

Reviewer's report

Title: Trends in sugar supply and consumption in Australia: Is there an Australian Paradox?

Version: 2 **Date:** 16 December 2012

Reviewer: Alan Barclay

Reviewer's report:

Trends in sugar supply and consumption in Australia: Is there an Australian Paradox?

Thank you for addressing many of the issues raised in the first round of reviews. Some, but not all, of the responses have improved the document, and some of the responses in your rebuttal and changes to the manuscript have raised some additional questions that now need to be addressed.

Do the title and abstract accurately convey what has been found?

1. Title – page 2

Minor Essential Revisions

The title does not accurately reflect this piece of research – it has not addressed all three lines of evidence presented by Barclay and Brand-Miller in their two papers *The Australian Paradox*(i) and *The Australian Paradox Revisited*(ii). The title should therefore be changed to reflect this. A more accurate title would be “Some apparent trends in sugar supply and consumption in Australia”.

i. Barclay AW, Brand-Miller J: *The Australian paradox: a substantial decline in sugars intake over the same timeframe that overweight and obesity have increased*. *Nutrients* 2011,3(4):491-504.

ii. Barclay AW, Brand-Miller J: *The Australian Paradox Revisited*. *Nutrients* 30 March 2012.

2. Abstract – page 2

Major Compulsory Revisions

It is both stated (e.g., “incomplete data”) and inferred (e.g., “data limitations”) that the data in *The Australian Paradox* were incomplete, and that imported foods were ignored. This is incorrect. Additional data in *The Australian Paradox Revisited* have not been referenced.

There is a confusion of terms in the abstract, and throughout the text with respect to total (naturally occurring and added) versus added sugars, and the different types of sugars (e.g., sucrose versus others). From your rebuttal and revised manuscript, it appears that you may be focusing on total (naturally occurring and

added) sucrose, but this is not clearly articulated.

The results in your abstract focus simply on your estimates of increasing imports. The background consumption of locally produced sucrose both in pure form and in locally manufactured foods has been declining and this should be stated in the abstract. As a result, the conclusion is based on your incomplete data and misleading.

Please revise the abstract taking these important points into consideration.

Is the question posed by the authors well defined?

3. Background – page 3

Minor Essential Revisions

In the 4th paragraph, the sentences “Much research has focused on the relationship between high consumption of sugar and the risk of weight gain and poor health outcomes [7]. This body of evidence details the potential links between chronic and high consumption of sugars and increased risk of poor health.” are unsubstantiated (the Ludwig et al reference [7] is about glycemic index (GI) not sugars and is therefore inappropriate, and it is a single RCT – not a body of evidence) and the Sievenpiper SLR and meta-analysis has not been included despite you stating you have done so in your rebuttal “However, we have included a new reference to Sievenpiper JL, de Souza RJ, Mirrahimi A, Yu ME, Carleton AF, Bevene J, et al. *Ann Intern Med* 2012 Feb 21; 156(4): 291-304.” Please either substantiate these statements with a suitable reference or amend them to reflect the findings of Sievenpiper et al as you stated you would do in your rebuttal letter.

Page 4, 2nd paragraph.

Discretionary Revision

In criticising Barclay and Brand-Miller you have included a \$ estimate for the value of sugar imports for the years 2008-2009. Please include a reference.

Minor Essential Revisions

You have clearly stated “imports of processed foods into Australia have increased and we were unsure whether Barclay and Brand-Miller included this in their estimates”. This indicates that your statements in the Abstract are simply conjecture. Barclay and Brand-Miller used FAOStat data up until 2003 as that was all that was available in 2009 when their research was conducted. Implying that they deliberately omitted the 2008-09 data is false. Please amend this sentence accordingly.

Page 4, 3rd paragraph.

Major Compulsory Revisions

You have misinterpreted the findings of The Australian Paradox by failing to

differentiate between total sugars (naturally occurring and added) and added sugars in the Australian diet. This issue was further clarified in *The Australian Paradox Revisited* (which is not referenced in your revised manuscript). Please clarify the difference between total and added sugars throughout the text and if you wish to provide a fair comparison with the Australian Paradox papers, please reference both.

You briefly mention the recent Green Pool(iii) research on the apparent consumption of sugar in Australia “This is consistent with recently published industry data suggesting a recent small decline in per capita sugar consumption [11].” However, you do not mention the fact that this analysis extended the ABS methodology from 1999 to 2011 and provides strong evidence that the apparent consumption of sugar has been declining in Australia since the 1950’s. You incorrectly imply (“additional data from nutrition surveys and industry sales data”) that the Green Pool report supports the other lines of evidence presented in *The Australian Paradox*, when in fact it supports only the FAOStat analysis. Please clarify this in your text.

iii. Green Pool Commodity Specialists: Sugar Consumption in Australia. Brisbane, Australia; 2012.

Page 4, 4th paragraph.

Minor Essential Revision

The objectives need to clarify whether they are referring to total or added sugars, sucrose and/or other sugars.

Are the methods appropriate and well described?

4. Methods

Page 5, 1st paragraph

Major Compulsory Revisions

The categories you list contain both naturally occurring (eg, fruit juice and other fruit products, and some (but not all) dairy) and added sugars. It is not clear why other dairy foods like milk and yoghurt that also contain sugars (including added sucrose) weren’t included? Your response to one of the reviewers suggests that these and other foods were not major import items but they are major export items. There is therefore no clear rationale for the categories of foods included in your analysis. Please explain the rationale clearly and concisely in your methods section.

You have not included any reference to the export of sugar as value-added ingredients in your text. The assertion in your rebuttal that “exports of processed foods containing sugar have traditionally not been large” is incorrect based on the figure on page 5 of the Green Pool report. Your statement in your rebuttal that “close examination of their time series suggest very strongly that the export of minimally processed sugar blends has been incorporated in the figures” is

unsubstantiated. There is no evidence that value added ingredients are included in FAOStat data. Overall, your analysis does not provide an approximation of apparent consumption data ($\text{Apparent Consumption} = ((\text{Opening Stock} - \text{End Stock}) + (\text{Local Production} + \text{Imports} - \text{Exports}) + (\text{Sugar Equivalent of Imported Foods} - \text{Sugar Equivalent of Exported Food})) / \text{total population}$). Therefore at best your results are incomplete. Please conduct a full analysis using all available data as per your stated objectives.

Finally, it is important that you mention in the text that the FAOStat analysis in The Australian Paradox paper looked at added sugars for the years 1980 – 2003 (the only data available at the time of publication) so that readers are aware that your analysis covers a different time frame and is therefore not completely comparable.

Page 6, 3rd paragraph

Minor Essential Revision

The final sentence of your methods section states “For comparative purposes we also obtained estimates of Australian sugar availability over the past three decades from the FAO food balance sheets [14].” Where in the text are the FAOStat estimates presented or discussed for comparative purposes?

Pages 6-7, last and first paragraphs, respectively.

Major Compulsory Revisions

The 2007 Australian National Children’s Nutrition and Physical Activity Survey (ANCNPAS) used a 24 hr recall methodology and the nutrient composition of each food the child consumed would have been well described as nutrition information panels have been mandatory on all foods in Australia since 2002. These data would have been applied directly in their analysis, and average nutrient intakes calculated directly – not via summation of crude categories as per your own analysis. Also, the ANCNPAS study reported only total sugar (not added sugar or total sucrose) consumption. Therefore, how the 2007 ANCNPAS methodology relates to your own method is not clear. Please clarify this in your text.

From your rebuttal it appears that you estimated the amount of total (not added) sucrose in your food categories. How the exact proportion of each food within each category was determined is not explained in either your rebuttal or main text. Within most of these food categories, there are sugar-sweetened and non-nutritively sweetened variants (soft drinks, chewing gum, chocolate, etc...). It is essential that you explain what assumptions were made and how the proportion of these foods consumed within each category was determined.

You also state in your rebuttal that “It is impossible to know the proportions of each within the trade data categories. It is also possible (highly probable) that the sugar content of food products has changed over time” yet this is not discussed in your main manuscript as a limitation. Data from FSANZ suggest that the use of

non-nutritive sweeteners is increasing, and it differs by age group and gender, so the Green Pool Estimates are likely to be too high (they are overestimating the amount of sugars in Australian foods), yet despite this, they show a clear decrease in the apparent consumption of added sugar, unlike your own analysis. How can you explain this major discrepancy between these two analyses that do cover approximately the same time frame? This discrepancy should be mentioned in your discussion section (see below)?

Minor Essential Revision

It is not clear why the \$ estimates for food categories and associated figures are included in your analysis yet the FAOStat data are not. It is the amount of sugar in the food supply that is the issue, not the \$ value of a food product category. What \$ values did you assign to each category in order to estimate the amount of product imported? Imported soft drinks, for example, are much more expensive (up to 10-fold more per L) than local soft drinks. How was the contribution of non-nutritive sweetened versions taken into account when calculating these figures?

Are the data sound?

5. Results

Page 7, 1st paragraph

Major Compulsory Revision

The introductory paragraph implies that this analysis has captured all forms of sugar in all sources of imported and exported foods, yet as discussed above, your methodology does not. Please revise accordingly.

Are the discussion and conclusions well balanced and adequately supported by the data?

6. Discussion

Page 8, 1st paragraph

Major Compulsory Revisions

The primary findings of this research and its implications should be presented first in the discussion (not the FAOStat data). It should be noted that imported foods have only become significant sources of added sugars in recent years due to removal of tariffs in the mid-late 1990's and the increasing strength of the Australian dollar (Green Pool, 2012). Regardless of this, the ABS Apparent consumption data up until 1999 did include all sugar in both imported and exported foods, and Green Pool likewise included these sources in their recent update. Both these independent sources, like the FAOStat database, show that apparent consumption of sugar is continuing to decline in Australia. The results of these studies provide alternate viewpoints to your own and need to be included in your discussion.

The second sentence “the FAO estimates show that our sugar consumption appears to have plateaued in recent years” is incorrect. Over your analysis’s time frame, the trend is clearly down as shown in the attached figure taken from the FAOStat website on the 7th of December 2012. For completeness, a figure of the most recent Australian FAOStat data should be included in your manuscript.

Page 8, final paragraph and page 9, first paragraph.

Minor Essential Revision

You have now included a clause noting the decline in the home consumption of sugar but you have do not stated the whole truth, i.e. that the increase in manufactured goods has been counter-balanced by a decrease in home use, leading to a net overall decline in total sugar use in Australia. Please include either the figures for home use or the net difference so that the reader is not misled.

Page 9, 2nd paragraph

Given all of the methodological issues noted above this statement is unjustifiable. Please revise accordingly.

Page 9, 2nd paragraph

Your own data are incomplete and therefore do not disprove The Australian Paradox. The Australian Paradox was based on three independent lines of evidence, only one of which is challenged here (apparent consumption). Please revise this accordingly.

Page 10, 4th paragraph

Minor Essential Revision

It would be useful to provide an estimate of the amount of wastage that occurs in developed nations so the reader can put this into perspective as it is a substantial proportion. For example, the USDA(iv) estimates that 11% is wasted at the retailer level and 34% at the consumer level

iv. United States Department of Agriculture, Economic Research Service (2012) Sugar and Sweeteners Yearbook Tables.

7. Conclusion

Page 12, 1st paragraph

Major Compulsory Revision

The final sentence is conjecture. The FAOStat data show a clear decline since 1988 as per the attached FAOStat figure. You note in your rebuttal “Extensive discussions with the ABS have failed to determine whether ABS methodology is any different from the FAO methodology” yet you make claims throughout your

document that the FAOStat data does not include import and export data yet ABS apparent consumption data does. Please revise the conclusion accordingly.

Page 12, 2nd paragraph

Major Compulsory Revision

This paragraph misrepresents the findings of The Australian Paradox as discussed above. Please revise the text accordingly.

Are limitations of the work clearly stated?

Major Compulsory Revisions

No, there are a significant number of limitations to this piece of work (as noted above) that have not been adequately addressed in this paper. Please revise the text accordingly.

Do the authors clearly acknowledge any work upon which they are building, both published and unpublished?

Major Compulsory Revisions

No, the authors do not clearly acknowledge or provide an accurate comparison with the full body of research in this area. For example, no reference to The Australian Paradox Revisited is made; the FAOStat data are mentioned but the latest data are not presented or adequately described or discussed; the Australian Bureau of Statistics apparent consumption of sugar data are not presented as a comparison to their own analysis; and the Green Pool analysis is only briefly mentioned in a manner that is misleading. The text implies that the Green Pool report supports other lines of argument presented in both The Australian Paradox and The Australian Paradox Revisited papers, when in fact it supports only the FAOStat analysis and shows the opposite of what you are saying. Please revise the text accordingly.

Is the writing acceptable?

Yes, the writing style is acceptable.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I am the Head of Research at the Australian Diabetes Council (ADC) and Chief Scientific Officer at the Glycemic Index Foundation (GIF). I have been with the ADC since 1998 and the GIF since 2001, and am a founding director of the latter. Directors are unpaid. Both companies are not-for-profit and their primary objectives are to help people prevent and manage diabetes. Via these companies I work with food industry to lower the glycemic index and load of foods and beverages. Companies are charged a fee for re-formulation advice. Advice is specific to carbohydrate containing foods and as such the foods are a mixture of sugars, oligosaccharides and starches. I am a co-author of a book on the prevention and management of diabetes that focuses on decreasing dietary glycemic load as a primary method of improving glycaemia. I am a co-author of both The Australian Paradox and The Australian Paradox Revisited papers referred to in the Vickers et al study I have reviewed.