

Vaccines 101 – Vaccine Terminology, Development and FAQs

As researchers, healthcare workers and governments continue to work to address the spread of COVID-19, there is much discussion and concern about forthcoming COVID-19 vaccines. As such, we provide the following information about **vaccine terminology and the process for vaccine development**.

Definition of Terms:

- **Immunity:** Protection from an infectious disease. If you are immune to a disease, you can be exposed to it without becoming infected.
- **Herd Immunity:** Herd immunity is established when a sufficient proportion of a population is immune to an infectious disease (either through vaccination and/or prior illness) to make its spread from person-to-person unlikely. When herd immunity exists, even individuals who are not vaccinated (such as newborns and those with chronic illnesses) are protected because the disease has little opportunity to spread within the community.
- **Vaccine:** A product that stimulates a person's immune system to produce immunity to a specific disease, protecting the person from that disease. Vaccines are usually administered through needle injections but can also be administered by mouth or sprayed into the nose.
- **Vaccination:** The act of introducing a vaccine into the body to produce immunity to a specific disease.
- **Immunization:** A process by which a person becomes protected against a disease through vaccination. This term is often used interchangeably with vaccination or inoculation.

How do Vaccines Work? Vaccines help develop immunity by *imitating* an infection from certain bacteria or viruses and stimulating the body's production of specific antibodies and activated immune cells. This helps prepare the body to fight off an actual infection. Sometimes, after getting a vaccine, the immune stimulation can cause minor symptoms, such as fever. Such minor symptoms are normal and should be expected as the body builds immunity. [Click here](#) for more detailed information about how vaccines work.

What is the Process for Developing a Vaccine? Extensive clinical trials are used to develop and test vaccines before they are available for the public. Clinical trials are conducted in "phases," primarily to ensure safety and to prove that the vaccines are effective at preventing infections. Importantly, the development of COVID-19 vaccine is using all of these same clinical trial steps but is proceeding on a faster timeline. Rather than taking each development step sequentially, some steps are being undertaken *simultaneously*, which does not impact the safety of the process but does increase the cost of production and the timing of the investment in logistics (e.g., manufacturing of glass vials), which would normally be made only after all testing is complete. Importantly, speeding up the vaccine development process for purposes of producing a safe and effective COVID-19 vaccine is possible due to significant financial investment from both public and private

funding. Importantly, no steps are being “skipped” or altered. COVID-19 vaccine candidates will be evaluated through the same very rigorous clinical trial process as other vaccines. But, the overall timeline will be faster because of efficiencies in manufacturing and distribution processes. Click [here](#)² for an explanation of each phase of a vaccine clinical trial.

Are vaccines safe? Vaccines are arguably the safest of all approved medications. Before the Food and Drug Administration (FDA) approves a vaccine, vaccines are studied in larger populations than other prescription drug trials. In addition, once a vaccine is approved and is in use, there are multiple layers of safety surveillance that continue for as long as the vaccine is distributed and allow for continuous reporting of potential adverse effects.³

- In the U.S., the **Vaccine Adverse Event Reporting System (VAERS)**⁴ exists to detect possible vaccine safety concerns as early as possible. VAERS is only one part of monitoring that goes on after the vaccine is licensed.
- The CDC also operates the **Vaccine Safety Datalink (VSD)**⁵ that conducts vaccine safety studies based on VAERS data and monitors the safety of newly recommended vaccines.
- The **Clinical Immunization Safety Assessment (CISA)**⁶ Project conducts clinical case reviews and research to advance vaccine safety knowledge, provides expert evaluation of vaccine safety issues, and is prepared for public health response during emergencies.
- The **FDA’s PRISM (Post-licensure Rapid Immunization Safety Monitoring system)**⁷ uses a large database of primarily health insurance data to monitor for potential vaccine safety signals.

Are there large amounts of other toxins in vaccines? No. Vaccines do contain other ingredients⁸ used as preservatives (to maintain purity), adjuvants (to boost immunity), stabilizers and residual materials from the vaccine production process. However, all of these ingredients, including mercury and aluminum, are found in lower quantities in vaccines than what can be found in environmental sources and/or naturally in the body.

¹ <https://www.cdc.gov/vaccines/hcp/conversations/downloads/vacsafe-understand-color-office.pdf>

² <https://www.cdc.gov/vaccines/parents/infographics/journey-of-child-vaccine-h.pdf>

³ <https://www.cdc.gov/vaccinesafety/ensuringsafety/monitoring/index.html>

⁴ <https://www.cdc.gov/vaccines/hcp/patient-ed/conversations/downloads/vacsafe-vaers-color-office.pdf>

⁵ <https://www.cdc.gov/vaccinesafety/ensuringsafety/monitoring/vsd/index.html>

⁶ <https://www.cdc.gov/vaccinesafety/ensuringsafety/monitoring/cisa/index.html>

⁷ <https://www.fda.gov/vaccines-blood-biologics/workshops-meetings-conferences-biologics/public-workshop-sentinel-post-licensure-rapid-immunization-safety-monitoring-prism-system>

⁸ <https://www.cdc.gov/vaccines/vac-gen/additives.htm>