

The North American Opiate Medication Initiative (NAOMI): Profile of Participants in North America's First Trial of Heroin-Assisted Treatment

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ABSTRACT *The North American Opiate Medication Initiative (NAOMI) is a randomized controlled trial evaluating the feasibility and effectiveness of heroin-assisted treatment (HAT) in the Canadian context. Our objective is to analyze the profile of the NAOMI participant cohort in the context of illicit opioid use in Canada and to evaluate its comparability with patient profiles of European HAT studies. Recruitment began in February 2005 and ended in March 2007. Inclusion criteria included opioid dependence, 5 or more years of opioid use, regular opioid injection, and at least two previous opiate addiction treatment attempts. Standardized assessment instruments such as the European Addiction Severity Index and the Maudsley Addiction Profile were employed. A total of 251 individuals were randomized from Vancouver, BC (192, 76.5%), and Montreal, Quebec (59, 23.5%); 38.5% were female, the mean age was 39.7 years (SD:8.6), and participants had injected drugs for 16.5 years (SD:9.9), on average. In the prior month, heroin was used a mean of 26.5 days (SD:7.4) and cocaine 16 days (SD:12.6). Vancouver had significantly more patients residing in unstable housing (88.5 vs. 22%; $p < 0.001$) and higher use of smoked crack cocaine (16.9 days vs. 2.3 days in the prior month; $p < 0.001$), while a significantly higher proportion of Montreal participants reported needle sharing in the prior 6 months (25% vs. 3.7%; $p < 0.001$). In many respects, the patient cohort was similar to the European trials; however, NAOMI had a higher proportion of female participants and participants residing in unstable housing. This study suggests that the NAOMI study successfully recruited participants with a profile indicated for HAT. It also raises concern about the high levels of crack cocaine use and social marginalization.*

KEYWORDS *Heroin dependence, Injection Drug Use, Substitution treatment, Cocaine abuse, Treatment refusals*

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INTRODUCTION

Heroin addiction is a chronic relapsing disease and is often accompanied by abuse of other psychoactive drugs, physical and mental health problems, and severe social marginalization.^{1,2} The evolution of this disease depends on a genetic contribution, influenced by personal choices and environmental factors, and it can be fatal if not treated.³ Heroin dependence remains a critical public health problem in Canada and most other parts of the world. Between 75,000 and 125,000 people inject drugs in Canada, with cocaine and heroin the favored injectable substances of choice.^{4,5} Institutional sources estimate approximately 80,000 regular opioid users in Canada⁶ with geographic differences in prevalence and trends. Although the “street” availability of prescription analgesic opioids such as hydromorphone and morphine has increased in recent years,^{7,8} intravenous use of heroin prevails in Vancouver and Montreal.^{5,9–11}

Injectors are exposed to life-threatening health risks such as drug overdoses, blood-borne viral infections, endocarditis, and others.^{12–14} Those who remain untreated or who are outside the social and health care system are known to experience higher rates of morbidity and mortality.^{15–17} Given that abstinence-oriented therapies for opioid addiction have relatively low efficacy,¹⁸ opioid agonist substitution is currently the most effective treatment option.² Oral methadone maintenance treatment (MMT) is the most common and accepted formulation and route of administration for substitution treatment. Evidence shows that MMT is effective¹⁹ if delivered under best practices guidelines.^{1,20,21}

Although MMT has been proven to be effective for some, it is well documented that a significant proportion of patients are not attracted into or do not respond to this therapy.^{22,23} Many nonresponders relapse into the use of illicit street drugs and/or continue injecting illicit opiates even during methadone treatment.²⁴ For example, in British Columbia, only 52% of MMT patients are retained for at least a year²⁵ in line with estimates of retention found in the National Institute of Drug Abuse review,²⁶ but significantly lower than those observed in Ontario,²⁷ in a low-threshold program in Montreal,²⁸ and in most of the European countries.^{29,30} For nonresponders, there are few alternatives currently available. Heroin-assisted treatment (HAT), in which patients are prescribed pharmaceutical quality heroin (diacetylmorphine) in specialized clinics, is one available therapeutic option for chronic, long-term, opioid injectors who remain outside of the current addiction treatment system. Clinical trials and follow-up studies have demonstrated that prescribed heroin is safe, feasible, and effective.^{31–37}

In 2005, a randomized controlled trial with injectable heroin [denoted the North American Opiate Medication Initiative (NAOMI)] began in two Canadian cities (Vancouver and Montreal), aimed at evaluating the feasibility and effectiveness of HAT in the Canadian context. The objective of the present analysis is to describe the profile of the subjects recruited into NAOMI and to evaluate the comparability with international patient profiles of other studies of HAT.

METHODOLOGY

The NAOMI study was designed as an open, randomized controlled trial that compares injected diacetylmorphine (DAM; plus oral methadone if deemed appropriated) with oral methadone alone in the treatment of opioid addiction for chronic injection opioid users who have not benefited from available therapies. Patients in both arms of the trial also receive an identical comprehensive range of psychosocial and primary care

services. The study is being carried out in two sites: the Downtown East Side (DTES) of Vancouver and Montreal.

The original sample size for the trial was 470 based on power calculations to detect absolute differences of 15% between groups in retention and response rates. As the trial progressed, this was relaxed to 20% as recommended by the Drug and Safety Monitoring Board leading to a revised sample size of 253. Recruitment began in February 2005 and ended in March 2007, with 251 participants recruited. The trial was originally planned for three sites, but construction delays and other factors precluded the proposed Toronto site from participating.

The recruitment strategy included an intensive outreach campaign, posters, on-the-street contact, media advertisement, and referrals from services that work with the same target population (e.g., the Vancouver supervised injection facility, needle exchange programs, primary care clinics). The main inclusion criteria included opioid dependence (DSM-IV), minimum of 25 years of age, 5 years or more of opioid use, regular opioid injection, and a minimum of 1 year residence in site/city location. Participants must have had a minimum of two previous opiate addiction treatments, including one in which they received a minimum of 60 mg or more of methadone daily for at least 30 days in a 40-day period. To participate in the study, the candidates could not have been enrolled in methadone maintenance treatment within the prior 6 months. Other exclusion criteria included severe medical or psychiatric conditions that are contraindicated for HAT, pregnancy, and current justice system involvement that could have resulted in an extended period of incarceration during the study period.

The screening period for each participant involved a minimum of 3 weeks from initial contact up to the time when all necessary eligibility criteria had been determined and confirmed (average 6 weeks). As eligible patients completed the screening, they provided informed consent and underwent the baseline assessment. Internationally established standardized assessment instruments were used including the European Addiction Severity Index (EuropASI),³⁸ SF-6D,³⁹ EQ5D,⁴⁰ WHO-DAS II,⁴¹ and the Maudsley Addiction Profile.⁴² Medical examinations and urine-toxicology were performed, and sociodemographic data and relevant institutional data on involvement with drug treatment, health care, and criminal justice were obtained. Following the baseline assessment, participants were randomly allocated to injection-assisted treatment (55%) or methadone maintenance alone (45%). For purposes of validation, a subset of participants in the injection arm was randomly assigned to receive hydromorphone (HDM) instead of DAM on a double-blind basis.

Descriptive analyses were performed for frequencies and means values. Comparisons were carried out using Student's *t*, Mann-Whitney *U*, and Kruskal-Wallis tests for comparisons of means and Chi Square tests for comparisons of frequencies, depending on variable distribution. For comparisons with the European HAT, the following baseline data was used: for The Netherlands, figures from the injection trial ($n=174$)⁴³; for Switzerland, patients admitted for a cohort study ($n=1,035$)⁴⁴; for Spain, the total sample ($n=62$),^{36,45} and for Germany, the "not reached" group ($n=540$).⁴⁶ The German trial expressly distinguished between participants from MMT and those not in treatment. Given that the NAOMI study only engaged participants not in MMT, the comparisons were made with the "not reached" strata instead of the whole German sample. Statistical analyses were conducted using SPSS 15.⁴⁷

RESULTS

A total of 1,588 people were contacted and went through the self-report step of the screening process (1,053 in Vancouver and 538 in Montreal), and 581 were assessed for eligibility. Among them, 101 dropped out from the screening process, and 229 were not eligible mainly due to not meeting the MMT history inclusion criteria (they did not get at least 30 days of MMT at 60 mg, or they were currently or recently on MMT, or they did not have a verifiable history of MMT). A total of 251 clients met the eligibility criteria and provided informed consent including 59 (23.5%) in Montreal and 192 (76.5%) in Vancouver (Table 1). Random assignments were as follows: oral methadone 111 (44.2%), injected diacetylmorphine 115 (45.8%), and injected hydromorphone 25 (10.0%).

Sociodemographics

The mean age of the study sample at recruitment was 39.7 years, 38.8% of the participants were female, and 23.9% defined themselves as aboriginal. A total of 72.9% declared that they were living in an unstable housing situation, and 49.8% had been living in their present address for less than 4 months. Montreal participants were younger ($F=18.3$; $p=0.001$), none identified themselves as aboriginal ($\chi^2=24.2$; $p=0.001$), and a much smaller proportion resided in unstable housing ($\chi^2=106.6$; $p=0.001$). The Vancouver site recruited a higher proportion of people living alone while Montreal had a higher number of participants living with people with alcohol problems or who use drugs ($\chi^2=36.18$; $p=0.001$).

Education and Employment

In the prior 3 years, most of the participants had been regularly unemployed (70.9%), and at baseline assessment, only 13.6% had received money from (legal) employment in the prior month. Montreal participants had, on average, more years of education ($t=14.1$; $p=0.001$) than the Vancouver participants, while the reported longest period of unemployment was notably higher among Vancouver participants, even after adjusting for age ($F=18.8$; $p=0.001$). Overall, the two most frequently cited sources of income were public assistance (76.1%) and illegal activity (67.3%).

Criminal Activity

Almost all of the participants (94.4%) had been charged at least once in their life for crimes of any nature, 81.7% had been convicted at some point, and the cohort had spent a median of 12 (interquartile 1 and 3 (Q1–Q3)=1–60) months in jail in their lifetime. In the month prior to baseline assessment, 73.3% of the participants were involved in illegal activities (for profit), and the median number of days of illegal activities in the prior 30 days was 15 days (Q1–Q3=0–30). A larger proportion of Vancouver participants had been criminally charged in their lifetime compared to the Montreal participants ($\chi^2=18.9$; $p=0.001$). This difference is significant even after adjusting for age, housing, and crack use in the prior month. There are no differences in relation to the percentage of participants who reported illegal activities during the prior month; however, Vancouver participants reported significantly more days of illegal activity (Mann–Whitney $U=4094.5$; $p=0.001$).

Drug Use

NAOMI participants reported an extensive history of regular drug use, with heroin and cocaine being the most commonly used drugs. Data on recent drug use in the prior

TABLE 1 Patient's eligibility criteria in Montreal and Vancouver

Sociodemographic characteristics	Vancouver (<i>n</i> =192) % (<i>n</i>)/M [SD]	Montreal (<i>n</i> =59) % (<i>n</i>)/M [SD]	Total (<i>n</i> =251) % (<i>n</i>)/M [SD]
Group			
Oral	44.3% (85)	44.1% (26)	44.2% (111)
Injection	55.7% (107)	55.9% (33)	55.8% (140)
Age***	40.9 [8.2]	35.6 [8.6]	39.7 [8.6]
Gender			
Male	61.5% (118)	61.0% (36)	61.4% (154)
Female	38.5% (74)	39.0% (23)	38.6% (97)
First Nation***	31.3% (60)	–	23.9% (60)
Current housing***,a			
Stable housing	11.5% (22)	78.0% (46)	27.1% (68)
Precarious housing	88.5% (170)	22.0% (13)	72.9% (183)
Living in the current address less than 4 months	49.5% (95)	50.8% (30)	49.8% (125)
Spend free time with family/friends			
Without alcohol or drug problems	9.4% (18)	15.3% (9)	10.8% (27)
With alcohol or drug problems	36.6% (70)	44.1% (26)	38.4% (96)
Alone	53.9% (103)	40.7% (24)	50.8% (127)
Living with anyone with alcohol problems or using drugs***			
No	30.7% (59)	28.8% (17)	30.3% (76)
Yes	16.1% (31)	52.5% (31)	24.7% (62)
Alone	53.1% (102)	18.6% (11)	45.0% (113)
Years of school education***	10.6 [2.1]	11.9 [3.1]	10.9 [2.4]
Generally unemployed ^b in the past 3 years	74.0% (142)	61.0% (36)	70.9% (178)
Longest period of unemployment (months)***	113.5 [83.6]	55.2 [51.0]	99.8 [81.0]
Received money in the prior 30 days for			
Employment	12.5% (24)	17.0% (10)	13.6% (34)
Alternatives sources ^c	32.8% (63)	25.4% (15)	31.1% (78)
Public assistance or welfare*	79.2% (152)	66.1% (39)	76.1% (191)
Mates, family, Or friends**	25.0% (48)	42.4% (25)	29.1% (73)
Illegal sources [§]	70.3% (135)	57.6% (34)	67.3% (169)
Sex work	18.8% (36)	13.6% (8)	17.5% (44)
Charges in life for any crime***	97.9% (188)	83.1% (49)	94.4% (237)
Ever convicted in life***	87.5% (168)	62.7% (37)	81.7% (205)
Months incarcerated in life***,d	18 (1–72)	3 (0–24)	12 (1–60)
Illegal activities in the prior 30 days	146 (76)	38 (64.4)	184 (73.3)
Illegal activities, days in the prior 30***,d	20 (1–30)	5 (0–16)	15 (0–30)
Money spent on drugs, prior month ^d	\$1,500 [900–3,000]	\$1,200 [600–3,000]	\$1,500 [900–3,000]

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; § $p < 0.09$

^aBased on type of housing, not time. Unstable housing was described as having no fixed address, living in a shelter, or living in a SRO (single room occupancy) hotel.

^bUnemployment includes housewife

^cBinning, panhandling, shoe-shining, etc.

^dMedian and interquartile ranges

30 days showed similar patterns (Table 2). Cocaine was almost always smoked as crack cocaine a mean days of 13.4 (SD:13.1), and injected as cocaine powder a mean of 5.1 (SD:8.9) days in the prior month. Speedball, a combination of heroin and cocaine, was used a mean of 2.7 (SD:6.4) days the prior month. Besides heroin, nonprescribed methadone, hydromorphone, and morphine were the three most common illicit opioids used by the participants; however, their use was minimal in comparison to heroin use. Compared to Vancouver, Montreal participants reported a higher mean days of use in the prior month of alcohol, injected cocaine, and cannabis. Vancouver participants, however, reported greater use of smoked crack cocaine, amphetamines, speedball, illicit hydromorphone, and illicit morphine.

Health Status and Previous Treatments

Half of the sample (Table 3) reported a significant chronic medical problem, and almost all had been hospitalized at least once (90.8%) in their lifetime. Vancouver participants had higher proportions of chronic health problems and hospitalizations even after adjusting for age and gender. One third of the sample (31.3%) had attempted suicide at least once in their life. In the prior month before randomization, 55% had reported psychological problems, though only 38.2% received psychological treatment in their life, with a higher proportion in Montreal receiving treatment (this difference remained significant after adjusting for age and gender).

Participants had a median of 7 (Q1–Q3=4–14) previous drug treatment attempts including three (Q1–Q3=2–3) methadone treatment episodes. The Montreal participants reported more previous MMT attempts than Vancouver participants (Median=3; Q1–Q3=2–5 vs. Median=3; Q1–Q3=2–3 (2–3); Mann–Whitney $U=4725.5$; $p=0.045$). Almost half of the sample has never remained abstinent for more than 3 months after drug treatment with similar patterns at both sites. Despite shorter lifetime durations of heroin use, Montreal participants reported higher lifetime numbers of overdoses.

TABLE 2 Data on recent drug use in the prior 30 days

Days of use in the prior month	Vancouver ($n=192$)		Montreal ($n=59$)		Total ($n=251$)	
	Mean	SD	Mean	SD	Mean	SD
Alcohol**	2.59	6.50	6.15	9.21	3.43	7.37
Heroin ^{a,***}	26.82	7.09	25.44	8.39	26.49	7.43
Illicit methadone ^b	1.89	4.47	1.93	4.95	1.90	4.57
Illicit benzodiazepines ^b	2.02	5.98	1.14	4.19	1.81	5.61
Cocaine powder ^a	5.09	9.02	4.90	8.75	5.05	8.94
Crack cocaine ^{c,***}	16.88	12.69	2.25	6.35	13.41	13.07
Amphetamine ^{d,*}	1.69	5.39	0.17	0.62	1.33	4.76
Cannabis ^c	6.14	10.51	7.78	11.29	6.53	10.70
Speedball ^a	3.19	6.87	1.12	4.48	2.70	6.44
Illegal hydromorphone ^{a,§}	2.14	5.71	0.76	4.13	1.82	5.40
Illegal morphine ^{a,***}	3.92	8.12	0.00	0.00	2.99	7.29
Injecting drugs ^{***}	29.06	3.43	24.47	8.26	27.98	5.35
Times injecting drugs in a day ^{**}	5.09	3.23	3.61	2.73	4.75	3.18

* $p<0.05$; ** $p<0.01$; *** $p<0.001$; § $p<0.09$

^aMore than 95% injected

^bMore than 95% oral

^cMore than 95% smoked

^dMore than 75% injected

TABLE 3 Health status and previous treatments

Health related events and behaviors	Vancouver (<i>n</i> = 192)		Montreal (<i>n</i> = 59)		Total (<i>n</i> = 251)	
	%/M	(<i>n</i>) [SD]	%/M	(<i>n</i>) [SD]	%/M	(<i>n</i>) [SD]
Chronic medical problem ^{a,**}	58.8%	(113)	35.6%	(21)	53.4%	(134)
Hospitalized in life at least once*	93.2%	(179)	83.1%	(49)	90.8%	(228)
Hepatitis C positive ^b	66.1%	(127)	52.5%	(31)	62.9%	(158)
HIV positive ^b	9.9%	(19)	8.55%	(5)	9.6%	(24)
Ever attempted suicide [§]	28.4%	(54)	40.7%	(24)	31.3%	(78)
Ever treated for psychological problem*	34.4%	(66)	50.8%	(30)	38.2%	(96)
Psychological problems prior month [§]	48.1%	(91)	62.7%	(37)	55.4%	(128)
Ever alcohol treatment**	28.1%	(54)	8.5%	(5)	22.5%	(59)
Methadone treatment ^{*,c}	3	2–3	3	2–5	3	2–3
Total number of previous drug treatments ^c	7	4–14	7	4–15	7	4–14
Abstinent after drug treatment						
Never	24.6%	(47)	25.4%	(15)	24.8%	(62)
Less than 3 months	24.6%	(47)	23.7%	(14)	24.4%	(61)
Four months or longer	50.8%	(97)	50.9%	(30)	50.8%	(127)
Years injecting drugs**	17.4	[10.15]	13.4	[8.11]	16.5	[9.85]
Overdoses in life*	3.5	[6.34]	5.9	[10.61]	4.08	[7.60]
Sharing needles in the past 6 months ^{***}						
Not sharing needles	96.4%	(185)	74.6%	(44)	91.2%	(229)
Sometimes sharing needles	3.7%	(7)	13.6%	(8)	6.0%	(15)
Often sharing needles	–	(0)	11.9%	(7)	2.8%	(7)
Sharing needles at least once, prior month ^{***}	2.1%	(4)	19.0%	(11)	6.0%	(15)
Had sex with <i>no</i> condom prior 30 days	19.5%	(37)	28.8%	(17)	21.7%	(54)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; § $p < 0.09$

^aDefined as interfering with life

^bSelf-reported

Missing values: abstinence after drug treatment, 1

^cMedian and interquartile ranges

There were marked differences in risk behaviors between the two cities. A quarter of Montreal participants reported sharing needles sometimes or often in the prior 6 months compared to only 3.7% in Vancouver. Similarly, 19% of Montreal participants reported sharing at least once in the prior month compared to only 2.1% in Vancouver. This difference remained significant even after adjusting for age and use of injected cocaine.

International Comparison

Comparisons with other HAT trial participants' baseline characteristics revealed some similarities and differences with the Canadian sample. The NAOMI participants were somewhat older, but this is not surprising given the inclusion criterion of age 25 or greater. NAOMI participants included more women than any of the European studies. Also, the Canadian sample has a remarkably higher proportion of unstable housing.

Although NAOMI is similar to the other studies with respect to unemployment and frequency of illegal activity, more NAOMI subjects rely on illegal income and less on welfare assistance. Days of heroin and cocaine use in the prior month were remarkably similar in the different settings, although NAOMI participants reported spending significantly higher amounts on the purchase of drugs.

DISCUSSION

Analysis of the baseline characteristics of participants in the NAOMI trial demonstrates successful recruitment of the target population: long-term, chronic opioid injectors with severe health and social problems, and several previous addiction treatment attempts. In addition, almost all the participants are polydrug users with cocaine being the second most popular drug of choice, after heroin.

Vancouver participants had more severe problems when compared to Montreal participants in relation to unstable housing status, criminal activity, physical health status, and crack cocaine use. These characteristics have been persistently described as part of the environment in Vancouver's DTES from where the NAOMI participants were recruited.^{9,48–50} Conversely, the Montreal site recruited younger injection drug users who partook in more life-threatening and risk behaviors like overdoses and injection equipment sharing, even after adjusting for age and injected cocaine use. It has been previously reported that there is a higher proportion of injection equipment sharing and overdoses in Montreal compared to Vancouver.^{8,51} Broad implementation of harm reduction measures such as a decentralized needle exchange and a supervised injection facility in Vancouver may contribute to lower levels of risky injection practices. On the other hand, Montreal participants have received more psychological treatment than Vancouver and have been on MMT more times. While Vancouver has seen a more rapid expansion in availability of MMT over the past 15 years than Montreal, many of the methadone programs include minimal levels of psychological supports, whereas these are standard components of MMT in Montreal. Number of MMT attempts may differ in the two cities as well because of the differences in treatment delivery systems with Montreal having both maintenance and short-term MMT available, the latter being focused on providing opportunities for physical health assessment, counseling, and referral to community resources such as housing. British Columbia is the only province in Canada which allows methadone clinics to charge user fees, and this may result in a barrier to treatment re-entry for some former MMT patients.

NAOMI participant profiles are a well-suited target population for HAT. The Canadian sample shows similarities with the other studies in relation to drug use and treatment history, employment and legal status, and health (Table 4). However, NAOMI participants have a higher proportion of females, have poorer housing, have less support from welfare assistance, and spend more money on drugs than participants in all other HAT studies at baseline.

In the international literature related to opioid dependence, the expected ratio of females to males is usually 1:4.⁵² However, the NAOMI study featured a higher ratio, almost 2:3, without differences between cities. At least in Vancouver, this is consistent with the literature; the proportion of women in MMT in British Columbia is 34.8%,²⁵ 36.3% in the Supervised Injection Facility Cohort,⁵³ and 48.8% in a cohort of illicit opioid users not in treatment.⁵⁴ In Montreal, the available data shows differences in the female proportion by study. For example, the OPICAN study had 19.8% females,⁵⁴ similar to the 16.7% of the St. Luc Cohort study with IDUs.⁵⁵

TABLE 4 Patient's employment/legal, health, and drug use data

Variable	CA <i>n</i> =251 [SD]	CH <i>n</i> =1,035 [SD]	NL <i>n</i> =174 [SD]	SP <i>n</i> =62 [SD]	DE <i>n</i> =540 [SD]
Age (mean) [SD]	39.7 [8.6]	31.5 [7.2]	38.5 [5.7]	37.2 [5.5]	35.9 [6.8]
Women	38.6%	28%	17.8%	9.7%	18.2%
Poor housing	72.9%	49%	13.8%	21%	36.1%
Employment/legal situation					
Illegal activities/income prior month	73.3%	50%	70.1%	58.1%	78.1%
Illegal activities prior month (mean days)	15.1 [12.7]		12.4 [?]	9.8 [12.2]	22.6 [9.8]
Major source of support					
Employment	15.9%		8.1%		4.0%
Welfare/public assistance	36.3%		57.6%		48.8%
Illegal activities	36.7%		28.5%		27.7%
Health					
HIV	9.6%	15%	13.2%	40.3%	6.9%
HCV	62.9%	82%		93.5%	78.5%
MAP physical health (mean)	15.3 [7.2]		11.5 [7.6]	23.4 [12.8]	
Ever attempted suicide	32.3%		37.9%		39.7%
Methadone previous treatment (median)	3		2	3	
Drug use					
Years of Heroin use (mean)	13.9 [8.0]	10.5	15.9 [5.7]	19.7 [6.4]	13 [6.3]
Days heroin use prior month (mean)	26.5 [7.4]		25.9 [6.0]	23.9 [9.5]	26.5 [6.9]
Days cocaine use prior month (mean)	16 [12.6]		18.7 [10.2]	23.1 [9.8]	15.5 [11.5]
Money spent in drugs (CAN)	\$2,346 [\$3,342]		\$1,459 [\$1,211]	\$1,476 [\$1,203]	\$1,941 [\$2,516]

CA=Canada; CH=Switzerland; NL=The Netherlands; SP=Spain; DE=Germany

(?) Not specified in the publication

However, a study with patients of a low-threshold MMT, a clientele more similar to the NAOMI target population, had a proportion of 48.9% females.⁵⁶ It is very difficult to differentiate a selection effect (i.e., more women reached by these services) from an actual higher proportion of female chronic heroin users in the study sites in relation to the international literature. Either the biases are the same, or the figures in

this study are representing a truly higher proportion of female heroin chronic users, at least in Vancouver. The Montreal situation is less clear.

Housing status is a strong predictor of drug treatment outcome.⁵⁷ Precarious housing lowers the chances of recovery from addiction, facilitates high risk behavior, limits access to social and health services, and leads to poorer engagement in treatment.⁵⁷ Moreover, homelessness has been associated with mental and physical health problems as well as drug abuse.⁵⁷⁻⁶¹ Homeless people tend to inject drugs more than non-homeless drug users.^{62,63} The housing situation in the DTES of Vancouver (from where the NAOMI sample was recruited) is no less than alarming and has been the subject of much debate.^{49,50,64} The study shows that chronic heroin dependent individuals who are not reached by the addiction treatment system have urgent housing needs. Given the relationship between negative consequences from addiction and availability of secure affordable housing, all interventions should strive to address both problems for greatest efficacy.

Aside from local differences in the drug scenes between the two cities, it is important to note that, in both cities, the housing situation shows indicators of instability and vulnerability. For example, almost 50% of all participants were living at their current address for less than 4 months. Furthermore, Montreal participants tended to live with people with alcohol and drug problems, whereas the Vancouver participants tended to live alone. Both situations present challenges in the recovery process of drug-dependent people.

Another distinctive difference of the NAOMI sample is that the Vancouver site, in relation to the European HAT participant's baseline profile, had a significantly higher prevalence of crack use, a practice that remains rare across Europe⁶⁵ even in marginalized populations.^{62,66} Cocaine use among opioid-dependent people has become a common practice.⁶⁷ While we have effective opioid addiction treatments, the lack of effective pharmacological approaches in the treatment of cocaine addiction jeopardizes opioid addiction treatment results,²³ given that the participants continue to be involved in criminal activities, health risk behaviors, and participate in the drug scene. Thus, cocaine use (in any form) among opioid-dependant people has become a significant problem for service providers. Evaluation of cocaine use among MMT patients does not show promising results, although results are better if accompanied by psychosocial therapy.⁶⁸⁻⁷² For example, a study with almost 400 MMT patients showed that at 18 months there was no change in cocaine use; however, cocaine powder and speedball use decreased, and smoking crack significantly increased.⁷³ Another recent study using contingency management showed that at 6 months follow-up visits participants that continued on methadone treatment, compared to those not in treatment, did not differ in their cocaine-dependence diagnosis.⁷⁴ On the other hand, cocaine use among Swiss HAT clients has been shown to be a predictor of nonresponse to treatment.⁷⁵ Those who continued cocaine use also used illicit heroin, continued to associate with the drug scene, and engage in criminal activities. Also, daily cocaine users tend to drop out earlier from treatment. Thus, the crack use scenario in Vancouver's DTES and the predominant use of cocaine in any form (85%) could be an important factor for NAOMI treatment outcomes and should be carefully evaluated.

This study presents the profile of a selected group of opioid-dependent people: adult, chronic heroin-injecting users for whom available treatments have failed repeatedly in the course of their substance dependence. Participant's past or current health status and social situation shows a predominance of indicators of marginalization and social exclusion. The data presented here features the limitations of intentional sampling and cross-sectional studies. Thus, generalizations should be made

cautiously, and conclusions of causal relationships should be avoided. Nevertheless, this study provides a snapshot of those who have had a long “drug career” in opioid addiction and for whom the health care system has been unable to provide effective engagement. It also raises a special concern about the high stimulant use and the high level of social marginalization among this sample of opioid injectors.

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