

_____ **Research Report** _____

**Post Release Outcomes of
Methadone Maintenance
Treatment Program (MMTP)
Participants: A Comparative Study**

Ce rapport est également disponible en français. Pour en obtenir un exemplaire, veuillez vous adresser à la Direction de la recherche, Service correctionnel du Canada, 340, avenue Laurier Ouest, Ottawa (Ontario) K1A 0P9.

This report is also available in French. Should additional copies be required, they can be obtained from the Research Branch, Correctional Service of Canada, 340 Laurier Ave. West, Ottawa, Ontario K1A 0P9.

**Post Release Outcomes of Methadone Maintenance Treatment Program (MMTP)
Participants: A Comparative Study**

Mary-Ann MacSwain

Shanna Farrell MacDonald

&

Madelon Cheverie

Correctional Service of Canada

February 2014

Acknowledgements

We would like to recognize the contribution of the many individuals who assisted in the completion of this project and report at various stages. First, we would like to acknowledge the contribution of staff working in Health Services (CSC) for their collaboration and continued support. Since the 2009-2010 fiscal year, Clinical Services, Health Services, CSC, has provided financial support for a data entry position, which has allowed the large amount of data received to be entered in a timely fashion and for continued analysis of data quality. We are also grateful for the contributions of the following individuals who have assisted us in our research, either by providing data or by ensuring that we had access to it: National MMT Coordinators, including Jan Holland, Joanne Barton and Céline Bissonnette; Regional MMT Coordinators; institutional staff, such as MMT nurses, institutional parole officers, institutional program officers, physicians, and pharmacists; and MMT participants. We appreciate the cooperation and assistance of Health Care staff at institutions and records staff at Regional Headquarters for assisting in the collection of missing data.

We would also like to thank individuals from the Research Branch who assisted in various stages of this project. Sara Johnson was involved in the initial phases of this research, and contributed greatly to the project. Dan Kunic and Derek Lefebvre established the data sharing agreement with Health Services and began the initial work on this project. Shannon Classen and Megan Mullally assisted in the MMT document revisions. The contributions of individuals who were involved in data entry, data coding and data collection were invaluable including Lindy Affleck, Michela Preddie, Serenna Dastouri, Nicole Elliott, Rae-Anne Morrison, Lindsay Gairns, Sherri Doherty, Jonathan Ross, Lisa MacDougall, Chantal Sirois, Louise Bourgeois, and Lysiane Marseille-Paquin. We are appreciative to Mireille Lemelin for her assistance with the preparation of this report.

Dr. Benedikt Fischer offered his advice and expertise in a review of an earlier report draft. Dr. Andrea Moser and Dr. Brian Grant provided their guidance and overall supervision of this project, for which we are greatly appreciative.

Executive Summary

Key words: *methadone maintenance treatment (MMT), opioid dependence, post release outcomes, recidivism*

Ensuring that offenders have access to interventions that will assist them in dealing with their substance abuse issues allows the Correctional Service of Canada (CSC) to support the safe reintegration of offenders into society. In order to address the treatment needs of offenders with opioid dependence, CSC introduced the Methadone Maintenance Treatment (MMT) Program in 1998. Methadone is a long-acting, synthetic, opioid medication that helps to stabilize the lives of people who are dependent on opioids, and to reduce the harms related to their use, as it prevents withdrawal symptoms, reduces cravings, and blocks the euphoric effects of shorter acting opioids.

This study examined the post release outcomes of a retrospective cohort of men and women federal offenders in CSC's MMTP between 2003 and 2008 for women, and 2006 and 2008 for men. MMT participants were divided into two groups – those who participated in MMT while incarcerated and continued their MMT involvement upon release from prison (MMT-Continued group), and those who did not continue MMT involvement following release from prison (MMT-Institution Only group) based on community urinalysis testing. Comparisons were also made with men and women offenders who had a moderate to severe rating on the Drug Abuse Screening Test and who indicated that their most used substance during the twelve months prior to arrest was an opioid (Non-MMT group). Offenders in the comparison groups did not receive MMT while incarcerated, or in the community. Return to custody due to revocations with a new offence or revocations without an offence were examined for the duration of the study period – the offender's date of release, until the earliest of warrant expiry date (WED), three years post release, or the end of the data collection period (January 9, 2012).

Examination of the sample characteristics of the three study groups for men and women revealed some key differences. Offenders in the MMT-Continued and MMT-Institution Only groups were assessed as being higher risk, having higher need, having served a greater number of federal sentences, and having a lower reintegration potential, compared to the Non-MMT group. Despite being assessed as a more complex group, for both men and women, offenders who participated in CSC's MMTP and continued participation in MMT upon release to the community had a lower rate of return to custody than untreated offenders in the Non-MMT group. Offenders in the MMT-Continued group also had more positive post release outcomes than offenders in the MMT-Institution Only group. In addition, a smaller proportion of offenders in the MMT-Continued were returned to custody at twelve months post release due to committing a new offence. These results suggest that retention in MMT may assist opioid dependent offenders in reducing their criminal behaviour, and successfully reintegrating into society. Furthermore, this study highlights the importance of ensuring a continuum of care for offenders upon release.

Table of Contents

Acknowledgements	ii
Executive Summary	iv
List of Tables	v
List of Figures	vi
Introduction	1
MMT in Correctional Settings	3
Effect of MMT on Post-Release Behaviour.....	3
Factors influencing treatment outcomes	6
Purpose and Rationale.....	8
Method	9
Sample.....	9
Data Sources	11
Measures	11
Statistical Analyses	14
Results.....	17
Part 1: Men.....	17
Sample Characteristics.....	17
Release Outcome	24
Reasons for Return to Custody	26
Part 2: Women	30
Sample Characteristics.....	30
Release Outcome - Fixed Follow-up	35
Discussion	38
Considerations and Limitations	41
Conclusions.....	43

List of Tables

Table 1 <i>Demographic and Sentence Characteristics by Men's Study Group</i>	18
Table 2 <i>Substance Abuse Indicators by Men's Study Group</i>	19
Table 3 <i>Criminogenic Variables by Men's Study Group</i>	22
Table 4 <i>Percentage of Men Offenders (by Study Group) who Committed One or More Offences for their Current Sentence, by Offence Type</i>	23
Table 5 <i>Release Type Across Men's Study Groups</i>	24
Table 6 <i>Cox Proportional Hazards Model of Time to Return to Custody</i>	25
Table 7 <i>Percentage of Men Offenders Returned to Custody between 0-6 Months Post Release, by Study Group</i>	27
Table 8 <i>Offence Types Among Men Offenders Returned to Custody With a New Offence between 0-6 Months Post Release</i>	28
Table 9 <i>Percentage of Men Offenders Returned to Custody between 6-12 Months Post Release, by Study Group</i>	29
Table 10 <i>Offence Types Among Men Offenders Returned to Custody With a New Offence between 6-12 Months Post Release</i>	29
Table 11 <i>Demographic and Sentence Characteristics by Women's Study Group</i>	31
Table 12 <i>Substance Abuse Indicators by Women's Study Group</i>	32
Table 13 <i>Criminogenic Variables by Women's Study Group</i>	34
Table 14 <i>Percentage of Women Offenders (by Study Group) who Committed One or More Offences for their Current Sentence, by Offence Type</i>	35
Table 15 <i>Release Type Across Women's Study Groups</i>	35
Table 16 <i>Percentage of Women Offenders Returned to Custody between 0-6 Months Post Release, by Study Group</i>	37
Table 17 <i>Percentage of Women Offenders Returned to Custody between 6-12 Months Post Release, by Study Group</i>	37

List of Figures

<i>Figure 1.</i> Percentage of Men Offenders Identified as Having Some or Considerable Need in Criminogenic Need Areas, by Study Group.....	21
<i>Figure 2.</i> Adjusted Survival Curve for Return to Custody by Study Group	26
<i>Figure 3.</i> Percentage of Women Offenders Identified as Having Some or Considerable Need in Criminogenic Need Areas, by Study Group.....	33

Introduction

Opioids are a narcotic drug class derived from the opium poppy that includes a variety of naturally occurring and synthetic drugs, some of which are legally prescribed medications (e.g., morphine, codeine, hydromorphone, oxycodone), and some of which are illicit (e.g., heroin). These drugs depress the central nervous system and are primarily prescribed for medical use, most often pain control. Although many opioids are prescribed medication, they are both psychologically and physically addictive and can easily become drugs of abuse. Untreated opioid addiction is especially problematic in relation to the spread of blood-borne diseases (e.g., Hepatitis C and HIV/AIDS) through injection drug use, and can also lead to interpersonal and family problems, violence, overdoses, loss of “normal” social and economic functioning, and criminal behaviour, such as engagement in drug-related (e.g., drug trafficking) and drug-acquisition crimes (e.g., robbery) (Hall, Doran, Degenhardt, & Shepard, 2006; Health Canada, 2002b).

The prevalence of opioid addiction, like substance abuse in general, is disproportionately high in correctional populations. For example, it was estimated that in 2003, less than 1% of the Canadian population between the ages of 15 and 49 years were regular illegal opioid users, whereas data collected from 2002-2004 indicated that 13% of offenders had used opioids in the twelve months prior to their arrest (Kunic & Grant, 2006; Popova, Rehm, & Fischer, 2006). According to results from a 2007 survey of inmate infectious diseases and risk-behaviours, conducted by the Correctional Service Canada (CSC), of the 39% of male inmates who reported using illicit drugs during the previous six month period of incarceration, 17% reported injecting drugs at least once, with opioids reported as being the most commonly injected drug while incarcerated (Zakaria, Thompson, Jarvis, & Borgatta, 2010).

Methadone Maintenance Treatment (MMT) is a drug abuse treatment modality that has been extensively utilized and rigorously evaluated for the treatment of opioid dependence (Health Canada, 2002b). As reported in the Health Canada document *Best Practices* (2002a), research indicates that, on average, individuals receiving MMT will: spend less time using narcotics on a day-to-day basis; reduce their use of illicitly obtained opioids; reduce their use of other substances; spend less time dealing drugs; spend less time involved in criminal activities;

spend less time incarcerated; have much lower death rates than individuals not receiving treatment; reduce injection drug use; reduce the risk of acquiring HIV/AIDS, Hepatitis C or other blood-borne pathogens; improve their physical and mental health; improve their social functioning and likelihood for full-time employment; and improve their overall quality of life (pp. 16-17). As a result of the effectiveness of MMT in reducing drug use, transmission of blood-borne diseases, and criminal activity, methadone positively benefits society by decreasing criminal activity and improving public health (Health Canada, 2002a, 2002b). Within Correctional Service Canada's federal facilities, offenders with opioid addictions who meet the program's eligibility criteria are able to access the MMTP in order to deal with their addiction.¹

The profile of offenders with an opioid addiction and who are in need of MMT suggests a complex group of individuals who require more services and resources in order to facilitate reintegration into society (Johnson, Farrell MacDonald, & Cheverie, 2011; MacSwain, Cheverie, Farrell MacDonald & Johnson, in press). Research has shown that offenders who report opioids (as well as cocaine and crack cocaine) as their drug of choice are assessed as having a more severe drug problem than users of other types of drugs. Furthermore, it has been demonstrated that offenders assessed as having more severe drug problems are also assessed as having higher needs, more involved criminal histories, and as being more likely to re-offend, based on standardized assessments used in the offender intake process (Kunic & Grant, 2006).

Johnson and colleagues (2011) found that, compared to the general institutional population, male offenders with an opioid addiction who were participating in MMT had greater needs in the areas of employment, substance abuse, community functioning, associates, personal/emotional orientation, and attitude, were considered a higher risk population, and had a more extensive criminal history. MacSwain and colleagues (in press) found similar results among women MMT participants, although women MMT participants did not differ in need from the general institutional population in the areas of community functioning, personal/emotional orientation, or attitude. Men and women MMT participants also had a lower level of motivation to change their behaviour than the general offender population, and were assessed as having a lower reintegration potential (Johnson et al., 2011; MacSwain et al., in press).

¹ More information about MMT and CSC's methadone program is available in the first report in this series: Johnson, S., Farrell MacDonald, S., & Cheverie, M. (2011). *Characteristics of participants in the methadone maintenance treatment program*. Ottawa, ON: Correctional Service Canada.

MMT in Correctional Settings

Methadone maintenance treatment has been used in a variety of correctional settings since the early 1970's (Cropsey, Villalobos, & St. Clair, 2005; Darke, Kaye, & Finlay-Jones, 1998; Dolan, Wodak, & Hall, 1998; Heimer et al., 2006; Johnson, van de Ven, & Grant, 2001; Magura, Rosenblum, Lewis, & Joseph, 1993). Though prison-based MMT programs vary somewhat by region, the objectives are often similar and include the reduction of drug use, relapse, and related high risk behaviours such as injection drug use and needle sharing which often lead to the transmission of infectious disease, a reduction in criminal behaviour and recidivism, the improvement of safety within correctional facilities by improving the institutional behaviour of drug users, and improving the offender's general health and quality of life (Correctional Service Canada, 2008; Stallwitz & Stover, 2007).

Effect of MMT on Post-Release Behaviour

Substance Abuse

A consistent goal of virtually all MMT programs is the prevention of relapse to substance use, which greatly impacts on positive treatment outcomes. Offenders who relapse to opioid use following release from prison may, for example, commit acquisitive crimes to fund their drug habit, or have a hard time gaining and maintaining employment. Several studies have examined the association of MMT participation with incidence of drug use following release from prison (Dolan et al., 1998, 2003; Dole et al., 1969; Gordon et al., 2008; Kinlock et al., 2009; Kinlock et al., 2007; Kinlock et al., 2008; Magura et al., 1993; Stones, 1999). For example, Stones (1999) examined a group of 37 Canadian federal offenders who initiated MMT upon release to the community. The results showed that 65% of offenders on MMT in the community markedly reduced or altogether ceased their chronic heroin use.

In the seminal study examining the post release outcomes of prison-based MMT participants, Dole and colleagues (1969) compared inmates randomly selected to receive MMT to those who received no treatment. At seven to ten months post release, none of the MMT participants had relapsed to regular, daily heroin use. All offenders who did not receive treatment resumed the regular use of heroin shortly after release.

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 to apply for methadone or other substance abuse treatment post release compared to those offenders who received heroin detoxification. At a 6.5 month follow-up, it was found that MMT participants were also more likely to be in treatment compared to the control group, which was associated with lower heroin and/or cocaine use. It should be noted that offenders participating in MMT at time of arrest had more favourable outcomes in regard to continuing MMT post release than offenders initiated in prison (Magura et al., 1993).

In a series of reports at different follow-up time frames (Gordon et al., 2008; Kinlock et al., 2009; Kinlock et al., 2008; Kinlock et al., 2007) researchers evaluating a MMT Program in Baltimore examined the post release outcomes of three groups of offenders: a counselling + methadone group (counselling and methadone in prison with transfer to methadone maintenance in the community upon release), a counselling + transfer group (counselling in prison without methadone and with transfer to methadone maintenance in the community upon release), and a counselling only group (counselling in prison without methadone and passive treatment referral upon release). Results from these studies showed that participants in the counselling + methadone condition were consistently less likely to self report heroin use, or to have a positive opioid urine test. Interestingly, there was also a trend for the counselling + methadone participants to have the lowest incidence of self reported and urinalysis confirmed cocaine use, although this finding was somewhat inconsistent across post release time frames, and was only found to be significant at the one year post release mark.

Dolan et al. (1998) conducted a study with a prison population in New South Wales. Participants who had been maintained on methadone reported a significantly lower prevalence of heroin injection than participants who received standard drug treatment and time-limited methadone treatment. In subsequent research, Dolan and colleagues (2003) used a randomized control design to compare 129 inmates in MMT to 124 inmates in a waitlist control group on heroin use at a five month follow-up period. MMT-treated inmates demonstrated lower levels of heroin use at follow-up than inmates in the waitlist control group (Dolan et al., 2003).

Criminal Behaviour

Several studies have examined the effect of prison-based participation in MMT on criminal behaviour. For example, research by Magura et al. (1993) found that in-jail MMT participants were more likely to be in drug treatment at a six and a half month follow-up than

offenders who received heroin detoxification. Being in treatment at follow-up was associated with fewer property offences, and less illegal income. Research by Dole and colleagues (1969) showed that offenders who received MMT during incarceration had more favorable re-incarceration rates compared to a group of untreated offenders. While almost 94% of untreated offenders were re-incarcerated within seven to ten months of release, this was true for only 25% of MMT recipients.

Dolan and colleagues (2005) conducted a four year follow-up study of inmates, and found that retention in MMT was associated with reduced incarceration rates. Risk of re-incarceration was also significantly reduced by participation in MMT for eight months or longer compared to periods of no treatment. It should also be noted that risk for incarceration was greatest for those participating in MMT for less than two months (Dolan et al., 2005).

In a follow-up of offenders who received counselling and MMT either prior to release or upon release from prison, or who received counselling only at three, six, and twelve months following release, it was found that offenders who received MMT showed greater reductions in criminal behaviour post release compared to offenders who received counselling only. While offenders who received MMT following release from prison generally had more positive outcomes than those who received counselling only, the greatest reductions in re-incarceration and engagement in criminal activity were seen in offenders who received MMT while incarcerated. While the significance of these differences varied over time, this general trend was quite evident. It should also be noted, however, that no significant differences or trends in the rate of re-arrest were found (Gordon, Kinlock, Schwartz, & O'Grady, 2008; Kinlock et al., 2008; Kinlock et al., 2009).

To date, there have been three studies conducted in Canada examining the impact of participating in an MMT program on recidivism. The first study by Stones (1999) examined a group of 37 Canadian federal offenders in MMT. However, these offenders had initiated MMT upon release to the community and therefore these results may not be generalizable to offenders participating in an institutional MMT program. Building on the work of Stones, Motiuk, Dowden, and Nafekh (1999) conducted a preliminary investigation of the post-release outcome of 35 offenders who initiated CSC's MMTP while incarcerated. Of the 35 offenders, 8.6% ($N = 3$) returned to federal custody; one for a new offence and the other two for technical violations. These results should be interpreted with caution, however, because of the small sample size,

limited follow-up period, and lack of a suitable comparison group (Motiuk et al., 1999).

Johnson and colleagues (2001) compared 303 offenders identified as having received MMT in a federal institution from November 1996 to October 1999 (MMT group) with a group of offenders who were identified as having a drug addiction and who had at least one positive urinalysis result for opiates or opiates A (heroin metabolites) in random and systematic testing from January 1998 to October 1999 (Non-MMT group).² Results demonstrated that offenders participating in MMT had lower re-admission rates and were re-admitted at a slower rate than the non-MMT group (Johnson et al., 2001). For example, at approximately twelve months following release, 59% of the MMT group had not been re-admitted compared to only 42% of the non-MMT group (Johnson, 2001). 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 (Johnson et al., 2001). 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 re-offending for the MMT group (Johnson et al., 2001).

Certain studies have shown no association between prison-based MMT participation and recidivism (Marzo et al., 2009; McMillan, Laphm, & Lackey, 2008). However, these studies cite several important limitations, most notably the inability to examine continuity of MMT services during incarceration and in the community once an offender has been released. As treatment retention has been found to be a predictor of positive treatment outcomes, including the reduction of recidivism, this information is crucial to determining the true effect of prison-based MMT on criminal behaviour following release (Dolan et al., 2005; Magura et al., 1993). For example, a recent study by Larney (2010) found that MMT participation at the time of release from prison did not affect risk of re-incarceration; however, continuing MMT treatment following release resulted in a reduced risk of re-incarceration (Larney, 2010).

Factors influencing treatment outcomes

Positive treatment outcomes within methadone treatment are influenced by a number of

² This study was conducted prior to the introduction of Phase II of the MMTP and therefore only included offenders who were continuing methadone treatment that was initiated in the community prior to incarceration, and those who had recently participated in community MMT, as well as those offenders who met the exceptional circumstances criteria (i.e., where all available treatments and programs had failed, the health of the offender continued to be seriously compromised by addiction, and there was a dire need for immediate intervention).

factors such as program and patient characteristics. A variety of studies have examined predictors of positive outcomes for community MMT users (positive outcomes are often defined as decreases in opioid use [self-report and urinalysis results] and longer retention in treatment). In general, factors such as older age, less frequent poly-substance use, higher methadone dosages, having stable housing, being employed, less involvement in criminal activities and having a shorter history of opioid abuse have been associated with positive outcomes (Burns et al., 2009; Favrat, Rao, O'Connor, & Schottenfeld, 2002; Gerra et al., 2003; Marsch et al., 2005; Mutasa, 2001; Rowan-Szal, Chatham, & Simpson, 2000; Stapleton & Comiskey, 2010; Strain, Stitzer, Leibson, & Bigelow, 1998).

A distinction has been made in the literature between pre-treatment factors and in-treatment factors as predictors of positive treatment outcomes. A study by Magura and colleagues (1998) examined the impact of pre-treatment and in-treatment factors on retention in a methadone treatment program. The authors concluded that in-treatment factors such as patient problems during treatment, including medical, legal, social, drug-related events, patient strengths, including motivation for change, education or job skills, availability of social supports along with methadone dosing, use of cocaine and use of heroin were significant predictors of retention in treatment over a 36 month follow-up period, while only two pre-treatment factors, older age and no criminal justice involvement, played a significant predictive role in treatment retention.

The participation in psychosocial programming or counselling while receiving methadone has been associated with positive treatment outcomes. For example, Scherbaum and colleagues (2005) examined the effect of group psychotherapy on MMT outcomes. Participants who received MMT as well as group psychotherapy showed significantly less drug use at a six month follow-up than participants who received MMT only. Furthermore, research by McLellan, Arndt, Metzger, Woody, and O'Brien (1993) demonstrated the provision of enhanced methadone services (methadone plus counselling and medical, psychiatric, employment, and family therapy) to be associated with more positive outcomes than both standard methadone services (methadone plus counselling) and minimum methadone services (methadone only).

Purpose and Rationale

This report is the fourth in a series of reports³ to examine CSC's Methadone Maintenance Treatment Program. The purpose of this report is to examine the correctional outcomes (i.e., returns to custody due to technical violations or the commission of new offences) following release from prison of men and women offenders who participated in the institutional MMTP during their prison sentence. Studies examining post release outcomes for women participating in institutional MMT programs, in particular, are non-existent. As such, the outcomes for men and women will be analyzed separately. The research questions that are explored include:

- 1) Do the demographic and criminogenic profiles of men and women offenders who continue MMT participation upon release into the community differ from those who do not continue or those who have an identified opioid problem but who do not receive MMT?
- 2) Does the continuation of MMTP participation upon release to the community decrease the rate of returns to custody for technical violations or commission of new offences for men and women offenders?

³ Two recent reports described the characteristics of men and women MMT participants who participated in the MMTP between 2003 and 2008 in comparison to the general offender population (Johnson et al., 2011; MacSwain et al., in press). A third report explored the impact of MMT participation on institutional adjustment of male offenders (Cheverie et al., in press).

Method

Sample

Continuing and terminating MMT groups

The retrospective cohorts consist of male federal offenders who initiated participation in the MMTP between January 1, 2006 and December 31, 2008, and women federal offenders who initiated participation in the MMTP between January 1, 2003 and December 31, 2008⁴, and were released on discretionary (full parole or day parole) or statutory release prior to January 9, 2012.⁵ MMTP participants were identified based on the following criteria: 1) if the offender's file had a methadone flag in the Offender Management System (OMS) and/or 2) if the offender had at least one of two MMTP initiation documents in the Research Branch's MMTP Research Databases, and/or 3) if the offender had indicated past and continuing MMT participation at intake, through the Computerized Assessment of Substance Abuse (CASA) database (for male participants only as CASA data is not currently available for women).⁶ MMTP participation was further verified by conducting an in depth file review using documents stored in the OMS for offenders with only a methadone flag, or for those who were identified through the CASA.

The MMTP cohorts were further classified into two groups using community urinalysis data. Offenders who received at least one community urinalysis test were retained in the sample, as community MMT involvement could not be determined for offenders without urinalysis testing results. In addition, only urinalysis tests which occurred following May 8th, 2007 were examined, as methadone screening was implemented in CSC's urinalysis testing program on this date (CSC, 2007). Below is a description of the study groups.

⁴ Different time frames were used for men and women based on available data for selection of a comparison group. For men, data from the Computerized Assessment of Substance Abuse (CASA) was used to select a comparison group, while the Computerized Lifestyle Assessment Inventory (CLAI) was used for a women's comparison group. Data for MMT participants (both men and women) was available from 2003-2008 and CLAI data was available for this entire time frame, however, CASA data was only available from 2006-2008. Therefore, we only examined male MMT participants during the same timeframe available for the male comparison group. The full time frame (2003-2008) was used for women to allow for a larger sample size.

⁵ The timeframe for this report differs from the first report in the series (2003 -2008) because of the need to identify an appropriate comparison group from the Computerized Assessment of Substance Abuse. This tool was nationally implemented in 2006. The timeframe also differs for men and women due to the availability of data to choose an appropriate comparison group.

⁶ The Computerized Assessment of Substance Abuse (CASA) is a tool used by CSC to assess substance abuse problems. It is administered at intake to offenders where there is an indication of a substance abuse problem linked to their criminal behaviour. The CASA includes standardized measures to determine the severity of substance abuse including the Drug Abuse Screening Test (DAST) and the Alcohol Dependence Scale (ADS).

1. ***Continuing MMT (MMT-Continued)***: All MMTP participants, with at least one community urinalysis test, who had at least one positive test for methadone, with no disciplinary action taken for the positive test result (indicating a legitimate prescription).
2. ***Terminating MMT (MMT-Institution Only)***: All MMTP participants, with at least one community urinalysis test, who had no positive tests for methadone, or who tested positive for methadone and as a result received disciplinary action (indicating illicit methadone use).

Comparison group (Non-MMT)

In order to examine the impact of MMT on post release outcomes, two comparison groups were identified - one for men and one for women.

a) Men

The men's comparison group consisted of male federal offenders who completed the CASA during the federal admission process between January 1, 2006 and December 31, 2008, and who were subsequently released on discretionary or statutory release prior to January 9, 2012. To be included in the comparison group, offenders had to have a Drug Abuse Screening Test (DAST) score of moderate, substantial or severe and had to indicate that their most used substance during the twelve months prior to arrest was an opioid. To reduce bias, only men who had at least one community urinalysis test following May 8, 2007 were included, as this was a requirement for inclusion in the methadone groups. Based on urinalysis testing results, men in the comparison group who tested positive for methadone, but who had no disciplinary action taken (n = 9) were excluded from the analysis, as this would indicate participation in a community-based MMT program.

b) Women

The women's comparison group consisted of all women federal offenders who completed the CLAI (Computerized Lifestyle Assessment Inventory) between January 1, 2003 and December 31, 2008, who had a Drug Abuse Screening Test (DAST) score of moderate, substantial, or severe, and who were found to have a history of problematic opioid use (e.g., use of opioids associated with criminal behaviour, evidence of negative consequences resulting from opioid use) or indication that opioids were the offender's drug of choice based on a case review of each offender's documentation found in the Offender Management System (OMS).⁷

⁷ A case review was necessary to determine opioid use for the women's comparison group as the CLAI does not

Furthermore, the women had to have been released on discretionary or statutory release prior to January 9, 2012. Similarly to the men's comparison group, only women who had at least one community urinalysis test following May 8, 2007 were included. No women in the comparison group had evidence of participating in a community-based MMT program, based on urinalysis testing results.

Data Sources

The two main sources of data for this report are the Offender Management System (OMS) and MMTP administrative documentation. Each will be discussed in turn.

The OMS is an electronic administrative and operational database used by CSC to maintain all offender records from sentence commencement to sentence end. The system includes information such as: demographics, sentence and conviction information, admission and release records, urinalysis results, disciplinary charge information, reports on offender performance during incarceration and while in the community, correctional program participation, specific alerts and flags, Offender Intake Assessment (OIA) information including static and dynamic risk and need assessments, substance abuse assessments, and supplementary assessment information and related records.

Although there is a wealth of offender-related information within the OMS, it does not contain methadone specific information; therefore, in 2004, the Addictions Research Centre (ARC) of CSC, in partnership with the Health Services Branch of CSC, agreed to collect, manage, and analyze current and archived CSC MMTP administrative information for research purposes. Research databases were created to manage MMT administrative records received from operational sites. Specifically, two initiation documents, the Substance Abuse Assessment Questionnaire (SAAQ) and the Medical Assessment for Methadone Initiation (MAMI), were used to identify participants. Datasets from these two sources were merged together to create one dataset that contained all relevant information. For copies of the MAMI and SAAQ, as well as the other MMT administrative documents, please refer to Johnson et al. (2011).

Measures

In order to provide an overview of the study participants, general characteristics such as age at admission, marital status, aboriginal ancestry, criminal history, substance abuse severity

collect data on types of drugs used. This information is collected during administration of the CASA, and therefore was readily available for men.

levels, motivation level, reintegration potential, and criminogenic risk and need ratings were extracted from OMS. These measures were used to characterize the groups and many were also included as covariates in the statistical modelling process. Other characteristics that were examined include opioid of choice (categorized as pharmaceutical only, or heroin/heroin and pharmaceutical opioids), and poly-substance use (retrieved from MMT administrative documents for MMT participants, and the CASA for the men's comparison group). Information on opioid of choice and poly-substance use was not available for the women's comparison group, as this information is not captured on the CLAI, and manual coding of offender documentation for these variables was not feasible.

The variables of criminogenic risk and need were based on results from the Offender Intake Assessment. The Offender Intake Assessment (OIA) process begins immediately after an offender is sentenced.⁸ It incorporates a variety of information sources and assessments and is an important correctional planning tool. Specifically, the OIA involves the systematic identification and analysis of critical factors that affect the safe and timely reintegration of each offender into the community (CSC, 2007).

The assessment of static factors (risk) includes historical factors such as criminal history, offence severity, and sex offence history. Offenders are assigned an overall static or 'risk' level of 'low', 'moderate', or 'high' based on the results of the static factor analysis. The dynamic factors (need) assessment specifically considers needs in seven domains: employment, marital/family, associates, substance abuse, community functioning, personal/emotional, and attitude. Unlike static factors, these areas are subject to change in response to correctional programming and intervention. Each of the seven domains includes a number of indicators that are used to determine an overall need level as follows: employment (35 indicators), marital/family relationships (31 indicators), associates/social interaction (11 indicators), substance abuse (29 indicators), community functioning (21 indicators), personal/emotional orientation (46 indicators) and attitude (24 indicators). Offenders are rated on a four-point scale

⁸ As of September 2009, the Compressed Offender Intake Assessment (COIA) was implemented. The COIA applies to offenders serving four years or less for non-violent crimes with limited or no criminal history who do not require psychological assessment or detention referral and who do not have a Long Term Supervision Order. In addition, the dynamic factors (need) assessment was also modified as of September, 2009, reducing the number of indicators in each of the seven domain need areas. However, these revisions to the OIA does not impact the OIA data of offenders in this study as all OIA assessments for the sample were completed prior to December 31, 2008.

for each domain⁹ (factor rated as an asset to community adjustment, no immediate need for improvement, some need for improvement, considerable need for improvement) and also assigned an overall dynamic factor need rating of ‘low’, ‘moderate’, or ‘high’ based on the number of domains identified and the severity of contributing dynamic risk factors. Individual indicators are rated as present (1), absent (0), or unknown (9) (Brown & Motiuk, 2005).

Motivation level provides an indication of the offender’s readiness and willingness to participate in programming and interventions to address their criminogenic needs, availability of external support, and past history related to demonstrating change. This OIA variable is also measured on a three-point scale with ‘low’ indicating that the offender strongly rejects the need for change; ‘moderate’, the offender may not fully accept the overall assessment for change in need areas but is willing to participate in recommended programs or interventions; and ‘high’, where these offenders are ready to engage in programming and are self-motivated to change (CSC, 2012a).

Reintegration potential is a rating used to assess the risk presented to the community by an offender and is based on the offender’s security classification (Custody Rating Scale or CRS rating, CSC, 2012b), static factor rating of the OIA, and the Statistical Information on Recidivism Scale (SIR-R1, Nafekh & Motiuk, 2002) score for non-Aboriginal men. The reintegration potential rating for women and all Aboriginal offenders is based on the CRS rating, the static factor rating of the OIA, and the dynamic factor rating of the OIA. Offenders are assigned a level of ‘low’, ‘moderate’, and ‘high’ in this area.

The main outcome of interest in this study was return to custody following release from prison. Returns to custody were further categorized as revocations without an offence (e.g., due to a violation of a parole condition), and revocations with a new offence (i.e., the offender’s parole was revoked due to being charged and convicted of a new offence committed during their release). Some offenders had revocations with an outstanding charge (i.e., the offender’s parole was revoked due to the offender being convicted of a charge for an offence that occurred previously). Offenders were considered ‘successful’ if they reached the earliest of their warrant expiry date (WED, the end of their sentence), three years post release, or the end of the study period (January 9, 2012) without being re-incarcerated for a revocation with a new offence, or

⁹ The substance abuse and the personal/emotional orientation domains are rated on a three-point scale ranging from ‘no need for improvement’ to ‘considerable need for improvement’ (these domains cannot be rated as ‘factor seen as an asset to community adjustment’).

without an offence. Offenders who were re-incarcerated for an outstanding charge were censored, as this return to custody was not related to their behaviour post release.

Statistical Analyses

All data management, data transformations and statistical analyses were performed using SAS[®] software, Version 9.2 (SAS Institute Inc, 2007). All analyses were conducted separately for men and women, and only for offenders who were released on discretionary or statutory release during the study period. In other words, these offenders were under some type of supervision, by CSC, in the community following release. This contrasts with offenders released at the end of their sentence, who are not under community supervision upon release. We only included offenders under supervision in the community in this study as offenders not under supervision would not have community urinalysis data available to determine continued MMT participation. The follow-up period for return to custody was the earliest of each offender's WED, or the end of our data collection period (January 9, 2012), up to a maximum of three years post release.

Sample characteristics

Frequency distributions and cross-tabulations were calculated for categorical variables. Means and standard deviation were calculated for the continuous variables. An alpha level of 0.05 was used to determine statistical significance for all inferential statistics. The relationships between categorical variables were examined using Pearson Chi-Square. Where relationships between variables were statistically significant, Cramer's V was also examined to assess the strength of the association. Cramer's V values were categorized into a weak association when values were less than 0.10, small association when values were between 0.10 and 0.30, moderate association when values were between 0.30 and 0.50, and strong association when values were at the 0.50 level or higher.¹⁰ In cases where significant differences were found across the three comparison groups, post-hoc two by two cross-tabulations and chi-square tests were performed. Differences between groups on continuous variables were analyzed using analysis of variance (ANOVA). Pairwise post-hoc comparisons were examined for statistically significant results.

¹⁰ Cut-off values for Cramer's V were obtained from the following source:
<http://www.acastat.com/Statbook/chisqassoc.htm>

Return to custody

Return to custody while under supervision in the community was examined using survival analysis, more specifically, the Cox proportional hazards model (Dohoo, Martin, & Stryhn, 2009). Survival analysis is a statistical method which models the time to an event, in this case, the time an offender remains in the community until the event of interest – re-incarceration. This method also allows inclusion of other factors (covariates), other than treatment status, which may impact outcomes, in order to determine the impact that each covariate has on the outcome of interest. Hazard ratios, the relative risk of experiencing the event of interest at any point in time (e.g., for one treatment group compared with another), are calculated using this method.

Potential covariates were tested for unconditional association with the outcome variable. Covariates significant at the $p < 0.25$ level were entered into the model. Forward, backward, and stepwise model selection were employed, all of which resulted with the same final model. Covariates were dropped from or retained in the model at the $p < 0.25$ level. Hazard ratios, confidence intervals, and significance levels were reported for all covariates retained in the final model. This analysis was conducted for male participants only, as sample sizes were too small for women participants to employ this method. Additionally, the adjusted survival curve for treatment status was plotted using the mean of the covariates method.

In order to look more specifically at the type of return to custody, a series of fixed follow-up period analyses were conducted between 0-6 months and 6-12 months post release, for all men and women offenders who could be followed for the full length of each follow-up period. For example, to be included in the 0-6 month follow-up, there must have been at least six months between an offender's release date, and the earliest of their warrant expiry date (WED), or the end of the data collection period (January 9, 2012). Therefore, an offender had to have the potential to be followed for the entire period. To be included in the 6-12 month follow-up, there must have been at least 12 months between an offender's release date, and the earliest of their WED or the end of the data collection period. Offenders were removed from the 6-12 month follow-up period if they returned to custody during the 0-6 month period. The relationship between group membership and post release outcome (any return to custody, or reason for return to custody where cell sizes were sufficient) was examined using Pearson Chi-Square. Where relationships between variables were statistically significant, Cramer's V was also examined to

assess the strength of the association. Among offenders returned to custody for committing a new offence, offence types were also examined descriptively.

Results

Part 1: Men

Sample Characteristics

During the study period, 977 male MMT participants, and 293 male offenders who met the criteria for the CASA comparison group were released to the community on discretionary or statutory release. Of the 977 MMT participants, 642 (65.7%) met the urinalysis testing criteria (received at least one community urinalysis test following May 8, 2007), and were included in our study. Based on community urinalysis results, 161 (25.1%) of MMT participants who met the urinalysis testing criteria were identified for inclusion in the MMT-Continued group, and 481 (74.9%) were identified in the MMT-Institution Only group. Of the 293 offenders in the comparison group, 223 (76.1%) met the urinalysis testing criteria for inclusion in the study. Of those, 9 offenders (4.0%) had evidence, based on their community urinalysis test results, of community-based MMT participation, and therefore were excluded from the analysis. The remaining 214 (96.0%) offenders were retained in the Non-MMT group.

Differences in demographic and sentence characteristics across the three groups are presented in Table 1. No significant differences were found between the study groups in terms of age at admission, Aboriginal status, or marital status, although the groups did significantly differ on the number of sentences being served and sentence length, with men in the Non-MMT group having fewer federal sentences, and shorter current sentences than the MMT-Continued and MMT-Institution Only groups.

Table 1
Demographic and Sentence Characteristics by Men's Study Group

Characteristic	MMT-Institution Only (N = 481)		MMT-Continued (N = 161)		Non-MMT (N = 214)		Significance
Age at admission <i>M (SD)</i>	34.3	(8.1)	35.3	(8.7)	34.6	(8.3)	$F(2, 853) = 0.90, p = 0.41$
Aboriginal ancestry % (<i>n</i>)	15.0	(72)	16.8	(27)	15.4	(33)	$\chi^2(2, n = 856) = 0.30, p = 0.86$
Marital status % (<i>n</i>)							$\chi^2(4, n = 854) = 7.41, p = 0.12$
Currently married	37.6	(181)	37.7	(60)	40.7	(87)	
Previously married	6.9	(33)	10.1	(16)	12.2	(26)	
Single	55.5	(267)	52.2	(83)	47.2	(101)	
Number of Sentence Served % (<i>n</i>)							$\chi^2(4, n = 856) = 14.45, p = 0.006,$ $v = 0.09^{+*}$
1	46.6	(224)	37.9	(61)	57.0	(122)	
2	26.0	(125)	31.7	(51)	22.9	(49)	
3 or higher	27.4	(132)	30.4	(49)	20.1	(43)	
Sentence length % (<i>n</i>)							$\chi^2(4, n = 855) = 38.56, p < 0.0001,$ $v = 0.15^{+*}$
2-4 years	64.2	(308)	63.4	(102)	80.4	(172)	
4-6 years	18.8	(90)	15.5	(25)	17.8	(38)	
Over 6 years	17.1	(82)	21.1	(34)	1.9	(4)	

Note. ⁺ = significant ($p < .05$) differences between MMT-Institution Only and Non-MMT groups; ^{*} = significant ($p < .05$) differences between MMT-Institution Only and MMT-Continued groups; [~] = significant ($p < .05$) differences between MMT-Continued and Non-MMT groups; ⁺⁺ = significant ($p < .05$) differences between all three groups.

Missing values: Marital status - 2 from MMT-Continued group; Sentence length - 1 from MMT-Institution Only group.

Group differences on certain substance abuse indicators are presented in Table 2. Men in the MMT-Continued group were less likely to report problematic poly-substance use in the twelve months prior to arrest compared with men in the MMT-Institution Only group. Group membership was found to be associated with opioid of choice, with men in the Non-MMT group being more likely to identify a pharmaceutical opioid and less likely to identify heroin or a combination of heroin and pharmaceutical opioids as their opioid of choice in the twelve months prior to incarceration, compared to men in the MMT-Institution Only or MMT-Continued

groups. These results should be interpreted with caution, however, due to the large percentage of missing information among the MMT groups, and the differing data sources between the MMT-Continued and MMT-Institution Only, and Non-MMT groups.

Table 2
Substance Abuse Indicators by Men's Study Group

Indicator	MMT-Institution Only (N = 481) % (n)		MMT-Continued (N = 161) % (n)		Non-MMT (N = 214) % (n)		Significance
ADS							$\chi^2 (6, n = 842) = 5.09, p = 0.53$
None	56.3	(267)	62.3	(96)	58.9	(126)	
Low	29.5	(140)	25.3	(39)	30.4	(65)	
Moderate	4.9	(23)	4.6	(7)	5.6	(12)	
Substantial/ Severe	9.3	(44)	7.8	(12)	5.1	(11)	
DAST							$\chi^2 (6, n = 842) = 31.6, p < 0.0001, v = 0.14^{+~}$
None	5.1	(24)	5.8	(9)	0	(0)	
Low	5.7	(27)	2.6	(4)	0	(0)	
Moderate	15.8	(75)	20.1	(31)	24.8	(53)	
Substantial/ Severe	73.4	(348)	71.4	(110)	75.2	(161)	
Poly-substance use	67.7	(266)	55.8	(72)	62.2	(133)	$\chi^2 (2, n = 736) = 6.39, p = 0.04, v = 0.09^{\wedge}$
Opioid of choice							$\chi^2 (2, n = 687) = 7.89, p = 0.02, v = 0.11^{+~}$
Heroin/Heroin & Pharmaceutical	48.5	(173)	50.0	(58)	37.4	(80)	
Pharmaceutical	51.5	(184)	50.0	(58)	62.6	(134)	

Note. ⁺ = significant (p < .05) differences between MMT-Institution Only and Non-MMT groups; [^] = significant (p < .05) differences between MMT-Institution Only and MMT-Continued groups; [~] = significant (p < .05) differences between MMT-Continued and Non-MMT groups; ⁺⁺ = significant (p < .05) differences between all three groups.

Missing values: ADS and DAST - 7 from MMT-Institution Only group and 7 from MMT-Continued group; Poly-substance use - 88 from MMT-Institution Only group and 32 from MMT-Continued group; Opioid of choice - 124 MMT-Institution Only group and 45 from MMT-Continued group.

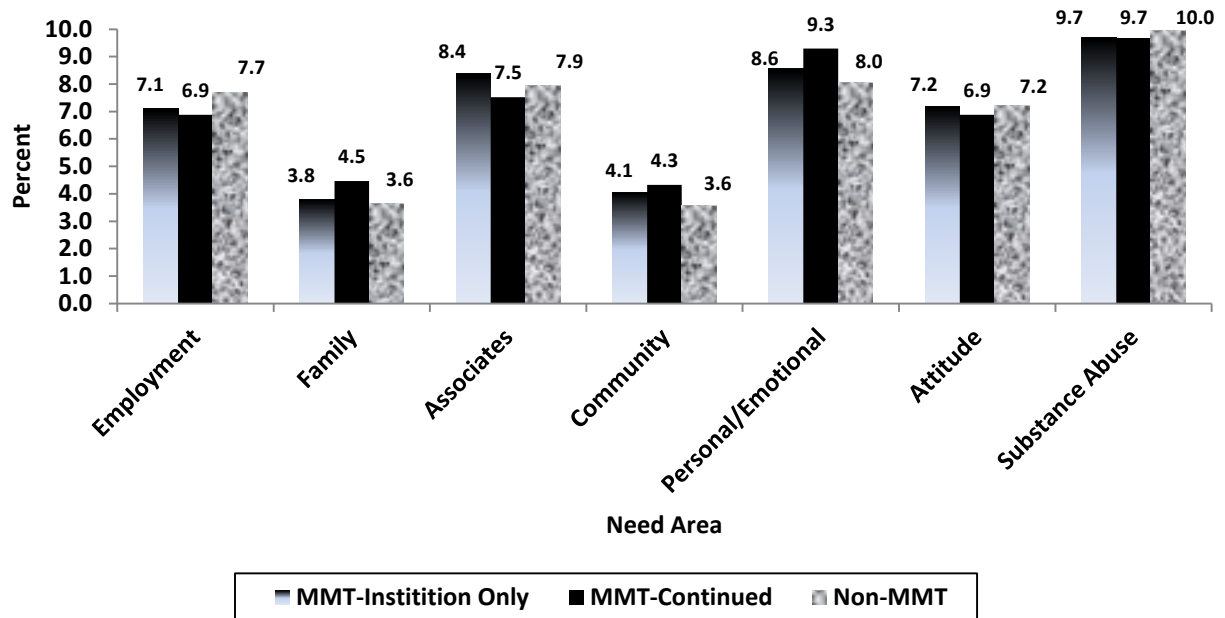
The Non-MMT group was also less likely to have a lower rating on the Drug Abuse Screening Test (DAST) upon correctional intake, indicating a greater severity of dependence to

drugs, than the MMT-Institution Only and Non-MMT groups. This finding is expected, given that a criterion of inclusion in the comparison group was a moderate to severe rating on the DAST.¹¹ The groups did not differ significantly on the assessed level of severity of alcohol abuse measured by the Alcohol Dependence Scale (ADS).

Figure 1 compares criminogenic need areas measured during the offender intake assessment across the three treatment groups. No significant group differences were found in the areas of employment, $\chi^2(2, n = 841) = 3.69, p = 0.16$, marital/family, $\chi^2(2, n = 841) = 2.90, p = 0.23$, community functioning, $\chi^2(2, n = 841) = 2.27, p = 0.32$, attitude, $\chi^2(2, n = 841) = 0.63, p = 0.73$, and substance abuse, $\chi^2(2, n = 841) = 4.35, p = 0.11$. Offenders in the MMT-Institution Only group compared to offenders in the MMT-Continued group, were significantly more likely to have some or considerable need in the area of associates, $\chi^2(2, n = 841) = 6.24, p = 0.04, v = 0.09$, whereas those in the MMT-Continued group were more likely to have some or considerable need in the personal/emotional domain than offenders in the MMT-Institution Only or Non-MMT groups, $\chi^2(2, n = 841) = 11.59, p = 0.003, v = 0.12$.

¹¹ MMT participants must be opioid dependent to receive treatment. Analyses of male participants of the MMTP who were rated none or low on the DAST at intake revealed several explanations as to why at the time of assessment, they were not found to have a drug problem, including offenders entering CSC already on methadone (and therefore not using drugs at the time of assessment), offenders whose opioid problem stemmed from a legitimate prescription, and therefore was not recognized as a problem initially, and offenders who began using opioids while they were incarcerated. In addition, some offenders may have denied drug use at intake, but later admitted to heavy use.

Figure 1. Percentage of Men Offenders Identified as Having Some or Considerable Need in Criminogenic Need Areas, by Study Group



Note. Missing values: 6 from MMT-Institution Only group, 4 from MMT-Continued group, and 5 from Non-MMT group

Ratings on several additional criminogenic variables are presented in Table 3. No group differences were found with respect to motivation level, however offenders in the Non-MMT group were more likely to have lower risk and need ratings, and a higher reintegration potential than offenders in the MMT-Continued or MMT-Institution Only groups.

Table 3
Criminogenic Variables by Men's Study Group

Criminogenic variable	MMT- Institution Only (<i>N</i> = 481) % (<i>n</i>)	MMT- Continued (<i>N</i> = 161) % (<i>n</i>)	Non-MMT (<i>N</i> = 214) % (<i>n</i>)	Significance
Risk				$\chi^2 (2, n = 841) = 8.47, p = 0.01, v = 0.10^{+*}$
Low/Moderate	45.5 (216)	41.4 (65)	55.5 (116)	
High	54.5 (259)	58.6 (92)	44.5 (93)	
Need				$\chi^2 (2, n = 841) = 8.07, p = 0.02, v = 0.10^{+*}$
Low/Moderate	25.1 (119)	19.8 (31)	32.5 (68)	
High	75.0 (356)	80.3 (126)	67.5 (141)	
Reintegration potential				$\chi^2 (4, n = 772) = 10.57, p = 0.03, v = 0.08^{+*}$
Low	45.3 (191)	46.8 (66)	34.5 (72)	
Moderate	30.6 (129)	34.8 (49)	35.4 (74)	
High	24.2 (102)	18.4 (26)	30.1 (63)	
Motivation level				$\chi^2 (2, n = 772) = 3.79, p = 0.15$
Low/Moderate	84.6 (357)	87.9 (124)	80.4 (168)	
High	15.4 (65)	12.1 (17)	19.6 (41)	

Note. + = significant ($p < .05$) differences between MMT-Institution Only and Non-MMT groups; * = significant ($p < .05$) differences between MMT-Institution Only and MMT-Continued groups; ~ = significant ($p < .05$) differences between MMT-Continued and Non-MMT groups; ++ = significant ($p < .05$) differences between all three groups.

Missing Values: Risk – 6 in MMT-Institution Only group, 4 in MMT-Continued group, and 5 in Non-MMT group; Criminogenic Need - 4 in continuing MMT group; 6 in MMT-Institution Only group, 4 in MMT-Continued group, and 5 in Non-MMT group; Motivation level and reintegration potential - 59 from MMT-Institution Only group, 20 from MMT-Continued group, and 5 from Non-MMT group

Current offence types were also examined for the three groups and are presented in Table 4. A significantly greater proportion of offenders in the MMT-Institution Only group had at least one current robbery offence compared to the Non-MMT group. No significant differences existed in the proportion of offenders with current violent, property, drug related, or other non violent offence categories. The mean number of offences committed for their current sentence did not significantly differ by group, $F (2, 853) = 1.66, p = 0.19$.

Table 4

Percentage of Men Offenders (by Study Group) who Committed One or More Offences for their Current Sentence, by Offence Type

Offence Type ^a	MMT- Institution Only (N = 481) % (n)	MMT- Continued (N = 161) % (n)	Non-MMT (N = 214) % (n)	Significance
Violent	35.1 (169)	34.8 (56)	33.2 (71)	$\chi^2(2, n = 856) = 0.25, p = 0.88$
Drug	20.8 (100)	22.4 (36)	23.4 (50)	$\chi^2(2, n = 856) = 0.62, p = 0.73$
Robbery	49.3 (237)	44.1 (71)	37.9 (81)	$\chi^2(2, n = 856) = 7.94, p = 0.02, v = 0.10^+$
Property	54.7 (263)	46.0 (74)	48.1 (103)	$\chi^2(2, n = 856) = 4.89, p = 0.09$
Other Non Violent	69.0 (332)	65.8 (106)	61.2 (131)	$\chi^2(2, n = 856) = 4.09, p = 0.13$

Note. ⁺ = significant ($p < .05$) differences between MMT-Institution Only and Non-MMT groups; [^] = significant ($p < .05$) differences between MMT-Institution Only and MMT-Continued groups; [~] = significant ($p < .05$) differences between MMT-Continued and Non-MMT groups; ⁺⁺ = significant ($p < .05$) differences between all three groups.

^a. Violent Crimes include homicide, sex offences, assault, kidnapping/forcible confinement, weapon offences, and other violent offences such as arson or uttering threats. Drug offences include offences related to the possession or trafficking of drugs. Property offences include theft, break and enter, and fraud. Robbery was kept as a separate category, as, although it is by nature a violent crime, its intent is usually acquisitive. Non-violent crimes include: escape, breach of recognizance, contempt of court, fail to comply, mischief, motor vehicle related offences, obstruct justice, violation of provincial statutes, solicitation, and trespassing.

As mentioned previously, participants in our study must have been released on discretionary or statutory release to be included in the analyses. The type of release an offender receives is an indicator of the level of risk the Parole Board of Canada perceives the offender to present to the community. Offenders who receive discretionary release (i.e., day or full parole prior to serving two-thirds of their sentence) are perceived as presenting less risk to the community than offenders who receive statutory release (release mandated by law after an offender has served two-thirds of a determinate sentence, except in exceptional circumstances). Table 5 presents release types across study groups. Offenders in the MMT-Institution Only group were significantly more likely to receive statutory rather than discretionary release compared with the MMT-Continued and Non-MMT groups; offenders in the MMT-Continued group were also significantly more likely to receive statutory rather than discretionary release than offenders in the Non-MMT group, $\chi^2(2, n = 856) = 34.78, p < 0.0001, v = 0.20$ (Table 5).

Table 5
Release Type Across Men's Study Groups

Release Type	MMT-Institution Only (N = 481) % (n)	MMT-Continued (N = 161) % (n)	Non-MMT (N = 214) % (n)	Significance
Discretionary	20.0 (96)	31.1 (50)	41.1 (88)	$\chi^2 (2, n = 856) = 34.78, p < 0.0001, v = 0.20^{++}$
Statutory	80.0 (385)	68.9 (111)	58.9 (126)	

Note. ⁺ = significant ($p < .05$) differences between MMT-Institution Only and Non-MMT groups; [^] = significant ($p < .05$) differences between MMT-Institution Only and MMT-Continued groups; [~] = significant ($p < .05$) differences between MMT-Continued and Non-MMT groups; ⁺⁺ = significant ($p < .05$) differences between all three groups.

Release Outcome

Initially, the covariates of age at correctional admission (continuous), risk (low/moderate or high), need (low/moderate or high), motivation level (low/moderate or high), reintegration potential (low or moderate/high), sentence number (first, second, or third or higher), Aboriginal status (Aboriginal or Non-Aboriginal), and release type (statutory or discretionary), along with treatment status (MMT-Institution Only, MMT-Continued, or Non-MMT) were tested for unconditional association with release outcome at the $p < 0.25$ level. In addition, association between variables was also examined to ensure covariates were not strongly associated, as including two covariates which are strongly related in a statistical model is not desirable.

Following these initial analyses, the covariates of motivation level and reintegration potential were removed. Motivation level was not found to be associated with release outcome, and reintegration potential was strongly related to the covariate risk, both of which were significant predictors of release outcome. As only one of these covariates could be included in the model, risk was chosen as it contained fewer missing values than reintegration potential. The remaining covariates were entered into the survival model, using backward, forward, and stepwise model selection, all of which resulted in the same final model. Covariates were added/removed from the model at the $p < 0.25$ level. All covariates with the exception of risk remained in the final model. Hazard ratios and confidence intervals for the final model are presented in Table 6.

Table 6
Cox Proportional Hazards Model of Time to Return to Custody

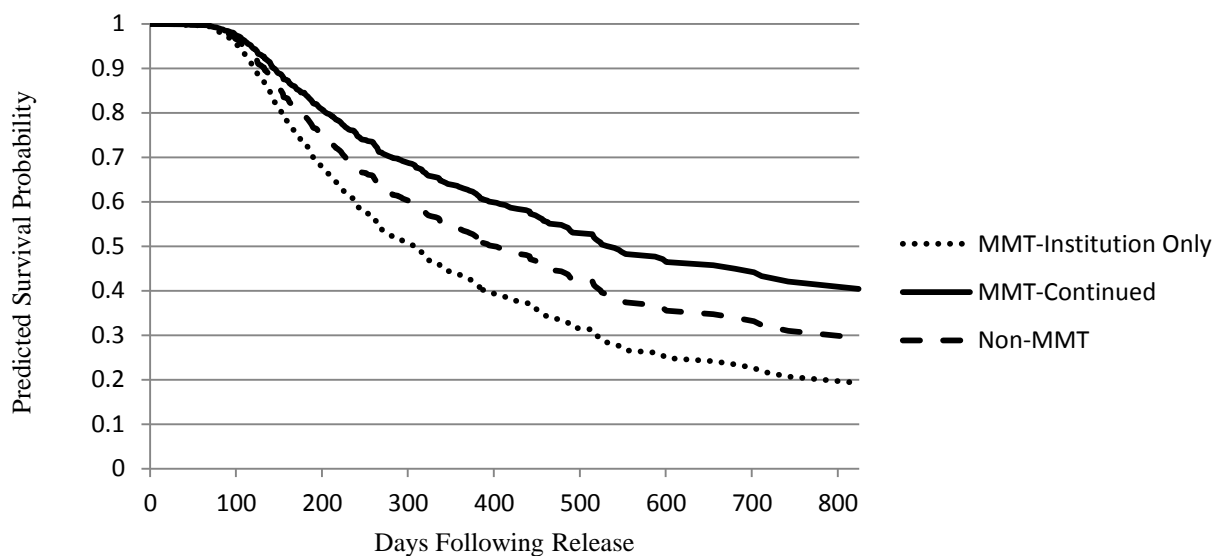
Covariate	Wald χ^2	p-value	Estimate (β)	SE	HR	95% CI
Treatment Status	17.07	0.0002				
Comparison Group			Ref	Ref	Ref	Ref
Terminating MMT			0.14	0.12	1.15	0.91-1.46
Continuing MMT			-0.45**	0.16	0.64	0.47-0.88
Need	9.75	0.0018				
Low/Moderate			Ref	Ref	Ref	Ref
High			0.38**	0.12	1.46	1.15-1.85
Sentence Number	11.23	0.0036				
First			Ref	Ref	Ref	Ref
Second			0.27*	0.13	1.31	1.02-1.67
Third or higher			0.44**	0.14	1.56	1.20-2.03
Aboriginal Ancestry	1.81	0.1787				
Non-Aboriginal			Ref	Ref	Ref	Ref
Aboriginal			0.18	0.13	1.20	0.92-1.55
Age at Admission	7.78	0.0053	-0.02**	0.01	0.98	0.97-0.99
Release Type	8.92	0.0028				
Discretionary			Ref	Ref	Ref	Ref
Statutory			0.37**	0.12	1.44	1.14-1.84

* $p < 0.05$. ** $p < 0.01$.

Offenders in the MMT-Continued group were found to have a significantly lower risk of being returned to custody than offenders in the Non-MMT group. More specifically, the risk of re-incarceration for the Non-MMT group was 36% higher than that of the MMT-Continued group. The risk of return to custody was not significantly different between the MMT-Institution Only and Non-MMT groups. Offenders with a high need rating were at a 46% greater risk than offenders with a low or moderate need rating to be returned to custody. Current number of

sentence served was also found to be a significant predictor of return to custody, with offenders serving their second federal sentence being at a 31% greater risk than offenders serving their first sentence, and offenders serving their third or subsequent sentence being at a 56% greater risk for return to custody than offenders serving their first federal sentence. Age at correctional admission was also found to be associated with risk to return to custody. For each one year increase in age, the risk of re-admission decreased by 2%. Finally, offenders released on statutory release had a 44% greater risk of re-incarceration than offenders released on discretionary release. Aboriginal offenders were found to have a 20% greater risk of re-incarceration than non-Aboriginal offenders, although this difference was not statistically significant. Figure 2 shows the survival curve for treatment status, adjusted for the effects of other covariates. This curve indicates that the hazard of being re-incarcerated for offenders in the MMT-Continued group is lower than that of the other two study groups.

Figure 2. Adjusted Survival Curve for Return to Custody by Study Group



Reasons for Return to Custody

In order to look more specifically at the reasons for return to custody, revocations with and without a new offence were examined among the three study groups at six and twelve months following release. A revocation without an offence occurs when an offender's release is revoked for reasons other than being convicted of a new offence; for example, due to a violation of a parole condition. A revocation with a new offence occurs when an offender is returned to custody due to being charged and convicted of committing a new offence. Only offenders who

could be followed for the entire follow-up period (i.e., there was at least six or twelve months between an offender's release date, and the earliest of their warrant expiry date, or January 9, 2012, the end of the data collection period) were included in each analyses. Outcomes were not examined for time periods greater than twelve months post release, due to the low number of study participants who could be followed for longer than twelve months.

Table 7 presents the percentage of offenders in each study group returned to custody with or without a new offence at six months post release. Approximately 89% of the MMT-Institution Only group, 94% of the MMT-Continued group, and 98% of the Non-MMT group could be followed for a full six months following release, and were included in the analyses. At six months post release, offenders MMT-Continued upon release to the community were significantly less likely to be returned to custody than offenders MMT-Institution Only group, and the Non-MMT group, $\chi^2(2, n = 792) = 14.65, p = 0.0007, v = 0.14$. The majority of offenders who were returned to custody for all study groups were returned due to a revocation without an offence. No offenders in the continuing MMT group were returned to custody for committing a new offence.

Table 7
Percentage of Men Offenders Returned to Custody between 0-6 Months Post Release, by Study Group

Release Outcome	MMT-Institution Only (N = 430)	MMT-Continued (N = 152)	Non-MMT (N = 210)
	% (n)	% (n)	% (n)
Returned to Custody (Total)	28.4 (122)	13.2 (20)	22.4 (47)
Revocation with a new offence	3.5 (15)	0.0 (0)	3.3 (7)
Revocation without an offence	24.9 (107)	13.2 (20)	19.1 (40)

Offence types were examined among offenders who were returned to custody due to committing a new offence (Table 8). No offenders were returned to custody for committing a violent crime. The majority of offenders who were returned to custody in the Non-MMT group had committed a property or acquisitive offence such as theft or fraud. Offenders in the MMT-Institution Only group who were returned to custody for committing a new offence had similar

proportions of acquisitive offences, and other non violent offences, which comprised the majority of offences committed.

Table 8
Offence Types Among Men Offenders Returned to Custody With a New Offence between 0-6 Months Post Release

Offence Type ^a	MMT-Institution Only (N = 15)	MMT-Continuing (N = 0)	Non-MMT (N = 7)
	% (n)	% (n)	% (n)
Violent	0.0 (0)	0.0 (0)	0.0 (0)
Drug	26.7 (4)	0.0 (0)	0.0 (0)
Robbery	13.3 (2)	0.0 (0)	14.3 (1)
Property/Acquisitive	46.7 (7)	0.0 (0)	85.7 (6)
Other Non-Violent	40.0 (6)	0.0 (0)	0.0 (0)

Note. Percentages may not add to 100% as offence types are not mutually exclusive

^a. Violent Crimes include homicide, sex offences, assault, kidnapping/forcible confinement, weapon offences, and other violent offences such as arson or uttering threats. Drug offences include offences related to the possession or trafficking of drugs. Property offences include theft, break and enter, and fraud. Robbery was kept as a separate category, as, although it is by nature a violent crime, its intent is usually acquisitive. Non-violent crimes include: escape, breach of recognizance, contempt of court, fail to comply, mischief, motor vehicle related offences, obstruct justice, violation of provincial statutes, solicitation, trespassing.

The percentage of offenders in each study group returned to custody at twelve months post release is presented in Table 9. Approximately 57% of the MMT-Institution Only group, 69% of the MMT-Continued group, and 63% of the Non-MMT group could be followed for a full twelve months following release, and were included in the analyses. Significant differences were found between the groups on return to custody at twelve months post release, $\chi^2(2, n = 482) = 7.90, p = 0.02, v = 0.13$, with offenders in the MMT-Continued group upon release to the community being significantly less likely to have been re-incarcerated than offenders in the MMT-Institution Only group. More than twice the proportion of offenders in the MMT-Institution Only and Non-MMT groups were returned to custody for committing a new offence, than of the MMT-Continued group. Most offenders were returned to custody due to a revocation without an offence.

*Table 9**Percentage of Men Offenders Returned to Custody between 6-12 Months Post Release, by Study Group*

Release Outcome	MMT-Institution Only (N = 245)	MMT-Continued (N = 105)	Non-MMT (N = 132)
	% (n)	% (n)	% (n)
Returned to Custody (Total)	50.6 (124)	34.3 (36)	45.5 (60)
Revocation with a new offence	10.2 (25)	4.8 (5)	11.4 (15)
Revocation without an offence	40.4 (99)	29.5 (31)	34.1 (45)

Offence types were examined among offenders who were returned to custody due to committing a new offence (Table 10). No offenders in the MMT-Continued group were returned to custody for committing violent or drug related offences, or robbery at twelve months post release. Acquisitive crimes and other non violent offences made up the majority of offences the comparison group was returned to custody for committing. Acquisitive and other non violent crimes were also the most common among the MMT-Institution Only group, although more robbery charges were observed among this group compared with the MMT-Continued and Non-MMT groups.

*Table 10**Offence Types Among Men Offenders Returned to Custody With a New Offence between 6-12 Months Post Release*

Offence Type	Terminating MMT (N = 25)	Continuing MMT (N = 5)	Comparison Group (N = 15)
	% (n)	% (n)	% (n)
Violent	4.0 (1)	0.0 (0)	4.4 (2)
Drug	12.0 (3)	0.0 (0)	6.7 (1)
Robbery	20.0 (5)	0.0 (0)	6.7 (1)
Property/Acquisitive	36.0 (9)	80.0 (4)	60.0 (9)
Other Non-Violent	36.0 (9)	40.0 (2)	33.3 (5)

Part 2: Women

Sample Characteristics

During the study period, 198 women MMTP participants, and 127 women offenders who met the criteria for the CLAI comparison group were released to the community on discretionary or statutory release. Of the 198 MMT participants, 92 (46.5%) met the urinalysis testing criteria (received at least one community urinalysis test following May 8, 2007), and were included in our study. Based on community urinalysis results, 25 (27.2%) MMT participants who met the urinalysis testing criteria were identified for inclusion in the MMT-Continued group, and 67 (72.8%) were identified for inclusion in the MMT-Institution Only group. Of the 127 offenders in the comparison group, 45 (35.4%) met the urinalysis testing criteria for inclusion in the comparison group. No women in the comparison group, based on their community urinalysis test results, had evidence of community-based MMT participation, therefore all 45 offenders were retained in the Non-MMT group. Differences across the three groups on demographic and sentence characteristics are presented in Table 11. Due to the small number of women in our study groups, only descriptive results are provided.

Women in each of the three groups were relatively similar in age at correctional admission. A higher proportion of women in the MMT-Continued and Non-MMT groups were of Aboriginal ancestry, compared with the MMT-Institution Only group. With regard to marital status, offenders in the MMT-Continued group were more likely to be currently married, and less likely to be single than offenders in the Non-MMT and MMT-Institution Only groups. Greater proportions of women in the MMT-Continued and Non-MMT groups had longer sentences, while more women in the MMT-Institution Only and MMT-Continued groups were serving their second or subsequent federal sentence, compared with the Non-MMT group.

Table 11
Demographic and Sentence Characteristics by Women's Study Group

Characteristic	MMT-Institution Only (<i>N</i> = 67)	MMT-Continued (<i>N</i> = 25)	Non-MMT (<i>N</i> = 45)
Age at admission <i>M</i> (<i>SD</i>)	34.5 (8.0)	33.0 (7.2)	31.3 (7.4)
Aboriginal ancestry % (<i>n</i>)	22.4 (15)	40.0 (10)	37.8 (17)
Marital status % (<i>n</i>)			
Currently married	31.3 (21)	48.0 (12)	27.3 (12)
Previously married	14.9 (10)	12.0 (3)	11.4 (5)
Single	53.7 (36)	40.0 (10)	61.4 (27)
Sentence number % (<i>n</i>)			
1	73.1 (49)	76.0 (19)	91.1 (41)
2 or higher	26.9 (18)	24.0 (6)	8.9 (4)
Sentence length % (<i>n</i>)			
2-3 years	71.2 (47)	64.0 (16)	71.1 (32)
Over 3 years	28.8 (19)	36.0 (9)	31.7 (13)

Note. Missing values: Marital status – 1 from Non-MMT group; Sentence length - 1 from MMT-Institution Only group.

Group differences on certain substance abuse indicators are presented in Table 12. The MMT-Continued group had the greatest proportion of offenders with a substantial or severe alcohol dependence rating. Information regarding poly-substance use and opioid of choice were not available for women in the Non-MMT group. Rates of poly-substance use, and opioid of choice were relatively similar between the MMT-Continued and MMT-Institution Only groups.

Table 12
Substance Abuse Indicators by Women's Study Group

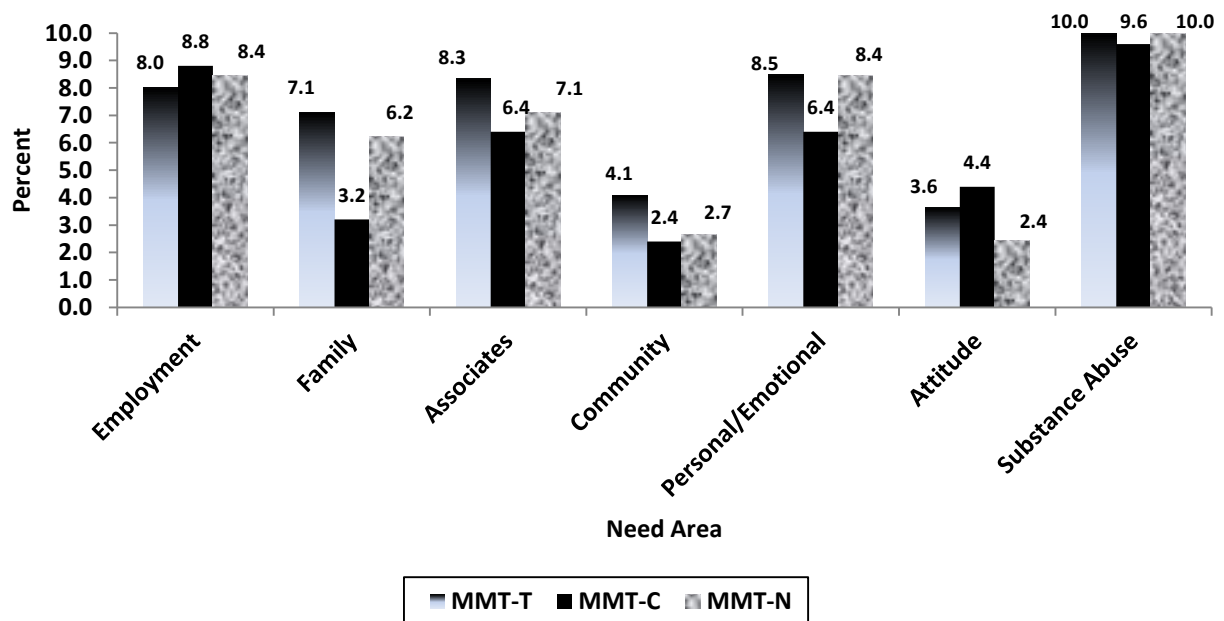
	MMT-Institution Only		MMT-Continued		Non-MMT	
	(N = 67)		(N = 25)		(N = 45)	
Indicator	%	(n)	%	(n)	%	(n)
ADS						
None	52.4	(33)	66.7	(16)	42.2	(19)
Low	28.6	(18)	16.7	(4)	46.7	(21)
Moderate	6.4	(4)	0	(0)	2.2	(1)
Substantial/ Severe	12.7	(8)	16.7	(4)	8.9	(4)
DAST						
None	0	(0)	0	(0)	0	(0)
Low	4.8	(3)	8.2	(2)	0	(0)
Moderate	7.9	(5)	4.2	(1)	17.8	(8)
Substantial/ Severe	87.3	(55)	87.5	(21)	82.2	(37)
Poly-substance use	69.4	(25)	72.2	(13)	n/a	
Opioid of choice						
Heroin/Heroin & Pharmaceutical	27.3	(9)	33.3	(6)	n/a	
Pharmaceutical	72.7	(24)	66.7	(12)	n/a	

Note. Missing values: ADS and DAST – 4 from MMT-Institution Only group and 1 from MMT-Continued group; Poly-substance use – 6 from MMT-Continued group and 27 from MMT-Institution Only group; Opioid of choice – 6 from MMT-Continued group and 30 from MMT-Institution Only group. Data on poly-substance use and opioid of choice were not available for the Non-MMT group.

Figure 3 compares criminogenic need areas measured during the offender intake assessment across the three treatment groups. The highest levels of need were observed in the areas of employment, associates, personal/emotional orientation, and substance abuse. A lower proportion of women in the MMT-Continued group had need in the marital/family and personal/emotional domains, compared with the MMT-Institution Only and Non-MMT groups.

More women in the MMT-Institution Only group were assessed as having need in the areas of associates and community functioning than in the other two groups. Fewer women in the Non-MMT group were assessed as having need in the area of attitude, compared with the MMT-Continued and MMT-Institution Only groups.

Figure 3. Percentage of Women Offenders Identified as Having Some or Considerable Need in Criminogenic Need Areas, by Study Group



Note. Missing values: 4 from MMT-Continued group, 6 from MMT-Institution Only group, 8 from Non-MMT group

Ratings on several additional criminogenic variables are presented in Table 13. The greatest proportion of high risk and high need offenders was observed among the MMT-Continued group. In addition, the MMT-Continued group contained the lowest proportion of offenders with a high reintegration potential. Motivation level was lower for the MMT-Continued and MMT-Institution Only groups, compared with the Non-MMT group.

Table 13
Criminogenic Variables by Women's Study Group

Criminogenic variable	MMT-Institution Only (<i>N</i> = 67)		MMT-Continued (<i>N</i> = 25)		Non-MMT (<i>N</i> = 45)	
	%	(<i>n</i>)	%	(<i>n</i>)	%	(<i>n</i>)
Risk						
Low/Moderate	74.2	(49)	56.0	(14)	68.9	(31)
High	25.8	(17)	44.0	(11)	31.1	(14)
Need						
Low/Moderate	39.4	(26)	32.0	(8)	40.0	(18)
High	60.6	(40)	68.0	(17)	60.0	(27)
Reintegration potential						
Low	23.1	(15)	36.0	(9)	26.7	(12)
Moderate	41.5	(27)	44.0	(11)	33.3	(15)
High	35.4	(23)	20.0	(5)	40.0	(18)
Motivation level						
Low/Moderate	56.9	(37)	60.0	(15)	46.7	(21)
High	43.1	(28)	40.0	(10)	53.3	(24)

Note. Missing Values: Risk and need – 1 in MMT-Institution Only group; Motivation level and reintegration potential - 2 from MMT-Institution Only group

Current offence types were also examined for the three groups and are presented in Table 14. A greater proportion of women in the Non-MMT group had current violent offences, than the MMT-Continued and MMT-Institution Only groups. Current robbery offences were more common among the two MMT groups, than the Non-MMT group. Women in the MMT-Continued group were the most likely to be serving time for a drug related offence, followed by the Non-MMT group, then the MMT-Institution Only group.

Table 14

Percentage of Women Offenders (by Study Group) who Committed One or More Offences for their Current Sentence, by Offence Type

Offence Type ^a	MMT-Institution Only (N = 67) % (n)	MMT-Continued (N = 25) % (n)	Non-MMT (N = 45) % (n)
Violent	31.3 (21)	24.0 (6)	40.0 (18)
Drug	22.4 (15)	32.0 (8)	26.7 (12)
Property	52.2 (35)	48.0 (12)	44.4 (20)
Robbery	37.3 (25)	44.0 (11)	26.7 (12)
Other Non Violent	71.6 (48)	76.0 (19)	75.6 (34)

^a. Violent crimes include homicide, sex offences, assault, kidnapping/forcible confinement, weapon offences, and other violent offences such as arson or uttering threats. Drug offences include offences related to the possession or trafficking of drugs. Property offences include theft, break and enter, and fraud. Robbery was kept as a separate category, as, although it is by nature a violent crime, its intent is usually acquisitive. Non-violent crimes include: escape, breach of recognizance, contempt of court, fail to comply, mischief, motor vehicle related offences, obstruct justice, violation of provincial statutes, solicitation, and trespassing.

Release type was examined across study groups and is presented in Table 15. Women in the Non-MMT group were more likely to have been released on discretionary release than offenders in the MMT groups, indicating a lower level of perceived risk to the community.

Table 15

Release Type Across Women's Study Groups

Release Type	MMT-Institution Only (N = 67) % (n)	MMT-Continued (N = 25) % (n)	Non-MMT (N = 45) % (n)
Discretionary	59.7 (40)	56.0 (14)	68.9 (31)
Statutory	40.3 (27)	44.0 (11)	31.1 (14)

Release Outcome - Fixed Follow-up

In order to look more specifically at the reasons for return to custody, revocations with and without a new offence were examined among the three study groups at six and twelve months following release. Only offenders who could be followed for the entire follow-up period

(i.e., there was at least six or twelve months between an offender's release date, and the earliest of their warrant expiry date, or January 9, 2012, the end of the data collection period) were included in each analyses. Outcomes were not examined for time periods greater than twelve months post release, due to the low number of study participants who could be followed for longer than twelve months.

Table 16 presents the percentage of offenders in each study group returned to custody at six months post release. Approximately 91% of the MMT-Institution Only group, 96% of the MMT-Continued group, and 100% of the Non-MMT group could be followed for a full six months following release, and were included in the analyses. At six months post release, offenders in the MMT-Continued group were less likely than offenders in MMT-Institution Only and Non-MMT groups to be returned to custody. Most offenders in the MMT-Institution Only and MMT-Continued groups were returned to custody due to a revocation without an offence. All women in the MMT-Continued group who were returned to custody were returned for committing a new offence; however this was only the case for two women.

The four women in the MMT-Institution Only group who returned to custody as a result of a new offence committed violent, robbery or other non-violent crimes. The two women in the MMT-Continued group were returned to custody for a new offence committed drug-related and non-violent crimes while the two women in the Non-MMT group committed non-violent crimes.

*Table 16**Percentage of Women Offenders Returned to Custody between 0-6 Months Post Release, by Study Group*

Release Outcome	MMT-Institution Only (N = 61) % (n)	MMT-Continued (N = 24) % (n)	Non-MMT (N = 45) % (n)
Returned to Custody (Total)	18.0 (11)	8.3 (2)	13.3 (6)
Revocation with a new offence	6.6 (4)	8.3 (2)	4.4 (2)
Revocation without an offence	11.5 (7)	0.0 (0)	8.9 (4)

The percentage of offenders in each study group returned to custody at twelve months post release is presented in Table 17. Approximately 66% of the MMT-Institution Only group, 60% of the MMT-Continued group, and 78% of the Non-MMT group could be followed for a full twelve months following release, and were included in the analyses. At twelve months post release, no women in the MMT-Continued group were returned to custody. In comparison, just under one-half of women in the MMT-Institution Only group and one-third of women in the Non-MMT group were returned to custody. Most women who were not successful had a revocation without an offence. A slightly higher proportion of women in the Non-MMT group were returned to custody due to committing a new offence compared with the MMT-Institution Only group.

The four women in the MMT-Institution Only group who returned to custody as a result of a new offence committed violent, robbery, property or other non-violent crimes. The five women in the Non-MMT group who returned to custody for a new offence committed property and non-violent crimes.

*Table 17**Percentage of Women Offenders Returned to Custody between 6-12 Months Post Release, by Study Group*

Release Outcome	MMT-Institution Only (N = 44) % (n)	MMT-Continued (N = 15) % (n)	Non-MMT (N = 35) % (n)
Returned to Custody (Total)	45.5 (20)	0.0 (0)	31.4 (11)
Revocation with a new offence	9.1 (4)	0.0 (0)	14.3 (5)
Revocation without an offence	36.4 (16)	0.0 (0)	17.1 (6)

Discussion

The main purpose of this study was to examine the impact of MMT participation on return to custody following release from prison among men and women offenders. Comparing the post-release success of men and women offenders who continued MMT participation upon release (MMT-Continued), who terminated MMT participation upon release (MMT-Institution Only) or who did not participate in MMT (Non-MMT) allowed for an examination of the rate of return to custody as well as the reasons for that return (i.e., either a technical revocation or as a result of committing a new offence).

An examination of the criminogenic variables presents an interesting picture of the characteristics of the various study groups. The study population as a whole is considered a group with high criminogenic risk and needs but even within this high risk group we see variations in characteristics between men and women and across study groups. For example, the majority of women offenders were serving their first federal sentence regardless of their MMT participation, while many male offenders were serving their second or higher sentence with differences across MMT groups. Substance abuse indicators differed by gender as well with women more frequently reporting pharmaceutical opioids as their opioid of choice while men more frequently reported heroin alone or heroin in combination with pharmaceutical opioids. Relatively few differences emerged across MMT groups for male offenders in the criminogenic need areas; however, women differed significantly by MMT group in all areas with the exception of employment and substance abuse with the MMT-Institution Only and Non-MMT groups generally showing the greatest need in most domains. In addition, very clear and interesting differences across men and women emerged in the overall risk and need areas. Male MMT participants presented as an overall higher need and higher risk group compared to women with relative stability across the MMT groups. In comparison, women offenders differed significantly across groups with the MMT-Continued groups presenting as higher risk and higher need compared to the other two groups. Gender differences were also evident for release types with men as a group being more likely to be released on statutory release compared to women.

The main focus of this study was to examine the impact of MMT participation on returns to custody and the results suggest that for both men and women, continuity of MMT from a prison-based to a community-based MMT program was associated with better outcomes with

respect to return to custody during supervision. Offenders in the MMT-Continued group did significantly better in the community than untreated offenders in the Non-MMT group, even though offenders in the MMT-Continued group were in some ways a more complex and problematic group than the Non-MMT group. For example, for both men and women, the MMT-Continued group had more extensive criminal histories as evidenced by a greater number of previous federal sentences, were higher risk, had higher criminogenic need, and a lower reintegration potential – all of which point to the MMT-Continued group as being the most likely group to re-offend. Offenders in the Non-MMT group were also more likely to have been released on discretionary, rather than statutory release compared with the MMT groups, indicating a lower level of perceived risk to the community. Again, these results are interesting given that, based on risk assessments, the MMT-Continued group presented as the highest risk group (particularly for women offenders) and it could be assumed that they would be most likely to be released on statutory release.

The survival analysis for male offenders revealed that, after adjusting for possible covariates, offenders in the MMT-Continued group were 36% less likely to return to custody than the Non-MMT group while the hazard of return to custody for the MMT-Institution Only and the Non-MMT group was not significantly different. Although the returns to custody for male offenders in this sample were generally high, with about half of the men in this study returned to custody following an average of less than one year of post-release community supervision, it is likely influenced by their substance abuse histories and entrenched criminal lifestyle. The MMT-Continued group had the most favorable outcome with approximately 40% returned to custody over 12 months, which was more similar to returns to custody for the general CSC population during approximately the same time period compared to the Non-MMT groups (48%) or the MMT-Institution Only group (Public Safety Canada, 2011). Male offenders in the MMT-Continued group were also the least likely to have been returned to custody for committing a new offence at both six and twelve months post release.

The fixed follow-up analysis for women revealed that, similarly to men, the most favorable outcomes were observed among the MMT-Continued group. For example, at six months post release, only two women (8%) in the MMT-Continued group returned to custody, compared with 18% of women in the MMT-Institution Only group and 13% of women in the Non-MMT group. At twelve months post release, for all women who could be observed for the

entire follow-up period, no women who continued MMT participation in the community were returned to custody, compared to just under one-half of women who terminated MMT participation, and just under one-third of women who had an opioid addiction, but who did not receive MMT.

The results of this study support previous research in community and correctional populations which have found similar findings: those in MMT treatment have more success with respect to decreased drug use, enhanced health benefits and social functioning, and decreased criminal activity compared to opioid-dependent individuals not in treatment, especially for offenders who initiate prior to release and transition to community-based MMT (Amato et al., 2005; Butzin, Martin, & Inciardi, 2002; Dolan et al., 2005; Larney, 2010; Larney, Toson, Burns, & Dolan, 2011; Magura et al., 1993; Marsch, 1998; Matheson, Doherty, & Grant, 2011; Mattick, Breen, Kimber & Davoli, 2009; Messina, Burdon, & Prendergast, 2006; Pearson & Lipton, 1999). Previous studies that did not find an association between prison-based MMT participation and recidivism cite the inability to examine continuity of MMT services in the community as a key limitation (Marzo et al., 2009; McMillan et al., 2008). Hence, prison-based initiation of MMT and successful transitioning to community-based programs appears to be an effective intervention to reduce criminal re-offending and re-admission to custody.

These results raise a logical question: since prison-based MMT participants who do not continue treatment in the community do no better upon release than offenders with an untreated opioid addiction, does receiving MMT while incarcerated matter? First, in response to this, it is important to recognize that MMT is exactly what its name implies – a maintenance treatment. It is not a cure for opioid dependence. Research consistently points to more positive outcomes for clients retained in treatment for longer periods of time, and in the case of participants of prison-based MMT programs, continuing treatment into the community, as key factors leading to positive treatment outcomes, including reductions in criminal activity (Dolan et al., 2005; Larney, 2010; Magura et al., 1993). Furthermore, research has shown that offenders who participate in prison-based MMT (in addition to counseling) and who continue treatment upon release spend more time in treatment in the community, and show a greater reduction in criminal activity than offenders who initiate MMT in the community following release (Kinlock et al., 2009). In addition, although not measured in this study, those in the MMT-Institution Only group may have reaped other potential health benefits from prison-based MMT participation. Evidence

shows that MMT involvement positively impacts on overall health as a result of decreased opioid and/or injection drug use, as well as improvements in mental health, overall social functioning, and institutional behaviour of offenders (Cropsey et al., 2011; Dolan et al., 2003, 2005, 2012; Johnson et al, 2001; Hedrick et al., 2012; Stallwitz & Stover, 2007). In addition to the potential health benefits of MMT participation, a recent study by the current authors has found that initiation of MMT while incarcerated has a positive impact on institutional behaviours as evidenced by decreased positive urinalysis results and decreased refusals to provide a sample as well as decreased positive drug tests for opioids. Other promising findings included increased engagement in correctional programming to assist their criminogenic needs. MMT participants also had fewer disciplinary charges or admissions to either voluntary or involuntary segregation following their initiation into the MMTP (Cheverie *et al.*, in press).

It may be also the case that participating in a prison-based MMTP helps to facilitate participation in a community-based MMT program following release. Consistent with the study conducted by Kinlock and colleagues (2009), in our study, while approximately one in four men and women who participated in the MMTP while incarcerated under CSC's jurisdiction and who met the study criteria had evidence of community-based MMT participation following release, only 4% of men and no women who were found to have an opioid problem but who did not access the MMTP while incarcerated had evidence of community MMT involvement. We were not able to examine outcomes for offenders who did not participate in the MMTP while incarcerated, but who initiated treatment following release due to the small sample size (only 9 men and 0 women).

Considerations and Limitations

This study has some important limitations. First, both the men's and women's samples were restricted to offenders for whom community urinalysis data were available in order to confirm community MMT participation. Obtaining data on community MMT participation for offenders is difficult, as no data collection strategy is currently in place; moreover, offenders are not obligated to report any type of medical treatment, such as MMT, to CSC while they are under supervision in the community. As a consequence of this, the findings are based on a convenience sample of offenders and, therefore, the results may not be generalizable to the larger opioid-dependent or general correctional population. Second, survival analysis was not used for

women due to the small size of the sample. Accordingly, the impact of other potential predictors on return to custody for women offenders was not examined. Finally, the duration of both prison-based and community MMT participation was unknown as the current administrative forms used to create the MMT research database do not record this information. Due to the fact that duration is a positive predictor of treatment success (Dolan et al., 2005; Lind, Chen, Weatherburn, & Mattick, 2005; Oliver et al., 2010, Zhang, Friedmann, & Gerstein, 2003), this information would have been advantageous to strengthening the findings of this study.

Previous research has identified several other factors which may be important in predicting post release outcomes for offenders, but which we were unable to include in our analysis as data were not available to examine these factors, or were beyond the scope of this research. These include changes in opioid use patterns, relapse to substance use, poly-substance use (opioid use and other drug or alcohol use), psychiatric co-morbidity, community employment, and participation in psycho-social counseling or programming which potentially impact not only the continuity of MMT participation, but also the successful community reintegration of offenders (Brands et al., 2004; Fischer et al., 2008; Gillis & Nafekh, 2005; Judson et al., 1980; King & Brooner, 1999; Kinlock et al., 2002; Leri et al., 2003; Maddux & Desmond, 1992; McLellan et al., 1993; Scherbaum et al., 2005). Women also face a variety of distinct issues that men may not have to navigate during reintegration: renegotiating familial relationships, particularly redefining the primary caregiver role with regards to minor children; housing; financial resources; or dealing with historical or current trauma (e.g. childhood abuse, domestic violence, etc.; Langan & Pelissier, 2001; Matheson et al., 2011, Messina, Burdon, Hagopian & Prendergast, 2006; Oser, Knudsen, Staton-Tindall, & Leukefeld, 2009).

Future research should also examine the factors that impact on the transition and continuity of MMT treatment. Examining the factors that influenced offenders in the MMT-Institution Only group to terminate treatment or determining why offenders in the Non-MMT group did not participate in MMT, either in prison or once released, may highlight potential issues for offenders transitioning to the community. In addition to the general reintegration factors faced by offenders, many other issues may impact on MMT participation, such as, unavailable or over-burdened MMT services in the community (particularly in rural areas), community organizations who refuse to work with offenders, and a breakdown in the coordination of treatment continuity between institutional staff and community partners

(Chandler, Fletcher, & Volkow, 2009; Marzo et al, 2009; Prendergast, 2009; Rich et al., 2001).

Conclusions

This study shows that opioid dependent offenders under CSC's jurisdiction, who participate in prison-based MMT and continue MMT participation in the community, are returned to custody less frequently and at a slower rate than opioid dependent offenders who are untreated, or who terminate their MMT involvement upon release from prison. These findings are consistent across gender groups even though very clear differences exist in various criminogenic factors between men and women. These results underscore the importance of providing MMT to opioid dependent offenders, and ensuring a continuum of care while offenders are transitioning into the community following release from prison. The challenge for future research and interventions is to understand the disconnect that often happens when offenders who are successfully participating in institutional MMT programs terminate their participation upon release into the community.

References

- Amato, L., Davoli, M., Perucci, C., Ferri, M., Faggiano, F., & Mattick, R. (2005). An overview of systematic reviews of the effectiveness of opiate maintenance therapies: available evidence to inform clinical practice and research. *Journal of Substance Abuse Treatment*, 28(4), 321-329.
- Brands, B., Blake, J., Sproule, B., Gourlay, D., & Busto, U. (2004). Prescription opioid abuse in patients presenting for methadone maintenance treatment. *Drug and Alcohol Dependence*, 73, 199-207.
- Brown, S. L., & Motiuk, L. L. (2005). *The Dynamic Factors Identification and Analysis (DFIA) component of the Offender Intake Assessment (OIA) process: A meta-analytic, psychometric and consultative review* (Research Report R-164). Ottawa, ON: Correctional Service Canada.
- Burns, L., Randall, D., Hall, W. D., Law, M., Butler, T., Bell, J., Degenhardt, L. (2009). Opioid agonist pharmacotherapy in New South Wales from 1985 to 2006: Characteristics and patterns and predictors of treatment retention. *Addiction*, 104, 1363-1372.
- Butzin, C.A., Martin, S.S., & Inciardi, J.A. (2002). Evaluating component effects of a prison-based treatment continuum. *Journal of Substance Abuse Treatment*, 22(2), 63-69.
- Canadian Centre on Substance Abuse (2009). Substance abuse in Canada: Concurrent disorders. Ottawa, ON: Author.
- Chandler, R.K., Fletcher, B.W., Volkow, N.D. (2009). Treating drug abuse and addiction in the criminal justice system: Improving public health and safety. *Journal of the American Medical Association*, 301(2), 183-190.
- Cheverie, M., MacSwain, M., Farrell MacDonald, S., & Johnson, S. (in press). *Institutional adjustment of methadone maintenance treatment (MMT) program participants: A comparative study*. Ottawa, ON: Correctional Service Canada.
- Correctional Service Canada. (2007). Policy Bulletin 224. Ottawa, ON: Author.
- Correctional Service Canada. (2008). *Specific guidelines for the treatment of opiate dependence (Methadone /Suboxone®)*. Ottawa, ON: Author.
- Correctional Service Canada. (2012a). *Commissioner's Directive 705-6: Correctional planning and criminal profile*. Ottawa, ON: Author.
- Correctional Service Canada. (2012b). *Commissioner's Directive 705-7: Security classification and penitentiary placement*. Ottawa, ON: Author.

- Cropsey, K. L., Villalobos, G. C., & St. Clair, C. L. (2005). Pharmacotherapy treatment in substance-dependent correctional populations: A review. *Substance Use and Misuse*, 40, 1983-1999.
- Cropsey, K.L., Lane, P.S., Hale, G.J., Jackson, D.O., Clark, B., Ingersoll, K.S., Islam, M.A., & Stitzer, M.L. (2011). Results of a pilot randomized controlled trial of buprenorphine for opioid dependent women in the criminal justice system. *Drug and Alcohol Dependence*, 119(3), 172-178.
- Darke, S., Kaye, S., & Finlay-Jones, R. (1998). Drug use and injection risk-taking among prison methadone maintenance patients. *Addiction*, 93(8), 1169-1175.
- Dolan, K., Salimi, S., Nassirimanesh, B., Mohesenifar, S., Allsop, D., & Mokri, A. (2012). Six-month follow-up of Iranian women in methadone treatment: Drug use, social functioning, crime and HIV and HCV seroincidence. *Substance Abuse and Rehabilitation*, 3(1), 37-43.
- Dolan, K. A., Shearer, J., MacDonald, M., Mattick, R. P., Hall, W., & Wodak, A. D. (2003). A randomized controlled trial of methadone maintenance treatment versus wait list control in an Australian prison system. *Drug and Alcohol Dependence*, 72, 59-65.
- Dolan, K. A., Shearer, J., White, B., Zhou, J., Kaldor, J., & Wodak, A.D. (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. A., Wodak, A. D., & Hall, W. D. (1998). Methadone maintenance treatment reduces heroin injection in New South Wales prisons. *Drug and Alcohol Review*, 17, 153-158.
- Dole, V. P., Robinson, J. W., Orraca, J., Towns, E., Searcy, P., & Caine, E. (1969). Methadone treatment of randomly selected criminal addicts. *The New England Journal of Medicine*, 280(25), 1372-1375.
- Dohoo, I., Martin, W., & Stryhn, H. (2009). *Veterinary Epidemiologic Research*, 2nd edition. Charlottetown, PE: Ver Inc.
- Favrat, B., Rao, S., O'Connor, P. G., & Schottenfeld, R. (2002). A staging system to predict prognosis among methadone maintenance patients, based on admission characteristics. *Substance Abuse*, 23(4), 233-244.
- Fischer, B., Patra, J., Firestone Cruz, M., Gittins, J., & Rehm, J. (2008). Comparing heroin users and prescription opioid users in a Canadian multi-site population of illicit opioid users. *Drug and Alcohol Dependence*, 27, 625-632.
- Gerra, G., Ferri, M., Polidori, E., Santoro, G., Zaimovic, A., & Sternieri, E. (2003). Long-term methadone maintenance effectiveness: Psychosocial and pharmacological variables. *Journal of Substance Abuse Treatment*, 25, 1-8.

- Gideon, L. (2010). Substance abusing inmates: Experiences of recovering drug addicts on their way back home. New York, NY: Springer.
- Gillis, C., & Nafekh, M. (2005). The impact of community-based employment on offender reintegration. *Forum on Corrections Research*, 17(1).
- Gordon, M. S., Kinlock, T. W., Schwartz, R. P., & O'Grady, K. E. (2008). A randomized clinical trial of methadone maintenance for prisoners: Findings at 6 months post-release. *Addiction*, 103, 1333-1342.
- Hall, W., Doran, C., Degenhardt, L., & Shepard, D. (2006). Illicit opiate abuse. In D. T. Jamison et al. (Eds.), *Disease control priorities in developing countries* (2nd ed.), pp. 907-932. New York: Oxford University Press.
- Health Canada. (2002a). *Best practices: Methadone maintenance treatment*. Ottawa, ON: Author.
- Health Canada. (2002b). *Literature review: Methadone maintenance treatment*. Ottawa, ON: Author.
- Hedrich, D., Alves, P., Farrell, M., Stover, H., Moller, L., & Mayet, S. (2012). The effectiveness of opioid maintenance treatment in prison settings: A systematic review. *Addiction*, 107(3), 501-517.
- Heimer, R., Catania, H., Newman, R., Zambrano, J., Brunet, A., & Ortiz, A. (2006). Methadone maintenance in prison: Evaluation of a pilot program in Puerto Rico. *Drug and Alcohol Dependence*, 83(2), 122-129.
- Johnson, S. (2001). Impact of institutional methadone maintenance treatment on release outcome. *Forum on Corrections Research*, 13(3).
- Johnson, S., Farrell MacDonald, S., & Cheverie, M. (2011). *Characteristics of participants in the methadone maintenance treatment program*. Ottawa, ON: Correctional Service Canada.
- Johnson, S., Farrell MacDonald, S., Cheverie, M., Myrick, C. & Fischer, B. (2012). Prevalence and trends of non-medical opioid and other drug use histories among federal correctional inmates in methadone maintenance treatment in Canada. *Drug and Alcohol Dependence*, 124(1), 172-176.
- Johnson, S. L., van de Ven, J. T. C., & Grant, B. A. (2001). *Institutional methadone maintenance treatment: Impact on release outcome and institutional behaviour* (Research Report R-119). Ottawa, ON: Correctional Service Canada.

- Judson, B. A., Ortiz, S., Crouse, L., Carney, T. M., & Goldstein, A. (1980). A follow up study of heroin addicts five years after first admission to a methadone treatment program. *Drug and Alcohol Dependence*, 6(5), 295-313.
- Kerr, T., & Jurgens, R. (2004). *Methadone maintenance therapy in prisons: reviewing the Evidence*. Retrieved May 20, 2008, from <http://www.aidslaw.ca/publications/interfaces/downloadFile.php?ref=1293>
- King, V. L., & Brooner, R. K. (1999). Assessment and treatment of comorbid psychiatric disorders. In E. C. Strain & M. L. Stitzer (Eds.), *Methadone treatment for opioid dependence*, (pp. 141-165). Baltimore, MD: Johns Hopkins University Press.
- Kinlock, T. W., Battjes, R. J., & Schwartz, R. P. (2005). A novel opioid maintenance program for prisoners: Preliminary findings. *Journal of Substance Abuse Treatment*, 22(3), 141-147.
- Kinlock, T. W., Gordon, M. S., Schwartz, R. P., Fitzgerald, T. T., & O'Grady, K. E. (2009). A randomized clinical trial of methadone maintenance for prisoners: Results at 12 months post-release. *Journal of Substance Abuse Treatment*, 37, 277-285
- Kinlock, T. W., Gordon, M. S., Schwartz, R. P., & O'Grady, K. E. A. (2008). Study of methadone maintenance for male prisoners: three month post-release outcomes. *Criminal Justice and Behavior*, 35, 34-47.
- Kinlock, T. W., Gordon, M. S., Schwartz, R. P., O'Grady, K., Fitzgerald, T. T., & Wilson, M. (2007). A randomized clinical trial of methadone maintenance for prisoners: Results at one-month post-release. *Drug Alcohol and Dependence*, 91, 220-227.
- Kunic, D., & Grant, B. A. (2006). The computerized assessment of substance abuse (CASA): Results from the demonstration project (Research Report R-173). *Ottawa, ON: Correctional Service Canada*.
- Langan, N.P., & Pelissier, B.M. (2001). Gender differences among prisoners in drug treatment. *Journal of Substance Abuse*, 13(3), 291-301.
- Larney, S. (2010). *Opioid Substitution Treatment in Prison and Post-Release: Effects on Criminal Recidivism and Mortality* (Doctoral Dissertation, National Drug and Alcohol Research Centre, School of Public Health and Community Medicine, University of New South Wales). Retrieved from <http://idpc.net/sites/default/files/library/OST-in-prison-and-post-release-effects-on-criminal-recidivism-and-mortality.pdf>
- Larney, S., Toson, B., Burns, L., & Dolan, K. (2011). Effect of prison-based opioid substitution treatment and post-release retention in treatment on risk of re-incarceration. *Addiction*, 107, 372-380.

- Leri, F., Bruneau, J., & Stewart, J. (2003). Understanding polydrug use: Review of heroin and cocaine co-use. *Addiction*, 98, 7-22.
- Lind, B., Chen, S., Weatherburn, D., & Mattick, R. (2005). The effectiveness of methadone maintenance treatment in controlling crime. *British Journal of Criminology*, 45(2), 201-211.
- MacSwain, M.A., Cheverie, M., Farrell MacDonald, S. & Johnson, S. (in press). *Characteristics of women participants in the methadone maintenance treatment program*. Ottawa, ON: Correctional Service Canada.
- Maddux, J. F., & Desmond, D. P. (1992). Ten-year follow up after admission to methadone maintenance. *The American Journal of Drug and Alcohol Abuse*, 18(3), 289-303.
- Magura, S., Nwakeze, P. C., & Demsky, S. (1998). Pre- and in-treatment predictors of retention in methadone treatment using survival analysis. *Addiction*, 93(1), 51-60.
- Magura, S., Rosenblum, A., Lewis, C., & Joseph, H. (1993). The effectiveness of in-jail methadone maintenance. *The Journal of Drug Issues*, 23, 75-99.
- Marsch, L. (1998). The efficacy of methadone maintenance interventions in reducing illicit opiate use, HIV risk behavior and criminality: a meta-analysis. *Addiction*, 93(4), 515-532.
- Marsch, L. A., Stephens, M. A., Mudrick, T., Strain, E., Bigelow, G., & Johnson, R. E. (2005). Predictors of outcome in LAAM, buprenorphine, and methadone treatment for opioid dependence. *Experimental and Clinical Psychopharmacology*, 13(4), 293-302.
- Marzo, J. N., Rotily, M., Meroueh, F., Varastet, M., Hunault, C., Obradovic, I., & Zin, A. (2009). Maintenance therapy and 3-year outcome of opioid-dependent prisoners: a prospective study in France (2003-06). *Addiction*, 104(7), 1233-1240.
- Matheson, F.I., Doherty, S., & Grant, B.A. (2011). Community-based aftercare and return to custody in a national sample of substance-abuse women offenders. *American Journal of Public Health*, 101(6), 1126-1132.
- Mattick, R.P., Breen, C., Kimber, J., & Davoli, M. (2009). Methadone maintenance therapy versus no opioid replacement therapy for opioid dependence. *Cochrane Database of Systematic Reviews* 2009, Issue 3.
- McLellan, A. T., Arndt, I. O., Metzger, D. S., Woody, G. E., & O'Brien, C. P. (1993). The effects of psychosocial services in substance abuse treatment. *Journal of the American Medical Association*, 269(15), 1953-1959.

- McMillan, G. P., Lapham, S., & Lackey, M. (2008). The effect of a jail methadone maintenance therapy (MMT) program on inmate recidivism. *Addiction*, 103(12), 2017-2023.
- Messina, N., Burdon, W., Hagopian, G., & Prendergast, M. (2006). Predictors of prison-based treatment outcomes: A comparison of men and women participants. *American Journal of Drug and Alcohol Abuse*, 32(1), 7-28.
- Messina, N., Burdon, W., & Prendergast, M. (2006). Prison-based treatment for drug-dependent women offenders: Treatment versus no treatment. *Journal of Psychoactive Drugs, Supp* 3, 333-343.
- Motiuk, L., Dowden, C., & Nafekh, M. (1999). *Methadone maintenance treatment (MMT) programming for federal prisoners: A preliminary investigation*. Ottawa, ON: Correctional Service Canada.
- Mutasa, H. C. F. (2001). Risk factors associated with noncompliance with methadone substitution therapy (MST) and relapse among chronic opiate users in an Outer London community. *Journal of Advance Nursing*, 35(1), 97-107.
- Nafekh, M., & Motiuk, L. L. (2002). *The Statistical Information on Recidivism – Revised 1 (SIR-R1) Scale: A psychometric examination* (Research Report R-126). Ottawa, ON: Correctional Service Canada.
- Oliver, P., Keen, J., Rowse, G., Ewins, E., Griffiths, L., & Mathers, N. (2010). The effect of time spent in treatment and dropout status on rates of convictions, cautions and imprisonment over 5 years in a primary care-led methadone maintenance service. *Addiction*, 105, 732-739.
- Oser, C., Knudsen, H., Staton-Tindall, M., & Leukefeld, C. (2009). The adoption of wraparound services among substance abuse treatment organizations serving criminal offenders: The role of a women-specific program. *Drug and Alcohol Dependence*, 103(Supp 1), S82-S90.
- Pearson, F. & Lipton, D. (1999). A meta-analytic review of the effectiveness of corrections-based treatments for drug abuse. *Prison Journal*, 79(4), 384-410.
- Platt, J. J. (1995). Vocational rehabilitation of drug abusers. *Psychological Bulletin*, 117(3), 416-433.
- Popova, S., Rehm, J., & Fischer, B. (2006). An overview of illegal opioid use and health services utilization in Canada. *Public Health*, 120(4), 320-328.
- Prendergast, M.L. (2009). Interventions to promote successful re-entry among drug-abusing parolees. *Addiction Science & Clinical Practice*, 5(1), 4-13.

- Public Safety Canada. (2011). Corrections and conditional release statistical overview – annual report 2011 (Publication No. PS1-3/2011E-PDF). Ottawa, ON: Public Works and Government Services Canada.
- Rich, J., Holmes, L., Salas, C., Macalino, G., Davis, D., Ryczek, J., & Flanigan, T. (2001). Successful linkage of medical care and community services for HIV-positive offenders being released from prison. *Journal of Urban Health*, 78(2), 279-289.
- Rowan-Szal, G. A., Chatham, L. R., & Simpson, D. D. (2000). Importance of identifying cocaine and alcohol dependent methadone clients. *The American Journal on Addictions*, 9, 38-50.
- Scherbaum, N., Kluwig, K., Specka, M., Krause, D., Merget, B., Finkbeiner, T., & Gastpar, M. (2005). Group psychotherapy for opiate addicts in methadone maintenance treatment – A controlled trial. *European Addiction Research*, 11, 163-171.
- Stallwitz, A., & Stover, H. (2007). The impact of substitution treatment in prisons- A literature review. *International Journal of Drug Policy*, 18, 464-474.
- Stapleton, R. D., & Commisky, C. M. (2010). Alcohol usage and associated treatment outcomes for opiate users entering treatment in Ireland. *Drug and Alcohol Dependence*, 107, 56-61.
- Stones, G. (1999). *Dynamic and static predictors of methadone maintenance treatment compliance among forensic clients* (Unpublished master's thesis). University of Toronto, Ontario Institute for Studies in Education, Toronto, ON.
- Strain, E. C., Stitzer, M. L., Leibson, I. A., & Bigelow, G. E. (1998). Useful predictors of outcome in methadone-treated patients: Results from a controlled clinical trial with three doses of methadone. *Journal of Maintenance in the Addictions*, 1(3), 15-28.
- Zakaria, D., Thompson J. M., Jarvis, A., & Borgatta, F. (2010). *Summary of emerging findings from the 2007 National Inmate Infectious Disease and Risk-Behaviours Survey* (Research Report R-211). Ottawa ON: Correctional Service Canada.
- Zhang, Z., Friedmann, P., & Gerstein, D. (2003). Does retention matter? Treatment duration and improvement in drug use. *Addiction*, 98, 673-684.