To vaccinate or not? A parent's dilemma

Parents must make many decisions about the health and safety of their child. Vaccination is one of these decisions. You might think that the decision is obvious – if you have your child vaccinated, you protect it against a potentially lethal disease. However, all vaccinations carry a small risk. Suppose that you believe this risk is too high; would you have your child vaccinated?

Table 1 The proportion of children affected as a result of getting measles or after their first dose of a vaccine offering protection against measles.

Condition	Proportion of children affected as a result of:	
	getting measles	their first dose of MMR vaccine
Convulsions	1 in 200	1 in 1000
Brain disease (meningitis or encephalitis)	Between 1 in 200 and 1 in 5000	Less than 1 in a million
Death	Between 1 in 2500 and 1 in 5000, depending on age	0

Parents recently faced exactly this dilemma. In the 1980s, a new triple vaccine, MMR, was introduced. The MMR vaccine gives protection against three diseases:

- measles, which can lead to severe illness, convulsions, lifelong disability and death
- mumps, which can cause meningitis and permanent deafness
- rubella, which during pregnancy can affect the fetus by causing deafness, blindness, heart defects and other difficulties.

The triple vaccine is thought to be a better protection than three separate vaccines because it reduces the time over which babies are exposed to rubella, measles and mumps. The MMR vaccination is made in two doses. The first dose is given at 12 to 15 months. The second dose is given at school entry.

1 The first dose of MMR coincides with the time when many breast-fed babies are weaned. What is the advantage of this timing?

2 Rubella affects the fetus of pregnant women, yet it is important that boys are vaccinated against rubella. Explain why.

3 Look at Table 1. What can you conclude from this about the safety of the MMR vaccine?

In February 1988, Dr Wakefield, a British doctor, published a research report suggesting that MMR might cause autism, a behavioural disorder. Dr Wakefield proposed that, in some children, MMR vaccination causes inflammation of the intestine, which causes toxins to leak into the blood. These toxins then pass into the brain, producing the damage that causes autism.

4 Dr Wakefield carried out his initial research on 12 children. How reliable were his findings?

In April 2000, Dr Wakefield and Professor John O'Leary, director of pathology at a Dublin hospital, presented further research findings to the United States Congress. They reported that tests on 25 children with autism showed 24 had traces of the measles virus in their guts. Professor O'Leary said this was now 'compelling evidence' of a link between autism and MMR.

5 Does the evidence of Dr Wakefield and Professor O'Leary show that MMR causes autism? Explain your answer.

Many other scientists performed investigations to check these research findings. None could find any evidence to support Dr Wakefield's proposal that MMR caused autism. Despite this, public confidence in the MMR

vaccine fell dramatically in the UK. Many parents prevented their children from receiving the MMR vaccine. Some parents of autistic children began to sue the pharmaceutical companies that had produced the MMR vaccine.

6 Dr Wakefield acted as a consultant for some of the parents who were suing the pharmaceutical companies. This led to criticism from his scientific peers. Explain why.

7 Figure 13 shows the results of research in California. Do these data support the theory that autism is linked to the use of MMR vaccine? Explain your answer.

There is now an overwhelming body of evidence to suggest there is no link between MMR vaccinations and autism. Despite this, the proportion of children in the UK receiving an MMR vaccination by their second birthday fell from 91% in 1997–1998 to 81% in 2004–2005. Would you have had your baby vaccinated with MMR? We must each use the available scientific evidence intelligently to inform our decisions.

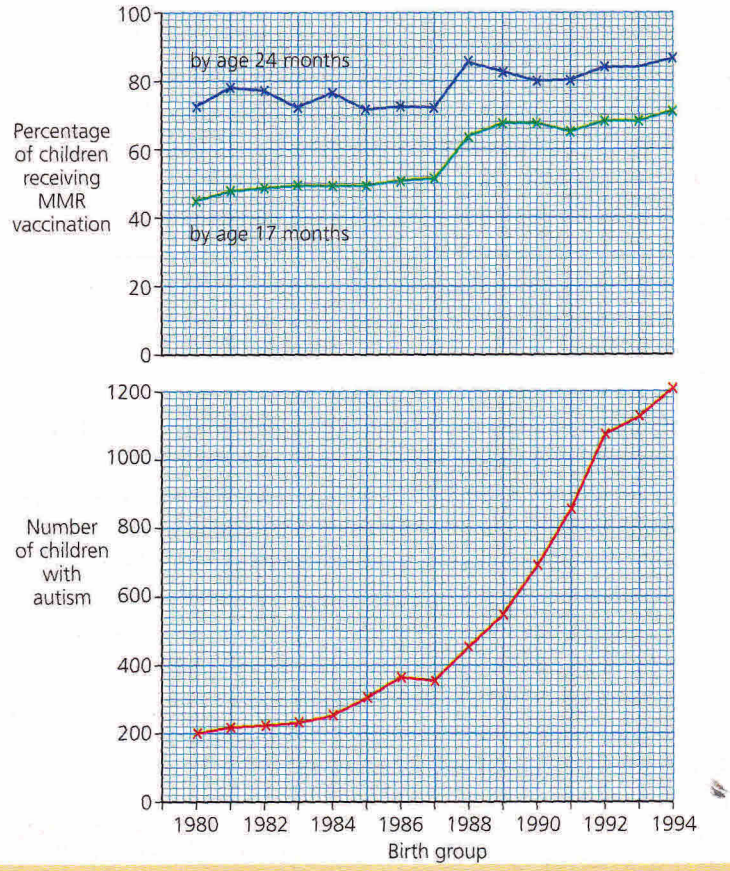

Figure 13 Is there a link between the use of MMR vaccine and autism? The upper graph shows the percentage of two-year-old children who received MMR vaccinations between 1980 and 1994. The lower graph shows the number of reported cases of autism among the children born in these years. The data are from a study in California, USA.