

Pfizer vs. Moderna Vaccines: Side Effects, Efficacy and More

Here's a breakdown of the Pfizer and Moderna vaccines, their potential side effects and how effective they are believed to be

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As many Johnson & Johnson vaccine appointments shift to doses of the Pfizer or Moderna vaccines in wake of a recommended pause in Illinois and Chicago, what can those who were once anticipating the single-shot vaccine now expect?

Though the pause in the J&J vaccine is likely only temporary, both the city and state [have already switched](#) many vaccination clinics and events to one of the remaining vaccines available.

White House chief medical advisor Dr. Anthony Fauci said Sunday he believes the U.S. [will likely resume](#) use of the [Johnson & Johnson](#) COVID-19 vaccine as early as this week, though it could come with a warning or restriction attached.

Here's a breakdown of the Pfizer and Moderna vaccines, their potential side effects and how effective they are believed to be.

What is an mRNA vaccine?

The Pfizer-BioNTech and Moderna vaccines differ from traditional vaccines in their use of mRNA.

Instead of introducing a weakened or an inactivated germ into your body, this vaccine injects mRNA, the genetic material that our cells read to make proteins, into your upper arm muscle. It teaches your body how to make the protein that triggers antibody production so if the real virus later enters your body, your immune system will recognize it, according to the federal [Centers for Disease Control and Prevention](#).

How effective are the Pfizer and Moderna COVID vaccines?

Questions about vaccine effectiveness have been paired with a rise in spread of multiple COVID variants.

So far, studies suggest that the vaccines currently in use can recognize the emerging variants — but they [may not provide as much protection](#) against the new strains.

Pfizer's latest study results, however, suggested that the vaccine is effective against the coronavirus variant that first emerged in South Africa.

"These data also provide the first clinical results that a vaccine can effectively protect against currently circulating variants, a critical factor to reach herd immunity and end this pandemic for the global population," Ugur Sahin, CEO and co-founder of BioNTech, said in a statement.

Moderna, citing data from its phase three clinic trial, reported its COVID-19 vaccine was more than 90% effective at protecting against COVID and more than 95% effective against severe disease up to six months after the second dose, the company said.

But boosters and new versions of vaccines that target the variants are already being explored.

Pfizer-BioNTech is testing a third booster shot of its vaccine on fully vaccinated people. Pfizer CEO Albert Bourla [said people will "likely" need a third dose of a COVID-19 vaccine](#) within 12 months of getting fully vaccinated.

"The flexibility of our proprietary mRNA vaccine platform allows us to technically develop booster vaccines within weeks, if needed," Ugur Sahin, CEO and co-founder of BioNTech, said in a [release](#).

Late last month, the National Institutes of Health started testing a new COVID vaccine from Moderna aimed at protecting against a variant first discovered in South Africa. Moderna CEO Stephane Bancel told CNBC that the company hopes to have a booster shot for its two-dose vaccine available in the fall.

But what about without the variants?

In clinical trials, Moderna's vaccine reported 94.1% effectiveness at preventing COVID-19 in people who received both doses. The Pfizer-BioNTech vaccine was said to be 95% effective.

A new CDC study reported that a single dose of Pfizer's or Moderna's COVID vaccine was 80% effective in preventing infections. That number jumped to 90% two weeks after the second dose, the study on vaccinated health care workers showed.

"These findings indicate that authorized mRNA COVID-19 vaccines are effective for preventing SARS-CoV-2 infection, regardless of symptom status, among working-age adults in real-world conditions," the U.S. agency wrote in the study. "COVID-19 vaccination is recommended for all eligible persons."

It is not known if any of the vaccines prevent the spread of the virus by people who are asymptomatic.

Monica Hendrickson, public health administrator for the Peoria County Health Department noted that the vaccines each hold a high effectiveness against death and severe illness for coronavirus.

"So, really, you're looking at a distinction that from a clinical standpoint, or from, you know, an epidemiological standpoint is very minor compared to what we really are hoping for, which is decreases in death and decreases in severe illness, where they all match up between the three vaccines," Hendrickson said. "Most important thing though is that when these vaccines come on the market, if you have an option to any of these, get one of them."

Hendrickson's message echoes one made by Dr. Marina Del Rios, emergency medicine specialist at the University of Illinois-Chicago, [during NBC 5's "Vaccinated State" panel.](#)

"Part of my messaging in the community has been that the vaccines on the market are equally efficacious and equally safe," Del Rios said. "The best vaccine you can get is the one that you can get ahold of first, and getting vaccinated earlier, sooner rather than later, protects us from getting sick ourselves and also our community, which has been so terribly devastated by this virus."

What are the potential side effects?

Side effects are possible after receiving any COVID vaccine currently being administered in the U.S.

Experiencing side effects isn't necessarily a bad thing. In fact, it's a sign your body is responding.

"The good news on our part is that a brisk response equals an effective response," Dr. Mark Loafman, chair of family and community medicine for Cook County Health in Illinois, told NBC 5. "It tells us that the vaccine is working. Our body's forming a robust immune response and we feel that that's a positive thing. So we tend to see the vaccines that have a higher efficacy rate also have more of the so-called side effects or the symptoms because they work so well."

According to Pfizer, about 3.8% of their clinical trial participants experienced fatigue as a side effect and 2% got a headache.

Moderna says 9.7% of their participants felt fatigued and 4.5% got a headache.

The CDC reports the most common side effects for the vaccines is at the injection site. They include:

- Pain
- Redness
- Swelling

Common side effects in the body include:

- Tiredness
- Headache
- Muscle pain
- Chills
- Fever
- Nausea

The Centers for Disease Control and Prevention advises people to stick around for 15 minutes after vaccination, and those with a history of other

allergies for 30 minutes, so they can be monitored and treated immediately if they have a reaction.

Are side effects more likely after the first or second dose?

With the two-shot vaccines, people are more likely to report side effects after their second dose, experts have said.

According to the CDC, side effects after your second shot "may be more intense than the ones you experienced after your first shot."

"These side effects are normal signs that your body is building protection and should go away within a few days," the CDC states.

In trials of both the Moderna and Pfizer vaccines, more people experienced side effects after the second dose.

But that doesn't mean that you shouldn't get your second shot if you get side effects after your first, experts say.

"When people receive that second dose, they are receiving the second booster to try and reach the maximum efficacy," said Dr. Edward Cachay, infectious disease specialist at UCSD.

The CDC also noted that both shots are needed.

"The Pfizer-BioNTech COVID-19 Vaccine and Moderna COVID-19 Vaccine both need 2 shots in order to get the most protection," the CDC states. "You should get the second shot even if you have side effects after the first shot, unless a vaccination provider or your doctor tells you not to get it."

Are certain people more likely to experience side effects?

There are also some factors that could make you more likely to experience side effects.

Chicago's top doctor said Thursday that younger people are more likely to experience side effects "because younger people have more robust immune system broadly."

And, according to Loafman, the body's immune system is what creates the symptoms.

"That's simply a reflection of the immune response, just the way we have when we get ill," he said.

Arwady also noted that women are more likely to report side effects than men.

"Some of this is because women may just be better reporters... but there probably is something real to this too because something else interesting for those who may not know as much about immunity is that autoimmune diseases? Much, more likely in women, too," Arwady said. "And even the, like, more serious like the allergic reactions, the more serious allergic reactions? More likely in women."

Why is that?

Arwady said estrogen can elevate immune responses, while testosterone can decrease it. At the same time, she noted that "a lot of your immune modulating genes" can live on an "x" chromosome, which women have two of, while men have one.

"So there's all these reasons that sort of immunity in general goes up a little bit different in women than it does in men," she said. "And so we're seeing women, a little more likely to report some of the side effects."

Data from the [CDC](#) also reported women were more likely to experience side effects than men, according monitoring from the first month of vaccinations.

From Dec. 14 through Jan. 13, more than 79 percent of side effects were reported by women, the data showed. Meanwhile, women received roughly 61.2 percent of the doses administered during that same time.

Side effects could also vary depending on whether or not you've had coronavirus.

"We have seen more likely that people will report some side effects because that is acting a little bit like a booster dose to your immune system," Arwady said. "Your immune system has already learned some of those lessons of how to protect itself, not in as long a way not as protective a way."

"That is also probably that booster effect," Arwady said.

Loafman agrees.

"If you had COVID a while ago or you've already got some immunity, it's more like a booster," he said. "And boosters for some people are completely asymptomatic, boosters for other people trigger their immune response against it so they have some inflammation with it."

But not getting side effects isn't a negative, health experts say.

"If you don't get side effects it does not mean that you are not protected," Arwady said. "I want to be really clear about that."

According to Loafman, it simply means "your body didn't react with as much of an inflammatory response.

"You're still making antibodies," he said.

According to Loafman, every person's response is unique.

"It's really just kind of a reflection of how unique each of our systems are, what other immunities we have," he said. "You know, a lot of the antibodies cross react and we have cross reactivity so it's really a mosaic. Each of our immune systems is a mosaic composite of all that we've been through and all that we have and all we've recently been dealing with. Our individual response varies. Everybody gets gets the appropriate immune response."