Methods. Blood samples collected for clinical testing and then discarded (“spent samples”) were obtained from the laboratory of a medical center in Atlanta. A convenience sample of spent samples from both inpatients (medical/surgical floors, intensive care, obstetrics) and outpatients (clinics and ambulatory surgery) were collected one day per week from January-March 2021. Samples were matched to clinical data from the electronic medical record. In-house single dilution serological assays for SARS-CoV-2 receptor binding domain (RBD) and nucleocapsid (N) antibodies were developed and validated using pre-pandemic and PCR-confirmed COVID-19 patient serum and plasma samples (Figure 1). ELISA optical density (OD) cutoffs for seroconversion were chosen using receiver operating characteristic analysis with areas under the curve for all four assays greater than 0.95 after 14 days post symptom onset. IgG profiles were defined as natural infection (RBD and N positive) or vaccinated (RBD positive, N negative).

Figure 1. Nucleocapsid serology assay validation

Table. SARS-CoV-2 antibody seropositivity by week of sample collection for spent routine blood chemistry samples.

| Week 1 (N=207) | Week 2 (N=332) | Week 3 (N=352) | Week 4 (N=352) | Week 5 (N=372) | Week 6 (N=342) | Week 7 (N=342) | Week 8 (N=342) |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| IgG RBD        | 80 (27.7)     | 86 (26.1)     | 73 (23.2)     | 64 (22.7)     | 73 (25.6)     | 69 (21.3)     | 67 (20.7)     |
| IgG N          | 44 (15.4)     | 54 (16.9)     | 41 (14.7)     | 39 (13.7)     | 37 (12.2)     | 35 (10.8)     | 36 (11.9)     |
| IgG RBD+N      | 77 (27.0)     | 81 (24.2)     | 62 (21.1)     | 52 (18.1)     | 53 (16.1)     | 53 (15.8)     | 56 (16.8)     |
| IgG N           | 61 (20.1)     | 69 (21.0)     | 56 (19.4)     | 53 (18.8)     | 53 (17.6)     | 56 (17.1)     | 52 (16.6)     |
| Any positive   | 114 (36.9)    | 158 (47.5)    | 117 (39.3)    | 108 (36.7)    | 108 (37.1)    | 115 (34.5)    | 114 (37.1)    |

RBD = receptor binding domain. N = nucleocapsid. Seropositivity defined by enzyme-linked immunosassay (ELISA) optical density cutoffs selected using receiver operating characteristic analysis with areas under the curve (AUC) for all four assays greater than 0.95 after 14 days post symptom onset. IgG defined as positive if both RBD and N seropositive.

Figure 2. RBD and Nucleocapsid seropositivity to differentiate natural infection vs. vaccination by week of sample collection.

Conclusion. Estimated SARS-CoV-2 IgG seroprevalence among patients at a medical center from January-March 2021 was 17% by natural infection, and 16% by vaccination. Weekly trends likely reflect community spread and vaccine uptake.

Disclosures. Daniel Gracia, MD, MPH, MSc, Critica, Inc (Consultant)