Needle and syringe programs in Yunnan, China yield health and financial return

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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 needle and syringe programmes to prevent HIV infections. The authors concluded that needle and syringe programmes were not only cost-effective, but also cost-saving in Yunnan, China. The methods were adequate, but some could have been explained in more detail, and a more thorough sensitivity analysis could have been reported. The authors’ conclusions appear to be valid for the scope of the analysis.

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

Study objective
The objective was to estimate the cost-effectiveness of a needle and syringe programme to prevent HIV infections in the province of Yunnan, China.

Interventions
The needle and syringe programme allowed intravenous drug users to exchange their old used needles and syringes for new ones. This intervention was compared with no intervention.

Location/setting
China/community care.

Methods
Analytical approach:
A published mathematical transmission model was used to assess the dynamics of HIV (Anderson, et al. 1991, see 'Other Publications of Related Interest' below for bibliographic details). The time horizon was the lifetime of the patient. The authors reported that a societal perspective was adopted.

Effectiveness data:
The clinical data were from published studies and reports, or assumed by the authors, based on the literature or personal communication with experts. Much of the data came from the needle and syringe programme in Yunnan province. The main estimate of effectiveness was the probability of HIV transmission per injection with a contaminated syringe. This was estimated from eight published studies.

Monetary benefit and utility valuations:
Not reported.

Measure of benefit:
The measures of benefit were the number of HIV infections averted and disability-adjusted life-years (DALYs).

Cost data:
The direct costs were those of the needle and syringe programme, which included syringes, the infrastructure, personnel, marketing, and recurring service costs, as well as viral load tests, cluster of differentiation (CD4) load tests, provision of antiretroviral therapy, herbal treatments, and treatment for opportunistic infections. The costs were from published studies and reports. All costs were reported in US $, and future costs were discounted at an annual rate of 3%. The price year was 2009.
Analysis of uncertainty:
A sensitivity analysis was presented by evaluating the cost-effectiveness of needle and syringe programmes over the period from 2002 to 2008 rather than over a lifetime. Different scaling factors were evaluated; the total intravenous drug user population was assumed to be 2.5 or four times the number of registered intravenous drug users in Yunnan, China.

Results
The lifetime DALYs without the needle and syringe programme were 128,879 with a scaling factor of 2.5, or 225,854 with a scaling factor of four. With the needle and syringe programme, the DALYs were 116,126 with a factor of 2.5, or 207,582 with a factor of four.

The total cost of the needle and syringe programme was $1.04 million. The total expenses for HIV infection without a needle and syringe programme were $285.22 million with a factor of 2.5, or $499.30 million with a factor of four. The total expenses for HIV infection with the programme were $258.23 million with a factor of 2.5, or $460.63 million with a factor of four.

With either scaling factor, the needle and syringe programme was dominant over no programme, as it was more effective and less costly.

Authors' conclusions
The authors concluded that needle and syringe programmes were not only cost-effective, but also cost-saving in Yunnan.

CRD commentary
Interventions:
The interventions were described. The main intervention was implemented in one province of China, while other provinces did not implement it, so the comparators were relevant to the setting.

Effectiveness/benefits:
The clinical information was primarily from published studies. The authors did not report the methods used to identify these published studies, and it is not possible to determine whether a systematic review of the literature was undertaken to identify all relevant studies. A range of estimates was used for each parameter, but it was not clear if these were the full ranges of values in the identified studies. The authors did not report the source for the disability weights used to generate the DALYs. The costs were discounted, but it was unclear if the benefits were also discounted.

Costs:
The authors explicitly reported that the perspective was that of society, but no indirect costs appear to have been included. For a health care system perspective, all the relevant major costs seem to have been included. The sources for these costs were reported. The price year, time horizon, and discount rate were also reported.

Analysis and results:
The information on costs and outcomes was synthesised in a mathematical model. The details of the model structure were reported with a diagram. A limited one-way sensitivity analysis was performed, but the overall model uncertainty was not assessed. Ranges of values for several parameters were reported and might have been used in sensitivity analysis, but this was not discussed. The authors reported that the main limitation of their study was that the results might not be generalisable to other parts of China due to cost variations.

Concluding remarks:
The methods were adequate, but some could have been explained in more detail, and a more thorough sensitivity analysis could have been reported. The authors' conclusions appear to be valid for the scope of the analysis.

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Other publications of related interest
Anderson RM, May RM. Infectious diseases of humans: dynamics and control. New York: Oxford University Press. 1991.

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