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SHORT COMMUNICATION

Pronounced difference in Covid-19 antibody prevalence indicates cluster transmission in Stockholm, Sweden

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ABSTRACT

The prevalence of COVID-19 antibodies on June 17–18, 2020 was investigated in two residential areas of Stockholm, Sweden. Among the residents in Norra Djurgårdsstaden, a newly built upper- and middle-class area of Stockholm, 4.1% of study participants had SARS-CoV-2-specific antibodies, while in Tensta, a highly segregated low-income area, 30% of the participants tested antibody positive.

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COVID-19, caused by the novel Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), has rapidly developed into a global pandemic [1]. By early July 2020, the total number of reported COVID-19 cases exceeded 11 million with more than half a million deaths [2], but the actual numbers are likely to be much higher, as testing and reporting are still limited in many regions. The major clinical symptoms of COVID-19, i.e. fever and dry cough, resemble those of respiratory illnesses caused by other viruses [3], while anosmia (loss of smell) and ageusia (loss of taste) have been noted as early and sometimes the only symptoms [4]. The virus has also been detected in completely asymptomatic individuals [5,6] and there are data indicating that the proportion of asymptomatic infections could be as high as 80% [7].

As in most parts of the world, COVID-19 has spread rapidly in Sweden, especially in larger cities, including the capital Stockholm. The number of deaths in COVID-19 is far higher in Sweden (n = 5,447, July 8, 2020), as compared to the compiled deaths in its neighbouring countries Norway, Denmark and Finland (n = 1,189 lethal cases, July 8, 2020) [2].

In a recent study, performed between May 30 and June 3, 2020, we noted differences in the COVID-19 antibody prevalence rates between different areas in Stockholm (population approx. 2.4 million individuals, our unpublished observation). Similar reports on clusters of SARS-CoV-2 infections have been published from e.g. China and Kuwait [8,9]. In the present study, we selected two areas in Stockholm with different socio-economic conditions: Norra Djurgårdsstaden (NDS), a new area located in the north-eastern inner city part of Stockholm, recently built with a mainly middle- to high-income population, and Tensta, a lower income highly segregated suburban area in northern Stockholm, built in the late 1960´s.

Randomly selected individuals were tested at local temporary testing sites (June 17–18, 2020) using a COVID-19 IgG/IgM rapid test (Zhejiang Orient Gene Biotech Co Ltd, Huzhou, Zhejiang, China), which has been described and evaluated previously [10]. Our recent extended evaluation (using serum samples from 200 negative individuals and 100 COVID-19 patients) of this rapid test has revealed specificities for IgM and IgG of 100 and 95.5%, respectively and sensitivities close to 100% for both IgM and IgG (our unpublished observations). In addition to the antibody test results, age, gender, residence, Swedish mother tongue or not, and Swedish origin or not, were recorded. A written consent was provided by all participants, and ethical approval was obtained from the Swedish Ethical Review Authority (2020–02047).

The study included 123 residents from NDS and 90 from Tensta (Table 1). The proportion of females were 58% and 29%, and the mean ages were 37y and 50y among the tested individuals in NDS and Tensta, respectively.

Of the 123 tested individuals living in NDS, five (4.1%; 95% confidence interval (CI): ± 3.5%) were found positive for SARS-CoV-2 IgM and/or IgG (Table 1). None tested positive for IgM only, while three tested positive only for IgG.

Of the 90 individuals tested in Tensta, 27 (30%; 95% CI: ± 9.7%) were found positive for SARS-CoV-2 IgM and/or IgG (Table 1). One individual tested positive for IgM only, while 18 were positive only for IgG.

The majority (98.4%) of the tested individuals in NDS were of Swedish origin in contrast to only 1.1% in Tensta (Table 1).

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Table 1. Summary of results.

Residence	Proportion of females (%)	Mean age (years)	Sweden as country of origin (%)	Swedish as mother tongue (%)	Total Ab positive (%)	IgM only (%)	IgM and IgG (%)	IgG only (%)
Djurgårdsstaden (n = 123)	58	37	98.4	97.5	4.1	0	1.6	2.4
Tensta (n = 90)	29	50	1.1	1.1	30.0	1.1	8.8	20

Although the number of tested individuals was limited in the present study, a clear and statistically significant (Fishers exact test, $p < 0.001$) difference in COVID-19 antibody prevalence was observed between the two residential areas, with only 4.1% antibody positivity in NDS as compared to 30% in Tensta, which is in line with earlier reports on COVID-19 super-spreaders and cluster transmission [8,9].

Cramped accommodation and generation housing may partly explain the significant difference in COVID-19 antibody prevalence rates between these two areas of Stockholm, suggesting a pronounced cluster transmission in Tensta. Another factor may be differences in working conditions, as it is likely that working from home has been much more common in NDS during the pandemic, while a large proportion of the residents in Tensta work in service professions, including transport and care. An additional potential explanation may be the fact that the translation of the recommendations from The Public Health Agency of Sweden concerning the safety measures and restrictions into e.g. Arabic, Tigrinya and Somali was severely delayed during the initial phase of the pandemic in Sweden.

Our results indicated an urgent need for extensively increased testing capacity, both by PCR for detailed calculations of actual infection levels and by serology to estimate the immunity rates, as well as for contact-tracing/quarantine measures in order to control the pandemic in Sweden.

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Disclosure statement

The authors declare no conflicts of interest

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