

PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Estimating deaths averted and cost per life saved by scaling-up mRNA COVID-19 vaccination in low- and lower-middle income countries in the COVID-19 Omicron variant era: a modeling study
AUTHORS	Savinkina, Alexandra; Bilinski, Alyssa; Fitzpatrick, Meagan; Paltiel, A David; Rizvi, Zain; Salomon, Joshua; Thornhill, Thomas; Gonsalves, Gregg

VERSION 1 – REVIEW

REVIEWER	Yuvaraj Krishnamoorthy JIPMER PSM
REVIEW RETURNED	09-Mar-2022

GENERAL COMMENTS	The authors have tried to provide the Model-based estimates of deaths averted and cost per life saved by scaling up the mRNA COVID-19 vaccination in low and lower-middle-income countries. Though the research question is an important one to study, I am skeptical about the model to derive these estimates. First of all, the authors have missed out on providing what type of model was used to generate these findings. The authors should provide the specific type of model (decision tree or Markov or dynamic models) along with the model structure, which is an essential part of economic evaluation studies. Many more essential concepts like from what perspective was the study conducted, discounting rate application, time horizon, etc are missing. Hence, it is essential for the authors revise the manuscript and provide a detailed description on these major methodological issues.
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REVIEWER	Jit Sarkar Elucidata, Customer Success Team
REVIEW RETURNED	09-Jun-2022

GENERAL COMMENTS	The authors have asked a very pertinent question with respect to the COVID-19 scenario. However lack of reproducibility seems to be a major concern. The clean data sources used and the scripts used for the modelling purpose are missing, submission of which in any open source repository is needed.
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Comments to the Author:

The authors have tried to provide the Model-based estimates of deaths averted and cost per life saved by scaling up the mRNA COVID-19 vaccination in low and

lower-middle-income countries. Though the research question is an important one to study, I am skeptical about the model to derive these estimates. First of all, the authors have missed out on providing what type of model was used to generate these findings. The authors should provide the specific type of model (decision tree or Markov or dynamic models) along with the model structure, which is an essential part of economic evaluation studies.

Author Response: We have added the following clarification to the manuscript. Please see page 6, lines 235-243:

“We developed a probability-tree model to assess potential deaths averted, total vaccination costs, and cost per death averted assuming vaccination scale up to 100% coverage in LIC/LMIC. We assumed the main COVID-19 variant to be Omicron, which leads to less severe disease than the prior Delta variant but has greater transmissibility and immune escape. The model assumed that all unvaccinated and previously uninfected individuals and some individuals with previous immune protection would be infected with COVID-19 within the year, which was the timeframe of our model, and some percentage of those infected would die based on infection fatality ratios (IFRs) estimated for the Omicron variant for spike naïve, previously infected, and vaccinated individuals.”

Many more essential concepts like from what perspective was the study conducted, discounting rate application, time horizon, etc are missing. Hence, it is essential for the authors revise the manuscript and provide a detailed description on these major methodological issues.

Author Response: The timeframe of the model is one year, as we assumed that all persons previously uninfected and unvaccinated (and some with previous infection and vaccination) would get COVID within the year. While we discuss that assumption within the manuscript, we did not make the time horizon clear and have added that clarification to the manuscript (page 6, lines 240-241):

“We assumed that all persons previously unvaccinated and uninfected and some individuals with previous immune protection would be infected with SARS-CoV-19 within the year, which was the timeframe of our model. We further assumed that some percentage of those infected would die based on infection fatality ratios (IFRs) estimated for the Omicron variant for spike-naïve, previously infected, and vaccinated individuals.”

As the time horizon of the model is only one year, we did not discount outcomes. This has now been made clear within the manuscript (page 6, lines 243-244):

“No discounting of outcomes was used given the short (one-year) timeframe of the analysis.”

The only costs we considered in the model were those associated with vaccination. The cost perspective is therefore that of the vaccinating body, though we make no assumptions within the manuscript on who that vaccinating body is. This clarification has also been added to the manuscript (page 6, lines 244-245):

“As the only cost included in analysis was the cost of vaccination, the perspective is that of the vaccinating body, whether that be within-country or international.”

Reviewer: 2

Comments to the Author:

The authors have asked a very pertinent question with respect to the COVID-19 scenario. However lack of reproducibility seems to be a major concern. The clean data sources used and the scripts used for the modelling purpose are missing, submission of which in any open source repository is needed.

Author Response: We have now made all code available in an open-source repository on github, which can be accessed here: <https://github.com/ASavinkina/COVIDVaccineEquity>

This will permit interested readers to reproduce all of our results and to explore any additional data scenarios of interest. We will work with the journal’s editorial staff to determine how the availability of this resource should be reported in the manuscript.

VERSION 2 – REVIEW

REVIEWER	Yuvaraj Krishnamoorthy JIPMER PSM
REVIEW RETURNED	01-Aug-2022

GENERAL COMMENTS	Thank you for addressing all the comments
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REVIEWER	Jit Sarkar Elucidata, Customer Success Team
REVIEW RETURNED	01-Aug-2022

GENERAL COMMENTS	Thanks for addressing all the issues. Best of Luck!!!
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