

**Factors Associated with Interest in Substance Use Treatment  
Among Syringe Exchange Clients Who Use Opioids**

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A thesis  
submitted in partial fulfillment of the  
requirements for the degree of

Master of Public Health

University of Washington  
2017

Committee:  
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Program Authorized to Offer Degree:  
Public Health, Health Services

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**Abstract**

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Clients Who Use Opioids

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**Background:** Opioid use disorder (OUD) is a growing problem across the United States. Despite the existence of effective, evidence-based treatments, the majority of people with OUD do not receive treatment. Increasing treatment receipt is an essential component of the public health response to the opioid crisis. This study examines factors associated with interest in treatment among opioid-using syringe exchange program (SEP) clients.

**Methods:** Survey data were collected at 17 SEPs in 16 counties across Washington State during 2015; 438 respondents reported current opioid use and not receiving current treatment, and thus were eligible for the analysis. Cross-sectional bivariate analyses and multivariate logistic regression were conducted to examine factors associated with interest in treatment (measured as reporting being somewhat or very interested in getting

help to reduce or cease drug use), including demographic and social characteristics, drug use behaviors and consequences, and factors related to access and use of health care services.

**Results:** The majority of participants in this study reported interest in treatment (77.6%). In multivariate analyses, factors independently positively associated with interest in treatment included: female gender (AOR=1.84; 95% CI: 1.07, 3.13), having an abscess in the past year (AOR=1.91; 95% CI: 1.10, 3.32), and having received treatment services in the past year (AOR=6.37; 95% CI: 2.47, 16.40). Factors independently negatively associated with interest in treatment included: older age (AOR=0.76; 95% CI: 0.58, 0.99 for ten-year increase), methamphetamine use in the past three months (AOR=0.46; 95% CI: 0.25, 0.86) and pharmaceutical opioid use in the past three months (AOR=0.56; 95% CI: 0.33, 0.94).

**Conclusions:** Public health and health care professionals who work with people who use opioids should consider factors associated with interest in treatment when planning treatment engagement interventions. Future research is needed to assess the generalizability of these findings and to better understand why certain factors may be positively or negatively associated with treatment interest.

## **1. Introduction**

### *1.1. Opioid use disorder trends and evidence for treatment*

In 2015, over 2.5 million people in the United States had an opioid use disorder (OUD; Center for Behavioral Health Statistics and Quality, 2015). OUD is potentially deadly – overdose deaths have surpassed motor vehicle accidents as the leading cause of accidental death in the United States, and from 2000 to 2014 the rate of overdose deaths involving opioids (including pharmaceutical opioid pain relievers and heroin) nearly tripled (Rudd et al., 2016a). The death rate increased again by 15.6% from 2014 to 2015, indicating that this trend is continuing (Rudd et al., 2016b). Overdose death rates have risen across all types of geographic areas, with the sharpest rise observed in rural areas (Rossen et al., 2013). In addition to risk of overdose, injecting heroin can lead to a number of negative health effects, including collapsed veins, abscesses and infections, and risk of blood-borne diseases from sharing needles (National Institute on Drug Abuse, 2016). Nonmedical use of pharmaceutical opioids has risen sharply, and available data suggest that this is a strong risk factor for initiating heroin use (Compton et al., 2016). Surveys of syringe exchange clients in Washington State found that 39% of young heroin users reported nonmedical use of pharmaceutical opioids prior to initiating heroin use (Peavy et al., 2012; Pollini et al., 2011).

Multiple effective treatments for OUD exist, and the clinical evidence for treatment involving opioid agonist medications has grown substantially in recent years. A review of randomized controlled trials concluded that psychosocial treatment with medication at least doubles opioid-abstinence outcomes compared to psychosocial treatment without

medication (Connery, 2015). More recently, a large cohort study conducted in England found that risk of overdose death was lower during periods in opioid agonist pharmacological treatment, but not during periods where patients received psychological support without medication (Pierce et al., 2016), supporting the use of opioid agonist medications as first-line treatment for OUD (Banta-Green & Coffin, 2016). There are three FDA-approved medications for treating OUD, including both agonist (methadone, buprenorphine) and antagonist (naltrexone) medications. Evidence for their effectiveness varies: there is strong evidence for the use of agonist medications (methadone and buprenorphine; Connery, 2015; Pierce et al., 2016), while the evidence for antagonist medication (naltrexone) is still emerging (Coviello et al., 2012; Lee et al., 2016).

Despite the existence of effective, evidence-based treatments, in 2015 80% of United States residents with OUD did not receive treatment for their disorder (Center for Behavioral Health Statistics and Quality, 2015). Increasing treatment receipt among people who use opioids is an essential component of the public health response to this epidemic.

### *1.2. The role of syringe exchange programs in treatment engagement*

Syringe exchange programs (SEPs) play a vital role in harm reduction by preventing blood-borne disease transmission among people who inject drugs (PWID), and have also been identified as an important point of contact to engage this population in substance use treatment. Studies have found no difference between SEP-users and non-users with respect to readiness for cessation of use (Bluthenthal et al., 2001; Henderson et al., 2003).

Some studies found that SEP users were more likely to enter treatment (Latkin et al., 2006; Shah et al., 2000; Strathdee et al., 1999) and had better outcomes and retention compared to PWID who did not use SEPs (Brooner et al., 1998; Hagan et al., 2000;). Additionally, studies have demonstrated that SEPs can be effective sites for interventions to increase treatment enrollment (Kidorf & King, 2008; Kidorf et al., 2009; Kidorf et al., 2011).

### *1.3 Existing research on predictors of treatment entry and interest*

Studies of PWID in multiple settings have found several factors to be associated with entry into substance use treatment for this population. Sociodemographic factors associated with treatment entry include female gender (Kerr et al., 2005; Latkin et al., 2006; Shah et al., 2000; Schütz et al., 1994), older age (Fairbairn et al., 2012; Reynoso-Vallejo et al., 2008; Shah et al., 2000; Shin et al., 2007), and not being homeless (Lundgren et al., 2003; Reynoso-Vallejo et al., 2008; Shah et al., 2000). Social support factors include living with a romantic partner, family or friends (Lloyd et al., 2004, Lundren et al., 2003, Schütz et al., 1994) and associating with fewer acquaintances who use drugs (Booth et al., 1998; Booth et al., 2003). Clinical factors include higher frequency of injection (Booth et al., 1998; Kimber et al., 2008; McCusker et al., 1994; Schütz et al., 1994; Zule & Desmond, 2000), longer duration of drug use (Al-Tayyib & Koester, 2011; McCusker et al., 1994; Schütz et al., 1994), and being HIV-positive (Kerr et al., 2005; Latkin et al., 2006; McCusker et al., 1994; Zule & Desmond, 2000). Most studies have found that PWID who use heroin (Al-Tayyib & Koester, 2011; Booth et al., 1996; Booth et al., 2003; Zule & Desmond, 2000), and do not use cocaine (Booth et al.,

1996; Booth et al., 2003; Latkin et al., 2006; Schwartz et al., 2011) are more likely to enter treatment. However, one study found opposite associations with treatment entry for each of these drugs (Kerr et al., 2005). Health care factors associated with treatment entry include having health insurance (Lundgren et al., 2003; Reynoso-Vallejo et al., 2008; Riley et al., 2002b; Shah et al., 2000) and history of prior treatment (Booth et al., 1996; Booth et al., 1998, Booth et al., 2003; Reynoso-Vallejo et al., 2008; Schütz et al., 1994; Schwartz et al., 2011; Zule & Desmond, 2000). Additionally, some studies have found expressed desire for treatment (Booth et al., 2003; Zule & Desmond, 2000) and greater motivation for change (Booth et al., 1998; Schwartz et al., 2011) to be independent predictors of treatment entry.

Fewer studies have examined factors associated with motivation for change or interest in treatment services, distinct from actual treatment entry. U.S. studies examining motivation for change (typically using scales measuring problem recognition, desire for help, and readiness for cessation) among people who use illicit drugs have found this construct to be associated with history of prior treatment (Henderson et al., 2003; Severtson, 2010), using speedballs (combination of cocaine and heroin; Henderson et al., 2003), higher level of education, regular use of more than one drug (Severtson et al., 2010), higher frequency of use, female gender, and homelessness (Trenz et al., 2012).

U.S. studies that have examined out-of-treatment PWID's expressed interest in or desire to access treatment services have found this to be associated with female gender, older age, using speedballs, older age of first injection (Riley et al., 2002a), higher frequency of

injection, and prior history of treatment (Zule et al., 1997). More recent studies conducted outside of the U.S. have identified additional factors associated with interest in treatment: a multi-city Ukraine study found that social and family support, HIV-negative status, depression, previous incarceration, and recent overdose were associated with interest in opioid agonist therapy (Makarenko et al., 2016), and a Vancouver study found that illegal income-generating activities, sex work, homelessness, and recent counseling were associated with stated need for substance use treatment among people who use illicit drugs (Luongo et al., 2017).

#### *1.4. Purpose of this analysis*

It is important to understand factors associated with interest in treatment, as this, for many people, is a prerequisite for obtaining treatment. To our knowledge, existing studies examining this question among opioid-using PWID in the United States all use data collected prior to 2005 and were conducted in major urban centers. The present analysis aimed to examine factors associated with interest in treatment among out-of-treatment, opioid-using SEP clients across the state of Washington, providing insight into this question for a more recent cohort of PWID who came of age in the prescription-opioid-to-heroin era (Peavy et al., 2012), and for a more geographically diverse sample with respect to urbanicity and rurality of residence. This exploratory analysis will further contribute to understanding of treatment interest among people who use opioids, narrowing questions for future research that can eventually inform strategies to engage people in treatment in the SEP setting as well as policies that support this work.

## 2. Methods

### *2.1 Study setting, data collection, and study population*

Data for this analysis were collected at 17 syringe exchange programs in 16 counties across Washington State during 2015. The *Washington State Drug Injector Health Survey* was developed by the University of Washington Alcohol and Drug Abuse Institute (ADAI) in collaboration with SEPs. This instrument assessed demographics, drug use, use of health care services, opioid overdose, and health care concerns among SEP clients across the state (Kingston & Banta-Green, 2016).

The survey was administered to clients verbally by trained SEP staff and volunteers during normal SEP operations. An attempt was made to survey all clients who inject drugs; occasionally, due to inadequate staffing, not all clients could be asked to participate. ADAI provided training and onsite technical assistance to support surveying. Participants had the purpose and contents of the survey explained to them and were asked for verbal consent to participate, and were offered candy as an incentive. No personally identifying information was collected from participants.

Respondents were eligible for the current analyses if they reported opioid use (heroin or prescription) within the past three months, were not currently in substance use treatment, and responded to a question regarding interest in treatment with a response other than “not sure.”

The University of Washington Human Subjects Division determined that this analysis of non-identifiable data did not require Institutional Review Board review, and the Washington State Institutional Review Board determined that data collection procedures were exempt.

## *2.2 Measures*

### *2.2.1 Outcome: Interest in treatment*

The outcome of interest, interest in treatment, was measured based on assessment of participants' level of interest in "getting help to cut down or quit using." Possible answers included "not at all," "somewhat," "very," or "not sure." The outcome was collapsed into a binary variable (not at all interested versus somewhat/very interested) with report of somewhat or very interested considered interest in treatment. Participants who responded "not sure" were dropped from the analysis (n=38), as this response could not be meaningfully interpreted in relation to the binary categories. The intent of this question was to ascertain interest in receiving structured help to reduce or cease use (i.e., treatment). Because some opioid users may have preconceived notions about what the word "treatment" refers to (e.g., traditional or "abstinence-based" models of treatment as opposed to treatment involving medication), the question was worded to describe the concept of treatment without using the word "treatment." For the sake of brevity, moving forward we will refer to the outcome variable as "interest in treatment."

*2.2.2. Independent variables: Demographic and social factors, drug use behaviors and consequences, access to health care, and use of health care services*

Demographic factors included gender, age, and race/ethnicity. Social factors included monthly income, urbanicity of residence, housing status, and past year incarceration.

Because the distribution of monthly income was heavily skewed, a categorical variable was created with cutoffs at the median/mode (\$0) and 75<sup>th</sup> percentile (\$733). Urbanicity of residence was determined by applying the USDA 2010 Rural-Urban Commuting Area Codes to participants' zip code of residence or the last zip code they slept in (Economic Research Service, 2016).

Drug use behaviors included drugs used during the past three months, length of injection drug use, and how many days participants injected during the past week. Length of injection drug use was constructed by subtracting age of first use from current age; because the distribution of this variable was heavily skewed, a binary variable was created using the median (8 years) as a cutoff. Drug use consequences included experiencing an overdose, witnessing an overdose, having an abscess, and having a skin or tissue infection in the past year. Additionally, a measure of primary health concern was obtained based on participant report in an open-ended question. Responses to this question were recoded into the following categories: drug use (including general concern about drug use and fear of overdose), abscess or infection, blood-borne disease (HIV or Hepatitis C), pain, weight or nutrition, dental, mental health, chronic physical illness (e.g., asthma, cancer, heart disease), other, or none.

Factors related to access and use of health care included current health insurance status, type of health insurance, usual source of medical care, and use of drug treatment-related services during the past year. Type of health insurance was measured as Medicaid, Medicare, private, military, or other. All participants who selected “other” indicated that they received health care through their membership in an American Indian tribe, and it is possible that this insurance type was underreported because it was not a response option.

### *2.3 Data analysis*

Bivariate analyses were conducted to describe and compare demographic and social factors, drug use behaviors and consequences, access to health care and use of health care services across interest in treatment. These analyses included Pearson chi-square statistics for categorical variables and a two-sample *t* test for age. Fisher’s exact statistic was used for categorical variables when an expected cell count was less than five.

Independent variables for which bivariate analyses produced *p* values less than 0.25 were entered into multivariate logistic regression models (Hosmer et al., 2013). In some cases, variables that did not meet the  $p < 0.25$  threshold were added because they had been shown to be associated with either treatment interest or entry in previous studies: these included housing status (Luongo et al., 2017; Trenz et al., 2012), cocaine use (Booth et al., 1996; Booth et al., 2003; Latkin et al., 2006; Schwartz et al., 2011), and length of injection drug use (Al-Tayyib & Koester, 2011; McCusker et al., 1994; Schütz et al., 1994). Methamphetamine use, which at  $p = 0.255$  was slightly over the suggested threshold, was also included in multivariate analyses as previous research in Washington

State has shown it is strongly associated with shorter treatment retention for those on methadone in opioid treatment programs across the state (Banta-Green et al., 2009). Finally, primary health concern was not included in multivariate analyses because it was determined that this was too conceptually similar to the outcome variable, particularly given that many participants indicated that drug use was their primary health concern. However, this variable was included in descriptive and bivariate analyses to characterize the study population.

Some variables were either excluded or collapsed to produce more stable estimates in multivariate analyses. Current heroin use was reported by 98% of the sample and produced a cell count of two, and was excluded from multivariate analyses. Race was aggregated into a binary variable to compare participants who identified as white only (76%) to all other participants. An “any drug treatment” binary variable was created that included methadone, buprenorphine, naltrexone, inpatient, or outpatient treatment during the past year to measure prior history of treatment. Detoxification, 12-step group, and other drug-related service were excluded from this variable, as it was determined that these services on their own would not constitute treatment for OUD.

In order to understand the impact of different variable types, we took a manual approach to model building in which we added successive blocks of variables to six different multivariate models. These blocks included (1) demographics, (2) social factors, (3) drug use behaviors, (4) drug use consequences, and (5) factors related to access and use of health care. We report adjusted odds ratios (AORs) and 95% confidence intervals (CIs).

Associations with  $p$  values less than 0.05 were considered statistically significant.

Analysis was conducted with Stata version 14.2 (StataCorp, 2015).

### **3. Results**

#### *3.1 Descriptive and bivariate analyses*

The majority of participants in this analysis reported that they were either somewhat or very interested in treatment (77.6%), with the remainder indicating that they were not at all interested. Just over half of participants were male (53.2%), most were white (76.3%), and the median age was 35.4 years. Over half of participants reported having no income (55.5%), most reported a metropolitan zip code (82.0%), most were homeless (29.7%) or had temporary/unstable housing (30.6%), and over one-third were incarcerated in the past year (36.5%). In bivariate analyses, female gender and younger age were significantly associated with interest in treatment. Independent variables are presented by interest in treatment in Table 1.

A large majority of participants reported current heroin use (98.0%), and the next most common drug used was methamphetamine (73.1%). The majority of participants injected daily during the past week (78.7%). One quarter (25.5%) of participants reported drug use as their primary health concern (Table 1). In bivariate analyses, current heroin use, witnessing an overdose in the past year, and having an abscess in the past year were significantly associated with interest in treatment.

Most participants had health insurance (84.5%), and of those who had insurance most had Medicaid (70.1%). Only 21.2% of participants had received any treatment (including methadone, buprenorphine, naltrexone, inpatient or outpatient treatment) in the past year (Table 1). In bivariate analyses, reporting the ER/urgent care as one's usual source of medical care and receiving any drug treatment in the past year were significantly associated with interest in treatment. Among all types of drug-related services, previously receiving buprenorphine, inpatient treatment, outpatient treatment, detoxification or 12-step group services were each significantly associated with treatment interest.

### *3.2 Multivariate analyses*

The first regression model included demographic characteristics of participants (Table 2a). Adjusting for these variables, female gender and younger age were significantly and positively associated with interest in treatment. The second model added social factors (Table 2a). In this model, gender and age remained significant and no other associations were significant. The third model added drug use behaviors (Table 2a). In this model, gender and age remained significant and no other associations were significant.

The fourth model added drug use consequences (Table 2b). In this model, gender and age remained significant. Methamphetamine use in the past three months was significantly negatively associated with interest in treatment, and having an abscess in the past year was significantly positively associated with interest in treatment. The fifth model added factors related to access and use of health care services (Table 2b). In this model, gender, age, methamphetamine use, and having an abscess retained their significant associations.

Pharmaceutical opioid use in the past three months was significantly negatively associated with interest in treatment, and receiving any drug treatment in the past year was significantly positively associated with interest in treatment.

## **4. Discussion**

### *4.1 Overview of findings*

The majority of participants in this study reported that they were either somewhat or very interested in treatment (77.6%). This finding lends further support to the idea that SEP clients are an important population to target for substance use treatment, and that SEPs are useful sites for connecting PWID to treatment services. This finding also suggests that barriers to entering treatment may exist for this population, as many participants were interested in getting help to reduce their use but not currently enrolled in treatment; 14% of all survey respondents were currently in treatment and excluded from this analysis. In multivariate analyses, treatment interest was independently positively associated with female gender, having an abscess in the past year, and having received treatment services in the past year. Interest was negatively associated with older age and using methamphetamine or pharmaceutical opioids in the past three months.

### *4.2 Demographic and social factors*

Female gender was significantly associated with interest in treatment in all multivariate models, and odds of being interested were 84% higher for females compared to males in Model 5 (AOR=1.84; 95% CI: 1.07, 3.13; p=.026). This finding reflects previous studies that found female gender to be positively associated with interest in treatment (Riley et

al., 2002), motivation for cessation (Trenz et al., 2012) and treatment entry (Kerr et al., 2005; Latkin et al., 2006, Schutz et al., 1994; Shah et al., 2000), suggesting that men may be an important target population for treatment engagement interventions. Older age was significantly negatively associated with interest in treatment in all models; in Model 5 a ten-year increase in age corresponded to a 24% decrease in odds of being interested (AOR=0.76; 95% CI: 0.58, 0.99; p=.043). This finding differs from previous studies that found older age to be positively associated with treatment interest (Riley et al., 2002) and treatment entry (Fairbairn et al, 2012; Reynoso-Vallejo, 2008; Shah et al., 2000; Shin et al., 2007). This difference may suggest a cohort effect, given that there is now a group of young opioid users more likely to have access to and misuse pharmaceutical opioids. No other demographic or social factors were significant in any of the multivariate models.

#### *4.3 Drug use behaviors and consequences*

Recent methamphetamine use, reported by 73.1% of participants, was significantly negatively associated with interest in treatment; odds of being interested were 54% lower for participants who had used methamphetamines in the past three months in Model 5 (AOR=0.46; 95% CI: 0.25, 0.86; p=.015). To our knowledge, methamphetamine use has not previously been shown to be associated with treatment interest or motivation for change, however one study conducted in Bangkok, Thailand found that it was negatively associated with entry into methadone treatment (Fairbairn et al., 2012). Additionally, a study conducted in Washington State found that methamphetamine use was associated with poorer retention in methadone treatment for OUD (Banta-Green et al., 2009). These findings may be important, as there are indications that methamphetamine use is

increasing among heroin users (Al-Tayyib et al., 2017) and PWID in general (Glick et al., 2017). Future studies might examine why methamphetamine use may impact interest in substance use treatment for this population. One potential hypothesis may be that opioid users perceive, correctly or incorrectly, that they are ineligible or will be discharged from opioid treatment if they screen positively for methamphetamine use. Another possibility is that people who alternate use of methamphetamine and heroin experience some benefit from this pattern of use and do not want to discontinue.

Recent cocaine use was reported by 16.4% of participants, a relatively low proportion compared to historical data, but one that parallels national trends in declines in cocaine availability and use compared to a decade ago (U.S. Drug Enforcement Administration, 2017). Departing from some previous studies (Henderson et al., 2003; Riley et al., 2002), recent cocaine use (used separately from heroin) was not significantly associated with interest in treatment, however this could be an issue of statistical power given relatively low rates of cocaine use in this sample. We also examined speedball use (injecting cocaine and heroin together) separately, finding that this was not significantly associated with the outcome and did not impact other associations in multivariate models (data not shown). Recent use of pharmaceutical opioids was significantly negatively associated with treatment interest in Model 5; odds of being interested were 44% lower for participants who had used pharmaceutical opioids during the past three months (AOR=0.56; 95% CI: 0.33, 0.94; p=.028).

Among the drug use consequences that were examined, only having an abscess was significantly associated with interest in treatment; odds of being interested were 91% higher for participants who had an abscess in the past year in Model 5 (AOR =1.91; 95% CI: 1.10, 3.32;  $p=.022$ ). Patients receiving care for an injection-related abscess at SEPs or other clinical settings might be considered a potential target population to connect with substance use treatment services.

#### *4.4 Factors related to access and use of health care services*

Having received any treatment services (including methadone, buprenorphine, naltrexone, inpatient or outpatient treatment) in the past year was significantly associated with interest in treatment (AOR=6.37; 95% CI: 2.47, 16.40), reflecting findings from previous studies examining interest in treatment (Zule et al., 1997) and motivation for change (Henderson et al., 2003; Severtson et al., 2010). This finding suggests that relapse to use does not dissuade people from wanting treatment again, aligning with a view of OUD as a chronic disease that requires ongoing treatment to manage (Dennis & Scott, 2007). Although this study did not have enough power to examine distinct types of drug-related services in multivariate analysis, bivariate, unadjusted analyses suggested that past-year receipt of buprenorphine, inpatient or outpatient treatment, detoxification, or 12-step group services may be associated with interest in treatment. It was noteworthy that more people reported having used buprenorphine than methadone, potentially an indication of increasing use of buprenorphine in Washington State, despite documented challenges with implementation (Hutchinson et al., 2014).

It was somewhat surprising that having health insurance was not associated with treatment interest, as lack of insurance has been noted as a major barrier to treatment access (Appel et al., 2004). The study sample's lack of variability in this respect (84.5% were insured) due to high rates of eligibility and enrollment resulting from the Affordable Care Act, may have prevented detection of any association.

#### *4.5 Limitations*

This study has several limitations. The cross-sectional design prohibits our ability to make causal inferences, and observed associations should be viewed as exploratory. Generalizability of the study is limited to PWID who use SEP services in Washington State, and this group may systematically differ from PWID who do not use SEP services and people in other states and countries. The study population does not include people who use pharmaceutical opioids or heroin but do not inject. Additionally, the sample is mostly white (77%), limiting both generalizability to other races/ethnicities and our ability to detect associations between different races/ethnicities and interest in treatment, should these associations exist.

In collecting data at SEPs across Washington State, one aim of this study was to assess interest in treatment for a geographically diverse sample with better representation of PWID who reside in rural areas. However, application of the USDA Rural-Urban Commuting Area Codes to participants' zip code of residence/where they slept the night before revealed that the majority of the sample (82.0%) resided in metropolitan areas, defined as having at least 30% of primary commuting flow to an urbanized area

(Economic Research Service, 2016). Future research is needed to assess interest in treatment among people who use opioids outside of urban areas.

Interest in treatment was measured as interest in “getting help to cut down or quit using,” due to the potential for participants misunderstanding or having preconceived ideas about what the term “treatment” refers to. However, it is possible that some responses could have been misclassified if participants didn’t understand what this question was asking.

A lack of statistical power prevented us from examining the association between treatment interest and prior receipt of distinct types of drug-related services in multivariate analysis. Finally, this study does not address the actual availability of treatment services, and therefore cannot account for how treatment availability (or perceptions of availability) may impact interest in treatment. This question may be especially important to consider for engaging non-urban populations in treatment.

#### *4.6 Conclusion and next steps*

The purpose of this study was to examine factors associated with interest in getting help to cut down or cease drug use among out-of-treatment, opioid-using SEP clients across the state of Washington. This exploratory, cross-sectional analysis builds on existing research by exploring treatment interest among a more recent cohort of PWID compared to previous U.S. studies, with a higher proportion having initiated drug use in the era of widespread opioid prescribing and availability. Interest in treatment was highly prevalent (78%) and independently positively associated with female gender, having an abscess in

the past year, and having received treatment services in the past year. Interest was independently negatively associated with older age, using methamphetamine in the past three months, and using pharmaceutical opioids in the past three months.

These findings highlight that several subpopulations (e.g., men and persons with concurrent methamphetamine use) may be important to target in terms of increasing motivation for seeking treatment for OUD. Thus, these findings may be of interest to SEP staff, public health workers and health care providers who work to engage PWID who use opioids in substance use treatment, as well as policy makers looking to improve public health and safety and reduce health care costs among a population with high levels of morbidity, mortality and health care use. Future studies are needed in larger and more racially diverse populations of PWID in order to assess the generalizability of these findings. Mixed methods research may be needed to further understand why certain factors may be positively or negatively associated with treatment interest in this population. A better understanding of factors associated with interest in treatment among people who use opioids may eventually inform the design of treatment engagement interventions in SEPs and other settings, and support funding outreach work as part of the provision of substance use treatment services.

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## Tables

Table 1. Independent variables by interest in treatment

Characteristic	Not at all interested (%)		Somewhat/very interested (%)		Total (%)		p value <sup>a</sup>
	n=98	(22.4)	n=340	(77.6)	n=438	(100)	
Gender							0.003
Male	65	(66.3)	168	(49.4)	233	(53.2)	
Female	33	(33.7)	172	(50.6)	205	(46.8)	
Age (mean (SD))	37.7	(11.5)	34.8	(10.6)	35.4	(10.9)	0.027 <sup>b</sup>
Race							0.754 <sup>c</sup>
White	81	(82.7)	253	(74.4)	334	(76.3)	
Black/African American	1	(1.0)	5	(1.5)	6	(1.4)	
American Indian/Alaska Native	6	(6.1)	23	(6.8)	29	(6.6)	
Asian/Pacific Islander	1	(1.0)	5	(1.5)	6	(1.4)	
Latino/Hispanic	1	(1.0)	14	(4.1)	15	(3.4)	
Multiple	7	(7.1)	35	(10.3)	42	(9.6)	
Other	1	(1.0)	5	(1.5)	6	(1.4)	
Race recoded							0.091
White only	81	(82.7)	253	(74.4)	334	(76.3)	
Any non-white	17	(17.4)	87	(25.6)	104	(23.7)	
Income							0.458
\$0/month	53	(54.1)	190	(55.9)	243	(55.5)	
\$1-732/month	15	(15.3)	65	(19.1)	80	(18.3)	
\$733+/month	30	(30.6)	85	(25.0)	115	(26.3)	
Urbanicity of residence/place last slept							0.540 <sup>c</sup>
Metropolitan	77	(78.6)	282	(82.9)	359	(82.0)	
Micropolitan	18	(18.4)	45	(13.2)	63	(14.4)	
Small town	3	(3.1)	10	(2.9)	13	(3.0)	
Rural	0	(0.0)	3	(0.9)	3	(0.7)	
Housing status							0.375
Permanent	37	(37.8)	111	(32.7)	148	(33.8)	
Temporary/unstable	30	(30.6)	130	(38.2)	160	(36.5)	
Homeless	31	(31.6)	99	(29.1)	130	(29.7)	
Incarcerated in past year	35	(35.7)	146	(42.9)	181	(41.3)	0.201
Drug use in past 3 months <sup>d</sup>							
Cocaine	17	(17.4)	55	(16.2)	72	(16.4)	0.783
Methamphetamine	76	(77.6)	244	(71.8)	320	(73.1)	0.255
Benzodiazepines/other downers	27	(27.6)	101	(29.7)	128	(29.2)	0.679
Heroin	91	(92.9)	338	(99.4)	429	(98.0)	0.001 <sup>c</sup>
Pharmaceutical opioids	43	(43.9)	119	(35.0)	162	(37.0)	0.109
Length of injection drug use <sup>e</sup>							0.334
Less than 8 years	44	(44.9)	171	(50.4)	215	(49.2)	
8 years or longer	54	(55.1)	168	(49.6)	222	(50.8)	
Daily injector during past week <sup>e</sup>	72	(73.5)	272	(80.2)	344	(78.7)	0.149
Experienced overdose in past year	17	(17.4)	81	(23.8)	98	(22.4)	0.175
Witnessed overdose in past year	47	(48.0)	208	(61.2)	255	(58.2)	0.019
Abscess in past year	27	(27.6)	148	(43.5)	175	(40.0)	0.004
Skin or tissue infection in past year	21	(21.4)	87	(25.6)	108	(24.7)	0.400

Table 1 (continued)

Characteristic	Not at all interested (%)		Somewhat/very interested (%)		Total (%)	p value <sup>a</sup>
	n=98	(22.4)	n=340	(77.6)	n=438 (100)	
Primary health concern						0.094 <sup>c</sup>
Drug use	13	(13.3)	98	(29.0)	111 (25.5)	
Chronic physical condition	17	(17.4)	45	(13.3)	62 (14.2)	
Abscess or infection	7	(7.1)	32	(9.5)	39 (8.9)	
Blood-borne disease	9	(9.2)	26	(7.7)	35 (8.0)	
Pain	9	(9.2)	20	(5.9)	29 (6.7)	
Weight or nutrition	9	(9.2)	19	(5.6)	28 (6.4)	
Dental	6	(6.1)	16	(4.7)	22 (5.1)	
Mental health	2	(2.0)	11	(3.3)	13 (3.0)	
Other	9	(9.2)	23	(6.8)	32 (7.3)	
None	17	(17.4)	48	(14.2)	65 (14.9)	
Have health insurance	78	(79.6)	292	(85.9)	370 (84.5)	0.130
Type of health insurance						0.386 <sup>c</sup>
Medicaid	62	(63.3)	245	(72.1)	307 (70.1)	
Medicare	6	(6.1)	12	(3.5)	18 (4.1)	
Private	8	(8.2)	25	(7.4)	33 (7.5)	
Veteran's Affairs	1	(1.0)	2	(0.6)	3 (0.7)	
Tribal	1	(1.0)	7	(2.1)	8 (1.8)	
No insurance	20	(20.4)	49	(14.4)	69 (15.8)	
Usual source of medical care <sup>e</sup>						0.029
Clinic or doctor's office	41	(41.8)	135	(39.8)	176 (40.3)	
Emergency room or urgent care	38	(38.8)	169	(49.9)	207 (47.4)	
Haven't needed or don't go	19	(19.4)	35	(10.3)	54 (12.4)	
Drug-related services in past year <sup>d</sup>						
Any drug treatment <sup>f</sup>	5	(5.1)	88	(25.9)	93 (21.2)	0.000
Methadone	2	(2.0)	20	(5.9)	22 (5.0)	0.187 <sup>c</sup>
Buprenorphine	1	(1.0)	36	(10.6)	37 (8.5)	0.003
Naltrexone	0	(0.0)	1	(0.3)	1 (0.2)	1.000 <sup>c</sup>
Inpatient	1	(1.0)	33	(9.7)	34 (7.8)	0.005
Outpatient	2	(2.0)	34	(10.0)	36 (8.2)	0.011
Detoxification	3	(3.1)	46	(13.5)	49 (11.2)	0.004
12-step group	2	(2.0)	47	(13.8)	49 (11.2)	0.001
Other drug-related service <sup>g</sup>	0	(0.0)	2	(0.6)	2 (0.5)	1.000 <sup>c</sup>

<sup>a</sup>Pearson's  $\chi^2$  test used except where noted otherwise

<sup>b</sup>Two-sample  $t$  test used

<sup>c</sup>Fisher's exact test used (expected cell count < 5)

<sup>d</sup>Participants could select more than one category

<sup>e</sup>Missing one case (N=437)

<sup>f</sup>Includes methadone, buprenorphine, naltrexone, inpatient or outpatient treatment

<sup>g</sup>Other responses included "Oxford House" and "jail"

Table 2a. Logistic regression analysis of characteristics associated with interest in treatment: Models 1-3

Characteristic	Model 1			Model 2			Model 3		
	AOR	95% CI	<i>p</i> value	AOR	95% CI	<i>p</i> value	AOR	95% CI	<i>p</i> value
Female gender	1.86	1.16 - 3.01	0.010	1.89	1.17 - 3.06	0.010	1.93	1.18 - 3.17	0.009
Age (10-year increase)	0.80	0.65 - 0.98	0.033	0.81	0.66 - 0.997	0.046	0.75	0.59 - 0.96	0.020
Nonwhite race	1.72	0.93 - 3.17	0.083	1.74	0.94 - 3.22	0.077	1.77	0.94 - 3.32	0.077
Housing status									
Permanent (reference)				--	--	--	--	--	--
Temporary/Unstable				1.20	0.68 - 2.11	0.525	1.25	0.71 - 2.22	0.442
Homeless				0.87	0.49 - 1.56	0.651	0.95	0.53 - 1.70	0.860
Incarcerated past year				1.35	0.83 - 2.21	0.223	1.47	0.88 - 2.43	0.138
Cocaine use							1.05	0.54 - 2.05	0.887
Methamphetamine use							0.58	0.33 - 1.02	0.059
Pharmaceutical opioid use							0.74	0.45 - 1.20	0.218
8+ years of injection drug use							1.26	0.72 - 2.21	0.424
Daily injector past week							1.48	0.86 - 2.56	0.158

AOR adjusted odds ratio; CI confidence interval.

Table 2b. Logistic regression analysis of characteristics associated with interest in treatment: Models 4-5

Characteristic	Model 4			Model 5		
	AOR	95% CI	<i>p</i> value	AOR	95% CI	<i>p</i> value
Female gender	1.80	1.08 – 3.02	0.025	1.84	1.07 – 3.13	0.026
Age (10-year increase)	0.74	0.58 – 0.95	0.020	0.76	0.58 – 0.99	0.043
Nonwhite race	1.73	0.92 – 3.25	0.086	1.52	0.79 – 2.90	0.206
Housing status						
Permanent (reference)	--	--	--	--	--	--
Temporary/unstable	1.28	0.71 – 2.30	0.409	1.28	0.68 – 2.39	0.443
Homeless	0.90	0.50 – 1.62	0.717	0.98	0.53 – 1.81	0.948
Incarcerated past year	1.41	0.84 – 2.36	0.195	1.34	0.78 – 2.29	0.288
Cocaine use	0.94	0.48 – 1.85	0.856	0.93	0.46 – 1.88	0.838
Methamphetamine use	0.52	0.29 – 0.94	0.030	0.46	0.25 – 0.86	0.015
Pharmaceutical opioid use	0.64	0.39 – 1.05	0.076	0.56	0.33 – 0.94	0.028
8+ years of injection drug use	1.24	0.69 – 2.22	0.469	1.20	0.67 – 2.14	0.544
Daily injector past week	1.25	0.72 – 2.18	0.428	1.26	0.72 – 2.22	0.414
Experienced overdose past year	1.36	0.72 – 2.58	0.340	1.38	0.73 – 2.61	0.325
Witnessed overdose past year	1.40	0.87 – 2.26	0.166	1.50	0.90 – 2.52	0.122
Abscess past year	2.11	1.25 – 3.57	0.005	1.91	1.10 – 3.32	0.022
Have health insurance				1.46	0.73 – 2.89	0.282
Usual source of care						
Clinic/doctor's office (reference)				--	--	--
ER/urgent care				1.47	0.83 – 2.61	0.187
Haven't needed/don't go				0.61	0.28 – 1.34	0.219
Any drug treatment past year <sup>a</sup>				6.37	2.47 – 16.40	0.000

AOR adjusted odds ratio; CI confidence interval.

<sup>a</sup>Includes methadone, buprenorphine, naltrexone, inpatient or outpatient treatment