

SARS-CoV-2 seroprevalence among nursing home residents and staff in Belgium

SCOPE

(Sars-COV-2 seroPrEvalence)

INTERIM REPORT

RESULTS VISIT 2 – APRIL 2021

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Study Protocol: <https://www.sciensano.be/nl/biblio/sars-cov-2-seroprevalence-among-nursing-home-staff-and-residents-belgium-protocol>

Report visit 1 (February 2021): https://www.sciensano.be/sites/default/files/sars-cov-2_seroprevalence_in_nh_report_june_2021.pdf

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ABBREVIATIONS

CI	Confidence interval
COVID-19	Coronavirus disease 2019
GEE	Generalised estimating equation
Ig	Immunoglobulin
NH	Nursing home
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SCOPE	Sars-COV-2 seroPrEvalence
V1	Visit 1 (1 Feb – 24 Mar 2021)
V2	Visit 2 (31 Mar – 1 May 2021)

1 INTRODUCTION

The SCOPE study assesses the seroprevalence of SARS-CoV-2 among residents and staff in Belgian NH (nursing homes). Starting from February 1st, 2021, a cohort of 3,008 residents (1,640) and staff members (1,368) in 69 Belgian NHs is being tested every two months on the presence of anti-SARS-CoV-2 antibodies, using a point-of-care (POC) COVID-19 IgG/IgM rapid test. Through the information collected at each bimonthly visit using a questionnaire, we gain additional insights in the association between seropositivity and COVID-19 vaccination status, COVID-19 clinical manifestations, pre-existence of relevant comorbidities, SARS-CoV-2 infections and mortality outcomes.

This interim report summarizes the result of the second testing visit (visit 2, V2) which took place between March 31st, 2021, and May 1st, 2021. Here we report the prevalence of antibodies against SARS-CoV-2 among residents and staff in Belgian NH, by region, vaccination status and self-reported history of infection. More details on the methodology and study cohort of the SCOPE study can be found in the previous report, together with the results of the first testing visit: https://www.sciensano.be/sites/default/files/sars-cov-2_seroprevalence_in_nh_report_june_2021.pdf

2 RESULTS

2.1 Participation

Of the 3008 (1640 residents, 1368 staff) initially recruited participants, 58 residents and 9 staff members dropped out by the second visit (V2). These dropouts were equally spread among the regions (Brussels: 2.6%; Flanders: 1.9% and Wallonia 2.7%). During V2, **2,848** (95% of the cohort participants) participants were tested, and **2,755** (92% of the cohort participants) participants completed the V2 questionnaire. For V2, combined seroprevalence and vaccine/infection status data¹ is available for **2,760** (92%) participants (**1,523** (93%) residents; **1,237** (90%) staff members).

2.2 Time varying participant characteristics

Time varying cohort characteristics are presented in Table 1. During V2 testing, **91%** of the cohort was fully² vaccinated, while **3%** was partially¹ vaccinated. A total of **7%** was not vaccinated at the moment of V2 antibody testing. When considering residents and staff separately, the vaccination coverage (fully vaccinated) was higher in residents than in staff with **97%** and **83%**, respectively. Of the vaccinated participants in the study, 99% was administered a Pfizer-BioNTech vaccine (14 participants received an AstraZeneca-Oxford vaccine, one participant received a Johnson & Johnson vaccine and two received a Moderna vaccine). Of the total study cohort **36%** reported a history of SARS-CoV-2 infection³ (**38%** residents; **33%** staff).

The vaccination coverage was higher in Flanders than in Brussels and Wallonia, as respectively **94%**, **85%** and **86%** of the tested cohort participants were fully vaccinated. In Wallonia, **42%** of participants reported a previous SARS-CoV-2 infection, compared to **33%** and **28%** in Flanders and Brussels.

¹Combined data retrieved from the questionnaires completed at V1 and V2.

Table 1: Self-reported vaccination status^{1,2} and history of SARS-CoV-2 infections³ among nursing home resident and staff in Belgium and by region, 31 Mar – 1 May 2021

	Not vaccinated		Partially vaccinated ¹		Fully vaccinated ²		Self-reported history of infection ³	
	n	%	n	%	n	%	n	%
All (n=2,848)	191	7	73	3	2,584	91	1,018	36
Residents (n=1,552)	31	2	17	1	1,504	97	595	38
Staff (n=1,296)	160	12	56	4	1,080	83	423	33
Brussels (n= 238)	21	9	14	6	203	85	66	28
Residents	4	3	0	0	140	97	37	26
Staff	17	18	14	15	63	67	29	31
Flanders (n=1,639)	57	3	36	2	1,546	94	546	33
Residents	3	0	7	1	873	99	315	36
Staff	54	7	29	4	673	89	231	31
Wallonia (n=971)	113	12	23	2	835	86	406	42
Residents	24	5	10	2	491	94	243	46
Staff	89	20	13	3	344	77	163	37

¹Participants that received a single dose at least 1 day before the antibody testing date or received a full-dose regimen less than 14 days before the antibody testing date.

² Participants that received a full-dose regimen at least 14 days before the antibody testing date.

³ Self-reported history of infection is defined as a reported previous positive PCR (nose swab/saliva)/antigen rapid test-/CT-scan COVID-19 test result between February 2020 and 14 days before the moment of V2 antibody testing.

2.3 SARS-CoV-2 seroprevalence

Between March 31st and May 1st, 2021, **90%** (95% CI: 87%;92%) of residents and **92%** (95% CI: 90%;94%) of staff in Belgian NHs had anti-SARS-CoV-2 antibodies. An overview of the seroprevalence (IgG/IgM/IgG+IgM) among residents and staff at national level and by region is given in Table 2. Out of the total 3,008 recruited participants, 165 (5%) had no test result due to illness, hospitalisation, holidays, drop-out, death or other, or had an invalid test result. Among the participants tested during V2, **68%** tested positive for only IgG antibodies, **0%** for only IgM antibodies and **18%** for both IgM and IgG antibodies. Overall, in Belgium the prevalence of anti-SARS-CoV-2 antibodies among residents and staff together was **91%** (95% CI: 89%;92%) and was the highest in NH in Brussels; **95%** (95% CI: 91%;97%), followed by Flanders and Wallonia being respectively **92%** (95% CI: 89%;94%) and **88%** (95% CI: 85%;91%).

Table 2: SARS-CoV-2 seroprevalence among residents and staff in Belgian nursing homes, in Belgium and by region, 31 Mar – 1 May 2021

	NH population n=3,008		Residents n=1,640		Staff n=1,368	
	n ² (total) ³	% (95% CI) ¹	n ² (total) ³	% (95% CI) ¹	n ² (total) ³	% (95% CI) ¹
IgG/IgM rapid test results						
No test	158	5	87	5	71	5
Invalid test	7	0	0	0	7	1
Negative	261	9	156	10	105	8
Positive						
IgM	11	0	7	0	4	0
IgG	2,039	68	1,014	62	1,025	75
IgM+IgG	532	18	376	23	156	11
Self-sampled	250	8	35	2	215	16
Belgium¹	2,582 (2,843)	91 (89;92)	1,397 (1,553)	90 (87;92)	1,185 (1,290)	92 (90;94)
By region¹						
Brussels	262 (276)	95 (91;97)	153 (158)	97 (91;99)	109 (118)	92 (84;96)
Flanders	1502 (1636)	92 (89;94)	788 (881)	89 (86;92)	714 (755)	95 (92;96)
Wallonia	818 (931)	88 (85;91)	456 (514)	89 (85;92)	362 (417)	87 (82;90)

¹ 95% confidence intervals (CI) are estimated using a generalised estimating equation (GEE) for seropositivity, with independence covariance structure.

² Absolute number.

³ The number between brackets represents the denominator (total number of valid tests) for the specific subgroups.

2.3.1 SARS-CoV-2 seroprevalence by vaccination status

Table 3 gives the anti-SARS-CoV-2 antibody prevalence by vaccination status and by self-reported infection history at the moment of testing. The same is visualised in Figure 1.

Among the fully vaccinated participants (residents and staff together), **94%** (95% CI: 93%;96%) had anti-SARS-CoV-2 antibodies. When looking at fully vaccinated residents and staff members separately, **91%** (95% CI: 89;93) of residents and **99%** (95% CI: 98%;99%) of staff members had anti-SARS-CoV-2 antibodies. However, for those who were fully vaccinated and reported a previous SARS-CoV-2 infection, the antibody prevalence observed among residents and staff was similar, as anti-SARS-CoV-2 antibodies were detected in **99%** (95% CI: 98%;100%) of both groups. Among fully vaccinated participants that did not report a previous infection, the anti-SARS-CoV-2 antibody seroprevalence was lower among residents compared to staff, being respectively **86%** (95% CI: 83%;89%) and **99%** (95% CI: 98%;99%).

Among the partially vaccinated participants, **83%** had anti-SARS-CoV-2 antibodies (residents; **54%** 95% CI: 33%;73% ; staff **94%** 95% CI: 86%;98%). Of the participants that were not vaccinated, **42%** (95% CI: 34%;50%) had anti-SARS-CoV-2 antibodies (residents; **50%** 95% CI: 32%;67% ; staff **41%** 95% CI: 31%;50%). Among this unvaccinated group, **42%** reported a previous SARS-CoV-2 infection.

Table 3: SARS-CoV-2 seroprevalence among residents and staff in Belgian nursing homes by self-reported vaccination status and history of infection, 31 Mar – 1 May 2021

	NH population		Residents		Staff	
	n=2,760 n ¹ (total) ²	% (95% CI) ⁶	n=1,523 n ¹ (total) ²	% (95% CI) ⁶	n=1,237 n ¹ (total) ²	% (95% CI) ⁶
Fully vaccinated³	2,374 (2,515)	94 (93;96)	1,345 (1,475)	91 (89;93)	1,029 (1,040)	99 (98;99)
Self-reported history of infection ⁴	884 (891)	99 (98;100)	563 (568)	99 (98;100)	321 (323)	99 (98;100)
No self-reported history of infection	1,490 (1,624)	92 (90;94)	782 (907)	86 (83;89)	708 (717)	99 (98;99)
Partially vaccinated⁵	59 (70)	83 (73;90)	9 (17)	54 (33;73)	50 (53)	94 (86;98)
Self-reported history of infection ⁴	24 (26)	92 (74;98)	4 (4)	86 (62;96)	20 (22)	93 (73;99)
No self-reported history of infection	35 (44)	77 (61;88)	5 (13)	42 (22;65)	30 (31)	93 (86;97)
Not vaccinated	74 (175)	42 (34;50)	16 (31)	50 (32;67)	58 (144)	41 (31;50)
Self-reported history of infection ⁴	54 (74)	73 (61;82)	13 (15)	92 (67;98)	41 (59)	68 (54;80)
No self-reported history of infection	20 (101)	20 (13;30)	3 (16)	14 (3;44)	17 (85)	21 (13;32)

¹ Absolute number.

² The number between brackets represents the denominator for the specific subgroups.

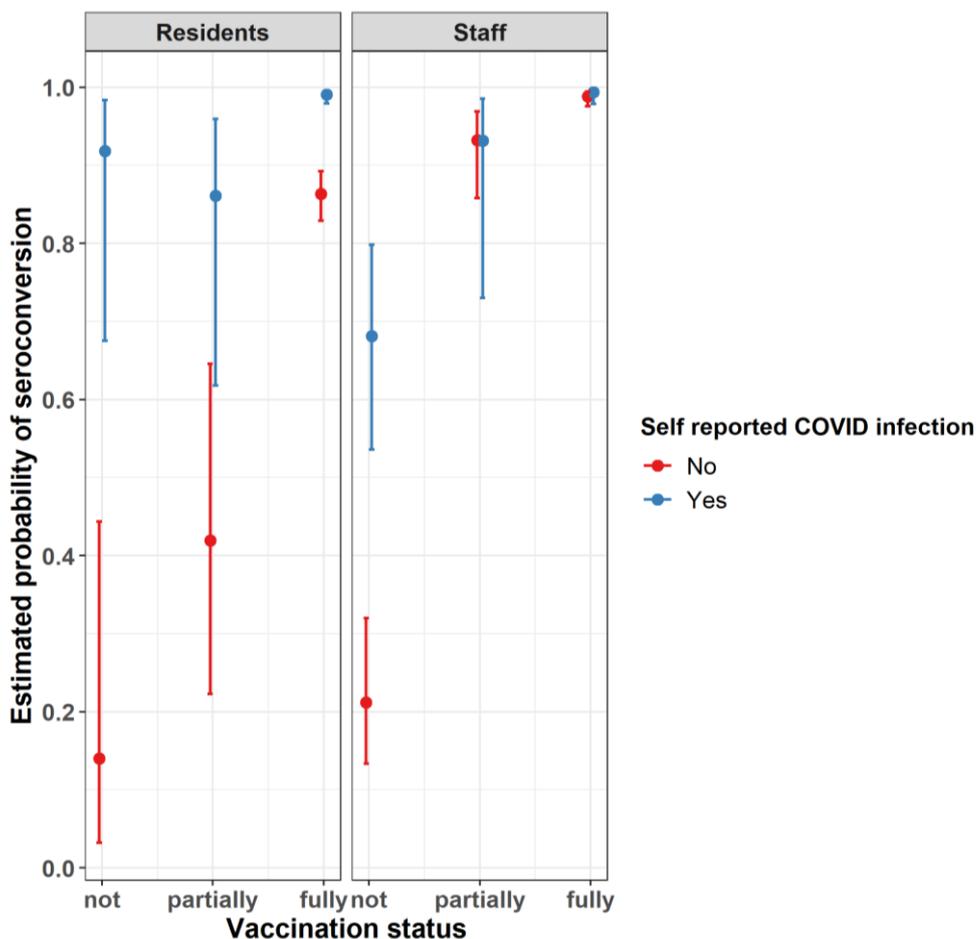
³ Participants that received a full-dose regimen at least 14 days before the antibody testing date.

⁴ Self-reported history of infection is defined as a reported previous positive PCR- (nose swab/saliva)/antigen rapid test-/CT-scan COVID-19 test result between February 2020 and 14 days before the moment of V2 antibody testing.

⁵ Participants that received a single dose at least 1 day before the antibody testing date or received a full-dose regimen less than 14 days before the antibody testing date.

⁶ 95% confidence intervals (CI) are estimated using a generalised estimating equation (GEE) for seropositivity, with independence covariance structure.

Figure 1: Seroprevalence by vaccination status (not vaccinated, partially vaccinated¹, fully vaccinated²) among nursing homes residents and staff with and without self-reported history of SARS-CoV-2 infections, Belgium, 31 Mar – 1 May 2021



¹Participants that received a single dose at least 1 day before the antibody testing date or received a full-dose regimen less than 14 days before the antibody testing date.

²Participants that received a full-dose regimen at least 14 days before the antibody testing date.

2.3.2 SARS-CoV-2 seroprevalence over time

Between February-March (visit 1) and April 2021 (visit 2), the SARS-CoV-2 seroprevalence among Belgian NH residents and staff members increased. In table 4, the seroprevalence and vaccination coverage of both testing visits are presented.

Table 4: Seroprevalence and vaccination coverage among staff and residents in Belgian nursing homes, 1 Feb – 24 Mar 2021 and 31 Mar – 1 May 2021

	Seroprevalence 1 Feb – 24 Mar 2021 % (95% CI)	At least 1 vaccine dose ¹ (%)	Fully vaccinated ² (%)	Seroprevalence 31 Mar – 1 May 2021 % (95% CI)	At least 1 vaccine dose ¹ (%)	Fully vaccinated ² (%)
Residents	69 (63;74)	96	68	90 (87;92)	98	97
Staff	80 (76;83)	85	48	92 (90;94)	88	84

¹ Participants that had received at least one dose at least one day before the antibody testing date.

² Participants that received a full-dose regimen at least one day before the antibody testing date.

3 CONCLUSION

Between 31 March and 1 May, 2021, the SCOPE study measured the prevalence of anti-SARS-CoV-2 antibodies in NHs in Belgium. This testing round was the second out of a total of six follow-up visits in this longitudinal cohort study.

During V2 (April 2021), the large-scale vaccination campaign in Belgian NHs, which took place between December 28th, 2020 and March 24th, 2021, had been completed. This was observed in the high vaccination coverage of the cohort, as **91%** of the cohort was completely vaccinated, **3%** was partially vaccinated and **7%** was not vaccinated. However, the vaccination coverage among residents (**97%** fully vaccinated) was higher than for staff (**83%** fully vaccinated).

In April 2021, **90%** (95% CI: 87%;92%) of residents and **92%** (95% CI: 90%;94%) of staff had anti-SARS-CoV-2 antibodies. This proportion increased compared with the SARS-CoV-2 seroprevalence measured in the previous test round (February 1st - March 24th, 2021), when the vaccination campaign was still ongoing. At that time 69% (95% CI: 63%;74%) of residents and 80% (95% CI: 76%;83%) of staff had anti-SARS-CoV-2 antibodies (results previous report see https://www.sciensano.be/sites/default/files/sars-cov-2_seroprevalence_in_nh_report_june_2021.pdf). Overall, in Belgium, the prevalence of anti-SARS-CoV-2 antibodies among residents and staff together was **91%** (95% CI: 89%;92%) and was highest in NHs in Brussels; **95%** (95% CI: 91%;97%), followed by Flanders and Wallonia being respectively **92%** (95% CI: 89%;94%) and **88%** (95% CI: 85%;91%).

The seroprevalence according to vaccination status demonstrated differences between NH residents and staff. Among the fully vaccinated staff, **99%** had anti-SARS-CoV-2 antibodies, while among the fully vaccinated residents **91%** had anti-SARS-CoV-2 antibodies. After complete vaccination, the proportion that had anti-SARS-CoV-2 antibodies with a self-reported history of infection was similar among residents and staff (**99%** 95% CI 98%;100%). However, for those with complete vaccination but without a self-reported history of infection, **86%** (95% CI 83%;89%) of residents compared to **99%** (95% CI 98%;99%) of staff tested positive for SARS-CoV-2 antibodies. These data suggest that a part of the infection-naïve residents have an impaired antibody response upon vaccination, as in 14% of them, no anti-SARS-CoV-2 antibodies were detected after receiving a full dose vaccine regimen. This observation is similar to the result of the previous test round, where the lowest seroprevalence among fully vaccinated individuals was seen in residents without a self-reported history of infection. This finding is supported by a recent study assessing antibody concentrations in NH residents and staff after COVID-19 vaccination, which showed reduced antibody levels in residents without a history of SARS-CoV-2 infection².

In conclusion, the Belgian vaccination campaign in NH resulted in a high vaccination coverage among residents and staff members and effective vaccine immunogenicity, as **90%** of residents and **92%** of staff members had anti-SARS-CoV-2 antibodies in April 2021. Nevertheless, the lower seroprevalence found in the group of vaccinated infection-naïve residents enhances the need for further monitoring, as they could potentially benefit from revaccination.

The study results from the upcoming follow-up visits (in June, August, October and December 2021) will provide further insights on the duration of the antibody responses upon vaccination.

² Sciensano. 2021. Bewoners van woonzorgcentra die geen COVID-19-infectie doormaakten, zijn mogelijks gebaat bij een 3de vaccindosis. [Bewoners van woonzorgcentra die geen COVID-19-infectie doormaakten, zijn mogelijks gebaat bij een 3de vaccindosis | sciensano.be](https://www.sciensano.be/sites/default/files/2021-08/Bewoners_van_woonzorgcentra_die_geen_COVID-19-infectie_doormaakten_zijn_mogelijks_gebaat_bij_een_3de_vaccindosis_sciensano.be). Accessed on August 24th, 2021.