

PREVALENCE AND INCIDENCE OF ANTIBODIES AGAINST SARS-COV-2 IN CHILDREN AND SCHOOL STAFF: AN OBSERVATIONAL SERO-PREVALENCE PROSPECTIVE COHORT STUDY

Main findings of the fifth testing period among primary school pupils (December 2021) – brief summary

Joanna Merckx, Mathieu Roelants, Milena Callies, Isabelle Desombere, Ines Kabouche, Els Duysburgh.

Brussels, January 2022

MAIN FINDINGS

This study provides an estimate of the prevalence of anti-SARS-CoV-2 antibodies among Belgian primary school pupils at the end of the first trimester of the school year 2021-2022 (6 to 17 December, 2021) based on a representative sample.

From December 2020 to June 2021, we have been monitoring the presence of SARS-CoV-2 antibodies among primary and secondary school pupils and school staff in Belgium. From September 2021 to December 2021, we continued monitoring the presence of SARS-CoV-2 antibodies among primary school children only, because children under 12 years old were the only sub-group in our cohort that was not yet systematically offered vaccination.

At the 5th testing period from 6 to 17 December, 2021, half (50.9%, 95%CI: 43.7 - 59.2) of the primary school pupils had antibodies against SARS-CoV-2. This is a large increase since the previous testing period in September-October 2021, when the seroprevalence was 26,6%.

This indicates that this unvaccinated population got infected at a high-rate during the fourth Belgian wave, even before the widespread transmission due to the omicron variant.

Regional differences in the prevalence of anti-SARS-CoV-2 antibodies were observed. The prevalence of anti-SARS-CoV-2 antibodies among primary school pupils was higher in **Wallonia (58.6%, 95% CI: 48.9 - 70.3)** compared to **Brussels (47.3%, 95% CI: 38.2 - 58.8)** or **Flanders (48.2%, 95% CI: 37.9 - 61.2)**.

It is important to emphasise that **children who are infected with SARS-CoV-2 rarely become seriously ill**. Also in this study, none of the participating children reported being hospitalised due to COVID-19.

In this report we present **the SARS-CoV-2 seroprevalence among Belgian primary school pupils at the 5th testing period from 6 to 17 December, 2021. Data are presented by region and compared to the seroprevalence measured at the previous testing periods.**

1. TESTING PERIOD, VACCINATION COVERAGE AND COMMUNITY TRANSMISSION BACKGROUND

Saliva samples of the 5th testing period (2nd testing period of the study extension) were collected from 6 to 17 December, 2021. This was **before the widespread occurrence of the omicron variant** in Belgium, meaning that changes in the seroprevalence observed are likely due to infections with the delta variant of the virus.

Figure 1 shows the vaccination coverage (fully vaccinated, with or without booster dose) and the number of laboratory confirmed SARS-CoV-2 cases per 100,000 population over time for the three Belgian regions and for the whole country. The five periods in which laboratory specimens for anti-SARS-CoV-2 antibody detection were sampled from the study participants are indicated in grey.

Vaccination coverage (fully vaccinated) among the 18+ population increased slightly, reaching 92% in Flanders, 83% in Wallonia, and 72% in Brussels, at the fifth testing period. Since the previous (4th) testing period, Belgium has experienced a 4th COVID-19 wave. This wave started mid-October 2021 and peaked at the end of November 2021 and was dominated by the delta variant (see dashboard Sciensano: <https://datastudio.google.com/embed/reporting/c14a5cfc-cab7-4812-848c-0369173148ab/page/urrUC>). Regional differences in reported SARS-CoV-2 cases (7 day moving average) are observed, with higher case numbers per 100,000 population in Flanders compared to the two other regions. At its peak, Flanders reported the highest number of daily SARS-CoV-2 infections since the start of the pandemic (see also dashboard Sciensano: <https://datastudio.google.com/embed/reporting/c14a5cfc-cab7-4812-848c-0369173148ab/page/8OEYB>).

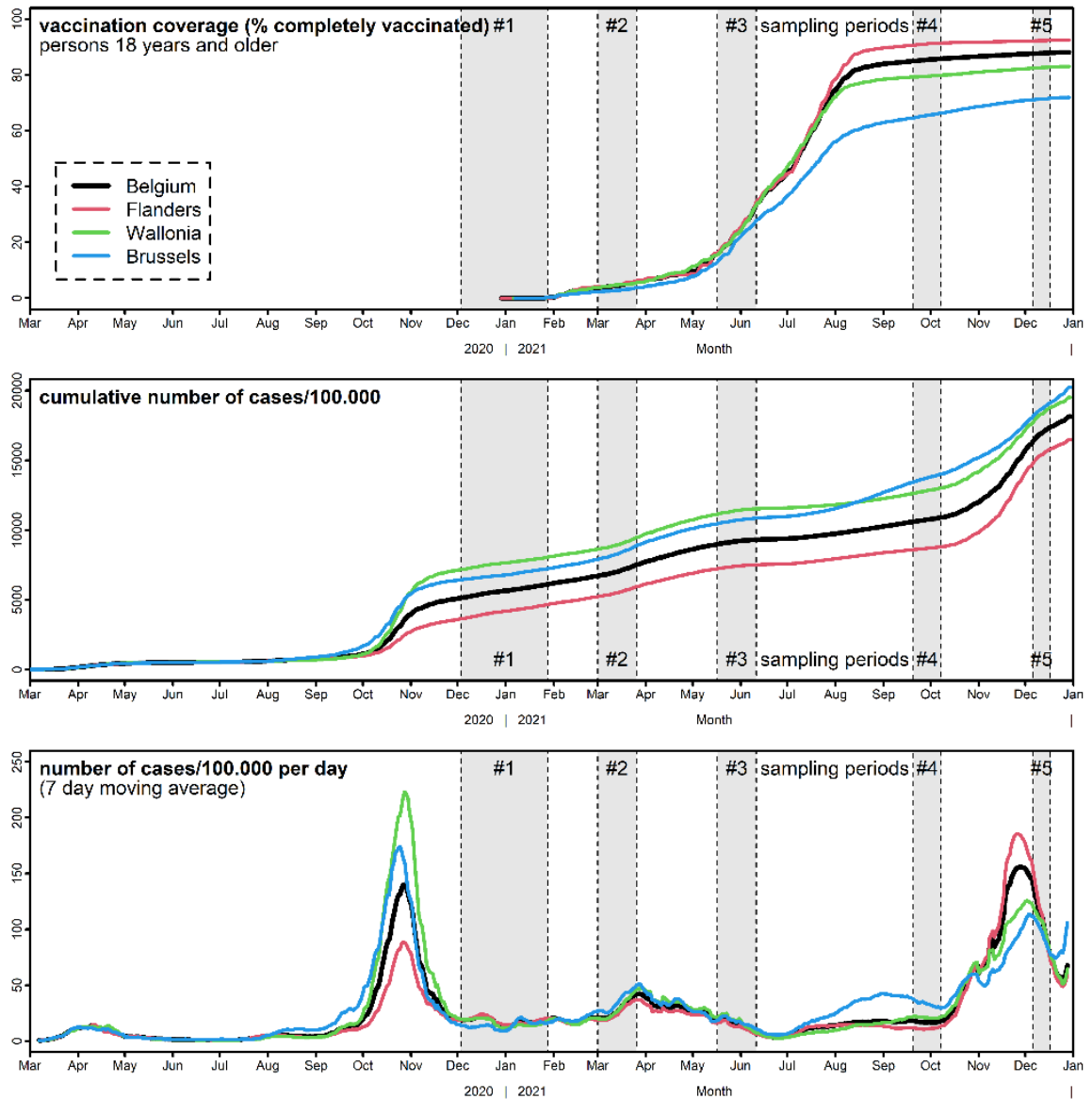


Figure 1: Vaccination coverage (top), cumulative number (middle) and seven day moving average (bottom) of laboratory confirmed SARS-CoV-2 cases per 100,000 population, Belgium and by region, March 2020- Dec 2021. Study sampling periods are marked in grey.

2. PREVALENCE OF ANTI-SARS-COV-2 ANTIBODIES

During the 5th testing period, saliva samples were collected from 435 primary school pupils. Three (0.7%) of these could not be tested due to insufficient sample volume (a minimum of 110 µL after centrifugation was required for reliable testing). The remaining 432 samples were tested in the Sciensano (Public Health Belgium) laboratories for the presence of anti-SARS-CoV-2 antibodies using an in-house semi-quantitative anti-RBD IgG (Receptor Binding Domain) ELISA.

During the 5th testing period, **between 6 and 17 December, 2021**, we recorded **SARS-CoV-2 antibodies among 50.9% (95% CI 43.7 - 59.2) of primary school pupils in Belgium** (see Table 1 and Figure 2 below).

Between September and December 2021 (the 4th and 5th testing period), before vaccination among this age groups was initiated, the **seroprevalence among primary schoolchildren doubled** (from 26.6% to 50.9%, an increase with 24.2 percentage points (95% CI 18.9 –29.4%)). The greatest increase was observed in Wallonia and Flanders (34.8 and 21.9 percentage points respectively), compared with an increase of 11.2 percentage points in Brussels.

Table 1: Number and prevalence* of anti-SARS-CoV-2 antibodies (IgG) among primary (age 7-9) school pupils, Belgium and three regions, 6-17 Dec 2021

	Number positive/total	Prevalence* % (95% CI)
Belgium	218/432	50.9 (43.7 - 59.2)
Brussels	29/61	47.3 (38.2 - 58.8)
Flanders	132/274	48.2 (37.9 - 61.2)
Wallonia	57/97	58.6 (48.9 - 70.3)

* adjusted for clustering of subjects within schools; CI, confidence interval

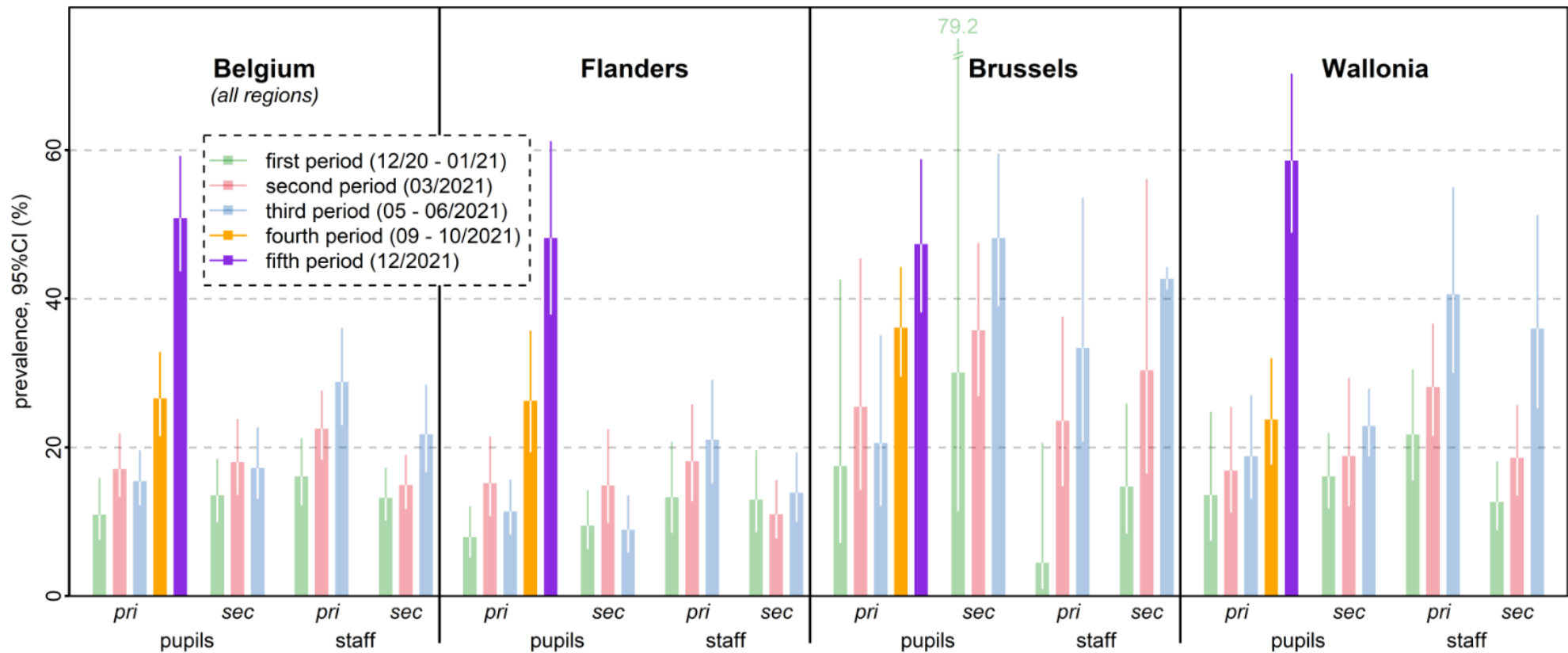


Figure 2: Prevalence and 95% confidence interval (whiskers) of anti-SARS-CoV-2 antibodies (IgG) among primary (age 7-9) and secondary (age 13-14) school pupils and non-vaccinated school staff, Belgium and three regions, first (3 Dec 2020-28 Jan 2021), second (1-26 Mar 2021), third (17 May-11 Jun 2021), fourth (20 Sep-8 Oct 2021), and fifth (6-17 Dec 2021) testing period (pri, primary schools; sec, secondary schools; tot, total). The fourth and fifth testing periods only include primary school pupils. Testing periods which only include primary school pupils are given in bright colours, the other testing periods are given in faded colours.

3. FINDINGS ON PCR OR RAPID TEST POSITIVITY AND HOSPITALISATION

Despite evidence of past infection with the SARS-CoV-2 virus in half of the children, only around one in four reported a previous confirmed positive PCR or rapid test.

The online survey of the 5th testing period was completed by parents of 394 pupils (91% of pupils who provided a sample), of whom 123 (31.2%) reported a test-confirmed acute SARS-CoV-2 infection since the start of the pandemic. For 78 (19.8%) pupils the infection was diagnosed between the 4th testing period in September 2021 and current (5th) testing period in December 2021. This includes 17 pupils who reported a positive PCR or rapid test in December 2021, i.e. near the time of collection of the saliva samples. Excluding these 17 pupils who may not yet have developed measurable antibodies, gives 106 (26.9%) pupils who reported a test-confirmed acute SARS-CoV-2 infection since the start of the pandemic, and 61 (15.5%) with a positive PCR or rapid test during the first trimester of the current school year.

The higher number of reported positive PCR or rapid tests between September and December 2021 might be due to changing policies regarding testing among primary school pupils.

No pupil with a completed questionnaire for the 5th testing period was admitted to the hospital because of COVID-19 since the pandemic start.

4. INFECTION PREVENTION AND CONTROL MEASURES

Throughout the study, we also assessed (1) the implementation of recommended infection prevention and control (IPC) measures against SARS-CoV-2 transmission and (2) the extent of school closures (either partial or full) due to a SARS-CoV-2 outbreak in the participating schools.

Table 2 lists findings in the primary schools at the beginning (1st testing period in Dec 2020/Jan 2021) and at the end (5th testing period in Dec 2021) of 2021. We assessed if the implementation of the IPC measures and number of school closures changed comparing these 2 testing periods.

We collected the data through an online survey which was completed by the local study coordinator of each participating primary school. The survey was completed for 43 primary schools (22 schools belonging to the Dutch and 21 to the French language school network) at the start and 30 primary schools (18 schools belonging to the Dutch and 12 to the French language school network) at the end of the study.

Comparing number of school closures in the period May-December 2020 with the period September-December 2021, we observed a clear increase in the percentage of total and partial (i.e. classes) school closures (Table 2). This may be due to the occurrence of the Delta variant, which caused a high infection rate among primary school children during the first trimester of the school year 2021-2022 and/or due to changing guidelines and policies regarding testing and class/school closure.

The implementation of IPC measures improved during the one-year observation period. Hygiene measures were best implemented, followed by physical distancing measures. In December 2021, compared with the year before, ventilation measures were more often implemented, but remained the least applied measures, despite sensitisation and expert advice focussed on improving ventilation at schools. Studies show that ventilation can be a very effective preventive measure against the spread of the SARS-CoV-2 virus¹. We, thus, strongly encourage schools to prioritize easily applicable ventilation measures (frequent passive ventilation and the use of CO₂ detectors for monitoring air quality).

¹ Park S, Natural ventilation strategy and related issues to prevent coronavirus disease 2019 (COVID-19) airborne transmission in a school building, Science of The Total Environment, Oct 2021: <https://www.sciencedirect.com/science/article/pii/S0048969721028357>.

Table 2: Number and percentage of Belgian primary schools that implemented infection prevention and control measures¹ in Dec 2020/Jan 2021 and Dec 2021²

Specific infection prevention and control measure	Primary schools	
	Dec 2020/ Jan 2021 ³ N = 43 n (%)	Dec 2021 ⁴ N = 30 n (%)
Closures (2 measures)		
School closure outside holiday breaks	1 (2)	5 (17)
Classes suspended	23 (53)	23 (77)
Ventilation measures (4 measures)		
Classrooms have a CO2 detector	9 (21)	15 (50)
School has and uses a ventilation system	9 (21)	9 (30)
Teachers are encouraged to ventilate class rooms regularly	41 (95)	30 (100)
Classes take place outside as much as possible	3 (7)	5 (17)
Hygiene measures (6 measures)		
Classrooms are cleaned regularly and more frequently than previous school years	26 (60)	24 (80)
Staff rooms are cleaned regularly and more frequently than previous school years	28 (65)	26 (87)
Toilets are cleaned regularly and more frequently than previous school years	31 (72)	26 (87)
Surfaces that are touched regularly are disinfected daily	33 (77)	18 (60)
Alcohol gel (or additional possibilities to clean hands) is made available for pupils and staff	39 (88)	30 (100)
Staff wear a mask if sufficient distance cannot be maintained ⁵	34 (79)	29 (97)
Physical distancing measures (7 measures)		
Breaks are spread to decrease contact between different age groups	12 (28)	7 (23)
Number of staff is limited per room	32 (74)	28 (93)
Pupils have one fixed place in a fixed classroom	25 (58)	27 (90)
Teachers change between classrooms, not the pupils	22 (51)	20 (67)
Lunches are taken in the classroom. If this is not possible pupils have a fixed place in the dining area	36 (84)	25 (83)
Distance is kept during contacts between adults	38 (88)	28 (93)
Distance is kept during contacts between staff and pupils	24 (56)	25 (83)

¹ All measures, except for closures, are scored on a scale ranging from 1 (not applied at all) to 5 (fully applied). Measures with a score of '4' or '5' are considered 'implemented' by the school.

² Schools who did answer to certain measures were considered to not apply these measures.

³ Baseline questionnaire covered the period between May 2020 until Dec 2020/Jan 2021.

⁴ The last follow-up questionnaire covered the period between Sept/Oct 2021 until Dec 2021.

⁵ Measures regarding mask wear among pupils were not assessed as these were not mandatory among this population at the start of the study.

n (%): absolute number of schools (percentage of schools) that implemented the measure; N: number of schools that completed the questionnaire.

REFERENCES

For the general methods and study protocol we refer to:

<https://www.sciensano.be/en/biblio/prevalence-and-incidence-antibodies-against-sars-cov-2-children-and-school-staff-measured-one-year>.

Report first testing period: <https://www.sciensano.be/en/biblio/prevalence-and-incidence-antibodies-against-sars-cov-2-children-and-school-staff-measured-between>, and

Brief summary second testing period: <https://www.sciensano.be/en/biblio/prevalence-and-incidence-antibodies-against-sars-cov-2-children-and-school-staff-measured-between-0>

Brief summary third testing period: <https://www.sciensano.be/en/biblio/prevalence-and-incidence-antibodies-against-sars-cov-2-children-and-school-staff-measured-between-2>

Brief report fourth testing period: <https://www.sciensano.be/nl/biblio/prevalence-and-incidence-antibodies-against-sars-cov-2-children-and-school-staff-main-findings>

Belgian COVID-19 dashboard: <https://datastudio.google.com/embed/reporting/c14a5cfc-cab7-4812-848c-0369173148ab/page/ZwmOB>

Statbel, het Belgische statistiekbureau | Statbel [Internet]. [cited 2021 Oct 1]. Available from: <https://statbel.fgov.be/nl>