The cost and cost-effectiveness of an enhanced intervention for people with substance abuse problems at risk for HIV
Zarkin G A, Lindrooth R C, Demiralp B, Wechsberg W

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
The health technology evaluated was the enhancement of a standard intervention to prevent human immunodeficiency virus (HIV) infection by means of reducing drug risk-taking behaviours within an out-of-treatment substance abuser population. The standard intervention comprised two sessions of HIV prevention counselling, with HIV antibody testing. The enhancement of the intervention included three additional sessions.

During the first of these sessions, a personal risk-reduction plan was developed, according to the personal risk of each patient. This included specific action for risk reduction, health promotion and maintenance, and the offer of referral to treatment.

The last two sessions were concentrated on problem-solving and communication skills, using role-playing and other interactive techniques.

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised out-of-treatment substance abusers at risk for HIV infection.

Setting
The setting appears to have been secondary care. The study was performed in Durham (NC), USA.

Dates to which data relate
The effectiveness and resource use data were collected between January 1996 and March 1998. The price year was unclear, but it might have been 1997.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The resource use data were collected from all individuals who entered the study site in 1996 and 1997. Some of the data might have been collected prospectively (from hospital data), and some retrospectively (from self-reporting of patients after 3 months).
Study sample
No power calculations appear to have been performed in the planning phase of the study in order to assure a certain power. Among 477 individuals who entered the study site and received the standard intervention during the period of analysis, 438 were eligible for randomisation. Of these, 262 were randomised to the enhanced intervention and 176 were followed up without being given any further intervention. In total, 39 patients were excluded (36 dropped out of the study before randomisation, while 3 entered the clinic before the randomisation process began). The authors did not report any evidence that the study sample was representative of the study population.

Study design
This was a randomised controlled study that was performed at a single centre. A ratio of 60:40 was used to allocate the patients to either the enhanced or the standard interventions, but the randomisation method used for this was not reported. The duration of follow-up was 3 months. The authors did not report whether the outcome assessment was blinded. It is unlikely that that the assessment was blinded, given that neither the patients nor doctors were blinded and the outcomes were assessed on the basis of follow-up interviews. Overall, 24% of the patients (107 patients: 74 in the enhanced intervention group and 33 in the standard intervention alone group) were lost to follow-up. The authors stated that there were few differences between those who completed the study and those lost to follow-up, but the associated data were not given.

Analysis of effectiveness
The basis of the main effectiveness analysis was treatment completers only (n=331). The authors stated that an intention to treat analysis was also performed, although they only briefly reported the results. The primary health outcome assessed in the effectiveness analysis was drug use, assessed in terms of:

- the number of days the patients used crack, cocaine and heroin during the last 30 days;
- the number of days the patients injected heroin during the last 30 days; and
- the number of times the patients injected heroin or any drugs during the last 30 days.

These outcomes were obtained through interviews with the patients, using the Risk Behaviour Assessment instrument. The study groups were shown to be comparable in terms of age. A slight difference was shown in terms of gender. The proportion of males was 57.64% in the standard intervention group versus 52.13% in the enhanced intervention group. No other baseline characteristics were reported. Multivariate analyses were performed to analyse whether the post-intervention outcomes were associated with pre-intervention drug use values, age, and gender, and whether the effect of the enhanced intervention differed by gender and by injection use.

Effectiveness results
Patients receiving the enhanced intervention showed significantly better outcomes during the last 30 days of the intervention, compared with patients receiving the standard intervention, in terms of:

- lower mean days of crack use (9.39 days, standard deviation, SD=9.94 versus 11.78 days, SD=11.04), (p<0.05);
- lower mean days of cocaine use (1.92 days, SD=5.50 versus 3.38 days, SD=7.72), (p<0.05); and
- lower mean days of heroin use (1.51 days, SD=5.49 versus 3.08 days, SD=8.38), (p<0.05).

The results of the multivariate analyses showed that there were no statistically significant differences between patients receiving the enhanced and the standard interventions in terms of gender, or whether they were injectors or non-injectors.

Among those receiving the enhanced intervention, the injectors experienced a significant reduction in the number of days of heroin use in comparison with non-injectors, (p<0.01).
On the basis of intention to treat, significant differences between the enhanced and standard intervention groups were found in terms of:

days used crack in the past 30 days (-1.39);

days used cocaine in the past 30 days (-0.38); and

days used heroin in the past 30 days (-0.43).

The results of the effectiveness analysis had been published elsewhere (Weschberg et al., see Other Publications of Related Interest).

**Clinical conclusions**

After the study period, patients receiving the enhanced intervention showed significantly lower number of days with drug use (crack, heroin, and cocaine use) than patients who received the standard intervention.

**Modelling**

An algorithm was developed in order to allocate the resource use time associated with each of the interventions.

**Measure of benefits used in the economic analysis**

The summary measures of benefit used were the drug use outcomes assessed in the effectiveness analysis.

**Direct costs**

The direct costs considered in the economic evaluation were those of the hospital. These included set-up costs and implementation costs (i.e. personnel; monetary incentives given to patients to attend the sessions; building and utilities; HIV, syphilis and urine tests; intervention materials; and implementation supplies). The resource use data were obtained from forms and from a cost instrument collected in the centre where the study was carried out. A detailed description of the resources, and the methods used to estimate the costs, was provided (although not all the resource quantities were reported separately from the unit costs). The unit costs appear to have been obtained from data from the hospital and a published study. The authors formulated several assumptions, based on experts’ opinion, to allocate some of the resource use to the interventions. Therefore, the cost estimation was based on both actual data and authors’ assumptions. An algorithm was developed to allocate the resource use time associated with each of the interventions. Discounting was not carried out, but it was not relevant as the costs were estimated for a 3-month period (i.e. shorter than 2 years). The costs reported were the average cost per patient. The price year might have been 1997.

**Statistical analysis of costs**

The costs estimated appear to have been treated stochastically, as some SDs (although not all) were reported.

**Indirect Costs**

No indirect costs were reported.

**Currency**

US dollars ($).

**Sensitivity analysis**

One- and two-way sensitivity analyses were performed to evaluate the robustness of the cost results. Changes in the allocation of the unreported resource use time between the interventions, in the cost of labour (considering that the
same staff who performed the standard intervention could perform the enhanced intervention), and in the sample size (i.e. considering 'treatment completers only', instead of the intention to treat sample population for the estimation of costs per patient) were investigated. The area of uncertainty investigated was variability in the data. The ranges used were mainly derived from authors' assumptions.

**Estimated benefits used in the economic analysis**
Se the 'Effectiveness Results' section.

**Cost results**
The set-up costs per patient were $2.53 for patients receiving the standard intervention and $1.18 for patients receiving the enhanced intervention.

The implementation costs per patient were $187.52 (SD=7.16) for patients receiving the standard intervention and $124.17 (SD=51.71) for patients receiving the enhanced intervention.

**Synthesis of costs and benefits**
The estimated costs and benefits were combined using incremental cost-effectiveness ratios. These were calculated as the incremental implementation cost per reduced day of drug use, and the incremental implementation cost per reduced time of any injected drug. The set-up costs were not included in the estimation of the ICERs.

The incremental costs per reduced day of drug use in the past 30 days were $90.64 for crack use, $91.98 for cocaine use, $86.23 for heroin use, and $139.52 for injected heroin use.

The incremental costs per reduced time of injected heroin, and any injected drugs in the past 30 days were $82.78 (injected heroin) and $35.68 (any injected drug), respectively.

The authors reported that the results of the sensitivity analyses showed the cost estimates to be robust to changes in assumptions, although the cost per person of the enhanced intervention was sensitive to the cost of labour. The authors stated that the quality of care could also vary if the same staff performed both types of interventions.

**Authors' conclusions**
The results suggested, although not conclusively, that the benefits of the enhanced intervention exceeded the costs.

**CRD COMMENTARY - Selection of comparators**
The comparator chosen was the preventive standard intervention used in the authors' setting to reduce drug and sexual risk-taking behaviours that may affect the risk of HIV infection among out-of-treatment substance abusers. You must decide whether this is a widely used health intervention in your own setting.

**Validity of estimate of measure of effectiveness**
Although a randomised controlled trial was performed, the randomisation method for the allocation of patients to the alternative interventions was not reported. Moreover, the study was not blinded, which might have introduced bias into the effectiveness results. The authors also reported further limitations that might have introduced other biases. For example, the consideration of a 3-month follow-up period might not have captured accurately the true patient behaviours, and the accuracy of behavioural self-reports among drug users may be questionable. The main weakness observed in this study is probably the fact that no baseline characteristics of the study groups were reported. Therefore, it cannot be stated with certainty whether the differences in the outcome results between the standard and the enhanced interventions were due purely to the features of the interventions, or whether some confounding factors might have altered the results. It would have been useful to have considered the changes between baseline and final values, in order to better assess the effects of the preventive interventions considered at analysis.
Validity of estimate of measure of benefit
The summary measures of benefits were directly obtained from the effectiveness analysis. Although the final aim of the interventions was to reduce the HIV infection risk, the authors did not report how many (if any) of the patients included in the study were infected with HIV during the study period for each intervention. The effect of the interventions on sexual risk-taking behaviours was also not analysed. All these outcomes could have been used as alternative summary measures of benefits. Moreover, an appropriate measure of benefit would have been the number of quality-adjusted life-years gained with each of the interventions, as this would have allowed the study results to be compared with those from different interventions.

Validity of estimate of costs
All the relevant costs associated with the perspective adopted in the economic evaluation appear to have been considered. The inclusion of monetary incentives may not have been appropriate, as it is not plausible that monetary incentives are given to the participants of this kind of interventions in clinical practice. The reporting of the cost estimation was very detailed, which would enhance reflation exercises of the cost findings to other settings. Some costs were treated in a stochastic way, and several one- and two-way sensitivity analyses were performed to assess the robustness of the cost results. Several authors’ assumptions, based on experts’ opinions, were used for the estimation of costs. These assumptions were tested in the sensitivity analyses. Discounting was not required since the period considered was shorter than 2 years. The date to which the prices referred was not reported clearly, which will hinder the generalisability of the results.

Other issues
The authors reported that other economic research in this field has focused on changes in sexual behaviours, and that this is the first cost-effectiveness analysis of an intervention for acquired immune deficiency syndrome (AIDS) that focuses on drug use as an outcome. This may be the reason why the authors did not report appropriate comparisons of their results with those from other studies. The issue of the generalisability of the results was not addressed. The authors did not report any limitations other than those already described.

Implications of the study
The authors recommended that the enhanced intervention should be considered as an important additional component of an AIDS prevention strategy for out-of-treatment substance abusers. They suggested that further research, to evaluate whether the quality of the enhanced intervention would be maintained if the same staff provided both the standard and enhanced intervention, should be performed.

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Other publications of related interest
