Sarah Larney, Bradley Mathers and Kate Dolan

Illicit drug treatment in prison: Detoxification, drug-free units, therapeutic communities and opioid substitution treatment

NDARC Technical Report No. 266

ILLICIT DRUG TREATMENT IN PRISON:
DETOXIFICATION, DRUG-FREE UNITS, THERAPEUTIC COMMUNITIES AND OPIOID SUBSTITUTION TREATMENT

Sarah Larney, Bradley Mathers and Kate Dolan

Technical Report No. 266

ISBN: 978 0 7334 2429 8

Acknowledgements

An earlier draft of this report was prepared for the National Treatment Agency, United Kingdom, for use in the development of guidelines for drug treatment in prisons.

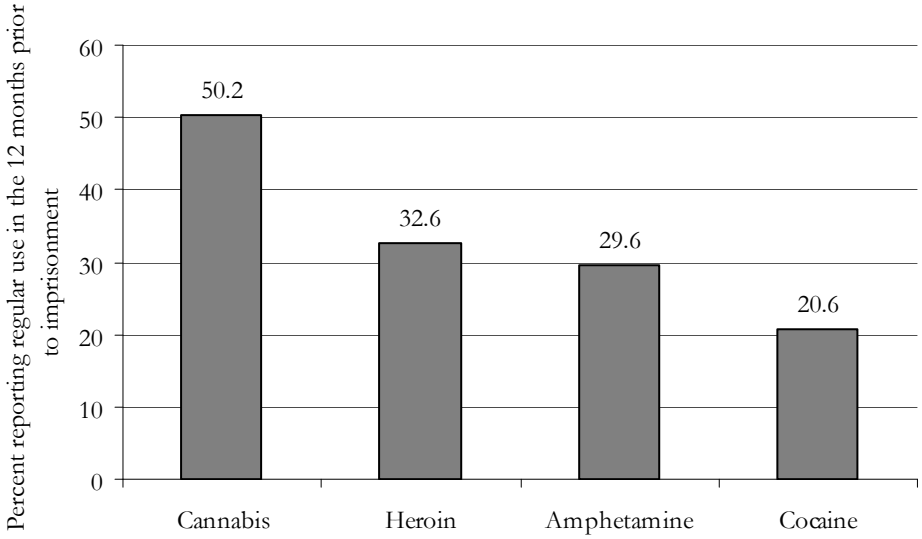
Benjamin Phillips and Effat Merghati Khoei contributed to an earlier draft of this report.

CONTENTS

1. INTRODUCTION

The relationship between drugs, crime and subsequent imprisonment is acknowledged around the world. Estimates of the prevalence of illicit drug use and dependence among male prisoners range from 17-30%; among female prisoners, this rises to 30-60% (Fazel, Bains, & Doll, 2006). In the United Kingdom, 80% of surveyed prisoners reported having ever used any illicit drug (Boys et al., 2002). Of sentenced prisoners surveyed, 43% of men and 41% of women met criteria for dependence on at least one illicit drug (Singleton, Farrell, & Meltzer, 1999). In New South Wales (NSW), Australia, inmate health surveys have shown that two thirds of male prisoners, and three quarters of female prisoners, had used illicit drugs regularly in the twelve months prior to imprisonment (Butler & Milner, 2003). The proportion of prisoners reporting regular use of selected illicit drugs is shown in figure 1.1.

Figure 1.1: Percent of NSW prisoners reporting regular drug use in the 12 months prior to imprisonment, by drug type.



Source: Butler, T., & Milner, L. (2003). *The 2001 New South Wales Inmate Health Survey*. Sydney: Corrections Health Service.

Although it is recognised that offering drug treatment to drug-using offenders may contribute to reducing re-offending, treatment availability is often limited (Kothari, Marsden, & Strang, 2002). In many countries, resources within prisons are scarce and

devoted to areas such as security. However, prisoners retain the right to adequate healthcare, including access to effective treatments for drug dependence. Furthermore, according to the principle of equivalence of care, prisoners have the right to receive healthcare equivalent to that available in the community (World Health Organization, 1992). The issues of drug dependence and treatment in prison take on added importance in the context of the global HIV epidemic. Prisons are important sites of HIV transmission due to sharing of drug injecting equipment and unprotected sexual activity (UNAIDS, 2006). Yet through the provision of effective drug treatment, prisons can also be sites for HIV education and prevention.

This report summarises the published literature on illicit drug detoxification and treatment interventions in prisons. Where relevant, literature on community-based interventions is also discussed. This report is not intended to be used as a guide for clinical practice; rather, its aim is to draw attention to various approaches for the treatment of illicit drug dependence in prison settings.

2. DETOXIFICATION

Detoxification is the management of withdrawal symptoms associated with the cessation of a drug of dependence. While not a treatment for drug dependence in itself, assisting a drug dependent person to detoxify safely and with a minimum of discomfort or danger to their health may lead to further opportunities for clinicians to provide harm reduction interventions or drug treatment services.

There is a paucity of literature detailing or evaluating detoxification protocols in either community or prison settings. However, detoxification in prison need not differ markedly from that provided in the community. Withdrawal can be managed in a number of ways, depending on the drug or drugs of dependence. Medical intervention may assist the detoxification process, particularly in the case of opiate dependence. Alternatively, detoxification can be managed non-medically, through the provision of psychological support and care.

2.1 Opiate detoxification

Opiate detoxification is rarely life-threatening and clinical management is uncomplicated. Management of opiate withdrawal typically involves the use of alpha2-adrenergic agonists (e.g. clonidine, lofexidine), opioid agonists (e.g. methadone, buprenorphine) and/or symptomatic treatment.

2.1.1 Alpha2-adrenergic agonists

One of the neurological mechanisms underlying opioid withdrawal is noradrenergic hyperactivity. Alpha2-adrenergic agonists, such as clonidine and lofexidine, relieve opiate withdrawal symptoms by moderating this activity (Gowing, Farrell, & White, 2004).

Several community-based studies have examined the use of clonidine and lofexidine. A review of studies found that withdrawal symptoms are similar whether adrenergic agonists or methadone is utilised. Treatment retention is worse compared to methadone-

assisted detoxification and clonidine, in particular, is associated with adverse side-effects such as dizziness and hypotension (Gowing, Farrell, & White, 2004).

Adrenergic agonists are attractive for use in prison settings due to their low potential for dependence and diversion. One randomised controlled trial comparing lofexidine to methadone in prison has been conducted. Opiate dependent inmates were randomised on reception to receive either lofexidine or methadone over ten days. There were no clinically significant differences between groups in severity of withdrawal symptoms. Treatment retention was higher in the methadone group (88% v. 70%), but this difference was not statistically significant. The authors concluded that lofexidine is comparable to methadone in effectiveness in managing withdrawal and is a viable alternative for opiate detoxification (Howells et al., 2002).

One concern related to the use of alpha-2 adrenergic agonists is their potential hypotensive effects. Lofexidine has been found less likely than clonidine to cause such effects (Gowing, Farrell, & White, 2004). In the prison-based study of lofexidine, no hypotensive episodes related to administration of this medication were identified (Howells et al., 2002).

2.1.2 Opioid agonists

Opioid agonists relieve opioid withdrawal symptoms by mimicking the effects of illicit opiates such as heroin. Methadone and buprenorphine are the agonists most frequently used in detoxification. They are provided in reducing doses over the course of the withdrawal syndrome, typically for 7-10 days.

Buprenorphine is generally considered a superior detoxification agent to methadone as it is quicker to alleviate withdrawal symptoms (Gowing, Ali, & White, 2006). Buprenorphine is also superior to alpha2-adrenergic agonists in ameliorating withdrawal symptoms (Mattick et al., 2001). However, the administration of buprenorphine in prison settings can be problematic; tablets must be absorbed sub-lingually, which may take several minutes per patient, and this process must be supervised to minimise diversion.

To date, there have been no published studies examining the use of buprenorphine for withdrawal management in prison and only two studies of methadone. One, a descriptive study of 49 newly received inmates, noted that while withdrawal severity was reduced through the use of methadone, symptom relief was not complete (Jeanmonod, Harding, & Staub, 1991). The other was the randomised controlled trial comparing methadone to lofexidine, as described above in section 2.1.1. To reiterate, methadone treated patients were more likely than lofexidine treated patients to be retained in treatment, but this difference was not statistically significant (Howells et al., 2002).

2.1.3 Symptomatic treatment

Withdrawal symptoms such as nausea, vomiting, cramps and diarrhoea can be treated symptomatically as they arise. Symptomatic treatment can be provided in conjunction with the pharmacotherapies described above.

The only study on the use of symptomatic treatment for opioid withdrawal was conducted in a community setting and referred to the use of 'clonidine plus symptomatic medications'. This combination was found to be inferior to buprenorphine-assisted withdrawal in terms of treatment completion and entry into post-withdrawal treatment (Mattick et al., 2001).

2.2 Psychostimulant detoxification

Psychostimulants include cocaine and methamphetamine. Treatment for withdrawal typically consists of psychological support (see section 2.6 below), symptomatic treatment and observation for psychiatric complications.

2.2.1 Symptomatic treatment

Withdrawal symptoms such as cramps, anxiety and insomnia can be treated symptomatically as they arise.

2.2.2 Psychiatric complications

Ongoing psychostimulant use can result in mood disturbances and/or psychosis. Patients must be carefully assessed for psychosis, depression and suicidal ideation and appropriate medications prescribed. Patients with severe psychosis or suicidal ideation may require hospitalisation.

2.2.3 Experimental pharmacotherapies

Studies are underway to determine the efficacy of mirtazapine in treating psychostimulant withdrawal. A recent study in a criminal justice setting in Thailand found that patients treated with mirtazapine had reduced withdrawal severity scores compared to a placebo group (Kongsakon, Papadopoulos, & Saguansiritharn, 2005). Pending further studies, mirtazapine may be a useful pharmacotherapy for use in psychostimulant detoxification in prisons.

2.3 Psychological support

Psychological support in the form of accurate information regarding withdrawal symptoms and strategies for coping with cravings can be useful in reducing patient anxiety and preparing the patient for the withdrawal experience. Psychological support is also valuable in cases where withdrawal symptoms continue beyond the provision of withdrawal medications. Providing psychological support during withdrawal adds to the effectiveness of pharmacological treatments (Amato et al., 2004).

3. DRUG-FREE WINGS

Voluntary drug-free units or drug-free wings are a form of residential correctional treatment program with the primary objective of rehabilitating offenders with histories of illicit drug use. Inmates residing in drug-free wings are segregated from the general prison population and pledge to abstain from drug use, usually in return for increased privileges such as recreational facilities or improved accommodation. Inmates are regularly urine tested and punishments for a positive urinalysis include loss of privileges or expulsion from the program (Incorvaia & Kirby, 1997). Drug-free units are used widely across Europe (Zurhold, 2004) and Australia (Black, Dolan, & Wodak, 2004), yet very little is known about their long-term effectiveness as few have been evaluated. Programs offered in drug-free wings also vary widely so the precise factors that contribute to a positive rehabilitative environment are uncertain.

A study of a drug-free wing in a Dutch prison compared behavioural changes of inmates in a drug-free wing to those in the general prison population and those in a specialist drug-free detention centre. Schippers et al (1998) concluded that there were no differences between these groups at one-year follow-up on drug use, criminal recidivism, social functioning or physical functioning. However, compared to the comparison group, a greater proportion of inmates in the drug-free wing were referred to drug treatment after release (64% v. 26%). Inmates from the drug-free unit were also more likely than those in the comparison group to have actual contact with a treatment agency (42% v. 8%). These results suggest that drug-free wings may assist inmates to access treatment on release (Schippers, Van den Hurk, Breteler, & Meerkerk, 1998).

An analysis of predictors of behaviour change in this study concluded that changes in recidivism among drug-free wing participants could not be predicted. Changes in drug use could be predicted to a limited extent by legal status of income; those who reported that their main source of income was legal showed a decrease in drug use at follow-up (Breteler, Van den Hurk, Schippers, & Meerkerk, 1996).

More positive findings were reported in an Australian study of a drug-free wing. Thirty-one inmates residing in a drug-free wing were compared to 31 inmates in general population. The majority (84%) of general population inmates surveyed reported currently using drugs, compared to one third (32%) of those in the drug-free wing. Urinalysis results confirmed a significant difference in drug use between the two groups, with half (49%) of general population inmates tested returning positive samples, compared to 6% of those in the drug-free wing (Incorvaia & Kirby, 1997). Inmates in the drug-free wing also expressed more positive attitudes towards being drug-free in prison and reducing drug use in prison compared to the general population group.

Drug-free wings may assist inmates to reduce their drug use while in prison and to access drug treatment on release from prison. However, their effectiveness is by no means established. Further research, clarifying the elements of programs conducted in drug-free wings and their long-term impacts on drug use and criminal recidivism, is required.

4. THERAPEUTIC COMMUNITIES

The therapeutic community (TC) is a drug-free approach to treatment in which drug or alcohol dependent individuals live in small, highly structured communities (WHO-WPRO, 2006). TCs in the broader community have been shown to be an effective treatment option for a subset of clients (see Gowing, Cooke, Biven, & Watts, 2002, for a review of the TC literature).

TCs are commonly found in prisons in the United States, from where much of the research literature originates. There is a great deal of theoretical and non-empirical literature on TCs. This review will only consider empirical TC research that employed a comparison group of non-treated drug dependent inmates to assess the impact of TC treatment on outcomes such as drug use and criminal recidivism.

4.1 Impacts on drug use

Only one study that compared treatment and non-treatment groups on drug use was identified for this review. A study of TC-treated inmates compared with non-treated inmates found that participation in treatment was the strongest predictor of abstinence from illicit drug use at five-year follow-up. Participants were more than three times more likely to be drug-free than non-participants (Inciardi, Martin, & Butzin, 2004).

4.2 Impacts on criminal recidivism

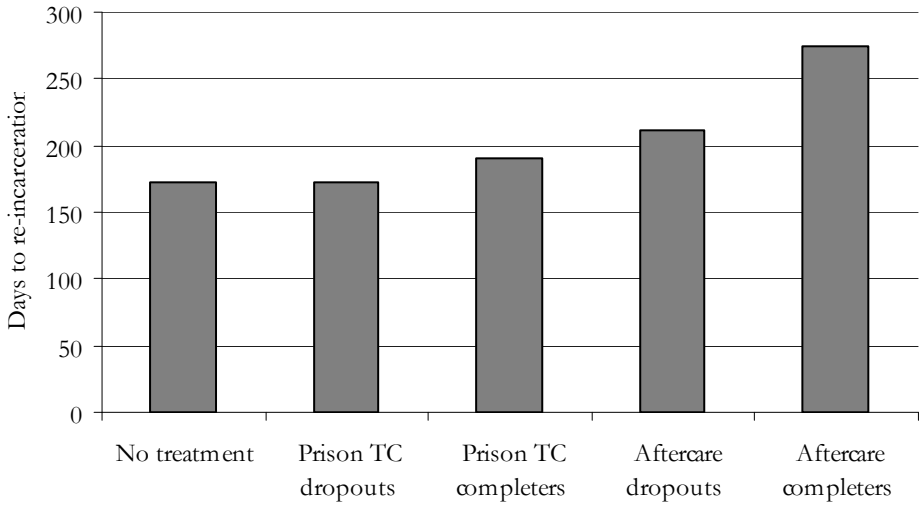
More research has considered the effect of TC treatment on criminal recidivism following release from prison. An evaluation of a TC for incarcerated women found that while 30% of women in a non-treated control group were convicted of another offence following release, only 13% of those who completed the treatment program were reconvicted. Of those with any exposure to treatment, 22% were reconvicted (Mosher & Phillips, 2006).

The impact of TC treatment on criminal recidivism is maximised when treated inmates transfer directly to community-based treatment on release from prison. For example, at two-year follow-up, 36% of a group of inmates who underwent prison-based TC

treatment had been re-arrested, compared to 42% of a matched, non-treated group. However, of inmates who attended both in-prison treatment and a post-release, community-based TC, only 30% were re-arrested. Compared to the non-treated group, the risk of re-arrest was halved for those who completed both treatment programs (Hiller, Knight, & Simpson, 1999).

Similarly, the greatest number of days to re-incarceration in a study of TC participants in California was seen among those who completed both the prison TC program and an aftercare program (Wexler, De, Thomas, Kressel, & Peters, 1999). A clear relationship existed between treatment exposure and length of time to re-incarceration, as seen below in figure 4.1.

Figure 4.1: Days to re-incarceration by treatment exposure



Source: Wexler, H. K., *et al.* (1999). The Amity prison TC evaluation: Reincarceration outcomes. *Criminal Justice and Behaviour, 26*(2), 147-167.

4.3 Identifying factors associated with treatment completion

From the limited research, it appears that post-prison aftercare programs and treatment completion are important for achieving positive outcomes. Identifying factors that influence treatment completion should be a priority for researchers in this area. As a starting point, studies in the United States have found that participant motivation, race and age may be implicated. Melnick *et al.* (2001) found that greater motivation for treatment and greater participation in treatment was associated with increased treatment

completion, which in turn was associated with lowered criminal recidivism. They suggest that programs to enhance inmate motivation for treatment, conducted in the early stages of TC treatment, may improve treatment completion rates (Melnick, De Leon, Thomas, Kressel, & Wexler, 2001). In their study of factors influencing program completion in a TC in a women's prison, older women were more likely to complete the program than younger women, and "white" women were more likely to complete treatment than "non-white" (incorporating African-American, Native American, Hispanic and Asian) women (Mosher & Phillips, 2006). This suggests the need to explore the applicability of program content to populations from diverse cultural backgrounds.

5. OPIOID SUBSTITUTION TREATMENT

Opioid substitution treatment is the medium- to long-term provision of opioid agonists to heroin- or other opioid-dependent people for the purposes of suppressing opioid cravings and improving the health and social well-being of the patient (Cropsey, Villalobos, & St. Clair, 2005; Ward, Mattick, & Hall, 1998). Methadone is the most commonly used opioid for maintenance purposes, but buprenorphine is also increasingly being prescribed (Hall, Ward, & Mattick, 1998).

5.1 Opioid substitution treatment in community settings

There is a very strong research base for community-based opioid substitution therapy generally, and methadone maintenance treatment (MMT) in particular. MMT has a moderate but significant effect on reducing heroin use (r = .35) (Marsch, 1998) and is also associated with reductions in injecting drug use and reduced frequency of injecting (Dolan, Hall, & Wodak, 1996), benefits that produce reductions in HIV and hepatitis C transmission. In a recent review of the literature, the HIV seroconversion rate of MMT patients was lower than that among non-treated injecting drug users (Gowing, Farrell, Bornemann, & Ali, 2004).

The positive effects of MMT on criminality of heroin users are also well established. A recent Australian study quantified the effect of MMT on crime rates and concluded that for every 100 heroin users receiving MMT in the state of New South Wales, there were 12 fewer robberies, 57 fewer break-and-enters and 56 fewer car thefts per year (Lind, Chen, Weatherburn, & Mattick, 2005). Other benefits of MMT include reduced mortality among heroin users (Brugal et al., 2005; Langendam, van Brussel, Coutinho, & van Ameijden, 2001) and the relative cost-effectiveness of the treatment program in the long-term (Barnett & Hui, 2000; Masson et al., 2004).

There is less evidence regarding the effectiveness of buprenorphine and other substitution therapies. It appears that retention in buprenorphine maintenance treatment (BMT) is similar to that of MMT (Mattick, Kimber, Breen, & Davoli, 2003). BMT is also

of similar cost-effectiveness to MMT (Harris, Gospodarevskaya, & Ritter, 2005). While there is little research regarding LAAM maintenance treatment, some results suggest it may have some advantages over MMT in terms of treatment retention and suppression of heroin use (Clark et al., 2002; Longshore, Annon, Anglin, & Rawson, 2005). However, it has been associated with cardiac arrhythmia in some patients and its safety as a substitution therapy is unknown (Clark et al., 2002).

5.2 Opioid substitution treatment in prison

5.2.1 Rationale for opioid substitution treatment in prison

An individual's drug use is usually much less frequent in prison than in the community (Dolan, Wodak, Hall, Gaughwin, & Rae, 1996). For this reason it is sometimes argued that substitution treatment in prison is unnecessary. However, it is the risks associated with drug injecting in prison that heightens the need for opioid substitution (Dolan, Hall, & Wodak, 1998). Drug injection in prison usually involves sharing needles and syringes (Dolan, Wodak, Hall, Gaughwin, & Rae, 1996), a behaviour that carries with it the risk of HIV or hepatitis transmission. Providing substitution treatment can reduce inmate drug use, thereby reducing the risk of viral transmission (Dolan et al., 2005).

Another risk specific to prisoners is their increased vulnerability to overdose on release from prison. The majority of heroin dependent prisoners use heroin shortly after their release (Dolan, Wodak, Hall, Gaughwin, & Rae, 1996). Prisoners who have had little exposure to opiates during imprisonment have reduced tolerance, leaving them vulnerable to overdose and death (Bird & Hutchinson, 2003; Darke, Ross, Zador, & Sunjic, 2000). Providing substitution treatment either throughout the length of the sentence or on a pre-release basis (sometimes referred to as 'retoxification') and ensuring uninterrupted transition to community-based pharmacotherapy programs can protect against this outcome.

5.2.2 Methadone maintenance treatment

The majority of Western European prison systems offer MMT to prisoners in their care (Kerr & Jurgens, 2004). Prison-based MMT is also provided in Australia (Dolan et al.,

2005), Canada (Johnson, van de Ven, & Grant, 2001) and limited locations in the United States (Rich et al., 2005) and Indonesia (AIDS Project Management Group, 2005).

Findings from studies of prison-based MMT programs reflect what is known about MMT in the community. As in the community, imprisoned heroin injectors who receive MMT inject drugs significantly less frequently than those not receiving this treatment. A study of injecting drug users in prison in New South Wales (NSW), Australia found that MMT patients reported significantly fewer injections per week than non-treated injectors (mean no. injections per week .16 v .35; p=.03) (Dolan, Hall, & Wodak, 1996). A randomised controlled trial of the NSW prison MMT program reported that treated inmates injected significantly less often than the control group at two, three and four-month follow-up periods. Lower drug use among the control group was confirmed through analysis of hair samples (Dolan et al., 2003).

A study of a pilot methadone maintenance program in a prison in Peurto Rico also found that heroin use was markedly reduced among program participants. Heroin use in prison in the thirty days prior to beginning treatment was compared to heroin use in the first thirty days of treatment. While all patients had used heroin in the thirty days prior to treatment, only one of 18 used heroin after starting treatment (Heimer et al., 2006).

Prison-based MMT has a positive effect on criminal recidivism and re-incarceration. A study of the Canadian prison MMT program followed patients for two years following release. At twelve-month follow-up, a smaller proportion of the treatment group than the control group had been charged with a new offence (17% v. 23%) and 41% of the treatment group had been re-incarcerated, compared to 58% of the control group. At two-year follow up, the control group was 28% more likely to have been re-incarcerated than the treatment group (Johnson, van de Ven, & Grant, 2001). In NSW, risk for re-incarceration decreased as retention in MMT increased such that risk of re-incarceration was reduced by 70% during MMT periods of eight months or longer (Dolan et al., 2005).

Reductions in recidivism and consequent re-incarceration are maximised through the provision of moderate to high doses of methadone. A study of inmates released from a

prison in New York revealed that those discharged on a higher dose of methadone (defined as 60mg or greater) were less likely to return to prison than those on low doses. The high-dose group also took longer than the low-dose group to return to prison (M = 253 days v. 187 days) (Bellin et al., 1999).

The impacts of MMT on mortality among prisoners are still to be fully explored. In a four-year follow-up study of the NSW prison methadone randomised controlled trial, seventeen of 382 participants died during the follow-up period. All deaths occurred while participants were not in MMT. Eight of the deaths were drug overdoses. Of these, four had never received methadone treatment and four had ceased methadone treatment prior to release from prison (Dolan et al., 2005), underscoring the importance of uninterrupted transfer from prison to community-based treatment.

MMT is the only prison-based drug treatment for which cost-effectiveness data are available. A recent cost-effectiveness study analysed the cost of MMT per heroin free day compared to no MMT in the context of the NSW prison methadone program. The total cost of the program (including administrative costs, clinical delivery costs and dispensing costs) was estimated at AU$4.8 million annually. Assuming that the cost of not providing MMT is zero, the additional cost of the program is AU$3,234 per prisoner per year. This is no more expensive than community MMT programs in Australia (Warren et al., 2006). Based on data from Dolan et al. (2003), it was estimated that inmates in MMT use heroin 15 days per year, compared to 100 days of heroin use per year for non-treated inmates. The cost of producing these heroin-free days was AU$38 per person-day, which compared favourably with costs associated with heroin-related morbidity and mortality (Warren et al., 2006).

While there are currently no studies that demonstrate an impact of prison-based MMT on the transmission of HIV, there is evidence for its impact of hepatitis C transmission. The four-year follow-up study of patients in the NSW prison MMT program found that hepatitis C incidence among the treated group (16 cases per 100 person-years) was lower than the non-treated group (27 cases per 100 person-years), however this difference was not statistically significant ($p = .08$). Seroconversion was associated with shorter (less than five months) periods of MMT treatment (Dolan et al., 2005). In the same trial, HIV

incidence was just 0.3 per hundred person years, reflecting the low prevalence (<2%) of the virus among Australian injecting drug users (NCHECR, 2005). Thus, it was not possible to draw conclusions about the effectiveness of MMT in preventing HIV transmission in prison.

While evidence for MMT in prison is based on only a small number of studies, results from these studies reflect what is known about MMT in the community. Available evidence suggests that prison-based MMT is a cost-effective and clinically effective treatment for heroin and other opioid dependence, providing benefits including reductions in drug injection, blood borne virus transmission, re-incarceration and mortality.

5.2.3 Buprenorphine maintenance treatment

Buprenorphine is a partial opioid agonist that is usually administered sub-lingually. Buprenorphine maintenance treatment is available in prisons in Australia (Black, Dolan, & Wodak, 2004) and a number of Western European countries (Stover, Hennebel, & Casselman, 2004).

While evidence around buprenorphine maintenance treatment (BMT) in the community is increasing, little research has examined BMT in prison settings. One study has examined compared BMT to other treatments for opiate dependence and found that retention in treatment at six-month follow-up was lower for BMT than MMT (30% vs. 59%). This study noted that the diversion of buprenorphine was initially a significant problem; however, as protocols for the supervision of dosing were further developed, this situation has improved (Shearer, Wodak, & Dolan, 2004).

The evidence for BMT in prison is not strong and further research is recommended. BMT may be a useful adjunct to other maintenance medications such as methadone, but well-developed protocols around supervision of dosing and prevention of diversion are required.

5.2.4 Levo-alpha-acetylmethadol maintenance treatment

Levo-alpha-acetylmethadol (LAAM) is similar to methadone in that it suppresses heroin withdrawal symptoms and reduces cravings for opiates. However, while methadone achieves these effects for 24 hours, LAAM does so for 48-72 hours, removing the need for daily dosing.

LAAM is not widely prescribed in the community and no prison jurisdiction in the world routinely prescribes LAAM as a treatment for opioid dependence. The only study of LAAM in prison is a randomised controlled trial of a pilot project in one prison in Baltimore, United States. Prisoners with a history of opioid dependence receive LAAM for three months pre-release (Kinlock, Battjes, Schwartz, & the MTC Project Team, 2002, , 2005). Post-release, there was no difference between the treatment and control groups on number of heroin-using days. However, the treatment group reported significantly fewer heroin-using days than a group of participants who were assigned to treatment but did not receive it for administrative or personal reasons (M = 66 v. 167) (Kinlock, Battjes, Schwartz, & the MTC Project Team, 2005).

There were no differences between the three groups (treatment, control and those who withdrew before starting treatment) on number of days committing crime. However, the treatment group reported significantly lower income from crime compared to the other two groups (M = $155 v. $640 and $470). There were no differences between the treatment and control groups with regard to arrest or reincarceration at nine-month follow-up. However, the treatment group was significantly less likely to have been arrested or reincarcerated compared to the group who withdrew before starting treatment (arrested 33% v. 58%; reincarcerated 29% v. 58%) (Kinlock, Battjes, Schwartz, & the MTC Project Team, 2005).

High participant attrition specific to the treatment group in this study limits the strength of conclusions that can be drawn regarding the effectiveness of LAAM in prison settings. Pending further research, LAAM may be effective in suppressing heroin use and reducing recidivism and re-incarceration.

6. CONCLUSIONS

This report has reviewed four interventions for drug-dependent prisoners: detoxification; drug-free units; therapeutic communities; and opioid substitution treatment. None of these treatment options have been thoroughly studied in the prison context, although the evidence base is increasing in the cases of therapeutic communities and opioid substitution treatment. On current evidence, methadone maintenance treatment is the most effective treatment for reducing drug use and criminal recidivism. It may also assist in reducing HIV and other blood borne virus transmission. However, this treatment is suitable only for opioid-dependent populations; users of psychostimulants and other non-opioid drugs remain poorly served by current treatment approaches, both in the community and in prison.

This literature review has identified a number of areas requiring further research:

Detoxification:

- Buprenorphine is widely considered the most efficacious agent for opioid detoxification; however, in prison settings, administration of this medication can be problematic. An exploratory study to develop and evaluate innovative treatment protocols that minimise problems is warranted.
- Clinical trials to evaluate the effectiveness of pharmacological agents for psychostimulant detoxification are underway. These studies should be expanded to include prison populations.

Drug-free units:

- There has been very little methodologically rigorous research into drug-free units. Specific topics requiring closer examination include defining drug-free units and how they differ from other non-pharmacological treatment options such as therapeutic communities; and identification of program elements that contribute to decreased drug use.

Therapeutic communities:

- Surprisingly few studies have focused on reduced drug use or improved inmate health following therapeutic community treatment. Studies focusing on these

outcomes should be conducted. Other treatment outcomes that could also be considered include reduced incidence of blood borne viral infections and mortality.

- Identifying program elements that increase positive outcomes should be a priority for researchers, as should improving outcomes for prisoners from culturally and ethnically diverse backgrounds.

Opioid substitution treatment:

- Further randomised controlled trials of methadone maintenance treatment should be conducted. In particular, further evidence should be collected on MMT in prisons in non-Western countries and low- and middle-income countries.
- Randomised controlled trials of buprenorphine maintenance treatment should be conducted to provide evidence of the effectiveness or otherwise of this treatment in prison settings.

Findings from research projects such as those listed above will help to build the evidence base for providing effective drug treatment in prison.

7. REFERENCES

AIDS Project Management Group. (2005). *Is there anyone left in the general population? A scan of information available on the context of HIV transmission and risk for vulnerable groups in seventeen countries with concentrated HIV epidemics*: AIDS Project Management Group.

Amato, L., Minozzi, S., Davoli, M., Vecchi, S., Ferri, M., & Mayet, S. (2004). Psychosocial and pharmacological treatments versus pharmacological treatments for opioid detoxification. *Cochrane Database of Systematic Reviews*(4), Art. No. CD005031.

Barnett, P. G., & Hui, S. S. (2000). The cost-effectiveness of methadone maintenance. *Mount Sinai Journal of Medicine, 67*(5-6), 365-374.

Bellin, E., Wesson, J., Tomasino, V., Nolan, J., Glick, A. J., & Oquendo, S. (1999). High dose methadone reduces criminal recidivism in opiate addicts. *Addiction Research, 7*, 19-29.

Bird, S. M., & Hutchinson, S. J. (2003). Male drugs-related deaths in the fortnight after release from prison: Scotland, 1996-99. *Addiction, 98*(2), 185-190.

Black, E., Dolan, K., & Wodak, A. (2004). *Supply, Demand and Harm Reduction Strategies in Australian Prisons: Implementation, Cost and Evaluation*. Canberra: Australian National Council on Drugs.

Boys, A., Farrell, M., Bebbington, P., Brugha, T., Coid, J., Jenkins, R., et al. (2002). Drug use and initiation in prison: results from a national prison survey in England and Wales. *Addiction, 97*(12), 1551-1560.

Breteler, M. H., Van den Hurk, A. A., Schippers, G. M., & Meerkerk, G. J. (1996). Enrolment in a drug-free detention program: The prediction of successful behaviour change of drug-using inmates. *Addictive Behaviors, 21*(5), 665-669.

Brugal, M. T., Domingo-Salvany, A., Puig, R., Barrio, G., Garcia de Olalla, P., & de la Fuente, L. (2005). Evaluating the impact of methadone maintenance programmes on mortality due to overdose and AIDS in a cohort of heroin users in Spain. *Addiction, 100*, 981-989.

Butler, T., & Milner, L. (2003). *The 2001 New South Wales Inmate Health Survey*. Sydney: Corrections Health Service.

Clark, N., Lintzeris, N., Gijsbers, A., Whelan, G., Dunlop, A., Ritter, A., et al. (2002). LAAM maintenance vs. methadone maintenance for heroin dependence. *The Cochrane Database of Systematic Reviews, 2*(Art. No. CD002210).

Cropsey, K. L., Villalobos, G. C., & St. Clair, C. L. (2005). Pharmacotherapy treatment in substance-dependent correctional populations: A review. *Substance Use & Misuse, 40*(13-14), 1983-1999.

Darke, S., Ross, J., Zador, D., & Sunjic, S. (2000). Heroin-related deaths in New South Wales, Australia, 1992-1996. *Drug and Alcohol Dependence, 60*(2), 141-150.

Dolan, K., Hall, W., & Wodak, A. (1996). Methadone maintenance reduces injecting in prison. *BMJ, 312*, 1162.

Dolan, K., Hall, W., & Wodak, A. (1998). The provision of methadone within prison settings. In J. Ward, R. Mattick & W. Hall (Eds.), *Methadone Maintenance Treatment and Other Opioid Replacement Therapies*. Amsterdam: Harwood Academic Publishers.

Dolan, K., Shearer, J., MacDonald, M., Mattick, R., Hall, W., & Wodak, A. (2003). A randomised controlled trial of methadone maintenance treatment versus wait list control in an Australian prison system. *Drug and Alcohol Dependence, 72*(1), 59-65.

Dolan, K., Shearer, J., White, B., Zhou, J., Kaldor, J., & Wodak, A. (2005). Four-year follow-up of imprisoned male heroin users and methadone treatment: Mortality, re-incarceration and hepatitis C infection. *Addiction, 100*, 820-828.

Dolan, K., Wodak, A., Hall, W., Gaughwin, M., & Rae, F. (1996). HIV risk behaviour of IDUs before, during and after imprisonment in New South Wales. *Addiction Research, 4*(2), 151-160.

Fazel, S., Bains, P., & Doll, H. (2006). Substance abuse and dependence in prisoners: A systematic review. *Addiction, 101*, 181-191.

Gowing, L., Ali, R., & White, J. M. (2006). Buprenorphine for the management of opioid withdrawal. *Cochrane Database of Systematic Reviews*(2), Art. No. CD002025.

Gowing, L., Cooke, R., Biven, A., & Watts, D. (2002). *Towards Better Practice in Therapeutic Communities*. Bangalow: Australasian Therapeutic Communities Association.

Gowing, L., Farrell, M., Bornemann, R., & Ali, R. (2004). Substitution treatment of injecting opioid users for prevention of HIV infection. *The Cochrane Database of Systematic Reviews, 4*(Art. No. CD004145).

Gowing, L., Farrell, M., & White, J. M. (2004). Alpha2 adrenergic agonists for the management of opioid withdrawal *Cochrane Database of Systematic Reviews*(4), Art. No. CD002024.

Hall, W., Ward, J., & Mattick, R. (1998). Introduction. In J. Ward, R. Mattick & W. Hall (Eds.), *Methadone Maintenance Treatment and Other Opioid Replacement Therapies*. Amsterdam: Harwood Academic Publishers.

Harris, A. H., Gospodarevskaya, E., & Ritter, A. J. (2005). A randomised trial of the cost effectiveness of buprenorphine as an alternative to methadone maintenance treatment. for heroin dependence in a primary care setting. *Pharmacoeconomics, 23*(1), 77-91.

Heimer, R., Catania, H., Newman, R. G., Zambrano, J., Brunet, A., & Ortiz, A. M. (2006). Methadone maintenance in prison: Evaluation a pilot program in Peurto Rico. *Drug and Alcohol Dependence, 83*, 122-129.

Hiller, M. L., Knight, K., & Simpson, D. D. (1999). Prison-based substance abuse treatment residential aftercare and recidivism. *Addiction, 94*(6), 833-842.

Howells, C., Allen, S., Gupta, J., Stillwell, G., Marsden, J., & Farrell, M. (2002). Prison based detoxification for opioid dependence: A randomised double bline controlled trial of lofexidine and methadone. *Drug and Alcohol Dependence, 67*(2), 169-176.

Inciardi, J. A., Martin, S. S., & Butzin, C. A. (2004). Five-year outcomes of therapeutic community treatment of drug-involved offenders after release from prison. *Crime & Delinquency, 50*(1), 88-107.

Incorvaia, D., & Kirby, N. (1997). A formative evaluation of a drug-free unit in a correctional services setting. *International Journal of Offender Therapy and Comparative Criminology, 43*, 231-249.

Jeanmonod, R., Harding, T., & Staub, C. (1991). Treatment of opiate withdrawal on entry to prison. *British Journal of Addiction, 86*, 457-463.

Johnson, S. L., van de Ven, J. T. C., & Grant, B. A. (2001). *Institutional Methadone Maintenance Treatment: Impact on Release Outcome and Institutional Behaviour*. Ottawa: Addictions Research Centre, Correctional Service Canada.

Kerr, T., & Jurgens, R. (2004). *Methadone maintenance therapy in prisons: Reviewing the evidence.* Ottawa: Canadian HIV/AIDS Legal Network.

Kinlock, T. W., Battjes, R. J., Schwartz, R. P., & the MTC Project Team. (2002). A novel opioid maintenance program for prisoners: Preliminary findings. *Journal of Substance Abuse Treatment, 22*, 141-147.

Kinlock, T. W., Battjes, R. J., Schwartz, R. P., & the MTC Project Team. (2005). A novel opioid maintenance program for prisoners: Report of post-release outcomes. *The American Journal of Drug and Alcohol Abuse, 31*, 433-454.

Kongsakon, R., Papadopoulos, K. I., & Saguansiritharn, R. (2005). Mirtazapine in amphetamine detoxification: A placebo-controlled pilot study. *International Clinical Psychopharmacology, 20*(5), 253-256.

Kothari, G., Marsden, J., & Strang, J. (2002). Opportunities and obstacles for effective treatment of drug misusers in the criminal justice system in England and Wales. *British Journal of Criminology, 42*(2), 412-432.

Langendam, M. W., van Brussel, G. H. A., Coutinho, R. A., & van Ameijden, E. J. C. (2001). The impact of harm reduction-based methadone treatment on mortality among heroin users. *American Journal of Public Health, 91*, 774-780.

Lind, B., Chen, S. L., Weatherburn, D., & Mattick, R. (2005). The effectiveness of methadone maintenance in controlling crime: An Australian aggregate-level analysis. *British Journal of Criminology, 45*, 201-211.

Longshore, D., Annon, J., Anglin, M. D., & Rawson, R. A. (2005). Levo-alpha-acetylmethadol (LAAM) versus methadone: treatment retention and opiate use. *Addiction, 100*(8), 1131-1139.

Marsch, L. A. (1998). The efficacy of methadone maintenance interventions in reducing illicit opiate use, HIV risk behaviour and criminality: A meta-analysis. *Addiction, 93*, 515-532.

Masson, C. L., Barnett, P. G., Sees, K. L., Delucchi, K. L., Rosen, A., Wong, W., et al. (2004). Cost and cost-effectiveness of standard methadone maintenance treatment compared to enriched 180-day methadone detoxification. *Addiction, 99*(6), 718-726.

Mattick, R., Diguisto, E., Doran, C., O'Brien, S., Shanahan, M., Kimber, J., et al. (2001). *National Evaluation of Pharmacotherapies for Opioid Dependence (NEPOD): Report of Results and Recommendations*. Canberra: Department of Health and Ageing.

Mattick, R., Kimber, J., Breen, C., & Davoli, M. (2003). Buprenorphine maintenance versus placebo or methadone maintenance for opioid dependence. *The Cochrane Database of Systematic Reviews*(2).

Melnick, G., De Leon, G., Thomas, G., Kressel, D., & Wexler, H. K. (2001). Treatment process in prison therapeutic communities: Motivation, participation, and outcome. *American Journal of Drug and Alcohol Abuse, 27*(4), 633-650.

Mosher, C., & Phillips, D. (2006). The dynamics of a prison-based therapeutic community for women offenders: Retention, completion and outcomes. *Prison Journal 86*(1), 6-31.

NCHECR. (2005). *Australian NSP Survey National Data Report 2000-2004*. Sydney: National Centre in HIV Epidemiology and Clinical Research.

Rich, J. D., Boutwell, A., Shield, D. C., Key, R. G., McKenzie, M., Clarke, J. G., et al. (2005). Attitudes and practices regarding use of methadone in US state and federal prisons. *Journal of Urban Health, 82*(3), 411-419.

Schippers, G. M., Van den Hurk, A. A., Breteler, M. H., & Meerkerk, G. J. (1998). Effectiveness of a drug-free detention program in a Dutch prison. *Substance Use & Misuse, 33*(4), 1027-1046.

Shearer, J., Wodak, A., & Dolan, K. (2004). *The Prison Opiate Dependence Treatment Trial* (Technical Report no. 199). Sydney: National Drug and Alcohol Research Centre.

Singleton, N., Farrell, M., & Meltzer, H. (1999). *Substance Misuse Among Prisoners in England and Wales*. London: Office for National Statistics.

Stover, H., Hennebel, L. C., & Casselman, J. (2004). *Substitution Treatment in European Prisons: A Study of Policies and Practices of Substitution Treatment in 18 European Countries*. London: European Network of Drug Services in Prison.

UNAIDS. (2006). *2006 Report on the Global AIDS Epidemic*. Geneva: UNAIDS.

Ward, J., Mattick, R., & Hall, W. (Eds.). (1998). *Methadone Maintenance Treatment and Other Opioid Replacement Therapies*. London: Harwood Academic Publishers.

Warren, E., Viney, R., Shearer, J., Shanahan, M., Wodak, A., & Dolan, K. (2006). Value for money in drug treatment: economic evaluation of prison methadone. *Drug and Alcohol Dependence, In press*.

Wexler, H. K., De, L. G., Thomas, G., Kressel, D., & Peters, J. (1999). The Amity prison TC evaluation: Reincarceration outcomes. *Criminal Justice and Behaviour, 26*(2), 147-167.

WHO-WPRO. (2006). *The Integration of Harm Reduction into Abstinence-Based Therapeutic Communities: A Case Study of We Help Ourselves*. Manila: World Health Organization Western Pacific Regional Office.

World Health Organization. (1992). *WHO Guidelines on HIV Infection and AIDS in Prisons*. Geneva: World Health Organization.

Zurhold, H. (2004). *Female drug users in European prisons: Best practice for relapse prevention and reintegration*. Hamburg: Centre for Interdisciplinary Addiction Research.