

COVID-19 DIGEST

From the Cross-Campus Infectious Diseases COVID-19 Task Force

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THE BACK TO SCHOOL ISSUE

Greetings readers! One of the most important issues facing society is the re-opening of schools. Restrictions on in-person school participation are having a profound impact on our society. Children, guardians, teachers and school staff are all affected in different ways and some strategies are inadvertently exacerbating economic, educational and gender inequities on a large scale. It is extraordinarily challenging to sort through fact from fiction in this rapidly evolving field. Moreover, there are many gaps in our knowledge. For this issue of the Digest, we invited Task Force member Dr. Theodore Ruel to be guest editor and asked him to address some of the critical questions along with other experts at UCSF leading efforts around schools and working with public health authorities. Stay tuned, and we will be sure to continue covering this topic in the coming months. DH and BS

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CURRENT KNOWLEDGE

What have we learned about child-to-child transmission associated with schools or camps to date?

Middle and high-school age: Without preventative measures in place, middle and high school age children can readily transmit SARS-CoV-2 virus to each other. A well-publicized outbreak occurred in [Israel](#) with peak transmission among grades 7-9; a heat wave at the time resulted in students congregating indoors with closed windows and revocation of a mask mandate. An [outbreak in a Georgia sleepaway camp](#) resulted in 44% attack rate, but campers did not mask,

engaged in vigorous singing, and shared sleeping spaces with an average of 15 others. We do not have data about transmission in middle/high schools with preventative measures in place during times of high community transmission. But there are promising examples that basic preventative measures can limit transmission from infected students in high schools in low-incidence settings. Pre-print of a [small study from high schools South Korea](#) that had masking and distancing policies in place, reported no transmissions from 5 infected adolescents. **Elementary school:** In contrast, epidemiologic evidence suggests transmission among younger children is much less common. Contact tracing of a [symptomatic French 9 year old](#) did not identify any transmission among over 112 contacts. Pre-prints of studies from a region of Northern France demonstrated [no clear evidence of in-school spread in primary schools](#), in contrast to a [high \(>40% attack rate\) transmission in high schools](#) during the same time period. **In summary:** Current epidemiologic evidence suggests that while transmission can occur in schools, protective measures can limit spread. Evidence also suggests that children of elementary school ages and younger could be more safely prioritized for in-person learning. We can expect to learn more as schools open with varying strategies in place.

Are there any biological explanations for why younger children would be less likely to acquire or transmit SARS-CoV-2?

Data about the biology of SARS-CoV-2 in children are mixed and limited. Expression of the gene for angiotensin-converting enzyme 2, the receptor that SARS-CoV-2 [uses for host entry](#) appears [lower in children < 10 years compared to older children and adults](#). Recently posted ([pre-review](#)) data suggests that school age children have elevated prevalence of antibodies to several coronaviruses that could confer protection against SARS-CoV-2. Other studies have shown that symptomatic children can carry a [burden of virus](#) comparable to that of adults and [can shed culture-competent virus](#). **In summary:** Age-specific differences in SARS-CoV-2 pathophysiology must be interpreted with caution. Children may be less likely to acquire infection but when infected can carry virus at levels comparable to adults. Epidemiologic studies are required to evaluate transmission from children to each other and adults.

What is the risk of SARS-CoV-2 transmission to the adult workforce in school settings?

Teachers and other school staff are at the frontlines and must be protected with the same caution as essential healthcare workers. Up to 24% of US educators are [estimated](#) to have risk factors for severe COVID-19. Few studies have specifically examined the infection risk to adults in schools. However, evidence suggests that there is greater risk for educators to acquire infection from other adults than children (either in schools or outside of them). In [one study](#) of 15 schools and 10 early childcare centers in Australia, the attack rate (secondary cases/contacts) was 1.0% from children-to-staff (1/103) but much higher from staff-to-staff at 4.4% (7/160) [note the attack from child-to-child was very low in this setting, 0.3% (2/649)]. **In summary:** Protective measures will need to be in place around all children, especially those in middle/high schools, however, protection against transmission *between* adults in school settings may be even more important. This conclusion should be considered “good” news, since we have tools that work for preventing infection between adults and can expect teachers to be better able to maintain these practices than children.

What is the role for testing in the safe opening of schools for in person teaching?

At a minimum, access to testing with short (~1-2 day) turnaround times will be important for case-contact investigations in communities as schools open; such testing is essential in containment of spread about new infections in any setting and community. Easy access to testing for SARS-CoV-2 (and other viruses) will also be important for parents who need to evaluate children with cold symptoms and potentially clear them for school attendance. The role for “surveillance testing” to identify asymptomatic infection is less clear. Targeted routine testing of students and teachers might be needed in periods of high transmission or for certain populations (e.g. children with special needs) who require close instruction and can’t tolerate masking and other preventative measures. Surveillance testing will play a key role in research to evaluate the different approaches of schools opening for in-person testing this year. Surveillance testing of teachers could also assist school opening in the context of increased community transmission, and routine testing of students is being planned [in some areas](#). [Newer low cost accurate assays](#) might make large-scale screening of children and teachers possible, and compelling [modelling](#) work suggests daily screening could reduce school-based transmission to very low levels. **In summary:** Easy access to testing with rapid turn-around time will be important in case-contact

investigations but system-wide surveillance testing should not be considered a prerequisite to schools opening for in-person teaching with preventative measures in place.

PREVENTION STRATEGIES

How should schools approach prevention of spread of SARS-CoV-2?

School COVID-19 policies should be based on the presumption that any student could be infected. Multiple laboratory and epidemiologic studies suggest that masking, physical distancing and hand hygiene are the strongest tools for reducing SARS-CoV-2 transmission. The CDC [recommends](#) that children down to the age of 2 years can wear masks, and [resources exist](#) to help families implement this guidance. There is [additional evidence](#) that masks may not only prevent transmission to others, but also reduce disease severity by limiting the initial inoculum of infection among those who wear them. The American Academy of Pediatrics (AAP) [recommends](#) physical distance of at least 3 and ideally 6 feet, when feasible with cloth face coverings for all children. While face shields could provide additional protection for teachers at higher risk of exposure, [face shielding alone \(without simultaneous masking\) is inferior](#) and should not be considered as an alternative to masking. While the [CDC](#), [AAP](#), and [National Academy of Sciences, Engineering and Medicine](#) have published high-level guidance for schools, the details will have to be tailored to individual school settings and populations. **In summary:** The core of prevention programs should be masking, spatial separation, and hand hygiene. Disparities exist in resources across schools. Advocacy to ensure adequate funding for universal implementation of these measures is required.

What is the potential impact of “tutoring clubs,” “learning pods” and other off-campus approaches in which groups of children are doing remote learning?

The shift to remote learning has had an enormous economic and social impact on parents and children. Low-income families who do not have the resources to either miss work or pay for additional childcare have disproportionately felt the additional supervisory burden. With most schools delaying in-person instruction, the prospect of “tutoring clubs” or “learning pods” for kids to perform remote learning together in small groups offer a chance for social interaction with peers and relieves parents and guardians of supervision responsibilities, potentially allowing them to return to work. However, the learning pod approach raises some issues that should be considered. Unless they are managed like schools with spatial separation, masking, symptom screening, and sick-stay-at-home policies, they run the risk of increasing transmission, perhaps even more so than a formal school setting. It is likely that many casual programs may not implement such formal policies and children may be less likely to follow the rules in the comfort of their own homes (where these often take place). This approach has the risk of even further exacerbate educational disparities. Many of these programs cost money and become another thing that low-income families cannot afford, further widening the educational divide their children suffer. **In summary:** Learning pods may be attractive strategy for parents of children receiving home schooling but have the risk for spreading infection and can exacerbate educational disparities.

WORK BEING DONE AT UCSF

Is UCSF involved with any research around children and schools and childcare settings?

UCSF is conducting a study of indoor summer camps, to assess the feasibility and acceptability of supervised self-collection of anterior nares samples for SARS-CoV-2 RT-PCR and saliva samples for antibody testing in Kindergarten-8th grade campers, camp staff, and parents. Data collection is complete, and analysis is underway, with pre-print publication planned in the next few weeks. Dr. Naomi Bardach, Associate Professor of Pediatric and Health Policy is Principal Investigator.

Dr. Bardach is also actively developing a study to evaluate the association between COVID-19 cases and outbreaks and differences in infection control implementations in learning hubs for elementary-middle school lower socio-economic status students in San Francisco. The goal of this work is to inform safe school reopening for public schools coming off the state monitoring list in California.

What is UCSF doing to provide accurate information to the public around COVID-19 and schools?

The UCSF Collaborative to Advise on Reopening Education Safely (CARES) was initially created because faculty in the Department of Pediatrics and across the SOM and health system were being tapped by their local schools and districts to provide input about the health and safety issues of reopening schools. Led by Dr. Elizabeth Rogers, the network quickly expanded to include a large and diverse audience that now includes policymakers, public health and school officials in the region. UCSF CARES has created a space for our stakeholders to discuss emerging data. Subgroups including academics and clinicians from UCSF are developing more granular guidelines for schools across different age-groups. UCSF CARES also launched a 3-part webinar series reaching over 2,000 attendees and plans to continue to provide information through webinars as the school year unfolds. UCSF CARES documents and links to recordings of the webinars are available at coronavirus.ucsf.edu/cares.

What advice do you have for parents and providers about how to interpret reports in the press about schools and safety?

Many news reports highlight outbreaks and negative outcomes with school openings. It is important to look at the details to ascertain the implications. What preventative measures were in place and how well were they followed? Do we learn anything new about transmission, not just cases? Does it change or reinforce public health principles? And many COVID-19 studies continue to be picked up by the press before peer-review, and have methodologic flaws. So, read carefully as we develop and improve strategies to the safe operation of schools. Best practices and schools doing well do not often get selected for the headlines, but we'd love to hear about them so we can help amplify lessons learned.

Where can people get more guidance about opening schools?

[*National Academy of Sciences, Engineering, and Medicine*](#)

[*Centers for Disease Control and Prevention*](#)

[*American Academic of Pediatrics*](#)

[*COVID-19 School and Community Resource Library \(Mass General Hospital\)*](#)

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