**Saturated Fat and CAD: It's Complicated**

Tricia Ward

**Shifting Views on Saturated Fat**

Dietary guidelines for the prevention or treatment of coronary artery disease (CAD) have emphasized a reduction in the consumption of saturated fat since the 1960s.[[1]](javascript:newshowcontent('active','references');) Dietary saturated fat increases blood levels of low-density lipoprotein cholesterol (LDL-C) and subsequent risk for CAD, or so goes the conventional wisdom. Indeed, there are studies showing such associations,[[2,3]](javascript:newshowcontent('active','references');) but other data challenge the hypothesis, including meta-analyses showing no link between saturated fat consumption and risk for CAD or cardiovascular disease (CVD).[[4,5]](javascript:newshowcontent('active','references');) The disparate findings have led to calls to stop demonizing saturated fat[[6,7]](javascript:newshowcontent('active','references');) and equally vocal cries to proceed with caution before we let lard back on the menu.[[8]](javascript:newshowcontent('active','references');) Meanwhile, the 2013 American College of Cardiology (ACC)/American Heart Association (AHA) guidelines on lifestyle management to reduce CVD risk omitted a target for total dietary fat but did recommend a goal of 5%-6% of calories from saturated fat.[[9]](javascript:newshowcontent('active','references');)

Asking whether saturated fat is good or bad for your cardiovascular (CV) health is looking for a simplistic answer to a complicated issue. Saturated fat is not a single entity, and the merits of saturated fatty acids (SFAs) can depend on what you are comparing them with, what foods the fats are in, what dietary pattern these foods are part of, and who is doing the consuming. (Genetics and lifestyle influence the effect of diet on health.)

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| **Saturated Fats**  SFAs, so called because they have no double bonds between the carbon atoms of the fatty acid chain, are found predominantly in animal foods. The main [sources](http://appliedresearch.cancer.gov/diet/foodsources/sat_fat/sf.html) of saturated fat in the US diet are: cheese, pizza, desserts (grain-based and dairy), and chicken and chicken dishes. Collectively, these sources contribute 31% of the saturated fat consumed.[[29]](javascript:newshowcontent('active','references');) |

**Saturated Fats and Lipid Levels**

The different SFAs vary in their effects on lipid levels; of note, stearic acid is generally excluded from the listings of cholesterol-raising saturated fats.[[10,11]](javascript:newshowcontent('active','references');) However, this thinking is the result of flawed logic, according to Dariush Mozaffarian, dean of the Friedman School of Nutrition Science and Policy at Tufts University in Boston, Massachusetts. "The US view on saturated fats is totally based on the effects on LDL-C, and that's why we have dietary guidelines to lower our saturated fat intake and why stearic acid is given a free pass," he noted in an interview with Medscape. SFAs are biologically complicated. "They don’t just affect LDL-C, they affect particle size, they affect HDL-C and triglycerides. It's not clear which [ones] are better or worse if you look at all of those effects."

In a meta-analysis of over 60 trials, higher intakes of saturated fat were associated with increases in both LDL-C and high-density lipoprotein cholesterol (HDL-C) and decreases in triglyceride levels, for a net neutral effect on the ratio of total cholesterol to HDL cholesterol.[[11]](javascript:newshowcontent('active','references');) Although saturated fats increase LDL-C, they reduce the LDL particle number. Total LDL particle number quantifies the concentration of LDL particles in various lipid subfractions and is considered a stronger indicator of CV risk than traditional lipoprotein measures.[[12]](javascript:newshowcontent('active','references');) As for stearic acid, the allegedly non-cholesterol-raising fat, while it appears to lower LDL-C relative to other SFAs, one analysis concluded that it raised LDL-C, lowered HDL-C, and increased the ratio of total to HDL cholesterol in comparison with unsaturated fatty acids.[[13]](javascript:newshowcontent('active','references');) And this is one of the confounders of much nutrition research—observations about a given nutrient are highly dependent on what you compare it to.

As Marion Nestle, professor of nutrition, food studies, and public health at New York University in New York City, told Medscape via email, "Saturated fat raises LDL-C in comparison to the effects of unsaturated or polyunsaturated fatty acids...all food fats, without exception, are mixtures of the three kinds of fatty acids, so it is not surprising that the effects of foods and diets differ."

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| **PUFAs and MUFAs**  Polyunsaturated fats have 2 or more double bonds and are classified as omega-6 or omega-3 depending on the position of the first double bond. They include the plant-based omega-6 fatty acids (eg, linoleic acid) and plant and animal omega-3 fatty acids (eg, alpha-linolenic acid and the fish oils eicosapentaenoic acid and docosahexaenoic acid).  MUFAs have one double bond; those with the double bond in the trans configuration are designated trans fats and are omitted from estimates of MUFA intake.  Good sources of MUFAs include fats and oils (eg, canola, olive, sunflower), nuts and nut butters, peanuts, avocado, olives, sesame seeds, and tahini. |

**Focusing on Foods: Is Dairy Different?**

Does it matter which foods the saturated fats come from? There is increasing evidence that dairy fats do not increase CVD risk and may even lead to a better metabolic profile. The MESA study asked more than 5000 adults aged 45-89 years to complete a 120-item food-frequency questionnaire and followed them for 10 years.[[14]](javascript:newshowcontent('active','references');) A higher intake of dairy SFA was associated with lower CVD risk, whereas a higher intake of meat SFA was associated with greater CVD risk.

To explore the findings further, the MESA investigators measured baseline plasma phospholipid levels in more than 2500 participants. Plasma levels of the odd-chain SFA 15:0 (pentadecanoic acid) were inversely associated with incident CVD and CAD, while no association was found with the even-chain SFA 14:0 (myristic acid).[[15]](javascript:newshowcontent('active','references');) Self-reported whole-fat dairy and butter consumption had the strongest associations with levels of 15:0. Dairy intake also correlates with a lower risk for type 2 diabetes: The EPIC-InterAct investigators looked at plasma phospholipids in a large prospective case-cohort study and saw an inverse association between odd-chain SFAs and type 2 diabetes (the analysis included over 12,000 type 2 diabetes cases).[[16]](javascript:newshowcontent('active','references');)

Dr Mozaffarian observes that "we can't synthesize the odd-chain SFAs (15:0 and 17:0), so they're not in your blood unless you're eating dairy fat."

**What You Replace the Saturated Fat With Counts**

Cutting back on dietary fat typically means increasing consumption of other macronutrients. The spectacular failure of the Women's Health Initiative (WHI) [Dietary Modification Trial,](http://www.medscape.com/viewarticle/788192) [[17]](javascript:newshowcontent('active','references');) which showed no reduction in coronary heart disease or stroke in the almost 20,000 postmenopausal women assigned to a low-fat diet, was a blow to the dietary fat/heart proponents. The saturated fat target for the WHI intervention group was 7% of calories; participants got down to 8% of calories by year 1 (from about 13%) but bounced back up to 9.5% of calories by year 6. The clue to the failure of the intervention may be in what they were eating instead.

A pooled analysis of 11 prospective studies by Jakobsen and colleagues[[18]](javascript:newshowcontent('active','references');) that included more than 340,000 healthy adults older than 35 years suggests that consuming polyunsaturated fats instead of saturated fat lowers the risk for CAD whereas replacing the saturated fat with carbohydrates may increase the risk.[[18]](javascript:newshowcontent('active','references');) There was no change in the ratio of saturated fat to polyunsaturated fat in the WHI intervention group.

From analyses of controlled feeding trials,[[11]](javascript:newshowcontent('active','references');) it is estimated that for every 1% of energy from SFA that is replaced by 1% of energy from carbohydrate, monounsaturated fat, or polyunsaturated fat, LDL-C is lowered progressively more (1.2, 1.3, and 1.8 mg/dL, respectively). However, substituting carbs and monounsaturated fatty acid (MUFA) also tends to raise triglyceride levels, whereas a switch to polyunsaturated fats lowers triglyceride levels. According to the Jakobsen analysis, substituting monounsaturated fats for saturated fats will have a neutral effect on rates of CAD death and myocardial infarction.[[18]](javascript:newshowcontent('active','references');) Dr Mozaffarian's take on the data is that "polyunsaturated fats are beneficial; monounsaturated fats are beneficial for blood lipids, but it's not clear if that translates to a reduction in CVD. If you compare saturated fats to carbs, you'll find they have a pretty neutral effect on lipids."

#### Culprit Carbs and Food Quality

Even those not willing to fully acquit saturated fat from the role of CV villain accept that carbohydrate consumption should be moderated. Studies like MESA and EPIC, which have shown worse metabolic and CV outcomes with higher blood levels of even-chain SFAs, implicate carbs because plasma levels of even-chain SFAs correlate more strongly with drivers of de-novo lipogenesis, including alcohol, soft drinks, and potatoes, than with dietary sources such as meat, butter, or cheese.[[16]](javascript:newshowcontent('active','references');)

Small amounts of carbohydrate are typically released into the blood as glucose or converted to glycogen by the liver, but these pathways are tightly regulated such that when excess glucose hits the liver, it gets turned into fat. As explained by Dr Mozaffarian, "the biggest driver of palmitic acid (16:0) production by the liver is the dose and speed that the carb is delivered." In terms of foods, a bagel or soda consumed in isolation is more likely to trigger palmitic acid production than a small amount of potato mixed with vegetables and oil.

In light of the WHI findings, advice to lower dietary saturated fat now specifies that the substitution of saturated fat with whole grains is preferable to refined carbohydrates.[[9]](javascript:newshowcontent('active','references');) And this brings us to the quality of the food the nutrient comes from.

The MESA trial showed that meat SFA was associated with greater CVD risk (hazard ratio = 1.26 for +5 g/d and 1.48 for +5% of energy, respectively), but before the vegetarians break out the champagne, the [EPIC trial](http://www.medscape.com/viewarticle/780412) conducted in almost half a million middle-aged adults from 10 countries found that processed meats but not red meat per se were linked to CV mortality.[[19]](javascript:newshowcontent('active','references');) Processed meat included ham, bacon, sausages, and minced meat in ready-made products. Similarly, in a [study](http://www.medscape.com/viewarticle/826598) in over 37,000 Swedish men, the risk for new heart failure and death from heart failure increased by 8% and 38%, respectively, for every 50-g rise in daily processed-meat intake.[[20]](javascript:newshowcontent('active','references');)

#### Moving Away From Macronutrients

With findings like these, there are calls to stop emphasizing macronutrients (fat, carbs, protein) in healthy-eating guidelines and to highlight real foods instead. Robert Eckel, professor of Medicine at the University of Colorado and lead author of the 2013 ACC/AHA lifestyle guidelines, agrees. "Absolutely and not good foods and bad foods; the emphasis needs to be on dietary patterns," he wrote in an email exchange with Medscape.

Among the most touted is the Mediterranean dietary pattern, which is rich in fruit, vegetables, whole grains, fatty fish, lean meat, oils, nuts, and legumes.[[21]](javascript:newshowcontent('active','references');) There are supporting data for this eating pattern, including the [PREDIMED trial](http://www.medscape.com/viewarticle/779831),[[6]](javascript:newshowcontent('active','references');) in which 7447 men and women free of CV disease but at high CV risk were randomly assigned to 1 of 2 Mediterranean diet groups (supplemented with either olive oil or nuts) or to a low-fat control diet. The primary endpoint of myocardial infarction, stroke, or CV death was reduced by 30% compared with the control group, largely driven by an early reduction in stroke.

In the two Mediterranean diets, 9%-10% of calories came from saturated fat, so why the stricter 5%-6% limit in the ACC/AHA lifestyle guidelines? Dr Eckel defends the recommendation, saying that "we have evidence that 5%-6% saturated fat lowers LDL-C maximally." The strongest data cited in the guidelines are from crossover feeding studies that compared a Dietary Approaches to Stop Hypertension [(DASH)-type diet](http://dashdiet.org/) (5%-6% saturated fat) against a diet with 14%-15% of calories from saturated fat and showed reductions in LDL-C of 11-13 mg/dL.[[22-24]](javascript:newshowcontent('active','references');)

Dr Mozaffarian disagrees with the guideline writing committee's conclusion. "The DASH diet is an overall dietary pattern that increased whole grain, fruits and vegetables, reduced refined carbs, included dairy. To derive a conclusion that saturated fat should be 5% of calories [from that] is not evidence based." He believes that there is little benefit to gain by pushing saturated fat below a cutpoint and that we may be better off advising people to simply increase polyunsaturated fat. There is supportive evidence for that strategy from a meta-analysis of 13 published and unpublished cohort studies on dietary linoleic acid and CAD events. Higher intakes of this omega-6 polyunsaturated fatty acid were inversely associated with risk for CAD, whether it replaced carbohydrates or saturated fat.[[25]](javascript:newshowcontent('active','references');)

#### We Are More Than What We Eat

Teasing out the health effects of a particular food or nutrient is difficult. As Dr Nestle notes, "Diet is one factor that affects heart disease risk among many others: lifestyle, physical activity, cigarette smoking, genetics, etc." In one small study, a single aerobic exercise session appeared to counteract the postprandial endothelial dysfunction induced by a high-fat meal in apparently healthy adults.[[26]](javascript:newshowcontent('active','references');) Poor diet can go hand in hand with a poor lifestyle: In the EPIC trial, those who consumed the highest amounts of processed meats were also more likely to smoke, be sedentary, and ate far fewer fruits and vegetables than other study participants.[[19]](javascript:newshowcontent('active','references');)

According to Dr Mozaffarian, "Dairy is a perfect example of how focusing on single nutrients leads to silly recommendations. It's an incredibly complicated category of foods...but our guidelines for dairy are based on theory about calcium content and vitamin D. The [School Lunch Program](http://www.fns.usda.gov/nslp/national-school-lunch-program-nslp) allows chocolate skim milk and banned whole milk. That's absurd. There's no evidence that whole milk is bad for kids."

So where does that leave saturated fat? According to the most recent National Health and Nutrition Examination Survey data (from 2009-2010), between 35% and 58% of American adults consumed less than 10% of total calories from saturated fat. Less than 12% met the goal from the 2013 lifestyle guidelines of less than 7% of calories from saturated fat.[[27]](javascript:newshowcontent('active','references');)

Dr Mozaffarian would prefer to shift the focus to increasing healthy food consumption: "Dairy appears to be neutral for CAD and good for diabetes, processed meats are particularly harmful for diabetes and CAD, and unprocessed meats seem to be neutral." Despite disagreements regarding specific saturated fat limits and whole-fat dairy, he agrees that a Mediterranean or high-vegetable-fat DASH dietary pattern is definitely beneficial (and far better than the average American diet).

Dr Eckel concedes that helping patients adhere to a heart-healthy lifestyle is complicated, but he believes that physicians have a vital role to play. His tip: spend at least 3 minutes per patient visit on lifestyle, which should include an evaluation of the patient's dietary pattern. "A medium rare steak once a month or ice cream and cake at a birthday party should not cause dietary guilt because it is the overall diet and level of physical activity that should be repeatedly assessed and emphasized," he advises.[[28]](javascript:newshowcontent('active','references');)

**Disclosures**

Robert Eckel, MD, reports consulting for Foodminds. Dariush Mozaffarian, MD, DrPH, reports being on the scientific advisory board of Unilever North America and receiving ad hoc honoraria or consulting fees from Bunge, Nutrition Impact, Amarin, AstraZeneca, and Life Sciences Research Organization. Marion Nestle, PhD, MPH, has authored a number of books on nutrition and food policy.

**An Interview With *The Big Fat Surprise* Author Nina Teicholz**

Tricia Ward, Nina Teicholz

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***Editor's Note:*** *The role of dietary fat, particularly saturated fat, in coronary artery disease (CAD) has been debated. The 2013 American Heart Association/American College of Cardiology* [*Guideline on Lifestyle Management to Reduce Cardiovascular Risk*](http://www.medscape.com/viewarticle/814139) *continues to recommend a diet comprising 5%-6% saturated fat. With* [*meta-analyses*](http://www.medscape.com/viewarticle/822092) *challenging the notion that saturated fat intake increases CAD risk, perhaps it's no surprise that among the* New York Times *best-selling books in 2014 was* [The Big Fat Surprise: Why Butter, Meat & Cheese Belong in a Healthy Diet](http://www.thebigfatsurprise.com/). *The author, Nina Teicholz, spoke with theheart.org | Medscape Cardiology.*

**theheart.org | Medscape Cardiology: Can you give our readers some background information on what prompted you to write the book?**

**Ms Teicholz:** I am an investigative journalist. I worked for NPR for many years as their South American correspondent, among other roles. When I got into print journalism, I started doing a series of investigative food stories for *Gourmet* magazine. They assigned me a story on trans fats. [That story](http://www.gourmet.com/magazine/2000s/2004/06/heart_breaker), which came out in 2004, broke the issue wide open, and I got a book contract from it. In the course of writing that story and as I was researching the book, I spoke to a number of scientists who had been marginalized. These people told me an alternative story about dietary fats, about how basically everything that we had come to believe about fat was untrue. It wasn't just trans fats; there was a whole story about vegetable oils and saturated fats that seemed to turn everything that we thought we knew on its head. Once I realized that this was much bigger than trans fats, I reoriented my book to be about all fats. That led me down this exhaustive compulsive path because there's such a huge body of scientific literature about dietary fat and cholesterol, heart disease, and the history of it all.

**theheart.org | Medscape Cardiology: Originally your book was just going to be on trans fats?**

**Ms Teicholz:** Yes. It was a slow discovery that this story was much bigger than trans fats.

**theheart.org | Medscape Cardiology: In science, it's common for an initial hypothesis to be tweaked or revised as data accumulate. The research on diet and heart disease, for example, has moved away from emphasizing dietary cholesterol and total fat. But in your book, you're suggesting that there is something more sinister going on with research data not being reported or the findings/researchers being disparaged. Can you comment on that?**

**Ms Teicholz:** This is not a case of a hypothesis being tweaked. This is a complete overthrow of the most important hypothesis about how nutrition affects disease over the past 50 years. Starting in the late 1950s, the hypothesis has been that saturated fats cause heart disease. Then that was expanded to include all fats over the following decades. That hypothesis seems to be fundamentally wrong. It's not a matter of slightly shifting course but completely overturning it. This hypothesis basically became dogma and could not be reversed, even though (to use the language of science) there were many observations that could not be explained by this hypothesis. The most obvious one today is that the American population slashed its fat and saturated fat consumption by 11% and increased carbohydrates by 25%, according to our nutritional guidelines, but we have clearly not become healthier. Our health is far worse. I'm referring to the past 30 years since the US Department of Agriculture (USDA) dietary guidelines began, which is when the US government adopted that hypothesis

The question I have is: How did that hypothesis endure for so long? Basically it was adopted and institutionalized before the evidence was even remotely solid. It was based on very weak science. The American Heart Association adopted it in 1961,[[1]](javascript:newshowcontent('active','references');) and the National Institutes of Health, and subsequently the USDA, got on board. Then once the hypothesis became institutionalized, the entire federal government adopted it. At that point, it's very hard to reverse out. That's the simplest way I can put it.

I think it's also true that the hand of big food, particularly the vegetable oil companies, influenced that science. If there's any maleficence, it's on the part of those scientists who were willing to accept soft data and stick with it despite decades of evidence to the contrary. Scientists ultimately control the expert panels. They are the gatekeepers to policy, which is still true today. Scientists faced with the public panic about heart disease, then cancer, and then obesity were willing to settle on inadequate science. I lay the blame at the feet of the nutrition scientists who did not apply rigorous standards to the science they used to make or to recommend public policy.

**theheart.org | Medscape Cardiology: In terms of dietary guidelines, there has been an acceptance that substituting carbohydrates for fats is not good. In your book, you go as far as saying that you can't eat a healthy diet if you don't eat meat or saturated fats.**

**Ms Teicholz:** It's a bit of a subtle argument. There are two parts to it. One is that in many clinical trials, a diet that is low in carbohydrates looks better than a low-fat diet in terms of weight loss, diabetes markers, and heart disease. If you're going to eat a higher-fat diet, how do you get to that higher-fat diet? A higher-fat diet inevitably includes animal foods unless you're drinking bowlfuls of olive oil like Italian peasants did after World War II. Typically, a higher-fat diet means eating foods that are naturally high in fat, which are animal foods. That's the only way you get to the diet that performs the best in clinical trials for multiple disease outcomes.

It's also true that animal foods are more nutritionally dense than plant foods. The nutrients in them are more bioavailable. For instance, if you drink skim milk, you don't have the fat in the milk to absorb vitamins A and D in the milk. If you don't have the vitamins, you can't absorb the minerals. The calcium is not absorbed; it's turned into insoluble calcium soap in your intestine.[[2]](javascript:newshowcontent('active','references');) [*Editor's note:* *There are data that vitamin D is bioavailable in skim milk*.[[3]](javascript:newshowcontent('active','references');) *Vitamin D is added to skim milk to aid calcium absorption.*]

Animal foods are the best sources for choline—which the US diet is deficient in.[[4,5]](javascript:newshowcontent('active','references');) Folate, selenium, iron, and zinc are far more available in animal foods, and vitamin B12 is only available in animal foods. They are really important for nutrition, which is not the conversation that we're used to having. In the 1950s, all of nutrition science got hijacked by the question of how to help prevent heart disease in middle-aged men. That became the focus of all nutrition. The diet we all eat today, including children from age 3 years and women, is the diet that was designed to help middle-aged men fight heart disease.

Before the 1950s, the nation was in a panic over the rising tide of heart disease, but in the 1920s and 1930s, the question that nutrition science asked was: How do you best help children grow and women reproduce? That is the basic question for any human animal. And the foods that are best for reversing growth faltering in children and enabling healthy reproduction over many generations were whole milk, butter, and meat, which ironically became the foods that became condemned when we started to think about how middle-aged men might avoid heart disease.

The hypothesis was to avoid saturated fat and cholesterol, which is why we also avoided organ meats and shellfish and all of the rest.

**theheart.org | Medscape Cardiology: Do you believe that people have to eat meat as part of a healthy diet?**

**Ms Teicholz:** No. You can also get those nutrients through eggs and dairy. Meat happens to be extraordinarily nutrient dense (especially for iron and folate), but people can stay healthy eating some animal foods even if they don't want to eat meat. I think it's very hard to be healthy on a vegan diet—it just doesn't have the nutrients that you need to sustain human health.

**theheart.org | Medscape Cardiology: In terms of nutrition policy, there are calls to move away from being overly focused on macronutrients (carbs, fats, protein) and to instead focus on dietary patterns and real food.**[**[6]**](javascript:newshowcontent('active','references');)

**Ms Teicholz:** I used that language in the book because that's the language of nutrition science for the past 50 years. Every single study that you read by the nutrition scientists is about polyunsaturated fat, monounsaturated fats, and saturated fats. Your eyes glaze over with those terms. But who goes into the dining room and says, "Mom, can I have 30% saturated fat and 10% carbohydrates for dinner?" Nobody. You say, "Can I have spaghetti and meatballs?" While it doesn't make sense to talk in those terms, it's very hard to do good science that will tell you anything about what leads to disease by just looking at overall dietary patterns.

A common argument is: What about the Japanese? They didn't get heart disease, and they mainly ate vegetables. It may be the diet that saved them from heart disease. But by the way, they had much higher rates of stroke and cerebral hemorrhage than Westerners.[[7]](javascript:newshowcontent('active','references');) How do you know what that's due to? You don't know if it's the vegetables that seem to be protective, or if it's the absence of sugar. That's another hypothesis. You have to test individual items in order to say anything conclusive. It's also true that the Mediterranean diet was based on observations about post-war Crete islanders. They attributed it to a relative lack of meat, but it's not even clear that those data were collected in any way that is convincing. Was it the total absence of sugar from their diet? A dietary pattern is just not helpful from a scientific point of view.

**theheart.org | Medscape Cardiology: Speaking of the Mediterranean diet, it is the dietary pattern that is among the most recommended for prevention of cardiovascular disease, but you're critical of some of those data as well.**

**Ms Teicholz:** The Mediterranean diet looks better than the low-fat diet. In all of the clinical trials on the Mediterranean diet, it's been tested against the low-fat diet. The low-fat diet is a failed diet. The largest-ever clinical trial in the history of nutrition science was on the low-fat diet. It was the Women's Health Initiative, and it showed in 50,000 women that it was completely ineffective for fighting obesity, diabetes, and heart disease.[[8]](javascript:newshowcontent('active','references');) That was also confirmed in smaller clinical trials. The low-fat diet doesn't work.

If you compared any higher-fat diet with the low-fat diet, it looks better. The Mediterranean diet is just the main diet that has been compared with the low-fat diet, and so that's why we talk about the Mediterranean diet. A higher-fat German diet or a higher-fat Chilean diet or a higher-fat Finnish diet would probably also look better than the low-fat diet. In fact, in the one experiment[[9]](javascript:newshowcontent('active','references');) where they compared the Mediterranean diet with the low-fat diet and also compared it with a much higher-fat, low-carb diet (a little bit like an Atkins diet), the Atkins diet did better than the Mediterranean diet. That was a 2-year trial, so it was one of the longer and better controlled studies out there. [*Editor's note: In the* [*DIRECT study,*](http://www.medscape.com/viewarticle/790178) *compared with a low-fat diet, reductions in total cholesterol/high-density lipoprotein cholesterol ratio were greatest in the low-carb group, and reductions in low-density lipoprotein cholesterol were highest with the Mediterranean diet. The Mediterranean diet also appeared to improve fasting plasma glucose levels in the 36 subjects with diabetes. No statistically significant differences were observed between the low-carb and Mediterranean diets.*]

My point is that scientists got obsessed with the Mediterranean diet in large part because it's a great place to go for scientific conferences. Everybody loved meeting in Italy, Spain, and Greece. There are extremely long-lived people in other parts of the world. The one common factor is that they have a higher-fat diet compared with our failed low-fat diet.

**theheart.org | Medscape Cardiology: You're suggesting that part of the attraction of the Mediterranean diet was all of the conferences held in a sunny climate.**

**Ms Teicholz:** I got a lot of great quotes from people who went on those trips. There was a constant series of junkets with chefs, scientists, food writers, and food journalists at fantastic, sun-kissed spots all over the Mediterranean, and people just loved it. They were also quite inventive conferences, in that instead of just convening scientists, they also brought together chefs and talked about food and the history of food. It was this rich, multisensory experience. There's no question that the reason everybody got interested in that diet was partly the allure of the Mediterranean junket. There are long-lived people in the Siberian Steppe, but nobody wants to go to food conferences in Siberia.

**theheart.org | Medscape Cardiology: Proponents of the low-fat diet (the Dean Ornishes of the world) argue that studies like** [**PREDIMED**](http://www.medscape.com/viewarticle/779831)[**[10]**](javascript:newshowcontent('active','references');) **didn't really test a low-fat diet because subjects didn't reduce their fat consumption enough.**[**[11]**](javascript:newshowcontent('active','references');)

**Ms Teicholz:** That's revisionist thinking. Since the 1970s and for the past four decades, the low-fat diet has been defined by the American Heart Association as somewhere between 25% and 35% fat, around 30% on average. That's the official low-fat diet. That clearly hasn't worked. Now there are folks like Dean Ornish and some of the vegan proponents who say that's not really a low-fat diet and propose something even lower, called the very–low-fat diet. The very–low-fat diet has simply not been well tested. Dean Ornish has done one study on 22 men.[[12]](javascript:newshowcontent('active','references');) It was multifactorial, with stress reduction, exercise, and all kinds of interventions. You really don't know what is attributable to diet. The other experiments have been uncontrolled, not randomized. I don't know what you could say about the very–low-fat diet except that there are hardly any data on it.

**theheart.org | Medscape Cardiology: Moving back to trans fat, you have a chapter in the book regarding the potential US Food and Drug Administration ban on trans fat (some cities have already banned them) because you are concerned with what we might get as a replacement.**

**Ms Teicholz:** Nobody has looked at the issue of what replaces trans fats. It hasn't been part of the conversation, which in itself is an amazing oversight. If you're engaging in policy, you need to know what the trade-offs are. Getting rid of partially hydrogenated vegetable oils is probably one of the biggest food shifts in the country over the past two decades. There are billions of pounds of vegetable oil in the food supply every year. You have to look at what's going to replace trans fats. The reason we got trans fats is that oils are not stable, so you have to manipulate the oil in some way to give it stability. Partially hydrogenating oil gave it stability so it wouldn't go rancid. It gave it a more solid, stable form. One of the side effects is that it produced trans fats.

There are a number of specialty oils that have been engineered to be more stable. There are oils made from genetically bred soybean seeds that produce different kinds of fatty acids. The manufacturers do something called interesterification. Those specialty oils are quite expensive and are still in short supply. In frying operations in major fast food chains all across the country, they mainly use peanut, soy, and corn oil. Those oils have the same problem in that they're not stable, especially when they're heated over long periods of time, as typically occurs in restaurant fryers. They produce literally hundreds of toxic oxidation products. Some of the worst are aldehydes. They are extremely worrisome. I believe my book is the first time anybody has pulled together all of the data from numerous fields to make the case that these oxidation products are worrisome to human health. If you're going to get rid of trans fats, you need to know if you are jumping out of the pan into the fire, so to speak.

**theheart.org | Medscape Cardiology: Trans fat came into the food chain largely because of the move away from frying in lard.**

**Ms Teicholz:** We got started down this road because scientists decided that we shouldn't eat saturated fats. Saturated fats are naturally stable. They don't oxidize even when they're heated at high temperatures. That's one of the unsung virtues of saturated fat. They're naturally stable. McDonald's used to fry their french fries in tallow. Tallow and lard are very stable fats.

**theheart.org | Medscape Cardiology: What are the changes that you would like to see in food policy?**

**Ms Teicholz:** I think the science exists to support two major changes in our dietary guidelines right away. One is to rehabilitate saturated fats. Take the limits off saturated fats. There were two meta-analyses[[13,14]](javascript:newshowcontent('active','references');) in the past 4 or 5 years saying that saturated fats do not cause heart disease. There really is no evidence that saturated fats cause heart disease. Our national nutrition policies should reflect that science and remove the limits on saturated fat so that we can enjoy full-fat animal foods. They are an important part of a diet, especially for children and women.

The other big change that could happen right away is to back off the high-carbohydrate diet that has been recommended by the government for 35 years. Back in the 1960s, before our epidemic of obesity and diabetes, Americans were eating about 40% of their calories as carbohydrates (potatoes and grains).[[15]](javascript:newshowcontent('active','references');) Now that's gone up to 50%.[[16]](javascript:newshowcontent('active','references');) The target was between 50% and 60%, and we've increased our carbohydrate intake quite a lot. I think there is a convincing body of science that excessive carbohydrates are not good for health and that restricting carbohydrates is the best bet for starting to reverse disease progression for obesity, diabetes, and heart disease. Backing off that high-carbohydrate goal, which is what the USDA dietary guidelines have had since 1980, would be an excellent step for American health, in my opinion.

**theheart.org | Medscape Cardiology: Michael Pollan made a famous statement on food: "**[**Eat food. Not too much. Mostly plants.**](http://www.nytimes.com/2007/01/28/magazine/28nutritionism.t.html?pagewanted=all)**" But am I correct in thinking that you wouldn't agree with that? You would want a bit more meat.**

**Ms Teicholz:** It's the "mostly plants"; there's just no scientific backing for that view. I fully agree with Michael Pollan's idea that we should be more in touch with our food, eat whole foods, and pay attention to where foods come from, and he writes about this in his book ( *[The Omnivore's Dilemma](http://michaelpollan.com/books/the-omnivores-dilemma/)* ). One of the chapters is about hunting a pig; I think it's a wild boar. Humans have lived on farms that were full of plants and crops, but they also had livestock. A dairy cow was the first thing on every farm, and chickens laying eggs. We can't ignore that that's part of our human history.

**theheart.org | Medscape Cardiology: Having written this book, how have you changed your own diet?**

**Ms Teicholz:** Your audience is science people, so they know that I'm just n = 1. I am irrelevant to this story. That said, I believe the science, and I've dramatically changed what I eat and what my family eats. We no longer eat much grains, and we don't eat a lot of rice. We don't eat a lot of potatoes (we have some). We are not afraid to eat red meat and a lot of eggs, and have only full-fat dairy. We start the day eating eggs, bacon, and sausage. We don't have cereal in the morning. We don't have orange juice. For lunch, it's tuna salad, chicken salad, egg salad, or leftovers. We snack on nuts and cheese. We don't fear the fat. I don't believe that the more fat you eat, the fatter you're going to get; I believe it is quite the reverse.

**theheart.org | Medscape Cardiology: What would you like physicians to take away from this?**

**Ms Teicholz:** I've spoken to a lot of doctors, and they are frustrated with the toolkit that has been given to them to help their patients lose weight and fight diabetes and heart disease. They tell their patients to go on a low-fat diet and eat more fruits and vegetables and eat more grains, reduce your fat, cut out any saturated fat. It's extremely rare that they see any sustained gains in their patients. Many of the doctors that I've spoken to have this a-ha moment where they realize that what they're prescribing simply isn't working. It's not because people are lazy or don't try hard enough or don't exercise enough. It's because the basic advice doesn't work. There's a growing population of doctors and nutritionists who have discovered the low-carbohydrate diet, which has a tremendous amount of science behind it (dozens of rigorous clinical trials involving thousands of people, some trials lasting up to 2 years). Carbohydrate restriction is a far better way to manage those chronic diseases. "Give it a try" is what I would I say to doctors.

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