

# Clear Answers & Smart Advice About Your Baby's Shots

By Ari Brown, MD, FAAP

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In response to the recent media attention given to vaccines, autism, and other controversies concerning vaccines, the Immunization Action Coalition (IAC) has reprinted a special excerpt from *Baby 411* that answers these questions and more. IAC thanks Dr. Brown for this clearly written information, but mostly, we are grateful for her continued advocacy for safe and effective vaccines.



**Vaccines. Autism. Controversy.** As a new parent (or parent-to-be), it's hard not to hear the great debate in parenting circles these days—do vaccines cause autism? If not, what causes autism and why is it on the rise?

*Let's start at the beginning—just what is autism?*

## Q: What is autism?

Autism Spectrum Disorder (ASD) is really a collection of several disorders that have three abnormal areas in common: social skills, communication skills, and repetitive or obsessive traits. Specialists use the terms ASD and Pervasive Developmental Disorders (PDD) interchangeably. To add even more confusion, Pervasive Developmental Disorder, not otherwise specified (PDD-NOS), and Asperger's Syndrome also are other categories that fall under the ASD umbrella.

There is a very broad range of severity within ASD. A child may have normal intelligence and language, but be socially awkward and have panic attacks if his sandwich is cut in triangles instead of squares. Or a child may appear out of touch with reality and spend his entire day rocking and flapping his hands. Both children have ASD. As you might suspect, children with severe problems as in classic autism are diagnosed much earlier than kids who can communicate but have trouble with social skills, as in Asperger's Syndrome.

Children are usually diagnosed by 18-24 months of age when language delays are obvious. Many children with Asperger's Syndrome may not be diagnosed until preschool (or sometimes even later).

However, clues to the diagnosis appear long before that time. Some early clues include: not smiling back at people, poor eye contact, not imitating, not gesturing (waving bye-bye), not responding to being called by name, and not trying to communicate/connect/engage with other people by 1 year of age.

There also are some unusual behaviors. Cuddling may not be soothing. In fact, an autistic child may get very upset by being touched. Bright lights and noises often bother them. Because they are bugged by the outside world, they may turn inward and find comfort in repetitive behaviors (rocking, head banging, spinning). Autistic chil-

dren may have little interest in playing with toys. Or they may play in an odd way—such as using a phone as a comfort object.

**Bottom line:** Children with autism have autism long before their first birthdays, even though their “official” diagnosis usually occurs in their second year of life.

## Q: I have a friend whose child has autism. She said he was “perfectly normal” until he was about 18 months old. Does this happen?

A small minority of ASD children have completely normal milestones and then regress, which is known as “late onset autism.” These children most likely have a distinct genetic abnormality that turns on or off without any trigger.

However, for most kids with ASD, parents and doctors just miss (or dismiss) the early signs in the first year of life and the child's atypical development only becomes apparent at 18 months.

Doctors rely heavily on parents to point out concerns. And parents (especially first-timers) don't know what is normal and what isn't.

The mother of one of my ASD patients told me that she only realized how unusual her son's development was after she watched her second child, without ASD, breeze through her milestones. Even the most vocal ASD mom of all, Jenny McCarthy, agrees. Her son was 5 months old when he first smiled at her (that's abnormal), when all of her friends' babies smiled at 2 months of age (that's normal).

Some parents report that their ASD child spoke a few words and then “lost” the ability to say them. If you delve a bit deeper, the child may have randomly said a few things, but was not consistently using words like “juice” or “no” to communicate his needs.

There is growing research in language development that looks at brain anatomy. Primitive brain parts control early language development from birth to 18 months. At 18 to 24 months, the mature brain parts turn on and language takes off. With autistic children, mature language does not take off. But from a parent's perspective, it may look like a loss of skills.

And again, children with subtle atypical behaviors may be harder to diagnose early on. Reviewing home movies of a child once the diagnosis is made often shows that early signs are overlooked.<sup>1</sup>

### Q: OK, so what causes autism?

The million-dollar question.

In the 1980s, one in 10,000 kids was diagnosed with autism. Today, one in 150 American 8-year-olds has some form of autism. Boys outnumber girls four to one. The United States is not the only country seeing this trend. It is increasingly diagnosed worldwide.

For starters, is it really an epidemic? Or, are more people being diagnosed? Many children who were diagnosed with mental retardation 30 years ago are children who are diagnosed with classic autism today. And mildly disabled ASD kids today are children who never would have had a diagnosis 30 years ago. Those verbal, but socially awkward, children account for the majority of new ASD cases.

Here are the hottest areas of autism research today:

- **Genetics:** There is no question genetics plays a role. Autism runs in families. I have a family in my practice and all four children have a diagnosis on the autism spectrum.

Studying twins is an obvious way to detect genetic disorders. If one identical twin has autism, up to 90 percent of the time, so will the other twin. To date, studies suggest there is more than just one “autism gene”; there appear to be several.

ASD children have several different abnormalities with their DNA. However the X chromosome is one of interest because of the high prevalence of boys with ASDs.<sup>2</sup>

Fragile X Syndrome, which is a known genetic cause of autism, also points to a defective X chromosome in ASD.

And Rett Syndrome, which is a disorder causing developmental regression and autistic behaviors in girls, is caused by a defective MECP2 gene located on the X chromosome.<sup>3</sup>

We also know that kids with autism and defects on Chromosome 11 have dysfunctional “neurexin 1 protein.” Researchers are looking into how this defective protein affects fetal and infant brain growth.

Finding these specific genetic defects may help in genetic counseling, as well as therapies, in the future. Animal studies already are underway for targeted genetic therapy in both Fragile X and Rett Syndrome.

- **Abnormal brain growth:** ASD children have problems with brain growth. Babies are born with immature brains that grow rapidly and make nerve connections called synapses ... like an information superhighway. In the normally growing brain, some branches of this superhighway get “pruned.” In the autistic brain, this pruning process seems to be defective. This may explain why babies who are autistic have abnormally rapid head growth under 1 year of age. No one has yet figured out what causes that defective nerve growth. Of note, boys with ASD have higher levels of hormones (insulin-like growth factor) that may contribute to their larger head size, weight, and body mass index.<sup>4</sup>

- **Environmental triggers:** Is there some environmental exposure that sets off abnormal brain development in a genetically predisposed baby? Maybe. And that exposure may happen at or shortly after conception, before a mother even knows she is pregnant. The embryo has a critical period of brain development at 20–24 days after conception. That is when the developing brain is most sensitive to injury. Studies done by the Environmental Working Group have detected over 280 environmental toxins in umbilical cord blood, so clearly pregnant moms are exposed to a variety of toxins. Could one of these be the autism trigger? We don't know.

Viral infections during pregnancy also may be a key environmental trigger that causes abnormal genes in the fetus. Those infections include rubella, CMV (cytomegalovirus), and influenza (yes, “the flu”).<sup>5</sup>

What about vaccines as an environmental trigger? Researchers and scientists have taken a long, hard look at vaccines—and there is conclusive evidence that vaccine exposure is NOT the turn-on switch for autism.<sup>6</sup>

**Bottom line:** There's evidence that newborns who are later diagnosed with ASD already have abnormal levels of certain proteins in their brains. So, whatever the trigger is (if there is one), it has been fired before the baby even enters the world.

- **Prematurity:** A developing brain is quite vulnerable. Premature, very low birth-weight babies (under three pounds) have a 25 percent chance of developing an autism spectrum disorder.<sup>7</sup>
- **Older parents:** Another possible reason for the increase of autism: the trend of parents having babies at a later age. Moms who conceive after the age of 40 have a 30 percent increased risk of having a child with autism. Dads who conceive after the age of 40 have a 50 percent increased risk of having an autistic child.<sup>8</sup> Scientists speculate that an older dad's sperm may have defective genetic material, possibly altered by environmental toxins.
- **Closely spaced pregnancies:** A 2011 study compared children who were conceived at least three years after their sibling was born to closer-spaced pregnancies and found that babies conceived less than 12 months after the birth of the first-born child were THREE times more likely to be diagnosed with autism spectrum disorder. Babies conceived from 12 to 23 months after the birth of the first-born child had almost two times the risk of ASD. And, even babies conceived 23 to 35 months after the first-born child had a slightly greater risk of ASD.

Unfortunately, the researchers have no idea why the odds are greater when the spacing between pregnancies is shorter. Perhaps it's because a woman's nutritional stores have not had enough time to be replenished. Or maybe women who have put off parenthood until later in life have more closely spaced babies—and parental age itself is a risk factor for having a child with an ASD.

This study alone should not necessarily influence your decision on how long to wait between pregnancies. However, the current recommendation from the Centers for Disease Control and Prevention is to wait at least 18 to 23 months between pregnancies for a mother's and baby's optimal health.<sup>9</sup>

**Bottom line:** Researchers don't know what causes autism, although the above factors provide clues. The goal is to find a way to prevent autism ... but we aren't there yet.

## Vaccines

### Q: Why do you care whether I vaccinate my child or not?

For starters, we want your baby to be protected.

But we also want you to realize that the decision to vaccinate your child impacts the health of other children in the community. Choosing NOT to vaccinate your child is choosing to put your child AND your community's children at risk. As a parent, you want to make the right choices to protect your child. I want you to ask questions. I want you to be informed. And I want you to get your child vaccinated. YOUR decision impacts ALL children. Why?

There are two critical points for vaccination to work:

1. You need to be vaccinated.
2. Your neighbor needs to be vaccinated.

This concept is called herd immunity. And yes, you are a member of a herd. When 90 to 95 percent of "the herd" is protected, it is nearly impossible for a germ to cause an epidemic. Think of germs as rain. Vaccination is a raincoat. Even with a raincoat on, you can still get wet. You need an umbrella, too. The umbrella is "herd immunity." Those who don't vaccinate expect someone to share their umbrella when it rains. But society can only buy umbrellas TOGETHER. And raincoats aren't made for newborns—they need umbrellas!

Some parenting decisions have little or no impact on the community at large. Deciding whether or not your child eats organic baby food, goes to preschool, or sleeps in a family bed is entirely up to you—your decision only affects your child.

However, your decision whether or not to vaccinate your child affects all our kids. If you are a parent who is considering delaying or skipping vaccinations altogether, please realize the impact of your decision.

If more than 10 percent of American parents choose to "opt out" of vaccines, there's no question that our entire country will see these horrible diseases of bygone days return. Fortunately, very few parents decide to do this. What is most concerning today is that there are pockets of under-vaccinated children. Birds of a feather flock together. Like-minded parents who don't vaccinate their kids tend to live in the same community and send their kids to the same schools. With lower immunization rates, there is no herd immunity. We have these "Ground Zero" areas to thank for recent measles and whooping cough outbreaks of 2008 and 2011.<sup>10</sup>

### Q: I've heard that the MMR vaccine might cause autism. Is this true?

No. Parents also hear that vaccinations cause multiple sclerosis, diabetes, asthma, and Sudden Infant Death Syndrome (SIDS). None of these are caused by vaccination. The government operates a safety monitoring system (Vaccine Adverse Event Reporting System, Food and Drug Administration, CDC) watching for any possible adverse effects from vaccines. No one wants to increase autism rates.

One small case report of only eight patients in 1998 led a research group to feel that the combination measles, mumps, and rubella (MMR) vaccine might cause autism.<sup>11</sup> But, don't try to find the article online because the journal that published it later retracted it when a former member of the research lab revealed that the data reported in the study was fabricated!<sup>12</sup> Twelve years later, the lead author lost his license to practice medicine in England and was accused of fraud. The whole thing was a hoax.

Before this came to light, several reputable scientists tried to duplicate the findings of this now discredited researcher. No one ever could—and now we know why!

Unfortunately, frightened parents chose to skip the MMR vaccine and measles epidemics occurred in the United Kingdom and the United States as a result of these unfounded claims.

**Bottom line:** Don't base health decisions for your child on one research study or what the media says! Talk to your child's doctor about any vaccine safety concerns.

### Q: If the MMR vaccine doesn't cause autism, why is the diagnosis made around the same time as the vaccination?

One of the criteria used to make a diagnosis of autism is a language delay. Because children do not have significant expressive language under a year of age, doctors have to wait until 15 to 18 months to confirm a language delay and make the diagnosis. That's about the same time as the MMR vaccination, which leads some parents to wonder about autism and vaccination.

### Q: I've heard mercury preservative is in vaccines. Is this true?

Only a few remain. Preservatives and stabilizers are used in vaccines so the vaccinations remain potent and uncontaminated. A popular preservative used to be a chemical called thimerosal, which contained trace amounts of ethylmercury. Thimerosal use began in the 1940s.

Thimerosal was removed from all vaccines given to infants younger than age 6 months by 2001. This deserves repeating: YOUR young baby will not be getting vaccines that contain mercury (thimerosal) as a preservative. The one exception is the influenza vaccine that is found in multi-dose vials that need a preservative to prevent contamination. Influenza vaccine that is packaged in single dose vials does not need a preservative and many clinics choose to use these individual vials with the youngest patients. Remember, it's very important that children get vaccinated against influenza each fall or winter beginning when they are 6 months old.

Despite the fact that most vaccines are mercury preservative-free now, speculation persists about vaccines previously containing mercury and links to autism. This speculation continues even after the Institute of Medicine (IOM) published a conclusive report in 2004 negating any association between vaccines and autism. (The IOM spent four years studying both the mercury question and the MMR combo vaccine question and published a series of eight reports on the subject.)

A quick chemistry lesson: Certain compounds have completely different properties even though they may be related. For instance,

take the alcohol family. Methanol is anti-freeze; ethanol is a Bud Light. Keep this in mind when we discuss mercury. We are all exposed to small amounts of mercury. The type of mercury that has raised health concerns is called methylmercury. High concentrations of methylmercury can be found in tuna, swordfish and shark from contaminated waters. The information known about mercury poisoning comes from unfortunate communities that have experienced it. Example: There is a large amount of data from the Faroe Islands, near Iceland. The people there would eat whale blubber contaminated with toxic levels of methylmercury and polychlorinated biphenyls (PCBs). Children, especially those exposed as fetuses during their mother's pregnancy, seemed to have lower scores on memory, attention, and language tests than their unexposed peers. (They were not diagnosed with autism or Attention Deficit Disorder, however.)<sup>13</sup>

Chronic exposure to liquid methylmercury causes Mad Hatter's Disease, named for hat makers who used liquid mercury in the hat-making process. The disease consists of psychiatric problems, insomnia, poor memory, sweating, tremors, and red palms. Chronic mercury poisoning also impairs kidney function.

Methylmercury is a small molecule that can get into the brain—it takes almost two months to break down in the body. Ethylmercury (the type of mercury that was previously used as a vaccine preservative) is a large molecule that cannot enter the brain and is rapidly eliminated from the body within a week.

Because of the increased number of vaccinations that children get, the potential cumulative exposure to mercury became a concern in 1999.

There are three federal groups that set standards for acceptable daily mercury exposure (the Environmental Protection Agency [EPA], the Food and Drug Administration [FDA], and the Agency for Toxic Substances and Disease Registry). When the exposure was calculated, the cumulative dose was higher than acceptable levels set by the EPA only (the other groups' standards were higher). As a result of these findings, the Public Health Service (which includes the FDA) and the American Academy of Pediatrics issued a joint statement as a precautionary measure, urging vaccine manufacturers to reduce or eliminate thimerosal in vaccines as soon as possible.<sup>14</sup> This was issued in 1999 before scientists had an opportunity to study the potential health effects of thimerosal-containing vaccines. Numerous studies have since shown that there is no relationship between vaccines, either with or without thimerosal, and the development of autism or other neurologic problems in children.

### Q: I heard that I should still ask my doctor if the vaccines for my baby are thimerosal-free. What do you suggest?

We think you should ask as many questions as you need to feel comfortable. Remember that since 2001, most childhood vaccines given to infants and children went thimerosal (mercury) preservative-free. If your doctor has a 2001 vintage vaccine vial sitting on the shelf (which would be expired by now), he needs to re-stock. To give you some perspective, my practice buys its vaccine supply on a monthly basis.

Why does flu vaccine need thimerosal or any other preservative? First, understand the flu vaccine is reformulated every year to reflect

the anticipated flu strains. Since millions of doses of flu vaccine are needed every year, the most efficient way to produce the shot is in multi-dose vials, which require a preservative.

Hence, some flu shots (not the flu nasal spray) contain the preservative thimerosal. However, there are single-dose preparations of flu vaccine that are mercury preservative-free. These can be given to young children and pregnant women. Ask your doctor for a thimerosal-free flu vaccine if you are concerned.

Even though thimerosal is safe, it would be ideal for all flu vaccines to be thimerosal preservative-free—this would put any concerns to rest. However, the technology just isn't there yet.

The Institute for Vaccine Safety at Johns Hopkins University has a chart online that tracks any thimerosal content in vaccines: [www.vaccinesafety.edu/thi-table.htm](http://www.vaccinesafety.edu/thi-table.htm).

**FYI:** Many vaccines such as the combination measles, mumps, and rubella vaccine never used thimerosal in the production process or as a preservative.

**Reality Check:** Worried about the mercury preservative (thimerosal) in your child's flu vaccine? Consider this: A tuna fish sandwich has five times more mercury than a thimerosal-preserved flu vaccine.<sup>15</sup> And the type of mercury (methylmercury) found in tuna is the one that has health concerns. Also, a baby who is exclusively breastfed for six months of life consumes about 0.36 mg of methylmercury from breast milk. That's 15 times the quantity of ethylmercury in one flu vaccine!

**Bottom line:** As a doc, I am much more concerned about your baby's mercury exposure from the environment than what's in a flu shot. Here's a look at the numbers:

Product	Amount of Mercury	Type of Mercury
Tuna, 5.6 oz can	0.115 mg	Methyl
Breast milk, 1 liter	0.015 mg	Methyl
Flu vaccine with thimerosal	0.025 mg	Ethyl

### Q: Does thimerosal cause autism?

No. The Institute of Medicine reached this conclusion in 2004. What proof do we have?

Thimerosal has been removed from most vaccines since 2001, but the rates of autism are still skyrocketing. A 2008 survey of autism rates in California confirms that mercury is essentially out and autism rates are still going up. If thimerosal was the cause and it was removed from vaccines seven years ago, autism rates would be going down by now. Why? Because autism spectrum disorders are usually diagnosed by 3 years of age. By now, any reduction in autism should have been obvious if thimerosal caused the disorder.<sup>16</sup>

- Mercury preservatives were removed from vaccines in Denmark in 1992. Canada and the European Union followed suit shortly thereafter. However, their autism rates are going up too.
- Mad Hatter's Disease (mercury poisoning) and autism are very different disorders (see chart in next column).
- A study of 100,000 kids in England compared those receiving thimerosal-containing vaccines to those who did not. The ones who had the t-free shots had HIGHER rates of autism.<sup>17</sup>

- A 2007 study showed that children between 7 and 10 years of age who got those mercury-containing vaccines (before 2001) have no significant differences in tests of attention and processing information. Although the study did not look specifically at autism, it showed that mercury preservatives did not make much of an impact on brain functions in general. A follow-up study that specifically addresses autism is underway.<sup>18</sup>

Did thimerosal cause autism? Notice the differences between autism and mercury poisoning:

	<b>Autism</b>	<b>Mercury Poisoning<sup>19</sup></b>
Motor	Repetitive movements	Wobbly, shaky gait
Vision	Normal	Impaired
Speech	Delay, repetitive sounds	Articulation problem
Sensory	Hyper-responsive	Loss of sensation
Psychiatric	Aloof, likes sameness	Psychosis, depression
Head size	Large	Small

### Q: Are there other additives in the vaccines?

Yes. And you should know about them.

Vaccines contain the active ingredients that provide immunity. But there are inactive ingredients that improve potency and prevent contamination. Below is a list of additives and why they are there. These products are present in trace amounts and none have been proven harmful in animals or humans.<sup>20</sup>

- **Preservatives:** Prevent vaccine contamination with germs (bacteria, fungus). Examples: 2-phenoxyethanol, phenol, and thimerosal (prior to 2001).
- **Adjuvants:** Improve potency/immune response. Example: aluminum salts.
- **Additives:** Prevent vaccine deterioration and sticking to the side of the vial. Examples: gelatin, albumin, sucrose, lactose, MSG, glycine.
- **Residuals:** Remains of vaccine production process. Examples: formaldehyde, antibiotics (Neomycin), egg protein, yeast protein.

See our website ([www.Baby411.com](http://www.Baby411.com), click on “Bonus Material”) for a list of ingredients for the routine childhood vaccination series.

### Q: Why is aluminum in vaccines?

Now that the mercury (thimerosal) saga is coming to an end, anti-vaccine crusaders have come up with a new bad guy: aluminum. Yes, trace amounts of aluminum salts are used in some childhood vaccines. Here's all you need to know (and more) about aluminum.

**Bottom line:** We are not worried about it.

Aluminum is everywhere. It's the most common metal in our earth's crust. So it is naturally present in our water, soil, and even in the air. Fruits, vegetables, nuts, flour, cereal, dairy products, and yes, even baby formula and breast milk ... all contain some aluminum. Do you wear antiperspirant? It's in there, too. To avoid aluminum exposure, you'd have to quit wearing antiperspirant ... and basically leave the planet.

Why is aluminum used in vaccines? Aluminum enhances the immune system's response to the vaccine. It's been used safely for several decades. By using aluminum salts, some inactivated vaccines require fewer booster shots for the body to mount an adequate immune response.

Are there any health concerns with aluminum in vaccines? No. There is significantly less aluminum in vaccines than what babies are exposed to in the environment. Both the National Vaccine Program Office and the World Health Organization have determined that the aluminum content in the childhood vaccination series is safe.

Does aluminum poisoning cause autism? No. People with aluminum poisoning have bone problems (osteomalacia) and anemia, as well as neurologic issues. These include memory loss, fatigue, depression, behavioral changes, and learning impairment. Aluminum also has been proposed as the cause of Alzheimer's Disease. To date, however, there is little evidence that aluminum causes that disorder.<sup>21</sup>

How much aluminum is in vaccines? Very little. If your baby follows the standard immunization schedule, he is exposed to about four to six milligrams (mg) of aluminum at six months of life. By comparison, he's also exposed to 10 mg of aluminum if he is breastfed, 40 mg if he is fed cow's milk-based formula, or 120 mg if he is fed soy formula. None of these are very large amounts, by the way. To put things in perspective, there are about 200 mg of aluminum in a standard antacid tablet. In fact, the average adult ingests seven to nine milligrams of aluminum every day. Here's a look at how much aluminum is in breast milk/formula, compared with vaccines:

#### Amount of aluminum exposure (milligrams per liter)<sup>22</sup>

<b>Product</b>	<b>Amount of aluminum</b>
Breast milk	0.01–0.05 mg/L
Cow's milk-based infant formula	0.06–0.15 mg/L
Soy-based infant formula	0.46–0.93 mg/L
Pprevnar vaccine	0.125 mg/dose
DTaP vaccine	0.17–0.625 mg/dose
HIB vaccine	0.225 mg/dose
Hep A vaccine	0.225–0.25 mg/dose
Hep B vaccine	0.25–0.5 mg/dose
DTaP/IPV/HIB vaccine	1.5 mg/dose

Is it a good idea to space out vaccinations that contain aluminum salts? No. Since aluminum-containing vaccines do not cause any health risk, separating or spacing out these vaccines has no benefit. In fact, there is a risk to spacing out the vaccines—your baby will go unprotected against real vaccine-preventable disease.

**Reality Check:** If vaccines contain ingredients like aluminum or formaldehyde, wouldn't it be better if vaccine makers got rid of these additives? Shouldn't vaccines be “greener”?

This is a red herring argument against vaccines—current vaccines are safe, even with tiny/trace amounts of preservatives or additives like aluminum. And your baby is exposed to many of these ingredients every day ... simply by eating or breathing.

**Q: Why is formaldehyde in vaccines?**

Small amounts of formaldehyde are used to sterilize the vaccine fluid so your child doesn't get something like flesh-eating Strep bacteria when he gets his shots. We know when you think of formaldehyde, you think of that ever-present smell wafting from the anatomy lab in high school. But what you probably don't know is that formaldehyde is also a naturally occurring substance in your body. And if you use baby shampoo, paper towels or mascara, or have carpeting in your home, you've been exposed to formaldehyde. The small amount used in vaccines is not a health concern.<sup>23</sup>

**Q: Is it true that anti-freeze is used in vaccines?**

No. Antifreeze has never been a component of vaccines. Antifreeze products commonly contain either ethylene glycol or propylene glycol. A product with a similar name, polyethylene glycol (PEG), is used in the production process to purify vaccines. PEG is not antifreeze! PEG is also found in medications, toothpastes, laxatives, lubricant eye drops, and various skin care creams.

**Q: Is it safer to delay vaccines or use an alternative vaccination schedule?**

Easy answer: No. The CDC publishes a recommended vaccine schedule for American children. Many, many doctors, scientists, and researchers work together with the CDC to decide what is the best timing to give shots. The goal: Protect babies as soon as it is safe and effective to do so. This schedule was not created out of thin air.

Between anti-vaccine activists shouting "too many shots, too soon" and Dr. Bob Sears hawking his book, new parents wonder if it would somehow be safer to wait on shots altogether or stagger them out on "Dr. Bob's schedule."

Here's a nasty little truth about alternative vaccination schedules: They are all fantasy. There is absolutely no research that says delaying certain shots is safer. Dr. Bob is making up "Dr. Bob's Schedule" all by himself. He even admits that. In an interview with iVillage, he commented, "My schedule doesn't have any research behind it. No one has ever studied a big group of kids using my schedule to determine if it's safe or if it has any benefits."

A 2010 study actually did evaluate children whose vaccinations were delayed and found absolutely no difference in their development compared with children who had received their shots on time. I'd much rather follow a schedule that has been extensively researched for both safety and effectiveness by experts in the field of infectious diseases.

What we do know about alternative vaccination schedules is that delaying shots is playing Russian roulette with your child. The simple truth is that you are leaving your child unprotected, at a time when she is the most vulnerable.

We realize that parents who choose to delay or opt out on vaccines are not bad parents. They are scared parents. What we are trying to help you realize is that the fear you should have is for the diseases that vaccines prevent. If you are on the fence about vaccinations, please take the time to research the disease—and talk to your child's doctor.

**Q: If I want to do a staggered vaccination schedule, how should I do it?**

I suggest setting up a consultation with your own pediatrician to discuss what both of you feel comfortable with doing. Remember, the ultimate goal is to have your child vaccinated in a timely manner.

**Q: Didn't the government concede that vaccines caused a child's autism?**

During the equivalent of a class action lawsuit against the government (called the "Omnibus Autism Proceedings"), one child, Hannah Poling, received a monetary settlement. The court did not hear her case. Hannah's case was being reviewed to serve as one of the test cases for a suit to represent 5,000 families who believe vaccines caused their child's autism.

During the review process, it was determined that Poling did not represent a test case because she had a rare, underlying genetic mitochondrial disorder that caused her deterioration and autism. For rare kids like her, any stress could have caused her to deteriorate. This is the equivalent of being born with an aneurysm, a ticking time bomb that could go off at any moment. Although she was not diagnosed prior to being vaccinated, experts recommend that even children with known mitochondrial disorders still be vaccinated.

**Bottom line:** The government did NOT concede that vaccines cause autism in the Poling case.

**Citations**

1. Maestro S. *Psychopathology*. 1999;32(6):292-300.
2. Jamain S, et al. *Nature Genetics*. 2003;34:27-9.
3. Chahrouh M, et al. *Science*. 2008;320(5880):1224-9.
4. Mills JL, et al. *Clinical Endocrinology*. 2007;67(2):230-7.
5. Fatemi SH, et al. *Schizophrenia Research*. 2008;99(1-3):56-70.
6. American Academy of Pediatrics. Immunizations. Available at [www.aap.org/immunization/families/safety.html](http://www.aap.org/immunization/families/safety.html). Accessed January 4, 2012.
7. Limperopoulos C, et al. *Pediatrics*. 2008; 121(4):758-65.
8. Croen LA, et al. *Archives of Pediatric and Adolescent Medicine*. 2007;161(4):334-40.
9. Cheslack-Postava K, et al. *Pediatrics*. 2011;127(2):246-53.
10. Omer SB, et al. *American Journal of Epidemiology* 2008; 168(12):1389-96.
11. Wakefield AJ, et al. *Lancet*. 1998;351:637-41.
12. Begley S. *Newsweek* 2009;153(9):42-7.
13. American Academy of Pediatrics. *Pediatrics* 2001;108(1):197-205.
14. Centers for Disease Control and Prevention. *MMWR* 1999;48:563-5.
15. Food and Drug Administration. Mercury Levels in Commercial Fish and Shellfish (1990-2010). Available at [www.fda.gov/Food/FoodSafety/Product-SpecificInformation/Seafood/FoodbornePathogensContaminants/Methylmercury/ucm115644.htm](http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/Seafood/FoodbornePathogensContaminants/Methylmercury/ucm115644.htm). Accessed January 4, 2012.
16. Schechter R, et al. *Archives of General Psychiatry* 2008;65(1):19-24.
17. Andrews N, et al. *Pediatrics* 2004;114(3):584-91.
18. Thompson WW, et al. *New England Journal of Medicine*. 2007;357:1281-92.
19. Nelson K. *Pediatrics* 2003;111(3):674-9.
20. Offit P. *Pediatrics* 2003;112(6):1394-1401.
21. Verreault R, et al. *Canadian Medical Association Journal* 2001;165(11):1495-8.
22. The Children's Hospital of Philadelphia, Vaccine Education Center, available at [www.vaccine.chop.edu/service/vaccine-education-center/hot-topics/aluminum.html](http://www.vaccine.chop.edu/service/vaccine-education-center/hot-topics/aluminum.html). Accessed on January 4, 2012.
23. Food and Drug Administration, HHS, Common Ingredients in U.S. Licensed Vaccines. Available at [www.fda.gov/BiologicsBloodVaccines/SafetyAvailability/VaccineSafety/ucm187810.htm](http://www.fda.gov/BiologicsBloodVaccines/SafetyAvailability/VaccineSafety/ucm187810.htm). Accessed on January 4, 2012.