Cost-effectiveness of syringe exchange as an HIV prevention strategy

Laufer F N

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
A syringe exchange programme (SEP) for use with injecting drug users (IDUs) was studied. The comparator was not explicitly defined.

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The population comprised 9,333 hypothetical individuals, whose characteristics were based on those of IDU clients registered with six SEP programmes during the calendar year 1996.

Setting
The setting was the community. Six community-based SEP programmes were conducted in New York City and one in Rochester, USA.

Dates to which data relate
The effectiveness evidence relate to 1994 to 1996. The resources used were estimated from studies published between 1996 and 1998. Resources and prices relate to 1996 and 1997. No overall price year was stated.

Source of effectiveness data
The effectiveness data were derived from actual data within a review/synthesis of completed studies.

Modelling
Two models were used, and the results were compared. The purpose of the models was to estimate the number of infections averted as a result of access to a SEP for the study population. The first model was a simple formula using the absolute risk difference between access to a SEP and the lack of a SEP. The second model was a simplified circulation model. This estimated the decrease in HIV incidence in a population as a result of potentially infectious needles being removed from circulation among IDUs. To estimate the number of HIV infections averted, this was then applied to the projected number of SEP clients who would contract HIV in the absence of SEP.

Outcomes assessed in the review
For the first model the inputs were:
the prevalence of HIV in the study population;

the attendance rate for SEP clients; and

the reduction in HIV incidence per 100 person-years at risk as a result of the SEP.

For the second model, the inputs, in addition to those above, were:

the number of needles distributed by the 7 programmes;

the needle sharing rate;

SEP participation in client years;

the number of injections per IDU per year; and

the HIV incidence among non-SEP users.

**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**
Not stated.

**Number of primary studies included**
The effectiveness data in the first model were derived from only one study. A further three studies provided the effectiveness data in the second model.

**Methods of combining primary studies**
Not stated.

**Investigation of differences between primary studies**
Not stated.

**Results of the review**
The results were as follows:

the prevalence of HIV in the study population was 39.5% in New York City and 26.5% in Rochester;

the attendance rate for SEP clients was 48.3%;

the reduction in HIV incidence per 100 person-years at risk as a result of SEP was 3.35 (95% confidence interval: 1.29
the number of needles distributed by the 7 programmes was 1,668,682;
the needle sharing rate was 31.5%;
the number of injections per IDU per year was 780; and
the HIV incidence among non-SEP users was 0.0526.

Measure of benefits used in the economic analysis
The benefit measure used was the number of HIV infections averted. A secondary analysis was also carried out, which used an estimate of the long-term costs of treatment saved because of an HIV infection averted. The costs of HIV treatment were discounted at 3% in the base-case analysis.

Direct costs
The resources and the costs were not reported separately. The direct costs were calculated to include the costs of the syringe exchange programmes, 'fringe' benefits and ancillary services provided to clients. In-kind and donated services were also included. Discounting was not applicable since the costs were incurred over a one-year period. Prices relate to 1996 and 1997 but a single price year was not stated.

Statistical analysis of costs
No statistical analysis was undertaken.

Indirect Costs
The analysis was stated to have been conducted from a societal perspective but no indirect costs of lost productivity were measured. (Correspondence with the author, subsequent to this abstract being written, indicates that this was due to the fact that participant costs were lacking).

Currency
US dollars ($).

Sensitivity analysis
A one-way sensitivity analysis was carried out on the HIV incidence among non-SEP users to allow for variability in data. A one-way sensitivity analysis was also conducted on the estimated number of shared injections per IDU per year, depending on the risk behaviour of different groups, to allow for the generalisability of the results.

Estimated benefits used in the economic analysis
The first model estimated that 92 infections would be averted per year. The second model estimated that 87 infections would be averted per year. No side effects of the treatment were considered in the analysis.

Cost results
The total intervention cost was estimated to be $1,822,426. Discounting was not performed. The costs of adverse events were not considered in the analysis. In the secondary analysis, the author estimated that an HIV infection averted saved $195,188. Therefore, the SEP saved about $17 million in treatment costs.
Synthesis of costs and benefits
For all programmes combined, the cost per HIV infection averted was $20,947. This ranged from $11,648 to $129,008 if the programme-specific costs and benefits were considered.

The number of injections per day was varied according to the risk behaviour of different groups. At 337 injections per year, the cost-effectiveness ratio was $21,957. For 3,018 injections per year, the ratio was $18,596 per infection averted.

The estimated HIV incidence among non-SEP users was varied from the lower to the upper bound of the confidence interval in the source study. At 2.41%, 40 HIV infections were averted at a cost of $45,561 per infection averted. At 11.49%, 189 HIV infections were averted at a cost of $9,624 per infection averted.

Authors' conclusions
Syringe exchange programmes (SEPs) reduced the incidence of human immunodeficiency virus (HIV) among injecting drug users (IDUs). They were cost-effective and cost-saving interventions from both the perspective of the programmes and from a societal perspective.

CRD COMMENTARY - Selection of comparators
The comparator was not explicitly stated but, by implication, it was the services provided to IDUs without access to a SEP. The omission of an explicit comparator may limit your ability to generalise the results to your own setting.

Validity of estimate of measure of effectiveness
The main source of the effectiveness data was a single study that estimated the reduction in HIV incidence resulting from the availability of a SEP. The author did not state whether a systematic review of the literature had been undertaken to identify other studies that could have been used to measure effectiveness.

Validity of estimate of measure of benefit
The main measure of health benefit was the number of HIV infections averted. This was modelled in two ways. However, both of the models were highly simplified and required a number of assumptions to be made. They should be seen as rough first estimates of the potential HIV infections averted from the introduction of a SEP.

Validity of estimate of costs
The author wished to use a societal perspective, but acknowledged that he did not include estimates of productivity losses. The direct costs of the programmes were taken from the reported expenditure for the programmes for a given year. The prices and the resource use were not reported separately. The programmes differed widely in their provision of fringe benefits and ancillary services, but these differences were not described in detail. This makes the generalisability of the study difficult to judge. The costs incurred by the participants themselves were not included, which the author conceded may limit the use of a societal perspective. For the secondary analysis, the author quoted a study which estimated the lifetime treatment costs of HIV. However, he did not discuss how this estimate was calculated.

Other issues
The author stated that the findings were consistent with other studies. He did not explicitly discuss generalisability to other settings outside of New York State. A number of possible limitations to the study were reported. First, the effect on other blood-borne infections. Secondly, the effect of secondary HIV infections averted. Thirdly, the measurement of costs by allowing self-reporting. Finally, the costs of drug treatments or other programmes to which SEP clients might be referred. The author also briefly discussed whether SEPs may have any adverse effects, such as legitimising drug use or increasing the number of discarded needles in the street, and referred to research that found no evidence of these negative outcomes.
**Implications of the study**
The study offers evidence that SEPs are cost-effective, but recognises that their acceptability to the local community varies widely between states and localities.

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