Author's response to reviews

Title: Projection of the Year 2050 Burden of Diabetes in the U.S. Adult Population: Dynamic Modeling of Incidence, Mortality, and Pre-Diabetes Prevalence

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Author's response to reviews: see over
Dear Editors:

Thanks you for the review of our manuscript and providing an opportunity to respond. Our response to the referees follows.

Referee 1:
Referee 1 did not request any changes.

Referee 2:
Minor Essential Revisions:

1- I think the authors should provide an overall summary of the models and assumptions in the main text.

We have expanded the subsection, Diabetes Projections, which previously included a summary of the models, to also include model assumptions.

2 - P23: the parameters q(t), s(t) and w(t) have not been defined in the appendix.

The parameters q(t), s(t) and w(t) are intermediate values defined by the equations at the bottom of page 23. We have reworked the equations to make them easier to follow.

Discretionary Revisions:

1 - I suggest that the authors use "preventive intervention" instead of intervention.

The first time we use the term intervention, methods section of the abstract, we say, “…intervention designed to prevent or delay diabetes…” We also use the term preventive intervention in the conclusion section of the abstract. We have added the use of preventive intervention to the main body of the paper including the background section, the material and methods section, the results section, the discussion section, Table 2, and to the appendix.
2 - It may be useful to add the potential another intervention where primary prevention of diabetes is modeled based on the effects reported in prospective observational studies (1, 2). Although I understand that this may require substantial changes to the models and a whole new analysis.

We agree this is a good idea. However, we do not want to include it in this paper because it is beyond the scope of this manuscript. Also the evaluation of a series of interventions based on published data is the subject for future research by our team.

3 - The proportional reduction in the incidence of diabetes after preventive interventions is fairly conservative. The evidence from half a dozen randomized clinical trials of life-style interventions shows a reduction between 30 and 70 percent in incidence of diabetes in the prediabetic population after 1-6 years (3-11). So, I think the authors can claim a 50% reduction in risk based on these trials.

We agree with the 50% reduction in risk. We used 25% reduction because we equated a 50% reduction in the incidence of diabetes in 50% of those eligible for the intervention to be roughly equivalent to a 25% reduction in our model. That is, we assumed that only half the people eligible for the intervention would participate. We have modified the section, Diabetes projections, to reflect this thinking.

4 - Page 10: I think the authors should explicitly mention in the Methods section that their prior distribution for # assumes that the incidence of diabetes won’t decline.

The likelihood, not the prior, restricts incidence rates to be monotonic over time. The methods section has been modified to include this.

5 - Page 11: The last sentence of the second paragraph "We believe it is.." is hard to read.

We agree. The sentence has been deleted.

6 - Page 12: The reduction estimated for the preventive intervention reduces the number of diabetes cases by less than 10% and still the authors have interpreted this reduction as "considerable". I suggest using a milder language in interpreting this estimate especially considering that the intervention is assumed to reach 100% of those in the high-risk group and uncertainty of the estimates has not been quantitatively evaluated.

Since we qualify the statement by saying, “… might considerably reduce…” we believe it’s appropriate for the discussion section.
7 - *The title of the Y axis of Figure 1 should be "Incidence cases per 1000 person years".*

The y-axis title has been changed.

8 - Abstract, last sentence of the Results: I suggest the authors report the number of cases prevented by the intervention in some year or range of number of cases prevented during the period.

Since we are only discussing a hypothetical intervention we prefer not to give the number of cases prevented in the abstract.

Sincerely,

Theodore J. Thompson