

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Could COVID-19 Pandemic be Stopped with Joint Efforts of Travel Restrictions and Public Health Countermeasures: a modelling study
AUTHORS	Kong, Lingcai; Hu, Yi; Wang, Qiang; Chen, Xinda; Yao, Tong; Wang, Yu; Jin, Hui; Fan, Lijun; Du, Wei

VERSION 1 – REVIEW

REVIEWER	Jean-David Zeitoun Centre d'Epidémiologie Clinique Hotel Dieu Hospital, APHP, Paris, France
REVIEW RETURNED	22-Nov-2020

GENERAL COMMENTS	<p>Thank you very much for providing me to review this manuscript dealing with an important question regarding the current pandemic. The manuscript is well written, well presented and seems to present its findings in an honest manner. I'll propose some sporadic comments regarding the intro and methods and I'll then make a general comment.</p> <p>Intro</p> <p>In the first sentence, authors should add that emerging diseases are favoured in general by the systematic manipulation of nature by humans, not only through cross species interaction yet also through weakening of natural barriers to disease emergence and persistence.</p> <p>Authors could also add that non-pharmaceutical interventions implemented in China were exceptionally stringent as compared to most other countries. By the way, this is acknowledged later in the manuscript: "Selection of intervention strategies...". I'm sorry yet I don't understand this sentence.</p> <p>"WHO commented that..." I think that there is a "more" missing before "harm" or something like that.</p> <p>Methods</p> <p>Total number of seats taken as a proxy for passengers. This assumption should be better detailed since it seems challenging to me.</p> <p>Then, I have two general comments.</p> <p>First, I found that authors gave little room for discussing the timing of implementation of public countermeasures. While the spread of the pandemic follows an exponential pattern, it seems critical to me to emphasize that point.</p> <p>Second, even though I know that comparison between models is not a trivial task, authors could still discuss a little more their findings as compared to others.</p>
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REVIEWER	Dr. Manas Pratim Roy Ministry of Health and Family Welfare India
REVIEW RETURNED	24-Nov-2020

GENERAL COMMENTS	Excellent effort. There were several other factors including complex human behaviors that determine the spread of the pandemic. It is not right to consider travel as the only factor responsible for such spread. What is the value of adding D column in Table 1? Effective contact rate was not equal in different countries other than China. In fact, rest of the world should never be considered as single unit. R0 considered in the paper seems to be too high.
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Dr. Jean-David Zeitoun, Hotel-Dieu Hospital Clinical Epidemiology Centre, Hospital Saint-Antoine
Comments to the Author:

Thank you very much for providing me to review this manuscript dealing with an important question regarding the current pandemic.

The manuscript is well written, well presented and seems to present its findings in an honest manner. I'll propose some sporadic comments regarding the intro and methods and I'll then make a general comment.

Response:

We are appreciative of the comment.

Intro

1. In the first sentence, authors should add that emerging diseases are favoured in general by the systematic manipulation of nature by humans, not only through cross species interaction yet also through weakening of naturel barriers to disease emergence and persistence.

Response:

We have made the requested change, which now reads (Introduction, page 3) "... by the systematic manipulation of nature by humans, not only through a variety of factors, including population growth, cross-species interactions, climate change, and international travel and trade, yet also through weakening of naturel barriers to disease emergence and persistence".

2. Authors could also add that non-pharmaceutical interventions implemented in China were exceptionally stringent as compared to most other countries. By the way, this is acknowledged later in the manuscript.

Response:

We have made the requested change, which now reads (Introduction, page 4) "decline of COVID-19 cases in China showed the effectiveness of non-pharmaceutical public health interventions, with their implementation exceptionally stringent as compared to most other countries".

3. "Selection of intervention strategies...". I'm sorry yet I don't understand this sentence.

Response:

We have made the requested change, which now reads (Introduction, page 5) "Selection and implementation of intervention strategies appeared to be different across countries and regions in

their responses to the early sign of disease spread, which could explain in part the current COVID-19 pandemic”.

4. “WHO commented that...” I think that there is a “more” missing before “harm” or something like that.

Response:

We have made the requested addition (page 5).

Methods

5. Total number of seats taken as a proxy for passengers. This assumption should be better detailed since it seems challengeable to me.

Response:

We have made revisions, which now read in the Method section (page 5) “Although number of travelers would most accurately reflect the population mobility, this exact information was not available; hence, we used the aircraft seating capacity as the best available proxy measure for analysis relating to number of travelers” and (page 5-6) “Individuals’ movements across different countries, which were estimated by the aircraft seating capacity as the proxy for number of travelers, were processed with scheduled events, causing the change of the population in each country”.

Then, I have two general comments

6. First, I found that authors gave little room for discussing the timing of implementation of public countermeasures.

Response:

We have made a revision, which now reads (Discussion, page 9) “Our modelling results showed that COVID-19 transmission could be contained by timely and intensive travel restrictions and public health countermeasures with multinational joint efforts implemented at the early stage of spread, and consequently the risk of becoming pandemic could perhaps be mitigated. Haug et al. quantified the change of R_t (i.e., the effective reproduction number of COVID-19) in relation to different implementation time of non-pharmaceutical interventions, and reported that the earlier implementation was associated with more benefits.²² China’s rapid responses to the COVID-19 spread also demonstrated a successful case in the real world.⁵ While the spread of the pandemic follows an exponential pattern during the initial growth phase, it is particularly important to uptake the effective intervention strategies as early as possible, especially when facing the COVID-19 resurgence spread at present”.

7. While the spread of the pandemic follows an exponential pattern, it seems critical to me to emphasize that point

Response:

We have made a revision, which now reads (page 9) “While the spread of the pandemic follows an exponential pattern during the initial growth phase, it is particularly important to uptake the effective intervention strategies as early as possible, especially when facing the COVID-19 resurgence spread”.

8. Second, even though I know that comparison between models is not a trivial task, authors could still discuss a little more their findings as compared to others

Response:

We have made a revision, which now reads (Discussion, page 9) “Reduction in cumulative infections and local transmissions of COVID-19, were somewhat attributed towards the aggregated public health countermeasures, and to a much lesser extent, international travel restrictions, which was consistent with previous studies using a similar analytic approach. Chinazzi et al reported impose travel restrictions on mainland China had a modest effect on the epidemic trajectory.²³ Wells et al showed

that the travel restrictions as well as airport screening enforced in China and other countries were insufficient to contain the COVID-19 spread around the world.¹⁰ Russell et al found that in general stringent travel restrictions might have little impact on the epidemic dynamics²⁴".

Reviewer: 2

Dr. Manas Roy, Vardhman Mahavir Medical College and Safdarjung Hospital

Comments to the Author:

Excellent effort.

1. There were several other factors including complex human behaviors that determine the spread of the pandemic. It is not right to consider travel as the only factor responsible for such spread.

Response:

We agree with that the COVID-19 pandemic was associated with complex human behaviors for example various compliance patterns from different countries in relation to social distancing and mask wearing. For example, China demonstrated a success control of COVID-19 spread, including rapid responses from the authorities, the establishment of COVID-19 surveillance system, the grid-network of community-based health checkpoints across the nation, and high-compliance with countermeasures in residents.^{a-c} All these efforts encouraged the hypothesis that such collective effort of public health would contribute the most of reduction in disease spread. In addition, the current study period represented the disease spread in its infancy. Should all countries uphold a similar approach to what China has responded to the COVID-19 outbreak, the current pandemic could have been avoided or at least its risk could have been largely mitigated.

We have made a further explanation, which now reads (Discussion, page 9) "Reduction in cumulative infections and local transmissions of COVID-19, were somewhat attributed towards the aggregated public health countermeasures, and to a much lesser extent, international travel restrictions. Given several factors including complex human behaviors that could determine the spread of the current pandemic, lessons learnt from China's experience could be informative to initiate multiple public health countermeasures such as the grid-network of community-based health checkpoints,⁵ when facing a COVID-19 resurgence spread at present. Our study findings emphasized again the importance of carrying out collaborative public health countermeasures rather than simply placing travel restrictions".

a. Burki T. China's successful control of COVID-19. *Lancet Infect Dis.* 2020;20(11):1240-1241.

b. Zhang Y, Zhao Q, Hu B. Community-based prevention and control of COVID-19: Experience from China. *Am J Infect Control.* 2020;48(6):716-717.

c. Guo Y, Li Y, Monroe-Wise A, et al. A dynamic residential community-based quarantine strategy: China's experience in fighting COVID-19. *Infect Control Hosp Epidemiol.* 2020;41(11):1363-1364.

2. What is the value of adding D column in Table 1?

Response:

The D column refers to the lack of any public health countermeasures, neither in China nor elsewhere around the world, representing an extremely adverse option. We have restructured the presentation (please see new Table 1 in the revised manuscript).

3. Effective contact rate was not equal in different countries other than China. In fact, rest of the world should never be considered as single unit.

Response:

We considered every country as a connection point during the early spread of COVID-19, and found substantial variation in the geographic spread across countries, to some extent reflecting heterogenous contact rates in different countries. We presented summary statistics around the world in relation to the COVID-19 spread, with which informed recommendation was made to encourage the global uptake of effective public health countermeasures. We have made a further clarification, which now reads (Discussion, page 11) "Second, the finding of substantial variation in the geographic

spread across countries reflected heterogenetic contact rates in different countries. Although the summary statistics around the world demonstrated a global benefit by means of public health interventions, each member state is encouraged to select appropriate countermeasures in its own setting to minimize the risk of COVID-19 resurgence spread becoming endemic”.

4. R0 considered in the paper seems to be too high.

Response:

The R0 value for COVID-19 was estimated to be 2.2 (95% CI, 1.4 to 3.9) at the earliest stage. As it spread around the world, different values for R0 were estimated with very high heterogeneity. A systematic review presented an R0 estimate of 2.87 (95% CI, 2.39–3.44).^d A preprint submitted to the Bulletin of the World Health Organization estimated a range of R0 values with the mean of 3.76 and the median of 3.51 for the Middle East countries. Another study published in PNAS used an estimate of 3.60.^f Therefore, given the study period corresponded to a relatively early stage of the disease spread, the estimated R0 value of 2.35 was acceptable per se.

d. Li Q, Guan X, Wu P, et al. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus–Infected Pneumonia. *New England Journal of Medicine* 2020 doi: 10.1056/NEJMoa2001316

e. Billah MA, Miah MM, Khan MN. Reproductive number of coronavirus: A systematic review and meta-analysis based on global level evidence. *PLOS ONE* 2020;15(11):e0242128. doi: 10.1371/journal.pone.0242128

f. Gatto M, Bertuzzo E, Mari L, et al. Spread and dynamics of the COVID-19 epidemic in Italy: Effects of emergency containment measures. *Proceedings of the National Academy of Sciences* 2020;117(19):10484-91. doi: 10.1073/pnas.2004978117

VERSION 2 – REVIEW

REVIEWER	Zeitoun, Jean-David Hotel-Dieu Hospital Clinical Epidemiology Centre, Clinical Epidemiology Centre
REVIEW RETURNED	08-Mar-2021

GENERAL COMMENTS	The authors adequately addressed my suggestions and comments I congratulate them again for their work
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REVIEWER	Roy, Manas Vardhman Mahavir Medical College and Safdarjung Hospital, Department of Pediatrics
REVIEW RETURNED	27-Jan-2021

GENERAL COMMENTS	Changes are satisfactory.
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