

COERCION INTO ADDICTION TREATMENT AND SUBSEQUENT SUBSTANCE USE PATTERNS AMONG PEOPLE WHO USE ILLICIT DRUGS IN VANCOUVER, CANADA

RUNNING HEAD: COERCED TREATMENT AND SUBSTANCE USE PATTERNS

Andreas Pilarinos^{1,2}, Brittany Barker^{1,6}, Ekaterina Nosova¹, M-J Milloy^{1,3},
Kanna Hayashi^{1,4}, Evan Wood^{1,3}, Thomas Kerr^{1,3}, Kora DeBeck^{1,5}

1. British Columbia Centre on Substance Use, 1045 Howe Street, Fourth Floor, Vancouver, B.C., Canada, V6Z 2A9
2. Interdisciplinary Studies Graduate Program, University of British Columbia, 270-2357 Main Mall, Vancouver, B.C., Canada V6T 1Z4
3. Department of Medicine, University of British Columbia, 2775 Laurel Street, Tenth Floor, Vancouver, B.C., Canada, V5Z 1M9
4. Faculty of Health Sciences, Simon Fraser University, 8888 University Drive, Room 11300, Blusson Hall, Burnaby, B.C., Canada, V5A 1S6
5. School of Public Policy, Simon Fraser University, 3277-515 West Hastings Street, Vancouver, B.C., Canada, V6B 5K3
6. First Nations Health Authority, 100 Park Royal S, West Vancouver, B.C., Canada, V7T 1A2

Send correspondence to: Kora DeBeck, PhD
Assistant Professor, Simon Fraser University
3263-515 W Hastings Street, Vancouver, Canada V6B 5K3
Research Scientist, B.C. Centre on Substance Use
400-1045 Howe Street, Vancouver, Canada V6Z 2A9
Tel: (778) 945-7616
Email: bccsu-kd@bccsu.ubc.ca

Conflict of Interest Declaration: Dr. M-J Milloy's institution has received an unstructured arms' length gift to support him from NG Biomed, Ltd., a private firm applying for a government license to produce cannabis. The Canopy Growth professorship in cannabis science was established through unstructured arms' length gifts to the University of British Columbia from Canopy Growth, a licensed producer of cannabis, and the Ministry of Mental Health and Addictions of the Government of British Columbia.

Word count: 3,499

ABSTRACT

Background and Aims: Many people who use drugs (PWUD) are coerced into receiving treatment. This study aimed to assess changes in substance use and related outcomes before versus after treatment in people coerced into treatment, voluntarily attending treatment or not attending treatment.

Design: Data from three linked prospective cohort studies of PWUD were used. McNemar's test and non-linear growth curve modeling were employed to: a) assess changes in substance use patterns before and after coerced addiction treatment and b) compare these changes with changes in PWUD who 1) voluntarily accessed and 2) did not access treatment.

Setting: Vancouver, Canada.

Participants: 3,196 community-recruited PWUD.

Measurements: The outcome variables were substance use and related outcomes assessed by self-reported questionnaire. The input variable was self-reported coerced addiction treatment (defined as being forced into addiction treatment by a doctor or the criminal justice system), voluntary treatment versus no treatment.

Findings: Between September 2005 and June 2015, 399 (12.5%) participants reported being coerced into addiction treatment. In McNemar's test, there were no statistically significant reductions in within-group substance use outcomes for people coerced into treatment, voluntarily attending treatment or not attending treatment. In non-linear growth curve analyses, there were no statistically significant differences in the before and after substance use patterns between those coerced into treatment versus either of the two control groups (all $p>0.05$). In sub-analyses, we found no statistically significant differences in substance use patterns between people who reported formal coerced treatment through the criminal justice system and people who reported informal coerced treatment through a physician.

Conclusions: Among PWUD in Vancouver, Canada, there appear to be no statistically significant improvements in substance use outcomes among those reporting coerced addiction treatment, those voluntarily accessing treatment, and those not attending treatment.

Keywords: Coerced treatment, compulsory treatment, substance use disorders, addiction treatment, longitudinal study, before and after analysis

BACKGROUND

The escalation of the opioid crisis has facilitated a renewed urgency to leverage addiction treatment to mitigate harms of illicit substance use (1). Coerced addiction treatment remains one such prevalent approach (2, 3), involving the exertion of legal, formal, and informal perceived pressure to force people who use drugs (PWUD) into treatment and disrupt substance use (4, 5). There is significant heterogeneity in coerced treatment types ranging from indefinite, abstinence-imposed detention to informal, perceived pressure to enter treatment from physicians, family and friends (5, 6).

Research on the effectiveness of formal coerced addiction treatment has produced mixed results. One study comparing one- and five-year outcomes between incarcerated individuals engaged in mandatory treatment to incarcerated and non-incarcerated individuals who attended treatment voluntarily found that coerced participants experienced similar or improved substance use outcomes (7). However, these findings may be overstated because of limited access to drugs in prison versus non-prison settings. Additionally, findings from a systematic review of compulsory addiction treatment among non-incarcerated PWUD found that treatment retention, duration, and subsequent substance use outcomes were equivalent or better compared to participants accessing treatment voluntarily (8).

Other studies examining formal coerced addiction treatment among incarcerated PWUD have found that it is less effective at reducing substance use and recidivism

when compared to controls (9-14). In a prospective study of PWUD in a Norwegian hospital comparing those coerced by healthcare providers to those attending treatment voluntarily, voluntary participants had higher reductions in substance use frequency than coerced participants (61% versus 37%) (15). Additionally, a systematic review on compulsory drug treatment determined that existing evidence is inconclusive, suggesting potential harms associated with coercive interventions (12).

Informal perceived pressures to engage in treatment have also received attention (5, 6, 16-20), with some literature suggesting that informal perceived coercion improves substance use outcomes (6, 16, 18). This is most notably observed in work environments where licensing bodies pressure employees to engage in treatment to maintain their accreditation (e.g., physicians, lawyers) (18). However, it may be that individuals in these positions have greater economic and social supports that facilitate treatment engagement.

Conversely, some literature disputes the effectiveness of informal perceived pressure at improving substance use outcomes, emphasizing that internal motivation is the strongest determinant of treatment success (5, 17, 19, 20). For example, one study comparing participants who were either formally or informally coerced into treatment and self-referred participants found that those who reported high internal motivation were more likely to achieve reductions in substance use compared to those who attended treatment due to external pressures (5). Qualitative findings from the study

setting suggest that perceived coercion damages trust between health care providers and PWUD, reducing the likelihood of future methadone treatment engagement (20).

Investigating substance use patterns among community-recruited populations that have experienced coerced treatment could help inform whether these interventions reduce substance use. We undertook a preparatory analysis to identify factors associated with coerced treatment, including formal coercion by the criminal justice system and informal perceived coercion by physicians, and assessed before and after substance use patterns between those who were coerced, voluntarily attended, or did not attend treatment.

METHODS

Study Sample

Data for this study were derived from three prospective cohorts of PWUD in Vancouver, Canada (the At-Risk Youth Study [ARYS], the Vancouver Injection Drug Users Study [VIDUS], and the AIDS Care Cohort to Evaluate Exposure to Survival Services [ACCESS]). ARYS includes street-involved youth (14-26 years old) who use drugs (21); VIDUS includes HIV-negative adults who use injection drugs (22); and ACCESS includes HIV-positive adults who use drugs (23).

To be eligible for recruitment, participants must have resided in the greater Vancouver region, have used illicit drugs other than or in addition to cannabis (e.g.,

crack, cocaine, heroin, crystal methamphetamine, prescription opioids) in the past 30 days, and provided written consent. To assess the impact of being coerced into treatment on drug use, the study sample was restricted to participants who reported any substance use and who responded either affirmatively or negatively to having engaged in addiction treatment between September 2005 and June 2015. Participants who did not indicate the treatment they accessed were removed from the analysis.

Details of the studies and their harmonized procedures have been described elsewhere (21, 24, 25). In brief, participants complete a baseline and bi-annual interviewer-administered questionnaire and received a \$40 (CAD) honorarium at visit completion. Upon study enrolment, participants are identified using government-issued personal health numbers and self-assigned pseudonyms thereafter, allowing for the linkage of data and the creation of a longitudinal dataset. Time-updated socio-demographic, substance use, and health and social service use data were collected. This study received ethical approval from the University of British Columbia/Providence Health Care Research Ethics Board.

Measures

Addiction treatment exposure was defined as having accessed any of the following treatment programs over the past six months: residential treatment, treatment centre, counselor, narcotics anonymous, pharmacotherapy, and drug treatment court, among others. Reports of accessing detoxification services were not included in the

treatment category as literature considers it a medical intervention to support entry into formal treatment (26). Participants who reported accessing treatment in the past six months were asked a follow-up question: “why did you enter treatment?”. Participants were then read a list of common reasons for treatment engagement and were asked to select the most accurate explanation for treatment engagement that included: “wanted to stop drugs myself”, “health reasons”, “convinced by family, friends, doctor, etc.”, “coerced/forced by doctor”, “coerced/forced by police, courts, etc.”, “elected drug treatment court”, or “other”. Reports of being “coerced/forced by doctor” or “coerced/forced by police, courts, etc.” were included as ‘case’ events. Observations that included reports of “wanting to stop drugs (own choice)”, being “convinced by family, friends, their doctor, etc.”, “health reasons”, “elected drug treatment court”, or “other” were included as voluntary treatment ‘control’ events. Lastly, observations that included reports of using drugs but being treatment naïve over the study period were included as treatment naïve ‘control’ events.

Self-reported demographic, behavioral, and substance use-related exposures were considered when comparing those reporting coerced treatment to those reporting voluntary treatment and those who were treatment naïve. These included age (per year older); gender (female vs. male); ethnicity (white vs. other); binge drug use (yes vs. no), defined as high-intensity drug use that deviates from regular substance use and persists for days or weeks (27, 28); any injection and non-injection heroin use (yes vs. no); any

injection and non-injection cocaine use (yes vs. no); any crack smoking (yes vs. no); any injection and non-injection crystal methamphetamine use (yes vs. no); any injection and non-injection non-medical prescription opioid (PO) use; any cannabis use (yes vs. no); daily cannabis use (yes vs. no); non-fatal overdose, defined as an acute reaction or overdose following drug use in the past six months (yes vs. no) (29); incarceration, defined as being in detention, prison, or jail overnight or longer (yes vs. no); police contact, defined as having had direct contact with the police (yes vs. no); experiencing homelessness, defined as sleeping on the street, having no fixed address, staying with friends, or staying in a shelter or hostel (yes vs. no); employment, defined as legal temporary, regular, or self-employment (yes vs. no); sex work, defined as receiving money, gifts, food, shelter, clothes or drugs for sex (yes vs. no); and drug dealing, defined as selling drugs for income, food or shelter, or by force (yes vs. no). To compare drug use patterns from periods before and after a treatment event between cases and controls, self-reported substance use patterns were also considered including: any heroin use (yes vs. no); any cocaine use (yes vs. no); any crack use (yes vs. no); any crystal methamphetamine use (yes vs. no); any non-medical prescription opioid (PO) use (yes vs. no); any cannabis use (yes vs. no); daily cannabis use; and non-fatal overdose (yes vs. no). All measures – excluding age, gender, and ethnicity – referred to exposures in the previous six months.

Analysis

Baseline comparisons

Pearson's Chi-square test for binary variables and Mann-Whitney U-test for continuous variables were used to compare baseline exposures between those coerced into treatment and the two comparison groups during the study period.

Cox regression analysis

We conducted a preparatory analysis by employing an extended Cox model with time-dependent variables, which is also referred to as the multiple event failure model (30). Due to the potential for participants to report multiple coerced treatment events, an extended Cox model allowed us to conduct our analysis without meeting the proportional hazards assumption (30). In the Cox regression analysis, we assessed the relationship between explanatory variables of interest and experiencing coerced treatment compared to not being coerced into treatment, which included participants who voluntarily accessed treatment and who remained treatment naïve over the study period. To prevent the potential for reverse causality, all substance use variables were lagged to the previous observation. The final extended Cox model was assessed for collinearity by calculating a variance inflation factor, and no such relationship was identified. This technique has been used and described previously (31-34).

First, we conducted bivariable analyses of all explanatory variables to determine if they were associated with the time to coerced treatment event, defined as the time between a participant's baseline and first coerced treatment event or the time between

coerced treatment events for cases that reported more than one coercion event. Explanatory variables that were significant at $p < 0.1$ level in bivariable analyses were then subjected to a backwards selection process, where a reduced model was built by removing the variable with the largest p-value. We continued this iterative process and selected the multivariable models with the lowest Akaike information criterion (35, 36).

Voluntary treatment access and treatment naïve control groups

For the before and after analysis, two control groups were established to compare the effectiveness of coerced treatment across multiple drug and behavioral factors over time. The first control group consisted of participants who contributed three consecutive observation points (a “trio”, i.e. “before event” – “event” – “after event”), where the middle “event” observation included a report of voluntarily accessing treatment to be able to assess before- and after-event substance use. Participants would report: 1) a “before event” that did not involve treatment; 2) a reported event of voluntary treatment; and, 3) an “after event” that could include accessing or not accessing treatment, but could not include a coerced treatment event. Similarly, the second control group consisted of participants who remained treatment naïve over three consecutive observation points, meaning no reports of treatment engagement were reported during the “before event”, “event”, or “after event” observations.

Coerced addiction treatment ‘cases’

Cases included a trio of observations where the middle observation involved a report of coerced treatment. Participants would report: 1) a “before event” that did not involve engaging in treatment; 2) a report of coerced treatment; and, 3) an “after event” which included reports of coerced or voluntary treatment, or not accessing treatment. Cases were matched to controls based on the following criteria: age (within ± 5 years); sex; ethnicity; non-fatal overdose; incarceration; and sex work due to the reported association between these factors and coerced treatment (37, 38). One case was matched to two controls for each analysis. In the coerced versus voluntary treatment analysis, there were an average of 82 case trios and 162 controls, while the coerced versus treatment naïve analysis had an average of 84 case trios and 168 controls. There were initially 91 case trios, however trios were removed if: the last event included an observation of coercion; all three observations occurred outside the predefined two-year period; or, if no match was identified. Matching occurred independently of the timing of event and at random.

We stipulated that a trio of observations were required to have occurred within a two-year period to ensure the inclusion of participants who may have missed a follow-up due to treatment or other event, while excluding participants with significant gaps between follow-ups. Because event-level data were used in the before and after analysis, the potential exists for participants to have contributed case and control observations.

Within-group changes of cases and control groups

To maximize control estimate stability, a bootstrapping method was employed whereby control selection and McNemar's test was repeated 50 times for each case and reported as an average of 50 runs. McNemar's test was used to compare within-group before vs. after changes in substance use patterns among cases and both controls groups.

Between-group changes of cases and the two control groups

Non-linear growth curve analyses were used to compare before and after binary substance use variables between cases and control groups (39, 40). Similar bootstrapping methods were used to maximize the stability of our control estimates, and each case was randomly matched to two controls. The slope from the multivariate non-linear growth curve analyses indicates the magnitude and direction of change in substance use patterns for case and control groups, and the corresponding *p*-value indicates interaction term significance.

We also conducted two sub-analyses to explore if variations in type of coercion (formal versus informal) or type of addiction treatment impacted our outcomes of interest. The first involved restricting coercion observations in the before and after analysis to only include formal coercion through the criminal justice system (i.e. "coerced by the police, courts, etc."). The second sub-analysis included reports of accessing detoxification in the 'addiction treatment' category.

Significance tests were two-sided at a significance level of $p < 0.05$. R Version 3.2.4 was used to perform these analyses (R Foundation for Statistical Computing, Vienna, Austria). Previous studies have used variations of this technique to assess before and after patterns and behaviors among PWUD (41-43).

RESULTS

Between September 2005 and June 2015, 3,196 participants were enrolled in the VIDUS (n=1,179), ARYS (n=1,188), and ACCESS (n=829) cohorts and eligible for this analysis. This included 23,694 observations over a median of 5 study visits per participant (Interquartile Range [IQR]: 2–12). In total, 399 (12.5%) participants reported experiencing at least one coerced treatment event over the study period. Of all coerced treatment events, 354 (54.8%) involved coercion by a physician, 300 (46.4%) involved coercion by the criminal justice system, and 8 (1.2%) involved coercion by both. Table 1 summarizes baseline characteristics of the study sample, stratified by being coerced into treatment at least once, voluntarily accessing treatment, and remaining treatment naïve over the study period.

Time to coerced addiction treatment

The sample for the extended Cox regression of time to coerced treatment included 2,653 participants that contributed 21,967 observations over a median of 7 study visits per participant (Interquartile Range [IQR]: 3–13). There were 483 coerced

treatment events over the study period and 358 were first-time events. Coerced treatment events accounted for 1,039 person-time risk years and an incidence rate of 34.5 per 100 person-years. Table 2 presents the unadjusted and adjusted hazard ratios of the extended Cox regression of factors associated with time to coerced treatment.

In the adjusted model, non-fatal overdose (Adjusted Hazards Ratio [AHR]=1.66, 95% Confidence interval [95% CI]: 1.20–2.28), incarceration (AHR=1.77, 95% CI: 1.37–2.28), and any cocaine use (AHR=1.33, 95% CI: 1.06–1.66) were independently associated with an increased hazard of being coerced into treatment, while recent employment (AHR=0.73, 95% CI: 0.57–0.93) and daily cannabis use (AHR=0.74, 95% CI: 0.58–0.95) were protective against coerced treatment.

Before and after analysis of substance use patterns

Table 3 and 4 compare drug use patterns before and after the ‘event’ for cases (event=coercion) and control group 1 (event=voluntary treatment), and for cases (event=coercion) and control group 2 (event=treatment naïve), respectively. Table 3 compares before and after substance use patterns of voluntary events to coerced events, with the voluntary group demonstrating greater reductions than the coerced group in the prevalence of: any heroin use (-8.3% vs. -2.5%); any cocaine use (-6.4% vs. +1.3%); any crack cocaine use (-8.6% vs. -7.3%); any crystal methamphetamine use (-0.9% vs. +3.7%); any PO use (-9.8% vs. -3.7%); any cannabis use (-2.9% vs. -2%); and daily cannabis use (-3.1% vs. +1.2%). Only reductions in non-fatal overdose were higher in the

coerced (-7.4%) vs. the voluntary (-3%) group. When comparing substance use patterns before and after a coerced event to the treatment naïve group (Table 4), before and after patterns were generally similar for the treatment naïve group and the coerced group. Specifically, the change in the prevalence of substance use patterns between the treatment naïve group vs. the coerced group were: -1.8% vs. -3.5% for any heroin use; -3.7% vs. +1.2% for any cocaine use; -6.7% vs. -5.9% for any crack cocaine use; -0.8% vs. +2.4% for any crystal methamphetamine use; -1.5% vs. -3.6% for any PO use; -2.8% vs. -3.6% for any cannabis use; -0.6% vs. +1.2% for daily cannabis use; and -2.9% vs. -4.7% for non-fatal overdose. Despite these observed trends, there were no statistically significant changes in substance use patterns for any group.

Tables 5 and 6 report the between-group differences between cases and both control groups, respectively. As shown, none of the observed changes in substance use patterns within groups were found to be statistically significant between groups. In sub analyses, no significant differences in substance use patterns were observed compared to the primary analyses (data not shown).

DISCUSSION

Incarceration, non-fatal overdose and cocaine use were significantly associated with an increased hazard of coerced treatment, while daily cannabis use and employment were negatively associated with coerced treatment. The finding that

coercion did not lead to measurable improvements in substance use supports evidence that coerced treatment may not effectively decrease substance use (12-15). Hence, the prevalence of reported coerced addiction treatment is concerning.

It is also concerning that participants who accessed treatment voluntarily saw no significant reductions in substance use. One interpretation of this is that current treatments may be insufficient in meeting the needs of PWUD. Because we could not analyze individual treatment encounters and capture factors related to treatment effectiveness, such as duration, intensity, and quality (44, 45), future studies that are able to account for these would be beneficial.

PWUD in the study setting have also reported difficulty accessing treatment services voluntarily (46-51) with barriers including long wait times, treatment costs, being expelled from treatment, not finding suitable treatment, and not residing near treatment (47, 50, 51). Among youth in ARYS, difficulty accessing addiction treatment was found to be associated with homelessness and binge drug use, and predicted subsequent injection initiation (47, 51). In the context of a system that is not meeting voluntary treatment needs, coerced treatment appears to be problematic from a human rights and health perspective (52).

Although the current study findings do not provide insight into how to improve treatment services, evidence suggests that reducing problematic substance use requires access to a range of treatment options. This involves investing in low-threshold

treatment (i.e. same-day treatment) (53, 54); implementing culturally-safe, trauma-informed care (55); integrating treatment services within primary care settings (56); expanding access to opioid agonist treatments (e.g. Suboxone, injectable treatments, etc.) for opioid use disorders (57, 58); and, developing strategies to communicate improvements in treatment services to PWUD (59).

The finding that daily cannabis use and employment were negatively associated with coerced treatment suggests that these factors may select for individuals that are less likely to be subjected to coercion, or that they may play a role in reducing the risk of being subjected to coercion. Further study is warranted.

This study has limitations. The cohorts are recruited from street-based settings and are not random samples. Therefore, our findings may not be generalizable to all PWUD in Vancouver, drug detention centers, or in other settings. Second, as we relied on self-reported data, our findings are susceptible to recall and response bias. However, research suggests that self-reported responses among street-involved populations represent genuine behaviors (60). Third, bias may arise due to unmeasured confounding. Fourth, while we sought to match participants on a number of substance use measures, we were unable to do so because these variables were examined in our before and after analysis. Fifth, our participants may have contributed multiple voluntary and coerced observations due to the use of event-level data. As a result, we were unable to examine patterns of coerced and voluntary treatment engagement, and

future research could employ a life course perspective to better understand treatment system encounters. Lastly, we were unable to discern the type, duration, or quality of treatment reported and other sources of coercion (i.e. child welfare system, social workers, etc.) due to limitations in our study instrument.

CONCLUSION

In sum, no significant improvements in substance use patterns were observed between those coerced into addiction treatment versus those who did not engage in treatment or those engaged in treatment voluntarily. As existing literature has alluded to effective treatment interventions (61-72), the intent of this analysis was to explore whether coerced treatment improved substance use outcomes when compared to no coercion. Consistent with existing literature (12), our study findings do not support the use of coercion in addiction treatment. This result, coupled with our finding that voluntary treatment did not result in statistically significant reductions in substance use, emphasizes the need for increased investments in evidence-based treatments.

DECLARATIONS

Acknowledgements

The authors thank all study participants for their contribution to the research, as well as current and past researchers, staff, and peers.

Funding

The VIDUS, ACCESS and ARYS studies are supported by the US National Institutes of Health (U01-DA038886, U01-DA021525) and the Canadian Institutes of Health Research (MOP-286532). Dr. Brittany Barker is supported in part by a CIHR Health System Impact Fellowship. Dr. Evan Wood is a Tier 1 Canada Research Chair in Inner City Medicine. Dr. Kanna Hayashi is supported by a Canadian Institutes of Health Research (CIHR) New Investigator Award (MSH-141971), a Michael Smith Foundation for Health Research (MSFHR) Scholar Award, and the St. Paul's Foundation. Dr. Kora DeBeck is supported by a MSFHR/St. Paul's Hospital Foundation-Providence Health Care Career Scholar Award and a CIHR New Investigator Award. Dr. M-J Milloy is supported in part by the United States National Institutes of Health (U01-DA021525), a New Investigator Award from CIHR and a Scholar Award from MSFHR. The funders had no role in the design of the study, data collection, analysis, interpretation of data, or in writing the manuscript.

Conflicts of interest

Dr. M-J Milloy's institution has received an unstructured arms' length gift to support him from NG Biomed, Ltd., a private firm applying for a government license to produce cannabis. The Canopy Growth professorship in cannabis science was established through unstructured arms' length gifts to the University of British Columbia from Canopy Growth, a licensed producer of cannabis, and the Ministry of Mental Health and Addictions of the Government of British Columbia.

TABLE 1. Baseline characteristics of people who use drugs in Vancouver, Canada, stratified by experiencing coerced addiction treatment at least once (n=399), voluntarily accessing addiction treatment at least once but not experiencing coerced addiction treatment (n=1,689), and not accessing or experiencing coerced addiction treatment (n=1,108) between September 2005 and June 2015 (n=3,196).

Characteristic	Coerced treatment Yes (%) (n = 399)	Voluntary Treatment Yes (%) (n = 1,689)	No Treatment Yes (%) (n = 1,108)	p value Coerced vs. Voluntary	p value Coerced vs. None
Age (med, IQR)	39 (26-45)	36 (24-45)	25 (21-41)	0.009 ¹	<0.001 ¹
Gender (female)	139 (34.8)	605 (35.8)	299 (27.0)	0.728	0.004
Ethnicity (white)	247 (61.9)	1,051 (62.2)	683 (61.6)	0.909	1.000
Binge drug use ²	171 (42.9)	773 (45.8)	435 (39.3)	0.313	0.211
Any heroin use ²	239 (59.9)	1,018 (60.3)	397 (35.8)	0.909	<0.001
Any cocaine use ²	203 (50.9)	822 (48.7)	500 (45.1)	0.469	0.053
Any crack use ²	296 (74.2)	1,287 (76.2)	671 (60.6)	0.434	<0.001
Any CM use ^{2, 3}	116 (29.1)	578 (34.2)	420 (37.9)	0.058	0.002
Any PO use ^{2, 4}	120 (30.1)	521 (31.4)	222 (20.0)	0.630	<0.001
Any cannabis use ²	247 (61.9)	1,078 (63.8)	865 (78.1)	0.488	<0.001
Daily cannabis use ²	95 (23.8)	461 (27.3)	447 (40.3)	0.166	<0.001
Overdose ²	33 (8.3)	177 (10.5)	105 (9.5)	0.196	0.544
Incarceration ²	91 (22.8)	301 (17.8)	153 (13.8)	0.033	<0.001
Police contact ²	129 (32.3)	507 (30.0)	337 (30.4)	0.431	0.487
Homelessness ²	170 (42.6)	780 (46.2)	643 (58.0)	0.218	<0.001
Employment ²	93 (23.3)	548 (32.4)	454 (41.0)	<0.001	<0.001
Sex work ²	58 (14.5)	268 (15.9)	108 (9.7)	0.492	0.012
Drug dealing ²	177 (44.4)	678 (40.1)	415 (37.5)	0.127	0.017
Cohorts					
VIDUS (Reference)	182 (45.6)	738 (43.7)	259 (23.4)	Ref.	Ref.
ACCESS	132 (33.1)	472 (27.9)	225 (20.3)	0.328	0.217
ARYS	85 (21.3)	479 (28.4)	624 (56.3)	0.022	<0.001

1. Refers to continuous variable, p-value is generated from Mann-Whitney test

2. Refers to activities in the previous 6 months

3. Denotes crystal methamphetamine = CM

4. Denotes prescription opioids = PO

TABLE 2. Cox Proportional Hazard regression analysis of factors associated with coerced addiction treatment between those coerced into addiction treatment versus not coerced into addiction treatment (n=2,653).

Characteristic	Unadjusted		Adjusted	
	Hazard Ratio (95% CI)	<i>p</i> value	Hazard Ratio (95% CI)	<i>p</i> value
Age (per 10 years older)	1.06 (0.96 – 1.18)	0.257		
Gender (female)	1.21 (0.94 – 1.55)	0.138		
Ethnicity (white)	1.13 (0.88 – 1.44)	0.330		
Binge drug use ¹ (yes vs. no)	0.97 (0.80 – 1.19)	0.796		
Any heroin use ^{1,4} (yes vs. no)	1.19 (0.97 – 1.47)	0.103		
Any cocaine use ^{1,4} (yes vs. no)	1.38 (1.12 – 1.71)	0.003	1.33 (1.06 – 1.66)	0.014
Any crack use ^{1,4} (yes vs. no)	1.02 (0.83 – 1.25)	0.876		
Any CM use ^{1,3,4} (yes vs. no)	0.94 (0.74 – 1.21)	0.641		
Any PO use ^{1,2,4} (yes vs. no)	1.30 (1.03 – 1.64)	0.029	1.12 (0.87 – 1.44)	0.367
Any cannabis use ^{1,4} (yes vs. no)	0.95 (0.78 – 1.16)	0.622		
Daily cannabis use ^{1,4} (yes vs. no)	0.76 (0.60 – 0.97)	0.030	0.74 (0.58 – 0.95)	0.017
Heavy alcohol use ^{1,4} (yes vs. no)	0.97 (0.69 – 1.37)	0.879		
Overdose ¹ (yes vs. no)	1.89 (1.38 – 2.59)	<0.001	1.66 (1.20 – 2.28)	0.002
Incarceration ¹ (yes vs. no)	2.02 (1.57 – 2.59)	<0.001	1.77 (1.37 – 2.28)	<0.001
Police contact ¹ (yes vs. no)	1.37 (1.07 – 1.74)	0.011	1.13 (0.88 – 1.44)	0.337
Homelessness ¹ (yes vs. no)	0.98 (0.78 – 1.22)	0.764		
Employment ¹ (yes vs. no)	0.70 (0.54 – 0.89)	0.004	0.73 (0.57 – 0.93)	0.001
Sex work ¹ (yes vs. no)	1.05 (0.73 – 1.51)	0.780		
Drug dealing ¹ (yes vs. no)	1.08 (0.85 – 1.38)	0.533		

1. Refers to activities in the last six months

2. Denotes prescription opioids = PO

3. Denotes crystal methamphetamine = CM

4. Refers to activities lagged to the previous available follow-up

TABLE 3. Substance use patterns reported in the period before and after addiction treatment among individuals who were coerced into treatment (n=86 cases) and controls that voluntarily accessed treatment (mean n over 50 runs = 162 controls).

Substance use patterns ³	Coerced Addiction Treatment		<i>p</i> value ⁶
	Period ²		
	Before n (%)	After n (%)	
Any heroin use¹			
Coerced	35 (42.9)	33 (40.4)	0.803
Controls	87 (53.1)	73 (44.8)	0.121
Any cocaine use¹			
Coerced	37 (45.3)	38 (46.6)	1.000
Controls	62 (38.1)	52 (31.7)	0.260
Any crack use¹			
Coerced	51 (62.0)	45 (54.7)	0.327
Controls	107 (65.3)	93 (56.7)	0.151
Any CM use^{1, 4}			
Coerced	15 (18.4)	18 (22.1)	0.579
Controls	44 (26.7)	42 (25.8)	0.610
Any PO use^{1, 5}			
Coerced	20 (24.5)	17 (20.8)	0.662
Controls	45 (27.3)	29 (17.5)	0.056
Any cannabis use¹			
Coerced	50 (60.8)	48 (58.8)	0.888
Controls	90 (55.3)	85 (52.4)	0.486
Daily cannabis use¹			
Coerced	22 (27.0)	23 (28.2)	1.000
Controls	43 (26.3)	38 (23.2)	0.548
Overdose¹			
Coerced	7 (8.6)	1 (1.2)	0.077
Controls	14 (8.6)	9 (5.6)	0.417

1. Estimates have been adjusted for age, gender, ethnicity, baseline education, and cohort membership
2. Before and after values represent the mean number of cases and controls based on the mean numbers from 50 datasets
3. Refers to activities in the previous 6 months
4. Denotes crystal methamphetamine = CM
5. Denotes prescription opioids = PO
6. Refers to a 95% confidence interval

TABLE 4. Substance use patterns reported in the period before and after addiction treatment between cases coerced into addiction treatment (n=84 cases) and controls that did not access addiction treatment (mean n over 50 runs = 168 controls).

Substance use patterns ³	Coerced Addiction Treatment		<i>p</i> value ⁶
	Period ²		
	Before n (%)	After n (%)	
Any heroin use¹			
Coerced	37 (44.0)	34 (40.5)	0.628
Controls	58 (34.5)	55 (32.7)	0.515
Any cocaine use¹			
Coerced	39 (46.4)	40 (47.6)	1.000
Controls	63 (37.4)	57 (33.7)	0.416
Any crack use¹			
Coerced	52 (61.9)	47 (56.0)	0.441
Controls	103 (61.6)	92 (54.9)	0.184
Any CM use^{1, 4}			
Coerced	17 (20.2)	19 (22.6)	0.789
Controls	45 (26.5)	43 (25.7)	0.628
Any PO use^{1, 5}			
Coerced	21 (25.0)	18 (21.4)	0.662
Controls	34 (20.4)	32 (18.9)	0.598
Any cannabis use¹			
Coerced	51 (60.7)	48 (57.1)	0.662
Controls	104 (61.9)	99 (59.1)	0.500
Daily cannabis use¹			
Coerced	22 (26.2)	23 (27.4)	1.000
Controls	53 (31.7)	53 (31.1)	0.656
Overdose¹			
Coerced	7 (8.3)	3 (3.6)	0.289
Controls	14 (8.3)	9 (5.4)	0.402

1. Estimates have been adjusted for age, gender, ethnicity, baseline education, and cohort membership
2. Before and after values represent the mean number of cases and controls based on the mean numbers from 50 datasets
3. Refers to activities in the previous 6 months
4. Denotes crystal methamphetamine = CM
5. Denotes prescription opioids = PO
6. Refers to a 95% confidence interval

TABLE 5. Non-linear growth curve analyses comparing substance use changes between cases and controls who voluntarily accessed addiction treatment.

Substance use patterns²	Slope (95% CI⁵)	<i>p</i> value⁵
Any heroin use¹		
Coerced	-0.21 (-1.98; 1.55)	0.422
Controls	-0.72 (-0.81; -0.63)	
Any cocaine use¹		
Coerced	-0.09 (-1.59; 1.78)	0.302
Controls	-0.52 (-0.59; -0.45)	
Any crack use¹		
Coerced	-0.50 (-2.08; 1.09)	0.673
Controls	-0.61 (-0.69; -0.53)	
Any CM use^{1, 3}		
Coerced	0.45 (-1.54; 2.43)	0.466
Controls	-0.08 (-0.18; 0.02)	
Any PO use^{1, 4}		
Coerced	-0.31 (-2.09; 1.48)	0.383
Controls	-0.31 (-0.34; -0.28)	
Any cannabis use¹		
Coerced	-0.18 (-1.98; 1.62)	0.666
Controls	-0.26 (-0.35; -0.17)	
Daily cannabis use¹		
Coerced	0.12 (-1.82; 2.07)	0.518
Controls	-0.31 (-0.42; -0.20)	
Overdose¹		
Coerced	-2.18 (-5.5; 1.15)	0.201
Controls	-0.56 (-0.69; -0.43)	

1. Estimates have been adjusted for age, gender, ethnicity, and baseline education, and cohort membership
2. Refers to activities in the previous 6 months
3. Denotes crystal methamphetamine = CM
4. Denotes prescription opioids = PO
5. Denotes 95% Confidence Interval

TABLE 6. Non-linear growth curve analyses comparing substance use changes between cases and controls who did not access addiction treatment.

Substance use patterns²	Slope (95% CI⁵)	<i>p</i> value⁵
Any heroin use¹		
Coerced	-0.39 (-2.43; 1.65)	0.690
Controls	-0.23 (-0.34; -0.12)	
Any cocaine use¹		
Coerced	0.10 (-1.65; 1.85)	0.452
Controls	-0.34 (-0.43; -0.25)	
Any crack use¹		
Coerced	-0.47 (-2.19; 1.24)	0.682
Controls	-0.60 (-0.69; -0.51)	
Any CM use^{1, 3}		
Coerced	0.33 (-1.82; 2.47)	0.537
Controls	-0.12 (-0.22; -0.02)	
Any PO use^{1, 4}		
Coerced	-0.35 (-2.28; 1.59)	0.672
Controls	-0.14 (-0.19; -0.09)	
Any cannabis use¹		
Coerced	-0.33 (-2.16; 1.49)	0.690
Controls	-0.28 (-0.36; -0.20)	
Daily cannabis use¹		
Coerced	0.13 (-1.78; 2.04)	0.662
Controls	-0.04 (-0.13; 0.05)	
Overdose¹		
Coerced	-1.16 (-4.09; 1.76)	0.586
Controls	-0.65 (-0.79; -0.51)	

1. Estimates have been adjusted for age, gender, ethnicity, and baseline education, and cohort membership
2. Refers to activities in the previous 6 months
3. Denotes crystal methamphetamine = CM
4. Denotes prescription opioids = PO
5. Denotes 95% Confidence Interval

REFERENCES

1. Sharfstein JM. The Opioid Crisis From Research to Practice. *The Milbank Quarterly*. 2017;95(1):24-7.
2. Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist*. 2000;55(1):68.
3. Ryan RM, Deci EL. A self-determination theory approach to psychotherapy: The motivational basis for effective change. *Canadian Psychology/Psychologie canadienne*. 2008;49(3):186.
4. Sullivan MA, Birkmayer F, Boyarsky BK, Frances RJ, Fromson JA, Galanter M, et al. Uses of coercion in addiction treatment: clinical aspects. *The American journal on addictions*. 2008;17(1):36-47.
5. Wild TC, Cunningham JA, Ryan RM. Social pressure, coercion, and client engagement at treatment entry: A self-determination theory perspective. *Addictive behaviors*. 2006;31(10):1858-72.
6. Marlowe DB, Kirby KC, Bonieskie LM, Glass DJ, Dodds LD, Husband SD, et al. Assessment of coercive and noncoercive pressures to enter drug abuse treatment. *Drug and alcohol dependence*. 1996;42(2):77-84.
7. Kelly JF, Finney JW, Moos R. Substance use disorder patients who are mandated to treatment: Characteristics, treatment process, and 1-and 5-year outcomes. *Journal of substance abuse treatment*. 2005;28(3):213-23.
8. Broadstock M, Brinson D, Weston A. The effectiveness of compulsory, residential treatment of chronic alcohol or drug addiction in non-offenders: a systematic review of the literature: Health Services Assessment Collaboration (HSAC), University of Canterbury; Christchurch, New Zealand; 2008.
9. Werb D, Elliott R, Fischer B, Wood E, Montaner J, Kerr T. Drug treatment courts in Canada: an evidence-based review. *HIV/AIDS policy & law review/Canadian HIV/AIDS Legal Network*. 2007;12(2-3):12-7.
10. Longshore D, Prendergast ML, Farabee D. Coerced treatment for drug-using criminal offenders. In *Drug treatment: What works*. London & New York: Routledge; Abingdon, England; 2004:109-21.
11. Urbanoski KA. Coerced addiction treatment: Client perspectives and the implications of their neglect. *Harm Reduction Journal*. 2010;7(1):13.
12. Werb D, Kamarulzaman A, Meacham M, Rafful C, Fischer B, Strathdee S, et al. The effectiveness of compulsory drug treatment: A systematic review. *International Journal of Drug Policy*. 2016;28:1-9.
13. Wild TC, Roberts AB, Cooper EL. Compulsory substance abuse treatment: An overview of recent findings and issues. *European Addiction Research*. 2002;8(2):84-93.

14. Klag S, O'Callaghan F, Creed P. The use of legal coercion in the treatment of substance abusers: An overview and critical analysis of thirty years of research. *Substance use & misuse*. 2005;40(12):1777-95.
15. Pasareanu AR, Vederhus J-K, Opsal A, Kristensen Ø, Clausen T. Improved drug-use patterns at 6 months post-discharge from inpatient substance use disorder treatment: results from compulsorily and voluntarily admitted patients. *BMC Health Services Research*. 2016;16(1):291.
16. Marlowe DB, Kirby KC, Merikle EP, Festinger DS, McLellan AT. Multidimensional assessment of perceived treatment-entry pressures among substance abusers. *Psychology of Addictive Behaviors*. 2001;15.
17. Wild TC. Social control and coercion in addiction treatment: towards evidence-based policy and practice. *Addiction*. 2006;101(1):40-9.
18. Nace EP, Birkmayer F, Sullivan MA, Galanter M, Fromson JA, Frances RJ, et al. Socially sanctioned coercion mechanisms for addiction treatment. *The American journal on addictions*. 2007;16(1):15-23.
19. Zeldman A, Ryan RM, Fiscella K. Motivation, autonomy support, and entity beliefs: Their role in methadone maintenance treatment. *Journal of Social and Clinical Psychology*. 2004;23(5):675-96.
20. Damon W, Small W, Anderson S, Maher L, Wood E, Kerr T, et al. 'Crisis' and 'everyday' initiators: A qualitative study of coercion and agency in the context of methadone maintenance treatment initiation. *Drug and alcohol review*. 2017;36(2):253-60.
21. Wood E, Stoltz J-A, Montaner JS, Kerr T. Evaluating methamphetamine use and risks of injection initiation among street youth: the ARYS study. *Harm Reduction Journal*. 2006;3(1):1.
22. Wood E, Tyndall MW, Spittal PM, Li K, Kerr T, Hogg RS, et al. Unsafe injection practices in a cohort of injection drug users in Vancouver: Could safer injecting rooms help? *Canadian Medical Association Journal*. 2001;165(4):405-10.
23. Tapp C, Milloy M, Kerr T, Zhang R, Guillemi S, Hogg RS, et al. Female gender predicts lower access and adherence to antiretroviral therapy in a setting of free healthcare. *BMC infectious diseases*. 2011;11(1):86.
24. Strathdee SA, Patrick DM, Currie SL, Cornelisse PG, Rekart ML, Montaner JS, et al. Needle exchange is not enough: lessons from the Vancouver injecting drug use study. *AIDS*. 1997;11(8):F59-F65.
25. Strathdee SA, Palepu A, Cornelisse PG, Yip B, O'shaughnessy MV, Montaner JS, et al. Barriers to use of free antiretroviral therapy in injection drug users. *The Journal of the American Medical Association*. 1998;280(6):547-9.
26. Gerstein DR, Lewin LS. Treating drug problems. *New England Journal of Medicine*. 1990;323(12):844-8.

27. Tyndall MW, Currie S, Spittal P, Li K, Wood E, O'shaughnessy MV, et al. Intensive injection cocaine use as the primary risk factor in the Vancouver HIV-1 epidemic. *AIDS*. 2003;17(6):887-93.
28. Miller CL, Kerr T, Frankish JC, Spittal PM, Li K, Schechter MT, et al. Binge drug use independently predicts HIV seroconversion among injection drug users: implications for public health strategies. *Substance use & misuse*. 2006;41(2):199-210.
29. Brugal MT, Barrio G, Regidor E, Royuela L, Suelves JM. Factors associated with non-fatal heroin overdose: assessing the effect of frequency and route of heroin administration. *Addiction*. 2002;97(3):319-27.
30. Kleinbaum DG, Klein M. *Survival analysis*: Springer; 2010.
31. Lima VD, Geller J, Bangsberg DR, Patterson TL, Daniel M, Kerr T, et al. The effect of adherence on the association between depressive symptoms and mortality among HIV-infected individuals first initiating HAART. *AIDS*. 2007;21(9):1175-83.
32. Lima VD, Kopec JA. Quantifying the effect of health status on health care utilization using a preference-based health measure. *Social science & medicine*. 2005;60(3):515-24.
33. Hoy C, Barker B, Regan J, Dong H, Richardson L, Kerr T, et al. Elevated risk of incarceration among street-involved youth who initiate drug dealing. *Harm reduction journal*. 2016;13(1):32.
34. Feng C, DeBeck K, Kerr T, Mathias S, Montaner J, Wood E. Homelessness independently predicts injection drug use initiation among street-involved youth in a Canadian setting. *Journal of Adolescent Health*. 2013;52(4):499-501.
35. Maldonado G, Greenland S. Simulation study of confounder-selection strategies. *American journal of epidemiology*. 1993;138(11):923-36.
36. Rothman KJ, Greenland S, Lash TL. *Modern epidemiology*. Lippincott Williams & Wilkins; 2008.
37. Blankenship KM, Koester S. Criminal law, policing policy, and HIV risk in female street sex workers and injection drug users. *The Journal of Law, Medicine & Ethics*. 2002;30(4):548-59.
38. Rafful C, Orozco R, Rangel G, Davidson P, Werb D, Beletsky L, et al. Increased non-fatal overdose risk associated with involuntary drug treatment in a longitudinal study with people who inject drugs. *Addiction*. 2018.
39. Davidian M. *Nonlinear models for repeated measurement data*. Routledge; 2017.
40. Grimm KJ, Ram N, Hamagami F. Nonlinear growth curves in developmental research. *Child development*. 2011;82(5):1357-71.
41. Vlahov D, Safai M, Lai S, Strathdee SA, Johnson L, Sterling T, et al. Sexual and drug risk-related behaviours after initiating highly active antiretroviral therapy among injection drug users. *AIDS*. 2001;15(17):2311-6.
42. DeBeck K, Kerr T, Li K, Milloy MJ, Montaner J, Wood E. Incarceration and drug use patterns among a cohort of injection drug users. *Addiction*. 2009;104(1):69-76.

43. Lake S, Milloy M, Dong H, Hayashi K, Wood E, Kerr T, et al. Initiation into prescription opioid injection and associated trends in heroin use among people who use illicit drugs. *Drug and alcohol dependence*. 2016;169:73-9.
44. Simpson DD, Joe GW. Motivation as a predictor of early dropout from drug abuse treatment. *Psychotherapy: Theory, research, practice, training*. 1993;30(2):357.
45. Brorson HH, Arnevik EA, Rand-Hendriksen K, Duckert F. Drop-out from addiction treatment: a systematic review of risk factors. *Clinical psychology review*. 2013;33(8):1010-24.
46. Barker B, Kerr T, Nguyen P, Wood E, DeBeck K. Barriers to health and social services for street-involved youth in a Canadian setting. *Journal of Public Health Policy*. 2015;36(3):350-63.
47. Hadland SE, Kerr T, Li K, Montaner JS, Wood E. Access to drug and alcohol treatment among a cohort of street-involved youth. *Drug and alcohol dependence*. 2009;101(1):1-7.
48. Callon C, Wood E, Marsh D, Li K, Montaner J, Kerr T. Barriers and facilitators to methadone maintenance therapy use among illicit opiate injection drug users in Vancouver. *Journal of Opioid Management*. 2006;2(1):35-41.
49. Wood E, Li K, Palepu A, Marsh DC, Schechter MT, Hogg RS, et al. Sociodemographic disparities in access to addiction treatment among a cohort of Vancouver injection drug users. *Substance use & misuse*. 2005;40(8):1153-67.
50. Milloy M-J, Kerr T, Zhang R, Tyndall M, Montaner J, Wood E. Inability to access addiction treatment and risk of HIV infection among injection drug users recruited from a supervised injection facility. *Journal of Public Health*. 2009;32(3):342-9.
51. DeBeck K, Kerr T, Nolan S, Dong H, Montaner J, Wood E. Inability to access addiction treatment predicts injection initiation among street-involved youth in a Canadian setting. *Substance abuse treatment, prevention, and policy*. 2016;11(1):1.
52. Hall W, Babor T, Edwards G, Laranjeira R, Marsden J, Miller P, et al. Compulsory detention, forced detoxification and enforced labour are not ethically acceptable or effective ways to treat addiction. *Addiction*. 2012;107(11):1891-3.
53. Hoffman KA, Ford JH, Tillotson CJ, Choi D, McCarty D. Days to treatment and early retention among patients in treatment for alcohol and drug disorders. *Addictive behaviors*. 2011;36(6):643-7.
54. Nolan S, Hayashi K, Milloy M-J, Kerr T, Dong H, Lima VD, et al. The impact of low-threshold methadone maintenance treatment on mortality in a Canadian setting. *Drug & Alcohol Dependence*. 2015;156:57-61.
55. Guerrero EG, Song A, Henwood B, Kong Y, Kim T. Response to culturally competent drug treatment among homeless persons with different living arrangements. *Evaluation and program planning*. 2018;66:63-9.

56. Weisner C, Mertens J, Parthasarathy S, Moore C, Lu Y. Integrating primary medical care with addiction treatment: a randomized controlled trial. *The Journal of the American Medical Association*. 2001;286(14):1715-23.
57. Ma J, Wang R-J, Su M-F, Liu M-X, Shi J, Lu L, et al. Effects of opiate substitution treatment on mortality for opioids users: a systematic review and meta-analysis. *The Lancet*. 2017;390:S56.
58. Kastelic A, Dubajic G, Strbad E. Slow-release oral morphine for maintenance treatment of opioid addicts intolerant to methadone or with inadequate withdrawal suppression. *Addiction*. 2008;103(11):1837-46.
59. Ford JH, Abraham AJ, Lupulescu-Mann N, Croff R, Hoffman KA, Alanis-Hirsch K, et al. Promoting Adoption of Medication for Opioid and Alcohol Use Disorders Through System Change. *Journal of studies on alcohol and drugs*. 2017;78(5):735-44.
60. Brener ND, Billy JO, Grady WR. Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: evidence from the scientific literature. *Journal of adolescent health*. 2003;33(6):436-57.
61. Schuckit MA. Treatment of opioid-use disorders. *New England Journal of Medicine*. 2016;375(4):357-68.
62. Luchenski S, Maguire N, Aldridge RW, Hayward A, Story A, Perri P, et al. What works in inclusion health: overview of effective interventions for marginalised and excluded populations. *The Lancet*. 2018;391(10117):266-80.
63. McLellan AT, Arndt IO, Metzger DS, Woody GE, O'brien CP. The effects of psychosocial services in substance abuse treatment. *Addictions Nursing Network*. 1993;5(2):38-47.
64. Carroll KM, Fenton LR, Ball SA, Nich C, Frankforter TL, Shi J, et al. Efficacy of Disulfiram and Cognitive Behavior Therapy in Cocaine-Dependent Outpatients: A Randomized Placebo-Controlled Trial. *Archives of general psychology*. 2004;61(3):264-72.
65. Woody GE, Luborsky L, McLellan AT, O'Brien CP, Beck AT, Blaine J, et al. Psychotherapy for opiate addicts: Does it help? *Archives of general psychology*. 1983;40(6):639-45.
66. Fiellin DA, Pantalon MV, Chawarski MC, Moore BA, Sullivan LE, O'connor PG, et al. Counseling plus buprenorphine–naloxone maintenance therapy for opioid dependence. *New England Journal of Medicine*. 2006;355(4):365-74.
67. Peirce JM, Petry NM, Stitzer ML, Blaine J, Kellogg S, Satterfield F, et al. Effects of lower-cost incentives on stimulant abstinence in methadone maintenance treatment: A National Drug Abuse Treatment Clinical Trials Network study. *Archives of general psychiatry*. 2006;63(2):201-8.
68. Higgins ST, Sigmon SC, Wong CJ, Heil SH, Badger GJ, Donham R, et al. Community reinforcement therapy for cocaine-dependent outpatients. *Archives of general psychiatry*. 2003;60(10):1043-52.

69. Silverman K, Higgins ST, Brooner RK, Montoya ID, Cone EJ, Schuster CR, et al. Sustained cocaine abstinence in methadone maintenance patients through voucher-based reinforcement therapy. *Archives of general psychiatry*. 1996;53(5):409-15.
70. Rawson RA, Huber A, McCann M, Shoptaw S, Farabee D, Reiber C, et al. A comparison of contingency management and cognitive-behavioral approaches during methadone maintenance treatment for cocaine dependence. *Archives of general psychiatry*. 2002;59(9):817-24.
71. Santisteban DA, Szapocznik J, Perez-Vidal A, Kurtines WM, Murray EJ, LaPerriere AJJofp. Efficacy of intervention for engaging youth and families into treatment and some variables that may contribute to differential effectiveness. *Journal of family psychology*. 1996;10(1):35.
72. Barrett H, Slesnick N, Brody JL, Turner CW, Peterson TR. Treatment outcomes for adolescent substance abuse at 4-and 7-month assessments. *Journal of consulting and clinical psychology*. 2001;69(5):802.