





Part 4: Frequently Asked Questions

How do we know vaccines aren't causing long-term health problems?

Observing vaccinated children for many years to look for long-term health conditions would not be practical, and withholding an effective vaccine from children while long-term studies are being done wouldn't be ethical. A more practical approach is to look at health conditions themselves and at the factors that cause them. Scientists are already working to identify risk factors that can lead to conditions like cancer, stroke, heart disease, and autoimmune diseases such as lupus or rheumatoid arthritis. Thousands of studies have already been done looking at hundreds of potential risk factors. If immunizations were identified as a risk factor in any of these studies, we would know about it. So far, they have not.

We learn about a vaccine's safety during clinical trials before it is licensed, and monitor it continually as millions of doses are administered after it is licensed. We also know there is not a plausible biologic reason to believe vaccines would cause any serious long-term effects. Based on more than 50 years of experience with vaccines, we can say that the likelihood that a vaccine will cause unanticipated long-term problems is extremely low.

Why do children need so many doses of certain vaccines?

The reason depends on whether the vaccine is inactivated (killed) or live. With an inactivated vaccine, each dose contains a fixed amount of disease antigen (virus or bacteria). Immunity is built in phases, with each dose boosting immunity to a protective level. Live vaccines are different in that they contain a small amount of antigen which reproduces and spreads throughout the body. One dose produces satisfactory immunity in most children. But a second dose is recommended, because not all children respond to the first one.

Aren't some of the ingredients in vaccines toxic?

Some vaccine ingredients could be toxic, but *at much higher doses*. Any substance – even water – can be toxic given a large enough dose. But at a very low dose, even a highly toxic substance can be safe. For example, many adults have one of the most toxic substances known to humanity, Botox, injected into their face to reduce wrinkles.

We aren't always aware of it, but we are exposed to small amounts of these same “toxic” substances every day:



Mercury: Babies are exposed to mercury in milk, including breast milk. Seafood also contains mercury.

Formaldehyde: Formaldehyde is in automobile exhaust; in household products and furnishings such as carpets, upholstery, cosmetics, paint,

and felt-tip markers; and in health products such as antihistamines, cough drops, and mouthwash.

Aluminum: The average person takes in an estimated 30 to 50 mg of aluminum every day, mainly from foods, drinking water, and medicines. Not all vaccines contain aluminum, but those that do typically contain about .125 mg to .625 mg per dose, or roughly 1% of that daily average.

Components of vaccines are all there for a reason. Some (like aluminum) help the vaccine work better. Others (like formaldehyde) were used during manufacturing and have been removed except for a tiny trace.

One final word – you can't believe everything you read about harmful ingredients in vaccines. For example, no vaccine contains, or has ever contained, even a molecule of antifreeze, although you would never know that after reading any of a dozen websites claiming that they do.

Can a child get a disease even after being vaccinated?

It isn't very common, but it can happen. Depending on the vaccine, about 1% to 5% of children who are vaccinated fail to develop immunity. If these children are exposed to that disease, they could get sick. Sometimes giving an additional vaccine dose will stimulate an immune response in a child who didn't respond to 1 dose. For example, a single dose of measles vaccine protects about 95% of children, but after 2 doses, almost 100% are immune.

Sometimes a child is exposed to a disease just prior to being vaccinated, and gets sick before the vaccine has had time to work. Sometimes a child gets sick with something that is similar to a disease they have been vaccinated against. This often happens with flu. Many viruses cause symptoms that look like flu, and people even call some of them flu, even though they are really something else. Flu vaccine doesn't create immunity to these viruses.

Can a child actually get the disease from a vaccine?

Almost never. With an inactivated (killed) vaccine, it isn't possible. Dead viruses or bacteria can't cause disease. With live vaccines, some children get what appears to be a mild case of disease (for example, what looks like a measles or chickenpox rash, but with only a few spots). This isn't harmful, and can actually show that the vaccine is working. A vaccine causing full-blown disease would be extremely unlikely. One exception was the live oral polio vaccine, which could very rarely mutate and actually cause a case of polio. This was a rare, but tragic, side effect of this otherwise effective vaccine. Oral polio vaccine is no longer used in the U.S.

Considering that rates of vaccine-preventable diseases are very low, my child is unlikely to get one of these diseases. Therefore, isn't the benefit of vaccination also very low?

That's a reasonable question. Statistically, the chances of any particular child getting measles, pertussis, or another vaccine-preventable disease might be low.

But you don't wear a seatbelt because you expect to be in a serious accident; you wear it because you want to be protected in the unlikely event that you are. If you're never in an accident, the benefit of wearing a seatbelt might be zero. But if you are, the consequences of not wearing it can be very high.

It's the same with vaccines. Your child might never need the protection they offer, but you don't want him to be lacking that protection if he ever does need it.

Why does the government require children to be vaccinated to attend school?

School immunization laws are not imposed by the federal government, but by the individual states. But that doesn't answer the question, which is often asked by people who see this as a violation of their individual rights.

Public health programs, such as immunization, are designed to protect the health of the public – that is, everybody. Remember that vaccines protect not only the person being vaccinated, but also people around them. Immunization laws exist not only to protect individual children, but to protect all children.

If vaccines were not mandatory, fewer people would get their children vaccinated – they would forget; they would put it off; they would feel they couldn't afford it; they wouldn't have time. This would lead to levels of immunity dropping below what are needed for herd immunity (see Glossary), which would, in turn, lead to outbreaks of disease.

So mandatory vaccination might not be a perfect solution, but it is a practical solution to a difficult problem. School immunization laws are like traffic laws. Laws forbidding us to drive as fast as we want on crowded streets or ignore traffic signals could also be seen as an infringement on individual rights. However, these laws are not so much to prevent drivers from harming themselves, which you could argue is their right, but to prevent them from harming other people, which is not.

Can children be exempted from school immunization laws?

Under certain circumstances, yes. All states allow medical exemptions, so children who cannot safely receive certain vaccines (like Riley – see page 27) are not required to get them. Most states also allow religious exemptions for children whose religion prohibits vaccination. Finally, some states allow philosophic exemptions for people who oppose vaccination on non-religious grounds. To protect themselves and others, unvaccinated students may be prohibited from attending classes if there is an outbreak of a vaccine-preventable disease at their school or in their community.

Vaccines are expensive. Is there a way to reduce the cost?

You can go to a public clinic or health department rather than to a private physician. Vaccinations are generally cheaper there, and may be free except for an administration charge.

There is also a national program called Vaccines for Children (or VFC), which allows qualified families to get free vaccinations for their children at participating doctors' offices. You can learn more about the VFC program at <http://www.cdc.gov/vaccines/programs/vfc/index.html>

Can't so many vaccines overwhelm a child's immune system?

We may not know exactly how many germs a baby's immune system can handle at one time, but it is considerably more than they will ever get from vaccines. After all, this is the immune system's job. From the day a baby is born, her immune system has to deal with the thousands of germs she is exposed to as part of daily life. As one doctor put it, "Worrying about too many vaccines is like worrying about a thimble of water getting you wet when you are swimming in an ocean."

Isn't vaccination "unnatural?"

No. Your child's immune system produces immunity following vaccination the same as it would following "natural" infection with a disease. The difference is that the child doesn't have to get sick first. (See "How Vaccines Work" on page 23.)



