

# *The MMR vaccine*

*Detailed answers to parents' questions*

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*March 2001*

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### **1. *Why is MMR vaccination so important?***

Immunisation against infectious disease has probably saved more lives than any other public health intervention, apart from the provision of clean water. The three diseases that MMR protects against can all cause serious problems.

**Measles:** Measles can kill. In the last year (1967) before measles vaccine was introduced measles killed one hundred children in the UK in an outbreak that affected half a million children. Last year two children died in Dublin and three children died in the Netherlands in measles outbreaks that were small compared to those that occurred prior to vaccination. In addition, there are complications of measles for one in every fifteen cases including bronchitis, pneumonia, convulsions and encephalitis (inflammation of the brain).

**Mumps:** Complications of mumps include pancreatitis, oophoritis (inflammation of the ovaries); orchitis (inflammation of the testicles); deafness; meningitis and encephalitis. Prior to MMR, mumps was the most common cause of viral meningitis and/or permanent unilateral deafness.

**Rubella:** Rubella can cause encephalitis and a blood clotting disorder. Most importantly if a pregnant mother catches it in the first ten weeks of pregnancy it causes fetal damage in 90% of babies and severe multiple defects are common. In 1971, prior to the introduction of rubella vaccine, 162 women either had to have an abortion because of rubella infection or had a baby with congenital rubella syndrome

The table on page 9 details the common symptoms and the possible complications of these infections.

### **2. *How can we be sure that MMR vaccine is safe?***

An enormous amount of research has been done into MMR vaccine stretching back over 30 years and it has been shown to have an excellent safety profile. It has been licensed in countries throughout Europe, North America and Australia. These countries have strict licensing procedures and the safety of the vaccine has had to be demonstrated for each country before it can be used. The World Health Organization **“strongly endorses the use of MMR vaccine on the grounds of its convincing record of safety and efficacy”**.

### **3. *What evidence is there that MMR does not cause autism or inflammatory bowel disease?***

We have evidence from a number of good quality studies that have looked for a link and found no evidence of one. These include:

(a) A study by Professor Taylor (a paediatrician) and colleagues was published in the Lancet in June 1999. They investigated all 498 known autistic children in North Thames since 1979, covering the period before and after the introduction of MMR in 1988. The study found:

- No increase in autism associated with the introduction of MMR in 1988.

- No difference in age of diagnosis between MMR immunised and unimmunised children.
- No difference in the MMR immunisation rates between these children with autism and the general population.
- No link between the timing of MMR and the onset of autism.

The authors therefore conclude that their data do not support a causal association.

- (b) A study from Finland was published in December 2000 in the *Pediatric Infectious Disease Journal*. It looked at 1.8 million children who had received three million doses of MMR over 14 years. The paper reported no cases of autism or bowel disease associated with the vaccine.
- (c) A study conducted in Gothenburg, Sweden over a ten year period during which time MMR vaccine was introduced showed the incidence of autism was unaffected by the introduction of MMR.
- (d) A paper published in the *British Medical Journal* on 24 February 2001 analysed the incidence of autism for boys born from 1988 – 1993. The uptake of MMR vaccine stayed virtually constant at 95% during this time, but the incidence of reported autism increased nearly fourfold. Whatever caused the rise in reports it couldn't have been MMR as it was not increasing during this period.

In addition to these and other papers a number of independent expert groups have also examined the overall evidence:

- (e) The Committee on Safety of Medicines set up a Working Party to examine reports of children whose parents believed that MMR had caused their illness. They examined the records of 92 children with suspected autism and 15 with suspected Crohn's disease. They concluded the evidence "did not support the suggested causal associations, or give concern about the safety of MMR or MR vaccines".
- (f) The Medical Research Council (MRC) held a scientific seminar to review the work of Wakefield and his colleagues. The meeting included leading experts in virology, epidemiology, immunology, child psychiatry and gastroenterology. Wakefield was given time to fully present his work – both published and unpublished. The seminar concluded that there is no evidence to indicate any link between MMR vaccinations and bowel disease or autism.

Since then the MRC have kept the matter under constant review examining any new evidence but have not changed this view.

- (g) The Joint Committee on Vaccination and Immunisation have kept the issue under constant review, examining all new evidence as it has emerged. They

have repeatedly confirmed the safety of MMR and rejected any evidence of a causal link. Their most recent statement was issued in January 2001.

#### **4. *What about the studies that have shown a link between MMR vaccine and autism?***

**There are no studies that have shown a link.** The main paper from which these suggestions have come was by Wakefield and colleagues and was published in February 1998. Unfortunately the press and media have greatly distorted what the paper actually said. The paper only suggests there may be a link and that further research needs to be done to investigate it. The following are direct quotes from the paper:

- “intestinal and behavioural pathologies may have occurred together by chance, reflecting a selection bias in a self-referred group”.
- “we did not prove an association between measles, mumps and rubella vaccines and the syndrome described”.
- “further investigations are needed to examine this syndrome”.

The further investigations which they suggest are needed have now been carried out (as summarised under question 3) and have shown no evidence of a link. More research into the cause of autism is being commissioned.

It is also interesting to note that Wakefield’s paper was based on 12 children whereas the other papers have looked at hundreds, thousands and even up to nearly two million children.

The latest paper by Wakefield has provided no new research data, it has simply looked at some old research papers and made some criticisms of them. (The main criticism has been shown to be factually incorrect and therefore invalid). It still does not claim to have proven a link.

#### **5. *Was the vaccine tested properly?***

The vaccine not only had to pass the licensing procedure in this country but in numerous other countries as well for which good evidence of safety was required. A publication from Scandinavia in 1988 (the year MMR was introduced here) lists a total of 30 published studies on MMR vaccines.

In addition, the vaccine has continued to be extensively studied and monitored since. Several hundred million doses have now been given world-wide. An increased risk of aseptic meningitis was discovered with the first MMR vaccine used in the UK and it was immediately withdrawn and replaced. This demonstrates that monitoring systems do work in picking up rare problems and action is taken when needed. The vaccine now used has continued to have an excellent safety record.

**6. *Why are the numbers of children affected by autism increasing?***

It is true there has been a steady increase in the number of reported cases of autism since the mid-80s. However, many experts in autism believe that much of this is not a true increase in the condition but is due to a raised awareness among parents and professionals leading to it being picked up more. There has also been greater recognition of the range of different types of autism.

The National Autistic Society have questioned whether there is a real increase (and have expressed their support for MMR).

A recent article, in the journal *Pediatrics*, by an expert in this area from the MRC Child Psychiatry Unit has examined the data in detail and questioned whether there is any real increase. He was particularly critical of people misusing data to support other theories.

Even if there has been a true increase there is no evidence that this is because of MMR.

**7. *Why do some parents believe their child developed autism as a result of MMR vaccine?***

MMR is given to children during the second year of life. It is around this time that many children with autism start to show signs of it. Over 90% of children have been vaccinated with MMR by their second birthday. Therefore many children who were going to develop autism anyway will do so after having MMR and some, by chance, will be soon after the vaccine.

However, to explain why parents blame MMR it is best to quote from the parent of a child with autism:

“One reaction which we, and other parents in similar circumstances, had was to search for a possible cause. Had there been an infection during the pregnancy, an encephalitic element to Adam’s chickenpox, anoxia during birth, lead in our water supply (this was checked), any family history of learning difficulties, or a metabolic disturbance? An explanation might help us to decide whether or not to have another child but, more importantly, if we found the cause, perhaps, just perhaps, Adam could receive some existing, or yet to be developed, treatment which would reverse his cognitive and social deterioration.

“When, in 1998, Andrew Wakefield and his colleagues hypothesised that there could be an association between MMR and autism, it was entirely understandable to us why many, though not all, parents of autistic children became either partly or totally convinced that this was the answer”.

**8. *What is the evidence that giving the three parts of MMR as three separate vaccines is safer?***

**There is no evidence that doing this is safer.** Nothing has been published that even suggests that giving the three separately would be any safer than giving MMR. The

paper published in the Lancet in 1998 makes no mention of giving the three separately. What happened was that one of the authors of the paper speculated to the press that giving them separately might be safer. No trials have been done which support this, it is purely theoretical speculation. Unfortunately, this is an aspect the press have really picked up on and blown out of all proportion. Even some of his fellow researchers don't agree with him. One stated on Radio 4 "what's important is that children are vaccinated... the risk with splitting vaccinations is that we haven't done specific research on whether individual vaccines, as opposed to the combined, make any difference. Anything that affects uptake rates, perhaps if they're split, some children may not be vaccinated; that increases the risk of disease. So, the message is continue vaccinating, obviously."

#### **9. *What are the risks of giving three single vaccines?***

Dr Wakefield has suggested that not only should the vaccines be given separately but that there should be a year between each one. The main risk from this is that it would leave children unprotected against two of the diseases and we would start to get outbreaks of them again. **Children would undoubtedly end up disabled and some would die as a result.**

This approach would also result in six injections instead of two. In addition to the unnecessary stress this could cause a child it also increases the risk of repeated reactions at the site of injections.

As giving the vaccine separately has never been properly investigated we do not know what other risks there might be. It is somewhat ironic that a doctor who has said there was not enough evidence about MMR (about which at least 30 papers had been published) should propose an alternative approach about which there is no safety information and no papers have been published.

#### **10. *Why do other countries offer three single vaccines?***

This is another myth that has been allowed to grow. No country in the world recommends that MMR vaccine is divided into three separate injections or recommends parents to be given the choice of having the three vaccines separately. In some countries some of the components are available on their own for other reasons.

For example, in France, they recommend that children aged 9 – 12 months attending nursery school have a first measles vaccine to prevent outbreaks in the nursery schools. All of these children are then recommended to have two doses of MMR at the appropriate ages the same as all other French children. Single rubella vaccine is available for some immune women planning to become pregnant. There is no appropriate single mumps vaccine available and there is no recommendation for it.

Japan is also quoted as using single vaccines. Japan withdrew a strain of MMR in the early 1990s for the same reasons we did (see question 5 above). They have not licensed any other strains. They offer single measles and rubella vaccines – but do so at the same time not separated by a year as suggested by Wakefield. They don't offer mumps at all. Japan has seen a dramatic rise in the diseases resulting in at least 75

deaths from measles at a time when we have seen no deaths. Rather than supporting the case for single vaccines the situation in Japan powerfully supports the benefits of combined MMR vaccine.

**11. *Aren't experts divided over the issue?***

The way the issue has often been reported in the media would give the impression that doctors and others are split down the middle over this issue. In fact the overwhelming majority strongly support the use of MMR. Following the recent paper by Wakefield and Montgomery a joint statement was issued on behalf of:

Royal College of Paediatrics and Child Health  
Royal College of General Practitioners  
Royal College of Nursing  
Community Practitioners and Health Visitors Association  
Faculty of Public Health Medicine

These professional bodies include many of the health professionals who are involved in caring for children with autism. If they had any doubts then they would not be promoting something which might cause autism – they know what a devastating condition it can be, but they fully support MMR vaccination.

They have stated: “As professionals intimately involved in the long-term care of children, as well as in the immunisation programme, we wholeheartedly endorse the current policy of using the combined MMR vaccine.”

**12. *What are the risks associated with the vaccine?***

As with all medicines there are some risks associated with vaccinations. Most of these are minor and last for only a short time for example redness and swelling at the injection site or a high temperature. More serious risks are rare and occur much less commonly than from the diseases themselves. They are set out in the table on page 9.

Vaccines can also cause anaphylactic (allergic) reactions. These occur at a rate of 1 in 100,000. Whilst serious at the time, treatment leads to rapid recovery and there have never been any deaths in the UK from anaphylactic reactions to MMR vaccines.

## Symptoms and complications of the diseases and the vaccine

The diseases	Common symptoms or side effects	Serious complications
<b>Measles</b>	Fever, rash, cough, red and painful eyes, swollen glands, loss of appetite, generally unwell.	Ear infection (1 in 20) Pneumonia/bronchitis (1 in 25) Febrile fit (1 in 200) Hospital admission (1 in 100) Meningitis/encephalitis* (1 in 1,000) Late onset of encephalitis* (1 in 8,000 children under 2 years old) Death (1 in 2,500 – 5,000)
<b>Mumps</b>	Painful and swollen glands in the cheeks, neck or under the jaw, fever, headache, abdominal pain, loss of appetite, generally unwell.	Swollen, painful testicles in older boys and men (1 in 5) Meningitis/encephalitis* (1 in 200 – 5,000) Pancreatitis (1 in 30) Deafness – usually with partial or complete recovery (1 in 25) Mumps during pregnancy can lead to miscarriage.
<b>Rubella</b>	Fever, headache, red and painful eyes, rash, sore throat, cough, swollen glands, joint pains (mainly women), loss of appetite, generally unwell.	Encephalitis* (1 in 6,000) Bleeding disorders (1 in 3,000) Rubella during first 10 weeks of pregnancy can lead to miscarriage or 9 in 10 babies being born with: <ul style="list-style-type: none"> <li>• deafness;</li> <li>• blindness;</li> <li>• heart problems;</li> <li>• brain damage;</li> <li>• other serious problems.</li> </ul>
<b>MMR vaccine</b>	Redness and swelling at the injection site. A week to 10 days after MMR some children become feverish and develop a measles-like rash. After three weeks a few children may get mild mumps.	Febrile fit (1 in 1,000) (due to high temperature) Encephalitis* (1 in 1,000,000) Bleeding disorder (1 in 24,000) (May cause small bruise like spots two weeks after the injection – if they occur show them to your doctor).

\*inflammation of the brain

**13. *What will happen if MMR vaccine uptake falls?***

The simple answer is that we will see the return of these diseases and all the consequences outlined in question 1. We need very high uptake rates – around 95% - to keep these diseases away. There is good evidence from Dublin and several European countries that with uptake rates of 75 – 80% outbreaks occur and children get seriously ill and some die as a result.

In the mid 1970s there was a scare about whooping cough vaccine. Uptake levels fell from 80% to 30%. Three whooping cough epidemics occurred over the next few years as a result. During these epidemics over 300,000 children were sick, some suffered long-term damage and at least 70 children died. The scare was later shown not be true – however, in the meantime 70 children had died because of it. It is essential that the same thing doesn't happen with MMR. We can be sure that if uptake levels do drop the diseases will return and children will die as a result. This is a safe vaccine, whose benefits by far outweigh any risks and we need to continue to have very high uptakes for it.

Further information can be found on the following website:

[www.immunisation.org.uk](http://www.immunisation.org.uk)