The effectiveness and cost-effectiveness of diversion and aftercare programmes for offenders using class A drugs: a systematic review and economic evaluation

Karen P Hayhurst,[1] Maria Leitner,[2] Linda Davies,[3] Rachel Flentje,[4] Tim Millar,[1] Andrew Jones,[5] Carlene King,[6] Michael Donmall,[5] Michael Farrell,[7] Seena Fazel,[8] Rochelle Harris,[9] Matthew Hickman,[10] Charlotte Lennox,[6] Soraya Mayet,[11] Jane Senior[6] and Jennifer Shaw[6]*

[1]Institute of Brain, Behaviour and Mental Health, University of Manchester, Manchester, UK
[2]School of Health Sciences, University of Liverpool, Liverpool, UK
[3]Manchester Centre for Health Economics, Institute of Population Health, University of Manchester, Manchester, UK
[4]Health Insights Ltd, Burton Springs Farm, Cheshire, UK
[5]National Drug Evidence Centre, Institute of Population Health, University of Manchester, Manchester, UK
[6]Offender Health Research Network, Institute of Brain, Behaviour and Mental Health, University of Manchester, Manchester, UK
[7]National Drug and Alcohol Research Centre, University of New South Wales, Sydney, NSW, Australia
[8]Department of Psychiatry, University of Oxford, Oxford, UK
[9]West Yorkshire Probation Service, Wakefield, UK
[10]School of Social and Community Medicine, University of Bristol, Bristol, UK
[11]Tees, Esk and Wear Valleys NHS Foundation Trust, County Durham, UK

*Corresponding author

Declared competing interests of authors: Linda Davies provided expert consultancy advice to the Home Office funded by grants to the University of Manchester (Drug Data Warehouse; planned evaluation of drug strategy).

Published January 2015
DOI: 10.3310/hta19060

Scientific summary

Diversion and aftercare programmes for offenders using class A drugs

Health Technology Assessment 2015; Vol. 19: No. 6
DOI: 10.3310/hta19060

NIHR Journals Library www.journalslibrary.nihr.ac.uk

Scientific summary

Background

Class A drugs are those which attract the strongest legal penalties for possession or supply. The class includes drugs associated with problematic use and addiction, such as heroin and crack cocaine. The prevalence of class A drug use among 20- to 24-year-olds in England and Wales reached almost 6% in the past year (2012–13). The natural history of drug-user offending and the links between class A drug use and acquisitive crime, in particular, are unclear and not yet fully delineated. The societal costs of problematic class A drug use in England and Wales are estimated to be over £15B, and drug-related crime accounts for almost 90% of these costs. It is suggested that diverting arrested class A drug-using offenders into treatment to reduce their substance misuse has the potential to accrue significant savings through a reduction in levels of drug-related crime. This is based on the assumption that offending is a way to generate income to fund continued drug use. Offenders in the community are an under-researched group, in comparison with offenders in prison settings, and there is a lack of clear, robust evidence on the effectiveness and cost-effectiveness of diversion programmes.

Objectives

The objective of the study was to evaluate whether or not diversion and aftercare strategies for class A drug-using offenders are likely to be clinically effective or cost-effective compared with no diversion or aftercare within the criminal justice system (CJS). Specific objectives were to:

1. carry out a systematic review of the literature to assess the effectiveness of diversion or aftercare for class A drug-using offenders
2. carry out a systematic review to evaluate the cost-effectiveness of diversion or aftercare specifically for opiate- and/or cocaine (crack or powder)-using offenders
3. use an economic decision model to evaluate the cost-effectiveness of diversion through the examination of a sample exposed to the UK diversion model [Drug Interventions Programme (DIP)]
4. identify the level of uncertainty and need for further research.

Methods

Thirty-one electronic databases (including MEDLINE, EMBASE and PsycINFO) were searched for studies published between January 1985 and January 2012. The economic review also searched the American Economic Association's electronic bibliography, NHS Economic Evaluation Database and UK government online resources. Searches were supplemented by screening bibliographies of identified studies. Studies examining adult class A drug-using offenders, in contact with the CJS and subject to a diversionary scheme, were included in the review of effectiveness. Data on drug use, offending behaviour, treatment completion and other outcomes, such as employment status, were extracted. Bivariate analysis of outcomes informed the pooling of data using meta-analysis. The presence of publication bias in the available literature was assessed by the meta-analysis. For the cost-effectiveness review, studies were restricted to those reporting outcomes for adult opiate and/or cocaine (crack or powder) users, which reported a full economic evaluation of diversion compared with an alternative intervention or no diversion.

An economic decision analytic model was used to synthesise available clinical and economic data and estimate the cost-effectiveness of diversion and aftercare interventions for class A drug-using offenders. The primary analysis was restricted to offenders with a community-based sentence, or no sentence, as a result of the index contact with the CJS. The economic analyses used the perspective of the CJS, NHS and social care providers and offenders. The analysis used cost-effectiveness analysis and estimated the incremental cost-effectiveness ratio (ICER) of diversion. Bootstrap simulations were used to generate 10,000 pairs of net cost and outcomes. These were used to estimate cost-effectiveness acceptability curves, the likelihood of the estimated ICER and net benefit (NB) statistic. Health benefit was measured using the quality-adjusted life-year (QALY) for the primary analysis. Alternative measures of participant benefit were explored in the sensitivity analysis. The time horizon for the primary analysis was the 12 months following the index contact with the CJS. Longer-term impact (5 and 10 years) was explored in sensitivity analyses, using a Markov approach to model subsequent cycles. One- and multiple-way sensitivity analyses were used to explore the uncertainty associated with the choice of data estimates and model design. Probabilistic sensitivity analysis (PSA), using Monte Carlo simulation (with 10,000 iterations) was used to explore variance and associated uncertainty in the parameter estimates. PSA assessed parameter uncertainty for the primary analysis and each of the one- and multiple-way sensitivity analyses. For the economic model, the main sources of data were the UK Drug Data Warehouse, the UK Drug Treatment Outcomes Research Study and published government statistics and reports.

Results

Sixteen studies (reported in 14 papers) met the inclusion criteria for the effectiveness review. Ten were US-based, four were based in the UK, one in Canada and one in Australia. The US evaluations were dominated by US drug court diversion interventions. These focused, in particular, on the impact of the Californian Substance Abuse and Crime Prevention Act (SACPA) referral. This led to a focus on methamphetamine-using offenders. Over 99% of participants included in the review were from California and evaluations of SACPA. Only half of the included studies reported outcomes for offences other than drugs offences and one study only included a comparator group of non-offenders. Included studies were generally of poor methodological quality and characterised by modest sample size, high attrition rate, retrospective data collection, limited follow-up and no random allocation of participants. There was also evidence of publication bias in the available literature.

Limited meta-analysis of pooled studies was possible, pointing to a potential but small impact of interventions on outcomes for drug use. Estimated odds ratios (ORs) were 1.68 [95% confidence interval (CI) 1.12 to 2.53] for reduced primary drug use and 2.60 (95% CI 1.70 to 3.98) for reduced use of other drugs. For the outcome of treatment completion, pooled outcomes did not favour class A drug users. In comparison with users of other primary drugs, class A drug users were significantly more likely to be expelled or drop out of treatment early (OR 0.89, 95% CI 0.80 to 0.96).

The use of conceptually different measures to evaluate the outcome of reductions in offending behaviour prevented the pooling of data for meta-analysis for this key variable. The results of individual included studies pointed to minimal impact of interventions on offending. For example, only one study evaluated the outcome of drug-related arrests and arrests for violent offending with statistical analysis. This concluded that treatment completion had no independent impact on the likelihood of subsequent rearrest for either offence type. The outcomes of general arrest were slightly more equivocal, with one of three studies reporting a statistically significant but slight reduction in rearrest as a result of treatment ($\beta = -1.34$ treated vs. untreated). Too few studies addressed other potential outcomes such as employment, training or family support/conflict. The outcome measures used were too diverse to draw any substantive conclusions regarding the impact of treatment. In addition, very few studies reported on health-related outcomes. A noticeable absence being any focus on physical or mental health, or longer-term impacts, such as hospital admission or mortality.

The review of the cost-effectiveness of diversion and aftercare did not identify any relevant studies. The primary analysis of the economic model indicated wide variance in net costs (net cost –£147; 95th percentiles –£17,573 to £16,317) and small net gain in QALYs (net QALY 0.005; 95th percentiles –0.057 to 0.065) from diversion. The 95th percentiles for both net cost and net QALYs cross zero, suggesting no statistically significant differences in cost and outcome. The analysis suggests that the likelihood that diversion is cost-effective is just over 50%.

The 95% CI of estimates of net cost, net outcome and NB crossed zero for all the primary and sensitivity analyses indicating a high level of uncertainty about parameter estimates. For many of the analyses, the likelihood that diversion is cost-effective, if decision-makers were willing to pay up to £30,000 to gain one additional QALY for arrested drug users, was between 48% and 52%. These findings suggest that there is a lack of evidence either way, which is supported by the use of multiple-way sensitivity analyses to reflect changes in more than one parameter at a time.

Conclusions

The quality of the studies included in the effectiveness review was poor. In addition, the overwhelming majority of participants included in the review analyses were American (Californian) methamphetamine users. This reduces the generalisability of pooled findings. There are obvious differences between the US and UK CJSs and methamphetamine users currently account for only 0.1% of the English drug treatment population.

No relevant studies were identified for the cost-effectiveness review. The main reason for exclusion of economic analyses was that they did not conduct a full economic evaluation that compared diversion to an alternative and included a measure of health benefit (effectiveness, QALY or monetary value of participant health and well-being) or estimated either an ICER or cost–benefit ratio.

Conclusions derived from the economic analysis were limited by the constraints of available data and uncertainty about structural aspects of the model. It remains unclear whether or not the UK model of diversion (DIP) had no impact compared with no diversion, or whether or not the evidence is insufficient to identify an existing difference.

Importantly, this research identified a range of methodological limitations in existing evidence. These highlight the need for research to conceptualise, define and develop models of diversion programmes and identify a core outcome set. A programme of feasibility, pilot and definitive trials, combined with process evaluation and qualitative research is recommended. The aim of the research is to assess the effectiveness and cost-effectiveness of diversionary interventions in class A drug-using offenders. Within this programme, large-scale evaluations are needed, to examine which groups of class A drug-using offenders are most likely to benefit from diversionary interventions, in terms of primary drug use, length of drug use, drug treatment history, pattern and history of offending.

Funding

Funding for this study was provided by the Health Technology Assessment programme of the National Institute for Health Research.

Health Technology Assessment

HTA/HTA TAR

ISSN 1366-5278 (Print)

ISSN 2046-4924 (Online)

Impact factor: 5.116

Health Technology Assessment is indexed in MEDLINE, CINAHL, EMBASE, The Cochrane Library and the ISI Science Citation Index and is assessed for inclusion in the Database of Abstracts of Reviews of Effects.

This journal is a member of and subscribes to the principles of the Committee on Publication Ethics (COPE) (www.publicationethics.org/).

Editorial contact: nihredit@southampton.ac.uk

The full HTA archive is freely available to view online at www.journalslibrary.nihr.ac.uk/hta. Print-on-demand copies can be purchased from the report pages of the NIHR Journals Library website: www.journalslibrary.nihr.ac.uk

Criteria for inclusion in the *Health Technology Assessment* journal

Reports are published in *Health Technology Assessment* (HTA) if (1) they have resulted from work for the HTA programme, and (2) they are of a sufficiently high scientific quality as assessed by the reviewers and editors.

Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

HTA programme

The HTA programme, part of the National Institute for Health Research (NIHR), was set up in 1993. It produces high-quality research information on the effectiveness, costs and broader impact of health technologies for those who use, manage and provide care in the NHS. 'Health technologies' are broadly defined as all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care.

The journal is indexed in NHS Evidence via its abstracts included in MEDLINE and its Technology Assessment Reports inform National Institute for Health and Care Excellence (NICE) guidance. HTA research is also an important source of evidence for National Screening Committee (NSC) policy decisions.

For more information about the HTA programme please visit the website: http://www.nets.nihr.ac.uk/programmes/hta

This report

The research reported in this issue of the journal was funded by the HTA programme as project number 09/109/04. The contractual start date was in July 2011. The draft report began editorial review in October 2013 and was accepted for publication in January 2014. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' report and would like to thank the reviewers for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

Published by the NIHR Journals Library (www.journalslibrary.nihr.ac.uk), produced by Prepress Projects Ltd, Perth, Scotland (www.prepress-projects.co.uk).