

Vaccinations: Are the Fears Unfounded?

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Ever since the 18th century, vaccines have been improving the health of mankind by providing protection against various specific diseases. Vaccination was first developed by Edward Jenner against smallpox using the cowpox virus, and, since then, many more vaccines have been developed against potentially fatal or debilitating diseases, such as polio or smallpox. Indeed, worldwide implementation of smallpox vaccination has led to its eradication in the late 1970s [1]. Despite the clear improvements to the standards of living vaccination has brought, doubts about

the safety of some of these vaccines have been raised. Some vaccines have been linked to adverse health effects, the most infamous of which include the relationship between the measles, mumps and rubella (MMR) vaccine and autism, as well as the influenza vaccine and the Guillain-Barré syndrome, which have led to a backlash by the public against national vaccination programmes.

Another vaccine that commonly arouses controversy is the influenza vaccine, which has been linked to the Guillain-Barré

“ **No credible evidence links the MMR vaccine to autism** ”

syndrome, an autoimmune disease that affects the peripheral nervous system, which often leaves sufferers paralysed. Guillain-Barré was first linked to the influenza vaccine in America in 1976, during the swine influenza vaccination campaign. An increased number of cases of Guillain-Barré syndrome were found in sufferers who had had the Swine Flu vaccine administered, as compared to those who had not, by a factor of 10. Many of these sufferers filed claims against the American government, resulting in payouts of nearly US\$ 93 million to claimants. In addition to contributing to public distrust about vaccines, these payouts had an additional negative effect on the approval of local immunization efforts within America. More recently, the vaccine for the 2009 Swine Flu pandemic has come under the spotlight, with a video of a girl who allegedly contracted dystonia, a neurological movement disorder, following administration of the vaccine, making viral rounds on the Internet.

The association of vaccines, usually involved in national immunisation programmes, with disease frequently undermines the public's trust in them, often to the detriment of public health. The MMR saga led to a drop in MMR vaccination rates in Britain from above 90% before 1998 to a low of 80% in 2003-2004, which was when the controversy was at its height and a subsequent rise in morbidity and mortality due to an increase in measles infections [5]. As immunisation

Vaccines have been instrumental in improving public health. Reproduced from [7].



Edward Jenner, the father of vaccination. Reproduced from [6].

The claims linking autism with the MMR vaccine were first raised in a paper published in *The Lancet*, a respected British medical journal [2]. Autism is a disorder of neural development characterized by impaired social interaction and communication, and is usually detected in children less than three years old. The MMR vaccine is typically given in two doses to children, one at 13 months of age, and the second booster dose before the start of school, when they are between three and five years old [3]. Wakefield's report described abnormal gastrointestinal features in 12 children with developmental disorders, out of which 9 have been diagnosed as autistic. The onset of autism was noted to be shortly after the administration of the MMR vaccine in 6 out of these 9 children. The report was subsequently covered by the press, resulting in a public controversy about the safety of the vaccine, and ensuing in a drop in MMR vaccination rates in Britain. This was despite the retraction of 10 out of 12 of the co-authors of their interpretation of the data in



A schoolboy receiving vaccination in Nigeria. Reproduced from [8].

programmes frequently depend on herd immunity, where a large proportion of the population is vaccinated to provide protection to those who are not vaccinated, it is even more important that as many people as possible are vaccinated, to provide protection to the entire population. Resistance in taking part in immunisation programmes would result in a breakdown of herd immunity, and an increase in infections in the population, which was seen for measles in the UK.

“ The vaccine for the 2009 Swine Flu pandemic has come ”

So are these fears unfounded? The MMR study by Wakefield was heavily disputed after its publication. The methodology was thought to be weak, as the data was not originally collected for research purposes, and there was no control group of unvaccinated children involved in the study [6]. Furthermore, there has been a lack of epidemiological

evidence and biological models which links autism and the MMR vaccine [5]. In 2004, the Immunization Safety Review Committee concluded that there was little or no causal relationship between the MMR vaccine and autism based on the numerous epidemiological evidence [7].

Whether there is a link between the influenza vaccine and Guillain–Barré syndrome is more controversial. The Immunization Safety Review Committee concluded in 2003 that there was a causal relationship between the 1976 influenza vaccine and Guillain–Barré syndrome in adults [8]. However, there is insufficient evidence to determine the presence or absence of a causal relationship in subsequent influenza vaccines administered after 1976, partly because the numbers which are vaccinated each year are small. Black et al. 2009 noted that there appeared to be temporal associations between the administration of vaccine and adverse health outcomes which are usually background coincident cases [9].

“ Vaccines generally play an important role in maintaining health ”

Despite the fact that some vaccines have been linked to autoimmune diseases, such as the 1976 influenza vaccine mentioned previously, or the MMR vaccine to arthritis and autoimmune thrombocytopenia [10], vaccines in general play an important role in maintaining health while also enjoying a high degree of safety for the majority of individuals. Vaccines have been instrumental in improving health on a global level – the smallpox vaccine has resulted in the eradication of smallpox, while the MMR vaccine has decreased the number of cases of congenital rubella infections. Congenital infections occur in babies who contract the disease from their mothers while in the womb and are frequently born with brain damage, blindness and hearing defects. They also protect people in occupations at high risk of exposure to certain diseases, such as healthcare workers from the current circulating strain of influenza, as well as individuals with lower levels of immunity, such as the young and the elderly. In conclusion, while there might be the risk of side effects from vaccination, the risk of not being vaccinated (whether to oneself or to the general public) is generally higher than contracting side effects from vaccination. ■

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