Institutional Methadone Maintenance Treatment: Impact on Release Outcome and Institutional Behaviour

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EXECUTIVE SUMMARY

Heroin is a powerful and extremely addictive drug. Research has shown that one of the best interventions for heroin addiction is Methadone Maintenance Treatment (MMT). Positive benefits from the use of MMT include reductions in illicit opiate use, HIV risk behaviors and drug and property-related crimes (eg., Marsch, 1998). Correctional research on MMT has demonstrated a lower prevalence of heroin injection, syringe-sharing (Dolan et al., 1998), increased likelihood to apply for post-release MMT and other drug abuse treatment, and lower drug use and crime (Magura et al. 1993).

The present study compares post-release outcome and institutional behaviour of MMT participants to a group of offenders who tested positive for heroin use while incarcerated and were assessed as having a substance abuse problem (Non-MMT group). Overall, offenders participating in MMT had lower readmission rates and were readmitted at a slower rate than the Non-MMT group. Within a 12 month period, the Non-MMT group were 28% more likely than the MMT group to be returned to custody. Furthermore, the MMT group were less likely to have been unlawfully at large (UAL) or in violation of an abstinence condition due to alcohol use while on conditional release than Non-MMT offenders. While the MMT and Non-MMT groups were similar in terms of time to new offence and number and type of new offences committed, the trend in the data was towards a lower rate of reoffending for the MMT group.

In terms of institutional behaviour, the MMT group had a reduced rate of serious drug related institutional charges following initiation of the MMT. This likely indicates a decrease in drug seeking and drug taking behaviour among MMT offenders in comparison to Non-MMT offenders after MMT initiation.

Compared to other offenders, the MMT offenders were slightly older and had a slightly lower criminal history risk. Over 80% of the offenders receiving MMT are in either the Ontario or Pacific Regions. The regional distribution of MMT and

Non-MMT offenders indicates that the Pacific Region has the most serious heroin problem, but that the Prairie Region may be the most in need of increased MMT participation.

Overall the study found that participation in an institutional MMT program had a beneficial effect on outcome following release. Additional research is needed to address issues such as continuation of treatment in the community and other community safety benefits.

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INTRODUCTION

Heroin is one of the most addictive and damaging illicit drugs. Addiction to heroin can occur after only a few uses and once addicted, it is extremely difficult to stop using the drug. The damage associated with an addiction to heroin includes loss of family and friends, dependence on a criminal lifestyle to support the purchase of heroin, and serious deterioration in health. The most serious health consequences include HIV and Hepatitis C infections from sharing needles and other drug taking paraphernalia. These medical conditions lead to serious health consequences that may ultimately result in death.

Treatment for a heroin addiction is extremely difficult, but efforts to control the effects of heroin by substituting the drug methadone and stabilizing the behaviour of the addict has resulted in successful interventions. Methadone has been used as an intervention in the community since the mid 1960s by Dole and Nyswander (1965). One of the earliest reports of the use of methadone in correctional settings was in Lexington, Kentucky, in the 1950s where methadone was used as an experimental medication to treat heroin addiction (Parrino, 2000). Since the early 1970s, incarcerated heroin addicts in New York city's Rikers Island have been receiving methadone (Magura, Rosenblum, Lewis, & Joseph, 1993). It has been used in other correctional settings since that time (Darke, Kaye, & Finlay-Jones, 1998; Dolan, Wodak, & Hall, 1998; Motiuk, Dowden, & Nafekh, 1999).

In January 1998, the Correctional Service of Canada (CSC) implemented Phase 1 of a National Methadone Maintenance Treatment (MMT) Program for federal offenders with heroin or other opioid addictions (Correctional Service Canada, 1999). Phase 1 was designed to continue methadone treatment that began in the community. The initial eligibility criterion was expanded from *continuity* of participation to *recent* participation in a community MMT program to adjust for delays in processing cases through the judicial system. CSC's MMT program integrates the medical management of the offender with existing institutional and community based substance abuse treatment programs.

In March 1999, Phase 1 of the National MMT Program was modified to allow, in exceptional circumstances, the option of providing methadone treatment to severely heroin-addicted offenders presently not eligible for MMT. To be eligible, the following criteria must be met: all available treatments and programs have failed; the health of the offender continues to be seriously compromised by addiction; and there is a dire need for immediate intervention (Correctional Service Canada, 1999).

The goal of the National MMT Program in CSC is to minimize the adverse physical, psychological, social, and criminal effects associated with opioid use, including the spread of HIV and other infectious diseases in CSC operational units (Correctional Service Canada, 1999).

Research on the impact of MMT will identify the possible benefits of MMT and its potential contribution to community safety. MMT is an expensive program that requires considerable economic and human investment. Knowledge about the outcome of the program will provide decision-makers with the information they need to evaluate the potential impacts of an expanded program that could address the needs of offenders who have not previously been on an MMT program. The current study is the first step in developing the required information.

Difference Between Heroin and Methadone

One of the conflicts surrounding the use of methadone concerns the issue of substituting one addictive drug for another. Contrary to the longstanding misconception that methadone produces many of the same negative effects as heroin, methadone has been shown to be medically safe (Parrino, 2000). Heroin, considered a short-acting narcotic, has an immediate onset of action with four to six hours duration. The route of administration of heroin is typically injection, snorting, or smoking. Conversely, methadone has a duration of action lasting from 24 to 36 hours and is administered orally (O'Brien, Cohen, Evans, & Fine, 1992).

Unlike heroin, methadone does not produce a narcotic effect once an individual is stabilized with the appropriate dosage. Indeed, the benefit of using methadone for heroin addicts is that methadone acts to eliminate withdrawal symptoms when the concentration of the opiate (heroin) in the body drops below a specific point. It has been noted that withdrawal from methadone is less severe than withdrawal from heroin, it is more extended and can be controlled by the slow reduction in methadone dosage over time (Parrino, 2000). This occurs because methadone and heroin both act upon the same opiate receptors. Therefore, with a relatively steady concentration of methadone in the blood, the opiate receptors remain continuously occupied and the patient becomes functionally normal.

Effects of Methadone Maintenance Therapy

Opioid substitution with methadone is the most widely implemented treatment for heroin addiction (Marsden, Gossop, Farrell, & Strang, 1998). There has been some controversy surrounding whether methadone should be applied using an abstinence-oriented or a maintenance approach. Caplehorn (1994) examined this issue with a sample of participants in an alcohol and drug program. Results showed that participants who were assigned to an abstinence-oriented program were significantly more likely than those assigned to indefinite maintenance to use heroin and amphetamines during the first 2 years of methadone treatment (Caplehorn, 1994). Thus, it would appear that there are merits to using a long-term maintenance approach, as opposed to an abstinence approach, with the administration of methadone.

Research has also been conducted to determine the effects of dosage and length of time in treatment on outcome. Overall, 60 milligrams of methadone per day has been identified as the lowest daily dose that is efficacious. Bellin, Wesson, Tomasino, Nolan, Glick and Oquendo (1999) compared inmates accepting high dose (60 mg. or more) and low dose methadone while incarcerated on the time from release from prison to the community until reincarceration. They found that inmates discharged on high dose methadone were less likely to be reincarcerated than those on low doses, with the median

time to reincarceration of 253 and 187 days respectively. Furthermore, use of higher doses of methadone has been found to be associated with lengthier retention in treatment, while maintenance on lower doses of methadone (often due to policy rather than dose being determined on an individual basis) tended to lead to increased drop out from treatment (Ward, Mattick & Hall, 1992). In terms of the effect of treatment length on outcome, Ward, Mattick and Hall (1992) concluded that length of time spent in methadone maintenance is related to post-methadone maintenance behaviour. In addition, results from studies suggest that more than two to three years of methadone maintenance is necessary before significant behavioural changes will occur, but that arbitrarily limiting the duration of methadone maintenance to such time periods has been found to have negative consequences (Ward, Mattick & Hall, 1992).

Researchers have also found that ancillary services in addition to MMT such as provision of medical services, frequent and high quality counseling and financial services were related to better outcomes including increased retention in treatment, lower rates of drug use and reduced crime (Ward, Mattick & Hall, 1992). For example, Simpson, Joe, Dansereau and Chatham (1997) found that enhanced counseling and length of time spent in treatment in addition to MMT were related to treatment outcomes.

Research has shown that being prescribed methadone in the community, then discontinuing that prescription on entry to prison was associated with an increased likelihood of needle sharing (Shewan, Gemmell, & Davies, 1994). This finding supports the need for MMT programs for incarcerated individuals as a method for dealing with the negative health consequences of needle sharing.

Many researchers have demonstrated the beneficial effects of participation in methadone maintenance programs. For example, Maddux and Desmond (1997) found that among participants on methadone, days of intravenous drug use, crime, and needle sharing decreased markedly and days of productive activity increased from the month preceding admission to methadone maintenance to the

month preceding the first anniversary of admission. Parker and Kirby (1996) also found substantial reductions in illicit drug use and acquisitive crime (e.g., theft, burglary) when comparing a sample of MMT patients to a community sample of heroin only and poly-drug users.

Magura et al. (1993) compared a sample of offenders from New York city who were enrolled in the MMT program with a control group of similar addicts who received seven-day heroin detoxification in jail. Results demonstrated that MMT participants were more likely than controls to apply for methadone or other drug abuse post-release treatment and to be participating in treatment after a 5-month follow-up. Moreover, being in treatment at follow-up was associated with lower drug use and crime. It should be noted that the in-jail MMT program was most effective in maintaining post-release continuity of methadone treatment for offenders previously enrolled in methadone at arrest (Magura et al. 1993).

Dolan et al. (1998) conducted a study with a prison population in New South Wales. They found that participants who had been maintained on methadone reported a significantly lower prevalence of heroin injection, syringe sharing, and scored lower on an HIV Risk-taking Behavioural Scale than participants who received standard drug treatment and time-limited methadone treatment.

In a comprehensive study, Coid and his colleagues (2000) found that participation in a community Methadone Treatment Programme contributed to decreases in self reported illicit drug consumption and criminal activity. Overall, use of heroin decreased by 50% from intake to 6 months after beginning treatment, although there was no change in the levels of illicit methadone, amphetamines, barbiturates, crack cocaine, powder cocaine, cannabis, or benzodiazepine misuse. Methadone treatment was associated with a fall in the level of financial gain from criminal activities, and a decrease in the number of reported arrests by the police during the treatment period. However, differential impact of MMT on different categories of crime were observed: burglaries and thefts were reduced by half and the effect on drug dealing was even greater. In

contrast, there were no changes reported in the level of fraudulent activities, acquisitive crime (such as mugging), sex work, or obtaining benefits illegally while working. Furthermore, MMT also appeared to have had the greatest impact on those individuals who were most heavily involved in crime, with dramatic reductions observed in the crimes committed by those who had been the most criminally active.

Marsch (1998) conducted a meta-analysis examining the efficacy of methadone maintenance interventions. The results demonstrated a consistent, statistically significant relationship between MMT and the reduction of illicit opiate use, HIV risk behaviors and drug and property-related crimes. Specifically, MMT had a moderate effect in reducing opiate use and drug and property crime, and a small to moderate effect in reducing HIV risk behaviours (Marsch, 1998).

It should be noted that there is a paucity of research on the effectiveness of MMT on behavioural outcomes in Canada and among correctional populations. Fischer, Gliksman, Rehm, and Medved (1999), who followed-up community opiate users over one year, conducted one of the few Canadian studies. They found that non-MMT participants, in comparison to MMT participants, were significantly more likely to be involved in: illegal activities as an income source (52% versus 2%), illicit drug market activities (56% versus 17%), heroin use (65% versus 34%), other opiate use (65% versus 38%), alcohol use (70% versus 45%), and benzodiazepine use (45% versus 28%). Although there was a trend for MMT participants to have decreased health care utilization (e.g., emergency services, hospitalization) in contrast to non-MMT participants, it was not statistically significant. Similarly, incarceration rates were comparable for the two groups, as were arrests for drug and property offences during the past year.

These results should be interpreted in light of the study limitations. First, the sample was composed of admitted drug users, but not offenders per se; thus, the results involving criminal justice system involvement may be different using a

higher risk sample. Second, the sample size in the two groups was small (29 MMT, 40 non-MMT), which may have attenuated the relationships examined.

Stones (1999) examined a group of 37 Canadian federal offenders who initiated MMT upon release to the community. The results demonstrated that 57% (*N* = 21) of MMT cases were revoked during the course of treatment, while 43% (*N* = 16) succeeded on parole or statutory release; however, the length of follow-up was not specified. More importantly, the results showed that 65% of offenders on MMT in the community markedly reduced or altogether ceased their chronic heroin use. While these findings are encouraging, it should be noted that this group of offenders commenced methadone while in the community; hence, it is possible that they were not stabilized on the proper dosage during the first portion of their release.

Building upon the work of Stones (1999), Motiuk et al. (1999) conducted a preliminary investigation of the post-release outcome of offenders who initiated CSC's MMT program while incarcerated. They found that 8.6% (*N* = 3) of MMT participants returned to federal custody; one for a new offence and the other two for technical violations. The authors concluded that "the very low rate of revocation for this group of higher-risk offenders is encouraging" (p. 4). However, these results were based on a small sample size (*N* = 35), a limited follow-up period, and no comparison group of offenders who were not participating in an MMT program but were heroin users.

Purpose and Rationale

The purpose of the current study is to examine the release outcome of offenders who have participated in the institutional MMT program. The MMT offenders are compared to a group who tested positive for heroin use while incarcerated and who were identified as having a substance abuse problem, but who did not participate in the MMT program. It is predicted that offenders who participated in MMT will survive longer in the community than the comparison offenders with respect to readmission following release.

The current study also examines the effect of MMT participation on institutional behaviour. Specifically, institutional misconducts and time spent in segregation is examined before and after MMT initiation. It is predicted that there will be a reduction in misconducts and time spent in segregation after MMT.

METHOD

Sample

MMT Group

The MMT group consists of all 303 offenders identified as having received MMT in a federal institution from November 20, 1996 to October 20, 1999. Among these offenders, approximately 62% (187 offenders) were released from custody before May 15, 2000 and these offenders are used for the follow-up analyses. The earliest release date for these offenders was November 19, 1997 and the latest was May 8, 2000. On average, these offenders were at risk to be readmitted (the number of days from the release date until the cut-off date) of approximately 415.3 days (*SD* = 215.7), and a median of 397 days.

Non-MMT Group

Good research requires that treated groups be compared to similar groups that do not receive treatment. The most direct way to do this is through random assignment of participants to either the treated or untreated group. However, this is not considered ethical in most treatment research and alternatives must be used. The challenge in creating an appropriate comparison group is to identify people who match the treated groups in most characteristics, except that they have not received treatment. In many cases an ideal comparison group cannot be identified so compromises must be made between scientific rigor (perfectly matched groups) and the value a comparison can bring to a study. Other studies of methadone maintenance treatment have used comparison groups consisting of offenders who have received alternative therapies (Dolan et al., 1998; Magura et al., 1993) but this type of group was not available in current study. It was decided that the key characteristic for members of the comparison group was that they be known heroin users and have a substance abuse problem. To identify heroin users, urinalysis data were examined and to identify a substance abuse problem offender intake assessment data were reviewed.

To be included in the Non-MMT group, an offender had to have at least one positive urinalysis result for opiates or opiates A (heroin metabolites) in random and systemic testing from January 1, 1998 to October 20, 1999. Offenders in the MMT group were excluded from the Non-MMT group. To confirm a drug problem, the offender intake assessment (OIA), and correctional plans were examined. If offenders did not have a substance abuse problem indicated, or if the urinalysis report specified that the offender was receiving Tylenol with codeine for pain relief, they were excluded from the Non-MMT group. There were 215 offenders in the Non-MMT group and approximately 52% (112 offenders) were released from the institution prior to May 15, 2000 and could be used in the follow-up analyses. The earliest release date for these offenders was February 26, 1998, and the latest was April 3, 2000. On average, these offenders were at risk to be readmitted of approximately 383 days (*SD* = 202.7), and a median of 364 days. The average time at risk was not significantly different between the MMT and Non-MMT groups (t (1,297) = 1.28, ns).

Sources of Data

A number of different types of data are used in the study.

Identification of MMT Participants

Lists of offenders involved in MMT were forwarded to the researchers by regional health care representatives from each of the five CSC regions (Atlantic, Quebec, Ontario, Prairie, Pacific). Additional information such as dose level and methadone initiation date was also collected in two regions.

Urinalysis

To identify offenders for the comparison group, urinalysis data were examined. Under the urinalysis program, offenders may be tested for illicit drug use by screening their urine for the drug metabolites. The testing may be part of a random drug testing program used for program monitoring or for "reasonable grounds" where it is believed that the offender is intoxicated. Approximately 5%

of all incarcerated offenders are tested in each month for the random testing program.

Demographic and Assessment Data

Demographic data such as age, race, number and type of current offences, and offender intake assessment information were obtained from the Offender Management System (OMS). The OMS is an electronic file system used to track all offenders in custody or under supervision of the Correctional Service of Canada. Overall criminal history risk and criminogenic need are assessed as part of the the Offender Intake Assessment (OIA) process that is completed shortly after admission to prison by a parole officer at the receiving institution. Criminal history risk and criminogenic need are rated on a three point scale (high, medium or low). Furthermore, offenders are assessed in terms of seven criminogenic need domains: associates, attitude, community functioning, employment, marital/family, personal/emotional and substance abuse.

Sentence and offence history information was also obtained from the OMS as well as important dates, such as release and admission dates.

To determine how the MMT and Non-MMT groups compared with the general inmate population, a data set containing all offenders released in 1998 was created and used to calculate comparative statistics. A release data set was used because only MMT and Non-MMT cases that were released are included in this report. Characteristics of released offenders frequently differ from those for the institutional population because more offenders serving shorter sentences are in the release population while more offenders serving longer sentences are in the institutional population.

Outcome

For all offenders released prior to May 15, 2000, outcome following release was measured as any readmission to a federal correctional institution. For the study group, release date was the first date following the methadone initiation date. If

the methadone initiation date was not available, the first release date after January 1, 1998 was used. For the comparison group, release date was the first release following the date of the positive urinalysis result. If multiple urinalysis dates were identified, one was randomly chosen to be the start point.

Readmission includes both readmissions due to technical violations and readmissions due to the commission of a new offence. Additional information such as reason for readmission (new offence and/or revocation), and type of revocation were also coded from the Offender Management System.

Institutional Behaviour

Measures of institutional behaviour, such as number and type of institutional misconducts and time spent in segregation, were collected from the OMS. For the study group, this information was collected for a maximum of six months prior to and six months after the date of the initial methadone dose. Similarly, for the comparison group, this information was collected for a maximum of six months before and six months after the date on which the offender had a positive urinalysis result for opiates or opiates A. Not all offenders had a full six month pre and post treatment so results were converted to an average monthly number.

Institutional charges were examined in terms of three general types: drug, violent and other. Drug disciplinary offences included possession of alcohol/drugs/drug paraphernalia, refusing to provide urine sample, failing urine sample, taking intoxicants into the body, involvement in drug trade. Violent charges included disrespectful/abusive to staff, fights/assault/threatens staff/inmates, and creates/participates in disturbance to jeopardize security. All other charges such as disobeys written rule/direct order, possession/deals in contraband, possession of unauthorized/stolen property, damages/destroys property were contained in the other charges category.

Analyses

The data were analysed using the Statistical Analyses System (SAS) Version 6.12 (SAS, 1997) or Version 8.01 (SAS, 1999). Statistical analyses consisted of frequency distributions and tests of statistical significance using the Chi square test. Survival analysis was used to evaluate outcome following release. Survival analysis evaluates the rate of survival (i.e. avoidance of negative outcome) at several points in time while taking into consideration time at risk.

In addition, continuous variables such as age and number of offences were compared between the two groups using t-tests. Institutional measures were measured at two points in time and therefore a repeated measures analysis was employed.

RESULTS

The results of the analyses are presented in three sections. First, outcome following release is examined, followed by comparisons between released offenders in the MMT and Non-MMT groups in terms of criminal history risk and criminogenic need, offence type, and demographics. Finally, pre to post changes in institutional behaviour is examined.

Release Outcome

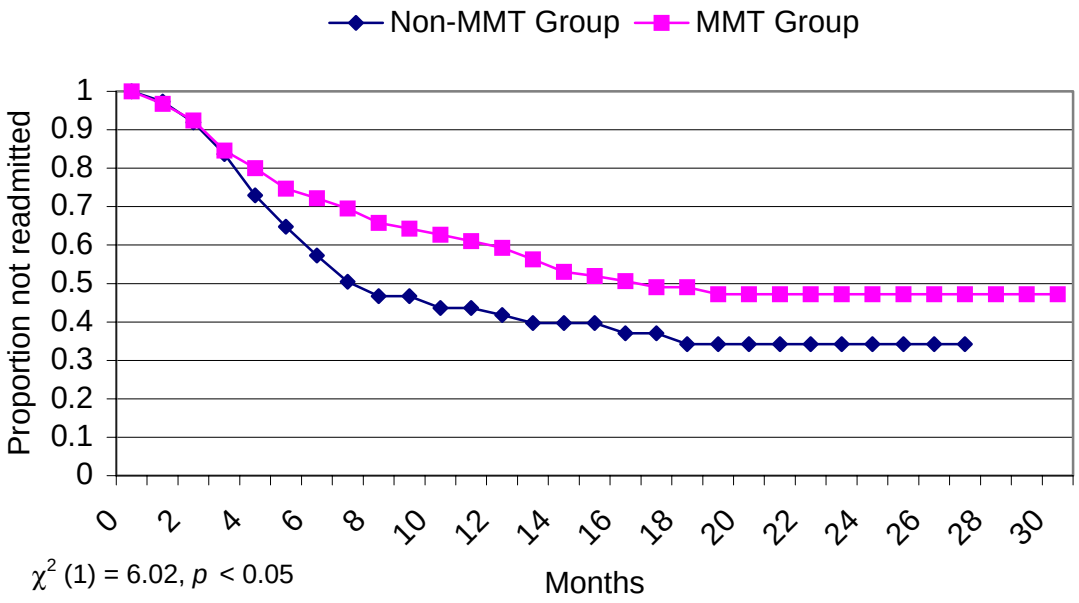
Survival Analyses

Survival analysis was used to compare MMT and Non-MMT groups in terms of the length of time they were able to remain in the community. Survival analysis makes more effective use of the available data and allows for longer follow-up periods than other methods when releases are spread over a long period of time thereby creating variable follow-up periods.

Figure 1 shows the results of the survival analysis by presenting the proportion of offenders remaining in the community at each month following release for up to a 28 month period. The differences in the curves for the two groups are statistically reliable ($\chi^2(1) = 6.02$, $p < 0.05$).

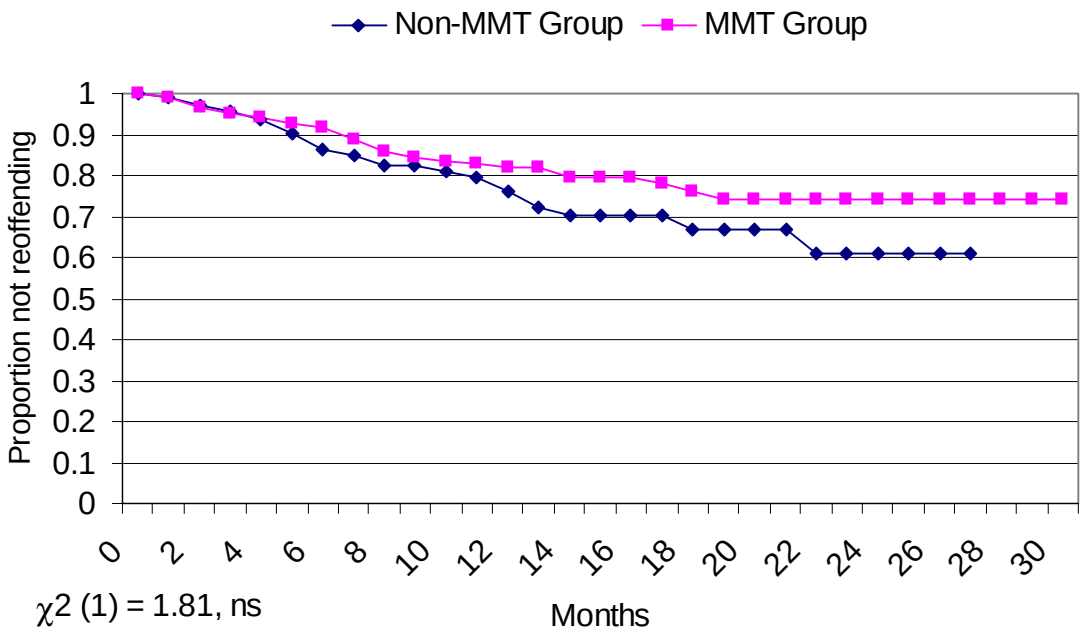
Overall, the MMT group was readmitted at a lower rate and more gradually than the Non-MMT group as shown by the slope of the curves. For example, at approximately 12 months after release, 59% of the MMT group had not been readmitted, compared to only 42% of the Non-MMT group. At 24 months, 47% of the MMT group had not been readmitted, while 34% of the Non-MMT group had not been readmitted. The success rate for the Non-MMT group was 13 percentage points lower than for the MMT group, or in other words, the Non-MMT group were 28% more likely to be returned to custody than the MMT group.

Figure 1: Proportion of offenders remaining in the community (not readmitted) for the MMT and Non-MMT groups



A survival curve was also prepared for new offences. As can be seen in Figure 2, there is only a small difference in the rate of new offending between the MMT and Non-MMT groups. The observed differences are not statistically reliable ($\chi^2(1) = 1.81$, ns), however, there are interesting patterns in the results. During the first 12 months after release, the MMT and Non-MMT groups are relatively similar in the proportion who commit a new offence, although the MMT group was more likely to be offence free at 12 months (82% for the MMT group vs. 76% for the Non-MMT group). The difference between the two groups in the rate of reoffending increases in later months, with approximately 74% of MMT offenders and 61% of Non-MMT offenders not reoffending 24 months after release.

Figure 2: Proportion of offenders not reoffending for the MMT and Non-MMT groups



Fixed Follow-up

Analyses using fixed follow-up periods provide opportunities for more detailed examination of the reasons for return to custody. The next set of results presents data for both six and twelve months fixed follow-up periods. It is not possible to extend these results beyond twelve months due to the small number of cases who had more than twelve months available between their release date and the end of data collection period. Readmissions were divided into three types, revocation without a new offence, revocation with a new offence and Warrant of Committal admission. Revocations occur while the offender is in the community under parole supervision and the conditional release is revoked by the National Parole Board. Readmissions under a Warrant of Committal occur when the offender has completed a sentence, but commits a new offence resulting in a new period of incarceration in a federal institution.

Among the offenders in the two groups who could be followed for at least six months, 71% of the MMT group remained in the community, while only 56% of those in the non-MMT group were not readmitted (see Table 1). The MMT group was also less likely to have a revocation for a technical violation and less likely to have committed a new offence while in the community (revocation with a new offence or warrant of committal). The difference between the two groups in terms of outcome following release for a fixed six month period was statistically reliable ($\chi^2(3) = 8.03$, $p < 0.05$).

Table 1: Outcome for 6 month fixed follow-up period

Type of admission	MMT group % (n)	Non-MMT group % (n)	χ^2
No readmission	70.8 (109)	56.5 (52)	7.96*
Revocation for a technical violation	16.9 (26)	21.7 (20)	
Revocation with new offence	7.8 (12)	8.7 (8)	
Warrant of commital[1]	4.5 (7)	13.0 (12)	
Number of cases	154	92	

*$p < 0.05$

1. Readmission to a federal institution with a new offence, following the completion of a previous federal sentence.

As was evident in the survival analysis, the MMT group was much more likely to remain in the community after 12 months (62%) than the Non-MMT group (39%). Consistent with the six month fixed follow-up results, the MMT group was less likely to be readmitted and was less likely to have committed a new offence (revocation with a new offence or warrant of committal) after release ($\chi^2(3) = 8.39$, $p < 0.05$) (see Table 2).

Table 2: Outcome for 12 month fixed follow-up period

	MMT group % (n)	Non-MMT group % (n)	χ^2
No Readmission	61.7 (66)	38.9 (21)	
Revocation without new offence	17.8 (19)	29.6 (16)	8.16*
Revocation with new offence	12.1 (13)	14.8 (8)	
Warrant of Commital[1]	8.4 (9)	16.7 (9)	
Number of cases	107	54	

*$p < 0.05$

1. Readmission to a federal institution with a new offence, following the completion of a previous federal sentence.

Revocations

There are a number of possible reasons for offenders' conditional release to be revoked by the National Parole Board. For the entire sample of released offenders, Table 3 presents the reasons for revocation. It is important to note that offenders may have more than one reason for revocation of a conditional release so numbers and percentages in the table cannot be summed. Being unlawfully at large (UAL) and violation of an abstinence condition due to drug use were the most common reasons for revocation for both groups. However, the MMT group was less likely to have a revocation for either of these reasons. The MMT group was also less likely to have a revocation for violation of the abstinence condition due to alcohol use (2% vs. 10%). Approximately 10% of both the MMT and non-MMT groups had their conditional release revoked for committing a new offence.

Table 3: Type of revocation

Revocation type	MMT group % (n)	Non-MMT group % (n)	χ^2
Revocation with a new offence	9.9 (18)	9.9 (11)	0.00
Violation of abstinence condition-alcohol	1.7 (3)	9.0 (10)	8.74[1]**
Violation of abstinence condition-drugs	14.4 (26)	20.7 (23)	1.99
Unlawfully at large (UAL)	8.8 (16)	22.5 (25)	10.67**
Violation of curfew	2.2 (4)	2.7 (3)	0.07[1]
Deterioration of behaviour	3.3 (6)	3.6 (4)	0.02[1]
Other violation	5.0 (9)	5.4 (6)	0.03
Total with any revocation	33.1 (60)	38.7 (43)	
Number of cases	181	111	

***p* < 0.01 ****p* < 0.001

1. Chi square value confirmed by Fisher's exact test.

New Offences

Released offenders were also compared on the number and types of offences committed after release. The average number of new offences for offenders who committed a new offence was not significantly different between the MMT (3.1) and the Non-MMT groups (2.5) ($t(1,48.7) = 0.83$, ns).

The types of offences committed by the MMT and Non-MMT groups are presented in Table 4. Overall, no significant differences were observed between the two groups in terms of the types of offences committed. However, the percentage of offenders with a new offence was lower for the MMT group (17% vs. 23%) than for the Non-MMT group.

Table 4: Type of new offence

Type of offence	MMT group % (n)	Non-MMT group % (n)	χ^2
Violent offence[1]	8.3 (15)	9.0 (10)	0.05
Robbery	5.0 (9)	8.1 (9)	1.17
Drug offence	3.3 (6)	2.7 (3)	0.09[2]
Non-violent offence	9.9 (18)	16.2 (18)	2.5
Total with any new offence	17.1 (31)	23.4 (26)	
Number of cases	181	111	

Note: Offenders may have committed more than one type of offence and therefore may be represented more than once in the table. Column totals do not sum to 100%.

1. Includes assaults, robbery, kidnapping etc. No offenders recidivated with murder, murder-related or sexual offences.
2. Chi square value confirmed by Fisher's exact test

Summary

Offenders in the MMT group were less likely to be readmitted and were readmitted at a slower rate than offenders in the Non-MMT group. Offenders in the MMT group were less likely to have their conditional release revoked because they were UAL or in violation of the abstinence condition (alcohol). In terms of new offences, the MMT group was less likely to have committed a new offence, but offenders in the two groups did not have significantly different survival curves for new offences, and were similar in the number of new offences and types of new offences committed.

Group Characteristics

The purpose of the following section is to provide a description of the offenders in the MMT and Non-MMT groups who were released during the study period. Comparisons between the groups will help to define differences which may impact the interpretation of the results and to build a profile of those offenders participating in MMT and those choosing not to participate, or who are unable to participate because of restrictions in Phase 1. Where possible, the MMT groups

are also compared to all offenders released in 1998 to provide an indication of how they differ from the general offender population.

Demographics

There were half as many Aboriginal offenders in the MMT group (10%) than in the Non-MMT group (20%) as can be seen in Table 5. In 1998, 19% of the offenders released were Aboriginal indicating that the Non-MMT group is representative of Aboriginal population. However, the MMT group under-represents the general population of Aboriginal offenders.

Table 5: Racial distribution of Non-MMT and MMT groups

Race	MMT group % (n)	Non-MMT group % (n)	χ^2
Aboriginal	9.5 (17)	20.2 (22)	
Non-Aboriginal	90.5 (162)	79.8 (87)	6.61*
Number of cases	179	109	

* $p < 0.05$

In terms of gender, results in Table 6 show that the Non-MMT and MMT groups did not significantly differ. Between 3% and 6% of offenders in the groups were women. In comparison, approximately 3% of offenders released in 1998 were women.

Table 6: Gender distribution of study groups

Gender	MMT group % (n)	Non-MMT group % (n)	χ^2
Women	3.3 (6)	6.2 (7)	
Men	96.7 (175)	93.7 (105)	1.41
Number of cases	181	112	

Offenders participating in MMT were, on average, 38 years old as compared to those in the Non-MMT group who were younger, at 34 years of age. As shown in Table 7, the MMT group was more likely to be in the age category above 35 years of age (68%), while the majority of the Non-MMT group (59%) were 35 years of age or younger. Offenders in the MMT group are also older than the general population of releases who had an average age at release of 34 years, and only 40% were over the age of 35.

Table 7: Age at release for study groups

Age	MMT group % (n)	Non-MMT group % (n)	Statistical Test
25 and under	3.5 (6)	10.6 (11)	
26 to 35	28.8 (49)	48.1 (50)	
36 to 45	49.4 (84)	35.6 (37)	^{2}=22.01***
46 and older	18.2 (31)	5.8 (6)	
Mean (SD)	38.3 (7.4)	34.0 (6.5)	F=24.61***
Number of cases	170	104	

***$p < 0.001$

The regional distribution of the MMT and Non-MMT cases is presented in Table 8. The Pacific region, had approximately 12% of releases in 1998, but 40% of the MMT offenders and 34% of the offenders in the Non-MMT group were in the Pacific region. These data clearly show that the Pacific Region has the largest problem with heroin addiction, having almost three times the number of cases in the Non-MMT group as would be expected given the proportion of releases who were in the Pacific region in 1998. The Pacific region also has the second largest number of offenders participating in the MMT program in the country even though they have fewer offenders than three other regions. Ontario has the largest number of offenders participating in the MMT program, accounting for 42% (79) of the MMT cases. The Ontario and Pacific regions account for 81% of the MMT cases in the country.

While the Atlantic and Quebec regions have relatively small percentages of the MMT cases, they also have a small percentage of cases in the Non-MMT group indicating that heroin addiction is not a major problem in these two regions. However, the Prairie Region, with 26% of inmate releases in 1998, had approximately 29% of the cases in the Non-MMT group, but had only 10% of the MMT cases. The higher percentage of cases in the Non-MMT group suggests that heroin addiction may be an important problem in this region, but that access to MMT is limited. However, by relying on these data alone, it is not possible to determine if the access to MMT is more limited in the Prairie Region, or if offenders are not applying or being approved for the program. Phase 1 MMT requires community availability of services to provide MMT prior to incarceration, and this may not be accessible in the Prairie Region.

Table 8: Regional distribution of study groups

Region	MMT group % (n)	Non-MMT group % (n)	χ^2
Atlantic	2.1 (4)	4.5 (5)	
Quebec	6.4 (12)	8.0 (9)	
Ontario	42.2 (79)	25.0 (28)	22.97***
Prairie	9.6 (18)	28.6 (32)	
Pacific	39.6 (74)	33.9 (38)	
Number of cases	187	112	

*** $p < 0.001$

Current offence

The MMT and Non-MMT groups did not differ in terms of the number of current offences with an average of six offences each on the current sentence. Table 9 presents the types of offences for which offenders were sentenced. Given that offenders generally have more than one offence when admitted to prison, the percentages in this table will sum to more than 100. While the types of offences for which offenders in the two groups have been convicted do not differ a great

deal, there are two important differences evident in the results. First, the MMT group is less likely to have been convicted of a sexual offence (0% vs. 8%) and they are less likely to have committed a violent offence (66% vs. 85%).

Table 9: Current offence types for study groups

Type of offence	MMT group % (n)	Non-MMT group % (n)	χ^2
Murder and murder related	5.3 (10)	7.1 (8)	0.39
Sexual offence	0 (0)	7.7 (8)	13.86***[1]
Assault	18.3 (32)	23.1 (24)	0.93
Robbery	49.1 (86)	56.7 (59)	1.50
Other violent offence	22.9 (40)	38.5 (40)	7.77**
Drug offence	40.6 (71)	35.6 (37)	0.69
Non-violent offence	37.7 (66)	33.6 (35)	0.47
Any violent offence[2]	66.3 (116)	84.6 (88)	11.15***
Number of cases	175	104	

Note: Offenders may have committed more than one type of offence and therefore may be represented more than once in the table. Column totals do not sum to 100%.

1. Chi square value confirmed by Fisher's exact test.
2. Includes murder and murder related offences, sexual offences, assaults, robbery, kidnapping, etc.

** $p < 0.01$
*** $p < 0.001$

Criminogenic risk and need levels at admission are compared in Table 10. Offenders in the MMT group appear to have a slightly lower criminal history risk than those in the Non-MMT group. However, in terms of criminogenic need level, the two groups do not differ significantly. In comparison to all releases in 1998, the MMT group is similar in the level of criminal history risk, but the Non-MMT group is higher risk. Both study groups are higher need than the general population of releases.

Table 10: Risk and need levels for study groups

	MMT group % (n)	Non-MMT group % (n)	χ^2
Risk			
Low	11.0 (19)	2.9 (3)	
Moderate	41.3 (71)	36.5 (38)	7.84*
High	47.7 (82)	60.6 (63)	
Need			
Low	2.9 (5)	0 (0)	
Moderate	32.0 (55)	31.7 (33)	3.12
High	65.1 (112)	68.3 (71)	
Number of cases	172	104	

* $p < 0.05$

More detailed results for each of the seven criminogenic need domains are presented in Table 11. The MMT and Non-MMT groups are very similar in terms of the needs identified, with the exception of the Marital/Family need domain where fewer offenders in the MMT group (58%) had a need indicated compared to the Non-MMT group (71%).

Table 11: Needs indicated for Non-MMT and MMT groups

Need domain	MMT group % (n)	Non-MMT group % (n)	χ^2
Associates	83.2 (144)	84.6 (88)	0.09
Attitude	66.5 (115)	68.3 (71)	0.09
Community Functioning	76.3 (132)	72.1 (75)	0.60
Employment	78.6 (136)	81.7 (85)	0.39
Marital/ Family	58.4 (101)	71.1 (74)	4.55*
Personal/ emotional	87.3 (151)	94.2 (98)	3.45
Substance abuse	97.7 (169)	92.3 (96)	4.54[1]
Number of cases	173	104	

1. Chi square value confirmed by Fisher's exact test.
*$p < .05$

Summary

The comparisons between the MMT and Non-MMT groups indicated that offenders in the MMT group were older, less likely to be Aboriginal offenders, and had slightly lower criminogenic risk than offenders in the Non-MMT group. All other analyses indicated the groups were relatively similar and therefore appropriate for comparisons. In addition, the results indicated that the MMT program is largely concentrated in the Pacific and Ontario regions, while the data for the Non-MMT group suggest that heroin is a problem in the Ontario, Prairie and Pacific regions. The number of heroin users identified by positive urinalysis results in the Atlantic and Quebec Regions was relatively low.

Pre to Post MMT Changes in Behaviour

Offenders' institutional behaviour before and after the start of MMT was measured using misconducts and segregation time. The pre- and post-MMT periods varied in length, to a maximum of six months, so data were converted to a rate or incidence per month in order to insure uniformity of measurement. Repeated measures analysis of variance (ANOVA) was used to test for differences between the MMT and Non-MMT groups. This analysis also tested for differences across the two time periods (pre and post) and the interaction of group by time factors. Results are presented in Table 12.

Differences between the MMT and Non-MMT groups were observed on a number of variables, but the only change associated with participation in the MMT was for serious drug charges. While, the MMT group had significantly fewer total institutional charges, fewer serious institutional charges and fewer periods of involuntary segregation than the Non-MMT group, none of these variables showed any differences in pre- post-comparisons of MMT initiation. The one exception was for serious drug charges. Not only did the MMT group have fewer serious drug charges than the Non-MMT group, there was also a statistically reliable decrease in serious drug charges from the pre-MMT period

(0.11) to the post-MMT period (0.08). In contrast, the Non-MMT group had an increase in serious drug charges (0.16 to 0.41) over time.

These results may indicate that MMT participants have already begun to change their behaviour prior to starting MMT or that offenders applying for and receiving MMT have fewer behaviour problems while incarcerated. Behaviour change prior to participation in MMT could be part of the process of choosing to pursue MMT.

Table 12: Pre to post measures (rate/month) of institutional behaviour

Measure	MMT group Pre M (SD)	MMT group Post M (SD)	Non-MMT group Pre M (SD)	Non-MMT group Post M (SD)	F (group)	F (time)	F (time* group)
Total institutional charges	0.37 (1.26)	0.34 (0.67)	0.91 (5.79)	0.79 (1.04)	5.48*	0.12	0.04
Total serious charges	0.17 (0.48)	0.16 (0.38)	0.49 (3.80)	0.54 (0.83)	6.33*	0.03	0.03
Total minor charges	0.20 (0.82)	0.17 (0.44)	0.42 (2.16)	0.25 (0.47)	3.14†	1.41	0.72
Serious drug charges	0.11 (0.41)	0.08 (0.23)	0.16 (0.24)	0.41 (0.80)	30.5***	10.32**	18.15***
Serious violent charges	0.01 (0.07)	0.04 (0.23)	0.14 (1.90)	0.03 (0.09)	0.75	0.43	0.99
Serious other charges	0.04 (0.19)	0.04 (0.14)	0.16 (1.90)	0.05 (0.14)	1.09	0.66	0.64
Minor drug charges	0.01 (0.04)	0.01 (0.08)	0.01 (0.07)	0.01 (0.06)	0.02	0.05	0.57
Minor violent charges	0.02 (0.07)	0.03 (0.14)	0.03 (0.12)	0.03 (0.08)	0.38	0.68	1.33
Minor other charges	0.17 (0.81)	0.13 (0.37)	0.38 (2.14)	0.21 (0.41)	3.01†	1.69	0.54
Voluntary segregation periods	0.11 (0.25)	0.12 (0.13)	0.03 (0.09)	0.08 (0.22)	1.88	0.68	0.29
Involuntary segregation periods	0.19 (0.17)	0.19 (0.17)	0.29 (0.32)	0.35 (0.38)	3.68†	0.32	0.28

† $p < 0.10$ * $p < 0.05$ ** $p < 0.01$ ***$p < 0.001$

DISCUSSION

Previous research has indicated that participation in MMT has numerous beneficial effects, both for the individual and society at large (Fischer et al. 1999; Maddux & Desmond, 1997; Marsch, 1998; Stones, 1999). The current study further examined the impact of institutional MMT participation by comparing two groups of offenders on outcome following release and institutional behaviour before and after MMT initiation. As predicted, offenders who had participated in MMT were less likely to be readmitted and were readmitted at a slower rate than the Non-MMT group. These results provide support for the need to initiate MMT in the institutional setting.

Among offenders who had a revocation (with or without offence), offenders in the Non-MMT group were significantly more likely to have a UAL or a violation of the abstinence condition due to alcohol use. In terms of new offences, the offenders in the two groups were similar in their survival curves, the number of new offences committed and the types of new offences committed.

In order to ensure that group comparisons were valid, offenders in the two groups were evaluated in terms of demographic characteristics, current offence, and risk and need. Overall, few notable differences were found, and therefore it is suggested that the outcome findings are valid.

Finally, the MMT and Non-MMT groups were compared in terms of institutional behaviour at two time periods (i.e. pre to post MMT) in order to determine if there were any positive effects of MMT on behaviour while incarcerated. Overall, few differences were observed, with the exception of the number of serious drug charges per month. Offenders involved in MMT showed a decrease in drug charges over time while offenders in the comparison group showed an increase. This finding suggests that offenders participating in MMT are less involved in the drug subculture, such as drug taking, drug seeking, and drug trafficking behaviours post MMT initiation. In regards to segregation periods, the MMT

group spent less time in involuntary segregation than the Non-MMT group both before and after the initiation of MMT.

Although these results do not provide conclusive evidence that methadone serves to calm disruptive institutional behaviour, they do suggest that negative behaviours are at least maintained at a low level while offenders are on the MMT program. More importantly, it was demonstrated that there was a decrease for MMT offenders, relative to non-MMT offenders, in behaviours related to activity in the drug subculture.

The impact of MMT on offenders is most likely underestimated in this study. Offenders were included in the MMT group without regard for how long they remained in the program, how close to release they were in the program, and without any measure of their participation in other related program activities. In addition, participation in an MMT program after release was not monitored. The MMT group was basically offenders who, for some period time while incarcerated, participated in an MMT program. In addition, the follow-up period was longer for the MMT group than the Non-MMT group.

Even with these limitations the MMT offenders did better than similar offenders who did not participate in the MMT program. If it is possible to demonstrate an effect with these minimal requirements for inclusion in the MMT group, more complete data on level of participation and participation in a community MMT program would likely yield a larger effect. Future research will address these issues.

Implications

The results of the present study suggest that MMT participation has a beneficial effect on post-release outcome in terms of readmission to a federal penitentiary. An important implication of these findings is that CSC may spend less money on these offenders in the long term. The cost of the institutional MMT program may be offset by the cost savings of offenders successfully remaining in the

community for a longer period of time than equivalent offenders not receiving MMT. In addition, health related costs such as treatment for HIV or Hepatitis C infection could be affected by MMT availability in prisons.

It should be mentioned that other measures of post-release outcome need to be examined in order to get a more complete picture of the effect of MMT participation on offenders' behaviour after release. These outcome measures may include such things as health care use, employment status and measures of substance abuse, as well as other measures. This will be assessed in a future study.

In terms of offender behaviour while incarcerated, few differences were observed. This may be due to a true lack of effect, or the inability of the current measures of institutional behaviour to detect changes over a 6-month period. Furthermore, it may be that offenders who apply for MMT have a waiting period prior to initiation of MMT that may be affecting the results. There was a difference, however, in terms of serious drug charges (e.g., possession of alcohol/drugs/drug paraphernalia, takes intoxicant into body). Specifically, heroin-addicted offenders on methadone showed a decrease in drug activity behaviours, while Non-MMT offenders showed an increase over time. This finding has implications regarding the functioning of the institution. In particular, if offenders who are on methadone are not as involved in the drug subculture, there may be less danger to themselves and to the staff around them.

It should be noted that the current study only examined institutional charges and segregation time, and other measures such as program participation were not addressed. For example, offenders who are involved in MMT may have increased ability to concentrate, which would in turn affect their ability to participate in useful activities such as employment, education and treatment. A future study will examine the effect of MMT participation on these other institutional behaviours as perceived by staff and offenders.

Most importantly, this research demonstrated that there are definite positive effects of MMT on offender behaviour, with the largest benefit existing following release. Future research is needed to further assess the degree to which institutional MMT is maintained upon release, and how this affects the long term functioning of heroin-addicted individuals.

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