Feasibility of controlling COVID-19

We read with interest the modelling study by Joel Hellewell and colleagues,[1] on the feasibility of controlling outbreaks of coronavirus disease 2019 (COVID-19) by isolation of cases and contacts. We agree that six main parameters must be considered in predicting the epidemiology—namely, number of initial cases, viral reproduction, isolation delay, tracing probability, asymptomatic transmission (considering a case incubation period of 5·8 days), and subclinical infection.

The COVID-19 pneumonia, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), initially broke out in December, 2019, in Wuhan, China. SARS-CoV-2 was traced to the Huanan Seafood Wholesale Market and is postulated to have bat origin.[2] During the past three months, information has accumulated on the transmissibility and clinical characteristics of this zoonotic pathogen, which are largely mirrored by the six parameters addressed by Hellewell and colleagues. However, several questions have been raised retrospectively regarding the clinical values of their modelling.

An initial concern was the definition of outbreak control, which seemed to be the focus of the modelling. A clear definition could have improved interpretation of the modelling work. Control could mean either complete isolation of all infected individuals, or an observed turning point of daily new cases as a result of isolation efforts. Complete isolation is difficult to measure because of asymptomatic infections.[3] Another crucial factor is the definition of infection and disease onset, because the success of control in terms of isolating all those infected is related to the delay in symptoms. Clinical manifestations, nucleic acid detection, and radiological approaches can all be used to identify an infection. The routine diagnostic procedure has been detection of fever, followed by SARS-CoV-2 nucleic acid detection for confirmation, but neither are highly accurate or sensitive,[4] making case identification challenging. Furthermore, more recent data indicate that the case incubation period can range widely, from 0 days to 24 days (mean of 6·4 days),[5] related to asymptomatic transmission. A third factor to consider is postdischarge quarantine. Some discharged patients will still carry the virus, as we and others have observed,[4] and these people are potentially a source of infection. Finally, post-isolation travel from countries with ongoing outbreaks can cause an additional, albeit minor, introduction of cases.

In Wuhan, daily new cases peaked after 29 days of deploying extensive quarantine measures throughout the city, after which new cases dropped, first steadily and then sharply. We now pose the question: how do these observations support the mathematical modelling?

We declare no competing interests.

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