

The probability of the 6-week lockdown in Victoria (commencing 9 July 2020) achieving elimination of community transmission of SARS-CoV-2

IN REPLY: In response to the letter by Crammond and Kishore, we would like to make a few points.

Firstly, the authors overly conflate two pieces of work. The *MJA* article¹ was prepared before any engagement with the Victorian Department of Health and Human Services.

Secondly, Crammond and Kishore incorrectly assert that we assume population homogeneity in the model. The heterogeneity in our model included variance in the over 60s population and individual-level variables, outlined in the Overview, Design concepts and Details (ODD) protocol.² For example, the model explicitly defines essential workers as a subpopulation (ie, health care workers, cleaners, carers). Like the real world, infection rates are much higher among essential workers in the model (around three times higher) than the general population.

Similarly, the model also identifies students and adjusts the likely asymptomatic status of people by age ranges, as well as the risk of infection,

school attendance, transmission, and symptomatic illness.




The example Crammond and Kishore offer of tea-room changes in hospitals being ignored and therefore rendering the work invalid is erroneous. A population-level policy model representing 6.4 million people could not and should not hope to include detailed interactions within hospital tea rooms any more than it would include interactions in abattoir bathrooms. Rather, a model should describe generic locations where reducing frequency of contacts can result in transmission reduction, wherever and however that is translated and achieved at the local level.

The authors' consequent assertion that the "global transmissibility" variable is undefined or cannot be correct is wrong. To quote the ODD protocol, "a [global transmissibility] setting that controls the likelihood of transmission between an infectious person and a susceptible person per close contact. This can be altered in conjunction with the number of contacts per day to calibrate the [reproduction number (R_0)] in the early stages of the model".²

A transmissibility rate of 0.30 (or 0.016 as used in the Burnet example; or any other number between 0 and 1)³ could be used under circumstances where the definition of close contacts per day varied or the transmissibility of a strain (eg, Alpha variant) altered.

In his 1976 essay, George Box⁴ said that "all models are wrong". He then went on to say that because models are wrong, the scientist cannot obtain a correct model by overparameterisation — "this is the mark of mediocrity". He remarked that in modelling it is essential to be alert to what is importantly wrong — "it is inappropriate to be concerned about mice when there are tigers abroad". We have tried to focus on tigers, not mice.

We finish on agreement with Crammond and Kishore that any concurrence between the actual model and reality is attributable to chance. However, on three occasions we have used the base model representation to accurately project severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection trends in Australia, New Zealand and Victoria. We remain satisfied with its performance to date while welcoming constructive ideas for improvement.

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Competing interests: No relevant disclosures. ■

doi: [10.5694/mja2.51157](https://doi.org/10.5694/mja2.51157)

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- 4 Box GEP. Science and Statistics. *J Am Stat Assoc* 1976; 71: 791–799. ■