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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Brief Report

SARS-CoV2 antibody positivity rates and employee expectations of positivity rates among health care workers at a community hospital in North Carolina

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Our study surveyed over 2000 employees of a community health care system in the Southeast United States for SARS-CoV2 antibodies. Survey included subjects' expectation of the result. Our local area had low community prevalence of SARS-CoV2 but low diagnostic testing capacity during much of the early phase of the epidemic. Despite only 3% positivity rate for antibodies in this population, 17% of subjects expected to have positive antibodies.

BACKGROUND

The current pandemic caused by a novel respiratory virus, a coronavirus known as SARS-CoV-2 continues to rise with millions of cases globally.[1] SARS-CoV-2 causes a clinical spectrum of respiratory disease called COVID-19. This ranges from asymptomatic infections to severe acute respiratory distress requiring intensive care. Recent publications estimate an average of 40-50% of SARS-CoV2 infections are mild or asymptomatic and may go undetected in our communities.[2] Serology (antibody) tests for the SARS-CoV-2 virus have the potential to inform good public health decision making during the pandemic.[3-7]

Like many areas of the United States, central NC has had significant limitations in testing availability, particularly in the early phase of the epidemic. In the early months of the pandemic individuals with mild symptoms were encouraged to stay home and isolate but not pursue testing (NC DHHS, 3/23/2020). Many individuals with mild illnesses during the early months of the pandemic may attribute prior illnesses to SARS-CoV2, even in communities with low community prevalence.

We performed a SARS-CoV2 seroprevalence study for our health care system that included measurement of individual's expectation of antibody results.

At the time of this study there had been a low prevalence of COVID-19 within our community, with approximately 3330 confirmed positive cases in a population of approximately 430,000 for our 6 county catchment area (http://www.NCDHHS.gov).

METHODS

This study was conducted within FirstHealth of the Carolinas, a community health system in central North Carolina that includes 4 hospitals and 28 associated clinics. The system has approximately 5386 employees. The flagship hospital is Moore Regional Hospital, a

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402-bed, acute care, not-for-profit community hospital with ICU and subspecialty care. During the study two system hospitals provided inpatient care for confirmed COVID-19 patients on both the medical floor and the ICU. All 4 hospitals provided care to COVID-19 patients in the emergency departments. This study was approved by the institutional review board.

Participants were recruited between June 10 and July 17, 2020. Participants were recruited via system wide memo and word of mouth. All health system employees and associated clinical staff over the age of 18 were eligible to participate. Study procedures included informed consent, a brief questionnaire regarding prior COVID-19 infection, perceived risk, expectation of antibody status, and a blood draw.

The antibody assay used in this study was SARS-CoV2 IgG Antibody through Abbott on the Architect Platform.[8] Raw frequencies and percentages of positives were calculated using Excel.

RESULTS

2076 subjects were enrolled. 97% were health system employees and 3% were affiliated staff. More women than men were enrolled (82% women) which was consistent with the target population (78% women). Nursing represented the largest subcategory (33% of subjects). Age distribution was roughly evenly distributed between ages 26 and 55, 18% were 56-66, 5% were between 18-25.

Out of 2076 subjects, 54 (3%) tested positive for SARS-CoV2 antibodies (95% confidence interval 1.9-3.3%). 19 of those individuals reported a known history of testing positive for SARS-CoV2, leaving 35 (1.6%) positive tests without known confirmed SARS-CoV2 infection. Individuals working in the COVID-19 units and EDs did not have a statistically higher percentage of antibody positivity compared to the general population studied.

Individuals were asked to estimate their antibody status prior to blood draw, and 352 (17%) subjects expected to have positive antibodies for SARS-CoV2 despite lack of known infection for most.

DISCUSSION

Much has been written about the unknowns of SARS-CoV2 antibody testing.[9] The specific test used in our study has a robust sensitivity and specificity but we acknowledge using it in a low prevalence setting which would compromise the positive predictive valve. There are many unknowns about how long antibody responses persist but a recent study out of Iceland showed 91% maintained SARS-CoV2 antibodies 4 months post infection[10].

The conclusions we can draw about our health care worker population is somewhat limited due to our sampling method of a convenience sample, however internal analysis showed that over 1/3 of our workforce did opt to participate and >50% of our frontline HCWs working directly in our COVID-19 units and EDs opted to participate.

Based on recruitment strategies we expected a bias towards individuals who suspected a prior infection compared to the general population, however we think our sample size of over 1/3 of the target population may still inform about a significant belief within the population sampled.

Despite a low population prevalence of COVID-19 and low antibody testing within the population over 1 out of 6 individuals expected to have a positive antibody test. There are unknowns about whether antibodies confer protection, however misbeliefs about prior infection status could impart a false sense of security in a vulnerable population. We hope to use these results to reassure our health care workers about the effectiveness of PPE and to encourage our system to remain vigilant in regards to COVID-19 risk.

CONCLUSIONS

In a low prevalence community in rural North Carolina in Summer 2020, we found a large percentage of health care workers who expected to have positive antibodies to SARS-CoV2, despite lack of known infection or risk factors. The actual prevalence of positive antibodies was low.

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