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Severe acute respiratory syndrome coronavirus 2 antibodies in pregnant women admitted to labor and delivery units.

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Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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OBJECTIVE: Serologic testing for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) immunoglobulin G (IgG) antibodies is now broadly available in the United States. The SARS-CoV-2 antibody levels rise within 2 to 3 weeks after infection and can indicate whether an individual has ever been infected, irrespective of symptomatic or asymptomatic presentation. Serology is not recommended by the Centers for Disease Control and Prevention as a diagnostic test for an active infection but instead can be used to understand the epidemiology of the virus and identify the groups who are at a higher risk of infection.[1]

Previous studies utilizing polymerase chain reaction (PCR) tests to detect SARS-CoV-2 from nasopharyngeal swabs for disease confirmation suggest that pregnancy does not seem to increase the risk of acquiring a SARS-CoV-2 infection when compared with the nonpregnant population.[2] However, PCR testing at the time of hospitalization for delivery may underestimate the prevalence of SARS-CoV-2 in pregnancy; infection during an earlier gestational period may only be detectable by antibody testing. Other factors that may affect the prevalence of SARS-CoV-2 infection in pregnancy include the viral prevalence in different regions of the country, asymptomatic carriage of the virus, unavailability of testing in particular regions of the country, and whether the patient seeks screening for various indications (eg, screening offered through employment, the presence of symptoms, and protocol-driven routine screening in labor and delivery [L&D] units).

The objective of this study was to determine the seroprevalence rate of SARS-CoV-2 antibodies in pregnant women admitted to L&D units. A secondary objective was to correlate the serum antibody status to the results of the PCR tests to determine the prevalence of potential immunity in our population.

STUDY DESIGN: A total of 7 hospitals with L&D units in the Northwell Health system in New York State were included in this study. The participants were all women admitted to the L&D units between May 27, 2020, and July 24, 2020, who had their blood drawn for SARS-CoV-2 IgG antibody testing. IgG titers were classified as either positive, negative, or equivocal. The serology test used in this study was the Roche Elecsys Anti-SARS-CoV-2 (Roche Diagnostics International Ltd, Rotkreuz, Switzerland) test. This test has a false positive rate of 0.2%, secondary to cross reactivity with the cytomegalovirus, Epstein-Barr virus, and systemic lupus erythematosus. The false negative rate for the test is unknown.[3] False negative results may be because of testing before seroconversion or after the waning of antibody levels over time. We used a universal testing approach for SARS-CoV-2 on admission to an L&D unit with a PCR test of a nasopharyngeal swab. The PCR test results were recorded for all study participants, if available.

This study received institutional review board approval from the Feinstein Institutes for Medical Research at Northwell Health. Descriptive statistics were used to evaluate the data.

RESULTS: During the study period, 1671 women delivered in the Northwell Health system and had available SARS-CoV-2 antibody results. Of those, 269 were seropositive (16.1%), 1400 were seronegative (83.7%), and 2 were equivocal (0.11%). The PCR results for each group are presented in Table 1.

CONCLUSION: To date, 3 other studies have examined the seroprevalence of SARS-CoV-2 antibodies in pregnancy with prevalence rates between 0.6% and 10.1% (Table 2).[4–6] In our cohort, 16.1% of pregnant women were seropositive for SARS-CoV-2 antibodies, which is the highest reported prevalence rate of SARS-CoV-2 in pregnancy. This likely

TABLE 1
COVID-19 antibody and PCR results for pregnant women admitted to L&D units

	PCR result		
	Positive, n (%)	Negative, n (%)	Not available, n (%)
Antibody status			
Positive (16.1%; n=269)	51 (19)	217 (80.6)	1 (0.4)
Negative (83.7%; n=1400)	15 (1.0)	1372 (98.0)	13 (1.0)
Equivocal (0.11%; n=2)	0	2 (100)	0

COVID-19, coronavirus disease 2019; *L&D*, labor and delivery; *PCR*, polymerase chain reaction.

Haizler-Cohen. SARS-CoV-2 antibodies in pregnant women. Am J Obstet Gynecol 2020.

TABLE 2
Seroprevalence studies of SARS-CoV-2 antibodies in pregnancy

First author, year	Sample size (N)	Timing during pregnancy	Study period	Location	Positive seroprevalence results for SARS-CoV-2 antibodies (%)
Flannery et al,[4] 2020	1293	Antepartum and delivery admission	April 4, 2020, to June 3, 2020	Philadelphia, PA, USA	6.2
Zöllkau et al,[5] 2020	234	Delivery admission	April 6, 2020, to May 13, 2020	Jena, Thuringia, Germany	0.6
Cosma et al,[6] 2020	138	First trimester	April 16, 2020, to June 4, 2020	Turin, Piedmont, Italy	10.1
Current study	1671	Delivery admission	May 27, 2020, to July 24, 2020	New York City and Long Island, NY, USA	16.1

SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

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reflects the higher prevalence of the virus in New York State,[7] which was once the epicenter of SARS-CoV-2 infections in the United States.

The results from both the SARS-CoV-2 PCR and antibody tests can help to determine the timing of infection. An acute infection may be characterized by a positive PCR and negative antibody test result. A past infection may be characterized by a negative PCR and positive antibody test result. If both tests are positive, a recent or past infection may have occurred. The PCR test results for some individuals have been reported to remain positive for weeks after infection.[8] There is a concern that some patients who were exposed to the virus have a transient elevation in antibody levels, complicating the interpretation of the test results.

Universal testing in L&D units represents a unique opportunity to continuously study the exposure to SARS-CoV-2 in a population. The general public has been practicing social distancing and avoiding healthcare contact, creating a selection bias in seroprevalence studies. Pregnant women, a generally healthy and mostly asymptomatic group, continue to receive routine prenatal and L&D services. A cohort of pregnant women admitted to L&D units is therefore more representative of the general population.

It is still unclear whether SARS-CoV-2 antibodies confer immunity to reinfection and for how long. However, there is growing interest in the literature on SARS-CoV-2 antibodies. Antibody testing may be a useful tool for studying exposure rates to the virus in different populations, developing a vaccine, and in treating sick patients with convalescent plasma. Further research is necessary to determine the antibody response to SARS-CoV-2 in pregnant women, its accuracy, and its role in the management of seropositive pregnant women and their fetuses. ■

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