Screening for tuberculosis: the port of arrival scheme compared with screening in general practice and the homeless

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Three settings for tuberculosis (TB) screening were examined. The settings were a new entrants' clinic (NEC), a general practice (GP) and centres for the homeless (CFH). Screening was based on a questionnaire that identified any relevant symptoms (cough, sputum, haemoptysis, fever, night sweats, weight loss, malaise, anorexia or lymph gland enlargement), BCG vaccination status, and residence in an area with a high incidence of TB in the last 18 months. The screening was offered to all new entrants and contacts. Subsequent tuberculin (Heaf) testing was offered to all new entrants, contacts, and symptomatic individuals under 35 years of age. It was also offered to those without a visible BCG scar, and to all homeless regardless of age. Those aged older than 35 years with symptoms or considered to be a very high risk were offered a chest radiograph, sputum examination and blood testing, as appropriate. Those with a Heaf test grade 0 or 1 without a BCG scar were offered BCG vaccination. Further investigation was offered to those with a grade 2 response but no BCG scar, and to all those with a grade 3 or 4 response.

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised the general group of new entrants and contacts who were at risk from TB. Further actions were limited to individuals who were identified according to specified criteria (see 'Health Technology' section).

Setting
The setting was the community, as different settings were considered. The economic study was carried out in the area of Hackney, an inner London borough in the UK.

Dates to which data relate
The effectiveness and resource use data were gathered between 1996 and 1998. More specifically, in 1996 for the NEC, from April 1997 to February 1998 for the GP, and in the winter of 1997/8 for the CFH. No price year was reported.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was not performed on the same sample of patients as that used in the effectiveness analysis.
**Study sample**
The use of power calculations to determine the sample size were not reported. The participants were identified from those who had access to the three study locations in each corresponding time period. Screening was offered to 199 of the 1,262 individuals in the NEC setting, to 172 of the 267 in the CFH group, and to 45 of the 1,311 in the GP group. The characteristics of the individuals in the samples were not provided.

**Study design**
This was a comparative study of screening in three different types of location. At each type of location, eligible individuals were offered screening. The study was carried out at the NEC of the Homerton Hospital, in a large GP with academic affiliation, and in several CFH (three hostels, an emergency accommodation centre and a drop-in centre). It was unclear how the individuals were subsequently followed after screening.

**Analysis of effectiveness**
It appears that the analysis of the effectiveness has been limited to those individuals with complete data. The primary health outcomes were the numbers of TB cases identified, tuberculin reactors requiring chemoprophylaxis and BCG vaccinations. The study groups were not compared at baseline.

**Effectiveness results**
Three TB cases were identified in the NEC versus 0 in the other settings.

There were 5 tuberculin reactors requiring chemoprophylaxis (which was then completed) in the NEC group, 6 in the CFH group, and 2 in the GP group.

There were 18 BCG vaccinations in the NEC group, 27 in the CFH group, and 14 in the GP group.

**Clinical conclusions**
The results of the effectiveness analysis were unclear since no cases of TB were identified in the GP and CFH settings.

**Measure of benefits used in the economic analysis**
Although the authors estimated the cost per case of TB prevented, it appears that a true cost-effectiveness analysis has not been performed and the number of TB cases prevented was used only in the cost analysis. Thus, no summary benefit measure was used in the economic evaluation. Hence, in effect, a cost-consequences analysis was conducted.

**Direct costs**
Discounting was not relevant since the costs of the screening programme were likely to have been incurred in less than two years. The unit costs were provided separately from the quantities of resources used. The health services included in the economic evaluation referred to nursing and clerical costs, treatment costs (e.g. investigations, inpatient stay, outpatient visits, drugs), overheads, contact tracing for those found positive, and chemoprophylaxis. The cost/resource boundary adopted in the analysis was not explicitly stated, but it appears to have been that of the NHS. The resource use data were estimated on the basis of a series of assumptions, some of which were derived from the literature. The source of the cost data was not reported and neither was the price year. The costs were standardised as the cost per case of TB prevented in order to compare the estimated costs in the three different settings. This calculation assumed that each case of TB would result in an average of 4.5 further cases, 3 of which developed early.

**Statistical analysis of costs**
The costs were treated deterministically, that is, only point estimates were provided.
Indirect Costs
The indirect costs were not included in the economic evaluation.

Currency
UK pounds sterling ( ).

Sensitivity analysis
The authors reported the results of a sensitivity analysis, but gave no details on the type of approach used or the ranges selected.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The total costs were 22,646 in the NEC group, 3,452 in the CFH group, and 938 in the GP group.

The total savings associated with the TB cases prevented were 25,621 (9.5 cases prevented) in the NEC group, 1,618 (0.6 cases prevented) in the CFH group, and 594 (0.2 cases prevented) in the GP group.

The cost per person screened per case prevented was 10 in the NEC group, 22 in the CFH group, and 6.32 in the GP group.

The authors stated that the sensitivity analysis demonstrated the important effect of identifying a case of TB: if a further case was detected at each location, the total costs per screened individual would become savings of 33 for the NEC, 6 for the GP, and 11 for the CFH.

Synthesis of costs and benefits
A synthesis of the costs and benefits was not performed as, in effect, a cost-consequences analysis was carried out.

Authors’ conclusions
Screening for tuberculosis (TB) was feasible and cheap in the setting of general practice (GP), mainly because the initial costs were minimal. However, it has to be considered that a substantial proportion of individuals eligible for TB screening were not registered with a GP. The new entrants’ clinic (NEC) had a very low uptake, but was the most successful setting for diagnosing new cases of TB. Overall, the analysis did not suggest that the current approach, based on the port of arrival, should be replaced by GP screening but that new ways of delivering TB screening might be considered.

CRD COMMENTARY - Selection of comparators
The authors justified the choice of NEC as the basic comparator because it represented the standard approach for detecting TB in the area where the study took place. The GP and CFH strategies represented two alternative and feasible options. You should decide whether they are valid comparators in your own setting.

Validity of estimate of measure of effectiveness
The analysis of effectiveness used a prospective comparative study of screening in three different types of location. More specifically, the NEC of the Homerton Hospital, a large GP with academic affiliation, and several CFH (three hostels, an emergency accommodation centre and a drop-in centre). Given that the objective of the study was to compare the absolute numbers of TB cases found, treated or prevented, the study design appears to have been
appropriate. The populations obviously varied between the different types of location. However, for a proper cost-effectiveness analysis of screening strategies in any one location, a randomised controlled trial would be the ideal effectiveness study. The authors suggested as much for the GP setting.

**Validity of estimate of measure of benefit**
No summary benefit measure was used in the analysis as, in effect, a cost-consequences analysis was conducted.

**Validity of estimate of costs**
The perspective was unclear and the source of the cost data was not provided. Thus, it was also unclear whether all the relative categories of costs were considered. The authors presented the unit costs and the quantities of resources used separately. A breakdown of the costs was reported. However, the price year was not given, thus making reflation exercises in other settings difficult. Some assumptions were also made to estimate resource use. The time horizon of the analysis was not explicitly stated, but it appears that the costs were incurred in less than two years, thus discounting was irrelevant.

**Other issues**
The authors did not compare their findings with those from other studies. They also did not address the issue of the transferability of the study results to other settings. It appears that only one factor has been varied in the sensitivity analysis. This limited the external validity of the analysis, which appears high only with respect to the economic analysis due to the fact that the costs and resources used were reported separately. This was done to enable the replication of the study in other settings. However, the final conclusions of the analysis do not appear clear in relation to the study results.

**Implications of the study**
The authors recommended that screening for TB should be limited to high-risk groups, such as new entrants, with many receiving the greatest benefits in an efficient way. The authors suggested that a randomised trial would be helpful to demonstrate that screening in the GP setting is worthwhile.

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