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Do we want to expose our children to the natural viruses to induce immunity or is exposure to the vaccines a better approach? After all many children contracted measles, mumps or rubella before vaccination was introduced – and lived to tell the tale

Three-in-one: Is there a case for the MMR vaccine?

This is a question concerned parents are constantly asking in doctors' surgeries and baby clinics across Britain; to the extent that the uptake of the combined MMR vaccine often falls below the levels required to maintain immunity in the general population. As a result disease outbreaks are beginning to occur. In Dublin in 2000, when the vaccine uptake was less than 72 per cent, 1603 children contracted measles, with 100 hospitalisations and three deaths. If you talk to a parent of a child who's experienced any of the worst symptoms or complications of these diseases their experiences will be cause for concern.

Disease Symptoms

Measles

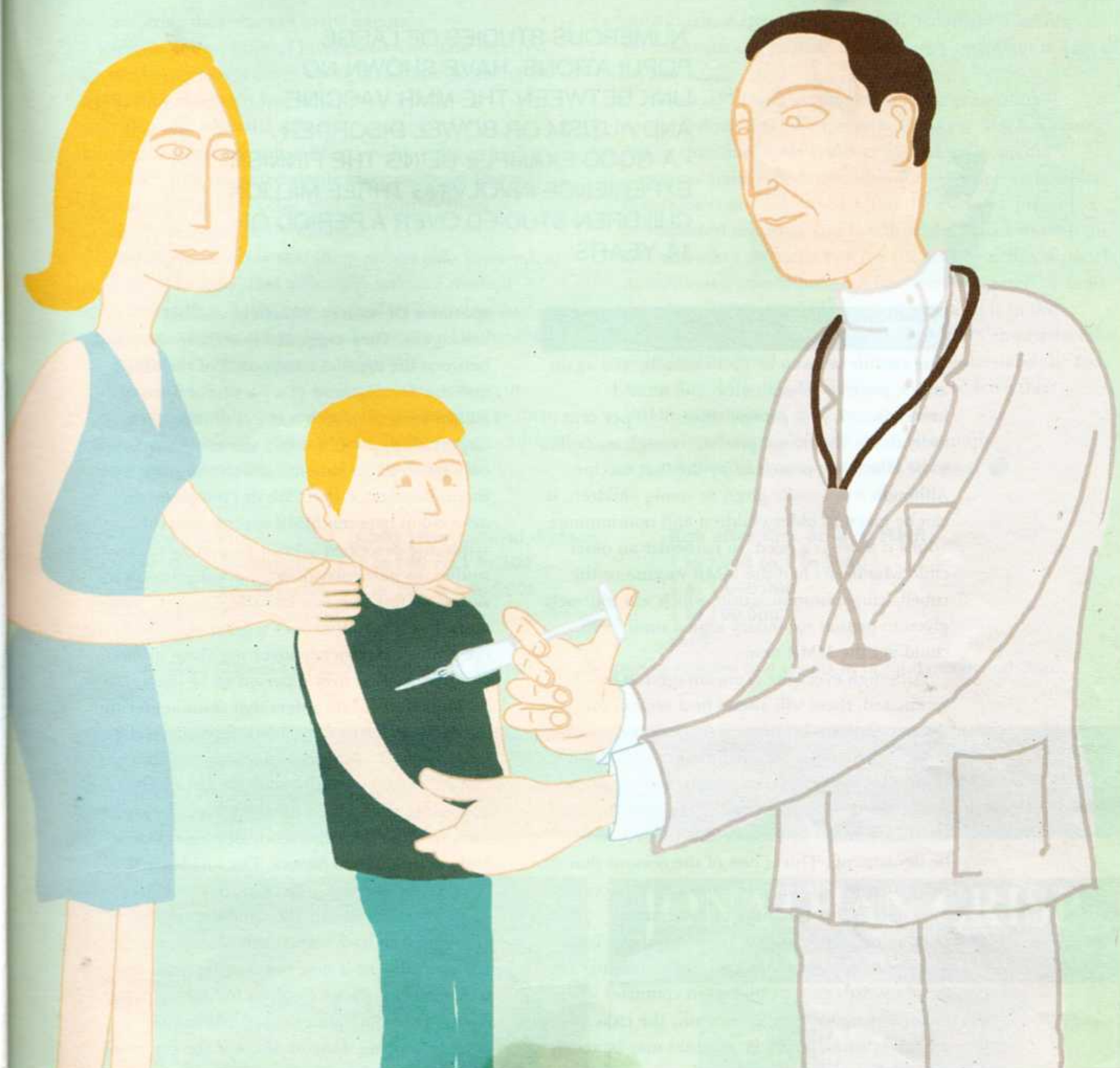
Prior to 1968 when the single measles vaccine was introduced in the UK, everybody contracted this highly infectious virus, with peak levels of infection at primary school age. Measles is spread when droplets of the virus are exhaled by coughing or sneezing and inhaled by another individual. Seven to ten days later the child will begin to feel unwell with cold like symptoms - a fever, runny nose and cough, and then a rash appearing first on the forehead and gradually spreading down the face and across the body. This is sometimes accompanied by conjunctivitis. Complications can include middle ear infections, pneumonia or convulsions and one child in 5,000 will get encephalitis, an inflammation of the brain, which can be fatal.

Mumps

Although not as infectious as its relative the measles virus, the mumps virus can also be spread through droplet infection and, in addition, in direct contact with saliva. Two to four weeks later the salivary glands become swollen and painful with associated symptoms including fever, headache, earache, loss of appetite and abdominal pain. Although mumps is rarely fatal (killing around five people a year in the UK before the MMR vaccine was introduced), meningitis (an inflammation of the lining of the brain and spinal cord) occurs in a small number of cases. In addition, men who catch the disease after puberty can become sub-fertile and pregnant women with mumps are at risk of miscarriage.

Rubella

The virus that causes rubella, or 'German measles' as it is often referred to, is not related to the measles virus. However, it is also spread by droplet infection, with symptoms appearing two to three weeks after infection. The disease itself is often quite mild and in young children can often have no symptoms. When symptoms occur they are: a runny nose and slight fever, swollen glands in the neck and a loss of appetite. A rash appears on the face and spreads across the body. By far the biggest risk with a rubella infection is the effect on unborn babies. For example, an older child, potentially with an unnoticeable infection, can infect its unprotected mother carrying a sibling. Congenital rubella syndrome can result in a child born blind or with heart defects.



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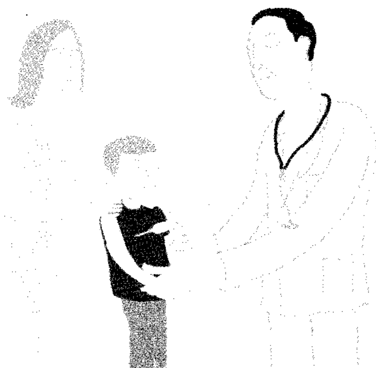
How does MMR work?

All the viruses used in the combined vaccine are living but are attenuated (weakened) versions of the original, such that they cannot replicate and therefore are not infectious. However, they will stimulate the body to produce the required immunity, stimulating the production of antibodies. These are key defensive components of the immune system and protect the individual from any future exposure to the virus. In this way, the vaccine stimulates the natural lifelong immunity gained by infection with the natural virus, without the major symptoms or risks of complications associated with actually having the diseases.

One of the reported concerns about the MMR is the supposed 'onslaught' on the immune system from the combination of three live viruses; but the immune system is designed to do just that, constantly coping with more than one challenge at any one time.

In addition, the components of the vaccine come into play at different times: 7 - 10 days, 3 - 4 weeks and 6 weeks for measles, mumps and rubella respectively. This can occasionally (one in 15,000 individuals) be associated with a localised swelling at the injection site and mild fevers and rashes.



'NUMEROUS STUDIES OF LARGE POPULATIONS, HAVE SHOWN NO LINK BETWEEN THE MMR VACCINE AND AUTISM OR BOWEL DISORDER - A GOOD EXAMPLE BEING THE FINNISH EXPERIENCE INVOLVING THREE MILLION CHILDREN STUDIED OVER A PERIOD OF 14 YEARS'

Vaccination age

The vaccine is given at 12-15 months and again at 3-5, prior to school entry. The second immunisation is to protect those 5-10 per cent of individuals who do not produce enough antibodies to be effectively protected by the first vaccine. Although it is usually given to young children, it can be given to older children and non-immune adults if there is a need. In particular an older child who hasn't had the MMR vaccine or the rubella single immunisation, which was routinely given to girls at secondary school until 1996, could get the MMR now.

Although everyone is encouraged to be vaccinated, there will always be a section of the population who cannot. A good example is those individuals who are undergoing chemotherapy for cancer, which compromises the immune system, for whom the effects of a measles, mumps or rubella infection could be devastating. This is one of the reasons that the guideline for the vaccination level necessary to maintain the immunity of the general population, the so-called 'herd immunity' is set at 95 per cent. Similarly with the increasing trend towards exotic holidays in countries where measles, for example, is endemic, the risks of infection for an unprotected child may be much higher than they are in the UK.

Fears

The MMR is one of the most widely used vaccines in the history of vaccination clocking up 30 years of use in the US, 20 years in Sweden and Finland, 15 years in the UK, and over ten years in the rest of Europe. This has been accompanied by a dramatic decrease in the number of babies with congenital rubella syndrome and a substantial reduction in the sickness and deaths caused by mumps and measles.

However, alarm bells have been ringing, principally in the UK, about the potential unwarranted effects of the vaccine itself. These fears were triggered by a press conference in 1998 that focused on the findings of gut specialist Dr Andrew Wakefield and his colleagues. They suggested that there was a link between the measles component of the MMR and the development of a particular form of autism associated with a bowel disorder. It is important to point out that this particular study only involved 12 patients and the authors themselves stated that "We did not prove an association between MMR vaccine and the syndrome described". Since then,numerous studies, in particular of large populations, have shown no link between the MMR vaccine and autism or bowel disorder - a good example being the Finnish experience involving three million children studied over a period of 14 years.

The effects of disorders that come under the umbrella of 'autism' can be frightening and devastating for the child concerned and their family. The fact remains that the causes of autism are not well understood, but are most likely to involve the interaction between genetic and environmental factors. The incidence is apparently increasing, perhaps due to better diagnosis, with one in 166 children in the UK considered to have some form of autism. The UK government is now considering plans to screen all pre-school children for autistic type disorders in the light of concerns that not enough is being done to discover the causes of autism.

Safety

Although there are people like Dr Wakefield who have raised concerns about the MMR vaccine, he and others support the principle of vaccination in itself. Single vaccines have attracted a lot of press as an alternative route to protecting children. However, only the rubella vaccine (routinely used until 1996) is licensed for use in this country. Legally, the use of single vaccines is restricted because there is a safe, effective and licensed alternative available in the form of the MMR vaccine. Of particular note is the concern that some of the unlicensed mumps vaccines may be less safe and/or effective than the mumps component of the MMR. Similarly, the recommended but arbitrary spacing of one year between single vaccines leaves a child susceptible