**Below are 11 questions** commonly asked by parents about vaccines, answered by experienced family practice physician Gretchen LaSalle, MD.

These answers are provided as a public service by Spokane Rotary Club 21 so parents have access to accurate information that will help them make informed decisions about vaccinations.

Our service club has no financial stake in vaccines or in the medical field. We are not making money on this, and Dr. LaSalle has donated her time to this effort. Our goal is healthy children and communities.

**Question #1 -- *I’ve heard there are toxins like mercury in vaccines. Is that true?***

**Dr. LaSalle:** First, let’s look at the word “toxins”. A toxin is anything that, in great enough quantity, can be harmful to the body. And, really, anything can be toxic. Water can be toxic to your body if you drink too much. Too much water can dilute out your electrolytes, like sodium and potassium, and can cause weakness, confusion, and even deadly heart rhythm problems. So, keep in mind that it is not the substance itself but the *amount* of the substance that really matters.

An organization called the Agency for Toxic Substances and Disease Registry (ATSDR) monitors for toxic levels of substances in medical products, like vaccines. They use a measure called the Minimum Risk Level to identify concerning levels of a substance. When the amount of a substance is below the Minimum Risk Level, it is deemed to have no toxic risk and is safe for use. NONE of the substances used in production of vaccines are above the MRL.

With regard to mercury, first we should recognize that, since 2001 (for nearly 20 years), there has been NO mercury in any US licensed vaccine other than the multi-dose influenza vaccine.

ETHYL mercury, in the form of Thimerosal, was previously used as a preservative in vaccines, to prevent fungal and bacterial contamination of multi-dose vials. This was important and necessary since fungal or bacterial contamination of vaccine, if then administered to patients, could cause serious harm.

METHYL mercury is the form of mercury that can accumulate in our bodies and be toxic to our nervous systems. We are more commonly exposed to this through consumption of certain fishes. But this is NOT what was used in vaccines. Vaccines contained ETHYL mercury, a form of mercury that is cleared much more rapidly from our bodies, is less likely to accumulate, and so is much less toxic.

Why was it removed from vaccines if it wasn’t worrisome to begin with? That is a very good question! It was removed to take it off the table as a concern, not because there was any evidence that it caused harm. Many argue that this only lent an air of believability to the “Thimerosal is toxic” claim and served to increase the cost of vaccines, now that each vaccine has to be individually packaged.

What is the take home message? There is no mercury in the majority of our vaccines and, even when there was, it was NOT TOXIC.

**Question #2 – *Is it true that vaccines can cause autism?***

**Dr. LaSalle:** It’s tough being a parent these days. There is SO much information at our fingertips and it can be difficult to tell what is valid and what is not. You can thank the Internet and Social Media for spreading and magnifying this bit of vaccine misinformation.

The MMR-Autism claim was originally put forth in 1998 by a British doctor, Andrew Wakefield, who has since been stripped of his medical license for falsifying data and for unethical practices.

His “study” involved only 12 children. It claimed that there was a syndrome of intestinal inflammation and developmental regression, termed “autistic enterocolitis,” that developed following administration of the MMR vaccine.

However, the problems with this study were numerous.

The participants in the study were not recommended by physicians, as is typical in valid research studies. Instead, their names were put forth by a lawyer that was hoping to file a class action lawsuit against manufacturers of the MMR vaccine.

Representing an incredible conflict of interest, Wakefield himself had applied for a patent for an individual measles vaccine which he hoped to profit from after discrediting the combination MMR vaccine.

* Two of the children in the study that were diagnosed with this “autistic enterocolitis” had actually been suspected of developmental delay by their physicians BEFORE administration of the MMR vaccine.
* Three of the children were not admitted to the study with suspicion of autism nor discharged from the study with this diagnosis.
* The one child who did truly have a diagnosis of autism, did not develop it within 2 weeks of the vaccine, as Wakefield claimed. His parents revealed to an investigative reporter that he had developed symptoms not until 2-6 MONTHS after the vaccine was administered.

Wakefield’s “study” was full of mistruths and misrepresentations and it only served to strike fear into the hearts of unsuspecting parents.

Having a child diagnosed with autism is REALLY difficult for parents. And not having an answer as to WHY their child has this condition is a hard pill to swallow. Children are most often diagnosed with this condition between the ages of 2-3, around the time they are receiving many of their childhood vaccinations. And the coincidence of timing is easy to grab on to. But it is just that… coincidence.

What parents need to know is that, since that study of 12 children was published, then retracted, millions of children have been studied to see if there is any validity to this claim. And study after study after study has shown NO truth to the assertion that the MMR vaccine, or vaccines in general, or the mercury in vaccines, or the number of vaccines given causes autism.

With increasing research into the area of autism, we now know that the symptoms of autism are often recognizable at much earlier ages than originally thought, long before an MMR vaccine is ever administered. We are coming to understand that there is a significant genetic component to this condition. Something in the child’s genetic makeup predisposes them to this condition. We know that identical twins are much more likely to both be afflicted and that siblings of a child with autism have a greater chance of developing autism themselves, regardless of vaccination status.

From a multitude of studies on the subject, we know that vaccines do not cause autism. Now scientists are hard at work to discover the true origins of this condition and to find interventions that can help patients with autism thrive.

**Question #3 – *Isn’t it better for my child to build natural immunity than to get a vaccination****?*

**Dr. LaSalle:** Before vaccines, most kids were infected with a variety of childhood illnesses - diseases like Chicken pox, mumps, and more. And, once infected and recovered, their immune systems developed an immune memory that kept them from getting sick with those same illnesses again in the future.

The problem with getting these illnesses naturally is that they carry risk of death and other serious consequences. 1-to-2 out of every 1,000 children infected with measles will die. If a mother is infected with Rubella during her pregnancy, she is at high risk of miscarriage or pre-term labor and the baby is at risk of a condition called Congenital Rubella Syndrome. This syndrome can cause cataracts, deafness, heart defects, and developmental delay.

Chicken pox can cause pneumonias and encephalitis (an inflammation of the brain), both of which can be deadly.

Before vaccines, every year millions of children around the world died or were permanently injured by childhood disease.

Vaccines harness our immune memory by exposing the immune system to a weakened or killed form of the infection. This lets our immune system respond and build antibodies to the pathogen, in a safe and controlled manner, without running the risks of death and serious injury that come with a full-strength, natural infection. Many of these vaccines provide life-long immunity, just like the natural illness does. Some require boosters because immunity fades over time, but this can be true of natural immunity as well.

In the case of vaccine-preventable disease, natural is not necessarily better.

**Question #4 – *Is it true that some kids get measles after getting the MMR shot?***

**Dr. LaSalle:** First, we have to look at the difference between “killed” or “inactivated” vaccines and “live-attenuated” vaccines.

Killed vaccines are those in which the ability of the virus or bacteria to cause an infection is completely removed. The virus or bacterium is “inactivated”. These are basically dead pathogens, but the body still recognizes them as foreign and can mount a safe and effective immune response. There is no “live” virus or bacteria present, so they cannot cause an infection. Other vaccines don’t use a full virus or bacteria but only a piece of the pathogen (like a surface protein) that, by itself, could not cause infection but that the body will also recognize as foreign and to which it will develop an antibody response.

A “live-attenuated” vaccine is one in which a live virus or bacteria is present but in a weakened form. It cannot cause illness in someone with a functioning immune system. However, people who have a suppressed immune system (because of an immune deficiency or because of treatments with immune suppressing medications or chemotherapy, for example), could develop illness from these weakened vaccines. These vaccines, like MMR and the Chicken Pox vaccine (called Varicella), are NOT recommended for people with weakened immune systems.

The problem is that, rarely, people have a weakened immune system and we don’t know it. For example, a child could be in the early stages of a leukemia that hasn’t yet had symptoms or been diagnosed. We wouldn’t know to avoid live-attenuated vaccines in these patients and they could be at risk of coming down with the illness we were trying to protect against. However, in reality, this happens very infrequently. With usual precautions taken, these vaccines are extremely safe.

**Question #5 -- *Why give several vaccinations at one time? Wouldn’t it be better to space them out?***

**Dr. LaSalle:** The Centers for Disease Control and Prevention and the Advisory Committee on Immunization Practices are charged with setting the childhood vaccine schedule. Their recommendations are based on timing or spacing that creates the most effective immune response and takes into consideration when children are at highest risk of complications or death from vaccine-preventable disease.

If we are not doing vaccines at the recommended intervals, it leaves children incompletely protected. Vaccinations given in series, build upon each other. The first flu shot we give a child, for example, only ‘primes the pump,’ so to speak. It gives the child’s immune system a first look at a pathogen and lets it start developing antibodies. But it is not until the second flu shot, given 4 or more weeks later, that the antibody production system really kicks into gear to develop a full immune response. If we only give the child the first of the two vaccines and delay the other, we are not giving their bodies a chance to develop full protection. This leaves the child at risk.

Also, children are at greatest risk of complications of disease at younger ages. If we wait to give them their vaccines until they are older, we are leaving them at risk exactly when they are the most vulnerable.

We also know that young children often have a much more robust immune response to vaccines than do older children or adults. Their bodies are much more efficient at developing antibodies. Consequently, most vaccines work better when given at a younger age than if we wait until kids are older.

No parent wants to see their child hurting and vaccines do cause temporary discomfort. But many vaccines are given in combination now so that there are fewer pokes necessary. If we separate these out, we are actually giving them more pokes, increasing the frequency of discomfort, than if we did them in combination and at the recommended intervals. And, if you’ve ever seen a child get their shots, you know that the upset that this causes is extremely temporary. Within minutes, they are back to their happy, smiling selves.

Finally, we have to look at the reality of our lives these days. Parents are busy juggling work, kids activities, etc. If we are spacing out vaccines, its not uncommon for parents to forget to come back. Life gets in the way. It happens to all of us. But this can result in incomplete immunity. It puts the child at risk of illness and increases the chances that they could then spread that illness to others in the community.

**Question #6 -- *Why should kids be vaccinated for diseases like Polio that we don’t have in this country?***

**Dr. LaSalle:** The near eradication of Polio is one of our greatest public health and vaccine success stories. Thanks to vaccination efforts around the world, there are only a few countries remaining with endemic cases of polio, and the United States is not one of them.

But the reason we don’t stop polio vaccinations altogether is because this illness has not yet been completely eradicated from the planet. Our world is much smaller than it used to be. Travel between countries occurs frequently and with ease. If we let down our guard, and allow immunization rates fall, we are only one plane ride away from having this deadly and debilitating disease re-introduced to our population.

We were given a taste of the return of vaccine-preventable disease in 2018-2019 when the world saw record numbers of measles cases and a sharp increase in measles-related deaths. As immunization rates fall, cases of vaccine-preventable disease rise. This is why doctors and nurses and public health experts are SO invested in fighting vaccine misinformation. None of us want to see a return of these devastating diseases or to see you or your child suffer.

Until Polio and other vaccine-preventable diseases are wiped off the face of the planet, we have to remain vigilant in our vaccination efforts or these diseases will return!

**Question #7 --** ***Why give kids an HPV vaccine before they're even old enough to date?***

**Dr. LaSalle:** While the Human Papilloma Virus, or HPV, is technically a sexually transmitted infection, it is SO COMMON that it takes NO high risk activity to become infected. We estimate that there are 79 million Americans currently infected with HPV and that there are 14 million new infections each year.

As a result, a person can become infected the very first time they have sex. In fact, intercourse is not even required for transmission. All that’s necessary is skin-to-skin contact. Even deep kissing has been shown to transmit HPV in saliva.

The reason we are so concerned about this virus is because it causes multiple types of deadly cancers, genital warts, and a devastating condition called Recurrent Laryngeal Papillomatosis. Our greatest worry is cancer.

There are nearly 40,000 cases of HPV-related cancers diagnosed in the United States each year. These include Cervical, Vaginal, Vulvar, Penile, Rectal, and Mouth and Throat cancers. These cancers, and their related loss of life or physical and psychological scars, are largely preventable with the HPV vaccine, which has been available in the US since 2006.

As one of our more recent additions to the vaccine schedule, there has been some confusion and misunderstandings about this vaccine.

Initially, it was only recommended for girls but both girls and boys are affected by HPV-related disease. So, in 2011, the vaccine was also recommended for boys. Both boys and girls need vaccination to be protected.

The vaccine was originally approved to be given between the ages of 9 and 26, with the recommended administration time between ages 11-12. This confuses some parents. If this is a sexually transmitted disease, why do we need to give it at such a young age? Won’t this give my kids the wrong message about sexual activity? Will it encourage them to become sexually active earlier? Will it even be effective by the time they need it? These are all great questions and concerns. Let’s talk about these individually.

We recommend the HPV vaccine at an early age for a couple of reasons. First, this vaccine is a prevention vaccine and does nothing to treat an infection once you have it. We want our kids to be protected BEFORE they become sexually active. Because we won’t always know when our kids become sexually active (as much as we’d like to think our kids will tell us everything, we know from being teenagers ourselves that this doesn’t always happen), and because some children will unfortunately suffer unwanted sexual contact, we need to protect them from an early age.

Second, studies show that our kids mount a much stronger immune response to this vaccine when it is given at younger ages than if we wait until later teen or young adult years. So, giving it earlier means it works better!

**Question #8 -- *Should I be concerned that getting my pre-teen vaccinated for HPV sends the wrong message about being sexually active?***

**Dr. LaSalle:** It turns out, most kids aren’t thinking about sexual activity at the age of 11 and even fewer are thinking about it at the age of 9. If we recommend this vaccine at an early age, and for what it is truly intended to be, a cancer prevention vaccine, the discussion of sexual activity with your child doesn’t even have to come up.

But to set parents minds at ease, there have been studies looking at the question of whether giving this vaccine at a young age encourages earlier or riskier sexual activity. The answer is an emphatic No!

As an example, A study of 300,000 girls in British Columbia who were part of a school-based HPV immunization program showed that those girls that received the vaccine, compared to their non-vaccinated peers, were LESS likely to have sex at an early age, LESS likely to use substances around sexual activity, LESS likely to get pregnant, LESS likely to be diagnosed with a sexually transmitted infection, and MORE likely to use protective measures like condoms and other birth control methods.

Some parents are concerned that giving the vaccine too early will mean that the protection fades, or wears off, by the time that kids really need it. As we discussed earlier, this vaccine has been around since 2006. That’s 14 years we’ve had to monitor antibody levels over time and research shows NO wearing off of immunity in that timeframe, with further studies still ongoing. You can be reassured that the HPV vaccine offers long-lasting protection against HPV-related cancers.

**Question #9 – *The flu isn’t a big deal. If I get it, I’m young and healthy. I’ll be fine. Plus, I’ve heard the vaccine can actually give you the flu, so why should I get one?***

**Dr. LaSalle:** There are several different claims to address here. The first is that the flu isn’t a big deal. This couldn’t be farther from the truth. Tens of thousands of Americans die every year from influenza. It is one of the most deadly vaccine-preventable diseases that we come into contact with.

Prior to a vaccine being developed, influenza was the cause of the most devastating Pandemic in history – the Spanish Flu of 1918. While Spain was the first to report it’s devastation, the Spanish flu actually started in US military barracks and traveled with soldiers around the world, leaving no country untouched. One third of the world’s population was affected and it killed over 50 million people in ONE YEAR.

Thankfully, we now have a vaccine. But misperceptions about the flu virus and about the vaccine itself contribute to the less than ideal acceptance of this vaccine by the general population. While the flu does more commonly severely impact those who are elderly, people who have chronic illness or immune compromise, and infants and children, healthy people also die of complications from influenza.

Studies looking back at children who died from this illness generally show that 40-50% of those kids were completely healthy, without any risk factors for severe disease. And even if it doesn’t kill you, it still results in 100s of thousands of hospitalizations each year, weeks off of work or school, lost wages, and a huge cost to society.

One of the most common claims people hear is that the flu shot can give you the flu. Thankfully, this is not at all true. The flu shot is a killed virus vaccine. There is no live virus in it. It cannot cause the flu.

The flu nasal spray is a different story. It is a live-attenuated vaccine and, if given to someone with a weakened immune system, could give them the flu. Use of the flu nasal spray is much more restricted and it is administered much less commonly than the shot. While we know definitively that the flu shot does NOT cause the flu, there are a few scenarios that can occur that might make someone think that they got the flu from the flu shot. Here’s what can happen.

First, any vaccine can make you feel a bit under the weather. Vaccines work by inducing an immune response. This can make us a bit achy, fatigued, sometimes even give us a low grade fever. But this is considered normal. This is just your immune system kicking into gear. These symptoms are MUCH less severe than those of the actual flu and they typically resolve within 1-2 days. We, as clinicians, need to be better at warning patients about these possible symptoms so that they know what to expect and don’t assume that the flu shot made them “sick”.

Second, it takes 2 weeks for the flu shot to actually work. So it is possible, especially if you wait to get the vaccine until flu season is already in high swing, to catch the flu after getting your flu shot. It was not the shot itself but the lack of effectiveness in those first two weeks that allowed the virus to take hold. In an ideal world, we get the flu shot in September or October, BEFORE flu season begins.

Finally, the flu shot is not perfect. At it’s best, it prevents about 60% of flu infections. So, even though it doesn’t always prevent the flu, what it does do is make symptoms less severe and prevents hospitalization and death from the flu. We know this by looking back each year at the people who died from influenza. Year over year, nearly 80-90% of these people had NOT had a flu shot.

So, while scientists are working on a more effective and longer-lasting flu vaccine, our current flu shot is the best thing we have to prevent the serious and potentially deadly complications of influenza.

**Question #10 -- *If other people are vaccinated, and you’re so sure that vaccinations work, why do you care if I vaccinate my kids? Isn’t it my choice?***

**Dr. LaSalle:** As we’ve learned with the novel Coronavirus Pandemic, we are all in this together. My actions impact your risk and vice versa. If we all take steps to keep each other safe, we will fare better as a society and can significantly reduce the amount of illness and death that we suffer as a people.

We don’t have a vaccine for SARS-CoV-2 virus yet, but the same holds true, even for illnesses that we DO have vaccines to protect against. Most of our vaccines are highly effective but NONE of our vaccines are 100% effective. The measles vaccine, for example, is about 97% effective after two doses, which is really good. But, some people will not develop an adequate immune response after vaccination. And some people, for reasons of age, allergy to components of the vaccine, or immune compromise, cannot get this immunization, which is a live-attenuated vaccine.

Measles is SO contagious, with on person being able to infect up to 18 others, that we are all at increased risk of contracting the virus and developing complications of the illness, if the large majority of us (at least 95% of us) aren’t immunized.

This is what we saw in 2018 and 2019 when immunization rates in certain communities and geographic areas dropped below that 95% threshold level. Measles made a roaring comeback.

The protection of those who can’t be vaccinated by vaccinating those of us who can, is called Herd Immunity or Community Immunity. Essentially, we are creating a bubble of protection around those who are at risk, so that the virus can’t get to them. But if the community doesn’t vaccinate to an adequate degree, those kids with leukemia and pregnant women and newborn babies, for example, are at high risk of contracting and dying from these vaccine-preventable diseases.

**Question #11 – *Is there aborted fetal tissue in vaccines? I have a religious objection to abortion so I can’t get those vaccines.***

**Dr. LaSalle:** Vaccines are produced in a variety of different ways, using a variety of different cell cultures. Viruses and bacteria will only grow or replicate with an adequate host cell, with adequate nutrition. Multiple different types of cells are used as the manufacturing plants for these viruses and bacteria or pieces of virus and bacteria. These include yeast cells, canine cells, and even human cells, among others.

* Human cell lines have some advantages for growing viruses and bacteria over other types of cells.
* Some pathogens don’t grow well in animal cells.
* Animal cells can introduce contamination by viruses or bacteria that aren’t typically carried in human cell lines.
* Vaccine production can be hindered or halted, causing a shortage of vaccine, if animal products used in vaccine development are threatened. For example, if an illness were to strike egg-laying chickens as eggs are commonly used in production of the influenza vaccine.

There are only six vaccines that are made using human (fetal) tissue. These are the Varicella, Hepatitis A, Rubella, Adenovirus, Rabies, and the original shingles vaccines. Only the first three are routinely used in the United States today.

It is true that the cell lines used to produce these vaccines were taken from two aborted fetuses. These fetuses were aborted in the 1960s by maternal choice, NOT for the purpose of vaccine production. The cells from these tissues have been propagated, or replicated, since then. These are “descendent” cells. No NEW fetal tissue is required or has been used.

Some of our patients, particularly our Catholic patients, may voice concerns about these vaccines. Some years ago, the National Catholic Bioethics Center prepared a statement regarding the use of these vaccines that may help put patients’ minds at ease. Following are quotes from this statement.

“It is important to note that descendent cells are not the cells of the aborted child. They never, themselves, formed a part of the victim’s body.

“There would seem to be no proper grounds for refusing immunization against dangerous contagious disease, for example, rubella, especially in light of the concern that we should all have for the health of our children, public health, and the common good.”

Of course, the National Catholic Bioethics Center DOES encourage families to voice their concerns to government agencies and vaccine manufacturers and to call for the development of future vaccines in ways that do not support abortion.