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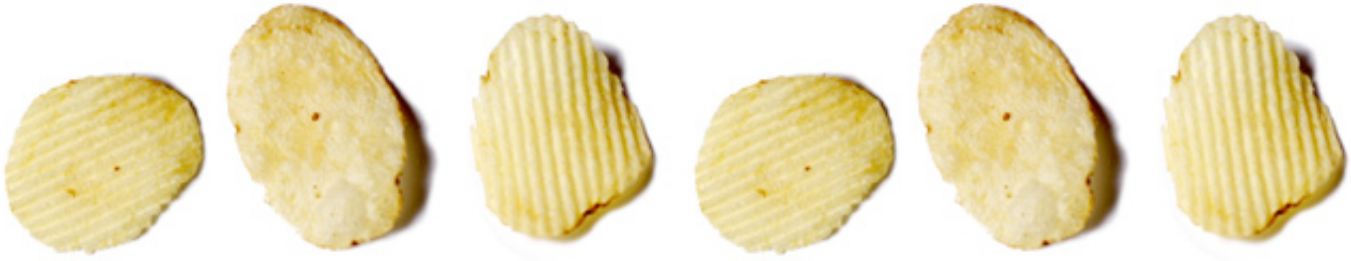
Trans Fats: The Story Behind the Label

It took 50 years of research to get the dangers into print



On January 1, 2006, consumers woke up to a special New Year's gift in their supermarkets: new information to help them choose the amount and types of fats they eat. Nutrition labels for all packaged foods sold in the United States now list harmful trans fatty acids, or "trans fats," in the fat category, below saturated fats and above cholesterol.

What did it take to generate that extra line of tiny type on food wrappers? A small army of researchers on two continents working for nearly 50 years, as well as vigorous lobbying by health and consumer education groups.

The Food and Drug Administration (FDA) gave food manufacturers two-and-a-half years to retool their labels and perhaps rethink their recipes. According to the FDA, this simple change will help Americans curb their risk of cardiovascular disease related to dietary trans fats; conservatively, it could also save an estimated $900 million to $1.8 billion a year in medical costs, lost productivity, and pain and suffering.

Harvard School of Public Health scientists took a leading role in trans fats research and the push for labeling.

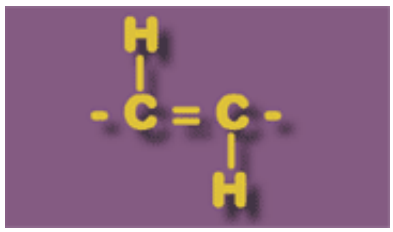
At the forefront at HSPH were **Walter Willett**, the Fredrick John Stare Professor of epidemiology and nutrition, and chair of the Department of Nutrition; **Eric Rimm**, associate professor of epidemiology and nutrition; **JoAnn Manson**, professor of epidemiology; **Alberto Ascherio**, associate professor of nutrition and epidemiology; **Meir Stampfer**, professor of nutrition and epidemiology, and chair of the Department of Epidemiology; **Frank Hu**, associate professor of nutrition; **Carlos Camargo**, associate professor of epidemiology; **Frank Sacks**, professor of cardiovascular disease prevention; **Graham Colditz**, professor of epidemiology; **Karen Peterson**, associate professor of nutrition and society; and **John Graham**, the founder and former director of the Harvard Center for Risk Analysis at HSPH.

1903
The first patent is filed with the British Patent Office for

What Are Transfats?

technology used to make trans fats.

1903-1950
Two world wars and the Depression push thrifty U.S. consumers into using economical products containing trans fats, such as sticks of margarine and Crisco. Little is known about the relationship between dietary fats and health.



Trans fatty acids—trans fats—are made by adding hydrogen to vegetable oil to create semi-solid fats, such as shortening and margarine, which help food retain flavor and texture over a long shelf life. The arrangement of hydrogen molecules in relation to carbon accounts for differences between trans, saturated, and unsaturated fats. Trans fats appear to raise heart disease risk by increasing LDL, or "bad" cholesterol, and decreasing HDL, the "good" kind.
Trans fats are still found in many processed foods, including crackers, cookies, and fried and baked goods. They cannot be eliminated from the diet completely, since small amounts appear in the meat and milk of cows and other ruminant animals. A healthy goal is to trim trans fat intake to less than 1 percent of total calories.

1948
The first McDonald's restaurant opens in San Bernadino, Calif. The American diet begins to include more and more high-fat processed and fast food.

1957
The Lancet publishes controversial studies by University of Minnesota scientist Ancel Keys hinting that a high-fat saturated diet leads to coronary heart disease. Food manufacturers' studies of a possible link between trans fats and cholesterol levels yield conflicting results.

1970s-present
Three groundbreaking, long-term epidemiologic studies uncover associations between dietary and lifestyle factors and disease, with HSPH faculty members serving as principal and co-investigators as the studies evolve. At Brigham and Women's Hospital, Channing Laboratory investigator Frank Speizer launches the first Nurses' Health Study in 1976, collecting health and dietary data from 121,700 women, while the HSPH Department of Nutrition's Health Professionals Follow-up Study begins in 1986, collecting data from 52,000 men. In 1989, the Nurses' Health Study II begins, enrolling 116,000 young women.

1985
Studies by HSPH's Sacks show that beef tallow is used in fried fast foods, even fish. Media attention prods restaurant chains to switch to hydrogenated vegetable oils laden with trans fats.
Health Aspects of Dietary Trans Fatty Acids, an overview of research prepared for the FDA by the Federation of American Societies for Experimental Biology, concludes that trans fats are probably akin to saturated fats in their cholesterol-raising properties, but that more research is needed.

1987
Netherlands nutrition researcher Martijn Katan asks European food conglomerate Unilever to fund a study of the effect of trans fats on blood lipids.

1990
The Nutrition Labeling and Education Act (NLEA) is signed into law in response to lobbying by the American Heart Association and other consumer groups. The law requires manufacturers to disclose the amount of saturated and unsaturated fats, cholesterol, sodium, sugar, fiber, protein, and carbohydrates in food products sold in the U.S., and sets standards for health claims and descriptors such as "lite" and "low fat."

Reporting in the *New England Journal of Medicine*, Katan and colleagues show that high levels of trans fat--typical of the European diet--increase LDL ("bad") cholesterol almost as much as saturated fat and, unlike saturated fat, decrease HDL ("good") cholesterol. This finding will be replicated elsewhere many times.

1992
The U.S. Department of Agriculture unveils a new food pyramid extolling the benefits of carbohydrates but ignoring the dangers of trans fats. Trans-fat free

margarines--already available in Europe--are introduced in the U.S.

1993
Willett, Stampfer, Manson, and others involved in the Nurses' Health studies find ties between trans fats and coronary artery disease in women. They publish their findings in the Lancet, using data on the trans fatty acid content of foods from Sacks' lab.

1993
Citing HSPH's and others' findings, the Center for Science in the Public Interest files a petition requesting the FDA to take steps to add trans-fats content to nutrition labels. After inviting comments, the agency concludes that research does not support this requirement.

1994
At HSPH, Willett and Ascherio's commentary in the *American Journal of Public Health* describes how trans fats are more damaging to heart health than saturated fats and are likely responsible for at least 30,000 premature U.S. deaths per year.

International food conglomerate Unilever, led by nutrition chief Onno Korver, moves to eliminate trans fats from margarines and spreads, and reduce saturated fats. This policy requires restructuring at every level, from farming to processing, labeling, and advertising.

1995
Annual direct costs of obesity to the American economy reach $100 billion, according to an analysis by HSPH's Colditz et al. in *Obesity Research*.

1996
The Center for Science in the Public Interest calls on restaurants and food manufacturers to disclose trans fats levels and switch to liquid vegetable oils, charging, for example, that trans fats in fries cause twice as much damage to arteries as saturated fats. "They might as well be frying in lard," charges one Center scientist.

1997
Hu and others from HSPH and the Channing Laboratory publish the most detailed analysis of types of fat in the *New England Journal of Medicine*. Trans fat is by far the worst.

1999

After taking public comments two more times, the FDA proposes rules requiring that the amount of trans fats be listed on nutrition labels. The FDA advises consumers to cut their intake as much as possible, then reverses course--and holds up finalizing the process--in part to consider the 2001 Report of the National Cholesterol Education Program from the Institute of Medicine/National Academy of Sciences and 2000 Dietary Guidelines for Americans.
Katan and HSPH's Ascherio, Stampfer, Willett, and others find that trans fats' adverse effects on the LDL/HDL cholesterol ratio extend to even lower doses than was previously documented.

2000
New dietary guidelines are released by the Department of Health and Human Services and USDA. Guidelines committee member Meir Stampfer of HSPH sees little difference between the 1995 and 2000 recommendations, despite mounting evidence that some fats are healthier than others.

2001
President George W. Bush appoints HSPH's Graham as head of the Office of Information and Regulatory Affairs in the Office of Management and Budget.

HSPH's Willett unveils a new food pyramid based on the Nurses' Health and Health Professionals Follow-Up studies and others worldwide, and includes it in his book, *Eat, Drink, and Be Healthy: The Harvard Medical School Guide to Healthy Eating*, and at

www.hsph.harvard.edu/nutritionsource/pyramids.html.

Graham directs the FDA to either make the trans-fat labeling change or explain why not.

2002-2003
At the FDA's Center for Food Safety and Applied Nutrition, director Joseph Levitt champions the push for trans fats labeling. The FDA reviews evidence and recommendations from non-advocacy groups such as the Institute of Medicine, which includes HSPH's Rimm, and the Advisory Committee on the 2000 Dietary Guidelines for Americans, which includes Stampfer.

2002-2003
Many major food businesses, including Frito-Lay and Olivio margarine, switch to more healthful cooking oils.

July 2003
The FDA requires trans fats to be labeled beginning January 1, 2006.

2004
Rimm of HSPH and co-authors, including Dariush Mozaffarian of Brigham and Women's Channing Laboratory, publish two papers documenting that greater intake of trans fat predicts higher levels of inflammatory factors in the blood, which in turn herald risks of heart disease and type 2 diabetes.

January 2005
The latest version of the US Dietary Guidelines is released, with a clear message: Consume as little trans fat as possible, and limit added sugar. Guidelines Committee member Carlos Camargo notes that traditional critics of the USDA and food industry describe these guidelines as "the most health-oriented ever."

April 2005
The USDA unveils a controversial new food pyramid, (see http://mypyramid.gov/) which champions exercise but omits clear directives on trans fats and sugar-laden drinks. In a critique, Camargo says: "If you want to tell [people] to avoid trans fats, you spell it out. You say avoid doughnuts, potato chips, French fries. You say look at the label, and pick zero!"


Nutrition Facts
Serving Size 1 oz (28g/about 20 chips)
Servings Per Container 18

Amount Per Serving
Calories 150 Calories from Fat 90

% Daily Value*
Total Fat 10g 16%
Saturated Fat 2.5g 13%
Trans Fat 0g
Cholesterol 0mg 0%
Sodium 95mg 4%
Potassium 370mg 11%
Total Carbohydrate 14g 5%
Dietary Fiber 1g 4%
Sugars 0g
Protein 2g

Vitamin A 0% • Vitamin C 15%
Calcium 0% • Iron 2%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Potassium	Less than	3,500mg	3,500mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

January 1, 2006
The trans fats ruling becomes law. Observes Willett: "Having to display the trans fats content of food was a strong incentive to reduce or eliminate them, so many foods are now much lower in trans fats than they were even a year ago. This is important because not everyone, for example, many adolescents, pays attention to food labels while making decisions."

What's next?

The battle against trans fats continues. Some consumer advocates aim to require restaurants to eliminate trans fats. Willett wants to see partially hydrogenated fats removed from the FDA Generally Regarded as Safe category (GRAS), which would essentially eliminate their use. "Given that every major review of trans fats has concluded that intake should be as low as possible," he says, "it is indefensible that they be allowed as GRAS constituents of foods."

Paula Hartman Cohen has written about science and health for* Newsday *and other major newspapers.

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