A cost-benefit analysis of scaling up tuberculosis control in India
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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
This study assessed the cost-effectiveness and return on investment of scaling-up tuberculosis (TB) control in a low-income country. The authors concluded that the programme to scale-up TB control was highly cost-effective and improved India's national health, with an exceptional return on investment. The study had some methodological limitations and the data sources were not extensively presented. These issues might reduce the validity of the authors' conclusions.

Type of economic evaluation
Cost-utility analysis, cost-benefit analysis

Study objective
This study assessed the cost-effectiveness and return on investment of scaling up tuberculosis (TB) control in a low-income country.

Interventions
The intervention was the Revised National Tuberculosis Control Programme (RNTCP), a centrally sponsored public health disease control programme, based on the internationally recognised Directly Observed Treatment Short-course (DOTS) strategy. This programme consisted of strategies to find cases and treat them. It was compared with no TB control programme.

Location/setting
India/primary care.

Methods
Analytical approach:
The analysis was based on a decision model that considered the scale-up period for the RNTCP, which was from 1997 to 2006. The authors stated that a societal perspective was adopted.

Effectiveness data:
The case fatality rates (CFRs) were a key input for the model. For the RNTCP, these were from DOTS databases. For the control intervention, they were from a published systematic review of the literature. These sources provided the difference in CFRs with DOTS versus without DOTS. Other data were from the World Health Organization (WHO).

Monetary benefit and utility valuations:
The disability weights for TB morbidity were from a published study of the South-East Asian population.

Measure of benefit:
For the cost-utility analysis, disability-adjusted life-years (DALYs) were the summary benefit measure and they were discounted at an annual rate of 3%. For the cost-benefit analysis, the economic benefit of TB control was measured by the value of a statistical life, which was based on an estimate published by the United States Environmental Protection Agency (USEPA) for 1999. This US estimate was adapted to India for 2006, using a comparison of their gross domestic products and India's per capita growth from 1999 to 2006.

Cost data:
The economic analysis included the health services associated with the diagnosis and treatment of disease, such as clinic
visits and hospitalisations. The resource use and cost data were from national databases that reported on the implementation of the programme. All costs were in US dollars ($).

Analysis of uncertainty:
Sensitivity analyses were carried out to examine how robust the base-case findings were to variations in the CFRs, disease duration, and value of a statistical life.

Results
Total expenditure on TB control rose from $27 million, in 1997 when geographical coverage was low, to $127 million, in 2006 with full coverage. Over the whole period from 1997 to 2006 the total cost of TB control was estimated at $768 million ($299 million for the programme and $469 for other health care costs).

Over the scaling-up period, 26.6 million life-years were saved, resulting in a gain of 29.2 million DALYs (range 22 to 36 million).

The cost per DALY gained was $19 in 2006 and $26 (range $21 to $35) over the period from 1997 to 2006. The total economic gain was $19,683 million in 2006, and $88,140 million from 1997 to 2006. The return per dollar spent was $155 in 2006 and $115 (range 65 to 179) over the period from 1997 to 2006.

Authors' conclusions
The authors concluded that the programme to scale-up TB control was highly cost-effective and improved India's national health, with an exceptional return on investment.

CRD commentary
Interventions:
The selection of the comparators was appropriate as the DOTS programme was compared against no such programme, where patients were treated less effectively with a higher CFR and longer periods of morbidity. The DOTS strategy was not described.

Effectiveness/benefits:
No systematic review was reported to identify the data sources, which were presumably known to the authors. The data on DOTS cases were from the implementation of the programme in India, while the data for non-DOTS cases were from a published systematic literature review. Both sources appear to have been valid, but their comparability was unclear and was not discussed. DALYs were a valid benefit measure and are often used for TB in low- and middle-income countries. The value of a statistical life was also justified as a benefit measure and its calculation was clearly described.

Costs:
The authors reported a societal perspective, but only the direct medical costs appear to have been considered. These costs were presented as category totals and were not broken down into individual items. Their sources were not extensively described. In general, the economic data were not transparently presented. The cost estimates were treated deterministically and the impact of variations in them was not tested in the sensitivity analyses. The price year was not explicitly reported, but appears to have been 2006.

Analysis and results:
The results were selectively reported as only the incremental findings for the programme versus no intervention were presented. The uncertainty was not satisfactorily investigated because the authors considered only variations in a few inputs. The alternative assumptions appear to have been based on authors' opinions. The results were specific to the authors' context and cannot be transferred to other settings, as insufficient details were reported. The authors acknowledged that their study did not account for other socio-economic factors that might have influenced the impact of the programme.

Concluding remarks:
The study had some methodological limitations and the data sources were not extensively presented. These issues
reduce the validity of the authors’ conclusions.

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