# *The Science Behind the Claims and Why the Product that Bears a Claim Needs to be "Healthy"*

Joanne R. Lupton
*Texas A&M University*
*College Station, Texas*

JLupton@tamu.edu

My focus is on what science is needed for a health claim or a nutrient-content claim, and Barbara Schneeman has paved the way for me[1] by describing these claims, which I will briefly review. I'll discuss the requirements for a product to carry a health claim or a nutrient-content claim. It's not enough to get the health claim, you must have a product that can carry that health claim. I'll talk about FDA's nutrient profiling—I'm calling it "nutrient profiling" although it can be called other things—and then segue into nutrient profiling for point-of-purchase systems. Point-of-purchase systems are little checkmarks, stars or smiley faces on packaging, directing consumers to healthy products. I'll talk about what these mean and the future direction in that area.

## Health Claims

A health claim is an expressed or implied statement in labeling about the relationship of a food substance to a disease or health-related condition. Where many people—individuals and manufacturers—go wrong is, instead of looking at decreased *risk* of disease, they think in terms of treating, mitigating or curing disease, which categorizes the active agent as a drug. Also, and very importantly for both health claims and nutrient-content claims, they must have pre-market approval from FDA. Makers who place health claims on their products without prior approval receive warning letters from FDA (*e.g.* Fig. 1).

[1]Pages 133–144.


Figure 1. Misbranded foods that led to receipt of warning letters from FDA.

A warning was issued for Pollock baby fillets, on which the label stated that they help to prevent heart attacks (Fig. 1). If this were an approved health claim, the label could state that the risk of heart attack was decreased but not that heart attack was prevented. The letter from FDA stated that this would categorize the product as a drug, subject to other regulatory strictures. Packaging on a herbal supplement claimed "constipation relief" or "restoring regularity." You can't have constipation and mitigate it with a health claim, you must decrease the risk of it occurring in the first place. Diamond of California claimed that their shelled walnuts' content of omega-3 fatty acids "inhibits the tumor growth that is promoted by the acids found in other fats," which defined the product as a drug; furthermore, it would be a new drug requiring an approved new-drug application. To make matters worse, Diamond also claimed that "studies have also shown that omega-3s may lower the risk of stroke." Although "lowering the risk" was consistent with a health claim, no such health claim had been applied for. You can't make up a health claim saying that risk is decreased. Their claim that the walnuts contain omega-3 at 2.5 g per serving may seem innocuous; however, next to that statement were four little hearts, making an apparent connection between that amount of omega-3 in the product and heart disease.

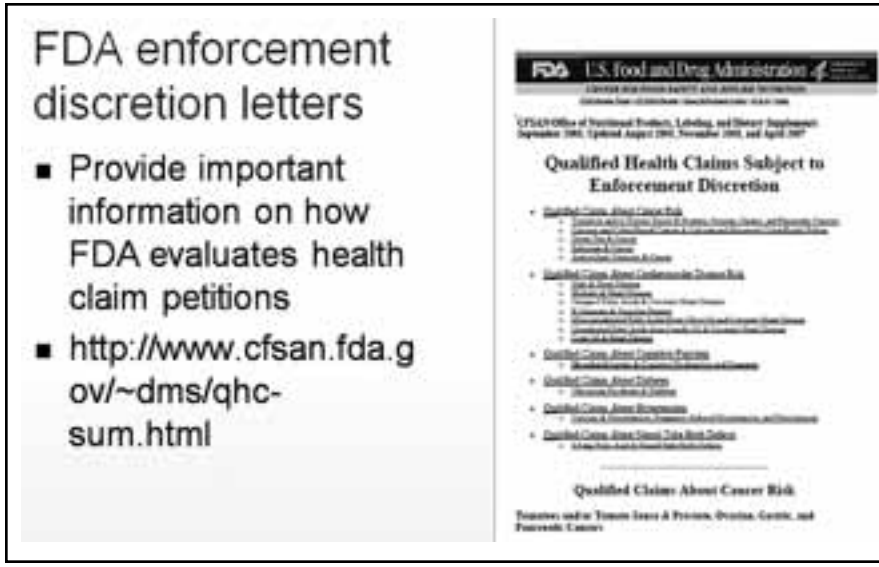


Figure 2. Enforcement discretion letters.

The FDA warning letter cautioned that "the heart symbols adjacent to this statement make this an implied health claim."

Figure 2 shows, in brief, guidance for industry issued in 2007[2]. This and the 2009 version[2] are required reading for anyone who wants to be a principal investigator on a study that may in the future be used for submission of a health claim. It clarifies pitfalls to be avoided when preparing and applying for a health claim. The company representative sends a dossier to FDA describing studies the results of which support the health claim. When FDA starts the review, any animal and/or *in-vitro* studies, review articles, and meta analyses—with a few exceptions—are set aside and major consideration is given to human studies on non-diseased populations. The animal, *etc*., studies can be used as background information, but they are not considered directly for the actual health claim. Substance X must reduce the risk of disease Y, with substance X and disease Y both defined and characterized.

Let's say that we want to make the statement that eating fish decreases the risk of heart disease. We would have to cite studies that had people eating fish and the endpoint would have to be decreased risk of heart disease or any one of the acceptable markers for heart disease. Alternatively, let's say that we want to claim that consuming omega-3 fatty acids decreases the risk of coronary heart disease. Instead of fish studies, we would use omega-3-supplement studies. Or let's say we wanted to make a similar claim for docosahexaenoic acid (DHA) or eicosapentaenoic acid (EPA), then we would have to show the results of the presence of DHA or EPA in the diet.

[2]An updated version, issued in 2009, is available at http://www.cfsan.fda.gov/guidance.html.

Substance X and disease Y have to be measurable and—very importantly—validated surrogate endpoints are necessary. For a heart disease, an endpoint would be LDL cholesterol, total cholesterol or blood pressure, which are accepted biomarkers. The results of a study will be discounted unless the data apply to an *accepted* biomarker

The submitted data are characterized as either intervention trials or observational studies. With the former, the single most important type of intervention study is a randomized clinical trial; the subjects of the trial and the information obtained must be able to be extrapolated to the population that is the subject of the health claim. Some observational studies are more important and receive higher levels of consideration because they entail less potential for bias. Long-term cohort studies rank higher than retrospective or cross-sectional studies. Within a prospective cohort study, some type of measurement other than a food-frequency questionnaire—*e.g.* blood levels of a certain omega-3 fatty acid—would give the quality of that study a higher rating. Studies are completely eliminated from consideration if they are deemed to be seriously flawed. For example, if the subjects already had cancer, a decreased risk of cancer would be meaningless and the results of the study would be unacceptable. On the other hand, some factors are on a continuum, such as blood pressure. You might make the case that people with moderately elevated blood pressure constitute a non-diseased population, since a lot of people over a certain age do have elevated blood pressure. The same may be said regarding obesity in view of the fact that two thirds of the US population are overweight or obese. It's another continuum, and, again, you would have to make a case for it. If there is no appropriate control group or the control group is dissimilar from the intervention group, the study would be considered as seriously flawed and eliminated from consideration. Similarly, elimination would occur if the effects obtained do not result clearly from the substance of interest. For example, an effect obtained from eating spinach cannot be deemed to be due to the lutein content of the spinach.

On completion of this process, the remaining studies are rated as "high," "moderate" or "low" in quality. Then the "surviving" studies—those that still count—are considered and the quality and quantity of the evidence are appraised along with their relevance to the US population. From the overall consistency of the entire body of data, FDA deduces the strength of the science showing that the food or nutrient or substance decreases the risk of the disease. The stronger the relationship, the better the science, the fewer the qualifications required on the eventual label. FDA sends an enforcement discretion letter, which describes how the health-claim petition was evaluated. Enforcement discretion letters are also available on the FDA's Website and they make for useful reading (Fig. 2).

## *Case Study: Enhanced Omega-3 Eggs*

A producer of hens' eggs petitioned FDA for a health claim that daily consumption of one egg containing 660 mg of omega-3 fatty acids (balanced 1:1 with omega-6 fatty acids) reduces the risk of heart disease and sudden fatal heart attack (Fig. 3). They submitted seventy-four peer-reviewed publications, of which twenty-eight were on nonhuman subjects; therefore, we actually considered forty-six. Step 2 focused on the substance, *i.e.* the egg with the specific fatty acid composition. Of eighteen intervention trials described,

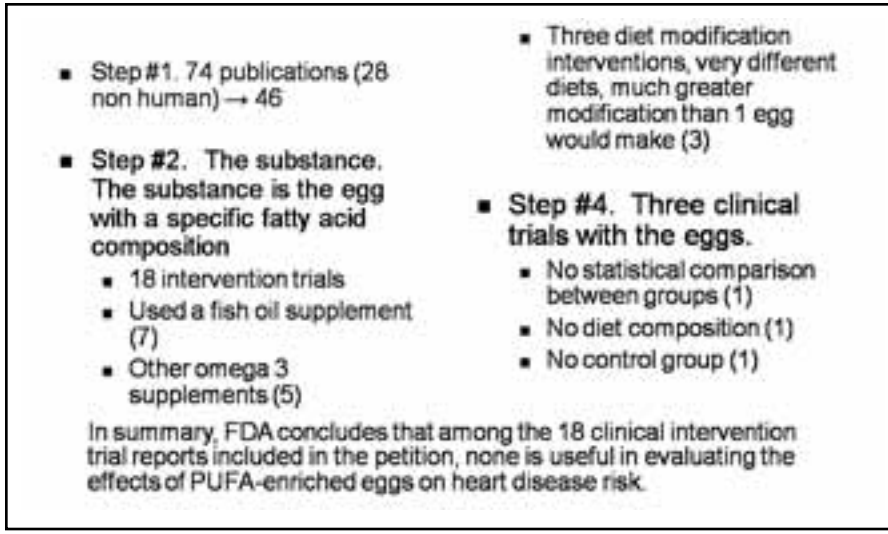


Figure 3. Case study: enhanced omega-3 eggs.

seven were eliminated because fish-oil supplement, not the egg, was used. Other omega-3 supplements were used in five of the eighteen trials, so they were eliminated from further discussion. Only six studies were left to provide evidence between intake of the substance and decreased risk of the disease. Three of those had such strong diet modifications in the intervention group—much more than the consumption of one egg—that they were very different from the control group. Those were eliminated. We were down to three clinical trials with the eggs, of which one showed no statistical comparisons, one provided no diet composition and one had no control group. In spite of the work and expense involved on the part of the company in making the submission, FDA concluded that none of the eighteen clinical-intervention trial reports in the petition was useful in evaluating the effects of polyunsaturated fatty acid-enriched eggs on risk of heart disease. The claim was denied and the last sentence in the letter of denial was: "Even if there were credible evidence for the proposed claims, polyunsaturated fatty acid-enriched eggs would be disqualified from bearing a health claim because of their cholesterol content." One would have thought that the producer would have anticipated this response and saved the not-insubstantial sum of money, time and effort involved in attempting to procure the health claim.

## Nutrient-Content Claims

### *Dietary Fiber*

The health-claim process is long and rigorous, and, unless the scientific basis of the claim is strong, a qualified health claim—which you probably wouldn't want on your product—may result. Therefore, people are turning to other types of claims, including nutrient-content claims. A daily value has to be quoted in order to obtain a nutrient-content claim. A content of 10% of the daily value of a nutrient in a serving is a "good"

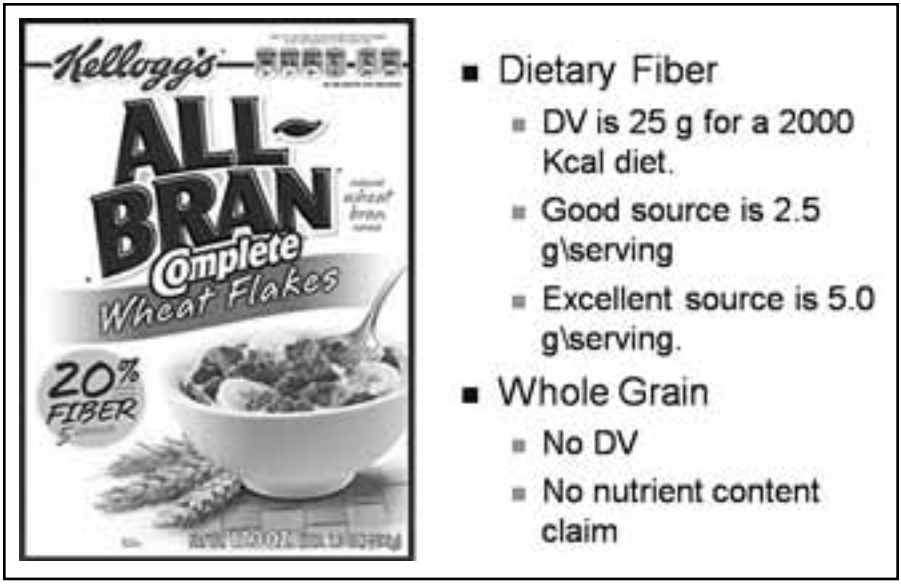


Figure 4. Nutrient-content claims: dietary fiber and whole grain

source, and 20% of the daily value is an "excellent source." For dietary fiber in a cereal (Fig. 4), the daily value is 25 g for a 2,000-calorie diet; therefore, 2.5 g of fiber per serving would be a "good" source and 5 g would be an "excellent" source. However, fiber cannot be interpreted in terms of whole grain (which we attempted to do in the 2005 Dietary Guidelines to encourage people to eat more whole grains, because they generally contain more fiber than refined grains). Contrary to popular belief, there simply isn't a daily value for a whole grain.

### *Isoflavones*

A somewhat similar situation prevails for soy isoflavones, for which Figure 5 summarizes a warning letter. The product label stated that the applicable soy product was "very high" in isoflavones, whereas the warning letter stated that FDA authorizes claims of "high" and a "good source," but does not authorize claims of "very high." The letter went on to state that, in any case, there is no daily value intake for isoflavone because it isn't a nutrient, and so a nutrient-content claim is meaningless. Other similar cases are described on the FDA website.

## Requirements for a Product to Carry a Claim

From FDA's perspective, if a food product carries a health claim or nutrient-content claim it has to be below a certain bar for "nutrients to limit" and it has to be above a certain bar for at least one key "nutrient to encourage" (Fig. 6). Also, there has to be at least a minimum effective amount of the beneficial ingredient in the food for it to carry the claim. If it's above the disqualifying levels for "nutrients to limit," it can't carry a health

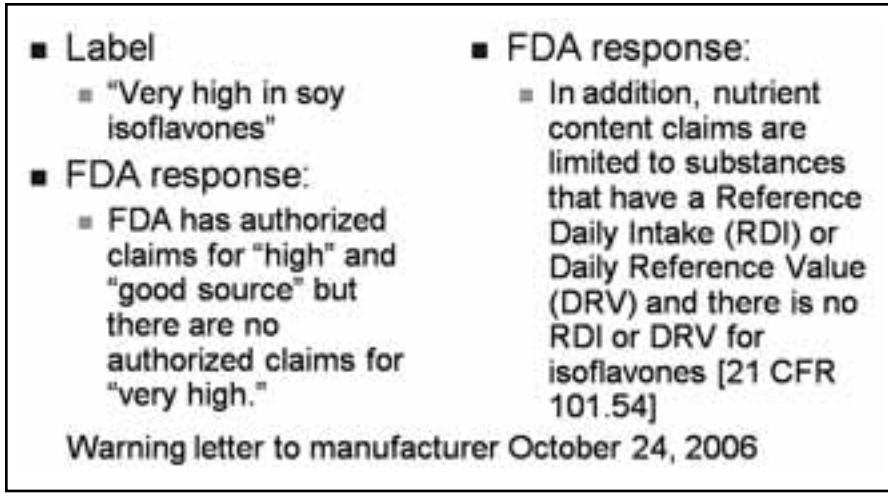


Figure 5. FDA response to a nutrient-content claim.

claim. If it's a nutrient-content claim and it's above this, it can still get a nutrient-content claim, but it has to disclose on the front of the package, right next to what it is saying in terms of a "good" or an "excellent" source. Let's say it's too high in saturated fat, it has to refer to the back panel or to the Nutrition Facts panel for the amount of fat, to bring it to people's attention.

## P-O-P Nutrient Profiling Systems

Point-of-purchase nutrient-profiling systems are useful if they direct shoppers to healthier products. If they are easy to understand, they can be particularly beneficial for those

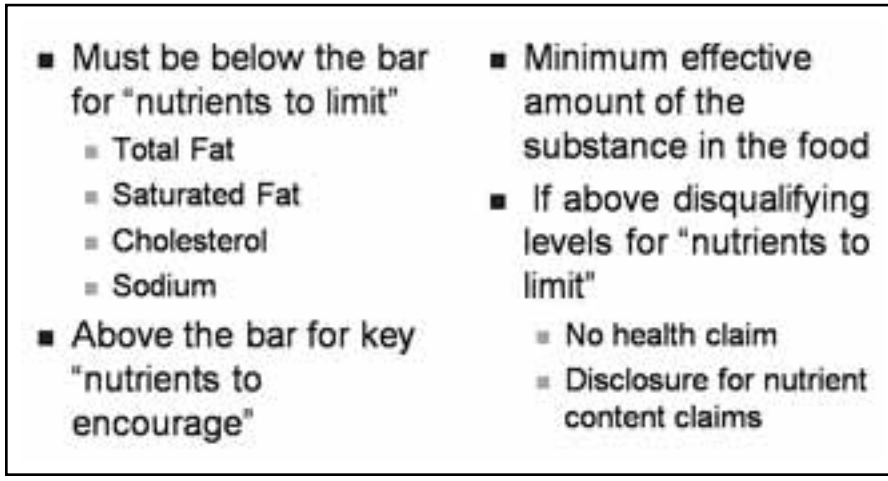


Figure 6. Requirements for foods bearing claims (FDA's nutrient profiling).

who do not have a lot of time for food shopping, circumventing the need to consult the Nutrition Facts panel or do calculations to make comparisons.

### *Discretionary Calories*

By visiting the Website mypyramid.gov, we can find out our calorie allotments for the day, *i.e.* how many calories can one take in without gaining or losing weight. If we take the number needed in terms of energy intake and subtract from that the calories required to obtain needed nutrients from foods, the difference is our discretionary calories. That can be a glass of wine, a dessert, or full-sugar soda, for example—however you wish to spend them because you've already spent your calories on the foods and the nutrients that you need without exceeding your energy requirement.

The issue here is, how many discretionary calories do we actually have to spend? When the USDA provides the number of servings that we should have for our energy level, gender and age, those numbers are based on the item in each food group that is lowest in fat, added sugar, and sodium. For example, in the dairy category, a recommendation of three glasses of milk a day means three glasses of non-fat milk—not 1% or 2%, and certainly not ice cream, and not even low-fat yogurt. Three glasses of 1% milk would mean using discretionary calories.

Two thirds of adults in the United States are either overweight or obese, therefore they have no discretionary calories and should be eating less than their calorie allotments so that they lose weight. Many others are not meeting their nutrient requirements because they are not choosing the most nutrient-dense foods. For example, most of the dietary fiber we get from vegetables in the United States is from French fried potatoes, which is not to imply that this a good source of fiber. Similarly, our greatest sources of grain fiber are hot-dog and hamburger buns. Again, these are not great sources of dietary fiber, but we eat a lot of them and they contain some fiber. These examples show how we are wasting some of our calories by not picking the most nutrient-dense foods and they illustrate the potential utility of point-of-purchase nutrition-profiling systems.

A major criticism, however, is that there are multiple point-of-purchase nutrition-profiling systems with multiple nutrition criteria, resulting in consumer confusion rather than helping to solve the problem. It's generally agreed that a unified system is needed to cut through the clutter, and FDA has taken action with workshops and consumer-research projects. They are supporting an Institute of Medicine panel to evaluate different systems. They've held a press conference and sent a letter to manufacturers seeking input on what they are looking for and, if there is to be a unified system, what it should be. Information is expected to be available by the end of 2010.

## In Summary

The evaluation of health claims is a rigorous, science-based process. Products that carry health or nutrient-content claims must meet nutrient-profiling requirements. There's a reason for not directing people to good substances that are in bad vehicles—we cannot afford to waste calories on non-nutrient-dense foods. Consequently, FDA and the Institute of Medicine are evaluating nutrient-profiling systems for point-of-purchase labeling. Results should be available by December, 2010.