How Vaccines Work to Prevent Infections

Anyone can become ill from viruses or bacteria, also caused germs or pathogens, though some people are at higher risk to become seriously ill from certain germs. When a germ gets into the body, our immune system responds.

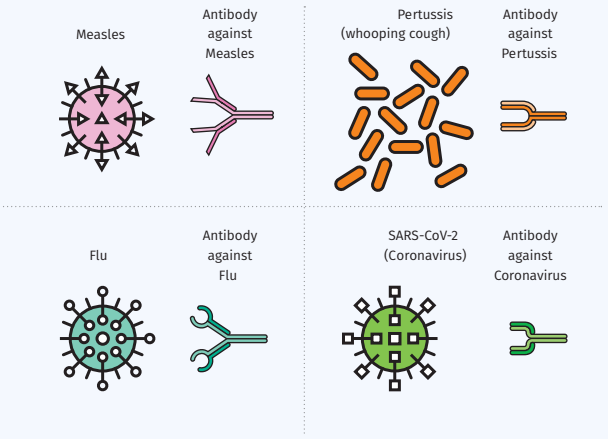
One of the ways our immune system fights infections and prevents future infections by the same germ is by making antibodies. Antibodies are proteins that the body makes to protect us from a specific germ. We have thousands of different antibodies in our body. Our body also responds by training immune cells to respond.

What is a Vaccine?

A vaccine stimulates your immune system to produce antibodies and train immune cells, exactly like it would if you were infected by a germ. There are different types of vaccines made in different ways. Some vaccines contain parts of a germ, a weakened germ, or killed germ. More recently there are vaccines that contain a strip of RNA (mRNA). These vaccines encode proteins (antigens), which are produced by the body and then stimulate immune responses, including antibody production. mRNA vaccines do not contain any part of the virus itself. In all cases, vaccines help your body's immune system learn how to protect against the germ target, including making antibodies against the germ. After getting vaccinated, you develop a level of immunity to that disease that may protect you from infection or severe outcomes from the disease. So, you need different vaccines to protect against different germs.

Unlike antibiotics or other medicines that treat infections, vaccines prevent infections or severe outcomes stemming from them. Vaccines in use today often have targeted diseases that were once common in the United States. These diseases include tetanus, hepatitis A, hepatitis B, rubella, measles, and whooping cough. Vaccines have helped us wipe out smallpox worldwide, a disease that killed 300 to 500 million people in the 20th century. We are very close to fully wiping out polio using vaccines.





Our immune system naturally responds to new germs that enter our body and makes antibodies that grab on to and defeat the germs. Vaccines stimulate our immune system to make specific antibodies to fight off specific germs, such as the measles. The COVID mRNA vaccine encodes proteins (antigens) which are produced by the body and then stimulate immune responses including antibody production against the "spike protein" on the coronavirus.

Image adapted from WHO 'How do vaccines work'
https://www.who.int/news-room/feature-stories/detail/how-do-vaccines-work

This Patient Education fact sheet is open access and distributed under the terms of the Creative Commons Attribution Non-Commercial No Derivatives License 4.0. For commercial usage and reprints, please e-mail Diane Gern (dgern@thoracic.org). This Patient Information Series fact sheet is based on the ATS Statement found in the April 15, 2023 issue of the American Journal of Respiratory and Critical Care Medicine (https://www.atsjournals.org/doi/10.1164/rccm.202302-0310ST).

Online version updated February 2026.

Routine immunization is the cornerstone to controlling vaccine preventable diseases. There are many vaccines recommended for children and for adults to maintain health and prevent disease. Expert medical organizations broadly recommend staying up to date with routine vaccinations. For example, if you haven't had a flu shot this season, it is important to get one. Getting multiple vaccines at once does not overwhelm the immune system. Our immune system is in a constant learning mode. Your healthcare provider can tell you which ones you may need to ensure you are up to date on all recommended vaccines.

Research continues on vaccines against COVID-19, known as SARS-CoV-2 virus. Studies look at how well and how long the vaccines will protect you.

Extensive vaccine data has shown that the currently available vaccines are very safe and work very well reducing the risk of serious illness, hospitalization and death for people who get vaccinated, especially those at high-risk.

Professional medical organizations recommend vaccinations for all people who are eligible and desire protection against infection and serious illness. It is especially important for people with lung disease or other high-risk conditions and their contacts to be vaccinated.

What is Community Immunity?

Community immunity is also known as herd immunity. Community immunity means that there are enough people protected from a germ, preferably by vaccination, to make the spread of the germ from person to person less likely.

When there is community immunity, there are not enough people who are still susceptible to the germ for it to spread. Not all vaccines confer herd-level protection, but getting a vaccines help protect you, those around you and your community. For a very contagious infection, the level of immunity required in the community has to be extremely high.

December 2025 Update Authors:
Marianna Sockrider, MD, DrPH, Jerry A. Krishnan, MD, PhD

2026 Reviewers:
Justin Ortiz, MD, MPH, Tina Hartert, MD, MPH

R_x Action Steps

- ✓ Talk to your healthcare provider to see what vaccines you and your children may need. This is especially important for people with high-risk conditions and their contacts.
- ✓ Ask about your own and your child's risk of infection and how quickly a vaccine starts to protect you from infection or serious illness.
- ✓ Ask about possible side effects of the vaccine and how you can manage them. Side effects are generally mild.
  - In addition to public health agencies, here are several professional medical organizations that offer science-based recommendations on which vaccines are recommended for high-risk groups as well as the general population:
    - American Thoracic Society (ATS)
    - American Academy of Pediatrics (AAP)
    - American College of Obstetricians and Gynecologists (ACOG)
    - American Academy of Family Physicians (AAFP)
    - Infectious Disease Society of America (IDSA)
- ✓ Educate yourself about the global and historical effectiveness of vaccine use, as well as current vaccine effectiveness studies available on medical organization websites noted above.

Healthcare Provider's Contact Number:

_____

For More Information About Vaccines

American Lung Association

- https://www.lung.org/lung-health-diseases/wellness/vaccines

American Academy of Pediatrics— Healthy Children.org

- https://www.healthychildren.org/English/safety-prevention/immunizations/Pages/understanding-the-benefits-of-vaccines-common-questions.aspx

Immunization Action Coalition

- https://vaccineinformation.org/

World Health Organization

- https://www.who.int/news-room/questions-and-answers/item/vaccines-and-immunization-vaccine-safety

This information is a public service of the American Thoracic Society. The content is for educational purposes only. It should not be used as a substitute for the medical advice of one's healthcare provider.