



# HHS Public Access

Author manuscript

*Child Abuse Negl.* Author manuscript; available in PMC 2020 July 01.

Published in final edited form as:

*Child Abuse Negl.* 2019 July ; 93: 119–127. doi:10.1016/j.chiabu.2019.05.006.

## The relationship between childhood emotional abuse and chronic pain among people who inject drugs in Vancouver, Canada

Amy Prangnell<sup>a,b</sup>, Pauline Voon<sup>a,b</sup>, Hennady Shulha<sup>a</sup>, Ekaterina Nosova<sup>a</sup>, Jean Shoveller<sup>a,b</sup>, M-J Milloy<sup>a,c</sup>, Thomas Kerr<sup>a,c</sup>, Kanna Hayashi<sup>a,d</sup>

<sup>a</sup>British Columbia Centre on Substance Use, 400-1045 Howe Street, Vancouver, BC, CANADA, V6Z 2A9

<sup>b</sup>School of Population and Public Health, University of British Columbia, 2206 East Mall, Vancouver, BC, CANADA, V6T 1Z9

<sup>c</sup>Department of Medicine, University of British Columbia, St. Paul's Hospital, 608-1081 Burrard Street, Vancouver, BC, CANADA, V6Z 1Y6

<sup>d</sup>Faculty of Health Sciences, Simon Fraser University, 8888 University Drive, Burnaby, BC, CANADA, V5A 1S6

### Abstract

**Background:** People who inject drugs (PWID) often contend with chronic pain as a result of illness and trauma, and such pain is known to have significant impacts on mental health, quality of life, and substance use behaviours. Although PWID are also known to have high rates of childhood trauma, little is known about how childhood emotional abuse may be associated with chronic pain in this population.

**Objective:** We undertook this study to explore emotional abuse and chronic pain among PWID.

**Participants and Setting:** This study comprised a total of 1,459 participants in Vancouver, Canada between June 2014 and November 2016.

**Methods:** We employed multivariable generalized estimating equations with data derived from two prospective cohort studies of community-recruited PWID to examine the relationship between childhood emotional abuse and chronic pain in the past six months.

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**Send correspondence to:** Kanna Hayashi, PhD, St. Paul's Hospital Chair in Substance Use Research and Assistant Professor, Faculty of Health Sciences, Simon Fraser University, Research Scientist, B.C. Centre on Substance Use, 400-1045 Howe Street, Vancouver, BC, V6Z 2A9, Canada. **Tel:** +1 (604) 558-6680 **Fax:** +1 (604) 559-9800, [bccsu-kh@bccsu.ubc.ca](mailto:bccsu-kh@bccsu.ubc.ca).

#### AUTHORS' CONTRIBUTIONS

MJM, KH and TK conceived and managed the cohorts during the study period. AP and KH designed the present study. HS and EN conducted the statistical analyses. AP drafted the manuscript, and incorporated suggestions from all co-authors. All authors made significant contributions to the conception of the analyses, interpretation of the data, and drafting of the manuscript.

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#### DECLARATIONS OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

**Results:** Among eligible participants, 591 (40.5%) reported childhood emotional abuse, and 760 (52.1%) reported chronic pain in the previous six months. In a multivariable analysis, experiencing childhood emotional abuse remained independently associated with chronic pain (adjusted odds ratio: 1.25; 95% confidence interval: 1.01–1.53) after adjustment for a range of socio-demographic and drug use confounders.

**Conclusions:** Our findings suggest that childhood emotional abuse may have lasting relationships with chronic pain among PWID, potentially through established physiological and psychological mechanisms. Current chronic pain treatment may benefit from the evaluation of life course vulnerabilities that may be amenable to earlier interventions. Further, increased availability of effective trauma-informed chronic pain treatment is needed among this vulnerable population.

### Keywords

Childhood emotional abuse; child trauma; chronic pain; morbidity

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## INTRODUCTION

Chronic pain, classified as significant pain lasting longer than three months and beyond normal healing time, occurs in approximately 20% of general, adult populations (Fayaz, Croft, Langford, Donaldson, & Jones, 2016; Treede et al., 2015; van Hecke, Torrance, & Smith, 2013). In comparison, higher proportions of people who use drugs (33% to 37%) report chronic pain (Heimer, Zhan, & Grau, 2015; Rosenblum et al., 2003). Other population subgroups also report increased risk of chronic pain including women, seniors, and those from low socio-economic status backgrounds (van Hecke et al., 2013). Medical conditions with chronic pain range from general widespread pain, migraines, headaches, low back pain, musculoskeletal pain, fibromyalgia, to joint pain (Jackson et al., 2016). The consequences of chronic pain are vast and include a reduced ability to maintain work, lower quality of life, increased mortality, increased risk of depression and anxiety, and hampered ability to participate fully in daily life (Andrew, Derry, Taylor, Straube, & Phillips, 2014; Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006; Lamé, Peters, Vlaeyen, Kleef, & Patijn, 2005). In addition, individuals with chronic pain report significantly higher health care utilization (e.g., physician visits; medication use) (Andrew et al., 2014).

To date prescription opioids remain the most common form of medical therapy for severe acute pain. However, there are increasing concerns with long-term use of prescription opioids: primarily questions regarding their effectiveness/benefits (particularly over long-term use), concerns relating to side effects, and recently, a recognition that prescription opioids can contribute to substance use disorders and overdose-related mortality (Chou et al., 2015; Ives et al., 2006; Rosenblum, Marsch, Joseph, & Portenoy, 2008). These concerns, alongside the implementation of clinical practice guidelines in some jurisdictions (Cheung et al., 2014), have contributed to uncertainty and reluctance in clinical practice to initiate or maintain opioid treatment regimens for patients presenting with chronic pain (Chang & Compton, 2013). As a result, people who inject drugs (PWID) are often forced to resort to self-medication for chronic pain, such as injecting illicitly acquired heroin or contraband prescription opioids (Alford et al., 2016; Voon et al., 2014). In light of the high proportion of chronic pain experienced by PWID, alongside the significant impacts of both pain and

substance use disorders, clinicians and patients face complex challenges in terms of the provision of effective pain treatment options (Andrew, Derry, Taylor, Straube, & Phillips, 2014; Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006; Heimer, Zhan, & Grau, 2015; Rosenblum et al., 2003).

To further understand this complexity, it is important to recognize that previous studies have shown that various forms of childhood abuse (e.g., physical, sexual, emotional) are also associated with higher likelihood of chronic pain and injection drug use during adulthood (Eriksen et al., 2016; Kerr et al., 2009; Lampe et al., 2000; Walsh, Jamieson, MacMillan, & Boyle, 2007). While less is known regarding the impact of childhood emotional abuse, especially among PWID, there is now compelling evidence suggesting childhood emotional abuse may be the most significant predictor of negative health outcomes among the childhood maltreatment categories (Glaser, 2002; Kaplan, Pelcovitz, & Labruna, 1999; Rees, 2010). This may be largely due to increased risk of psychological distress, poor mental health outcomes, decreased ability to cope with stressful situations, and detrimental impact on family relationships (Dias, Sales, Hessen, & Kleber, 2015; Rees, 2010).

Childhood emotional abuse, or psychological abuse, has broadly been defined as a failure to provide developmentally appropriate and supportive environments for a child, which have reason to result in psychological harm to the child (Rees, 2010). This can take the form of insults, humiliation, isolation, excessive punishment, or manipulation among many others (Kairys & Johnson, 2002; Norman et al., 2012). While rates of childhood emotional abuse are difficult to ascertain due to the lack of physical evidence, it is likely the most prevalent category of childhood abuse because of its frequent co-occurrence with sexual and physical abuse, as well as occurring on its own (Kaplan et al., 1999). Rates of childhood emotional abuse differ among various groups with estimates ranging from 7% to 26% (Cammack & Hogue, 2017; Dube et al., 2001; Schilling et al., 2016). Among people who use drugs, rates of exposure to childhood emotional abuse are estimated to be much higher than among people who do not use drugs, with estimates ranging from 44% to 46% (Lake, Hayashi, et al., 2015; Taplin, Saddichha, Li, & Krausz, 2014).

Prior research has identified a significant positive association between both childhood physical and sexual abuse and the risk of chronic pain conditions in adulthood (Lampe et al., 2000; Walker et al., 1988; Walsh et al., 2007). However, only recently has research begun to explore the impact of childhood emotional abuse on health conditions among adults (Eriksen et al., 2016; Hu, Link, McNaughton-Collins, Barry, & McKinlay, 2007). For example, a significant positive association has been found between childhood emotional abuse and chronic pelvic pain among American adults (Hu et al., 2007), and between childhood emotional abuse and overall chronic pain among Indigenous and non-Indigenous Norwegian adults (Eriksen et al., 2016). Potential pathways linking childhood emotional abuse and adult chronic pain likely involve psychological factors in addition to physiological impacts from emotional abuse, including negative impacts on brain development, over-activation of the hypothalamus-pituitary-adrenal axis leading to inappropriate release of cortisol, and negative impacts on the immune system (Burke, Finn, McGuire, & Roche, 2017; Carpenter et al., 2009). In order to cope with the impacts from emotional abuse itself including psychological

distress, individuals may also engage in injection drug use (Dias, Sales, Hessen, & Kleber, 2015).

To our knowledge, no studies have focused on the association between childhood emotional abuse and chronic pain among PWID. This is concerning, as PWID are known to have higher rates of both chronic pain and childhood emotional abuse compared with non-drug using populations. Further, inadequate pain control has been associated with subsequent substance use following withdrawal management among people with substance use disorders (Larson et al., 2007). In light of these serious concerns, and using data from long-running prospective cohorts of people who use drugs in Vancouver, we sought to evaluate the relationship between childhood emotional abuse and chronic pain among PWID in Vancouver, Canada.

## METHODS

### Study Procedures

The Vancouver Injection Drug Users Study (VIDUS) and the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS) are ongoing open prospective cohort studies of adults who use drugs, who have been recruited through word of mouth, street outreach, and referrals from community organizations in Vancouver, Canada. The study setting of Vancouver includes the Downtown Eastside (DTES), which is home to a large open drug scene (Miller et al., 2006) with a range of harm reduction programs and treatments for substance use disorders. These studies have been described in detail previously (Strathdee et al., 1998; Wood & Kerr, 2006). Briefly, VIDUS enrolls HIV-negative persons who report injecting an illicit drug at least once in the month preceding enrollment. ACCESS enrolls HIV-positive individuals who report using an illicit drug (other than, or in addition to, cannabis) in the previous month. For both cohorts, other eligibility criteria include being aged 18 years or older, residing in the greater Vancouver region, and providing written informed consent. The study instruments and all other follow-up procedures for each study are harmonized to permit combined analyses. At baseline and semi-annually thereafter, participants complete an interviewer-administered questionnaire eliciting socio-demographic data as well as information pertaining to drug use patterns, risk behaviours, and health care utilization. Nurses collect blood samples for HIV and hepatitis C virus serology, provide basic medical care, and provide referrals to appropriate health care services if required. Participants receive a \$40 (CDN) honorarium for each study visit. The University of British Columbia/Providence Health Care Research Ethics Board provided ethical approval for both studies.

Participants were included in the present analysis if they reported ever injecting drugs and had completed at least one study visit between June 1, 2014 (the first follow-up period that included questions about chronic pain via the Brief Pain Inventory (Cleeland & Ryan, 1994)) and November 30, 2016 (the most recent follow-up data available for the present analysis). No other exclusion criteria applied to participants.

## Study Variables

The primary outcome variable of interest was reporting chronic pain in the previous six months (yes vs. no). Having chronic pain was defined as responding “Yes” to the question: “Throughout our lives, most of us have had pain from time to time. In the last 6 months, have you had any major or persistent pain (other than minor headaches, sprains, etc.)?” and subsequently responding either “4 to 6 months” or “Longer than 6 months” to the question: “How long have you experienced this pain? (For multiple pain types, check the longest pain duration to date.)” This measure of chronic pain is consistent with that of the International Association for the Study of Pain, which defines chronic pain as “pain that persists beyond normal tissue healing time, which is assumed to be three months” (Merskey, 1986). This measure refers to generalized chronic pain that is not specific to location or syndrome type.

The primary explanatory variable of interest was experiencing moderate to extreme emotional abuse during childhood, as measured during the baseline interview by the Childhood Trauma Questionnaire (CTQ). The CTQ is a commonly used 28-item validated instrument used to retrospectively assess three forms of childhood abuse (sexual, physical, and emotional abuse) and two forms of childhood neglect (physical and emotional neglect) (Bernstein et al., 2003; Scher, Stein, Asmundson, McCreary, & Forde, 2001; Taplin, Saddichha, Li, & Krausz, 2014). The CTQ provides a score for five subscales that correspond to each type of abuse and neglect, based on responses to five items. Using a five-point Likert scale from “never true” (1) to “very often true” (5), participants respond to statements such as “People in my family called me things like ‘stupid,’ ‘lazy,’ or ‘ugly’” (emotional abuse). All questions refer only to events that occurred during childhood, without specifying an age cut-off distinguishing childhood from adulthood. Each subscale produces scores ranging from 5 to 25. We used recommended and pre-determined cut-off scores to translate the emotional abuse subscale score into one of four levels of childhood trauma: none or minimal (5–8), low to moderate (9–12), moderate to severe (13–15), and severe to extreme (>15) (Bernstein, 1998). For this analysis, we chose to collapse these four trauma levels into two: none/low (5–12) and moderate/extreme (>13), as has been done in previous studies (Lake, Wood, et al., 2015). This was done as previous studies have demonstrated a lack of significant findings associated with reporting low levels of childhood abuse within drug using populations (Medrano, Hatch, Zule, & Desmond, 2002). The reliability and validity of the CTQ has been demonstrated previously, and the instrument has been used successfully in several studies of illicit drug-using populations (Bernstein et al., 2003; Lake, Hayashi, et al., 2015; Scher, Stein, Asmundson, McCreary, & Forde, 2001).

We also considered secondary explanatory variables that might confound the relationship between childhood emotional abuse and reporting recent chronic pain, based on previous research (Walsh et al., 2007). These included socio-demographic characteristics, including: age (per year older); biological sex at birth (female vs. male); ancestry (white vs. non-white); homelessness in the previous six months, defined as having no fixed address, sleeping on the street, or staying in a shelter or hostel (yes vs. no); residing in the DTES in the previous six months (yes vs. no); and educational attainment (less than high school diploma vs. high school diploma or higher). Drug-use variables referred to behaviours in the previous six months, and included: daily heroin use (yes vs. no); daily prescription

opioid non-medical use (yes vs. no); daily cocaine use (yes vs. no); daily crack cocaine use (yes vs. no); daily crystal methamphetamine use (yes vs. no); and heavy alcohol use, defined by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) as more than 3 drinks per day or more than 7 drinks per week for females and more than 4 drinks per day or more than 14 drinks per week for males (yes vs. no) (NIAAA). Other exposures included: childhood physical abuse (moderate/extreme vs. none/low); childhood sexual abuse (moderate/extreme vs. none/low); childhood physical neglect (moderate/extreme vs. none/low); childhood emotional neglect (moderate/extreme vs. none/low); ever diagnosed with mental health illness (yes vs. no); engagement in opioid agonist therapy in the previous six months (yes vs. no); and HIV serostatus (positive vs. negative). The other forms of childhood abuse and neglect, including sexual abuse, physical abuse, physical neglect, and emotional neglect were also measured using the Childhood Trauma Questionnaire. As was done with emotional abuse we used the same cut-off scores of none or minimal (5–8), low to moderate (9–12), moderate to severe (13–15), and severe to extreme (>15). The trauma subscores were also translated into two levels: none/low and moderate/extreme.

### Statistical Analysis

As a first step, we examined the baseline sample characteristics stratified by chronic pain, using the Pearson's Chi-squared test (for binary variables) and Wilcoxon Rank Sum test (for continuous variables). Fisher's exact test was used when one or more of the cells contained expected values less than or equal to five.

Since the analyses of reporting chronic pain included serial measures for each participant, we used generalized estimating equations (GEE) with logit link, which provided standard errors adjusted by multiple observations per person using an exchangeable correlation structure. We first used bivariable GEE analyses to examine the association between each explanatory variable and chronic pain. To examine the relationship between childhood emotional abuse and chronic pain, we fit multivariable GEE models using a conservative confounding model selection approach. We included all variables that were associated with chronic pain in unadjusted analyses at  $p < 0.10$  in a full multivariable model, and used a stepwise approach to fit a series of reduced models. The value of 0.10 was chosen to remain inclusive while balancing the number of potential confounders included in the multivariable model to avoid overloading the model. After comparing the value of the coefficient of childhood emotional abuse in each reduced model, we dropped the secondary variable associated with the smallest relative change. We continued this iterative process until the minimum change exceeded 5%. We also quantified the severity of multicollinearity using the variance inflation factor (VIF). Variables with a VIF squared  $\geq 3$  were considered to be dependent and further examined using phi coefficient (Pearson correlation coefficient estimated for pairs of binary variables) at baseline. All p-values are two sided and tests were considered statistically significant at  $p < 0.05$ . All statistical analyses were performed using R software version 3.2.4 (R Foundation for Statistical Computing, Vienna, Austria [2016]).



## RESULTS

In total, 2223 participants enrolled in the VIDUS or ACCESS studies between December 2005 and June 2017. A total of 699 participants were not eligible due to not completing an interview during the study period, 36 participants were not eligible due to not reporting injection drug use ever, and 29 participants were not eligible due to missing data. Therefore, 1,459 participants were eligible for the present study. Among this sample, 518 (35.5%) were women, 820 (56.2%) self-reported white ancestry, and the median age at baseline was 47.7 years (interquartile range [IQR] = 39.1–54.0). Overall, the 1,459 individuals contributed 5,428 observations to the analysis and the median number of follow-up visits was 4 (IQR: 3–5) per person. The baseline characteristics of all participants stratified by reporting chronic pain are presented in Table 1. As shown, among the 1,459 individuals included in the study, 591 (40.5%) reported moderate to extreme childhood emotional abuse and 760 (52.1%) reported chronic pain in the previous six months at baseline. In addition, the extent of overlap among those who reported childhood emotional abuse with additional maltreatment categories are presented in Table 2. Among the 591 participants who reported childhood emotional abuse, 418 (70.7%) also reported physical abuse, 328 (55.5%) also reported sexual abuse, 297 (50.3%) also reported physical neglect, and 450 (76.1%) also reported emotional neglect.

The results of the bivariable and multivariable GEE analyses of reporting chronic pain are presented in Table 3. Childhood physical abuse was removed from the multivariable model due to collinearity with childhood emotional abuse. Physical abuse and emotional abuse resulted in VIF squared >4 and their phi coefficient was 0.68 indicating high collinearity. As shown, in the final multivariable model after adjusting for a range of potential confounders, experiencing childhood emotional abuse remained independently and positively associated with reporting chronic pain (adjusted odds ratio [AOR] = 1.25; 95% confidence interval [CI]: 1.01–1.53).

## DISCUSSION

There was a substantial prevalence (40.5%) of self-reported childhood emotional abuse (of moderate to extreme extent) among our sample of PWID in Vancouver, Canada. In addition, a high prevalence of chronic pain (52.1%) was observed at baseline. In a multivariable analysis, childhood emotional abuse remained independently and positively associated with reporting adult chronic pain after adjusting for a range of potential confounders.

Our finding of a significant positive association between childhood emotional abuse and chronic pain is consistent with previous research documented in non-substance using populations (Eriksen et al., 2016; Tietjen et al., 2010). This provides further evidence that childhood exposures might increase the likelihood of chronic pain in adulthood beyond what is already conferred through injection drug use. Given the detrimental impact of childhood emotional abuse on long-term health outcomes, effective early interventions are needed to address this ongoing problem. The information gained through the current study could be used to tailor and target support services for parents and children in safe and supportive non-judgemental ways.

Known risk factors for emotional abuse include children whose parents have mental illness challenges, substance use disorders, are unemployed, and those younger than 22 years of age (Stith et al., 2009). The relationship between childhood emotional abuse and chronic pain persisted even after adjusting for other forms of childhood maltreatments such as sexual abuse, emotional neglect, and physical neglect, suggesting the profound impact of emotional abuse as indicated in previous research (Gilbert et al., 2009). Although we were unable to discern the effect of emotional abuse from that of physical abuse due to the collinearity, other research has shown that the vast majority of physical abuse cases in childhood also demonstrate signs of childhood emotional abuse (Kaplan et al., 1999). Due to this overlap, existing interventions aimed at addressing childhood physical abuse should also consider emphasizing novel responses to address concomitant childhood emotional abuse.

Prior research has suggested some potential physiological and psychological pathways linking childhood emotional abuse and chronic pain during adulthood. Physiologically, chronic stress from emotional abuse in childhood has been shown to impact brain development. For example, exposures to emotional forms of abuse during childhood have been found to over-activate the hypothalamus-pituitary-adrenal axis resulting in a sustained release of cortisol, leading to inappropriate and chronic activation of the inflammatory arm of the immune system (Carpenter et al., 2009; Kuhlman, Chiang, Horn, & Bower, 2017). In turn, the resulting increase of allostatic load, or increased wear and tear on the body, increases the risk of pain conditions (Kuhlman et al., 2017). In addition, psychological development can be impaired by emotional abuse resulting in inappropriate emotional regulation and increased risk of depression and anxiety (Kendall-Tackett, 2002; Neumann, 2017). This can lead to utilizing inappropriate coping strategies for pain, including catastrophizing and activity avoidance, which are known contributors for acute pain becoming chronic (Odes et al., 2017).

Importantly, the physiological and psychological maldevelopments are also shaped by broader social and structural forces. While these were not explored in this study, they are important to acknowledge as they add to the broader discussion of relationships between early life experiences and adult health. Adult survivors of childhood emotional abuse often have poor social networks limiting the ability to depend on others, which is known to be associated with increased stress and isolation, leading to physiological and mental health damages (Kendall-Tackett, 2002). Also, households with a low socioeconomic status and educational attainment have been associated with children experiencing maltreatment, challenges relating to others, and poor emotional control (Sidebotham, Heron, & Team, 2006; Thomson, Guhn, Richardson, Ark, & Shoveller, 2017; Thomson, Guhn, Richardson, & Shoveller, 2017). These can result in low educational attainment for the children themselves, reducing employment opportunities and forcing individuals into low-paying and physically demanding positions, increasing risk of injury and stress (Jones, Nurius, Song, & Fleming, 2018). The physiological, psychological, and social vulnerabilities work together to increase not only the likelihood of pain occurring but also that pain becoming chronic.

Current clinical treatment approaches for chronic pain focus on the use of prescription opioids. While prescription opioids may be effective for a limited set of acute pain scenarios and cancer-related pain, there remains a lack of evidence to support their effectiveness for



long-term treatment of chronic pain, except in the case of some cancers (Volkow & McLellan, 2016). Alternatives to prescription opioids include cognitive behavioural therapy, exercise, yoga, acupuncture, and massage therapy which have been shown to decrease chronic pain in patients (Dillie, Fleming, Mundt, & French, 2008; Volkow & McLellan, 2016). In addition, previously identified pathways between childhood emotional abuse and chronic pain represent potential vulnerabilities that may be amenable to treatment. For example, interventions addressing psychosocial impacts, including improving emotion regulation, self-awareness, and social functioning, have demonstrated a promising first-step in ameliorating previous harms and an area for further research (Cameron, Carroll, & Hamilton, 2018). Another approach involves tampering the overactive stress responses, through relaxation techniques and cognitive therapy (Lin, Wan, & Jamison, 2017). Further, utilizing multidisciplinary trauma-informed treatment approaches to chronic pain have demonstrated effectiveness in reducing chronic pain in patients (Scascighini, Toma, Dober-Spielmann, & Sprott, 2008). Addressing the chronic pain among populations of PWID is particularly essential, as pain is known to drive individuals to use riskier consumption methods and drug sources to obtain pain relief, including injecting illicit heroin (Voon et al., 2014). Reducing chronic pain may also be an effective intervention to address the increased risk of overdose and transmission of infectious agents resulting from self-management of pain through illicit opioid injection (Alford et al., 2016).

This study has several limitations. First, the VIDUS and ACCESS cohorts are not random samples and therefore generalizability of the findings may be limited. Second, data used in the study were mostly based on self-report and thus could be subject to reporting bias, including socially desirable responses. Although self-reported behavioural data has been shown to be largely accurate among adult drug-using populations (Darke, 1998), childhood emotional abuse in particular may date back a few decades, and therefore concerns with recall bias and socially desirable responding remain. Lastly, as with any observational research, unmeasured confounders may exist, although we sought to reduce this bias through adjustment of regression models using key predictors of chronic pain. As this was an observational study, we cannot infer causation between childhood emotional abuse and adult chronic pain.

In summary, we observed high rates of experiencing childhood emotional abuse and chronic pain among adult PWID. We also found that childhood emotional abuse remained independently associated with adult chronic pain after adjusting for other forms of childhood maltreatment and relevant socio-demographic and drug using confounders. These findings demonstrate the need to expand on interventions focusing on improving parenting to decrease child maltreatment as well as those aimed at children identified as exposed to emotional abuse to prevent future health impacts. Finally, our findings also emphasize the importance of adopting trauma-informed approaches to pain treatment among this population.

## ACKNOWLEDGEMENTS:

The authors thank the study participants for their contribution to the research, as well as current and past researchers and staff. The study was supported by the US National Institutes of Health (NIH) (U01DA038886, U01DA021525). This research was undertaken, in part, thanks to funding from the Canada Research Chairs program through a Tier 1

Canada Research Chair in Inner City Medicine which supports Dr. Evan Wood, and the Canadian Institutes of Health Research (CIHR) Canadian Research Initiative on Substance Misuse (SMN-139148). Dr. Kanna Hayashi is supported by a CIHR New Investigator Award (MSH-141971), a Michael Smith Foundation for Health Research (MSFHR) Scholar Award, and the St. Paul's Foundation. Pauline Voon is supported by doctoral scholarships from the CIHR Vanier Canada Graduate Scholarship and the Pierre Elliott Trudeau Foundation. Dr. M-J Milloy is supported by a CIHR New Investigator Award, a MSFHR Scholar Award, and the US NIH (U01DA021525). His institution has received an unstructured gift from NG Biomed, Ltd., to support him. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

## ABBREVIATIONS

<b>DTES:</b>	Downtown Eastside
<b>HIV:</b>	Human immunodeficiency virus
<b>PWID:</b>	People who inject drugs

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**Table 1:**

Baseline sample characteristics, stratified by reporting chronic pain in the past six months among people who inject drugs in Vancouver, Canada (n = 1,459).

Characteristic	Reporting chronic pain *		p - value
	Yes n (%) 760(52.1)	No n (%) 699(47.9)	
<b>Childhood emotional abuse</b>			
Moderate/extreme	330 (43.4)	261 (37.3)	0.015
None/low	385 (50.7)	397 (56.8)	
<b>Childhood physical abuse</b>			
Moderate/extreme	273 (35.9)	206 (29.5)	0.006
None/low	441 (58.0)	454 (64.9)	
<b>Childhood sexual abuse</b>			
Moderate/extreme	239 (31.4)	190 (27.2)	0.046
None/low	470 (61.8)	472 (67.5)	
<b>Childhood physical neglect</b>			
Moderate/extreme	226 (29.7)	189 (27.0)	0.181
None/low	479 (63.0)	469 (67.1)	
<b>Childhood emotional neglect</b>			
Moderate/extreme	356 (46.8)	328 (46.9)	0.819
None/low	343 (45.1)	324 (46.4)	
<b>Age</b>			
Median, IQR	49 (42-54)	46 (38-53)	<0.001
<b>Sex</b>			
Female	280 (36.8)	238 (34.0)	0.260
Male	474 (62.4)	456(65.2)	
<b>Ancestry</b>			
White	433 (57.0)	387 (55.4)	0.476
Other	311 (40.9)	300 (42.9)	
<b>Homelessness *</b>			
Yes	143 (18.8)	138 (19.7)	0.662
No	615 (80.9)	560 (80.1)	
<b>DTES residency *</b>			
Yes	451 (59.3)	395 (56.5)	0.273
No	309 (40.7)	304 (43.5)	
<b>Educational attainment</b>			
Less than high school	373 (49.1)	355 (50.8)	0.400
High school diploma or higher	370 (48.7)	322 (46.1)	
<b>Daily heroin use *†</b>			
Yes	163 (21.4)	150 (21.5)	0.996
No	597 (78.6)	549 (78.5)	



Characteristic	Reporting chronic pain *		<i>p</i> - value
	Yes n (%) 760(52.1)	No n (%) 699(47.9)	
<b>Daily prescription opioid use</b> <sup>*†</sup>			
Yes	57 (7.5)	22 (3.1)	<0.001
No	703 (92.5)	677 (96.9)	
<b>Daily cocaine use</b> <sup>*†</sup>			
Yes	44 (5.8)	36 (5.2)	0.592
No	716 (94.2)	663 (94.8)	
<b>Daily crack cocaine use</b> <sup>*†</sup>			
Yes	102 (13.4)	91 (13.0)	0.829
No	658 (86.6)	607 (86.8)	
<b>Daily crystal methamphetamine</b>			
Yes	98 (12.9)	87 (12.4)	0.797
No	662 (87.1)	612 (87.6)	
<b>Heavy alcohol use</b> <sup>*†</sup>			
Yes	111 (14.6)	112 (16.0)	0.465
No	646 (85.0)	586 (83.8)	
<b>Mental health diagnosis ever</b>			
Yes	517 (68.0)	422 (60.4)	0.002
No	241 (31.7)	276 (39.5)	
<b>Engaged in OAT</b> *			
Yes	431 (56.7)	349 (49.9)	0.009
No	328 (43.2)	350 (50.1)	
<b>HIV Serostatus</b>			
Positive	338 (44.5)	266 (38.1)	0.013
Negative	422 (55.5)	433 (61.9)	

IQR: interquartile range; DTES: Downtown Eastside; OAT: opioid agonist therapy

\* Denotes activities in the previous six months

<sup>†</sup> Refers to any route of consumption (i.e., sniffing, snorting, smoking or injecting)

**Table 2.**

Extent of overlap with additional maltreatment categories among people who inject drugs who reported childhood emotional abuse in Vancouver, Canada (n = 591).

<b>Child maltreatment category</b>	<b>Number of those who reported</b>	<b>% of overlap</b>
Childhood Physical Abuse	418	70.7
Childhood Sexual Abuse	328	55.5
Childhood Physical Neglect	297	50.3
Childhood Emotional Neglect	450	76.1

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**Table 3.**

Bivariable and multivariable GEE analysis of reporting chronic pain among people who inject drugs in Vancouver, Canada (n = 1459).

Characteristic	Unadjusted		Adjusted	
	Odds Ratio (95% CI)	p - value	Odds Ratio (95% CI)	p - value
<b>Childhood emotional abuse</b>				
Moderate/extreme	1.38 (1.16-1.63)	<0.001	1.25 (1.01-1.53)	0.037
None/low	Ref		Ref	
<b>Childhood physical abuse</b>				
Moderate/extreme	1.44 (1.21-1.72)	<0.001		
None/low	Ref			
<b>Childhood sexual abuse</b>				
Moderate/extreme	1.32 (1.10-1.58)	0.002	1.18 (0.95-1.46)	0.127
None/low	Ref		Ref	
<b>Childhood physical neglect</b>				
Moderate/extreme	1.25 (1.04-1.50)	0.017	1.09 (0.89-1.35)	0.388
None/low	Ref		Ref	
<b>Childhood emotional neglect</b>				
Moderate/extreme	1.05 (0.89-1.24)	0.567		
None/low	Ref			
<b>Age</b>				
(per year older)	1.03 (1.02-1.04)	<0.001	1.04 (1.03-1.05)	<0.001
<b>Sex</b>				
Female	1.09 (0.92-1.29)	0.332		
Male	Ref			
<b>Ancestry</b>				
White	1.12 (0.95-1.33)	0.166		
Other	Ref			
<b>Homelessness*</b>				
Yes	1.08 (0.92-1.27)	0.333		
No	Ref			
<b>DTES residency*</b>				
Yes	1.10 (0.97-1.25)	0.143		
No	Ref			
<b>Educational attainment</b>				
Less than high school diploma	0.94 (0.80-1.12)	0.503		
High school diploma or higher	Ref			
<b>Daily heroin use*†</b>				
Yes	1.09 (0.94-1.26)	0.247		
No	Ref			
<b>Daily prescription opioid use*†</b>				

Characteristic	Unadjusted		Adjusted	
	Odds Ratio (95% CI)	p - value	Odds Ratio (95% CI)	p - value
Yes	1.49 (1.16-1.91)	0.002		
No	Ref			
<b>Daily cocaine use<sup>*†</sup></b>				
Yes	0.85 (0.66-1.11)	0.235		
No	Ref			
<b>Daily crack cocaine use<sup>*†</sup></b>				
Yes	1.07 (0.89-1.27)	0.473		
No	Ref			
<b>Daily crystal methamphetamine use<sup>*†</sup></b>				
Yes	0.90 (0.75-1.08)	0.269		
No	Ref			
<b>Heavy alcohol use<sup>*†</sup></b>				
Yes	0.94 (0.80-1.09)	0.415		
No	Ref			
<b>Mental health diagnosis ever</b>				
Yes	1.49 (1.26-1.77)	<0.001	1.50 (1.25-1.80)	<0.001
No	Ref		Ref	
<b>Engaged in OAT<sup>*</sup></b>				
Yes	1.19 (1.03-1.37)	0.020	1.26 (1.08-1.47)	0.003
No	Ref		Ref	
<b>HIV Serostatus</b>				
Positive	1.29 (1.09-1.52)	0.003		
Negative	Ref			

GEE: generalized estimating equations; CI: confidence interval; DTES: Downtown Eastside; OAT: opioid agonist therapy

\* Denotes activities in the previous six months.

† Refers to any route of consumption (i.e., sniffing, snorting, smoking or injecting).