

MMR: a saga of bad science and scare stories that swayed health professionals

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The claim that the measles, mumps and rubella vaccine was associated with autistic spectrum disorder (ASD) should now be dead. *The Lancet* has finally retracted the 1998 paper by Andrew Wakefield *et al*, and the General Medical Council (GMC) has found Mr Wakefield to be dishonest, irresponsible, and to have a "callous disregard for the distress and pain the children might suffer" when he paid £5 to children at a birthday party for blood samples. Children were exposed to unnecessary and risky procedures (colonoscopies and lumbar punctures) without ethical approval in what was little more than a fishing expedition carried out on behalf of lawyers. The GMC also ruled that Wakefield had sought funding research into a "transfer factor" to be used as a measles-specific vaccine. Wakefield submitted a patent for this in June 1997.

The 1998 paper did not prove an association between autism and the MMR vaccine, it was concerned with a link between ASD and bowel inflammation. However, at the associated press conference, Wakefield announced he thought MMR should be split into separate vaccines and that he would not support "the continued use of these three vaccines given in combination until this issue has been resolved".

Wakefield's argument for the dangers of MMR vaccine rested on the "leaky gut syndrome". After injection with the MMR vaccine, it was suggested that the measles vaccine virus (MVV) would lodge in the intestine, causing inflammation and allowing harmful neuroactive proteins to enter the bloodstream and the brain. Wakefield wrote to *The Lancet* in 2000, with co-researchers J. J. O'Leary and V. Uhlmann, claiming that MVV had been found in the bowels of children with ASD and enterocolitis. In 2002, Uhlmann and O'Leary published a paper reporting the presence of MVV in ASD children.

Three other research groups were unable to confirm this virological finding. In 2008, a study by Hornig replicated the 2002 Uhlmann paper. They found no difference in the presence of MVV in the gut between the ASD and non-ASD children, removing any remaining suspicion that ASD with gut inflammation was related to the MMR vaccine. Additionally, there was no relationship found

between the timing of MMR vaccine and the onset of either gut inflammation or ASD.

It has since been found the 2002 Uhlmann paper was fatally flawed. During legal testimony in the US, Stephen Bustin, a world expert on the methods used to detect MVV, stated that Uhlmann had detected a contaminant rather than measles virus. Even worse, Wakefield's 1998 paper had stated: "We did not prove an association between measles, mumps and rubella vaccine and the syndrome described. Virological studies are underway that may help to resolve this issue." These virological studies were carried out by Nicholas Chadwick, a co-researcher with Wakefield. In US court testimony in 2007, Chadwick stated that he had tested all the samples from Wakefield's ASD children and found no MVV present. Wakefield was made aware of this before the publication of the 1998 paper, but saw fit

not to draw attention to this negative finding that undermined his hypothesis.

The MMR vaccine has not been associated with autism in epidemiological studies. Ironically, some of the strongest evidence arose following the withdrawal of the MMR vaccine in 1993 in Japan due to cases of aseptic meningitis associated with the urabe strain of the mumps component (the urabe strain of mumps was changed in 1992 in the UK). This allowed a comparison of ASD frequency before and after MMR vaccine withdrawal. A decline in ASD frequency would have strongly suggested a casual relationship between MMR vaccine and ASD. However, annual trends showed no decline in the incidence of ASD. Rates continued to rise despite the withdrawal of the MMR vaccine. The vaccine was obviously not the cause for the rise in incidence of ASD. A more likely alternative might be changes in awareness of ASD and changes in diagnostic criteria.

However, the science has always been secondary to the media hype, brilliantly dissected by Ben Goldacre in his book 'Bad science'. The media's reporting has been lamentable, with even fairly sober news sources trying to achieve "balance" in reporting on an issue that should be about facts, not opinion. Extremist anti-vaccine groups were given exposure far out of proportion to their size or importance. Even after the recent news, there

has been little evidence of contrition. A timeline about the MMR controversy in *The Independent* in January omitted any mention of the role of the media. After the GMC's decision and *The Lancet's* retraction, the *Daily Mail* (not a publication renowned for its introspection) had the chutzpah to issue an editorial entitled "MMR and the lessons doctors must learn".

There are many victims. Children have caught measles (1,144 in 2009 alone) since the loss of herd immunity. Even parents who did vaccinate were victims. In a 2006 survey, only 20 per cent of parents agreed that "scientific evidence shows that there is no link between MMR and autism", showing many who chose vaccination believed they were exposing their child to a risk of ASD. Other victims are those who paid money to the cottage industry of single-vaccine clinics with a vested interest in keeping fears of MMR in the public consciousness, and the parents of children with ASD who have paid money for quack treatments based on the leaky gut hypothesis. By 2003, over £15m of legal aid had been wasted on legal attempts to prove MMR vaccine's guilt. This cul-de-sac has also distracted autism research.

There are lessons for the media, government and the professions. Healthcare professionals are not immune to vaccine scare stories. Correspondence in *The Pharmaceutical Journal's* letters page during the height of the scare in 2001–02 included emotive arguments such as "it was grossly unfair to dismiss these observations [of parents] as merely anecdotal", and an accusation that the Government insulted pharmacists by asking them to "slavishly follow directives from the Government". One correspondent described the hypothetical leaky gut syndrome, as well as the scientifically unsustainable lay belief that multiple vaccines can "overload" the body. "For some, it (MMR vaccine) appears not to be safe and to have devastating consequences", wrote another pharmacist.

Recently, scare stories about the human papillomavirus vaccine and the H1N1 vaccine have been propagated by the media. Production of the H1N1 vaccine was reported as "rushed". There was no reason to suspect the vaccine was more dangerous than the seasonal influenza vaccine. Yet, a *Nursing Times* poll showed only one in three nurses was prepared to have the vaccine, citing a lack of safety testing. Ensuring healthcare professionals — more trusted by the public than the Government — are armed with accurate information will be crucial in future scares.

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