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Feasibility of controlling COVID-19

Authors' reply

We thank Nian Xiong and Zhicheng Lin for their letter. The on-the-ground experience of medical workers is important for building appropriate models and correctly interpreting their results.

In our Article, we defined control as the absence of new infections between weeks 12 and 16 after the start of the outbreak. To achieve control in the model, the outbreak also had to stay at fewer than 5000 cumulative cases. We chose our time points as an approximate range for the length of a short outbreak, and the size of the outbreak for practical reasons, and checked that modelled epidemics that were controlled were never close to reaching 5000 cases. Xiong and Lin certainly raise interesting points about what control could alternatively mean for larger epidemics, but the model was specifically designed to address what control might mean in the context of introductions in new areas.

We defined onset as showing symptoms of infection, not viral detection or other approaches that the authors mention. The model simulates isolation on symptom onset among identified contacts of individuals who test positive. We agree that a lack of sensitivity in the tests used to identify cases, as well as the non-specificity of coronavirus disease 2019 (COVID-19) symptoms such as fever, could make achieving control by contact tracing challenging.

Although long incubation periods have been reported, studies have estimated that 95% or more of incubation periods are shorter than 12·5 days (in the article Xiong and Lin cite),[1] shorter than 11·1 days (in the article we used in our model),[2] and shorter than 11·5 days (in a pooled analysis).[3] The authors mention asymptomatic infection, which we called subclinical and separated from infections that resulted in symptoms in the model. We did not include treated patients who had been discharged as a source of infection—in the model, individuals are isolated on presentation with symptomatic disease and have no further involvement in transmission. If post-discharge transmission occurred, it would likely make control (as defined in the model) difficult to achieve.

Our model was not focused on the epidemic trajectory in Wuhan, nor on interventions apart from contact tracing and isolation of cases early in an outbreak. Other models have been used to investigate the rise, control, and subsequent decline of the outbreak in Wuhan and beyond.[4,5]

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