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## Acupuncture for Substance Abuse Treatment in the Downtown Eastside of Vancouver

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**ABSTRACT** *In British Columbia, Canada, the City of Vancouver's notorious Downtown Eastside (DES) represents the poorest urban population in Canada. A prevalence rate of 30% for HIV and 90% for hepatitis C makes this a priority area for public-health interventions aimed at reducing the use of injected drugs. This study examined the utility of acupuncture treatment in reducing substance use in the marginalized, transient population. Acupuncture was offered on a voluntary, drop-in basis 5 days per week at two community agencies. During a 3-month period, the program generated 2,755 client visits. A reduction in overall use of substances ( $P = .01$ ) was reported by subjects in addition to a decrease in intensity of withdrawal symptoms including "shakes," stomach cramps, hallucinations, "muddle-headedness," insomnia, muscle aches, nausea, sweating, heart palpitations, and feeling suicidal,  $P < .05$ . Acupuncture offered in the context of a community-based harm reduction model holds promise as an adjunct therapy for reduction of substance use.*

**KEYWORDS** *Acupuncture, Addiction, Alcohol, Cocaine, Complementary therapy, Harm reduction, Heroin, Substance use.*

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### INTRODUCTION

In British Columbia, Canada, the City of Vancouver's notorious Downtown Eastside (DES) has an estimated 4,000 addicts concentrated in an area of 10 city blocks. The dismal economic, social, and housing environment in the DES makes it the poorest urban population in Canada. Thirty percent of this concentrated population is infected with HIV, and 90% are infected with hepatitis C. In 1997, the highest rates of HIV in the developed world were documented here.<sup>1</sup> This population represents a significant public health challenge for prevention of transmission of disease by needle use and other high-risk activities associated with substance abuse. The purpose of this study was to assess the feasibility of delivering acupuncture therapy to addicts in the DES in Vancouver for the purpose of reducing substance use.

The use of alternative therapies (anticraving medications, acupuncture, biofeedback, and neurobehavioral models) for the treatment of substance abuse disorders

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has increased in popularity over the last decade.<sup>2</sup> Specifically, acupuncture therapy is designed to help alleviate the emotional (depression and anxiety) and physical (cravings) symptoms elicited by abstinence, particularly in the early phase of the process and then to achieve mood stabilization and relaxation in later stages of recovery. Although the mechanisms underlying acupuncture are complex and not yet well understood, many researchers agree that substances such as alcohol and opioids alter the concentration of opiate peptides in the brain.<sup>3</sup> They may also preferentially bind to opiate receptors and thereby displace endogenous opioids. Over time, the production and action of the natural endorphins is inhibited, and craving may result from a deficiency in endogenous opioids. Various studies have linked acupuncture to the production of endogenous opiate peptides.<sup>4</sup>

Acupuncture has been used in addiction treatment facilities in the United States since the early 1970s when Dr Michael Smith began to experiment with acupuncture as an adjuvant therapy for treatment of heroin addiction at New York's Lincoln Hospital.<sup>5</sup> The modification of an acupuncture protocol developed by Wen<sup>6</sup> to a 5-point system of auricular acupuncture for addiction treatment by Smith<sup>7</sup> created a simple, safe, and inexpensive procedure that could be incorporated into standard clinic practice.

Acupuncture has been shown to reduce craving and consumption of substances in community-based studies. In a blinded placebo/acupuncture study of crack/cocaine in an outpatient setting in New York, lower levels of cocaine metabolite were found in urine samples from subjects receiving treatment versus sham acupuncture after 2 weeks of treatment.<sup>8</sup> A similar study of 100 heroin users in San Francisco reported that subjects receiving acupuncture treatment attended a detoxification clinic more consistently than those receiving an acupuncture sham treatment.<sup>9</sup> Richard and colleagues reported that adjunct therapies, including acupuncture, were significantly associated with retention in treatment among crack/cocaine users compared with neurobehavioural treatment alone in a 30-day outpatient treatment program serving an indigent urban population in Texas.<sup>2</sup> Retention in treatment was significantly associated with reduction in cocaine-specific urine metabolites. In a recent trial of acupuncture for cocaine dependence, Avants et al.<sup>10</sup> randomized subjects attending a community-based methadone maintenance program in New Haven, Connecticut, to auricular acupuncture, sham acupuncture, or a no-needle relaxation control. Subjects receiving the National Acupuncture Detoxification Association acupuncture protocol were more likely to provide cocaine negative urine samples than either the needle insertion or relaxation controls at 8 weeks. In Florida, the feasibility of use of acupuncture for substance abuse in a public health setting was tested among participants attending on a voluntary basis or as mandated by court orders.<sup>11</sup> Clean urine tests were obtained in the treatment group in 57% of the time required for the comparison (counselling only) group. One randomized controlled trial of 628 cocaine-dependent subjects failed to show a reduction in use of cocaine as measured by urine samples or self-report.<sup>12</sup> The authors concluded that the study did not support the use of acupuncture as a stand-alone treatment for cocaine addiction.

In this study we offered acupuncture on a voluntary basis to assess its acceptability to the "hard core" population of the DES, to assess safety to the individuals providing the services, and to explore the effectiveness of acupuncture as an adjunctive treatment for substance use in this setting.

## METHODS

### Setting

Subjects were recruited from two sites in Vancouver's DES between June 1, 1999, and August 31, 1999. The sites were selected according to criteria established before the study, including accessibility to residents in the DES, on-site support services, and availability of a large quiet room with comfortable chairs. We chose to include two different service settings: a drop-in facility open to the general public and a residential treatment centre, both of which had been in existence for a number of years and were well known to the residents of the DES.

The drop-in site was the Vancouver Native Health Society Positive Outlook Drop-in. This clinic is centrally located in the DES and on a major street serviced by buses. It provides medical services and programs for youth, employment counselling, hot lunches, drop-in child care, and referral to drug and alcohol counselling for people of aboriginal descent and others. The residential site was the Salvation Army Harbour Light Complex. This complex includes a 29-bed detoxification facility (23 beds for men, 6 beds for women) for acute withdrawal and a 62-bed residential facility offering a 90-day treatment program for rehabilitation of male substance users. Residents have access to individual and group counselling, life skills training, literacy programs, in-house Narcotics Anonymous and Alcoholics Anonymous groups, and medical care. Daily acupuncture treatments were offered at the Vancouver Native Health Society (VNHS) by one licensed acupuncturist and at the Salvation Army (SA) by the same or one other acupuncturist. Acupuncturists are accredited in British Columbia through a provincial licensing board.

### Participants

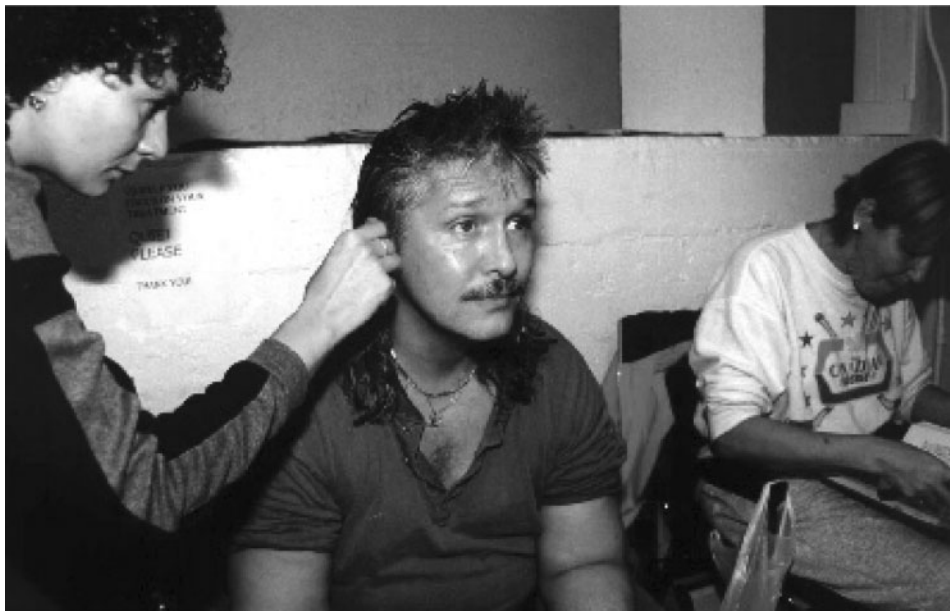
All people over the age of 16 who either resided in or frequented the DES were eligible for treatment at the VNHS site (Fig. 1). All clients participating in the treatment facilities at the Salvation Army Complex during the study period were eligible for treatment. Clients were made aware of the service by means of multilingual posters and brochures distributed throughout the DES and by word of mouth. It was not necessary for the clients to have abstinence as a treatment goal at either site, and participation in the study was voluntary. Anonymity was maintained by having subjects identify themselves by means of code numbers known only to them. Caregivers at the residential treatment facilities did not know which of their clients were participating. Participation at acupuncture sessions was not documented in the patient chart, and constant turnover among patients would make it difficult for staff to keep track of which patients were receiving acupuncture. Ethical review was undertaken by the Vancouver/Richmond Health Board before the commencement of the project. Written consent was obtained before taking photographs of participants.

### Treatment

Acupuncture treatment was delivered using the 5-point auricular acupuncture protocol of the National Acupuncture Detoxification Association, originally developed by Smith.<sup>7</sup> The protocol consists of inserting five sterile, disposable stainless steel acupuncture needles in both ears at points known as Sympathetic, Shen men, Liver, Kidney, and Lung. This point combination is believed to be specific for substance abuse. Treatment was conducted in a group setting with a minimum of six clients receiving treatment simultaneously. Clients sat in comfortable reclining chairs



**FIGURE 1.** Checking in for acupuncture at the Vancouver Native Health Society.



**FIGURE 2.** Insertion of needles by the acupuncturist.

during treatment (Fig. 2). At the conclusion of the treatment (usually 35–40 minutes) they removed the needles from their ears and placed them in protective “sharps” containers (Fig. 3).



**FIGURE 3.** Removing needles at the completion of an acupuncture treatment.

### **Outcome Measurements**

Study subjects completed questionnaires on the Fridays that they attended the acupuncture clinic before receiving treatment. The weekly questionnaire documented information about drug use in the past week and their experience of withdrawal symptoms. Drug use symptomatology was reported using a 10-cm visual analogue scale anchored with “none” at 0 cm and “extreme” at 10 cm. Visual analogue scales as a method of quantifying withdrawal symptoms have been shown to be consistent with standardized questionnaires and plasma markers.<sup>13</sup> Symptoms assessed were chosen from the literature related to use of heroin, alcohol, crack/cocaine, sedatives, and amphetamines. Assistance was offered to clients if they required help filling out the forms. Before the first treatment, subjects were asked to document their reasons for seeking treatment, substances most often used, and general sociodemographic information.

A nonparametric statistical test for related samples (Friedman Test) was used to test within subjects changes in use of drugs and severity of symptoms over time. A nonparametric test was used because distributions of symptoms were nonnormal

and data did not meet assumptions of homogeneity of variance at subsequent time intervals. A *P*-value of .05 or less was denoted as statistically significant. A multivariate analysis utilising logistic regression was undertaken to elucidate factors associated with continued attendance at acupuncture treatments. The software used for the analysis was SPSS, version 12.

In addition to quantitative measures, subjects were invited to write comments about the treatment in a “communication book.”

## RESULTS

### Study Subjects

The total number of acupuncture treatments provided during the study period was 2,755. The total number of individual study subjects accessing acupuncture treatment and filling out our weekly questionnaires on Fridays was 261. Among these 261 subjects, VNHS served 168 (64.4%) clients while the SA site served the remaining 93 (35.6%) clients (Table 1).

Subjects accessing acupuncture treatment in either facility were most often in the 30–39 or 40–49 year age groups. Men and women were equally represented at the VHNS acupuncture site (50%) compared with a predominance of men (81.3%) at the SA site, which served primarily men,  $P < .001$ . Ethnicity among subjects attending the VHNS was more diverse, with 32.8% being non-Caucasian compared with 19.5% at the SA. At the VHNS, a greater proportion of subjects were aboriginal (17.6%) compared to the SA (11.0%), but this difference was not statistically significant ( $P = 0.22$ ). Heroin was the drug most frequently used among people attending the VNHS (25.4%), followed by crack/cocaine (19.2%), compared to alcohol (51.8%) and methadone (17.6%) at the SA ( $P < .001$ ). At the VNHS, clients were asked whether they had been diagnosed with a psychiatric illness. Forty-two percent (71) indicated that they had. Five (3.0%) clients reported being told by a physician that they had schizophrenia, fifty-eight (34.5%) had depression, and eight (4.8%) had other mental illnesses.

The number of subjects having acupuncture on each Friday, data collection day, was 261, 105, 51, and 39 at week one, two, three, and four, respectively. The mean number of days between treatments ranged from 9.9 to 13.4 days. Attrition rates differed between the two sites; after the first visit it was 41.9% at the VNHS and 89.1% at the SA residential, 68.8% after the second visit at the VHNS and 95.7% at the SA site, and after the third visit it was 77.8% at the VHNS and 97.8% at the SA site.

Given that 58.1% of VHNS clients and 10.9% of SA clients returned for a second treatment, we sought to determine if there were differences between those clients who did and did not continue with treatment. Clients who returned for a second or more visits did not differ in measured characteristics from those who sought one treatment only, other than by location of treatment, that is, VHNS versus SA. In a multivariate analysis, ongoing attendance was not related to age, race/ethnicity, gender, reasons for seeking treatment, or substances most often used.

### Severity of Withdrawal Symptoms

Among all of the 39 clients who attended the clinics on at least four Fridays (data collection day), severity of withdrawal symptoms were assessed (Table 2, Fig. 4). Reductions in severity were statistically significant for shakes, stomach cramps, hallucinations, muddle-headedness, insomnia, muscle aches, nausea, sweating, heart palpitations, and feeling suicidal. Among the 57 subjects attending for at least

**TABLE 1. Characteristics of the study sample**

	VHNS [n (%)]	SA [n (%)]	Total [n (%)]
	168 (64.4)	93 (35.6)	261 (100)
<b>Number of Fridays attending</b>			
One	70 (41.7)	83 (89.2)	153 (58.6)
Two	45 (26.8)	8 (8.6)	53 (20.3)
Three	17 (10.1)	0	17 (6.5)
Four	16 (9.5)	1 (1.0)	17 (6.5)
Five or more	20 (11.9)	1 (1.0)	21 (8.0)
<b>Age</b>			
1–19	1 (0.7)	0	1 (0.4)
20–29	12 (8.2)	14 (17.3)	26 (11.5)
30–39	49 (33.6)	35 (43.2)	84 (37.0)
40–49	56 (38.4)	16 (19.8)	72 (31.7)
50–59	18 (12.3)	11 (13.6)	29 (12.8)
60–69	8 (5.5)	4 (4.9)	12 (5.3)
70–79	2 (1.4)	1 (1.2)	3 (1.3)
Not stated	22	12	34
<b>Race/Ethnicity</b>			
Caucasian	80 (67.2)	66 (80.5)	146 (72.6)
Aboriginal	21 (17.6)	9 (11.0)	30 (14.9)
East Asian	8 (6.7)	3 (3.7)	11 (5.4)
Black	4 (3.4)	2 (2.4)	6 (3.0)
South Asian	3 (2.5)	1 (1.2)	4 (2.0)
Latino	2 (1.7)	0	2 (1.0)
Other	1 (0.8)	1 (1.2)	2 (1.0)
Not Stated	49	11	60
<b>Gender</b>			
Male	66 (50)	70 (81.3)	136 (62.4)
Female	64 (48.5)	16 (18.6)	80 (36.7)
Transgendered	2 (1.5)	0	2 (0.9)
Not Stated	36	7	43
<b>Reasons for seeking treatment</b>			
Help with drug addiction	75 (64.1)	78 (83.9)	153 (72.9)
Stress/anxiety	28 (23.9)	8 (8.6)	36 (17.1)
Quit smoking	4 (3.4)	1 (1.1)	5 (2.4)
Help me sleep	1 (0.9)	0	1 (0.5)
Other	9 (7.7)	3 (3.2)	12 (5.7)
Not stated	51	3	54
<b>Substance most often used</b>			
Alcohol	11 (10.6)	44 (51.8)	55 (29.1)
Heroin	30 (25.4)	15 (17.7)	45 (23.9)
Crack, cocaine	20 (19.2)	0	20 (10.6)
Marijuana	10 (9.6)	9 (10.6)	19 (10.1)
Methadone	3 (2.9)	15 (17.6)	18 (9.5)
Benzodiazepines	2 (1.9)	1 (1.2)	3 (1.6)
Amphetamines	0	1 (1.0)	1 (0.5)
Other	11 (10.6)	0	11 (5.8)
Former drug user	17 (16.3)	0	17 (9.0)
Not stated	64	9	73

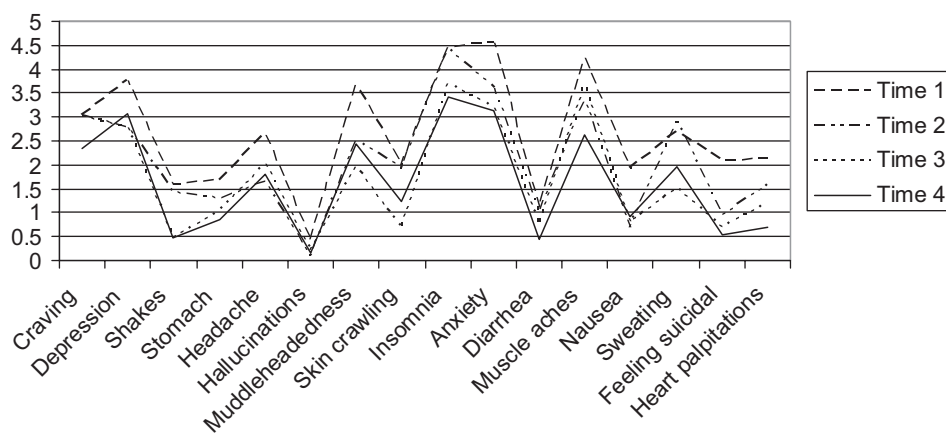
VHNS, Vancouver Native Health Society; SA, Salvation Army.

**TABLE 2. Changes in severity of withdrawal symptoms**

Symptoms*	Time 1	Time 2	Time 3	Time 4	P-value
Cravings	3.04	3.03	3.02	2.33	.271
Depression	3.76	2.80	2.77	3.08	.301
Shakes	1.57	1.42	0.49	.049	.037
Stomach cramps	1.67	1.31	1.05	0.85	.049
Headaches	2.65	1.65	2.02	1.80	.475
Hallucinations	0.42	0.10	.019	0.17	.012
Muddle-headedness	3.67	2.49	1.97	2.45	.015
Skin crawling	1.98	1.93	0.67	1.25	.083
Insomnia	4.45	4.44	3.70	3.41	.020
Anxiety	4.56	3.61	3.20	3.12	.054
Diarrhoea	1.12	1.01	0.77	0.43	.201
Muscle aches	4.25	3.37	3.67	2.62	.009
Nausea	1.93	0.71	0.78	0.93	.033
Sweating	2.70	2.92	1.51	1.97	.005
Feeling suicidal	2.10	0.98	0.70	0.54	.005
Heart palpitations	2.11	1.57	1.20	0.70	.042

Symptoms were reported weekly on Fridays on a 10-cm visual analogue scale. Times 1–4 may not have been consecutive Fridays for individual participants.

\*The number of people experiencing a particular symptom ranged from 113–229.



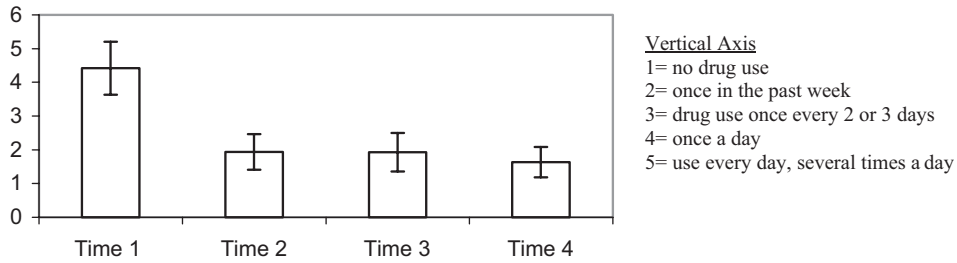
**FIGURE 4.** Changes in severity of symptomatology over time among subjects attending at least 4 weeks of treatment.

three Fridays, reductions in severity of symptoms were significant for shakes, stomach cramps, hallucinations, muddle-headedness, insomnia, anxiety, diarrhoea, nausea, sweating, and feeling suicidal. The direction of change after the first treatment was consistently towards reduction in severity among all evaluated symptoms.

#### Overall Frequency of Substance Use

Subjects reported frequency of drug use on a scale: 1 = no drug use; 2 = once during the previous week; 3 = use every 2–3 days; 4 = daily; and 5 = several times daily. Among 39 subjects reporting on substance use on at least four Fridays, there was a significant decrease ( $P = .01$ ) in mean self-reported frequency of use of drugs after





**FIGURE 5.** Substance use in the previous week among subjects completing 4 weeks of treatment, mean frequency, and 95% confidence intervals. (Frequency of drug use was reported weekly on Fridays. Times 1–4 may not have been consecutive Fridays for individual participants.)

the first treatment and this decrease was maintained over the ensuing three measurement times (Fig. 5).

### Comments from Subjects

The following comments were illustrative of entries in the communication book regarding responses to the acupuncture.

Aboriginal female, age 43

I am down to 100 mg Zoloft and I am sleeping better. The acupuncture combined with the lower dose of Zoloft is really helping my depression and anxiety. Coming to the clinic is the first thing I do in the morning. It calms and grounds me . . . I crave the ritual of IV use a lot and this takes care of that.

Caucasian male, age 46

The longer I seek treatment the more I'm benefiting from the results. I try to average 3 treatments per week. I have noticed that I'm much less anxious also without cravings for alcohol, tobacco or other substances. Thanks a lot for the help.

Caucasian female, age 43

I am into my 4th week of acupuncture and the effects of this are so wonderfully calming, makes my life much less stressful, so that it is easier to cope daily in this stressful life.

### Safety and Cost

No-needle stick injuries were sustained during the duration of the project. Police were called to escort a client to a psychiatric facility on one occasion. Assistance of agency staff members to deal with agitated patients was requested and received for four clients. The overall cost of the program, including the hourly wage for the acupuncturist as well as supplies and equipment was \$35,884 over the 3-month period. The cost per patient visit was \$13.

### DISCUSSION

We have demonstrated the ability of an acupuncture treatment program to attract the participation of substance-using individuals in Vancouver's DES. Over 2,700 visits took

place in a 3-month period. Although estimates of the number of addicted individuals in the DES are crude, our sample of 261 may represent as much as 15% of that population. Among subjects returning to the clinic three or more times, the self-reported overall use of drugs declined during the study period, as did severity of withdrawal symptoms.

Similar to other studies,<sup>2,8-11</sup> we experienced a high rate of attrition among study subjects. Previous studies of community-based interventions have reported drop-out rates ranging from 34<sup>2</sup> to 75%.<sup>9</sup> A site report from the Residential Treatment Centre indicated that the acupuncture sessions interfered with the daily schedule of activities, preventing most clients from attending acupuncture sessions. Also, most of the clients had completed withdrawal from drugs and would not access acupuncture for alleviation of symptoms. Among clients who were actively withdrawing, staff reported a decrease in levels of agitation and a reduction in requests for sleeping medication.

In a multivariate analysis we were not able to predict ongoing attendance at the "storefront" facility on the basis of age, race/ethnicity, sex, reasons for seeking treatment, or substances most often used. This could mean that the treatment has general appeal to many subgroups within the population. Among participants in a drug injection study by Craib and colleagues<sup>14</sup> in progress in the DES at the same time as our study, the proportion of aboriginal participants was 24.4%, higher than our overall rate of 14.9%. Aboriginal people may therefore be underrepresented in our study population. Similar to our sample from the Native Health Society, which served both men and women on an equal basis, the Craib study reported equal proportions of male and female participants.

Our study is limited by our ascertainment of substance use that was by self-report only. Our subjects did not see their visual analogue scores from previous visits, so it is unlikely that there was systematic bias in reporting severity of symptoms over time. We lack a comparison group in this study, and we could not measure drug use among subjects who did not return for ongoing treatment. We cannot evaluate, therefore, to what extent our study participants represent a subgroup of the population who may be particularly motivated to reduce substance use. However, it is likely that this group is more representative of the DES population than a group that would have voluntarily participated in a more rigorous study design. We were unable to measure the extent to which the services and programs that participants were exposed to in the treatment settings versus the acupuncture itself may have influenced their motivation to reduce use of substances. For example, some participants may have been starting their treatment program at the same time that they started acupuncture treatments.

The most common drugs used by our DES clients were alcohol and heroin. Some clients did not consider certain categories of drugs to be "harmful" (alcohol, marijuana, and benzodiazepines) and did not record their use of these substances. Therefore, our data may be underrepresenting the true magnitude of the problem in the DES. A significant proportion of respondents (27.6%) did not list their drug of choice.

It is important to note that because data was collected every Friday during the period of the project, our study underreports the number of clients who actually used the acupuncture services on a daily basis. However, we are not aware of any bias associated with use of the treatment centres on Friday.

A substantial proportion of our VNHS clients (42%) have been diagnosed with a psychiatric illness. It is noteworthy that these people found their way for treatment because clients with substance abuse problems and a coexisting mental illness form a particularly vulnerable segment of the DES. Studies have indicated that acupuncture therapy may be beneficial in the treatment of various psychiatric disorders including depression.<sup>15</sup>

Our study has demonstrated the success of a voluntary, inexpensive acupuncture program in engaging addicts in an acupuncture treatment, which they found to be beneficial in reducing their use of drugs. Acupuncture in isolation is not understood to be an effective long-term treatment for drug addiction. Its value may lie in creating a window of opportunity, through reduction of symptoms, for participants to avail themselves of longer-term alternatives to their lifestyle. Despite the limitations inherent in observational study designs, in this study, subjects who participated in a treatment program for a minimum of 3 weeks reported both a reduction in symptoms associated with use of substances and an overall reduction in use of illicit drugs. Future studies need to explore the utility of offering acupuncture on a voluntary basis in a randomized design with a longer-term follow-up, objective measurements of substance use, standardized treatment protocols, and an examination of factors predicting ongoing attendance.

### ACKNOWLEDGEMENT

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