



BRIEF COMMUNICATION

To what extent do children transmit SARS-CoV-2 virus?

Concern that children might be major spreaders of SARS-CoV-2, the virus which causes COVID-19, stems largely from past experience: children are certainly major spreaders of other respiratory viral infections, such as influenza and measles. Adults infected with SARS-CoV-2 are infectious for up to 48 h before developing symptoms. Children infected with SARS-CoV-2 are often asymptomatic: 4–28% in published studies^{1–4} and 13% in the most detailed study from China.¹ Asymptomatic child carriers were important spreaders of polio during epidemics, but this does not mean that asymptomatic children often transmit SARS-CoV-2.

The evidence to date suggests that children spread SARS-CoV-2 virus relatively rarely and that children are usually infected by symptomatic or pre-symptomatic adults (in the first 48 h before they become symptomatic). During contact tracing, the China/World Health Organization joint commission recorded no episodes where transmission occurred from a child to an adult. A review of 31 family clusters of COVID-19 from China, Singapore, the USA, South Korea and Vietnam, found only three (9.7%) clusters had a child as the index case and in all three clusters the child was symptomatic.⁵


Child care clusters of COVID-19 have been notable for their extreme rarity in reports from around the world, although this could be for lack of testing. A current child care outbreak in Sydney was initiated and spread by infected adults. SARS-CoV-2 is mainly spread by droplets and through touching contaminated surfaces. Studies show SARS-CoV-2 can be detected by polymerase chain reaction in the stool of affected infants for several weeks, raising the possibility of faecal–oral spread. Reassuringly, German researchers found no live virus in stool despite viral RNA being detectable, suggesting the positive test is due to dead viral debris shed from the respiratory tract rather than active virus. One would expect child care clusters to be common if asymptomatic or mildly symptomatic pre-school children were even moderately infectious.

School outbreaks are also rare, but can be serious. New Zealand's single biggest cluster of COVID-19 was at a secondary girls' school, Marist College, Auckland.⁶ The outbreak reportedly started with an infected teacher who attended a school cultural event, following which 94 staff and pupils became infected. The extent of any child-to-child or child-to-adult spread is as yet uncertain.⁶ An unreviewed study of 15 New South Wales schools found nine staff and nine students who had tested positive for SARS-CoV-2.⁷ Only one of their 168 primary school contacts and only one of 695 secondary school contacts became infected; both were probably infected by schoolmates.⁷ It is possible that asymptomatic and mildly infected children are important transmitters of SARS-CoV-2, but the evidence to date suggests children rarely spread the virus.

A systematic review of school closure to control COVID-19 found insufficient data to comment on efficacy.⁸ Studies suggest school closures in China, Hong Kong and Singapore had little or no effect on control of the 2003 outbreak with the related SARS

virus, which like infection with SARS-CoV-2 was much milder in children than adults.⁸ However, we should be cautious about extrapolation from SARS to SARS-CoV-2. Modelling studies suggest school closures would prevent fewer than 5% of COVID-19 deaths, much less than other social distancing interventions, and would have major adverse effects on children and on the workforce, but modelling studies are only as good as the data.⁹

In conclusion, the available evidence to date suggests children are unlikely to be major transmitters of SARS-CoV-2, the coronavirus that causes COVID-19. In Australia and New Zealand, very few children or health-care workers have been diagnosed with SARS-CoV-2 despite intense testing. Health workers who develop symptoms compatible with COVID-19 should be tested and should stay away from work until cleared, which will protect children, their families and other staff. Hospital staff who follow infection control recommendations regarding social distancing, hand-washing and appropriate use of personal-protective equipment are at very low risk of catching SARS-CoV-2 from children.

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