



The Science Behind COVID-19 Vaccines: Parent FAQs

Since COVID-19 vaccines ([/English/health-issues/conditions/COVID-19/Pages/default.aspx](#)) were recommended for everyone age 5 and up, millions of children and teens (<https://www.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/children-and-covid-19-vaccination-trends/>) have been safely vaccinated. Now, to keep as many kids protected as possible, a booster dose (<https://www.cdc.gov/media/releases/2022/s0105-Booster-Shot.html>) is recommended for more kids and teens.



Everyone age 12 through 17 years should get a booster shot if it has been at least five months since they had their second COVID shot. Boosters (<https://www.cdc.gov/media/releases/2022/s0105-Booster-Shot.html>) help broaden and strengthen protection against omicron and other virus variants that cause COVID-19 disease.

Whether you're the parent of a teen or a grade-school age child, you likely have questions about the vaccine and booster. And top-of-mind for many parents is how we know that it is safe for kids.

Here are answers to some common questions about the science behind the COVID-19 vaccine.

How does the COVID-19 vaccine work?

The COVID-19 vaccine works similarly to other vaccines your child has had. Germs such as SARS-CoV-2, the virus that causes COVID-19, invade and multiply inside the body. The vaccine helps stop this by teaching the immune system to recognize and make antibodies that fight the virus.

Children and teens who are vaccinated and boosted are better protected. If they do get infected, they likely will not be as sick as they would without the vaccine or booster. They also are much less likely to be hospitalized if they get the virus.

How are mRNA and viral vector COVID-19 vaccines different?

There are two types of vaccines (<https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines.html>)

currently available in the United States: messenger ribonucleic acid (mRNA) vaccines (Pfizer & Moderna) and a "viral vector" vaccine (Johnson & Johnson). They all have the same result — protecting people from COVID-19. Their delivery systems are just a bit different.

Right now, children and adolescents 5 to under 18 in the U.S. can only receive the COVID-19 mRNA vaccine from Pfizer BioNTech.

- **COVID-19 mRNA vaccines** contain messenger RNA (mRNA (https://www.cdc.gov/coronavirus/2019-ncov/downloads/vaccines/COVID-19-mRNA-infographic_G_508.pdf)), which is made up of nucleic acids. Nucleic acids, found naturally in all our cells, instructs them to make protein. The mRNA from the vaccine carries instructions, delivered inside a lipid (fat) coating, tells cells to produce harmless pieces of "spike" protein. These look like spikes on the actual COVID virus.

When the cells make these pieces of spike protein, the immune system recognizes that they should not be there. Your child's body then makes antibodies that get rid of the spike pieces. These antibodies remember how to protect your child from the virus in the future.

Did you know?

Even though widespread use of mRNA vaccines is new, this technology has been studied for decades. mRNA vaccines do not contain any live or dead parts of the virus.

- **Viral vector vaccines** (<https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/janssen.html>) also give instructions to your immune cells. The instructions are carried in a harmless virus that has been changed so it is not able to copy itself, spread and make your child sick.

The process is similar to the way the mRNA vaccine works. Cells create the protein that is found on the virus that causes COVID-19. The person's immune system makes antibodies to get rid of the virus, and that can remember how to protect them from getting very sick from the virus in the future.

Do mRNA vaccines change your DNA?

No, the COVID-19 vaccines made with messenger RNA do not interact with your DNA at all. DNA is your genetic material and it is stored in the nucleus of a cell. The mRNA in the vaccines never gets into the nucleus. And once your immune cells have used the instructions, they break down the mRNA and it quickly exits the body.

What about boosters?

- The mRNA vaccines are given in a two-dose series. A single booster dose of the Pfizer vaccine is authorized for kids 12 through 17 years old at least 5 months after the second dose of vaccine.
- The viral vector vaccine in the United States is given in one dose to people 18 years and older. An mRNA vaccine booster dose (<https://www.fda.gov/media/146305/download>) or Johnson & Johnson booster is recommended at least two months after the first dose.

Can children with immune conditions get a third dose?

Yes. A third dose is recommended (<https://www.cdc.gov/media/releases/2022/s0104-Pfizer-Booster.html>) for children and teens (age 5 and up) who have medical conditions or take medicines that weaken the immune system. The third dose is given at least 28 days after the second dose of the vaccine.

How do we know COVID-19 vaccines are safe for kids?

Over half of all kids 12 to 17 years old in the U.S. have been fully vaccinated (<https://www.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/children-and-covid-19-vaccination-trends/>)! That's over 13 million kids who have had both of their doses of COVID-19 vaccine. Almost one-fourth of all kids 5 through 11 have had at least one dose.

The vaccines continue to be monitored very closely. In fact, the Centers for Disease Control and Prevention (<https://www.cdc.gov/coronavirus/2019-ncov/vaccines/safety/safety-of-vaccines.html>) (CDC) say that COVID-19

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vaccines will have "the most intensive safety monitoring in U.S. history."

More information

- Ask the Pediatrician: When can children get the COVID-19 vaccine or a booster? (/English/tips-tools/ask-the-pediatrician/Pages/when-can-children-get-the-COVID-19-vaccine.aspx)
- Ask the Pediatrician: Was the COVID-19 Vaccine Rushed? (/English/tips-tools/ask-the-pediatrician/Pages/Was-the-COVID-19-vaccine-rushed.aspx)
- Ask the Pediatrician: What side effects might my child have after a COVID-19 vaccine? (/English/tips-tools/ask-the-pediatrician/Pages/What-side-effects-might-my-child-have-after-a-COVID-19-vaccine.aspx)
- Understanding How COVID-19 Vaccines Work (<https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/how-they-work.html>) (Centers for Disease Control and Prevention)

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