

# Covid-19 in schoolchildren

A comparison between Finland and Sweden



Folkhälsomyndigheten  
PUBLIC HEALTH AGENCY OF SWEDEN



Terveyden ja  
hyvinvoinnin laitos

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Article number: 20108-1

## About the report

- This report has been written to compare the effect of different approaches in regards to school closure, as a response to the covid-19 pandemic.
- It adds to the knowledge of the effectiveness of measures aimed at the mitigation of covid-19.
- It could be of interest for any decision maker involved in choosing the most effective measures.
- This report has been produced in cooperation with the Finnish Institute for Health and Welfare THL, represented by Dr Hanna Nohynek, MD PhD and Dr Otto Helve, MD PhD.

The Public Health Agency of Sweden

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## Abbreviations/glossary

Covid-19 – the infection caused by the new coronavirus SARS-CoV-2

ICU - intensive care unit

SARS-CoV-2 – the new coronavirus that causes covid-19

## Summary

This report is a comparison between Finland and Sweden, two in many ways similar countries who applied different measures regarding schools during the covid-19 pandemic. There is no difference in the overall incidence of the laboratory confirmed covid-19 cases in the age group 1-19 years in the two countries and the number of laboratory confirmed cases does not fluctuate with school closure or change in testing policy in Finland. In Sweden, the number of laboratory confirmed cases is affected by change in testing policy. Severe covid-19 disease as measured in ICU admittance is very rare in both countries in this age group and no deaths were reported. Outbreak investigations in Finland has not shown children to be contributing much in terms of transmission and in Sweden a report comparing risk of covid-19 in different professions, showed no increased risk for teachers.

In conclusion, closure or not of schools had no measurable direct impact on the number of laboratory confirmed cases in school-aged children in Finland or Sweden. The negative effects of closing schools must be weighed against the positive indirect effects it might have on the mitigation of the covid-19 pandemic.

# Background

This report is a comparison between Finland and Sweden, two in many ways similar countries who applied different measures regarding schools during the covid-19 pandemic. As covid-19 is a completely new infection to humankind there are still many question marks regarding what mitigation measures to apply for maximum effect.

Sweden is one of very few countries that decided to keep day care and primary schools open during the pandemic. School closure may have many negative effects, mainly of social character but also secondary effects such as parents having to stay at home with their children (1, 2). This could add to staffing problem for example in hospitals or other for society critical areas.

Children in general seem to be much less affected by covid-19 than adults (3, 4). They do not become severely ill in the same extent as adults and because of less severe symptoms or none at all, might be less infectious (5).

In Sweden this assumption and weighing in the negative effects of a school closure, resulted in the decision not to close day care or primary schools for children, when secondary schools and universities were closed on March 17.

In Finland on the other hand, all schools were closed on March 18 until May 13 with the exception of children in grades 1-3, who had the possibility to participate in regular on site teaching if their caretakers were working in areas that were considered critical for the society (18.3.-13.5) or if the caretakers deemed participation necessary (23.3.-13.5). However, caretakers of children in grades 1-3 were encouraged to have their children participate in distance learning from home.

Both in Finland and Sweden children usually start attending day care during their second year of life and preschool the year they turn six years old. Primary school is from seven to fifteen years of age followed by three to four years of secondary school. Regarding the population, Finland is about half the size of Sweden with 5,5 million inhabitants compared to 10,3 million.

**Table 1.** Number of schools and pupils

Country	Number of primary schools	Number of pupils (class 1-9, 7-15 y)	Mean number of children per school unit
Finland*	2 333	550 509	235
Sweden**	4 829	1 086 180	225

\* Finnish National Agency for Education, 2018

\*\*Swedish National Agency for Education 2019

# Data

**Table 2, Finland:** Number of reported cases, number admitted in intensive care unit (ICU), number of deaths due to covid-19 and cumulative incidence of reported cases, per June 14, 2020.

Age group (school level)	Number of reported cases	Number admitted in ICU	Number of deaths	Population*	Incidence of reported cases (per 100 000)
1-5 years (day care)	96	0	0	269 246	36
6-15 years (pre- and primary school)	257	0	0	616 516	42
16-19 years (secondary school)	231	1	0	236 199	98
Total 1-19 years	584	1	0	1 121 961	52
Percentage of total number	8.2%	0.3%	0%	20.3%	
Total all ages	7 110	288	320	5 525 292	129

\* Population numbers from Statistics Finland, as reported December 2019

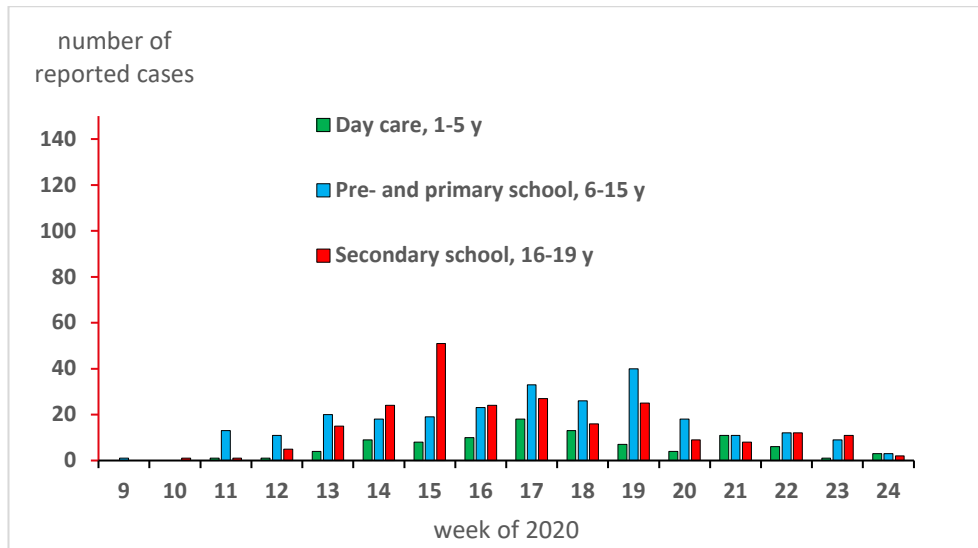
**Table 3, Sweden:** Number of reported cases, number admitted in intensive care unit (ICU), number of deaths due to covid-19 and cumulative incidence of reported cases, per June 14, 2020.

Age group (school level)	Number of reported cases	Number admitted in ICU	Number of deaths	Population*	Incidence of reported cases (per 100 000)
1-5 years (day care)	98	2	0	610 904	16
6 -15 years (pre- and primary school))	370	6	0	1 225 478	30
16-19 years (secondary school)	680	6	0	451 965	150
Total 1-19 years	1124	14	0	2 288 347	49
Percentage of total number	2,1%	0,6%	0%	22.2%	
Total all ages	52 424	2 328	5 051	10 327 589	508

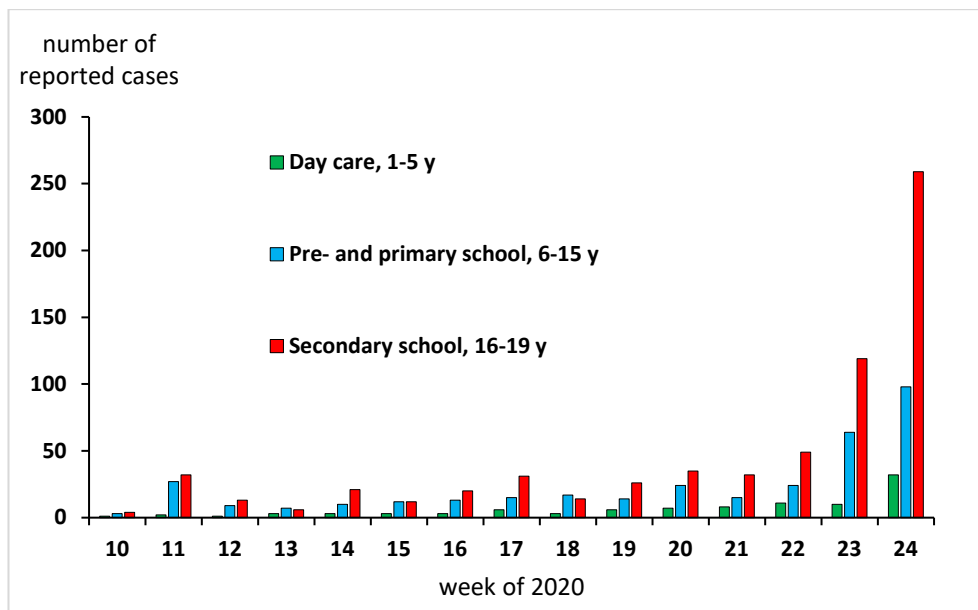
\* Population numbers from Statistics Sweden, as reported November 2019



**Figure 1.** Cases in Finland by age group and week of diagnosis. All schools closed week 12 to week 20. Extended testing started midweek 16.



**Figure 2.** Cases in Sweden by age group and week of diagnosis. Secondary school closed week 12 and extended testing started week 22.



**Table 4, Sweden:** Number of teachers, cases among them and relative risk compared to other professions.

Teachers in	Number of teachers 2019/2020	Number of cases	Median age at diagnosis	Relative risk* (95% CI)
Day care	157 263	192	45	0.9 (0.7-1.1)
Primary school	105 418	160	50	1.1 (0.9-1.3)
Secondary school	30 357	29	47	0.7 (0.5-1)

\* compared to other professions

## Analysis/results

In Finland, primary school closures took place between March 18 and May 13. Primary schools were reopened between May 14 and May 31. During this reopening period, there were 23 primary school exposures (index cases) in 21 primary schools. Of the index cases, 16 were pupils and seven adults. There were 392 pupils and 54 adults placed under quarantine and the last quarantine ended on June 12. The Finnish Institute for Health and Welfare and the Ministry of Education issued restriction guidelines for primary school openings on the 4th of May. A key component of these guidelines was limiting the number of contacts in schools and therefore minimizing the number of possible quarantines. During the period May 14 to June 12 (the end of the last quarantine period), there were no secondary cases in any of the primary schools.

Primary school closure and reopening did not have any significant impact on the weekly number of laboratory-confirmed cases in primary school aged children (**figure 1**).

In Finland, the number of cases in primary school aged children has been less than half of their percentage of the population (**table 2**). In general, the testing guidelines for SARS-CoV-2 have not differed between children and adults and children with symptoms have been tested according to the same protocols as adults. Until April 15, testing was mostly focused on those belonging to risk groups and staff in healthcare. Thereafter testing was encouraged among all suspected cases of covid-19 infection.

The extremely low percentage of SARS-CoV-2 positive children requiring intensive care and no deaths underlines the age-specific pathology of covid-19.

In Sweden, the percentage of reported cases among schoolchildren is only one tenth of their percentage of the population. Also very few cases have been admitted to ICU and there has been no deaths reported in cases aged 1-19 years (**table 3**). **Figure 2** shows the epidemic curve for schoolchildren in Sweden per week where the somewhat higher number week 11 is related to extensive testing of people returning from spring break in Italy. In week 12 testing was limited to cases seeking hospital care. Also in week 12, secondary school and universities switched to on-line teaching, but day care and primary schools remained open. Because of the reduction in testing, contact tracing was limited in most parts of the country and no outbreak investigations performed in schools, missing any opportunity to fill the knowledge gap on the role of children in propagating the epidemic. The increase in number of cases from week 22 coincides with introduction of a more generous testing policy again, testing all with symptoms. In **table 4**, data from Statistics Sweden on individuals and profession was matched with reported cases to get an idea of which professions were overrepresented among reported cases (6). Compared to other professions, the relative risk among teachers in day care, primary and secondary school were close to one, indicating no increased risk of exposure and infection in this group.

The Public Health Agency of Sweden published a report on covid-19 and school children on May 29, summarising the findings and effects of keeping day care and primary schools open in Sweden (7).

## Discussion

Schools have been closed in most countries affected by the pandemic, with the intention to protect children from being infected and to reduce the spread in general. It has been suggested that children may be important in spreading this infection, especially since they usually do not become very ill but still can have a high viral load (8-10).

The overall cumulative incidence among school-aged children in Finland and Sweden is similar even though Finland closed schools for most children and Sweden did not. Sweden has been much more affected by the pandemic than Finland but this does not show in the incidence among children. It is likely that many mild cases in children in Sweden never been detected since testing during week 12 to 22 mainly focused on persons seeking hospital care. By now it is evident that children are much less likely to develop serious disease if they become infected (3, 10, 11), meaning that keeping schools open might be less harmful for children than closing them.

In Sweden, outbreak investigations have been very limited in the regions with the highest number of cases due to strained resources. In the contact tracings in primary schools in Finland, there has been hardly any evidence of children infecting other persons. The Swedish comparison of number of reported cases among staff in day care and primary school to number of cases in other professions does not show any increased risk for teachers. This also indicates that the role of children in propagating this infection is likely to be small. Various papers on contact tracing have also found that children rarely are the first case in family clusters (4, 12, 13).

In the US, a peer reviewed paper has been published suggesting that children might be the best group to target for covid-19 immunization in order to reduce the spread of the virus also to other groups, comparing it with other respiratory infections like influenza and pneumococcal infections (14). This theory is not supported by the findings in our report.

Another study, still only available as a pre-print, finds school closure to be the most effective non-pharmaceutical intervention when looking at a number of countries and different interventions (15). However, as they do point out, it might be a confounded finding as it was one of the first interventions in most countries, thus raising the awareness of the gravity of the situation, which would affect behaviour in general.

## Conclusions

- Closing of schools had no measurable effect on the number of cases of covid-19 among children.
- Children are not a major risk group of the covid-19 disease and seem to play a less important role from the transmission point of view, although more active surveillance and special studies such as school and household transmission studies are warranted.
- The negative effects of closing schools must be weighed against the possible positive indirect effects it might have on the mitigation of the covid-19 pandemic.

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