A four-decades-old study — recently discovered in a dusty basement — has raised new questions about longstanding dietary advice and the perils of saturated fat in the American diet.

The research, known as the Minnesota Coronary Experiment, was a major controlled clinical trial conducted from 1968 to 1973, which studied the diets of more than 9,000 people at state mental hospitals and a nursing home.

During the study, which was paid for by the National Heart, Lung and Blood Institute and led by Dr. Ivan Frantz Jr. of the University of Minnesota Medical School, researchers were able to tightly regulate the diets of the institutionalized study subjects. Half of those subjects were fed meals rich in saturated fats from milk, cheese and beef. The remaining group ate a diet in which much of the saturated fat was removed and replaced with corn oil, an unsaturated fat that is common in many processed foods today. The study was intended to show that removing saturated fat from people’s diets and replacing it with polyunsaturated fat from vegetable oils would protect them against heart disease and lower their mortality.

So what was the result? Despite being one of the largest controlled clinical dietary trials of its kind ever conducted, the data were never fully analyzed.
Several years ago, Christopher E. Ramsden, a medical investigator at the National Institutes of Health, learned about the long-overlooked study. Intrigued, he contacted the University of Minnesota in hopes of reviewing the unpublished data. Dr. Frantz, who died in 2009, had been a prominent scientist at the university, where he studied the link between saturated fat and heart disease. One of his closest colleagues was Ancel Keys, an influential scientist whose research in the 1950s helped establish saturated fat as public health enemy No. 1, prompting the federal government to recommend low-fat diets to the entire nation.

“My father definitely believed in reducing saturated fats, and I grew up that way,” said Dr. Robert Frantz, the lead researcher’s son and a cardiologist at the Mayo Clinic. “We followed a relatively low-fat diet at home, and on Sundays or special occasions, we’d have bacon and eggs.”

The younger Dr. Frantz made three trips to the family home, finally discovering the dusty box marked “Minnesota Coronary Survey,” in his father’s basement. He turned it over to Dr. Ramsden for analysis.

The results were a surprise. Participants who ate a diet low in saturated fat and enriched with corn oil reduced their cholesterol by an average of 14 percent, compared with a change of just 1 percent in the control group. But the low-saturated fat diet did not reduce mortality. In fact, the study found that the greater the drop in cholesterol, the higher the risk of death during the trial.

The findings run counter to conventional dietary recommendations that advise a diet low in saturated fat to decrease heart risk. Current dietary guidelines call for Americans to replace saturated fat, which tends to raise cholesterol, with vegetable oils and other polyunsaturated fats, which lower cholesterol.

While it is unclear why the trial data had not previously been fully analyzed, one possibility is that Dr. Frantz and his colleagues faced resistance from medical journals at a time when questioning the link between saturated fat and disease was deeply unpopular.

“It could be that they tried to publish all of their results but had a hard time getting them published,” said Daisy Zamora, an author of the new study and a research scientist at the University of North Carolina at Chapel Hill.
The younger Dr. Frantz said his father was probably startled by what seemed to be no benefit in replacing saturated fat with vegetable oil.

“When it turned out that it didn’t reduce risk, it was quite puzzling,” he said. “And since it was effective in lowering cholesterol, it was weird.”

The new analysis, published on Tuesday in the journal BMJ, elicited a sharp response from top nutrition experts, who said the study was flawed. Walter Willett, the chairman of the nutrition department at the Harvard T.H. Chan School of Public Health, called the research “irrelevant to current dietary recommendations” that emphasize replacing saturated fat with polyunsaturated fat.

Frank Hu, a nutrition expert who served on the government’s 2015 dietary guidelines committee, said the Minnesota trial was not long enough to show the cardiovascular benefits of consuming vegetable oil because the patients on average were followed for only about 15 months. He pointed to a major 2010 meta-analysis that found that people had fewer heart attacks when they increased their intake of vegetable oils and other polyunsaturated fats over at least four years.

“I don’t think the authors’ strong conclusions are supported by the data,” he said.

To investigate whether the new findings were a fluke, Dr. Zamora and her colleagues analyzed four similar, rigorous trials that tested the effects of replacing saturated fat with vegetable oils rich in linoleic acid. Those, too, failed to show any reduction in mortality from heart disease.

“One would expect that the more you lowered cholesterol, the better the outcome,” Dr. Ramsden said. “But in this case the opposite association was found. The greater degree of cholesterol-lowering was associated with a higher, rather than a lower, risk of death.”

One explanation for the surprise finding may be omega-6 fatty acids, which are found in high levels in corn, soybean, cottonseed and sunflower oils. While leading nutrition experts point to ample evidence that cooking with these vegetable oils instead of butter improves cholesterol and prevents heart disease, others argue that high levels of omega-6 can simultaneously promote inflammation. This
inflammation could outweigh the benefits of cholesterol reduction, they say.

In 2013, Dr. Ramsden and his colleagues published a controversial paper about a large clinical trial that had been carried out in Australia in the 1960s but had never been fully analyzed. The trial found that men who replaced saturated fat with omega-6-rich polyunsaturated fats lowered their cholesterol. But they were also more likely to die from a heart attack than a control group of men who ate more saturated fat.

Ron Krauss, the former chairman of the American Heart Association’s dietary guidelines committee, said the new research was intriguing. But he said there was a vast body of research supporting polyunsaturated fats for heart health, and that the relationship between cholesterol-lowering and mortality could be deceiving.

People who have high LDL cholesterol, the so-called bad kind, typically experience greater drops in cholesterol in response to dietary changes than people with lower LDL. Perhaps people in the new study who had the greatest drop in cholesterol also had higher mortality rates because they had more underlying disease.

“It’s possible that the greater cholesterol response was in people who had more vascular risk related to their higher cholesterol levels,” he said.

Dr. Ramsden stressed that the team’s findings should be interpreted cautiously. The research does not show that saturated fats are beneficial, he said: “But maybe they’re not as bad as people thought.”

The research underscores that the science behind dietary fat may be more complex than nutrition recommendations suggest. The body requires omega-6 fats like linoleic acid in small amounts. But emerging research suggests that in excess linoleic acid may play a role in a variety of disorders including liver disease and chronic pain.

A century ago, it was common for Americans to get about 2 percent of their daily calories from linoleic acid. Today, Americans on average consume more than triple that amount, much of it from processed foods like lunch meats, salad dressings, desserts, pizza, french fries and packaged snacks like potato chips. More
natural sources of fat such as olive oil, butter and egg yolks contain linoleic acid as well but in smaller quantities.

Eating whole, unprocessed foods and plants may be one way to get all the linoleic acid your body needs, Dr. Ramsden said.

Related:

Ask Well: Is Grass-Fed Beef Better for You?
Organic Food vs. Conventional Food
Is Organic Better? Ask a Fruit Fly

For more fitness, food and wellness news, follow us on Facebook and Twitter, or sign up for our newsletter.