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Rubella immunisation: the medical view

Rubella (german measles) vaccination is unique. It is not given to protect the individual, or the community at large; instead, it safeguards children who are not yet conceived. This article explains the background to the vaccination campaign, and suggests action which teachers can take to improve uptake of the vaccine and thus forestall a potentially avoidable source of handicap.

What is rubella?

Rubella is a viral illness, of little consequence to adults and even less to children. However, if a pregnant woman becomes infected, the virus enters the bloodstream and infects the developing foetus. The characteristic effects include various major abnormalities of the heart and large blood vessels; blindness; and profound, incurable deafness: these may occur singly or together, in any combination. The danger period is the first 16 weeks of pregnancy. After this, although infection still occurs, the organs have formed sufficiently for the damage to be absent or very mild.

In Britain, before the vaccination campaign began in 1970, approximately 80% of adults were found to have natural resistance in the form of antibodies. Antibodies are

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produced by the body in response to an infection – whether artificial (as in vaccination) or natural – and protect the system from future attacks. Thus, without vaccination, we should expect 20% of women to be unprotected, and potentially at risk of becoming infected. The risk to the foetus is very high: ***almost all women who become infected in the first 11 weeks of pregnancy give birth to a handicapped child.***

The size of the problem

Cases of rubella handicap are monitored by a system of voluntary notification (National Congenital Rubella Surveillance Programme). Since reporting is voluntary, and since some of the milder handicaps are not noticed for some time after birth, the figures are an under-estimate. However, an average of 41 cases of rubella handicap were notified each year in the 1970s, the annual range being from 8 to 68.

Vaccination strategies

I have already indicated that antibodies are acquired either by natural infection or by artificial infection (vaccination). A vaccine is a preparation of killed organisms or live modified organisms, which induce an immune response without causing the illness itself. Rubella vaccine consists of live organisms: it has been used in Britain since 1970, and has been found very safe. It causes antibodies to be produced in 90% of non-immune people vaccinated; but, for reasons which are not clear, 10% do not produce antibodies. These are known as "primary failures".

There are two approaches to vaccination.

In the "US" system, the aim is to vaccinate all children – boys and girls – at the age of one year. If successful, this will stop rubella virus from circulating in the community, since most people will then be immune. Pregnant women will be protected because they will be unlikely to come into contact with the virus, and 90% of vaccinated children (i.e., excluding primary failures) will be protected throughout their lives.

The "UK" strategy is to vaccinate only girls, just before they enter the childbearing years – at between 10 and 14 years of age. This will not stop the natural disease circulating in the community, since the vaccine used in this way does not alter the immunity of young children, nor of males of any age. Thus, before vaccination, about 20% of girls in a class would be expected to be non-immune. After vaccination, this would have fallen to 2% (in other words, the 10% who are primary failures). In the "US" system, which relies wholly on vaccination and not on natural infection, the non-immunity rate will be 10%.

There is a continuing debate about which system is better. The drawback of

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the "UK" system is that the disease is still being spread through the community, meaning that any non-immune pregnant woman is still at risk. Therefore, the aim must be 100% coverage of pre-pubertal girls. Studies have shown no evidence of a falling-off in the level of protection with time, and it is felt that immunity is probably permanent.

Although there is no need to vaccinate girls who have already gained immunity through natural infection, rubella is so mild a disease, and so easily confused with other infections, that it may be difficult or impossible to establish whether it has already been contracted. Even a GP's diagnosis is unreliable, without a confirming blood test. Since the vaccine is harmless, it is considered better simply to vaccinate every girl in a class and to take no notice of claims that "I've already had it".

What about the non-immune 2%?

Even if we are completely successful in persuading parents to give permission for their daughters to be vaccinated, 1 in 50 will still be at risk, and it is a Health Authority's responsibility to make tests on women attending family-planning or ante-natal clinics. However, there will still be women who become pregnant without having had a test or any necessary subsequent vaccination. The solution is to get the maximum uptake when the girls are at school, and to ensure that the very minimum of girls remain at risk.

Is the vaccination campaign working?

There is no evidence so far from the notifications of the disease, or from the handicaps it causes, that there has been a fall in the numbers affected since the vaccination campaign started. There are four reasons for this:

(a) The chance variations from year to year;

(b) The confusing effect of epidemics, which will increase numbers markedly in some years;

(c) The level of uptake, which has been less than satisfactory;

(d) The time lag between pre-pubertal vaccination and pregnancy.

It is expected that the numbers of children affected will fall, now that the girls given vaccine at the start of the programme in 1970 have reached their child-bearing years. However, the success of the programme will always be less than it could be if uptake is not improved.

Vaccination uptake and social class

In 1977, the rubella vaccination uptake in schools was estimated to be 71%. There was a campaign in 1979 to increase this, and by 1980 it had increased to 84%. This is still far short of the 100% which I have suggested above is desirable. However, there is considerable variation from region to region. Although the national average is almost 84%, some local campaigns have achieved acceptance rates of over 90%. This should encourage us all to be neither complacent nor defeatist!

In more than one study, a relative deficiency of vaccination in social classes I and V has been noted. One explanation for the low uptake in professional families could be that they are more likely to send their children to independent schools, which are excluded from the vaccination programme run by the school health services. It is important that independent schools be considered in school health provision: it has been

shown that the uptake of rubella vaccination *is* lower here than in state schools. This finding may indicate a lack of parental awareness of the problem, or a lack of structure for administering vaccine in independent schools. Even though a child comes from a social class I family, neither teachers nor health professionals should assume that their need for health education or for practical services such as vaccination is any the less.

A low uptake of rubella vaccine in girls from social class V families could be accounted for by school absences, which are commoner in this group, or by failure to obtain parental consent. A disproportionate effort is required to follow up those for whom consent forms were not returned. This consumes resources which could be better used elsewhere, and illustrates how health education has the potential not only to help the child to be healthier, but to assist individuals and society as a whole to make the best use of available resources.

A joint project between City and Hackney Health Authority and the Spastics Society is currently attempting to demonstrate that an increase in vaccination uptake is possible, utilising existing services and manpower, and to identify the causes of failure and default. I feel sure that the results of this work will be of value to teachers and health professionals.

What can teachers do to help?

Health education is a broad subject: it covers the biology of disease and health; promotes a healthy outlook in everyone, especially children, who are less entrenched in their habits and more open to change than are adults; overlaps with civic studies in teaching children what society does both to promote and to harm health; and informs people of the health services available and how they should be used. Teachers have a responsibility to encourage children and their parents to take advantage of the preventive services which are offered. This means

1. One of the aims of health education should be to encourage people to take up offers such as rubella vaccination, thereby helping the health services to make optimum use of resources.
2. All schools must be included; attention must be paid to private schools and other residential establishments.
3. It is desirable to vaccinate girls as early as possible in the 10–14 age group, to allow maximum time for following up those who have not been vaccinated.
4. "Immigration" of girls from other areas, both within the UK and abroad, must be catered for by any successful system, since different health authorities vaccinate at different ages.
5. A readable leaflet should be produced to explain to girls' parents why rubella immunisation is important. It should emphasise the risk to the foetus and the poor reliability of a clinical diagnosis of german measles rather than the risk of pregnancy (small in this age group) or side-effects of the vaccine (which appears to be very safe).
6. All those involved in the rubella programme, particularly teachers, should be made aware of the thinking that underlies it, and this should be done, wherever possible, by direct contact, whether with doctors such as community physicians, or with health education officers.
7. Parents should be informed that an immunisation has been given, and encouraged to keep this information for later reference. This is part of the larger task of persuading people to take an interest in what has been done to them, why, and when. Most of us are very bad at producing such information when it is required, and this may result in missing something which should have been given, or receiving something a second time unnecessarily, which may be unpleasant and is certainly wasteful.
8. The target is 100% immunity to rubella in girls by the age of 14 years.

helping them to understand what is being offered and why, and to foster an atmosphere in the class which is conducive to enlisting co-operation.

A pressing practical problem for health authorities, to which teachers can make a valuable contribution, is to help improve the uptake of rubella vaccination. Teachers can play an important part in reducing the number of people who, through fear, ignorance, laziness, or poor social circumstances, do not return consent forms or absent themselves when the clinical medical officer visits to give the vaccine. These girls are either lost from the system, or involve a great deal of effort on the part of school nurses, health visitors, GPs, or doctors running the school health service – effort which could be put to use elsewhere on the many tasks facing the health services, and which are not done (or done badly) through lack of time and money.

Therefore, if a child does not return a consent form, the teacher is ideally placed to encourage the child, or its parents, in time for the vaccination session. In doing so, teachers will be able to feel that they have made a contribution towards avoiding the unhappiness of 40 unnecessarily handicapped children being born every year, as well as assisting the health services to use their staff and money to the best advantage.

Conclusion

Rubella vaccination is a good example of the need for health education in relation to a medical procedure. There are many diseases whose prevention lies in the behaviour of individuals, or in the environment in which they live. It is essential that society provides healthy environments, whether sociologically (for instance, by banning tobacco advertising or promoting social disapproval of smoking) or physically (for instance, by providing safer roads or child-proof drug containers). This broad base is what health education rests on. However, there are other problems to which medical procedures are the best answer. No one, merely by making the right choices or living in a suitable environment, can prevent the tragedy of a child handicapped by german measles. The only way of making an impact on this problem is to aim at 100% coverage of pre-pubertal girls by rubella vaccination, with suitable back-up arrangements to identify and vaccinate young women who still remain at risk.

All those concerned with health should become more expert at communicating information to people in such a way that they can make informed choices. I feel sure that doctors have much to learn from both teachers and health education officers in this field.

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