Reviewer’s report

Title: Evaluation of the potential incidence of COVID-19 and effectiveness of containment measures in Spain: a data-driven approach

Version: 0 Date: 09 Apr 2020

Reviewer: Antoine Allard

Reviewer's report:

I liked the manuscript in general and found it straightforward to read and to understand. The efficiency of containment strategies to fight the spread of COVID-19 is a very timely topic, especially since the situation is changing very fast and because dramatic events are still unfolding on a daily basis.

I believe the main conclusions of the manuscript are sound and highlight the importance of contact tracing and of being able to identify and isolate new cases quickly; a strategy that has been applied in many countries where the progression of the pandemic has been limited.

My main issue with the manuscript is directly related to its timeliness. The manuscript has been submitted (on March 10th according to medRxiv) only a few days before the state of emergency was declared in Spain (on March 14th). Consequently, some of its analysis, for instance with respect to a total shutdown of the country

"These measures are extreme and unless the situation gets really critical, would not be put into practice as they bear an economic cost that would be insurmountable." (line 180)

already sound dated. There are also several comments about the existence of asymptomatic transmissions "currently under debate and not yet statistically supported" (line 219) that should be updated (see comment 2 below).

Granted, the authors could not have anticipated all these changes a month ago, even though they did so to a certain extent. Therefore, my recommendation would be to adjust some of their claims in a new version of their manuscript so that a published version would reflect the current situation in Spain and our current knowledge on COVID-19 as much as possible.

Here are a list of questions/comments that should be addressed in a future version:

1) "[...] at each time-step, we sample the number of individuals on the move from each province [...]" (line 71)

Q. Are individuals sampled uniformly within each province?
Q. Do individuals that moved, say, from Barcelona to Madrid are more likely to come back to Barcelona (imagine someone on a business trip)? Or once an individual has moved to another province, are they as likely to move back to their original province as any other individual in that other province? If so, do the authors know if this choice impacts their conclusions? For instance, if I am infectious and live in Madrid and I go to the beach for a weekend, I may infect people over there, but not as much as if I move and stay there for a long time.

2) "[...] exposed (E) if they have been infected but are still asymptomatic and cannot infect other individuals; [...]" (line 95) and "Asymptomatic spreading is still under scrutiny and the statistical evidences are scarce and not significant enough as to be taken by granted." (line 115) and "asymptomatic individuals who are able to spread the disease, something that is currently under debate and not yet statistically supported." (line 219). (also in abstract)

Q. I agree that there are still many unknowns regarding the natural history of COVID-19. However, while truly asymptomatic transmission has yet to be demonstrated (i.e., transmission from carriers of SARS-CoV-2 that are asymptomatic throughout the course of the disease), it is my understanding that it is now commonly accepted that pre-symptomatic individuals can transmit the virus (i.e. carriers of the virus that will develop symptoms later on but do not have symptoms at the moment of the transmission). While the authors already address the potential effect of asymptomatic transmission on their results (line 218), I believe the authors should adjust the way they talk about it throughout the manuscript.

3) A table summarizing the parameters used in the model and their values would be useful.

Q) The probability $P(S \to I)$ should read $P_i(S \to I)$ since its value is specific to province $i$.

Q) There is a typo: the subscript $i$ should be at the exponent.

Q) The authors should provide the units of the variables they use.

5) Did the authors do any sensibility analysis for the uncertainty regarding the value of $R_0$ (like they did for the length of the mean incubation and infectious periods)?

6) I would recommend using another layout for Figure 4. It is very hard to read and the angular positions do not provide information. Would a simple histogram be able to convey the message? Or perhaps some sort of timeline?
7) Could the authors discuss how their approach compares to that of https://doi.org/10.1101/2020.03.21.20040022 used to produce these maps (https://covid-19-risk.github.io/map/)?

8) There are a few typos throughout the manuscript

- In silicon is the Latin phrase, but typically people use in silico (accepted by Meriam-Webster and Oxford) (line 23)
- time step (line 71)
- statistical evidence is (line 115)
- I believe "containment" is more appropriate than "contention".
- "[...] has the advantage of allowing directly the implementation and evaluation [...]" (line 65)
- "[...] washing more frequently one's hands [...]" (line 231)

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

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Not applicable

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

Not relevant to this manuscript

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