

## SUMMARY

# TUBERCULOSIS EPIDEMIOLOGY AND FAILURES OF TUBERCULOSIS CONTROL IN CHILDREN

Between 1961 and 1966 intensive investigations were carried out in 15 centres in France, Poland, Switzerland (Geneva), and Yugoslavia to determine the number of cases of tuberculosis among schoolchildren, to detect the sources of infection and to establish the degree of participation of schoolchildren in tuberculosis control measures.

In these centres, record cards were established for a total of 232 098 children in certain age groups and these children were given regular examinations and tuberculin tests over periods up to 4 years. The results of the examinations and tests were recorded, as was information concerning the family history of tuberculosis, previous BCG vaccinations, etc. All the children who gave a positive reaction in the tuberculin test, and a sample of those with negative reactions, were tested radiologically. Special efforts were made to detect all cases of tuberculosis among schoolchildren and to investigate the possible sources of infection. All the cases found were subjected to bacteriological examination.

The size distribution of reactions to the tuberculin test among non-vaccinated children in France and Geneva showed the typical bimodal curve of a population including infected and non-infected children. These curves led to the establishment of a 10-mm reaction as the limit of positivity for this investigation. The prevalence of infection at the beginning of the study in France and Geneva, where fewer than 10% of the children had been previously vaccinated, was 4% and 2.9%, respectively.

From the prevalence of positive reactions among the youngest age groups of children, the annual incidence of infection, calculated by two methods, was 0.4% in Geneva, 0.6% in France and 1.5% in Poland. The annual incidence of infection was also studied in France and Yugoslavia by analysing the reactions to tuberculin tests in successive years. This analysis showed that children with an increase in reaction size in one year of 18 mm or more formed a distinct group and probably represented those recently infected. The annual incidence of infection calculated in this way was 0.64% in France and 1.15% in Yugoslavia.

During the course of the investigations a total of 556 cases of all forms of tuberculosis was detected. Case-finding was based on the systematic investigation of all children by means of tuberculin tests and radiological and bacteriological examinations and, in fact, about half the cases were detected in this way. The remaining cases came to light after making further enquiries of the public health authorities and private doctors. The number of cases detected by radiological examination was very small: of the children with suspect radiographic findings, tuberculosis of the respiratory system was confirmed in

less than 1% in Poland, 4% in France, 6% in Geneva and 10% in Yugoslavia. In contrast, among children with tuberculin reactions of 14 mm or more, 3% of those who had been vaccinated previously with BCG and 20% of those not vaccinated were later found to have active disease. This group of children thus had a high risk of morbidity. An even higher risk of morbidity was found among children whose tuberculin reaction had recently increased by 18 mm or more.

The numbers of new cases of tuberculosis of the respiratory system discovered by the systematic investigations, per 100 000 population, were as follows: 83 in Yugoslavia, 25 in Poland, 25 in Geneva, and 29 in France. In France the number per 100 000 was 2 among vaccinated children, 54 among non-vaccinated children, 320 among children with a tuberculin reaction of 14 mm or more, and 1190 among those children with a recent increase in size of tuberculin reaction of 18 mm or more.

These levels of the risk of infection and the risk of morbidity show considerable reductions in comparison with those of 10-15 years earlier but, as the recently infected children themselves represent a potential source of infection, the eradication of tuberculosis is still far from having been achieved.

Analysis of the results of this study demonstrate certain weaknesses in tuberculosis control measures. For instance, even in the course of this special study, many children missed the tuberculin test, the proportions being 6% in Poland, 8% in Geneva, 20% in Yugoslavia, and 30% in France. Fewer children missed both the tuberculin test and the radiological test—2% in Poland, 8% in Geneva, 16% in Yugoslavia, and 18% in France. At the beginning of the study, large numbers of children had not been vaccinated with BCG, the proportions being 84% in Geneva (where vaccination was voluntary) and 73% in France (where vaccination was compulsory). In Poland and Yugoslavia the proportions of children without scars or without a past record of vaccination were 51% and 24%, respectively.

The study itself, however, did much to improve the numbers of children participating in tuberculin tests and at the end of the study improvements were seen in all the centres in the proportions of children vaccinated. In France and Geneva, where BCG vaccination seems to have been more effective than in Poland and Yugoslavia, new cases were 5-7 times less frequent among vaccinated than among non-vaccinated children.

Despite great efforts the sources of infection were often not found. Of the sources that were found, however, the majority were among family contacts most of whom had not been bacteriologically tested in the previous year.