

## **Just the Facts: MMR Vaccine and Autism**

A panel of experts convened by the Academy reviewed data on possible associations between MMR vaccine and autistic spectrum disorder (ASD). The panel also examined information on a possible relationship of measles virus and/or vaccine and inflammatory bowel disease (IBD).

The report concludes, "The available evidence does not support the hypothesis that MMR vaccine causes autism or associated disorders or IBD" (Pediatrics. 2001;107:e84. ). It also says pediatricians need to work with families to ensure children are protected from these preventable diseases.

The expert panel also concluded in its report that "separate administration of measles, mumps and rubella vaccines to children provides no benefit over administration of the combination MMR vaccine and would result in delayed or missed immunizations."

More research should be conducted to determine the true cause or causes of autism.

## **BACKGROUND ON MMR**

**Q:** A 60 Minutes story (Nov 12, 2000) suggested individual shots for Measles, Mumps, and Rubella. Is this possible?

While measles, mumps and rubella vaccines are available individually, there is no scientific reason for or benefit to separating the vaccines. By separating them, we are putting children (and pregnant women who may be exposed to them) at increased risk by extending the amount of time they go unvaccinated. Studies have shown that there is an increased risk that children may not receive all the shots they need if their parents have to schedule additional appointments for immunizations. We are increasing our children's discomfort. Instead of receiving two shots, they will receive six. At this time we simply do not have enough individual vaccine supply to make the individual shots possible. Again, children who don't receive the currently available combination shot are put at needless risk.

**Q.** Is there a link between measles vaccination and autism?

No, there is no scientifically proven link between measles vaccination and autism. Autism is a chronic developmental disorder, often first identified in toddlers from age 18 months to 30 months. MMR is administered just before the peak age of onset of autism, leading some parents to assume a causal relationship. A recent study in the British journal Lancet showed that there is no association between the MMR vaccine and autism. The CDC continues to conduct studies to further assure the safety of vaccines. Increasing evidence indicates that autism is determined early in the pregnancy (during the first trimester).

**Q.** Why are we seeing a rise in the incidence of autism?

Doctors use a book called the Diagnostic Statistical Manual to help them diagnose cases of autism. In the past decade, the guidelines in that book have changed. They have become more inclusive. So children who used to be considered "learning delayed" or to have "behavior problems." may now be more correctly diagnosed with mild autism. Parents and medical professionals are simply more aware of the condition and are more likely to pursue a diagnosis and treatment than in years past. As there are more state and federally funded programs available for children with autism, there is an increased incentive to make a diagnosis, so those children will have access to those programs. Statisticians who gather data disagree over whether there is truly an increase in the number of children who have autism. But there have already been studies completed that show that MMR does not cause autism. Many studies are underway both nationally and internationally to try to determine the cause for the perceived increase in cases of autism.

**Q. What can happen if parents don't get their child immunized?**

Without immunizations, a child can catch diseases that may cause high fever, coughing, choking, breathing problems, and even brain injury. These illnesses may leave a child deaf or blind, cause paralysis, and even death. Despite this and other successes, some parents still refuse to have their child immunized. This not only puts their child at risk, it also opens up the possibility of outbreaks in schools, child care centers and other public settings.

**Q. Why should we still vaccinate against measles when cases are so uncommon?**

Measles virus is common throughout the world and is frequently imported into the U.S. In 1996, 47 cases were known to have been imported by people traveling to the U.S. from other countries. In 1998 and 1999 all U.S. measles cases reported were linked to imported cases. Before measles immunizations were available, nearly everyone in the U.S. got measles. There were approximately 3 to 4 million measles cases each year. An average of 450 measles-associated deaths were reported each year between 1953 and 1963. A reduction in measles vaccination rates would substantially increase the potential size and morbidity of any outbreak. That means we would see more people die from measles.

**Q. What are the known complications of measles vaccination?**

Measles vaccine is very safe; most people have no reactions. About 5 percent to 15 percent of vaccine recipients may develop a fever five to 12 days after MMR vaccination. The fever usually lasts one to two days and usually is not associated with other symptoms. About 5 percent of MMR recipients may develop a transient rash one to two weeks after immunization. Central nervous system disturbances, such as encephalitis, have been reported with a frequency of less than one per 1 million doses administered, a frequency many times lower than the incidence of serious central nervous system disorders that follow natural infection at a rate of one per 800.

**Q. Aren't measles, mumps and rubella relatively harmless illnesses?**

Measles

Highly contagious respiratory disease

Causes rash, high fever, cough, runny nose and red, watery eyes, lasting about a week

Causes ear infections and pneumonia in 1 out of every 12 children who get it

Causes encephalitis that can lead to convulsions, deafness or mental retardation in 1 to 2 of every 2,000 people who get it

In 1989-90, there was a measles epidemic, resulting in 55,000 cases of measles, 11,000 hospitalizations, and 123 deaths. The majority of these cases were in unimmunized preschool children.

Of every 1,000 people who get measles, 1 to 2 will die

Measles vaccine (contained in MMR, MR and measles vaccines) can prevent this disease

Mumps

Causes fever, headache and swelling of one or both cheeks or sides of the jaw

Four to six persons out of 100 who get mumps will get meningitis

Inflammation of the testicles occurs in about 4 of every 10 adult males who get mumps, which may lead to sterility

May result in hearing loss, which is usually permanent

Rubella

Also known as German measles

Mild disease in children and young adults, causing rash and fever for 2 to 3 days

Causes devastating birth defects if acquired by a pregnant woman; there is at least 80% chance of damage to the fetus if a woman is infected early in pregnancy

Q. What is autism?

**A.** Autism is a spectrum of chronic developmental disorders. The main characteristics of autism are difficulties in social interaction, communication, and restrictive and repetitive interests and activities. Autism may be noted initially in infancy as impaired attachment, but autism is most often first identified in toddlers, mostly boys, from 18 to 30 months of age. Although there is no cure, autism is treatable. Symptoms associated with autism often improve as children start to acquire language and learn how to communicate their needs.

**Q.** What causes autism?

**A.** The causes of autism are not known for certain. Most experts agree that autism is a condition that begins before birth. The current theory favored by many experts is that autism is a genetically-based disorder. Studies of persons with autism have identified abnormalities in brain structures that develop in the first few weeks of gestation (that is, while the fetus is in the womb). Evidence that genetics is an important, but not exclusive, cause of autism includes a 3 to 8 percent risk of recurrence in families with one affected child. Also, when one identical twin has autism, the chances are extremely high that the other twin will also have autism. A working group convened by the National Institutes of Health in 1995 reached a consensus that autism is a genetic condition. An issue unresolved by the group was the role of immune factors in certain forms of autism; it was suggested that studies to clarify the situation are needed.

**Q.** Is there any evidence linking measles vaccine or MMR and autism?

**A.** The currently available evidence does not support a link between MMR and autism. Autism usually is diagnosed in children when they are 18 to 30 months old. This is a period in life shortly after children have received many of the recommended vaccinations. Because of this coincidence, some parents of children with autism believe that an immunization may have caused their child's condition. A 1998 study in the medical journal *Lancet*, reported that there may be a link between the measles virus and autism. Subsequent studies in the United Kingdom and in Sweden have been conducted to evaluate whether measles virus or MMR vaccine causes, or in any way contributes to, autism. These studies showed no association between the MMR vaccine and autism. In a thorough review of all the evidence, the Medical Research Council in the United Kingdom found no scientific evidence supporting a relationship between MMR vaccine and autism.

**Q.** What if multiple laboratories confirmed the presence of measles virus in specimens from the intestines of children with autism? Would that indicate that measles causes autism?

**A.** Even if measles virus were consistently shown to be present in intestinal specimens of children, this would not conclusively indicate that measles causes autism. It is possible that the measles virus persists in the intestines of children with autism, ie, the measles virus in the intestine is a side effect of autism, not a cause. In addition, in order to implicate measles virus as a cause of autism, it would be important to show that measles virus is not present in the bowel of healthy children who are of the same age as the autistic children and have the same history of measles infection and the same vaccination status. Also, there is no scientific evidence to show how intestinal inflammation with measles virus would cause the chronic neurological and behavioral difficulties seen with autism.

**Q.** What if measles virus is shown to be associated with autism? Would that mean we should stop vaccinating against measles?

**A.** If measles virus is shown to be associated with autism, it would be most likely that the wild measles virus would be a greater cause of autism than vaccine virus. Therefore, it is likely that in preventing wild measles virus infections, we also would be reducing the total number of cases of autism. People infected with wild type measles virus develop severe infections. Vaccination exposes the child to a weaker measles virus and prevents the complications of these severe infections. As an example, a severe degenerative infection of the brain (sub-acute sclerosing panencephalitis or SSPE) can occur following wild - type measles virus

infection. Vaccine virus does not cause this severe degenerative infection and vaccination programs in the United States have virtually eliminated such complications by controlling measles.

**Q.** What can happen if parents don't get their child immunized?

**A.** Without immunizations, a child can catch diseases that may cause high fever, coughing, choking, breathing problems, and even brain injury. These illnesses may leave a child deaf or blind, cause paralysis, and even death. Around 1960, there were over a half a million measles cases and more than 400 deaths associated with this disease. Thanks to immunization efforts, there were only 100 cases of measles in 1998 and zero deaths related to measles. Despite this and other successes, some parents still refuse to have their children immunized. This not only puts their child at risk, it also opens up the possibility of outbreaks in schools, child care centers and other public settings.

**Q.** Why should we still vaccinate against measles when cases are so uncommon?

**A.** Before measles immunizations were available, nearly everyone in the U.S. got measles disease. There were approximately 3 to 4 million measles cases each year. An average of 450 measles-associated deaths were reported each year between 1953 and 1963. Currently measles virus is common throughout the world and is frequently imported into the U.S. In 1998, 100 cases of measles occurred in the U.S. In 1998 and 1999, all measles cases in the U.S. were linked to imported cases. A reduction in measles immunization rates would substantially increase the potential size and morbidity of any outbreak. That means we would see more people die from measles.

**Q.** What are the known complications of measles vaccination?

**A.** Measles vaccine is very safe; most people have no reactions. About 5 percent to 15 percent of vaccinees may develop a fever 5 to 12 days after MMR vaccination. The fever usually lasts one to two days and usually is not associated with other symptoms. About 5 percent of MMR recipients may develop a transient rash one to two weeks after immunization. Central nervous system disturbances, such as encephalitis, have been reported with a frequency of less than one per 1 million doses administered, a frequency many times lower than the incidence of serious central nervous system disorders that follow natural infection.

**Q.** Aren't measles, mumps and rubella relatively harmless illnesses?

**A.** Measles is a highly contagious serious viral infection. The illness is characterized by a rash, but the virus can also spread through the body causing pneumonia, diarrhea, or ear infections in up to 10% of people. In addition, it can cause an infection of the brain (encephalitis), which can cause permanent brain damage. Approximately 20% of people with measles will be hospitalized and for every 1,000 people who get measles, 1 to 2 will die. Measles vaccine (contained in MMR, MR and measles vaccines) can prevent this disease. Mumps causes fever, headache and swelling of one or both cheeks or sides of the jaw. Four to six persons out of 100 who get mumps will get meningitis, an inflammation of the lining of the brain. Inflammation of the testicles, which may lead to sterility, occurs in about 4 of every 10 adult males who get mumps. Mumps also may result in hearing loss, which is usually permanent. Rubella is also known as German measles. Rubella is a mild disease in children and young adults, causing rash and fever for 2 to 3 days. However, rubella can cause devastating birth defects if acquired by a pregnant woman; there is at least 20% chance of damage to the fetus if a woman is infected early in pregnancy.

**Q.** What is being done to find the causes of autism and to ensure the safety of the MMR vaccine?

**A.** The U.S. Centers for Disease Control and Prevention is conducting other scientific studies to further examine any possible association between autism and the MMR vaccine.

Additionally, England's Medical Research Council will fund one of the largest studies of autism ever attempted. The study will attempt to discover the causes of autism. The CDC and the AAP continues to recommend two doses of MMR vaccine for all children. The first dose is recommended at 12-15 months of age and the second dose is recommended at 4-6 years of age. Immunizations are one of the most important ways that parents can protect their children against serious infectious diseases.

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# No link between vaccine, autism

## 500,000 children with, without shots tracked in research

By Rosie Mestel  
Los Angeles Times

A study of 500,000 Danish children has found no link between receiving the measles-mumps-rubella vaccine and developing the devastating childhood disorder autism.

The study, published in today's *New England Journal of Medicine*, is the latest of several studies to negate the suspicion, held by many parents, that the vaccine is behind the recent dramatic rise in autism cases.

Although the study is from Denmark, it is relevant for the United States, the authors said. The two countries use the same MMR vaccine and use very similar medical criteria for diagnosing autistic children.

Earlier studies had concluded there is no evidence for a MMR-autism link. But sev-

eral scientists said the study to be reported today was particularly powerful because it was so large and allowed researchers to track children individually. All residents of Denmark are given an identification number and later medical events such as vaccinations and psychiatric diagnoses are routinely recorded.

The study, led by epidemiologist Dr. Kresten Meldgaard Madsen of the Danish Epidemiology Science Center, analyzed data for all Danish children born between January 1991 and December 1998.

Of those 537,303 children, 440,655 had received an MMR vaccine and 96,648 had not. A total of 316 had been diagnosed with autistic disorder, and 422 had been diagnosed with other, closely-related conditions collectively known as autism spectrum disorders.

Analyzing the data, the scientists found that children who had been vaccinated were statistically no more likely to develop autism than children who had not been vaccinated. The study was co-authored

by scientists at the Danish Epidemiology Science Center in Arhus and Copenhagen, and the U.S. Centers for Disease Control and Prevention in Atlanta.

"I hope the study finally lays to rest the idea that the MMR vaccine causes autism," said Dr. Jay M. Lieberman, chief of pediatric infectious diseases at Miller Children's Hospital in Long Beach, Calif. Lieberman said that he has been troubled by an increase in the numbers of parents refusing the MMR vaccination out of fears that it will hurt their children.

Measles kills about 600,000 people worldwide each year, Lieberman said. It killed more than 140 people in the United States during a 1989-1991 outbreak caused by inadequate vaccination among schoolchildren. Rubella causes birth defects when it infects pregnant women and was once a leading cause of deafness in the United States before MMR vaccinations became routine.

Scientists are still seeking an explanation for the apparent rise in autism cases.