Reviewer's report

Title: Graphical comparisons of relative disease burden across multiple risk factors

Version: 0 Date: 16 May 2019

Reviewer: Maja Katharina von Cube

Reviewer's report:

The paper discusses simplifying approximations of the PAF for cross-sectional studies. These simplifications are used for visualization of multiple PAFs of different Risk factors. Overall, the main paper is presented well and I like the idea of simplifying the PAF in such a way.

Unfortunately, the approximations, which are the basis of the paper, are not easily accessible due to formatting errors. Therefore, I propose the authors resubmit the files of the appendix in a different format (eg as a pdf document which has been created in latex). Then, I suggest the paper gets re-evaluated.

Additionally, I have some comments on the main manuscript:

Methods Section:
- The authors suddenly switch from counterfactual notation and the wording "hypothetical population" to conditional probabilities and the wording "controls". Please build a bridge by showing in formulas how the hypothetical risk is (under the assumptions) is equal to the conditional risk. And explain "risk in the hypothetical population" versus "prevalence in controls"

- Please define RR and OR in formulas (are these RR and OR based on conditional or hypothetical probabilities?)

- Please write down the logistic model to properly define beta_1

Results Section:
- In Table 1, please add to the column name 'beta_ave' log OR and to exp(beta_ave) OR. Additionally, please add confidence intervals of the exact PAF

- In Figure 1: Please increase font size

Additionally, I do not find the figure very intuitive. For example, it is confusing that the prevalence is decreasing, usually values on the x-axis are increasing. Moreover, from the figure is does not become clear what the increasing slope with decreasing prevalence means. Especially for application, the reader should be able to understand the figure without reading the methods part of the manuscript.

- In Figure 2+3: Again, font size is very small

Why are the distances between two points on the axis so different (eg Figure 3a OR: the distance
between 3 to 2.5 is smaller than between 2.5 and 2)? It would be helpful to have a short explanation as this is again counter-intuitive.

Biases in approximations:
Are conclusions on the bias different, if the RR is used instead of the OR?

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

Unable to assess

**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.

I am able to assess the statistics

**Quality of written English**  
Please indicate the quality of language in the manuscript:

Acceptable

**Declaration of competing interests**  
Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?
3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?

If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests.

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comment to the editors, which will not be published.

I agree to the open peer review policy of the journal