

To spread or not to spread Sars-Cov-2— Is that the question? ^[1]

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Excerpt

EDITORIAL - The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic has upended society in many ways. The tragic and rising number of deaths we continue to see throughout the world, the overloaded hospitals, the devastated economies—all of these appropriately garner daily front-page headlines. However, the impact of this pandemic on children may ultimately prove to have the most lasting effect. Because of concerns about the potential for driving transmission of the virus, with a few exceptions, schools in many parts of the world have been mostly closed to in-person learning since roughly March 2020. We have already seen short-term consequences of these closures, and the potential longer-term consequences of a missed year (or more) of learning are dire. Nine months into this pandemic, the question of what role children play in transmission of the virus has not been fully answered, with conflicting data, particularly from early in the pandemic, creating a confusing picture. Without a clearer picture, many schools remain either fully or partially closed to in-person learning because of concerns of both passing the virus to teachers and staff and of bringing it home from schools to their families.

Tönshoff et al ^[3] take us one step closer to a better understanding of the role that children play in the transmission of SARS-CoV-2. In their article, the authors sought to describe the rate of SARS-CoV-2 infections and the seroprevalence of SARS-CoV-2 antibodies in children aged 1 to 10 years compared with a corresponding parent in a population-based sample in southwest Germany. The study ^[3] enrolled 2482 children aged 1 to 10 years and 2482 corresponding parents from April to May 2020. They tested for the presence of SARS-CoV-2 using reverse transcriptase–polymerase chain reaction of nasopharyngeal swabs and for SARS-CoV-2 IgG antibodies in serum using enzyme-linked immunosorbent assay and immunofluorescence, with discordant results clarified using alternative methods. In the study period, only 2 participants (0.4%), a parent and child in the same family, tested positive for SARS-CoV-2 by polymerase chain reaction. Overall, the estimated seroprevalence was low, with significant differences between parents (1.8%; 95% CI, 1.2–2.4) and children (0.6%; 95% CI, 0.3–1.0). Among the 56 families with at least 1 seropositive child or parent, seropositive parents living with seronegative children were 4.3-fold (95% CI, 1.19–15.52) more common than seropositive children living with seronegative adults. Tönshoff et al ⁶ also attempted to answer certain other questions, such as whether there were differences by age (child aged 1 to 5 years vs 6 to 10 years; no significant differences) and whether childcare attendance influenced seropositivity. Although numbers were fairly small for the childcare attendance outcome, children who attended childcare actually had lower seroprevalence than those who did not (0.5% for children in childcare vs 1.0% for children not in childcare). The authors concluded that children were unlikely to be driving transmission during the pandemic and that mass testing as demonstrated in the study offers a basis for rational political decision-making during a pandemic.

Why does this matter? It has been well-known since early in the pandemic that coronavirus disease 2019 (COVID-19) is a milder disease in children compared with adults, particularly older adults. While it is not completely benign in children, rates of hospitalization and death are far lower in children than adults. It has also been recognized that children account for a smaller proportion of cases than would be expected based on the size of the childhood population.⁹ A question that has confounded epidemiologists is whether this simply represents lower rates of testing in children—more severe cases are more likely to get tested—or if they are truly less likely to both acquire infection and spread infection. One way to answer this question, at least in part, is to look at seroprevalence: is there evidence of prior infection? In what Tönshoff et al describe as the largest seroprevalence study among children to date, by examining parent-child dyads within the same household, this study suggests that children were both less likely to acquire infection when it was in the household and less likely to spread it in the household when they were infected.

There are several limitations to this study, some of which Tönshoff et al acknowledge and some they do not. An important limitation that the authors acknowledge is that this study was performed during a period of lockdown, and children may have been less likely to be exposed than their parents, thus partially explaining the findings. However, the lack of increased prevalence in children in childcare somewhat rebuts this limitation and is consistent with other studies showing relatively low transmission in childcare settings.^{10,11} The authors also state as a limitation that they are unable to draw conclusions about the infectivity of a child infected with SARS-CoV-2, a limitation that I think is overstated; the fact that there were far fewer adults who were seropositive when a child was seropositive than the converse is at least suggestive of decreased infectivity. Finally, an unacknowledged limitation was that the authors used seropositivity as a marker for prior infection rather than doing a longer prospective polymerase chain reaction–based study to fully ascertain all of the acute infections. While the authors made a strong argument that they used very sensitive and specific methods for ascertaining seroprevalence,

one might hypothesize that children do not acquire antibodies at detectable levels after a SARS-CoV-2 infection as frequently as adults and therefore may become infected and spread the virus without developing detectable antibodies, although this seems unlikely.¹²

Throughout this pandemic, many of us in the field of pediatric infectious diseases have been asked some version of the question, “Can children spread COVID-19?” As if somehow anything in medicine is binary. When a question begins with “can,” the answer is almost always yes. Unfortunately, in too many parts of the world, the decisions to open or not open schools and childcare facilities have stopped there, ignoring the nuance necessary to understand the question. We know far more now about both transmission dynamics and mitigation measures than we did in March 2020 when most schools shut down. The preponderance of evidence now shows that children 10 years and younger, as in the study by Tönshoff et al,⁶ are both less likely to acquire SARS-CoV-2 infection and less likely to transmit it to others. Proper mitigation measures can reduce that risk even further.¹⁶ Therefore, the question we should be asking now is not do or do not children spread SARS-CoV-2; rather, we ought to be asking what we should do with the knowledge we have accumulated since the pandemic began regarding acquisition and transmission of SARS-CoV-2 in children. With this large seroprevalence study⁶ demonstrating yet again what we have suspected for several months, the answer to that question could not be clearer: we must prioritize the reopening of childcare facilities and elementary schools to full time, in-person learning without exception.

Region: United States ^[4]

Tags: COVID-19 ^[5]

transmission ^[6]

health and safety guidelines ^[7]

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