



COVID-19 Booster Shots

We are experiencing a new wave of COVID-19 infections driven by both the Delta and Omicron variants. Increases in Delta infections can be traced to waning vaccine immunity six months after injection, as well as the onset of colder weather, holiday activities, and travel. As of Dec 20, the number of Omicron cases is doubling every two to four days. Omicron infects bronchial tubes 70 times faster than Delta, which may explain why it spreads so quickly. Omicron appears to infect bronchial tubes efficiently, but the variant is less infectious in the lungs.¹ Omicron may supplant Delta soon, but the two variants are driving surges simultaneously in Europe.

At the same time, we have growing evidence that vaccine-induced immunity drops precipitously after six months, BUT Pfizer and Moderna booster shots provide protection against Omicron and stronger protection against Delta.^{2, 3} These mRNA vaccines and Johnson & Johnson protect against severe illness. Pfizer and Moderna boosters do offer protection from infection from Omicron.⁴

Multiple reports of immune response in lab studies and longitudinal studies of booster recipients in Israel all agree—two doses of mRNA (Pfizer and Moderna) vaccines produce high, short-term protection that wanes significantly after six months, but neutralizing antibodies are boosted for Omicron, with a stronger immune response for Delta.⁵

Clinical Studies Support Boosters as a Critical Protective Strategy.

Pfizer provides a 100-fold increase in neutralization efficiency against Omicron and even greater efficacy against Delta in the weeks after the third shot.⁶ mRNA boosters (currently Pfizer and Moderna vaccines) provide immunity against Omicron that is nearly as potent as against the original virus.⁷ In a review of all the studies to date, researchers estimate that mRNA vaccine efficacy against Omicron wanes after six months to 40 percent against symptomatic disease and 80 percent against severe disease. A booster has the potential to raise efficacy against Omicron to 86 percent against symptomatic infection and 98 percent against severe infection.⁸

¹ [HKUMed finds Omicron SARS-CoV-2 can infect faster and better than Delta in human bronchus but with less severe infection in lung - News | HKUMed.](#)

² Gruel, H. et al. 2021. <https://doi.org/10.1101/2021.12.14.21267769>

³ Hall, V. et al. 2021. <https://doi.org/10.1101/2021.11.29.21267006>

⁴ [Covid-19, Omicron and Travel News: Live Updates - The New York Times \(nytimes.com\)](#)

⁵ Basile, K., et al. 2021. <https://doi.org/10.1101/2021.12.12.472252>

⁶ Nemet, I. et al. 2021. <https://doi.org/10.1101/2021.12.13.21267670>

⁷ Garcia-Beltran, et al. 2021. <https://doi.org/10.1101/2021.12.14.21267755>

⁸ Khoury, D. et al. 2021. <https://doi.org/10.1101/2021.12.13.21267748>



Studies in Israel Show Boosters Save Lives.

In an Israeli study of nearly 850,000 people, participants who received a booster at least five months after their second dose of the Pfizer vaccine had 90 percent lower mortality due to COVID-19 than people who did not receive the booster.⁹ Another found that infection and severe illness were substantially lower for people in a wide range of ages.¹⁰

What About Natural Immunity After COVID-19 Infection?

The emergence of Omicron shows that the virus is evolving to avoid natural human antibody response protections following infection. Although mRNA vaccines are less potent against Omicron than they are against Delta, they are significantly more protective than natural immunity following infection.¹¹ Individuals who received two mRNA vaccines six or more months previously (but no booster shot) or who survived COVID previously are still at risk of symptomatic disease and hospitalization.¹²

Will We Need More Boosters?

We do not know yet if the third shot will remain effective over years. We do know that the short interval between the first and second Pfizer and Moderna injections was designed to bring people to full immunity quickly, but it was not ideal for inducing lasting vaccine efficacy. Vaccine schedules, such as the MMR (measles, mumps, rubella) are normally given six to 12 months apart and last a lifetime. In contrast, the influenza virus mutates so much each year the vaccine is only effective for one year.

Boosters will protect people now as case rates are surging, our hospitals are struggling, and our members are exhausted. If it has been six or more months since you received Pfizer or Moderna, or two or more months for the Johnson & Johnson vaccine, getting a booster is your best defense against Delta and Omicron, which will help us to end this pandemic.

⁹ Arbel, R. et al. 2021. [Arbel et al BNT162b2 Vaccine Booster and Mortality Due to COVID-19.pdf](#)

¹⁰ Bar-On, M. et al 2021. [Bar-On et al Protection against Covid-19 by BNT162b2 Booster Across Age Groups.pdf](#)

¹¹ Schmidt, F. et al. 2021. <https://doi.org/10.1101/2021.12.12.21267646>

¹² Gardner, B. et al. 2021. <https://doi.org/10.1101/2021.12.10.21267594>