

Biotech Innovations

COVID-19 mRNA Vaccines Blunt Breakthrough Infection Severity

People who become infected with SARS-CoV-2 after being vaccinated against it are likely to have [milder and shorter illnesses](#), according to data from 2 ongoing studies funded by the Centers for Disease Control and Prevention.

Researchers analyzed breakthrough infections among almost 4000 US health care personnel, first responders, and other essential and frontline workers in the Arizona Healthcare, Emergency Response, and Other Essential Workers Surveillance Study (AZ HEROES) and the Research on the Epidemiology of SARS-CoV-2 in Essential Response Personnel (RECOVER) study. Data from the HEROES-RECOVER network [previously showed](#) that the Pfizer-BioNTech and Moderna mRNA vaccines reduce the risk of SARS-CoV-2 infection by 90% in real-world settings.

In the new analysis, published in the *New England Journal of Medicine*, 204 SARS-CoV-2 infections occurred. The majority of cases were among unvaccinated workers—only 5 fully vaccinated and 11 partially vaccinated participants tested positive for the virus between December 14, 2020, and April 10, 2021. The partially or fully vaccinated workers had a 40% lower viral load on average, a 66% lower risk of viral RNA detection for more than 1 week, and a 58% lower risk of fever symptoms than unvaccinated participants who became infected. Their COVID-19 symptoms also subsided about 6 days earlier and they spent 2.3 fewer days sick in bed.

Vaccination likely creates immunological memory responses that reduce viral replication and speed up the elimination of infected cells during breakthrough infections, the study's authors noted. However, because so few of these infections occurred, the researchers could not differentiate the attenuating benefits of partial vs full vaccination.

"These are the people who are getting exposure to the virus day in and day out, and the vaccine protected them against getting the disease," Sarang Yoon, DO, RECOVER's principal investigator, said in a [statement](#).

"Those who unfortunately got COVID-19 despite being vaccinated were still better off than those who didn't."

Oldest Adults Need 2 mRNA Vaccine Doses to Neutralize SARS-CoV-2

COVID-19 vaccine clinical trial data involving people older than 80 years have been limited, and no information has been available on how well this group is protected against SARS-CoV-2 variants of concern. To address this information gap, a recent [study](#) analyzed age-related immune responses to Pfizer's mRNA vaccine. The findings underscore the importance of completing the 2-dose vaccine regimen in the oldest age group.



Researchers in the UK compared post-vaccination immune responses among 140 adults with a median age of 72 years. After the vaccine first dose, serum neutralizing activity against a "pseudotyped" nonreplicating virus engineered with the SARS-CoV-2 spike protein diminished with age. About half of participants aged 80 years or older had no evidence of neutralizing antibodies 3 to 12 weeks after their first dose. However, almost all the oldest adults who had low or nonexistent neutralizing activity after the first dose saw an increase after they received their second shot.

The researchers also investigated how vaccination protects older adults from SARS-CoV-2 variants of concern. After the first dose, participants aged 80 years or older had lower neutralizing antibodies

than younger adults against pseudotyped B.1.1.7 (alpha), B.1.351 (beta), and P.1 (gamma) variants. Although nearly all participants developed responses to these variants after the second shot, "further work is needed to understand the impact of age on durability of immune responses following vaccination," the authors wrote in *Nature*.

Antigen Testing Every 3 Days Is Highly Sensitive for SARS-CoV-2

A recent campus-based [study](#) suggests that rapid SARS-CoV-2 antigen testing could help curb community spread by detecting asymptomatic infections. The study found that antigen testing—which is faster and cheaper than gold-standard polymerase chain reaction (PCR) testing—is highly sensitive for detecting SARS-CoV-2 infections when conducted at least every few days.

The research involved 43 on-campus students and employees of the University of Illinois at Urbana-Champaign who had mild or asymptomatic infections and positive nasal virus cultures. Participants submitted daily samples for 14 consecutive days, and antigen testing was performed with the 15-minute point-of-care Quidel Sofia SARS Antigen Fluorescent Immunoassay.

Nasal and saliva PCR testing were more sensitive than antigen testing with nasal samples early in the course of infection. However, antigen testing's sensitivity reached 98% when conducted at least every 3 days, bringing it on par with PCR testing at the same frequency.

The National Institutes of Health's COVID-19-focused Rapid Acceleration of Diagnostics (RADx) Tech program funded the work, which appeared in the *Journal of Infectious Diseases*. "Rapid antigen testing at home, two to three times per week, is a powerful and convenient way for individuals to screen for COVID-19 infection," Bruce Tromberg, PhD, RADx Tech program leader and director of the National Institute of Biomedical Imaging and Bioengineering, said in a [statement](#). — Jennifer Abbasi

Note: Source references are available through embedded hyperlinks in the article text online.