Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

impairment, which might become apparent with time, revealing the full consequences of the disease.

For vaccine implementation, cost-effectiveness analyses are essential. It is crucial the reliable high-quality epidemiological data documented in the study by Horváth-Puhó and colleagues have been made available, to allow policy makers to make well informed decisions when vaccines to prevent neonatal meningitis and sepsis become available.

I declare no competing interests.

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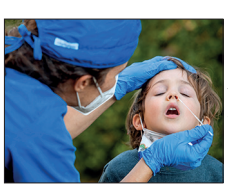
Testing for SARS-CoV-2 infection: a key strategy to keeping schools and universities open

Education has been profoundly affected by the COVID-19 pandemic. Lack of access to education has exacerbated the divide between rich and poor and left vulnerable children exposed to domestic violence and hunger. The best way of keeping educational institutions open for in-person learning is to control transmission of SARS-CoV-2 in the wider community[1] and to ensure rapid identification of infected staff and students to support timely and tailored public health responses. A comprehensive testing strategy is a core tenet in control, especially as a majority (40–60%) of children and young people have asymptomatic COVID-19,[2] and individuals who are pre-symptomatic also present a transmission risk. Mitigation measures such as physical distancing, use of masks, and ensuring adequate ventilation within classrooms are also key, especially when community-based transmission exists.

SARS-CoV-2 infection can be diagnosed by two methods: direct testing for the viral RNA with highly sensitive SARS-CoV-2 RT-PCR tests or viral antigen detection tests, which identify active (or resolving) infection on a nasal, oropharyngeal, or salivary sample and allow early case identification to contain outbreaks. Testing for antibodies against the virus diagnose previous or recent infection (with onset of 10 or more days previously). The delayed nature of virus-specific antibody testing precludes it as tool for rapid outbreak suppression; rather, its predominant public health utility is to understand infection and transmission rates and patterns in a community or clusters.

Two studies published in *The Lancet Child & Adolescent Health* from different countries and educational settings show how virus testing strategies and serological surveys help to understand SARS-CoV-2 transmission and inform outbreak control.

The prospective study by Shamez N Ladhani and colleagues[3] was done in primary schools in England, UK. During weekly RT-PCR testing in 131 schools across a 6-week mini term (June to mid-July, 2020) following the country's first lockdown, 40 501 nasopharyngeal swabs were collected from students and staff. Very few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For more on the **impact of COVID-19 on education** see https://reliefweb.int/report/world/global-analysis-covid-19-impact-education-thematic-series-education-november-2020

acute infections were found (one positive case among students and two positive cases among staff). 45 schools also participated in three rounds of SARS-CoV-2 antibody testing (June 1–19, July 3–23, and Nov 23–Dec 18, 2020). After a high rate of seropositivity at baseline in June (13·7%, 95% CI 10·8–16·9)—with similar infection rates in staff (15·1%, 11·9–18·9), students (11.2%, 7·9–15·1), and the community—a low seroconversion rate (5·1%, 3·8–6·5) was observed over the subsequent 6 months. Seroconversion was similar between staff (4·8%; 3·4–6·6) and students (5·6%; 3·4–8·6), teachers were not at higher risk than others in community, and no association was found between being seropositive and attendance at school. Correlation with notified case and outbreak data from across England[4] verified that relatively low rates of SARS-CoV-2 transmission occurred in primary schools, consistent with that seen in other settings such as Australia[1] and Norway.[5] These two testing approaches indicate that, in settings where case detection and public health measures are applied, so-called silent transmission in schools was largely absent and school attendance did not exacerbate the risk of acquiring COVID-19. Study limitations, including selection biases (eg, non-randomised inclusion methods for both participants and schools) might have influenced these findings, underpinning the need to repeat such rigorous prospective studies in various settings.

The retrospective cohort study reported by Lior Rennert and colleagues[6] examined different testing strategies for detection of SARS-CoV-2 infection among 6273 dormitory-dwelling students commencing in-person study at an US rural university in September, 2020. The students (median age 18 years) had baseline SARS-CoV-2 testing before or on arrival to the university. Afterwards, in addition to voluntary testing when symptomatic, a surveillance-based informative testing (SBIT) strategy was implemented for 12 days, using random surveillance testing to identify outbreaks in residence halls, followed by targeting testing in the areas where positive cases were located. This was associated with a relative 36% (95% CI 27–44) decline in prevalence of infection early in the semester (from 8·7% to 5·6%). Subsequent weekly surveillance testing resulted in a relative 75% (71–81) decrease in prevalence (to 1·4%). Using modelling, Rennert and colleagues concluded that voluntary symptomatic testing alone would have resulted in 154% more infections than SBIT. Although the timeliness of the public health response to identified cases could have been more optimal, compliance with the additional testing, although not mandated, was high (91·2% complied 1 day before or within 3 days of the mandated date, 96·2% complied within 7 days). Universities are high-risk settings and the site of numerous large outbreaks.[7] Rennert and colleagues' study and previous modelling[8] shows the value of frequent testing and that outbreaks cannot be controlled with symptomatic testing alone.

These two studies show the utility of sensitive and timely testing for SARS-CoV-2 with RT-PCR. Timely reporting of results and public health action is crucial: delays in result notification longer than 24 h, or up to 2 weeks reported in some settings,[9] do not allow the isolation of positive cases and contact testing that is necessary to interrupt transmission. In one modelling study, same-day results were predicted to avert 80% of new transmissions, whereas a 7-day delay prevented only 5%.[10]

Cost and access to testing are key barriers to interrupting transmission. In the USA, an individual test costs between US$50 and $200.[9] This is not only a disincentive to being tested, but also totally unaffordable in low-income and middle-income settings. Cheaper, rapid, point-of-care antigen testing has been proposed as an alternative to RT-PCR, but reduced test sensitivity (30–70%) and the requirement of higher viral loads (cycle threshold values <20–25) for detection can limit its usefulness.[11] In a study in UK university students, the sensitivity of a rapid antigen assay was found to be extremely poor (3·2%),[12] with the study noting that the false-negative results occurred in students with cycle threshold values of 29 or higher who might not have been infectious.[11] Novel assays to detect RNA, with more sensitive methods such as loop-mediated isothermal amplification, are being developed. Additional studies in varied settings need to be done to assess its applicability.

Developing practical and effective ways of living with SARS-CoV-2 and keeping open or re-opening educational institutions remains a priority. Although we begin to see vaccination providing additional individual protection, it will take time and great efforts to reach high population coverage and reduce virus morbidity and transmission in many settings. Implementation and evaluation of tailored testing, contact tracing,

and isolation need to continue, and the provision of practical assistance to middle-income and low-income communities needs to be prioritised, so that schools and universities can deliver the most basic human right to education and simultaneously keep students and staff safe.

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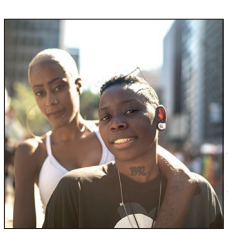
Equity in paediatric care for sexual and gender minority adolescents

On May 17, the International Day Against Homophobia, Biphobia, Intersexphobia, and Transphobia raises awareness of equality for lesbian, gay, bisexual, trans, queer, and intersex individuals. The day originally came about to commemorate the removal of homosexuality from the International Classification of Diseases. Despite ongoing progress towards equality and equity, sexual and gender minority individuals are still at risk because of mental health disparities, especially during the critical phase of adolescence—when they explore and form their distinct identities.

Sexual and gender minority adolescents are three times more likely than heterosexual and cisgender adolescents to develop depression and suicidality.[1] Thus, paediatricians are in a unique position to monitor these mental health outcomes while supporting and advocating for sexual and gender minority adolescents. This Comment discusses the ways in which paediatric care can address the diverse needs of the sexual and gender minority population.

Sexual and gender minority adolescents experience substantial barriers in receiving health care, and they might experience discrimination by health-care providers. For example, health-care providers might overlook pressing issues related to sexual orientation or gender identity, refuse treatment, or assume that a patient is heterosexual and cisgender. Unsurprisingly, many sexual and gender minority adolescents avoid seeking health care, and when they do visit their physician or paediatrician they might not feel safe to disclose their sexual orientation or gender identity, which could have detrimental effects on their health.[2] What can paediatricians do to make their practice more inclusive and affirming of sexual and gender minority adolescents? Four aspects are outlined here.

First, an increased understanding of identity and awareness of mental and behavioural health disparities among sexual and gender minority adolescents is needed. For example, all medical programmes should include courses on sexual and gender diversity and health disparities. Moreover, because sexual and gender minority youth are diverse in identities and experiences, training might include a focus on the dynamic nature of sexual and gender diversity. For instance, the use of identity labels and the meaning of those



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