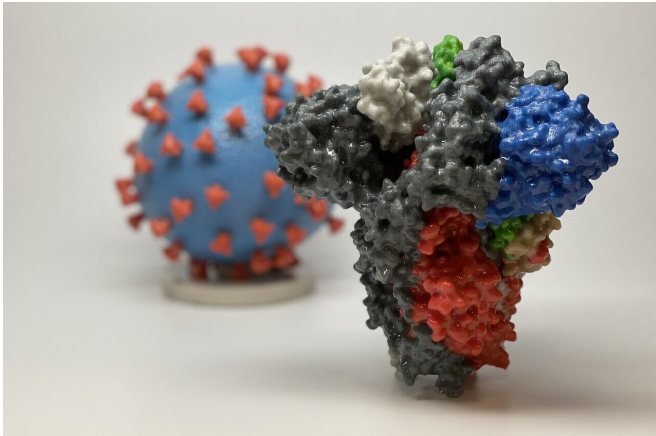


# Limited transmission of COVID-19 from open schools but teachers were affected: study

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3D print of a spike protein of SARS-CoV-2, the virus that causes COVID-19—in front of a 3D print of a SARS-CoV-2 virus particle. The spike protein (foreground) enables the virus to enter and infect human cells. On the virus model, the virus surface (blue) is covered with spike proteins (red) that enable the virus to enter and infect human cells. Credit: NIH

Most countries introduced school closures during the spring of 2020 despite substantial uncertainty regarding the effectiveness in containing SARS-CoV-2. In Sweden, upper-secondary schools moved online while lower-secondary schools remained open. A comparison of parents with children in the final year of lower-secondary and first year of upper-secondary school shows that keeping the former open had limited consequences for the overall transmission of the virus. However, the infection rate doubled among lower-secondary teachers relative to upper-secondary ones. The infection rate among partners of lower-secondary teacher was 30 percent higher than among their upper-secondary counterparts.

On March 18, 2020, Swedish upper-secondary

schools moved to online instruction while lower-secondary schools remained open. This facilitates a comparison of infections and disease between groups that are comparable in other regards. In the study, all PCR-confirmed cases of SARS-CoV-2 and all healthcare registered cases of COVID-19 until the summer break are linked to register data on families and teachers in lower and upper-secondary schools.

Since the age of the student is likely to correlate with the severity of symptoms, student infectiousness and various types of risk behavior, it is crucial to compare parents to children close in age. According to the study, the risk of [infection](#) was 17 percent higher among parents whose youngest child studied at the final year of lower-secondary rather than the first year of upper-secondary school. Had lower-secondary schools moved online, the estimates correspond to 500 fewer detected cases among a total of 450 000 lower-secondary parents (4.5 percent of the population). This can be compared to 53,000 PCR-confirmed cases in the total population during until the summer break in mid-June.

When comparing lower to upper-secondary teachers, we find that the risk for both PCR-confirmed infection and healthcare treatment due to COVID-19 doubled by keeping schools open. Among 124 occupations, upper-secondary teachers had a median risk of infection while lower-secondary were the 7th most affected. This comparison excludes healthcare workers who had markedly different access to PCR-testing. By the end of June, 79 out of 39 500 lower-secondary teachers had been hospitalized due to COVID-19, one of whom deceased. According to the study, this number had been down to 46 if lower-secondary schools had closed.

It is well-known that SARS-CoV-2 is transmitted within households. The study finds that the risk of a positive PCR-test was 30 percent higher among partners of lower-secondary teachers than among their upper-secondary counterparts. The estimates for more serious cases of COVID-19 are somewhat lower than for PCR-tests but—just as for parents—these estimates are imprecise.

Closing the schools is a costly measure with potentially long-run detrimental effects for students. The results for [parents](#) are in line with theoretical models predicting a limited impact of [school closures](#) on the general transmission of SARS-CoV-2. In an international comparison, the precautionary measures undertaken in Swedish schools are best described as mild. Thus, strict measures within open schools cannot explain the relatively minor impact on the overall rate of transmission. The results for teachers suggest that further precautionary measures could be considered.

The study does not analyze the impact of [school closures](#) for virus transmission among students. We note, however, that there are few cases of serious illness among the young. In particular, zero deaths from COVID-19 had been recorded among 2-19 year olds in Sweden until mid-summer 2020.

**More information:** Jonas Vlachos et al, The effects of school closures on SARS-CoV-2 among parents and teachers, *Proceedings of the National Academy of Sciences* (2021). [DOI: 10.1073/pnas.2020834118](#)

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