PREVALENCE AND INCIDENCE OF ANTIBODIES AGAINST SARS-COV-2 AMONG PRIMARY HEALTHCARE PROVIDERS IN BELGIUM: RESULTS FIRST TESTING POINTS – JANUARY 2021

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CHARMING

Coronavirus HuisARtsenpraktijk - MédecINe Générale

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LIST OF ABBREVIATIONS

95% CI	95% confidence interval
CHARMING	Coronavirus Huisartsenpraktijk-Médecine générale
COVID-19	Coronavirus infectious disease 2019
GEE	Generalised estimating equations
GP	General practitioner
Ig	Immunoglobin
IPC	Infection prevention and control
IQR	Interquartile range
PHCP	Primary health care provider
PPE	Personal protective equipment
POCT	Point of care test
RBD	receptor binding domain
SARS-CoV-2	Severe acute respiratory syndrome Coronavirus 2

1. INTRODUCTION

For Belgium, Sciensano (www.sciensano.be) coordinates several national seroprevalence studies on SARS-CoV-2 antibodies in relevant populations (Table 1). As part of this project, Sciensano validated five point-of-care tests (POCT), identifying one test with appropriate sensitivity and specificity for use in some of these seroprevalence studies (OrientGene®; measuring IgG and IgM against the receptor binding domain (RBD) of SARS-CoV-2 based on a finger prick (capillary) blood sample).[1]

The CHARMING study focuses on the seroprevalence in primary health care providers (PHCPs). PHCPs manage the vast majority of COVID-19 and other patients and therefore are essential to organise health care efficiently.[2 3] Among the PHCPs, general practitioners (GPs) in particular act as gatekeepers to the next levels of care. Therefore, preserving the capacity of GPs and other PHCPs is essential.

However, currently evidence is lacking on 1. how many PHCPs have been infected with SARS-CoV-2 in Belgium, 2. the rate at which this happened, 3. their clinical spectrum, 4. their risk factors, 5. the effectiveness of the measures to prevent this from happening and 6. the accuracy of the immunological serology based point-of-care test in a primary care setting. In addition, the follow-up of a cohort of PHCPs will help us to understand the persistence of antibodies generated in response to SARS-CoV-2 infection.[4] It might also help us to understand the response generated by vaccination.

Table 1. Populations of Sciensano coordinated SARS-CoV-2 seroprevalence studies

General population (via blood donors)
General population (via their national health interview survey)
School aged children and school staff
Nursing home residents and personnel
Hospital health care workers
Primary health care workers

In CHARMING 'first results' reports, we present the first CHARMING study results after each testing time point (see Methods and Table 2).

For the first testing time point, we report the geographical representativeness of the GPs in our sample and the prevalence of antibodies against SARS-CoV-2 among GPs and other PHCPs in their practice, based on the POCT results as well as on the self-reported previous positive testing (SARS-CoV-2 virus or antibody detection) for Belgium, by region and by province. We also report on the willingness among the participating PHCPs to get vaccinated against SARS-CoV-2.

For each follow-up testing time point, we will give an update of the seroprevalence since the previous testing time point, the monthly incidence of SARS-CoV-2 infection in the study population, the persistence of the serological antibody response among seropositive PHCPs and the proportion of asymptomatic cases among new cases detected during follow-up. We also report on the vaccination status of the participating PHCPs, which will influence the prevalence of anti-SARS-CoV-2 antibodies among the study participants.

2. METHODES

2.1. OBJECTIVES

CHARMING's primary objectives are to assess:

- the prevalence of antibodies against SARS-CoV-2 among GPs and other PHCPs in their practice in Belgium at timepoint 1 (24 December 2020 - 8 January 2021) and at different timepoints during a 12 month follow-up period;
- the monthly and annual incidence of antibodies against SARS-CoV-2 among PHCPs in Belgium during a 12 month follow-up period.

The secondary objectives include the assessment of:

- the persistence of the antibody response among seropositive PHCPs;
- the proportion of asymptomatic cases among (new) cases (that develop during follow-up);
- the determinants (risk, protective and predictive factors) of SARS-CoV-2 infection in PHCPs;

and to:

- validate the immunological serology-based POCT in a primary healthcare setting (Phase 3 validation);
- familiarise PHCPs with the use of immunological serology-based POCT.

2.2. STUDY POPULATION

CHARMING aimed to include a sample of Belgian GPs covering sufficiently all 44 Belgian districts (geographic entities smaller than the provinces but bigger than the municipalities), including GPs in professional training currently working in primary care and any other frontline PHCPs from the same GP practice.

2.3. STUDY DESIGN AND SAMPLE SIZE

CHARMING is a set up as a prospective cohort study. PHCPs were recruited just before the first testing time point, which took place from 24 December 2020 until 8 January 2021. Recruitment was done with support of the professional GP organisations 'Domus Medica' and 'Collège de Médecine Générale' and the academic centres for general practice of the universities of Antwerp, Brussels, Ghent, Leuven and Liège and their networks. Additional participants were allowed to join for the second testing time point, starting 22 January 2021. We essentially ended up with a convenience and not a random sample, meaning that all eligible PHCPs that registered could participate in the study, since no more than the maximum accepted number of 5000 eligible PHCPs registered to join CHARMING. This sample size was based on the need to include at least 301 seropositives on the reference standard test to estimate the POCTs sensitivity with a 95%CI lower limit not smaller than 90%, starting from the sensitivity estimated by Sciensano's validation using finger prick blood, and on a seroprevalence of 6% when this study was conceived. All registered PHCP were sent personal study materials including POCTs. Once registered online, PHCPs were asked to provide informed consent before entering their POCT result (see www.dmguliege.be/charming-study/ for instructions on how to perform and interpret the OrientGene® in Dutch and French) and further completing a questionnaire through LimeSurvey hosted by Sciensano. The baseline questionnaire, to be completed at the first testing point, also collected information about basic socio-demographics, health status, including presence of symptoms since the start of the epidemic, implementation of infection prevention and control

measures and the availability of personal protective equipment. At each of the follow-up testing points next to the new POCT result, information on the health status, including the presence of symptoms, and preventive measures since the previous testing point will be collected with a follow-up questionnaire.

CHARMING will last twelve months with data collection monthly for six months and one sample collection at nine and one at twelve months (Table 2). This corresponds to a total of nine testing time points. This number will however depend on the evolution of the epidemic. Each follow-up testing point, the POCTs will be performed ideally within a timeframe of maximum 5 days.

Table 2. Timing of data collection

	T1	M1	M2	M3	M4	M5	M6	M9	M12	Total
POCT	x	x	x	x	x	x	x	x	x	9
Baseline	x									1
Follow-up		x	x	x	x	x	x	x	x	8

More detailed information on this study's sample size, sampling procedure, data collection and data analysis can be found in the study protocol available at: https://www.sciensano.be/en/biblio/prevalence-and-incidence-antibodies-against-sars-cov-2-among-primary-healthcare-providers-belgium

2.4. DATA ANALYSIS

We included in the analysis all PHCPs who provided informed consent and reported their POCT result, if the POCT was performed within the timeframe of the first testing time point (from 24 December 2020 until 8 January 2021). If the date of the POCT was missing or implausible, the date of completing the questionnaire was used instead.

We calculated the total number of participating PHCPs, and the number of GPs, of GPs in training and of other PHCPs and the number of practices they represent. The geographical representativeness of the GPs in our sample was assessed by comparing the distribution of active GPs in Belgium in 2020 (source www.ima-aim.be) with the distribution of GPs who participated in the first testing time point by district, province and region. We described the age (median, interquartile range) and gender distribution of all PHCPs who participated in the first testing time point and their practice size. For the latter we distinguished between solo practices (only one GP in the practice), duo practices (two GPs in the practice), group practices (more than two GPs and up to seven PHCPs in total in the practice) and big group practices (more than two GPs and over seven PHCPs in total in the practice).

To assess the prevalence of antibodies against SARS-CoV-2, we calculated the proportion (95% CI) of valid self-administered and self-reported POCTs and used the number of valid POCT as denominator for the proportion (95% CI) of positive POCT for IgG and/or IgM, and for IgG and IgM separately (crude seroprevalences). We also calculated the proportion (95% CI) of PHCPs that self-reported testing positive for SARS-CoV-2 (no test specified, so this includes both virus or

antibody detection) since the outbreak of the COVID-19 pandemic (February 2020), and the proportion (95% CI) of PHCPs with any positive test, either a positive study POCT or testing positive since the outbreak.

We also estimated the prevalence of antibodies against SARS-CoV-2 (IgG and/or IgM) taking into account clustering of PHCPs within their practice as well as the distribution of PHCPs across the districts in Belgium (adjusted seroprevalences). Weights were calculated based on the differences between the actual distribution of GPs across districts and the distribution of participating GPs with valid test results across districts. These weights were then extrapolated to all other PHCPs. The estimates are based on Generalised Estimating Equations (GEE) assuming a binomial distribution for the test result, an identity link function and an independent working correlation matrix.[5] In a similar way we also estimated the adjusted prevalence self-reported positive tests for SARS-CoV-2 since the start of the COVID-19 pandemic and the adjusted prevalence of these two tests results combined, either a positive study POCT or testing positive since the outbreak.

To assess the willingness to get vaccinated, we described the agreement to the statement:" I want to get the COVID-19 vaccination as soon as it is available" on a five point Likert scale ranging from totally agree to totally disagree.

All analyses were conducted using R version 3.6.3 (www.R-project.org).

3. RESULTS

3.1 DESCRIPTION OF THE POPULATION

We included all PHCPs who provided informed consent and reported the result of their POCT in the analysis.

In total, 3045 PHCPs from 1711 practices who registered before 11 December 2020 3pm were eligible and were asked to provide informed consent and sent personal study materials before Christmas 2020 to collect data for the first testing time point from 24 December 2020 until 8 January 2021. 2680 PHCPs participated between 24 December 2020 and 08 January 2021, by completing the baseline questionnaire, among which 2098 GPs, 275 GPs in training and 289 other PHCPs, while for 18 this information was missing. An additional 140 PHCPS responded later, but before the second testing time point, starting 22/01/2021.
To assess the geographical representativeness of our sample, in Table 1 we compare the distribution by region and by province of active GPs in Belgium in 2020 (source www.ima-aim.be) with the distribution of GPs who participated in the first testing time point. Our sampling procedure resulted in the participation of a fairly geographically representative sample of GPs at the level of the provinces. At the level of the regions, there is some overrepresentation of GPs in Flanders participating in CHARMING at the expense of some underrepresentation of GPs in Wallonia.

Table 2 presents some characteristics of all PHCPs who participated in the first testing time point. These PHCPs, mainly GPs, were relatively young, more often female and working more often in (big) group practices than in solo or duo practices.

Table 1. Distribution by province of active general practitioners (GPs) in Belgium in 2020 and of GPs who participated in CHARMING

Region/Province	Active GPs n (%)		Participating GPs n (%)	
Brussels	1178	(10.01)	177	(8.44)
Flanders	6805	(57.83)	1464	(69.78)
Wallonia	3784	(32.16)	457	(21.78)
Antwerpen-Anvers	1806	(15.35)	398	(18.97)
Brussel-Hoofdstad-Bruxelles capitale	1178	(10.01)	177	(8.44)
Henegouwen-Hainaut	1293	(10.99)	120	(5.72)
Limburg-Limbourg	943	(8.01)	191	(9.10)
Luik-Liège	1125	(9.56)	148	(7.05)
Luxemburg-Luxembourg	301	(2.56)	57	(2.72)
Namen-Namur	594	(5.05)	74	(3.53)
Oost-Vlaanderen-Flandre orientale	1556	(13.22)	370	(17.64)
Vlaams-Brabant-Brabant-flamand	1241	(10.55)	271	(12.92)
Waals-Brabant-Brabant wallon	471	(4.00)	58	(2.75)
West-Vlaanderen-Flandres occidentale	1259	(10.70)	234	(11.15)
Total	11767		2098	(17.83)

Table 2. Characteristics of primary healthcare providers (PHCPs), including general practitioners (GPs), GPs in training and other PHCPs who participated in the first testing time point

	PHCPs n=2680	GPs n=2098	GPs in training n=275	Other PHCPs n=289
Age[1], median (IQR)	39 (31-54)	43 (33-56)	26 (25-27)	37 (31-48)
Gender[2], n (%)				
- Male	892 (33.28)	767 (36.56)	81 (29.45)	42 (14.53)
- Female	1786 (66.64)	1329 (63.35)	194 (70.55)	247 (85.47)
- Not reported	2 (0.07)	2 (0.10)	0 (0)	0 (0)
Practice size, n (%)[2]				
- Solo	488 (32.60)	461 (33.82)	36 (14.57)	16 (8.89)
- Duo	287 (19.17)	263 (19.30)	53 (21.46)	20 (11.11)
- Group (<8 employees)	315 (21.04)	289 (21.20)	38 (15.38)	16 (8.89)
- Big group (>7)	375 (25.05)	327 (23.99)	120 (48.58)	119 (66.11)

[1] Ages < 21 were considered unrealistic and recoded as missing; [2] if numbers do not add up to the column total, this is due to missing data; numbers of practices for PHCPs=1497, GPs=1363, GPs in training=247 and other PHCPs=180.

3.2 PREVALENCE OF ANTIBODIES AGAINST SARS-CoV-2

Table 3 and 4 present the results for the prevalence of antibodies against SARS-CoV-2 (IgG and/or IgM) among PHCPs in Belgium for the first testing time point based on the self-administered and self-reported POCT results. Table 3 gives crude seroprevalences and Table 4 adjusted prevalences. Additionally, both tables also presents the proportion of PHCPs that self-reported testing positive for SARS-CoV-2 since the outbreak of the COVID-19 pandemic. The crude prevalence of antibodies against SARS-CoV-2 among PHCPs based on the POCT result was 14% at the first testing time point, while 17% of the PHCP reported having tested positive for SARS-CoV-2 since the start of the COVID-19 pandemic. Adding those who are currently seronegative on the POCT but reported a positive test in the past to the ones who are seropositive on the POCT at the first testing time point, 20% of the PHCPs in Belgium have been infected with SARS-CoV-2 since the start of COVID-19 outbreak. This means that antibodies against SARS-CoV-2 were not detected by the POCT in all PHCPs who reported to be tested positive for SARS-CoV-2 since the outbreak and that antibodies against SARS-CoV-2 were detected by the POCT in PHCPs who did not report a previous positive test for SARS-CoV-2 and/or were suspected of COVID-19.

Table 4 presents the adjusted prevalence of antibodies against SARS-CoV-2 (IgG and/or IgM) among PHCPs in Belgium for the first testing time point , the adjusted prevalence of self-reported positive tests for SARS-CoV-2 since the start of the COVID-19 pandemic and the adjusted prevalence of these two tests results combined (positive POCT and/or positive test in the past). The adjusted prevalence took into account clustering of PHCPs within their practice as well as the distribution of PHCPs across the districts in Belgium.

Both the crude and the adjusted seroprevalence show geographical variation, with higher prevalence of participants with antibodies against SARS-CoV-2 in Wallonia and in Brussel compared to Flanders. The prevalence of PHCPs with any positive test (either the antibody POCT or reported positive test in the past) found in Wallonia is twice the prevalence found in Flanders.

Table 3. Crude prevalence of antibodies against SARS-CoV-2 among general practitioners (GPs) and other primary healthcare providers (PHCPs) in Belgium at the first testing period (24 December 2020 – 8 January 2021) and numbers self-reported positive tests for SARS-CoV-2 since the outbreak of the COVID-19 pandemic

Crude prevalence, % (95% CI)	All PHCPs n=2680		GPs n=2098		GPs in training n=275		Other PHCPs n=289	
Valid test[1] results	98.10	(97.58- 98.61)	98.24	(97.67-98.80)	97.82	(96.09-99.54)	97.23	(95.34-99.12)
Positive POCT[2]	13.92	(12.60-15.24)	13.44	(11.97-14.94)	19.70	(14.95-24.46)	12.10	(8.29-15.91)
IgG	13.20	(11.91-14.49)	12.71	(11.27-14.15)5	18.96	(14.27-23.64)	11.39	(7.67-15.10)
IgM	3.00	(2.35-3.66)	3.20	(2.44-3.96)	2.60	(0.70-4.50)	2.14	(0.45-3.83)
Brussels[5]	18.45	(13.47-23.44)	18.18	(12.48-23.88)	25.81	(10.40-41.21)	8.70	(-2.82-20.21)
Flanders[5]	11.28	(9.82-12.74)	11.09	(9.46-12.71)	12.43	(7.45-17.40)	11.70	(7.11-16.30)
Wallonia[5]	20.13	(16.91-23.35)	19.07	(15.44-22.69)	34.78	(23.54-46.02)	14.29	(6.09-22.48)
Positive test in the past[3]	17.34	(15.90-18.79)	16.89	(15.27-18.50)	22.68	(17.67-27.68)	16.73	(12.36-21.09)
Brussels[5]	21.03	(15.80-26.26)	21.02	(15.00-27.04)	29.03	(13.05-45.01)	13.04	(-0.72-26.81)
Flanders[5]	13.50	(11.92-15.08)	13.67	(11.89-15.45)	14.20	(8.94-19.46)	12.23	(7.55-16.92)
Wallonia[5]	27.52	(23.93-31.10)	25.50	(21.48-29.52)	40.58	(28.99-52.17)	30.00	(19.26-40.74)
Any positive test [4]	20.20	(18.66-21.73)	19.70	(17.98-21.42)	25.65	(20.43-30.87)	19.22	(14.61-23.82)
Brussels[5]	24.89	(19.34-30.44)	23.30	(17.05-29.54)	41.94	(24.56-59.31)	13.04	(-0.72-26.81)
Flanders[5]	16.00	(14.31-17.69)	16.18	(14.27-18.08)	15.38	(9.94-20.82)	15.43	(10.26-20.59)
Wallonia[5]	31.04	(27.33-34.75)	29.49	(25.28-33.70)	43.48	(31.78-55.18)	31.43	(20.55-42.30)

[1] The control line of the test (OrientGene®) changed complete from blue to red; [2] IgG and/or IgM positive; [3] Virus or antibody detection; [4] Positive POCT or a positive test in the past; [5] The numbers for PHCPs, GPs, GPs in training and other PHCPs are 233, 176, 31 and 23 for Brussels, 1800, 1434, 169 and 188 for Flanders, and 596, 451, 69 and 70 for Wallonia. For 18 PHCPs data on job category is missing .

Table 4. Adjusted prevalence of antibodies against SARS-CoV-2 among primary healthcare providers (PHCPs) in Belgium at the first testing period (24 December 2020 – 8 January 2021) and numbers self-reported testing positive for SARS-CoV-2 since the outbreak of the COVID-19 pandemic, taking into account clustering of PHCPs within their practice[1] and distribution of GPs across districts in Belgium

Adjusted prevalence, % (95% CI)		All PHCPs n=2680		GPs n=2098		GPs in training n=275		Other PHCPs n=289	
Positive POCT [2]		15.08	(13.54-16.62)	14.51	(12.81-16.22)	22.90	(17.16-28.65)	11.96	(7.77-16.15)
	IgG	14.33	(12.82-15.85)	13.79	(12.12-15.46)	22.25	(16.67-27.85)	10.94	(6.95-14.92)
	IgM	3.20	(2.45-3.95)	3.42	(2.54-4.30)	2.63	(0.65-4.60)	2.41	(0.43-4.39)
	Brussels	18.45	(13.47-23.44)	18.18	(12.48-23.88)	25.81	(10.06-41.55)	8.70	(-2.82-20.21)
	Flanders	11.28	(9.77-12.79)	11.06	(9.37-12.75)	12.67	(7.45-17.80)	11.80	(6.88-16.72)
	Wallonia	20.37	(16.91-23.84)	19.52	(15.63-23.41)	35.53	(23.49-47.56)	13.01	(4.82-21.19)
Positive test in the past[3]		19.40	(17.69-21.111)	18.52	(16.64-20.40)	27.00	(21.02-32.99)	18.32	(12.77-23.88)
	Brussels	21.30	(16.04-26.57	21.02	(15.00-27.04)	29.03	(14.12-43.94)	13.04	(-0.72-26.81)
	Flanders	13.76	(12.11-15.41)	13.87	(12.01-15.74)	14.56	(9.11-20.01)	12.13	(7.15-17.12)
	Wallonia	28.31	(24.42-32.20)	26.06	(21.74-30.38)	42.89	(30.63-55.14)	28.11	(16.11-40.11)
Any positive test[4]		22.45	(20.65-24.25)	21.60	(19.61-23.59)	30.15	(24.04-36.25)	20.53	(14.85-26.21)
	Brussels	25.11	(19.54-30.68)	23.29	(17.05-29.54)	41.94	(25.72-58.15)	13.04	(-0.72-26.81)
	Flanders	16.28	(14.50-18.05)	16.41	(14.41-18.41)	15.63	(10.04-21.22)	15.40	(9.95-20.86)
	Wallonia	32.02	(27.99-36.05)	30.37	(25.85-34.98)	45.33	(33.05-57.62)	29.41	(17.28-41.54)

[1] Estimates are based on Generalised Estimating Equations[5]; [2] IgG and/or IgM positive; [3] Virus or antibody detection; [4] Positive POCT or a positive test in the past.

3.3 WILLINGNESS TO BE VACCINATED AGAINST SARS-CoV-2

Table 5 presents the willingness to be vaccinated against SARS-CoV-2 as soon as a vaccine is available. Overall, close to 90% of the PHCPs agrees with the statement that they want to be vaccinated as soon as a vaccine is available, but compared to GPs and GPs in training the other PHCPs are substantially less willing to be vaccinated (2101/2371 (88.61%) vs 205/289 (70.93%); -17.68% (95%CI: 12.29-23.07)).

Table 5. Willingness to be vaccinated against SARS-CoV-2 as soon as a vaccine is available among general practitioners (GPs) and other primary healthcare providers (PHCPs) in Belgium (24 December 2020 – 8 January 2021).

	All PHCPs n=2660[1]		GPs n=2096		GPs in training n=275		Other PHCPs n=289	
Totally agree, n (%)	1918	(72.11)	1578	(75.29)	185	(67.27)	155	(53.63)
Agree, n (%)	388	(14.59)	290	(13.84)	48	(17.45)	50	(17.30)
Neutral, n (%)	211	(7.93)	140	(6.68)	23	(8.36)	48	(16.61)
Disagree, n (%)	76	(2.86)	48	(2.29)	12	(4.36)	16	(5.54)
Totally disagree, n (%)	67	(2.52)	40	(1.91)	7	(2.55)	20	(6.92)

[1] 20 PHCPs did no answer this question

4. CONCLUSION AND RECOMMENDATIONS

CHARMING is one of the few studies on the prevalence of antibodies against SARS-CoV-2 in PHCPs. A large and geographically fairly representative sample of Belgian PHCPs working in a general practice, participated in the first testing point. The crude and adjusted prevalence, taking into account clustering of PHCPs within a practice and their geographical distribution, of anti-SARS-CoV-2 antibodies among PHCPs, using a self-administered and self-reported POCT, are respectively 13.9% and 15.1%. The adjusted prevalence found that 22.5% of the participating PHCPs reported having been tested positive (by a positive PCR or a non-specified serological test) since the start of the COVID-19 pandemic. These seroprevalence results show considerable geographical variation with highest prevalence in Wallonia and lowest in Flanders. In Wallonia, the crude and adjusted prevalence of PHCPs with any positive test (either a positive POCT or a reported other previous positive SARS-CoV-2 test) was twice the prevalence found in Flanders. While nine out of ten GPs and GPs in training PHCPs wanted to be vaccinated as soon as a vaccine is available, this was only seven out of ten for the other frontline PHCPs.

Our study cohort is based on a convenience sample rather than on a random sample of Belgian PHCPs. We have no indications yet that participating PHCPs were more or less exposed than average. The large sample size allows for precise estimates at regional level.
The participating PHCPs, mainly GPs, were probably younger, and more often female and working in (big) group practices than average.
We relied on self-reported data for the results of the POCT performed by or under the supervision of a GP, however, these POCT are exactly developed to be used by this level of healthcare providers.

At the same time point, the prevalence of antibodies against SARS-CoV-2 in Belgian PHCPs is similar to the prevalence found among blood donors and a bit lower than the seroprevalence found among hospital health care workers (see https://datastudio.google.com/embed/u/0/reporting/7e11980c-3350-4ee3-8291-3065cc4e90c2/).

It appears that the prevalence of SARS-CoV-2 antibodies among frontline PHCPs is a reflection of the viral circulation in their community. When there is increased viral circulation in a community, PHCPs have a higher risk of getting infected and having a positive serological test. This suggests that PHCP appropriately limited unprotected exposure to COVID-19 patients in their practice and a positive effect of implemented infection prevention and control (IPC) measures for example by performing teleconsultations, organising patient triage outside their practice, organising the patient flow in their practice and using personal protective equipment (PPE). Analysis of these risk and protective factors collected as part of our study is still pending.
We found a higher seroprevalence among GPs in training in Brussels and Wallonia. Further analysis of our data is also needed to try to find an explanation of this finding, for example lower use or availability of PPE, higher exposure to COVID-19 patients in their practice or in triage centres or less experience with IPC. Or is it a reflection of the prevalence found in this region in this age group?

In conclusion, frontline PHCPs were not disproportionately infected by SARS-CoV-2. Our study findings show that about one in five had been in contact with SARS-CoV-2 since the start of the outbreak and nine in ten is willing to be vaccinated as soon as a vaccine is available.

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