

## Does the MMR Vaccine Cause Autism?

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Jenna, one of my youngest patients, has been a picture of health since the day she was born. At her one-year-old checkup one recent morning, I found her still growing like a weed and meeting all her developmental milestones right on time. But when it came time to give Jenna her routine immunizations -- including her first measles, mumps, and rubella (MMR) vaccine -- her mother seemed a little anxious. I heard that that shot can cause autism, she said. Can't Jenna skip that one?

Jenna's mom's concern is a common one. Many of today's parents have read news reports and Internet rumors about the MMR vaccine, but are too young to remember a time when the horrible diseases it prevents were widespread. When parents ask if a child should forgo the shot, I always strongly recommend that they give their child the excellent protection the vaccine offers -- and reassure them that worrying about autism isn't necessary.

This month in Your Child's Health, Duke pediatrician and medical historian Jeffrey P. Baker, MD, PhD, presents the facts about the MMR vaccine and autism.

--Dennis Clements, MD, PhD

Dr. Baker

No one disputes that autism is being diagnosed more frequently than it was twenty years ago. But experts debate to what extent this trend reflects better detection or a real increase in the disorder itself. The definition of autism has been expanded considerably in recent years, and better recognition likely accounts for much of the rise. Indeed, studies of families and twins suggest that genetic factors are of primary importance.

Yet for parents coping with the demands of an autistic child, it is hard not to believe that something in the environment is at fault as well. Many possible causes have been proposed, ranging from food additives to environmental mercury and PCBs. The National Autism Association has focused on the vaccine preservative thimerosal, metabolized to ethyl mercury, as a possible culprit. There is simply no evidence supporting this assertion, however. Denmark removed thimerosal from its vaccines in 1992 and still experienced a subsequent rise in autism. The United States has done the same, and today all of the required childhood vaccines are now available without this preservative. Again, no association with autism has been shown.

### **Benefits of the MMR vaccine**

The other chief vaccine controversy involves the MMR immunization, which protects against measles, mumps, and rubella (German measles). First licensed in the United States in 1971, it long had a reputation as one of the safest and most effective vaccines.

The most serious of the three diseases against which it protects, measles, was once a nearly universal affliction in childhood. At best it involves several miserable days of high fever followed by a rash. What makes it a greater concern, however, are its complications of pneumonia and encephalitis (an infection that can permanently injure the brain). In the last major epidemic in the United States (1990-1991), 20 percent of children who caught the disease were hospitalized and 1 in 400 died. The dangers of measles have largely been forgotten since widespread use of the vaccine has resulted in a 99 percent decline in the incidence of the disease in this country.

### **The charges against MMR**

In 1997, however, British investigator Andrew Wakefield published an article in which he described several children who developed signs of autism and intestinal symptoms following their MMR immunization. He suggested that the vaccine inflamed the gut in a manner that allowed an unspecified toxic substance to cross into the bloodstream. As the British media picked up the story, anecdotes from parents began to circulate in support.

Out of this modest study has arisen a formidable challenge to the MMR vaccine. Vaccination rates in Britain have dropped to the point that outbreaks of the disease are again occurring. Many parents of autistic children on both sides of the Atlantic have embraced the theory.

And many parents are just not sure what to think. Is the MMR vaccine really guilty as charged?

### **Link to autism: A matter of timing?**

The fundamental question is whether the relationship of the vaccine to autism is real or coincidental. The MMR is generally given to infants 12 to 15 months old. Children with autism are often described by the parents as developing normally until regressing (or losing language and social abilities) during the second year of life. Many autism researchers would not agree that most autistic children progressed truly "normally" during the first year, but it remains true that some autistic children do regress dramatically as toddlers. And in certain cases this will inevitably occur soon after the MMR vaccine. The question is whether these distressing cases represent a cause-and-effect relationship or a tragic coincidence.

This question has been intensively examined by both large studies and expert panel reviews. Panels convened by the Institute of Medicine, Medical Research Council, and World Health Organization have all agreed that these studies have not supported the hypothesis that MMR is an important cause of autism.

Still, parents cannot help but wonder whether the experts are right. Statistics are complex and subject to manipulation. A host of Internet sites charge that this is exactly what has happened.

### **Why the worry arose**

Here is where understanding a bit of medical history can be of help. It is no accident that the MMR/autism controversy resonated with so many parents in Britain. Autism cases began to rise roughly around 1980. Public talk about an "autism epidemic" gained momentum in the 1990s. And in Britain, the MMR was a relatively new vaccine, introduced into the routine child vaccine schedule only in 1988. In the United States, as previously mentioned, MMR has been used since 1971. Measles vaccine was licensed still earlier (in 1963). Yet there was no talk of an autism epidemic then.

The MMR/autism controversy, in other words, is a British import to the U.S. In this regard it is worth noting that such controversies have been a recurrent theme in the United Kingdom since the bitter controversies surrounding compulsory smallpox vaccination in the 19th century. In 1978 and 1982, whooping cough epidemics swept the British Isles in the wake of widespread public fear that its vaccine carried a significant risk of brain damage. That alleged association was shown at best to be extremely rare if based in reality at all.

### **Studies find no link between MMR and autism**

If MMR caused a significant fraction of the rise in cases of autism, one would expect that its introduction would have been associated with a jump in autism cases. Studies have examined this question in both California and Britain. In neither case has any link been found.

Far from being covered up, the MMR/autism hypothesis has been intensively studied. One of the authors of Wakefield's original paper has recently stepped forward to say that "There is now unequivocal evidence that MMR is not a risk factor for autism -- this statement is not spin or medical conspiracy, but reflects an unprecedented volume of medical study."

The parents of autistic children are some of the most courageous and dedicated in my practice. I can only begin to grasp their level of frustration surrounding the many uncertainties that attend the cause of autism. The studies admittedly cannot disprove that MMR has ever provoked a single case of autism. But they do show, unequivocally, that if this has happened at all, it has happened only extremely rarely, and cannot begin to account for the rise in autistic cases that has caused so much distress. There is no doubt, on the other hand, that the dangers from measles itself are real and well-documented.

Jeffrey P. Baker, MD, PhD, is an associate clinical professor of pediatrics and on the faculty of the Duke Center for the Study of Medical Ethics and Humanities.

Dennis Clements, MD, PhD, is the chief of primary care pediatrics at Duke Children's Hospital.

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