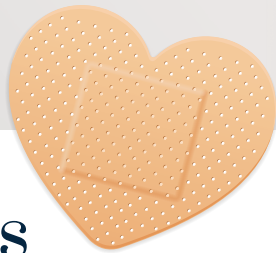


You have questions, and that's a good thing.

As parents, determining how best to protect our children can be overwhelming and confusing because of the volume of information available on the internet about vaccines. Even the bad information can look and sound credible and science-based.

We're here to help.



The good news

While many parents have questions about vaccines, most do choose to protect their child through vaccination and discuss questions with their child's health care provider.

The answers to some of the most frequent questions parents ask about vaccines can be found within this packet. These answers are based on credible medical research and science from the most trusted and respected physicians, research and public health organizations across the globe.

The answers also draw attention to some of the "bad science" about vaccines that has confused and alarmed so many parents, even after those studies were exposed as fraudulent and untrue.

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MOST COMMON QUESTIONS

What is in a vaccine?

Are all ingredients in vaccines safe?

Is there a link between autism and vaccines?

Why so many shots at one time?

Can vaccines overload a child's immune system?

What is in a vaccine?

Vaccines help develop immunity by imitating an infection. This type of infection doesn't cause illness, but it does cause the immune system to produce antibodies that help protect you from the disease in the future. Vaccines contain ingredients called antigens, which tell the body's immune system to create those antibodies.

Every day, a healthy child's immune system successfully fights off thousands of antigens—the parts of germs that cause the body's immune system to go to work.

The antigens in vaccines come from the germs themselves, but the germs are weakened or killed so they cannot cause serious illness. Vaccines contain only a tiny fraction of the antigens that children encounter every day in their environment, even if they receive several vaccines in one day.

- Kids are exposed to 2,000 to 6,000 antigens every day.
- A strep throat infection, for example, exposes children to at least 25 to 50 antigens. That's comparable to the antigens in the vaccines that infants get at their two-month visit—the DTaP, IPV, HepB, Hib, and rotavirus vaccines combine to just 54 antigens.

And even though children receive more vaccines to protect against more diseases now compared to 30 years ago, the actual number of antigens in vaccines is dramatically less than decades ago because vaccine technology has improved, making vaccines more efficient.

- In 1980, the recommended vaccines contained more than 15,096 antigens.
- Today's vaccines contain only 173 antigens in 12 vaccines that protect children and teens against 16 vaccine-preventable diseases.

Vaccines also contain very small amounts of other ingredients—all of which play necessary roles either in making the vaccine, or in ensuring that the final product is safe and effective. While some of the names of certain ingredients may sound strange or even alarming, the ingredients are necessary and safe. Talk to your child's doctor about any questions you have about vaccine ingredients.

Sources:

CDC: Making the Vaccine Decision
Children's Hospital of Philadelphia: Vaccine Ingredients
Verywell: Antigen Counts in Vaccines

Learn more and explore other common questions:

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Are all ingredients in vaccines safe?

As a parent, it's smart to question and be aware of anything that goes into your child's body. Many parents naturally have questions about ingredients in vaccines, specifically when they hear words such as aluminum, formaldehyde, thimerosal, gelatin and antibiotics. However, parents can be reassured that ingredients in vaccines are minuscule, safe and necessary.

Ingredients in vaccines are all there for a reason – to help the vaccine work better and to keep the vaccine safe.

Common ingredients in vaccines are:

- **Adjuvants:** Adjuvants (like aluminum) help vaccines work better. They enhance the immune response, decreasing the quantity of vaccine needed to gain protective immunity, or lowering the number of doses required.
- **By-products:** Some products (like formaldehyde) are used during vaccine manufacturing to make sure viruses are inactivated and are removed except for a tiny trace.
- **Stabilizers:** Stabilizers (like gelatin) are added to vaccines to protect the active ingredients from breaking down during manufacture, transport and storage.
- **Preservatives:** Preservatives (like trace amounts of thimerosal) prevent bacterial or fungal contamination. Early in the 20th century, most vaccines were packaged in vials that contained multiple doses. Doctors and nurses would draw up a single dose and place the vaccine back in the refrigerator. Unfortunately, sometimes bacteria would inadvertently enter the vial and cause infections. Preservatives, originally added in the 1930s, solved this problem.

Aluminum: Aluminum is present in our environment; the air we breathe, the water we drink and the food we eat all contain aluminum. The average person takes in an estimated 30 to 50 milligrams of aluminum every day, mainly from foods, drinking water, and medicines. Not all vaccines contain aluminum, but those that do typically contain about .125 milligrams to .625 milligrams per dose, or roughly 1 percent of the daily amount we all take in naturally.

For example, in the first six months of life, babies receive about 4 milligrams of aluminum if they get all of the recommended vaccines. However, during this same period they will be exposed to about 10 milligrams of aluminum if they are breastfed, 40 milligrams if they are fed regular infant formula, and up to 120 milligrams if they are fed soy-based infant formula.

Aluminum salts have been used as adjuvants in vaccines in the United States since the 1930s. Adjuvants enhance the immune response by allowing for lesser quantities of active ingredients and, in some cases, fewer doses.

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Some people wonder about the difference between aluminum injected in vaccines versus aluminum ingested in food. Typically, infants have between 1 and 5 nanograms (billionths of a gram) of aluminum in each milliliter of blood. Researchers have shown that after vaccines are injected, the quantity of aluminum detectable in an infant's blood does not change and that about half of the aluminum from vaccines is eliminated from the body within one day.

Formaldehyde: Vaccines contain antigens, or inactive versions of the viruses or bacteria they are protecting against. Formaldehyde is used during the manufacture of some vaccines to make sure these viruses or bacteria are dead. While most formaldehyde is purified away, small amounts remain. It is important to realize that formaldehyde is also a natural by-product of processes in our bodies, so it is commonly found in the bloodstream. The quantity of formaldehyde found in our blood is 10 times greater than that found in any vaccine.

Thimerosal: Thimerosal, a mercury-containing preservative, is no longer used as a preservative in any childhood vaccine except for the influenza vaccine, and some versions of the influenza vaccine are thimerosal free. Mercury is a naturally occurring element found in the earth's crust, air, soil and water. As a result, we are all exposed to mercury. Thimerosal is also found in trace amounts in some multi-dose preparations of the influenza vaccines as a preservative to help prevent the vaccine from becoming contaminated with bacteria, which could cause infection. Today, breastfed infants are exposed to 15 times more mercury in breast milk than is contained in the influenza vaccine.

Other ingredients: The amount of good and bad information online about vaccines can be overwhelming and confusing, but you can't believe everything you read about ingredients in vaccines. For example, no vaccine contains, or has ever contained, antifreeze.

It's important to look to the most trusted physician, research, and public health organizations in the world for answers. Talk to your child's doctor about any questions or concerns you have about vaccine ingredients.

Sources:

CDC: Ingredients of Vaccines Fact Sheet

CDC: Parents' Guide to Childhood Immunizations FAQ

Children's Hospital of Philadelphia: Vaccine Ingredients Q&A

Learn more and explore other common questions:

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Is there a link between autism and vaccines?

No. One of the most frequent concerns expressed by some parents is that certain vaccines might cause autism. Please know there is absolutely no credible medical or scientific evidence to support any link between vaccines and autism. In fact, numerous credible medical, science-based studies have shown that there is no link between receiving vaccines and developing autism.

Concerns about autism and vaccines typically center on three areas:

1. The combination measles-mumps-rubella (MMR) vaccine

In 1998, a British researcher named Andrew Wakefield raised the notion that the MMR vaccine might cause autism. In the medical journal *The Lancet*, he reported the stories of eight children who he claimed developed autism and intestinal problems soon after receiving the MMR vaccine. It is important to know that the Wakefield study was later retracted for scientific misconduct, as his studies were exposed as fraudulent and his data misrepresented. However, to test Wakefield's discredited claims, researchers performed a series of studies comparing hundreds of thousands of children who had received the MMR vaccine with hundreds of thousands who had never received the vaccine. They found that the risk of autism was the same in both groups. The MMR vaccine, in fact, did not cause autism. Some parents wary of the safety of the MMR vaccine stopped getting their children immunized. As immunization rates dropped, outbreaks of measles and mumps led to hospitalizations and deaths that could have been prevented.

2. Thimerosal, a mercury containing preservative previously contained in several vaccines

Several studies have shown that thimerosal in vaccines does not cause autism. Thimerosal is a mercury-containing preservative that was used in vaccines to prevent contamination. Thimerosal is no longer used as a preservative in any childhood vaccine except for the influenza vaccine. Attention by the news media has caused some parents to fear that thimerosal contained in vaccines might have harmed their children. Addressing these concerns, scientists performed several studies to determine whether thimerosal causes autism. Hundreds of thousands of children who received thimerosal-containing vaccines were compared to hundreds of thousands of children who received the same vaccines free of thimerosal. The results were clear: The risk of autism was the same in both groups; thimerosal in vaccines did not cause autism.

3. Concern that babies receive too many vaccines too soon

Before they are licensed, new vaccines are tested alone or in combination with existing vaccines. These studies determine whether new vaccines change the safety and effectiveness of existing vaccines and whether existing vaccines affect the new vaccine. These studies are performed every time a new vaccine is added to the existing vaccination schedule.

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Every day, a healthy child's immune system successfully fights off thousands of antigens—the parts of germs that cause the body's immune system to go to work. Vaccines contain only a tiny fraction of the antigens that babies encounter every day in their environment, even if they receive several vaccines in one day.

- Kids are exposed to 2,000 to 6,000 antigens every day.
- A strep throat infection, for example, exposes children to at least 25 to 50 antigens. That's comparable to the antigens in the vaccines that infants get at their two-month visit—the DTaP, IPV, HepB, Hib, and rotavirus vaccines combine to just 54 antigens.

And even though children receive more vaccines to protect against more diseases now compared to 30 years ago, the actual number of antigens in vaccines is dramatically less than decades ago because vaccine technology has improved, making vaccines more efficient.

- In 1980, the recommended vaccines contained more than 15,096 antigens.
- Today's vaccines contain only 173 antigens in 12 vaccines that protect children and teens against 16 vaccine-preventable diseases.

Sources:

CDC: Vaccines Do Not Cause Autism

Children's Hospital of Philadelphia: Vaccines and Autism

Children's Hospital of Philadelphia: Vaccine and Autism Q&A

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Why so many shots at one time?

No parents like to see their child cry or get upset. Many parents become uncomfortable, concerned and stressed out when they learn about the number of vaccines recommended for children. It does seem like a lot of shots! Please be assured that it is very safe for your child to receive several different vaccines during one visit. Mild discomfort immediately following a vaccine is still better than your child getting a potentially life-threatening and vaccine-preventable disease.

Scientific data show that this results in very few side effects. Studies also show that combination vaccines (which combine multiple vaccines into a single vaccine) pose no greater risk for side effects than vaccines given individually. These vaccines also are as effective in the combined form as they are when given separately.

Please know, too, that vaccines do not overload a child's immune system. Vaccines contain ingredients called antigens, which tell the body's immune system to create those antibodies. Every day, a healthy child's immune system successfully fights off thousands of antigens—the parts of germs that cause the body's immune system to go to work.

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Sources:

CDC: The Childhood Immunization Schedule

American Academy of Pediatrics: Do Multiple Vaccines Overwhelm or Weaken the Infant's Immune System?

Verywell: Antigen Counts in Vaccines

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