The importance of tuberculin retesting in the adult community at risk

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SUMMARY. Tuberculosis immunization status was assessed in 2,501 individuals seeking employment in a district general hospital between January 1979 and December 1981. For 587 (23 per cent) of the employment seekers there was no evidence of BCG vaccination and nor were any of them aware of having had a tuberculin skin test at school. Tuberculin skin tests (Heaf's test) on these 587 individuals showed no reaction in 163 (28 per cent) and a strong (grade 4) reaction in 50 individuals. Only five of the individuals with grade 4 reaction to Heaf's test needed chemotherapy. During the same period, 43 patients with tuberculosis were in contact with 1,568 members of the hospital's staff.

The management of occupational contact is described and the need to rescreen the population at risk is discussed.

Introduction

TUBERCULOSIS continues to be the commonest notifiable disease in England and Wales.[1] As medical staff are more at risk of contracting the disease than the general population,[2-4] the National Health Service (NHS) has organized a surveillance scheme for hospital workers.

Bacille Calmette-Guérin (BCG) antituberculosis vaccine confers 80 per cent protection,[5] and in the UK vaccination is usually carried out by the school medical service. Previous studies have shown that such a service may not cover the entire community[6] and that vaccination details may not be obtainable from general practice records (S. J. Jachuck, C. L. Bound and P. Price, unpublished findings).

It was the lack of information in general practice records and the possibility of ineffective administration of the BCG vaccination programme in schools that prompted us to review the immunization status of 2,501 prospective employees for a district general hospital during their pre-employment assessment.

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Method

Between January 1979 and December 1981 all prospective employees for a 900-bed district general hospital were screened for visual evidence of BCG vaccination and radiological evidence of pulmonary tuberculosis. Those individuals who showed no evidence of BCG vaccination and no radiological or clinical evidence of having had tuberculosis in the past were given the multipuncture tuberculin test (Heaf's test). The response to tuberculin tests was graded 1-4.[7] BCG vaccine was administered to all individuals with grade 1 or no reaction to the tuberculin test. All the prospective employees were born after 1940 and, as the BCG vaccination programme. was introduced in 1950, would have been offered BCG vaccination in school.

Forty-three patients in various (noninfectious disease) wards in the hospital were found to have tuberculosis when undergoing investigation of other clinical conditions. Hospital workers who had been in contact with these tuberculous patients were traced and screened.

Results

Table 1 shows the number of prospective employees screened in each year of the survey and the results of tuberculin testing. Of the total of 2,501 individuals, 1,914 (76.6 per cent) had evidence of having had a satisfactory tuberculin skin test or BCG vaccination, but there were 587 (23.4 per cent) individuals who had no evidence of BCG vaccination and who were not aware of having had a tuberculin skin test at school. Fifty people reacted strongly to Heaf's test (grade 4) and five of them required chemoprophylaxis.

Table 2 shows the yearly incidence of tuberculosis in the hospital and the wards in which the 43 cases were detected, as well as the figures for occupational contacts. The total number of hospital workers (1,568) who were found to have been in contact with tuberculous patients does not include staff employed in the outpatient department and pathology laboratories as there was no access to this information. There was no further follow-up of the occupational contacts if they had a positive reaction to a tuberculin test or evidence of a BCG vaccination. None of these workers is reported to have suffered from tuberculosis since the contact.

Table 1. Results of screening all prospective employees for a hospital between 1979 and 1981.

Surveillance year	Number of prospective employees screened	Number who required tuberculin test (% screenings)	Number who required BCG vaccination (% tests)	Number who had grade 4 reaction to tuberculin test (% tests)
1979	980	276 (*28.1*)	81 (*29.3*)	28 (*10.1*)
1980	850	137 (*16.1*)	47 (*34.3*)	15 (*10.9*)
1981	671	174 (*25.9*)	35 (*20.1*)	7 (*4.0*)
Total	2,501	587 (*23.4*)	163 (*27.7*)	50 (*8.5*)

Table 2. Details of tuberculosis cases detected in the hospital over the same period and the number of hospital staff in contact with the patients.

Surveillance year	Number of tuberculosis patients				Number of occupational contacts	Wards where diagnosis was made
	Sputum positive	Sputum negative	Sputum not tested	Total		
1979 (June–Dec)	4	2	1	7	281	Medicine, trauma, neurosurgery
1980 (Jan–Dec)	4	2	7	13	594	Medicine, surgery, coronary care unit, geriatric day unit, geriatric ward
1981 (Jan–Dec)	13	10	—	23	693	ENT, medicine, psychological medicine, geriatric ward, paediatric ward, radiotherapy, orthopaedic ward
Total	21	14	8	43	1,568	

ENT = ear, nose and throat.

Discussion

It was encouraging to observe from this study that nearly 80 per cent of people seeking work in a hospital had evidence of a satisfactory tuberculin skin test or BCG vaccination. Some of these people had had BCG during their previous employment in the NHS. The remainder (23 per cent) had no evidence of BCG vaccination and were not aware of having had a tuberculin skin test; some of the people in this group might have had the test at school and not realized the significance. The high mobility of our population has contributed to the failure of other immunization programmes in schools. It was not surprising, therefore, to find that some of the people in our study had escaped the tuberculin screening programme in school.

Houghton and Horne reported that before 1950 17 per cent of the adult community failed to react to tuberculin tests.[8] Subsequently, Poole reported a negative reaction to a tuberculin skin test in 40.3 per cent of a sample of 1,653 nurses.[9] The high proportion (69 per cent) of negative reactions found in the Liverpool area[6] could have been partly due to the unsatisfactory method of testing.[10] In our study, 587 prospective employees needed a tuberculin test and 163 (27.7 per cent) of them showed no reaction. The decline in the incidence of tuberculosis in the community could account for such a high proportion of negative responses to tuberculin testing. It is also known that some individuals fail to convert even after BCG vaccination.

The need to rescreen school-leavers by testing for tuberculin sensitivity becomes clear in view of the fact that 23.4 per cent of the prospective employees had no evidence of BCG vaccination and 27.7 per cent of those who were given a tuberculin skin test had no reaction and needed BCG vaccination. It has been shown that tuberculosis is four times more common in tuberculin-negative individuals working in hospitals.[2]

In our study, 50 (8.5 per cent) individuals who required tuberculin testing reacted strongly (grade 4 reaction) to the tuberculin. This implied past or present infection with *Mycobacterium tuberculosis*. It has been suggested that young people with such a reaction to tuberculin should be investigated and kept under surveillance for two years if treatment is not indicated.[2] All

individuals with grade 4 reaction to Heaf's test were followed up with annual chest radiography. Only five people in this study needed chemoprophylaxis in view of their history of contact with tuberculous patients outside the hospital and radiological evidence at the time of pre-employment assessment.

Apart from those people who are at risk of contracting tuberculosis through their occupation,[3,11] immigrants from Pakistan, India and Ireland, hostel dwellers, alcoholics, patients suffering from diabetes mellitus, those who have had partial gastrectomy, and patients receiving corticosteroid or immunosuppressive therapy are also at high risk.[12]

The detection of 43 tuberculosis patients in various wards of the hospital emphasizes the occupational risk. The diagnosis was not made before their admission. Only four of these patients were immigrants. Twenty-one of these patients demonstrated tubercle bacilli in their sputum. The 43 tuberculous patients had been in contact with 1,568 members of the hospital's staff. We had no record of contacts among laboratory staff, but hospital laboratories do not always follow the recommended code of practice.[13] The follow-up of contacts is of concern to clinicians, occupational physicians and general practitioners[13] and, of course, the contacts themselves. The incidence of new cases of tuberculosis among close contacts is similar for both the Asian and non-Asian community. The incidence is significantly higher when the index-case is positive on sputum smear.[14]

Fortunately, the risk of new cases from social and occupational contacts is small, but up to 10 per cent of household contacts may require treatment.[8] Relevant contact tracing is usually done by the clinician who initiates treatment for the patient. The occupational and social contacts need to be reassured by the occupational physician or the general practitioner: those who have no BCG scar and show no clinical or radiological evidence of having had tuberculosis in the past should undergo tuberculin testing and chest radiography; those who have had a BCG vaccination or positive tuberculin test in the past need no further follow-up.

To facilitate the retrieval of vaccination records, better communication between the school medical service and primary care teams is essential. This might be achieved by introducing an easily administered common recording system to be stored in the general practice record folder. A second stage screening programme for tuberculosis is required, if not for all members of the community then at least for those who are at special risk of contracting the disease.[15] The tuberculosis surveillance scheme instituted by the NHS should also include the members of the primary care team who are exposed to patients at home and their families.[4] There still appears to be considerable benefit from vaccinating children and rescreening the adult community at risk[16] despite the proposal to reconsider the current vaccination policy.

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No mid-term census

The Government has announced that the case for a mid-term census in 1986 was not sufficiently strong to justify the cost and the burden on the public that would have been involved, and that planning will proceed on the assumption that the next census will be in 1991. In consequence the use of 1981 census results will be extended, and the publications of guides to the use of 1981 results—such as *A census user's handbook* and an article on population definitions in *Population trends 33* reviewed in this Monitor—is particularly timely.

This Monitor also contains information about the latest national reports and about the publication of a new county-by-county series—the *Ward and parish monitors.*

Source: Office of Population Censuses and Surveys. 1981-1991. *OPCS Monitor* 1983; CEN 83/5: 22 November.