**COVID-19 Evidence Digest 02/19/21**

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## Antibody Status and Incidence of SARS-CoV-2 Infection in Health Care Workers (NEJM)

**Bottom line:** A cohort study of 12,541 health care workers (HCWs) in Oxfordshire, United Kingdom found that the presence of anti-spike (antibodies to spike protein) or anti-nucleocapsid IgG antibodies was associated with a reduced risk of SARS-CoV-2 reinfection in the following 6 months. However, there was a very low number of reinfections (n=2) and they were asymptomatic. Ongoing follow-up studies are needed to assess magnitude and duration of antibody protection from reinfection.

**Details:** This is a cohort study of 12,541 HCWs in Oxfordshire, United Kingdom. Starting March 27, 2020, symptomatic workers had the opportunity for SARS-CoV-2 PCR testing. As of April 23, asymptomatic workers were invited for voluntary PCR testing every 2 weeks and for serological testing every 2 months. The HCWs were followed until November 30, 2020. A total of 11,364 HCWS were anti-spike seronegative at baseline, of which 88 seroconverted. A total of 1,177 HCWs were anti-spike seropositive at baseline. Of those with negative anti-spike antibody assay at baseline, 223 HCWs had a positive PCR test (1.09 per 10,000 days at risk), 100 during asymptomatic screening and 123 while symptomatic. Only 2 HCWs that were seropositive at baseline had a positive PCR test at least 60 days after their first positive anti-spike antibody test (0.13 per 10,000 days at risk). These individuals were asymptomatic. Incidence of PCR positive tests varied over time. After adjustment for age, gender, and month of testing or calendar time, the incidence rate ratio for positive PCR tests in seropositive HCWs was 0.11 (95% CI: 0.03-0.44; P=0.002). Findings were similar for HCWs with anti-nucleocapsid IgG antibodies. Note there were very few reinfection cases, therefore ongoing follow-up studies are needed to assess magnitude and duration of antibody protection from reinfection.

**Key Takeaways:**

- The presence of anti-spike or anti-nucleocapsid IgG antibodies was associated with a reduced risk of SARS-CoV-2 reinfection in the following 6 months.
- After adjustment for age, gender, and month of testing or calendar time the incidence rate ratio for positive PCR tests in seropositive HCWs was 0.11 (95% CI, 0.03 to 0.44; P=0.002).
- Findings were similar for HCWs with anti-nucleocapsid IgG antibodies.
- Very few reinfection cases (n=2) were found in this study, therefore ongoing follow-up studies are needed to assess magnitude and duration of antibody protection from reinfection.

## Impact of age, ethnicity, sex and prior infection status on immunogenicity following a single dose of the BNT162b2 mRNA COVID-19 vaccine: real-world evidence from healthcare workers, Israel, December 2020 to January 2021 (Euro Surveil)

**Bottom Line**: In an Israel cohort study that focused on 514 healthcare workers (HCWs) who received 1 dose of the Pfizer-BioNTech BNT162b2 mRNA vaccines, immunogenicity was prevalent (92%) at day-21 post vaccination, with no statistically significant differences found across ethnicity groups and by sex. Decreased immunogenicity was significantly associated

with increasing age; Individuals with prior COVID-19 infection had antibody titers one magnitude order higher than those without regardless of presence of detectable IgG antibodies at baseline.

**Details**: Israel has the highest percent of population vaccinated (29.2%) as of January 25, 2021, with predominantly the Pfizer-BioNTech BNT162b2 mRNA vaccines and HCWs as the first eligible group. In this study, 514 HCWs (out of 1,378 HCWs who received the first dose of the vaccine) from a medical center in Israel staffed by a multi-ethnic (Jewish, Arab, Druze, and Circassian) workforce are included. The Immunogenicity, measured by anti-spike IgG levels at 21 days after dose 1, was compared across different age groups, ethnicities, sexes, and prior COVID-19 infection status. Previously infected individuals were identified by detectable IgG antibodies at baseline or by evidence of previous positive PCR tests for SARS-CoV-2. IgG antibodies were detectable in 475 (92%) participants—i.e. vaccine responders, with a geometric mean concentration (GMC) of 68.6 AU/mL (95% CI: 64-73.6). Among responders, no statistically significant differences in antibody titers were found between ethnicity groups and sexes; titers significantly decreased with increasing age ($p<0.001$), regardless of previous infection status. Compared to vaccine responders, the 39 vaccine non-responders were older (median age: 57 vs 45; $p<0.001$) and were more often Jewish (82% vs 63%; $p=0.01$). Compared to HCWs with no documented prior COVID-19 infections, individuals with prior infections had post-vaccination antibody titers one magnitude higher (GMC 573 vs 61.5), regardless of presence of detectable IgG antibodies before vaccination and regardless of the time interval between infection and vaccination. Limitations of this study include relatively small sample size; inability to adjust for covariates; missing information on comorbidities; under-representation of elderly; and limited generalizability beyond HCWs.

**Key Takeaways**:

- Immunogenicity was observed in 92% (out of 514) of HCWs 21 days after receiving the first dose of the Pfizer-BioNTech BNT162b2 COVID-19 vaccine in a Israel study, consistent with data from the clinical trial.

- Individuals with prior COVID-19 infection tend to have a boost response after receiving the COVID-19 vaccine, regardless of the presence of detectable IgG antibodies at baseline and regardless of the time interval between infection and vaccination. This supports findings from prior studies suggesting that immune memory could persist at least 6 months post infection.