School risk calculations scrambled by fast-spreading virus strains [1]

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EXCERPT

A new, more transmissible coronavirus variant has upended efforts to balance the known harm that closed schools cause against the risk that the pandemic virus might spread in classrooms. Studies done before it emerged seemed to point in a hopeful direction: School outbreaks are rare, even when community spread is relatively high, providing schools limit class sizes and require safety measures including masks. And if community spread is low, those safety measures may not be essential, especially among children under the age of 10.

An outbreak of the new variant at a primary school in the Netherlands has undermined that confidence. Tests of 818 teachers, students, and families revealed 123 people—nearly 15%—were infected, just 1 month after the first case was identified at the school, which did not require teachers or children to wear masks. The new variant was responsible for a large fraction of those cases. This week, health officials asked the more than 60,000 residents of the school's region, north of Rotterdam, to get tested for the virus in an effort to learn how widely it has spread in the community.

In the Netherlands, children attended school full time, with full classes, and masks were not recommended in primary schools. That may need to change in regions where the new variant is spreading. "We need to be much more vigilant, especially indoors, and put many more safeguards in place," says Müge Çevik, an infectious disease specialist at the University of St. Andrews. "Given the new variant, all activities will likely be much higher risk."

But Çevik still thinks schools will be safer than, for example, large groups of adults. "Before the variant, we know primary schools contributed very little to community spread."

The new variant, B.1.1.7, first emerged in England, and early reports found the highest rates of infection in children, raising fears that they might be especially susceptible. But more recent analyses show the age distribution of B.1.1.7 infections looks similar to that of earlier variants, with many fewer cases diagnosed in children under age 13 than in teens or adults. (The initial surge in children likely appeared because England had shut many parts of the economy, whereas schools remained open.)

Because the new version is up to 50% more infectious than previous variants, however, "we will see many more clusters" of infection, Çevik says.

In the Netherlands, the first case appeared at the Willibrord school in late November 2020 and apparently spread quickly. Ewout Fanoy, a physician at the regional health department in Rotterdam, says reports of multiple cases at the school, which serves students ages 4 to 12, caught their attention in early December. "We were puzzled that there was such a large outbreak among younger children," he says. "Normally we saw significant outbreaks only at high schools and universities."

On 16 December, the Netherlands closed all schools as part of a wider shutdown. By then, 40% of students and nearly half the staff at Willibrord reported respiratory symptoms, Fanoy says. Cases also emerged at a second school that shared the building and an associated school at a different campus. In late December, a Willibrord teacher who had been infected died, although officials did not say whether she died of COVID-19 complications.

On 23 December, routine sequencing found the B.1.1.7 variant in a patient in Lansingerland, the school's municipality. Contact tracing revealed a connection to the school. On 26 December, the team invited all staff, students, and their families for testing and by 3 days later, had tested 818 people, identifying 123 cases. All sequences from infected teachers and students, 46 so far, were the B.1.1.7 variant. (Ten family members were infected with other variants of the virus.)

In early January, a second call went out to families connected to the two other schools and six day cares that shared their facilities, about 3000 people total, Fanoy says. More than 1300 have been tested, and so far 2% of those are positive. The team is sequencing the samples to determine how many carry the B.1.1.7 variant.

“The response has been incredible,” says Marion Koopmans, a virologist at the Erasmus Medical Center in Rotterdam. “There’s a lot of willingness in the community to get this sorted.” So far more than 80% of the B.1.1.7 cases in the region link back to the school, including grandparents of pupils, says Janko van Beek, a public health expert at Erasmus Medical Center who is working on the investigation with Fanoy and Koopmans.

The researchers are now trying to piece together who infected whom, using sequences and data on when symptoms appeared to piece together genetic clues about the path of the virus.

To understand how much farther the new variant has spread, officials decided to try to test the entire community—all 60,000 residents. “It’s worth giving it a shot,” Koopmans says. “It’s not likely to contain everything, but whatever we can do to delay this variant from spreading” is worthwhile, she says.

Despite the Dutch town’s experience, Kanecia Zimmerman, a pediatrician at Duke University who with her colleagues tracked school outbreaks among 100,000 students and staff in North Carolina schools this fall, remains hopeful that with strict measures in place, schools can remain relatively low risk even with the new variant spreading. She and her colleagues found that even in communities with very high transmission—a 14-day incidence of more than 900 cases per 100,000 residents—strict mask requirements and small class sizes (with children attending in person 2 days per week) can keep school outbreaks very rare.

And Lin Thorstensen Brandal, an infectious disease expert at the Norwegian Institute of Public Health, found a similarly optimistic result: Between August and November, she and her colleagues tracked 292 contacts of 13 cases identified in elementary school students, testing each contact at the beginning and end of their 10-day quarantine. Only three of the contacts ended up infected.

Norway has had relatively low rates of infection, however—just one-tenth of those in the North Carolina regions where Zimmerman and her colleagues worked. That might mean safety measures are less important, at least for younger children: Students in Norway are told to stay home if they are ill, but they attend school full time and don’t wear masks. Brandal and her colleagues are expanding their study to include secondary schools and add genome sequencing, which they hope might enable them to quickly notice any fast-spreading variants.

Whether more transmissible variants will undermine school safety even in countries like Norway remains an open question, Brandal acknowledges. In Lansingerland, Fanoy says 27,000 residents have made appointments to be tested, and he expects results by late next week. The answers, he says, may help determine whether children return to classrooms at the end of the month as planned.

**Correction, 18 January, 5:30 a.m.: An earlier version of this story incorrectly suggested that Dutch policies required children to wear masks in primary school hallways and common areas when in fact they are not recommended.*

Region: Europe [3]
Tags: school system [4]
COVID-19 [5]
health and safety [6]

Links
[1] https://childcarecanada.org/documents/child-care-news/21/01/school-risk-calculations-scrambled-fast-spreading-virus-strains [2] https://www.sciencemag.org/news/2021/01/new-coronavirus-variant-scrambles-school-risk-calculations [3] https://childcarecanada.org/category/region/europe [4] https://childcarecanada.org/category/tags/school-system [5] https://childcarecanada.org/taxonomy/term/9040 [6] https://childcarecanada.org/category/tags/health-and-safety