Reviewer’s report

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

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Reviewer: Don Klinkenberg

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Review of "The introduction of "No jab, No school" policy and the refinement of measles immunisation strategies in different demographic settings" by Trentini et al, for BMC Medicine

Summary

In this manuscript the authors extrapolate vaccination policies and uptake figures for nine countries to predict the susceptible fractions in populations in 2050. They do so for current policies and uptake figures, a range of uptakes, and under the assumption of additional vaccination at school entry. For two African countries, they also consider introduction of a second shot in the routine programme.

For most countries, continuation of the current situation results in too many susceptibles in 2050 (threshold level 7.5%). Higher uptake levels or school entry vaccination would result in sufficient coverage in all countries except for Italy, Kenya, and Ethiopia. In Italy that is because coverage is already too low in older age cohorts; in the African countries because a single vaccination is not effective enough. In the two African countries, school entry vaccination is more effective than giving a second routine dose, because school uptake is assumed to be independent of routine uptake whereas the second dose is only given to children with a first dose. The authors conclude that school entry vaccination can be useful to increase coverage levels.

General remarks

It is a well written paper with clear results and an important message. There are two points that deserve a little extra attention:

1) the assumption of absence of transmission. The authors state that future infections would arise from a small proportion of the susceptible population, suggesting that only a negligible fraction of susceptibles will be infected. However, this is somewhat at odds with the idea of a risk of resurgence coupled to a threshold for herd immunity. If herd
immunity is relevant, major outbreaks may also occur before 2050 in countries with too many susceptibles, significantly changing the proportion of susceptibles in 2050. I think it should be made very clear that you calculate the proportion of people that were not vaccinated AND not infected before 2018: all people at risk for infection between 2018 and 2050. These people may either be susceptible in 2050, or they have experienced a measles infection between 2018 and 2050. I think that this improves interpretation without assuming absence of transmission.

(2) the result that school-entry vaccination is so much better than a second regular vaccination in Kenya and Ethiopia. This is under the assumption that school-entry vaccination is independent of regular vaccination. Is that assumption correct? For instance, are there communities where children don't get vaccinated and may not even go to school, let alone get vaccinated when they do?

Minor point:

In the model there is a group with maternal immunity, and all children are born into that group. That is a bit strange if seroprevalence in the age group of the mother is low. On the other hand, this M class does not seem to affect the results much. I suggest you briefly comment on this point in the supplementary material itself.

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

Yes

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