

THE DIET-HEART HYPOTHESIS, 70+ YEARS IN?

GARY TAUBES

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2 Maintain Ideal Weight page 7
3 Avoid Too Much Fat, Saturated Fat, and Cholesterol page 11
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U.S. Department of Agriculture
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Revised Edition, 1995
U.S. Department of Agriculture
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Revised Edition, 2000
U.S. Department of Agriculture
U.S. Department of Health and Human Services

Nutrition and Your Health: Dietary Guidelines for Americans
Balance the food you eat with physical activity to maintain or improve your weight
Choose a diet with plenty of vegetables, fruits, and grains
Choose a diet low in fat, saturated fat, and cholesterol
Eat a variety of foods
Choose a diet moderate in salt and sodium
Choose a diet moderate in sugars
If you drink alcoholic beverages, do so in moderation

Revised Edition, 1995
U.S. Department of Agriculture
U.S. Department of Health and Human Services

DIETARY GUIDELINES FOR AMERICANS
AIM FOR FITNESS...
• Aim for a healthy weight.
• Be physically active each day.
BUILD A HEALTHY BASE...
• Let the Pyramid guide your food choices.
• Choose a variety of grains daily, especially whole grains.
• Choose a variety of fruits and vegetables daily.
• Keep food safe to eat.
CHOOSE SENSIBLY...
• Choose a diet that is low in saturated fat and cholesterol and moderate in total fat.
• Choose beverages and foods to moderate your intake of sugars.
• Choose and prepare foods with less salt.
• If you drink alcoholic beverages, do so in moderation.

...for good health

U.S. Department of Agriculture
U.S. Department of Health and Human Services

Dietary Guidelines for Americans 2005
U.S. Department of Agriculture
U.S. Department of Health and Human Services
www.dietaryguidelines.gov

Dietary Guidelines for Americans 2010
U.S. Department of Agriculture
U.S. Department of Health and Human Services
www.dietaryguidelines.gov

DIETARY GUIDELINES FOR AMERICANS 2015-2020 EIGHTH EDITION
U.S. Department of Agriculture
U.S. Department of Health and Human Services
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DGA Dietary Guidelines for Americans 2020-2025
Make Every Bite Count With the Dietary Guidelines.
USDA
DietaryGuidelines.gov

Nutrition and Your Health
Dietary Guidelines for Americans

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Second Edition, 1988
U.S. Department of Agriculture
U.S. Department of Health and Human Services

Nutrition and Your Health
Dietary Guidelines for Americans

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Third Edition, 2002
U.S. Department of Agriculture
U.S. Department of Health and Human Services

Nutrition and Your Health:
Dietary Guidelines for Americans

22 Balance the food you eat with physical activity—moderate to vigorous your weight

23 Choose a diet with plenty of grains, proteins, vegetables, and fruits

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

25 Eat a variety of foods

26 Choose a diet moderate in salt and sodium

27 Choose a diet moderate in sugars

28 If you drink alcoholic beverages, do so in moderation

Fourth Edition, 1995
U.S. Department of Agriculture
U.S. Department of Health and Human Services

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BUILD A HEALTHY BASE...

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Dietary Guidelines for Americans 2005

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U.S. Department of Agriculture
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I then realized that medical decision making was not built on a bedrock of evidence or formal analysis, but was standing on Jell-O.

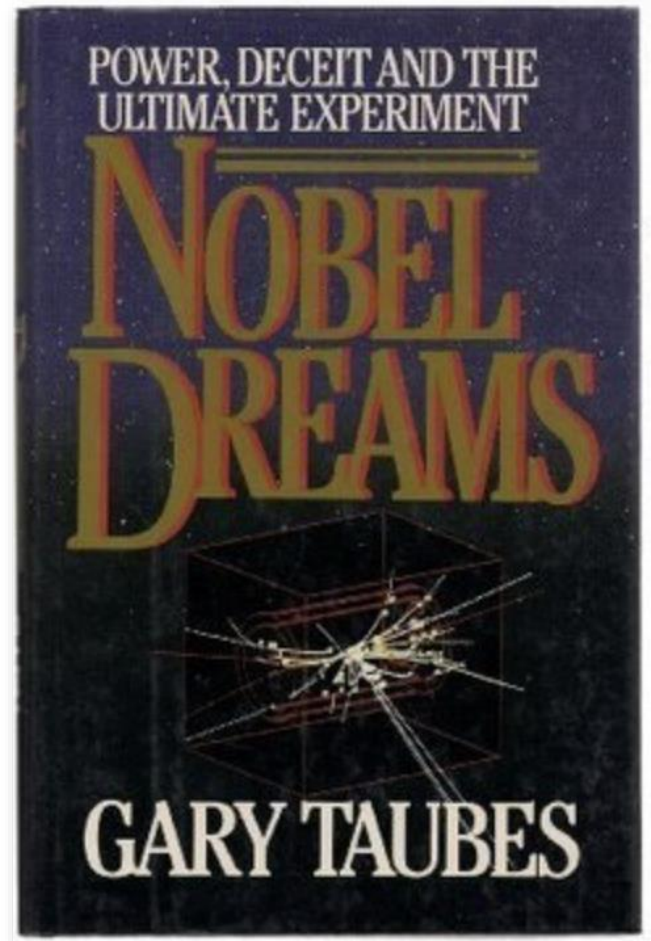
David Eddy, 2013, The Origins of Evidence-Based Medicine

CONTEXT

MY CREDIBILITY?

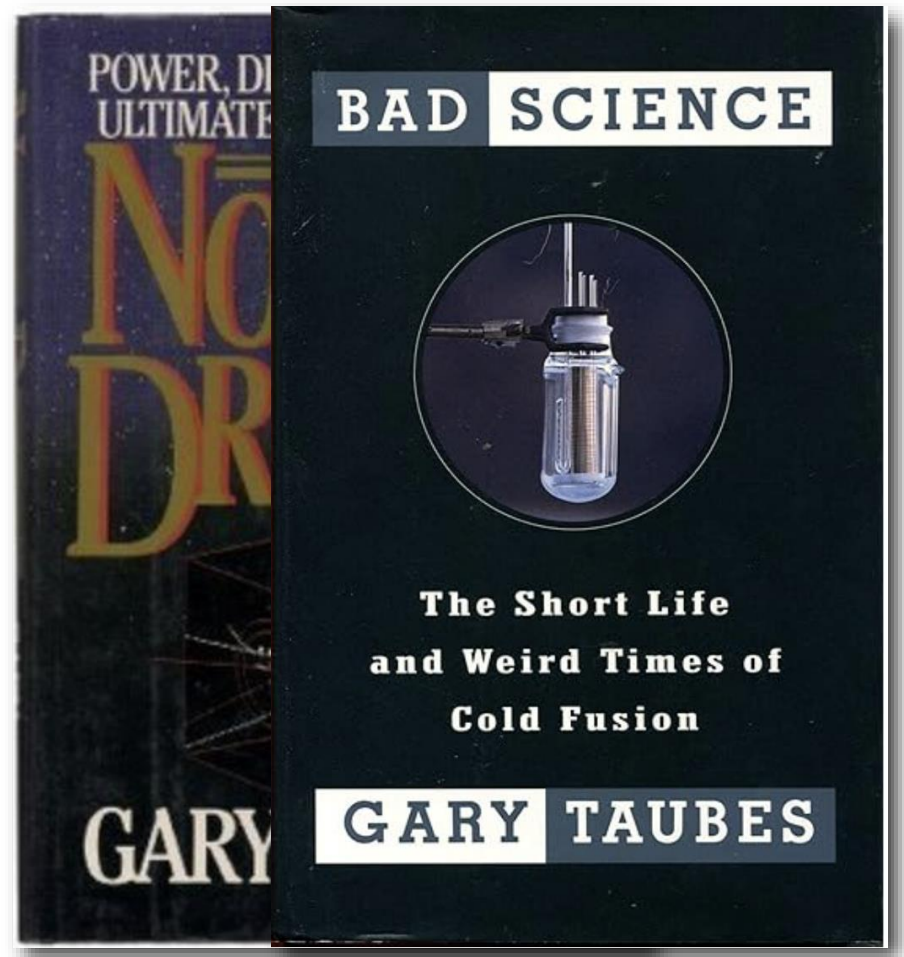
CONTEXT

MY CREDIBILITY?



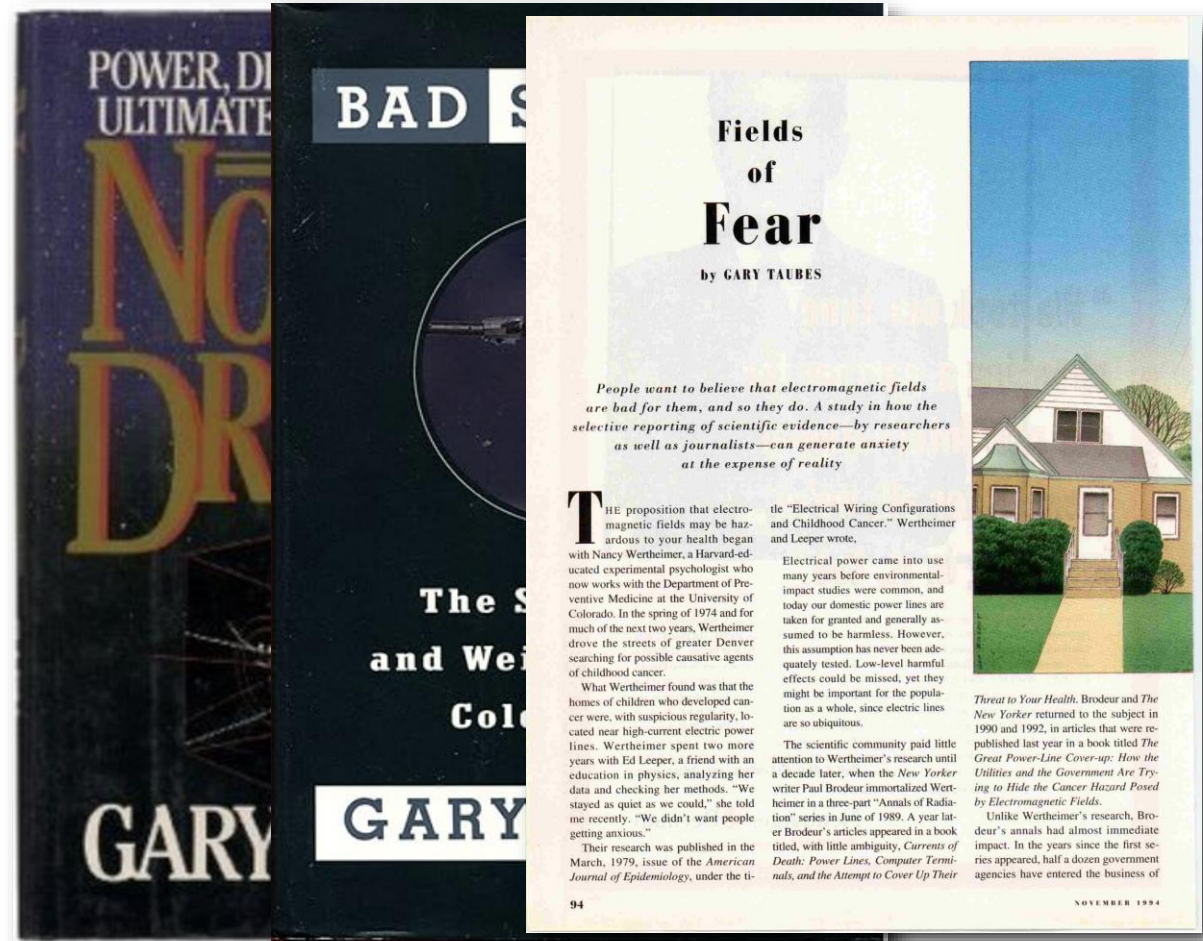
CONTEXT

MY CREDIBILITY?



CONTEXT

MY CREDIBILITY?



Fields of Fear

by GARY TAUBES

People want to believe that electromagnetic fields are bad for them, and so they do. A study in how the selective reporting of scientific evidence—by researchers as well as journalists—can generate anxiety at the expense of reality

THE proposition that electromagnetic fields may be hazardous to your health began with Nancy Wertheimer, a Harvard-educated experimental psychologist who now works with the Department of Preventive Medicine at the University of Colorado. In the spring of 1974 and for much of the next two years, Wertheimer drove the streets of greater Denver searching for possible causative agents of childhood cancer.

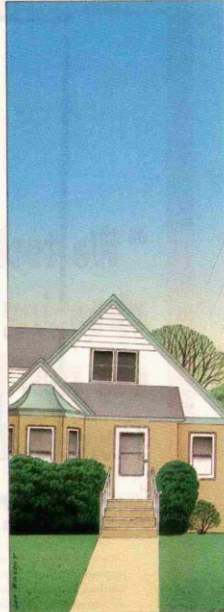
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Their research was published in the March, 1979, issue of the *American Journal of Epidemiology*, under the ti-

tle "Electrical Wiring Configurations and Childhood Cancer." Wertheimer and Leeper wrote,

Electrical power came into use many years before environmental-impact studies were common, and today our domestic power lines are taken for granted and generally assumed to be harmless. However, this assumption has never been adequately tested. Low-level harmful effects could be missed, yet they might be important for the population as a whole, since electric lines are so ubiquitous.

The scientific community paid little attention to Wertheimer's research until a decade later, when the *New Yorker* writer Paul Brodeur immortalized Wertheimer in a three-part "Annals of Radiation" series in June of 1989. A year later Brodeur's articles appeared in a book titled, with little ambiguity, *Currents of Death: Power Lines, Computer Terminals, and the Attempt to Cover Up Their*



Threat to Your Health. Brodeur and *The New Yorker* returned to the subject in 1990 and 1992, in articles that were republished last year in a book titled *The Great Power-Line Cover-up: How the Utilities and the Government Are Trying to Hide the Cancer Hazard Posed by Electromagnetic Fields*.

Unlike Wertheimer's research, Brodeur's annals had almost immediate impact. In the years since the first series appeared, half a dozen government agencies have entered the business of

CONTEXT

MY CREDIBILITY?

SPECIAL NEWS REPORT

Epidemiology Faces Its Limits

The search for subtle links between diet, lifestyle, or environmental factors and disease is an unending source of fear—but often yields little certainty

The news about health risks comes thick and fast these days, and it seems almost constitutionally contradictory. In January of last year, for instance, a Swedish study found a significant association between residential radon exposure and lung cancer. A Canadian study did not. Three months later, it was pesticide residues. The *Journal of the National Cancer Institute* published a study in April reporting—contrary to previous, less powerful studies—that the presence of DDT metabolites in the bloodstream seemed to have no effect on the risk of breast cancer. In October, it was abortions and breast cancer. Maybe yes. Maybe no. In January of this year it was electromagnetic fields (EMF) from power lines. This time a study of electric utility workers in the United States suggested a possible link between EMF and brain cancer but—contrary to a study a year ago in Canada and France—no link between EMF and leukemia.

These are not isolated examples of the conflicting nature of epidemiologic studies; they're just the latest to hit the newspapers. Over the years, such studies have come up with a mind-numbing array of potential disease-causing agents, from hair dyes (lymphomas, myelomas, and leukemia) to coffee (pancreatic cancer and heart disease) to oral contraceptives and other hormone treatments (virtually every disorder known to woman). The pendulum swings back and forth, subjecting the public to an "epidemic of anxiety," as Lewis Thomas put it over a decade ago. Indeed, last July, the *New England Journal of Medicine* (NEJM) published an editorial by editors Marcia Angell and Jerome Kassirer asking the pithy question, "What Should the Public Believe?" Health-conscious Americans, wrote Angell and Kassirer, "increasingly find themselves beset by contradictory advice. No sooner do they learn the results of one research study than they hear of one with the opposite message."

Kassirer and Angell place responsibility on the press for its reporting of epidemiology, and even on the public "for its unrealistic expectations" of what modern medical research can do for their health. But many epidemiologists interviewed by *Science* say the problem also lies with the very nature of epidemiologic studies—in particular those that try to isolate causes of noninfectious disease, known variously as "observational" or "risk-factor" or "environmental" epidemiology. The predicament of these studies is a simple one: Over the past 50 years, epidemiologists have succeeded in identifying the more conspicuous determinants of noninfectious diseases—smoking, for instance, which can increase the risk of developing lung cancer by as much as 3000%. Now they are left to search for subtler links between diseases and environmental causes or lifestyles. And that leads to the Catch-22 of modern epidemiology.

On the one hand, these subtle risks—say, the 30% increase in the risk of breast cancer from alcohol consumption that some studies suggest—may affect such a large segment of the population that they have potentially huge impacts on public health. On the other, many epidemiologists concede that their studies are so plagued with biases, uncertainties, and methodological weaknesses that they may be inherently incapable of accurately discerning such weak associations. As Michael Thun, the director of analytic epidemiology for the American Cancer Society, puts it, "With epidemiology you can tell a little thing from a big thing. What's very hard to do is to tell a little thing from nothing at all." Agrees Ken

Orlman, editor of the journal *Epidemiology*: "We're pushing the edge of what can be done with epidemiology." With epidemiology stretched to its limits or beyond, says Dimitrios Trichopoulos, head of the epidemiology department at the Harvard School of Public Health, studies will inevitably generate false positive and false negative results "with disturbing frequency." Most epidemiologists are aware of the problem, he adds, "and tend to avoid causal inferences on the basis of isolated studies or even groups of studies in the absence of compelling biomedical evidence. However, exceptions do occur, and their frequency appears to be increasing." As Trichopoulos explains, "Objectively the problems are not more than they used to be, but the pressure is greater on the profession, and the number who practice it is greater." As a result, journals today are full of studies suggesting that a little risk is not nothing at all. The findings are often touted in press releases by the journals that publish them or by the researchers' institutions, and newspapers and other media often report the claims uncritically (see box on p. 166). And so the anxiety pendulum swings at an ever more dizzying rate. "We are fast becoming a nuisance to society," says Trichopoulos. "People don't take us seriously anymore, and when they do take us seriously, we may unintentionally do more harm than good." As a solution, epidemiologists interviewed by *Science* could suggest only that the press become more skeptical of epidemiologic findings, that epidemiologists become more skeptical about their own findings—or both.

An observational science

What drives the epidemiologic quest for risk factors is the strong circumstantial evidence that what we eat, drink, breathe, and so on are major factors in many devastating illnesses. Rates of heart disease, for example, have changed much faster over recent decades than can be explained by genetic changes, implicating dietary



Anxiety epidemic. Protesting risks that may—or may not—be real.



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Fields of Fear

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People want to believe that electromagnetics are bad for them, and so they do. A selective reporting of scientific evidence—as well as journalists—can generate at the expense of reality

THE proposition that electromagnetic fields may be hazardous to your health began with Nancy Wertheimer, a Harvard-educated experimental psychologist who now works with the Department of Preventive Medicine at the University of Colorado. In the spring of 1974 and for much of the next two years, Wertheimer drove the streets of greater Denver searching for possible causative agents of childhood cancer.

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MY CREDIBILITY?

NEWS FOCUS

SPECIAL NEWS REPORT

Epidemiology

The search for subtle links between diet and disease is an unending source of controversy.

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Kassirer and Angell place responsibility for the confusion on the media. "The public is being misled by a flood of conflicting information," they write. "The media are often the source of the confusion, and the public is often the victim." They argue that the media should be held responsible for the confusion. "The public is being misled by a flood of conflicting information," they write. "The media are often the source of the confusion, and the public is often the victim." They argue that the media should be held responsible for the confusion.

164 SCIENCE

Three decades of controversy over the putative benefits of salt reduction show how the demands of good science clash with the pressures of public health policy

The (Political) Science of Salt

"Science... warns me to be careful how I adopt a view which jumps with my preconceptions, and to require stronger evidence for such belief than for one to which I was previously hostile. My business is to teach my aspirations to conform themselves to fact, not to try and make facts harmonize with my aspirations."

—Thomas Huxley, 1860

In an era when dietary advice is dispensed freely by virtually everyone from public health officials to personal trainers, well-meaning relatives, and strangers on check-out lines, one recommendation has rung through 3 decades with the indisputable force of gospel: Eat less salt and you will lower your blood pressure and live a longer, healthier life. This has been the message promoted by both the National Heart, Lung, and Blood Institute (NHLBI) and the National High Blood Pressure Education Program (NHBPEP), a coalition of 36 medical organizations and six federal agencies. Everyone, not just the tens of millions of Americans who suffer from hypertension, could reduce their risk of heart disease and stroke by eating less salt. The official guidelines recommend a daily allowance of 6 grams (2400 milligrams of sodium), which is 4 grams less than our current average. This "modest reduction," says NHBPEP director Ed Roccella, "can shift some arterial pressures down and prevent some strokes." Roccella's message is clear: "All I'm trying to do is save some lives."

So what's the problem? For starters, salt is a primary determinant of taste in food—fat, of course, is the other—and 80% of the salt we consume comes from processed foods, making it difficult to avoid. Then there's the kicker:

While the government has been denouncing salt as a health hazard for decades, no amount of scientific effort has been able to dispense with the suspicions that it is not. Indeed, the controversy over the benefits, if any, of salt reduction now constitutes one of the longest running, most vitriolic, and surreal disputes in all of medicine.

On the one side are those experts—primarily physicians turned epidemiologists, and administrators such as Roccella and Claude Lenfant, head of NHLBI—who insist that the evidence that salt raises blood pressure is effectively irrefutable. They have an obligation, they say, to push for universal salt reduction, because people are dying and will continue to die if they wait for further research to bring scientific certainty. On the other side are those researchers—primarily physicians turned epidemiologists, including former presidents of the American Heart Association, the American Society of Hypertension, and the European and international societies of hypertension—who argue that the data supporting universal salt reduction have never been compelling, nor has it ever been demonstrated that such a program would not have unforeseen negative side effects. This was the verdict, for instance, of a review published last May in the *Journal of the American Medical Association* (JAMA). University of Copenhagen researchers analyzed 114 ran-

domized trials of sodium reduction, concluding that the benefit for hypertensives was significantly smaller than could be achieved by antihypertensive drugs, and that a "measurable" benefit in individuals with normal blood pressure (normotensives) of even a single millimeter of mercury could only be achieved with an "extreme" reduction in salt intake. "You can say without any shadow of a doubt," says Drummond Rennie, a JAMA editor and a physiologist at the University of California (UC), San Francisco, "that the [NHLBI] has made a commitment to salt education that goes way beyond the scientific facts."

At its core, the salt controversy is a philosophical clash between the requirements of public health policy and the requirements of good science; between the need to act and the institutionalized skepticism required to develop a body of reliable knowledge. This is the conflict that fuels many of today's public health controversies: "We're all being pushed by people who say, 'Give me the simple answer. Is it or isn't it?'" says Bill Harlan, director of the office of disease prevention at the National Institutes of Health (NIH). "They don't want the answer after we finish a study in 5 years. They want it now. No equivocation. ... [And so] we constantly get pushed into positions we may not want to be in and cannot justify scientifically."

The dispute over salt, however, is an idiosyncratic one, remarkable in several fundamental aspects. Foremost, many who advocate salt reduction insist publicly that the controversy is a) either nonexistent, or b) due solely to the influence of the salt lobby and its paid consultants—scientists. Jeremiah Stamler, for instance, a cardiologist at Northwestern University Medical

The salt controversy is the "number one perfect example of why science is a destabilizing force in public policy."

—Sanford Miller

PHOTOGRAPHY BY ANN ELLIOTT CUTTING



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BAD

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for the confusion on the shoulders of the media. "Electrical and Childhood Cancer: A Study of Many Years Impact on Our Daily Lives" is a study that has been taken for granted for many years. It is assumed to be this study that has led to the assumption that effects could be impeded by a woman who is so ubiquitous. The scientific attention to Wertheimer in a three-part series in *JAMA* in 1979, under the title "Death: Power Lines, and the At-

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So what's the problem? For starters, salt is a primary determinant of taste in food—fat, of course, is the other—and 80% of the salt we consume comes from processed foods, making it difficult to avoid. Then there's the kicker:

The salt content of many processed foods is a number on why scientists are so forceful in their recommendations.

NEW

NEWS FOCUS

Mainstream nutritional science has demonized dietary fat, yet 50 years and hundreds of millions of dollars of research have failed to prove that eating a low-fat diet will help you live longer.

The Soft Science of Dietary Fat

"Clearly the thoughts of yesterday were not going to serve us very well."

During the past 30 years, the concept of eating healthy in America has become synonymous with avoiding dietary fat. The creation and marketing of reduced-fat food products has become big business; over 15,000 have appeared on supermarket shelves. Indeed, an entire research industry has arisen to create palatable nonfat fat substitutes, and the food industry now spends billions of dollars yearly selling the less-fat-is-good-health message. The government weighs in as well, with the U.S.

Department of Agriculture's (USDA's) booklet on dietary guidelines, published every 5 years, and its ubiquitous Food Guide Pyramid, which recommends that fats and oils be eaten "sparingly." The low-fat gospel spreads farther by a kind of societal osmosis, continuously reinforced by physicians, nutritionists, journalists, health organizations, and consumer advocacy groups such as the Center for Science in the Public Interest, which refers to fat as this "greasy killer." "In America, we no longer fear God or the communists, but we fear fat," says David Kritchevsky of the Wistar Institute in Philadelphia, who in 1958 wrote the first textbook on cholesterol.

As the Surgeon General's Office discovered, however, the science of dietary fat is not nearly as simple as it once appeared. The proposition, now 50 years old, that dietary fat is a bane to health is based chiefly on the fact that fat, specifically the hard, saturated fat found primarily in meat and dairy products, elevates blood cholesterol levels. This in turn raises the likelihood that cholesterol will clog arteries, a condition known as atherosclerosis, which then increases risk of coronary artery disease, heart attack, and untimely death. By the 1970s, each individual step of this chain from fat to cholesterol to heart disease had been demonstrated beyond reasonable doubt, but the veracity of the chain as a whole has never been proven. In other words, despite decades of research, it is still a debatable proposition whether the consumption of saturated fats above recommended levels (step one in the chain) by anyone who's not already at high risk of heart disease will increase the likelihood of untimely death (outcome three). Nor have hundreds of millions of dollars in trials managed to generate compelling evidence that healthy individuals can extend their lives by more than a few weeks, if that, by eating less fat (see sidebar on p. 2538). To put it simply, the data remain ambiguous as to whether

"They say, 'You really need a high level of proof to change the recommendations,' which is ironic, because they never had a high level of proof to set them."

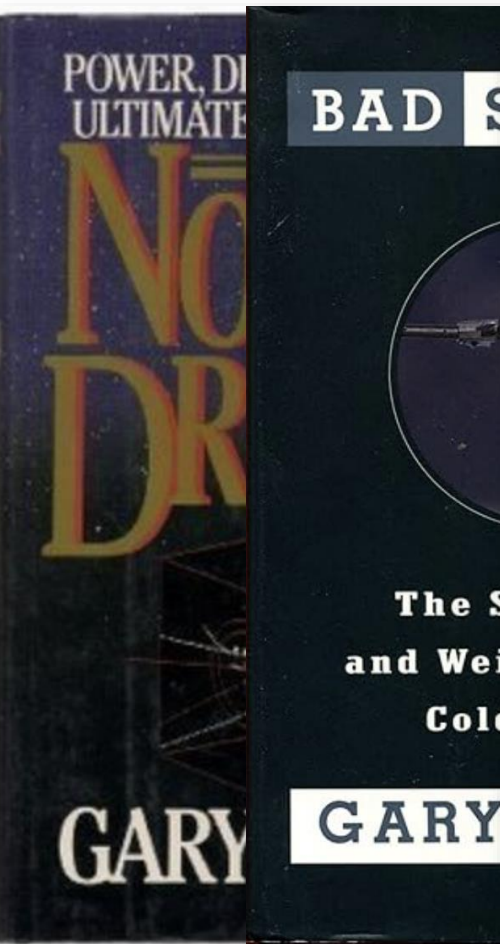
—Walter Willett



PHOTOGRAPHY BY JAMES R. HARRIS

CONTEXT

MY CREDIBILITY?



Fields of Fear

by GARY TAUBES

People want to believe that electromagnetics are bad for them, and so they do. A selective reporting of scientific evidence as well as journalists—can generate at the expense of reality

THE proposition that electromagnetic fields may be hazardous to your health began with Nancy Wertheimer, a Harvard-educated experimental psychologist who now works with the Department of Preventive Medicine at the University of Colorado. In the spring of 1974 and for much of the next two years, Wertheimer drove the streets of greater Denver searching for possible causative agents of childhood cancer.

What Wertheimer found was that the homes of children who developed cancer were, with suspicious regularity, located near high-current electric power lines. Wertheimer spent two more years with Ed Leeper, a friend with an education in physics, analyzing her data and checking her methods. "We stayed as quiet as we could," she told me recently. "We didn't want people getting anxious."

Their research was published in the March, 1979, issue of the *American Journal of Epidemiology*, under the ti-

tle "Electrical and Childhood Cancer." Electrical power lines have been the subject of many years of impact studies today our data taken for granted. It is assumed to be this assumption that quietly tests effects could be important as a whole. The scientific attention to Wertheimer in a three-part series in *JAMA* by Jerome Kassirer and Paul Brodeur's article, with little fanfare, titled, with little irony, "Should the Public Believe?" Health-conscious Americans, wrote Angell and Kassirer, "increasingly find themselves beset by contradictory advice. No sooner do they learn the results of one research study than they hear of one with the opposite message."

SPECIAL NEWS REPORT

Epidemiology

The search for subtle links between diet and disease is an unending source of frustration

The news about health risks comes thick and fast these days, and it seems almost constitutionally contradictory. In January of last year, for instance, a Swedish study found a significant association between residential radon exposure and lung cancer. A Canadian study did not. Three months later, it was pesticide residues. The *Journal of the National Cancer Institute* published a study in April reporting—contrary to previous, less powerful studies—that the presence of DDT metabolites in the bloodstream seemed to have no effect on the risk of breast cancer. In October, it was abortions and breast cancer. Maybe yes. Maybe no. In January of this year it was electromagnetic fields (EMF) from power lines. This time a study of electric utility workers in the United States suggested a possible link between EMF and brain cancer but—contrary to a study a year ago in Canada and France—no link between EMF and leukemia.

These are not isolated examples of the conflicting nature of epidemiologic studies; they're just the latest to hit the newspapers. Over the years, such studies have come up with a mind-numbing array of potential disease-causing agents, from hair dyes (lymphomas, myelomas, and leukemia) to coffee (pancreatic cancer and heart disease) to oral contraceptives and other hormone treatments (virtually every disorder known to woman). The pendulum swings back and forth, subjecting the public to an "epidemic of anxiety," as Lewis Thomas put it over a decade ago. Indeed, last July, the *New England Journal of Medicine* (NEJM) published an editorial by editors Marcia Angell and Jerome Kassirer asking the pithy question, "What Should the Public Believe?" Health-conscious Americans, wrote Angell and Kassirer, "increasingly find themselves beset by contradictory advice. No sooner do they learn the results of one research study than they hear of one with the opposite message."



Anxiety epidemic. Protesting risks that may—or may not—be real.

noninfectious stroke, which is left to the discretion of the public health officials to personal trainers, well-meaning relatives, and strangers on check-out lines, one recommendation has rung through 3 decades with the indisputable force of gospel: Eat less salt and you will lower your blood pressure and live a longer, healthier life. This has been the message promoted by both the National Heart, Lung, and Blood Institute (NHLBI) and the National High Blood Pressure Education Program (NHBPEP), a coalition of 36 medical organizations and six federal agencies. Everyone, not just the tens of millions of Americans who suffer from hypertension, could reduce their risk of heart disease and stroke by eating less salt. The official guidelines recommend a daily allowance of 6 grams (2400 milligrams of sodium), which is 4 grams less than our current average. This "modest reduction," says NHBPEP director Ed Roccella, "can shift some arterial pressures down and prevent some strokes." Roccella's message is clear: "All I'm trying to do is save some lives."

So what's the problem? For starters, salt is a primary determinant of taste in food—fat, of course, is the other—and 80% of the salt we consume comes from processed foods, making it difficult to avoid. Then there's the kicker:

The salt content of many scientific studies is

PHOTOGRAPHY BY

The (Political)

"Science... warns me to be careful how I adopt a view which jumps with my preconceptions, and to require stronger evidence for such belief than for one to which I was previously hostile. My business is to teach my aspirations to conform themselves to fact, not to try and make facts harmonize with my aspirations."

—Thomas Huxley, 1860

In an era when dietary advice is dispensed freely by virtually everyone from public health officials to personal trainers, well-meaning relatives, and strangers on check-out lines, one recommendation has rung through 3 decades with the indisputable force of gospel: Eat less salt and you will lower your blood pressure and live a longer, healthier life. This has been the message promoted by both the National Heart, Lung, and Blood Institute (NHLBI) and the National High Blood Pressure Education Program (NHBPEP), a coalition of 36 medical organizations and six federal agencies. Everyone, not just the tens of millions of Americans who suffer from hypertension, could reduce their risk of heart disease and stroke by eating less salt. The official guidelines recommend a daily allowance of 6 grams (2400 milligrams of sodium), which is 4 grams less than our current average. This "modest reduction," says NHBPEP director Ed Roccella, "can shift some arterial pressures down and prevent some strokes." Roccella's message is clear: "All I'm trying to do is save some lives."

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The salt content of many scientific studies is

PHOTOGRAPHY BY

NEW

Three decades of controversy over the putative good science clash with the

Mainstream nutritional science has demonized dollars of research have failed to prove the

The Soft Diet

When the U.S. Surgeon General's Office set off in 1988 to write the definitive report on the dangers of dietary fat, the scientific task appeared straightforward. Four years earlier, the National Institutes of Health (NIH) had begun advising every American old enough to walk to restrict fat intake, and the president of the American Heart Association (AHA) had told *Time* magazine that if everyone went along, "we will have [atherosclerosis] conquered" by the year 2000. The Surgeon General's Office itself had just published its 700-page landmark "Report on Nutrition and Health," declaring fat the single most unwholesome component of the American diet.

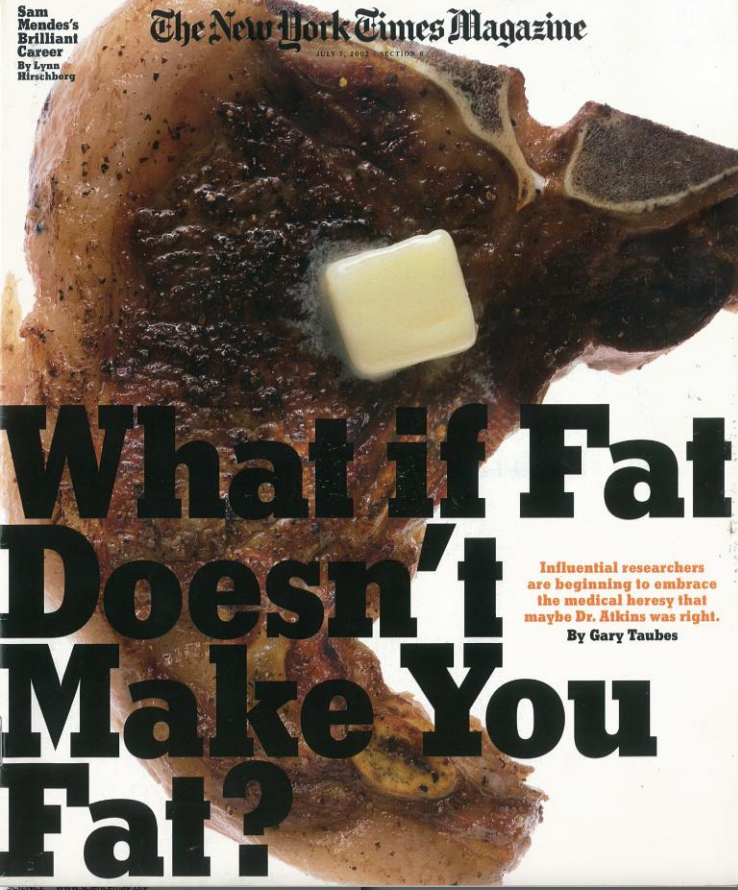
All of this was apparently based on sound science. So the task before the project officer was merely to gather that science together in one volume, have it reviewed by a committee of experts, which had been promptly established, and publish it. The project did not go smoothly, however. Four project officers came and went over the next decade. "It consumed project officers," says Marion Nestle, who helped launch the project and now runs the nutrition and food studies department at New York University (NYU). Members of the oversight committee saw drafts of an early chapter or two, criticized them vigorously, and then saw little else.

Finally, in June 1999, 11 years after the project began, the Surgeon General's Office circulated a letter, authored by the last of the project officers, explaining that the report would be killed. There was no other public announcement and no press release. The letter explained that the relevant administrators "did not anticipate fully the magnitude of the additional external expertise and staff resources that would be needed." In other words, says Nestle, the subject matter "was too complicated." Bill Harlan, a member of the oversight committee and associate director of the Office of Disease Prevention at NIH, says "the report was initiated with a preconceived opinion of the conclusions," but the science behind those opinions was not holding up.

NEWS

The New York Times Magazine

Sam Mendes's Brilliant Career
By Lynn Hirschberg



What if Fat Doesn't Make You Fat?

Influential researchers are beginning to embrace the medical heresy that maybe Dr. Atkins was right.

By Gary Taubes

COMPETING HYPOTHESES/PARADIGMS?

COMPETING HYPOTHESES

THE DOMINANT HYPOTHESIS: THE DIET-HEART HYPOTHESIS

Fat (saturated fat) raises **LDL cholesterol** and causes heart disease.
The dense calories of fat make us fat.

The less fat we eat (and particularly saturated fat) and, so, the *more* carbohydrates we eat—fruits, vegetables, whole grains, legumes—the healthier and leaner we'll be.

COMPETING HYPOTHESES

THE ALTERNATIVE HYPOTHESIS: A DIET-INSULIN HYPOTHESIS

Carbohydrates—particularly refined grains and sugars—cause **insulin resistance and Metabolic Syndrome** and so obesity, diabetes *and* heart disease.

The *fewer* carbohydrates we eat—particularly refined grains and sugars— and so the *more* fat, the healthier and leaner we'll be.

A BRIEF HISTORY OF THE DIET-HEART HYPOTHESIS

COMPETING PHILOSOPHIES OF SCIENCE

Diet-Heart Hypothesis

We don't have time to wait for "definitive scientific evidence"
because people are dying out there.

"It's an imperfect world. The data that would be definitive is
ungettable, so you do your best with what is available."

Basil Rifkin, 2002

The 1950's

Keys at WHO meeting in Amsterdam:
“fatty diet, raised serum cholesterol,
atherosclerosis, myocardial infarction.”

1952

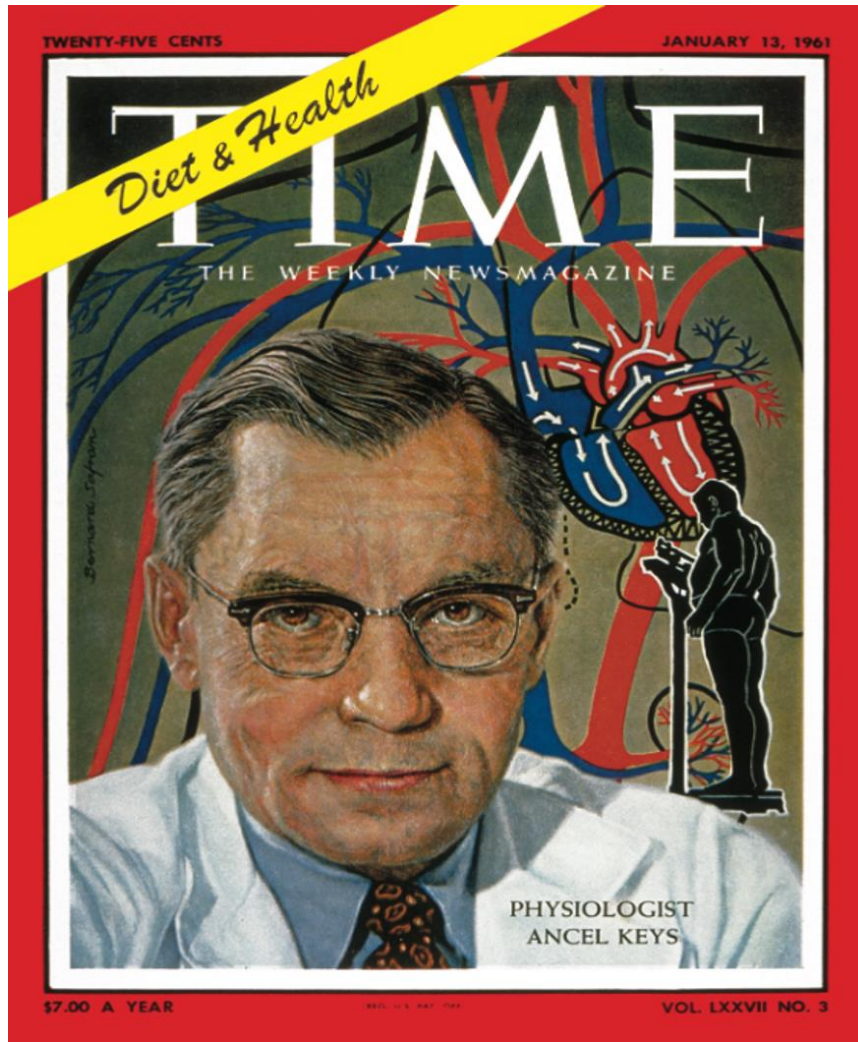
1951

Ancel Keys and his wife Margaret visit Naples, Italy. They assess the cholesterol and fat content of the diet among workers & wealthy. Margaret Keys measures cholesterol levels.

1957

A 15-page AHA report criticizes Keys for taking “uncompromising stands based on evidence that does not stand up under critical examination.”

The 1960's & 1970's



1961

Keys: the ideal heart-healthy diet should be almost 70% carbohydrate and only 15% fat.

The American Heart Association, part 1
Report "that Americans would reduce their risk of heart disease by reducing the fat in their diets, and replacing saturated fats with polyunsaturated fats."

A BRIEF HISTORY OF THE DIET-HEART HYPOTHESIS

U.S. TRIALS OF CHOLESTEROL-LOWERING DIETS (P/S RATIO INCREASED)

1961

Anti-Coronary Club

Heart disease reduced among intervention group

Caveat: total mortality increased

8 of the intervention group die of heart attacks; none of the controls

1969

Los Angeles VA Hospital

Cholesterol reduced. CHD mortality reduced

Caveat: cancer mortality increased

No difference in total mortality

Christakis et al, 1966. *JAMA*. Nov 7;597-604.

Christakis et al, 1966. *Am J Public Health Nations Health*. Feb; 299-314.

Dayton et al, 1969. *Circulation*. Jul;11-1-62.

A BRIEF HISTORY OF THE DIET-HEART HYPOTHESIS

U.S. TRIALS OF CHOLESTEROL-LOWERING DIETS (P/S RATIO INCREASED)

1973

Minnesota Coronary Survey

9000 men and women

269 deaths in intervention group. 248 in controls.

Caveat: The results go unpublished for 16 years.

Why?

“We were disappointed in the way they turned out.”

Ivan Frantz, Jr., principal investigator.

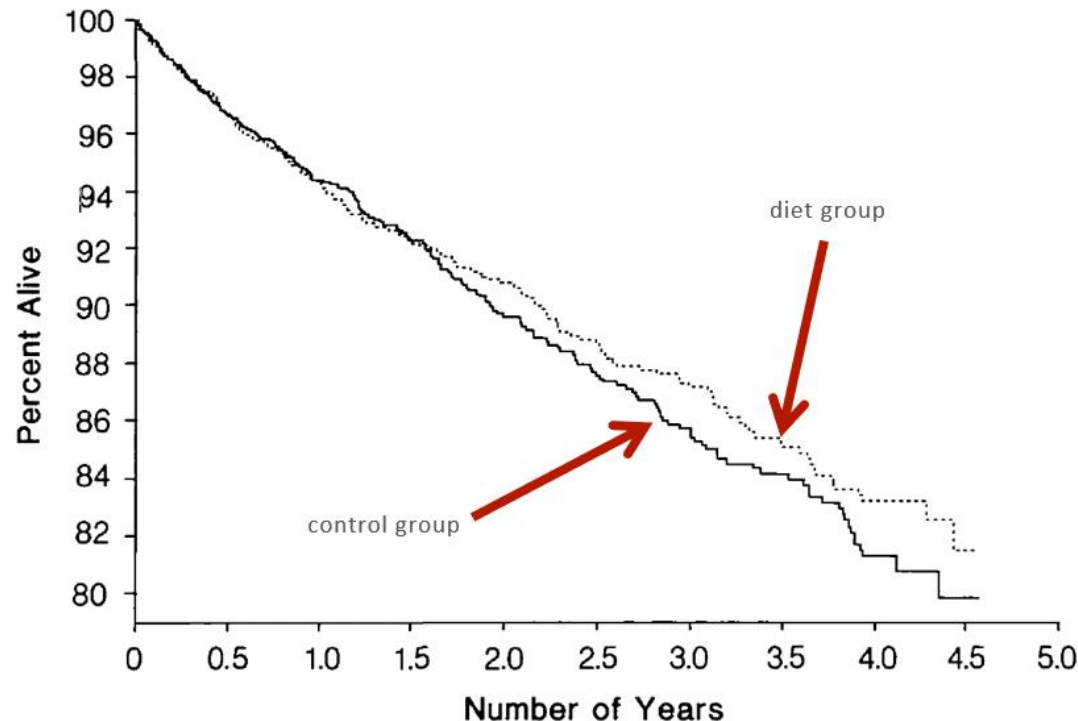


Figure 6. Life-table presentation of percent of men and women of all ages still living. Treatment, (—) and Control, (- -).

The 1970's

An AHA committee recommends low-saturated-fat diets (less than 10% of calories) for every American, including “infants, children, adolescents, lactating and pregnant women, and older persons.”

1970

1977

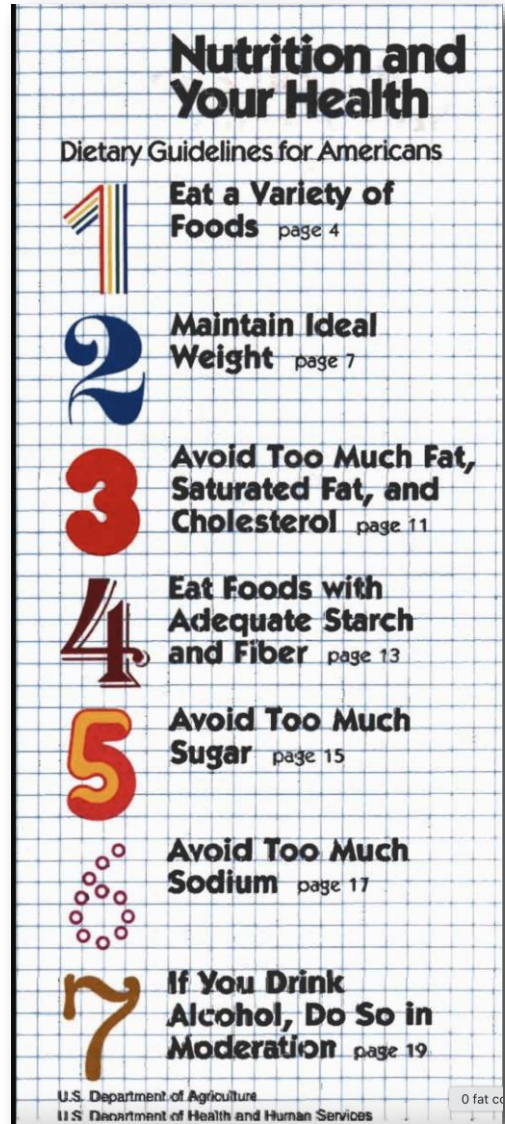
Dietary Goals for the United States

“The first comprehensive statement by any branch of the Federal Government on risk factors in the American diet.”

1. Increase carbohydrate consumption to 55 to 60 percent of calories
2. Reduce fat consumption to 30 percent of calories

The 1980's

THE TIPPING POINT? FIRST DIETARY GUIDELINES



1980

USDA Dietary Guidelines for Americans

The 1980's

CLINICAL TRIALS: 1977-1984

1984

LRCCPPT (\$150 million)

3,800 middle-aged men with cholesterol > 265.

Intervention: cholestyramine, a cholesterol-lowering drug.

Results:

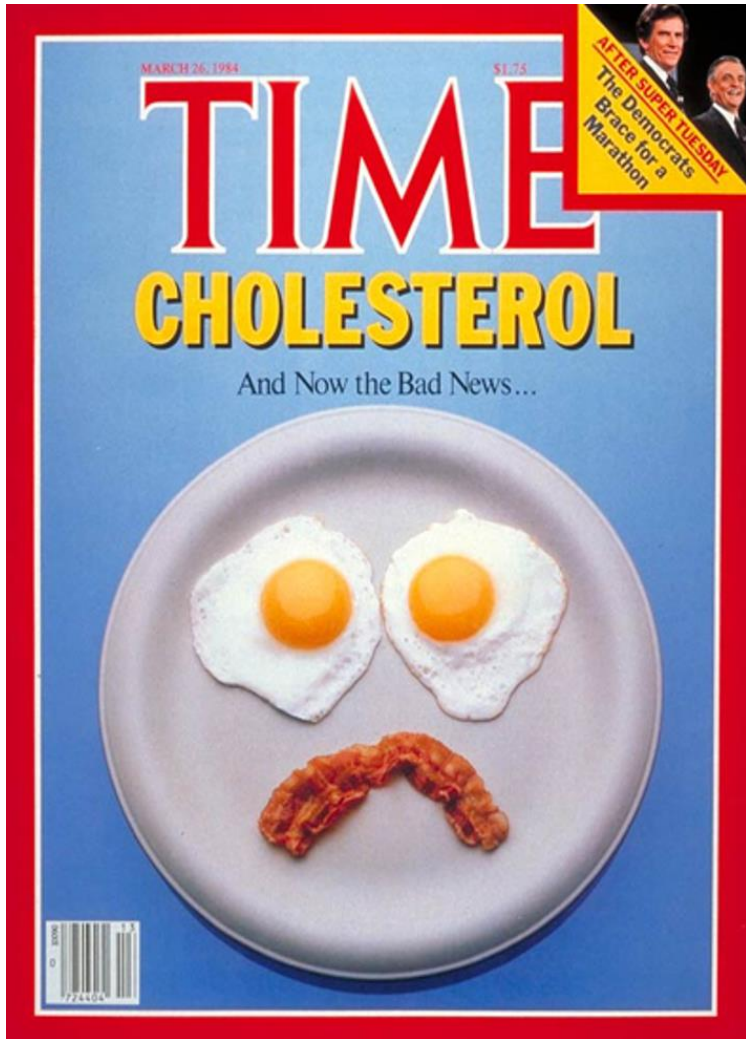
38 definite CHD deaths in control vs. 30 in intervention

158 vs. 130 nonfatal heart attacks

Caveat: No difference in all-cause mortality

The 1980's

1984: THE TIPPING POINT TIPS



The LRC findings are extrapolated from a drug to a diet.

“It is now *indisputable* that lowering cholesterol with diet and drugs can actually cut the risk of developing heart disease and having a heart attack.”

Basil Rifkind, NIH director of the trial, in *Time*

Anon, 1984. *Time*. Jan 23:30.

Consensus conference, 1985. *JAMA*. Apr 12;253(14):2080-6.

The 1980's

The NIH consensus conference conclusion:

There is “no doubt” that a low-fat diet “will afford significant protection against coronary heart disease” to *every* American over the age of two.

Surgeon General's Report on Nutrition and Health
The “disproportionate consumption of food high in fats” is held responsible for two-thirds of the 2.1 million deaths in the U.S. that year.

1984

1987

National Cholesterol Education Program
“The guidelines urge that all Americans, starting at age 20, have their cholesterol levels tested as part of a general medical examination.”

1988

1989

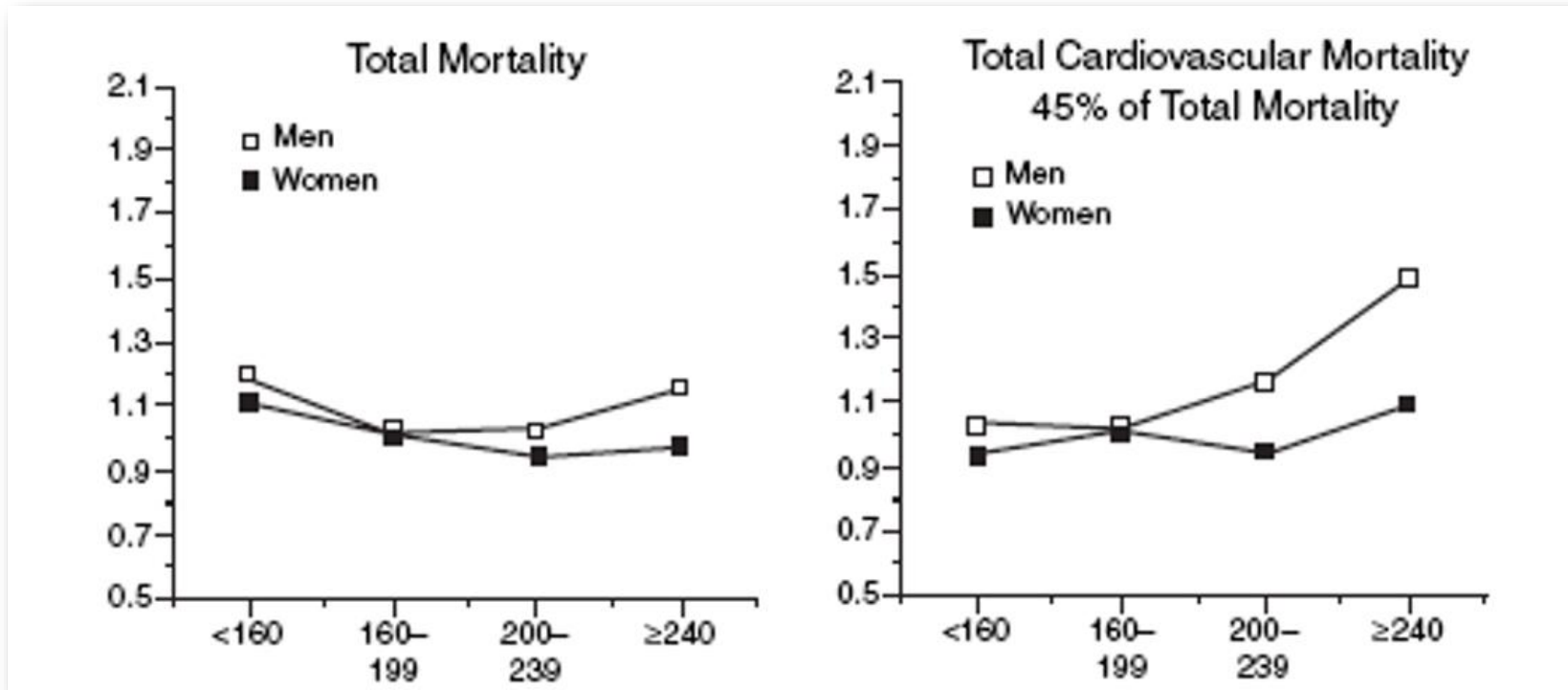
National Academy of Sciences
“Highest priority is given to reducing fat intake, because the scientific evidence concerning dietary fats and other lipids and human health is strongest and the likely impact on public health the greatest.”

EVIDENCE POST-CONSENSUS

EVIDENCE POST-CONSENSUS

Total mortality vs. CHD mortality vs. serum cholesterol (1990)

Data from 19 cohort studies worldwide, as reported at the 1990 NHLBI conference on Low Blood Cholesterol: Mortality Associations.



EVIDENCE POST-CONSENSUS

2001

Cochrane Collaboration review of “Reduced or Modified dietary fat for preventing cardiovascular disease”

27 well-controlled randomized trials

10,000 subjects followed for an average of three years each.

No effect on longevity.

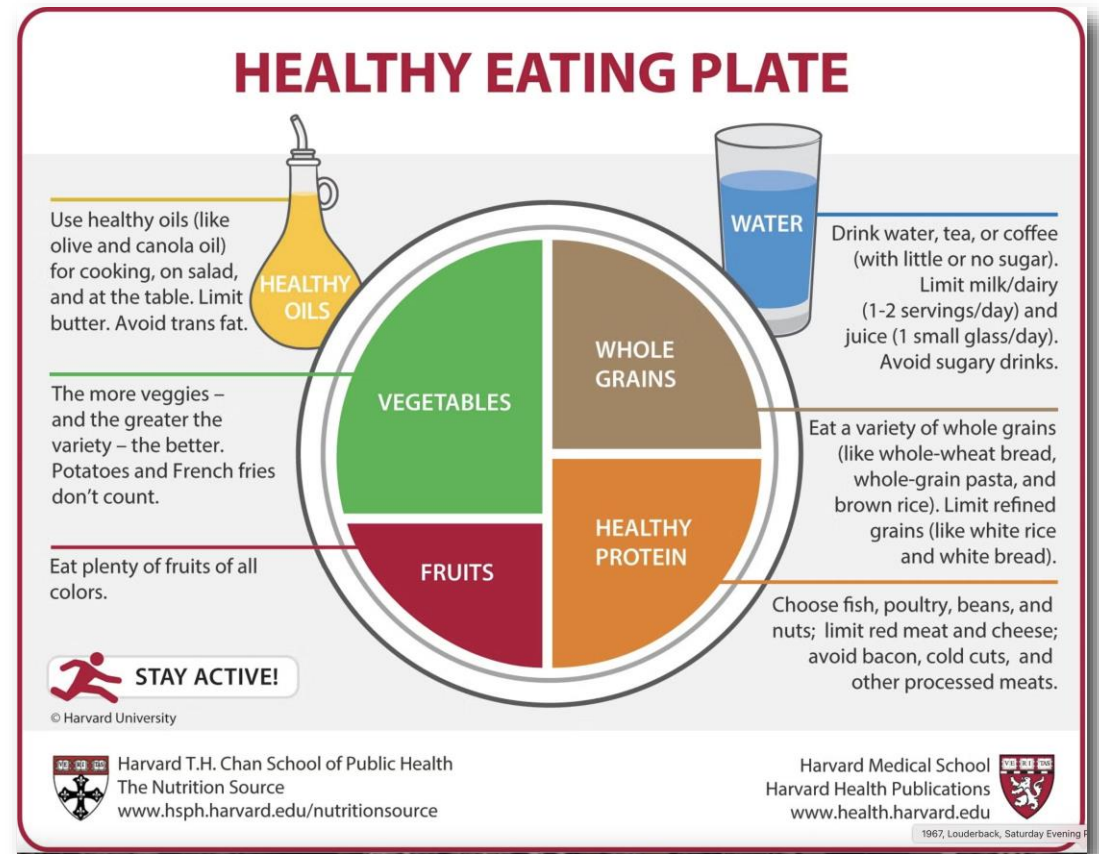
No “significant effect on cardiovascular events.”

WHERE WE ARE TODAY

THE DIET-HEART HYPOTHESIS APPLIED TO DIET



1992



2011

2020-2025 USDA DIETARY GUIDELINES FOR AMERICANS



Saturated Fat

For those 2 years and older, intake of saturated fat should be limited to less than 10 percent of calories per day by replacing them with unsaturated fats, particularly polyunsaturated fats.

2026-2030 USDA DIETARY GUIDELINES FOR AMERICANS



Saturated Fat

In general, saturated fat consumption should not exceed 10% of total daily calories. Significantly limiting highly processed foods will help meet this goal. More high-quality research is needed to determine which types of dietary fats best support long-term health.

STATE OF THE EVIDENCE

COCHRANE COLLABORATION, 2020 (LATEST) REVIEW

The screenshot shows the Cochrane Library interface. At the top left is the Cochrane Library logo with the tagline 'Trusted evidence. Informed decisions. Better health.' To the right, there is a 'Review language : English' dropdown menu and a search box containing 'Title Abstract Ke'. Below the logo is a purple navigation bar with links for 'Cochrane reviews', 'Searching for trials', 'Clinical Answers', 'About', and 'Help'. The main content area shows the title 'Reduction in saturated fat intake for cardiovascular disease' in bold. Below the title, it lists authors: 'Lee Hooper, Nicole Martin, Oluseyi F Jimoh, Christian Kirk, Eve Foster, Asmaa S Abdelhamid' and includes a link for 'Authors' declarations of interest'. It also states 'Version published: 21 August 2020' and provides a 'Free access' button. At the bottom, there is a DOI link: <https://doi.org/10.1002/14651858.CD011737.pub3>.

Authors' conclusions

The findings of this updated review suggest that reducing saturated fat intake for at least two years causes a potentially important reduction in combined cardiovascular events.

STATE OF THE EVIDENCE

COCHRANE COLLABORATION, 2020 (LATEST) REVIEW

Main results

The included long-term trials suggested that reducing dietary saturated fat reduced the risk of combined cardiovascular events by 17%

There was little or no effect of reducing saturated fats on non-fatal myocardial infarction

We found little or no effect of reducing saturated fat on all-cause mortality or cardiovascular mortality.

SUMMARY: COMPETING PHILOSOPHIES OF SCIENCE

COMPETING PHILOSOPHIES OF SCIENCE

Alternative Hypothesis

If we don't have definitive scientific evidence, we don't know if we're right.

“The first principal of science is that you must not fool yourself—and you're the easiest person to fool.”

Richard Feynman, 1974