Reviewer’s report

Title: Influence of demographic changes on the impact of vaccination against varicella and herpes zoster in Germany - a mathematical modelling study

Version: 0 Date: 19 May 2017

Reviewer: Alberto d’Onofrio

Reviewer's report:

Dear Editors and Authors,

I read this interesting manuscript and its Supplementary Information.

This work explores the important interplay between demography and vaccination programmes (considering both anti-varicella and anti HZ vaccination).

The illustrated results are of great epidemiological interest and are valuable for Public Health policy-makers, and not only in Germany.

To "parametrize" (in wide sense) their complex model, the authors wisely use/adapt state of the art results for demography and for the contact rate. For example, the modelling of contact rate structure is built on top of the results of the influential POLYMOD study.

Wisely the authors consider three scenarios: 1) stable demography; 2) projected demography; 3) Demography dynamics that includes the unforeseen 2015/2016 "demographic impulse" due to extra immigration (see, however, below).

On the whole, I agree with the authors' approach (apart the caveat notes below), and with their comments on their model and results.

The manuscript is very important and deserves publication, apart minor but very important revisions.

Indeed, due to the very large time-windows of the predictions, authors should far more explicitly include in the "limitation" section the fact that the proposed model is deterministic.

In particular, motivated by the unforeseen 2015/2016 "demographic impulse" (an important practical example of sudden large stochastic fluctuation), which they included in their model, in my opinion the authors ought to explore a fourth scenario where a SECOND similar pulse is included in a random year between 2018 and 2060, let us say in 2030. Even better, the impact of the year of occurrence of such an impulse should be analysed.
As far as the supplementary information are concerned, I am sorry to say that the description of the mathematical model is largely insufficient. For example, the fact that the model is deterministic can only be inferred thanks to a short observation written at page 12 of the PDF of the manuscript, rows 296-297!

Only a graph plus some scant information are reported, at least in the files I could access. No information at all are given on the simulation methodologies!

In my opinion, the supplementary information of a computational epidemiology work as the submitted ms. ought to have as objective to provide a detailed description of the computational and mathematical details.

Kind Regards,

Alberto d'Onofrio

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

Yes

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/](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 comments to the editors, which will not be published.

I agree to the open peer review policy of the journal