Peer reviewed version

Link to published version (if available):
10.1080/09687637.2017.1398715

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The effectiveness of diversion programmes for offenders using Class A drugs: a systematic review and meta-analysis

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** At time of study

Word count: 4994

Running head: Diversion programmes for Class A drug-using offenders

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ABSTRACT

Aims: To review existing evidence on effectiveness of community-based diversion programmes for Class A drug-using offenders.

Methods: 31 databases were searched for studies published 1985-2012 (update search 2012-2016) involving community-based Criminal Justice System diversion of Class A drug users via voluntary or court-mandated treatment.

Findings: 16 studies were initially included (US, 10; UK, 4; Canada, 1; Australia, 1). There was evidence for a small impact of diversion to treatment on drug use reduction (primary Class A drug use: OR 1.68, CI 1.12-2.53; other drug use: OR 2.60, 1.70-3.98). Class A drug users were less likely to complete treatment (OR 0.90, 0.87-0.94) than users of other drugs. There was uncertainty surrounding results for offending, which were not pooled due to lack of outcome measure comparability and heterogeneity. Individual studies pointed to a minor effect of diversion on offending. Findings remained unchanged following an update review (evidence up to March 2016: US, 3; Australia, 1).

Conclusions: Treatment accessed via community-based diversion is effective at reducing drug use in Class A drug-using offenders. Evidence of a reduction in offending amongst this group as a result of diversion is uncertain. Poor methodological quality and data largely limited to US methamphetamine users limits available evidence.

The effectiveness of diversion programmes for offenders using Class A drugs: a systematic review and meta-analysis

Introduction

Supply and possession of drugs such as heroin and crack cocaine attract the longest sentences in a number of jurisdictions, including the US and Europe. In the UK, these drugs are classified as Class A (together with drugs associated with recreational use, such as LSD and Ecstasy) (UK Government, 1971).

Prevalence of Class A drug use is high among those involved in crime; 38% of UK arrestees test positive for opiates and/or cocaine (including crack) on entry into police custody (Bennett, Holloway, & Williams, 2001; Holloway & Bennett, 2004). European prison samples are characterised by high rates of Class A drug use, with up to a half of inmates reporting lifetime prevalence of cocaine use compared with less than 10% in the general population (European Monitoring Centre for Drugs and Drug Addiction, 2012). Additionally, many individuals entering treatment for Class A drug use self-report recent offending; 55% of Australian heroin users report committing crime in the month prior to treatment entry (Darke et al., 2009).

The social and economic costs of Class A drug use in England and Wales are estimated to be in excess of £15 billion with drug-related crime accounting for the majority (90%) of these costs (Gordon, Tinsley, Godfrey, & Parrott, 2006). US economic costs associated with heroin use, in particular, have previously been estimated at $21.9 billion (Mark, Woody, Juday, & Kleber, 2001). Opioid dependence is the largest contributor to the global burden of disease attributable to illicit drug use (Degenhardt et al., 2010).

Diverting arrested Class A drug-using offenders into treatment with the aim of reducing their substance use could have the potential to accumulate significant cost savings (for the justice system and overall economy) via a reduction in the level of drug-related crime. This is predicated on the assumption that much of the offending by this group is undertaken to generate income to fund drug use. However, we have previously reported that drug use expenditure is a weak predictor of acquisitive crime (Hayhurst et al., 2013), which frequently precedes the onset of Class A drug use (Pudney, 2002). The links between Class A drug use and crime are, indeed, complex and yet to be fully delineated using robust and appropriate methodology (Hayhurst et al., 2017; Seddon, 2000).

For the purposes of this review, diversion is defined as the identification of drug users within the Criminal Justice System (CJS) leading to treatment specifically designed to treat drug use. This review focuses on the effectiveness of

community-based diversion, i.e. excluding post-sentence measures delivered as part of a prison sentence or probation supervision. The current Government drug strategy provides the policy context for diversion in the UK. It recommends that, '*offenders are encouraged to seek treatment and recovery at every opportunity in their contact with the CJS*' (HM Government, 2010). During 2015/16, 27% of opiate users entering treatment in England did so via a CJS referral (PHE, 2016). The UK diversion approach, the Drug Interventions Programme (DIP) was established in 2003 as the successor to the Arrest Referral scheme (Sondhi, O'Shea, & Williams, 2002). DIP centres on the identification and appropriate treatment referral of drug-using offenders at the point of arrest and/or charge, combining the principles of arrest referral with (from 2005) a drug test on arrest (EMCDDA, 2015). Drug testing on arrest results from the commission of a 'trigger' offence (including acquisitive crimes such as theft, robbery or burglary); an assessment of treatment needs carried out by a drug referral worker then proceeds to case management, involving a care plan and the coordination of care and support services. Treatment orders are available to the court, for example, Drug Rehabilitation Requirements (DRRs) which aim to provide treatment, supported by random drug tests, to drug-using offenders and Restrictions on Bail; provision of bail is conditional on a specified level of treatment attendance. Criminal Justice Integrated Teams (CJITs) work in police custody suites and courts, providing access to treatment for offenders. The court can take CJIT assessments into consideration for bail and sentencing decisions.

Drug treatment itself is associated with reduced offending, for example, crime rates among opiate users (N=3,221) are reduced to less than a half of those observed prior to treatment entry (Bukten et al., 2011). CJS-referred opiate and/or crack users achieve similar positive treatment outcomes to clients referred via other routes (Jones et al., 2016). Limited evidence is available specific to the UK DIP, for example, offending (N=7,726) in the six months following DIP contact was lower than in the previous six months (Skodbo et al., 2007). However, despite central funding for DIP exceeding £91 million (2012/13), there was no robust RCT evidence suggesting likely effectiveness or cost effectiveness available prior to its inception and the efficacy of the diversion approach for community-based drug-using offenders has not been sufficiently evaluated.

In addition, individual studies of diversion are set in varied criminal justice settings. For example, the voluntary referral system that operates via arrest referral schemes into treatment services in the UK may not be comparable with the mandatory referral system operating via the drug court into primarily abstinence-based residential treatment programmes in the US. US Drug Court pre-adjudication models offer pre-charge intervention programmes with charges dismissed on successful graduation; post-adjudication models offer intervention programmes as an alternative to a custodial sentence. Case management is an integral role in the Drug Court model, providing a coordinated approach, linking the offender to other services and providing assessment and monitoring data to the Drug Court team (Monchick

et al., 2006). The US approach focuses on individuals committing drug offences, often excluding clients with a history of violent offending (Stevens et al., 2005). In contrast, in the UK, CJS diversion can be mandated, or voluntary, with no formal link between the diversion process and court sentencing decisions; treatment is primarily via community-based substitute prescribing services (Lurigio, 2000).

Across Europe, countries have at their disposal sanctions to encourage drug-using offenders to voluntarily attend substance misuse treatment. Recent work indicates that drug treatment orders are used in 61% of European member states (Kruithof et al., 2016) and a number of systems (for example, German, Austrian and Dutch) also incorporate compulsory treatment requirements (Stevens et al., 2005). Evaluations of alternatives to punishment for drug-using offenders across Europe have highlighted the poor quality of available evidence (EMCDDA, 2015).

Recent Cochrane and Campbell reviews on interventions for drug-using offenders, under CJS supervision have not focussed on the effectiveness of community-based diversion of drug-using offenders (Mitchell, Wilson, & MacKenzie, 2012; Perry et al., 2015a; 2015b; 2015c). We were commissioned by the UK National Institute for Health Research (NIHR) Health Technology Assessment (HTA) programme to examine the efficacy of diversion and aftercare programmes for offenders using Class A drugs. We conducted a systematic review to: (1) assess the effectiveness of community-based diversion for Class A drug-using offenders; and (2) make recommendations for required research based on gaps in the existing evidence base. To provide a framework for the systematic review, the diversion process is defined as the identification of Class A drug users within the CJS and subsequent intervention with the aim of drug treatment. This can be voluntary, mandated, and/or monitored by probation, or drug treatment services. Drug use was classified as Class A using the UK Misuse of Drugs Act (1971) (UK Government, 1971) definition in both UK and non-UK settings.

Methods

Search strategy and selection criteria

The search methods were based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement (Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009); see supplementary material. For the original study, 31 electronic databases (including MEDLINE, EMBASE and those covering 'grey' literature) were searched for studies published January 1985 to January 2012. For the purposes of this paper, an update search was carried out on available evidence up to March 2016. The full search strategy and list of all databases searched is available online (Table S1). Reference lists of full-text articles were hand-searched for additional material.

Studies meeting the following inclusion criteria were included: (1) participants aged 18yrs and above; (2) Class A (as defined under the UK Misuse of Drugs Act, 1971) (UK Government, 1971) drug users; (3) contact with any part of the CJS; and (4) diversion defined as the identification of drug users within the CJS leading to treatment specifically designed to treat drug use. Exclusion criteria included: (1) studies that only included participants in prison at the time of the treatment intervention; (2) studies that only included participants with intervention/treatment as a routine element of probation case management (the project funding brief excluded post-sentence measures); (3) studies with participants who used a broader range of drug classes, with no primary or sub-analysis specific to people using Class A drugs; and (4) references in the following formats - books, conference proceedings, dissertations, or theses. Only papers written in English were considered although no geographical restrictions were applied.

Retrieved studies were exported into Reference Manager software and duplicates removed. Inclusion and exclusion criteria were applied to titles and abstracts of studies identified by the search strategy, with full-text articles screened when titles and abstracts were ambiguous. A second reviewer (inter-rater reliability: kappa 0.71) independently screened 50 per cent of retrieved studies. The full text of potentially-relevant items was independently assessed by two reviewers for inclusion in the review with any disagreement resolved by consensus and a third reviewer where necessary. Study quality was assessed using the Maryland Scale of Scientific Methods (Sherman et al., 1998), a widely-used 5-point quality evaluation scale for research in criminal justice settings (Farrington, Gottfredson, Sherman, & Welsh, 2002). The scale assesses study design, sample size, participant allocation, length of follow-up and attrition.

Data synthesis

Two reviewers independently extracted data via a piloted data extraction form. Data on drug use, offending behaviour and treatment completion were extracted, together with any relevant statistical analyses. Associations between study/participant characteristics and outcomes were explored to inform meta-analysis. Outcomes were pooled via meta-analysis using odds ratios in both random and fixed effects models to obtain a pooled effect size. The most robust models obtained are presented. Heterogeneity was assessed using the Q statistic and the I^2 statistic. Possible publication bias was assessed using Funnel plots. Meta-analysis was carried out using Comprehensive Meta-Analysis software (version 2).

Results

Selection of included studies

The search process is presented in Figure 1. Fourteen papers, comprising 16 studies, were included in the review. One study (Eley, Gallop, McIvor, Morgan, & Yates, 2002) is reported as three sub-studies; one with a sample of participants living in Fife, one with a sample of participants from Glasgow, and one providing a case series sample derived from combined data (see Table 1).

Description of included studies

Table 1 reports the characteristics of the 16 included studies, with participant characteristics summarised in Table 2. None of the studies reported a power calculation. Eight studies compared diversion to an alternative, or no, intervention (Anglin et al., 2007; Brecht & Urada, 2011; Brewster, 2001; Chun et al., 2007; Longshore et al., 2007; Marinelli-Casey et al., 2008; Newton-Taylor, Patra, & Gliksman, 2009; Passey et al., 2003). However, none of these eight studies used a randomised controlled trial design to prospectively and randomly allocate participants to the diversion intervention or to a comparator/control group (i.e. in advance of the participant receiving an intervention or treatment). Instead, allocation to groups was *post-hoc*, with group membership determined by the researchers and baseline differences between groups were not consistently controlled for. Two of the eight group comparisons (Brewster, 2001; Longshore et al., 2007) used a cross-sectional group comparison design; the other six studies used a concurrent group design (Anglin et al., 2007; Brecht & Urada, 2011; Chun et al., 2007; Marinelli-Casey et al., 2008; Newton-Taylor, Patra, & Gliksman, 2009; Passey et al., 2003). Data collection in eight studies was retrospective. The follow-up period began at the point of treatment discharge in only three studies (Marinelli-Casey et al., 2008; Saum & Hiller, 2008; Van Stelle, Mauser, & Moberg, 1994); these had a minimum follow-up of 365 days (Marinelli-Casey et al., 2008). .

Participants were majority (or all) methamphetamine users in four US studies (Anglin et al., 2007; Brecht & Urada, 2011; Longshore et al., 2007; Marinelli-Casey et al., 2008). In other studies, participants were majority opiate and/or crack cocaine users (Chun et al., 2007; Eley, Gallop, McIvor, Morgan, & Yates, 2002a; 2002b; 2002c; Hartley & Phillips, 2001; Hevesi, 1999; Newton-Taylor, Patra, & Gliksman, 2009; Passey et al., 2003; Saum & Hiller, 2008; Turnbull & Webster, 2007). In the two remaining studies, participants were, respectively, majority (47%) cannabis users, with 34% of the sample comprising cocaine users (Brewster, 2001); and a sub-sample of Class A drug users (15%, n=40) (Van Stelle, Mauser, & Moberg, 1994). Eight of the 16 studies provided baseline frequency of drug use (Anglin et al., 2007; Brecht & Urada, 2011; Brewster, 2001; Chun et al., 2007; Longshore et al., 2007; Marinelli-Casey et al., 2008; Newton-Taylor, Patra, & Gliksman, 2009; Passey et al., 2003).

Interventions were mainly pragmatic and *ad hoc* (e.g. services available in the local area) rather than tailor-made specifically as a diversion programme. Details of the diversion process itself were scant. Participants in nine studies were diverted to treatment from a court setting (Brewster, 2001; Chun et al., 2007; Eley, Gallop, McIvor, Morgan, &

Yates, 2002a; 2002b; 2002c; Hartley & Phillips, 2001; Hevesi, 1999; Newton-Taylor, Patra, & Gliksman, 2009; Saum & Hiller, 2008; Turnbull & Webster, 2007). The majority of interventions can be described as multi-factorial programmes, comprising day and/or residential settings with components based on both individual and group therapies.

Meta-analysis

Continued primary Class A drug use

Data from six studies were available to estimate the impact of diversion on continued primary Class A drug use (Brecht & Urada, 2011; Chun et al., 2007; Eley, Gallop, McIvor, Morgan, & Yates, 2002a; 2002b; 2002c; Marinelli-Casey et al., 2008). Data from two studies could not be pooled; one (Brecht & Urada, 2011) compared methamphetamine users with other drug users and another had a small sample size (n=10) (Eley, Gallop, McIvor, Morgan, & Yates, 2002c).

Individual study effects are reported in Table 3, with results of the meta-analysis of data from the six studies reported in Table 4 and Figure 2. Overall, the analysis indicated a modest impact on primary Class A drug use (reduction in use, pooled OR: 1.7; 95% CI: 1.1 to 2.5; random effects model) with little heterogeneity between studies (Q=0.75, p=0.861, I^2=0). Reductions in primary Class A drug use were greatest for users of opiates treated with methadone maintenance and for heroin users diverted to a multifactorial treatment programme via SACPA instead of custodial detention (see Tables 3 and 4).

Continued use of other drugs

Data from three studies were pooled to estimate the impact of diversion on continued other drug use (Chun et al., 2007; Marinelli-Casey et al., 2008; Newton-Taylor, Patra, & Gliksman, 2009). Data on sedative use and cannabis use did not demonstrate an effect in favour of treatment (Chun et al., 2007), whereas there was an impact on use of other drugs following treatment (reduction in use, pooled OR: 2.6, 95% CI: 1.8-3.8, random effects model; z=5.00, df 2, p<0.001) with limited evidence of heterogeneity (Q=2.48, p=0.290, I^2=19) (see Tables 3 and 4 and Figure 3).

Continued offending

A lack of comparability in outcome measures and focus meant that it was not possible to pool the data on continued offending. The results of individual studies point to a minor effect of diversion on offending. Initial exploratory analyses of the studies (Brecht & Urada, 2011; Chun et al., 2007; Eley, Gallop, McIvor, Morgan, & Yates, 2002c; Hevesi, 1999; Newton-Taylor, Patra, & Gliksman, 2009; Saum & Hiller, 2008; Van Stelle, Mauser, & Moberg, 1994) with data that could be included in a meta-analysis of continued offending outcomes, highlighted heterogeneity (Q=107

p<0.001 I^2=62). Outcome measures of continued offending were diverse, including imprisonment, re-arrest, indictment, and self-report offending; each across a range of crime types.

Treatment completion

Ten studies (Anglin et al., 2007; Brecht & Urada, 2011; Brewster, 2001; Hartley & Phillips, 2001; Longshore et al., 2007; Marinelli-Casey et al., 2008; Newton-Taylor, Patra, & Gliksman, 2009; Passey et al., 2003; Turnbull & Webster, 2007; Van Stelle, Mauser, & Moberg, 1994) were included in a meta-analysis to assess the impact of diversion on treatment completion. Most of these focussed on differential completion rates for users of different drug types. Other studies presented data by: mode of intervention (Marinelli-Casey et al., 2008); number of treatment sessions attended (Newton-Taylor, Patra, & Gliksman, 2009); treatment engagement (Newton-Taylor, Patra, & Gliksman, 2009); day vs. residential therapy (Turnbull & Webster, 2007); and referral source (Longshore et al., 2007). Studies with these outcomes were excluded from meta-analysis as high levels of heterogeneity were obtained (Q=391 p<0.001, I^2=94).

Outcomes for individual Class A drug types point to lower completion rates for heroin users (OR 0.8, CI 0.7-0.9) (Marinelli-Casey et al., 2008; Newton-Taylor, Patra, & Gliksman, 2009; Saum & Hiller, 2008) and cocaine users (OR 0.7, CI 0.7-0.8) (Brecht & Urada, 2011; Marinelli-Casey et al., 2008; Saum & Hiller, 2008) compared with users of other substances. Pooling across a range of Class A drug types indicates a small but consistent reduction in treatment completion for Class A drug users compared to users of other drugs (pooled OR random effects 0.9 (95% CI 0.9-0.9), z = -5.10, df 5, p<0.001, Q=7, p=0.206, I^2=31) (see Tables 3 and 4 and Supplementary Figure S1).

Publication bias

The uneven distribution in the funnel plot of effect estimate (OR) against standard error is broadly indicative of publication bias (see Supplementary Figure S2).

Review update

A review update was carried out for this paper (with databases searched up to March 2016). This identified four eligible studies from the US (3) and Australia (1). Supplementary Table S2 sets out the characteristics of these studies, individual study effects are shaded in Table 3. The decision was taken to not pool these additional findings via meta-analysis. Two studies (DeVall & Lanier, 2012; Jessimer, Ang, Rabone, & Lander, 2014) comprised drug court samples, one study (Brocato, 2013) comprised probationers mandated to treatment, and the final study (Du, Huang, Zhao, & Hser, 2013) used a sample from the Californian Proposition 36 programme. These four studies contributed two potentially-relevant findings. Heroin users had a lower treatment completion rate (OR 0.2, CI -2.66 to -0.59) than marijuana users in one study (DeVall & Lanier, 2012); a finding which would not have changed our original

conclusions regarding treatment completion. Controlling for other potentially predictive factors, cocaine users were more likely to reoffend within 12 months in a further study (OR 1.72, CI 1.06 to 2.79) than methamphetamine users (Du, Huang, Zhao, & Hser, 2013); both substances are Class A drugs meaning that this finding would not have altered our decision not to pool reoffending outcomes. More recent findings did therefore not amend the main conclusions from our original review.

Discussion

Summary of main findings

Pooled effect estimates (16 studies: US, 10; UK, 4; Canada, 1; Australia, 1) point to a greater likelihood of reduced primary Class A drug use (OR 1.68, 95% CI 1.12 to 2.53) and reduced use of other drugs (OR 2.61, 1.79-3.80) associated with diversion programmes. When compared with users of other drugs, Class A drug users are less likely to complete treatment (OR 0.90, 0.87-0.94). Odds ratios for offending were not pooled as comparable outcome measures were not used. Individual studies point to minimal impact of diversion on offending and there is currently insufficient evidence on the effectiveness of treatment via diversion as a means of reducing offending amongst Class A community-based drug users. Review findings remained unchanged in the light of an update review carried out on available evidence up to March 2016.

Strengths and limitations

The main strength of this review is in its comprehensive search of the literature, including of 'grey' literature, to identify, for example, relevant findings presented in Government reports, which screened 1,300 potential inclusions. This paper incorporates an update of recent available evidence. There was evidence of publication bias, which may inflate apparent effectiveness, due to the non-publication of negative findings (Turner, 2013). The review is limited by its focus on English language sources; other reviews have highlighted that the inclusion of non-English language research serves to emphasise less positive outcomes of quasi-compulsory treatment in criminal justice systems (Stevens et al., 2005). Meta-analysis was used to pool odds ratios to obtain a pooled effect size. Study designs relating to data pooled in the meta-analyses of continued primary Class A and continued other drug use were broadly comparable; those pooled for the meta-analysis of treatment completion were more mixed. Additional findings from an update review were not pooled via meta-analysis.

Overall, included studies were not high quality; there were no randomised controlled trials. Sample sizes were modest and attrition rates high. Study design was mostly retrospective and/or correlational with limited follow-up beyond the

end of the diversion programme. Comparator groups were limited to unmatched participants drawn from the same location. There was some evidence of publication bias in the available literature. Recommendations for more methodologically sound research in this field are set out below; it is unclear whether more robust studies will reach similar conclusions as those derived here from pooling existing evidence.

Drug use was measured primarily via self-report or scale-based measures; objective measures (e.g. urine screening) were used in four studies (Brewster, 2001; Eley, Gallop, McIvor, Morgan, & Yates, 2002a; 2002b; Hevesi, 1999). For offending, only five studies (Eley, Gallop, McIvor, Morgan, & Yates, 2002b; Hevesi, 1999; Passey et al., 2003; Saum & Hiller, 2008; Turnbull & Webster, 2007) detailed offence types committed by the intervention group; none provided details for comparator groups. The lack of comparability on offending outcomes meant that pooling findings was not possible. The focus of most studies was treatment completion. Although this will be of practical relevance to service providers, drug use and offending outcomes are of greater importance to researchers and policy makers in this field.

Insufficient details of the diversion process were provided, for example, how decisions were made about which intervention might be appropriate for specific participants. This lack of detail made it difficult to conclude which aspects of treatment had been effective (or not) and for whom. Similarly, important participant characteristics such as previous drug treatment history were not provided in over a half of studies.

The majority of studies were US-based and the majority of participants were Californian methamphetamine users. Indeed, nearly all participants included in the review (99.6%) were diverted via the California-based SACPA (Substance Abuse and Crime Prevention Act). SACPA's delivery model focuses on nonviolent, low-level offenders (e.g. with convictions for drug possession), the majority of whom receive outpatient abstinence-based treatment (unsupported by opiate substitution, such as methadone) (Evans et al., 2014). The age and ethnicity profile of participants in included studies is broadly representative of US Drug Court participants (Drug Courts Program Office, 1998; Huddleston and Marlowe, 2011). This limits the generalisability of pooled findings, particularly to the UK or most other European countries. Clients with primary amphetamine use comprise only 6.7% of the EU treatment population, a figure primarily driven by numbers seeking treatment in the Czech Republic (European Monitoring Centre for Drugs and Drug Addiction, 2015). There is no clear evidence whether the reported outcomes of diversion for methamphetamine users are pertinent to users of other stimulants (e.g. powder or crack cocaine).

In the US, diversion is primarily mandated by the court, or offered as an alternative to custodial sentencing for non-violent offenders, and treatment is primarily via abstinence-based residential programmes. In comparison, less than one-tenth of the 27% of opiate users entering drug treatment in England via a CJS referral have a mandatory element of diversion in place (PHE, 2016).

The review centred on one drug class of the UK classification of drugs (Class A), meaning that a substantial body of existing evidence was not eligible. A sizable proportion (31%) of studies identified for potential inclusion was excluded because it was not possible to identify outcomes specifically for the population of Class A drug users, for example, Gottfredson, Najaka, & Kearley (2003). The focus on Class A use also disregards the potential efficacy of diversion for offenders who use other drugs, such as cannabis or amphetamines. Similarly, the focus on non-incarcerated individuals participating in diversion programmes led to the exclusion of data from studies previously synthesised in notable reviews. For example, randomised studies of drug-using offenders in prison, such as the UK LEEDS trial (Wright et al., 2011) were not eligible for inclusion.

Only four of the 16 included studies were rated as of higher quality (with a score of 4 out of a possible 5 on the Maryland Scale of Scientific Methods (Sherman et al., 1998); these were all US studies, with a focus on SACPA–diverted participants and/or methamphetamine use (Anglin et al., 2007; Brecht & Urada, 2011; Chun et al., 2007; Marinelli-Casey et al., 2008) and may not be generalizable to UK services and elsewhere.

Further research

This is the first review to synthesise research on the effectiveness of community-based diversion for Class A drug-using offenders. Undertaking the review has allowed us to identify key gaps in the evidence base, which point to the future direction for research activities in this field.

Research is required to evaluate which subgroups of Class A drug-using offenders are more likely to benefit from diversion so that resources can be allocated more effectively and interventions tailored to better meet the needs of particular subgroups. For example, in this review, studies which comprised a higher proportion of women were more likely to report positive outcomes. A further subgroup requiring greater focus is older drug-using offenders. Older adults comprise a large and growing proportion of both treated and untreated users of Class A drugs, for example, 46% of currently-treated English opiate users are aged 40yrs and above (PHE, 2016).

Aspects of the participant's substance use and offending profile are likely to affect the effectiveness of the intervention, for example: primary drug type, frequency and delivery of use; length of drug problem; poly-drug use and pattern of adjunctive substance use; previous drug treatment history; history of offending; offence type (esp. violent vs. non-violent acquisitive). As a minimum, future research should include these factors, in addition to better reporting of intervention components and programme design adherence, in order to better augment the evidence base, for example, characteristics of the setting in which the intervention takes place, details of the specific organisation delivering the intervention and characteristics of the intervention itself, such as level of supervision. These details would facilitate an

exploration of the mechanisms of 'why' a particular diversion intervention did, or did not, work. Future research also needs to incorporate a longer follow-up period post-intervention/diversion to assess the effect on future substance use, re-presentation to treatment services via CJS/non-CJS referral route, and subsequent re-offending. A diverse range of outcome measures was used in included studies leading to uncertainty, particularly around the outcome of offending. Included studies focussed on treatment completion, which was not of key importance to the review, if not linked to drug outcomes such as abstinence. The field would benefit from work to establish a core outcome set that is valued/ preferred by service users and of relevance to service providers and policy makers, particularly with reference to measures of offending.

This review highlights that research with diverted drug-using offenders in community settings is limited. In particular, no randomised trials of diversion interventions have been carried out in the UK; ethical and practical difficulties are cited as overwhelming (Weisburd, 2000). Others have commented that this lack of high-quality studies of the criminal justice system is no longer tenable (Bird, Goldacre, & Strang, 2011). Randomised studies of mental health interventions for community-based offenders with multiple complex needs, for example, have demonstrated that both legal and ethical difficulties can be overcome (Burns et al., 2013). A UK RCT of diversion interventions would appear timely and necessary to account for selection and allocation biases likely to be prevalent in such a non-formalised intervention. The design would need to consider CJS and non-CJS referral routes into drug treatment, plus diversion and non-diversion into treatment services amongst eligible arrestees. Preliminary pilot work involving stakeholders would be required to define the intervention, assess the feasibility and acceptability of a diversion RCT, and identify potential barriers to enrolment of sites and recruitment of participants.

Practice and Policy Implications

Evidence for the effectiveness of diversion schemes is of poor quality, largely limited to US offenders, and characterised by uncertainty surrounding the effect on offending, although the impact on reduction of substance misuse was significant. Existing evidence does point to the effectiveness of both community treatment for Class A drug misuse (Gossop et al., 1997; Jones et al., 2016; Mattick, Breen, Kimber, & Davoli, 2009) and in-prison treatment for, in particular, opioid dependence (Hedrich et al., 2012), although the costs of treatment in prison, compared with treatment in the community, are higher. The provision of drug treatment for offenders in the community is therefore a less costly resource. However, as this review has demonstrated, there is currently insufficient existing evidence to warrant the use of such treatment via community-based diversion as a means of reducing offending amongst Class A drug users; robust evidence derived from studies applying the research design recommendations made earlier is required.

The link between drug use and crime is not uni-directional; whilst drug treatment may be effective at reducing drug use, our study shows a lack of robust evidence on the effectiveness of drug treatment accessed via community-based diversion as a means of reducing crime among Class A drug-using offenders. Drug policy in the UK and elsewhere rests on the tenet of a causal link between drug use and crime (HM Government, 2010), producing initiatives such as diversion schemes for drug-using offenders. These initiatives are expensive to implement and deliver. Current evidence is uncertain as to whether or not diversion programmes reduce crime; this ought to be of immediate concern to policy makers.

References

Anglin, D. M., Urada, D., Brecht, M.-L., Hawken, A., Rawson, R., & Longshore, D. (2007). Criminal justice treatment admissions for methamphetamine use in California: a focus on Proposition 36. *Journal of Psychoactive Drugs, 39*, 367–381.

Bennett, T., Holloway, K., & Williams, T. (2001). *Drug use and offending: summary results from the first year of the NEW-ADAM research programme*. London: Home Office Research, Development & Statistics Directorate.

Bird, S. M., Goldacre, B., & Strang, J. (2011). We should push for evidence-based sentencing in criminal justice. *British Medical Journal, 342*, 335.

Brecht, M.-L., & Urada, D. (2011). Treatment outcomes for methamphetamine users: California Proposition 36 and comparison clients. *Journal of Psychoactive Drugs, 43*, 68–76.

Brewster, M. P. (2001). An evaluation of the Chester County (PA) drug court program. *Journal of Drug Issues, 31*, 177–206.

Brocato, J. (2013). The impact of acculturation, motivation and the therapeutic alliance on treatment retention and outcomes for Hispanic drug involved probationers. *Journal of Ethnicity in Criminal Justice, 11,* 150–180.

Bukten, A., Skurtveit, S., Gossop, M., Waal, H., Stangeland, P., Havnes, I., *et al.* (2011). Engagement with opioid maintenance treatment and reductions in crime: a longitudinal national cohort study. *Addiction, 107*, 393–399.

Burns, T., Rugkåsa, J., Molodynski, A., Dawson, J., Yeeles, K., Vazquez-Montes, M., *et al.* (2013). Community treatment orders for patients with psychosis (OCTET): a randomised controlled trial. *Lancet, 381*, 1627–1633.

Chun, J. S., Guydish, J. R., Sorensen, J. L., Haug, N. A., Andrews, S., & Nelson, L. (2007). Outcomes in a sample of opioid-dependent clients treated under California's Proposition 36. *Journal of Drug Issues, 37*, 699–715.

Darke, S., Mills, K. L., Ross, J., Williamson, A., Havard, A., & Teesson, M. (2009). The ageing heroin user: career length, clinical profile and outcomes across 36 months. *Drug and Alcohol Review, 28*, 243–249.

Degenhardt, L., Whiteford, H. A., Ferrari, A. J., Baxter, A. J., Charlson, F. J., Hall, W. D., *et al.* (2013). Global burden of disease attributable to illicit drug use and dependence: findings from the Global Burden of Disease Study 2010. *Lancet, 382*, 1564–1574.

DeVall, K. E., & Lanier, C. L. (2012). Successful completion: an examination of factors influencing drug court completion for White and non-White male participants. *Substance Use & Misuse, 47*, 1106–1116.

Drug Courts Program Office (1998). Drug Court Clearing House and Technical Assistance Project. Looking at a
Decade of Drug Courts. Office of Justice Programs, US Department of Justice.

Du, J., Huang, D., Zhao, M., & Hser, Y. I. (2013). Drug-abusing offenders with co-morbid mental disorders: gender
differences in problem severity, treatment participation, and recidivism. *Biomedical and Environmental
Sciences, 26*, 32–39.

Eley, S., Gallop, K., McIvor, G., Morgan, K., & Yates, R. (2002). *Drug treatment and testing orders: evaluation of the
Scottish pilots.* Edinburgh: Scottish Executive. http://www.scotland.gov.uk/Resource/Doc/46997/0030591.pdf

Eley, S., Gallop, K., McIvor, G., Morgan, K., & Yates, R. (2002a). *Drug treatment and testing orders: evaluation of the
Scottish pilots* (Fife). Edinburgh: Scottish Executive.

Eley, S., Gallop, K., McIvor, G., Morgan, K., & Yates, R. (2002b). *Drug treatment and testing orders: evaluation of the
Scottish pilots* (Glasgow). Edinburgh: Scottish Executive.

Eley, S., Gallop, K., McIvor, G., Morgan, K., & Yates, R. (2002). *Drug treatment and testing orders: evaluation of the
Scottish pilots* (Combined). Edinburgh: Scottish Executive.

European Monitoring Centre for Drugs and Drug Addiction. (2012). *Prisons and drugs in Europe: the problem and
responses*. Lisbon: EMCDDA.

European Monitoring Centre for Drugs and Drug Addiction. (2015). Alternatives to punishment for drug-using
offenders. Lisbon: EMCDDA.

European Monitoring Centre for Drugs and Drug Addiction. (2015). *European Drug Report. Trends and Development*.
Lisbon: EMCDDA.

Evans, E., Li, L., Urada, D., & Anglin, M. D. (2014). Comparative effectiveness of California's Proposition 36 and
Drug Court Programs before and after propensity score matching. *Crime & Delinquency, 60,* 909-938.

Farrington, D. P., Gottfredson, D. C., Sherman, L. W., & Welsh, B. C. (2002). The Maryland Scientific Methods Scale.
In Sherman L. W., Farrington D. P., Welsh B. C., MacKenzie D. L., editors. *Evidence based crime prevention*.
London: Routledge.

Gordon, L., Tinsley, L., Godfrey, C., & Parrott, S. (2006). The economic and social costs of Class A drug use in
England and Wales, 2003/04. In: Singleton N., Murray R., Tinsley L., editors. *Measuring different aspects of
problem drug use: methodological developments*. London: Home Office.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/116642/hoor1606.pdf

Gossop, M., Marsden, J., Stewart, D., Edwards, C., Lehmann, P., Wilson, A., *et al.* (1997). The National Treatment Outcome Research Study in the United Kingdom: six-month follow-up outcomes. *Psychology of Addictive Behaviors, 11*, 324–337.

Gottfredson, D. C., Najaka, S. S., & Kearley, B. (2003). Effectiveness of drug treatment courts: evidence from a randomized trial. *Criminology and Public Policy, 2*, 171-196.

Hartley, R. E., & Phillips, R. C. (2001). Who graduates from drug courts? Correlates of client success. *American Journal of Criminal Justice*, 26, 107-119.

Hayhurst, K. P., Jones, A., Millar, T., Pierce, M., Davies, L., Weston, S., *et al.* (2013). Drug spend and acquisitive offending by substance misusers. *Drug and Alcohol Dependence, 130*, 24–29.

Hayhurst, K. P., Pierce, M., Hickman, M., Seddon, T., Dunn, G., Keane, J., *et al.* (2017). Pathways through opiate use and offending: a systematic review. *International Journal of Drug Policy, 39*, 1-13.

Hedrich, D., Alves, P., Farrell, M., Stöver, H., Møller, L., & Mayet, S. (2012). The effectiveness of opioid maintenance treatment in prison settings: a systematic review. *Addiction, 107*, 501–517.

Hevesi, A. G. (1999). *Quitting drugs, quitting crime: reducing probationers' recidivism through drug treatment programs*. New York: Office of Policy Management, Office of the Comptroller. www.comptroller.nyc.nyus

HM Government. (2010). *Drug Strategy 2010. Reducing demand, restricting supply, building recovery: supporting people to live a drug free life*. London: Home Office.

Holloway, K., & Bennett, T. (2004). *The results of the first two years of the NEW-ADAM programme*. London: Home Office.

Huddleston, W., & Marlowe, D. B. (2011). Painting the current picture: a national report on drug courts and other problem-solving court programs in the United States. Alexandria, VA: National Drug Court Institute.

Jessimer, M., Ang, J., Rabone, S., & Lander, R. (2014). Magistrates Early Referral Into Treatment program follow-up pilot study. *SAGE Open,* 1–7. DOI: 10.1177/2158244014530728.

Jones, A., Hayhurst, K. P., Pierce, M., Millar, T., Dunn, G., & Donmall, M. (2016). Short-term outcomes for opiate and crack users accessing treatment: the effects of criminal justice referral and crack use. *European Addiction Research, 22*, 145–152.

Kruithof, K., Davies, M., Disley, E., Strang, L., & Ito, K. (2016). Study on alternatives to coercive sanctions as response to drug law offences and drug-related crimes. Brussels: European Commission.

Longshore, D., Urada, D., Conner, B.T., Hawken, A., Hiromoto, S., Du, D., *et al.* (2007). *Evaluation of the substance abuse and crime prevention act final report.* California Health and Human Services Agency: Department of Alcohol and Drug Programs. http://www.uclaisap.org/prop36/documents/SACPAEvaluationReport.pdf

Lurigio, A. J. (2000). Drug treatment availability and effectiveness - studies of the general and criminal justice populations. *Criminal Justice and Behavior, 27*, 495–528.

Marinelli-Casey, P., Gonzales, R., Hillhouse, M., Ang, A., Zweben, J., Cohen, J., *et al.* (2008). Drug court treatment for methamphetamine dependence: treatment response and posttreatment outcomes. *Journal of Substance Abuse Treatment, 34*, 242–248.

Mark, T. L., Woody, G. E., Juday, T., & Kleber, H. D. (2001). The economic costs of heroin addiction in the United States. *Drug and Alcohol Dependence, 61*, 195–206.

Mattick, R. P., Breen, C., Kimber, J., & Davoli, M. (2009). Methadone maintenance therapy versus no opioid replacement therapy for opioid dependence. *Cochrane Database of Systematic Reviews,* Issue 3.

Mitchell, O., Wilson, D. B., & MacKenzie, D.L. (2012). The effectiveness of incarceration-based drug treatment on criminal behaviour: a systematic review. *Campbell Systematic Reviews,* 18.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of Internal Medicine, 151*, 264–269.

Monchick, R., Scheyett, A., Pfeifer, J. (2006). Drug Court case management: role, function, and utility. Virginia, US: National Drug Court Institute.

Newton-Taylor, B., Patra, J., & Gliksman, L. (2009). Toronto drug treatment court: participant intake characteristics as predictors of "successful" program completion. *Journal of Drug Issues, 39*, 965–987.

Passey, M., Patete, S., Bird, G., Bolt, S., Brooks, L., Lavender, K., *et al.* (2003). Evaluation of the Lismore MERIT Pilot Program. Final report. Northern Rivers University Department of Rural Health: NSW, Australia. http://www.ncahs.nsw.gov.au/tmp/final_report_MERIT_evaluation.pdf

Perry, A. E., Neilson, M., Martyn-St James, M., Glanville, J. M., Woodhouse, R., Godfrey, C., *et al.* (2015a). Interventions for drug-using offenders with co-occurring mental illness. *Cochrane Database of Systematic Reviews,* Issue 6.

Perry, AE, Neilson, M, Martyn-St James, M, Glanville, JM, Woodhouse, R, Godfrey, C., *et al.* (2015b). Pharmacological interventions for drug-using offenders (review update). *Cochrane Database of Systematic Reviews,* Issue 6.

Perry, A. E., Neilson, M., Martyn-St James, M., Glanville, J. M., Woodhouse, R., Hewitt, C. (2015c). Interventions for female drug-using offenders (review update). *Cochrane Database of Systematic Reviews,* Issue 6.

PHE. (2016). *Adult substance misuse statistics from the National Drug Treatment Monitoring System (NDTMS). 1 April 2015 to 31 March 2016*. London: Public Health England. https://www.ndtms.net/Publications/downloads/Adult%20Substance%20Misuse/adult-statistics-from-the-national-drug-treatment-monitoring-system-2015-2016.pdf

Pudney, S. (2002). *The Road to Ruin? Sequences of Initiation into Drug Use and Offending by Young People in Britain*. London: Home Office.

Saum, C. A., & Hiller M. L. (2008). Should violent offenders be excluded from drug court participation? An examination of the recidivism of violent and nonviolent drug court participants. *Criminal Justice Review, 33*, 291–307.

Seddon T. (2000). Explaining the drug-crime link: theoretical, policy and research issues. *Journal of Social Policy, 29*, 95–107.

Sherman, L. W., Gottfredson, D., MacKenzie, D., Eck, J., Reuter, P., & Bushway, S. (1998). *Preventing Crime: What works, what doesn't, what's promising: A report to the United States Congress, prepared for the National Institute of Justice*. University of Maryland: Department of Criminology and Criminal Justice.

Skodbo, S., Brown, G., Deacon, S., Cooper, A., Hall, A., Millar, T., *et al.* (2007). The Drug Interventions Programme (DIP): addressing drug use and offending through 'Tough Choices'. London: Home Office.

Sondhi, A., O'Shea, J., & Williams, T. (2002). *Arrest referral: emerging findings from the national monitoring & evaluation programme*. London: Home Office Drugs Prevention Advisory Service.

Stevens, A., Berto, D., Heckmann, W., Kerschl, V., Oeuvray, K., van Ooyen, M., *et al.* (2005). Quasi-compulsory treatment of drug dependent offenders: an international literature review. *Substance Use & Misuse, 40*, 269–83.

Turnbull, P. J., & Webster, R. (2007). *Supervising crack-using offenders on drug treatment and testing orders.* London: National Treatment Agency for Substance Misuse. www.nta.nhs.uk.

Turner, E. H. (2013). Publication bias, with a focus on psychiatry: causes and solutions. *CNS Drugs, 27*, 457-468.

UK Government. (1971). *Misuse of Drugs Act 1971*. London: HMSO.

Van Stelle, K. R., Mauser, E., & Moberg, D. P. (1994). Recidivism to the criminal justice system of substance-abusing offenders diverted into treatment. *Crime & Delinquency, 40*, 175–196.

Weisburd D. (2000). Randomized experiments in criminal justice policy: prospects and problems. *Crime & Delinquency*, 46, 181–193.

Wright, N. M., Sheard, L., Adams, C. E., Rushforth, B. J., Harrison, W., Bound, N., *et al.* (2011). Comparison of methadone and buprenorphine for opiate detoxification (LEEDS trial): a randomised controlled trial. *British Journal of General Practice, 61*, 772-780.

Table 1. Included studies: design characteristics.

Study	Country	Study design	Sample size: N (n used in analyses)	Length of follow-up (days)	Intervention design	Data collection	Quality (Maryland scale score) [e]
Anglin et al. (2007)	US	concurrent group comparison	36,132 (29,757)	730 - 1095	multi-factorial day & residential	retrospective	4
Brecht & Urada (2011)	US	concurrent group comparison	145,947 (73,805)[b]	main outcomes measured only at discharge	multi-factorial day & residential	prospective	4
Brewster (2001)	US	cross-sectional group comparison	235 (235)[c]	365	drug court	retrospective	2
Chun et al. (2007)	US	concurrent group comparison	85 (18-85)	Unclear	multi-factorial residential	prospective	4
Eley, Gallop, McIvor, Morgan, & Yates (2002a Fife)[a]	UK	longitudinal follow-up	49 (unclear)	Unclear	multi-factorial day	prospective	2
Eley, Gallop, McIvor, Morgan, & Yates (2002b Glasgow)[a]	UK	longitudinal follow-up	47 (unclear)	Unclear	multi-factorial day	prospective	2
Eley, Gallop, McIvor, Morgan, & Yates (2002c Combined)[a]	UK	case series	10 (10)	0	multi-factorial day	prospective	2
Hartley & Phillips (2001)	US	correlational	196 (196)	Not stated	multi-factorial day	retrospective	1
Hevesi (1999)	US	correlational	154 (147)	1460 (intervention length unclear)	not stated	retrospective	2
Longshore et al. (2007)	US	cross-sectional group comparison	492,966 (unclear)	900 for yr 1 intake; 365 for yrs 2 and 3	multi-factorial day & residential	mixed	2
Marinelli-Casey et al. (2008)	US	concurrent group comparison	287 (287)	365	multi-factorial day	prospective	4
Newton-Taylor, Patra, & Gliksman (2009)	Canada	concurrent group comparison	365 (365)	730	harm reduction	prospective	1
Passey et al. (2003)	Australia	concurrent group comparison	266(262)	average 270	multi-factorial day & residential	prospective	1
Saum & Hiller (2008)	US	'before and after' comparison	456 (452)	1095 for 70% of participants	multi-factorial day	retrospective	2
Turnbull and Webster (2007)	UK	correlational	70 (70)	540	multi-factorial day & residential	mixed	2
Van Stelle, Mauser, & Moberg (1994)	US	longitudinal follow-up	259 (259)[d]	average 540	multi-factorial day	mixed	2

Notes: [a] Eley et al (2002) is an 'umbrella' study addressing the roll-out of a programme in 2 locations - the report divides into 3 sub-studies covering each location separately and combining data. [b] 2 groups excluded as included participants <18yrs. [c] substantial missing data regarding primary drug – analysis based on sub-group of those with primary drug cocaine (N=63) and those with primary drug was marijuana (N=81). [d] analysis based on a sub-sample of Class A drug users (N=40). [e] a higher score indicates a higher methodological standard.

Table 2. Included studies: participant characteristics.

Study	Age: mean (range)	Gender: % male	Ethnicity: % white	Drug use	Offence history	Arrest history	Employment
Anglin et al. (2007)	33 (---)	73	45	majority meth (56%)	not stated	not stated	employed 30%
Brecht & Urada (2011) [b]	not stated	74	41	meth users vs. users of 'other' drugs (unspecified)	not stated	arrest/prison past 30 days: meth users: 32% other drug users: 31%	employed 33%
Brewster (2001)	28 (18-75)	81	49	majority cannabis (47% drug court vs. 35% comparison group)	not stated	not stated	employed 57%
Chun et al. (2007)	39 (20-62)	64	54	majority opiates (62%)	not stated	99% arrested (lifetime) 0% arrested last 30 days	71% lowest income category
Eley, Gallop, McIvor, Morgan, & Yates, 2002a (Fife)[a]	25 (19-34)	94	not stated	all heroin	unclear	not stated	Employed at DTTO 0%
Eley, Gallop, McIvor, Morgan, & Yates, 2002b (Glasgow)[a]	30 (19-58)	80	not stated	all heroin	92% non-violent/ 8% drug	not stated	not stated
Eley, Gallop, McIvor, Morgan, & Yates, 2002c (Combined)[a]	not stated	100	not stated	all heroin	no details	not stated	not stated
Hartley & Phillips (2001)	34 (21-60)	66	56	majority referred for heroin usage (98%)	not stated	most first time offenders	employed prior to programme 67%
Hevesi (1999)	--- (19-29)	100	not stated	cocaine/crack users (no further details)	65% non-violent/ 6% violent/ 67% drug/ 29% other	not stated	employed at time of arrest 18%
Longshore et al. (2007)	33 (---)	68	46	2 groups majority meth (52% & 33%) 1 group majority heroin (29%)	not stated	not stated	not stated
Marinelli-Casey et al. (2008)	32 (18-57	63	57	all meth	not stated	not stated	employed 71%
Newton-Taylor, Patra, & Gliksman (2009)	35 (---)	75	not stated	crack/cocaine users	all non-violent criminal offenders	not stated	employed 22%
Passey et al. (2003) [c]	not stated	76	unclear	majority heroin (54%)	14% violent/ 55% theft/ 46% drug/ 12% other	not stated	employed 7%
Saum & Hiller (2008)	30 (18-59)	79	27	majority opiates (24%)	76% violent/ 81% property/ 83% drug/ 75% other	not stated	not stated
Turnbull & Webster (2007) [d]	31 (20-46)	93	57	majority crack and heroin (61%)	43% burglary/ 37% theft/ 10% drug/ 10% other	not stated	not stated
Van Stelle, Mauser, & Moberg (1994)	not stated	100	not stated	15% Class A drug users	not stated	lifetime average of 10 arrests	majority employed full-time
Total sample	31.8	81	48				

Notes: [a] Eley et al (2002) is an 'umbrella' study addressing the roll-out of a programme in 2 locations - the report divides into 3 sub-studies covering each location separately and combining data. [b] Figures for Brecht2011 are the averages for the two groups which meet our inclusion criteria. [c] data apply to the full sample not the sub-set meeting our criteria. [d] The age cited for Turnbull & Webster (2007) is a median rather than a mean. Meth: methamphetamine.

Table 3. Individual study effects.

Study	Comparison	Outcome	OR	95% CI	p-value
		Continued Class A Primary Drug Use			
Chun et al. (2007)	SACPA vs. non-SACPA	heroin use last 30 days (change from assessments 1 to 2)	2.33	0.97 – 5.57	0.058
Eley, Gallop, McIvor, Morgan, & Yates, 2002b (Glasgow)	longitudinal follow up of DTTO participants	positive test for opiates at 1st test vs. 5th test	1.79	0.53 – 6.05	0.346
Eley, Gallop, McIvor, Morgan, & Yates, 2002a (Fife)	longitudinal follow up of DTTO participants	positive test for opiates at 1st test vs. 5th test	1.54	0.30 – 7.92	0.604
Marinelli-Casey et al. (2008)	methamphetamine (MTP + Drug Court) vs. methamphetamine (MTP only)	reduction in methamphetamine use 6 months after treatment	1.49	0.88 – 2.53	0.137
Jessimer, Ang, Rabone, & Lander (2014)[1]	MERIT + cocaine vs. MERIT + cannabis	cocaine use last 30 days (programme exit vs. entry)	0.14	-4.79 to 0.85	0.344
		Continued Other Drug Use			
Chun et al. (2007)	SACPA vs. non-SACPA	ASI drug (change from assessment 1 to 2)	1.63	0.69 – 3.88	0.267
Marinelli-Casey et al. (2008)	methamphetamine (MTP + Drug Court) vs. methamphetamine (MTP only)	ASI drug - 6 months after treatment	2.44	1.44 – 4.15	**0.001**
Newton-Taylor, Patra, & Gliksman (2009)	TDTC graduated vs. expelled-non-engaged	court appearances - substance abuse reported	3.85	1.97 – 7.57	**<0.001**
		Treatment Completion			
Anglin et al. (2007)	SACPA (heroin/opiate vs. marijuana/hashish)	treatment completion	0.82	0.74 – 0.92	**<0.001**
Brecht & Urada, 2011	SACPA (methamphetamine vs. other drugs)	treatment completion	0.92	0.88 – 0.96	**<0.001**
Brewster (2001)	Drug Court (cocaine vs. marijuana)	survival in programme	0.93	0.51 – 1.69	0.813
Hartley & Phillips (2001)	Drug Court (referred for crack vs. not)	treatment completion	0.75	0.45 – 1.25	0.266
Passey et al. (2003)	MERIT + heroin vs. MERIT + other drugs	treatment completion	1.13	0.70 – 1.84	0.620
Van Stelle, Mauser, & Moberg (1994)	TAP (Class A vs. other drug)	treatment completion	0.52	0.25 – 1.07	0.077
Brocato (2013)[1]	Mandated to treatment (cocaine vs. marijuana)	treatment completion	2.25	-0.69 to 2.31	0.454
DeVall & Lanier (2012)[1]	Drug Court white clients (heroin vs. marijuana)	treatment completion	0.20	-2.66 to -0.59	**0.001**

Notes: ASI: Addiction Severity Index. DTTO: drug treatment and testing order. MERIT: Magistrates Early Referral Into Treatment. MTP: Methamphetamine Treatment Project. SACPA: Substance Abuse and Crime Prevention Act. TAP: Treatment Alternative Program. TDTC: Toronto drug treatment court. [1] Update review findings – not pooled in meta-analyses summarised in Table 4.

Table 4. Meta-Analysis[1].

| | Effect size (95% CI) | Test of null (2-Tail) | | Heterogeneity | | | | Tau-squared | | | |
		z-value	p-value	Q-value	df (Q)	p-value	I-squared	Tau Squared	Standard Error	Variance	Tau
				Continued Class A Primary Drug Use							
Fixed	1.68 (1.12-2.53)	2.493	0.013	0.751	3	0.861	0	0.000	0.187	0.035	0.000
Random	1.684 (1.12-2.53)	2.493	0.013								
				Continued Other Drug Use							
Fixed	2.61 (1.79-3.80)	5.001	<0.001	2.478	2	0.290	19	0.028	0.148	0.022	0.169
Random	2.60 (1.70-3.98)	4.387	<0.001								
				Treatment completion							
Fixed	0.90 (0.87-0.94)	-5.105	<0.001	7.206	5	0.206	31	0.003	0.008	0.000	0.058
Random	0.88 (0.80-0.96)	-2.810	0.005								

Notes. [1] Update review findings not pooled via meta-analyses.

Figure 1. Review search: PRISMA flow diagram.

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┌──────────────────────────────────────────────────────────────────────────────────┐
│  ┌─────────────────────┐                                                          │
│  │  Data search        │                                                          │
│  │                     │         ┌──────────────────────────────────┐             │
│  │  28,408             │────────▶│  Excluded via examination of     │             │
│  └─────────┬───────────┘         │  titles/abstracts                │             │
│            │                     │                                  │             │
│            ▼                     │  27,110                          │             │
│  ┌─────────────────────┐         └──────────────────────────────────┘             │
│  │  Full Text screened │                                                          │
│  │                     │                                                          │
│  │  1,298              │         ┌──────────────────────────────────────────────┐ │
│  └─────────┬───────────┘         │  Excluded via examination of full text:      │ │
│            │──────────────────▶  │                                              │ │
│            ▼                     │  Non-offender                          36    │ │
│  ┌─────────────────────┐         │  Prison intervention                   54    │ │
│  │  Included papers    │         │  Not diversion                        107    │ │
│  │                     │         │  Drug use unspecified/unclear         199    │ │
│  │  14                 │         │  Mixed drug use (no Class A sub analysis) 172 │ │
│  └─────────────────────┘         │  <18 years                             22    │ │
│                                  │  No relevant outcomes reported         29    │ │
│                                  │  Factors analysis only                 19    │ │
│                                  │  Background*                          574    │ │
│                                  │  Other                                 72    │ │
│                                  └──────────────────────────────────────────────┘ │
└──────────────────────────────────────────────────────────────────────────────────┘
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Notes: * Background includes manuscripts with no experimental component, for example, narrative reviews of diversion; scene-setting papers setting out an intention to carry out future work; overviews of the number or type of diversion schemes available; Government or CJS policy documents etc.

Figure 2. Forest Plot: continued Class A primary drug use[1].

Chun et al. (2007)

Eley, Gallop, McIvor, Morgan, & Yates (2002b Glasgow)

Eley, Gallop, McIvor, Morgan, & Yates (2002a Fife)

Marinelli-Casey et al. (2008)

Random Effects
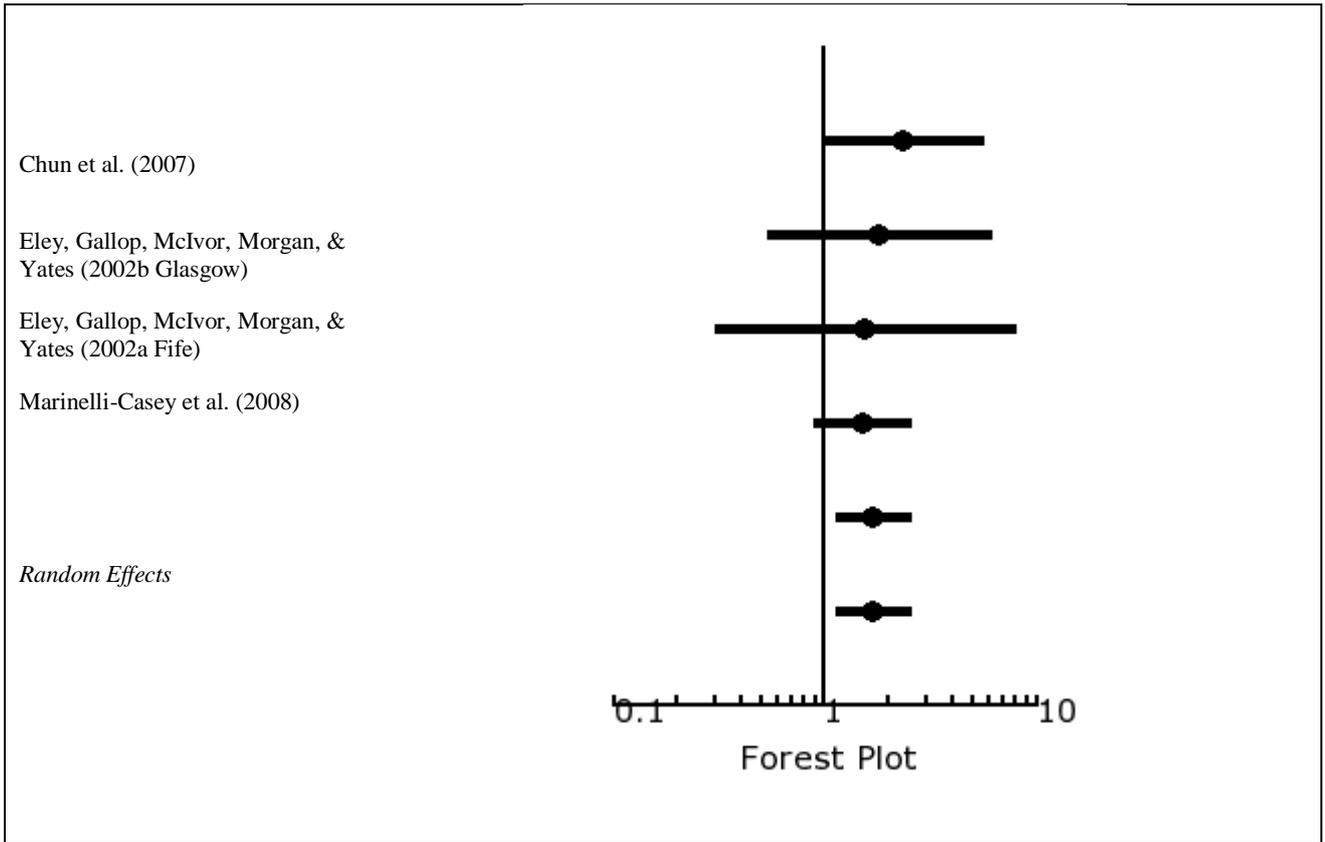
Forest Plot

Notes. [1] Update review findings not pooled via meta-analyses.

Figure 3. Forest Plot: continued other drug use.

Chun et al. (2007)

Marinelli-Casey et al. (2008)

Newton-Taylor, Patra, &
Gliksman (2009)

Fixed Effects

Random Effects

Forest Plot