

In-person schooling and COVID-19 transmission:

A review of the evidence

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Governments around the world are grappling with a resurgence of SARS-COV-2 – the virus that causes COVID-19 – and working through whether schools can continue in-person instruction relatively safely. This evidence brief aims to summarize the available research to inform policymakers on this issue. It examines the literature to answer the following three questions: (1) Is there a connection between in-person schooling and increased COVID-19 transmission rates in the community? (2) Are students at a higher risk of being infected at school? (3) Are school staff at a higher risk of being infected at school?

The brief is based on a review of twenty-six publications: reviews of literature, national surveillance studies of re-opened schools, ecological studies, transmission modelling simulation studies and case tracing studies. The authors include government agencies, academic researchers and independent research organizations. Most sources are focused on high-income countries. The preliminary findings thus far suggest that in-person schooling – especially when coupled with preventive and control measures – had lower secondary COVID-19 transmission rates compared to other settings and do not seem to have significantly contributed to the overall community transmission risks.

In-person schooling and COVID-19 transmission in the community

While sporadic COVID-19 cases have been reported in school settings, relative to the level of community transmission schools have not been identified as superspreading settings except for a Jerusalem high school in Israelⁱ in May 2020 (where mitigation measures were not followed). An early study in the United States showed an initial drop in infection rates following school closures but could not isolate the policy's effects from wide-ranging lockdown measures.ⁱⁱ A quasi-experimental design study in Germany found that there is no evidence of a decline in community infection rates when schools close and

no evidence of spikes when they re-open.ⁱⁱⁱ A study in two US states found that in-person schooling had little effect on community transmission rates, when the baseline transmission rates were low. At higher community infection rates the effects of in-person schooling were unclear.^{iv} Other studies have found similar results in Victoria, Australia^v and the United States^{vi}.

A global study that tracked school closures and subsequent re-openings data in 191 countries showed no association between school status and COVID-19 infection rates in the community.^{vii} Similarly, in a review of infection levels and school status in 32 European countries the European Centre for Disease Prevention and Control (ECDC) found that “the evidence from contact tracing in schools, and observational data from a number of EU countries suggest that re-opening schools has not been associated with significant increases in community transmission.”^{viii} A systematic review of 47 studies published on transmission from children to adults found that the risk of transmission from children to the community (especially the elderly) was relatively low.^{ix} A review of COVID-19 infection rates in select regions of Italy during a period of school openings in late 2020 found no evidence of a relationship with increasing community infections rates.^{xi}

A recent modeling study ranked closing education settings as a highly effective intervention, however it did not distinguish between primary, secondary schools and university settings.^{xii} Other simulation studies have shown that school closures would not significantly reduce the transmission rates compared to other policy levers.^{xiii xiv}

In-person schooling and risk levels for students & staff

Children under 18 represent about 8 *per cent* of all reported cases. Surveillance evidence from Europe shows that the proportion of reported cases in children remains lower than in adults and is lowest among children below 10 years. This may be due to lower infection rates or due to milder or absent symptoms.^{xv} A British government report based on a national surveillance system found that following limited school re-openings in the summer, the infection rates among students did not increase over the existing population rate.^{xvi xvii} The national surveillance system in Scotland also found little to no evidence of transmission risks for students in school settings.^{xviii} It is important to note that the studies of the summer term re-openings in the UK were based



on very limited secondary school re-openings. Recent reporting from the UK government shows a slight uptick in infection rates among children, especially in the 12-18-year-old population.^{xix}

The ECDC paper based on evidence from 32 European countries concluded that student-to-student transmission was uncommon and not the primary cause of infection in children.^{xx} Additionally, multiple contact-tracing based studies of infected students in school settings in Australia^{xxi}, Finland^{xxii}, France^{xxiii}, Ireland^{xxiv}, and Singapore^{xxv} (including some that screened asymptomatic children) found little to no evidence of secondary transmission by infected students in the school setting. One case of a school-based outbreak was reported at an Israeli secondary school with no mitigation measures in place.^{xxvi} Another contact-tracing study in India showed that children-to-children transmission may be higher, but it was not clear if the transmission occurred in school settings or elsewhere.^{xxvii}

Little evidence exists that school staff are at higher risk of being infected when they are at school relative to the general adult population. Findings from the national surveillance systems in the UK^{xxviii} and Scotland^{xxix} show that school staff are at lower risk of infection in school settings compared to the general adult population. Transmission cases show that the risk of adult to adult transmission is higher than child to child or child to adult transmission.^{xxx} Finally, British government data suggests that school staff positivity rates have remained the same as comparable workers from other sectors over the autumn months. One contact-tracing study of infected children and staff in childcare and school settings in New South Wales found low infection rates relative to the general population as well as low secondary transmission



rates (0.5 *per cent* of cases). Another study, focusing on 57,000 caregivers at childcare facilities in the US, found that there was no increased risk of infection for the caregivers.^{xxxix}

A contact-tracing study in Wisconsin found that during a period of school re-opening COVID infection rates among students and staff remained lower than the infection rates in the wider community.^{xxxix} A contact-tracing study in North Carolina followed schools in 11 school districts where 90,000 students returned to school for 9 weeks between March and July 2020. It found that out of 805 infections among students and staff, 773 were community acquired and only 32 were school acquired.^{xxxix} There were no cases of student to staff transmission. The schools in the study followed strict mitigation measures.

This is important to note. In most cases in-person schooling has resumed with several mitigation measures to minimize the risk of transmission. These measures included phased opening, enhanced hygiene measures (hand washing, use of hand sanitizer), regular screenings, limited interactions outside classroom pods, distancing measures, transparency, targeted communication strategies

and PPE use (including masks, and face shields). One U.S.-wide survey found that the implementation of mitigation measures significantly reduces COVID infection risks for household members where children are attending in-person schooling.^{xxxix}

Conclusion

While evidence continues to emerge regarding the effects of in-person schooling on the risk of COVID-19 infections, a review of the current evidence shows that in-person schooling does not appear to be the main driver of infection spikes, children in school do not appear to be exposed to higher risks of infection compared to when not in school when mitigation measures are in place, and school staff also do not appear to be at a higher relative risk compared to the general population. It is important to note that in most cases schools have re-opened along with the implementation of various mitigation measures and some of the early research reviewed was collected in the context of relatively limited school re-openings.

Endnotes

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