



East Tennessee Children's Hospital

# Immunizations: More than just an ounce of prevention

*Since the start of widespread vaccinations in the United States, cases of formerly common childhood illnesses like measles and diphtheria have declined dramatically. Immunizations have protected millions of children from potentially deadly diseases and saved hundreds of thousands of lives. In fact, success with some diseases has been so great that most parents have never known anyone who has had them. But the diseases aren't gone. Pediatric infectious disease specialist Lori Patterson, M.D., discusses this and other important facts about immunization.*



**Lori Patterson, M.D.,  
pediatric infectious disease specialist**

**Q:** What do immunizations do?

**A:** Vaccines work by preparing a child's body to fight off an invading infection or microbe. Each immunization contains either a dead or a weakened germ, or parts of it, that cause a particular disease. The body builds up its ability to fight off the disease by making antibodies that recognize specific parts of that germ. This permanent or longstanding response means that when someone is eventually exposed to the actual disease, the antibodies are already in place, so the body knows how to combat it. The person doesn't get sick because the vaccine has protected him or her – that is, made the person immune.

**Q:** Will an immunization give someone the disease it is supposed to prevent?

**A:** This is one of the most common concerns about vaccines. However, it's impossible to get the disease from any vaccine made with dead (killed) bacteria or viruses or any vaccine made from just a part of the germ.

Only those immunizations made from weakened (also called attenuated) live viruses -- like the chickenpox (varicella) or measles-mumps-rubella (MMR) vaccine -- could possibly make a child develop a mild form of the disease. But even this is a rare event that usually only occurs in children with severely weakened immune systems, like those being treated for cancer. Your child's doctor will know if your child shouldn't get the vaccine because of this type of issue.

**Q:** Why should I have my child immunized if all the other children in school are immunized?

**A:** It is true that a single child's chance of catching a disease is lower if everyone else is immunized. Yet if one person thinks about skipping vaccines, chances are that others are thinking the same thing. And each child who isn't immunized gives these highly contagious diseases one more chance to spread. Also, like practically everything in life, almost no vaccine works in 100 percent of the people who receive it, but we don't know who that might be ahead of time.

As an example, in 1989-91, an epidemic of measles broke out in the United States. Lapsing rates of immunization among preschoolers led to a sharp increase in the number of measles cases, deaths and children with permanent brain damage. Even in 2008, the number of cases of measles in the United States more than doubled from recent years. Most of the cases were among people who had not been vaccinated. The same problem happened with pertussis in Great Britain and with influenza in Japan, when vaccination rates dropped in those countries for those illnesses. Although vaccination rates are fairly high in the United States, there's no reliable way of knowing if everyone your child comes into contact with has been vaccinated, particularly now that so many people travel to and from other countries. Our best defense is to make sure as many people as possible are immunized.

**Q:** Why should I subject my child to a shot if vaccines aren't 100 percent effective?

**A:** Few things in medicine (or life!) work 100 percent of the time, but vaccines are one of the most effective weapons we have against disease -- they work in 85-99 percent of people who receive them. They greatly reduce your child's risk of serious illness and give diseases fewer chances to take hold in a population. It can be difficult to watch children get a shot, but the short-term discomfort is nothing compared with suffering through a potentially deadly bout of meningitis, pertussis or measles.

**Q:** Why do children who are healthy, active and eating well need to be immunized?

**A:** Good lifestyle choices are wonderful for maintaining your child's health in other ways, such as preventing obesity. However, they won't protect against most infections, which come up without notice. The best way to keep your child healthy is to provide that protection BEFORE it's needed.

**Q:** Can immunizations cause a bad reaction in my child?

**A:** The most common reactions to vaccines are minor and include:

- redness and swelling where the shot was given
- fever
- soreness at the site where the shot was given

Every year, millions of children are safely vaccinated and almost all of them experience no significant side effects. Before any vaccine is licensed, experts evaluate hundreds of thousands of pieces of data to make sure the expected benefit outweighs the possible risk. In rare cases, immunizations can trigger serious problems, such as severe allergic reactions. If your child has a history of allergies to food or medication or has had a problem with a vaccine previously, make sure to let the doctor know before any vaccines are given.

Meanwhile, research continually improves the safety of immunizations. For instance, the current versions of pertussis and polio vaccines are safer than those used just two decades ago.

**Q:** Do immunizations or thimerosal cause autism?

**A:** There is absolutely no link between either immunizations or thimerosal (a mercury-containing preservative that has been used in some vaccines) and autism (a neurodevelopmental disorder). In fact, every respected organization (including the American Academy of Pediatrics, the National Institutes of Health, the Centers for Disease Control and Prevention and the World Health Organization) that has looked at the matter has found no connection, and the lead author of the original study has been thoroughly discredited.

Autism is a real and heart-rending condition, and it's truly a tragedy that we've wasted so much time on this false theory, when we could have been dedicating ourselves to finding the real cause of the disease. Regarding the thimerosal question, there's no connection there, either. To eliminate the question, thimerosal was removed from all childhood vaccines (except certain flu vaccines) a number of years ago; however, autism rates have not fallen. It's a natural human tendency to try to blame SOMETHING when a bad event occurs, and we understand that. Unfortunately, people can post a theory on the Internet without any scientific proof at all, and families suffering from a similar problem will grasp at that straw. It's a real disservice to them. Scrutiny of a vaccine before licensure is very intense, and this goes on even after the vaccine is approved for use. If there is even a very rare event (say, one in a million) that occurs after vaccination, that information is collected and analyzed; on occasion, this has resulted in a vaccine being pulled from the market.

**Q:** Do immunizations cause SIDS, multiple sclerosis or other problems?

**A:** To date, there has been no connection found between vaccines and the conditions listed. Remember, everything we do in medicine is a balance of benefit versus risk -- is the disease we're protecting against common enough or serious enough to warrant the risk of any observed or hypothetical side effects? In the case of our current vaccines, the answer is a resounding "Yes!"

**Q:** Why does my child need to be immunized if the disease has been eliminated?

**A:** The only disease we've managed to eliminate totally is smallpox, so we don't vaccinate routinely against that any more. Diseases that are rare or nonexistent in the United States, like measles and polio, still exist in other parts of the world. Doctors continue to vaccinate against them because it's easy to be exposed to illnesses through travel. That includes anyone who may not be properly immunized who's coming into the United States, as well as Americans traveling overseas. If immunization rates fell, a disease introduced by someone visiting from another country could cause serious damage in an unprotected population; this is what happened with recent measles outbreaks in certain areas of the U.S.

**Q:** How long does immunity last after getting a vaccine?

**A:** It varies. Certain more recent vaccines haven't been around long enough for us to know, and we're still following that long-term. A few vaccines, like the two for measles or the series for hepatitis B, may make you

immune for your entire life. Others, like tetanus, last for many years but require periodic shots (boosters) for continued protection against the disease.

The whooping cough (pertussis) vaccine also does not give lifelong immunity, and that may be one reason why there are still outbreaks of the disease, such as one in Knoxville in 1999 and ongoing disease we see even today. And although pertussis isn't a life-threatening problem for older children and adults, it can be for infants and young children. Because of this, adolescents and adults now receive a pertussis booster along with the tetanus and diphtheria booster (Tdap) -- an important step in controlling this infection.

It's important to keep a record of vaccinations so the doctor knows when your child is due for a booster. Also, make sure your child gets the influenza vaccine each year, if it isn't in short supply. Having been immunized last year won't protect someone from getting the flu this year because the protection wears off and flu viruses constantly change. That's why the vaccine is updated each year to include the most current strains of the virus.

The flu vaccine reduces the average person's chances of catching the flu by up to 80 percent during the season. But because the flu vaccine doesn't prevent infection by all of the viruses that can cause flu-like symptoms, getting the vaccine isn't a guarantee that someone won't get sick during the season. But even if someone who's gotten the shot gets the flu, symptoms will usually be fewer and milder.

**Q:** What about the H1N1 strain of flu ("swine flu")?

**A:** As of press time, there is no vaccine against this strain of flu, although scientists are working very hard to develop one in time for the anticipated flu season. In the meantime, you need to take other precautions to prevent this illness. The Centers for Disease Control and Prevention (CDC) recommends these precautions against swine flu:

- Cover your nose and mouth with a tissue when you sneeze or cough and put used tissues in the trash.
- If you don't have a tissue, cough or sneeze into your upper sleeve, not your hands.
- Clean your hands after coughing or sneezing — wash with soap and water or use alcohol-based hand cleaner.
- Avoid touching your eyes, nose and mouth.
- Keep sick children and adults home from daycare, school or work and limit the sick person's contact with others; children and adults should stay home 10 days after the onset of illness.

If you have more questions about immunization, talk with your child's doctor about which immunizations your child needs. Working together, you and your health care provider can help keep your child healthy.