GOOD STORIES, BAD SCIENCE

A GUIDE FOR JOURNALISTS TO THE HEALTH CLAIMS
OF "CONSUMER ACTIVIST" GROUPS

Prepared for
THE AMERICAN COUNCIL ON SCIENCE AND HEALTH

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INTRODUCTION

The media frequently report claims by nonprofit consumer groups about alleged health hazards in our food supply and our environment. Often these claims are coupled with suggestions for specific actions to reduce the purported risk of disease or premature death by avoiding or reducing exposure to the allegedly harmful substance.

It would be in the best interest of the American consumer if the media treated such reports with a greater degree of skepticism

The American Council on Science and Health (ACSH), a consumer education group directed and advised by over 300 leading scientists and physicians, has reviewed many such reports and claims. After carefully considering the scientific evidence, ACSH concludes that it would be in the best interest of the American consumer if the media treated such reports with a greater degree of skepticism than is currently employed.

Supposedly, the public claims and warnings that these activist groups make are based on scientific evidence. But in general, there is no independent peer review of their claims or recommendations. The groups publish the reports themselves, often via press release or paid advertisements. Often, the claims are extrapolations from small studies or animal studies, and lack strong supporting evidence. This is not the way mainstream science works.

Scientists working in academic institutions, for example, submit their work to journals that then have the papers reviewed by other scientists with appropriate expertise. Such papers must clearly delineate the methods used to obtain the published results, as well as the statistics used to analyze them. Both will be examined and criticized by reviewers. If a body of work does not pass muster, it will either be rejected for publication, or the author(s) will be required to revise it, and perhaps supply additional information, before it is published. A scientific paper of high quality may be revised and reviewed more than once before publication. While this process isn't always perfect, it is the best procedure we have to insure that the scientific information presented to the public is based on valid data that are analyzed in an appropriate manner. Its value has been shown decisively over decades of experience.

Additionally, reputable scientists understand that a single report, wherever it may be published, is not "proof" of a theory or hypothesis. Experiments or observations must be replicated by independent research in order to be considered valid. Often, however, advocacy groups don't wait for confirmation before sounding an alarm that may be based on poorly designed or single studies, or on studies that are performed only on laboratory animals. When disapproving of a product or chemical, they may cite anecdotal, unsupported reports of ill effects, neglecting to validate the data. Or, they may cite data selectively, choosing only those data that support the point(s) they wish to make.

Another feature of many of these groups' alarms is direct extrapolation of data from high-dose animal tests to predict disease risk in humans. The assumption is that any chemical, food, or product that causes harm to animals in high-dose testing situations must also harm humans, even if the typical human exposure is orders of magnitude less than those used in the animal tests.

While animal testing is certainly a valid and necessary means of examining the possibility that a chemical might be harmful to humans, a finding of harm in such tests does not automatically mean that humans exposed at much lower doses will also be harmed. More information, such as typical or expected toxicity and human exposure, must also be factored into any assessment of risk to humans. Further, the possibility that any chemical or compound is harmful to humans is strengthened if it is found to be harmful to more than one species of experimental animal. Thus, finding that a compound is toxic or carcinogenic at high dose to laboratory rats, but not to mice or rabbits, would weaken the argument that humans might be affected (for more information on animal testing, see the ACSH publications "Of Mice and Mandates" at http://www.acsh. org/publications/pubID.153/pub_detail.asp and America's War on "Carcinogens" at http://www.acsh.org/ publications /pubID.992/pub_detail.asp). Yet, such scientific facts are only rarely mentioned, and then as caveats at the end of a story.

Parents of babies and young children often are the group most concerned about potential health risks stemming from foods or environmental exposures. A common attention-grabbing ploy is to paint a particular risk as especially harmful to babies or young children. Thus, the NRDC promotes their study of children's exposure to diesel exhaust, and the PCRM inveighs against the drinking of milk by children. Public health policy, however, should be based on competent risk assessments, not hyperbole.

In this report, ACSH reviews claims by four self-styled consumer groups and evaluates the scientific veracity of some of their statements. Further, the report proposes some guidelines and follow-up questions for journalists to use in assessing the scientific quality of health-related claims.

ACSH considers statements by the Center for Science in the Public Interest (CSPI), the Environmental Working Group (EWG), the Natural Resources Defense Council (NRDC), and the Physicians Committee for Responsible Medicine (PCRM) as examples of claims about health concerns that are not grounded in sound science yet have been widely covered by the media.

CENTER FOR SCIENCE IN THE PUBLIC INTEREST (CSPI)

Examples of CSPI targets widely covered by the media

Olestra

Background

Olestra (technically known as sucrose polyester) is a no-calorie fat substitute that is produced from sucrose (table sugar) and vegetable oils. Olestra can be used to replace fats in foods—it provides texture and "mouth feel" that are more like those produced by natural fats than other fat replacers. The human body is unable to break down olestra, so it cannot be absorbed from foods in the gastrointestinal tract, and thus it supplies no calories.

The safety and utility of olestra and olestra-containing products were studied for over twenty years before the producer (Procter & Gamble) petitioned the FDA for approval for use in savory snacks such as chips and crackers. In 1996, that approval was granted.

CSPI's Position

CSPI mounted a determined campaign against Americans' use of olestra, claiming that it frequently caused severe gastrointestinal (GI) distress, fecal incontinence, and diarrhea.[1] [2] One part of the CSPI website is devoted to anecdotal reports of consumers' GI problems, which they attributed to olestra consumption. CSPI did not verify whether these attributions were accurate. These reports were used to fuel repetitive media campaigns attacking olestra and Procter & Gamble.

CSPI also focused on the fact that olestra, as a fatty substance, can carry fat-soluble vitamins (A, D, E, and K) and nutrients called carotenes out of the body if they are consumed at the same time as olestra-containing foods. To assurances that the vitamins would be added to olestra-containing foods, CSPI responded by emphasizing the possible loss of carotenes as a health threat.

The Scientific Evidence

The truth is that there is a relatively high natural background rate of GI upsets in the population at large: in a national survey, 69 percent of respondents reported having had a variety of gastrointestinal symptoms in the previous three months (this information was published in 1993, well before olestra was approved by the FDA).[3] Against this high background occurrence, controlled scientific studies revealed that consumption of olestra-containing snack foods does not significantly increase the rate at which people experience such effects.[4] [5] CSPI ignored these studies, because olestra producers provided at least some of the studies' support. Even though these reports were peer-reviewed and published in scientific journals of the highest quality and credibility (e.g., the New England Journal of Medicine, Science, and the Journal of the American Medical Association), CSPI discounted their results. Originally, with an over-abundance of caution, the FDA mandated a statement on all packages of olestra-containing foods to the effect that the olestra might cause GI distress in some people. When no scientific studies supported the idea that such effects are widespread, the FDA allowed the warning to be removed. But this apparently did not impress CSPI, which continued its warnings about olestra consumption (see sidebar).

CSPI Still After Olestra
(CSPI press release, with ACSH comments added)

Center for Science in the Public Interest
For Immediate Release: May 21, 2004
Popcorn Makers Considering Using Olestra
Statement of CSPI Executive Director Michael F. Jacobson

The news that major microwave popcorn makers are considering using the diarrhea-inducing fake fat Olestra is unwelcome news for Americans' insides.

Some 20,000 people have filed complaints about abdominal cramps, diarrhea, and other health problems caused by Olestra—more complaints than for all other food additives combined.
[Comment: These complaints have not been scientifically validated—they result from an unceasing CSPI campaign to encourage such complaints. Though 20,000 sounds like a lot of complaints, we don't know how many people actually ate olestra-containing foods; it might be that 20,000 is only a tiny fraction of olestra consumers.]
There's already plenty of low-fat microwave popcorn on the market that doesn't make people sick. I hope ConAgra, General Mills, and Pop Weaver choose not to put their customers at risk of such dangerous side effects.
[Comment: This statement implies that olestra-containing popcorn will make most people sick, a position not supported by any data.]

While it is true that olestra can carry some fraction of fat-soluble vitamins and other nutrients out of the body, it is also true that the FDA mandated that additional vitamins be added to any olestra-containing food to make up for this characteristic. Further, olestra only affects nutrients that are present in the gastrointestinal tract at the same time that the olestra is present.

As noted above, CSPI emphasized the possible health effects of carotene loss (some of these fat-soluble compounds are antioxidants) as another basis for avoiding olestra. But it has not been shown that the carotenes are essential nutrients in the way that vitamins are. Nor has it been shown that they are necessary for disease prevention. In fact, when the latest editions of the Dietary Reference Intakes were prepared by the Food and Nutrition Board of the Institute of Medicine, the members of that body declined to set reference intakes for any of the carotenes or for antioxidants as a whole. They stated that there simply weren't enough sound scientific data to justify doing so.[6]

Beta-carotene

Background

In the early 1990s, the supplement bandwagon was just beginning to roll. Every day it seemed that there were reports of new and miraculous uses for a variety of nutrients in foods or herbs. One of these nutrients was beta-carotene. Beta-carotene is not (and was not then) a novel food constituent. Food scientists and nutritionists had known for many years that the human body can convert it into vitamin A, if needed. While vitamin A is essential for human health, beta-carotene is not. In the 1980s and early 1990s, however, several studies, often observational ones, indicated that people who frequently ate foods containing ample beta-carotene seemed to be at lower risk for a variety of diseases than people who didn't consume such foods.[7] In particular, beta-carotene was seen as a preventative for heart disease and several forms of cancer or precancerous conditions.

CSPI's Position

In 1994, CSPI advised readers of its "Nutrition Action Healthletter" that taking beta-carotene supplements was a good, health-promoting action. A glossary of food additives on the CSPI website asserts, "Large amounts of beta-carotene may reduce the risk of cancer and other diseases." [8]

The Scientific Evidence

Subsequent scientific studies have not supported CSPI's recommendation. In 1995 one large study of smokers found that users of beta-carotene supplements had a small but significantly *increased* risk of lung cancer.[9] The following year, two more large intervention studies did not find any protection by beta-carotene supplements against either heart disease or lung cancer.[10] [11] To its credit, CSPI did eventually withdraw its premature recommendation for beta-carotene supplements and has since noted the impact of these studies.[12] It is not clear, however, that they have ceased making similar premature assessments of the scientific literature (e.g., see section below on acrylamide).

The scientific nutrition literature is full of studies whose results conflict with each other. For this reason authoritative bodies, such as the Food and Nutrition Board of the National Academy of Sciences, consider a large body of evidence, often hundreds of studies, before making recommendations for the public. In doing so, these organizations consider the types of studies, e.g., animal vs. human; large epidemiological as well as small clinical studies; as well as the number of subjects included, when devising their recommendations. CSPI, presenting itself as a source of sound, scientific health advice, made recommendations before there was solid evidence that beta-carotene supplements were really effective, or even safe, for all consumers. In fact, their advice might have been harmful to people who smoked—people who might have thought they could allay the damage of smoking with inexpensive supplements.

Quorn

Background

Quorn is a meat substitute that is produced from a fungus—a member of the same group of organisms as mushrooms, though it does not physically resemble mushrooms. The fungus is mass-produced in large vats, and the protein component that is used to produce Quorn is isolated from it. Quorn has been used to produce meat-like burgers, "chicken" tenders, lasagna, and other food products, much as soybean products have been used in the past. Quorn was first developed and mass-produced in England in the late 1980s.[13] Vegetarians have used it as a suitable high-protein substitute for meat products.

CSPI's Position

At first, CSPI praised at least some Quorn-containing food. In the March, 2002 edition of its *Nutrition Action Healthletter*, CSPI rated "ground beef" made with Quorn highly—as one of their "best bites"—because the product is low in both saturated fat and sodium. But then the group did an about-face. Only two months later, Michael Jacobson, CSPI's executive director, disparaged Quorn as being an "unnatural" foodstuff because it was grown in vats rather than harvested from farms. CSPI also challenged the labeling of Quorn products for describing the product as "mushroom in origin."[14] Much as it did with olestra, CSPI maintains a niche on its website for consumers who have supposedly suffered gastrointestinal ill effects after consuming Quorn-containing foods and petitioned the FDA to recall Quorn products because of such ill effects.[15] [16]

The Scientific Evidence

Mushrooms are fungi—organisms that exist in many forms. "Myco" is simply the Greek term for fungus, but most American consumers probably would not recognize it as such. So if companies listed the source of Quorn as "mycoprotein," which is what it is (and it is indeed related to the more familiar culinary mushroom), many people would not understand what that meant. If a person were allergic to mushrooms and were checking ingredient labels to avoid them, he or she might well not realize that the product contained a potentially harmful one. Thus, although CSPI's call for more accurate labeling is scientifically correct, it could actually be more harmful than helpful.

CSPI's website for Quorn complaints[17] suffers from the same weakness as their site for olestra complaints. There is no attempt at independent validation of the complaints listed, and there is no recognition of the high background level of gastrointestinal symptoms in the general population, symptoms that can be caused by many factors.

There is no attempt at independent validation of the complaints listed, and there is no recognition of the high background level of gastrointestinal symptoms in the general population

Another point that CSPI ignores is that Quorn-containing foods have been consumed in the United Kingdom since the 1980s—with very few reports of intolerance by consumers. In fact, in 2002 the British Food Standards Agency (their equivalent of our FDA) responded to CSPI's concern about Quorn safety by noting in part that "several commonly consumed foods and food ingredients have much higher intolerance levels [than does Quorn]." The FSA also noted that about 1 in 146,000 consumers of Quorn products experienced some evidence of intolerance. The agency stated that this level of intolerance is not unexpected and that the level of intolerance to other commonly consumed foods is much greater—for example, 1 in 300 consumers have reactions to soy products. They continued "the Food Standards Agency does not consider that…it would be right to prevent those people who currently enjoy this product from being able to continue to purchase it if they wish."[18] Why not let Americans who want to use non-meat, protein-rich ingredients have access to Quorn-containing foods? As with olestra, CSPI would deny them the choice of a widely used and safe ingredient by asking the FDA to withdraw Quorn products from the marketplace.

Acrylamide

Background

In April 2002, Swedish scientists reported an alarming finding: they had determined that a toxic compound widely used in industrial settings had been found in a variety of foods. Although there were legal limits to the amount of acrylamide that was allowed in water, limits had not been set for amounts in foods—no one had looked for it in foods. The announcement created a furor worldwide. Isn't it dangerous to have this chemical in our foods? How does it get there? Is industrial malfeasance to blame?

Toxicologists know that, when exposed to high levels of acrylamide in their drinking water (higher than those found in human foods), laboratory rodents can develop cancer. Occupational exposure to high levels of the substance in humans has neurotoxic effects, but no human carcinogenic effects have been found—even in high-exposure occupational situations.

As it turns out, acrylamide is naturally produced in foods containing high levels of carbohydrates when they are cooked at high temperatures—fried or baked. Thus, bread, potato chips, crackers, and fried potatoes are all sources of acrylamide, as are wheat cereals and coffee. Interestingly, the FDA recently published (http://www.cfsan.fda.gov/~dms/acrydata.html#l ast) the results of its determination of acrylamide content of various foods: one of the highest levels was found in ripe olives.

CSPI's Position

Shortly after the initial news on acrylamide was released, CSPI began raising the alarm in the United States. Within a couple of months, the group put out press releases proclaiming that acrylamide was present in American foods and that the levels found in popular brands of snack chips and French fries were "disturbingly high."[19] They went on to note "Fast-food French fries showed the highest levels of acrylamide among the foods CSPI had tested." The group also castigated the FDA for not warning consumers to cut back or avoid foods with high levels of acrylamide. CSPI repeatedly describes acrylamide as a "carcinogenic substance," neglecting to mention that so far it has only been shown to be carcinogenic at high doses in lab rats. Further, in the studies showing that acrylamide is carcinogenic to rats, the acrylamide was provided in the animals' drinking water, not in food. This could result in a higher rate of absorption of the acrylamide than would occur from foods.[20] Such factors should be taken into account in assessing the potential for damage to human health. But CSPI did not mention these caveats. CSPI ignored the lack of data about the purported human health effects of acrylamide in foods.

The Scientific Evidence

Recently, an expert panel under the aegis of the National Toxicology Program (NTP) Center for the Evaluation of Risks to Human Reproduction evaluated the available data on the possible adverse reproductive effects of acrylamide.[21] This expert panel noted that animal (rat and mouse) experiments found some adverse effects of acrylamide on reproduction, but these effects occurred at levels thousands of times greater than those estimated to exist in foods to which humans might be exposed. In fact, the route of greatest exposure for humans was via smoking, for people who also were exposed to acrylamide in occupational settings. More recently, the British Institute of Food Science and Technology reported that the levels of acrylamide consumed in the typical British diet would be one thousand times lower than those found to cause cancer in rats.[22]

CSPI ignored the lack of data about the purported human health effects of acrylamide in foods

Since the announcement by Swedish scientists three years ago, the FDA has published data on levels of acrylamide in a variety of foods frequently consumed by Americans. Some of the higher levels have been found in coffee, ripe olives, and toasted wheat cereals. But CSPI has not warned Americans to minimize or avoid consumption of these foods. This is hardly balanced advice. If acrylamide really poses a serious danger to consumers, it would be reasonable to expect that all foods with high levels should be flagged. The lack of balance in CSPI's warnings about acrylamide should cast doubt on the criteria the organization uses to decide to issue warnings about foods.

In general, CSPI promotes a black and white view of foods, which in some camps has earned them the title "Food Police." This view is evident in CSPI's statements about acrylamide. Some foods, such as French fries, are "bad," while nearly everything low in fat, low in added sugar, and low in sodium is considered by CSPI to be "good." When it was discovered that carbohydrate-rich foods cooked at high temperatures were likely to contain acrylamide, CSPI was quick to point out that French fries, one of the foods the organization considers to be "bad," were on the list of acrylamide-containing foods.

This stance implies that if one eats only the "good" foods, good health must necessarily ensue. In fact, the composition of the whole diet is what determines its healthfulness, and making poor choices among only foods low in saturated fats, added sugar, and sodium can certainly result in a poor diet. Whether a food can be considered health-promoting or health-damaging depends on the context of the diet in which it is consumed. This basic nutritional truism is ignored in CSPI's public stance.

ENVIRONMENTAL WORKING GROUP (EWG)

Examples of EWG targets widely covered by the media

Pressure-treated Wood

Background

Pressure-treated wood is lumber that has been impregnated with a solution of chromium copper arsenate (CCA) to render the wood inhospitable to insects, fungi, and rot. Although there are other types of preservatives, CCA was most commonly used on wood that would be in frequent contact with people. It has been, until recently, widely used for construction of decks, fences, retaining walls, picnic tables, and other structures where wood could be vulnerable to such forms of deterioration. Structures made of CCA-treated wood can withstand weather, insect, and fungal attacks much longer (sometimes 10 to 20 times longer) than can those made of untreated wood. Thus, CCA-treated wood is both economically and environmentally friendly because it does not have to be replaced as often as untreated wood. The fact that the preservative contains arsenic, a substance known to be highly toxic at appropriate doses, has, however, made CCA a target of activist attention.

the EWG ignores the toxicological principle that "the dose makes the poison."

EWG's Position

EWG has done its utmost to frighten parents of children who might play on swing sets made of CCA-treated lumber. According to the EWG report, "EWG researchers found that CCA-treated wood oozes unsafe amounts of arsenic for years."[23] The group called for immediate recall of all playsets made of CCA-treated lumber.

The Scientific Evidence

The truth is, however, that CCA-treated wood is safe to use. The amount of arsenic to which people would be exposed from treated wood is minuscule. As with other alarms that it has raised, the EWG ignores the toxicological principle that "the dose makes the poison." In one study, soil samples were collected one inch from buried CCA-treated lumber. The samples were analyzed by two laboratories for arsenic content. Arsenic levels were between 1.1 and 14 parts per million parts of soil. By way of contrast, naturally occurring arsenic in soil can be as high as 100 parts per million. In Bangladesh, where long-term exposure to arsenic from deep ground water has caused widespread cancers, water concentrations are often over 100 micrograms per liter—sometimes over 1000 (the World Health Organization upper tolerable level for water is 50 micrograms per liter).[24] Although soil and water concentrations are not directly comparable (arsenic would be more likely to be injurious when consumed on a daily basis in drinking water than from intermittent contact with soil), these numbers should give some perspective on the question of whether small amounts of arsenic in soil might be dangerous.

In late 2003, however, manufacturers of CCA-treated products, after meeting with the EPA, agreed to stop using this chemical for most residential consumer uses. How this will affect either human health or the environment is open to speculation, but it seems unlikely that easily discernible benefits will result.

Farmed Salmon and PCBs

Background

PCBs are oily substances that used to have a variety of industrial uses, such as insulating fluid inside electrical transformers. In the 1960s PCBs were detected in soil and wildlife, and concerns were raised over their possible adverse effects on health and the environment. In 1968 and 1978-79, there were incidents of human poisoning and liver toxicity in Japan and Taiwan that were originally attributed to consumption of PCB-contaminated rice bran oil. Later research, however, indicated that the real culprits were more likely chemicals that were produced only when PCBs were exposed to very high temperatures—furans and another group of compounds called PCQs—not the PCBs themselves. In 1977, however, the manufacturer (Monsanto) ceased the production of PCBs, and in 1979 the Environmental Protection Agency (EPA) banned their manufacture. Because they are not readily broken down, low levels of PCBs still appear to be relatively widespread in the environment.

EWG's Postion

In July 2003, EWG posted on their website a study purporting to show that farmed salmon contained dangerous levels of polychlorinated biphenyls (PCBs).[25] The EWG's report assumes that PCBs are human carcinogens: their press release was titled "First-Ever U.S. Tests of Farmed Salmon Show High Levels of Cancer-Causing PCBs," and the text describes PCBs as "persistent, cancer-causing chemicals."[26] The group based their widespread condemnation of farmed salmon on the results obtained from ten fish. All were purchased in American stores, but some were raised in Canada, Iceland, or Scotland.

The Scientific Evidence

High-dose animal studies have suggested that PCBs are animal carcinogens, and on this basis the EPA classified these compounds as probable human carcinogens.[27] However, later work indicated that the cancer-causing potency of at least some PCBs in animals had been over-estimated, and the EPA lowered its evaluation of their carcinogenic potency.[28] Studies of workers who were exposed to PCBs via inhalation and skin contact over long periods of time have not revealed an increased cancer risk. The only confirmed health effects of high-dose exposure to PCBs in humans (occupational exposures) are eye irritation and chloracne, a severe form of acne.[29] [30] More detailed information on PCBs can be found in the ACSH publication The Public Health Implications of *Polychlorinated Biphenyls (PCBs) in the Environment*, available at: http://www.acsh.org/publications/pubID.1030 /pub_detail.asp

The bottom line: there is no evidence that trace levels of PCBs in salmon or other foods pose a hazard to human health.

The EWG study of ten fish can only be described as preliminary, and should not be the basis for wide-ranging changes in consumers' eating habits. In fact, a much more comprehensive report comparing the residues of PCBs and other organic compounds in farmed Atlantic vs. wild Pacific salmon was published over a year after the EWG report was posted (the authors noted that they were unable to obtain wild Atlantic salmon commercially).[31] This study examined over 700 samples of farmed salmon from northern Europe and from North and South America. The researchers said that while the levels of contaminants were higher in farmed than wild salmon, they did not recommend avoidance of farmed fish. They noted the beneficial nutrients in salmon (e.g., omega-3 fatty acids) and that the levels found did not exceed the FDA's action or tolerance levels for PCBs, although they did exceed the more stringent levels set by the EPA. Further, they reported that PCB levels from farmed fish raised in North and South America (Canada and Chile) were significantly lower than levels from salmon raised in Northern Europe. In summary, their results and analysis were not nearly as alarming as those from the EWG report, and they did not advise consumers to eliminate farmed salmon from their diets.

NATURAL RESOURCES DEFENSE COUNCIL (NRDC)

Examples of NRDC targets widely covered by the media

Alar

Background

Perhaps the most famous scare promulgated by the NRDC was the one concerning Alar. This substance (also known as daminozide) is a plant growth regulator used on apples (not a pesticide, as it is called on the NRDC website) that was developed in the 1960s. Alar was used to prevent apples from dropping off trees prematurely before they could be harvested. After two years of testing for carcinogenicity, the FDA concluded that Alar was safe (1968). But in 1973, a study indicated that UDMH, a byproduct of Alar, when given in extremely high doses, could cause tumors in mice.[32]

1989: Alar withdrawn from food

Alar was a pesticide used on apples.

[Comment: Actually, Alar is not a pesticide; it is a plant growth regulator.]

Uniroyal withdrew Alar from the market following a 60 Minutes story—viewed by 40 million people—on the supposed health dangers it posed.

From:
http://www.nrdc.org/features/feattime/lineprint.html

These studies were followed by others conducted by the National Cancer Institute (NCI: 1978), and the Environmental Protection Agency (EPA: 1986): they did not find evidence that Alar is a carcinogen. In spite of the fact that the NCI and EPA studies employed unrealistically high doses of Alar or UDMH, which the EPA acknowledged, the agency ordered a gradual phaseout of Alar use, to be completed by July 1990.[34] [35]

NRDC's Position

This gradual phase-out did not satisfy the NRDC, however. On the contrary, it published an incendiary report: *Intolerable Risk: Pesticides in Our Children's Food*—the obvious implication being that only complete elimination of Alar would suffice to protect the nation's children. In concert with Fenton Communi-cations, a public-relations firm, the NRDC managed to get the CBS show 60 Minutes to cover the Alar story in February 1989. The ensuing media blitz managed to terrify parents across the country, and many school systems removed apples and apple products from their lunches.[34] [36] Even today, the NRDC calls Alar a "pesticide" (see sidebar) and claims it is a human carcinogen.

The Scientific Evidence

Even after its own tests indicated that Alar is not carcinogenic, the EPA mandated more tests at levels of UDMH that were greater than the Maximum Tolerated Dose (MTD), that is, the highest dose an animal can receive and still live.[37] In such tests, 11 of 52 mice developed either benign or malignant tumors, but 80 percent of all the mice died from toxicity, not from cancer. Still, the EPA mandated that Alar's manufacturer, Uniroyal, had to phase out its use by July 1990.

A number of mainstream scientists spoke out about the paucity of solid science behind the claims of danger. Dr. Daniel Koshland, editor of the prestigious journal Science, characterized the Alar news story as: "a clearly dubious report about possible carcinogenicity by a special interest group…hyped by a news organization without the most simple checks on its reliability or documentation."[38] Dr. Ralph Reed of the American Medical Association noted, "When used in the approved regulated fashion, as it was, Alar does not pose a risk to the public's health."[39] Food scientist Dr. Joseph Rosen of Rutgers University stated, "The daily dose of UDMH administered in the

studies on which the risk estimates were based is 280,000 times the amount that is ingested daily by preschool children."[34]

But the Alar story is still alive—many believe that the NRDC was responsible for removing a deadly, carcinogenic pesticide from children's food,[40] despite all the scientific evidence that Alar, at realistic exposure levels, posed absolutely no health risk, even to children.

Diesel Exhaust from School Buses

Background

Diesel exhaust (DE) is a complex mixture of many chemical compounds, some of which have been individually shown to be carcinogenic in laboratory studies. The presence of DE is also obvious because of its visibility and distinctive odor.[41] Studies of workers who were occupationally exposed to DE found only statistically insignificant increases in respiratory symptoms.[42] Epidemiological studies examining the carcinogenic potential of occupational exposure to DE have found only a weak increase in risk compared to unexposed workers.[43] Some animal studies using very high exposures have found an increased incidence of cancer, but others using low or moderate exposures have not.[44]

NRDC's Position

In 2001 NRDC published a report—*No Breathing in the Aisles*—that supposedly examined the risk to children's health from exhaust of school buses using diesel oil as fuel.[45] The report examined the amount of diesel exhaust (DE) in school buses when they driven along routes mimicking those followed on school days. It concluded that because of such exposure, the children were at a significantly increased risk of developing cancer.

The authors of *No Breathing in the Aisles* tried to support their conclusions by showing that the exposures they measured in the buses posed a real risk to children. They cited studies of workers that suggested high, long-term occupational exposures increased the risk of human cancer (especially lung and possibly bladder cancer).[46] Stating (with no citations to back it up) that "Children are among those most susceptible to the health effects of diesel exhaust," the NRDC raised the alarm.

The Scientific Evidence

The NRDC's study had a number of shortcomings that make it difficult to realistically assess its validity. Unlike papers published in high-quality, peer-reviewed scientific journals, the methods and statistical analyses were not described in a manner that would allow thorough evaluation. For example, an instrument that measures soot (Aethalometer) and one that measures particulate matter (DataRam) were used to evaluate exposure to DE inside school buses and in cars preceding the buses. But no information is provided about numerical averages for either type of vehicle.[47] Further, according to their report, only 4 buses were studied for up twenty hours total.[48] While this is adequate for a pilot or preliminary study, it certainly should not be used as the basis for damning all diesel school buses. We do not know the extent to which the studied buses were representative of those currently in use. For example, were they older models that hadn't been serviced recently? Would there have been similar results with newer buses? What is the typical age of buses currently being used in the area examined?

This study adds nothing to our understanding of any possible risk to children from riding in diesel-powered school buses. Even if there is a link between occupational exposure to high levels of diesel exhaust and health effects, such high exposure cannot be directly extrapolated to intermittent, lower-dose exposures, the type of exposure that children riding in buses twice per day would have. As noted above, there is not even a robust link between carcinogenicity and occupational exposure, which would certainly be greater than that of children riding a bus twice per day. The evidence simply does not support a serious risk to children's health.

PHYSICIANS COMMITTEE FOR RESPONSIBLE MEDICINE (PCRM)

Examples of PCRM targets widely covered by the media

Milk

Background

Mainstream physicians and nutritionists have, for many years, recommended that children drink milk. In addition to high-quality protein, cows' milk contains high levels of well- absorbed calcium and is typically fortified with vitamins A and D.

PCRM's Position

PCRM not only denies that milk is a health-promoting food for children (or anyone), it also asserts milk consumption can harm health, as indicated below.

Bone health. On the PCRM website, President Neal Barnard raises several objections to milk consumption.[49] For example, he states that milk intake is not important in preventing osteoporosis, and cites epidemiological studies that failed to show a significant association between dairy intake (or in some cases calcium intake) and a decreased risk of fracture.[50] [51] Barnard mentions that calcium can also be obtained from vegetable sources.

Lactose intolerance. Another objection to milk consumption listed on PCRM's website is the supposedly widespread and insurmountable problem of lactose intolerance, in which individuals are deficient in the intestinal enzyme called lactase that makes it possible to digest the milk sugar called lactose. In cases of severe lactase deficiency, consumption of large amounts of dairy products can lead to gastrointestinal bloating, diarrhea, and pain.

The website of the Physicians Committee for Responsible Medicine describes the organization as "Doctors and laypersons working together for compassionate and effective medical practice, research, and health promotion." Certainly the group's title, and to a lesser extent this description, suggest that the membership includes many, if not only physicians (http://www.pcrm.org/about/index .html). However, in 1990, in a letter to Dr. Barnard, the American Medical Association noted that: "your organization purports to speak for a majority of physicians although your membership constitutes less than half of one percent of the total physician population in this country….bonafide physicians constitute less than ten percent of your total membership." (http://naiaonline.org/body/Resources .htm)

The Scientific Evidence

Bone health: There are difficulties with the epidemiological studies that Barnard cites to support his contentions about milk and bone health. Such studies must rely on self-reports of dietary intake, or recall of intake after a disease has occurred. Further, it is widely accepted by mainstream scientists that a low calcium status early in life can result in a diminished peak bone mass and predispose a person to osteoporosis and fracture later in life.[52] Even if this benefit of drinking milk were overrated, that is not a reason to avoid its consumption. In October 2004, the Surgeon General's Report on Bone Health identified lifelong low calcium intake as a critical risk factor for osteoporosis.[53]

While it is certainly true that calcium can be obtained from vegetable sources as Barnard claims, he neglects to mention that the majority of such foods, in the amounts commonly eaten by Americans, contains less calcium than milk, and that it is not as well absorbed as calcium from milk.[54] The Surgeon General's report also noted that Americans get most of their calcium from dairy foods and that it would be difficult to obtain the recommended amounts from non-dairy sources alone.[55]

Another refutation of Barnard's claims about dairy and bone health derives from studies of the so-called DASH (Dietary Approaches to Stop Hypertension) diet. This dietary regimen was devised to investigate the effect of different dietary patterns on people with hypertension (high blood pressure). The most effective diet tested included a large proportion of vegetables and fruit; moderate portions of meat, fish, and poultry; and several servings per day of low-fat dairy products. Recent studies have demonstrated that in addition to ameliorating high blood pressure, the DASH diet, with its abundant dose of dairy, does not impair and may well benefit bone health by reducing the rate of bone turnover. This is true even when study participants do not consume very low levels of sodium or of animal protein (cited by Barnard as a cause of calcium loss in the urine). Indeed, DASH dieters consumed about 18 percent of their calories from protein, and of that protein nearly 60 percent was of animal origin.[56] Such data contradict Barnard's assertions that milk and dairy food consumption does not contribute to bone health. A more complete description of the DASH diet may be found on the website of the National Heart Lung and Blood Institute of the National Institutes of Health.[57]

Lactose intolerance: While it is true that some populations, e.g., Asians and people of color, may have a genetic predisposition to produce low levels of the enzyme

lactase, it is incorrect to assume that such individuals cannot consume any dairy products, or that others should avoid dairy foods in case they might at some point develop lactose malabsorption. In fact, careful scientific studies have demonstrated that many, if not most, lactose-intolerant people can consume up to one cup of milk at a time without uncomfortable symptoms.[58] The National Medical Association, which represents physicians of African descent in the U.S. and Caribbean, has seconded this opinion. In addition, this group noted that African Americans have a greater risk of several chronic diseases than does the general public and recommends consumption of a diet that includes ample vegetables, fruit, and low-fat milk and other dairy products.[59] Of course, there are also dairy products available that have had the lactose removed, as well as dietary aids containing the missing lactase enzyme.

"Addictive" Foods

Background

PCRM president Neal Barnard has written a book about what he calls "seductive foods."[60] Supposedly, foods containing sugar and fat, foods like chocolate, cheese and meat, set up addictions not unlike those seen with opiate drugs. In the introduction to his book, Barnard claims this view is "based on research studies that have examined how various foods affect our health and how we change from one eating pattern to another. My colleagues and I have conducted these studies over the past several years at our research center…"[61]

PCRM's Position

PCRM holds that foods like those listed above are as addictive as opiates, that consumption of such foods is thus uncontrollable and will lead to weight gain and other unhealthy consequences. Indeed, he claims that cheese contains opiate-like substances and cows' milk contains morphine. In this book, Barnard repeatedly cites a study by Drewnowski, et al., as a main support for his theories of addictive foods.[62]

The Scientific Evidence

There is no solid evidence in support of this theory. Dr. Barnard cites a particular reference from 1981 to support his claim that meat, cheese, milk, and chocolate are particularly addictive. The reference he cites as evidence did find morphine-like substances in cows' milk as well as in human milk. However, that article also states that similar morphine-like materials may be found in common plant-derived foods, such as lettuce, and may be ubiquitous dietary components.[63] [64] Thus, if meat, cheese, milk, or even chocolate are addictive because of the "opiates" they contain, apparently plant-derived foods should be considered addictive as well.

Since Dr. Barnard refers to his own research on this topic, one might reasonably expect to see a myriad of references to that research in the book. However, the only references listed that include Dr. Barnard as an author refer to weight loss on a vegetarian diet,[65] alleged medical costs related to meat-containing diets,[66] and dealing with premenstrual symptoms and particular blood proteins.[67] Further, a computer search of the scientific literature since 1992 (via Medline) did not turn up any other published studies related to food addiction that included Dr. Barnard as an author.[68]

The paper by Drewnowski, et al. that Barnard cites was published in 1992.[69] The study's purpose was to determine if opioid receptors in the brain, the type that mediate the response to drugs like morphine and heroin, were also involved in the response to highly palatable foods.

The lead author of the study, Dr. Adam Drewnowski, said that these data simply suggest a role for the opioid system in determining people's food preferences, especially those for sweet, high-fat foods, and particularly among obese and bulimic patients. He demurred at the suggestion that his data support a general concept of addictive foods, noting that the effect was seen primarily in women whose eating behavior was abnormal.[70]

Later work indicates that areas of the brain implicated in the response to opioid drugs also respond to other pleasurable modalities—even activities like gambling or anticipation of rewards. One study even found that painful temperature stimuli "lit up" the same area.[71] So it would seem that these brain areas are not simply responding to activities or substances that one might want to call "addictive." As psychiatrist Dr. Sally Satel has noted, the term "addictive" has been used so much it has become virtually meaningless.[72]

Although Dr. Barnard cites some valid scientific studies in his tome on addictive foods, he seems to interpret them in ways that support his own agenda—primarily one of *demonizing foods of animal origin*. Although Dr. Barnard refers repeatedly to studies he and colleagues have conducted, the studies have not yet appeared in the published, peer-reviewed scientific literature.

Red Meat Consumption and Colon Cancer

Background
There have been numerous epidemiological studies of the possible relationship between red meat consumption and the risk of colon cancer. Some studies have found that consumers of meat have an increased risk, but others have not. The conflicting results have been variously ascribed to differences in study populations, differences in research methodologies, and unintentional biases in the selection of participants. In early January 2005, a large, well-controlled prospective study of men and women reported that habitual heavy consumers of red and processed meats had a significantly higher risk of colon cancer than did people who consumed such foods more sparingly.[73]

PCRM's Position
In a news release, PCRM's president stated that this study "shows that the less red and processed meat people eat, the lower their risk of colon cancer."[74] In the same statement, the group also set up a false analogy between meat and tobacco: "The meat industry should be held financially responsible for a measure of the colon cancer incidence in the meat-eating population, as the tobacco industry has been for its contribution to lung cancer."

The Scientific Evidence
In fact, for people who habitually consumed large quantities of meat—over 3 pounds per week for men—there was an increased risk of colon cancer, compared to people who ate the smallest amounts. Analysis of the data, however, showed that persons who consumed moderate portions did not have a significantly increased risk.[75] This contradicts PCRM's implication that the amount of red meat consumed and the risk of colon cancer are related to each other at all levels of consumption. The real message is moderation, not avoidance. In addition, there is no similarity between the health effects of tobacco and red meat. There are no health benefits of tobacco use (especially cigarette smoking): it is linked to numerous forms of cancer, as well as emphysema, and a host of other illnesses. Conversely, red meat provides many essential nutrients such as high quality protein, vitamin B12, magnesium, and iron.

Chicken: No Part of a Healthy Diet?

Background
PCRM Magazine asserted that unlike vegetable foods, chicken—even the breast cooked without skin—has so much fat that it has to be unhealthy. In addition, this article warned that chicken, unlike plant foods, contains cholesterol, can be contaminated by bacteria such as salmonella and campylobacter, and is lacking in a number of nutrients contained in plant-derived foods such as fiber and vitamin C.[76]

PCRM's Position
Because chicken breast derives 23 percent of its calories from fat, much more than the 1 percent in a baked potato, or the 6 percent in steamed cauliflower, PCRM indicates it contains too much fat to be part of a healthful diet. The article also notes that chicken, unlike plant foods, contains cholesterol, can be contaminated by bacteria such as salmonella and campylobacter, and is lacking in a number of nutrients contained in plant-derived foods such as fiber and vitamin C. Because of these characteristics, the article advises consumers to avoid chicken.

The Scientific Evidence
PCRM is guilty of selecting data to prove its point. The article's author selected only very low-fat vegetables to compare with chicken breast. In fact, tofu (soybean curd), a favorite protein source for many vegetarians, derives approximately 57 percent of its calories from fat. Avocados, the basis of the guacamole dip common in Mexican cuisine, derive about 72 percent of their calories from fat.[77] But fat content is only one aspect to consider in deciding whether to include a food in one's diet. From a nutritional standpoint, chicken is a good source of high-quality protein and needn't be shunned because of its fat content.

The fact that chicken can be contaminated with bacteria, as can any food, should provide impetus for handling and cooking it correctly, not for avoiding its consumption. (More detailed information about avoiding foodborne illness can be found at http://www.acsh.org/publications/pubID.317/pub _detail.asp).

Although it is true that only animal foods contain cholesterol, as PCRM states, dietary cholesterol is no longer considered the major problem it once was with respect to raising blood cholesterol levels. Dietary saturated fat is more problematic, but less than one third of the fat in a chicken breast is saturated. Further, saturated fat can also be found in some plant-derived foods, such as cocoanut and palm oils, which the PCRM article fails to mention.

It is also true that chicken is not a source of dietary fiber or vitamin C; fiber is strictly a plant product. However, while disparaging chicken for its lack of some nutrients, the article fails to mention that chicken and other foods of animal origin do contain vitamin B12, which is not found in any plant products.[78]

Although the actual facts about chicken mentioned in the article are true, the article fails to put these facts into an unbiased, realistic context. PCRM's nutritional advice to consumers is unbalanced and inaccurate.

ASSESSING THE HEALTH CLAIMS OF "CONSUMER ACTIVISTS": SUGGESTIONS FOR JOURNALISTS

By presenting biased and often preliminary or inaccurate versions of scientific reports and data to the public, these groups use the media to attract consumer attention and support. By reporting their claims without asking who they are and how valid these claims are, journalists can unwittingly play into these groups' often hidden agendas, resulting in unwarranted alarm. To help journalists sort the valid science from the scams, ACSH suggests the following questions for journalists to consider asking, or at least think about, when faced with the latest claim about health threats in foods, air, water, or consumer products:

Questions for Activist Groups

- Was the study performed by an independent research group?
  - o (e.g., associated with an academic institution)?
    - ◊What is their track record on similar issues?
      Is the group listed or described by an organization that evaluates the veracity of the group or its claims (see http://www.quackwatch.org)?
- Is the group's statement about a particular study, or is it simply a press release expressing a position or opinion?
- If it's a press release, does it refer to the results of a particular study?
  - o If so, has the study been published?
  - o Or was the study presented at a scientific meeting but not yet published?
    - ◊ (Such results are usually considered preliminary, and readers should be so advised.)
  - o If it has been published, was it published by the group privately or in a respected peer-reviewed journal?
- What is significant about the timing, if anything?
  - o Is the release timed to coincide with any legislative discussion or decision?
- Does the group call for an extreme response, such as withdrawal of a product or a generalized warning, and are there other studies supporting such an action?
- Was the study performed on animals or humans?
  - o If an animal study, why is it relevant to humans?
- Do the results of this study agree with the current consensus in the scientific literature?
  - o If not, why not—and what is the evidence that these contradictory results should be accepted?

Answers to questions such as these should assist the journalist (or his or her editor) in deciding how to "pitch" his or her presentation of the story—or indeed, whether it's worth presenting at all. More emphasis on the scientific validity of advocacy groups' reports and statements will improve the quality of information about various health and safety issues presented to the public.

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APPENDIX: THE GROUPS—BACKGROUND INFORMATION

Organization: Center for Science in the Public Interest (CSPI)
Year Founded: 1971
Executive Director and Founder: Michael Jacobson, Ph.D.
Board of Directors:

- Anne Bancroft, actress
- William Corr, Executive Vice President, Campaign for Tobacco-Free Kids
- David Hensler, Attorney, Hogan and Hartson, Washington, DC
- Mark Ingram, President, Ingram CPA Review
- Diane MacEachern, Author of several environmental/activist books. Also involved with NRDC. Co-founder of Vanguard Communications, a PR/Marketing firm.
- Mark Ordan, Founder, Fresh Fields food markets. Owner of Sutton Place Gourmet and Balducci's markets; CEO Bethesda (MD) Retail Partners LLC
- Kathleen O'Reilly, Former executive director, Consumer Federation of America; former consumer/legal correspondent, NBC's Today show
- James Sullivan, Director, USAID Office of Energy
- Deborah Szekely, President, Szekely Family Foundation; board member, Partners for Livable Communities, 1984-90; president & CEO, Inter-American Foundation; businesswoman, founded Rancho La Puerta health spas

Other Advisors/Area Directors:

- John Banzhaf III, Professor of Public Interest Law, George Washington University Law School. Best known for successful tobacco litigation.
- Kelly Brownell, Ph.D., Professor of Psychology, Yale University; partners with Michael Jacobson in promot ing "Twinkie taxes" on high fat and "junk foods"
- Margo Wootan, D.Sc., Director of Nutrition Policy for CSPI. Supports obesity lawsuits, using tobacco suits as models.
- Stephen Havas, M.D., M.P.H., M.S., Professor of epidemiology, University of Maryland at Baltimore School of Medicine
- David Jacobs, Ph.D., Professor of epidemiology, University of Minnesota; biostatistician and cardio vascular epidemiologist.
- Norman Kaplan, M.D.,Professor of Medicine, University of Texas Southwest Medical Center

Mandate/Goals: to "conduct innovative research and advocacy programs in health and nutrition and to provide consumers with current, useful information about their health and well-being." (www.cspinet.org/about/mission.html)
Budget and Sources of Support: According to ActivistCash.com, for the tax year ending 6/30/02, CSPI reported income of $13.99 million, expenditures of $13.67 million, and a net worth of $9.21 million. Support comes from subscriptions to monthly *Nutrition Action Healthletter* and grants from numerous private foundations and activist groups, including:

- The Robert Wood Johnson Foundation ($2.2 million between 1994-2001)
- The Park Foundation ($1.16 million 1996-2002)
- The Philanthropic Ventures Fund ($516,450 1997-2002)
- Environmental Defense (over $50,000, 2000-2001)
- The Tides Foundation and Tides Center (over $50,000, 2000-2001)

Organization: Environmental Working Group (EWG)
Year Founded: 1993, but not independently incorporated until 1999
Executive Director and Founder: Kenneth Cook
Board of Directors:

- Kenneth Cook, past lobbyist and press director, World Wildlife Federation; Vice President for Policy of the Center for Resource Economics; board member, Environmental Media Services
- Drummond Pike, President, Tides Center; President, founder, Tides Foundation; Founder, eGrants.org; Director and shareholder, Working Assets Funding Service[1]
- Sandy Buchanan, Executive Director of Ohio Citizen Action, consumer and environmental organization[2]
- Charlotte Brody, RN, Chairwoman, EWG; Co-coordinator, Healthcare Without Harm Campaign; Former director, Planned Parenthood of North Carolina; Organizing director, Center for Health, Environment, & Justice
- David Fenton, founder, Fenton Communications, PR firm that designed and implemented the anti-Alar scare in 1989; co-founder, Environmental Media Services; co-founder, New Economy Communications; former PR director, Rolling Stone magazine. Also employed by the NRDC, Greenpeace, and Organic Consumers Association.
- David B. Baker, Sr., Founder (1998), Executive Director, and Chair of the Board of Community Against Pollution, grassroots organization dealing with PCBs and Superfund site in Anniston, AL
- Cari Rudd, Strategic Communications Consultant, Arlington, VA
- Other Advisors: "A team of scientists, engineers, policy experts, lawyers, and computer programmers."[3]

Mandate/Goals: "to expose threats to your health and the environment, and to find solutions"; EWG says that it is "dedicated to using the power of information to protect human health and the environment."
Sources of Support: Private donations, private charitable foundations, and "select corporations":
In tax year 2001, EWG reported an income of over $2.2 million and a net worth of approximately $1.4 million. Between 1991 and 2002, the Joyce Foundation gave over $5 million to EWG. Other top funders include the Ford Foundation ($3.4 million 1989-1998), the Blue Moon Fund ($2.8 million from 1998-2002), the Pew Charitable Trusts ($1.9 million from 1990-1997), and the Association of Trial Lawyers of America ($176,000 in 2003).

Organization: Natural Resources Defense Council (NRDC)
Year Founded: 1970
President: John H. Adams
Board of Directors:

- John H. Adams, President and Co-Founder; former Assistant U.S. Attorney General (NY); Director, Winston Foundation for World Peace; Trustee, American Conservation Society; Chairman of the Board, Open Space Institute[4]
- Frances Beinecke, Executive Director; MFS and BA, Yale University; co-founder, the New York League of Conservation Voters; Member of the Board of: Yale Corporation, World Resources Institute, China-US Center for sustainable Development, American Conservation Association, Ethical Culture Fieldston School[5]
- Richard E. Ayres, Trustee; Partner, Howrey & Simon; former chairman, National Clean Air Coalition; Aryes Law Group[6]
- Linda Greer, Health & Environment Program Director; formerly Technical Director at the Hazardous Waste Treatment Council in Washington, DC[7]
- Alan Metrick, Director of Communications; former partner, the PR Consulting Group (New York City); Former Executive Vice President, David M. Grant, Inc.[8]
- Robert Redford, Trustee; actor, director, and conservationist; Manager, the Redford Foundation[9]
- Laurance Rockefeller, Trustee; President, American Conservation Association; trustee of the Laurance Rockefeller Charitable Trust; Former chairman, Rockefeller Brothers' Fund; Former chairman, Citizens' Advisory Committee on Environmental Quality; Private philanthropist[10]
- Kathleen Scheg, National legislative director; Legislative counsel for Action on Smoking and Health (ASH)[11]
- Frederick A.O. Schwartz, Jr., Chairman of the Board; Partner, Cravath Swaine & Moore; former New York City Corporation counsel[12]
- Gregory Wetstone, Director of Programs; former environmental chief counsel, U.S. Congressional Health and Environment Subcommittee; author, *Acid Rain in Europe and North America*; was involved in drafting Clean Air Act Amendments of 1990, the Safe Drinking Water Act Amendments of 1986, and the Superfund Amendments and Reauthorization Act[13]

Mandate/Goals: Organization's purpose is "to safeguard the Earth: its people, its plants and animals, and the natural systems on which all life depends."
"Litigation has always been a cornerstone of NRDC's success," according to the website, and they sue in both federal and state jurisdictions.[14]
Sources of Support: For the tax year ending 6/30/2003, NRDC reported income of approximately $49.3 million, expenditures of $43.4 million, and a net worth of $71.3 million. Support includes:

- $770,000 from the Pew Charitable Trusts in 1999 for monitoring and implementation of the 1996 Food Quality Protection Act;
- $200,000 from the Joyce Foundation in 1999 to track and participate in implementation of federal law addressing the toxicity of pesticides for children's health.
- In 1997 the U.S. EPA funded a small grant to educate the public about the impact of livestock waste on waterways.
- The Pew Charitable Trusts donated over $11 million between 1991 and 2000. Between 1989 and 2002, the Joyce Foundation provided over $3.3 million for a variety of projects.
- The Tides Foundation and Tides Center gave over $460,000 between 1991 and 2002.
- The National Audubon Society and the National Environmental Trust between them provided nearly a quarter of a million dollars between 1999 and 2001.

Organization: Physicians Committee For Responsible Medicine (PCRM)
Year Founded: 1985
President: Neal Barnard, M.D.; Psychiatrist, Adjunct Associate Professor of Medicine, George Washington University School of Medicine and Health Sciences; President, PETA Foundation (also known as the Foundation to Support Animal Protection).[15]
Advisory Panel:

- T. Colin Campbell, Ph.D., Jacob Gould Schurman Professor of Nutritional Biochemistry, Cornell University; past senior science advisor to the American Institute for Cancer Research and the World Cancer Research Fund[16]
- Caldwell B. Esselstyn, Jr., M.D., Preventive cardiology consultant, Cleveland Clinic Foundation, Cleveland Clinic; Past President, American Association of Endocrine Surgeons[17]
- Suzanne Havala, Ph.D., M.S., R.D., L.D.N., F.A.D.A.; Nutrition advisor to the Vegetarian Resource Group; Member, the American Dietetic Association, National Association of Science Writers[18]
- Henry J. Heimlich, M.D., Sc.D.; in 1974 published research on the Heimlich Maneuver; 1984, received the Albert Lasker Award[19]
- Lawrence Kushi, Sc.D., Professor of Education, Columbia University Teachers' College; nutritional epidemiologist[20]
- Virginia Messina, M.P.H., R.D., vegetarian dietitia; formerly nutrition specialist for the Michigan Coopertive Extension Service; co-founder of journal *Vegetarian Nutrition: An International Journal*[21]
- John McDougall, M.D., Founder of the McDougall Weight Loss Plan; promotes diet plan based on very low fat (<10% of calories from fat), vegetarian diet[22]
- Milton Mills, M.D, Associate Director of Preventative Medicine; claims that U.S. Dietary Guidelines are racially and ethnically biased, since they promote consumption of dairy foods[23]
- Dean Ornish, M.D.; Advisory Board member, EarthSave International; Founder, president, and director of the non-profit Preventive Medicine Research Institute; Clinical Professor of Medicine at UCSF[24]
- Myriam Parham, R.D., L.D., C.D.E., President, Florida Voices for Animals; vegetarian dietitian; Chief Clinical Dietitian & Certified Diabetes Educator at the East Pasco Medical Center, Seventh Day Adventist Hospital[25]
- William Roberts, M.D, Executive Director, Baylor University Cardiovascular Institute; Editor, American Journal of Cardiology[26]
- Andrew Weil, M.D.; Advisory Board member, EarthSave International; clinical professor of internal medicine and founder and director of the Program in Integrative Medicine at the University of Arizona's Health Sciences Center[27]

Mandate/goals: According to the PCRM website, the organization is composed of "Doctors and laypersons working together for compassionate and effective medical practice, research, and health promotion." The group supports efforts to reduce or eliminate the use of animals in medical research and promotes vegan diets.
Sources of Support: For the tax year ending 7/31/2002, PCRM reported income of $3.3 million, expenditures of $2.7 million, and a net worth of $887,000.[28] PCRM's top funders include:

- The PETA Foundation (nearly $600,000 between 1999 and 2000)
- The Glaser Progress Foundation donated over $300,000 between 2000 and 2002
- The Alexander Foundation gave over $191,0000 between 1998 and 2002
- The Animal Charities of America gave nearly $190,000 between 1997 and 2001
- The New England Anti-Vivisection Society gave $535,000 between1989 and 1998
- PETA: gave PCRM over $265,000 between 1988 and 1999

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