

# Three questions on COVID-19: testing, infectiousness, and school opening

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## Test, test, test: does it help to avoid lockdowns?

One of the statements that we have heard repeatedly is that countries must test, test, test. The strategy is called TTI (test, trace, and isolate). The first step is to break the chain of infection by using existing diagnostic tests to identify those who may be incubating SARS-CoV-2 and spreading it in the community. However, many countries have not been able to implement effective community testing programs for multiple reasons.

There are several types of diagnostic tests for SARS-CoV-2, and all of them have limitations, understanding as limitations both operational deployment problems and shortcomings in diagnostic accuracy<sup>1</sup>. It is not easy to quickly install laboratory capacities to sustain a surge in test demand and increase throughput, especially if they are molecular-based; reagents may run out, as happened in Chile in May<sup>2</sup>; the samples are sometimes transported to places far from the point of care requiring special logistics; and from there, once the laboratory processing is done, the results must be informed to providers and patients. In all these milestones, bottlenecks and delays can occur in limited-resource countries and those with supposedly advanced health systems, such as the United States<sup>3</sup>.

After testing comes contact tracing, a critical public health measure to slow the spread of an infection or stop it altogether. For contact tracing to occur, countries must set up trained task forces closely linked to primary care at the territorial level. Countries that lack a robust primary care system will find it more challenging to quickly implement contact tracing for COVID-19 cases. Some countries have been successful in making contact tracing the cornerstone of their response to the SARS-CoV-2 pandemic. Vietnam is a particularly interesting case where lockdown measures were adopted

right after the first cases of COVID-19 were reported in January 2020<sup>4</sup>. Fast forward to November 14, and this country of 100 million inhabitants reported only three cases of COVID-19, while Chile, on the same day, had 15 092 cases with a population of less than 20 million. When writing this editorial, "Our World in Data" reports that Vietnam did 2009 tests for October 15, while Chile had done 18 005 for the same day<sup>5</sup>.

What these data tell us is that testing is necessary, but when the virus is widely spread out in the community, which is the case in Chile, no testing will suffice to identify all symptomatic, presymptomatic and asymptomatic cases of people with COVID-19, let alone trace all the contacts of a case to break the chain of infection.

So, testing does not help avoid lockdowns, but it is essential when COVID-19 prevalence is low and all cases can be traced and effectively isolated, because as the prevalence spikes—as we see now in Europe—lockdowns become impossible to avoid. Testing capabilities will be overwhelmed, just like hospital capacity is with the care of critically ill COVID patients. Consequently, we would expect national authorities to impose lockdowns not when cases rise to out-of-control levels but when there are few, and the risk of losing traceability is still low—quite the opposite of what many countries have done. Lockdowns must be strict but self-limited, for periods of no more than a few weeks and should be coupled with strong state financial support to those who need it.

## What do we know about the infectiousness of SARS-CoV-2?

Unlike SARS-CoV-1, SARS-CoV-2 presents its highest viral load at the onset of symptoms or during the first week of illness, declining subsequently<sup>6</sup>. In other words, most of the potential for infectivity occurs in the first five days after the onset of symptoms or just before that<sup>6</sup>. Evidence dated August 2020 showed that COVID-19 patients with mild to moderate illness had a very low probability of being contagious after the 10th day of symptom onset, while patients with severe or critical forms of COVID-19 could have viral shedding for more prolonged periods<sup>7</sup>.

A person with suspect COVID-19 will seek diagnostic confirmation only when they manifest the first symptoms. Hence, SARS-CoV-2 can spread in communities from people who are carrying the virus but are still uncertain about their diagnosis or who may not want to

confirm their diagnosis due to the implications that this may have on their ability to work or send their children to school.

On the other hand, asymptomatic people can transmit the infection, as has been widely discussed in the media, but their potential for infectivity seems to be lower. The proportion of infected people who remain asymptomatic would also be lower, 20%, and could reach 31% according to some reports depending on the confirmation methods used<sup>8</sup>. The proportion of presymptomatic cases is still unknown, but the sum of asymptomatic and presymptomatic cases undoubtedly contributes to the continued spread of the virus in the population.

A way of knowing how many asymptomatic or presymptomatic community cases there are, is by mass testing groups of healthy people, something that is already being done in different parts of the world. The concern that arises from having a proportion of people who carry the SARS-CoV-2 virus but do not know it is that these people may have a larger number of total contacts by not self-isolating, contributing to the spread of the virus and the difficulty of controlling it. Likewise, when mass testing is done using tests with lower specificity, a negative result can give a false sense of security to people, resulting in a potential impact on controlling the pandemic.

The priority for public health must be set on tracing the contacts of a case starting from the date of first symptoms rather than seeking out asymptomatic cases since preliminary data show that most people who get SARS-CoV-2 will develop symptoms. Furthermore, we should always remember that a molecular diagnostic test can give a false-negative result, so when a suspect COVID-19 case is symptomatic with a negative PCR test, the test should be repeated.

## Should schools close or stay open during this pandemic?

Children are known to be key transmitters of infections such as influenza. We also know that kindergartens and schools facilitate the spread of upper respiratory diseases. Therefore, school closures reduce the spread of these diseases, which was the logic applied in the face of the COVID-19 pandemic. When the pandemic began, mitigation strategies such as mask-wearing, physical and social distancing, and frequent handwashing were not implemented at the population level. To this day, some governments persist in minimizing the importance of masks to curb COVID-19<sup>9</sup>. The evidence on school closure as a measure to control COVID-19 is scarce and inconclusive<sup>10</sup>, but the decision to close schools and daycare centers at the beginning of the pandemic was inevitable given the circumstances.

The impact of lockdowns and the absence of face-to-face classes on children and adolescents are just beginning to be investigated, and the studies carried out so far are few. Children from less developed countries will suffer the harshest consequences<sup>11</sup> because schools provide stimulation and social support in those contexts. Nevertheless, there is also an adverse impact on children living in developed countries<sup>12</sup>, and parents are also suffering from exhaustion from having to take care of their children and work remotely during periods of lockdown<sup>13</sup>.

What we know is that the viral load in COVID-19 is comparable between children and adults<sup>14</sup>; that children and young people can

get ill from COVID-19<sup>15</sup>; and that they can transmit SARS-CoV-2, even though apparently at lower rates<sup>14</sup>. Considering these realities, we must weigh all the epidemiological factors on COVID-19 in a given territory, the level of community compliance with the mitigation measures, and the negative impact that school closure has on children and caregivers. If schools are to open, it should not be for the economy (making it possible for mothers to work or avoiding the bankruptcy of private schools), a notion that underpins many governments' intent. School shutdowns should be the last measure to be implemented in the context of the current pandemic and the first to be lifted when conditions permit because they promote the development and well-being of children and their caregivers' mental health. Only then, all the actors involved (teachers, principals, parents, officials, students, school support staff, and the community where the schools are located) should be part of the decision on *how* to open. What we can conclude is that the continued closure of schools, for now, is currently not supported by evidence in that it contributes directly to mitigating the pandemic. The decision to close schools should be made based on objective, transparent, and previously agreed-upon epidemiological criteria involving the scientific community and as a last measure when all other mitigation strategies are not giving the expected results. Ultimately, the risk that schools' opening presents to the community will define whether they should be closed or not.

## Conclusion

There are many questions regarding COVID-19. In this article, I have commented on some of the issues that are being discussed on the public agenda of all affected countries: the testing strategy and restrictive measures such as lockdowns; viral shedding, and infectiousness in COVID cases; and the considerations that must be taken into account when deciding to close or open schools.

For now, the evidence is scant on many vital aspects of SARS-CoV-2 and the disease it causes: COVID-19. The scientific and public health community around the world is actively researching and publishing their findings. These findings should be reviewed and discussed to inform the best care and epidemiological mitigation measures, always putting people's health at the forefront.

## Notes

### Competing interests

The author states she has no competing interests to declare.

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