

SYNOPSIS

01/28/2021

Review of “Incidence and secondary transmission of SARS-CoV-2 infections in schools”

Article citation: Zimmerman KO, Akinboyo IC, Brookhart MA, Boutzoukas AE, McGann K, Smith MJ, et al. Incidence and secondary transmission of SARS-CoV-2 infections in schools. *Pediatrics*. 2021 Jan 08 [Epub ahead of print]. Available from: <https://doi.org/10.1542/peds.2020-048090>

One-minute summary

- This study evaluated the hypothesis that in-person learning would not lead to substantial Coronavirus Disease 2019 (COVID-19) transmission among school students and staff in North Carolina, United States, if students and staff adhere to wearing face masks, physical distancing and hand hygiene.
- Duke University and the University of North Carolina developed the ABC Science Collaborative (ABCs) in which 56 of 115 school districts in North Carolina participated. The aim of ABCs is to: 1) educate school staff and community; 2) use school-specific data to drive decision-making; and 3) generate new science to improve the health of children.
- The authors reported data from **the school districts (n=11, 90,000 students and staff) that offered in-person instruction for all 9 weeks of the study (August 15 to October 23, 2020) and reported weekly data.**
 - 773 primary cases (community-acquired, identified as school students and staff)
 - 32 secondary cases (acquired within school setting)
 - No instances of child-to-adult transmission of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) were reported within schools
- Case adjudication of within-school transmission was performed via contact tracing by the local public health department.
- Community-acquired primary case infection rates in the 11 districts were consistently lower (range: 0.3 to 0.8 cases per 100,000 population) and visually correlated with the infection rates for the respective counties (1.2 to 1.9 per 100,000 population) [values estimated from Figure 2].
- The authors concluded that in the first 9 weeks of in-person instruction, there was limited secondary transmission within schools and they suggest that strict enforcement of mitigation strategies resulted in low rates of secondary infections and low numbers of clusters in schools, with no increase in community burden of disease.

Additional information

- Prior to the start of the school quarter, and continuing through the quarter, there was an education campaign on COVID-19 prevention, transmission, and outcomes for school staff, school leaders and parents.
- Of the 115 school districts in North Carolina, 56 joined the ABCs. Participating districts were:
 - Larger in school population size (7,739 vs. 4,516)
 - Had fewer non-Hispanic white students (46.8% vs. 54.9%)
 - Offered fewer weeks of in-person instruction (3.6/9 vs. 5.7/9)
- All ABC and non-ABC schools were required to follow mitigation strategies as directed by the North Carolina Department of Health and Human Services (NCDHHS) which included universal masking of staff and students (≥ 5 years old), maintaining 6-foot physical distancing, hand hygiene, and daily symptom monitoring and temperature checks.
- Clusters of cases (as defined by 5 cases over 14 days in one facility, with possible epidemiological link) occurred in 15 traditional public schools, 11 of these clusters (89 cases) occurred in schools not participating in ABCs. There were 4 clusters of 20 cases in ABCs participating schools; 1 cluster occurred in a school district that was only open for 4 weeks of in-person instruction and the remaining 3 clusters (15 cases) occurred in school districts that provided data for the manuscript. One of these clusters occurred in a pre-kindergarten class where masking was not required and two clusters occurred in special needs environments where one cluster was felt to be linked to children eating together in close proximity.
- Besides the 15 clusters in traditional public schools with in-person learning, additional clusters occurred in private schools (19 clusters, 191 cases), charter schools (2 clusters, 10 cases) and traditional public schools with no in-person learning (2 clusters, 10 cases).
- Traditional public school settings with secondary transmission (n=32) included: pre-kindergarten (6), elementary school (11), middle school (6), high school (5), and K-12 (4).
- During the study, the infection rate in residents of North Carolina was approximately 1–2 cases per 1,000 population. Community-acquired infection rates in the 11 districts were higher than infection rates for all of North Carolina (higher by 0.1–1.0/1,000) [estimated from Figure 2].
- Testing of within-school contacts was encouraged, but not required.

PHO reviewer's comments

- Caution should be exercised in generalizing the findings from this study. The conclusions from the study may be valid; however, the authors could have strengthened the research by improving the epidemiological study design and use of statistical hypothesis testing. In addition, it is unclear the extent to which within-school contacts were tested and therefore transmission leading to asymptomatic infection (occurring in up to 30–50% of children) may not have been captured, leading to an underestimate of secondary transmission.
- The authors did not statistically test their main hypothesis that “in-person instruction, if accompanied by assiduous adherence to masking, distancing, and hand hygiene, would not result in substantial risk of SARS-CoV-2 spread within schools for children or staff.”
 - In this study design as described, the ABCs was essentially an intervention applied to the group of schools under study similar to a clinical trial. For example, educational materials and weekly group sessions with school leaders were provided to the participated schools; however, the analysis only described findings from the schools under study. The study

could have been strengthened by providing a statistical comparison with schools that did not receive the intervention.

- The authors defined a “substantial risk” as >5 cases per 1,000. School-associated infection rates were lower (<1/1,000). Statistical tests would have been useful to determine if the difference was significant.
- There was no measure of how effective each school or district adhered to mitigation strategies (ABC and non-ABC schools). Therefore, it is difficult to conclude that mitigation strategies contributed to a reduction in secondary cases because the non-ABCs schools were mandated to perform the same preventive measures.
- The study took place during a nine week period from August 15 to October 23, 2020, when the second wave of the pandemic was occurring, but not yet at maximum case numbers. With greater case numbers in the community, the number of school introductions would increase, leading to increased transmission pressure. Further studies are needed to evaluate secondary transmission in these circumstances.

Citation

Ontario Agency for Health Protection and Promotion (Public Health Ontario). Review of “Incidence and secondary transmission of SARS-CoV-2 infections in schools”. Toronto, ON: Queen’s Printer for Ontario; 2021.

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