



How dietary guidelines are out of step with science

It has a big impact on the diet of American citizens, and those of most Western nations, so why does the expert advice underpinning US government dietary guidelines not take account of all the relevant scientific evidence? **Nina Teicholz** reports

The expert report underpinning the next set of US Dietary Guidelines for Americans fails to reflect much relevant scientific literature in its reviews of crucial topics and therefore risks giving a misleading picture, an investigation by *The BMJ* has found. The omissions seem to suggest a reluctance by the committee behind the report to consider any evidence that contradicts the last 35 years of nutritional advice.

Issued once every five years, the guidelines have a big influence on diet in the US, determining nutrition education, food labelling, government research priorities at the National Institutes of Health, and public feeding programmes, which are used by about a quarter of Americans each year.¹ The guidelines, which were first issued in 1980, have also driven nutrition policy globally, with most Western nations subsequently adopting similar advice.

The guidelines are based on a report produced by an advisory committee—a group of 11-15 experts who are appointed to review the best and most current science to make nutrition recommendations that both promote health and fight disease. The committee's latest report was published in February² and is under review by the

government's health and agricultural agencies, which will finalise the guidelines in the autumn.

Concern about this year's report has been unprecedented, with some 29 000 public comments submitted compared with only 2000 in 2010. In recent months, as government officials convert the scientific report into the guidelines, Congress has sought to intervene.

A Congressional hearing on the guidelines is scheduled for October, when two cabinet secretaries are to testify.

Is the report scientific?

The BMJ has found that the committee's report used weak scientific standards, reversing recent efforts by the government to strengthen the scientific review process. This backsliding seems to have made the report vulnerable to internal bias as well as outside agendas.

The 2015 report openly states that the committee abandoned established methods for most of its analyses. Since its inception, the guideline process has suffered from a lack of rigorous methods for reviewing the science on nutrition and disease, but a major effort was undertaken in 2010 to implement systematic reviews of studies to bring scientific rigour and transpar-

ency to the review process. The government set up the Nutrition Evidence Library (NEL) to help conduct systematic reviews using a standardised process for identifying, selecting, and evaluating relevant studies.³

However, in its 2015 report the committee stated that it did not use NEL reviews for more than 70% of the topics, including some of the most controversial issues in nutrition.⁴ Instead, it relied on systematic reviews by external professional associations, almost exclusively the American Heart Association (AHA) and the American College of Cardiology (ACC), or conducted ad hoc examination of the scientific literature without well defined systematic criteria for how studies or outside review papers were identified, selected, or evaluated.

Use of external reviews by professional associations is problematic because these groups conduct literature reviews according to different standards and are supported by food and drug companies. The ACC reports receiving 38% of its revenue from industry in 2012, and the AHA reported 20% of revenue from industry in 2014. Potential conflicts of interest include, for instance, decades of support from vegetable oil manufacturers, whose products

WHAT YOU NEED TO KNOW



- The latest dietary guidelines for Americans are imminent and will affect the diet of tens of millions of citizens, as well as food labelling, education, and research priorities. In the past most Western nations have adopted similar dietary advice
- The scientific committee advising the US government has not used standard methods for most of its analyses and instead relies heavily on systematic reviews from professional bodies such as the American Heart Association and the American College of Cardiology, which are heavily supported by food and drug companies. The committee members, who are not required to list their potential conflicts of interest, also conducted ad hoc reviews of the literature, without defining criteria for identifying or evaluating studies
- This year in its report to government, the committee largely sticks to the same advice it has given for decades—to eat less fat and fewer animal products and eat more plant foods for good health. But this decision to keep with the status quo fails to reflect much of the current, relevant science. Exceptions include a proposal for a cap on sugar intake
- The committee recommends three diets to promote better health, again without the accompanying rigorous evidence
- The US Congress has stepped in, after 29 000 public comments to the proposed guidelines with a hearing scheduled in October



The committee's approach to the evidence on saturated fats and low carbohydrate diets reflects an apparent failure to address any evidence that contradicts what has been official nutritional advice for the past 35 years

the AHA has long promoted for cardiovascular health. This reliance on industry backed groups clearly undermines the credibility of the government report.

Saturated fats

On saturated fats, for example, the committee did not ask the NEL to conduct a formal review of the literature from the past five years, even though this topic clearly merited re-examination. When the committee started its work in 2013, there had been several prominent papers, including a meta-analysis⁵ and two major reviews (one systematic)^{6,7} that failed to confirm an association between saturated fats and heart disease.

Restrictions on saturated fats have been a foundation of nutrition policy since the first guidelines in 1980 and have had a dominant role in determining which foods, such as low fat dairy and lean meats, are considered “healthy.” Instead of requesting a new NEL review for the recent literature on this crucial topic, however, the 2015 committee recommended extending the current cap on saturated fats, at 10% of calories, based on a review by the AHA and ACC,⁸ a 2010 NEL review, and the 2015 committee’s ad hoc selection of seven review papers.⁹

The NEL systematic review on saturated fats from 2010¹⁰ covers only the literature published from 2004 to 2009. Significantly, this review omits a large controlled clinical trial, the Women’s Health Initiative, which included nearly 49 000 people and achieved a significantly lower intake of saturated fat in the intervention group yet, compared with controls, observed no benefits for this group in incidence of fatal and non-fatal coronary heart disease events and total cardiovascular disease, including stroke.¹¹

Papers on saturated fats published since 2010 were covered by the committee’s ad hoc review, which did not use a systematic method to select or evaluate studies. Three meta-analyses concluded that saturated fats did not increase cardiovascular mortality,^{14,15,16} but the committee downplays these findings. And two other included meta-analyses had mixed results: sat-

urated fats generally looked more atherogenic than polyunsaturated fats but less atherogenic than carbohydrates or monounsaturated fat.^{17,18} Despite this conflicting evidence, however, the committee’s report concludes that the evidence linking consumption of saturated fats to cardiovascular disease is “strong.”

Low carbohydrate diets

Another important topic that was insufficiently reviewed is the efficacy of low carbohydrate diets. Again, the 2015 committee did not request a NEL systematic review of the literature from the past five years. The report says that this was because, after conducting “exploratory searches” of the literature since 2000, the committee could find “only limited evidence [on] low-carbohydrate diets and health, particularly evidence derived from US based populations.”²⁷

The report provides no documentation of these “exploratory searches,” yet many studies of carbohydrate restriction have been published in peer review journals since 2000, nearly all of which were in US populations. These include nine pilot studies, 11 case studies, 19 observational studies, and at least 74 randomised controlled trials, 32 of which lasted six months or longer. A meta-analysis and a critical review have concluded that low carbohydrate diets are better than other nutritional approaches for controlling type 2 diabetes,^{28,29} and two meta-analyses have concluded that a moderate to strict low carbohydrate diet is highly effective for achieving weight loss and improving most heart disease risk factors in the short term (six months).^{30,31} A recent meta-analysis found that if carbohydrates are kept “very low,” weight loss is greater than with a low fat diet maintained for a year.³² Given the growing toll taken by these conditions and the failure of existing strategies to make meaningful progress in fighting obesity and diabetes to date, one might expect the guideline committee to welcome any new, promising dietary strategies. It is thus surprising that the studies listed above were considered insufficient to warrant a review.

New strategies

The committee’s approach to the evidence on saturated fats and low carbohydrate diets reflects an apparent failure to address any evidence that contradicts what has been official nutritional advice for the past 35 years. The foundation of that advice has been to recommend eating less fat and fewer animal products (meat, dairy, eggs) while shifting calorie intake towards more plant

foods (fruits, vegetables, grains, and vegetable oils) for good health. And in the past decades, this advice has remained virtually unchanged.³³

Because the guidelines have obviously not led to better health, however, there has been a need to find new strategies to tackle nutrition related diseases. The committee’s new proposal for a cap on sugar consumption is one idea. The committee’s most significant shift, which began in 2010, however, has been to redouble its efforts towards emphasising a plant based diet. This can be seen in a number of ways in the 2015 report, none of which is supported by strong evidence.

New proposals by the 2015 report include not only deleting meat from the list of foods recommended as part of its healthy diets, but also actively counselling reductions in “red and processed meats.”³⁴ This advice has been the subject of much debate, which guideline supporters have successfully characterised as a conflict between the self interested meat industry versus virtuous efforts to safeguard health (and the environment).^{35,36} Yet framed this way, the debate fails to address the question fundamental to nutrition: would reducing meat lead to better health? Consulting the NEL for a review on this topic turns up a surprising fact: a systematic review on health and red meat has not been done. Although several analyses look at “animal protein products,” these reviews include eggs, fish, and dairy and therefore do not isolate the health effects of red meat, or meat of any kind.³⁷

Recommended diets

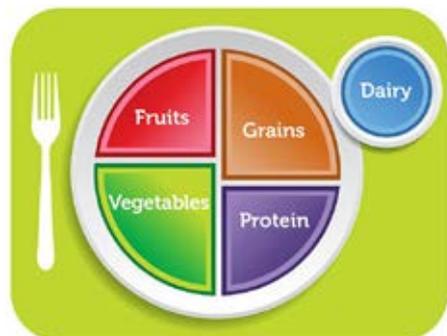
Another clear move towards a plant based approach in the report is the introduction of the “healthy vegetarian diet” as one of three recommended diets (the others are: “healthy Mediterranean-style” and “healthy US-style”).² A NEL review of a healthy vegetarian diet does exist, but it concludes that the evidence for this diet’s disease fighting powers is only “limited,” which is the lowest rank for available data.⁴⁰

In general, the quality of the evidence supporting the report’s three recommended diets is limited. The NEL review found only “limited” or “insufficient” evidence that the diets could combat diabetes.⁴² In a highly unorthodox move, the guideline committee over-ruled the NEL’s systematic reviews on this topic and decided to upgrade the rank to “moderate,” based on its opinion that one review paper on observational data, which showed positive results, was particularly strong.

And are the recommended diets better than other diets in helping people lose weight? On this

bmj.com

- Analysis: The science of obesity: what do we really know about what makes us fat? (*BMJ* 2013;346:f1050)
- Link to Diet specialty page <http://www.bmj.com/specialties/diet>
- Editorials: Where the latest US dietary guidelines are heading (*BMJ* 2015;351:h4034)



For decades, the US dietary guidelines have recommended eating less fat and fewer animal products, including dairy

question, the report ranked the evidence as moderate, yet to support this claim, it presents only a single clinical trial in 180 people with metabolic syndrome, which found the Mediterranean diet produced more weight loss than a low fat diet.⁴³

In conclusion, the recommended diets are supported by a minuscule quantity of rigorous evidence that only marginally supports claims that these diets can promote better health than alternatives. Furthermore, the NEL reviews of the recommended diets discount or omit important data. There have been, at a minimum, three National Institutes of Health funded trials on some 50000 people showing that a diet low in fat and saturated fat is ineffective for fighting heart disease, obesity, diabetes, or cancer.^{46 11 55-59} Two of these trials are omitted from the NEL review.^{55 56} The third trial is included, but its results are ignored.

Questions about bias

The overall lack of sound science and proper methods in the 2015 report could be seen as a reluctance to depart from existing dietary recommendations. Many experts, institutions, and industries have an interest in keeping the status quo advice, and these interests create a bias in its favour. Abandoning the NEL review methods, as the 2015 committee has done, opens the door not only for bias but also for influence from outside agendas and commercial interests, and all of these can be observed in the report.

Much has been written about how industries try to influence nutrition policy, so it is surprising that, unlike authors in most major medical journals, guideline committee members are not required to list their potential conflicts of interest. A cursory investigation shows several such possi-

ble conflicts: one member has received research funding from the California Walnut Commission⁶¹ and the Tree Nut Council,⁶² as well as vegetable oil giants Bunge and Unilever.^{63 64} Another has received more than \$10 000 (£6400) from Luminari, which produces health related multimedia content for General Mills, PepsiCo, Stonyfield Farm, Newman's Own, and "other companies."⁶⁵ And for the first time, the committee chair comes not from a university but from industry: Barbara Millen is president of Millennium Prevention, a company based in Westwood, MA, that sells web based platforms and mobile applications for self health monitoring. While there is no evidence that these potential conflicts of interest influenced the committee members, the report recommends a high consumption of vegetable oils and nuts as well as use of self monitoring technologies in programmes for weight management.

Still, it's important to note that in a field where public research dollars are scarce, nearly all nutrition scientists accept funding from industry. Of far greater influence is likely to be bias in favour of an institutionalised hypothesis as well as a "white hat" bias to distort information for what is perceived as righteous ends.⁶⁶

The report is highly confident that its findings are supported by good science, stating that "The evidence base has never been stronger to guide solutions."² Millen told *The BMJ*, "You don't simply answer these questions on the basis of the NEL. Where we didn't feel we needed to, we didn't do them. On topics where there were existing comprehensive guidelines, we didn't do them. We used those resources and that time to cover other questions. The notion

that every question that we posed should have a NEL is flawed." She said she would "go to the mat" to defend the committee's approach.

"That's why you have an expert committee . . . to bring expertise," including "our own original analyses."

"These folks know how to do this work. People who criticise this are coming from the point of view that they don't like the answer. They don't like the fact that randomised controlled trials testing these dietary patterns are successful. I think you have to read the report. NEL helped us to do the searches to update the literature. That is stated. If it doesn't satisfy you, that is all I can say. It's well stated and been reviewed by dozens of people."

On saturated fats, especially, she said, "We thought we nailed it." Millen said that her committee's work had not been entirely without methodology but had "worked with the NEL and USDA assistance to identify the research literature." She said that "it was clear that polyunsaturated fats reduced heart disease risk and mortality, yet that the "evidence is not as clear on whether replacement of saturated fat with monounsaturated fats or carbohydrates reduces cardiovascular disease risk, and likely depends on the type and source."

On diets low in carbohydrates, she said that there was "not substantial evidence" to consider. "Many popular diets don't have evidence. But can you achieve healthiness, the answer is yes."

Regarding the committee's conflicts of interest, she said that members were vetted by counsel to the federal government. She would not reveal details of her company's activities. Critics of the report, she said, "are coming from the point of view that they don't like the answer."

Yet given the ever increasing toll of obesity, diabetes, and heart disease, and the failure of existing strategies to make inroads in fighting these diseases, there is an urgent need to provide nutritional advice based on sound science. It may be time to ask our authorities to convene an unbiased and balanced panel of scientists to undertake a comprehensive review, in order to ensure that selection of the dietary guidelines committee becomes more transparent, with better disclosure of the conflicts of interest, and that the most rigorous scientific evidence is reliably used to produce the best possible nutrition policy.

Nina Teicholz is a journalist, New York City, USA
teicholz@gmail.com

Cite this as: *BMJ* 2015;351:h4962

