

## **Better Immunity than a Two-Dose Regimen provided by Pfizer-BioNTech Booster Shot**

A new study suggests that the immune response against [severe acute respiratory syndrome coronavirus 2](#) (SARS-CoV-2) is greater with a three-dose regimen than a two-dose regimen. Administering a Pfizer-BioNTech booster shot produced a 1.7-fold increase in IgG levels one after one month compared to IgG levels one month after the second dose. Additionally, there was a significant 6.1-fold rise in neutralizing antibodies.

Booster shots generated a high immune response among healthcare workers 60 years or older and people with two or more comorbidities. Compared to the first two [Pfizer-BioNTech doses](#), the booster shot had an 85.6% vaccine effectiveness.



The researchers conclude that a third Pfizer-BioNTech dose is immunologically “superior” to the second dose. Booster shots have shown considerable effectiveness against the newly identified [Omicron variant](#) which has caused a record number of breakthrough infections in vaccinated individuals. Additionally, the booster shot may be essential in providing protection against people who are older or immunocompromised who may not have had a full antibody response with the first two doses.

### **How they did it**

The researchers studied vaccine effectiveness, vaccine safety, and immune response of 12,413 healthcare workers living in Israel who were given a third dose of the Pfizer-BioNTech [vaccine](#).

Serum samples were collected from vaccinated healthcare workers after the second, before the third dose, and after the third dose to study changes in [antibody levels](#). Vaccine effectiveness was studied between healthcare workers with three doses to healthcare workers who received two vaccines at least 5 months ago.

[Healthcare](#) workers inoculated with a booster shot by September 2, 2021 were invited to fill out an electronic questionnaire involving adverse events after vaccination.

### **Third Pfizer-BioNTech Shot Boosts Immune Levels against SARS-CoV-2**

The [third vaccine dose](#) produced a 31-fold increase in IgG antibody levels compared to two doses. Additionally, there was a 41-fold increase in neutralizing antibodies after the third dose.

The researchers also found a small, but significant increase in T cell activation in 16 healthcare workers. The average IgG titer was greater after the third (2,745) than the [second dose](#) (1,586). In other words, a 1.7-fold increase was observed in IgG levels after the third booster shot. With the third dose, neutralizing antibodies rose from 646 to 3,948. This translated to a 6.1-fold increase from the second dose.

The researchers also tested antibody binding strength to a complex [antigen](#) after the second and third doses. The second dose produced a 61.1% antibody binding strength while the third dose produced a 96.3% binding strength. Age did not make a difference in binding strength between doses.

### **Individual Factors Associated with Dosage Strength**

Old age was linked to lower IgG levels and neutralizing titers after the second dose. Being male and having one or two pre-existing health conditions was also associated with [lower levels](#).

Higher [IgG tiers](#) are correlated with obesity — a BMI of 30 or higher — than those that are not. In healthcare workers 60 years or older with two or more comorbidities, the third dose increased IgG antibody levels by 1.41-fold. Additionally, neutralizing titers in this age group increased by 1.66-fold compared to younger healthcare workers and those with no pre-existing health conditions.

The gap in differences in IgG levels between older and younger adults, gender, and between those with and without pre-existing health conditions was reduced after receiving a third dose. The increased binding strength from the third booster shot was correlated with the observed increases in IgG levels and [neutralizing antibodies](#).

### **Vaccine Effectiveness after Booster**

The rate of breakthrough [infections](#) two doses was 5.8 per every 10,000 days. Healthcare workers inoculated with three shots had a lower risk of breakthrough infections at a rate of 1.1 per every 10,000 days.

The [vaccine effectiveness](#) for the booster was calculated at 85.6%.

### **Side Effects from COVID-19 Booster**

About 3,611 healthcare workers completed an electronic questionnaire asking about any local or systemic adverse events after the booster. Almost all young females younger than 60 and two-thirds of older males reported local reactions, mainly pain at the [injection site](#). About 76% of young females reported systemic adverse events, including fatigue and muscle pain. Nineteen percent also reported fever. In contrast, 31% of older males reported systemic reactions and 3% reported fever.

Two healthcare workers developed [symptoms](#) after their booster and required hospitalization.

### **Source:**

<https://www.news-medical.net/news/20211224/Pfizer-BioNTech-booster-shot-may-offer-better-immunity-than-a-two-dose-regimen.aspx>