

# Almost two months into the school year, here's what we know — and don't — about school safety in the pandemic <sup>[1]</sup>

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## EXCERPTS

From the vantage point of her large pediatric clinic, Dr. Dina Kulik has an insider's view of what's happening with COVID-19 and kids.

For months and months, none of the patients at her practice, Kidcrew, tested positive for the virus. In September, when schools reopened, her west Toronto clinic was suddenly flooded with her patients' COVID test results — but still no cases.

The torrent of lab reports has diminished, from more than 200 daily a month ago to about 10 a day, Kulik says. But something else happened: two weeks ago, the clinic received its first COVID-positive lab report. Seven more quickly followed.

The reopening of schools is perhaps the most fraught juncture of the pandemic so far, in Ontario and many other jurisdictions. Local public health officials have expressed cautious optimism, even as doctors are noticing more cases in kids: the nightmare scenario of significant outbreaks, they say, has not yet materialized.

But experts are still struggling to divine clarity from the data, especially in the middle of so much flux. Testing protocol overhauls, surges in community cases, and the relatively young school year all muddy the picture. Experts often vigorously disagree, leaving parents wondering how at-risk their kids actually are.

"If the data were crystal-clear, there would not be too much discussion," said Beate Sander, a scientist with the University Health Network, and Canada Research Chair in Economics of Infectious Diseases. "But I don't think it's crystal-clear, and that's the problem."

Ten months into the pandemic, and almost two months into the school year, here's what we know — and don't — about school safety in the pandemic, and how to interpret the blizzard of sometimes conflicting information.

## Ontario data

Kulik, the pediatrician, is quick to point out that Kidcrew's patients represent just one cohort of children in Toronto. But what she is seeing at her clinic mirrors what is happening in the province as a whole.

In the province's first wave, children represented a tiny fraction of cases: by midsummer, 5.7 per cent of infections were in kids 19 and under, despite them making up 21.1 per cent of the population. Children were also the least-tested age group from March onwards.

When in-person schooling resumed in September, testing in children surged. Within weeks, kids under 10 were suddenly the most-tested group, according to provincial data. And yet positivity rates — the percentage of tests coming back positive in this age group — remained very low.

On Oct. 1, the province overhauled school screening criteria, announcing that kids with only a runny nose did not need a COVID test to return to class. Testing rates plummeted again — but percent positivity began to rise. Children under 10 have since seen the steepest climb in weekly average percent positivity, going from 0.5 to 2.3 in just four weeks.

But test positivity in the province as a whole has also risen. And with so many changes in a short period, it's very difficult to tease out what any of this means. High test positivity can signal an increase in virus spread, or insufficient testing; like any statistic, it should be interpreted in the context of other information, epidemiologists say.

"I think there was a lot of probably low-yield testing being done, where a lot of kids are being tested to make up very few positives," says Dr. Kevin Schwartz, an infection prevention and control physician at Public Health Ontario and a pediatric infectious disease specialist.

"Undoubtedly, though, with the change of criteria, we are going to miss some children if we don't test as broadly. And so I think that's what the numbers are reflecting," Schwartz said, referring to rising test positivity in under-10s.

Are COVID rates in children rising, independent of the effect of testing changes?

"It's hard to say definitively," Schwartz says. "I mean, children are part of the community, right? I think as community rates go up, we're

going to see higher rates in children.”

This caveat also applies to case data from schools. Dozens of new cases in staff and students are reported daily, generating alarming headlines and scaring parents. The key question, however, is how often a single infection in schools is leading to more.

Last week, Toronto medical officer of health Dr. Eileen de Villa noted that the number of school outbreaks has been small, and typically involve fewer than five cases. Between Sept. 15 and Oct. 23, Toronto Public Health declared 23 outbreaks in schools, with the largest affecting seven students and staff.

“If we must have any outbreaks, I’d prefer numbers like this, which suggest relatively good infection prevention and control,” de Villa said.

De Villa and public health officials in other jurisdictions have said that schools do not seem to be driving community transmission — a key concern at the outset of the pandemic, since children are major amplifiers of influenza.

Others say it’s too soon to conclude that. Amy Greer, a Canada Research Chair in population disease modelling at the University of Guelph, said that despite the messiness of the data, she finds the increase in test positivity in children concerning.

Greer pointed out that kids’ networks also extend well beyond the classroom. In a survey from September, she and her colleagues questioned nearly 1,000 Ontarians, of which about a quarter had children under 18, and found that elementary-aged kids had 31 contacts on average after also taking their school bus, after-school care and extracurriculars into account. High school students had an average of 23.

Epidemiologists are increasingly pointing to lopsided transmission dynamics as a key element of the COVID-19 pandemic: most people don’t infect anyone else, but a few lead to many other cases. Greer suspects kids are just as capable of being “superspreaders” as adults.

“We need to keep this in mind when we think about schools,” said Zoe Hyde, an epidemiologist with the University of Western Australia in Perth, in an email. “When we see examples where children haven’t transmitted the virus, we have to remember that most adults don’t either. But as community transmission rises, the more we push our luck, and the more likely it is that we’ll see clusters in schools.”

## Research

Ten months into the pandemic, one early observation has stayed reassuringly consistent: kids are unlikely to get seriously sick, and pediatric deaths are rare.

But initial assumptions that kids are less likely to get infected have been largely disproven by a growing body of evidence. “Kids are not unicorns,” Greer said. “There’s nothing really extraordinarily special about kids that make them less susceptible. They do in fact become infected.”

Seroprevalence data — antibody levels measured in blood samples — can help generate a more accurate picture of infections in a population, because it is not dependent on access to testing. Epidemiologists believe children tend to be under-tested because they are so mildly affected or asymptomatic.

Public Health Ontario’s seroprevalence report for August, the most recent available, shows that the proportion of children under 19 carrying antibodies to the virus is similar to the population as a whole — roughly 1.1 per cent.

What remains murky — and has massive implications for schools — is the degree to which kids transmit the disease. Some studies have shown that kids are less likely to be the ones transmitting the virus to members of their households. But others have found they are just as likely, and posited that kids only appeared to be transmitting less because they were out of school, and therefore less likely to catch COVID in the first place.

“I think the evidence is currently mixed,” says PHO’s Schwartz, noting that this area of literature is “controversial.”

One type of research can offer far more conclusive answers: phylogenetic analysis, which maps small mutations in the virus that occur naturally over time, creating a family tree of infections. Phylogenetic analysis in Boston showed that a single business conference in late February was a massive superspreader event; the strain of virus present at the conference was the same one that swept through Boston’s biggest homeless shelters in March and April, causing massive clusters of new cases.

Phylogenetic analysis is underway in Ontario, but a spokesperson for PHO says that while the tool is being used in settings like long-term-care homes, it currently isn’t being applied to school outbreaks.

Schwartz says case data is being collected by public health units that PHO will help organize and analyze, and should provide insights into transmission in schools.

But Greer is puzzled by the lack of school-based surveillance studies that would tackle some of the thornier questions around schools and COVID risk. And to really clarify whether students are actually spreading COVID in classrooms — or just showing up at school already infected — we need genomic studies that can track the virus’s movement from person to person, she said.

## Expert takes

Last week, the Times of Israel published an alarming headline: “Health Ministry Report Warns Kids with COVID Could Be Superspreaders.” The following day saw the opposite message in the New York Times: “Schoolchildren Seem Unlikely to Fuel Coronavirus Surges, Scientists Say.”

Anxious parents can be forgiven for feeling whiplashed by conflicting messages from policymakers and experts, many of whom have divergent views around schools and COVID risk — a topic that has become particularly polarized.

This is partly because expert opinions are evolving along with the science. But it's also what happens when urgent decisions need to be made in the absence of solid data, said Sander, with UHN.

"A lot of it is left to how we interpret different things. And we all have to accept that everyone has some kind of bias: many of us have kids in schools, and everyone has a different level of risk," she said. "I think you just cannot entirely remove your personal bias or stake in this, as much as we try."

Without robust data to draw from, outsized attention is being paid to anecdotal reports from countries that have attempted school reopenings. These reports have become powerful narratives, with success stories often held up as proof that schools are safe while countries with COVID resurgences are pointed to as cautionary tales.

But "every school is different, every country is different," Sander said. "We can't just take one example and hold it up and say everything went wrong here, or everything went amazing here."

Israel, for one, has become a poster child for the argument that schools "may accelerate the spread of the virus," as the country's ministry of health recently concluded. Israeli schools reopened in late May, a move that some have blamed for contributing to a devastating second wave that sent Israelis back into lockdown.

Denmark, meanwhile, is often used as a foil to Israel because it went months without a major COVID resurgence after reopening schools in April.

But these different outcomes shouldn't be solely attributed to whether schools were opened or closed, says Dr. Nisha Thampi, a pediatric infectious disease physician with the Children's Hospital of Eastern Ontario. Context and details matter, she said.

"What I really think is missing (from the conversation) is ... what prevention measures were put in place when schools were opened? And what if any measures were introduced as the community rates increased?"

A scientific brief published by Ontario's COVID-19 Science Advisory Table takes a closer look at some of these questions. According to the brief, even though Denmark did not require masking for students or staff, it implemented a slow and gradual return to school where most classrooms had no more than 11 students and outdoor learning was recommended.

In Israel, however, limitations on class sizes were lifted in mid-May when all schools were allowed to open. Ten days later, the first school outbreak was reported; classrooms in the school were packed with 35 to 38 students and an unfortunately timed heat wave meant students were exempted from wearing masks and air conditioners were revved up.

For experts like Thampi, the school debate has grown divisive because it's too often framed as a binary: "Should schools open or should they close?" To her, the better question is how can schools open safely? When infection rates rise, should policymakers reduce classroom sizes or student cohorts in addition to closing restaurants and bars?

Schools should be a societal priority — education is enshrined as a fundamental human right — and the debate shouldn't centre around whether classrooms need to be shut down, but what other interventions are needed to keep them running, Greer believes.

"At what point do we decide that we need to make unpopular decisions about places that are not schools?" she said. "Because if we shut kids out of school again, that should be our action of last resort."

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**Region:** Ontario <sup>[3]</sup>

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