# Opioid misuse onset: Implications for intervention

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## Introduction

Opioid misuse (OM; e.g., prescription opioids and heroin) remains a national problem that has implications for public health, pain management, and addiction treatment. The Centers for Disease Control and Prevention (CDC) estimates that over 49,000 deaths involved opioids in 2017, an increase of over 500% since 1999 [1,2] Additionally, since 2005, the national rate of opioid-related inpatient hospital stays has increased by 64%, and the rate of opioid-related emergency department (ED) visits rose by 99% [3]. A recent federal report estimated the cost of the opioid crisis at $504 billion in 2015 [2.8% of gross domestic product;,4]. Despite growing concerns over the consequences of OM, the problem continues to worsen as over a million Americans are projected to begin misusing opioids in the next few years [5,6].

Although the rise in opioid-related deaths [7], treatment admissions [8], and ED visits [3] have been well-documented, less is known about opioid misuse initiation (OMI). Increased

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knowledge of OMI can inform prevention and treatment interventions, but relatively few studies explore this aspect of OM. The majority of opioid research examines factors related to current or lifetime use, not initial use. Furthermore, much of the literature on OM is derived from epidemiological data, which provides useful information on risk factors, but are not well-suited for describing the specific circumstances under which OMI occurs.

When individuals are asked why they started using a particular drug, they typically do not point to a singular factor, but rather tell a story explaining the circumstances surrounding their initiation [9]. Initiation narratives typically include descriptions of background (e.g., use motivations, low self-control) and situational factors (e.g., sources of drugs, peer influences), and can help identify common pathways that facilitate drug misuse [10]. As such, studies that analyze OMI narratives have the potential to shed new light on the etiology of opioid use disorders (OUDs) by arranging risk factors into storylines that help identify points of intervention.

How an individual initiates OM is a logical place to begin explaining OUDs. In fact, insights into the origins of substance use disorders (SUDs) are the foundation for designing effective prevention interventions and individualizing treatment [9]. Drug use initiation is an important life event that can typically be recalled with vivid detail [11]. The initiation experience may also set the stage for subsequent use, as positive experiences may provide rationale for continued experimentation and eventual chronic use. Furthermore, the greatest opportunity for early intervention exists following initial drug use. Research underscores the importance of early intervention by showing that treatment outcomes tend to be more favorable for users with shorter "drug careers," as opposed to those with extensive histories [12]. Describing factors related to OMI, as well as the contexts in which it occurs is important for developing OUD interventions.

Much of the research on OMI has centered on the timing of initiation, with some studies pointing to adolescence/young adulthood as a high-risk time for onset [13], although others have noted misuse beginning later in life [14]. One study [15] classified two distinct OMI patterns, which they termed early and later onset. "Early onset" described OM that began in middle/high school, with onset often coinciding with first use of alcohol or marijuana. The "later onset" pattern usually took the form of misusing opioids *after* using street stimulants (e.g., cocaine, ecstasy) to "take the edge off" or "come down." Overall, however, the literature strongly suggests most OMI tends to occur during adolescence or young adulthood [16–19].

Other studies have highlighted the normalization of OM in social settings [20], current use of illicit drugs [21], exposure to opioids through medical channels [18], and mental health problems [22,23] as being important risk factors for initiation. In addition, there is considerable evidence that OM often begins with prescription opioids, rather than heroin [24–26], a notion broadly reflected in popular narratives of the contemporary opioid crisis [27]. However, recent data suggest dramatic increases in use of heroin at OMI, which is concerning because of the dosing imprecision inherent in heroin use and limited tolerance among opioid novices [28].

### The Current Study

The current study responds to the need to better understand OMI [29–31]. A better understanding of how individuals begin their OM may help tailor interventions to the unique needs of persons with OUDs. The goals of the current study, therefore, were to: 1) describe the age patterns of OMI, 2) identify the opioid most commonly used at initiation and the source of the initial opioids, and 3) explore the narrative accounts of the circumstances surrounding the onset of OM.

## Methods

### Sample

Data for this study came from a multi-phase, mixed-method pilot project on social networks and OM in southwest Pennsylvania, funded by the Social Science Research Institute at the Pennsylvania State University (PSU). Participants were recruited from July 2017-July 2018. Adults (age 18+) who reported past year OM (either heroin or prescription opioids) and lived in one of four counties in southwestern Pennsylvania (Allegheny, Fayette, Green, and Washington) were eligible to participate. These counties were demographically diverse and spanned the rural-urban continuum. They were selected because they have an active OM profile and experienced a sharp five-year rise in opioid deaths (see Table 1 below), driven largely by increased heroin use and economic hardships in the region. Additionally, these counties are adjacent to Ohio and West Virginia, two states often considered to be "ground zero" for the current opioid crisis in the United States [32,33]. Table 1 contains a breakdown of our target counties according to their relevant population characteristics. All study procedures were reviewed and approved by PSU's Institutional Review Board.

### Procedures

Sampling protocols were designed to enable the use of respondent-driven sampling [RDS; 34], but also allowed flexibility to fall back onto a targeted sampling design [35,36] if needed. We ultimately used a blended approach that allowed respondents to recruit peers using RDS coupons but also relied on a diverse set of targeted recruitment strategies, such as advertising in local drug treatment clinics, halfway houses, and public locations including laundromats, community health clinics, bus stops, and online via Craigslist and Facebook. We also allowed word of mouth recruitment (which resulted in 17 respondents) and did not dismiss potential respondents that lacked the official RDS recruitment coupons (5 respondents).

From July 2017 to July 2018, we recruited 125 survey respondents, which is within the typical range for studies of hidden populations [21]. We asked all participants to complete a survey (n=125) that included a battery of questions pertaining to demographics, substance use, social networks, and a range of risk factors. Survey question wording and response anchors were modelled from the National Survey on Drug Use and Health, but other questions on specific topics were also asked. Respondents were compensated $25 for their participation in the survey portion of the study. Following the survey, respondents were invited to participate in a semi-structured, in-depth interview to collect more detailed information on their drug use history. Thirty respondents accepted this invitation and

each was paid an additional $25 for completing the interview. As part of the interview, participants were asked open-ended questions regarding the onset of their OM (e.g., How did your opioid use start? What was going on in your life when you first began using opioids?). Interviews typically lasted 60 minutes and were conducted by one of the authors in locations such as treatment centers, coffee shops, and public libraries.

### Analysis

Each interview was recorded using a digital voice recorder. The audiotaped interview was then transcribed verbatim and imported into NVivo, a qualitative data analysis computer software program. Initial coding consisted of highlighting commonly used words and phrases and locating initial themes. After initial coding was complete, a more selective coding process was used. The most frequently occurring initial codes were used to sort, synthesize, and conceptualize the data [37]. In the final step, excerpts from study participants were chosen to illustrate each theme. The themes related to OMI were the focus of this analysis. All names are pseudonyms. Statistics on demographic and substance use characteristics were computed using SAS 9.4.

## Results

### Demographic Characteristics

Demographic characteristics of the whole sample and the subset of interview participants are displayed in Table 2. The sample consisted of 125 participants. Reflecting the racial demographics of Pennsylvania overall and our sample counties, the majority of respondents (81.6%) were non-Hispanic white. Two-thirds (66%) were male, the mean age was 34 (range 20–62), and about half (48%) had a high school degree or less. The vast majority were unmarried (only 6.4% married), but about one-third reported living with a partner. Over half (57%) were employed, but most (72%) had annual incomes of less than $30,000, and the majority (56%) were insured through Medicaid or another government health insurance program. The majority (85.6%) came from Allegheny County, and about two-thirds (69%) reported living in their county of residence for more than 10 years. There were neither substantively important nor statistically significant differences between the larger survey sample and interviewees.

### Substance Use Characteristics

Substance use characteristics for the whole sample and the subset of interviewees are displayed in Table 3. Most survey respondents reported past-year heroin use (82.4%), and just under two-thirds (61.6%) reported past year prescription OM. Among recent prescription opioid misusers (past 30 days) (N=27), 15% misused painkillers every day and 22% misused them a few times a week. Prescription opioids were most commonly acquired from friends or family members (via gift, purchase, or theft [72.7%]), whereas 46.8% reported getting the opioids they misused from one or more physicians, and 48.1% reported purchasing them from a dealer/stranger. Although most participants reported multiple routes of administration, the most popular methods of ingesting prescription opioids were oral (86.6%) and intranasal (77.3%), whereas intravenous (73.8%) and intranasal (89.7%) were most often used to administer heroin. Of the 79 respondents who reported heroin use or

prescription OM in the past 30 days, poly-substance use was high; nearly all (95%) reported using other substances in addition to opioids in the past 30 days. Alcohol (63.3%) and marijuana (51.9%) were the most commonly used substances in addition to opioids, but non-trivial shares of respondents also used powder cocaine (41.8%), crack cocaine (41.8%), and prescription sedatives/tranquilizers (43.0%).

Almost all OMI (either prescription opioids or heroin) occurred prior to age 25. First prescription OM most often occurred in adolescence (29% before age 18) or young adulthood (45% between ages 18 and 25). Similar results were found for heroin use initiation, with almost half (48%) starting during young adulthood (ages 18–25). However, only 14% started using heroin prior to age 18. Consistent with previous studies [25,26,38], the most common opioid of initiation was prescription opioids, with 81.2% of respondents who have ever used both heroin and prescription opioids reporting using prescription opioids first, and 16.8% reporting using heroin first.

### Qualitative Findings on Opioid Misuse Initiation

**Timing of initiation and early-age exposure to family member use**—Although OMI usually occurred prior to age 25, interviewees consistently referenced even earlier exposure to drug use from family members or friends. Participants repeatedly (N=23) reported having a peer or caregiver in their childhood who had a substance use problem. Stories from childhood of witnessing one of these people selling, preparing, or using drugs were very common. Being exposed to others' substance use at an early age was often cited as a turning point for OMI and of drug use in general. This was largely because it made participants curious about using drugs and/or normalized its use. Such drug use often served as a behavioral exemplar for participants in childhood and created an impression that using drugs was an acceptable recreational activity or method of dealing with problems. This early exposure to substance use cast opioids and other drugs in a light that made such behavior appear benign, commonplace, or even fun. In some cases, participants reported initiating OM directly because of a family member.

It is important to note that interviewees universally reported initiating OM only after previously starting their substance use career with another drug (e.g., alcohol, marijuana, cocaine). Opioids were never the first drug used, suggesting that OMI is likely associated with being further along in one's drug using career. The fact that participants were already using other drugs is important because it appeared to help alleviate reservations about "graduating" up to opioids, which were usually viewed as a "harder," stronger drug than the ones they were already using. In fact, decisions to try opioids for the first time were sometimes made while being under the influence of other substances, especially alcohol.

### Acquiring Opioids at Initiation

There were several ways that opioids were acquired at initiation. Friends, acquaintances, or romantic partners were the most common sources of opioids at initiation; 56% of interviewees reported they obtained their first prescription opioid from a friend or family member, and 70% reported initially getting heroin from a friend or family member. Interestingly, participants in these cases rarely reported paying for the drug at initiation.

Opioids were given to them at no cost to try for the first time. The person sharing their opioids typically obtained the drug via their own prescription for analgesic medications or personal supply of heroin.

Only a quarter of interviewees reported gaining access to the prescription opioids they initially misused through a health care provider. Reasons given for initially visiting their doctor included pain related to a tooth extraction or surgery. Once their pain subsided or they finished their pills prematurely, these interviewees typically attempted to feign symptoms to acquire more pain medication. Receiving a prescription from a doctor was viewed as a preferred source because it could potentially provide continuous access to a high volume of opioids. Another way of acquiring opioids at initiation was through theft (N=6). In this category, initiation narratives included taking prescription opioids from a family member/ friend without their knowledge. The scenario would typically involve the user knowing an individual with a legitimate prescription for opioids, but who did not use their entire supply of pills.

**Motivations for Initiating Opioid Misuse**—Three main motives were reported for OMI. The first reason (N=14) was to cope with mental health problems and stressors in their life, both proximal and distal. Among the stressors most commonly reported as contributing to OMI were adverse childhood experiences and relationship problems. The psychological escape from these problems that opioids (and other drugs) bestowed were highly desired and a reason for OMI and continued use. Ironically, although opioids were perceived to help them cope with their problems, some of these issues were directly caused or exacerbated by drug use. The overarching theme was that although participants began using substances prior to their OMI, opioids were viewed as another (sometimes more effective) means of coping with psychological symptoms and the adversity of their life circumstances.

Only about one-quarter of interviewees reported that they started misusing opioids for pain relief (N=7). The defining characteristic of this initiation pattern was contact with the healthcare system. For these participants, doctors prescribed opioid analgesics to relieve pain, but during treatment, participants felt an accompanying state of well-being and euphoria that was appealing. Although they began using substances prior to being prescribed opioids, their first opioid high was within the context of medical intervention for pain. Their initial contact with prescription opioids was for a legitimate medical issue and the unexpected intoxication was viewed as a pleasant surprise. It is important to note that persons in this category did not suffer from chronic pain such as arthritis or pain due to cancer, but rather experienced acute symptoms, such as injury-related or postoperative pain.

Though not always explicitly stated, the final motive for OMI (N=16) was experimentation or the desire for a novel psychoactive experience. Typically, such individuals reported a substantial history of other illicit drug use and often named an entirely different substance (cocaine, methamphetamine) as their "drug(s) of choice." This "experimental" initiation pattern was defined by the absence of a specific motivation prior to opioid exposure. Instead, initiation occurred as a consequence of social access, boredom, and, perhaps, the absence of internal or external opposition.

## Discussion

This study responds to the need to better understand OMI [29–31]. The research reported here used a mixed-methods approach to examine OMI. Given that OMI is a process rather than a static condition, a mixed methods approach allowed for a fuller understanding of OMI than would have been possible using a survey alone. These findings add to the overall picture of OM by contributing to our understanding of when and how persons begin misusing opioids. Although drug use initiation has been extensively studied [11,39], there is less research, mixed methods or otherwise, that specifically examines OMI.

Our findings indicate that OMI most often takes places in young adulthood, regardless of the opioid used at initiation. The next most common age group for OMI was adolescence (before age 18); this again was irrespective of whether heroin or prescription opioids was the initiating opioid. These findings are consistent with other studies that found OMI to occur in adolescence/young adulthood [13,15]. Our results, however, provide additional context on OMI. We found that although OMI tended to occur at a relatively young age, our sample reported using a variety of other drugs (typically for years) before trying opioids. This suggests that OMI is associated with being at a more advanced stage in one's drug use career, despite the relatively young age at which OM begins. Additionally, we found that early-age exposure to a family member's drug use appears to be associated with OMI and drug use in general. This finding sheds light on the type of childhood events that confer risk of OMI, as early exposure to drugs appears to be one foundation for vulnerability to OM. This also raises concerns about the magnitude of the intergenerational effects of the opioid crisis; if the children of current opioid misusers are at increased risk of misuse as they age into adolescence and young adulthood, we may see OM and mortality continue to rise in the coming decade.

Our results also provide valuable data on which type of opioid tends to be used at initiation (heroin vs. prescription opioids). This has been a current topic of conversation in the literature [28,40], especially since a recent report [41] documented a four-fold increase in the use of heroin as an initiating opioid from 2005 to 2015. That same report using treatment admissions data also found that heroin as an initiating opioid now exceeded both hydrocodone and oxycodone. Our findings, however, contrast with this report as the vast majority of our sample (81.2%) reported misusing prescription opioids first. One possible explanation for the difference in findings is that our study used a smaller regional sample of nonmedical opioid users, whereas Cicero and colleagues used a national sample of individuals seeking treatment for OUD. Our data are more in line with other studies that document prescription opioids being used at initiation [25,26,38].

Our findings also shed light on how persons acquire opioids at initiation. The vast majority of studies [42,43] examine current methods of acquiring opioids (not how opioids are obtained at initiation), which forces us to speculate on how users initially gained access to the opioids they misused. We found that most users initially gained access to opioids via sharing/trading among friends. Other studies have similarly documented users acquiring opioids in this way [25]; however, our data suggest sharing/trading opioids among peers is particularly common at OMI. Interventions, especially those that are peer-led, would do

well to emphasize the health risks of giving opioids to another person. Heroin [44] and counterfeit pain pills [45] can be adulterated with fentanyl and other synthetic analogues that increase the likelihood of adverse reactions (e.g., overdose, death). Additionally, in some states, people who use opioids have faced criminal charges when the opioid they distribute results in death or harm to the recipient who ingested it [46].

Also revealed in these data was how OMI can occur among drug users who receive opioid therapy for legitimate pain management, highlighting the complexities of treating pain among persons with prior drug use histories. Although previous studies have shown a connection between prior drug use and OMI within a pain-management context [47,48], a fuller understanding of how OMI transpires is provided by our data. Given that warranted therapeutic opioid use does, in some cases, lead to OMI (sometimes referred to as "medical initiation"), prescribers should be informed about the potential risks of how this might occur [49]. This initiation pattern, albeit less common than other OM pathways, underscores the importance of proper screening for SUDs prior to prescribing opioids and demonstrates how contact with the healthcare system can be a starting point for OM and an opportunity for SUD intervention.

Additionally, because we examined some of the motives for initiating OM, the data presented in this study have the potential to inform clinicians and harm reduction workers who use motivational interviewing to reduce OM. This client-centered approach to counseling seeks to engage the client's intrinsic motivations to elicit behavior change by exploring and resolving ambivalence within the client [50]. Motivational interviewing has experienced increased popularity within the field of addiction counseling and harm reduction, largely due to its efficacy as a method of behavior change [51,52]. Because the overall goal is to help the client understand and resolve their competing drug use motivations (the motivation to continue using vs. the motivation to cease/reduce drug use), the findings presented here provide insights into the motivational forces that compel some individuals to initiate OM. This increased knowledge can better enable clinicians to facilitate a resolution between both sides of the ambivalence impasse by better understanding some of the motivational factors that may compromise treatment or harm reduction efforts [53].

A few methodological issues warrant discussion. As with all self-report data, the possibility of recall bias should be considered. Given that face-to-face data collection methods were used, social desirability and interviewer bias may have been a possibility. We also acknowledge that some interviews were conducted in venues that were not completely private (e.g., coffee shops) which may have limited the candor of interviewees. However, these effects are believed to have been mitigated through the use of an experienced interviewer. Because this was a nonprobability sample from a select region, any generalizations should be made with caution. Also, please note this study did not consider biological factors, which can sometimes play a role in substance use initiation. Despite these limitations, these findings begin to fill an important void in the literature. Overall, our findings represent a step forward in understanding why and how OMI occurs. The various OMI patterns found in this study indicate the need for interventions to be tailored to specific groups. For example, interventions designed for persons who initiate OMI to help cope with psychological distress should be differentiated from those who begin as a

result of pain management [49]. Although additional OMI research is needed, preferably with nationally representative data, these data can be used to inform new interventions, as well as to tailor existing ones aimed at high-risk populations. These findings provide insights to drug treatment providers, prescribers, and public health professionals in identifying who is at risk for OMI, and more importantly, when and how to intervene most effectively.

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**Table 1.**

Sample County Population Characteristics

| County | Total Pop.[a] | Population Aged 18–64[a] | Pop Density (res/sq mile)[a] | Percent Poverty[a] | Percent non-Hispanic White[a] | Hospitalizations for Drug Poisonings (per 100,000)[b] | Age-Adjusted Drug Overdose Death Rate (per 100,000)[c] |
|---|---|---|---|---|---|---|---|
| Allegheny | 1,230,360 | 781,321 (3.5%) | 1685 | 12.8 | 79.4 | 76.1 | 37.2 |
| Fayette | 134,229 | 81,981 (1.1%) | 170 | 18.6 | 92.3 | 70.7 | 44.7 |
| Greene | 37,669 | 24,036 (3.8%) | 65 | 15.3 | 92.6 | 35.1 | 43.1 |
| Washington | 208,269 | 127,501 (1.3%) | 243 | 10.1 | 92.8 | 62.5 | 39.6 |
| PA Overall | 12,783,977 | 7,946,462 (2.2) | 286 | 13.4 | 77.7 | 64.6 | 28.6 |

Sources:

[a]U.S. Census Bureau, American Community Survey 5-year estimates (2012–16) (US Census Bureau 2017);

[b]Pennsylvania Health Care Cost and Containment Council (years 2016–17)

[c]CDC WONDER Online Database, Underlying Cause of Death (years 2014–16) (Centers for Disease Control and Prevention 2017)

**Table 2.**

Demographic Characteristics for the Full Sample and Subset of Interviewees

| | Overall (N=125) | | | | Interview Sample (N=30) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Min | Max | Mean | SD | Min | Max | t | p<t | |
| Age | 34.5 | 8.7 | 20 | 62 | 31.8 | 7.4 | 20 | 51 | 2.17* | | |
| Number of other adults living in household | 1.4 | 1.3 | 0 | 7 | 1.3 | 1.1 | 0 | 4 | 0.40 | | |
| Number of children <18 living in household | 0.5 | 1.1 | 0 | 5 | 0.7 | 1.0 | 0 | 5 | −0.92 | | |
| | Percent | | | | Percent | | | | Chi-Sq | p<Chi-Sq | |
| Sex | | | | | | | | | 3.15 | 0.207 | |
| Male | 66.4 | | | | 56.7 | | | | | | |
| Female | 32.0 | | | | 43.3 | | | | | | |
| Other | 1.6 | | | | 0.0 | | | | | | |
| Race | | | | | | | | | 5.39 | 0.250 | |
| Non-Hispanic White | 81.6 | | | | 80.0 | | | | | | |
| Non-Hispanic Black | 11.2 | | | | 6.7 | | | | | | |
| Asian | 0.8 | | | | 3.3 | | | | | | |
| Hispanic | 3.2 | | | | 6.7 | | | | | | |
| Other/Mixed | 3.2 | | | | 3.3 | | | | | | |
| Relationship Status | | | | | | | | | 5.17 | 0.396 | |
| Married | 6.4 | | | | 6.7 | | | | | | |
| Divorced/separated | 9.6 | | | | 10.0 | | | | | | |
| Unmarried but living with partner | 32.8 | | | | 46.7 | | | | | | |
| In relationship but not living with partner | 11.2 | | | | 3.3 | | | | | | |
| Not in a relationship | 39.2 | | | | 33.3 | | | | | | |
| Widowed | 0.8 | | | | 0.0 | | | | | | |
| Educational Attainment | | | | | | | | | 6.29 | 0.179 | |
| Did not complete high school | 6.4 | | | | 10.0 | | | | | | |
| High school diploma or GED | 41.6 | | | | 43.3 | | | | | | |
| Attended college but did not complete a degree | 26.4 | | | | 33.3 | | | | | | |
| 2-year college degree | 13.6 | | | | 13.3 | | | | | | |
| 4-year college degree | 12.0 | | | | 0.0 | | | | | | |

| | Overall (N=125) | | | | Interview Sample (N=30) | | | | t | p<t |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Min | Max | Mean | SD | Min | Max | | |
| Employment status (past 30 days) | | | | | | | | | 0.00 | 0.987 |
| Employed | 56.8 | | | | 56.7 | | | | | |
| Not employed | 43.2 | | | | 43.3 | | | | | |
| Total personal income (past year) | | | | | | | | | 2.89 | 0.410 |
| Less than $10,000 | 31.2 | | | | 43.3 | | | | | |
| $10,000–19,999 | 19.2 | | | | 13.3 | | | | | |
| $20,000–29,999 | 21.6 | | | | 23.3 | | | | | |
| $30,000 or more | 24.8 | | | | 20.0 | | | | | |
| Refused | 3.2 | | | | 0.0 | | | | | |
| Health insurance status | | | | | | | | | 3.73 | 0.443 |
| Not insured | 24.8 | | | | 20.0 | | | | | |
| Insured through employer or spouse's employer | 4.0 | | | | 0.0 | | | | | |
| Government insurance (e.g., Medicaid) | 56.0 | | | | 63.3 | | | | | |
| Veteran's Administration insurance | 2.4 | | | | 0.0 | | | | | |
| Other insurance (private, parents) | 12.8 | | | | 16.7 | | | | | |
| County of residence | | | | | | | | | 6.16 | 0.104 |
| Allegheny | 85.6 | | | | 73.3 | | | | | |
| Fayette | 4.0 | | | | 10.0 | | | | | |
| Greene | 3.2 | | | | 6.7 | | | | | |
| Washington | 7.2 | | | | 10.0 | | | | | |
| County duration of residence | | | | | | | | | 3.31 | 0.346 |
| Less than one year | 8.0 | | | | 13.3 | | | | | |
| 1 to 5 years | 14.4 | | | | 16.7 | | | | | |
| 6 to 10 years | 8.8 | | | | 13.3 | | | | | |
| More than 10 years | 68.8 | | | | 56.7 | | | | | |

*Note*: Tests for difference (t-test and Chi-Square) compare the survey+interview sample to the survey-only sample.

**Table 3.**

Substance Use Characteristics for the Full Sample and Subset of Interviewees

| | Overall Sample (N=125) | | Interview Sample (N=30) | | Tests for Difference | |
|---|---|---|---|---|---|---|
| | N | Percent | N | Percent | Chi-Sq | p<ChiSq |
| **PRESCRIPTION OPIOID MISUSE** | | | | | | |
| Last prescription opioid misuse | | | | | 1.30 | 0.523 |
| Within past 30 days | 27 | 21.6 | 4 | 13.3 | | |
| More than 30 days ago but within past 12 months | 50 | 40.0 | 12 | 40.0 | | |
| More than 12 months ago | 42 | 33.6 | 11 | 36.7 | | |
| Never misused Rx opioid | 6 | 4.8 | 3 | 10.0 | | |
| ***Among those who ever misused Rx opioids*** | N=119 | | N=27 | | | |
| Age at first Rx opioid misuse | | | | | 2.92 | 0.404 |
| Under 18 | 35 | 29.4 | 7 | 25.9 | | |
| 18 to 25 | 54 | 45.4 | 15 | 55.6 | | |
| Older than 25 | 28 | 23.5 | 4 | 14.8 | | |
| Unknown | 2 | 1.7 | 1 | 3.7 | | |
| Ways ever misused Rx opioids [a] | | | | | | |
| Consumed tablet or capsule orally | 103 | 86.6 | 23 | 85.2 | 0.06 | 0.813 |
| Smoked | 19 | 16.0 | 4 | 14.8 | 0.03 | 0.853 |
| Intranasal | 92 | 77.3 | 19 | 70.4 | 0.96 | 0.327 |
| Transdermal (fentanyl patch) | 30 | 25.4 | 5 | 18.5 | 0.88 | 0.348 |
| Injected with needle | 32 | 26.9 | 7 | 25.9 | 0.02 | 0.898 |
| How did R obtain Rx opioids very first time ever misused? | | | | | 8.16 | 0.148 |
| Prescribed to respondent by physician or other HCP | 46 | 38.7 | 7 | 25.9 | | |
| Given to respondent by friend or family member | 45 | 37.8 | 15 | 55.6 | | |
| Respondent purchased or stole from friend/family member | 22 | 18.5 | 3 | 11.1 | | |
| Purchased from dealer/stranger or some other way | 6 | 5.0 | 2 | 7.4 | | |
| ***Among those reporting Rx opioid misuse in past 12 months*** | N=77 | | N=15 | | | |
| Sources for obtaining Rx opioids in past 12 months [a] | | | | | | |
| Prescribed by one or more doctors | 36 | 46.8 | 9 | 60.0 | 1.20 | 0.274 |

| | Overall Sample (N=125) | | Interview Sample (N=30) | | Tests for Difference | |
|---|---|---|---|---|---|---|
| | N | Percent | N | Percent | Chi-Sq | p<ChiSq |
| From a friend or family member (given, purchased, or stolen) | 56 | 72.7 | 11 | 73.3 | 0.00 | 0.973 |
| Did a favor for someone or traded something for the Rx opioids | 21 | 27.3 | 5 | 33.3 | 0.30 | 0.582 |
| Purchased from dealer/stranger | 37 | 48.1 | 7 | 46.7 | 0.03 | 0.862 |
| Some other way | 7 | 9.1 | 0 | 0.0 | 1.90 | 0.169 |
| *Among those reporting Rx opioid misuse in past 30 days* | N=27 | | N=4 | | | |
| Frequency of Rx opioid misuse in past 30 days | | | | | 3.18 | 0.365 |
| Every day | 4 | 14.8 | 1 | 25.0 | | |
| A few times a week | 6 | 22.2 | 2 | 50.0 | | |
| About once a week | 4 | 14.8 | 0 | 0.0 | | |
| Once or twice | 13 | 48.2 | 1 | 25.0 | | |
| HEROIN USE | | | | | | |
| Last heroin use | | | | | 1.41 | 0.494 |
| Within past 30 days | 68 | 54.4 | 18 | 60.0 | | |
| More than 30 days ago but within past 12 months | 35 | 28.0 | 9 | 30.0 | | |
| More than 12 months ago | 4 | 3.2 | 0 | 0.0 | | |
| Never used heroin | 18 | 14.4 | 3 | 10.0 | | |
| *Among those who ever used heroin* | N=107 | | N=27 | | | |
| Age at first heroin use | | | | | 3.89 | 0.273 |
| Under 18 | 15 | 14.0 | 4 | 14.8 | | |
| 18 to 25 | 52 | 48.6 | 17 | 62.9 | | |
| Older than 25 | 39 | 36.5 | 6 | 22.2 | | |
| Unknown | 1 | 0.9 | 0 | 0 | | |
| Ways ever used heroin [a] | | | | | | |
| Smoked | 29 | 27.1 | 6 | 22.2 | 0.44 | 0.509 |
| Intranasal | 96 | 89.7 | 24 | 88.9 | 0.03 | 0.869 |
| Injected with needle | 79 | 73.8 | 20 | 74.1 | 0.00 | 0.974 |
| How did R obtain heroin very first time ever used? | | | | | 3.09 | 0.543 |
| Given to respondent by friend, family member, or someone they knew well | 66 | 61.7 | 19 | 70.4 | | |
| Respondent purchased or stole from friend/family member, or someone they knew well | 14 | 13.1 | 4 | 14.8 | | |

| | Overall Sample (N=125) | | Interview Sample (N=30) | | Tests for Difference | |
|---|---|---|---|---|---|---|
| | N | Percent | N | Percent | Chi-Sq | p<ChiSq |
| Purchased from dealer | 23 | 21.5 | 4 | 14.8 | | |
| Some other way | 4 | 3.7 | 0 | 0.0 | | |
| **_Among those reporting heroin use in past 12 months_ [a]** | N=103 | | N=27 | | | |
| Sources for obtaining heroin in past 12 months [a] | | | | | | |
| From a friend or family member (given, purchased, or stolen) | 71 | 68.9 | 18 | 66.7 | 0.09 | 0.767 |
| Did a favor for someone or traded something for the Rx opioids | 47 | 45.6 | 13 | 48.2 | 0.09 | 0.760 |
| Purchased from dealer/stranger | 89 | 86.4 | 23 | 85.2 | 0.05 | 0.829 |
| Some other way | 2 | 1.9 | 1 | 3.7 | 0.60 | 0.440 |
| **_Among those reporting heroin in past 30 days_** | N=68 | | N=18 | | | |
| Frequency of heroin use in past 30 days | | | | | 0.70 | 0.873 |
| Every day | 33 | 48.5 | 8 | 44.4 | | |
| A few times a week | 22 | 32.4 | 6 | 33.3 | | |
| About once a week | 5 | 7.4 | 1 | 5.6 | | |
| Once or twice | 8 | 11.8 | 3 | 16.7 | | |
| **_Among those reporting both heroin use and Rx opioid misuse (ever)_** | N=101 | | N=24 | | | |
| Which did respondent use first? | | | | | 3.98 | 0.137 |
| Used Rx opioids first | 82 | 81.2 | 17 | 70.8 | | |
| Used heroin first | 17 | 16.8 | 5 | 20.8 | | |
| Started using both around the same time | 1 | 1.0 | 1 | 4.2 | | |
| Unknown | 1 | 1.0 | 1 | 4.2 | | |
| **_Among those reporting either heroin use or Rx opioid misuse in past 30 days_** | N=79 | | N=19 | | | |
| Use of other substances in the past 30 days [a] | | | | | | |
| Alcohol | 50 | 63.3 | 10 | 52.6 | 2.49 | 0.288 |
| Marijuana | 41 | 51.9 | 7 | 36.8 | 8.99 | 0.029 |
| Powder Cocaine | 33 | 41.8 | 6 | 31.6 | 2.25 | 0.523 |
| Crack Cocaine | 33 | 41.8 | 7 | 36.8 | 3.61 | 0.307 |
| Methamphetamine | 16 | 20.3 | 4 | 21.1 | 0.13 | 0.989 |
| Rx Sedative or Tranquilizer Misuse | 34 | 43.0 | 8 | 42.1 | 0.94 | 0.817 |

| | Overall Sample (N=125) | | Interview Sample (N=30) | | Tests for Difference | |
|---|---|---|---|---|---|---|
| | N | Percent | N | Percent | Chi-Sq | p<ChiSq |
| Rx Stimulant Misuse | 7 | 8.9 | 3 | 15.8 | 1.53 | 0.676 |
| Any of these substances in the past 30 days | 75 | 94.9 | 17 | 89.5 | 1.55 | 0.213 |

*Note*: Chi-Square tests compare the survey+interview sample to the survey-only sample; two-tailed tests

[a]Percentages exceed 100 because respondents were asked to select all that apply