Cost-effectiveness of various tuberculosis control strategies in Thailand
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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.

CRD summary
The objective was to estimate the cost-effectiveness of different tuberculosis control strategies in Thailand. The authors concluded that due to the large uncertainty it was not possible to determine whether directly observed treatment was cost-effective when compared to self-administered treatment. Study methodology was of adequate quality. Methods and results were well reported. Given the limitations in the evidence used, the authors’ conservative conclusions are valid.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to estimate the cost-effectiveness of different tuberculosis (TB) control strategies in Thailand.

Interventions
The study investigated three main six-month interventions: daily drug intake observed directly by a health worker at a healthcare facility, community member or family member; daily mobile phone reminders by village health volunteers who had completed their own tuberculosis treatment; and self-administered treatment without supervision.

Location/setting
Thailand/Community care.

Methods
Analytical approach:
A decision analytic tree model was used to assess the costs and outcomes associated with the interventions under study. The time horizon of the study was the lifetime of the patient. The authors reported that the perspective was that of the healthcare system incorporating costs borne by patients.

Effectiveness data:
Clinical and effectiveness data were derived from previously published studies. The main effectiveness measures used in the model were the success rate, failure rate, transfer out rate and death rate for each intervention. Treatment effectiveness for directly observed treatment interventions and self-administered treatment were derived from a Thai randomised controlled trial (Kamolratanakul et al. 1999, see Other Publications of Related Interest). Treatment effectiveness for the mobile phone intervention were derived from a monitoring care study (Visrutaratna et al. 2008, see Other Publications of Related Interest).

Monetary benefit and utility valuations:
Disability weights associated with tuberculosis were derived from a Dutch disability weights study. Disability weights for all other causes were derived from the Thai Burden of Disease and Injuries study.

Measure of benefit:
The measure of benefit was disability-adjusted life-years (DALYs) averted. Expected health-adjusted life expectancy was combined with the disability weights to estimate DALYs. Benefits could be generated over the lifetime of the patient. Future benefits were discounted using an annual rate of 3%.

Cost data:
Included costs were for government expenditure (including health staff supervision and monitoring time, travel costs to
monitor patients at home, mobile phone monitoring care, laboratory costs, pharmaceutical costs, radiology and health facilities) and costs incurred by patients and/or their families (including travel and time costs of supervision, follow-up or treatment and out-of-pocket expenses). Resource use information was derived from previously published studies and the authors’ own assumptions. Unit costs were derived from published sources. The price year was 2005. Costs could be incurred over the lifetime of the patient. Future costs were discounted using an annual rate of 3%. All costs were reported in international dollars (I$), using an exchange rate of I$=12.12 Thai Baht.

**Analysis of uncertainty:**

Uncertainty distributions were fitted alongside model parameters. Ninety-five per cent uncertainty intervals (95% UI) were determined for all outcome measures using 2,000 Monte Carlo simulations.

**Results**

The total costs in millions of treating 25,815 patients were: I$42 (95% UI 36 to 50) for directly observed treatment by a healthcare worker; I$26 (95% UI 19 to 35) for directly observed treatment by a community member; I$20 (95% UI 18 to 22) for directly observed treatment by a family member; I$20 (95% UI 18 to 23) for mobile phone reminders; and I$29 (95% UI 26 to 32) for self-administered treatment.

When compared to self-administered treatment, total DALYs averted when treating 25,815 patients were: 7,900 (95% UI -50,000 to 43,000) for directly observed treatment by a healthcare worker; 13,000 (95% UI -21,000 to 37,000) for directly observed treatment by a community member; 9,400 (95% UI -7,200 to 25,000) for directly observed treatment by a family member; and -26,000 (95% UI -68,000 to 11,000) for mobile phone reminders.

Costs and benefits were combined using an incremental cost-utility ratio (additional cost per DALY averted). When compared to self-administered treatment, the median incremental cost-utility ratio was: I$1,100 (95% UI 270 to dominated) for directly observed treatment by a healthcare worker and I$350 (95% UI dominant to 120) for mobile phone reminders. Directly observed treatment by a community member and by a family member were found to be dominant (less costly and more effective) over self-administered treatment but both had very wide 95% uncertainty intervals.

**Authors' conclusions**

The authors concluded that the large uncertainty made it impossible to determine whether directly observed treatment was cost-effective when compared to self-administered treatment.

**CRD commentary**

**Interventions:**

The study interventions were reported adequately and clearly represented relevant options in the nominated setting; it was unclear how widely generalisable or relevant the interventions were outside of this setting.

**Effectiveness/benefits:**

The authors adequately reported the main effectiveness estimates used in the model and their sources. The authors did not report whether a systematic review of the literature was undertaken to identify studies. As a result it was not possible to determine whether all relevant information was included in the study. Use of probabilistic methods allowed some parameter uncertainty to be incorporated but cannot be assumed to compensate for the lack of a systematic review.

**Costs:**

The perspective adopted in the study was adequately reported as that of the healthcare system in addition to costs borne by patients or their families; it appeared that all major relevant costs for this perspective were included in the analysis. The sources from which resource use and unit costs were derived from were reported adequately. Price year, time horizon, discount rate and currency conversions were all reported appropriately. Details of resource use and unit costs were provided in online supplementary files.

**Analysis and results:**

A decision analytic tree model was used to synthesise cost and outcome information. Full details of the model structure, including a graphical depiction, were provided by the authors. Uncertainty in the model was tested using a probabilistic
analysis and the results were presented adequately in the form of 95% uncertainty intervals. The authors reported as main limitation to their study that the effectiveness of directly observed treatment and self-administered treatment were obtained from a small randomised trial.

Concluding remarks:
Study methodology was of adequate quality. Methods and results were well reported. Given the limitations in the evidence used, the authors’ conservative conclusions are valid.

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