

# Review of: "A Multi-factor Model of COVID-19 Epidemic in California"

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**Potential competing interests:** No potential competing interests to declare.

The study is very interesting and the obtained results are suitable for a paper in a journal.

The paper is about a multi-factor model applied on Covid-19 data in California using a combination of five different factors (population, population density, family income, Gini coefficient and land area) to estimate the cumulative cases and the duration of infection in 58 different counties.

- In my opinion, there are some things to improve:

You need to define better the structure of the paper: usually is useful to have the "Introduction", "Data and Methods", "Results", "Discussion" and "Conclusion" sections, in this order.

- The section "What Is a Multi-factor Model?" includes too much details on data and few details on what is a multi-factor model. You could rename this section as "Introduction" and move the details on data in an other section (e.g. "Data and Methods"). In the "Introduction" section you can put all the state-of-the-art and the description of what you did. I suggest you telling a story in a way that comes naturally why you need to use a multi-factor model. Which are the advantages/disadvantages of the other epidemic models? Which are the advantages/disadvantages of your method? Which are the novelties with respect to the state-of-the-art?
- Enrich the state-of-the-art on epidemic models (in the first row of the "What Is a Multi-factor Model?" you talk about models; put some references).
- In the second paragraph of the "What Is a Multi-factor Model?" section you talk about diffusion rates. By diffusion rate to me comes to mind the infection rate because, for example, the recovery rate and the death rate are not diffusion rates, are simply rates.
- In the second paragraph of the "What Is a Multi-factor Model?" section you define the death rate using the death rate itself and without introducing the SIRD or SEIRD compartmental model.
- I suggest you to add this reference ([Colizza, Vittoria, et al. "Epidemic modeling in complex realities." \*Comptes rendus biologies\* 330.4 \(2007\): 364-374.](#)) when you talk about more elaborate models that incorporate additional factors and network models.
- I suggest you to move all the details on data in the section "What Is a Multi-factor Model?" in a different section. You can put simply a summary here.
- In the section "Methods and Models" move the second paragraph in the introduction.
- You could put the sections "Single Factors", "Combining Factors", "Factors in High/Low Cumulative Cases" and "Predictive Power" inside a "Results" section.

- Put the "Discussion" section before the "Conclusion" section.
- Do not split the references in "Citations" and "Bibliography". Use for example the title "References" or "Bibliography".
- There are some typo.

I saw that the second version of the preprint has already improved a lot from the first version, congratulations.

Overall the study is very good and interesting.

Good luck!

Kind regards,

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