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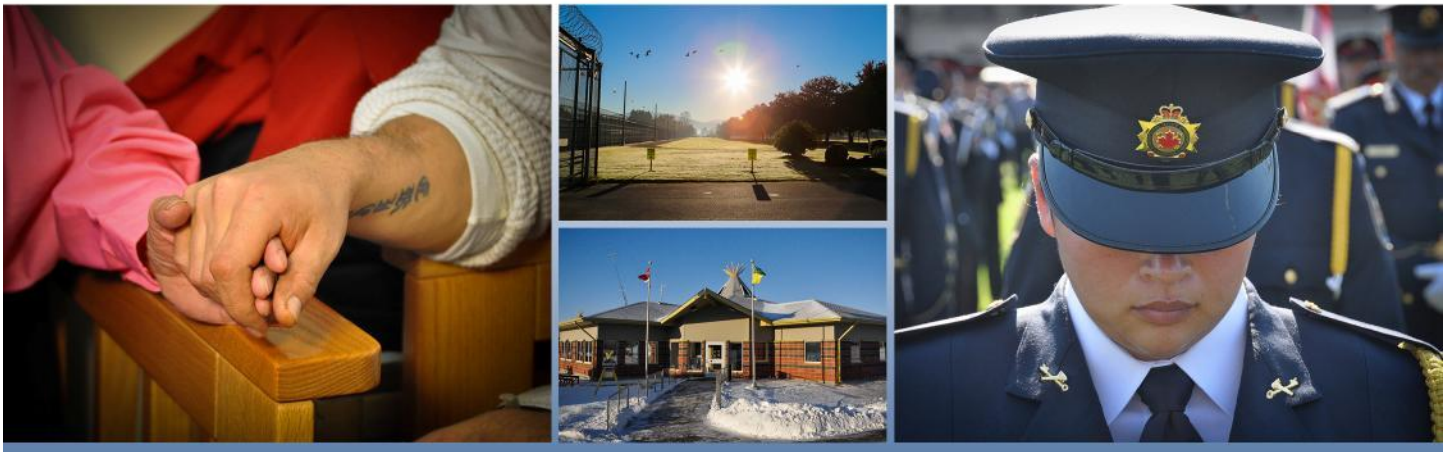

RESEARCH REPORT

Characteristics, Institutional Behaviour, and Post-release Success of Opioid Agonist Treatment (OAT) Participants: Examining Differences across OAT Options

2022 Nº R-436

ISBN : 978-0-660-41279-5

Cat. No. : PS84-200/2022E-PDF

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Characteristics, Institutional Behaviour, and Post-release Success of Opioid Agonist Treatment (OAT) Participants: Examining Differences across OAT Options

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Correctional Service of Canada

2022

Acknowledgements

Thanks to the staff of the Correctional Service of Canada's (CSC) Clinical Services and Public Health Branch for their support of this research, for providing access to CSC pharmacy data for Opioid Agonist Treatment (OAT), and for responding to questions concerning OAT provision in CSC institutions, specifically Jonathan Smith, Olivia Varsaneux, Teresa Mersereau, Judith Laroche, Kashmeera Meghnath, and Emily Kom. The authors appreciate the overall support of Dena Derkzen and Laura Hanby for this project, and to Dena for editorial feedback.

Executive Summary

Key words: *opioid agonist treatment, opioid use disorder, post-release success, institutional behaviour*

Ensuring that offenders have access to interventions that will assist them in addressing their substance use issues allows the Correctional Service of Canada (CSC) to support the safe reintegration of offenders into society. For offenders who misuse opioids, CSC offers Opioid Agonist Treatment (OAT). Methadone has been offered in CSC institutions since 1998 and more recently, Suboxone® has been added to the medication roster (Johnson, Farrell MacDonald & Cheverie, 2011). However, previous CSC research focused on methadone maintenance treatment exclusively. The current study examines both methadone and Suboxone® based treatment. Study cohorts consisted of 2,325 men federal offenders, and 273 women federal offenders, who participated in the CSC's OAT while incarcerated between October 2016 and 2018. Cohorts were further divided into three treatment type groups: methadone only (M-OAT), Suboxone® only (S-OAT), and both medication types (Cx-OAT). Non-OAT comparison groups were also included. Men and women were examined separately. Demographics, offence, and sentence characteristics of these three groups were compared, and indicators of institutional behaviour and post-release success were examined.

Results indicated that men non-OAT offenders were younger, more likely to be classified as minimum security, and more likely to be serving their first federal sentence. In contrast, men offenders in the Cx-OAT group were more likely to be classified as maximum security and serving a longer sentence. Women offenders in the non-OAT and M-OAT groups were more often classified as minimum security while those in the Cx-OAT and S-OAT groups were more often classified as maximum security. Women in the non-OAT group were also most likely to be serving their first federal sentence.

Across all risk related indicators the non-OAT men offenders were the least likely to be high risk or need. The Cx-OAT group were the most likely to have positive urinalysis tests, disciplinary charges or institutional incidents, and flagged mental health concerns. Interestingly, the S-OAT group was most likely to have an institutional incident recorded for diverting OAT medications. The women S-OAT and Cx-OAT groups were more likely to be high risk than the M-OAT or non-OAT groups. The women S-OAT group was also most likely to be high need, across all indicators examined. Among study groups, the S-OAT groups were least likely to be released. The Cx-OAT groups were most likely to have a release suspension and were also the most likely to have a return to custody.

This study provides information about a group of offenders that have not been extensively examined within a Canadian context. Findings suggest that OAT treatment groups have varying characteristics, institutional adjustment, and post-release success. Capacity and modality enhancements, as well as continued research will further improve OAT provisions and support to participants.

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Introduction

Ensuring that offenders have access to interventions that will assist them in dealing with their substance use issues allows the Correctional Service of Canada (CSC) to support the safe reintegration of offenders into society. For offenders who misuse opioids, CSC offers Opioid Agonist Treatment (OAT). Prior research regarding CSC's OAT program indicated that OAT participants were at a higher risk to re-offend, had more extensive criminal histories than the general offender population, and almost half identified a history of mental health challenges (Johnson, Farrell Macdonald, & Cheverie, 2011). The characteristics of these offenders demonstrate the importance of an effective OAT program to address the multiple needs of offenders who have an opioid use disorder (OUD) (Johnson, Farrell Macdonald, & Cheverie, 2011).

Understanding how inmates adjust and adapt to prison life is another important factor in providing a safe environment where rehabilitation can be achieved. In 2008, CSC examined the impact of OAT on institutional adjustment. Results indicated that offenders in the sample were significantly less likely to test positive or refuse to provide urine samples following OAT initiation (Cheverie, MacSwain, Farrell MacDonald, & Johnson, 2014). In addition, the proportion of positive drug tests for opioids was significantly reduced from pre- to post- OAT initiation (13% to 4%) (Cheverie et al., 2014). Finally, fewer OAT participants had disciplinary charges or admissions to either voluntary or involuntary segregation in the post-OAT time period (Cheverie et al., 2014). Moreover, the examination of inmates' behaviour prior to and following OAT initiation revealed positive changes over time, suggesting that OAT has a positive impact on institutional behaviour for offenders who initiate treatment while incarcerated.

Finally, when looking at post-release outcomes for OAT participants, results suggest that retention in OAT may assist opioid dependent offenders in reducing their criminal behaviour, and successfully reintegrating into society (MacSwain, Farrell MacDonald & Cheverie, 2014). The findings of this study highlight the importance of ensuring a continuum of care for offenders upon release. Prior CSC research, however, focused on methadone maintenance treatment exclusively; none have compared OAT modalities to date. The current study will examine both methadone and Suboxone® based treatment.

Opioid Misuse and Dependence

The increasing occurrence of opioid misuse and dependence is a growing concern internationally, both among general and prison populations (Dreifussa et al., 2013; Glenn et al. 2016; Hser et al., 2014; Magura et al., 2009; Sordo et al., 2017; Soyka, Zingg, Koller, & Kuefner, 2008;Velander, 2018). The World Health Organization has estimated global prevalence rates of drug use disorders among adults ranging from 0-3% (World Health Organization, 2014). Further to this, Degenhardt et al. (2014) have estimated that the number of people with opioid dependence worldwide has increased from 10.4 million (0.20%) in 1990 to 15.5 million (0.22%) in 2010. In 2003, it was estimated that there were more than 80,000 regular illegal opioid users in Canada alone (Popova, Rehm, & Fischer, 2006).

Rates for substance misuse are typically more pervasive among offender populations, and are disproportionately higher for those with an OUD (Fazel, Bains, & Doll, 2006; Fazel, Yoon, & Hayes, 2017; Kinlock, Gordon, Schwartz, & O' Grady, 2013; Krawczyk, Picher, Feder, & Saloner, 2017; MacSwain, Farrell MacDonald, Cheverie, & Fischer, 2013). In a systematic review of studies measuring the prevalence of drug misuse and dependence among offenders, estimates varied from 10-61% for men and 30-69% for women (Fazel et al., 2017).

Within the CSC context, 69% of men and 77% of women have an identified substance use issue, with over a third of men (37%) and over a half of women (55%) having a moderate to severe issue (Kelly & Farrell MacDonald, 2015). In addition, the federal inmate infectious disease survey reports that 11% of men and 16% of women disclosed a pre-incarceration history of opioid injection with 8% and 6%, respectively, reporting continued opioid injection use while incarcerated (Zakaria et al., 2010). Further to this, women offenders who used opioids in the twelve months prior to their arrest had the most challenging substance use issues[1], as evidenced by severity, injection drug use, polysubstance use, and prescription drug misuse (Cram & Farrell MacDonald, 2019). Similarly, men offenders who identified opioids as the drug used most in the twelve months prior to their arrest had more severe use histories and overall needs (Wardrop, Farrell MacDonald, 2015).

Responding to the opioid epidemic has received added urgency from the rise of extremely potent synthetic opioids such as fentanyl as well as other prescription opioid medications (Bruneau et al., 2018; Special Advisory Committee on the Epidemic of Opioid

[1] When compared to women who self-identified other substance use types.

Overdoses, 2019; Velander, 2018). Recent years have seen a marked increase in opioid related overdose and death in both community and institutional settings (Bruneau et al., 2018; CSC, 2019b; Health Canada, 2017; Malta et al., 2019; McKendy, Biro & Keown, 2019). The Special Advisory Committee on the Epidemic of Opioid Overdoses (2019) reported that between January 2016 and March 2019, 12,800 Canadians lost their lives to an opioid-related overdose[2]. In a recent CSC report on all overdose incidents in federal custody between 2012 and 2017, opioids were most common in fatal overdoses and unintentional non-fatal overdose incidents, accounting for 91% and 57% of incidents respectively (McKendy, Biro & Keown, 2019). Notably, the percentage of those involving fentanyl increased from 3% (1) in 2012/2013, to 26% (23) in 2016/2017 (McKendy, Biro & Keown, 2019). When it came to fatal overdose incidents, fentanyl was the most common substance found, noted in 36% (8) of cases across the five-year period (McKendy, Biro & Keown, 2019). Taken together, these rates highlight the need for health services and harm reduction initiatives for those who come into contact with the criminal justice system. Effective treatment while in custody and follow-up on release have the potential to make a considerable impact on future outcomes (Fazel et al., 2006; Gordon, Kinlock, Schwartz, & O'Grady, 2008; Magura et al., 2009; Malta et al., 2019).

Opioid Agonist Treatment (OAT)

OUD is one of the most challenging forms of addiction (Bruneau et al., 2018). It places individuals at greater risk of overdose death, infectious disease (e.g. Human Immunodeficiency Virus (HIV), Hepatitis B and C), and criminal involvement (Gordon et al., 2008; Magura et al., 2009; Malta et al., 2019; Marsden et al., 2017; Smith-Rohberg, Bruce, & Altice, 2004). Furthermore, research targeting prison populations has found that offenders with an OUD experience elevated levels of risk upon release to the community (Gordon et al., 2008; Malta et al., 2019; Marsden et al., 2017). OAT is a first-line, highly effective treatment approach for OUD that has demonstrated a range of positive outcomes both for the individual and the community at large (Smith-Rohberg et al. 2004). The most commonly cited benefits of OAT include reductions in the risk for premature death, the commission of drug-related crime, the spread of blood borne viruses, and illicit opioid consumption, as well as prolonged engagement with treatment services, increases in quality of life (improved physical, mental, and social functioning), and reductions in

[2] The number of opioid overdose deaths has steadily increased with each year.

overall healthcare costs (Gordon et al., 2008; Kelly, O'Grady, Mitchell, Brown, & Schwartz, 2011; Malta et al., 2019; Marcovitz, McHugh, Volpe, Votaw, & Connery, 2016; McKeganey, Russell, & Cockayen, 2013; Pinto et al., 2010; Russolillo, Moniruzzaman, McCandless, Patterson, & Somers, 2017; Sordo et al., 2017; Soyka et al., 2008).

Methadone and Suboxone® are two distinct OAT medications. Methadone has been used in OAT for several decades and continues to be the most commonly used worldwide (Hser et al., 2014; Magura et al., 2009). It is a full agonist synthetic opiate, with pharmacological effects similar to morphine (Hser et al., 2016; Pinto et al., 2010; Soyka et al., 2009)[3]. In more recent years in Canada, Suboxone® has been introduced as an alternative approach to methadone[4]. Suboxone® is an opiate substitute that combines buprenorphine (a partial agonist synthetic opiate that lessens the symptoms associated with drug withdrawal) and naloxone[5] (which when combined with heroin or other opioids, counteracts the effects of the drug and initiates opiate withdrawal) (McKeganey et al., 2013; Velander, 2018). Both approaches are effective, though each medication has strengths and weaknesses. Methadone offers better retention, however, it is also associated with stronger physiological dependence and intoxication/sedation (Evans, Zhu, Yoo, Huany, & Hser, 2019; Hser et al., 2016; Hser et al., 2014; Pinto et al., 2010; Russolillo et al., 2017; Srivastava, Kahan, & Nader, 2017). It is also well established in the literature that the higher the dose of methadone, the more effective the treatment is in retaining patients (Amato, Davoli, Perucci, Ferri, Faggiano, & Mattick, 2005). Fewer studies have investigated the effectiveness of higher doses of Suboxone®; however, Hser et al., (2014) suggest that increased doses of either medication offer improved retention[6]. Suboxone®, on the other hand, has a superior safety profile (e.g., reduced risk of overdose, less attractive for diversion, greater cognitive functioning, and minimal medication withdrawal), is more widely accessible (e.g. can be administered and prescribed by physicians in a primary care setting), and has a shorter time to stabilization (Bell, Trinh, Randall, & Rubin 2009; Bi-Mohammed, Wright, Hearty, King, & Gavin, 2017; Bruneau et al., 2018; Evans et al., 2019; Hser et al., 2016; Hser et al., 2014;

[3] Methadone is taken in the form of drink.
[4] In Canada, Suboxone® is the version of buprenorphine that is approved by Health Canada. Although not relevant to the study period, it is also important to note that in May 2019, Health Canada expanded the approved substances for OAT to include injectable hydromorphone and Diacetylmorphine (Health Canada, 2019).
[5] Suboxone® is taken as a sublingual tablet or buccal formulation (film), usually in a 4:1 ratio.
[6] Although dosage data is not available for the current study, future studies could examine the impact of dosage and medication type on patient outcomes.

Magura et al., 2009; Marcovitz et al., 2016; McKeganey et al., 2013; Pinto et al., 2010; Srivastava et al., 2017; Velander, 2018). Although each medication offers a unique profile, research demonstrates that there are few differences in long-term outcomes between methadone and Suboxone® based OAT (Hser et al., 2016; McKeganey et al., 2013; Soyka et al., 2008). Both are effective treatments, especially when combined with psychosocial treatment (Connery, 2015; Sordo et al., 2017; Soyka et al., 2008; Veilleux, Colvin, Anderson, York & Heinz, 2010).

OAT and Correctional Populations

A long standing history of incarceration is not uncommon among those with an OUD (Gordon et al., 2008; Malta et al., 2019; Stöver & Michels, 2010). Crimes committed by opioid dependent individuals are often to support their addiction (e.g. drug possession or sales, theft, forgery, fraud, handling stolen goods, prostitution, etc.), which in turn, contribute to the cyclical problem of relapse, recidivism, and re-incarceration (Evans et al., 2019; Stöver & Michels, 2010). Correctional settings, however, offer a distinct opportunity to engage offenders with OUD's in treatment (Malta et al., 2019). Institutional settings are particularly beneficial because there is less opportunity for relapse into illicit drugs and the structured medication schedules are easily accessible, unlike in the community where continued participation in OAT can be challenging for some (Kelly et al., 2011; Magura et al., 2008). In addition, longer exposure to OAT has been associated with enhanced positive outcomes including both improved retention and reductions of risk (Kelly et al., 2011; Malta et al., 2019). For example, Magura et al., (2009), found that offering OAT to incarcerated individuals encourages continued therapy in the community post-release. Similarly, Gordon et al. (2008) observed that offenders who received counselling and OAT treatment pre-release were significantly more likely to be retained in OAT post-release, were less likely to have opioid positive urine tests, and self-reported fewer days of involvement in heroin use and criminal activity[7]. Further, in a national study conducted in England, prison-based OAT was associated with an 85% reduction in fatal drug-related overdose in the first month after release (Marsden et al., 2017). As noted previously, CSC data has also shown that OAT, initiated in the institution and continued in the community, is associated with improved health and criminogenic outcomes (Farrell MacDonald, MacSwain, Cheverie, Tiesmaki, & Fischer, 2014; MacSwain et al., 2013). Studies of both men and women offenders

[7] When compared to offenders who only received pre-release counselling or pre-release counselling and a referral to OAT in the community post-release.

enrolled in CSC's methadone program, and whom continued methadone post-release in the community, demonstrated a lower risk of returning to custody than those who discontinued methadone post-release (Farrell MacDonald et al., 2014; MacSwain et al., 2013). These findings, along with others, suggest that OAT provided to offenders with pre-incarceration OUD histories may be an effective intervention for interrupting the cycle of relapse and recidivism (D'Andrade, Ritchie, Rowlands, Mann, & Hides, 2018; Gordon et al., 2008; Malta et al., 2019).

OAT participation

Methadone has been offered in CSC institutions since 1998 (Cheverie, MacSwain, Farrell MacDonald, & Johnson, 2014; Johnson, Van de Ven & Grant, 2001; Sibbald, 2002). The OAT treatment program has evolved over time; both expanding the admission criteria[8] and adding Suboxone® to the medication roster[9] (Johnson, Farrell MacDonald & Cheverie, 2011). Previous research has indicated that 7% of men offenders and 11% of women offenders participated in CSC's OAT program while incarcerated (Zakaria, Thompson, Jarvis & Borgatta, 2010), although the demand for OAT has risen in recent years. In response, CSC has increased capacity for OAT in custody by 116% from 2015 to 2019 (CSC, 2019b), and increased the total number of offenders participating in OAT to over 1,200 from October 2016 to December 2018 (CSC, 2018). The objectives of CSC's OAT include reducing illicit drug use, reducing the transmission of blood borne infections through injection drug use, reducing sharing of needles, improving overall health and quality of life, improving work, school and programming activities, and decreasing criminal behaviour and rates of re-incarceration (CSC, 2016).

Purpose of the Current Study

Currently no studies have been undertaken which compare CSC's OAT options. This study aims to provide empirical insights into how different OAT modalities (methadone or Suboxone®) available in CSC fare in regards to key participant characteristics, institutional adjustment, and post-release outcomes following release.

[8] When the program was initially implemented only those offenders who entered a correctional facility already engaged in OAT continued in the program. Beginning in 2002, offenders were able to initiate OAT at any point during their incarceration.

[9] CSC Health Services has been delivering both since December, 2008.

Method

Study Cohort

Men Offenders

The retrospective cohort consisted of 2,325 men federal offenders incarcerated in Canadian federal institutions who were identified as participating in the CSC's OAT while incarcerated between October 2016 and October 2018. Indigenous offenders accounted for 31% (*n* = 877) of the men's study cohort. A subset of 1,466 (63%) men OAT participants who were released during the study period were examined for post-release outcomes.

OAT men participants were divided into three groups: 1,211 men were prescribed methadone (M-OAT), 729 were prescribed Suboxone® (S-OAT), and 385 were prescribed both methadone and Suboxone® during the study period (Cx-OAT). Demographics, offence, and sentence characteristics of these three groups were compared, as were indicators of institutional behaviour, and post-release success.

Men offenders who had a self-identified opioid use issue in the 12 months prior to arrest but who did not participate in OAT were included as a non-OAT comparison group (*n* = 508; non-OAT). Seventy-two percent (*n* = 364) of non-OAT men participants were examined for post-release outcomes.

Women Offenders

For women federal offenders, 273 were identified as participating in CSC's OAT while incarcerated between October 2016 and October 2018. Indigenous women accounted for 40% (*n* = 145) of the study cohort. A subset of 222 (81%) women OAT participants were examined for post-release outcomes.

Women offenders were divided into three groups: 149 women were prescribed methadone (M-OAT), 95 were prescribed Suboxone® (S-OAT), and 29 were prescribed both methadone and Suboxone® during the study period (Cx-OAT). Demographics, offence, and sentence characteristics of these three groups were compared, as were indicators of institutional behaviour, and post-release outcomes.

Women offenders who had a self-identified opioid use issue in the 12 months prior to arrest but who did not participate in OAT were included as a non-OAT comparison group (*n* = 86; non-OAT). Post-release outcomes were examined for 78% (*n* = 67) of this group.

Data Sources

OAT participation was confirmed through CSC regional pharmacy data snapshots taken quarterly between October 2016 and October 2018. Information in these data included substitution type (methadone and Suboxone®), region of OAT participation, and personal identifiers that were used to link OAT data with additional offender information routinely collected by CSC. Additional data were extracted from the Offender Management System (OMS), an electronic administrative and operational database used by CSC to maintain all offender records from sentencing commencement to end. Information contained in the OMS is used by front-line staff for decision-making and tracking of offender information and movement, as well as by CSC for corporate reporting. Substance use information was obtained from the Computerized Assessment of Substance Abuse (CASA; Kunic & Grant, 2006), a self-administered assessment completed by offenders at admission to federal custody.

Measures

General demographic characteristics such as age and Indigenous ancestry were examined. Sentence and offence characteristics examined included region of federal admission, sentence length (average for those serving determinate sentence, and length categories for all offenders: less than 4 years, 4 to 10 years, more than 10 years), and offence type. Other descriptive indicators measured include: initial security classification (minimum, medium, maximum), whether the offender had a mental health concerns flag on their file during incarceration, identified as previously receiving treatment for emotional/mental health issues at admission to federal custody, identified as having unstable accommodation prior to incarceration, substance use severity and characteristics of substance use patterns from the CASA administered at admission, involvement in institutional education interventions, and the Criminal Risk Index (CRI). The CRI is a tool that examines static criminal offence history indicators to determine static risk and identify in-custody intervention needs (CSC, 2019a; Motiuk & Vuong, 2018). Indicators of institutional behaviour included guilty disciplinary charges, random urinalysis testing results, whereby 5% to 10% of the in-custody population was randomly selected, and institutional incidents related to substance use and contraband (overdoses, drug-related contraband, diversion of OAT incidents, and other contraband incidents). Release descriptives for the subset who were released (security classification at release, release type, region of release, release employment status, and community urinalysis results) were examined. Finally,

post-release outcomes were explored: suspensions of release, revocation of release resulting in a return to custody, and the days in the community prior to returning to custody.

Analytical Approach

As all offenders involved in OAT and all offenders identified by the CASA as a non-OAT comparison group were included in this study, the focus of the study is a population and not a sample, therefore inferential statistics were inappropriate and results were examined for meaningful rather than statistical differences. To examine the differences between study groups, frequency distributions were calculated for categorical variables and the effect size was examined using Cramer's *V*.[10] Means and standard deviations were calculated for continuous variables. A multivariable, Cox proportional hazards model was used to determine if study group type was associated with the rate of returns to custody using SAS's PHREG[11] procedure. 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 – return to custody. This method also allows inclusion of other factors (covariates), other than study group, which may affect outcomes in order to determine the impact that each covariate has on the outcome of interest. All variables that identified differences between the study groups were included in the survival analyses, with only those identified as having an impact on post-release success retained. Adjusted hazard ratios (AHR; adjusted for other covariates in the model), 95% confidence intervals (CI), and significance levels were reported for all variables included in the final model.

[10] Cut-offs for Cramer's *V* were obtained from: http://www.acastat.com/statbook/chisqassoc.htm. A weak association is evident when Cramer's *V* is less than 0.1, small association between 0.1 and 0.3, moderate association between 0.3 and 0.5, and a strong association for values above 0.5.

[11] SAS's analysis procedure for Cox proportional hazards regression that allows for time at risk as well as other covariates to be controlled when examining the impact of a particular variable (study group) on the outcome (returns to custody).

Results

The results sections is divided into two parts: 1) the results for men offenders, and 2) the results for women offenders. Within each section, offender demographics, sentence and offence information, criminogenic risk and need information, substance use history, institutional behaviour, and post-release outcomes are examined.

Men Offenders

Table 1 shows the basic descriptive information for the men offenders in the study. On average, offenders in the non-OAT were younger than any of the OAT study groups (35 years versus 37 to 39 years). Overall, about a third of offenders in the study were married or common-law, ranging from 29% for the non-OAT group to 36% for the Cx-OAT and S-OAT groups. Offenders in the S-OAT were most likely to be of Indigenous ancestry while those in the M-OAT group were least likely (42% versus 25%). This difference, however, may be explained by the regional variation in the prescription of Suboxone® among study groups, with almost two-thirds of the S-OAT group being admitted to custody in either the Prairies or Pacific regions. Offenders in the M-OAT group were most likely admitted in the Ontario or Atlantic regions while those in the Cx-OAT group were more likely admitted in the Ontario or Quebec regions. Offenders in the non-OAT group were more likely admitted in the Ontario or Prairie regions (see Table 1). Examination of initial security classification at admission indicates that offenders in the non-OAT group were more likely to be classified as minimum security (22%) while offenders in the S-OAT and Cx-OAT groups were more likely to be classified as maximum security (23% and 24%, respectively).

Table 1

Descriptive characteristics of men study participants

Characteristic	Study Group – Men Offenders								Cramer's *V*
	M-OAT (N = 1,211)		S-OAT (N = 729)		Cx-OAT (N = 385)		Non-OAT (N = 508)		
	% (*n*)		% (*n*)		% (*n*)		% (*n*)		
Age at study period – *M* (*SD*)	39	(10.0)	37	(8.8)	38	(9.5)	35	(10.2)	
Indigenous ancestry	25	(297)	42	(303)	27	(104)	34	(173)	0.15
Married/Common Law	34	(414)	36	(264)	36	(140)	29	(145)	0.06
Study region									0.25
Atlantic	23	(275)	6	(43)	8	(30)	6	(31)	
Quebec	8	(104)	6	(44)	25	(95)	16	(79)	
Ontario	39	(468)	24	(177)	28	(108)	38	(194)	
Prairies	18	(214)	31	(222)	18	(71)	36	(183)	
Pacific	12	(150)	33	(243)	21	(81)	4	(21)	
Offender security classification at admission									0.13
Minimum	16	(191)	10	(69)	8	(31)	22	(97)	
Medium	67	(815)	67	(494)	68	(262)	71	(307)	
Maximum	17	(202)	23	(166)	24	(91)	7	(31)	

Note. OAT = Opioid Agonist Treatment. *M* = Mean, *SD* = Standard Deviation. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, non-OAT = non-OAT group.

Table 2 presents the sentence and offence information for the four study groups. Offenders in the non-OAT were more likely to be serving their first federal sentence (68% versus 45% to 50%). Offenders in the Cx-OAT group were more likely to be serving a longer sentence as over a quarter were serving a sentence of ten years or more or an indeterminate sentence – on average 6 years compared to 4-5 years for the other study groups. The Cx-OAT group was also more likely to have committed a violent offence (74% versus 62% to 67%), particularly a robbery offence (34% versus 24% to 28%). Of the four groups, the non-OAT group was more likely to have committed a drug related offence (25% versus 14% to 19%, see Table 2).

Table 2

Sentence and offence information for men study participants

Characteristic	Study Group – Men Offenders								Cramer's *V*
	M-OAT (N = 1,211)		S-OAT (N = 729)		Cx-OAT (N = 385)		Non-OAT (N = 508)		
	%	(*n*)	%	(*n*)	%	(*n*)	%	(*n*)	
First Federal Sentence	48	(582)	50	(364)	45	(174)	68	(344)	0.15
Average sentence length (years) – *M* (*SD*)	4	(3.7)	5	(3.7)	6	(5.4)	4	(2.5)	
Sentence length categories									0.11
Less than 4 years	55	(662)	51	(370)	43	(165)	59	(300)	
4 to 10 years	29	(354)	30	(216)	31	(120)	33	(170)	
More than 10 years/Indeterminate	16	(195)	19	(143)	26	(100)	8	(38)	
Offence Type									0.08
Robbery	28	(334)	24	(176)	34	(130)	26	(130)	
Drug Related	19	(225)	16	(118)	14	(54)	25	(125)	
Property Related	15	(179)	11	(77)	7	(27)	9	(48)	
Other Violent	34	(416)	43	(315)	40	(154)	36	(182)	
Other Non-Violent	4	(55)	6	(41)	5	(20)	4	(22)	
Violent Offence	62	(750)	67	(490)	74	(282)	62	(750)	0.09

Note. OAT = Opioid Agonist Treatment. *M* = Mean, *SD* = Standard Deviation. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, non-OAT = non-OAT group.

Criminogenic risk and need characteristics are displayed in Table 3. Across all indicators examined, offenders in the non-OAT were less likely to be high risk or need, were more engaged in their correctional plan, and were less likely to have a moderate to high need in the majority of criminogenic need domain areas. Offenders in the S-OAT and the Cx-OAT groups were most likely to be high risk or need, to be less engaged in their correctional plan, to have moderate to high need in six of the seven need domain areas (S-OAT participants were most likely to have need in the marital/family domain). Offenders in the Cx-OAT were most likely to have indicators of mental health concerns on their file or to have unstable accommodation prior to admission.

Table 3

Criminogenic risk and need characteristics for men study participants

Characteristic	Study Group – Men Offenders				Cramer's *V*
	M-OAT (N = 1,211) % (*n*)	S-OAT (N = 729) % (*n*)	Cx-OAT (N = 385) % (*n*)	Non-OAT (N = 508) % (*n*)	
Static Factor Rating (Intake)					0.12
Low	6 (67)	3 (25)	2 (7)	8 (35)	
Moderate	27 (326)	24 (175)	25 (97)	43 (190)	
High	67 (817)	73 (529)	73 (281)	49 (221)	
Dynamic Factor Rating (Intake)					0.11
Low	1 (12)	1 (6)	1 (1)	1 (4)	
Moderate	16 (195)	12 (89)	9 (36)	28 (122)	
High	83 (1,003)	87 (634)	90 (348)	71 (317)	
Criminal Risk Index (CRI) at admission					0.10
Low	6 (66)	6 (44)	5 (17)	13 (62)	
Moderate	35 (390)	31 (217)	33 (120)	41 (201)	
High	59 (666)	63 (443)	62 (226)	46 (227)	
Engaged in Correctional Plan	80 (962)	73 (532)	72 (278)	83 (368)	0.10
Criminogenic Need Domain – Moderate to High Need					
Associates	80 (863)	85 (568)	85 (277)	72 (311)	0.12
Attitudes	83 (905)	90 (599)	90 (292)	71 (308)	0.18
Community Functioning	41 (116)	55 (371)	46 (150)	27 (116)	0.19
Education / Employment	62 (675)	74 (497)	70 (229)	63 (273)	0.11
Marital/Family	35 (376)	50 (334)	31 (101)	33 (142)	0.15
Personal Emotional Orientation	81 (884)	90 (602)	90 (292)	77 (335)	0.13
Substance Abuse	94 (1,021)	94 (629)	96 (312)	95 (412)	0.03
Mental health flag	56 (675)	64 (467)	70 (270)	48 (246)	0.14
Unstable accommodation prior to incarceration	50 (499)	62 (393)	70 (188)	41 (163)	0.15

Note. OAT = Opioid Agonist Treatment. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, non-OAT = non-OAT group.

Table 4 examines substance use history indicators. Although this information is available for all offenders in the non-OAT group, it is only available for about two-thirds of offenders in the other study groups due to regional administration decisions related to the CASA. Therefore, although this information examines substance use patterns for study participants, the results should be interpreted with caution.

Table 4

Substance use history information for men study participants

Characteristic	Study Group – Men Offenders				Cramer's *V*
	M-OAT (N = 813) % (*n*)	S-OAT (N = 460) % (*n*)	Cx-OAT (N = 259) % (*n*)	Non-OAT (N = 508) % (*n*)	
Severity of substance use – 12 months prior arrest					0.07
None/Low	21 (175)	20 (95)	18 (47)	14 (71)	
Moderate	18 (144)	23 (104)	16 (41)	23 (119)	
Substantial/Severe	61 (494)	57 (261)	66 (171)	63 (162)	
Opioids used most in 12 months prior to arrest?*	40 (182)	39 (81)	43 (52)	100 (508)	0.60
Heroin*,+	14 (64)	12 (24)	13 (15)	18 (93)	0.07
Pharmaceutical Opioids*,+	27 (124)	28 (59)	34 (41)	85 (431)	0.55
Lifetime history of injection drug use*	62 (281)	49 (103)	60 (72)	41 (208)	0.19
Same day polysubstance use*	64 (289)	69 (145)	68 (82)	78 (397)	0.14
Previous OAT participation prior to admission*	74 (334)	57 (120)	67 (80)	27 (137)	0.42
Entered CSC on OAT*	60 (270)	29 (60)	46 (55)	3 (16)	0.54

Note. OAT = Opioid Agonist Treatment. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, non-OAT = non-OAT group.

*These indicators were only available for offenders who had completed the CASA assessment (n = 1,288). Assessment non-completion was not a result of study participant characteristics but due to regional assessment practices during the study period. + Categories not mutually exclusive.

The three OAT groups had similar patterns of use in the 12 months prior to arrest with respect to opioids, although the Cx-OAT was slightly more likely to use pharmaceutical opioids during that time (see Table 4). As the non-OAT group was identified based on their use of opioids in the 12 months prior to arrest, their information for opioid use and the types used should not be compared to the OAT groups.

The other substance use indicators examine lifetime use and therefore are suitable to compare across all study groups (see Table 4). Offenders in the M-OAT and Cx-OAT groups were most likely to have a lifetime history of injection drug use (62% and 60%, respectively). The non-OAT group, on the other hand, was most likely to have indicated lifetime polysubstance use (using different substance types in the same day). Examination of indicators related to prior OAT participation showed that the M-OAT and Cx-OAT groups were most likely to have prior OAT participation (74% and 67%, respectively) or to have entered CSC while on OAT (60% and 46%, respectively), suggesting a greater proportion of these two groups were continuing OAT involvement during their incarceration. Three percent of the non-OAT group indicated entering CSC on OAT, and did not continue their participation during their incarceration. Only one-quarter of the S-OAT indicated entering CSC on OAT.

Table 5 summarizes the indicators of institutional behaviour examined for this study: guilty disciplinary charges, institutional incidents, random urinalysis testing, and participation in correctional programming, as well as, education and employment initiatives. Across all indicators examined, the Cx-OAT group were more likely to have positive urinalysis tests (25%), disciplinary charges (71%), or institutional incidents (60%) when compared to the other study groups (see Table 5). The S-OAT and Cx-OAT groups, however, were most likely to have an institutional incident recorded for diverting OAT medications compared to the other groups (13% and 11% versus 0.2% and 2%). Compared to the other OAT groups, M-OAT participants were least likely to exhibit problematic institutional behaviour during the study period.

Examination of indicators to address criminogenic needs showed that offenders in the non-OAT were least likely to have participated in institutional education or employment initiatives or to have completed correctional programming (see Table 5). This may be due to lower identified needs in these areas for offenders in the non-OAT group. Among the three OAT groups, similar proportions participated in institutional education and employment, while the S-OAT was slightly more likely to have completed correctional programming.

Table 5

In-custody behaviour indicators for men study participants

Characteristic	Study Group – Men Offenders				Cramer's *V*
	M-OAT (N = 1,211) % (*n*)	S-OAT (N = 729) % (*n*)	Cx-OAT (N = 385) % (*n*)	Non-OAT (N = 508) % (*n*)	
Institutional random urinalysis results*					
Refuse to provide urine sample	11 (82)	15 (63)	16 (45)	11 (40)	0.07
Positive for substance use	16 (125)	24 (97)	25 (69)	20 (70)	0.09
Positive for opioids	10 (80)	5 (20)	7 (19)	7 (23)	0.08
Positive for marijuana	13 (97)	17 (69)	20 (54)	16 (55)	0.07
Any institutional charges (guilty)	46 (558)	50 (363)	71 (275)	52 (264)	0.16
Minor	33 (402)	36 (263)	55 (211)	41 (210)	0.15
Serious	27 (327)	34 (246)	47 (181)	34 (170)	0.14
Institutional incidents	37 (446)	48 (352)	60 (229)	40 (201)	0.16
Overdose related	1 (14)	1 (7)	2 (7)	2 (8)	0.03
Alcohol/drug contraband related	33 (400)	47 (343)	56 (214)	36 (184)	0.17
Contraband related to OAT diversion	2 (23)	13 (93)	11 (43)	0.2 (1)	0.23
Participated in institutional education	40 (480)	44 (321)	44 (168)	36 (185)	0.06
Participated in institutional employment	21 (255)	25 (179)	24 (92)	14 (69)	0.09
Completed correctional programming	82 (995)	87 (633)	82 (316)	70 (350)	0.15

Note. OAT = Opioid Agonist Treatment. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, Non-OAT = non-OAT group.

* Random urinalysis testing selects 5% to 10% of the institutional population per month, therefore not all offenders would have been tested (65% of offenders in the study had random urinalysis data). Multiple substances can be identified in each sample. Other drug types tested (cocaine/crack, benzodiazepines, and other drugs) did not have sufficient positive results to report for the study groups.

Overall, 65% of men offenders were released during the study period. A smaller proportion of offenders in the S-OAT group were released (57%) when compared to the Cx-OAT (65%), M-OAT (66%) or non-OAT (72%) groups. Tables 6 examines the release characteristics of the study groups. The non-OAT group was more likely to be classified as minimum security at release (41%) while the S-OAT and Cx-OAT participants were more likely to be released from maximum security than the other groups (21%-22% versus 6% and 12%; see Table 6). Region of release had similar patterns to admission region across the study groups. The non-OAT was twice as likely as the Cx-OAT to be released on discretionary release (44% versus 21%) and was less likely than all the OAT groups to have a residency requirement of release. The non-OAT group was more likely to have community employment opportunities on release, and less likely to have positive urinalysis tests during release. The M-OAT group was most likely to have positive tests for opioid use across the four study groups (see Table 6).

Post-release outcomes are shown in Table 7. The Cx-OAT was most likely to have a release suspension while the other three groups had similar rates (71% versus 51% to 54%). The Cx-OAT group was also more likely to have a return to custody (either due to a technical revocation or from committing a new offence), followed by the non-OAT group (49% and 41%, respectively). Overall, a small proportion of offenders from any of the groups committed a new offence while on release (2% to 7%). Although more likely than the M-OAT and S-OAT groups to return to custody, on average, the non-OAT was in the community one month to one and a half months longer than those in the other study groups before returning to custody (see Table 7). OAT participation during release is not shared with CSC unless the offender consents to provide that information, however, using community urinalysis results, over half of the M-OAT and one-quarter of the Cx-OAT continued to be prescribed methadone following release. This finding should be interpreted with caution, as the laboratory responsible for testing CSC's random and community monitoring urinalysis results was not accredited to test for Suboxone® during the study period, therefore it is not possible to confirm on-going Suboxone® participation using this method.

Table 6

Release characteristics for men study participants

Characteristic	Study Group – Men Offenders				Cramer's *V*
	M-OAT (N = 799) % (*n*)	S-OAT (N = 418) % (*n*)	Cx-OAT (N = 249) % (*n*)	Non-OAT (N = 364) % (*n*)	
Offender security classification at release					0.17
Minimum	25 (197)	20 (82)	14 (34)	41 (149)	
Medium	63 (506)	59 (247)	64 (160)	53 (192)	
Maximum	12 (96)	21 (89)	22 (55)	6 (23)	
Region of Release					0.28
Atlantic	26 (208)	7 (30)	6 (15)	8 (28)	
Quebec	8 (68)	5 (22)	29 (72)	17 (63)	
Ontario	34 (269)	21 (86)	22 (56)	37 (133)	
Prairies	16 (126)	20 (84)	15 (37)	32 (117)	
Pacific	16 (128)	47 (196)	28 (69)	6 (23)	
Discretionary release (day or full parole)	31 (251)	26 (107)	21 (53)	44 (161)	0.16
Residency condition on release	33 (262)	39 (163)	44 (11)	21 (75)	0.16
Employed during release	43 (340)	39 (161)	43 (107)	59 (213)	0.14
Community urinalysis results*					
Positive for substance use	49 (306)	60 (186)	51 (101)	28 (112)	0.14
Positive for opioids	30 (187)	8 (24)	13 (26)	11 (31)	0.25
Positive for marijuana	27 (168)	40 (125)	29 (58)	17 (50)	0.17

Note. OAT = Opioid Agonist Treatment. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, non-OAT = non-OAT group.

* Community urinalysis testing was available for 78% of the offenders in the study. Multiple substances can be identified in each sample, if consumed by the offender. There were no differences across study groups with respect to positives for cocaine/crack (15.3%) or other drug types (16.6%). Benzodiazepines did not have sufficient positive results to report for the study group.

Table 7

Post-release outcomes for men study participants

Characteristic	Study Group – Men Offenders				Cramer's *V*
	M-OAT (N = 799) % (*n*)	S-OAT (N = 418) % (*n*)	Cx-OAT (N = 249) % (*n*)	Non-OAT (N = 364) % (*n*)	
Release suspended	54 (431)	54 (226)	71 (177)	51 (187)	0.12
Returned to custody (revocation of release)	36 (285)	27 (114)	49 (123)	41 (148)	0.14
Returned to custody with new offence	5 (40)	2 (26)	5 (13)	7 (26)	0.07
Average number of days until return to custody *M* (*SD*)	203 (124.9)	187 (119.9)	185 (85.4)	234 (131.2)	
Post-release methadone maintenance participation*	54 (430)	3 (14)	27 (66)	0 (0)	0.54

Note. OAT = Opioid Agonist Treatment. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, non-OAT = non-OAT group.
* Offenders are not required to share post-release OAT status with CSC, and the lab that analyzes CSC's urinalysis samples is not licenced to test for Suboxone®, therefore only on-going methadone participation by community urinalysis testing is possible to detect.

Table 8 presents the results of the Cox proportional hazards regression survival analysis, taking into account time at risk on release and other factors that impact on post-release outcomes (security classification at release, type of release, region of release, and CRI rating). After accounting for these other factors, the Cx-OAT was 57% more likely to return to custody than the M-OAT group. The S-OAT was as likely as the M-OAT group to return to custody, and the non-OAT groups was 14% more likely to return to custody, but the finding was non-significant in the survival model.

Table 8

Cox regression analysis of any returns to custody for men study participants

Indicator	Cox Regression Model		
	Hazard Ratio (HR)	**Confidence Interval (CI)**	**P-Value**
OAT Substance: *Methadone* (ref)			0.0005
Suboxone®	1.00	(0.80-1.26)	
Both Methadone/Suboxone®	1.57	(1.26-1.97)	
Non-OAT	1.14	(0.92-1.42)	
Offender Security Classification: *Minimum* (ref)			< .0001
Medium	1.59	(1.25-2.03)	
Maximum	2.41	(1.78-3.25)	
Release Type: *Discretionary* (ref)			< .0001
Non-discretionary Release	1.65	(1.33-2.06)	
Criminal Risk Index (CRI): *Low* (ref)			< .0001
Moderate	1.91	(1.21-3.01)	
High	2.77	(1.76-4.35)	
Region of Release: *Ontario* (ref)			< .0001
Atlantic	1.95	(1.52-2.50)	
Quebec	0.79	(0.59-1.05)	
Prairies	2.00	(1.59-2.49)	
Pacific	1.14	(0.90-1.46)	
Wald Chi-Square		255.3	
DF		12	
P-Value		< .0001	

Note. OAT = Opioid Agonist Treatment.

Women offenders[12]

Descriptive information for women study participants are presented in Table 9. On average, women in the study were between 33 and 36 years of age. As with men offenders, a greater proportion of women in the S-OAT group were Indigenous compared to the other groups (54% versus 28% to 42%). Almost one-third of M-OAT participants were married/common law compared to one-quarter or less of the other study groups. Women in the M-OAT group were most likely to be admitted to the Ontario (33%), Prairies (27%) or Atlantic (27%) regions. Admissions in the Prairies (45%) or the Ontario (27%) were most common in the S-OAT group. The Cx-OAT participants were more likely to be admitted to the Quebec (42%) or Ontario (24%) regions, while the non-OAT group were most likely to be admitted to the Prairie (57%) or Ontario (20%) regions. Women in the non-OAT and M-OAT groups were more likely to be minimum security at admission (41% and 36%, respectively) while those in the Cx-OAT and S-OAT groups were more likely to be classified as maximum (14% and 17%, respectively, see Table 9).

Table 9

Descriptive characteristics of women study participants

Characteristic	Study Group – Women Offenders				Cramer's *V*
	M-OAT (N = 149) % (*n*)	S-OAT (N = 95) % (*n*)	Cx-OAT (N = 29) % (*n*)	Non-OAT (N = 86) % (*n*)	
Age at study period – *M* (*SD*)	36 (9.5)	33 (7.8)	36 (9.0)	33 (9.6)	
Indigenous ancestry	34 (50)	54 (51)	28 (8)	42 (36)	0.18
Married/Common Law	31 (46)	25 (24)	17 (5)	23 (20)	0.10
Offender security classification at admission					0.16
Minimum	36 (54)	19 (18)	21 (6)	41 (31)	
Medium	57 (85)	64 (61)	65 (19)	51 (39)	
Maximum	7 (10)	17 (16)	14 (4)	8 (6)	

Note. OAT = Opioid Agonist Treatment. *M* = Mean, *SD* = Standard Deviation. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, non-OAT = non-OAT group.

[12] Some results for women offenders were excluded from the tables or were collapsed into fewer categories than for men offenders due to small numbers.

Table 10 shows the sentence and offence information for women study participants. Women in the non-OAT group were most likely to be serving their first federal sentence (87% compared to 69% to 82%). Average sentence lengths across the groups were comparable (3 to 4 years), but a greater proportion of offenders in the S-OAT group were serving sentences of four or more years. The S-OAT group was also more likely to have committed a violent offence (see Table 10). Offenders in the M-OAT and Cx-OAT groups were more likely to have committed drug offences.

Table 10

Sentence and offence information for women study participants

Characteristic	Study Group – Women Offenders				Cramer's *V*
	M-OAT (N = 149) % (*n*)	S-OAT (N = 95) % (*n*)	Cx-OAT (N = 29) % (*n*)	Non-OAT (N = 86) % (*n*)	
First federal sentence	80 (119)	82 (78)	69 (20)	87 (75)	0.12
Average sentence length (years) – *M* (*SD*)	3 (1.5)	4 (1.9)	4 (2.9)	3 (1.6)	
Sentence length categories					0.06
Less than 4 years	77 (114)	70 (66)	76 (22)	74 (64)	
4 years or more/ Indeterminate	23 (35)	30 (29)	24 (7)	26 (22)	
Offence Type					0.17
Robbery	20 (29)	16 (15)	35 (10)	22 (19)	
Drug Related	42 (62)	31 (30)	39 (11)	29 (25)	
Other Violent	23 (35)	39 (37)	11 (3)	30 (26)	
Property or Other Non-Violent	15 (23)	14 (13)	15 (4)	19 (16)	
Violent Offence	43 (63)	55 (52)	46 (13)	52 (45)	0.11

Note. OAT = Opioid Agonist Treatment. *M* = Mean, *SD* = Standard Deviation. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, non-OAT = non-OAT group.

Criminogenic risk and need information is displayed in Table 11. The S-OAT and Cx-OAT groups were more likely to be high risk than women in the M-OAT or non-OAT groups. The S-OAT group was more likely to be high need, across all indicators examined: static factor rating, dynamic factor rating, and CRI. Women in the S-OAT group were also more likely to have responsivity issues (48% versus 27% to 41%) although a similar proportion of the OAT participants had mental health concerns, regardless of study group (48% to 50%). The M-OAT group was least likely to have identified needs in the seven criminogenic need domain areas, except for the personal emotional domain, where the non-OAT group were least likely to have an identified need in this area (see Table 11). As with the men offenders in the study, women in the Cx-OAT group were the most likely to have unstable accommodation prior to admission to custody (78% compared to 62% to 72%).

Substance use history information for women offenders in the study is presented in Table 12. As with men offenders, the CASA was used to identify members of the non-OAT group, therefore the opioid use information in the 12 months prior to arrest should only be compared across the three OAT groups. For women offenders, very few (n = 15) did not have this information.

There were similar patterns of use in the 12 months prior to arrest with respect to opioids among the three OAT groups, however, the S-OAT was slightly less likely to use any type of opioids during that time (see Table 12). For the other lifetime substance use indicators, women in the M-OAT and Cx-OAT groups were most likely to have a lifetime history of injection drug use (81% and 85%, respectively). The Cx-OAT group was also most likely to have indicated lifetime polysubstance use (using different substance types in the same day).

Table 11

Criminogenic risk and need information for women study participants

Characteristic	Study Group – Women Offenders				Cramer's *V*
	M-OAT (N = 149) % (*n*)	S-OAT (N = 95) % (*n*)	Cx-OAT (N = 29) % (*n*)	Non-OAT (N = 86) % (*n*)	
Static Factor Rating (Intake)					0.11
Low	28 (41)	15 (14)	17 (5)	23 (18)	
Moderate	48 (72)	50 (48)	48 (14)	55 (43)	
High	24 (36)	35 (33)	35 (10)	22 (17)	
Dynamic Factor Rating (Intake)					0.09
Low	3 (5)	0 (0)	0 (0)	5 (4)	
Moderate	28 (42)	26 (25)	31 (9)	27 (21)	
High	69 (102)	74 (70)	69 (20)	68 (53)	
Criminal Risk Index(CRI) at admission					0.13
Low	26 (31)	13 (11)	20 (5)	30 (22)	
Moderate	48 (47)	53 (44)	44 (11)	52 (38)	
High	26 (31)	34 (28)	36 (9)	18 (13)	
Responsivity issues	41 (61)	48 (46)	38 (11)	27 (21)	0.15
Engaged in Correctional Plan	91 (136)	89 (85)	90 (26)	95 (73)	0.07
Criminogenic Need Domain – Moderate to High Need					
Associates	84 (122)	96 (90)	93 (27)	87 (68)	0.16
Attitudes	48 (70)	61 (57)	72 (21)	49 (38)	0.15
Community Functioning	49 (70)	67 (63)	69 (20)	54 (42)	0.17
Education / Employment	61 (88)	72 (68)	72 (21)	62 (88)	0.11
Marital/Family	58 (83)	71 (67)	62 (18)	72 (56)	0.14
Personal Emotional Orientation	84 (122)	96 (90)	86 (25)	79 (62)	0.18
Substance Abuse	94 (137)	98 (92)	97 (28)	95 (74)	0.07
Mental health flag	50 (74)	50 (47)	48 (14)	34 (29)	0.14
Unstable accommodation prior to incarceration	62 (66)	72 (56)	78 (18)	68 (42)	0.11

Note. OAT = Opioid Agonist Treatment. *M* = Mean, *SD* = Standard Deviation. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, non-OAT = non-OAT group.

Table 12

Substance use history information for women study participants

Characteristic	Study Group – Women Offenders				Cramer's *V*
	M-OAT (N = 149) % (*n*)	S-OAT (N = 95) % (*n*)	Cx-OAT (N = 29) % (*n*)	Non-OAT (N = 86) % (*n*)	
Severity of substance use – 12 months prior arrest					0.10
None/Low	7 (11)	12 (11)	7 (2)	5 (4)	
Moderate	10 (14)	18 (17)	11 (3)	16 (12)	
Substantial/Severe	83 (120)	70 (64)	82 (22)	79 (61)	
Opioids used most in 12 months prior to arrest?	45 (64)	40 (36)	50 (13)	100 (86)	0.50
Heroin	6 (9)	10 (9)	15 (4)	0 (0)	0.18
Pharmaceutical Opioids	39 (55)	30 (27)	35 (9)	100 (86)	0.57
Lifetime history of injection drug use	81 (114)	65 (59)	85 (22)	59 (51)	0.22
Same day polysubstance use	80 (113)	76 (69)	92 (24)	84 (72)	0.11

Note. OAT = Opioid Agonist Treatment. *M* = Mean, *SD* = Standard Deviation. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, non-OAT = non-OAT group.

Table 13 displays the information for institutional behaviour.[13] Women in the M-OAT group had the most stable institutional behaviour when examining disciplinary charges and institutional incidents while women in the Cx-OAT group were more likely to have disciplinary charges and women in the S-OAT group were more likely to have institutional incidents. Examination of pro-social indicators showed that offenders in the S-OAT group were more likely to have participated in institutional education or employment initiatives (see Table 13). Correctional program completion was similar across all groups.

[13] There were only six random urinalysis tests that were positive for women in the study, only four women had overdose incidents, and only 9 had incidents related to diversion (all in the Suboxone® group), so these indicators were not examined across study groups for women.

Table 13

In-custody behaviour indicators for women study participants

Characteristic	Study Group – Women Offenders				Cramer's *V*
	M-OAT (N = 149) % (*n*)	S-OAT (N = 95) % (*n*)	Cx-OAT (N = 29) % (*n*)	Non-OAT (N = 86) % (*n*)	
Any institutional charges (guilty)	38 (57)	52 (49)	72 (21)	45 (39)	0.19
Minor	32 (48)	43 (41)	69 (20)	41 (35)	0.20
Serious	21 (31)	37 (35)	41 (12)	16 (14)	0.21
Institutional incidents	30 (45)	48 (46)	35 (10)	31 (27)	0.16
Alcohol/drug contraband related	11 (17)	27 (26)	14 (4)	12 (10)	0.19
Participated in institutional education	52 (77)	54 (51)	41 (12)	51 (44)	0.06
Participated in institutional employment	54 (81)	59 (56)	28 (8)	51 (44)	0.16
Completed correctional programming	97 (144)	97 (92)	100 (29)	90 (77)	0.16

Note. OAT = Opioid Agonist Treatment. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, Non-OAT = non-OAT group.

During the study period, 81% of women offenders were released. Offenders in the S-OAT group were least likely to be released (73%) when compared to the non-OAT (78%), Cx-OAT (83%), or M-OAT (87%) groups. Tables 14 presents the release characteristics for women offenders. As with the men, the non-OAT group was more likely to be classified as minimum security at release (67%) while the S-OAT and Cx-OAT participants were more likely to be released from maximum security (17%-25% versus 2% and 3%; see Table 14). M-OAT women were most likely released from the Ontario and Atlantic regions (33% each) while S-OAT women were more likely released from the Ontario (30%), Prairie (29%), and Pacific (28%) regions. Over half of women (54%) in the Cx-OAT group were released from the Quebec region while about half (49%) of the non-OAT women were released from the Prairie region. Almost three-quarters (75%) of the non-OAT were released on discretionary release compared to less than half for the Cx-OAT group (46%). S-OAT participants were most likely to have a residency

condition during release (20% compared to 3% to 17%). The non-OAT group was more likely to have community employment opportunities on release (49%). Offenders in the Cx-OAT and S-OAT groups were least likely to have positive urinalysis tests during release (see Table 14).[14]

Post-release outcomes are shown in Table 15. The Cx-OAT was most likely to have a release suspension while the other three groups had similar rates (67% versus 43% to 52%). The Cx-OAT group was also more likely to have a return to custody (either due to a technical revocation or from committing a new offence), followed by the S-OAT group (54% and 41%, respectively). Overall, 4% to 9% of women across the groups had committed a new offence during release. Among offenders who returned to custody, the M-OAT and non-OAT were in the community longer than those in the other study groups before returning to custody (see Table 15); the M-OAT group was in the community over two months longer than the non-OAT group and almost three months longer than the other two groups.

[14] Urinalysis tests positive for prescribed methadone were excluded from the positive tests for opioids.

Table 14

Release characteristics for women study participants

Characteristic	Study Group – Women Offenders				Cramer's *V*
	M-OAT (N = 129) % (*n*)	S-OAT (N = 69) % (*n*)	Cx-OAT (N = 24) % (*n*)	Non-OAT (N = 67) % (*n*)	
Offender security classification at release					0.25
Minimum	51 (66)	35 (24)	25 (6)	67 (45)	
Medium	46 (59)	48 (33)	50 (12)	31 (21)	
Maximum	3 (4)	17 (12)	25 (6)	2 (1)	
Discretionary release (day or full parole)	65 (84)	55 (38)	46 (11)	72 (48)	0.16
Residency condition on release	10 (13)	20 (14)	17 (4)	3 (2)	0.19
Employed during release	37 (48)	31 (22)	4 (1)	49 (33)	0.24
Community urinalysis results*					
Positive for substance use	49 (51)	37 (18)	25 (4)	43 (18)	0.15
Positive for opioids	40 (42)	6 (3)	13 (2)	14 (6)	0.35

Note. OAT = Opioid Agonist Treatment. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, non-OAT = non-OAT group.

* Community urinalysis testing was available for 73% of the offenders in the study. Multiple substances can be identified in each sample, if consumed by the offender. There were no differences across study groups with respect to positives for marijuana (15.6%), cocaine/crack (16.6%) or other drug types (17.1%). Benzodiazepines did not have sufficient positive results to report for the study group.

Table 15

Post-release outcomes for women study participants

Characteristic	Study Group – Women Offenders				Cramer's *V*
	M-OAT (N = 129) % (*n*)	S-OAT (N = 69) % (*n*)	Cx-OAT (N = 24) % (*n*)	Non-OAT (N = 67) % (*n*)	
Release suspended	43 (56)	52 (36)	67 (16)	46 (31)	0.13
Returned to custody (revocation of release)	35 (45)	41 (28)	54 (13)	28 (19)	0.14
Return due to new offence	6 (8)	9 (6)	4 (1)	6 (4)	0.05
Average number of days until return to custody *M* (*SD*)	275 (135.2)	186 (109.2)	185 (85.2)	207 (133.1)	

Note. OAT = Opioid Agonist Treatment. M-OAT = methadone group, S-OAT = Suboxone® group, Cx-OAT = Changed methadone/Suboxone®, non-OAT = non-OAT group.

Discussion

This study examined the characteristics, sentence and offence information, and criminogenic risk and need information, as well as institutional behaviour and post-release outcomes for four groups of offenders: three who participated in varying OAT modalities (M-OAT, S-OAT, and Cx-OAT), and a non-OAT group.

Generally, men and women offenders in the OAT treatment groups were slightly older than the non-OAT comparison group but younger than offenders in the general population[15] (CSC, 2019c), with one exception; women in the S-OAT group were comparable in age to their non-OAT counterparts. This may be explained by the higher proportion of Indigenous offenders in that group compared to other women's study groups, as Indigenous offenders in general, tend to be younger (CSC, 2014).This effect is somewhat evident among men offenders in the S-OAT group as well. Similarly, they were the youngest of the OAT study groups and had the highest proportion of Indigenous ancestry. Research has shown that OAT participants who are older have longer period of treatment and overall better treatment outcomes than younger participants (Carew & Comiskey, 2017; Rajarnatnam, Sivesind, Todman, Roane, & Seewald, 2009), which is supported by the proportion of M-OAT participants, in particular, who reported pre-incarceration OAT participation.

Offenders in the S-OAT and Cx-OAT groups, regardless of gender, had higher criminogenic risk and need profiles than either the M-OAT or non-OAT study groups as evidenced by their static and dynamic ratings, their initial security classification, the proportion with moderate to high needs across six of the seven criminogenic needs areas (associates, attitudes, community functioning, employment/education, marital/family relations, and personal/emotional orientation) and their CRI levels. Not surprisingly, comparable proportions across study groups had an identified need in the substance abuse domain. Compared to the general offender population (both men and women), offenders in the current study were higher criminogenic risk and need, with a greater proportion having a high CRI, and a greater proportion identified as moderate-high need across all seven criminogenic domain areas (Helmus & Forrester, 2014; Motiuk & Vuong, 2018; Stewart et al., 2017), although the non-OAT group

[15] The median age of the federal offender population in 2018 was 42 years.

was more similar to the general offenders population than the OAT groups. These findings reinforce that OAT participants would benefit from a variety of interventions (addictions related, correctional programming, education, employment, etc.) in order to address their multiple needs and the factors that lead to their criminal offending. The goal of OAT is not only to reduce illicit drug use, but also to improve overall quality of life and participation in work, school and programming activities in order to fully support reintegration and reduce their risk to re-offend (CSC, 2016).

Men offenders in the Cx-OAT group and women offenders in the S-OAT and Cx-OAT groups were found to have the most problematic institutional behaviour, as identified through random institutional urinalysis, disciplinary charges, and institutional incidents, especially those which were substance related (contraband). The problematic behaviour of the Cx-OAT may be associated with the changing of treatment modalities, as health care staff work with these offenders to explore all possible options and ensure retention in OAT, even though they are less likely to have stable adjustment. Diversion of OAT medications by the men's S-OAT and Cx-OAT groups was also more frequent than the other study groups. Although Suboxone® diversion is often identified as occurring less frequently than methadone diversion among OAT community participants (Bi-Mohammed et al., 2017), diverting a tablet within a correctional population may be preferable to a liquid methadone dosage. CSC now offers the Suboxone® buccal film and in late 2019 introduced the Sublocade, an extended release monthly injection approved for use in Canada in 2018, which may help to reduce to rates of diversion (CSC, 2019b; Government of Canada, 2019).

The Cx-OAT group among men and women offenders had higher rates of post-release suspension and returns to custody than the other study groups. Adjusting for time at risk and other covariates among men offenders confirm the finding that the Cx-OAT returned to custody more than the M-OAT group, which was comparable to the S-OAT group with respect to returns but slightly less likely than the non-OAT group (although non-significant). Relative to the general offender population (Thompson, Forrester, & Stewart, 2015), the M-OAT, S-OAT, and non-OAT groups for men, and the M-OAT and non-OAT groups for women, had comparable proportions who returned to custody due to revocations of release. Ongoing OAT participation post-release has shown to decrease returns to custody among federal offenders (Farrell MacDonald et al., 2014; MacSwain et al., 2013), and although not measured in this study as it

was not possible to determine Suboxone® participation in the community, it is likely that those offenders across the OAT modalities who continued treatment would have greater success post-release. OAT groups were less likely than non-OAT participants to have community employment upon release, even though they were more likely than the non-OAT group to participate in employment and education initiatives while incarcerated. On-going substance use treatment requirements during release, including OAT participation, may impact offenders in the OAT groups' ability to access and maintain employment while on release.

As with any research, there are limitations to this study. First, specific information pertaining to OAT participation was not available for examination for the study period. In particular, the exact duration of OAT participation, OAT dosage information, and whether OAT participation continued during release. For instance, confirmation of OAT participation during release for all OAT groups may have provided additional sensitivity to examine suspensions and returns to custody for those who maintained their OAT versus those who did not. Second, data were not available concerning the physical or in-depth mental health of the offenders in the study. An examination of the physical and mental health issues of these offenders may reveal differing characteristics across the study groups. Finally, the non-OAT were slightly different than the OAT groups in that they were younger, less likely to be serving a second or subsequent federal sentence, had lower CRI scores, and were less likely to have poor institutional behaviour indicators (such as, disciplinary charges and institutional incidents) or post-release issues (suspensions or returns to custody) compared to the OAT groups. It is possible that this group may not have been the ideal comparison group for the OAT groups. They identified opioids as the drug use most prior to arrest, but they did not access OAT treatment during incarceration, therefore, differences other than those measured in the study may exist between the OAT and non-OAT groups. Using a group who self-identified for OAT but who did not access the intervention during custody (waitlisted group) would have been the most suitable comparison group, but this information was not available nationally during the entire study period.

Research to provide a deeper understanding of living and lived experiences of OAT participants could supplement our current knowledge for this group of offenders and, in turn, assist CSC in continuing to enhance OAT provisions. Currently, CSC is supporting research by

academic partners in the Ontario[16] and Quebec[17] regions to explore the transition for OAT participants from the institution to the community. These qualitative studies involve interviews with OAT participants in the six months prior to release and in the community after four to six months post-release to explore how the offender transitioned from the institution to the community, whether they are continuing with OAT provisions in the community, and how the offenders' substance use issues have impacted on their reintegration to the community.

Another potential area for further examination could be exploratory interviews with non-OAT participants to determine why they have not accessed OAT treatment, either prior to incarceration or in-custody, to address their opioid use. Overall, the non-OAT group was more likely to have a moderate to severe substance use issue than any of the OAT treatment groups. This may be due to the time reference for assessing severity (12 months prior to arrest). More specifically, some offenders in the OAT groups may have been participating in OAT in the community during the 12 months prior to arrest, therefore substance use patterns of these offenders may differ than their non-OAT use patterns. Furthermore, although the non-OAT group had all identified opioids as the substance most often used in the 12 months prior to arrest, a greater proportion indicated polysubstance use than the OAT groups. It is possible that the non-OAT may not perceive their use of opioids as their most problematic substance or they may not consider OAT sufficient to address their more diverse substance use issues.

Future research collaborations with CSC Health Services related to OAT will also be explored, using information from CSC's electronic medical record system (OSCAR; CSC, 2017b). OSCAR was implemented in late 2016 and, following a staggered integration of offender medical information, now includes data pertaining to OAT as well as a variety of other health information (e.g., testing for blood borne infections, other prescribed medications, treatment for on-going health concerns, etc.). Furthermore, data warehouse capabilities for OSCAR have evolved over the last few years, and the data have now matured sufficiently to provide a viable source of administrative health information for Health Services to continually monitor their services, as well as provide data for research purposes. In addition, with the introduction of prison needle exchange programs (PNEP) within CSC institutions in 2018, the

[16] CSC is working with the Centre for Addiction and Mental Health (CAMH) in the Ontario region.
[17] CSC is working with l'Institut universitaire sur les dépendances du Centre intégré universitaire de santé et services sociaux du Centre-Sud-de-l'Île-de-Montréal (l'IUD du CCSMTL) in the Quebec region.

provision of take-home naloxone kits for offenders, overdose prevention services (OPS) in 2019 at Drumheller Institution in the Prairie region, and enhancements to psychosocial supports from Health Services, future research could examine how these CSC initiatives further support offenders in OAT (CSC, 2017a, 2018, 2019d).

Conclusions

OAT treatment groups have varying characteristics, institutional adjustment, and post-release success. Capacity and modality enhancements to CSC's OAT, as well as complementary Health Services initiatives for harm reduction and to address offenders' addiction issues working in collaboration with CSC's correctional programs, education, and employment interventions will continue to assist offenders with OUD to minimize the impacts of their use in relation to their offending. The research that is currently being undertaken by collaborative partners will further identify how CSC can support the reintegration of offenders with OUD into the community.

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