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Proposed Trans-Fat Ban

by Ann Gerhardt, MD *December 2013*

Bottom line at the top: Artificial trans-fats, made by hydrogenating vegetable oils, are unhealthy. The FDA has proposed a ban.

The media's take on the FDA's proposal to severely limit trans-fats in food made it sound like a total ban was a "done deal". In truth, there is no ban… yet. What actually happened was the FDA determined that hydrogenated oils containing artificial trans-fats do not qualify as "generally recognized as safe" (GRAS) ingredients. If this determination stands after a 60-day comment period, food manufacturers will phase out artificial trans-fats over the next few years. The proposed ban only applies to chemically-generated trans-fats.

The FDA defines as GRAS naturally occurring substances like spices, vitamins, and minerals which are not known toxins. Even substances with chemical sounding names, like calcium phosphate and sphingomyelin, are GRAS because they occur naturally in human tissue. Partially hydrogenated vegetable oils are not natural because vegetable oils naturally contain no trans-fat.

Food manufacturers introduced partially hydrogenated vegetable oils in the 1960's to stabilize unsaturated fat in packaged food. Time, heat and light exposure turn unstabilized poly- and mono-unsaturated fats rancid. The hydrogenation process generates trans-fat, changing the oil from liquid to solid at room temperature. It prolongs shelf-life, and facilitates packaging and transport. Consumers seemed to be fine with it because the food was cheaper and had less saturated fat.

In the 1980's, as the medical nutrition community vilified saturated fat, butter was "out." The alternative was trans-fat-laden margarine. Hydrogenated oils containing trans-fats became a staple of commercial baked goods, margarines and snack foods. More than 95% of cookies and crackers contained trans-fat.

Now we know the switch took us out of the fat and into the (health) fire. Artificial trans-fats accounted for 4-12% of fat in Americans' diets, and had no positive nutritional value, even as a caloric source.

Unfortunately trans-fats do have negative metabolic effects:

1) They contribute to abdominal fat (the spare tire, apple shape).
2) They raise LDL-cholesterol (the bad one) and lower HDL-cholesterol (the good one) more than some saturated fats and certainly more than the natural oil that was hydrogenated. To keep things in perspective, moderate trans-fat intake raises LDL-C only 6%, compared to 9% for high saturated fat diets.
3) They induce fat accumulation in the liver (non-alcoholic fatty hepatitis).
4) They augment inflammation in blood vessels and liver.
5) They cripple blood vessels' ability to respond to normal pressure changes, by blocking production of nitric oxide (a real star in normal metabolism).
6) They block tissue responsiveness to insulin, promoting diabetes.
7) They are incorporated into cell membranes and blood vessel walls, where they block the effect of a natural substance that prevents clogged arteries.

It's too soon to know the magnitude of trans-fat's contribution to America's obesity and diabetes epidemic. Trans-fat likely adds to the perfect storm of too little physical activity performed by people eating too much cheap, high calorie, fructose, fat and sugar-laden food. When the ban takes effect,

and artificial trans-fats disappear from our food, we'll see if obesity, diabetes and vascular disease prevalences change.

This is not the first time that the FDA has addressed the trans-fat issue. By 2003 the evidence that trans-fats were bad for us grew strong enough for the FDA to issue a regulation requiring food labels to reveal trans-fat content. By the time the requirement took effect in 2006, food manufacturers had already reduced hydrogenated fat in labelled, packaged food.

Heart disease has leveled off in the last decade since those changes, but it would hard to attribute the improvement solely to less trans-fat in the diet. Aspirin and statin drug use, as well as improved treatment overall, deserve a lot of the credit.

The 2003 regulation was not a ban and didn't apply to all commercial food, much of which does not carry a nutrition label. Restaurants, schools, and purveyors of non-packaged food typically don't reveal nutrition content via labels.

To address this issue, some communities started dictating artificial trans-fat limits in all foods. In California, New York City and numerous other communities, recent legislation requires schools, cafeterias and restaurants to go trans-fat "free," but this really means less than 1/2 gram per serving.

Artificial trans-fats are not the only trans-fats in the food supply. A complete ban on trans-fats is impossible, because many animal products naturally contain it. Ruminant animals have a second stomach (the rumen), in which bacteria hydrogenate their food fat to form saturated and trans-fats. A true ban on trans-fats would have to also ban meat and dairy from cattle, deer, goat, sheep, giraffe, bison, yak, buffalo, wildebeest, moose, caribou, elk, reindeer and muskox.

Such a complete ban is not necessary, because animal trans-fats seem to be less unhealthy than the artificial variety. Two of the major trans fatty acids generated by dairy cows, vacenic acid and c9,t11-conjugated linoleic acid, have anti-cancer and anti-artery clogging effects in animal models of human health. The major unhealthy trans-fatty acid generated by industrial oil hydrogenation, elaidic acid, is only a minor fraction of ruminant-generated trans-fat. The fat of industrial farm cows fed corn contains more monounsaturated fat and less trans-fat. The more acidic rumen environment kills the bacteria which make trans-fat. Given that some ruminant trans-fat may be healthy, it's not clear if the difference makes their fat more or less healthy.

The food industry wants time to respond to the proposed ban and to devise alternatives to hydrogenated oils. They already use some alternatives that seem to work. Many packaged crackers now contain soybean oil and taste just fine. Margarines are using oil blends that might not be so healthy, such as soybean with palm and palm kernel oils. The product has the right texture, but the latter two oils contain major saturated fat culprits for vascular disease.

The food industry has developed a high stearic acid soybean oil. It is trans-free, stable under oxidant stress, and raises LDL-cholesterol only a little. Using it in margarine is a better choice than a palm/palm kernel mixture.

The best choice is to include unmodified vegetable oils in a plant-based diet containing some animal protein with a minimum of animal fat.