

Measles, mumps, rubella vaccine, inflammatory bowel disease and autism

for parents and caregivers...

MMR is a combination vaccine that protects against measles, mumps, and rubella (German measles). In New Zealand it is usually offered to children at 15 months and again at 4 years of age. A link between the MMR vaccine and development of bowel inflammation (IBD) and autism has been suggested by some researchers.

However, numerous large, carefully performed studies and reviews have now been done and have consistently found no relationship between MMR vaccine and autism or IBD.

This fact sheet answers commonly asked questions. It is adapted from a resource produced by the Australian National Centre for Immunisation Research and Surveillance. The original and complete copy of that resource can be found at: www.ncirs.usyd.edu.au/facts/mmr_autismbw.pdf

What is MMR vaccine?

Measles, mumps, rubella (MMR) vaccine is a live viral vaccine that contains weakened measles, mumps and rubella viruses that have been modified (or attenuated) to produce a protective immune response against natural infection without causing the diseases themselves. The New Zealand National Immunisation Schedule recommends MMR for all children at 15 months of age and again at 4 years of age.

What are autism and inflammatory bowel disease (IBD)?

Autism is a disorder of normal development that is usually diagnosed between 18 months and 3 years of age. Children and adults with autism typically have difficulties in verbal and nonverbal communication, social interactions, and leisure or play activities.

Autism is four times more common in boys than girls and occurs among all ethnic and social groups. A single cause of autism has not been identified, but current research links it to developmental, genetic and environmental factors.

IBD is a group of chronic inflammatory disorders of the small and large bowel, the commonest being ulcerative colitis and Crohn's disease. IBD is relatively rare, and usually occurs between 15 to 30 years of age, but can also occur in children. Common symptoms include diarrhoea, fever, stomach pain and weight loss. The cause of IBD is not understood, but immune mechanisms and a genetic predisposition are likely involved.

Does the MMR vaccine cause autism or IBD, and why was this suggested?

Numerous studies and expert panel reviews have concluded that there is no link between MMR vaccine and autism or IBD. The possibility of a link between the MMR vaccine and autism/IBD was suggested primarily by one group of researchers led by Dr Andrew Wakefield in the United Kingdom. Dr Wakefield claimed in the media that his study on 12 children suggested that measles virus in the gut caused a new syndrome of IBD which resulted in decreased absorption of essential vitamins and nutrients through the intestinal tract. It was suggested that this in turn caused developmental disorders such as autism, or worsening of symptoms in children already diagnosed with autism, so-called "regressive autism".

Although this theory generated a great deal of media attention, the study on which it is based has many significant weaknesses. Over 20 subsequent studies and many expert reviews that have shown no association between MMR and these diseases.

What about the studies that suggested a link between MMR and IBD /autism?

Medical and scientific experts who have reviewed the few studies where the authors claim a relationship between measles or MMR vaccine and autism/IBD have found them to have many significant weaknesses.

Additionally, they are not the types of studies that can possibly determine such a link. In 1993 Dr Wakefield suggested an association between both the natural and vaccine types of measles virus and IBD based on a study of bowel specimens from children with IBD. However, other groups of researchers using sensitive laboratory methods have shown that there is no evidence of measles virus in the blood or bowel of children with IBD. In 1998 Dr Wakefield and others reported 12 children with an apparently new syndrome of IBD in association with developmental disorders like autism. However, this study was conducted on highly selected patients, and no control patients. This significantly limits the credibility of the study findings. In 2002 Uhlmann, Wakefield and others published a study showing a higher rate of measles virus in the bowel of autistic children with bowel symptoms, compared to a group of children without autism. However, key information on the characteristics and the method of selection of the cases and control patients, on vaccination status, and on laboratory methods were not given, and the control subjects were not matched for gender or age.

In 2004, 10 of the original 13 authors of Dr Wakefield's 1998 study published a statement retracting the paper's interpretation, stating that the data were insufficient to establish a causal link between MMR vaccine and autism.

What studies show that autism and IBD are not related to the MMR vaccine?

A large number of independent researchers from around the world, using many different techniques ranging from molecular biology studies to population based epidemiology, have now shown that there is no evidence of a link between MMR vaccine and autism or IBD. Many of these studies compare the rates of autism and IBS in large groups of vaccinated and unvaccinated children. The following are summaries of some of the studies performed.

- In 1999, a large population-based study in England looked at the vaccination status of 498 children with autism and control subjects without autism and found no link between the timing of vaccination with MMR and the onset of autism.
- In 2004 another English study looked at the rates of autism in 5,500 children who attended GPs and were immunised with MMR, and found no evidence to suggest a link between the vaccine and autism.

- A study of more than 440,000 Danish children vaccinated in the 1990's compared with 96,000 unvaccinated children provided strong evidence against the hypothesis that MMR causes autism or autistic spectrum disorder.
- A large study in Finland followed almost 600,000 children for 20 years after MMR vaccination and found no evidence for MMR vaccine-associated autism or other neurological disorders.
- A study of the rates of IBD and autism among 6100 French school- aged children found no association between MMR and these diseases.
- A study in Sweden in 1998 looking at the prevalence of autism over 10 years found no change after the introduction of MMR vaccine.
- Two independent groups of researchers in the UK performed epidemiologic studies to determine if there was an association between bowel symptoms, autism and MMR. Both studies found no evidence for gastrointestinal problems being linked to developmental regression or to MMR vaccination.
- Additional studies in the US and UK found no correlation between trends in early childhood MMR immunisation rates and trends in autism diagnosis. For example, a study done in California, showed that although rates of autism have gone up by 373% over 15 years, the increase in the number of children immunised with MMR has only increased by 14% in that time.
- A study in the United States looked at patients with IBD born over a 32 year period, found that vaccination with MMR or other measles-containing vaccines, or the timing of vaccination early in life, did not increase the risk for IBD.
- At least 3 laboratory-based studies by different research groups using technical methods similar to those in the Uhlmann study, found no evidence of measles virus in the bowel specimens of patients with IBD.

What have expert reviews concluded?

A review by the World Health Organization concluded that current scientific data do not permit a causal link to be drawn between the measles virus and autism or IBD. An extensive review published in 2004 by the Institute of Medicine, an independent expert body in the United States, has concluded that there is no association between the MMR vaccine and the development of autism. Reviews by the American Academy of Pediatrics, The British Chief Medical Officer, the UK Medical Research Council, Canadian experts, and numerous other scientific experts have stated that there is no link between autism or IBD and the measles vaccine.

Is there any benefit in giving each of the vaccine components separately?

No, there is no evidence that giving each vaccine component of MMR separately over time is of any benefit. In fact, giving each component separately may be harmful because children and their contacts would be exposed to serious diseases over a longer period of time. In addition, many extra needles and immunisation visits would be required. National and international expert bodies, including the NHMRC, the World Health Organization, the Institute of Medicine, the American Academy of Pediatrics, and The United Kingdom Department of Health all recommend that MMR should continue to be used.

What about reports of a link between autism and thiomersal?

Thiomersal (also known as thimerosal) is a preservative used in some vaccines to prevent bacterial contamination of the vaccine vial. Since it is a mercury-based substance, theoretical concerns regarding its use in vaccines have been raised, and it has been removed from many vaccines as a precautionary measure. However, all the scientific evidence available to date suggests that thimerosal in vaccines has never caused any harm. Although a study published by Geier and Geier in 2003 suggested links between thiomersal in vaccines and the rates of autism and heart disease in the United States, these findings have been dismissed because of numerous significant errors in the study's methods. A recent review published in the journal *Pediatrics* assessed all the published studies regarding thiomersal and autism and concluded that there was no link between thiomersal containing vaccines and autism spectrum disorder. The Institute of Medicine recently conducted a wide ranging expert review that concluded that there is no link between thiomersal in vaccines and autism. Neither MMR, nor any other childhood vaccine contain thiomersal. The MMR vaccine has never contained thiomersal.