

# Measles, mumps and rubella (MMR) vaccination

Sense was established in 1955 by the parents of children with rubella damage. It is a national organisation providing services, advice and support to deafblind people.

In this briefing, we critically examine the call for parents to be offered the choice of single vaccines as an alternative to the measles, mumps and rubella (MMR) vaccine and sets out why we believe that to do this would have serious negative consequences for public health.

## A matter of choice?

Extending choice is one of the government's four principles of public service reform.<sup>1</sup> However, there are some areas of public policy where choice cannot be offered without undermining the very purpose of the policy. As far as MMR is concerned, the cost of offering choice would be too high, not financially but in terms of the consequences for public health.

There are two main reasons why some people consider that single vaccines should be offered as an alternative to MMR. These are both addressed in detail in this briefing, but essentially they are:

- ***The 'single vaccines are safer than MMR' argument***

As will be shown, there is no evidence that single vaccines would be safer than MMR, and a great deal of evidence to show that they would lead to problems with delays, missed appointments and reduced uptake up of rubella.

- ***The 'single vaccines are better than no vaccines' argument***

It is possible to argue in favour of offering single vaccines even if you believe MMR to be safe, because you take the view that single vaccines are better than no vaccination at all, and/or that choice is a civil right. However, Sense believes that this is a dangerous argument. Offering single vaccines would undermine confidence in MMR, which could actually depress uptake, leading to the risk of epidemics.

## Why do we vaccinate?

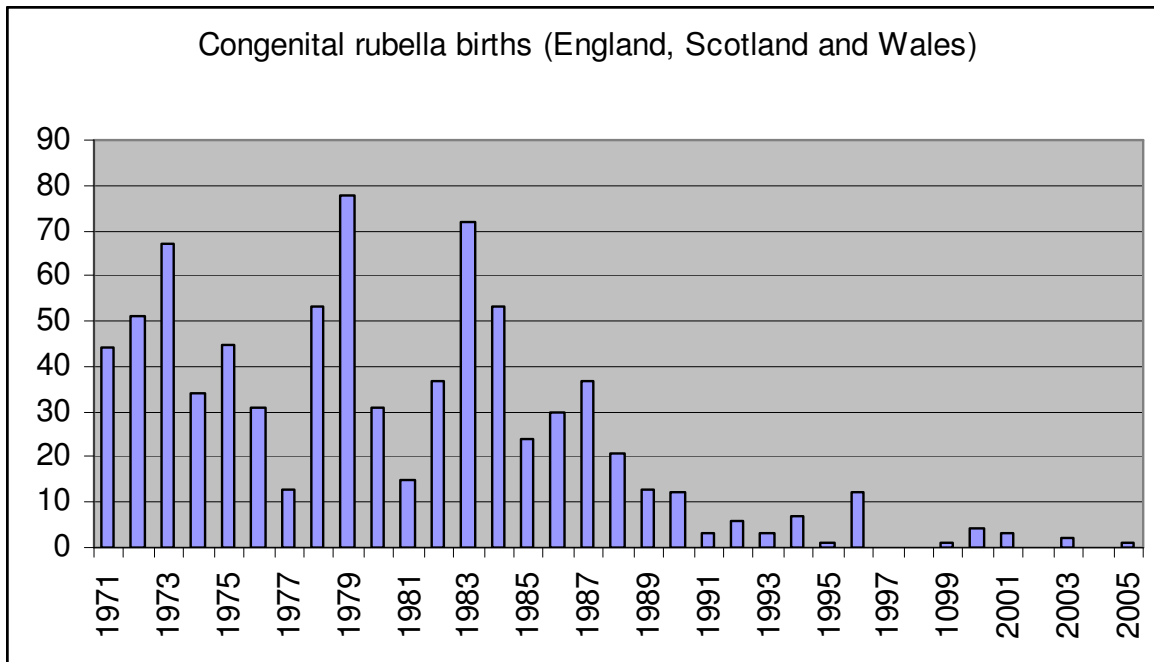
Few medical procedures can compare with the enormous benefits to society from immunisation. Vaccines can, very rarely, cause serious adverse effects. However, such adverse effects are significantly more common following the natural disease. At both an individual and a population level, the benefits of vaccination far outweigh any potential risk.

## The importance of uptake

An immunisation strategy can only ever be effective if there is mass uptake, meaning that choice between single vaccines and MMR cannot be part of an effective vaccination programme. One of the difficulties with MMR uptake is that, while the prevalence of measles, mumps and rubella in the UK is low, the incentive to vaccinate can appear less. From the perspective of an individual parent, the risk of their child contracting an infectious disease can seem small compared with the risk of possible (or perceived) adverse reactions to immunisation. However, this is only true if vaccination levels remain high. It is actually the counter-argument to this view that is the rationale for vaccination programmes - that the risk of vaccine damage is extremely low compared with the risk of the ill-effects of contracting the disease.

At the same time, low uptake of rubella vaccination could actually have worse consequences than no uptake. If there were no vaccination against rubella, then most people would catch rubella in childhood and would subsequently be immune. A low uptake of vaccination would mean that the virus would still be able to circulate, but that fewer children would become immune in childhood. Outbreaks of rubella would be less common than the epidemics that would occur with no vaccination, and so a cohort of unvaccinated and un-immunised children would increase each year and get older, with the burden of the disease shifting to those who are most at risk. Thus the impact of an outbreak in terms of congenital rubella syndrome births could be greater.

For MMR vaccination to be effective, uptake needs to be above 95%: this is why boys as well as girls need to be vaccinated. From 1970 to 1988, schoolgirls were vaccinated against rubella, and this did have some success in reducing the number of rubella births. However, the real breakthrough came in 1988 when MMR was introduced for all children. This reduced rubella births by a further 90% - there were 447 congenital rubella births between 1971 and 1980 and 38 between 1991 and 2000.<sup>2</sup>



## The effects of rubella, measles and mumps

If a woman catches rubella in early pregnancy it can be passed on to the foetus, causing damage to the eyes, ears, heart, brain and nervous system. Thanks to vaccination, rubella damage is now rare. However, this means that many people do not realise how dangerous rubella can be. In the United States, people from the Amish community have exercised their right for their children not to be immunised against rubella. As a result, in 1995, one baby in 50 born to Amish parents was

born severely rubella damaged.<sup>3</sup> Measles and mumps are also very unpleasant diseases. Measles can kill, and mumps can cause viral meningitis and lasting damage to hearing.

### **Children who cannot be vaccinated**

Mass uptake is particularly important for children who are not able to be vaccinated, for example because they are having treatment for cancer or have received an organ transplant, meaning that their immune system is suppressed. In the decade before MMR was introduced, half of the measles deaths in the UK occurred in children with leukaemia and similar conditions.<sup>4</sup>

### **How did the controversy about MMR begin?**

In February 1998, a paper written by Dr Andrew Wakefield, a reader in gastroenterology at the Royal Free Hospital, and 12 other doctors about a group of twelve autistic spectrum children was published in the medical journal *The Lancet*.<sup>5</sup> The authors speculated about a possible link between MMR and autism and/or inflammatory bowel disease, based on parental reporting. There was, however, an editorial in the same edition expressing doubts about the validity of the research.<sup>6</sup> The *Lancet* paper specifically stated that “we [the authors] did not prove an association between MMR vaccine and the syndrome described”. However, at a press conference and in a video news release, Dr Wakefield called for suspension of the triple MMR vaccine. He proposed that single vaccinations against measles, mumps and rubella be given, with a gap of a year between each injection. Dr Wakefield specifically invited further research, in particular epidemiological studies, in his *Lancet* paper. The conclusion of the *Lancet* article was subsequently retracted by ten of the paper's thirteen authors.<sup>7</sup>

A later paper by John O'Leary, co-authored by Andrew Wakefield, was published in the journal *Molecular Pathology* in 2002. This claimed to have found fragments of the measles virus in samples from the intestines of children with autism.<sup>8</sup> However, these findings have not been replicated, and researchers in Montreal published an article in the journal *Paediatrics* in 2006 showing that it was easy to get positive results with the tests that had been used, but that when more sophisticated work was done on the positive samples, they all turned out to be false positives.<sup>9</sup>

Parents of children with conditions such as autism are understandably keen to know the reason for their child's condition, and Dr Wakefield's paper gave them a seemingly plausible explanation. It also came at a time when confidence in Government health advice had been undermined by issues such as BSE/CJD.

Since Dr Wakefield's article was published, other theories about MMR, and about other vaccinations, have sprung up, including one about dangers attributed to the preservative thiomersal, which is used in some vaccines. However, MMR has never contained thiomersal.

### **The role of the media**

All parents want to feel that they are doing the best for their children. But their perception of what is best is shaped by what they read in the media. The World Health Organisation recognises MMR as a highly effective vaccine with an outstanding safety record. Yet stories about the supposed dangers of MMR continue to appear in the media, and the adjectives used to describe MMR are rarely positive. This could be excused as lazy journalism - MMR is always “controversial” in the way that suburbs are always “leafy” - but it has serious and negative consequences. Research at the University of Cardiff found that people do tend to absorb associations they hear in the media - such as the alleged association between the MMR vaccine and autism.<sup>10</sup>

One consequence of media coverage of MMR is that many parents wrongly believe that medical opinion is divided about MMR. This is absolutely not the case - the overwhelming body of

evidence points to the safety of MMR. However, a small number of parents will continue to believe that MMR is unsafe, however much evidence there is to the contrary. These people may have a great deal invested in the theory that MMR is unsafe, and effectively have too much to lose by changing their minds.

Another view, promoted by some sections of the media, is that the people charged with making decisions about public health do not necessarily have the best interests of the public at heart. This phenomenon is described by the *Guardian* journalist Michael White as being driven by a type of journalistic assumption that “the governing classes are a bunch of third-rate crooks and liars who are in it to enrich themselves and let down the public”.<sup>11</sup>

Lastly, there is the view that the Government is too much influenced by the pharmaceutical companies. But neither the Government nor the pharmaceutical companies has produced the body of research that finds no association between MMR and autism. The important thing is that people involved in research declare any interests they do have.

However much some parents may believe that MMR caused their children’s autism, it is important to continue to point out that there is no evidence of an association. This is particularly important because parents who believe their children’s autism to have been caused by MMR often suffer a great deal of guilt and anxiety, and parents faced with decisions about whether to vaccinate are also often going through needless anguish. It is easy to forget that the victims of this misinformation include both the parents of children with autism and the parents facing decisions about vaccination.

One of the difficulties facing parents making decisions about MMR is the lack of objective information in the media. The other main difficulty is that, although vaccination provides benefits both to individuals and to society, the benefits of vaccination appear to diminish as uptake rises. So the more successful the strategies to promote uptake are, the less obvious benefit there is to vaccinating one’s child.

### **Can there be too much media balance?**

Some journalists believe that it is always a good idea to give “balance” to a story by giving the same prominence to someone opposing an idea as to the person promoting it. In the case of MMR, this practice has helped to promote the idea that there are two competing bodies of evidence around MMR, when this is not the case.

At the same time, studies that point to the safety of MMR have not received the media coverage that has been given to scare stories. Even the coverage of the discrediting of Dr Wakefield’s paper has often focused on his personal life rather than described the academic research that points to his research having been flawed. This has led to an image in the media of Andrew Wakefield as a martyr. Similarly, there was virtually no coverage of the paper by D’Souza that discredited the O’Leary research. This phenomenon may be all but inevitable given that newspapers need to print stories that sell newspapers, but it does not help parents who are trying to come to an informed decision. And lastly, there is almost no reporting of the fact that private clinics make a great deal of money out of administering single vaccines.

### **Is more research the answer?**

Media coverage of MMR often calls for more research into its safety. However, there is already a large body of evidence suggesting that there is no link between MMR and autism, and the number of studies demonstrating this is growing. For example:

- A 2002 study, with a sample population of virtually all the children born in Denmark over almost ten years, found no evidence that there was more autism in children who had received MMR than in the non-vaccinated children.<sup>12</sup> This study collected vaccine records and autism

diagnoses separately, meaning that there could be no 'recall bias' from parents looking for a reason for an autism diagnosis. In addition, there was no association between the age at vaccination, the time since vaccination or the date of vaccination and the development of autism. The Danish study concluded that: "this study provides strong evidence against the hypothesis that MMR vaccination causes autism".

- In 2005, researchers from the Cochrane Vaccines Field reviewed 139 studies conducted to assess the effects of the live attenuated combined vaccine to prevent measles, mumps and rubella in children.<sup>13</sup> No credible evidence of an involvement of MMR with either autism or Crohn's disease was found.
- One of the most recent studies, published in July 2006, showed that autism rates in Canada continued to rise when MMR coverage was falling.<sup>14</sup> The study concluded that apparent increases in autism in recent birth cohorts, as found in many countries, was due to better awareness and improved diagnosis of autism.

So while more research can always be done, there already exists a huge body of highly convincing evidence from around the world supporting the safety of MMR. However, some people will always be suspicious of scientific, medical and political authority, and this is not helped by coverage of MMR in some sections of the media which has been presented as though opinion were divided about its safety.

### **Would single vaccines be better than no vaccination?**

It has been argued that even if the Government believes MMR to be safe, they should provide single vaccines as an alternative because then more children would be vaccinated. However, there is absolutely no evidence to support the suggestion that allowing single vaccines would lead to a greater uptake of MMR, and a significant amount of evidence to show that it would have the opposite effect. Single vaccines would be less effective than MMR and there is no evidence that they would be safer. Sense believes that it is unethical to promote six invasive procedures instead of two without sound scientific support, and when there is evidence that such a strategy would have negative effects. Problems associated with single jabs include:

- **Delays** - these would be an inescapable part of a single vaccine strategy. More children would be left unprotected for longer, with more opportunity for dangerous diseases to spread.
- **Missed appointments** - over 11 million GP and over 5 million practice nurse appointments are missed every year.<sup>15</sup> Single vaccines would require six appointments instead of two: this would be bound to cause more missed appointments and reduced protection against disease.
- **Not taking up rubella vaccination** - parents may opt not to vaccinate their children, particularly their sons, against rubella. This would lead to increased risk to pregnant women. Unvaccinated boys can catch rubella and go on to infect pregnant women, including their own mothers. This is exactly what happened before MMR was introduced.

Lastly, offering single vaccines could reduce confidence in the vaccination programme, which could lead to reduced uptake, putting more people at risk.

Given that there is no evidence that single vaccines have any advantages over combined vaccines and plenty of evidence of the risks, Sense believes that it would be a mistake to offer them.

## **What happens when single vaccines are offered**

In the 1970s, following a decrease in uptake of the diphtheria, tetanus and pertussis (DTP) vaccine, single vaccines for pertussis (whooping cough) were offered, with diphtheria and tetanus vaccines given separately. What happened was that over half of parents chose to vaccinate their children without the pertussis component. Coverage fell from 80% to 30%, there were three epidemics of pertussis, thousands of hospital admissions and around a hundred deaths. It took nearly fifteen years for vaccine uptake levels to recover.

## **The 'prevention paradox'**

By their nature, immunisation programmes suffer from what has been called the 'prevention paradox'. The greater the success of the programme (in this case uptake of MMR) at the population level, the less health relevance there is at the individual level.

Decisions have to be taken in the context of the decision that we believe other people will take, and whether we know it or not, we are all familiar with this to a greater or lesser extent. For example, we may avoid visiting a garden centre on a bank holiday weekend because we expect it will be crowded. Parents who choose not to vaccinate their children are not in the main hoping that they will catch the diseases that the vaccinations will prevent. This means that, whether they admit it or not, Parent A is hoping that parents B, C and so on will vaccinate their children so that parent A's children are protected.

When uptake is high, it can appear to be a rational choice for parents to opt out of immunising their own children, while enjoying the protection offered to the community as a whole from a high level of immunity in the population. But at the same time it is clear that, if all parents were to take this view, no child would be vaccinated and there would be epidemics of serious diseases.

## **MMR as a political issue**

It is clear that MMR is in danger of going beyond science and becoming politicised.

Sense believes that politicians have a responsibility to ensure that they are not adding to the fear and emotion surrounding this issue. Governments also have a responsibility to make decisions about public health based on what would be the most effective interventions. Medical evidence overwhelmingly points to MMR as being both safe and effective.

We strongly reject the argument that, even if the Government believes MMR to be safe, it should provide single vaccines as an alternative because more children would be vaccinated than at the moment.

We also reject the argument that single vaccines should be offered because this would give more choice to parents - because the consequences of offering this choice would be so dangerous.

## **Alternatives to promote increased uptake of MMR vaccination**

Given the need for mass uptake, it is worth examining alternatives that might promote the uptake of MMR further, and whether such interventions could be justified if vaccination rates fell further and there were epidemics of measles, mumps or rubella?

### **▪ *Vaccination as a condition of entry to the school system***

In the United States, children cannot enter the public school system unless they can provide evidence of vaccination. There is evidence that this requirement has succeeded in increasing vaccination rates and reducing the incidence of childhood disease.<sup>16</sup> (Although in the UK

vaccination is not currently a condition of entry to school, some pre-school nurseries do refuse entry if children are not fully vaccinated.)

Where this policy prevails, there are also normally exemptions for people who have philosophical or religious objections to vaccination and for children who can not be vaccinated on medical grounds.

This debate turns on the question of balance between the enormous public health benefits of vaccination and concerns about individual freedoms. Only a minority consider home schooling or private schools so making vaccination a condition of entry to state schools would be perceived as making it compulsory, and would undoubtedly lead to accusations that the Government was only offering choice to those who were willing to pay to educate their children other than in the state school system.

Requiring proof of immunisation before a child could enter school would have two additional effects: parents who have missed vaccination appointments could be identified, and parents who wished to exercise their right to refuse vaccination would be required to do this formally, by making a written declaration stating the nature of their objection.

Some other countries, for example Australia, have made vaccination a condition of receiving certain benefits (again, unless the child cannot be vaccinated for medical reasons or if there is a declared philosophical or religious objection). This serves the same purpose as making vaccination a condition of entry to school - catching up with people who have just missed out on vaccination, and forcing people to opt out formally rather than through inaction.

- ***Vaccination could be made compulsory***

It is possible for children to receive medical treatment against the wishes of their parents if doctors believe it necessary. In the UK a court has decided that immunisations where in a child's best interests, where the parents disagreed about whether to vaccinate or not.

For compulsory vaccination to be considered, a long-term assessment by those responsible for public health would need to show that a compulsory scheme was likely to deliver consistent, high uptake of vaccinations. Such an assessment would need to take into account the power of those promoting anti-vaccination views, and those who oppose compulsion in general.

There would also need to be public support - it is inconceivable that compulsory vaccination could successfully be introduced without this, although that is not to say that the decision would have to be universally popular. The principle of trust becomes important in this context. Parents need to be able to trust health professionals and the information they are given that informs their choice.

Lastly, there would need to be open debate and a willingness to engage in the arguments and evidence that is presented against vaccination. The public debate about MMR has been dominated by anti-MMR views. With a few honourable exceptions, medical, scientific and media opinion has been slow to present counter-arguments and to shape the debate. There have been real reasons for caution - lower uptake of MMR has tended to follow the publicity, much of it negative; when the debate in the media has subsided uptake tends to recover. However, we live in an information-rich age and the public are easily exposed to arguments on all sides so there is a greater need to engage openly and honestly with the public about the science and benefits that justify vaccination.

The British government has no plans to make vaccination compulsory and in March 2003 said, "none of the childhood vaccinations available in the UK are compulsory. They are offered on a voluntary basis. There are no plans to alter this policy".<sup>17</sup> It is also unlikely that compulsory

vaccination could find favour with the medical profession, because it could harm relationships between patients and practitioners, which should be based on trust.

Across Europe the trend has been toward greater voluntary participation. Countries such as Germany, where compulsion was the rule a couple of decades ago, now rely on voluntary acceptance of vaccination.

The reality is that a compulsory vaccination programme, in today's climate is not deliverable and would be counterproductive. Over the last few decades, society's emphasis on the idea of choice, and the principles of consent and autonomy have come to the fore and would be barriers to any sort of compulsory vaccination programme. What has been less evident in the public debate about MMR is individuals' and society's readiness to accept the consequences of making some decisions rather than others. For example, while there has been much focus on the call to introduce the choice of single vaccines on the NHS, there has been very little debate about whether increases in congenital rubella syndrome births would be an acceptable consequence of such a choice.

In conclusion, Sense believes that in the current environment compulsory vaccination would lead to more people challenging immunisation and so less children being vaccinated. It is not deliverable and would be counterproductive. Rather than debate the merits of compulsory vaccination it is more important to put effort into changing the attitudes of those who are not convinced about the benefits of vaccination and addressing health inequalities within immunisation programmes.

Sense does not recommend any form of compulsory vaccination as worthy of further consideration.

### **Measures currently in place to promote uptake of MMR**

As well as encouraging a range of health professionals to promote the benefits of MMR, and publishing information aimed at parents and carers, the Department of Health currently makes payments to general practitioners who achieve targets for immunisation. However, the British Medical Association has called for the abolition of the target payments system, because the perceived link between medical advice and pecuniary interest has a detrimental effect on the doctor/patient relationship.<sup>18</sup>

### **Conclusion and recommendations**

Sense supports current Government policy on MMR, which is to promote uptake for all children who are able to receive vaccinations. Making single vaccines available by choice cannot be sustained on the basis of the available scientific evidence. Single vaccines would leave children unprotected for extended periods and raise the likelihood of epidemics. They would be likely to reduce uptake, both because of the need for more appointments and because offering single vaccines would further undermine confidence in MMR.

Sense recommends that

- The Government should continue to offer MMR and should not make single vaccines available as an alternative. However, vaccination should not be made compulsory.
- Politicians of all parties should avoid using MMR as a political issue.
- Journalists should attempt to ensure that media reporting of MMR stories reflects the fact that medical evidence overwhelming points to MMR being safe and effective.



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