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

To the Editor: In their article, Blakely and colleagues[1] describe an infectious disease model for simulating the effect of a lockdown on the transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

Although we cannot say this work determined pandemic policy, two of the authors have described their close collaboration with the Victorian Government, culminating in the release of a road map to reopening[2] based directly on, and released alongside, their modelling.[3]

The model is stochastic and agent-based, with 2500 individuals moving around a model space. When both an infected and a susceptible person land on the same patch, there is a probability of transmission. Some individuals are marked as being essential workers; population homogeneity is otherwise assumed.[4]

Models are necessarily abstractions from reality; it is neither possible nor relevant to include every population group. The question is whether the model effectively captures the dynamics of infection.

The combination of model type and population structure has a surprising result. People in the model can only be infected by moving around, and a lockdown is simulated by a reduction in the pace and frequency of movement. At a technical level, the model's mechanics guarantee the effectiveness of a population-wide lockdown because it most extensively reduces movement. It is hardly surprising that Blakely and colleagues refer to a lockdown as an "opportunity".[1]

The assumption of population homogeneity is robust to exceptions, but only to a point. Using official data, we estimate that, in Victoria, the odds of an aged care worker becoming infected were almost 12 times that of the general population (odds ratio [OR], 11.81; 95% CI, 11.76–11.87). For health care workers, the odds were more than three times higher (OR, 3.19; 95% CI, 3.14–3.23).[5] At this level of contact and risk heterogeneity, the model cannot reflect the true virus dynamics.

Throughout the period covered by the model predictions, interventions targeted at health care settings were implemented. These interventions, such as closing hospital tea rooms and changing aged care working conditions, cannot be factored into the model predictions because health and aged care workers are not included in the model.

By failing to specifically consider the populations that drove the epidemic or the interventions targeted at those populations, any ultimate concurrence between the actual and predicted numbers can only be attributable to chance.

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Competing interests: No relevant disclosures. ∎

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