Economic analysis of methamphetamine prevention effects and employer costs
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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 evaluated the costs and benefits of programmes centred around family skills to prevent early adolescent methamphetamine use. The authors concluded that all three programmes were economically beneficial, and that a wider perspective than that of the employer would find them more beneficial. The study was generally well reported, but had limitations in the employer perspective and the discounting of benefits that make it unclear if the results were robust.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study evaluated the costs and benefits of programmes centred around family skills to prevent early adolescent methamphetamine use.

Interventions
Three interventions were compared with minimal contact: an Iowa programme, life skills training, and life skills training plus an adaptation of the Iowa programme. The Iowa Strengthening Families Program consisted of seven family-based sessions focusing on parenting skills, parent-child relationships, and adolescent skills. The adaptation was specifically for adolescents aged 10 to 14 years and their parents. Life skills training consisting of 15 school-based sessions focusing on youth culture, information use, and substance use resistance and refusal skills. Researcher follow-up assessments were conducted in the family homes.

Location/setting
USA/secondary care.

Methods
Analytical approach:
The analysis combined clinical trial data and national survey data to evaluate the short-term cost-effectiveness of the interventions and their impact on long-term employment productivity. The time horizon was 66 to 78 months. The perspective for the benefits was stated to be that of the employer.

Effectiveness data:
The effectiveness of the intervention was from two cluster randomised controlled trials (308 and 597 participants) in 58 school districts. Schools were grouped by socioeconomic factors and then randomised. Students were assessed in the sixth or seventh grade and last followed-up in the twelfth grade (66 or 78 months). The primary measure of effectiveness was the average methamphetamine use by students in the twelfth grade over the previous year. Data from the 2006 National Survey on Drug Use and Health were used in a regression to calculate the likelihood of methamphetamine use up to age 65 years. This survey was also used to estimate the benefits in increased productivity, measured using the human capital approach, assuming that the relative risk reduction from the two trials was the same in the employed population.

Monetary benefit and utility valuations:
The benefits were productivity gains and losses, measured using the human capital method. The association between methamphetamine use and employment was from the 2006 national survey. Multilevel regressions were used to calculate the drug use associations for each employment outcome (absence, healthcare, productivity, theft, and
employee turnover). These associations were used to calculate monetary values using wages from the Bureau of Labor Statistics. Productivity costs were the wages of methamphetamine users relative to non-users at 28 years old, derived from the national survey; this difference in salary was the productivity lost to the employer. Theft costs were from the Association of Certified Fraud Examiners and larceny statistics for methamphetamine users from the national survey. This survey was also used to calculate employee turnover differences.

Measure of benefit:
The primary measure of benefit was the cases of methamphetamine use, over the previous year, that were prevented in the twelfth-grade intervention cohort. The net present value and the benefit-cost ratio were presented.

Cost data:
The costs of the intervention included programme delivery, training, materials, and the opportunity cost for teachers training and time. Programme delivery costs were the total cost to administer the interventions in the trials, divided by the number of participants. The costs were inflated to 2006 US $, where necessary. All costs incurred after one year were discounted at a 3% annual rate. The net present value (at intervention, age 12 years) of the reduction in employer costs was calculated using the 3% discount rate.

Analysis of uncertainty:
The results were reported with 90% confidence intervals. One-way sensitivity analyses were conducted on the benefit-cost ratios.

Results
There was a reduction in methamphetamine use of 3.9% with the Iowa programme; 2.46% with life skills training; and 1.78% with life skills and the adapted Iowa programme. The costs per adolescent were $990 with the Iowa programme; $126 with life skills training; and $1,116 with both.

The incremental cost per prevented past-year methamphetamine use (incremental cost-effectiveness ratio) was $25,385 with the Iowa programme; $5,122 with life skills; and $62,697 with both.

The net present value of the prevention of each methamphetamine use case, was estimated to be $97,523, based on the total costs saved by the employer per participant over their working career, discounted to the intervention age. This amount was divided by the respective incremental cost-effectiveness ratios to generate benefit-cost ratios, which were $3.84 for the Iowa programme, $19.04 for life skills, and $1.56 for both. All interventions had positive net benefits, indicating they were cost-effective.

Most of the sensitivity analyses yielded positive net benefits. Negative net benefit was found for the Iowa programme and the combined intervention with an increased rate of drug use (3%); with the prevention effect reduced to five years for the Iowa programme or 20 years or less for the combined intervention; and for the combined intervention with a cost discount rate of 6% or more.

Authors' conclusions
The authors concluded that all three prevention programmes were economically beneficial, and that a wider perspective than that of the employer would find them more beneficial.

CRD commentary
Interventions:
The interventions were briefly described, with references given to the two trial publications. Given the type of intervention, there are likely to be many other programmes that could be considered, but these were beyond the scope of this study. The selection of the interventions appears to have been appropriate.

Effectiveness/benefits:
There was no indication that a systematic search for the best available evidence was conducted, but it appears that the two trials chosen were large and of good quality. Given the variety of interventions, it is unlikely that other trials of these interventions exist; a full discussion would have given more confidence. The trials were not reported in detail, and it was unclear what proportion of the eligible students and families participated in each intervention. The assumption
that the relative risk reduction with each intervention was matched by a proportional reduction in employees using methamphetamine was justified by the authors, but it might have been appropriate to discount prevented cases, which could greatly reduce the cost-effectiveness of the interventions. The perspective was limited to the employer costs and benefits, specifically wages, with no valuation of health gains or other value from prevented methamphetamine use. As acknowledged by the authors, this was likely to underestimate the benefits of prevented methamphetamine use.

Costs:
The costs of the interventions could have been reported in more detail. Those costs considered in the benefit-cost and net present value calculations were well reported, and appear to have been from large relevant national sources. The intervention costs were from a report of their 1994 values, which were inflated to 2006 values. The source for the inflation rate was not reported, and this could be important given the wide variation in inflation rates by sector of the US economy. Appropriate discounting was undertaken.

Analysis and results:
The authors conducted a thorough analysis, but it was not a full incremental cost-effectiveness analysis. Each intervention was only compared with the control. A full incremental cost-effectiveness analysis compares each intervention with the others in addition to the control group. The methods used to generate the net present values and net benefits appear to have been appropriate for estimating an employers willingness to pay for prevention of methamphetamine use. Additional thresholds could have been tested for the net present value to indicate the uncertainty around this value. As noted by the authors, the employer perspective was very limited. Ideally, health and other benefits to individuals and society as a whole would be included.

Concluding remarks:
The study was generally well reported and, despite the limitations that have been highlighted, the authors’ conclusions are reasonable, but it is unclear if the results were robust.

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