COVID-19 Health Basics

Who can get COVID-19 vaccines?

COVID-19 vaccine development has occurred at an unprecedented pace. The first vaccines were authorized for emergency use in the United States in December 2020—less than a year after the genetic sequence of the SARS-CoV-2 coronavirus was discovered.

Vaccines trigger the production of antibodies against SARS-CoV-2, but these typically wane after a few months. However, they also stimulate memory B-cell and T-cell responses, which provide longer-lasting protection against severe disease.

Three COVID-19 vaccines are authorized in the Unites States:

- Pfizer-BioNTech mRNA vaccine (Comirnaty)
- Moderna mRNA vaccine (Spikevax)
- Novavax protein subunit vaccine (Nuvaxovid).

(A fourth vaccine, from Johnson & Johnson, is no longer available.)

The Pfizer-BioNTech and Moderna messenger RNA (mRNA) vaccines contain genetic blueprints for the SARS-CoV-2 spike protein. The Novavax vaccine delivers these proteins directly. The latest versions of the vaccines target newer variants. Health officials expect COVID vaccines will be updated annually.

Previously, the original Pfizer-BioNTech, Moderna and Novavax vaccines were given as a two-dose series spaced three or four weeks apart, while the Johnson & Johnson vaccine involved a single shot.

Now, the Centers for Disease Control and Prevention (CDC) recommends a single dose of the updated Pfizer-BioNTech or Moderna vaccine for everyone ages 6 years and older. People over 65 and immunocompromised individuals may be eligible for a second dose. Children ages 6 months to 5 years may need multiple doses, depending on their prior vaccination history.The updated Novavax vaccine is authorized for people ages 12 and up.

The CDC revises its vaccine and booster recommendations as SARS-CoV-2 variants evolve and as new evidence becomes available. Click here for the current recommendations.

Vaccine Safety and Effectiveness

Vaccine researchers have taken several different approaches. The Pfizer-BioNTech and Moderna vaccines use lipid nanoparticles, or fat bubbles, to deliver bits of genetic material (messenger RNA) that encode instructions for making the spike protein the coronavirus uses to enter cells. When injected, the cells produce the viral protein, triggering an immune response. The Johnson & Johnson vaccine used a weakened adenovirus as a vector to deliver genes for the SARS-CoV-2 spike protein. A vaccine from AstraZeneca and the University of Oxford (not authorized in the United States) works similarly. The Novavax vaccine uses SARS-CoV-2 spike proteins grown in insect cells.

The COVID vaccines trigger the production of antibodies against SARS-CoV-2, but these typically wane after a few months. However, they also stimulate memory B-cell and T-cell responses, which provide longer-lasting protection. While the vaccines do not reliably prevent infection or mild illness, they are effective for preventing severe illness, hospitalization and death, and they may reduce the risk of developing long COVID.

Immunocompromised people—including cancer patients on active treatment, people with advanced or untreated HIV and organ transplant recipients—may not respond as well to vaccines and may benefit from additional doses.

All of the authorized vaccines are generally safe and well tolerated. The most common side effect is temporary soreness, redness or swelling at the injection site. Some recipients experience flu-like symptoms, such as fever or fatigue. Severe allergic reactions (anaphylaxis) are rare and usually can be managed with medical care. The Pfizer-BioNTech and Moderna vaccines rarely cause myocarditis, or heart inflammation, especially in young men.

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