COVID-19 Country Response Analysis – April No. 4

Summary

The global total of COVID-19 cases has surpassed 2.5 million with a case-fatality ratio of almost 7%. The US had its highest spike of 39,460 new cases on 21 April. Elsewhere, the most affected countries are experiencing declines in new cases, with the exception of the UK and Belgium, which are highly unstable. Singapore, Russia, Saudi Arabia and Peru have the highest rates of increase in new cases. The countries with attack rates higher than 200 per 100,000 are Luxembourg, Spain, Belgium, Ireland, Switzerland, Italy, US, France, Qatar, and Portugal.

Differences between countries may reflect different testing strategies.

Australia continues to report fewer than 50 new cases per day. However, the number of tests performed has dropped from a high of 14,980 on 18 April to 8,108 on 21 April.

COVID-19 and schools

In response to the coronavirus disease 2019 (COVID-19) pandemic, 107 countries had implemented national school closures by March 18, 2020. A team of researchers from UCL Institute of Child Health and other institutions has published the first broad review of evidence for the effectiveness of school closures in reducing transmission of coronavirus.

The evidence for the effectiveness of school closures and other school social distancing measures comes almost entirely from influenza outbreaks, for which transmission of the virus tends to be driven by children. Children contribute more to influenza transmission than do adults, with low levels of immunity and high levels of transmission due to symptomatic disease. However, in the COVID-19 pandemic thus far, children appear to form a much lower proportion of cases than expected.

Data from the SARS outbreak in mainland China, Hong Kong, and Singapore included in the systematic review suggest that school transmission played no substantial role in the outbreak, and that school closures and other activities such as school temperature monitoring did not contribute to control of infection transmission. Modelling studies from the COVID-19 pandemic support the use of national school closure as part of a package of social distancing measures; however, the only study to examine school closures as a separate intervention warned that the impact was relatively marginal.

Global Situation[1]

2,561,915 cases (as of 11 am AEST)
177,200 deaths

Trends

The global number of new cases (75,245) has been flat for the past three days.

The US had a major spike in new cases (39,460) on 21 April. This represents an increase of 5% from the previous day's cumulative total. Italy, Spain, France, Germany and Iran continue to show declines in daily new cases. The UK, Belgium and the Netherlands have highly unstable changes in daily new cases.

The global case-fatality ratio remains at 6.9%.

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[1] https://coronavirus.jhu.edu/

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The highest daily increases in new cases (among countries with at least 5,000 confirmed cases) on 21 April were in Singapore (13.9%), Russia (12%), Peru (9.1%), Saudi Arabia (9.1%), Qatar (8.6%), India (8.3%), Pakistan (7.6%), Belarus (7.3%), and Ukraine (7.3%).

The highest cumulative attack rates in the world are in Luxembourg (578 per 100,000), Spain (437), Belgium (353), Ireland (325), Switzerland (324), Italy (304), US (247), France (242), Qatar (227), and Portugal (210). The differences between countries may be due to different testing policies detecting more or less mild and asymptomatic cases. Australia's attack rate is 27 per 100,000 and New Zealand's is 30 per 100,000.

Australia[2]

6,647 cases (as of 11 am AEST)
74 deaths

CFR 1.1%

Total tests conducted: 439,812 (1,727 per 100,000)
Tests conducted 21 April: 8,108 (32 per 100,000)

In Australia, the number of daily tests has been falling from a high of 14,980 on 18 April to 8,108 on 21 April, equivalent to 32 per 100,000.

Issues relevant to the three stages of lifting restrictions in Australia

Are school closures effective in reducing SARS-CoV-2 transmission?

School closure and management practices during coronavirus outbreaks including COVID-19: a rapid systematic review.
Russell M Viner, Simon J Russell, Helen Croker, Jessica Packer, Joseph Ward, Claire Stansfield, Oliver Mytton, Chris Bonell, Robert Booy. Lancet Child Adolesc Health 2020. Published Online 6/Apr/2020. https://doi.org/10.1016/S2352-4642(20)30095-X

In response to the COVID-19 pandemic, 107 countries had implemented national school closures by March 18, 2020. It is unknown whether school measures are effective in coronavirus outbreaks (e.g., due to severe acute respiratory syndrome [SARS], Middle East respiratory syndrome, or COVID-19). The authors undertook a systematic review by searching three electronic databases to identify what is known about the effectiveness of school closures and other school social distancing practices during coronavirus outbreaks. They included 16 of 616 identified articles. School closures were deployed rapidly across mainland China and Hong Kong for COVID-19. However, there are no data on the relative contribution of school closures to transmission control.

The evidence for the effectiveness of school closures and other school social distancing measures comes almost entirely from influenza outbreaks, for which transmission of the virus tends to be driven by children. A 2018 review of 10 studies found that school closure reduced the peak of the related outbreak by a mean of 29.7% and delayed the peak by a median of 11 days[3].

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[2] www.COVID19data.com.au and www.health.gov.au
[3] Bin Nafisah S, Alamery AH, Al Nafesa A, Aleid B, Brazanji NA. School closure during novel influenza: a systematic review. *J Infect Public Health* 2018; **11:** 657–61.

There are several theoretical reasons why school closures might be less effective in COVID-19 than in influenza outbreaks. Children contribute more to influenza transmission than do adults, with low levels of immunity and high levels of transmission due to symptomatic disease[4]. However, in the COVID-19 pandemic thus far, children appear to form a much lower proportion of cases than expected from their population, although evidence for this is mixed and some data suggest that children might be as likely to be infected as adults but largely remain asymptomatic or have a mild form of the disease[5]. In Hubei province in China, only 2.4% of more than 70,000 cases were in children and adolescents under 19 years of age[6]. Emerging epidemiological data suggest little evidence of transmission of COVID-19 through schools in China, although this might reflect closure of schools during most of the outbreak.

Data from the SARS outbreak in mainland China, Hong Kong, and Singapore included in the systematic review suggest that school transmission played no substantial role in the outbreak, and that school closures and other activities such as school temperature monitoring did not contribute to control of infection transmission. Modelling studies of SARS produced conflicting results. Modelling studies from the COVID-19 pandemic support the use of national school closure as part of a package of social distancing measures. Yet, the only study to examine school closures as a separate intervention warned that the impact was relatively marginal, given the reasonable assumptions that household and community contacts would rise as a consequence[7].

As of April 3, 2020, Taiwan had been recognised to have effectively minimised spread of COVID-19, but with national policies that avoided widespread planned school closures and instead mandated initially local class closures, and subsequently local temporary school closures, based on low thresholds for infected cases within individual schools[8].

These findings pose a dilemma for policy makers seeking measures to protect populations. School closure presents an apparently common-sense method of dramatically reducing spread of disease and the evidence from previous influenza outbreaks appears compelling. However, policy makers need to be aware of the equivocal evidence when proposing or implementing national or regional school closures for COVID-19, given the very high costs of lengthy school closures during pandemics.

Considerations for School Closure by the US Centers for Disease Control and Prevention[9]

Recommendations on school closure based on available science, reports from other countries and consultation with school health experts.

1. There is a role for school closure in response to school-based cases of COVID-19 for decontamination and contact tracing (few days of closure), in response to significant absenteeism of staff and students (short to medium length, i.e. 2-4 weeks of closure), or as part of a larger community mitigation strategy for jurisdictions with substantial community spread (medium to long length, i.e. 4-8 weeks or more of closure).

2. Available modelling data indicate that early, short to medium closures do not impact the epi curve of COVID-19 or available health care measures (e.g., hospitalisations). There may be some impact of much longer closures (8 weeks, 20 weeks) further into community spread, but that modelling also shows that other mitigation efforts (e.g., handwashing, home isolation) have more impact on both spread of disease and health care measures. In other countries, those places

[4] Wallinga J, Teunis P, Kretzschmar M. Using data on social contacts to estimate age-specific transmission parameters for respiratory spread infectious agents. *Am J Epidemiol* 2006; **164:** 936–44.

[5] Shen K, Yang Y, Wang T, et al. Diagnosis, treatment, and prevention of 2019 novel coronavirus infection in children: experts' consensus statement. *World J Pediatr* 2020; published online February 7. DOI:10.1007/s12519-020-00343-7.

[6] Zunyou Wu and Jennifer M. McGoogan. Characteristics of and Important Lessons from the Coronavirus Disease 2019 (COVID-19) Outbreak in China. Summary of a Report of 72 314 Cases. *JAMA.* 2020;323(13):1239-1242. doi:10.1001/jama.2020.2648. February 24, 2020.

[7] Ferguson NM, Laydon D, Nedjati-Gilani G, et al. Report 9: impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. London: Imperial College, 2020.

[8] Wang CJ, Ng CY, Brook RH. Response to COVID-19 in Taiwan: big data analytics, new technology, and proactive testing. *JAMA* 2020; published online March 3. DOI:10.1001/jama.2020.3151.

[9] https://www.cdc.gov/coronavirus/2019-ncov/downloads/considerations-for-school-closure.pdf

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who closed school (e.g., Hong Kong) have not had more success in reducing spread than those that did not (e.g., South Korea).

3.   In places where school closures are necessary, the anticipated academic and economic impacts and unintended impacts on disease outcomes must be planned for and mitigated. Provision of academic support (e.g., tele-ed), alternatives for school-based meals as well as other services (e.g., behavioural and mental health services) for economically and physically vulnerable children, support for families for whom telework and paid sick leave is not available, ensuring that high risk individuals continue to be protected must all be addressed. Special consideration must be given for health care workers so that school closures do not impact their ability to work.

Optimal testing rates

Researchers at the Harvard Global Health Institute estimate the United States will need to perform at least 500,000 coronavirus tests per day in order to successfully reopen the economy[10]. This equates to 152 per 100,000 population compared with the current 150,000 tests per day, or 45 per 100,000. The report stated that this was the minimum required to implement an effective test, trace and isolate strategy. Others in the US have argued for even higher rates of testing, such as the Harvard University Centre for Ethics which proposes testing between 2% and 6% of the US population, or between 5 and 20 million people, between now and August in order to restart the economy[11]. Given the current difficulties of sourcing tests in the U.S., this scenario seems improbable. However, the Harvard recommendation is based on the high current test positivity rate in the U.S. of close to 20%. WHO recommends conducting enough tests that no more than 10% come back positive.

In Australia, by contrast, the positivity rate is just 1.5%. So, it is difficult to find evidence for a specific rate of testing here. Here, the number of daily tests has been falling from a high of 14,980 on 18 April to 8,108 on 21 April, equivalent to 32 per 100,000.

Rather than aiming for a certain per capita testing rate, it may make more sense in Australia to prioritise who is tested. There are different reasons to prioritise different groups. For example, older adults and people with chronic illnesses have a higher likelihood of developing severe conditions if they get COVID-19. First responders, health workers, teachers and others who have close contact with large numbers of people also have a high chance of getting and spreading the disease. People living in close quarters such as nursing homes or prisons also run a high risk of infection.

The other approach that needs to be considered is doing random population surveys to detect the true COVID-19 infection rate in the community. Given the low attack rate in Australia, the sample size for such surveys may need to be high, perhaps of the order of 10,000 to achieve narrow confidence intervals. These surveys could either test throat swabs for the virus or blood for antibodies (once there are reliable antibody tests available).

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[10] https://www.thecrimson.com/article/2020/4/22/harvard-coronavirus-hghi-daily-tests/
[11] https://ethics.harvard.edu/files/center-for-ethics/files/roadmaptopandemicresilience_updated_4.20.20.pdf

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