



Guest Editorial

Are disclosures in nutrition research really any different?

This past December, the *Journal of the American Medical Association (JAMA)* published a Viewpoint entitled 'Disclosures in nutrition research: why it is different' by Ioannidis & Trepanowski⁽¹⁾. In that Viewpoint, the authors assert that health benefits of specific dietary modifications are trivial or non-existent and that special consideration is required in dealing with potential conflict of interest in the discipline of nutrition research. It was surprising to see this perspective being put forward by a scientist of Dr Ioannidis' stature, especially given that the prestigious C.F. Rehnberg Chair in Disease Prevention, a position held by Dr Ioannidis at Stanford University, was endowed by (in addition to the Rehnberg family) the Nutrilite Foundation and Amway Corporation⁽²⁾. Rehnberg's strong belief in the linkages between dietary supplements and health led to his development of one of the earliest multivitamins and the subsequent formation of the NUTRILITE line of food supplements⁽³⁾, the sale of which is a core business activity of Amway. The intent of this guest editorial is to provide a counterpoint to the opinion of these authors, challenging both the assertion that the impact of dietary behaviour change upon health is not substantial, and the notion that conflict of interest issues are different in nutrition science than with other disciplines.

The importance of dietary change on health has been demonstrated clearly and consistently over a very long period of time. The eradication of micronutrient deficiency diseases including rickets, goitre and pellagra in North America more than a century ago were some of the earliest successes in this regard; in the ensuing decades many more diet-related improvements have positively impacted personal and public health as demonstrated by several landmark studies including (to name a few) the Lyon Heart Study and PREDIMED Study. These achievements represented a massive but perhaps largely forgotten step forward in nutrition research targeted to improving health. Perhaps the earliest randomised controlled trial (RCT) was a dietary one performed by the surgeon Captain James Lind of the British Royal Navy, who demonstrated the therapeutic effect of citrus in eliminating scurvy among sailors. In more modern times, health claim regulatory frameworks devised around the world now inform through authoritative statements regarding health benefits of foods based on rigorous evaluation systems for high-quality RCT. For instance, plant sterol health claims permitted in numerous global jurisdictions are based on almost 200 carefully controlled RCT now support the use of this food ingredient to achieve an LDL-cholesterol

lowering level of 10% – certainly not a trivial health benefit. Similarly, combining sterols with other dietary ingredients such as nuts, viscous fibre, and soya protein has been shown empirically to lower circulating LDL-cholesterol concentrations⁽⁴⁾ as substantially as results reported with use of statin drugs⁽⁵⁾.

Such diet-based approaches avoid prolonged usage of expensive pharmaceutical treatments along with their not-infrequent side effects. Numerous health claims for foods exist globally, authorised by groups of experts who have critically evaluated the science and arrived at significant consensus supporting the benefits of nutritional interventions. Such food-borne health claims are not based on observational data, as asserted by Ioannidis & Trepanowski, but rather on evidence-linked RCT platforms equally robust and similar to those found in other domains of science. Accordingly, the assertion that nutrition research has little effect in advancing public health is not only incorrect, but also dangerous insofar as it casts doubt and suggests to the public that it has little control over and responsibility for its own health, and that physician-prescribed medication use is the only solution.

Benefits of dietary improvements extend well beyond positive impacts upon personal and public health. For instance, the impact of nutrition change in reducing healthcare costs has been assessed in a number of studies – one recent example showed that monetising dietary substitution to emulate the Mediterranean diet provides annual savings to the US healthcare system of more than US\$60B as a result of reduced prevalence of CVD⁽⁶⁾. Similarly, analysis carried out using a four-step Markov model approach to calculate the savings to the publicly funded healthcare system resulting from the use of plant sterols in Canada suggests an offset of as high as \$2.45B per year, accounting for a non-trivial proportion of that country's single-payer healthcare budget⁽⁷⁾. Extensions of that approach have explored healthcare cost savings associated with the consumption of pulse crops⁽⁸⁾ and dietary fibre^(9,10). Benefits from better health outcomes go well beyond these healthcare cost reductions; for example the human social element of avoiding disease in loved ones, while not easily monetised, is considerable. The importance of disease prevention through changing diet simply cannot be viewed as contentious through this lens. Diet-based potential savings to global healthcare costs have the potential to be substantial, and should be recognised as such. Accordingly, suggesting that the potential impact of nutrition research is trivial is simply inaccurate.

With respect to Ioannidis & Trepanowski's second contention – that nutrition scientists should be held to a higher standard with respect to disclosure rules – research within the nutrition domain is no different than other disciplines with respect to the effects of potential conflicts of interest. For example, large food companies supporting research are in no more of an advantageous position than are pharmaceutical companies with respect to the mechanisms through which large multi-centre trials are supported, managed and reported. Whether testing foods or drugs, the opportunity for bias and personal gain is an ever-present threat as both are huge, for-profit industries, and it is unreasonable to assert that such tendencies are greater in nutritional sciences compared to any other area. In addition, the notion that financial gains from writing books are particularly lucrative in nutrition compared to other fields is demonstrably false; the struggling, famished writer may be an overused stereotype but it is often true – and nutrition is well down the list in terms of author profitability. Moreover, writers who do reach the stage of profitability are rarely those engaged in nutrition research.

Ioannidis & Trepanowski's final assertion – that a nutrition researcher's own religious or personal belief will engender bias – is again no more of an issue for food than it is for other lifestyle behaviours. One would not assume that an exercise physiologist will produce biased research because she uses a bicycle instead of a car to commute to work, or that pharmaceutical science researchers become biased through their personal decisions to use medicines. Similarly, no rationale exists to place nutritional scientists in any different category than their colleagues who share a diversity of views within their own areas of specialty. As any researcher understands, the scientific method is based upon the principle that novel and significant scientific discoveries will be replicated and validated – so it is in the core interest of those conducting research to ensure that bias is avoided to ensure results can be reproduced. This is not to say that biased as well as fraudulent science is unavoidable; these unfortunate tendencies are a regrettable part of human nature. However, it is neither fair nor accurate to single out nutrition research as being any more or less vulnerable to bias or fraud than other fields of science. Because members of the population have to eat, while only a relatively small proportion require pharmaceuticals to sustain life, small changes in diet can make a huge overall difference. For example, a 5–10% reduction in some adverse health condition attributable to diet across an entire population will potentially save many lives in the absolute sense. Such changes are small in a percentage sense, but nevertheless worthwhile, causing nutritional scientists to pursue small percentage differences in areas where there is considerable background noise. A potential solution may be to mount larger studies, as Ioannidis has previously noted⁽¹¹⁾.

Unfortunately, however, scant federal funding exists for nutrition-related research, and the food industry in general is not as blessed from a profitability perspective as the drug industry. This hampers the former's ability to engage in long-term planning and expend significant levels of funding to the extent that the

latter is able. For example, over 250 000 participants have been randomised to statin trials, with individual trial tallies of 6000–10 000 participants. By comparison, dietary investigators consider themselves lucky if they can run a diet trial with 100–300 participants. It is therefore important not to confuse the ability to come to a definitive conclusion using data from a large trial with the fiscal constraints associated with underfunded dietary trials where the outcomes could be compromised.

In summary, the impact of nutrition on health and wellness of both individuals and society as a whole has been, and will continue to be, enormous. Those who carry out this important research are no different from researchers in other disciplines in terms of their predisposition to bias. All prudent scientists need to be wary that their results will eventually need to be replicated by others through the passage of time. Accordingly, it is our position that Ioannidis & Trepanowski's *JAMA* Viewpoint diminishes the stature of nutrition as a determinant of health and should appreciate that the same standards of conflict of interest apply evenly across multiple disciplines of science, including nutrition.

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References

1. Ioannidis JPA & Trepanowski JF (2018) Disclosures in nutrition research: why it is different. *JAMA* **319**, 547–548.
2. Stanford Prevention Research Center (2018) Support and endowment. <https://prevention.stanford.edu/about/support.html> (accessed April 2018).
3. Amway (2018) History of Nutrilite. <http://www.amway.ca/nutrition/nutrilite/about-nutrilite/nutrilite-history> (accessed April 2018).





4. Jenkins DJ, Jones PJ & Lamarche B (2011) Effect of a dietary portfolio of cholesterol-lowering foods given at 2 levels of intensity of dietary advice on serum lipids in hyperlipidemia: a randomized controlled trial. *JAMA* **306**, 831–839.
5. Jenkins DJ, Kendall CW & Marchie A (2003) Effects of a dietary portfolio of cholesterol-lowering foods *vs* lovastatin on serum lipids and C-reactive protein. *JAMA* **290**, 502–510.
6. Abdullah MMH, Jones JPH & Jones PJH (2015) Economic benefits of the Mediterranean-style diet consumption in Canada and the United States. *Food Nutr Res* **59**, 27541.
7. Gyles CL, Carlberg JG, Gustafson J, *et al.* (2010) Economic valuation of the potential health benefits from foods enriched with plant sterols in Canada. *Food Nutr Res* **54**, 54113.
8. Abdullah MMH, Marinangeli CPF, Carlberg JG, *et al.* (2017) Canadian potential healthcare and society cost savings from consumption of pulses: a cost-of-illness analysis. *Nutrients* **9**, 793.
9. Abdullah MMH, Gyles CL, Marinangeli CPF, *et al.* (2015) Dietary fibre intakes and reduction in functional constipation rates among Canadian adults: a cost-of-illness analysis. *Food Nutr Res* **59**, 28646.
10. Abdullah MMH, Gyles CL, Marinangeli CPF, *et al.* (2015) Cost-of-illness analysis reveals potential healthcare savings with reductions in type 2 diabetes and cardiovascular disease following recommended intakes of dietary fibre in Canada. *Front Pharm* **11**, 167.
11. Ioannidis JP (2013) Implausible results in human nutrition research. *BMJ* **347**, f6698.