



## Health behaviors of young adult heroin injectors in the Seattle area



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### ABSTRACT

**Background:** Recent indicators point to substantial increases in the number of young heroin users across much of the United States as well as across Washington State. This study characterizes this younger generation of heroin injectors in order to inform public health responses.

**Methods:** A cross-sectional analysis was conducted using street-intercept surveys at King County, WA syringe exchange programs in 2013. Survey responses were restricted to heroin injectors ( $n = 389$ ) and then categorized by the participant's age ( $<30$  and  $\geq 30$ ) for a descriptive epidemiological analysis. A manual stepwise logistic regression tested the independent relationship of user characteristics with being under the age of 30.

**Results:** In regression analyses, adjusting for other characteristics, young adults were significantly ( $p < 0.05$ ) more likely to: re-use syringes 2–4 times (OR = 2.28 compared to those who used a syringe once), share syringes (OR = 2.92), report they were “hooked on” prescription-type opioids prior to using heroin (OR = 2.54), have had a sexual partner in the prior year (opposite sex OR = 7.37, same sex OR = 23.29, both genders OR = 22.04), and report powder cocaine use in the prior 3 months (OR = 2.49) compared to those ages 30 and older. Young adults were significantly less likely to report using pain medicines (OR = 0.33), having an abscess in the prior year (OR = 0.33) or having tested positive for hepatitis C (OR = 0.22) than older adults adjusting for other variables.

**Conclusions:** Younger heroin injectors engage in risky injection practices more than older heroin injectors. Along with other significant differences, these findings have implications for outreach programs and medical care for younger heroin injectors.

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## 1. Introduction

### 1.1. Heroin use trends among young adults

Heroin use among young people is increasing on a national level (Jones, 2013). Young people ages 18–25 accounted for 27.6% of the treatment admissions for heroin injection in 2009, which is a dramatic increase from 1992 when this age group only accounted for 8.4% of the treatment admissions (US Department of Health and Human Services, 2011). This demographic shift in heroin use is reflected in Washington State. The number of treatment admissions for heroin use increased dramatically from 1999 through 2012 among those aged 18–29, effectively decreasing the median age of treatment admissions for heroin from 40 to 29-years-old. This trend was paralleled by an increase in mortality secondary

to overdoses involving heroin in individuals under age 30 (Banta-Green et al., 2013). Nationally, the annual number of drug poisoning deaths involving heroin doubled between 2002 and 2011 (Centers for Disease Control and Prevention, 2014).

### 1.2. The relationship between prescription opioids and heroin among young adults

Some risk factors for initiation of heroin use may be specific to today's youth. Previous studies have shown that heroin use is often preceded by prescription opioid abuse, especially in younger heroin users (Peavy et al., 2012). In 2012, 6% of tenth graders in Washington State reported using prescription opioids in order “to get high” in the prior month (Washington State Department of Health, 2014). Twenty-three percent of the tenth graders who had recently used prescription-type opioids to get high also reported using heroin at some point, compared to only 3% of the tenth graders who had not recently used prescription-type opioids to get high (Banta-Green, 2013). Both the opioid prescription rate and the misuse of

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prescription opioids increased in the United States from 2004 to 2011 (Atluri et al., 2014).

### 1.3. Washington State's early adoption of opioid prescribing restrictions

Washington State has been on the front lines of strengthening regulations around prescribing opioids (Meier, 2012), with the possible unintended consequence of pushing some prescription opioid abusers to heroin. Having experienced an epidemic of heroin use preceded by prescription opiate abuse and, in turn, early policy action to stem prescription misuse, Washington State is well positioned to identify health behaviors in this young population. Knowledge about these health behaviors can help mitigate these risks in the future, as well as provide information to other regions facing earlier stages of this epidemic.

### 1.4. Risks associated with drug injection

Injection drug users (IDUs) are at risk for infectious diseases such as human immunodeficiency virus (HIV) and hepatitis C (HCV), primarily via sharing syringes and other injection equipment. Injection drug use is also a risk factor for serious infections such as right-sided endocarditis (Moss and Munt, 2003). Heroin users are at high risk for overdose, with estimates of annual incidence ranging from 15% to 25% (Coffin et al., 2007; Jenkins et al., 2011; Darke et al., 2007). An analysis of opioid injectors at syringe exchange programs in King County showed that recent incarceration and sharing of injection materials were independently associated with nonfatal overdose (Jenkins et al., 2011). Incarceration is an especially strong risk factor for overdose in the time immediately after release from prison (Ochoa et al., 2005; Strang et al., 2013; Farrell and Marsden, 2008).

### 1.5. Purpose of the analysis

The purpose of this study is to characterize the younger generation of heroin injectors, including the ways in which they differ from the heroin injectors age 30 and over. This younger generation of heroin injectors may be unique in ways that impact their public health and medical care needs. Given that the size of this population appears to be growing in part due to the cohort effects of recent initiates to heroin starting with prescription opioids and the fact that Washington State may be ahead of the rest of the country in these trends, these analyses may inform outreach programs and medical care for young IDUs in King County, with lessons learned potentially of value for other regions.

## 2. Methods

### 2.1. Study setting and data collection

Over 5.7 million syringes were exchanged in King County, Washington in 2013. About half of these syringes were exchanged at syringe exchange facilities operated by Public Health–Seattle and King County (PHSKC). The other half of syringes exchanged were exchanged at facilities operated by People's Harm Reduction Alliance (PHRA), a non-governmental organization. In addition to syringe exchange, these programs also provide services such as infectious disease testing, clean injection equipment, referrals to methadone treatment, overdose education and take-home naloxone, and case management.

This study was conducted at three syringe exchange program (SEP) sites in King County operated by PHSKC. During a two-week period in July, 2013, clients at these SEP sites were asked to complete a voluntary survey. The survey was administered verbally by staff and volunteers trained in survey administration procedures in a manner similar to surveying conducted in prior years (Jenkins et al., 2011). Interviews were conducted in public spaces adjacent to syringe exchanges and every attempt was made to maximize privacy during interviewing by stepping away from other people and talking at a low volume. Participants were given a piece of candy in appreciation of their time. No personal identifiers were collected with the survey responses. The main content domains of the survey questions were demographics,

sexual behaviors, drug use behaviors, HIV and HCV testing, and overdose experience. The following time frames were used for questions: current status for housing, health insurance; past month for injection frequency and syringe re-use as these had quantitative responses; past 3 months for syringe and equipment sharing as well as drug use and having naloxone; past year for sexual activity, overdose, muscling, femoral injecting, and abscesses. The University of Washington Human Subjects Division determined that this data analysis was exempt from Institutional Review Board review.

All individuals using the PHSKC SEPs during the study period were asked to participate in the survey. Repeat participants (those who had already completed the survey) were asked only for demographic information upon subsequent contact. Survey administrators, syringe exchange staff and volunteers, made a total of 996 approaches at the syringe exchange locations. Of these, there were 475 unique participants, 414 repeat participants, 76 individuals who declined the survey, and 31 individuals who did not have complete information regarding unique or repeat status.

### 2.2. Data analysis

The final sample for analysis was restricted to the 389 unique participants who reported recent heroin use and who had adequate data recorded for the injection and age-related questions. Heroin use included participants who used heroin alone, goofballs (heroin mixed with methamphetamine), or speedballs (heroin mixed with cocaine). Injection variables included the number of injection days per month, the number of injections on an average injecting day, and the number of times a syringe was used before getting rid of it. Exclusion of participants who answered "0" for all three of the injection variables was done in order to enhance the internal validity of the study by specifically analyzing heroin injectors.

A stratified analytic approach was based on age: <30-years-old and ≥30-years-old. Pearson's chi-square statistic was used to evaluate the statistical significance of differences in the proportions by age group for categorical variables. Fisher's exact statistic was used to evaluate the *p*-values of categorical variables when the expected number per cell was less than or equal to 5. *p*-Values less than 0.05 were considered statistically significant. Variables significant at a level of *p* < 0.20 were then included in an unconditional multivariate logistic regression model (Hosmer and Lemeshow, 2000). A manual stepwise approach to model building was taken with each successive model adding additional variables: (1) demographics and social factors; (2) added injection related behaviors; (3) added drugs used and (4) added drug use consequences and naloxone possession. We report odds ratios (ORs) and 95% confidence intervals (CI). Analysis was conducted with Stata version 13.1 (StataCorp, College Station, TX).

## 3. Results

### 3.1. Descriptive and bi-variate analyses

**3.1.1. Demographic characteristics.** The demographic characteristics of the participants by age <30 vs. ≥30-years-old are presented in Table 1. Younger respondents were significantly more likely to report incarceration in the last year (43.0% vs. 31.3%, *p* = 0.023) and were less likely to have health insurance than older users (38.4% vs. 51.9%, *p* = 0.013). Overall, there were more male than female respondents (69.9% vs. 29.3%), but there was no significant difference in the gender composition of the younger and older groups. A somewhat greater percentage of the younger participants identified as white (76.2%) compared to the older participants (66.0%) (*p* = 0.035). The majority of participants were not in permanent housing, with a somewhat greater percentage of older users in unstable housing compared to younger users (59.0% vs. 50.0%), although this difference was not statistically significant.

**3.1.2. Injection and drug use behaviors.** Injection and drug use behaviors of heroin injectors, categorized by age, are described in Table 2. Younger users were significantly more likely than older users to report being "hooked on" prescription-type opioids before using heroin (62.5% vs. 36.9%, *p* < 0.001) and reported almost twice as much recent syringe sharing (36.7% vs. 19.9%, *p* < 0.001); however, there was no statistically significant difference for sharing of other injection equipment such as cookers and cotton. A greater proportion of younger users reported using a single syringe more than once (*p* < 0.007). Note that 10% of respondents indicated they used a syringe 0 times before getting rid of it. This response category was excluded from the bi-variate test statistic and included

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