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Managing COVID-19 importation risks in a heterogeneous world



In 18 months, the COVID-19 pandemic has caused more than 4 million deaths worldwide. The stringent control measures implemented to mitigate its impact on health and health-care systems have been associated with major costs for society, devastating whole economic sectors such as the international travel and tourism industry. Mass vaccination campaigns with vaccines that are safe and effective should end the most acute and challenging phase of the pandemic. There is great hope that vaccination will allow a full return to normal life, characterised by a complete relaxation of control measures and reopening of borders. This prospect, however, is associated with the risk of an epidemic rebound if relaxation is implemented too quickly.

In *The Lancet Public Health*, Kathy Leung and colleagues' modelling analysis examines how within-country and border restrictions might be relaxed as vaccine coverage increases.¹ The study—which used Hong Kong as a case study and then applied the model to 304 jurisdictions—shows it will be difficult to quickly come back to normal life. Given the very high transmissibility of the delta (B.1.617.2) variant and the imperfect efficacy of vaccines, Leung and colleagues anticipate that even with vaccine coverage of 80%, some control of community transmission might be necessary to avoid overwhelming health-care systems. These results are consistent with other modelling studies.^{2,3} On a more positive note, with high vaccination coverages, the intensity of measures necessary to avoid an epidemic rebound should be much lower than what was required in the pre-vaccination era.² Importantly, these measures might also be more targeted, limiting disruptions and leaving a larger part of the population unaffected.⁴

Before the COVID-19 pandemic, the implementation of border restrictions was expected to only have a small effect on international disease spread, allowing at best a slight delay in dissemination.^{5,6} However, these assessments did not consider the set of radical measures that have been implemented during this pandemic; a rethink of this stance is probably necessary to capture the realities of this unprecedented crisis. The management of the risk of re-introduction of

COVID-19 from international travellers will probably remain a complex and hotly debated question in the coming months as the pandemic becomes ever more heterogeneous, with vastly different vaccine coverage, incidence, and circulating variants around the world. The modelling analysis by Leung and colleagues is, therefore, particularly timely and relevant in that it highlights key factors that need to be considered and offers a first analytical framework to support risk assessment and management.

A sensible management of the risk of re-introduction needs to account for the local epidemiological situation of the destination country as well as its economic dependence on international travellers. For example, border control appears largely irrelevant when viral circulation is high in the destination country because local cases are driving the epidemic.⁷ By contrast, border control is essential for countries that have achieved, and aim to maintain, zero COVID. In this context, Leung and colleagues propose an analytical framework that can help authorities to determine how international arrivals should be managed to ensure the expected number of infections among travellers remains below a threshold they deem acceptable. The framework accounts for the protocol travellers have to follow at arrival (eg, one or two tests upon arrival and the existence and duration of quarantine upon arrival), the incidence in the origin country, and the proportion of vaccinated individuals among travellers.

Making such a tool operational will require additional work. The primary challenge is to obtain robust surveillance data documenting the levels of viral circulation in all countries, with the risk that countries with poor surveillance are simply excluded from international travel. To improve estimates of incidence in origin countries, countries could use the testing data they collect at points of entry to complement international data. This approach would require countries to work together and combine their data to obtain sufficient power. Such international collaboration would seem particularly natural in settings such as the European Schengen area, where countries have a long history of working together on border management.

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It is also essential to account for circulating variants in such risk assessments since variants that partly escape immunity represent an important threat for vaccinated populations globally.

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