

IS IT SAFE TO REOPEN SCHOOLS?

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School reopening decisions should reflect evidence-based estimates of the risks associated with reopening schools and the risks associated with keeping schools closed. Experiences from countries around the world where schools have reopened suggest that with adequate mitigation strategies, schools pose low risk for disease transmission for students, teachers and other school staff, and communities. Available evidence suggests that young children are both less likely to get COVID-19 and less likely to transmit the disease to others. Transmission within schools has been low, particularly for preprimary and primary schools, and staff in schools are more likely to get the virus from other staff, not from students. Given the safe reopening experiences in countries prior to vaccine development, often in the midst of high community transmission, education systems do not need to wait for widespread vaccination of school staff or other adults in the community before reopening, although prioritizing school staff for vaccination may allay their fears of returning to schools for in-person instruction. Keeping schools closed eliminates the risk of disease transmission at school, but it also imperils children's learning, psychosocial health, and overall development.



As the COVID-19 pandemic spread within and across countries at the start of 2020, we knew very little about the virus: how it spread, who would be most affected, and how to treat it. To protect children and slow disease transmission, most governments reacted by closing schools. By the end of March 2020, the COVID-19 pandemic shut down schools in more than 160 countries, leaving more than 1.5 billion children—75% of enrolled students—out of school. One year later, we know much more about both the virus and the disease and how to mitigate transmission (see [Minimizing Disease Transmission in Schools](#)), and health authorities like the WHO recommend school closures only as a “last resort.” In March 2021, schools in 141 countries have reopened or partially reopened. This trend has still left more than 168 million children shut out of any form of in-person learning for almost an entire year, and follow-on waves of outbreaks across the globe have prompted lockdowns and school closures again, suggesting that pandemic recovery may involve schools’ switching repeatedly between being open and closed.

Schools have remained closed where governments, communities, teachers, or parents fear that reopening schools poses too great a risk for disease transmission. While these fears are valid, in each context, it is important to quantify the risks associated with reopening schools, as well as the risks of keeping schools closed, so that reopening decisions can be based on risk assessments informed by evidence. In particular, we need evidence for both students and school staff on their susceptibility of getting COVID-19 and the ease of transmitting the disease to others. We also need to know whether reopening schools will contribute to the spread of COVID-19 within communities.

The Risk for Children

Data from population surveillance studies and contact tracing studies suggest that, compared to adolescents and adults, very young children, particularly those under the age of ten, are much less susceptible to contracting COVID-19 and much less likely to transmit the disease. In representative samples collected early in the pandemic (first quarter of 2020), children under age ten tested positive in 0.0, 0.0 to 3.5, and 0.0 percent of the time in Italy, Spain, and Iceland, respectively, in contrast to children older than ten, who tested positive 1.2, 4.0 to 4.2, and 0.8 percent of the time in these countries. In the case of Iceland, among children under ten years old who were either symptomatic themselves or in contact with an infected person, 6.7 percent tested positive for COVID-19. Children under ten represented less than 1 percent of diagnosed cases in South Korea in the early part of the pandemic. In the second quarter of 2020, asymptomatic children hospitalized in 28 hospitals across the United States tested positive 0.65 percent of the time ([Gudbjartsson et al. 2020](#)). Data from [National COVID-19 School Response Dashboard in the United States](#) also suggest very small infection rates. In the second half of February 2021, when around 55 percent of the 12.2 million students covered in the database were attending in-person instruction, the student infection rate was 0.16 percent, which includes infections acquired both by students attending school remotely and those attending in person.



Among children who do get COVID-19, severe illness and death are rare and most commonly occur among children with other underlying illnesses. According to the American Academy of Pediatrics and Children’s Hospital Association, 0.1 to 2.2 percent of all child COVID-19 cases have resulted in hospitalization, and 0.00 to 0.04 percent of all child COVID-19 cases have resulted in death ([Cull and Harris 2021](#)). In a contact tracing study in two states in India 85 ([Laxminarayan et al. 2020](#)), 0.05 percent of confirmed cases resulted in death among children aged five to seventeen years. In comparison, death occurred in 1.31 percent of all cases among 40- to 49-year-olds and 16.6 percent of all cases among people over the age of 85.

Although children are efficient spreaders of other respiratory illnesses like influenza or the common cold, a [summary](#) of large-scale epidemiological surveys and smaller analyses of household clusters indicated that they appear to transmit COVID-19 less effectively than adults. Evidence from reopened schools is consistent. According to the [Public Health Agency of Sweden \(2020\)](#), the incidence of COVID-19 among children under the age of nineteen in Sweden was similar to the incidence among the corresponding cohorts in Finland, even though Sweden had a disease incidence in the population that was five times higher than Finland’s and had kept schools open while Finland had

kept them closed. An analysis of infection clusters and outbreaks in the United Kingdom found that incidence rates were lowest among primary school students and that the most common direction of transmission was staff to staff ([Ismail et al. 2021](#)). A similar study that traced transmission from confirmed pediatric cases in Norway ([Brandal et al. 2021](#)) found a child-to-child transmission rate of 0.9 percent and a child-to-adult transmission rate of 1.7 percent. A study in Germany ([Schoeps et al. 2021](#)) found that when infections were surging within the community, and when children over age ten were physically distanced more than 1.5 meters and children under ten had no minimal distance to maintain, an infected student led to an average of 0.04 secondary cases in teachers, while an infected teacher led to an average of 0.56 secondary cases.

The Risk for Teachers and Other School Staff

Since the likelihood of contracting COVID-19 and suffering from a severe form of the disease increases with age, teachers and other school staff (such as administrative staff, janitors, food service workers, and school bus drivers) face higher virus-related risks at school (and in the community).

Evidence from reopened schools, however, does not suggest that schools are high-risk environments for school staff. According to the [National COVID-19 School Response Dashboard in the United States](#), the staff infection rate in the second half of February 2021 was 0.23 percent. The [European Centre for Disease Prevention and Control](#) has concluded that for adults the risk of acquiring COVID-19 within a school setting is no greater than the risk in of getting it the community or household. According to [data](#) from the Office of National Statistics of the United Kingdom, the risk to female teachers in schools is equivalent to what retail and customer service workers experience at work, which is well below the risks faced by healthcare workers. Increased risk compared to working from home can be mitigated through infection control strategies. (See also guidance on [Minimizing Disease Transmission in Schools](#)).

Given the low infection rates among children and their observed limited capacity to transmit the disease, the largest risk to staff in schools appears to come from other staff in the school. In a contact tracing study in Australia, the staff-to-staff transmission rate was 4.4 percent, compared to the child-to-staff transmission rate of 1 percent. This finding means that the contacts of an infected staff member who were school staff tested positive for COVID-19 4.4 percent of the time, and the contacts of an infected child who were staff tested positive 1 percent of the time ([Macartney et al. 2020](#)). In some sense, this fact, combined with the documented efficacy of infection control strategies, should be comforting because it should be relatively easier for adults than for children to comply with mitigation strategies.

If, however, education systems or schools do not adopt the most basic mitigation measures (like masking, physical distancing, and ventilation), and health systems do not provide adequate treatment when an individual does get sick, older staff and those with underlying health conditions will face considerable risk when returning to school.

The Risk to Communities

Determining whether schools contribute to transmission in the community is challenging to assess by infection rates, given that testing rates might increase once students and teachers return to school, and the presence of an infected individual in a school prompts contact tracing. In this kind of situation, it is difficult to assess whether school reopening reflects actual changes in transmission or changes in the frequency of testing. A recent quasi-experimental study ([Harris, Ziedan, and Hassig 2021](#)) using data from hospitals across all counties the United States avoids this



problem by focusing on hospitalizations related to COVID-19. In counties where there were fewer than 36 to 44 new COVID-19 hospitalizations per 100,000 population per week before reopening, school reopenings did not increase COVID-19 hospitalizations, even up to six weeks afterwards. In counties with higher hospitalization rates prior to school reopenings, study results were inconclusive on whether reopenings generated an increase in COVID-related hospitalizations ([Harris, Ziedan, and Hassig 2021](#)).

School Reopenings and Rates of Vaccination

Most of the infection and transmission rates cited above come from periods when there was limited to no distribution of vaccines among the population or within the education workforce. Given that schools that have reopened around the world have been able to effectively curtail transmission within schools with simple and relatively cheap infection control strategies like masking, ventilation, and physical distancing, and given that widespread vaccination coverage in most countries is not expected for many months, keeping schools closed until all staff can be vaccinated results in very little benefit in terms of reduced risk of transmission but potentially generates substantial costs for children.



On the other hand, anxiety among staff could interfere with their return to work and their effectiveness in the classroom. Governments may consider placing teachers and other school staff on a priority list for vaccination.

The Risks to Children Associated with School Closures

When schools are closed, children learn less; some are not learning at all. Many education systems were unable to offer remote instruction that covered the equivalent to what children would have learned in school and that all students could access ([UNESCO, UNICEF, and World Bank 2020](#)). Even in countries that were able to quickly organize real-time online instruction, learning loss seems to be substantial. In Belgium, for example, where schools were closed or partially closed for one third of the school year in 2020, evidence from standardized tests implemented before and after the start of the pandemic suggests losses of 0.19 standard deviations for math and 0.29 standard deviations for language ([Moldonado and de Witte 2020](#)). Evidence from past emergencies like the 2005 earthquake in Pakistan suggests that even if school enrollment recovers, the impacts of school closures and an aggregate shock on learning may last much longer ([Andrabi, Daniels, and Das 2020](#)).



In addition to instruction, schools also tend to serve other functions that promote children's well-being. In many countries, they provide children with nutritious meals and psychosocial support. Studies of children during the pandemic have documented high rates of anxiety and depression ([Bignardi et al. 2020](#); [Haripersad et al. 2020](#); [Lee 2020](#); [Luijten et al. 2020](#); [Xie et al. 2020](#)). Uncertainty about the pandemic, the loss of interactions with peers, disruptions to routines, and the stress associated with parents' employment at home or job loss may all contribute to these decreases in children's mental health. Increases in myopia (nearsightedness) have also been observed in some contexts ([Wang, Li, and Musch, 2021](#)).

Useful Resources



Research and Guidance on COVID-19

- [Coronavirus Disease \(COVID-19\): Schools \(WHO Q&A\)](#)
- [COVID-19 School and Community Resource Library \(Massachusetts General Hospital\)](#)

Transmission in Schools

- [What we know about COVID-19 transmission in schools \(in French\)](#)
- [COVID-19 in Children and the Role of School Settings in COVID-19 Transmission](#)
- [Operational Strategy for K-12 Schools through Phased Mitigation](#)

References

- Andrabi, Tahir, Benjamin Daniels, and Jishnu Das. "Human Capital Accumulation and Disasters: Evidence from the Pakistan Earthquake of 2005." RISE Working Paper 20/039, Research on Improving Systems of Education, Washington, DC, May 2020.
<https://riseprogramme.org/publications/human-capital-accumulation-and-disasters-evidence-pakistan-earthquake-2005>.
- Bignardi, Giacomo, Edwin S. Dalmajjer, Alexander L. Anwyl-Irvine, Tess A. Smith, Roma Siugzdaite, Stepheni Uh, and Duncan E. Astle. "Longitudinal Increases in Childhood Depression Symptoms during the COVID-19 Lockdown." *Archives of Disease in Childhood* December 9, 2020.
<https://doi.org/10.1136/archdischild-2020-320372>.
- Brandal, Lin T., Trine S. Ofitserova, Hinta Meijerink, Rikard Rykkvin, Hilde M. Lund, Olav Hungnes, Margrethe Greve-Isdahl, Karoline Bragstad, Karin Nygård, and Brita A. Winje. "Minimal Transmission of SARS-CoV-2 from Paediatric COVID-19 Cases in Primary Schools, Norway, August to November 2020." *Eurosurveillance* 26, no. 1 (January 2021): 2002011.
<https://doi.org/10.2807/1560-7917.ES.2020.26.1.2002011>.
- Cull, Bill, and Mitch Harris. "Children and COVID-19: State-Level Data Report." American Academy of Pediatrics and Children's Hospital Association, Washington, DC, April, 2021.
<https://services.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/children-and-covid-19-state-level-data-report>.
- Gudbjartsson, Daniel F., Agnar Helgason, Hakon Jonsson, Olafur T. Magnusson, Pall Melsted, Gudmundur L. Norddahl, Jona Saemundsdottir, Asgeir Sigurdsson, Patrick Sulem, Arna B. Agustsdottir, Berglind Eiriksdottir, Run Fridriksdottir, Elisabet E. Gardarsdottir, et al., "Spread of SARS-Cov-2 in the Icelandic Population," *New England Journal of Medicine* 382, no. 24 (June 2020): 2302–15.
<https://doi.org/10.1056/NEJMoa2006100>.
- Haripersad, Yasheer Venay, Madeleine Kannegiesser-Bailey, Katinka Morton, Sarah Skeldon, Nicolene Shipton, Kara Edwards, Rachel Newton, Amanda Newell, Paul Geoffrey Stevenson, and Andrew C. Martin. "Outbreak of Anorexia Nervosa Admissions during the COVID-19 Pandemic." *Archives of Disease in Childhood* 106 (July 24, 2020): e15.
<https://doi.org/10.1136/archdischild-2020-319868>.
- Harris, Douglas N., Engy Ziedan, and Susan Hassig. "The Effects of School Reopenings on COVID-19 Hospitalizations." National Center for Research on Education Access and Choice Technical Report, New Orleans, LA, January 4, 2021.
<https://www.reachcentered.org/publications/the-effects-of-school-reopenings-on-covid-19-hospitalizations>.
- Ismail, Sharif A., Vanessa Saliba, Jamie Lopez Bernal, Mary E. Ramsay, and Shamez N. Ladhani. "SARS-CoV-2 Infection and Transmission in Educational Settings: A Prospective, Cross-Sectional Analysis of Infection Clusters and Outbreaks in England." *Lancet Infectious Diseases* 21, no. 3 (December 2021): 344–53.
[https://doi.org/10.1016/S1473-3099\(20\)30882-3](https://doi.org/10.1016/S1473-3099(20)30882-3).
- Laxminarayan, Ramanan, Brian Wahl, Shankar Reddy Dudala, K. Gopal, Chandra Mohan, S. Neelima, K. S. Jawahar Reddy, J. Radhakrishnan, and Joseph A. Lewnard. "Epidemiology and Transmission Dynamics of COVID-19 in Two Indian States." *Science* 370, no. 6517 (November 2020): 691–7.
<https://doi.org/10.1126/science.abd7672>.
- Lee, Joyce. "Mental Health Effects of School Closures during COVID-19." *The Lancet* 4, no. 6 (June 2020): 421.
[https://doi.org/10.1016/S2352-4642\(20\)30109-7](https://doi.org/10.1016/S2352-4642(20)30109-7).
- Luijten, Michiel A. J., Maud M. van Muilekom, Lorynn Teela, Hedy A. van Oers, Caroline B. Terwee, Josjan Zijlmans, Leonie Klaufus, Arne Popma, Kim J. Oostrom, Tinca J. C. Polderman, and Lotte Haverman. "The Impact of Lockdown during the COVID-19 Pandemic on Mental and Social Health of Children and Adolescents." Preprint, submitted November 4, 2020.
<https://doi.org/10.1101/2020.11.02.20224667>.
- Macartney, Kristine, Helen E. Quinn, Alexis J. Pillsbury, Archana Koirala, Lucy Deng, Noni Winkler, Anthea L. Katelaris, Matthew V.N. O'Sullivan, Craig Dalton, Nicholas Wood, and the NSW COVID-19 Schools Study Team. "Transmission of SARS-CoV-2 in Australian educational settings: a prospective cohort study." *The Lancet: Child & Adolescent* 4 (August 3, 2020): 807–16.
[https://doi.org/10.1016/S2352-4642\(20\)30251-0](https://doi.org/10.1016/S2352-4642(20)30251-0)

- Moldonado, Joana Elisa, and Kristof de Witte. "The Effect of School Closures on Standardised Student Test Outcomes." Department of Economics Discussion Paper Series DPS20.17, KU Leuven, Leuven, Belgium, September 2020.
<https://lirias.kuleuven.be/retrieve/588087>.
- Public Health Agency of Sweden. "Covid-19 in Schoolchildren: A Comparison between Finland and Sweden." Article 20108-1, Public Health Agency of Sweden, Solna, Sweden, July 7, 2020.
<https://www.folkhalsomyndigheten.se/publicerat-material/publikationsarkiv/c/covid-19-in-schoolchildren>.
- Schoeps, Anja, Dietmar Hoffmann, Claudia Tamm, Bianca Vollmer, Sabine Haag, Tina Kaffenberger, Kimberly Ferguson-Beiser, Berit Kohlhase-Griebel, Silke Basenach, Andrea Missal, Katja Höfling, Harald Michels, Anett Schall, et al. "COVID-19 Transmission in Educational Institutions August to December 2020, Rhineland-Palatinate, Germany: A Study of Index Cases and Close Contact Cohorts." Preprint, submitted February 20, 2021.
<https://doi.org/10.1101/2021.02.04.21250670>.
- UNESCO, UNICEF, and World Bank. "What Have We Learnt?: Overview of Findings from a Survey of Ministries of Education on National Responses to COVID-19." UNESCO, UNICEF, and World Bank, Paris, New York, and Washington DC, October 2020.
<https://openknowledge.worldbank.org/handle/10986/34700>.
- Wang, Jiaying, Ying Li, and David C. Musch. "Progression of Myopia in School-Aged Children after COVID-19 Home Confinement." *JAMA Ophthalmology* 139, no. 3 (January 2021): 293–300.
<https://doi.org/10.1001/jamaophthalmol.2020.6239>.
- Xie, Xinyan, Qi Xue, Yu Zhou, Kaiheng Zhu, Qi Liu, Jiajia Zhang, and Ranran Song. "Mental Health Status among Children in Home Confinement during the Coronavirus Disease 2019 Outbreak in Hubei Province, China." *JAMA Pediatrics* 174, no. 9 (April 2020): 898–900.
<https://doi.org/10.1001/jamapediatrics.2020.1619>.