NETSCC, HTA

26 January 2012

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

Planned Investigation

Objectives:
1. To review systematically the efficacy of diversion and aftercare programmes for offenders using class A drugs.
2. Based on a systematic review of the data, to model the impact of diversion and aftercare programmes for offenders using class A drugs.
3. To summarise and evaluate the economic evidence about the cost effectiveness of diversion and aftercare for drug using criminal offenders.
4. To identify and explore the consequences of potential characteristics of diversion and aftercare interventions that may have most impact on the cost effectiveness of the programmes.
5. To estimate probability, cost and outcome data, relevant to the UK setting, to populate an economic model.
6. To integrate the findings from the above objectives and make recommendations for the design of high quality primary research studies to further inform future HTA research.

Methodology (Updated Dec 2011)

Part 1 – Systematic Review

Search Strategy
The following electronic databases will be consulted:

- Medline
- PsycINFO
- EMBASE
- Web of Knowledge
- Wiley
- JSTOR
- Ingenta
- CINAHL
- Criminal Justice Abstracts
- Wilson Social Sciences Abstracts
- Social Sciences Index
- C2-SPECTR
- Informa Healthcare
- Sage
- Science Direct
- Highwire
- Proquest (used to search the following: ASSIA, BHI, National Criminal Justice Reference Service, Social services Abstacts, Sociological Abstracts, Dissertations and Theses, IBBS)

- Scirus
- Metapress
- Scopus
- Taylor and Francis Online
- SIGLE
- Centre for Reviews and Dissemination
- AMED
- Trip
-

Computerised searches will be performed from January 1985 to June 2011 using the following search terms, which were developed through Hartley's approach of successive fractions:

1. ((drug court$) OR (diversion program$) OR DTTO$ OR (communit$ correction$) OR (mental health court$) OR (diversion scheme$) OR (arrest$ refer$) OR (magistrates early referral into treatment) OR (drug abuse resistance education)

2. ((Interven$ AND drug$) AND (offend$ OR delinquen$ OR parole$ OR jail$ OR prison$ OR crim$ OR custod$ OR coerc$))

3. ((Interven$ AND offend$) AND (cocaine$ OR substance$ OR narcotic$))

4. ((control$ AND drug$) AND (offend$ OR parole$ OR jail$ OR penitentia$ OR prison$ OR probation$ OR remand$ OR detain$ OR custod$ OR coerc$ OR crim$ OR recidiv$))

5. ((reduc$ AND drug$) AND (offend$ OR convict$ OR parole$ OR jail$ OR prison$ OR incarcerat$ OR recidiv$))

6. (reduc$ AND offend$ AND substance$)

7. ((program$ AND (drug$ OR substance$)) AND (offend$ OR probation$ OR coerc$ OR recidiv$ OR crim$ OR inmate$ OR prison$ OR correction$))

8. ((program$ AND offend$) AND (substance$ OR addict$))

9. ((mental$ AND drug$) AND (offend$ OR delinquen$ OR parole$ OR jail$ OR prison$ OR probation$ OR custod$ OR coerc$))

10. (mental$ AND offend$ AND substance$)

11. (reduc$ AND offend$ AND (mental$ ill$))

12. (control$ AND offend$ AND (mental$ ill$))

13. (program$ AND offend$ AND (mental health$))

14. ((drug$ OR substance$) AND treat$ AND (court$ OR offend$ OR crim$ OR parole$ OR jail$ OR prison$))

15. ((therapeut$ AND communit$) AND (drug$ OR substance$ OR treat$))

16. ((criminal justice) AND (drug$ OR substance$ OR treat$))

17. ((case manag$) AND (drug$ OR substance$))
18. (aftercare AND (drug$ OR substance$))
19. ((juvenile justice) AND (drug$ OR substance$ OR treat$))
20. (drug$ AND diver$ AND court$) OR (treat$ AND (addict$ OR coerc$) AND (offend$ OR detain$))
21. (1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20)
22. (HIV OR AIDS OR vascular OR cancer OR heart OR disease OR surgery OR surgical OR infection$))
23. 21 NOT 22

The study's definition of diversion:

"The process whereby offenders who use class A drugs are identified as having a drug problem at any point in the criminal justice system and this then results in subsequent criminal justice interventions comprising wholly or partly of specific treatment, rehabilitation or education requirements for drug abuse, either voluntarily, mandated by court and/or monitored by probation or drug services".

The study's definition of aftercare:

"Care or intervention that follows the diversion process".

There will be no language restriction. References will be hand-searched for other references, including to the grey literature. Much of the available UK evidence will be in Home Office research reports. Additional studies will be identified by contacting national and international experts in the field. The authors of published studies will be contacted for additional information as required. Reports will be excluded if they are superseded by subsequent work and their inclusion would involve duplication of data.

Review Strategy

Databases will be searched using systematic review strategies employed for Cochrane reviews (The Cochrane Handbook 5th edition, 2009). Reviewers will inspect the search hits by reading the titles and the abstracts. Each potentially relevant study located in the search will be obtained in full text and assessed for inclusion independently by at least two reviewers. If there are doubts as to whether a study should be included, this will be resolved by discussion between the reviewers. Multiple publications will be collated and assessed as one study. At least two reviewers will independently extract data. Any disagreement will be discussed and resolved by consensus. The findings of the study will address the objectives of the study outlined above.

Data extraction

The following standardised form will be used to extract the data.

Administration Details

Paper ID no					Study no		No of studies in paper	

Extractor initials		*Throughout use:*	888 = not applicable 999 = not stated

Type of report		1 = Journal article 2 = Book/chapter 3 = Conference	4 = Dissertation 5 = Govt. report 6 = Other *(specify)*
Published or not?		0 = no	1 = yes

First author:	
Study name:	
Year of publication:	
(Combine these to give a unique name to the paper)	
Number of studies included in this paper:	
(if more than one, complete separate extraction forms for each, and display study no's above)	
Paper numbers of other studies with which this paper may link: **(if other papers report further results of this trial, incorporate them onto this form and note here what has been done)**	____ ____ ____ ____ ____ ____

Country of origin		1 = USA 2 = Canada 3 = UK & Eire 4= Other European	5 = Mid E/Asia 6 = Africa 7 =Australia/NZ 8 =Latin America

Study Design

Type of study		1 = RCT 2 = Case series 3 = Cohort study 4=Case control 5=Other comparative design

Study setting

(in full)		1 = Community 2 = Remand 3 = Prison

		4 = Probation 5 = Secure forensic hospital 6 = Juvenile centre 7 = therapeutic community 8 = Other *(specify)*

Participants

1. Sample Size

Entire study N	**Males %**	**Males N**

2. Age

Juvenile (less than 19 years) 1 = yes 0 = no	**Adult** 1 = yes 0 = no

3. Sample criminal and psychiatric history targeted by intervention

Sample characteristics	***Specify***	**Coding** 1 = yes 0 = no		***Page Table no Text***
Criminal history	1 = Any offence/felony/not stated			
	2 = Violent offence			
	3 = Sexual offence			
	4 = Property offence			
	5 = Drugs offence/use			
	6 = Driving offence			
	7 = Other *specify*			
Psychiatric diagnosis			**Diagnostic criteria** *specify*	
Also to include DSM-IV categories	1 = Personality disorder			
	2 = Schizophrenia			
	3 = Affective disorder			
	4 = Substance abuse			
	5 = Sexual disorder			
	6 = Behaviour disorder			
	7 = Neurotic problem			
	8 = Organic brain disorder			
	9= Other			
Learning disability	1 = IQ below 80			
	2 = Organic brain damage			
	3 = Autism			
	4 = Other			

Outcome

Outcome measure	**Longest follow-up period for outcome measurement (months)** (over 6 months for non-RCT)	**Page no**
1)		
2)		
3)		
4)		
5)		
6)		
7)		

Any further comments on study

Describe

The data extraction sheet will be piloted on five randomly selected included studies and refined accordingly. An assessment of the quality of study findings will be included. The mechanisms through which the effects of the intervention are mediated will be elucidated with reference to qualitative data of people's perceptions and experiences. A narrative summary will be provided explaining in detail the findings from each of the included studies. This will include clear descriptions of the interventions being evaluated, target populations, outcomes and results.

Synthesising data

Quantitative data methods: The main outcome measures based on a systematic review of outcomes in forensic mental health (Chambers *et al.,* 2009) and drug misuse research (Donmall *et al.,* 2009) are a) reoffending; b) psychometric measures such as symptomatic drug abuse; c) health, risk behaviour and social functioning; d) service variables such as number of hospital admission and days of inpatient care; e) mortality data including deaths from undetermined causes, accidents, and suicide. We will write to the authors of the identified studies in an attempt to employ similar outcome measures. The exact pooling method employed will differ between these outcomes. The decision about whether or not to combine data from two or more separate studies in a meta-analysis will be subject to statistical, clinical and methodological discussions within the team. An assessment will be made of the extent to which there are variations in outcomes. Heterogeneity will be evaluated with I squared statistic, the chi-square test, and by comparing results of fixed and random effects models. Heterogeneity will be explored using subgroup analyses and metaregression. Standard guidelines will be followed in pooling data and the results will be combined in a meta-analysis using fixed or random effects models based on the level of heterogeneity. For example this will take account of international variation. In USA (whence much published evidence originates) diversion to community treatment is scarce (circa 2% of USA community treatment clients via CJS (Hiller *et al.,* 1998; Hubbard *et al.,* 1997; Joe *et al.,* 1998; Simpson *et al.,* 1997), versus around 25% in the UK.

Qualitative data methods: Narrative synthesis will be performed in three steps: firstly, by developing a preliminary synthesis of the findings of included studies; secondly, by exploring relationships in the findings; and thirdly, by assessing the robustness of the synthesis produced.

The systematic review will be reported according to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (Moher *et al.,* 2009). The flow of information through the different phases of the systematic review will be displayed graphically. The main findings will be summarised, including the strength of evidence for each outcome. Limitations at the study and outcome level (e.g. risk of bias) and review level (e.g. reporting bias) will be discussed.

Part 2 – Economic Review and Model

A. Systematic Review of Economic Literature

Search strategy
The economic search strategy (same as above; except will only focus on crack, cocaine and opiates) will be applied to the electronic databases used for the review of effectiveness as well as Econlit, the Office of Health Economics Health Economic Evaluations Database and the NHS Economic Evaluation Database will be reviewed for data relevant to participant and intervention outcomes, resource use and/or costs associated with diversion. In addition, Department of Health databases (Hospital Episode Statistics and Health Related Resource Groups) will

be reviewed for data relevant to outcomes, resource use and/or costs associated with diversion. Preliminary electronic and secondary exclusion criteria will be applied. Remaining articles will be excluded if they do not include a health economics analysis or details of patient costs or outcomes that could be included in the economic model. Economic evaluations and patient outcome studies must report sufficient detail to extract costs and outcome data relevant to long term comparisons of diversion and after care strategies for the economic model; be based on primary data collection or systematic review. Studies using expert opinion will be excluded if observed measures are available. Cost studies that: (i) do not report resource use and costs separately, (ii) use charge data or (iii) do not report resource use or costs that are generalisable to the UK setting will be excluded. Economic evaluations will be included if they conform to the standard economic evaluation quality criteria used for critical appraisal of studies included on the NHS EED database.

Review strategy
The same review strategy will be used as above in the systematic review section. Quality assessment will be based on the critical appraisal criteria used by the NHS EED database. In addition to the inclusion criteria above all papers retrieved for these data will be screened to determine: the source of resource use and cost data; methods used to value resource use and patient benefits; methods of analysis and generalisability of results. Prospective data will be preferred to retrospective data and randomised controlled trial data preferred to non randomised data.

B. Secondary Analysis of Administrative and Observational Data

Methods
Anonymised record-linked data from the datasets outlined below will be analysed to add to the information from the clinical and economic systematic reviews about the effectiveness and cost effectiveness of diversion and aftercare programmes for criminal offenders using Class A drugs.

Datasets

National Drug Treatment Monitoring System (NDTMS)
This is housed at NDEC and contains information collected from each problem drug user presenting to Tier 3 or 4 services for treatment across all 149 Drug Action Team (DTA) areas of England over the past 5 years. The dataset contains records of some 200,000 drug users in treatment each year, 83% of whom are users of Class A drugs, mainly heroin and crack/ cocaine.

Drug Treatment Outcomes Research Study (DTORS)
Funded by the Home Office, DTORS is the largest drug treatment outcomes study in the UK (n=1,131). It is a longitudinal, naturalistic cohort which examined outcomes following treatment access by a large sample of treatment seekers (mainly opiate users) at a large representative sample of treatment facilities across England. Those presenting for treatment with problems of drug misuse, often have multiple and complex needs, and service responses were

correspondingly complex, often involving repeated and overlapping interventions (Jones *et al.,* 2009), An economic evaluation arm to The DTORS included an economic component that measured the relative cost effectiveness of treatment (Davies *et al.,* 2009).Finally, a qualitative arm of the study described factors affecting the outcomes from the perspective of treatment providers and treatment seekers (Barnard *et al.,* 2009).

Drug Data Warehouse (DDW) and MRC Addiction Cluster
The DDW is designed to integrate case-level data to construct event histories describing individuals' progress through and between the treatment and various criminal justice sub-systems. A core sample of drug users (currently around 1,000,000 people) known to the various sub-systems is being constructed using existing databases: the Drug Intervention Record (DIR); Offender Assessments (OASys); Drug Test on Arrest=Records (DTR); and the National Drug Treatment Monitoring System (NDTMS). Additional databases are being linked to provide wider contextual information about the core samples contact with the criminal justice system and about key CJS outcomes, such as the Police National Computer (research extract – circa 12,000,000 arrest events) and the Prolific Offender Tracking datasets. The Treatment Outcomes Profile data (from NDTMS) will allow assessment of how wider outcomes, such as health, accommodation, and drug use, vary according to CJS/treatment status.

The potential use of DDW data has been discussed with Home Office research colleagues who have expressed their interest in the work and will work with us as far as possible to enable access to the DDW data required. Although not in a position at the moment to guarantee full use and access, the project steering group is currently developing a data sharing protocol and a 'DDW Data Sharing Panel' made of representatives from MoJ, HO, NTA will be responsible for facilitating access. The Home Office have indicated that they consider the use of these data for the purposes of this Evidence Synthesis Project 09/109 to be appropriate in principle. The case linked data are held at NDEC and the data will be analysed at NDEC, in accordance with the research governance regulations and ethical approval applicable to the DDW.

Key outcome and cost measures will be identified from the systematic reviews, the DDW and other datasets, where data from these sources can be pooled for meta-regression analysis. In addition, the analysis of the data will identify typologies of pathways through and within the treatment, after care and criminal justice systems and the relationship between treatment retention, relapse and outcome in terms of self-reported and recorded offending. Finally, the DDW and other datasets will be used to estimate probability, resource use, cost and outcome variables for the economic model that are not estimable from the systematic reviews, and supplement the systematic review data where appropriate. All the analyses of data will allow for time-varying covariates (including current treatment) and confounders (e.g. past treatment) which may influence subsequent treatment episodes, outcomes and loss to follow-up (attrition). The choice of regression models will be informed by a preliminary descriptive analysis. The case linked data are held and will be analysed at NDEC,

in accordance with the research governance regulations and ethical approval applicable to the DDW.

C. Economic Model

Methods

An economic model will be constructed to synthesise clinical and economic data from the systematic reviews and datasets. It is anticipated that a Markov model structure will be used to account for the cyclical nature of offending, use of CJS, treatment and after care services for a proportion of the population of offenders who use Class A drugs. This economic model analyses will use the perspective of the CJS, NHS and social care providers and offenders. These comprise the key components of a societal perspective. The consequences of offending behaviour for victims will also be included indirectly by including the costs to victims in the cost estimates of offences. The time horizon for the primary analysis will be the 12 months following the index contact with the CJS. The evidence about the relative long-term benefits (in terms of re-offending, drug use and health status) of diversion and after care is limited and uncertain. It is also likely to be confounded by the type and effectiveness of treatment and after care interventions used. In addition, the use of a time frame longer than one year for the analysis, with a high level of uncertainty about these outcomes of treatment, may mask the costs, outcomes and uncertainty resulting from the use of the alternative diversion and after care packages. The long term impact (5 and 10 years) will be explored in sensitivity analyses. The long term costs and outcomes associated with the final outcome states of the model will be discounted at the recommended Treasury and NICE rates. Current practice varies in the diversion and after care packages and sequence of treatment and support interventions used. The final choice of alternatives for the cost effectiveness analysis will be informed by the systematic reviews and analysis of the datasets described above. Criteria for the choice will be:

(i) combinations or packages of treatment and support interventions that are currently used in routine practice in the UK;

(ii) combinations or packages of treatment and support interventions not currently used in the UK but demonstrated to be effective by the systematic review.

The economic model will include events relevant to the effectiveness, intended and unintended outcomes and resource use and costs of diversion and after care. The final structure of the model will be developed from the systematic reviews and analysis of the datasets described above. The model structure will be validated with relevant experts in offender health research, offenders who use drugs, drug treatment and after care services, forensic mental health and service users to ensure it incorporates an accurate and feasible representation of practice.

Effect sizes or derived effect sizes with 95% confidence intervals for the probability, cost and outcomes of events in the model will be generated from the

meta-analyses and analyses of the additional datasets. These will be weighted by the patient sample size of the studies included. If there are insufficient data to estimate effect sizes and 95% confidence intervals for some variables, best estimates with a minimum and maximum range will be calculated. Any deterministic parameters in the model will be assigned distributions derived from minimum, average and maximum values.

The costs of resources used as inputs to diversion, after care and associated events will be estimated and will include the costs of the initial CJS contact, referral to drug treatment and after care services, treatment and after care intervention, the costs of subsequent offending, the costs of health and social support services. The costs will be estimated as the product of resource use and unit costs for each event, as determined from the systematic reviews and datasets, national published unit cost data and agreed prices and local practice. For each cost item data on resource use and unit costs will be extracted from the reviewed literature and databases and published national plus local unit cost and accounts data. Where more than one estimate for each cost item is obtained, the range of values found will be used to generate a distribution for the simulation analysis.

The economic model will be used to separately estimate the cost effectiveness of diversion and after care for the following expected outcomes: (i) incremental cost per QALY gained; (ii) incremental cost per life year gained (LYG); (iii) incremental cost per person re-offending; (iv) incremental cost per person using Class A drugs. Data on health status to estimate QALYs will be estimated from the DTORS dataset, which included the SF12 . Analysis of these data has indicated that QALYs can be estimated using the weights for the SF6D and that the QALYs discriminate between baseline and follow up health states for people assessed for structured drug treatment (Davies, *et al.,* 2009).The QALYs will be estimated as the product of utility values and estimated life expectancy for those who survive.

Monte Carlo simulation will be used to generate mean expected costs and outcomes, and statistical measures of expected variance around the mean and standard deviation (probabilistic sensitivity analysis). This will be used for variables where there are sufficient data to estimate a mean value and distribution, or where a plausible range of values can be estimated. The primary and sensitivity analyses will each include estimation of incremental cost-effectiveness ratios followed by generation of cost-effectiveness acceptability curves to summarise the uncertainty in the generated cost-effectiveness ratios. This allows estimation of the probability and extent to which uncertainty and variation in the data used affect the absolute and relative costs and outcomes.

Sensitivity analysis will be used to explore the impact of structural uncertainty by estimating costs, effects, incremental cost effectiveness ratios (ICERs) and cost effectiveness acceptability curves (CEACs) for (i) each of the alternative outcomes estimated in the analysis (ii) diversion and after care compared to no diversion and after care (iii) comparison of alternative packages or models of diversion and after care (iv) alternative time horizons (v) alternative unit cost

data. Probabalistic sensitivity analysis and cost effectiveness acceptability curves will be used to assess uncertainty for each of the sensitivity analyses.

Timetable

Apr 2011: Researcher 1 employed (12 months) and establish steering group
May 2011 – Jan 2012: Part 1 - collection and analysis of papers and data extraction
Oct 2011: Research Assistant 2 employed (12 months)
Oct 2011 – Jun 2012: Part 2 - collection and analysis of papers and data extraction
Oct 2011 – Aug 2012: Secondary data analysis
Jan 2012 – Mar 2012: Part 1 - data synthesis including meta-analysis where possible
May 2012 – Jun 2012: Part 2 - data synthesis including meta-analysis where possible
April 2012 - August 2012: Health Economics Modelling
August 2012: Research priority setting and write up
September 2012: Submit final report

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