Whooping cough in nursery school children

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SUMMARY. This paper describes an outbreak of whooping cough in a nursery school during a large epidemic in West Glamorgan. Explosive outbreaks of whooping cough occurred in nursery schools in the area when the majority of children had not been vaccinated. It is recommended that the period of quarantine for whooping cough should be four weeks.

Introduction

IN 1974 there was a good deal of adverse publicity about pertussis vaccine, especially on television. This made parents, and indeed many doctors, reluctant to allow children to be vaccinated against whooping cough. Children born after the end of 1973 were particularly affected by this fear to vaccinate and the acceptance rate for whooping cough vaccination in England and Wales dropped from 78·5 per cent in children born in 1971 to 38 per cent in those born in 1974 (DHSS, 1980). In West Glamorgan, however, the position was much worse. Here the percentage vaccinated fell to 9·5 per cent (Royal College of General Practitioners, 1981), so that this part of the country became particularly vulnerable to whooping cough. The next peak proved to be the biggest for 20 years. It started at the beginning of autumn 1977 and ended in the spring of 1979. The highest incidence was amongst children of nursery school age. This paper describes a study of whooping cough as it affected one small nursery school in West Glamorgan.

The school and the staff

A small nursery school of 52 children in Port Talbot, West Glamorgan, was examined closely as part of the West Glamorgan whooping cough study. It was administratively part of a bigger infant school, but the building itself was separate, except for being joined to the main school by a corridor. The population of the whole school was 212 pupils; 52 of these were in the nursery school.

There were two members of staff, a trained teacher aged 26 and a nursery assistant aged 42. The children in the nursery school were divided into two equal groups of 26; one group attended in the morning, the other during the afternoon. The morning session started at 09.00 and ended at 11.30; the afternoon session started at 13.00 and ended at 15.30. None of the children had lunch in school, but both of the members of staff had their lunch with the infant teachers in the staff room. The nursery assistant went to the school kitchens to collect and take the morning coffee to the teachers in the staff room. In the kitchen were five cooks with whom she talked while the coffee was being prepared. The nursery school toilets adjoined those used by classes four, five and six from the main school, but were separated by a wall four feet high.

Method

Permission to carry out pernasal swabbing was obtained from the headmistress and the parents of the children. This was to be carried out irrespective of whether the child had symptoms. On 30 June 1978, the children in the afternoon session were investigated. Thirteen infants were absent from this school session that day; three of these were reported by the parents and four by their doctor as suffering from whooping cough. The 13 children who remained in that school session, as well as the teacher and the nursery assistant, were swabbed. A further five children, who had been kept home because of symptoms of whooping cough, were brought to school by their parents to be swabbed and then taken home afterwards. Five children were swabbed at home at the request of their own doctor. A total of 23 out of 26 children, the teacher and the nursery assistant were therefore swabbed.

On 10 July some of the children from the morning

session were investigated; 13 were swabbed in school and two at home. The weekly absentee rate was obtained from the school attendance record files. The homes of all cases of whooping cough were visited and the West Glamorgan whooping cough questionnaire was completed for each household.

Results

The earliest date of onset of all the children swabbed was a little boy aged four who started his first symptom on 23 April. The staff said that it was he who was the first to show symptoms of whooping cough in the class. He had returned to school with symptoms after the half term holiday.

Of the 23 children who were swabbed from the afternoon session, six of those swabbed in school were positive for *Bordetella pertussis,* but four of these were symptomless. One of the four developed symptoms that evening, another three days later and a third after five days. The fourth child remained symptomless, in spite of his never having been vaccinated. His two brothers, aged eight and six respectively, developed whooping cough (but when swabbed at home were found to be negative) and his mother also had symptoms suggesting whooping cough. Her swab also was negative and she was known to have had pertussis as a child. Of the five children swabbed at home, one was positive and four were negative. However, two of the negative children had contacts at home who had positive swabs for pertussis. Both the teacher and the assistant had positive swabs. The teacher had been taking penicillin for three days before swabbing because she had developed a sore throat. The nursery assistant did not develop symptoms until the seventh day after swabbing.

On 10 July, 13 children were swabbed in school from the morning session and they were all found to be negative. Another two were swabbed at home and they also were negative, but a home contact of each of them was positive. Eleven of the 13 children who were absent from the morning session had been kept at home by their parents because they knew that there was whooping cough in the school. It was a fortnight before the end of term and most of the parents had paid deposits for holidays and did not want the holiday spoilt. None of the 11 had symptoms.

Absentee rate

The average number of child days lost per week during the afternoon session in the four weeks prior to the first case of whooping cough was 19. For the next eight weeks this figure jumped to an average of 42½ days per week. The corresponding figure for the morning class was 10½ days per week for both periods.

Spread of infection to the infants' school

The first children to show evidence of whooping cough in the infants' school were in classes five and six, those aged five and over. Both these classes joined the afternoon nursery class for singing lessons each Friday afternoon. There were 27 children in class five and 26 children in class six. Eight children developed symptoms of whooping cough in class five and at least eight in class six. These classes were not investigated in the same way as the nursery school.

Spread of infection to the home

Twenty-one of the children in the afternoon class were first onset cases at home. In 19 of these the history strongly suggested that the infection had been brought home from school. Of the remaining two, one was the child who was considered to have introduced the infection to the school, and the other was said by the parents to have picked up the infection from another house. It was impossible to be certain in this case if the child in fact had picked up the infection in another house as suggested by the parents, or in the nursery school.

Period of quarantine

There was some confusion amongst the teachers as to how long a child with whooping cough should stay away from school. The general consensus amongst the staff was three weeks, but they were uncertain what to do when a child continued to cough after this period.

Vaccination state

In the afternoon class nine had been fully vaccinated against whooping cough and six (66·7 per cent) of these developed the disease. None of the remaining 17 had been vaccinated and 14 (82·3 per cent) developed whooping cough. Two of the six fully vaccinated children had positive swabs, while six of the 14 unvaccinated were positive.

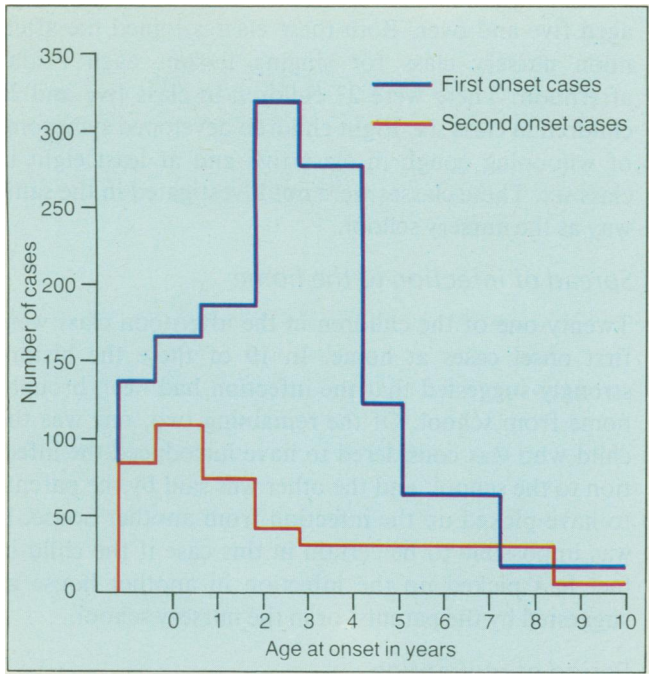
Attitudes of parents to whooping cough

One of the authors (A.R.) who visited the households of these children found some parents reluctant to give details for the questionnaire. There seemed to be a stigma attached to the diagnosis of whooping cough and some parents thought that only children from 'dirty' houses caught it. Some parents questioned strongly the diagnosis of whooping cough, even when the criteria for a positive diagnosis had been fulfilled. This attitude was not found in general during the West Glamorgan study.

Some children were returned to school too soon, even while still infectious. This was more likely if the parents were working. Some parents said that the general practitioner's advice on the quarantine period had been unclear.

Discussion

The recent report on the West Glamorgan study of whooping cough (Royal College of General Practitioners, 1981) shows that the highest peak was in the autumn of 1978. This was the school term when many



Age at onset—first onset and second onset cases. (Source: Royal College of General Practitioners, 1981.)

of the children born in 1974 and 1975 were going to nursery school for the first time. The highest incidence of first onset cases was also in this age group. The highest incidence of secondary onset cases was among those too young to go to school (see figure). This may imply that the nursery school children were bringing the infection home to their younger siblings. Some of the children who had developed whooping cough towards the end of the summer holiday period were infectious when they first went to school. As very few of their classmates would have been vaccinated, an explosive outbreak of whooping cough was very likely.

The outbreak described in the present paper started after a half term holiday, when a little boy aged four years returned to school with typical symptoms. He was described by his teacher as distressed and 'shaking' after severe bouts of coughing, sometimes followed by vomiting. He was almost certainly the cause of whooping cough in at least 19 of his classmates, as well as in the teacher and nursery assistant. Infected children in this classroom were then responsible for infecting children from classes five and six in the junior school. These two classes and one other from the junior school used adjoining toilets to those used by children from the nursery school, but they were separated by a wall four feet high. It was the singing lessons on Friday afternoons which were more likely to have caused the spread of the disease from the afternoon class to classes five and six. Singing is an excellent way of spreading the disease by droplet infection.

Although whooping cough did occur in the morning class, it was neither as explosive nor as extensive as that which occurred in the afternoon class; here the main outbreak also occurred four months later and therefore could not have been a spread from the afternoon class. The teacher and nursery assistant, although infectious, did not seem to have carried the infection from the afternoon class.

When the school was visited by both authors it was soon obvious that the teachers did not know for certain what the period of quarantine after whooping cough should be. They were following the advice given by a DHSS/Welsh Office Schools Health Service document which states that the period of quarantine should be 21 days from the onset of paroxysmal cough. They were uncertain what to do when a child continued to cough after this time. Some of the parents we interviewed complained that there was also some uncertainty amongst their own general practitioners as to how long this period should be.

In the West Glamorgan study it was found that the cough may last 12 weeks or sometimes very much longer in some children; it is therefore quite understandable how difficult it would be for parents or teachers to know when their children had become non-infectious. The West Glamorgan study found it was less common to isolate the organism after four weeks, confirming Donald's findings (1938); it was also found that newborn babies who were isolated for safety from siblings at home, usually by being taken to the grandmother, did not develop whooping cough if the period of quarantine was at least four weeks. It would seem from the evidence in the present study that a period of four weeks from the start of the cough would be a reasonable quarantine period, even though the child may cough for several months afterwards.

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NHS Costs

According to Dr Vaughan, Minister of Health, the NHS costs £20,000 a minute, or £13·3 billion in 1981 compared with £9·3 billion in 1979.

Source: Speech to BMA Junior Members Forum, 4 April 1981.