Tuberculin Conversion Rates in Primary School Children: Absence of a Relationship with Tuberculin Reactor Rates in Cattle

J. D. Collins, K. Lynch, L. Daly, G. Bourke, J. M. Horgan

Introduction

In 1984/85 a survey of the tuberculin conversion rate in 112,269 primary school children in Ireland indicated that 1,980 of the Heaf test-positive children appeared not to have been vaccinated with the BCG vaccine (Horgan, Daly and O'Boyle, 1988). These children were enrolled in infant and 6th year classes at 790 schools throughout the country. It was decided to investigate whether or not there was any relationship between the tuberculin conversion rates seen in unvaccinated children and the level of tuberculosis in the cattle population in the surrounding districts over the same period.

Method

The locations of the schools in which children who had shown positive reactions (Grade 1 reactions or higher) and who appeared not to have been vaccinated with BCG vaccine were plotted according to their national grid coordinates, using the MapInfo package.

The annual disclosure rates of tuberculin reactor cattle for the years, 1983, '84 and '85, for each Divisional Electoral District (D.E.D.) in the country were determined. The estimator used in the survey was the rate of disclosure of total reactors, expressed as the A.P.T., that is, the number of reactor cattle disclosed per 1,000 tuberculin tests carried out. The mean A.P.T. rate for the three-year period was then calculated for each D.E.D.

Results

The locations of 550 of the schools were plotted and are shown in Figure 1. Schools in the Greater Dublin Area along with a number of smaller schools for which coordinates were not available are omitted. A total of 30,003,834 tuberculin tests were conducted on cattle during 1983, '84 and '85; the national A.P.T. rate for each of these years was 3.00, 3.64 and 2.92 respectively. The mean A.P.T. rate for each D.E.D. over the 3 years, expressed as percentiles, is also shown in Figure 1.

Discussion

There was no apparent correlation between the level of tuberculin reactors in the local cattle population and the prevalence of tuberculin-sensitive children, as measured by the reaction to the Heaf test conducted on 112,269, or 79.9 per cent, of the children enrolled in the infant and 6th year classes studied. A proportion of the Heaf-positive children referred to here showed Grade 1 reactions only; such reactions are commonly attributed to a response to BCG vaccination (W.H.O. Report, 1974).

1 Department of Public Health Medicine and Epidemiology, Faculty of Medicine, University College Dublin.

2 Each District Electoral Division is ranked in order of decreasing values for APT. The resulting ranked set of DEDs are divided into percentiles (units containing 1/100th one hundredth of the set). The percentiles 90-100 therefore, are an amalgamation of the 10% of DEDs with the highest APTs over the years '83, '84 and '85.
Horgan et al. acknowledged in their paper that such misclassification may have occurred; they proposed that the true tuberculin conversion rates in the categories of children they had examined were considerably lower than those initially cited and suggested that conversion rates of 0.1 per cent and 0.9 per cent for infants and 6th class children who had not been vaccinated were more accurate. These latter rates compare favourably with those seen in other developed countries. The results of the present study indicate that children attending school in areas in which there is a relatively high incidence of tuberculosis in the local cattle population are no more likely to display evidence of tuberculin conversion than are children in other areas of the country.

References


Figure 1. Locations of 550 primary schools [...] in which positive Heaf test reactions were recorded in children who appeared not to have been vaccinated with BCG vaccine together with the rates of disclosure of tuberculin reactor cattle at D.E.D. level, expressed as A.P.T. in percentile terms for the period 1983-85.