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Increases in the availability of prescribed opioids in a Canadian setting

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ABSTRACT

Background: The nonmedical use of prescribed opioids (POs) has increased across North America over the past decade. Our objective was to identify changes in the availability of POs and other illicit drugs among drug users in a Canadian setting.
Methods: Information on the availability of illicit drugs was collected in standardized interviews from a large observational research program involving illicit drug users in Vancouver, British Columbia from 2006 to 2010. The primary outcome was the perceived availability of a set of six POs (aspirin/oxycodone, hydromorphone, oxycodone, morphine, acetaminophen/codeine and methadone) among individuals reporting ever using POs. Availability was measured in three levels: not available, delayed availability (available ≥10 min), and immediate availability (available <10 min). Multivariate ordinal logistic regression models were executed to estimate the trend in PO availability, controlling for individual characteristics hypothesized to influence availability.
Results: 1871 individuals were followed during the study period (2006–2010), including 583 (31.2%) women. The availability of POs increased over time, regardless of changes in the characteristics of cohort entrants. These increases were observed while the availability of traditional drugs of abuse (e.g., heroin and cocaine) remained constant. The adjusted odds of delayed availability vs. unavailability were between 34% (hydromorphone) and 71% (acetaminophen/codeine) greater in each calendar year.
Discussion: The availability of POs among drug users in a Canadian setting increased markedly over a relatively short timeframe, despite persistent and high availability of heroin and cocaine. Further study is required to determine the context of use of POs, associated harms, as well as policy responses to increasing availability.

1. Introduction

Whereas the 1980s and 1990s bore witness to epidemics of crack cocaine and heroin use in many inner city areas, the nonmedical use of prescribed opioids (POs) is emerging as an increasing concern. Rising rates of use have been documented in the US, most notably among youth and young adults. Among high school seniors, Hydrocodone abuse was second only to marijuana abuse (Volkow and McLellan, 2011). A 7-fold increase in drug treatment admissions involving opioids other than heroin was observed between 1998 and 2009 (SAMHSA TEDS Database, 2011). Emergency department visits involving non-medical use of prescription drugs increased to a greater extent than other illicit drugs, with Oxycodone (175,949 in 2009; a 242.2% increase from 2004) and Hydrocodone (104,490 in 2009; a 124.5% increase from 2004) among the highest increases. Finally prescribed opioid-related overdose deaths increased from 2000 in 1999 to 14,800 in 2008 (Centers for Disease Control and Prevention, 2011). Opioid overdose is now the second leading cause of unintentional death in the United States, second only to motor vehicle accidents (National Centre for Injury Prevention and Control, 2010), which prompted the Centers for Disease Control and Prevention to label PO overdose as a national epidemic (Centers for Disease Control and Prevention, 2011).

There is accumulating evidence of similar trends in use in Canadian settings. An early study conducted in Vancouver identified a range of prescription medications available for illicit sale, including POs such as acetaminophen/codeine, aspirin/oxycodone, meperidine, hydromorphone, morphine, and Anileridine (no longer manufactured in North America; Sajan et al., 1998). In a 2004 report on a cohort of methadone maintenance treatment (MMT) patients in Ontario, Brands et al. (2004) reported that 83% of all patients

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had been using POs, with or without heroin, upon admission. The OPICAN study, conducted in five Canadian cities, revealed that non-medical use of POs was far more prevalent than the use of heroin in every setting except Vancouver and Montreal (Fischer et al., 2005). From 2002 to 2005, a relative increase of 24% was observed in the proportion of the street drug using population who used non-medical POs only (Popova et al., 2009). Recent studies have described increases in the amounts of opioids prescribed across Canada (Fischer et al., 2011), increasing opioid utilization among recipients of social assistance in Ontario (Gomes et al., 2011a) and street users in Montreal (Bruneau et al., 2012; Roy et al., 2011), a strong independent relationship between PO dose and opioid-related mortality (Gomes et al., 2011b), high variation in opioid prescribing among Ontario physicians (Dhalla et al., 2011) and high rates of non-methadone opioid use among clients in methadone maintenance treatment in Ontario (Kurdyak et al., 2011).

Despite this rapidly growing literature documenting problematic PO use in North America, few studies have endeavored to ascertain temporal trends in street-level availability of POs and other illicit drugs (e.g., cocaine and heroin). Our objective, therefore, was to examine the availability of prescribed opioids and other illicit drugs among street users in Vancouver, British Columbia between 2006 and 2010.

2. Methods

2.1. Study design

Data for this analysis were derived from the baseline assessments of a series of ongoing open prospective cohort studies involving illicit drug users, including the At-Risk Youth Study (ARYS), the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), and the Vancouver Injection Drug Users Study (VIDUS). The VIDUS study began enrollment in May 1996 and recruits individuals through word of mouth, street out-reach, and referrals. Recently, the original VIDUS cohort was divided into two separate studies: VIDUS now follows HIV-negative participants and its sister study ACCESS follows HIV-positive drug users based in the Greater Vancouver area (Strathdee et al., 1998; Wood et al., 2009). The At-Risk Youth Study began in late 2005 and is made up of street-involved youth who report use of drugs other than or in addition to cannabis and are aged 14–26 (Wood et al., 2006a,b).

Sampling and follow-up methodologies have been described in detail previously (Strathdee et al., 1997; Tyndall et al., 2003; Wood et al., 2006a,b). Specific eligibility criteria were specified in other articles; however, general eligibility across all three cohorts required age of at least 14 years, Greater Vancouver region residence, and the provision of informed consent. At baseline, participants complete an interviewer-administered questionnaire that elicits information pertaining to sociodemographic characteristics, drug use, treatment utilization, and HIV risk behaviours. Nurses also assessed participants for various health conditions, and obtain blood specimens for HIV and Hepatitis C Virus (HCV) serology, and HIV disease monitoring (e.g., CD4 counts, HIV-1 RNA) where appropriate. Participants receive $20 CAD for each visit. While combining data from studies with different inclusion criteria may present some challenges, we note that all studies rely on harmonized recruitment and data collection tools. These studies have been approved by the University of British Columbia/Providence Health Care Research Ethics Board.

2.2. Participants and measures

Questions assessing the availability of illicit drugs were first added to the baseline study instrument for the ARYS, ACCESS and VIDUS cohort studies in late 2005. All participants who completed the baseline interview after this date were eligible for inclusion. The study period was defined as the 5-year interval ending in December 31st, 2010. The availability of a set of 12 substances (crack cocaine, heroin, powder cocaine, crystal methamphetamine, marijuana, aspirin/oxycodone, hydromorphone, oxycodone, morphine, acetaminophen/codeine and methadone), acquired illicitly, were assessed at five levels: (1) score within 10 min; (2) score within 90 min; (3) score within a day; (4) score in more than a day; (5) could not score this drug.

We assessed changes in the availability of these drugs over the study period, with availability being an aspect of *supply*, rather than *demand* for the substances in question. Given that individual characteristics could influence access to a given illicit drug, and these factors may have changed among cohort entrants over the study period, we controlled for these factors by estimating the independent effect of calendar year on the availability of illicit drugs among cohort entrants. Further, respondents were asked to provide assessments of availability regardless of whether they had ever used the substance. We included assessments on availability from individuals who reported having used the substance in question.

We hypothesized that a number of factors were potentially associated with availability. Aside from age and gender, we hypothesized unstable housing (defined as living in a single occupancy room hotel, a treatment or recovery house, jail, shelter or hostel, or having no fixed address for the last 6 months), daily use of POs, drug dealing involvement, sex work involvement, and geographic proximity to Vancouver's Downtown Eastside (DTES) would each influence how quickly an individual may access illicit drugs. Housing instability may be indicative of greater mobility and therefore irregular contacts with suppliers, while daily use and dealing status are clearly indicative of stronger contact with a given drug supply chain. Involvement in sex work, potentially in exchange for illicit drugs, may also increase the ease of availability of illicit drugs. Vancouver's DTES is the most impoverished neighborhood in Canada, and home to a high concentration of illicit drug use (Wood and Kerr, 2006), and therefore proximity to this area may predict easier access to drugs. For the latter, we considered several related variables, including current DTES residence, any DTES residence in the past 6 months, regular visits to the DTES and indication of purchasing illicit drugs in the DTES, and selected the covariate that provided the best model fit, using Akaike's and Bayes' information criteria, and the largest effect size. Unless otherwise indicated, variables refer to behaviours or activities in the past 6 months from the date of the baseline interview. In addition, we included cohort indicators, given that the assessments were drawn from three separate cohort studies with different aims and target populations.

2.3. Statistical analysis

As a first step, we plotted univariate trends in the availability of each drug assessed in baseline data from participants entering the cohorts in different years. We then constructed ordinal logistic regression models to determine the odds of delayed and immediate availability, controlling for other factors. The proportional odds assumption was tested using the Score test. Given low levels of responses for availability in <90 min, <1 day and >1 day, we combined these categories, thus providing us with a three-level, ordered outcome variable: not available; delayed availability (available in ≥10 min) and immediate availability (available in <10 min). We proceed with this terminology from this point onward. Regression models for the availability of each substance were constructed with manual stepwise elimination. For dichotomous variables, adjusted odds ratios are interpreted as the increase/decrease in the odds of the higher availability category for a 1-unit increase in the covariate (in comparison to the stated reference group). All analyses were executed using SAS version 9.2.

3. Results

3.1. Summary statistics

Summary statistics on the covariates included in the analysis are provided in Table 1. A total of 1871 individuals were recruited into the ARYS [$N = 712$ (38.1%)], ACCESS [$N = 536$ (28.7%)] and VIDUS [$N = 623$ (33.3%)] cohorts during the study period; 31% were female and 37% were 25 or under (median age: 33.7; interquartile range: 22.7, 44.3). The majority of individuals reported living in unstable housing (52%), 37.8% reported dealing drugs and 8.3% reported being engaged in sex work in the past 6 months. Past use of each of the major classes of substances was high; 66.3% the cohort reported ever having used POs in the past. Finally, in each calendar year, between 123 (6.6%) in 2010 and 643 (34.4%) in 2006 individuals entered the study and completed baseline questionnaire packages.

3.2. Univariate trends in availability

Trends in the immediate availability of the illicit drugs assessed are plotted in Fig. 1. While the immediate availability of heroin, crack cocaine, powder cocaine, crystal methamphetamine and marijuana were high and remained constant throughout the study period (Fig. 1), the immediate availability of POs all increased between 2006 and 2010. Increases in the immediate availability of aspirin/oxycodone and hydromorphone were the most pronounced, increasing by 26.7% and 19.8%, respectively, for these substances during the study period. Immediate availability of aspirin/oxycodone increased from 11.2% in 2006 to 37.9% in 2010; hydromorphone increased from 21.6% to 41.4%, and acetaminophen/codeine from 17.2% to 39.7%. During this same period, the proportions of individuals reporting that the set of POs were not available dropped 10–20%, most notably in 2007 (Fig. 2).