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Lessons from New Zealand's COVID-19 outbreak response

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In the absence of a vaccine for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), or of highly effective pharmaceutical treatments for COVID-19, countries have implemented a large range of non-pharmaceutical interventions to control the spread of the virus.[1] These interventions differ in their level of stringency (ie, the severity of the measures) and their ultimate objective (eg, prevent health systems being overwhelmed, suppress incidence to low levels, or reduce incidence to zero and keep it there). With many countries facing epidemic resurgence, evaluating the impact of different strategies implemented in the early phases of the pandemic is crucial for developing an effective long-term response.

New Zealand adopted a set of non-pharmaceutical interventions aiming to bring COVID-19 incidence to zero.[2] In *The Lancet Public Health*, Sarah Jefferies and colleagues[3] describe the impact of New Zealand's national response on the transmission of COVID-19 using two detailed sets of data: (1) the features of 1503 laboratory-confirmed and probable cases and (2) the list of all patients tested for SARS-CoV-2 in New Zealand between Feb 2 and May 13, 2020. The authors showed that many transmission chains started from younger imported cases, with a total of 575 imported cases and 459 import-related cases, and reached more vulnerable parts of the local population further down the chain (eg, residents of residential care facilities). Locally acquired cases were older, came from lower socioeconomic backgrounds, and were more likely to be associated with severe outcomes than imported cases (crude odds ratio 2·32, 95% CI 1·40–3·82). The authors highlight that transmission chains were spread out across the country, with the highest incidence in popular tourist areas, and large transmission events such as weddings led to transmission chains containing multiple age groups. Similar dynamics have been reported elsewhere—eg, in Europe where young adults were infected upon visiting ski resorts and returned with the infection to their countries.[4] The reconstruction of detailed epidemiological links is paramount to improve understanding of the spread of SARS-CoV-2 and keep close surveillance on settings with high risk of transmission.[5]

Identifying transmission chains before they spill over into vulnerable populations relies on detecting new importations, finding existing transmission chains through widespread testing and contact tracing, and isolating new cases and quarantining their contacts. Jefferies and colleagues highlight that this was achieved in New Zealand thanks to the rapid improvements in testing capacity and case management: by late April, the time from onset of symptoms to notification had been reduced from 9·7 days (95% uncertainty interval 8·8 to 10·7) to 1·7 days (1·2 to 2·2), and the time from onset to isolation from 7·2 days (6·3 to 8·2) to –2·7 days (–4·7 to –0·8), meaning that people were isolating an average of 2·7 days before illness onset. Therefore, cases were isolated from the community promptly, reducing the risk of onwards local transmission. From mid-April onwards, higher-risk groups were targeted for tests by population testing surveys to avoid undetected circulation of the virus. Nevertheless, the authors report only 25 asymptomatic infections in the dataset, which corresponds to 1·7% of all cases. This is much lower than the commonly reported proportion of asymptomatic infections in COVID-19 outbreaks, which varies between 20% and 40%.[6] This finding suggests that many asymptomatic individuals remained undetected despite targeted testing of groups less likely to show symptoms in the late phases of New Zealand's epidemic. Comparing setting-specific serosurveys and surveillance data could reveal the profile of infections that New Zealand's surveillance system struggled to identify, thus highlighting an area for improvement in the infection detection process. This could also indicate whether the detection of asymptomatic infections should be a priority, as recent genomic epidemiology studies suggest many introductions did not result in transmission chains,[7] which might be linked to a lower infectiousness of asymptomatic individuals.

The lockdown implemented in New Zealand was remarkable for its stringency and its brevity: Jefferies and colleagues show that the daily number of cases dropped below ten in mid-April, less than a month after the first increase in New Zealand's Alert Level.[8] Furthermore, although most of the cases reported by mid-March were imported, almost no further importation was observed 2 weeks after the implementation of the first travel bans and isolation orders: imported cases represented 58% (95% CI 53–62) of the cases before March 15 but

just 38% (36–41) of the total. Control of importations and local transmission in New Zealand was achieved with stringent non-pharmaceutical interventions implemented rapidly when infection numbers were low: the Alert Level escalated from 1 to 4 in 5 days, when the number of cases had just passed 1000. Such stringent measures do not always result in a rapid drop of cases: the lockdown implemented in Melbourne on Aug 5, 2020, shows that it can take months before incidence is brought to minimal levels, with measures kept in place until late September. Long-lasting lockdowns also cause major economic disruption, deterioration of mental health in the population,[9] and other indirect health consequences,[10] ultimately decreasing population compliance. As other high-income countries have reported an increasing number of cases since August, 2020, the experience of New Zealand highlights that successful non-pharmaceutical interventions rely on early decisive reactions from health authorities, performant surveillance systems, and targeted testing strategies as much as stringency.

I declare no competing interests.

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