Reviewer’s report

Title: Estimating the cost-effectiveness of salt reformulation and increasing access to leisure centres in England, with PRIMEtime CE model validation using the AdViSHE tool.

Version: 0 Date: 28 May 2019

Reviewer: Lennert Veerman

Reviewer's report:

This paper uses the new PRIMEtime CE model to compare the health impact of two interventions, one targeting salt consumption and one that enhances physical activity, when rolled out across England. It then goes on to use the results, and extensive additional analyses, to validate the model.

It is an interesting paper, especially from a methodological point of view, and considerable effort went into the exercise. I do find that the separation of this material from the model description leaves a few questions, as some of the detail in methods and input sources has now been removed. I have some question marks around some of the choices made, and did not understand a few issues, as per my comments below.

Please explain in the methods section how you calculated your economic output parameters. Specifically the return on investment, where I find it un-intuitive (and undesirable) that the value of health is ignored (as I explained in my review of the first draft of this paper). You do mention this straight up in the results, which is helpful.

Likewise, can you please explain what the social care costs are? Large savings in the salt scenario, so I gather at least part are related to disease (in parallel to health care costs), as the old age pension would have the opposite effect. I am therefore puzzled by the explanation that 'Women were responsible for more social care savings due to living longer'. Why is that? Living costs money. Death is cheap.

The choice of a 10-year time horizon needs explanation, in the methods section. As I wrote previously, this disadvantages interventions targeting the young, compared to the old, and I consider it a bad choice for preventive interventions. The discount rate also merits mention in the methods section. I recommend using the CHEERS checklist to ensure the reporting is complete.

Line 278: "Intervention costs per participant in 2014 after adjusting for inflation were £53.80 (triangular distribution 43.50, 53.80, 85.90)" A drawback of the triangular distribution is that in your model, the mean costs will be much higher than £53.80. See for example Briggs et al in 'Decision Modelling for Health Economic Evaluation'. You refer to Frew et al, but why copy someone else's less-than-optimal methods? A skewed distribution like gamma, Weibull or...
lognormal would not have this problem, and you can fit those using the parameters Frew et al give. As things stand, it seems that your central estimates of cost are too high, which negatively biases your C/E results.

Table 2: Why no RoI?

Line 128: typo 'are'

Line 518-522: That is indeed a dramatic difference. Which of the parameters made the greatest difference on the cost per QALY estimates, between your assumptions and those of Frey et al?

Additional data, page 6: MET is per minute.

Additional data, page 29, "the baseline annual incidence rate of breast cancer among those aged 16 years and over used in PRIMEtime CE was 0.0008." I assume this varied by age? Still, this seems too low. Cancer Research UK gives an incidence of around 80 per 100,000 for ages 35-39 years, rising to >400 for age 70+. It would take a very young population to arrive at an average of 80 per 100,000, which England does not have. Are you sure about this number? Where is it from?

Figures S6 and S7: What does 'Primary analysis' stand for? Intervention effect on exposure to salt/PA?

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

No

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

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