

# Editorial

## Infectivity of tuberculosis

The rapid and encouraging advances in chemotherapy have led to a very rapid diminution in the duration of infectivity of patients suffering from infectious tuberculosis, and have made a significant contribution to the control of spread of the disease. There is thus a danger that other control measures, particularly contact tracing and examination, may be neglected because they may be considered to be time-consuming and to have a low yield.

The potential infectiousness of the tuberculous patient was first suspected by Aristotle and these suspicions were echoed by Marten<sup>1</sup> in the eighteenth century who regarded close contact as important. In a series of elegant experiments Riley *et al*<sup>2</sup> established beyond doubt the infectious potential of circulating air in a tuberculosis ward. It has been shown that, in smear-positive patients, droplet nuclei less than 10  $\mu\text{m}$  in diameter and containing usually only one bacillus may transmit the disease. Thin watery sputum is more easily dispersed into infective particles than viscous material, and forced ventilatory manoeuvres such as coughing and singing are more efficient dispersing mechanisms than quiet breathing.<sup>4,5</sup> The level of ventilation and recirculation of air may also be of importance. Houk *et al*<sup>6</sup> described an outbreak of tuberculosis in a submarine in which over one-third of the ship's crew developed evidence of infection. They related the spread of infection not only to direct contact but the ventilation system in each crew area. Other important factors are the closeness of contact of a tuberculin negative patient with an infectious patient, previous protection with BCG or chemoprophylaxis,<sup>7</sup> and chemotherapy which reduces bacillary numbers<sup>8</sup> and cough frequency<sup>9</sup> within a few weeks.

It is 25 years since Shaw and Wynn-Williams<sup>10</sup> studied the infectivity of pulmonary tuberculosis in relation to sputum status in Great Britain. In view of the great changes which have occurred in the epidemiology of tuberculosis in recent years, the Research Committee of the British Thoracic Association has recently conducted a large multi-

centre study of a standardised contact procedure.<sup>11</sup> All newly notified cases of tuberculosis from 37 centres and their respective close contacts were studied. There were 1237 index cases, 4668 close contacts (household contacts or close friends), and 2731 casual or other contacts. After the initial examination, contacts were examined annually for two years, the attendance level being 75% at the first and 50% at the second year. Three-quarters of the index cases suffered from pulmonary tuberculosis of whom one-quarter were sputum smear-positive. Active pulmonary tuberculosis was found in 3.5% of close contacts during the two years but if the index case was smear-positive, the yield increased to 9.4% in Asians and 12.7% in other ethnic groups. Culture positive respiratory disease and non-respiratory tuberculosis were associated with a very low incidence of active disease. It is interesting that there has been little change in the yield from contact examination in the course of the past 25 years.<sup>11</sup>

Most contacts with active disease were identified at the initial attendance, particularly in the non-Asian group (84%). In this group those who were found to have disease at subsequent attendances were contacts of smear positive patients. In Asian contacts, only 66% presented initially, 20% being discovered at the first annual examination and 14% at two years. Chemoprophylaxis would seem to have a role in this group of contacts. Previous vaccination with BCG had a markedly beneficial effect on the risk of acquiring active disease by contacts, 4.4% of unvaccinated contacts developing disease compared with 1.1% of the vaccinated group.

Contact tracing and examination must remain an essential part of tuberculosis control and any direction to reduce this important aspect of prevention should be resisted. An appropriate contact examination scheme must be related to the ethnic origins<sup>12</sup> and to the sputum smear status of the index case, and to the BCG status of the contact. All close contacts should be examined once, and the non-vaccinated (BCG), tuberculin-positive close contact of a smear-positive non-Asian index case should be reviewed

annually for two years. All non-vaccinated tuberculin positive contacts of Asian patients suffering from respiratory tuberculosis should be examined annually for two years. Examination of casual contacts is unnecessary unless there has been exposure to a highly infectious patient.

B H DAVIES  
Sully Hospital  
Sully  
South Glamorgan  
Wales

#### References

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