Reviewer's report

Title: Biting off more than we can chew? The use and cumulation of evidence from modelling studies to inform policy on food taxes and subsidies.

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Reviewer: Tony Blakely

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Re: Biting off more than we can chew? The use and cumulation of evidence from modelling studies to inform policy on food taxes and subsidies

This paper is a thoughtful critique of intervention and disease modelling, in the context of food taxes and subsidies.

I have the following comments and suggestions:

1. Testing assumptions in future research (e.g. pass through rates). Agreed. And indeed probabilistic sensitivity analyses in the simulation models themselves can assist here:
   a. First, by simply modelling uncertainty in the pass through rate to incorporate this uncertainty in the final outputs.
   b. Second, using these analyses (e.g. through Tornado plots examining what effect change in pass through rate would have on model outputs, moving onto more formal ‘expected value of perfect information’ methods) to explicitly identify which parameter uncertainty is driving the most uncertainty in model outputs, and prioritising these parameters for future research.

2. The non-feedback or non-dynamic assumption is an important limitation – agreed. The onus is on researchers to make this clear. Systems dynamic and other modelling strategies could be used in the future to more explicitly include such reciprocal effects – although the parameters for such modelling will be difficult to set!

3. The authors state:
   “Model input parameters are also typically described by unique values, and the impact of uncertainty about parameter values on uncertainty in results is not typically addressed. There 151 are also deeper levels of uncertainty that are not quantifiable [62]. These can be expressed as acknowledged inadequacies of the models (things we know we have left out or been unable to model properly), and unacknowledged inadequacies (things we have not even thought of).”

   I agree. And see comments above. Should the authors discuss the voluminous literature on modelling uncertainty in health economic decision modelling, and the (well known) problem of model structure uncertainty (often) dwarfing input parameter uncertainty? This is commonly addressed elsewhere in modelling
4. The authors state:

“As noted above, most models employed in simulation studies of food taxes and subsidies are deterministic and do not therefore include measures of uncertainty from which standard deviations could be computed.”

As above, this invites recommendations in this paper to include more modelling with uncertainty, and more critique of that incorporation of uncertainty.

5. I am not convinced by the meta-analysis analogy. Uncertainty, for example, as an output from simulation modelling is not random error. Other methods – if possible – of averaging across models are necessary.

6. The critique of existing synthesis studies has some merit. However, the case is not well made (in my opinion) as to why if the research question at hand is “Does SSB tax effect SSB intake and overall QALYs gained (say)”, why one therefore has to go and look at multiple outcomes. Isn’t the issue more that (naïve, or first generation) modelling that only considers the effect of an SSB tax on SSB consumption, or a bit further onto sugar intake, is ‘incomplete’ The issue at hand is to improve the modelling per se, to estimate (say) QALYs gained/lost with a model fully conceptualized and parameterized to capture the important pathways (e.g. any knock on (read cross-PE) effects of SSB tax on salt consumption). That is, about improving the separate models per se.

7. The introduction of the vote counting method is not that relevant in my view. The authors conclude it is not useful, either. I suggest the focus should more be on: improving the modelling per se (above); and the literature elsewhere on the validity (or not) of synthesis of findings across models (e.g. health economics literature [e.g. Medical Decision Making, Value in Health], and in climate change literature [I assume]).

8. The authors state:

“This calls for a basic humility in communicating model results, with clear and consistent acknowledgement that modelled estimates of effects are tentative projections, entirely conditional on incorporated assumptions and data.”

I completely agree!

9. The authors state:

“The time has come to move beyond simulation studies in the appraisal of such policies.”

I disagree. Rather than “move beyond”, isn’t it “compliment”. Modelling and primary research inform each other. A model can highlight where the most uncertainty is (see above) and prioritize primary research. The primary research can then improve an input parameter estimation, or model conceptualization, to improve the modelling (e.g. to decide which tax/subsidy package). I think that this is my major comment on this paper – it misses the point that these methods work
together, not in competition.

**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 one of the senior authors of a paper critiqued by these researchers.