LAY SUMMARY

The temporal association of introducing and lifting non-pharmaceutical interventions with the time-varying reproduction number (R) of SARS-CoV-2: a modelling study across 131 countries

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In the first quarter of this year, several countries introduced different public health measures, such as school closure, social distancing and lockdowns, to control the spread of novel coronavirus (SARS-CoV-2) in the community. Starting from May 2020, some countries decided to lift some of these measures and subsequently, the number of daily reported COVID-19 cases have surged again. In response, a number of countries have now re-introduced some of these public health measures.

The study led by researchers from the University of Edinburgh Usher Institute modelled the effect of individual public health measures on SARS-CoV-2 transmission (indicated by reproduction number or R), using data from 131 countries. The authors found that school closure, workplace closure, ban on public events, requirements to stay at home and limits on internal movement could individually reduce R by a range of 3–24% 28 days after their introduction, with the highest reduction found for bans on public events (24%). They reported that re-opening schools, lifting bans on public events, lifting bans on gatherings of more than ten people, lifting requirements to stay at home and lifting internal movement limits could individually increase R by a range of 11–25% 28 days after the introduction of these relaxations.

The study found that the effect of introducing and lifting these measures was not immediate. It took about one week to see a substantial (60%) reduction in R and even longer (about 3 weeks) to see a substantial increase in R.

The authors further modelled four candidate (incremental) public health measures to tackle a resurgence in COVID-19 cases. The first candidate, which included bans on public events and gathering of more than 10 people, could reduce R by 6% on the 7th day, 13% on the 14th day and 29% on the 28th day after introduction. The second candidate, which added workplace closure to the first candidate, could reduce R by 16% on the 7th day, 22% on the 14th day and 38% on the 28th day. The third candidate, which added internal movement limits to the second candidate, could reduce R by 19% on the 7th day, 24% on the 14th day and 42% on the 28th day. The fourth candidate, which added school closure and requirements to stay at home to the third candidate, could reduce R by 35% on the 7th day, 42% on the 14th day and 52% on the 28th day.

These findings provide additional evidence that can inform policymaker decisions on which public health measure(s) to introduce or lift as well as when to expect a noticeable effect following the introduction or the relaxation of such measures.