Author's response to reviews

Title: The accuracy of General Practitioner workforce projections

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

This letter accompanies the revised version of our manuscript (MS: 1195208522923906) ‘The accuracy of General Practitioner workforce projections’ for publication in Human Resources for Health.

We are thankful to the reviewers and the editor for pointing out their important and highly appreciated suggestions and modifications to improve the article. We have thoughtfully taken into account all comments and, based on that, substantially reworked the manuscript. The explanation of what we have changed in response to the reviewers’ concerns is listed, point by point, in the following pages.

We believe that the comments have been highly constructive and very useful to improve the manuscript. We hope that all changes included in the revised paper fulfil the reviewers suggestions and makes the manuscript acceptable for publication in Human Resources for Health.

Looking forward to hearing from you soon,

Kind regards,

Malou van Greuningen

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Authors’ reply to reviewers’ reports

Reviewer: Judy Bloom

Major Compulsory Revisions –
The paper challenges the established theory that more data equals better projections. This is potentially important to planners who often lack huge amounts of historical data and could therefore be a good, publishable contribution. We fully agree with these statements.

However, the method presented here does not clearly enough describe how historical data was or was not used (eg. inflow data is historical data) and how policy choices were removed as an influence if the original projections influenced inflow numbers. Apparently we were not clear enough in what we did. We did not evaluate original projections. We evaluated how well our current projection model is as if it has been applied in the past. In original projections, the future inflow in training is an estimate, based on historical data or based on some intended amount. However, for this evaluation of the model, the observed inflow from the launch year onwards is used to remove policy choices. We explained the methods more clearly throughout the article. For example in the abstract and on pages 4, 6, 7, 8, 11.

We performed sets of a posteriori projections of the workforce as if they were a priori projections. This was done from a range of launch years, using stock and flow data which would have been available at each of these launch years. Stock data pertain to the launch years themselves. The flow data pertain to what happened in some period before and up to this launch year, with base periods starting 15,10 or 5 years before the launch year. The historical flow data are used as estimates for transition rates which are (repeatedly) applied on the stock data. For the future inflow in training, however, we used observed numbers, as if we could foresee what the future inflow really would be. We chose to use the observed number of inflow to remove policy choices from the evaluation of the performance of the simulation model. So we do not evaluate how well we could foresee the future inflow in training (because that is also the result of policy choices), but only how well we could foresee all other elements in the model which are necessary to project the total future capacity.

More significant testing of the shorter base period producing more accuracy is required in order to ensure the method is not just identifying the relationship between a historical projection and the resulting intended change to level of enrolments. Because of our method, we account for the observed changes in enrolment (intended or not), so that the accuracy of the model calculations are not influenced by intended changes in enrolment. In addition, we are not using original projections. The method we used is explained more extensively in the article, see also the answer above.

Additionally we generally weight the most recent time frame as the most accurate regardless. It must be clearer the outcome being presented in this paper is something different. The paper clearly shows that a 5-year base period results in more accurate projections than 10- or 15-year base periods. In the 10- and 15-year base periods, the most recent time frame (i.e. the 5 years before each launch year) is weighted the same as the older time frames (10-5 years or 15-10 years before the launch year). We expected that longer base periods would perform better, because of a larger data set, but the results showed the opposite. The base period does not have to be as long as the projection horizon.

The most recent time frame (5-0 years before the launch year) is present in all base period lengths. We described this more clearly on pages 7, 11 and 12 of the article.
Additionally, on page 13 we explain why the projections are more accurate in more recent years. Two potential additional explanations are mentioned.

Minor Essential Revisions –
1) Conclusions section in the Abstract should more specifically answer the main question of whether the original projections were accurate or not. Current draft seems to have emphasized the unexpected result/relationship of projection horizon and base period to the exclusion of the original question.
   *We do not have original projections. We evaluated the models methods, which resulted is some unexpected outcomes. We did add a sentence about the result that forecasting the size of the future workforce did not become more difficult between 1998 and 2011, as we originally expected.*

2) Methods section, para 1, sentence 6 "...projections made in the would..." words are missing or edit is needed.
   *Words are missing, It is “…projections made in the past…”.*

3) Results section, para 1, sentence 1 - what is the context for demand ie what is the risk of the large range for error? This could be addressed in resolving comment #1 related to answering the main question in the conclusion section more directly.
   *In this case, it is a potential risk as the projections evaluated are not original projections. Of course it is important to know if projections have large errors, because these could still cause under- or oversupply of GPs. Therefore, workforce projections have to be updated regularly. This topic is also discussed in the discussion, on page 12.*

4) Discussion section, para 8 - I think this is the beginning of a new section for Limitations but the title is missing.
   *We agree and added the title.*

5) Discussion para 8/Limitations para 1, sentences 6 and 7, there seems to be words missing.
   *Changed the sentences.*

6) Limitations para 4, last sentence is a repeat sentence.
   *Changed the sentence.*

7) Conclusions section, as previously mentioned the first goal of the research - how accurate were the initial set of projections relative to actuals - is not represented with emphasis in the conclusion.
   *We do not have original projections. We evaluate the models methods. We did add a sentence about the result that forecasting the size of the future workforce did not become more difficult between 1998 and 2011, as we originally expected.*

Discretionary Revisions –
1) Background, para 2, sentence 5 - I think it is unusual not to reference ageing workforce in this list of dynamics although you may have intended that with the reference to reduction of working hours We agree, that is an important factor.

2) Discussion section, para 4, sentence 3 - very interesting observation, potentially quite valuable - I will be applying right away in my work.

3) Discussions section, para 5, last sentence, seems abrupt - an example of a different type of projection might be useful
   *We clarified this.*
4) Discussion section, paras 6 and 7 - I found these paragraphs to introduce ideas and topics that seemed not part of the research and therefore detracting from the overall strengths of the paper. We chose to leave this paragraphs in, because we think they add international relevance to the topic of this article. Because the results of this study imply that with short base periods, projections could also be very accurate, it is feasible for other countries to engage in model-based workforce planning. Even if there is not a very extensive amount of historical data available. Saying this, we have to keep in mind that health systems are different and that the successful application of a model similar to the Dutch model is dependent on the type of health care system. Workforce planning models have to be suitable for the systems in which they are applied.

**Level of interest:**
An article whose findings are important to those with closely related research interests

**Quality of written English:**
Needs some language corrections before being published

**Statistical review:**
Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**
I declare that I have no competing interests.

**Reviewer:** James Buchan

**Reviewer's report:**
Major Compulsory Revisions
None

Minor Essential Revisions
some minor corrections to grammar, English language use:
- abstract: "have been done..".
p8 "This is mainly.." rather than "This is for a large part..
p14. Sentence beginning "Because.." should be e.g "This is because..
references need to be checked- eg ref 38 should be "Belgium", ref 39 is incomplete.
We have corrected the language.

Discretionary Revisions
n/a

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:** 'I declare that I have no competing interests'
Reviewer: Gustavo GH Nigenda

Reviewer’s report:  
Discretionary Revisions

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:  
I declare that I have no competing interests