



Most Frequently Asked Questions about Vaccines

Q. If the diseases that vaccines prevent are now rare, why should my child still get vaccines?

A. Although several of the diseases that vaccines prevent have been dramatically reduced or eliminated, vaccines are still necessary to prevent common infections, to prevent infections that could easily reemerge, and to prevent infections that are common in other parts of the world. Although some diseases have been completely eliminated (polio) or virtually eliminated (diphtheria) from this country, they still occur commonly in other parts of the world. Because there is a high rate of international travel, **outbreaks of these diseases are only a plane ride away.**

Q. Are vaccines safe?

A. Because vaccines are given to people who are not sick, they are held to the highest standards of safety. As a result, they are among the safest things we put into our bodies. Although all vaccines have some side effects, most are mild (such as fever, or tenderness and swelling where the shot is given). Some side effects from vaccines may (rarely) be more severe. For example, the pertussis vaccine is a very rare cause of persistent inconsolable crying, high fever or seizures with fever. Although these reactions do not cause permanent harm to the child, they can be quite frightening. Decreasing rates of pertussis vaccination in other countries has led to a tenfold increase in hospitalizations and deaths. When you consider the risk of vaccines and the risk of diseases, vaccines are the safer choice.

Q. What ingredients are in vaccines?

A. All vaccines contain antigens, substances that prompt the body to create the immune response needed to protect against infection. Some examples of antigens are: weakened live viruses, inactivated (or killed) viruses, and partial viruses and bacteria. Vaccines also contain other ingredients, which help make them safer and more effective; these include preservatives, adjuvants and additives. Example of additives include substances like gelatin and sucrose. **Vaccines do not include antifreeze (or its ingredient, ethylene glycol).**

The amount of each additive used in vaccines is very small. In fact, we are exposed to much higher levels of these chemicals in our everyday lives. In vaccines, these ingredients are used to make the vaccine safer and more effective. Each vaccine is tested many times to make sure it is safe and works. Taking ingredients out might affect the ability of the vaccine to protect a child.

Q. Do vaccines contain mercury?

A. Thimerosal, a mercury-based preservative, was removed from most childhood vaccines in 2001. It is still present in some influenza vaccines. Thimerosal is still used in the manufacture of some vaccines to prevent contamination. The thimerosal is removed at the end of the manufacturing process. In some cases, a tiny amount of thimerosal remains. The remaining amount is so small, that it is not possible for it to have any effect. Valid scientific studies have shown there is no link between thimerosal and autism. In fact, autism rates have actually increased since thimerosal was removed from childhood vaccines. The American Academy of Pediatrics (AAP), the American Medical Association (AMA), the CDC, and the Institute of Medicine (IOM) agree that science does not support a link between thimerosal in vaccines and autism. For the IOM report, go to: <http://www.iom.edu/CMS/3793/4705/4717.aspx>.

Q. Why aren't all vaccines 100% effective?

A. Vaccines are designed to generate an immune response that will protect the vaccinated individual during future exposures to the disease. Individual immune systems, however, are different enough that in some cases, a person's immune system will not generate an adequate response. As a result, he or she will not be effectively protected after immunization. That said, the effectiveness of most vaccines is high. After receiving the second dose of the MMR vaccine (measles, mumps and rubella) or the standalone measles vaccine, 99.7% of vaccinated individuals are immune to measles. The inactivated polio vaccine offers 99% effectiveness after three doses. The varicella (chickenpox) vaccine is between 85% and 90% effective in preventing all varicella infections, but 100% effective in preventing moderate and severe chicken pox.

Q. What is herd immunity? Is it real? Does it work?

A. Herd immunity, also known as community immunity, refers to the protection offered to everyone in a community by high vaccination rates. With enough people immunized against a given disease, it's difficult for the disease to gain a foothold in the community. This offers some protection to those who are unable to receive vaccinations—including newborns and individuals with chronic illnesses—by reducing the likelihood of an outbreak that could expose them to the disease.

Q. Is natural immunity better than vaccine-acquired immunity?

A. In some cases, natural immunity is longer-lasting than the immunity gained from vaccination. The risks of natural infection, however, outweigh the risks of immunization for every recommended vaccine. For example, wild measles infection causes encephalitis (inflammation of the brain) for one in 1,000 infected individuals. Overall, measles infection kills two of every 1,000 infected individuals. In contrast, the combination MMR (measles, mumps and rubella) vaccine results in a severe allergic reaction only once in every million vaccinated individuals, while preventing measles infection. The benefits of vaccine-acquired immunity extraordinarily outweigh the serious risks of natural infection. Additionally, the Hib (Haemophilus Influenzae Type b) and tetanus vaccines actually provide more effective immunity than natural infection.

Q. Isn't it true that better hygiene and nutrition were responsible for decreases in deaths and disease rates, rather than vaccines?

A. Improved hygiene and nutrition, among other factors, can certainly lower the incidence of some diseases. Data documenting the number of cases of a disease before and after the introduction of a vaccine, however, demonstrate that vaccines are overwhelmingly responsible for the largest drops in disease rates. Measles cases, for example, numbered anywhere from 300,000 to 800,000 a year in the United States between 1950 and 1963, when a newly licensed measles vaccine went into widespread use. By 1965, U.S. measles cases were beginning a dramatic drop. In 1968 about 22,000 cases were reported (a drop of 97.25% from the height of 800,000 cases in just three years); by 1998, the number of cases averaged about 100 per year or less. Perhaps the best evidence that vaccines, and not hygiene and nutrition, are responsible for the sharp drop in disease and death rates is chicken pox. If hygiene and nutrition alone were enough to prevent infectious diseases, chicken pox rates would have dropped long before the introduction of the varicella vaccine, which was not available until the mid-1990s. Instead, the number of chicken pox cases in the United States in the early 1990s, before the vaccine was introduced in 1995, was about four million a year. By 2004, the disease incidence had dropped by about 85%.

Q. Do children get too many shots?

A. Newborns commonly manage many challenges to their immune systems at the same time. Because some children could receive as many as 25 shots by the time they are 2 years old and as many as five shots in a single visit to the doctor, many parents wonder whether it is safe to give children so many vaccines. Although the mother's womb is free from bacteria and viruses, newborns immediately face a host of different challenges to their immune systems from the moment of birth. By quickly making immune responses to these bacteria, babies keep them from invading the bloodstream and causing serious diseases. The vaccines given in the first two years of life are a raindrop in the ocean of what an infant's immune system successfully encounters and manages every day.

Q. Do vaccines cause autism?

A. This possibility was publicized after a 1998 paper by a British physician who claimed to have found evidence that the MMR (measles, mumps and rubella) vaccine was linked to autism. The potential link has been thoroughly explored; study after study has found no such link, and the original 1998 study has been formally withdrawn by the *Lancet*, which had originally published it. Studies were also done regarding the possibility of a link between the preservative thimerosal, which is used in some vaccines, and autism; again, no such link was found.

Q. Can I delay or skip vaccines?

A. It is not a good idea to skip or delay vaccines, as this will leave your child vulnerable to diseases for a longer time. Children are most vulnerable to complications from disease in their early years of life, when vaccines provide protection, and some vaccines produce a better immune response at particular ages. Parents should follow the schedule provided by the U.S. Centers for Disease Control and Prevention, the American Academy of Pediatrics and the American Academy of Family Physicians, which is designed by experts to ensure maximum protection and safety for children at various ages.

[center/vaccines-fact.pdf](#); *The History of Vaccines – A project of the College of Physicians of Philadelphia* - <http://www.historyofvaccines.org/content/articles/top-20-questions-about-vaccination>