Author’s response to reviews

Title: The introduction of "No jab, No school" policy and the refinement of measles immunisation strategies in high-income countries

Authors:

Filippo Trentini (ftrentini@fbk.eu)
Piero Poletti (poletti@fbk.eu)
Alessia Melegaro (alessia.melegaro@unibocconi.it)
Stefano Merler (merler@fbk.eu)

Version: 2  Date: 15 Feb 2019

Author’s response to reviews:

Dear Editor,

Please find enclosed the revised version of the manuscript “The introduction of "No jab, No school" policy and the refinement of measles immunisation strategies in high-income countries” (BMED-D-18-01492R1).

We thank you and the editorial board for the useful feedback on the manuscript and the opportunity to resubmit our work to BMC Medicine. We are grateful to the Reviewers for their useful comments on the manuscript that helped us to make clearer the results of the proposed analysis. We have done our best to thoroughly address all comments raised by both the Reviewers and the Editor.

In particular, following the suggestion of Prof. Felicity Cutts (reviewer #2), we better clarified:

• which individuals are eligible for the compulsory vaccination at school entry, i.e. only unvaccinated individuals during routine programs

• which are the limitations of the assumption of homogeneous coverage and susceptibility within countries

Minor comments have also been addressed and all changes are highlighted in the manuscript.
Please note that the new version of the manuscript now adheres to the stylistic guidelines of the journal and that all editorial comments have been addressed as well.

We believe that the clarity of the manuscript has improved, and we dare to hope that it is now suitable for publication in BMC Medicine.

Sincerely yours,

Filippo Trentini

on behalf of all the authors (Piero Poletti, Alessia Melegaro and Stefano Merler)

Detailed reply to Reviewers

Reponse to Reviewer #2: Felicity Cutts

p.10 Lines 17-18: The sentence "In the model only individuals who have not received either the first or the second dose are considered eligible for the two latter immunisation strategies" is a little unclear - do you mean that only individuals who have not already received 2 doses of vaccine through the routine programme are eligible? That is, individuals who were either unvaccinated against measles or had only received one dose were eligible?

Addressed by specifying in the Methods section that both the school entry vaccination and the catch up campaign among 1-15 yo are administered to individuals who were not vaccinated during routine programs:
"In contrast, vaccination at school entry and catch up campaigns aim at immunising children who were not vaccinated during routine programs therefore increasing the overall vaccine uptake. In particular, in the model, only individuals who have not been vaccinated before they enter the primary school are considered eligible for the school entry vaccination."

p.11 line 5: I think you mean replacement rather than replenishment of individuals who were immune as a consequence of natural infection with susceptible individuals who have been neither infected nor vaccinated.

Yes, thanks for pointing this out. Addressed by using "replacement" instead of "replenishment".

p.11 line 50: "However, 100% coverage in both the 1st and the 2nd dose is expected to reduce the fraction of susceptible individuals in 2050 around 10%" - this is not very clear, do you mean to reduce the fraction susceptible by 10 percentage points, or to around 10% of the population?

Sorry for the lack of clarity. We meant that the fraction of susceptible individuals in 2050 is expected to be 10% of the overall population in 2050. We clarified the point by modifying the paragraph as follows:

"However, 100% coverage in both the 1st and the 2nd dose is expected to reduce the fraction of susceptible individuals in 2050 to around 10% of the overall population, and additional vaccination strategies may therefore be needed to achieve measles elimination in this country."

p.12 It's still unclear to me whether the catch-up campaign targets children aged 1-15 years or only school children. Or, are 2 different types of campaigns being considered, one for children aged 1-15 years and a different one for schoolchildren at the time of introduction of the school entry laws?

Here we assume that the catch-up campaign targets all children aged 1-15 once for all in 2018; vaccination of children at school entry is instead repeated annually. We modified this paragraph in the Results section to better clarify our assumptions:
For all countries considered, the fraction of children at risk of infection is expected to be slightly larger, with respect to results reported above, if vaccination at school entry (performed annually) were implemented without a catch up campaign among 1-15 years old (performed only once in 2018) [see Additional file 1: pp 5-6].

p.13 The authors mention spatial heterogeneity in coverage but might wish to expand on this a little, with reference e.g. to the recent paper by Truelove et al (Vaccine. 2018 Dec 19. pii: S0264-410X(18)31672-4. doi: 10.1016/j.vaccine.2018.12.012), to avoid giving the message that achieving an average level below 7.5% population susceptibility will always be enough to sustain elimination.

Thanks for the useful suggestion. We expanded the discussion on this point by modifying a paragraph in the Discussion section as follows:

"In addition, our model does not take into account spatial heterogeneities in measles susceptibility as possibly resulting from different vaccination coverage at sub-national level. However, it has been recently shown that the assumption of spatially homogeneous coverage could potentially lead to underestimate the effective reproduction number [26]. Therefore, the achievement of the 7.5% susceptibility threshold may not be enough to sustain measles elimination in settings characterized by heterogeneous vaccine uptake levels."

The following reference was also added:


Fig 3 title: there seem to be some typos or words missing here.

Addressed by modifying the title as follows:

"Measles susceptibility in 2050 as obtained with vaccination at school entry"