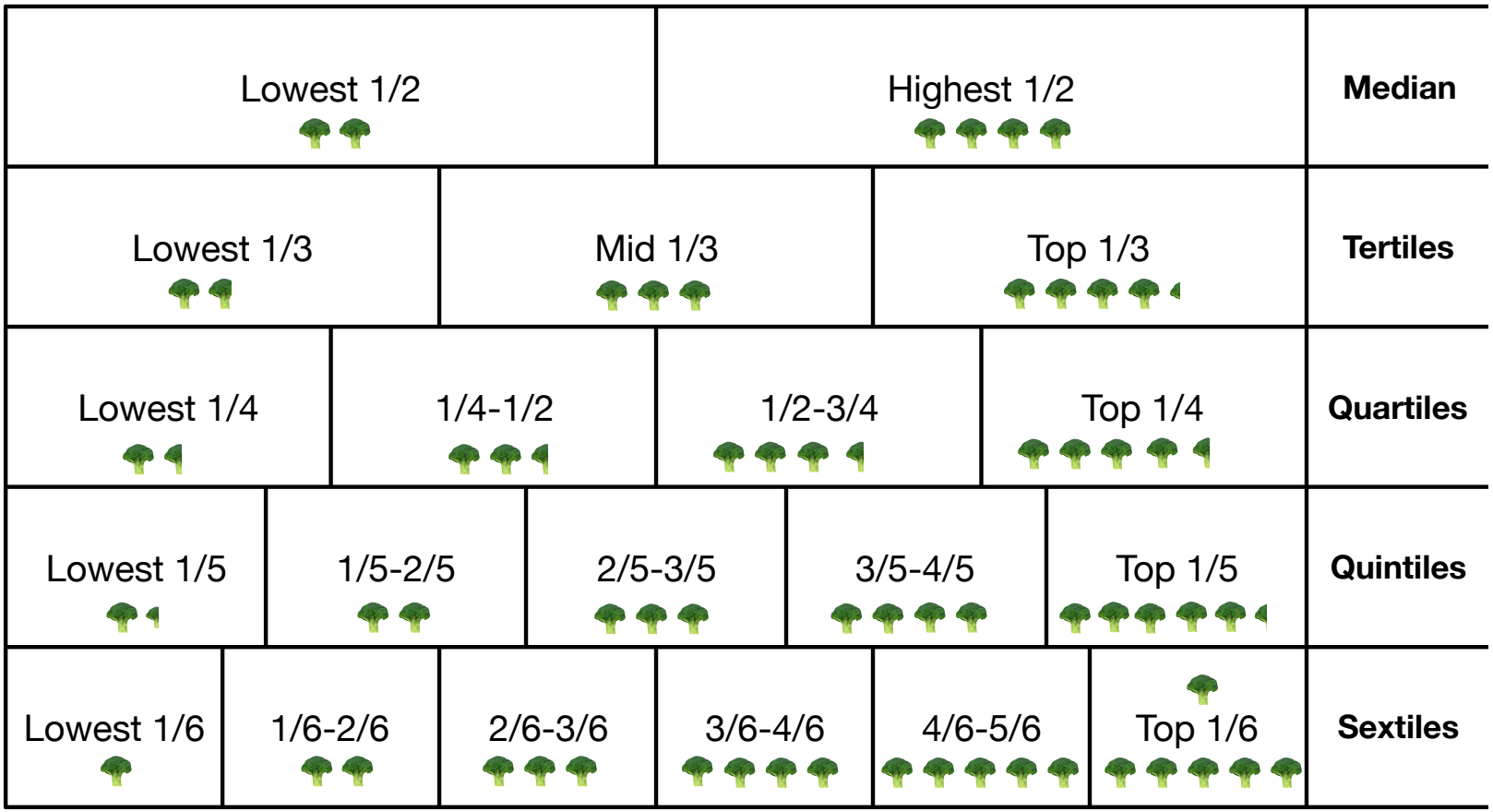


Quantiles

Tertiles
Quartiles
Quintiles
Can help prevent misclassification

Quantiles

Splitting the observed population into the differing amounts of a food or nutrient etc



Design bias in nutritional cohort studies

EXAMPLES OF BIASES

Recall bias

Everybody is unblinded

EXAMPLES OF CONFOUNDING

When we see real differences but, there is a “third” cause

Coffee - does it cause lung cancer - smoking is a confounder

Beer preference is associated with less healthy dietary behaviour, especially compared with wine preference

Eating “healthy” - may be more physically active

Alcohol intake - may be more social, less stress

Reporting bias in nutritional studies

PUBLICATION BIAS

Publish findings that are found to show differences or are controversial

REPORTING BIAS

Media flip-flopping - more likely to report “NEW or DIFFERENT” findings

We Can't Ignore Industry Influence

JAMA Internal Medicine | Special Communication

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

"Access to documents not meant for public consumption has provided the public health community unprecedented insight into industry motives, strategies, tactics, and data designed to protect companies from litigation and regulation." and **"Policymaking committees should consider giving less weight to food industry–funded studies"**

HEALTH CARE POLICY AND LAW

Food Industry Funding of Nutrition Research
The Relevance of History for Current Debates

Marion Nestle, PhD, MPH

" Today, it is almost impossible to keep up with the range of food companies sponsoring research—from makers of the most highly processed foods, drinks, and supplements to producers of dairy foods, meats, fruits, and nuts— **typically yielding results favorable to the sponsor's interests"**

JAMA Int Med 2016

But despite all these limitations observational studies will often be the best we have and will likely be the best we will ever have because RCTs may not be possible

The Worst Way (to infer causality) -“Mechanisms”- 1000s

Assess the impact of nutrition on surrogate markers or get wedded to an hypothesis - RCTs can be done

- insulin
- glucose
- lipids
- weight
- ketones
- blood pressure
- hormone balance
- atherosclerosis
- endothelial function

Eat what people ate10,000+ years ago

What can we study?

Implausible results in human nutrition research

Definitive solutions won't come from another million observational papers or small randomized trials

John P A Ioannidis *professor of medicine, health research and policy, and statistics*

Stanford Prevention Research Center, Stanford, CA 94305, USA

BMJ 2013;347:f6698

Objectively speaking, we can't get definitive answers from more studies because they all have important biases, there are numerous confounders and evaluating surrogate markers is fraught with problems

Single Nutrients

"on the basis of dozens of randomized trials, single nutrients are unlikely to have relative risks less than 0.90 for major clinical outcomes …"

"… most are greater than 0.95"

In other words, if differences exist the relative difference is

<10% and may be <5%

"Observational studies and even randomized trials of single nutrients seem hopeless, with rare exceptions"

BMJ 2013;347:f6698

Multiple Nutrients and Behaviours

"Larger effect sizes [ie. >10%] are more plausible for complex dietary patterns that sum the effects of multiple nutrients and behaviors"
PREDIMED, Lyon Diet Heart Study

It is possible to *"identify nutrition related interventions that produce a 5-10% relative risk reduction in overall mortality in the general population"*

However, this would require
>10 times the sample size of PREDIMED
(n = 80,000 and 4,000 endpoints)

BMJ 2013;347:f6698

The Process

Present the best available evidence I could find - MA or SR

Not doing a detailed critical appraisal - all RCTs and cohorts have design and implementation issues

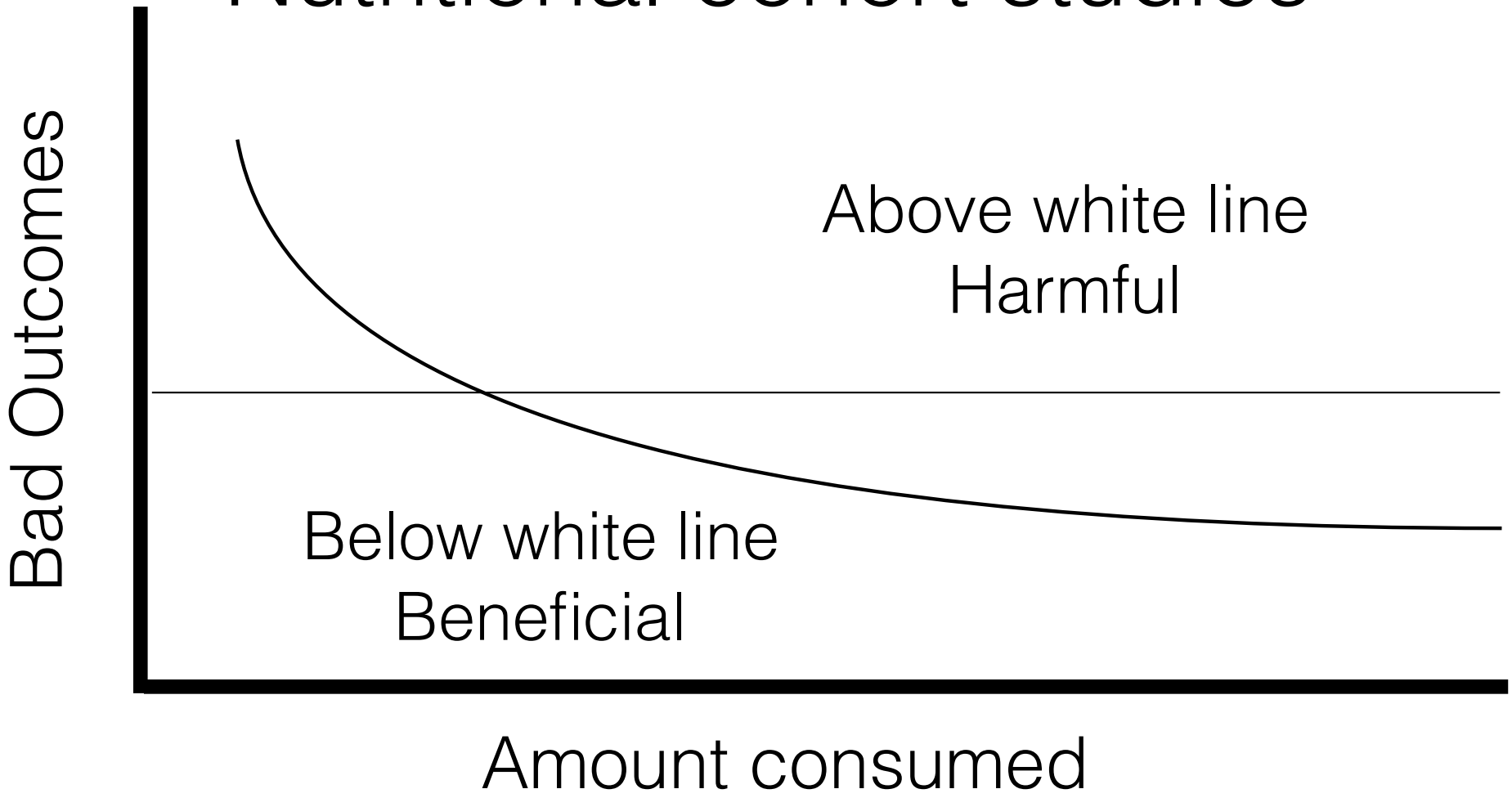
If these “studies” I present have serious limitations then we are basically stuck with opinion that is not informed by evidence

Single Food Items

and some little behaviours

Salt, eggs, fiber,
coffee, daily servings,
chocolate, alcohol

Nutritional cohort studies



Does salt increase blood pressure and/or increase risk of cardiovascular disease?

The problem of the surrogate marker

Salt

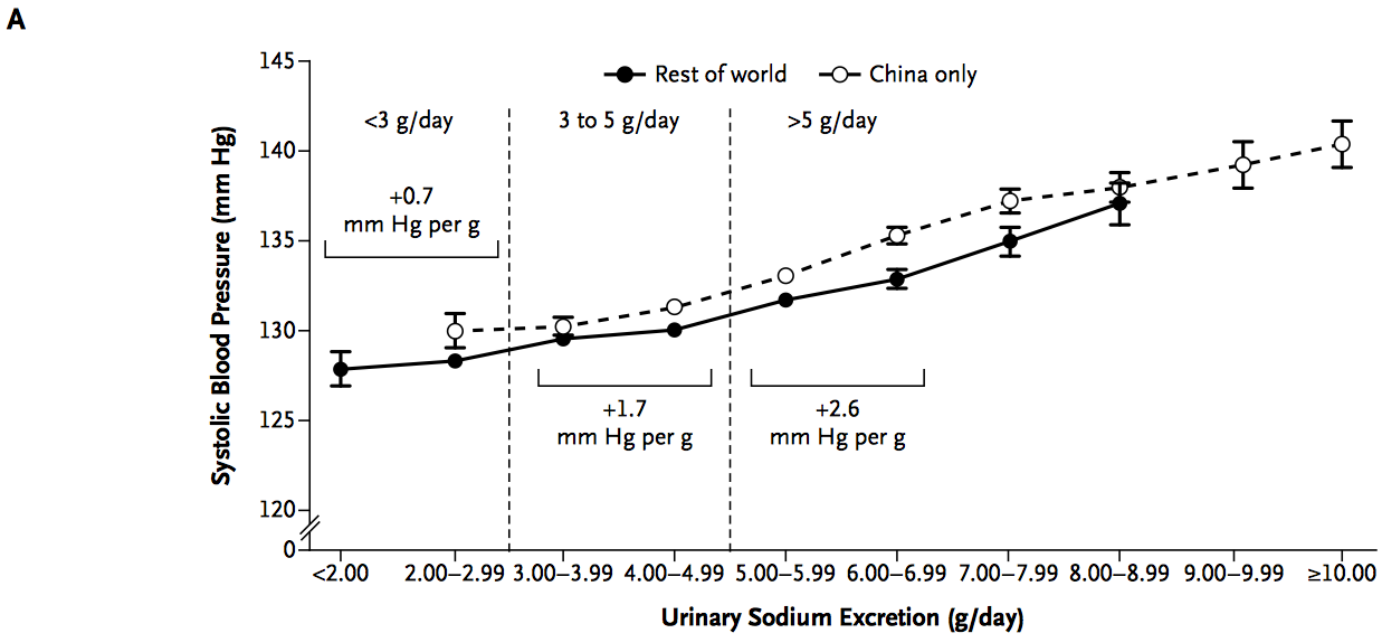
Average Canadian daily intake
~3000 mg/day

Health Canada
"This is more than double the amount we need"

Aim for 1500 mg/day and don't go over 2300 mg/day

BUT

Salt does (on average) increase BP



No. of Participants										
China		1876	6,012	9,794	10,101	7177	4093	2035	1002	952
Other countries	1613	7384	15,101	16,015	10,810	5211	2048	992		

N Engl J Med 2014;371:601-11

Effect of longer term modest salt reduction on blood pressure: Cochrane systematic review and meta-analysis of randomised trials

"A modest reduction in salt intake for four or more weeks causes significant and, from a population viewpoint, important falls in blood pressure"

BMJ 2013;346:f1325 doi: 10.1136/bmj.f1325

Sodium Intake in Populations
Assessment of Evidence

Committee on the Consequences of Sodium Reduction in Populations
Food and Nutrition Board
Board on Population Health and Health Practice

Brian L. Strom, Ann L. Yaktine, and Maria Oria, *Editors*

Institute of Medicine - May 2013

"evidence from studies on direct health outcomes is inconsistent and insufficient to conclude that lowering sodium intakes below 2,300 mg per day either increases or decreases risk of CVD outcomes"

"the available evidence suggests that low sodium intakes may lead to higher risk of adverse events in mid- to late-stage CHF patients with reduced ejection fraction and who are receiving aggressive therapeutic regimens"

JAMA Internal Medicine | Review

Reduced Salt Intake for Heart Failure
A Systematic Review

Kamal R. Mahtani, PhD; Carl Heneghan, DPhil; Igho Onakpoya, DPhil; Stephanie Tierney, MA, PhD; Jeffrey K. Aronson, DPhil; Nia Roberts, MSc; F. D. Richard Hobbs, FMedSci; David Nunan, MSc, PhD

9 RCTs - 479 participants

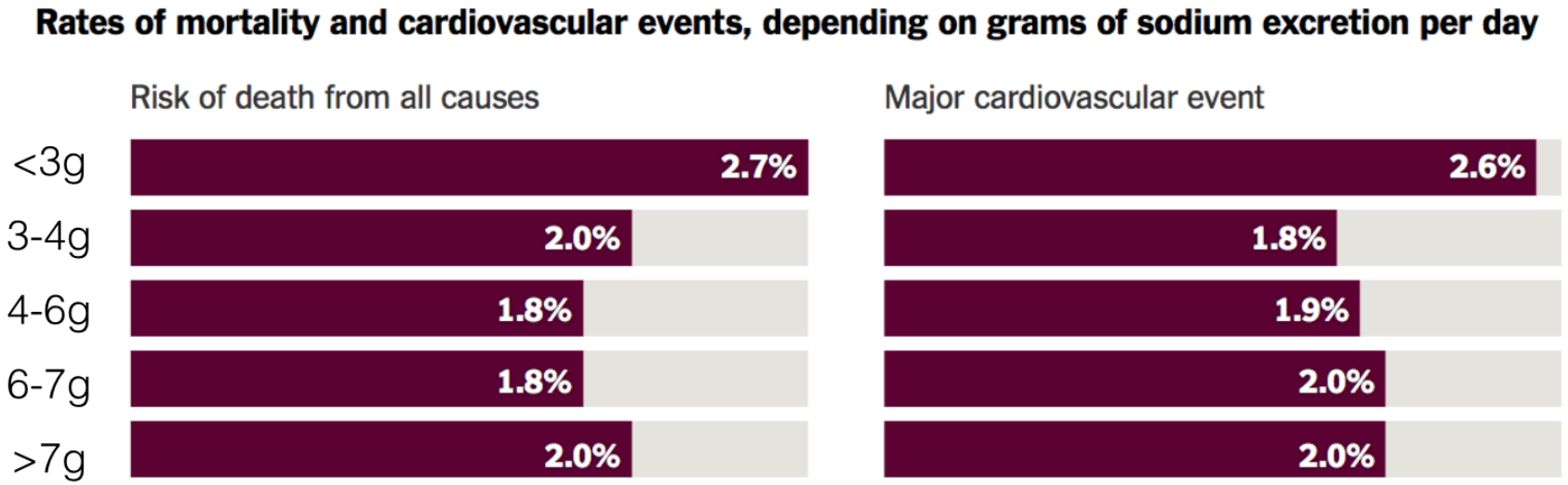
no robust high-quality evidence

“no clinically relevant data on whether reduced dietary salt intake affected outcomes such as cardiovascular-associated or all-cause mortality, cardiovascular-associated events, hospitalization, or length of hospital stay”

JAMA Intern Med. doi:10.1001/jamainternmed.2018.4673

PURE study

Cohort - 101,945 people in 17 countries - 3.7 years
Association between CVD and sodium **excretion**



ABSOLUTE RISKS

N Engl J Med 2014;371:612-23

"These provocative findings beg for a randomized, controlled outcome trial to compare reduced sodium intake with usual diet. In the absence of such a trial, the results argue against reduction of dietary sodium as an isolated public health recommendation"

N Engl J Med 2014;371:677-9

Compared With Usual Sodium Intake, Low- and Excessive-Sodium Diets Are Associated With Increased Mortality: A Meta-Analysis

Usual daily sodium intake = 115-215 mmol or 2,645-4,945 mg of Na

23 cohorts and 2 follow up RCTs

All cause mortality

HR 0.91 (0.82-0.99) in favour of usual vs LOW sodium

HR 1.16 (1.03-1.30) in favour of usual vs HIGH sodium

Overall CVD

HR 0.90 (0.82-0.99) in favour of usual vs LOW sodium

HR 1.12 (1.02-1.24) in favour of usual vs HIGH sodium

Am J Hyp 2014;27:1129-37

Reduced dietary salt for the prevention of cardiovascular disease (Review)

Adler AJ, Taylor F, Martin N, Gottlieb S, Taylor RS, Ebrahim S

"there is insufficient power to confirm clinically important effects of dietary advice and salt substitution on cardiovascular mortality in normotensive or hypertensive populations. Our estimates of the clinical benefits from advice to reduce dietary salt are imprecise, but are larger than would be predicted from the small blood pressure reductions achieved. Further well-powered studies would be needed to obtain more precise estimates. Our findings do not support individual dietary advice as a means of restricting salt intake"

CD009217-2014

Controversies in Cardiovascular Medicine

The technical report on sodium intake and cardiovascular disease in low- and middle-income countries by the joint working group of the World Heart Federation, the European Society of Hypertension and the European Public Health Association

Prospective cohort studies

"Optimal range of sodium intake to reside in the 3–5 g/day"

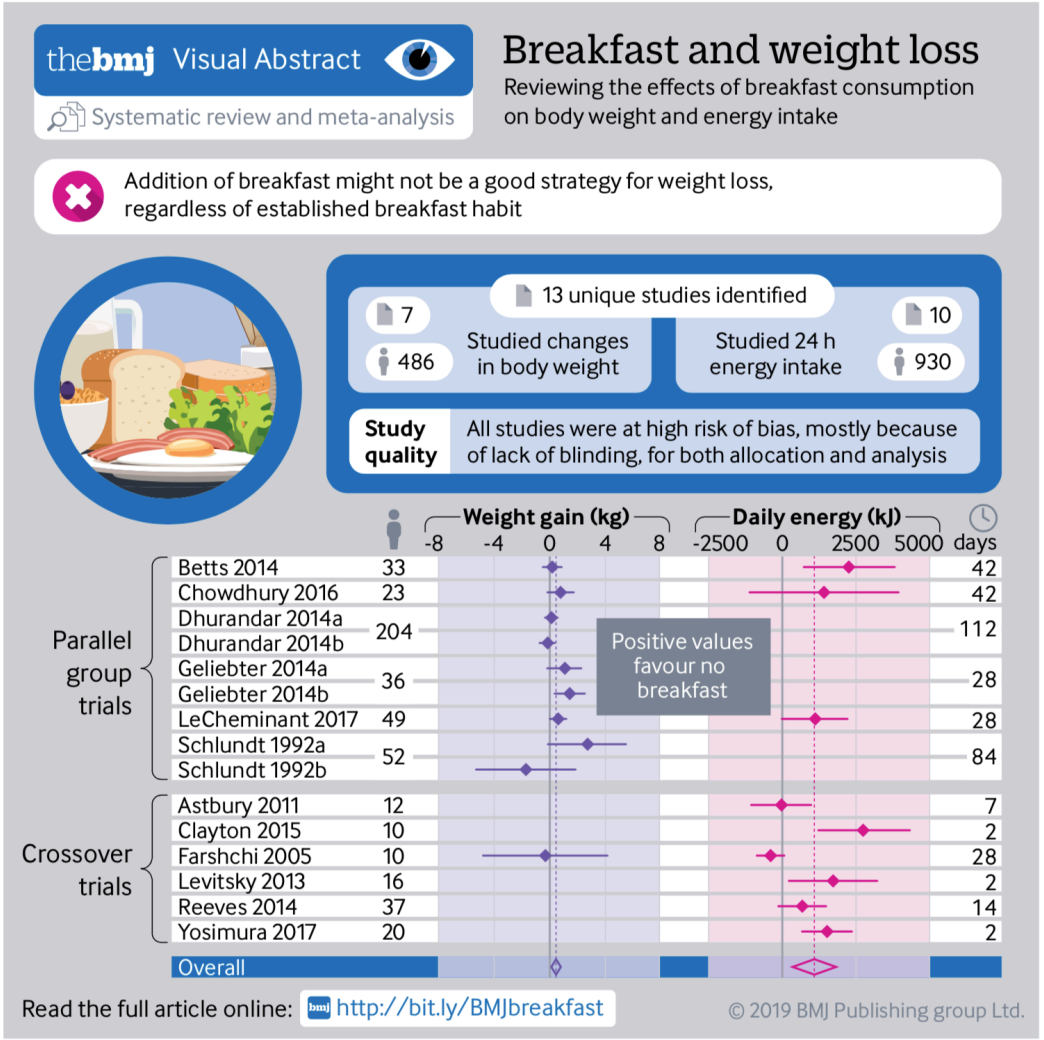
"consistent evidence … to support reducing sodium intake to less than 5 g/day"

"inconsistent evidence for further reductions below 3–5 g/day."

European Heart Journal (2017) 0, 1–9 doi:10.1093/eurheartj/ehw549

Does skipping breakfast increase risk of obesity or impact cognitive performance?

The problem of the cohort studies versus the RCT



"no evidence to support the notion that breakfast consumption promotes weight loss or that skipping breakfast leads to weight gain"

"there was evidence to show that breakfast consumption increased total daily energy intake compared with skipping breakfast"

BMJ 2019;364:l42

The effect of breakfast composition and energy contribution on cognitive and academic performance: a systematic review[1–3]

15 studies

"there was insufficient quantity and consistency among the studies to draw firm conclusions on the relation between the amount of energy intake at breakfast and breakfast composition and cognitive and academic performance"

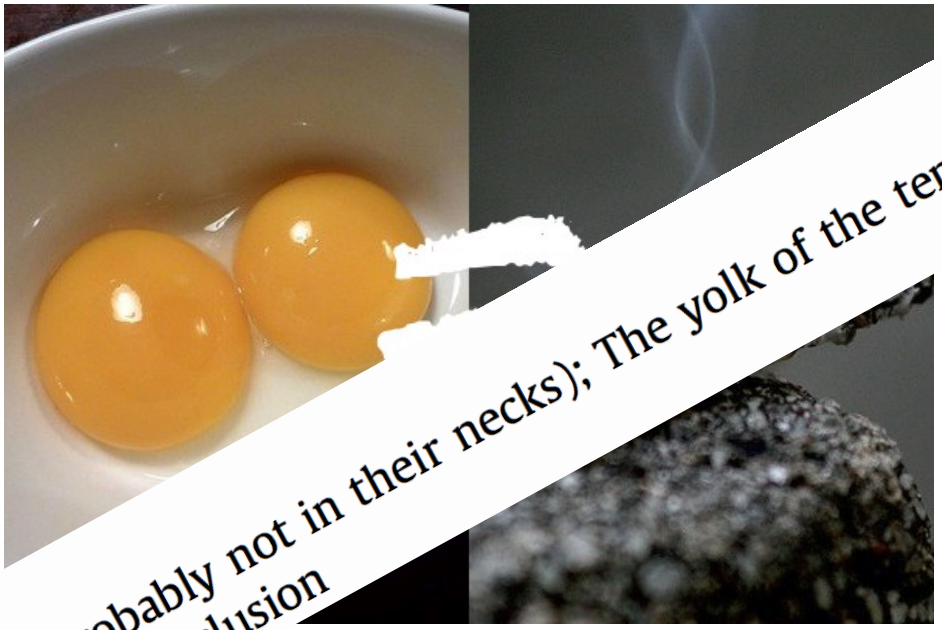
Am J Clin Nutr 2014;100:626–56

Yesterday ♫ Scrambled Eggs

Do eggs increase the risk of coronary heart disease?

The problem of mechanisms and surrogate markers

2012



Letter to the Editor

Egg on their faces (probably not in their necks); The yolk of the tenuous cholesterol-to-plaque conclusion

"Eggs almost as bad as smoking"

"Your breakfast is trying to murder you"

"What do egg yolks and smoking have in common"

Atherosclerosis 2012;224:469-73

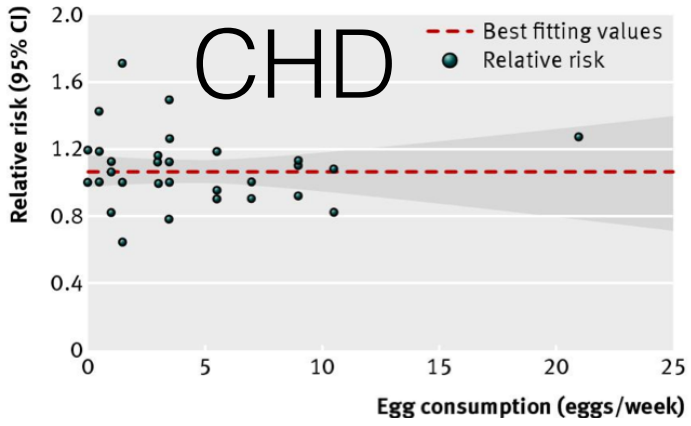
Egg consumption and risk of coronary heart disease and stroke: dose-response meta-analysis of prospective cohort studies

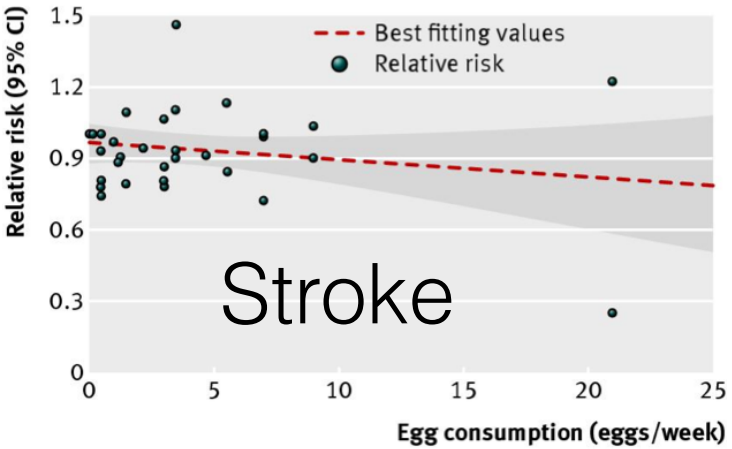
8 articles - 17 reports - 9 for CHD, 8 for stroke

3,081,269 person years and 5847 incident cases for CHD;
4,148,095 person years and 7579 incident cases for stroke

Risk for every additional egg eaten/day
CHD 0.99 (0.85-1.15), Stroke 0.91 (0.81-1.02)

BMJ 2013;346:e8539 doi: 10.1136/bmj.e8539





BMJ 2013;346:e8539 doi: 10.1136/bmj.e8539

Another systematic review and meta-analysis supports these data
overall CVD 0.97 (0.86, 1.09)
Am J Clin Nutr doi: 10.3945/ajcn.112.051318

European Journal of Nutrition
https://doi.org/10.1007/s00394-018-1692-3

ORIGINAL CONTRIBUTION

Egg consumption and the risk of cardiovascular disease and all-cause mortality: Guangzhou Biobank Cohort Study and meta-analyses

7 eggs/wk vs 1 or less eggs/wk
Stroke 0.91 (0.85-0.98)
IHD 0.97 (0.90-1.05)

Eur J Nutrition 2018

Effect of a high-egg diet on cardiometabolic risk factors in people with type 2 diabetes: the Diabetes and Egg (DIABEGG) Study—randomized weight-loss and follow-up phase

RCT 12 eggs/wk vs <2 eggs/week - 3 months with12 month follow -up
no changes in cardiometabolic markers - lipids, glucose

Am J Clin Nutr. 2018 Jun 1;107(6):921-931. doi: 10.1093/ajcn/nqy048.

Effects of Egg Consumption on Blood Lipids: A Systematic Review and Meta-Analysis of Randomized Clinical Trials

American College of Nutrition 2018:37:99-110

28 studies
TC and LDL increased ~2-3%
HDL increased ~ 5%

Goodbye to the egg-white omelet—welcome back to the whole-egg omelet

Arne Astrup ✉

The American Journal of Clinical Nutrition, Volume 107, Issue 6, 1 June 2018, Pages 853–854, https://doi-org.ezproxy.library.ubc.ca/10.1093/ajcn/nqy106

JAMA | Original Investigation

Associations of Dietary Cholesterol or Egg Consumption With Incident Cardiovascular Disease and Mortality

30,000 people over 17.5 years

Each additional half an egg consumed per day

incident CVD (adjusted HR, 1.06 [95% CI, 1.03-1.10] ARD =1%
all-cause mortality (adjusted HR, 1.08 [95% CI, 1.04-1.11] ARD = 2%

BUT The associations between egg consumption and incident CVD and all-cause mortality were no longer significant after adjusting for dietary cholesterol consumption

JAMA. 2019;321(11):1081-1095. doi:10.1001/jama.2019.1572

Does increasing fiber decrease the risk of cardiovascular disease?

The problem of the size of the difference

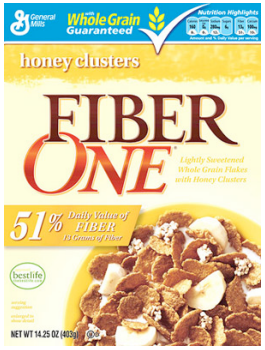
ORIGINAL INVESTIGATION

Dietary Fiber and Risk of Coronary Heart Disease

A Pooled Analysis of Cohort Studies

Mark A. Pereira, PhD; Eilis O'Reilly, MSc; Katarina Augustsson, PhD; Gary E. Fraser, MBChB, PhD; Uri Goldbourt, PhD; Berit L. Heitmann, PhD; Goran Hallmans, MD, PhD; Paul Knekt, PhD; Simin Liu, MD, ScD; Pirjo Pietinen, DSc; Donna Spiegelman, ScD; June Stevens, MS, PhD; Jarmo Virtamo, MD; Walter C. Willett, MD; Alberto Ascherio, MD

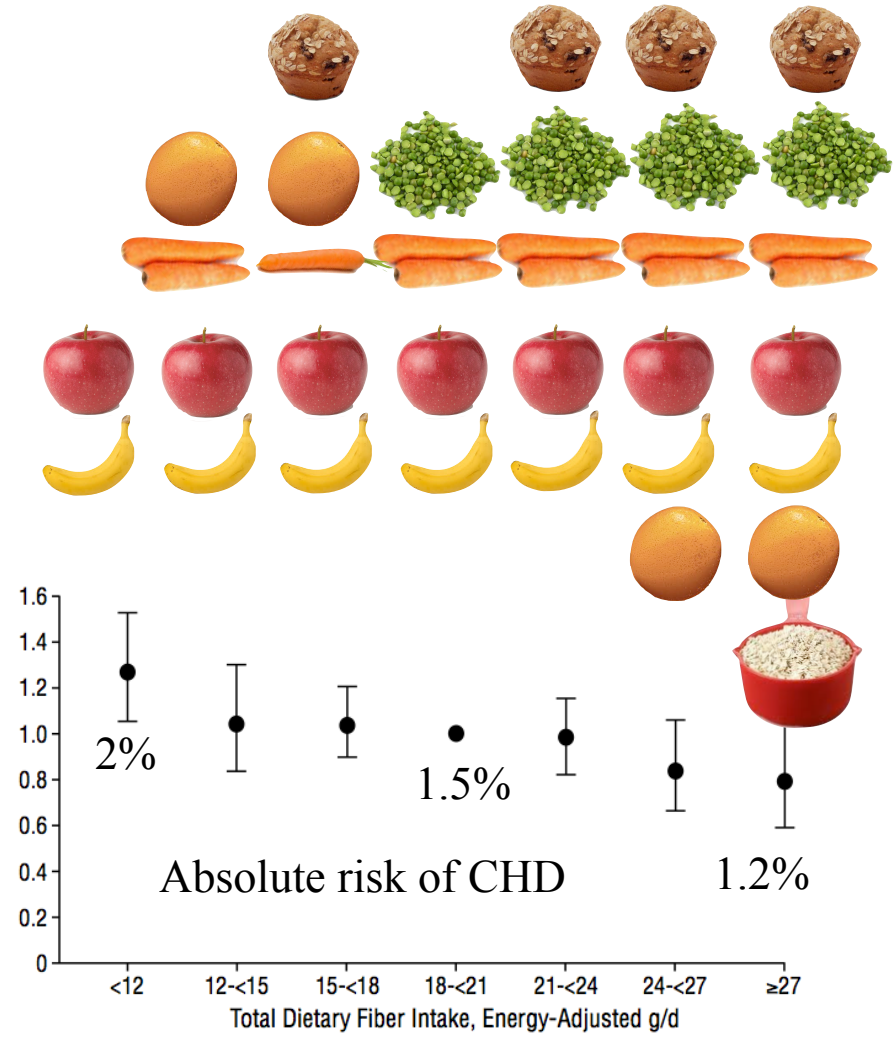
Arch Intern Med 2004;164:370-6



10 prospective cohorts - 6-10 years
336,244 - avg age ~ 50-55
5,249 events

for each 10g/day increment of dietary fiber
CHD was reduced by 14% CI (4-22)

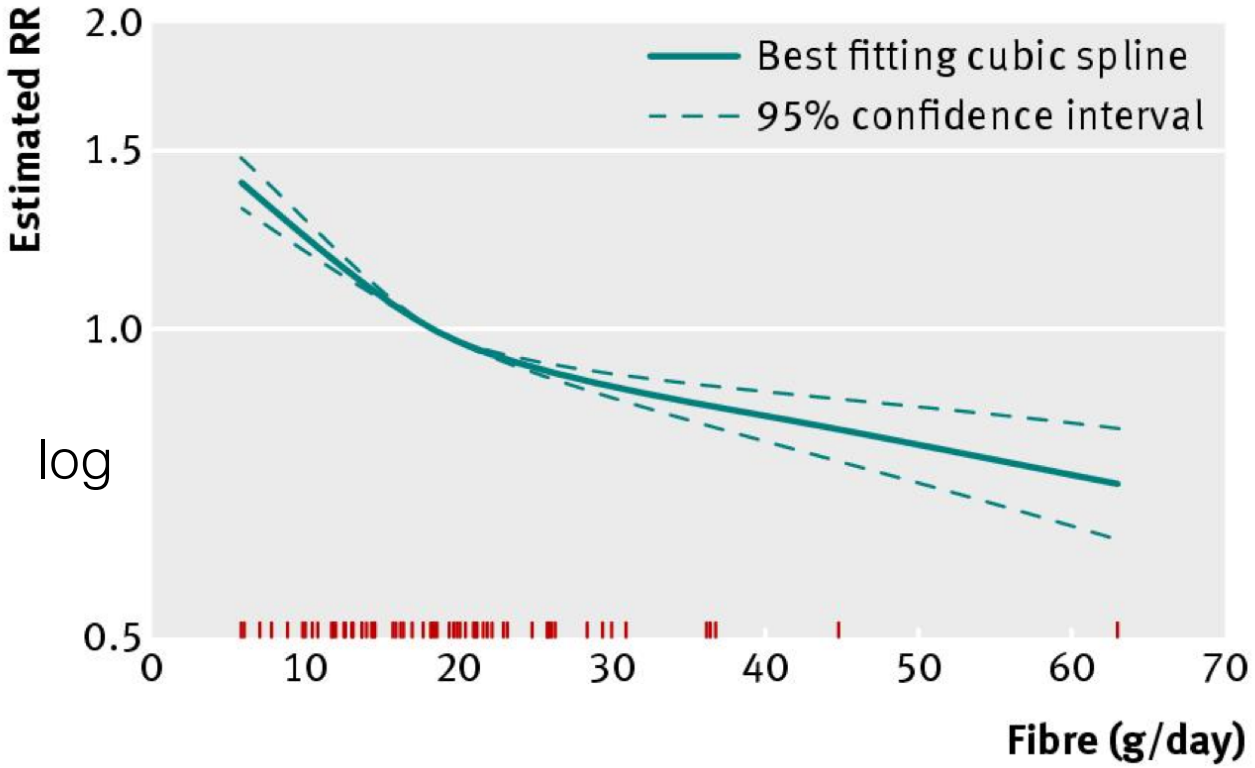
55 y/o
increase fiber
from
none to a lot
for 5-10
years
1 in 125
would not die
from
CHD



ative risk of death from coronary heart disease (CHD) by category of total
ary fiber intake. The relative risks are adjusted for the same variables as
able 3. Error bars indicate 95% confidence intervals.

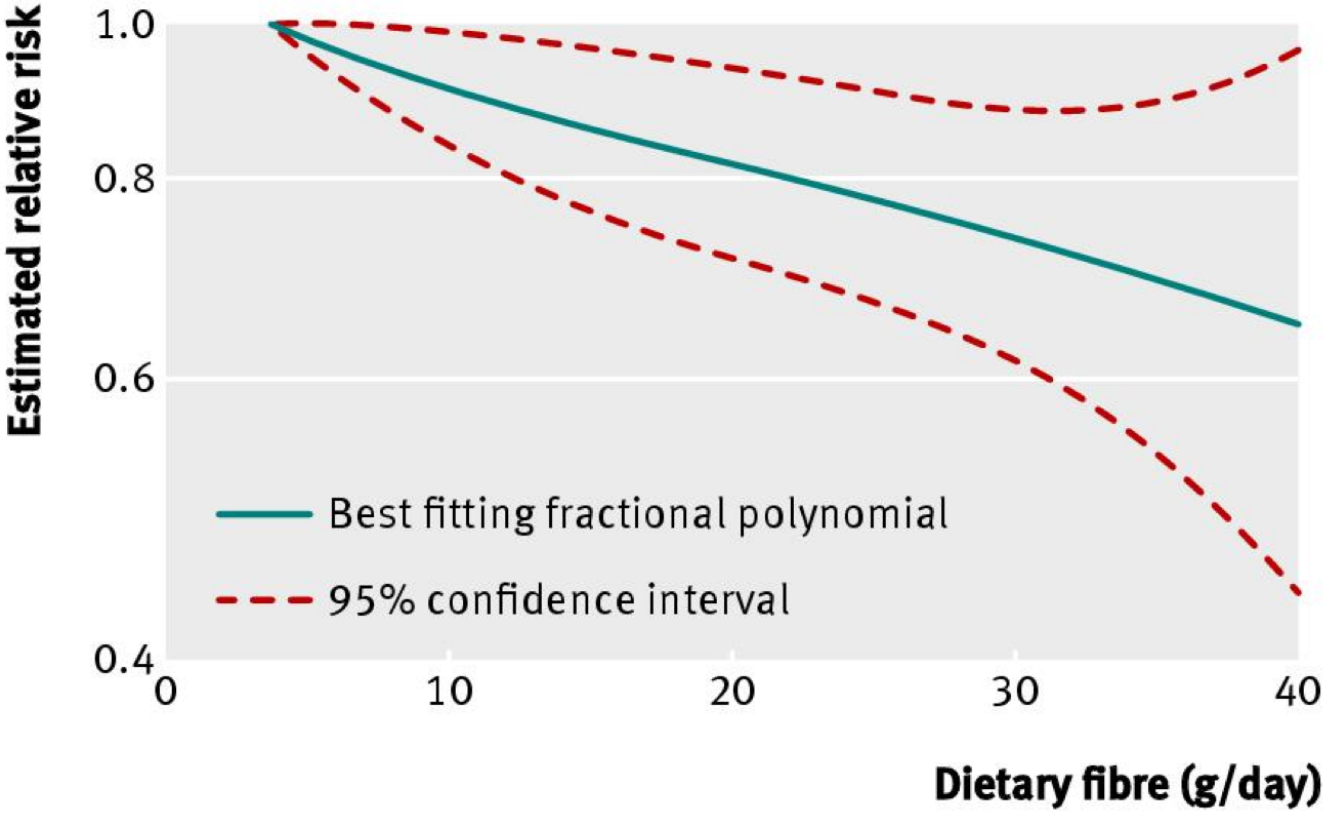
Relative risk of death from coronary heart disease

Fibre and risk of cardiovascular disease



BMJ 2013;347:f6879

Fibre and risk of colorectal cancer

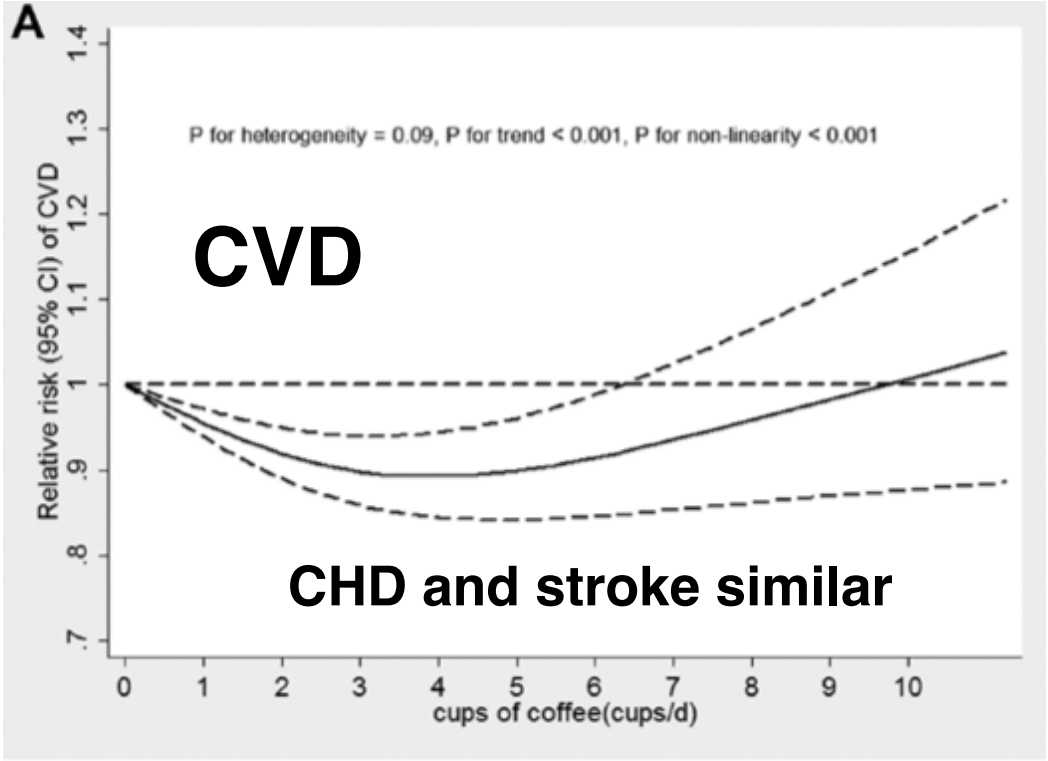


BMJ 2011;343:d6617 doi: 10.1136/bmj.d6617

Does coffee increase cardiovascular risk?

The problem of “I like coffee”

Thirty-six prospective cohort studies
1,279,804 participants, 36,352 CVD cases



"the lowest CVD risk at 3 to 5 cups per day of coffee consumption, and heavy coffee consumption was not associated with CVD risk"

Circulation 2014;129:643–59

"coffee intake is inversely related to all cause and, probably, CVD mortality"

Eur J Epidemiol 2013;28:527–39

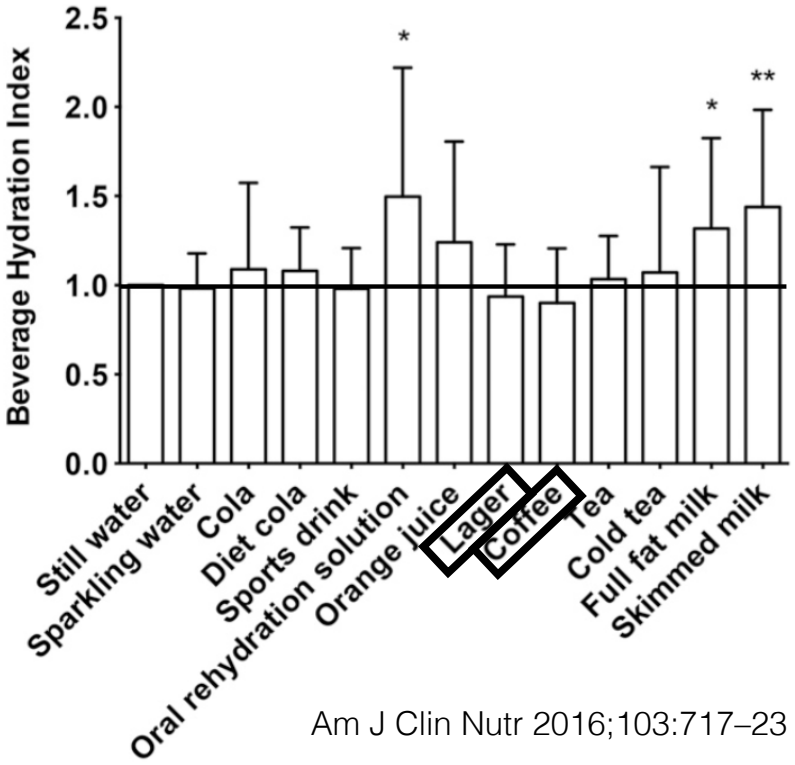
"Drink at least eight glasses of water a day." Really? Is there scientific evidence for "8 × 8"?

"Despite an extensive search of the literature and many personal inquiries and discussions with nutritionists and colleagues, I have found no scientific reports concluding that we all must drink at least eight glasses of water a day. On the contrary, there are publications that state the opposite"

Am J Physiol Regul Integr Comp Physiol 2002;283: R993–R1004

Beverage hydration index

13 different commonly consumed drinks on urine output and fluid balance when ingested in a hydrated state - 72 males



Am J Clin Nutr 2016;103:717–23

How many daily servings of fruits and vegetables a day do we need?

The problem of inappropriate conclusions and reporting

5 a day June 2014

7+ a day March 2014

Fruit and vegetable consumption and all-cause, cancer and CVD mortality: analysis of Health Survey for England data

7 per day

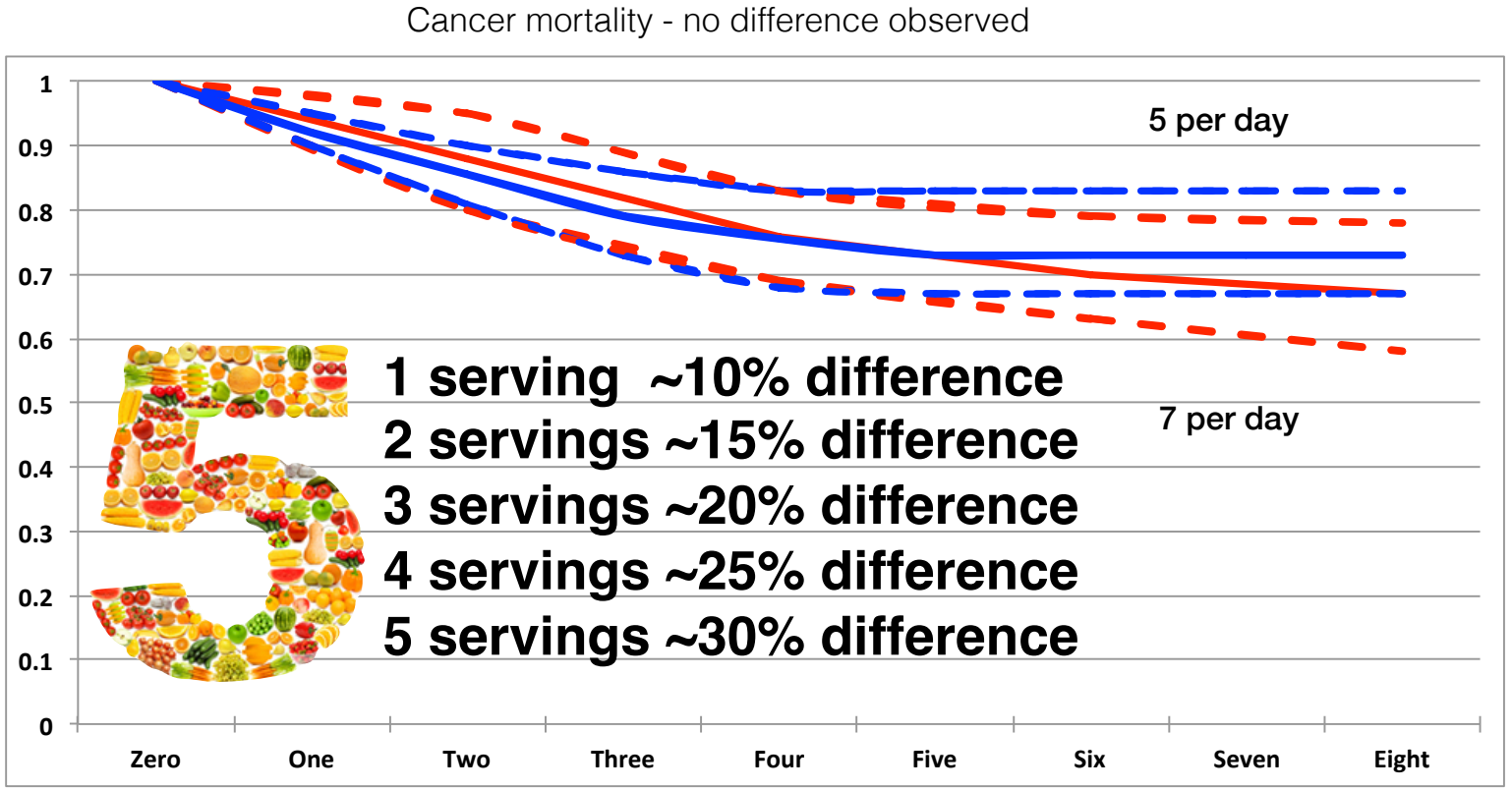
J Epidemiol Community Health - March 2014

Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer: systematic review and dose-response meta-analysis of prospective cohort studies

5 per day

BMJ - June 2014

Numbers of servings a day vs total mortality



Does alcohol and/or red wine decrease the risk of cardiovascular disease?

The problem of “I like wine”

The cardioprotective association of average alcohol consumption and ischaemic heart disease: a systematic review and meta-analysis

44 observational studies
38,627 IHD events (mortality or morbidity) among 957,684 participants

20 grams
~ Pint (550 mL) of beer/cider
~1/4 (200 mL) bottle of wine
~ Double (70 mL) spirits (vodka, whisky, rum, gin)

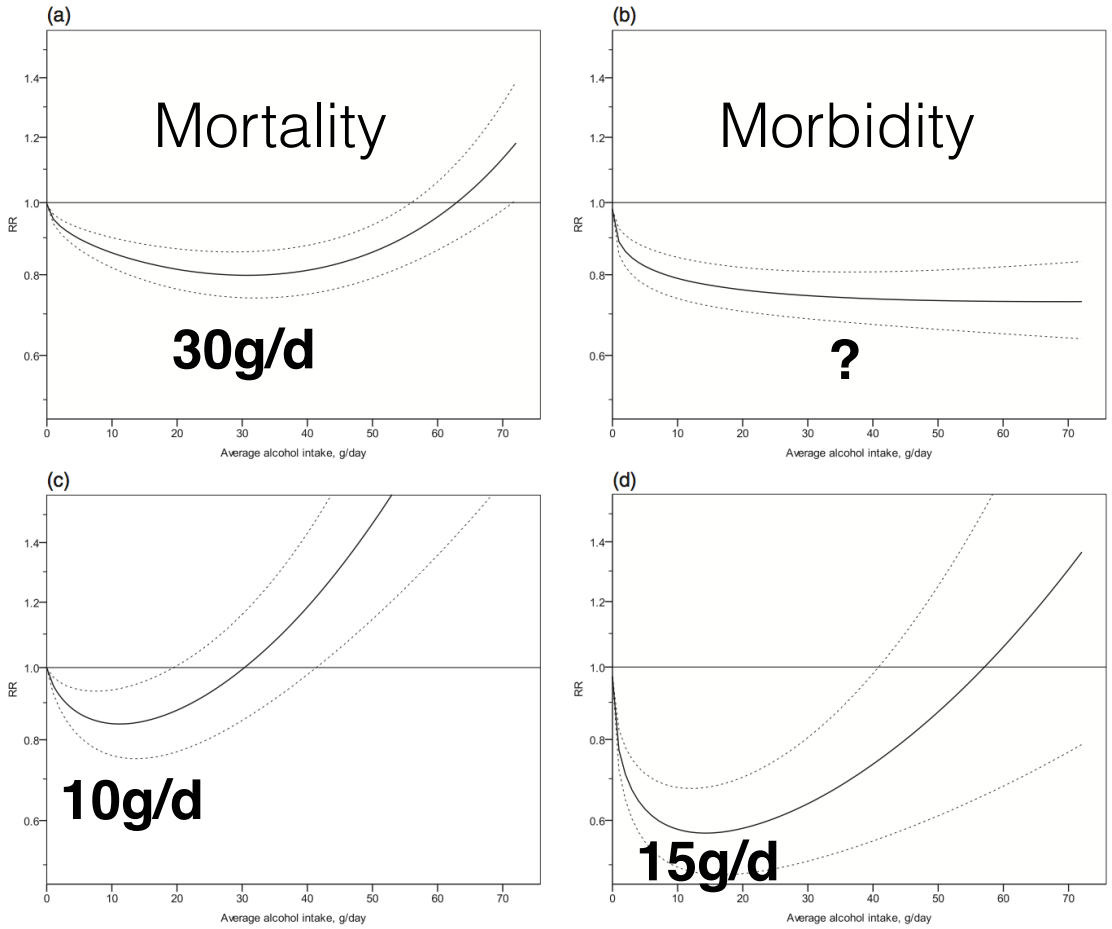
Addiction 2012;107:1246–60

Ischemic heart disease

20 grams
~ Pint (550 mL) of beer/cider
~1/4 (200 mL) bottle of wine
~ Double (70 mL) spirits

Men

Women



Other meta-analyses - cardiovascular disease

Association of alcohol consumption with selected cardiovascular disease outcomes: a systematic review and meta-analysis

"Dose-response analysis revealed that the lowest risk of coronary heart disease mortality occurred with 1–2 drinks a day, but for stroke mortality it occurred with ≤1 drink per day."

BMJ 2011;342:d671

Alcohol consumption, drinking patterns, and ischemic heart disease: a narrative review of meta-analyses and a systematic review and meta-analysis of the impact of heavy drinking occasions on risk for moderate drinkers

"Epidemiological evidence for a beneficial effect of low alcohol consumption without heavy drinking episodes is strong, corroborated by experimental evidence. However, episodic and chronic heavy drinking do not provide any beneficial effect on IHD"

BMC Medicine 201412:182

Alcohol use and burden for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016

*GBD 2016 Alcohol Collaborators**

"Our results show that the safest level of drinking is none. This level is in conflict with most health guidelines, which espouse health benefits associated with consuming up to two drinks per day"

The leading causes of attributable deaths were tuberculosis, road injuries and self-harm

Additional alcohol related illness PER 100,000 over 1 year
1 drink/day - 4
2 drinks/day - 63
5 drinks/day - 338

Lancet 2018

Does chocolate decrease the risk of cardiovascular disease?

The problem of “I like chocolate”

Chocolate consumption and cardiometabolic disorders: systematic review and meta-analysis

7 observational studies - 114,009 participants

“highest levels of chocolate consumption were associated with a 37% reduction in cardiovascular disease and a 29% reduction in stroke compared with the lowest levels”

definition of “highest level” varied

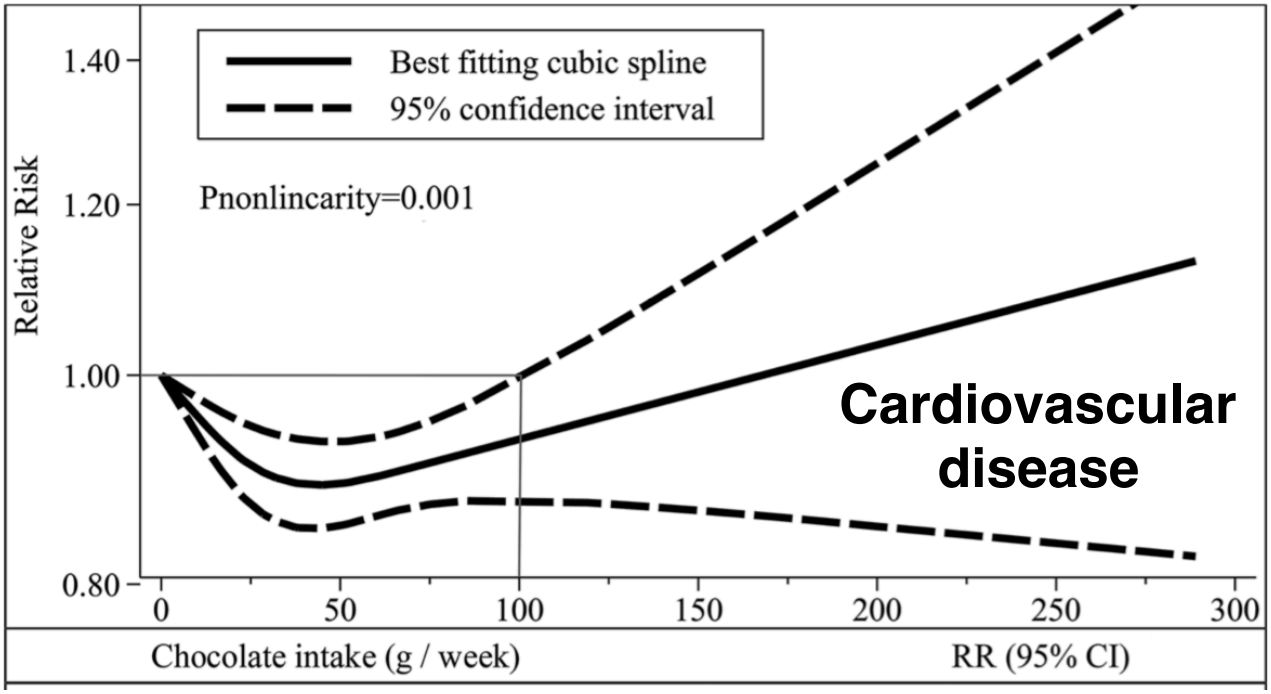
BMJ 2011;343:d4488 doi: 10.1136/bmj.d4488

Chocolate consumption and risk of myocardial infarction: a prospective study and meta-analysis

“Chocolate consumption is associated with lower risk of MI and ischaemic heart disease”

Heart 2016 doi:10.1136/heartjnl-2015-309203

Chocolate consumption and risk of cardiovascular diseases: a meta-analysis of prospective studies



Heart 2018;0:1–7. doi:10.1136/heartjnl-2018-313131

Dietary calcium/dairy

2 RCTs, 44 cohort trials

“43 of the 58 (74%) reported associations between dietary calcium intake and fracture outcomes were neutral”

for milk and dairy - “no association with fracture risk, with 25/28 neutral associations for milk intake and fracture risk and 11/13 for dairy intake”

BMJ 2015;351:h4580

Association of dairy intake with cardiovascular disease and mortality in 21 countries from five continents (PURE): a prospective cohort study

Only whole fat dairy

	n	Events	HR (95% CI)	p_{trend}
Composite outcome				**0·0001**
<0·5 servings per day	12 399	968 (7·8%)	1·00 (1·00–1·00)	
0·5–1 servings per day	12 023	789 (6·6%)	0·89 (0·79–1·00)	
1–2 servings per day	8853	519 (5·9%)	0·84 (0·73–0·96)	
>2 servings per day	7552	430 (5·7%)	0·71 (0·60–0·83)	

Whole fat and low fat dairy

	n	Events	HR (95% CI)	p_{trend}
Composite outcome				**0·24**
<0·5 servings per day	3297	207 (6·3%)	1·00 (1·00–1·00)	
0·5–1 servings per day	4074	232 (5·7%)	0·82 (0·66–1·03)	
1–2 servings per day	9340	483 (5·2%)	0·83 (0·68–1·02)	
>2 servings per day	17 276	916 (5·3%)	0·84 (0·68–1·03)	

Lancet 2018 http://dx.doi.org/10.1016/ S0140-6736(18)31812-9

What is the correct % of macronutrients?

The Journal of Nutrition
Nutrient Requirements and Optimal Nutrition

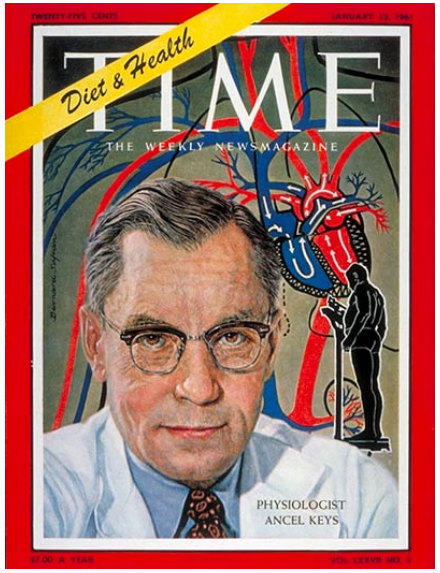
Americans Do Not Meet Federal Dietary Recommendations[1]

"nearly the entire U.S. population consumes a diet that is not on par with recommendations"

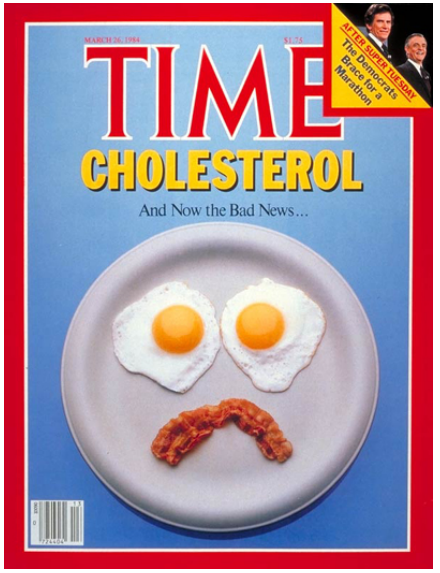
Is this a problem with the population, the guidelines or both?

J Nutr 2010;140:1832–38

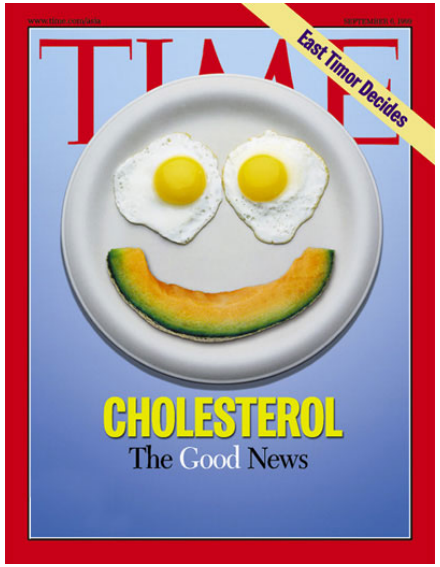
Fats/ cholesterol



January
1961



March
1984



September
1999

June
2014

2015 DGAC: MEETING 7 December 15, 2014

Science Base Chapter:

Food and Nutrient Intakes, and Health: Current Status and Trends

Subcommittee 1

health.gov

- Cholesterol is not considered a nutrient of concern for overconsumption.

HOWEVER, THE FINAL REPORT RELEASED IN JANUARY 2016 STATES "individuals should eat as little cholesterol as possible"

Food and Nutrient Intakes, and Health: Current Status and Trends

Average
Macronutrient intake

Worldwide

carbohydrates: 63%, proteins: 11%, fats: 26%

http://chartsbin.com/view/1160

The Telegraph

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Low-fat diet could kill you, major study shows

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HEALTH

Huge new study casts doubt on conventional wisdom about fat and carbs

By PATRICK SKERRETT @PJSkerrett / AUGUST 29, 2017

SEAN GALLUP/GETTY IMAGES

Meeting Coverage > ESC

ESC: Huge Diet Study Shows Carbs, Not Fats Are the Problem

— But PURE also challenges belief that more is better for fruits and vegetables

by Larry Husten, CardioBrief

August 29, 2017

PURE study

Fruit, vegetable, and legume intake, and cardiovascular disease and deaths in 18 countries (PURE): a prospective cohort study

135,000 individuals, seven geographical regions - 7.4 years

"Benefits appear to be maximum for both non-cardiovascular mortality and total mortality at three to four servings per day"

August 29, 2017 http://dx.doi.org/10.1016/

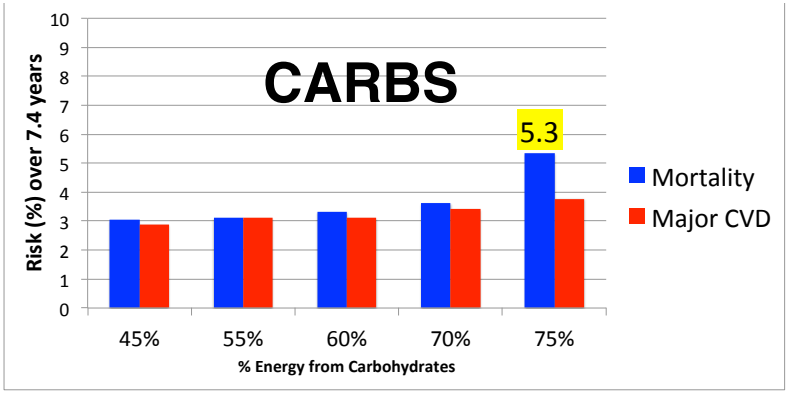
Associations of fats and carbohydrate intake with cardiovascular disease and mortality in 18 countries from five continents (PURE): a prospective cohort study

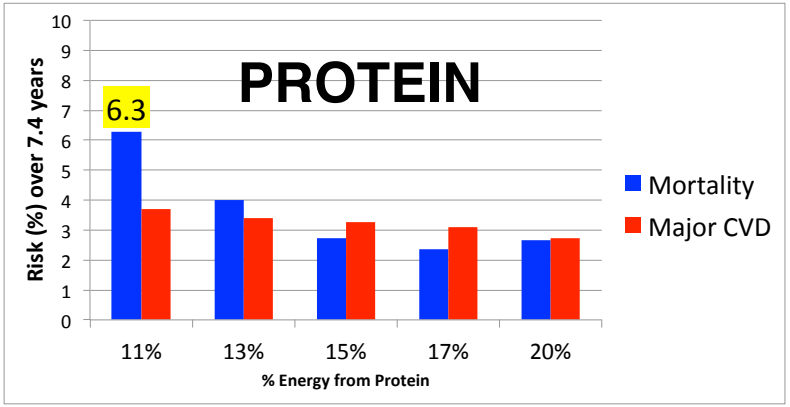
50 y/o (M40%, F60%) over 7.4 years - looked at the impact of % energy from macronutrients

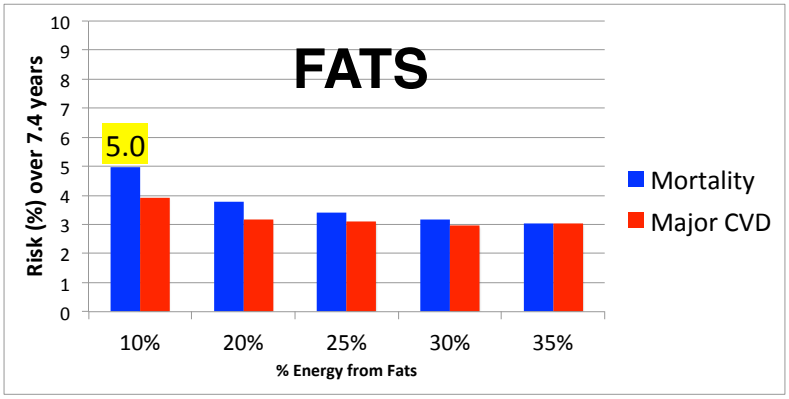
Looked at quintiles

- Carbs from 45-75%
- Fats from 10-35%
- Protein from 10-20%

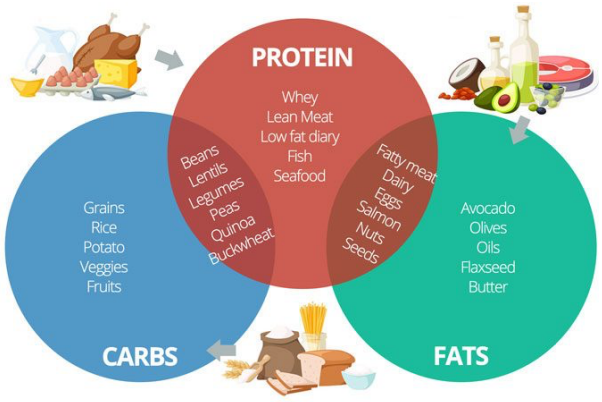
Lancet Aug 29/2017







Risk(%) of mortality and CVD over 7.4y based on % energy from macronutrients



Lancet Aug 29/2017

50 y/o (M40%, F60%) over 7.4 years

FINDINGS

CVD - Macronutrient % intake made no difference on overall CVD

Mortality

a) No harm as long as carbs < 70%, and fat and protein > 10%-15%

b) If eat > 70% carbs or < 10-15% protein or fat for 7.5 years

1-2% will die prematurely but 99-98% won't

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

609 randomized to low fat vs low carb for 1 year - 56% women, 40 y/o, 60% white, 22% hispanic

achieved macronutrient distributions were 48% vs 30% for carbs, 29% vs 45% for fat, and 21% vs 23% for protein

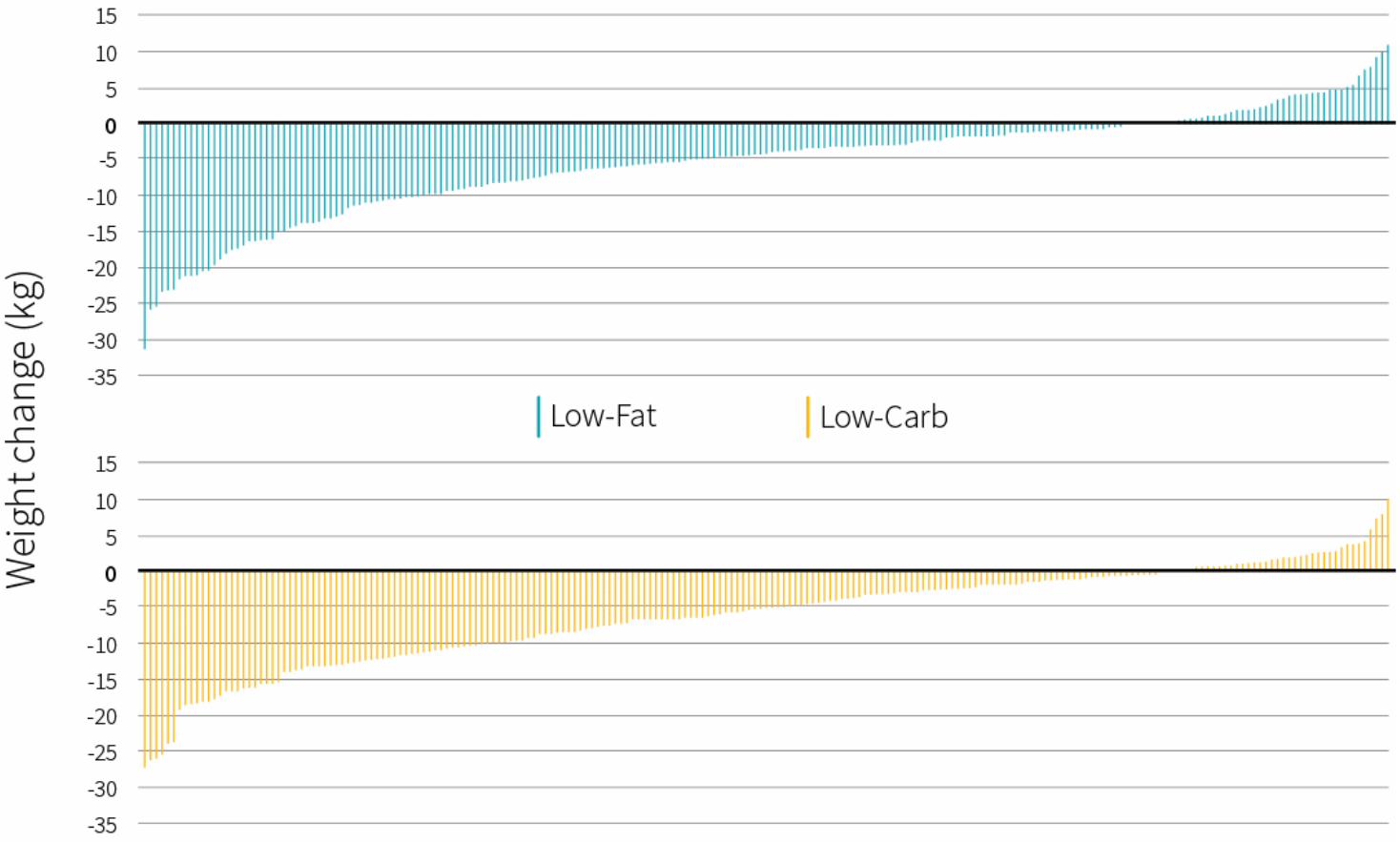
no change in mean 12-month weight change –5.3 kg (95% CI, –5.9 kg to –4.7 kg) low-fat and –6.0 kg (95% CI, –6.6 kg to –5.4 kg) low-carb

low fat - 5% lower LDL and low carb - 5% higher HDL and 15% lower for triglycerides

genotype pattern was not predictable

JAMA 2018;319:667-679

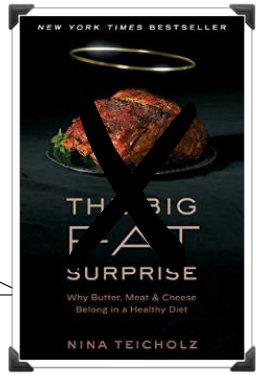
Figure 2: 12-month weight change for each participant

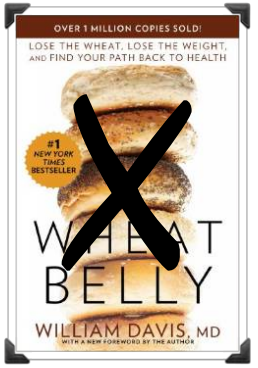


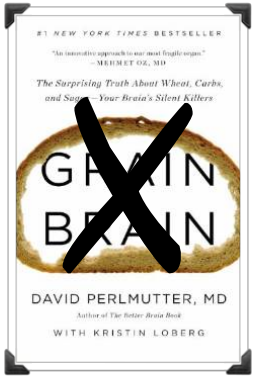
All the evidence around the debate between
Low Fat = <~30% of total energy intake
Low Carb =<~20% of total energy - ketogenic = <10%

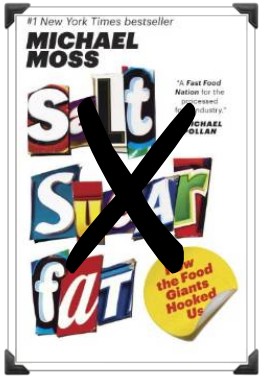
Surrogate Marker Endpoints NOT AS IMPORTANT AS				Clinically Relevant Endpoints MUCH MORE IMPORTANT				LEVELS OF EVIDENCE IN HEALTH CARE WE USE TO FIGURE OUT WHAT WORKS
LDL cholesterol	**HDL cholesterol**	**Glucose**	**Decrease weight**	**Reducing risk of heart attacks/ strokes/cancer**		**Reducing risk of dying**		
LOW FAT ⬇LDL~ 5% more than LOW CARB	LOW CARB ⬆HDL~10% more than LOW FAT	LOW CARB ⬇glucose ~3% more than LOW FAT	LOW CARB ⬇weight ~3% more than LOW FAT	NONE		NONE		**Systematic reviews/ Meta-analyses**
Many RCTs for both including head-to-head comparisons see above SR/MA for findings				LOW FAT 1 trial - 49,000 women No benefit seen over 8 years "Mediterranean"diet ⬇ CVD by 1-2% more than low fat over 5 years	LOW CARB No trials	LOW FAT 1 trial - 49,000 women No benefit seen over 8 years	LOW CARB No trials	**Randomized Controlled Trials**
Not really needed as we have lots of randomized controlled trials of surrogate markers				Only higher TRANS FAT intake consistently associated with increased CVD, other "fats" no effect	LOW CARBS associated with no effect on CVD	Only higher TRANS FAT intake consistently associated with increased mortality, others no effect	LOW CARBS associated with increased mortality	**Cohort Studies**
LOTS, IN FACT WAY TOO MUCH Just see above evidence or, in this case, lack thereof, for either side of the debate to be as definitive as they are								**Expert Opinion**

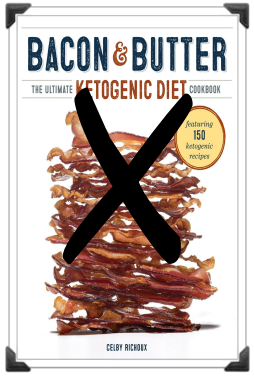
LOW ← Ability of the evidence to ascertain cause and effect → HIGH

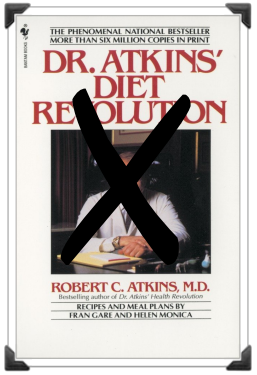












Oct 21, 2017
The Province

James McCormack: Maybe the diet you are on right now is actually pretty good

JAMES MCCORMACK

Published:
October 21, 2017

Updated:
October 21, 2017 10:00 PM PDT

Filed Under:
The Province › Opinion › Op-Ed

According to a study in the Lancet medical journal, no particular diet is better than another in preventing heart disease. Gra??a Victoria / Getty Images/Hemera

The world has seen a plethora of "experts" providing nutritional advice that sounds definitive and evidence-based. Many of us have lived through all the recommendations: low fat then high fat; salt is a problem, then salt is no problem; eggs are good, then they are bad; butter is very bad, margarine is good, then butter is good again; high carbs, then no carbs — and so on.

Do saturated fats increase the risk of cardiovascular disease?

The problem of a theory gone completely haywire

Dietary fat guidelines have no evidence base: where next for public health nutritional advice?

Zoë Harcombe

"Dietary fat guidelines have prevailed for almost 40 years. The evidence base at the time of their introduction has been examined for the first time and found lacking. Evidence currently available provides no additional support. Public health opinion differed when the guidelines were introduced. Opposition to the guidelines is becoming more strident. Substantial increases in diet-related illness over the past four decades, particularly obesity and type 2 diabetes, indicate that a review of dietary advice is warranted."

Br J Sports Med 2016;0:1–7. doi:10.1136/bjsports-2016-096734

Evidence from randomised controlled trials did not support the introduction of dietary fat guidelines in 1977 and 1983: a systematic review and meta-analysis

"Dietary recommendations were introduced for 220 million US and 56 million UK citizens by 1983, in the absence of supporting evidence from RCTs."

Open Heart 2015;2: doi:10.1136/openhrt-2014-000196

Meta-analysis of prospective cohort studies evaluating the association of saturated fat with cardiovascular disease[1–5]

Requested RR for extreme quantiles of saturated fat intake
1.07 (0.96-1.19) for CHD
0.81 (0.62-1.05) for stroke
1.00 (0.89-1.11) for CVD

"A meta-analysis of prospective epidemiologic studies showed that there is no significant evidence for concluding that dietary saturated fat is associated with an increased risk of CHD or CVD."

Am J Clin Nutr 2010;91:535–46

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

A Systematic Review and Meta-analysis

32 observational studies (512,420 participants) of fatty acids from dietary intake
17 observational studies (25,721 participants) of fatty acid biomarkers
27 randomized controlled trials (105,085 participants) of fatty acid supplementation

Compared tertiles

Ann Intern Med 2014;160:398-406

Monounsaturated fat

- Olive oil
- Canola oil
- Sunflower oil
- Peanut oil
- Sesame oil
- Avocados
- Olives
- Nuts (almonds, peanuts, macadamia nuts, hazelnuts, pecans, cashews)
- Peanut butter

COHORT
9 studies - CHD
1.00 (0.91-1.10)

Polyunsaturated fat

- Soybean oil ω-6 FA
- Corn oil ω-6 FA
- Safflower oil ω-6 FA
- Walnuts ω-3 FA
- Sunflower, sesame, and pumpkin seeds ω-6 FA
- Flaxseed ω-3 FA
- Fatty fish (salmon, tuna, mackerel, herring, trout, sardines) ω-3 FA
- Soymilk ω-6 FA
- Tofu ω-3 FA

COHORT
ω-6
8 studies - CHD
0.98 (0.90-1.06)

COHORT
ω-3 short chain
Plant oils
7 studies - CHD
0.99 (0.86-1.14)

COHORT
ω-3 long chain
Marine Oils
16 studies - CHD
0.87 (0.78-0.97)

Saturated fat

- High-fat cuts of meat (beef, lamb, pork)
- Chicken with the skin
- Whole-fat dairy products (milk and cream)
- Butter
- Cheese
- Ice cream
- Palm and coconut oil
- Lard

COHORT
20 studies - CHD
1.03 (0.98-1.07)

Trans fat

- Commercially-baked pastries, cookies, doughnuts, muffins, cakes, pizza dough
- Packaged snack foods (crackers, microwave popcorn, chips)
- Stick margarine
- Vegetable shortening
- Fried foods (French fries, fried chicken, chicken nuggets, breaded fish)
- Candy bars

COHORT
5 studies - CHD
1.16 (1.06-1.27)

Intake of saturated and trans unsaturated fatty acids and risk of all cause mortality, cardiovascular disease, and type 2 diabetes: systematic review and meta-analysis of observational studies

Saturated fat intake

- all cause mortality (0.99, 95% CI 0.91 to 1.09)
- CVD mortality (0.97, 0.84 to 1.12)
- total CHD (1.06, 0.95 to 1.17)
- ischemic stroke (1.02, 0.90 to 1.15)
- type 2 diabetes (0.95, 0.88 to 1.03)

Total trans fat intake

- all cause mortality (1.34, 1.16 to 1.56)
- CHD mortality (1.28, 1.09 to 1.50)
- total CHD (1.21, 1.10 to 1.33)
- ischemic stroke (1.07, 0.88 to 1.28)
- type 2 diabetes (1.10, 0.95 to 1.27)

Industrial, but not ruminant, trans fats

- CHD mortality (1.18 (1.04 to 1.33) v 1.01 (0.71 to 1.43))
- CHD (1.42 (1.05 to 1.92) v 0.93 (0.73 to 1.18)

"Saturated fats are not associated with all cause mortality, CVD, CHD, ischemic stroke, or type 2 diabetes, but the evidence is heterogeneous with methodological limitations. Trans fats are associated with all cause mortality, total CHD, and CHD mortality, probably because of higher levels of intake of industrial trans fats than ruminant trans fats."

BMJ 2015;351:h3978

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

Ann Intern Med 2014;160:398-406

“The present systematic review [secondary prevention] provides no evidence (moderate quality evidence) for the beneficial effects of reduced/modified fat diets in the secondary prevention of coronary heart disease”

BMJ Open 2014;4:e004487 doi:10.1136/bmjopen-2013-004487

PURE study

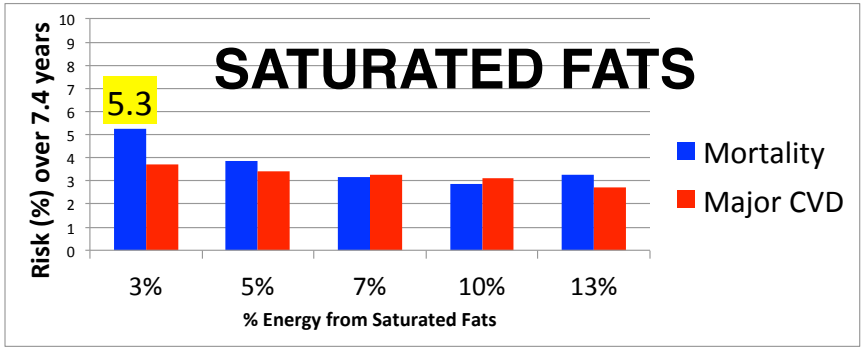
Associations of fats and carbohydrate intake with cardiovascular disease and mortality in 18 countries from five continents (PURE): a prospective cohort study

135,000 individuals, seven geographical regions - 7.4 years

"Global dietary guidelines should be reconsidered in light of these findings"

August 29, 2017 http://dx.doi.org/10.1016


SATURATED FATS
O
OH
MONOUNSATURATED FATS
O
OH
OLIVE
POLYUNSATURATED FATS
O
OH
CANOLA


SATURATED FATS
Risk (%) over 7.4 years
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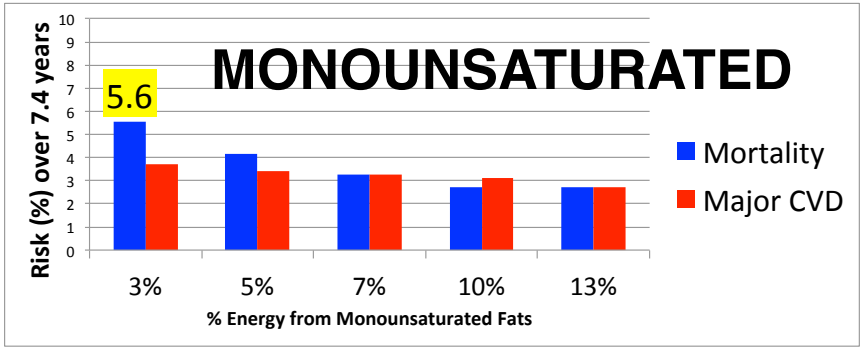
10%
13%
% Energy from Saturated Fats
Mortality
Major CVD


MONOUNSATURATED
Risk (%) over 7.4 years
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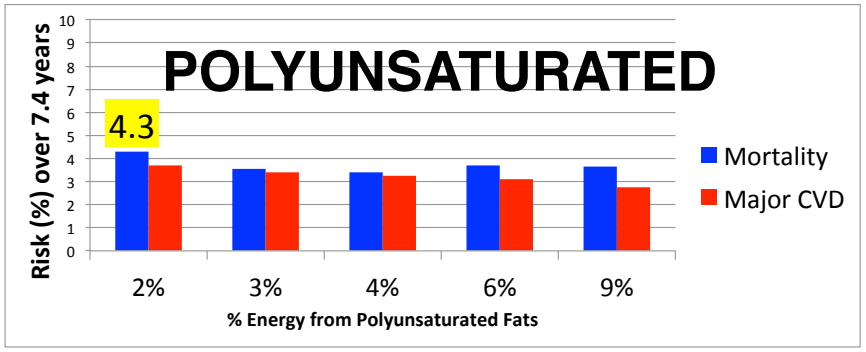
13%
% Energy from Monounsaturated Fats
Mortality
Major CVD


POLYUNSATURATED
Risk (%) over 7.4 years
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1
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4.3
2%
3%
4%
6%
9%
% Energy from Polyunsaturated Fats
Mortality
Major CVD

Reduced or modified dietary fat for preventing cardiovascular disease (Review)

36 hard (non-surrogate) outcomes were reported

1 outcome showed a statistically significant difference in combined cardiovascular events 0.86 (0.77-0.96)

If true - 1% absolute reduction in risk

CD002137

Does red meat consumption increase the risk of cardiovascular disease?

The problem of different types of meat

Red and Processed Meat Consumption and Risk of Incident Coronary Heart Disease, Stroke, and Diabetes Mellitus

A Systematic Review and Meta-Analysis

20 studies - 1,218,380 individuals and 23,889 CHD, 2,280 stroke, and 10,797 diabetes mellitus cases

Red meat - unprocessed meat from beef, hamburgers, lamb, pork, or game and excluding poultry, fish, or eggs

Processed meat - meat preserved by smoking, curing, or salting or addition of chemical preservatives, such as bacon, salami, sausages, hot dogs, or processed deli or luncheon meats, and excluding fish or eggs

Circulation 2010;121:2271-83

Relative risk	Red meat (per 100g serving/day)	Processed meat (per 50g serving/day)
CHD	1.00 (0.81-1.23)	1.42 (1.07-1.89)
Stroke	1.17 (0.40-3.43)	1.14 (0.94-1.39)

Circulation 2010;121:2271-83

Systematic Reviews and Meta- and Pooled Analyses

Red Meat and Processed Meat Consumption and All-Cause Mortality: A Meta-Analysis

Nine prospective studies
1,330,352 individuals and 137,376 deaths
Relative risk of all-cause mortality (highest vs lowest intake)
Unprocessed red meat 1.10 (0.98, 1.22)
Processed meat 1.23 (1.17, 1.28)

American Journal of Epidemiology 2013DOI: 10.1093/aje/kwt261

Food Processing

Almost all foods are processed
The issue is “ultra-processed” foods

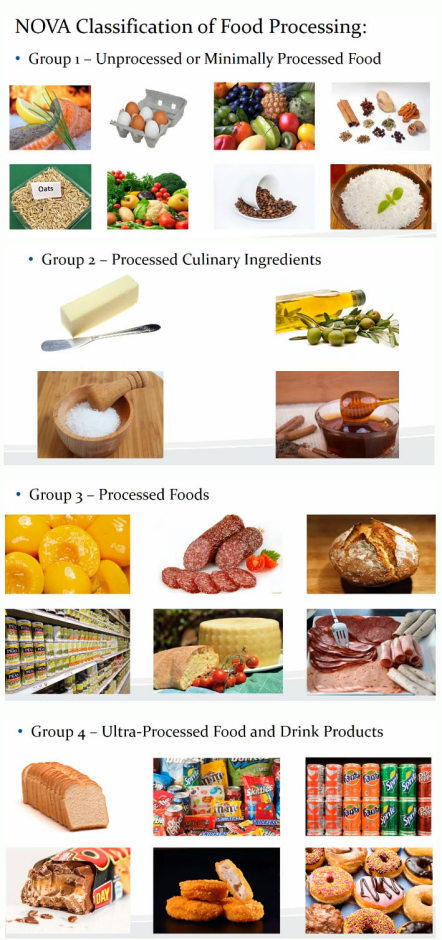
Canada, USA, UK - 50% of the diet
is made up of ultra-processed foods

“the practical way to identify if a product is ultra-processed is to check to see if its list of ingredients contains at least one item characteristic of the ultra-processed food group*, which is to say, either food substances never or rarely used in kitchens, or classes of additives whose function is to make the final product palatable or more appealing (‘cosmetic additives’)”

*hydrolysed proteins, soya protein isolate, gluten, casein, whey protein, ‘mechanically separated meat’, fructose, high-fructose corn syrup, ‘fruit juice concentrate’, invert sugar, maltodextrin, dextrose, lactose, soluble or insoluble fibre, hydrogenated or interesterified oil

Public Health Nutr 2019 Feb 12:1-6

Processed food



unprocessed or minimally processed foods

processed culinary ingredients

processed foods

ultra-processed foods

Does added sugar consumption increase the risk of obesity or cardiovascular disease?

The potential problem of a new theory and the size of the differences

Every single one of these names on a food label...

Agave juice
Agave nectar
Agave sap
Agave syrup
Beet sugar
Brown rice syrup
Brown sugar
Cane juice
Cane sugar
Clintose
Confectioner's powdered sugar
Confectioner's sugar
Corn sweetener
Corn syrup
Corn glucose syrup
Date sugar
Dri-mol
Dri-sweet
Dried raisin sweetener
Edible lactose
Flo-malt
Fructose
Fructose sweetener
Glaze and icing sugar
Glaze icing sugar
Golden syrup
Gomme
Granular sweetener
Granulated sugar
High-fructose corn syrup
Honey
Honi-bake
Honi-flake
Inverted sugar
Isoglucose
Isomaltulose
Kona-ame
Lactose
Liquid sweetener
Malt
Malt sweetener
Malt syrup
Maltose
Maple
Maple sugar
Maple syrup
Mizuame
Molasses
Nulomoline
Powdered sugar
Rice syrup
Sorghum
Sorghum syrup
Starch sweetener
Sucanat
Sucrose
Sucrovert
Sugar beet
Sugar invert
Sweet 'n' neat
Table sugar
Treacle
Trehalose
Trusweet
Turbinado sugar
Versatose

=added sugar

SOURCE: The Lancet: "Sweetening of the global diet, particularly beverages: patterns, trends, and policy responses" Barry M. Popkin, Corinna Hawkes, 2015

Vox

Dietary sugars and body weight: systematic review and meta-analyses of randomised controlled trials and cohort studies

Adults

Reduced intake of dietary sugars was associated with a decrease in body weight - 0.80 kg (0.39-1.21)

Increased sugar intake was associated with a weight increase - 0.75 kg (0.30 -1.19)

Isoenergetic exchange of dietary sugars with other carbohydrates showed no change in body weight - 0.04 kg (–0.04 to 0.13)

Children

Sugar sweetened beverages - one year follow-up in prospective studies - odds ratio for being overweight or obese was 1.55 (1.32 to 1.82) - highest intake compared with the lowest intake

BMJ 2012;345:e7492 doi: 10.1136/bmj.e7492

Epidemiology and Prevention

Sweetened Beverage Consumption, Incident Coronary Heart Disease, and Biomarkers of Risk in Men

Compared never drink vs 2 servings (12oz)/month vs 2/week vs 7/week

Only 7 servings/week showed a difference in CHD - roughly 20%

Circulation 2012;125:1735-41

Only 7 servings/week showed a difference in CVD mortality - roughly 30%

JAMA Intern Med 2014;174:516-24

Original Investigation

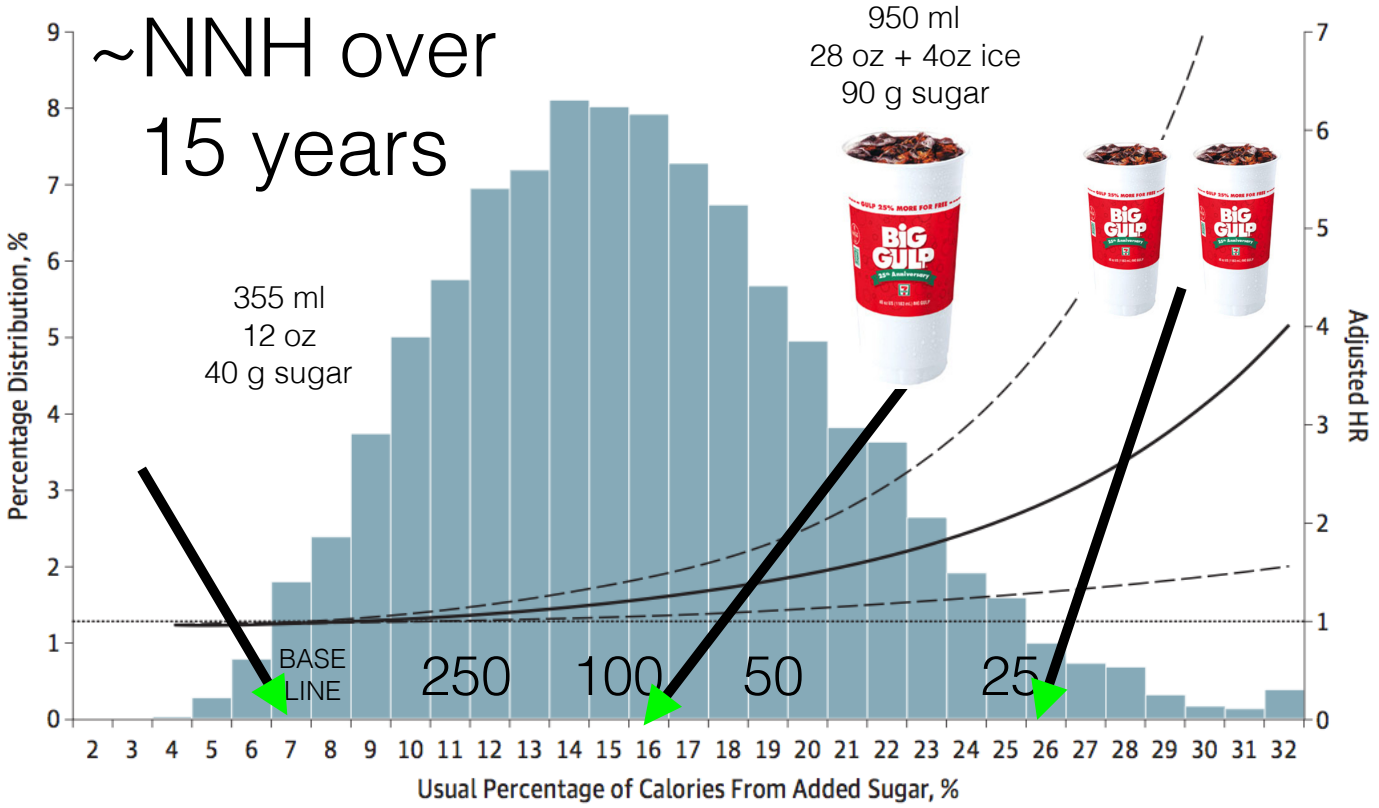
Added Sugar Intake and Cardiovascular Diseases Mortality Among US Adults

DEFINITION OF ADDED SUGARS
all sugars used in processed or prepared foods, such as sugar-sweetened beverages, grain-based desserts, fruit drinks, dairy desserts, candy, ready-to-eat cereals, and yeast breads, BUT NOT naturally occurring sugar, such as in fruits and fruit juices

FREE SUGARS = ADDED SUGARS + honey, syrups, or fruit juice

JAMA Intern Med 2014;174:516-24

Figure 1. Adjusted Hazard Ratio (HR) of the Usual Percentage of Calories From Added Sugar for Cardiovascular Disease Mortality Among US Adults 20 Years or Older: National Health and Nutrition Examination Survey Linked Mortality Files, 1988-2006



JAMA Intern Med 2014;174:516-24

Do Sugar-Sweetened Beverages Cause Obesity and Diabetes? Industry and the Manufacture of Scientific Controversy

"We established that experimental studies that have financial conflicts with the SSB industry (25 of 26 studies) are much more likely than independently funded ones (1 of 34 studies) to find no relationship between SSB consumption and metabolic outcomes."

Ann Int Med 2016;165:895-7

The Scientific Basis of Guideline Recommendations on Sugar Intake

A Systematic Review

Jennifer Erickson, RD*; Behnam Sadeghirad, PharmD, MPH*; Lyubov Lytvyn, MSc; Joanne Slavin, PhD, RD; and Bradley C. Johnston, PhD

"Guidelines on dietary sugar do not meet criteria for trustworthy recommendations and are based on low-quality evidence. Public health officials (when promulgating these recommendations) and their public audience (when considering dietary behavior) should be aware of these limitations."

BUT - authors had lots of COIs

Ann Intern Med 2017;166:XXX-XXX. doi:10.7326/M16-2020

Controversies about sugars: results from systematic reviews and meta-analyses on obesity, cardiometabolic disease and diabetes

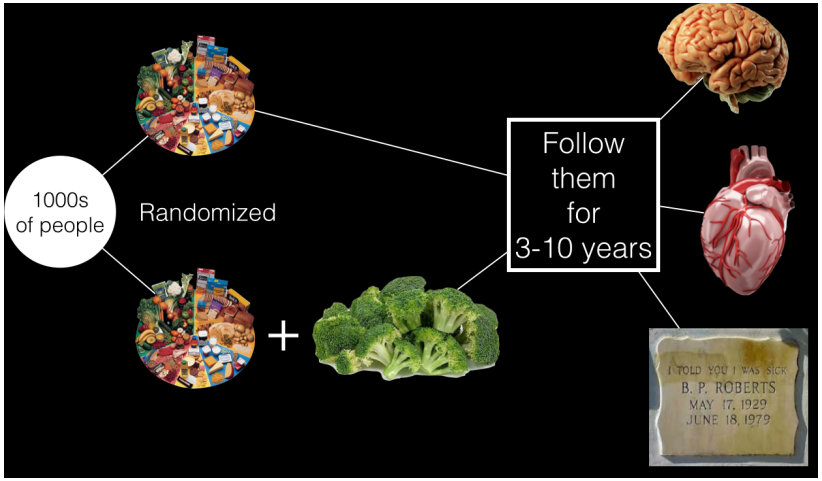
Tauseef A. Khan[1,2] · John L. Sievenpiper[1,2,3,4]

"A lesson we can learn from the fat paradigm is that there can be unintended consequences of focusing singly on one nutrient."

"If a similar approach is taken by the industry who produce 'low-sugar' food products, a replay of the above scenario looks likely."

Eur J Nutr 2016;55 (Suppl 2):S25–S43

Are there differences in cardiovascular outcomes in people randomized to different diets?



Mediterranean diet in secondary prevention of coronary heart disease - Lyon Diet Heart Study

27 months - 605 patients <age 60 with a previous MI in the last 6 months - 90% male

one group advised in a one-hour session (with a couple of follow ups) to adopt a diet of more bread, more root vegetables, more fish, less beef, lamb and pork (replaced with poultry), no day without fruit; and butter and cream replaced with margarine - also used rapeseed, and olive oils in salad

Results

Weight, cholesterol, lipoproteins and blood pressure were not statistically different between groups

Lancet 1994;343:1454-9

Mediterranean diet in secondary prevention of coronary heart disease

	Total mortality (%)	Cardiovascular deaths (%)	Non-fatal MI's (%)	Total primary endpoints (%)
Dietary intervention	3.5	1.0	1.7	2.6
No dietary intervention	6.6	5.3	5.6	10.9
Relative risk reduction	47	81	NSS	76
Absolute risk reduction	3.1	4.3		8.3
Number needed to treat	32	23		12

Lancet 1994;343:1454-9

Women's Health Initiative Randomized Controlled Dietary Modification Trial - “low fat”

48,835 postmenopausal women (62 y/o) - 4% prev CVD - 8.1 years

1) lower fat intake to 20% of their total calories, and to eat five or more fruit/vegetable servings and six or more grain servings a day

2) asked not to make any dietary changes

led to ~10% reduction in energy from fat and one more serving a day of vegetables/fruit

no statistical difference in CHD, CVD, stroke, breast cancer, colorectal cancer

JAMA 2006;295:629-642, 643-54, 655-66

Primary Prevention of Cardiovascular Disease with a Mediterranean Diet PREDIMED - 4 years, 67 y/o, 58% male, 48% T2DM

	Total mortality (%)	Myocardial infarction, stroke, and death from cardiovascular causes (%)	MI (%)	Stroke (%)
Control "Low fat"	4.7	4.4	1.6	2.4
Mediterranean diet - EVOO - 1 liter/week**	4.6	3.8*	1.5	1.9*
Mediterranean diet - NUTS (30 gm of mixed nuts per day)**	4.7	3.4*	1.3	1.3*

**increased weekly servings of fish (by 0.3 servings) and legumes (by 0.4 servings)

* statistical different from control

N Engl J Med 2013; 368:1279-90

What Does the PREDIMED Trial Retraction & Reboot Mean for the Mediterranean Diet?

June 2018

PREDIMED Study Retraction and Republication

Retraction and Republication of a Mediterranean Diet Trial

Randomization had gone wrong for ~20% of the participants - 1,588/7,447
If more than one person in a house recruited - all assigned the same diet
Randomization table hadn't been used correctly - 1 site
Clinics randomized instead of people - 1 site

Primary Prevention of Cardiovascular Disease with a Mediterranean Diet PREDIMED - 5 years, 67 y/o, 58% male, 48% T2DM

	Total mortality (%)	Myocardial infarction, stroke, and death from cardiovascular causes (%)	MI (%)	Stroke (%)
Control "Low fat"	5.4	5.7	2.1	3.0
Mediterranean diet - EVOO - 1 liter/week**	4.4	3.6*	1.4	1.7*
Mediterranean diet - NUTS (30 gm of mixed nuts per day)**	5.4	4.0*	1.6	1.5*

**increased weekly servings of fish (by 0.3 servings) and legumes (by 0.4 servings)

* statistical different from control

N Engl J Med 2018; 368:1279-90

2013

Implies causation

CONCLUSIONS

Among persons at high cardiovascular risk, a Mediterranean diet supplemented with extra-virgin olive oil or nuts reduced the incidence of major cardiovascular events. (Funded by the Spanish government's Instituto de Salud Carlos III and others; Controlled-Trials.com number, ISRCTN35739639.)

Does not imply causation

2018

CONCLUSIONS

In this study involving persons at high cardiovascular risk, the incidence of major cardiovascular events was lower among those assigned to a Mediterranean diet supplemented with extra-virgin olive oil or nuts than among those assigned to a reduced-fat diet. (Funded by Instituto de Salud Carlos III, Spanish Ministry of Health, and others; Current Controlled Trials number, ISRCTN35739639.)

Consumption of nuts and legumes and risk of incident ischemic heart disease, stroke, and diabetes: a systematic review and meta-analysis

25 observational studies

both nuts (approx 24%) and legumes (approx 14%) reduced total IHD - but no impact on stroke

Amer J Clin Nutr 2014;100:278-88

“currently there is insufficient material to give a proper definition of what the Mediterranean diet is or was in terms of well defined chemical compounds or even in terms of foods.... The all embracing term 'Mediterranean diet' should not be used in scientific literature...."

Eur J Clin Nutr 1989;43:13–29

Original Article

There are many Mediterranean diets

Ann Noah MSc and Arthur Stewart Truswell MD, DSc

Can We Say What Diet Is Best for Health?

"There have been no rigorous, long-term studies comparing contenders for best diet laurels using methodology that precludes bias and confounding, and for many reasons such studies are unlikely"

Annu Rev Public Health 2014; 35:83–103

“In medicine in particular, the illusion that science can provide some objective answer that applies to everyone -- how much salt to eat, how and how often to screen for cancer, even whom to treat with cholesterol-lowering drugs, and so on -- is a special danger.”

Wall Street Journal, 19 Aug 2014

What is the answer?

Teasing out the benefits and harms of things we eat is EXTREMELY complicated

SINGLE NUTRIENTS

Not enough robust data to ascribe causality

Some interesting associations - eggs, salt, coffee, alcohol

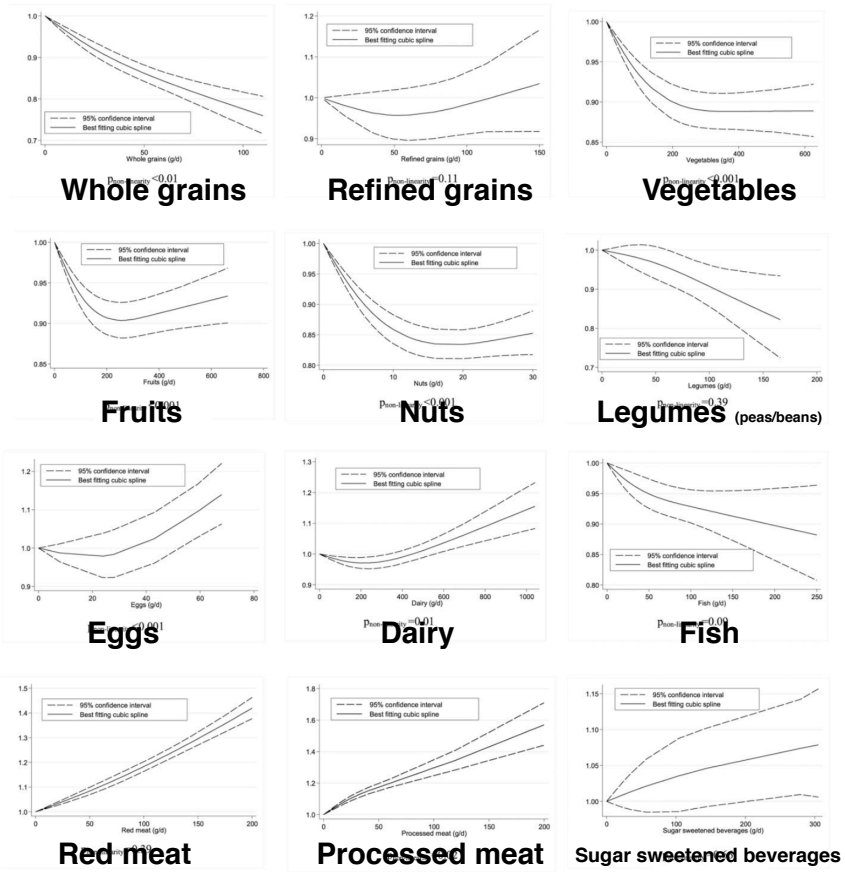
MULTIPLE NUTRIENTS AND BEHAVIOURS

Issues of RCTs and Cohorts - bias and confounding - answer may be unknowable

How to best lose weight is very individual - low carb/higher fat/protein maybe somewhat better? - is the difference important?

Overall nutrition is hugely personal and emotional

Food groups and risk of all-cause mortality: a systematic review and meta-analysis of prospective studies[1,2]



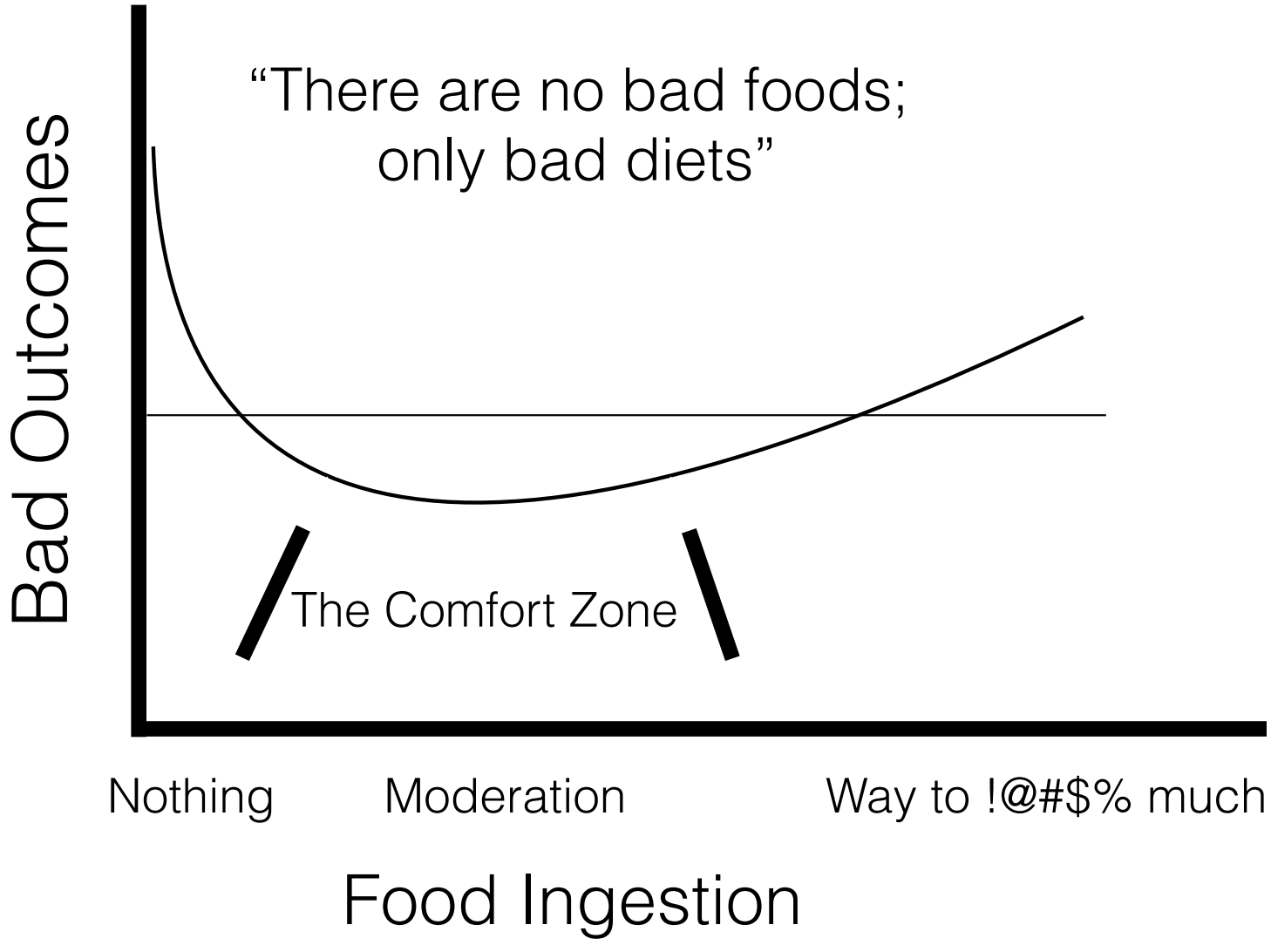
Whole grains **Refined grains** **Vegetables**

Fruits **Nuts** **Legumes** (peas/beans)

Eggs **Dairy** **Fish**

Red meat **Processed meat** **Sugar sweetened beverages**

Am J Clin Nutr 2017;105:1462–73


"There are no bad foods;
only bad diets"
Bad Outcomes
The Comfort Zone
Nothing
Moderation
Way to !@#$% much
Food Ingestion

Nutrition advice which pretty much everyone agrees with

A greater % of whole foods food that has been overly processed or refined as little as possible
More vegetables specifically
Less added sugar
Less refined grains

Choose an eating style that fits your food preferences, health goals, lifestyle.

Most importantly, choose an eating style you can sustain.

1. ENJOY EATING

Differences in outcomes are typically found from “extremes” and are “small”

The Mediterranean diet (whatever it is) seems reasonable - also CFG/ USDA ~DASH

Eat in moderation/moderation/moderation

Avoid “ultra” processed food - within reason

You can easily justify some red meat, butter etc

Eggs, coffee, salt, and alcohol in moderation seem fine if not even healthy

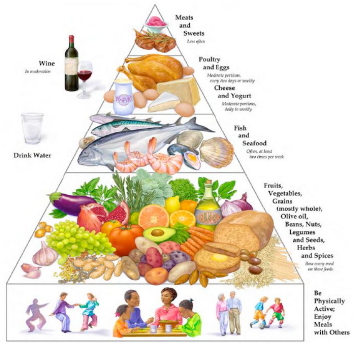
8. Saturated fats - OK - trans-fat?

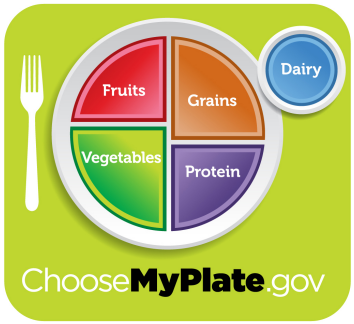
Added sugars at the high end seem to increase risk

“Big Gulps”- really what is the point of them?

It is VERY unlikely a single “nutrient” would have an important effect

Animal rights/environmental issues are a whole other topic





The M&M's Diet

Mediterranean

Moderation

"The secret of life is to eat what you like and let the food fight it out inside"
Mark Twain