Is there a link between the MMR triple vaccine and the increasing number of cases of autism?

What is the MMR vaccine?

The MMR vaccine is a three-part vaccine, given by injection, which is used to immunise against Measles, Mumps and German Measles (Rubella). In the UK it is given to children at 12 to 15 months, with a booster dose before they begin school, usually between 3 and 5 years.

Measles, Mumps and Rubella all have serious symptoms and can be fatal. Measles can cause respiratory problems, ear infections and meningitis. Mumps can cause deafness, and before the vaccine, was the biggest cause of viral meningitis in children. Rubella can cause inflammation of the brain and also can affect blood clotting. In pregnant women especially, it can cause miscarriage or health problems for the newly born child such as brain damage or heart conditions.

The vaccine is freeze dried during preparation and contains live particles of the three viruses, which have been altered to prevent them producing the full effects of the disease.

How many people receive the MMR vaccine?

In 1988 the MMR vaccine was introduced in the UK. The number of vaccines given was at its peak in 1996, when the percentage of MMR vaccine take-up in children was 92%. This figure fell to 82% in 2002. Many parents are faced with the decision to listen to the reassurances by the government and the scientific community, that the vaccine is safe, or such allegations made by e.g. Wakefield that the vaccine is linked to autism.

What is autism?

This is a term that refers to a collection of neurologically-based developmental disorders in which individuals have impairments in social interaction and communication skills, along with a tendency to have repetitive behaviours or interests. A variety of factors could be associated with forms of autism including infectious, metabolic, genetic, neurological, and environmental factors. Genetic factors and brain abnormalities at birth are the most recognised causes of autism.

Why is there public discussion of a possible link between MMR vaccine and autism?

In 1998 claims were made by Wakefield and his colleagues at The Royal Free Hospital in London that there was a link between the perceived increase in the cases of autism and the widespread use of the MMR vaccine. Their work was published in the Lancet (a medical journal). They reviewed reports of children with bowel disease and regressive development disorders, mainly autism. The researchers suggested that the MMR vaccine led to intestinal abnormalities, resulting in impaired intestinal function and developmental regression within 24 hours to a few weeks of the vaccine. The report in the Lancet stated, “Rubella virus is associated with autism and the combined measles, mumps and rubella vaccine has also been implicated. Fundenburg noted that for 15 out of 20 autistic children, the first symptoms developed within a week of vaccination. Gupta commented on the striking association between the MMR vaccine and the onset of behavioural symptoms in all children that he had investigated for regressive autism.” The Lancet . Vol. 351. February 28, 1998

How can the evidence be best evaluated?
The first task is to gather all the available information from published studies. This was achieved by first defining the key terms for a search: MMR vaccine, autism were the most appropriate.

Then the various search engines are used. In this case, www.google.com gave rise to a large number of reference sites and comment, but little of clear scientific publication. Pubmed, the online reference database developed by the National Centre for Biotechnology and the National Library of Medicine in the United States, provided a more exhaustive and complete scientific source for 198 published papers. (www.ncbi.nlm.nih.gov/PubMed). Finally, Medline, the National Library of Medicine premier database in medicine and healthcare systems gave access to some further published sources.

Each relevant paper can then in turn be assessed for its scientific validity.

Is there evidence of a causal link?
The main claim by Wakefield in 1998 was based on the study of just 12 children who suffered from autism. In nine of these children, either the children's parents or their paediatrician had felt that the MMR vaccine, administered prior to the onset of autism, was responsible for causing the disease. The MMR-autism relationship theory is based on the idea that intestinal problems e.g. Crohn's disease, and the autism syndrome, are the result of a viral infection which leads on from the virus particles administered by MMR. Crohn's disease is a chronic inflammatory disease of the bowels.

A new condition of Regressive Autism was suggested. This involves an apparently normally-developing child beginning to show signs of autism between 2 and 3 years of age. Such signs are loss of speech skills and action, and that this occurs after the MMR vaccine.

The study caused serious problems for the nationwide vaccination campaign, and the number of children receiving MMR dropped significantly. But the evidence was considered unreliable and rejected by much of the scientific community and by the government for a number of reasons.

As the number of people taking part in the study was so small the results could not be conclusive for the whole population for the causes of autism. Also, behavioural problems could be identified before MMR, as could the onset of symptoms of bowel disease in at least 4 out of the 12 cases. Therefore the children were experiencing symptoms before the MMR vaccine had been administered.

However, further confusion has been added in the last few weeks by a more recent study that was published on the 10th March 2004. This paper, using a national United States database, made a comparative evaluation on the relationship between MMR immunisation, the mercury doses involved in giving the vaccine, and the increasing cases of autism. It was posted on the internet in the net journal Medical Science Monitor. The study determined that there was a "close correlation between mercury doses from thimerosal-containing childhood vaccines and the prevalence of autism from the late 1980's through the mid 1990's."
The study concluded that, "there is a biological plausibility and epidemiological evidence showing a direct relationship between increasing doses of mercury from thimerosal-containing vaccines and neurodevelopmental disorders, and measles-containing vaccines and neurological disorders."
The researcher suggested that thimerosal should be removed from all vaccines and additional research should be carried out to develop a safer MMR vaccine.

Many more studies have been carried out producing evidence against the link between MMR and autism.
One study published in 1999 by the researchers from the Public Health Laboratory Service and from Royal Free Hospital looked at the case history of all autistic children born in the North Thames region between 1979 and 1994. This time frame covers the period before and after the introduction of the MMR vaccine in the UK.
The study found that there was no increase in autism associated with the introduction of MMR in 1988, no difference in the age of diagnosis of autism between children who had been immunised with MMR and unimmunised children. They also concluded that there was no difference in the MMR immunisation rates between those children with autism and the general population in the North Thames, and no link between the timing of MMR and the onset of autism. He researchers concluded that here was therefore "no casual link between the MMR vaccine and autism."

Another strong piece of evidence appeared in the British Medical Journal in 1998, which stated that, "national data seem to indicate a rise in the incidence of autism, but it started over a decade before MMR's introduction in 1988 and showed no change at that time".

It is a fact that there have been increasing numbers of diagnoses of autism in both the UK and in the USA. It is not clear whether there is an increase in the number of cases of autism, or due to the better technology enabling better and earlier indentificaton of cases.

It is understandable that parents whose children show signs of autism after the MMR vaccine often link the two events together. This is because signs of autism usually appear in the second year of life, and the MMR vaccine is administered when the child is aged between one and two. But there remains no solid evidence of a definite link between the vaccine and autism, as one independent enquiry published in 1998 stated that there is no evidence to suggest a link between the MMR and autism.