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 effects of three types of treatment programme typically offered to heroin addicts were investigated. The three programmes were methadone prescribing, specialist inpatient drug-dependency units (DDUs) and residential rehabilitation units.

Methadone prescribing is a substitute prescribing scheme, which is provided in the National Health Service (NHS) and offers heroin addicts free access to a supply of methadone. Specialist inpatient DDUs are provided by the NHS, and offer medically supervised detoxification alongside a psychosocial intervention. Residential rehabilitation units offer varying therapeutic approaches to achieving abstinence, and are generally provided by not-for-profit organisations.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised problem heroin users admitted to treatment agencies across England. Individuals with a diagnosis of alcohol dependency were excluded.

Setting
The study setting was the community and primary care. The economic study was carried out in London, UK.

Dates to which data relate
The effectiveness and resource use data appear to have been collected from March 1995 to July 1996. The price year was 1999/2000.

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

Link between effectiveness and cost data
The costing appears to have been undertaken prospectively on the same patient sample as that used in the effectiveness study.

Study sample
No sample size appears to have been determined in the planning phase of the study. In addition, no power calculations were reported. Heroin users admitted to 54 treatment agencies across England over a 5-month period (from March 1995 to July 1995), and who met the inclusion criteria (see 'Study Population' section) were considered for inclusion in the study. All treatment clients were required to be starting a new episode of treatment and to be primarily presenting with a drug-related problem. A total of 1,075 clients were recruited, of whom 667 were admitted to the methadone prescribing programme, 122 to the DDU programme, and the remaining 286 to residential rehabilitation programmes. In the first month of recruitment, 11% of eligible clients refused to participate in the study, with refusal highest within the methadone group. The refusal rates throughout the remainder of the recruitment period remained low. The total number of refusals was not reported.

**Study design**

The study was a multi-centred, prospective, cohort study that was carried out in 54 treatment agencies around England. The centres included were not randomly selected, but were purposely chosen to be representative of treatment regimens provided in the UK. Clients were interviewed face-to-face by trained interviewers at 6 months and 1, 2 and 4 to 5 years following intake to treatment. However, this study only utilised data from the first (i.e. treatment intake) and 1-year follow-up interviews (mean length of follow-up 59 weeks).

**Analysis of effectiveness**

The basis for the effectiveness analysis was treatment completers only. Thirty-eight per cent of patients did not have usable data and were excluded from the analysis, leaving a usable sample of 668 patients. Of these, 420 were in the methadone group, 74 in the DDU group and 174 in the rehabilitation group.

The primary outcome assessed was the total number of self-reported offences (including burglary, fraud, shoplifting, robbery, vehicle theft, selling drugs and prosecution) committed in the 3 months before treatment intake and follow-up interviews. The Mandsley Addition Profile was used to interview patients. Predictions from a Poisson random-effects model were used to estimate the number of crimes before and after participation in the treatment programmes. Analyses comparing two sub-groups of patients (injectors versus non-injectors), and including and excluding outlying crime observations (i.e. those with 900 crimes or more), were performed.

The baseline characteristics of the patients were only given for patients with follow-up at one year. These showed that the study groups were similar in terms of age and gender, although participants in the rehabilitation programme were less likely to have self-reported offences and presented higher daily levels of alcohol intake prior to participation in the treatment programmes. Those in the DDU group were more likely to inject the drugs, although they presented a slightly lower average daily dose of heroin consumption in comparison with the other groups (statistical comparisons were not reported).

A logit model of the probability of remaining in the study at one year provided some evidence that those clients with less severe drug-related problems at intake, those who committed less crime prior to treatment, and those who had used heroin over a shorter period of time, were less likely to remain in the study at follow-up.

**Effectiveness results**

When outlying crime observations were considered in the analysis, the number of crimes 1-year post-treatment for non-injecting heroin users fell by 36.4 in the DDU group, 31.5 in the residential rehabilitation group and 34.8 in the methadone group. The corresponding numbers for injecting heroin users were 12.5 (DDU), 24.4 (residential rehabilitation) and 22.0 (methadone), respectively.

When outlying crime observations were excluded from the analysis, the number of crimes 1-year post-treatment for non-injecting heroin users fell by 24.1 in the DDU group, 19.5 in the residential rehabilitation group and 21.9 in the methadone group. For injecting heroin users, the number of offences increased by 33.9 in the DDU, but decreased by 12.5 in the residential rehabilitation group and 13.1 in the methadone group.
Clinical conclusions
During the study period, the mean levels of criminal offending fell quite substantially across all study groups, although these results were sensitive to the exclusion of outlying observations with extremely high reported levels of crime. Treatment was found to be more effective among non-injecting drug users.

Measure of benefits used in the economic analysis
The measure of benefits used was the total number of offences (burglary, fraud, shoplifting, robbery, vehicle theft, selling drugs and prosecution) prevented. This summary measure of benefit was obtained from the effectiveness analysis.

Direct costs
The costs and resource use were not reported separately. The direct costs included in the analysis were those incurred by the NHS and not-for-profit organisations in providing drug addiction treatment programmes, although the categories included were not clearly identified. Time spent in each type of treatment (measured in days) was weighed by a national unit cost estimate derived for each provider agency included in the National Treatment Outcome Research Study. Discounting was unnecessary, as the costs were incurred during one year, and hence was not performed. The study reported the mean costs. The price year was 1999/2000.

Statistical analysis of costs
Tests based on bootstrapped 95% confidence interval estimations were performed to compare the costs across sub-groups of patients (injectors versus non-injectors).

Indirect Costs
The indirect costs were not included.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analyses were performed.

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

Cost results
The mean costs per heroin injector when outlying crime observations were included in the analysis were 2,684 (standard deviation, SD=1,723) for the DDU group, 7,602 (SD=10,037) for the residential rehabilitation group and 2,662 (SD=1,472) for the DDU group. These mean costs were the same for non-heroin injectors.

The mean costs per heroin injector when outlying crime observations were excluded from the analysis were 2,717 (SD=1,723) for the DDU group, 7,602 (SD=10,037) for the residential rehabilitation group and 2,662 (SD=1,711) for the methadone group. These costs were not significantly different for the corresponding costs of non-heroin injectors, 2,684 (SD=1,723), 7,602 (SD=10,037) and 2,662 (SD=1,711), respectively.

Synthesis of costs and benefits
The costs and benefits were combined using incremental cost-effectiveness ratios (ICERs; i.e. the extra cost per crime
prevented when a drug addiction programme was compared with no programme).

For non-injecting heroin users, when all the outlying crime observations were considered at analysis, the ICER was 73.70 for the DDU group, 241.30 for the residential rehabilitation group and 76.50 per crime prevented for the methadone group. The corresponding ICERs when all the outlying crime observations were excluded from the analysis were 111.4 (DDU), 389.8 (residential rehabilitation) and 121.5 per crime (methadone), respectively.

For injecting heroin users, when all the outlying crime observations were considered at analysis, the ICER was 214.70 for the DDU group, 311.60 for the residential rehabilitation group and 121.00 per crime prevented for the methadone group. The corresponding ICERs when all the outlying crime observations were excluded from the analysis were 608.2 (residential rehabilitation) and 203.2 per crime prevented (methadone). No ICER was reported for drug users in the DDU group since an increased number of crimes following treatment was predicted.

**Authors’ conclusions**
Treatment was more effective among non-injectors, with no difference in treatment costs between the groups.

**CRD COMMENTARY - Selection of comparators**
No treatment was used as the comparator, which allowed for an active comparison with each of the treatment programmes evaluated. The authors made it clear that they did not attempt to compare the relative cost-effectiveness of the three different programmes, as these were geared towards clients with different preferences and treatment needs.

**Validity of estimate of measure of effectiveness**
The analysis was based on a prospective cohort study, which appears to have been appropriate for the study question. Although a randomised controlled trial might have been appropriate, as it reduces the potential for bias, the fact that treatment should be geared according to patients’ preferences might have made it difficult to perform this type of study without incurring high rates of losses to follow-up. Before-and-after comparisons were performed, which increased the potential of external factors biasing the results. In this context such factors could include an increase in police numbers during follow-up (hence lower reported crimes). It is very likely that the study sample was representative of the study population since patients from 54 representative UK centres were included. Appropriate statistical analyses were undertaken to account for potential confounding factors.

**Validity of estimate of measure of benefit**
The estimation of benefits was obtained from the effectiveness analysis. The authors highlighted that the prevention of drug-related crime is important, although there are other health benefits that should be considered in these types of studies, such as quality of life-related outcomes.

**Validity of estimate of costs**
The authors provided very little information on the costs included in the study. Consequently, it was not possible to determine whether all the relevant cost categories and costs were included in the analysis. The costs and the quantities were not reported separately, which will hamper relflation exercises in other settings. The unit costs were obtained from national sources. Appropriate statistical tests of the costs were undertaken. Discounting was not relevant since all the costs were incurred during one year. The price year was reported, which will aid any possible inflation exercises.

**Other issues**
The authors reported that their findings were consistent with the bulk of existing economic evidence, derived mainly from the evaluation of addiction treatment services in the USA. The issue of generalisability to other settings was partially addressed in the statistical analysis. The authors do not appear to have presented their results selectively and their conclusions reflected the scope of the analysis. The authors reported a number of further limitations to their study. First, the predicted cost-effectiveness was subject to a considerable degree of sampling error. Second, the predictions
were also found to be sensitive to the exclusion of outlying observations with extremely high reported levels of crime. Third, 11% of the treatment referrals refused to participate. The authors speculated whether refusal was random, or whether those who chose to participate were in any way different. Finally, the study was also hampered by sample attrition, with some evidence of bias resulting from attrition based on certain measures of the severity of problem use.

**Implications of the study**

The authors highlighted that their results offered an encouraging signal that increasing public expenditure on treatment services for heroin addicts reduces drug-related offending. They reported that more evidence of the cost-effectiveness of drug treatment programmes over longer periods of time should be generated. Further evidence on cost-effectiveness with respect to any health- and quality of life-related outcomes is also required. The authors also reported that the onus was on public decision-makers to decide whether the predicted reductions in crime were worth the opportunity costs of investing extra resources in a major expansion of treatment services.

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**Other publications of related interest**


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