

Understanding MMR Vaccine Safety

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<http://www.cdc.gov/vaccines/conversations>

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- CDC recommends two doses of the measles, mumps, and rubella vaccine (MMR) for children because it protects them against dangerous, even deadly, diseases.
- The MMR vaccine has a long record of safety. Serious risks of MMR vaccine are rare. All reputable scientific studies have found no relationship between MMR vaccine and autism.
- The routinely recommended age for the first MMR dose is 12 months through 15 months. The routinely recommended age for the second MMR dose is 4 years through 6 years.
- If there is an outbreak of measles, health authorities might recommend the vaccine be given at an earlier age.

the first dose of MMR at age 12 months through 15 months. Because parents know their children best, they should become familiar with the developmental milestones that children should reach and when they should reach them, learning what to watch for in how children play, learn, speak, and act. These milestones can be found on CDC's Learn the Signs. Act Early website at <http://www.cdc.gov/ncbddd/autism/ActEarly/default.htm>.

Parents also should talk to their child's health care professional immediately about any concerns that may arise as they observe their child's development. By working together, parents and health care professionals can act early not only to identify developmental problems but also to take action to help children reach their full potential.

A second reason that some people think MMR vaccine may cause autism stems from a 1998 study published in the *Lancet* in the United Kingdom. One of the authors claimed that MMR vaccine could contribute to the development of autism. This study received a great deal of media coverage. It was followed by many larger population studies totaling thousands of children and conducted in several countries, including the U.S. These studies found that MMR vaccine is not responsible for a rise in autism. It is also important to note, that 10 of the 13 authors of the 1998 *Lancet* study have withdrawn their support of the article. In 2010, the British General Medical Council found the lead author of the study guilty of professional misconduct, the *Lancet* retracted the 1998 article, and the study's lead author has lost his license to practice medicine in the UK. Further, in January 2011, the *British Medical Journal* (BMJ) published a series of articles that conclude that the data in the 1998 study were misrepresented or altered.

What's the harm in delaying the first MMR shot until my child is age 2 or older?

The MMR vaccine is recommended to be given during ages 12 months through 15 months. If you wait to give it later, your child could get measles, mumps, and/or rubella. Unfortunately, all of these diseases remain a threat in the United States. For

questions and answers |

Reputable scientific studies have found no link between MMR vaccine and autism. So, why do some people think that MMR vaccine causes autism?

There are a couple of reasons for this. Some parents of children with autism say they first noticed signs of autism a few days, weeks, or months after their child received MMR vaccine. They usually explain that their child was developing normally, and then signs of autism appeared after MMR vaccination.

Sometimes, signs of autism do not appear until around the age that the first dose of MMR is given. Some toddlers who have turned 1 year old—or even 2 or 3 years old—regress. That is, they lose the ability to do things that they once were able to do. If regression follows a memorable event like a trip to the doctor for vaccinations, this may seem like cause and effect. However, there may be signs of autism before a child is old enough to get



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example, in 2008, there were 140 measles cases in the United States, more than any year since 1996. Seventeen of those cases were in children younger than 12 months old—too young to be vaccinated according to the routine recommendation. Another 9 were in unvaccinated 12- through 15-month-olds—the age when the vaccine is recommended. And 72 cases were in children and teens 16 months old through 19 years old who had not received the vaccine. Eight children younger than 2 years old and 9 adults were so seriously ill that they required hospitalization. Following U.S. recommendations for using MMR vaccine is the best way to protect children from these diseases and avoid outbreaks.

How effective is MMR vaccine?

The vaccine is so effective that the United States eliminated measles in 2000. *Elimination* means that, even if measles is introduced into a community, it cannot spread to very many people. Elimination is possible when enough people are immune to a disease because of vaccination.

But, measles is still common in other parts of the world. Since people from the United States and other countries frequently travel internationally, we must keep MMR vaccination rates in the United States high. Even if your family does not travel, you could come into contact with international travelers anywhere in your community, from the grocery store to a sporting event. The United Kingdom had eliminated measles, but then MMR vaccination rates fell. Now, measles is once again spreading in that country.

Some people think that the vaccine preservative thimerosal is dangerous. Is there thimerosal or mercury in MMR vaccine?

No. The MMR vaccine never has contained thimerosal or any other form of mercury. Furthermore, there is no evidence that thimerosal in vaccines is harmful.

How long has MMR vaccine been in use?

The measles component in MMR vaccine that we use today has been in use since 1968, the mumps vaccine since 1967, and the rubella vaccine since 1979. All of these vaccines replaced earlier versions. Today's versions are safer, provide longer-lasting protection, and have fewer side effects.

What are the known side effects of MMR vaccine?

Mild problems include fever (about 1 person out of 6), mild rash (about 1 person out of 20), and swelling of the glands in the cheeks or neck (rare). Moderate problems include seizure caused by fever (about 1 out of 3,000 doses), and temporary low platelet count, which rarely can cause a bleeding disorder (about 1 out of

30,000 doses). Severe problems are rare. Severe allergic reaction happens less than 1 time per 1,000,000 vaccine doses.

What are the causes of autism?

CDC and other agencies and organizations are conducting research to find out. Many doctors believe that genetics likely play a strong role.

Across the world, parents, doctors, and scientists are working together to find the causes of autism and the best ways to treat or prevent the symptoms. More information can be found on CDC's Autism Spectrum Disorders website at <http://www.cdc.gov/ncbddd/autism/>.

| the science |

Here is a summary of 5 of the more than 20 reputable studies that have found no relationship between MMR vaccine and autism. These studies were selected for this sheet because they illustrate the variety of methods that have been used to investigate whether MMR vaccine is linked to autism.

Lack of Association between Measles Virus Vaccine and Autism with Enteropathy: A Case-Control Study by Mady Hornig et al. *PLoS ONE*. September 2008. Vol 3: page e3140. <http://www.plosone.org/article/info:doi/10.1371/journal.pone.0003140>.

Age at First Measles-Mumps-Rubella Vaccination in Children with Autism and School-Matched Control Subjects: A Population-Based Study in Metropolitan Atlanta by Frank DeStefano et al. *Pediatrics*. February 2004. Vol 113: pages 259-266. <http://pediatrics.aappublications.org/cgi/reprint/113/2/259>.

Immunization Safety Review: Vaccines and Autism. Institute of Medicine. The National Academies Press: 2004. <http://www.iom.edu/?id=20155&redirect=0>.

A Population-Based Study of Measles, Mumps and Rubella Vaccination and Autism by Kreesten Meldgaard Madsen et al. *New England Journal of Medicine*. November 7, 2002. Vol 347: pages 1477-1482. <http://content.nejm.org/cgi/reprint/347/19/1477.pdf>.

Autism and Measles, Mumps, and Rubella Vaccine: No Epidemiological Evidence for a Causal Association by Brent Taylor et al. *The Lancet*. June 12, 1999. Vol 353: pages 2026-2029. <http://www.freenetpages.co.uk/hp/gingernut/lancet/Brent%20Taylor%20June%201999.pdf>.