

Vaccines Don't Cause Autism. Why Do Some People Think They Do?

How a retracted study from the 1990s undermined trust in vaccines and led to a persistent myth.

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By Public Health On Call

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In 1971, the FDA approved the measles-mumps-rubella (MMR) vaccine, which combined three vaccines that had been approved previously—in 1963, 1967, and 1969, respectively. The vaccine has proven safe and effective and has been widely administered around the world for decades.

But in 1998, a paper describing 12 children who received the MMR and later developed autism or other disorders planted seeds of doubt about the vaccine's safety. The paper was later retracted, and several large studies have since shown no association between vaccines and autism, but the idea persists among some groups that vaccines cause autism.

In the [March 14 episode \(https://johnshopkinssph.libsyn.com/869-the-evidence-on-vaccines-and-autism\)](https://johnshopkinssph.libsyn.com/869-the-evidence-on-vaccines-and-autism) of [Public Health On Call \(https://publichealth.jhu.edu/headlines/public-health-on-call-podcast\)](https://publichealth.jhu.edu/headlines/public-health-on-call-podcast), vaccinologist [Daniel Salmon \(https://publichealth.jhu.edu/faculty/1015/daniel-salmon\)](https://publichealth.jhu.edu/faculty/1015/daniel-salmon), PhD '03, MPH, director of the [Johns Hopkins Institute for Vaccine Safety \(https://www.hopkinsvaccine.org/\)](https://www.hopkinsvaccine.org/), spoke with [Josh Sharfstein \(https://publichealth.jhu.edu/faculty/1781/joshua-m-sharfstein\)](https://publichealth.jhu.edu/faculty/1781/joshua-m-sharfstein), MD, about how this idea took hold and why it's been so hard to dispel. This Q&A is adapted from that conversation.

When did you start seeing concerns about vaccines and autism as a side effect of vaccines?

The issue was first raised by an article published by Andrew Wakefield in 1998. He was a GI doctor at the Royal Free Hospital in London, a very well-known hospital, and he published [a paper \(https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(97\)11096-0/fulltext\)](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(97)11096-0/fulltext) in *The Lancet*, a prestigious journal. He looked at 12 children, eight of whom the parents reported developing autism after getting the MMR vaccine.

The study was described as a consecutive case series—but it wasn't even really that, because there was no control group or control period. But even a case series can't tell you whether one thing causes another thing. It is simply a description.

But once that paper was published, Wakefield got a lot of press and told people that he had shown vaccines had caused autism, which again, that study couldn't even do.

The paper was ultimately retracted. Within a short amount of time, several of the authors pulled their names.

There were lots of problems later found with what was published. For example, the cases were not consecutive [i.e., they did not include all of the children studied]. They were cherry-picked cases. And we know that, given that the age when children receive the MMR is also the age when some children regress into autism, there will be a temporal relationship; by chance alone, some children would develop autism after vaccination. So, from a scientific perspective, the paper didn't show much.

But you had a very well-credentialed, very charismatic person coming from an outstanding institution publishing this paper in a very prestigious journal, and he really ran with it.

Do you think it was just Dr. Wakefield himself that made people think vaccines cause autism, or were there other factors?

I think autism was ripe for vaccine safety controversies for a few reasons: It becomes apparent to the parent early in childhood, around when we give a lot of vaccines. Autism seems to be increasing in incidence or prevalence, so there's more of it out there. And we don't fully understand what causes it.

So, you have a lot of parents who are watching their children develop normally and then regress into autism. And they want to know why.

In addition, you had autism advocacy groups, where parents came together looking for answers and looking for support for their children. So, you have parents thinking, what happened? What caused this? And then they think, my child had just gotten vaccinated. And then they talk with other parents of autistic children who say, wow, my child just got vaccinated, too.

Parents are looking for answers, understandably. And so the issue was very ripe for it to be associated with vaccines—not by cause and effect, but by timing and temporality.

What research was done to look into this perceived link?

The attention this question got led to a number of large epidemiological studies that looked at kids who were vaccinated with the MMR vaccine and those who weren't, so there were control groups. And those studies found no association between the MMR vaccine and autism.

Once it started to become clear that the MMR vaccine was not associated with autism, the hypothesis shifted from the MMR vaccine [as a cause of autism] to thimerosal, which at the time was used as a preservative in some childhood vaccines.

Thimerosal was never used in the MMR vaccine, but it was used as a preservative in multidose vials of other vaccines.

That led to a number of large studies looking at thimerosal in vaccines and autism, and those studies also found no relationship. Then the hypothesis shifted again to the number of vaccines given at one time, so there were studies of that, which also found no relationship between vaccines and autism.

At this point, we have 16 well-conducted, large population-based studies, carefully designed, done by different investigators in different countries, using different but strong methods. And all have found no relationship between MMR vaccine, thimerosal in vaccines, or the number of vaccines given and autism. The evidence is compelling.

Why do you think this theory has persisted despite the research showing there is no relationship between vaccines and autism?

It's a complicated question. There's not a single, simple answer to that.

I'm not an autism researcher, but my understanding is that we've identified some causes for autism, but there are still a lot of causes we haven't identified. So the question of what causes autism spectrum disorder is still out there.

Another part of the answer is that it took some time for those studies to be done—more than a year for the first study after the MMR vaccine hypothesis, and years in the case of the thimerosal hypothesis. It created a void, a vacuum of information in a time when about a quarter of the parents had already made up their minds that vaccines cause autism.

I think if the science had been done sooner—understanding that good science takes time and effort—that would have helped. I also think if there'd been more trust in public health authorities and in those doing the science, it may have been received in a more impactful way.

To be clear, when you say good science versus bad science, you're talking about how the study is done.

Correct. I'm talking about the rigor of the methods used in a study.

Can you give an example of rigorous study versus a non-rigorous study?

Something we often hear from people worried about vaccines is that we need to do a vaccinated/unvaccinated study. And intuitively, that makes a lot of sense. It seems rather straightforward. But in fact, it's more complicated than that.

Consider the example of what causes lung cancer. If you looked at lung cancer rates among people who drink alcohol, you would find that the rate is higher than it is for nondrinkers, and somebody might conclude that drinking alcohol causes lung cancer. But that's not the case. The issue is that people who drink are more likely to smoke, and smoking causes lung cancer. So drinking would be a confounder, something that's associated with the exposure and the outcome, but not a part of the causal pathway.

And in the case of looking at vaccinated versus unvaccinated children, only about 2% of American children are completely unvaccinated. And that 2% is very, very different from the 98%.

I received an email last week that said, why can't you just look at Amish children [based on the misperception that Amish children are not vaccinated], and we can figure out whether vaccines cause autism and other health outcomes?

Amish children are very, very different from other populations of children—in their lifestyle, in all sorts of environmental exposures, in what they eat, and, importantly, in terms of how they access and use medicine and health care. I've never studied autism among Amish children, but my guess is that even if autism rates were about the same, they're probably much less likely to get diagnosed.

Earlier I brought up the issue of confounding. You really have to adjust for confounding when you look at vaccine safety. These studies can be done, and they have been done. They're just not easy to do. And sometimes it's not intuitive.

What do you think about the idea of doing more research on whether vaccines are linked to autism?

I'm a scientist and I believe in the value of science. The science that has been done has shown that vaccines are very safe. They're not perfectly safe; they do sometimes, very rarely cause adverse reactions.

But when it comes to autism, the science has already largely been done. If you gave me a pot of money and said, let's do more vaccine safety research, autism would not be high up on this list because the existing science is already quite compelling.

This interview was edited for length and clarity by Melissa Hartman.

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