



SARS-CoV-2 in children (0-15 years) in Denmark

- infection, hospitalizations and serious courses; developments since 15. December 2021

English summary

During the two months between December 15, 2021 and February 15, 2022, where the Omicron variant has been dominating, Denmark has experienced a surge of PCR confirmed cases. During these two months, 46% of the 0-15 year olds have tested SARS-CoV-2 positive by PCR. With increasing numbers of infected, there have also been a higher number of admissions amongst children. A total of 2,025 children have been admitted following their SARS-CoV-2 infection, equivalent to 0.4% of the PCR confirmed cases in the age group. The highest proportion of admitted cases was seen amongst the youngest children (0-6 months old), where 21% were admitted. Of the admitted children, however, only half had a COVID-19 diagnosis, and around 40% of the admissions were of less than 12 hours duration. A total of 85 children and adolescents aged 0-15 years received intensive care or observation during the two months period. One SARS-CoV-2 positive child had died in the period, but the cause of death was another than COVID-19. There are no signs of the Omicron variant giving rise to more severe disease in children than did previous viral variants.

The severe but rare complication to SARS-CoV-2 infections, MIS-C, has been seen in 88 children during the COVID-19 epidemic in Denmark. During the period March 1, 2020 - February 28, 2021 MIS-C was seen in 1 per 1,700 PCR confirmed SARS-CoV-2 infections in unvaccinated children, while there during the period from December 2021 to January 4, 2022 until now have been 1 MIS-C case per 5,400 PCR confirmed SARS-CoV-2 infections in unvaccinated children. The follow-up period is still ongoing, so more children infected during the period might still develop MIS-C.

Preliminary estimates of the vaccine effectiveness (VE) against PCR confirmed SARS-CoV-2 infection during a period where the Omicron variant was dominating, show a VE of 30% 14-30 days after the second vaccine dose for children 5-11 years old.

Summary:

In the two months where the omicron variant has been dominant, between 15 December 2021 and 15 February 2022, there has been an increase in the number of detected SARS-CoV-2 infections among 0-15-year-olds in Denmark, where 46% of the age group were diagnosed with SARS-CoV-2 infection by PCR. In step with that increasing number of infected there has been a corresponding increase in the number of hospitalized children. In total, 2,025 have children been hospitalized, corresponding to 0.4% of those detected infected. The highest proportion of inpatients compared to



infected are seen in the youngest children (0-6 months old), where 21% of detected infected were hospitalized. Of the infected 0-15-year-old children who were hospitalized had only approx. 50%, however, received a covid-19 diagnosis, and for about 40%, hospitalization lasted less than 12 hours. In total, 85 children and young people aged 0-15 years since 15 December received intensive care, and one death has been recorded in one SARS-CoV-2 infected child, where the death is due to a different cause than covid-19.

Thus, there is nothing to date to suggest that the omicron variant gives rise to more serious disease in children than previous variants.

The rare but serious complication of SARS-CoV-2 infection, MIS-C, has been seen in 88 children throughout the course of the epidemic. In the period 1 March 2020 - 28 February 2021, the frequency of MIS-C was 1 per 1,700 detected SARS-CoV-2 infections in unvaccinated children, while for the period 15 December 2021 to 4 January 2022 so far only cases corresponding to a frequency of 1 per 5,400 have been seen detected SARS-CoV-2 infections in unvaccinated children. However, the follow-up period is not yet over, ie. that there are still infected children from this period who may manage to develop symptoms of MIS C.

Preliminary analyzes, calculated for children aged 5-11 years, show a vaccine efficacy for PCR detected SARS CoV-2 infection 14-30 days after 2nd bite of 30% (29-32%) for the period December 28, 2021 to 27. January 2022

SARS-CoV-2 in children in Denmark

The statement is made on the basis of data from the covid-19 monitoring, and is calculated as of 15 February 2022

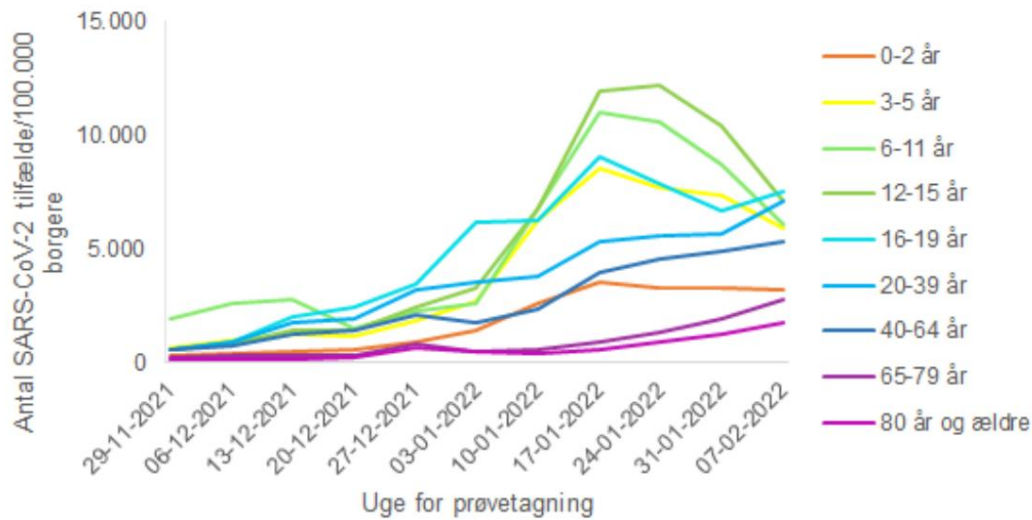
Number of cases and test activity

Figure 1 shows the development in the incidence (number of cases of SARS-CoV-2 infection per 100,000) from week 48, 2021 to week 6, 2022 divided into age groups. Many school children were sent home for online tuition from week 50 to week 1. Among the 5-15-year-olds, over 10% of a year group tested positive in week 3 and 4 and since 15 December 2021, when the omicron variant became dominant, 53% of this group tested positive, and several are actually expected to have been infected without having been tested. Throughout the group of 0-15 year olds is 46% tested positive for SARS-CoV-2 infection by PCR during the two months.



Figure 1. Number of individuals with RT-PCR-detected SARS-CoV-2 per 100,000; the whole country divided into age groups, week 48 2021 - 6, 2022

Figure 1. Number of persons with RT-PCR diagnosed SARS-CoV-2 per 100,000; per nine age groups, week 48 2021 - 6, 2022



During the period, there has been an invitation to be screened twice a week for all students from and with 1st grade as well as employees in primary school. This has primarily been done by antigen testing. There is significant difference in both antigen and PCR test activity relative to age, with persons <3 years (<5 years for antigen tests) and > 65 years have been tested less than half as often as persons aged 3-64 years (Figures 2a and 2b). While the test activity was stable for adults > 20 years and older, the test activity decreased children and young people clearly during school closures around Christmas and New Year, but rose again immediately after.



Figure 2a. Number of antigen tests per 100,000, nationwide by age group, week 48, 2021 - 6, 2022

Figure 2a. Number of antigen tests per 100,000, per nine age groups, week 48 2021 - 6, 2022

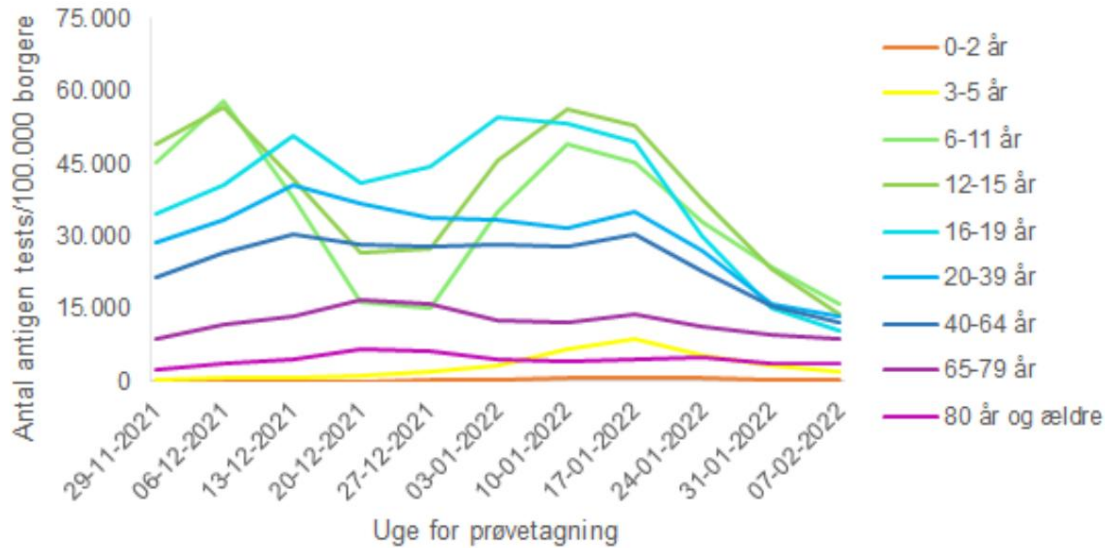
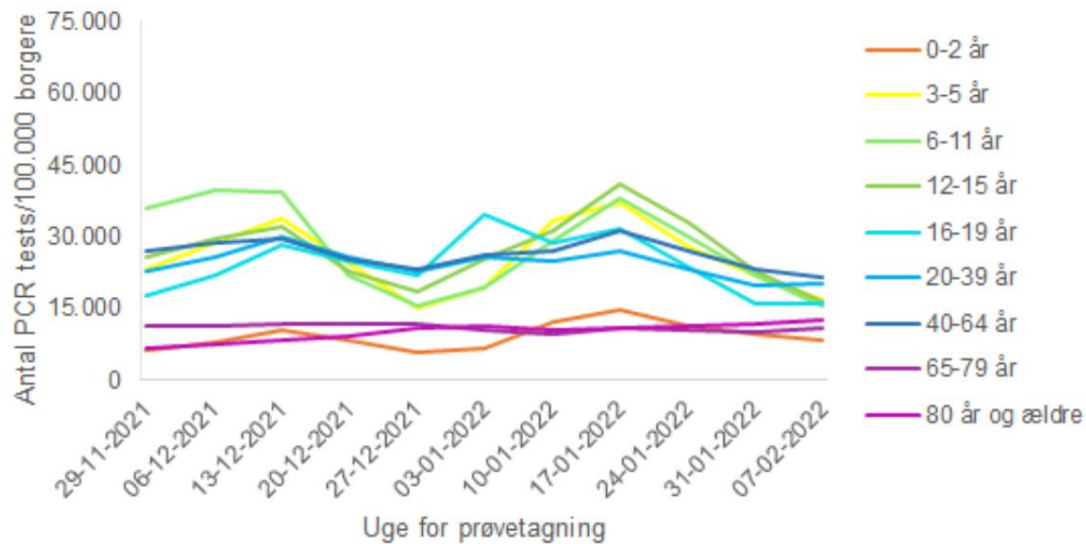


Figure 2b. Number of PCR tests per 100,000, nationwide by age group, week 48, 2021 - 6, 2022

Figure 2b. Number of PCR tests per 100,000, per nine age groups, week 48, 2021 - 6, 2022



Despite this, the proportion of positives (positive percentage) has increased steadily among children and young people from week 51.

This may be because the positives are increasingly found through antigen testing and subsequently on

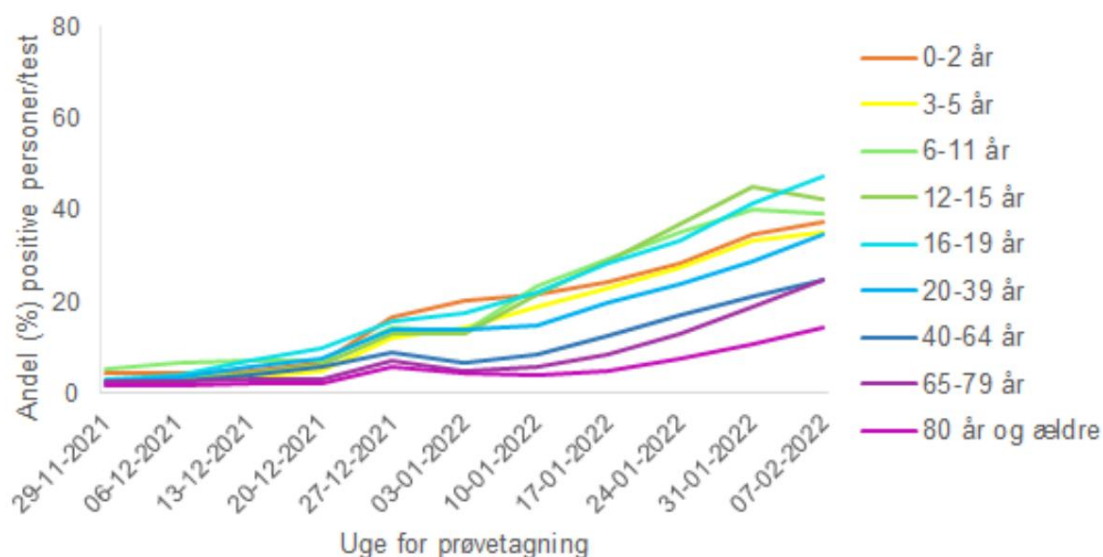
Based on this test, reference is made to confirmatory PCR testing, at the same time as an increasing number of children and adolescents became infected after week 51 and are not fully present through the test system.

The positive percentage among the 0-2-year-olds is on a par with the positive percentage among the 3-15-year-olds, despite last group higher test activity.



Figure 3. Number of positive people per 100,000 PCR tests, nationwide by age group, week 48, 2021 - 6, 2022

Figure 3. Number of positive persons per 100,000 PCR tests, per nine age groups, week 48, 2021 - 6, 2022



Severity

The number of hospitalized children has increased as more children become infected. In total, 40% of all children between the ages of 0 and 15 have been tested positive since 15 December 2021. Of these, 0.4% have been admitted. The highest proportion of hospitalized is seen in the youngest children (0-6 months old), where 21% of infected are hospitalized (table 1). A total of 85 (18 per 100,000 infected; 4% of the inpatients) received intensive care (defined by special procedure codes and not necessarily hospitalized in the intensive care unit). One death has been registered in a SARS-CoV-2 infected child, where the death is due to a cause other than covid-19.

Table 1. Number and proportion of inpatients with test dates from 15 December 2021 to 1 February 2022, divided into seven age groups (0-15 years). The date of 1 February has been chosen to ensure full follow-up time with regard to hospitalization after infection

Table 1. Number and proportion admitted amongst persons testing positive between December 15, 2021 and February 1, 2022, by seven age groups (0-15 years). February 1, 2022 has been chosen to ensure full follow up time

Age group	Coincidence	Inpatients	Share hospitalized (%)	Proportion of short admissions out of all admissions (%)
0 - 6 months	2,011	429	21	38
7 - 11 months	2,090	92	4.4	43
12-18 months	5,142	72	1.4	40
19-23 months	4,190 (most common)	44	1.1	34
2 years	12,232	79	0.6	37
0-2 years	25,665	716	2.8	38
3-5 years	58,828	209	0.4	42



6-15 years	262,216	556	0.2	33
------------	---------	-----	-----	----

A SARS-CoV-2 infected person is defined according to SSI's algorithm as hospitalized if the person becomes hospitalized within 14 days after sampling date for positive PCR test for SARS-CoV-2.

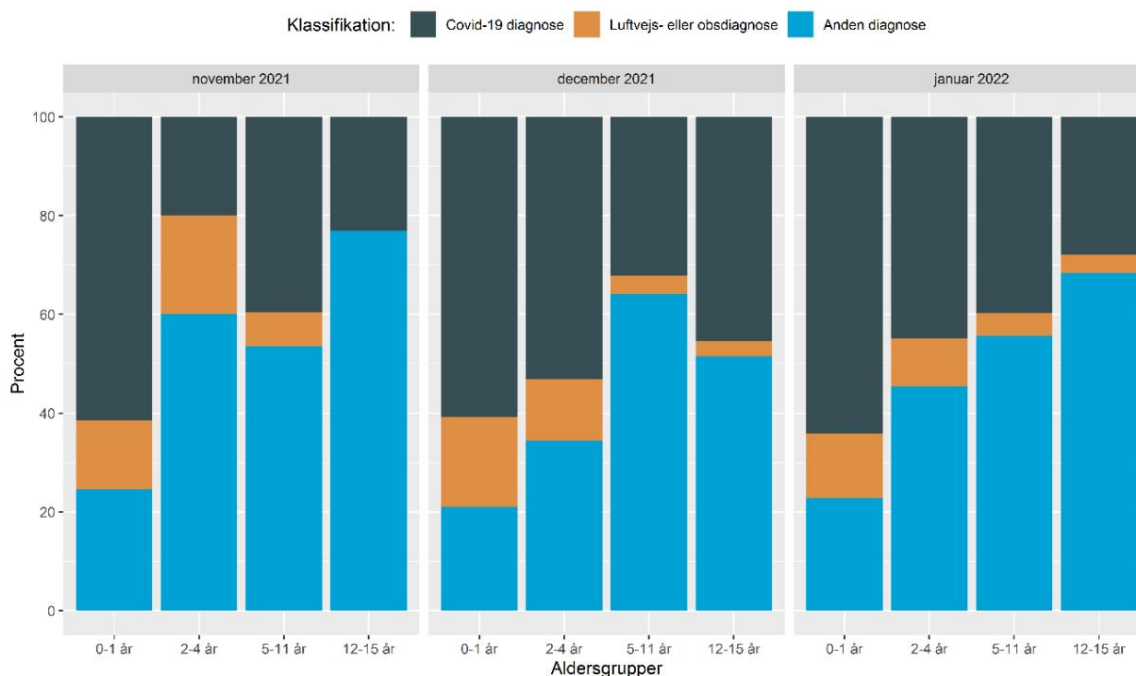
Individuals who are tested SARS-CoV-2 positive during an admission are also registered as hospitalized. In the above figures from the monitoring, no distinction is made between the reason for the admission or the length of hospitalization.

On the basis of data from the National Patient Register and from the Regions, hospitalized SARS-CoV-2 infected divided into three groups according to whether the person is (a) hospitalized with a covid-19 diagnosis, (b) with a diagnosis which may be compatible with a covid-19 infection, e.g. a respiratory infection diagnosis, or (c) with a different diagnosis than the above (Figure 4).

In the months of November 2021 - January 2022, 63% of the 0-1-year-olds were hospitalized with a covid-19-diagnosis, 45% of 2-4-year-olds, 38% of 5-11-year-olds and 30% of 12-15-year-olds. The proportion that was admitted with a diagnosis other than covid-19 or respiratory diagnosis, 23% of the 0-1-year-olds, 44% of the 2-4-year-olds, 57% of the 5-11-year-olds and 66% of the 12-15-year-olds .

Figure 4. Proportion of new admissions with a covid-19 diagnosis (black), with a diagnosis that may be compatible with covid-19 infection, e.g. a respiratory infection diagnosis (orange), and with a diagnosis other than the above (blue), per month since November 2021, divided into four age groups (0-15 years)

Figure 4. Proportion of new admission with a COVID-19 diagnosis (black), with a diagnosis that may be compatible with COVID-19 infection, eg a respiratory diagnosis (orange), and with another diagnosis than the ones above (blue), per month since November 2021, by four age groups (0-15 years)

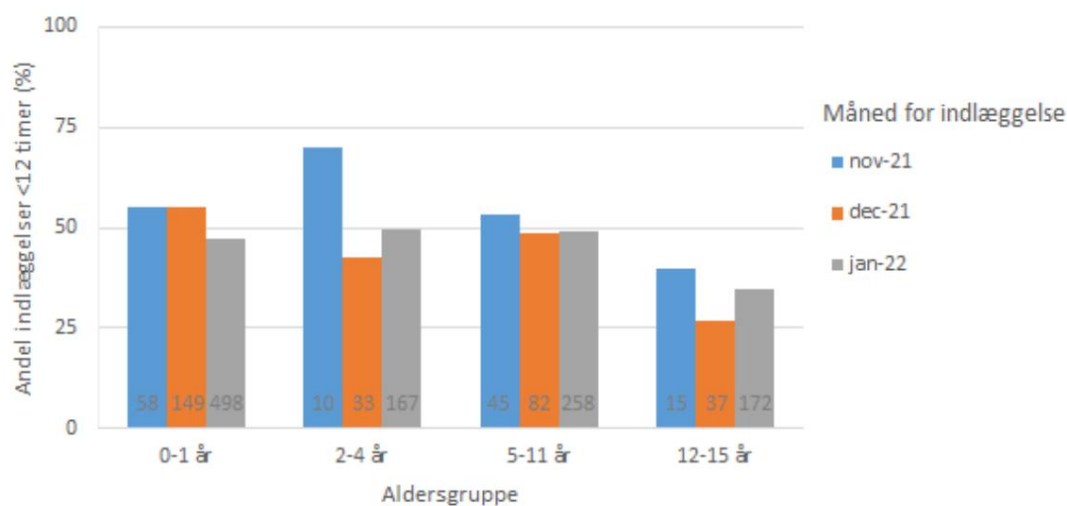




About half of the hospitalized 0-11-year-olds with SARS-CoV-2 infection were hospitalized in fewer than 12 hours (Figure 5 and Table 1). This proportion is lower for the 12-15-year-olds, where 30% -40% were hospitalized below 12 hours.

Figure 5. Proportion of short admissions divided into four age groups (0-15 years) - total number of admissions appears on the graph - November 2021 to January 2022

Figure 5. Proportion admission <12 hours per four age groups (0-15 years) - total number of admissions appear from the graph - November 2021 - January 2022



As can also be seen from the development in the number of cases, the omicron variant is more contagious than before variants but is generally thought to give rise to milder disease than the delta and alpha variants, which were dominant in resp. autumn and spring 2021. Knowledge specifically about the severity of the omicron variant in children remains limited, but there is no evidence that the omicron variant gives rise to more serious disease in children than previous variants.

0-2-year-olds

Since the end of December, there has been a steady increase in the number of new admissions per 100,000 in the group 0-2-year-olds with 80-120 new admissions per 100,000 since mid-January. The occurrence is thus at the same level as among the + 80-year-olds (Figure 6).



Figure 6. New admissions per 100,000 persons, the whole country divided into age groups, week 48 2021 - 6, 2022

Figure 6. Newly admitted persons per 100,000 population, whole country by age group, week 48 2021 - 6, 2022

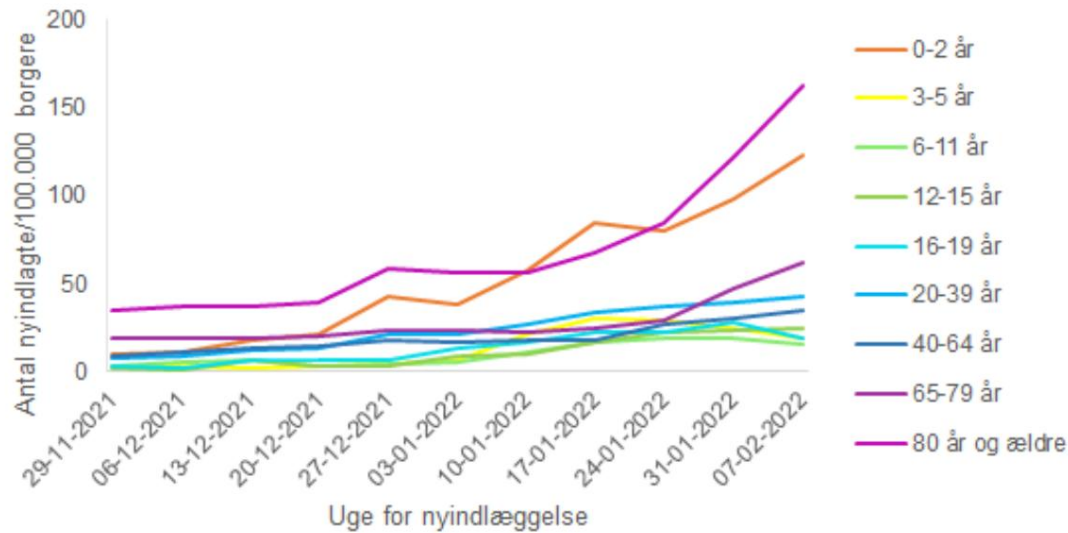


Figure 7 shows the development in the number of infected and hospitalized among 0-2-year-olds. It appears that both numbers infected and hospitalized have risen sharply in December and January and are followed along. The number of admissions in this age group has been below 40 per. month since the beginning of the epidemic and even October 2021, when the infection increased sharply and where in January 569 inpatients were seen.

Figure 7. Number of SARS-CoV-2 cases (left y-axis) and inpatients (right y-axis) per month, 0-2-year old, November 2020-1. February 2022

Figure 7. Number of SARS-CoV-2 cases (left y axis) and admitted (right y axis) per month, 0-2 year olds, November 2020-February 1 2022

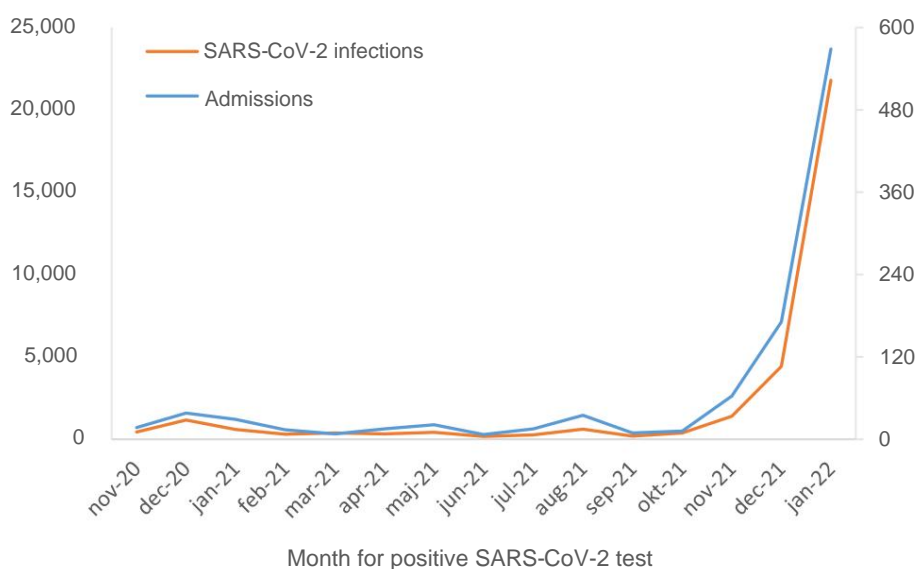


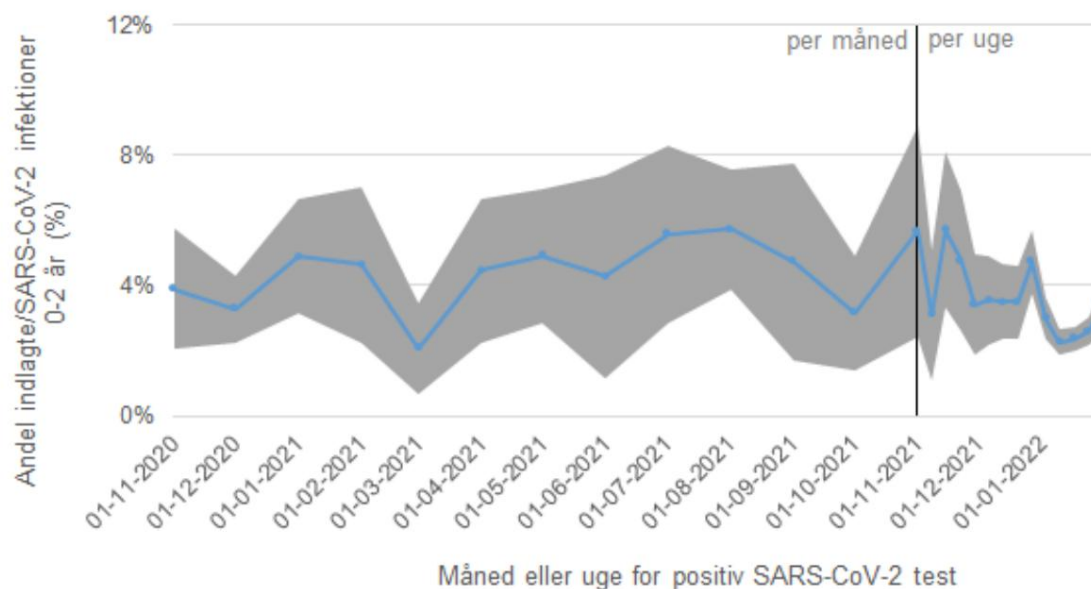


Figure 8 shows the proportion of confirmed cases among the 0-2-year-olds who are admitted within 14 days.

Here it can be seen that this share has been fluctuating, but at a lower level from November 2020.

Figure 8. Proportion of hospitalized SARS-CoV-2 cases and associated 95% confidence interval (in gray) per month until November and then per week, 0-2-year-olds, November 2020-1. February 2022

Figure 8. Proportion of admitted persons of SARS-CoV-2 infections and 95% confidence intervals (in gray) per month (until November 2021) or week (from November 2021 and onwards), 0-2 year old's, November 2020 - February 1, 2022



Since December 15, 2021, 1,078 children aged 0-2 years have been hospitalized. In total, 48 received intensive care, corresponding to about 1 in 800 detected infected and 4.5% of the hospitalized children. No deaths were recorded during the period in this group.

Multisystem Inflammatory Syndrome in Children (MIS-C)

A serious but rare complication of SARS-CoV-2 infection is Multisystem

Inflammatory Syndrome in Children (MIS-C). MIS-C usually occurs 2-6 weeks after a frequent

asymptomatic or mild infection with SARS-CoV-2. The condition is serious and half require hospitalization in the intensive care unit, but the prognosis among children in Denmark is good.

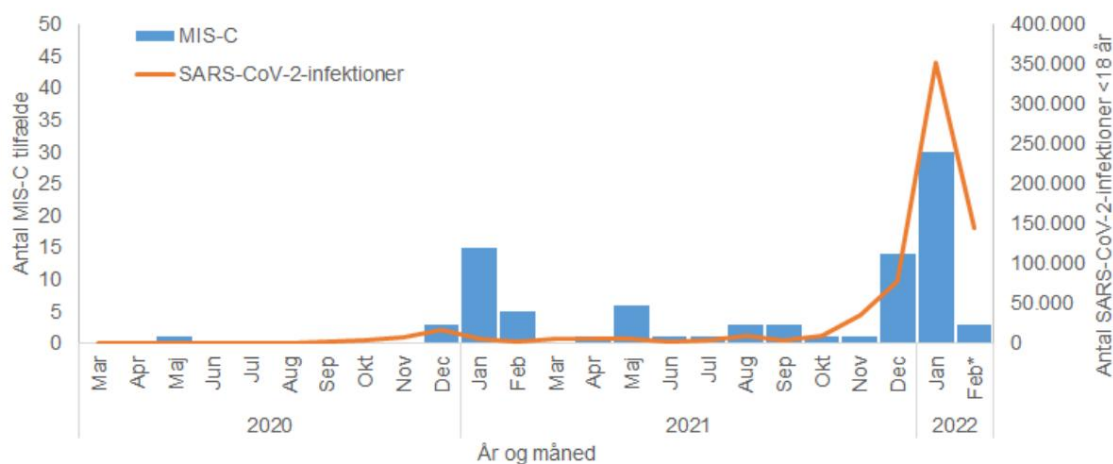
Figure 9 shows the number of MIS-C cases and the number of SARS-CoV-2 cases per month for the 0-17-year-olds. Quantity MIS-C cases are based on extracts from the National Patient Register, but for the period August 2021 - January

In 2022, 11 children will be sorted out, after it has been assessed in a journal review that the child did not have MIS C. The total number during the entire covid-19 epidemic in Denmark is thus 88.



Figure 9. Number of MIS-C (left y-axis) and number of detected SARS-CoV-2 infections (right-y-axis) per month, March 2020-15. February 2022

Figure 9. Number of MIS-C cases (left y axis) and number of PCR confirmed SARS-CoV-2 infections (right y axis) per month, March 2020-February 15 2022



* indtil 15. februar 2022

There is currently one case of MIS-C in a person with a breakthrough infection (SARS-CoV-2 infection in a fully vaccinated person) with the delta variant. The Danish MIS-C cases have typically occurred 4½-6 weeks after infection with SARS-CoV-2. Therefore, cases of MIS-C will occur with a certain delay in relation to infection. Most of the MIS-C cases seen in January 2022 have occurred among children who were infected with the delta variant. Therefore, the full has not yet been seen in Denmark effect of the omicron variant on the number of new cases of MIS-C. For the period 1 March 2020 - 28 February 2021, it was reported that MIS-C was seen among 1 in 1,700 detected SARS-CoV-2 infections in unvaccinated children in Denmark (Holm). Among the more than 66,000 children and young people aged 0-17, who were tested positive for SARS-CoV-2 in the period 15 December 2021 to 4 January 2022 (ie for 6 weeks since), where the omicron variant was dominant, until February 15, 8 children have been diagnosed with MIS-C, corresponding to 1 in 5,400 detected SARS-CoV-2 infections among unvaccinated children (1 out of 8,300 children in total). However, there are still children infected during this period who may develop symptoms of MIS-C, so it is still too early to assess the risk of MIS-C after the omicron variant is has become dominant in Denmark.

Vaccine efficacy

Preliminary analyzes calculated for children aged 5-11 years show a vaccine efficacy (RE) for PCR detected SARS-CoV-2 infection 14-30 days after completion of primary vaccination (2 doses) with Comirnaty® on 30% (29-32%) for the period 28 December 2021 to 27 January 2022 and 22% (16-27%) for PCR-detected SARS-CoV-2 infection 31-60 days after completion of primary vaccination (Table 2). The results are preliminary and must be interpreted with caution.



Table 2 Vaccine efficacy against PCR-detected SARS-CoV-2 infection with (presumed) omicron after primary vaccination course (2 plugs) with Pfizer in children aged 5-11 years without a previous positive PCR test. December 28 - January 27, 2022

Table 2 Vaccine effectiveness against PCR confirmed SARS-CoV-2 infection during a period where the Omicron variant was dominant, after two doses of Pfizer, children 5-11 years old, without previous positive SARS-CoV-2 PCR test. December 28, 2021 - January 27, 2022

Days since 2nd vaccine sting	Population	SARS-CoV-2 cases in period	VE (95% CI)
14 - 30	97,314	16,719 (16 most common)	30.3 (29.0 - 31.5)
31 - 60	9,504	785	21.6 (15.7 - 27.0)
Unvaccinated	177,078	63,931 (16 most common)	reference

The estimates show VE against all PCR-detected SARS-CoV-2 infections (omicron and delta) in the inventory period, which runs from 28 December 2021 to 27 January 2022. The analysis only includes children who have been tested with PCR at least once since the beginning of the pandemic.