Activity 17.1
Autism and the MMR Vaccine

"I have three children. The eldest, who is 15, did not have the MMR injection and is not autistic. The second two, who did have MMR are both autistic and showed no signs of the condition prior to immunisation"

This was a comment sent to a BBC web-site by a mother following a TV programme discussing claims that pervasive developmental disorders were associated with the measles, mumps and rubella (MMR) vaccine given to children during infancy. The claim that the MMR vaccine might be a cause of some forms of autism was first made by Wakefield, Murch & Anthony (1998). They proposed that the vaccine was linked to a new syndrome consisting of certain gastrointestinal conditions associated with marked regression in multiple areas of functioning after 2 years of age (e.g. Childhood Disintegrative Disorder, CDD). This claim caused a significant fall in the number of parents in the UK willing to have their children vaccinated with MMR, and resulted in an increase in incidence of mumps, measles and rubella infections.

Evidence *for* the link between MMR and autism: Wakefield et al. (1998) based their claim of an association between the MMR vaccine and autism on a study of 12 children with inflammatory bowel conditions and regressive developmental symptoms typical of autism. In 8 of the 12 cases, the children's parents suggested that the MMR vaccine might have contributed to the onset of the behavioural problems. We have already noted that epidemiological studies suggest that the prevalence rate of autism has been increasing significantly over the last 10-15 years (Chakrabarti & Fombonne, 2005), and supporters of the link between MMR and autism suggest that the introduction of new "environmental risk factors", such as new vaccines, may be partly responsible for this increase.

Evidence *against* the link between MMR and autism: Wakefield et al. (1998) themselves admit that their study did not prove an association between MMR and the development of autistic symptoms, and the following factors are important in providing a balanced view of this issue:

- The sample that Wakefield et al. (1998) used to make the claim is very small and very selective (Payne & Mason, 1998), meaning that their findings are neither statistically significant nor generalisable to the population as a whole.
- It is not obvious what the mechanism might be that would link the MMR vaccine with the development of autistic symptoms. Wakefield et al. (1998) do attempt to relate their findings to the effect of the vaccine on intestinal disorders, and that some forms of intestinal disorders can lead to the incomplete breakdown of peptides in the gut which have been shown to cause autistic-like symptoms (Panksepp, 1979).
- If there is a causal link between MMR and autism, then we would expect to find that more children who have been given the MMR vaccine would exhibit autistic symptoms than those who have not received the vaccine. However, numerous studies have indicated that children given MMR are no more likely to develop autistic symptoms than those who have not received the vaccine (DeStefano, Bhasin, Thompson, Yeargin-Allsopp et al., 2004; Farrington, Miller & Taylor, 2001).
- Finally, an interesting experiment to test the hypothesised link between MMR and autism would involve finding out what happens when we stop giving MMR injections

– does the rate of autism go down, as we might predict if the MMR vaccine is the cause of recent rises in the prevalence of autism? Unfortunately, this is not an easy experiment to do! However, Honda, Shimizu & Rutter (2005) do report the results of what turns out to be a type of 'natural experiment' in Japan. Japan introduced the MMR vaccine for children in 1977 but then terminated the programme in April 1993. Honda et al. found that between 1988 and 1993 (during the time that the vaccine was being administered) the incidence of autistic spectrum disorder (ASD) increased. However, the statistics also show that the incidence of ASD continued to increase in children born even after the vaccine had been withdrawn. They conclude that MMR is unlikely to be the main cause of the increase in incidence of ASD in many counties, and that the withdrawal of MMR is unlikely to lead to a reduction in the incidence of ASD.

This issue is still far from resolved, although the weight of evidence is now more consistent with the fact that there is no causal link between the MMR vaccine and autism.

You may want to discuss this evidence with your fellow students, and perhaps try to think up some further studies that might contribute to resolving this debate.