A model of the cost-effectiveness of directly observed therapy for treatment of tuberculosis

Palmer C S, Miller B, Halpern M T, Geiter L J

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
Directly observed therapy for treatment of tuberculosis.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Three identical hypothetical cohorts of 25,000 adult TB patients with drug-susceptible disease.

Setting
TB clinics and the community. This study was carried out in the USA.

Dates to which data relate
Effectiveness data were collected from studies previously published between 1969 and 1995. Cost data were retrieved from 1992 data sources. The price year was 1992.

Source of effectiveness data
Effectiveness data were obtained from 178 abstracted outpatient records (TB clinic records from four health department outpatient TB control programmes), published literature and surveillance systems.

Modelling
A 10-year decision model was developed to estimate the health and economic consequences and cost-effectiveness of three strategies for the treatment of TB.

Outcomes assessed in the review
The review assessed the following outcomes: treatment duration, mortality, treatment default, treatment completion, relapse, infectiousness following default, development of multiple drug resistant (MDR) TB, immunologic status, whether MDR, and loss to follow-up.

Study designs and other criteria for inclusion in the review
Not stated.
Sources searched to identify primary studies
Not stated.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Summary statistics from each study.

Number of primary studies included
Approximately 7 studies were included in the review.

Methods of combining primary studies
Narrative method.

Investigation of differences between primary studies
Not stated.

Results of the review
9% of patients died from all causes during treatment. 3.5% of patients who completed therapy relapsed. 75% of relapses occurred within a year, another 20% within the second year, and the remaining 5% spread equally across years 3 to 10. Each patient with active TB had 9.8 contacts, 92% of these contacts were examined for TB and 0.7% of those examined had active TB. 22% of those examined had TB infection and 16% of all contacts were placed on preventive therapy. Preventive therapy effectiveness was estimated to be 65% for MDR TB-infected and non-MDR TB-infected patients. For newly infected contacts, the risk of developing active TB was 4% in the first year following infection, and 1% per year for the following four years. 35% of patients were hospitalised for diagnosis of TB prior to outpatient treatment. Patients with drug-susceptible TB had a mean hospital stay of 20 days for all hospitalisations. Patients with MDR TB who were immunosuppressed spent 70 days in hospital.

Measure of benefits used in the economic analysis
The primary outcome of interest was the number of cases cured.

Direct costs
Future costs were discounted at a rate of 3%. Quantities and costs were reported separately. Direct costs included all costs of curative and preventive TB treatment (based on inpatient and outpatient medical and non-medical resource use). The quantity/cost boundary adopted was that of the health service. The estimation of quantities and costs was based on actual data. Cost data were obtained from outpatient records, staff interviews at the TB clinics and the published literature. The price year was 1992.

Statistical analysis of costs
Not reported.

Indirect Costs
Not included.
Currency
US dollars ($).

Sensitivity analysis
Sensitivity analysis was conducted on the following variables: discount rate, rate of default, the rate of infectiousness following default, the rate of development of MDR TB, the mortality rate for immunocompetent patients with MDR TB, the proportion of patients with MDR TB who were immunosuppressed, the length of stay for hospitalised TB patients, the rate of hospitalisation for TB before or between episodes of outpatient treatment, and direct outpatient costs for TB treatment.

Estimated benefits used in the economic analysis
The cure rate was 80.4% for partial DOT, 65.1% for 100% PRT, and 86.3% for 100% DOT.

Cost results
Total discounted direct costs amounted to $398 million for partial DOT, $386 million for 100% PRT, and $438 million for 100% DOT.

Synthesis of costs and benefits
The cost per case cured amounted to $16,846 for partial DOT, $20,106 for 100% PRT, and $17,323 for 100% DOT. The results were sensitive to changes in the cost of outpatient treatment and the rate of development of MDR TB after default.

Authors’ conclusions
Outpatient DOT provides a cost-effective method of improving health outcomes for TB patients and their contacts, while controlling direct costs.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparators was clear. You, as a user of this database, should verify whether these health strategies are relevant to your setting.

Validity of estimate of measure of benefit
The measure of benefit seems to be valid, although it was based on effectiveness data derived from a variety of data sources. All-cause mortality was held constant across treatment delivery strategies, although this was not always supported by the data found in the literature. Some effectiveness data were based on evidence of a small group of 178 patients treated at only 4 TB clinics.

Validity of estimate of costs
The model did not include direct costs of all TB activities related to treatment failure (e.g. costs of managing TB outbreaks resulting from infectious patients who have failed therapy), or any indirect costs associated with decreased productivity or intangible costs associated with impaired quality of life of patients.

Other issues
The model only considered patients with drug-susceptible TB.

Implications of the study
The authors state that the use of cost per cure is a better measure than cost per life-year saved and that TB programmes should use DOT whenever possible.

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**Other publications of related interest**


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