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The costs of crime associated with stimulant use in a Canadian setting

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Abstract

Background: Costs attributable to criminal activity are a major component of the economic burden of substance use disorders, yet there is a paucity of empirical evidence on this topic. Our aim was to estimate the costs of crime associated with different forms and intensities of stimulant use.

Methods: Retrospective cohort study, including individuals from three prospective cohorts in Vancouver, Canada, measured biannually (2011-2015), reporting stimulant use at baseline assessment. Monthly crime costs included policing, court, corrections, and criminal victimization (2016 CAD). We estimated monthly crime costs associated with mutually exclusive categories of crack, cocaine, methamphetamine, and polystimulant use, stratified by daily/non-daily use, relative to stimulant abstinence, as well as the independent effects of treatment (opioid agonist (OAT) and other addiction treatment). We used a two-part model, capturing the probability of criminal activity and costs of crime with generalized linear logistic and gamma regression models, respectively, controlling for age, gender, education, homelessness, mental health issues, employment, prior incarceration, alcohol and opioid use.

Results: The study sample included 1,599 individuals (median age 39, 65.9% male) assessed over 5299 biannual interviews. Estimates of associated monthly crime costs ranged from $5449 [95%C.I.: $2180, $8719] for non-daily polystimulant use, to $8893 [$4196, $13,589] for daily polystimulant use. Cost differences between daily/non-daily use, injection/non-injection, and

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Contributors

BN designed the study. BE managed the literature searches, summaries of previous related work, undertook the statistical analysis, and wrote the first draft of the manuscript. EK, KD, KH, MJM, LR and EW led the studies on which the analysis was based and provided critical input into the design and interpretation of results. All authors have approved the final manuscript.

Conflicts of interest

None to declare.

stimulant type were not statistically significant. Drug treatment was not associated with lower monthly crime costs in our sample.

Conclusions: Substantial crime-related costs were associated with stimulant use, emphasizing the urgency for development and implementation of efficacious treatment regimens.

1.0. Introduction

Criminal activity is one of the largest components of the total societal costs attributable to illicit drug use in Canada and around the world. It is estimated that the direct costs (e.g. healthcare, law enforcement) of illicit drug use were as high as $3.57 billion (CAD) in Canada in 2002, with law enforcement costs comprising over 65% (Rehm et al., 2007). Direct costs have been estimated at $52.2 billion (USD) in the United States in 2007, with crime costs accounting for over 69% (National Drug Intelligence Center, 2011). Worldwide, stimulant use disorders are the second most common illicit drug use disorder after opioids, and the majority of the disease burden associated with stimulant use comes from cocaine (crack cocaine and cocaine hydrochloride) and amphetamines (specifically methamphetamine (MA)) (Degenhardt et al., 2014). Globally, MA use is more problematic than cocaine, due to dramatic physiological changes and sensitization in chronic users, as well as significantly higher prevalence beyond North and South America (Degenhardt et al., 2014; Degenhardt et al., 2013). In a literature review of studies estimating the economic benefits of addiction interventions, McCollister and French (2003) found that reductions in crime accounted for more than half of the total economic benefit in the majority of studies. More recent studies for treatment interventions found criminal activity to account for over 75% of accumulated lifetime direct costs for individuals with opioid use disorders (Nosyk et al., 2012), as well as a major component of total costs in other studies (Byford et al., 2013; Dijkgraaf et al., 2005; Zarkin et al., 2005).

High rates of drug use, particularly stimulants, among criminals have been observed in populations of arrestees and prison inmates (Karberg and James, 2005; ONDCP, 2014), however, the mechanism for the association between stimulant use and criminal activity is multifaceted (Goldstein, 1985). Pharmacological effects of stimulant use are well-known, and there is evidence that the risk of psychotic episodes and aggressive behavior increases in long-term users of methamphetamine (Harro, 2015), as well as similar neurocognitive problems in chronic cocaine users (Bolla et al., 1998). Furthermore, acute effects of drug use in reducing impulse control have been found to be more pronounced in stimulants than opiates (Badiani et al., 2011). Economic motivations for criminal activity stemming from stimulant use (such as acquisitive crime and other income generating activities) are perhaps the most direct mechanism for this relationship, given the high cost of illicit drugs (Bennett et al., 2008; Hepburn et al., 2016; Wilkins and Sweetsur, 2011).

Despite a large literature on the association between drug use and criminal behaviour, there are few studies examining the effects of stimulant use on criminal activity and associated costs. Flynn et al. (1999) estimated a range of $18,244 - $33,609 for yearly costs of crime of among untreated cocaine-dependent individuals, with significantly lower costs during and after treatment. Oser et al. (2011) found that stimulant use was associated with increased

criminal activity amongst rural drug users, compared to no stimulant use. Vaughn et al. (2010) found that crack cocaine use was associated with higher odds of violence than powdered cocaine. However, the authors concluded that other heterogeneity in users was largely contributing to these differences. In a systematic review and meta-analysis, Bennett et al. (2008) found that the odds of offending was 1.9 times higher for amphetamine users and 6 times higher for crack users, compared to non-drug users.

To date, no effective pharmacological treatments have been identified for stimulant use disorders (Fischer et al., 2015). Contingency management and cognitive behavioural therapies (CM/CBT) have shown efficacy in trial-based settings, particularly short-run CM interventions, in which participants receive a prize or reward for maintaining abstinence (DeFulio et al., 2009; Jaffe et al., 2007; McKay et al., 2010; Rawson et al., 2006; Schumacher et al., 2007; Shoptaw et al., 2005). However, treatment modalities are far from standardized, and treatment utilization and outcomes are not systematically tracked in the province of British Columbia or elsewhere across Canada.

The goal of this study was to test a series of hypotheses about the association between stimulant use and crime costs. First, that stimulant use (stratified by type and use intensity) is positively associated with crime costs, relative to stimulant abstinence; second, that higher frequency of use is associated with higher crime costs within stimulant types; third, that different stimulant types and polystimulant use are associated with different levels of crime costs, holding intensity of use constant; and finally, that injection use is associated with higher crime costs than non-injection use within stimulant types.

2.0. Methods

2.1. Study Sample

Data for this analysis was derived from a series of ongoing open prospective cohort studies, conducted in Vancouver, involving people who use drugs, including the At-Risk Youth Study (ARYS), the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), and the Vancouver Injection Drug Users Study (VIDUS). The VIDUS study follows HIV-negative adults who inject drugs while the ACCESS study follows HIV-positive adults who inject drugs (Strathdee et al., 1997; Wood et al., 2009). ARYS is made up of street-involved youth aged 14-26 who report use of drugs other than, or in addition to, cannabis (Wood et al., 2006a; Wood et al., 2006b). Sampling and follow-up methodologies have been described in previous studies and surveys were structured identically to allow for combined longitudinal analysis (Strathdee et al., 1997; Tyndall et al., 2003; Wood et al., 2006a; Wood et al., 2006b). At baseline and semiannually thereafter, participants completed an interviewer-administered questionnaire and received $30 CAD at each visit. All studies were approved by the University of British Columbia/Providence Health Care Research Ethics Board.

Individuals included in this analysis entered the study between September 2005 and December 2013, and the data were collected from December 2011 to May 2015 to coincide with the inclusion of survey items comprehensively capturing criminal activity. During this period, individuals could have a maximum of seven biannual assessments. All individuals

who had completed at least one follow-up interview during this period were eligible for inclusion. In addition, individuals were excluded if they had never reported stimulant use prior to the start of our sample period or at baseline. The reference group for our main analysis was past stimulant users who reported abstinence (no use of any stimulant drugs in the previous six months) at the time of assessment.

2.2. Crime Costs

Detailed survey questions included both the type and frequency of criminal acts committed in the past 30 days, categorized as violent offenses (such as assault, murder and weapons offenses), property crimes, drug dealing, sex work, legal status violation, disorderly conduct, and other offenses. Questions also included number of days incarcerated, on parole or under legal supervision in the past 30 days. Costs were assigned to each act by both the type of crime, as well as unit costs for the relevant expenditure categories. Monthly crime costs included all self-reported incidents of criminal activity, regardless of whether or not an individual was arrested for a particular act. Costs were calculated from a societal perspective, and included costs regardless of who incurred them or whether they corresponded directly to budgetary expenditures (Garrison et al., 2010). Total monthly crime costs were the combined costs of incident costs (police response), arrest processing and court costs for the criminal justice system, and criminal victimization (Krebs et al., 2014) (unit costs are presented in Supplementary material). Incident costs were derived from the overall operating budget of the Vancouver Police department, which captured the costs of police response to crime scenes, whether or not an arrest was made (Krebs et al., 2014). Arrest processing and court costs were assigned to acts where an individual reported being arrested, and incarceration costs to days an individual reported being incarcerated or on parole in the previous month. Victimization costs included medical expenses, cash losses and pain-and-suffering based on jury-compensation for victims (McCollister et al., 2010). Victimization costs were applied to violent offenses based on estimates for assaults, and property crimes as a weighted average based on cost estimates for break and enter and theft in McCollister et al. (2010), and the observed proportions of each type of crime in Vancouver, derived from the Vancouver Police Department and Statistics Canada (Krebs et al., 2014; McCollister et al., 2010). Incidents of sex work and drug dealing were only assigned costs if individuals reported being arrested, given that police are likely responding to only a fraction of total incidents (which we define as an individual reporting arrest), and were excluded from victimization costs, given the argument that these activities can be viewed as transactions with no direct costs of victimization (Dijkgraaf et al., 2005; Rajkumar and French, 1997; Zarkin et al., 2012). Monthly crime costs were adjusted to account for the proportion of days incarcerated in the past month.

2.3. Measures

Our primary independent variables were indicators of stimulant use in the past six months, grouped into one of eight mutually exclusive categories (Figure 1), including any use of powdered cocaine, daily or non-daily use of crack cocaine or methamphetamine, concurrent use of more than one stimulant drug (polystimulant), with daily use for polystimulant users specified as daily use of at least one stimulant, and a reference group of stimulant abstinent individuals. In addition to these categories, we also estimated the crime costs associated with

individuals in treatment (either OAT or other non-OAT treatment modalities) in the previous six months.

Baseline control variables included sex, education (completion of high school), and a history of incarceration. These were included to control for demographic and socioeconomic characteristics, as well as potential predisposition for criminality (Krebs et al., 2014). Time varying control variables included linear and quadratic age trends, homelessness, formal employment (full- or part-time), accessing mental health treatment, binge alcohol use, and opioid use, all in the previous six months. Indicators for homelessness and addiction treatment were included to control for their potential association with criminal activity, both directly and mediated through changes in drug use, specifically among opioid co-users (DeBeck et al., 2007; Schwartz et al., 2010). A variable for accessing mental health treatment was included to control for the potential association between mental health problems, drug use and criminal activity (Bolla et al., 1998; Harro, 2015). To test our hypothesis on the effects of injection drug use, we regressed crime costs on indicators for injection and concurrent injection/non-injection use in a subgroup of methamphetamine users. In this subgroup analysis, control variables were included for polystimulant use, and the reference group was non-injection MA users.

2.4. Statistical Analysis

Estimates for the association between stimulant use and monthly crime costs were derived using a two-part multiple regression model to account for the large number of observations with zero-valued monthly crime costs. The first part modeled the probability of having non-zero crime costs using a logit regression, while the second part estimated the level of non-zero costs using a Generalized Linear Model (GLM). For the GLM specification, we selected a log link function, and used modified Park tests to choose a gamma distribution for crime costs. We also estimated cluster-robust (Huber-White) standard errors to account for within-individual correlation of error terms resulting from repeated measures. We estimated marginal effects for both parts of the model, estimated at each individual's respective covariate values. The resulting average marginal effects (AME) were interpreted as the population effect associated with stimulant use on monthly costs of crime, and were not conditional on individuals having positive crime costs. Data was prepared in SAS 9.4, and the analysis was conducted in Stata 14.1.

Given that cost data were derived from self-reported accounts of criminal activity, we chose a conservative approach consistent with Krebs et al. (2014) and excluded the top two percent of total crime cost observations from our final sample. This was done to limit the effect of extremely high cost and potentially uncertain responses on the representativeness of our results.

In sensitivity analysis, we examined two alternative scenarios to our baseline model, which considered costs from a societal perspective. First, we considered the perspective of a third-party payer, which only considered costs incurred by the criminal justice system (arrests, incidents and court costs) and not victimization costs. Second, we estimated our model using only costs of arrests and court proceedings, and not costs of incidents which were reported in survey assessments, but did not result in arrest. Finally, we estimated our model with the

top outliers included, as well as a more restrictive upper bound in which we removed the top five percent of cost outliers for comparison.

3.0. Results

3.1 Study Sample Characteristics

A total of 1599 individuals (contributing 5299 observations, median of 3 [IQR: 2-4] per individual) met the primary inclusion criteria and 83.2% of individuals completed at least two assessments during the study period. Our sample was over 65.9% male, with 71.4% of individuals reporting prior incarceration at baseline. Summary statistics for our sample are presented in Table 1. Table 2 presents summary statistics for monthly crime costs by expenditure category, while Figure 1 depicts the number of observations by stimulant use category, and Figure 2 presents monthly crime costs by stimulant use category. Approximately half of all observations with crack cocaine and MA use (48.6% and 51.5% respectively) were individuals using only one type of stimulant drug, compared to 25.5% of powdered cocaine users. Additionally, individuals reported no criminal activity and had zero-valued monthly crime costs in 79.6% of all observations.

3.2. Results of Two-Part Regression Models

In the baseline specification of our two-part model regression analysis, we found a positive and significant association between crime costs and MA, polystimulant and cocaine use, relative to abstinence ($p < 0.05$). AME estimates for associated monthly crime costs were $5449 [95% C.I. $2180, $8719] for non-daily polystimulant use, $5723 [$2013, $9434] for nondaily MA use, $5845 [$663, $11,028] for daily MA use, $5864 [$1220, $10,508] for powdered cocaine use, and $8893 [$4196, $13,589] for daily polystimulant use (Table 3). In addition to our comparison between stimulant use and stimulant abstinence, we also tested differences in crime costs between stimulant use categories, holding intensity of use constant (e.g. daily MA vs. daily crack cocaine, or non-daily MA vs. non-daily crack cocaine). We could not reject the null hypothesis of no difference in associated crime costs across stimulant use categories for either daily or non-daily use intensities. Although estimates for crime costs associated with daily use were higher within each stimulant use category, these differences were not significant. Finally, estimates for independent associations between OAT and non-OAT treatments, and monthly crime costs were not significant (Table 3).

In addition to our baseline model, we also estimated monthly crime costs associated with injection vs. non-injection use in a subgroup of MA users. Neither estimate for injection or concurrent injection/non-injection MA use was significantly associated with higher crime costs relative to non-injection MA use (Table 4).

3.3. Sensitivity Analysis

In sensitivity analysis of alternative payer perspectives, results were similar in direction and statistical significance, with slightly smaller magnitude when including only third-party payer costs. For estimates including arrests and court costs only, the magnitude of estimates was lower than either societal or third-party payer perspectives, and only daily methamphetamine, daily and non-daily polystimulant use categories were significantly

higher than abstinence. Results of testing differences between daily and non-daily use as well as across drug types were robust. Lastly, when the top two percent of monthly crime cost observations were included in the sample, most associations were no longer significantly different from abstinence, with the exception of the daily polystimulant use, and results were robust, though smaller in magnitude, when the top five percent of monthly crime costs were excluded (results available in Supplementary material).

4.0. Discussion

4.1. Findings

We found a positive and significant association between stimulant use and monthly crime costs for powdered cocaine, MA and polystimulant use, relative to stimulant abstinence. We did not find significant differences between levels of use intensity within stimulant types, across stimulant types, or between routes of administration of methamphetamine.

Estimates for both OAT and other substance use treatment (non-OAT) did not allow us to conclude that either had independently beneficial effects amongst users in our analytic sample (i.e. a significant negative association with monthly crime costs). Since neither treatment was specifically targeted toward stimulant use, we were not necessarily expecting to observe a significant association with lower crime costs among those in our analytic sample, however, we wanted to consider the potential for positive spillover effects and increased pro-social behaviour resulting from any type of addiction treatment. This was informed by results from Krebs et al. (2014) and Krebs et al. (2016), which found that OAT was more effective in reducing crime costs among opioid users who were co-using stimulants. Although estimates for OAT in our study were not independently associated with lower crime costs, opioid users comprised only a subset of our analytic sample, as the inclusion criteria was not related to opioid use or OAT history. Additionally, our reference group for OAT was individuals not receiving OAT, regardless of concurrent stimulant or opioid use and cannot be directly compared to estimates reported elsewhere for OAT treatment among opioid users.

Our finding of positive and significant associations between monthly crime costs and drug use for the majority of stimulant use categories was consistent with other studies (Bennett et al., 2008; Oser et al., 2011), and similar in magnitude to crime cost estimates of drug users in-relapse or out-of-treatment, compared to in-treatment or abstinent (Flynn et al., 1999; Krebs et al., 2014; Krebs et al., 2016). Our finding that monthly crime costs associated with powdered cocaine use were not significantly different than crack cocaine was consistent with Vaughn et al. (2010), who found no differences in violent behavior after controlling for contextual variables and co-morbid disorders. Furthermore, our result that powdered cocaine, but not crack cocaine use, was significantly associated with higher monthly crime costs relative to stimulant abstinence, was contrary to results in Stewart et al. (2014) suggesting that crack cocaine was associated with higher amounts criminal activity. Due to differences in measurement for both drug use and criminal activity, however, these results are not directly comparable with our estimates. Additionally, this result may be due, in part, to a high proportion of injection users of powdered cocaine in our study, relative to the

general population (Novak and Kral, 2011), which has shown to be associated with other high-risk behaviours (Lloyd-Smith et al., 2009; Tyndall et al., 2003).

The result that daily use was not associated with higher crime costs than non-daily use was somewhat surprising, however, this may have been affected by less precise estimates given the rarity of criminal activity and smaller group sizes, once users were stratified by daily and non-daily use. In addition, our measure for stimulant use intensity was may not have been sensitive enough to detect these differences. As such, the association between stimulant use intensity and crime costs remains an open question for future research. The literature on substance use and crime, as well as the neurological effects of binge stimulant use suggests that intensity of use may be an important moderator of the effects of drug use. In addition to nearly 80% of observations having zero-valued crime costs, over 60% of stimulant using individuals in our analytic sample reported no criminal activity throughout the duration of their follow-up. This illustrates what is typically the case; that criminal activity is a relatively rare event, and crime costs are characterized by a small number of events and individuals having a substantial influence on the total costs.

4.2. Limitations

There are several potential limitations to our analysis. First, that our data was collected via self-report surveys. Survey data has demonstrated to be a reliable measure for arrests when recall windows are appropriately short, with no consistent bias toward over or under reporting (Johnson et al., 2005). Since our survey instruments only asked respondents to report criminal activity from the past 30 days, it is unlikely that the length of recall time was a significant problem. In the case of drug use in particular, other studies have found that potential bias may go in the direction of underreporting, given the possibility of respondent mistrust of interviewers when reporting illegal activity (Johnson and Golub, 2007). Given that our analytic sample was from a longitudinal cohort in which over 80% of individuals were measured over multiple cycles, trust between respondents and interviewers was likely stronger than in cross-sectional surveys where respondents were only interviewed once.

While we accounted for observable heterogeneity by including a number of a priori-specified control variables in our regression analysis, there was still potential for unmeasured confounding. A common method to address this problem in panel data is fixed effects estimation, which uses each individual as his or her own control to eliminate time-invariant heterogeneity, whether observed or unobserved. Although this specification is not currently available for two-part model estimation packages, we were able to re-estimate Part I of our model using a fixed-effects logit specification for the probability of an individual having any crime costs in the previous six months. While this reduced the size of our analytical sample, as we could only estimate within-individual effects among the subset of those who exhibited variation in criminal activity over time, fixed-effects logit estimates for stimulant use were consistent in direction with Part I of our baseline model, though most estimates were smaller in magnitude and only daily MA use remained significantly higher than stimulant abstinence (Supplementary material).

Finally, caution must be exercised when generalizing these results. Injection drug use was a criterion for selection into the VIDUS and ACCESS studies, while 49.7% of individuals

from the ARYS cohort included in our sample had used injection drugs. Our analytic sample was located in a unique urban Canadian setting, characterized by socioeconomic marginalization and easy access to illicit drug markets (DeBeck et al., 2007; Richardson et al., 2015; Ti et al., 2014). As a result, there are a number of contextual effects that may be quite different when dealing with a broader cross-section of stimulant users, including structural factors such as higher levels of policing activity and higher probabilities of police interaction and arrests among this cohort than might be the case in other settings.

4.3. Implications

As there are no evidence-based pharmacologic approaches for treating stimulant use disorders, and other promising forms of psychosocial therapy have yet to show persistent effects across settings or over longer time horizons, the implications of this study in estimating the benefits of treatment are largely hypothetical. The treatment variables included in our analysis represented an exploratory assessment of the potential for positive effects for stimulant users from non-stimulant-specific treatments, however, we would expect an effective, evidence-based treatment regimen for stimulant use disorders to have considerably larger effects. For example, if an effective treatment regimen was identified and capable of generating an 80% reduction in crime costs, similar to what has been recently estimated for OAT and opioid users (Krebs et al., 2014; Krebs et al., 2016), as well as individuals in long-term residential treatment for cocaine use disorders (Flynn et al., 1999), there are potential average monthly cost savings of $4691 per cocaine user, $4676 per daily MA user, and $7114 per daily polystimulant user treated. This is in addition to many other potential health benefits and cost savings, such as reduced health care costs, that could be generated by an effective treatment program (Baser et al., 2011; French and Martin, 1996). Even with all tangible costs such as policing, healthcare and victimization included, these estimates can still be considered a lower bound for the overall societal costs of criminal activity (Basu et al., 2008).

4.4. Conclusion

Most types of stimulant use were associated with increased monthly crime costs. If new, effective treatment modalities for stimulant use disorders can generate similar reductions in crime costs to what has been estimated for OAT, there are potentially large economic benefits, in addition to public health benefits, to reap from such treatments.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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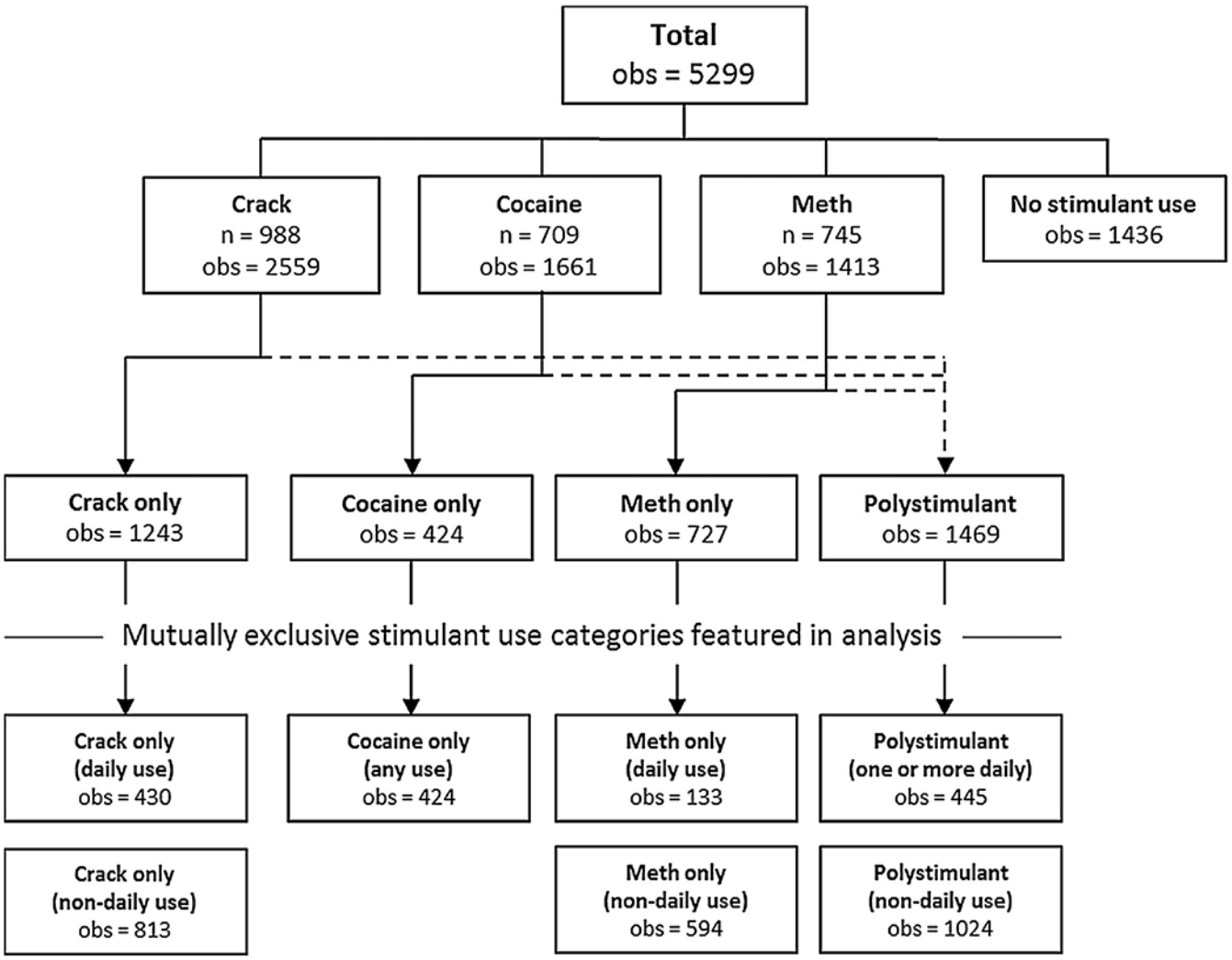

Fig. 1.

Observations within mutually exclusive stimulant use categories, and unique individuals reporting use of particular stimulant types at any assessment.

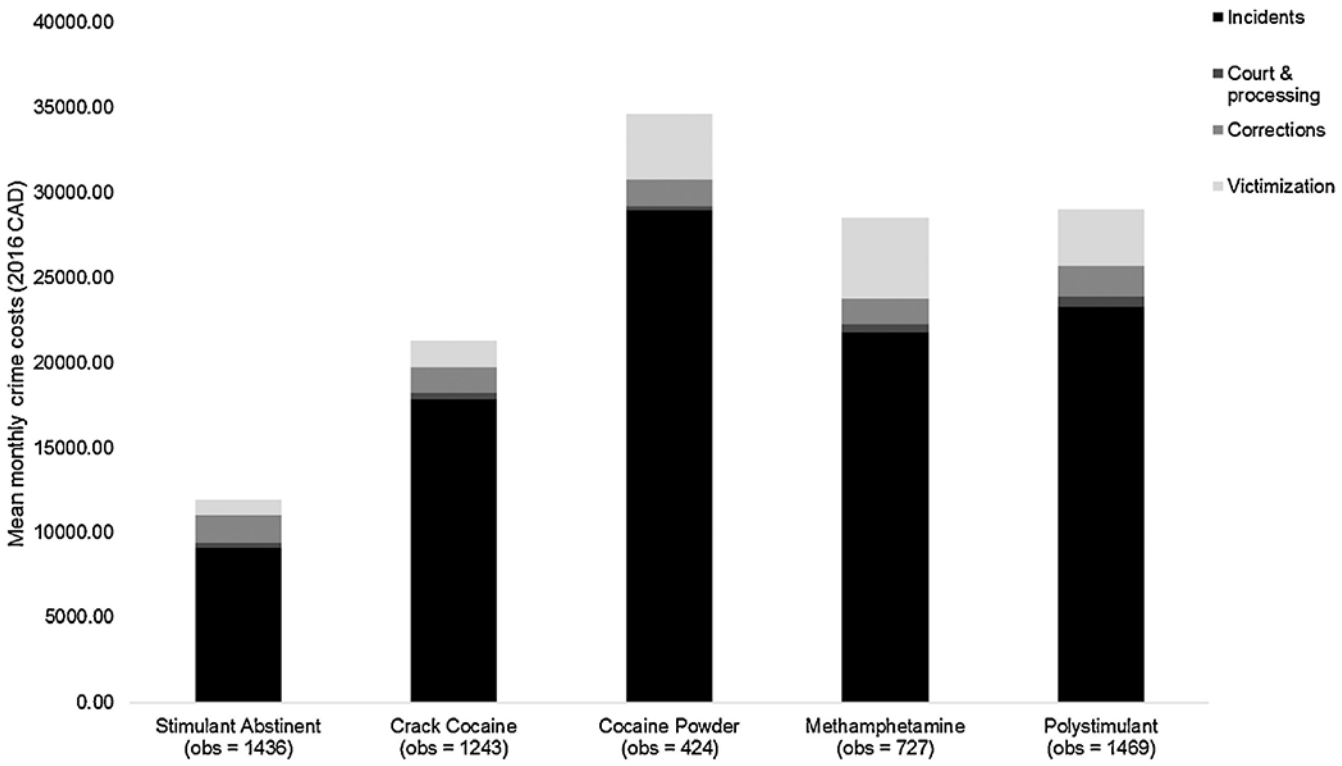

Fig. 2.

Average monthly crime costs among observations with positive crime costs, by mutually exclusive stimulant use group and expenditure category (2016 CAD).

Table 1.

Descriptive statistics of individual baseline characteristics and time-varying covariates used in analysis.

Baseline covariates (n = 1599)	Levels	n	(%)
Age (median [IQR])	39 [26,46]	–	–
Year of baseline assessment	<2007	786	49.2
	2007–2009	504	31.5
	>2009	309	19.3
Sex	Male	1054	65.9
Education	High School	853	53.3
Ever homeless		1357	84.9
Ever in jail		1141	71.4
Surveys completed	1	269	16.8
	2	289	18.1
	3	508	31.8
	4+	533	33.3

Time-varying covariates (obs = 5299)	Levels	obs	(%)
Mental health treatment		1843	34.8
Employed		1389	26.2
Drug treatment	OAT	1609	30.4
	Other (non-OAT)	1838	34.7
Concurrent opioid use		1943	36.7
Binge alcohol use		1371	25.9

IQR – Interquartile range; OAT – Opioid agonist treatment.

Table 2.

Descriptive statistics for monthly crime cost components among observations with positive crime costs (2016 CAD).

	Incidents	Court	Corrections	Victimization	Total
% Zero (of all obs)	94.75	97.60	82.47	96.41	79.58
Mean	$16,977	$407	$1677	$2561	$21,622
SD	$56,211	$1363	$1358	$9922	$63,399
Median	$0	$0	$1426	$0	$1426
IQR	[$0, $4602]	[$0, $0]	[$1426, $1426]	[$0, $0]	[$1426, $6469]
99th Percentile	$285,325	$6389	$7393	$58,075	$321,153

SD – Standard deviation; IQR – Interquartile range.

Descriptive statistics calculated for data used in baseline model specification, which excludes the top two percent of monthly crime cost outliers.

Table 3.

Monthly crime costs associated with mutually exclusive categories of stimulant use, relative to stimulant abstinence, and daily vs. non-daily use intensity, derived from two-part multiple regression results (2016 CAD).

		Stimulant use vs. No use (1)		**Daily vs. Non-daily (2)**	
Crack Cocaine	Daily *(n = 430)*	$4441*	[−$153, $9034]	$976	[−$4282, $6235]
	Non-daily *(n = 813)*	$3464	[−$830, $7758]	*Reference*	
	No use *(n = 1436)*	*Reference*			
Methamphetamine	Daily *(n = 133)*	$5845**	[$663, $11,028]	$122	[−$4968, $5212]
	Non-daily *(n = 594)*	$5723***	[$2013, $9434]	*Reference*	
	No use *(n = 1436)*	*Reference*			
Polystimulant	Daily *(n = 445)*	$8893***	[$4196, $13,589]	$3444*	[−$515, $7402]
	Non-daily *(n = 1024)*	$5449***	[$2180, $8719]	*Reference*	
	No use *(n = 1436)*	*Reference*			
Powdered Cocaine	Any use *(n = 424)*	$5864**	[$1220, $10,508]		
	No use *(n = 1436)*	*Reference*			
Treatment (OAT)	Yes *(n = 1609)*	−$3722	[−$8213, $769]		
	No *(n = 3690)*	*Reference*			
Other treatment (non-OAT)	Yes *(n = 1838)*	$1336	[−$2672, $5343]		
	No *(n = 3461)*	*Reference*			

Observations: 5299.

Control variables include: age, gender, education, history of incarceration, mental health issues, employment, homelessness, opioid use, and alcohol use.

Average marginal effect estimates presented with 95% confidence intervals in brackets.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

Table 4.

Monthly crime costs associated with mutually exclusive categories of injection and concurrent injection/non-injection use, relative to non-injection-only use, derived from two-part multiple regression results in methamphetamine user subgroup (2016 CAD).

		Injection vs. Non-injection (1)	
Methamphetamine	Injection *(n = 602)*	$6327*	[−$835, $13490]
	Both *(n = 406)*	$1349	[−$3849, $6547]
	Non-injection *(n = 405)*	*Reference*	

Observations: 1413.

Control variables include: age, gender, education, history of incarceration, mental health issues, employment, homelessness, polystimulant use, opioid use, and alcohol use. Average marginal effects presented with 95% confidence intervals in brackets.

* $p < 0.1$.