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Initiation into Prescription Opioid Misuse among Young Injection Drug Users

Stephen E. Lankenau[1], **Michelle Teti**[2], **Karol Silva**[1], **Jennifer Jackson Bloom**[3], **Alex Harocopos**[4], and **Meghan Treese**[3]

[1]Drexel University, School of Public Health, Department of Community Health and Prevention, 1505 Race Street, 11th floor, Philadelphia, PA 19102

[2]University of Missouri, School of Health Professions, 506A Lewis Hall, Columbia, MO 65211

[3]Childrens Hospital Los Angeles, Division of Research on Children, Youth and Families, 6430 Sunset Boulevard, Suite 1500, Los Angeles, CA 90028

[4]National Development and Research Institutes, Inc., 71 West 23rd Street, 4th floor, New York, NY 10010

Abstract

Background—Prescription opioids are the most frequently misused class of prescription drugs among young adults. Initiation into prescription opioid misuse is an important public health concern since opioids are increasingly associated with drug dependence and fatal overdose. Descriptive data about initiation into prescription opioid misuse among young injection drug users (IDUs) are scarce.

Methods—An exploratory qualitative study was undertaken to describe patterns of initiation into prescription opioid misuse among IDUs aged 16 to 25 years. Those young IDUs who had misused a prescription drug at least three times in the past three months were recruited during 2008 and 2009 in Los Angeles (n=25) and New York (n=25). Informed by an ethno-epidemiological approach, descriptive data from a semi-structured interview guide were analysed both quantitatively and qualitatively.

Results—Initiation into prescription opioid misuse was facilitated by easy access to opioids via participant's own prescription, family, or friends, and occurred earlier than misuse of other illicit drugs, such as heroin. Nearly all transitioned into sniffing opioids, most injected opioids, and many initiated injection drug use with an opioid. Motives for transitions to sniffing and injecting opioids included obtaining a more potent high and/or substituting for heroin; access to multiple sources of opioids was common among those who progressed to sniffing and injecting opioids.

Conclusion—Prescription opioid misuse was a key feature of trajectories into injection drug use and/or heroin use among this sample of young IDUs. A new pattern of drug use may be emerging whereby IDUs initiate prescription opioid misuse before using heroin.

Corresponding Author Stephen E. Lankenau, Ph.D., Drexel University, School of Public Health, Department of Community Health and Prevention, 1505 Race Street, 11th floor, Philadelphia, PA 19102, lankenau@drexel.edu, 215-762-2570 (phone), 215-762-4088 (fax).

Keywords

Prescription opioid misuse; young injection drug users

Introduction

Prescription drug misuse has increased significantly over the past decade in the U.S. (Johnston et al., 2010; SAMSHA, 2010a) and is most prevalent among young adults aged 18 to 25 years old (McCabe et al., 2009; SAMSHA, 2010a). Prescription opioids, such as hydrocodone and oxycodone, are the most frequently misused class of prescription drug among young adults (SAMHSA, 2010a). Furthermore, prescription opioids are among the most commonly used drugs at initiation into illicit drug use - second only to marijuana (SAMHSA, 2010a). Initiation into prescription opioid misuse is an important public health concern since opioids are increasingly associated with drug dependence (SAMSHA, 2008a; Weiss et al., 2010) and fatal overdose (Paulozzi & Xi, 2008; SAMSHA, 2010b).

Young injection drugs users (IDUs) – persons aged 30 and younger who currently inject drugs (e.g., Fuller et al., 2001; Roy et al., 2007; Page et al., 2009; Hagan et al., 2010) - are a particularly high-risk subgroup of adolescents and young adults (Thorpe et al., 2002; Davidson et al., 2002; Miller et al., 2004; Rondinelli et al., 2009). Young IDUs – whose lifetime prevalence of heroin has approached 100% in some studies (Ochoa et al., 2005; Havens et al., 2006) - are at increased risk for initiation and misuse of prescription opioids (SAMSHA, 2009b). Yet, a review of nearly 60 research articles focusing on young IDUs in North America, published since 2000 – the period covering the rapid rise in opioid misuse (SAMSHA, 2009c) - revealed only five manuscripts that reported data on prescription opioid misuse (Hagan et al., 2007; Lankenau et al., 2007a; 2007b; Firestone & Fischer, 2008; Evans et al., 2009). These studies provided only minimal descriptive data such as lifetime prevalence (Lankenau et al. 2007a), misuse in the past three months (Hagan et al., 2007; Evans et al., 2009), or anecdotal findings on initiation (Lankenau et al., 2007b; Finestone & Fischer, 2008). Hence, large gaps exist in the research literature concerning fundamental questions about prescription opioid misuse among young IDUs.

Two key characteristic of initiation - the drug and the mode of administration – are often studied to understand trajectories into increasingly risky types of drug use, such as transitions to injecting heroin or cocaine (Fuller et al., 2001; Sherman et al., 2002; Roy et al., 2003). Participants in these studies are typically polydrug users who report multiple initiation events during adolescence and young adulthood, e.g., first time smoked crack, first time sniffed heroin, first time injected heroin. Prior research indicates that studying initiation events among young IDUs contributes towards a fuller comprehension of emerging drugs (Lankenau & Clatts, 2004; Firestone & Fischer, 2008), user populations (Roy et al., 2002; Fuller et al., 2003), risk behaviours (Roy et al., 2003; Lankenau et al., 2010), social context (Harocopos et al., 2009; Goldsamt et al., 2010) and potential prevention and intervention strategies (Sherman et al., 2005; Miller et al. 2006). Towards this end, an exploratory qualitative study was undertaken to describe patterns of initiation into prescription drug misuse among young IDUs in Los Angeles and New York. Using descriptive and qualitative data, this manuscript addresses a number of unanswered questions, such as: at what age do young IDUs initiate misuse of prescription opioids compared to other illicit drugs; where do young IDUs obtain prescription opioids at initiation; why do young IDUs initiate prescription opioid misuse; what are the contextual factors at initiation; and how does this initiation fit into patterns of injection drug use and current drug use, including use of heroin?

Methods

The study design was informed by an ethno-epidemiological methodology (Agar, 1996; Clatts et al., 2002; Pach & Gorman, 2002) that utilises both quantitative data, i.e., frequencies and percentages, to describe broader patterns found within a study sample and qualitative data, i.e., narrative accounts, to provide contextualised details as reported by individual participants. This mixed method approach has been used previously to describe risk behaviours and patterns of substance misuse among smaller samples of high-risk youth (Lankenau et al., 2005; Lankenau & Sanders, 2007; Hathazi et al., 2009; Sanders et al., 2010).

Study Sample

IDUs (n=50) described in this analysis are a subgroup of a larger sample of 150 young adults -- 50 IDUs and 100 non-IDUs -- who were recruited in New York and Los Angeles as part of a study focused on non-medical prescription drug use. Prior to sampling, trained ethnographers from each site conducted a Community Assessment Process (CAP; Clatts et al., 1995), which recorded local knowledge about prescription drug misuse and determined the locations of groups of young IDUs. Following the CAP, ethnographers sampled young IDUs using a combination of targeted sampling (Watters & Biernacki, 1989) and chain referral sampling (Biernacki & Waldorf, 1981; Penrod et al., 2003). Using this approach, IDUs were sampled primarily from Union Square and the East Village in New York and from Venice and Hollywood in Los Angeles – areas known to attract a diverse population of young IDUs (Lankenau et al. 2007a).

A screening tool assessed IDUs for study eligibility based upon three criteria: aged between 16 and 25 years old; misused a prescription drug at least three times in the past three months; and had injected a drug within the past three months. Targeted prescription drugs included opioids, tranquillizers, and stimulants. “Prescription drug misuse” or “non-medical use” was defined to participants as: “drugs you may have used without a prescription, in greater amounts, administered differently, more often, or longer than prescribed, or for a reason other than a doctor said you should use them” (Blanco et al. 2007). All screened individuals received a $3 gift card.

In Los Angeles 25 IDUs were interviewed between September 2008 and May 2009. In New York 25 IDUs were interviewed between October 2008, and July 2009. Study procedures were approved by Children’s Hospital Los Angeles and National Development and Research Institutes, Inc. prior to implementation.

Data Collection

Ethnographers interviewed study participants using a semi-structured instrument. Interviews were programmed using Questionnaire Development Software (QDS), administered on laptop computers, and recorded with digital recorders. Ethnographers conducted interviews in semi-private settings, such as coffee shops or park benches, in the neighborhoods where participants were recruited. Following each interview, participants received $25 cash incentives and outreach information.

Measures

The semi-structured instrument consisted of three interview modules: history of prescribed medications; history of misuse of prescription and other drugs; and demographics. The instrument was a combination of structured questions, e.g., “How old were you the first time you misused Vicodin?” and qualitative follow-up probes and questions, e.g., “Tell me more about that experience. Why did you use it that first time? Where did you get it? Were you

using any other drugs? How did it make you feel?" The content of the three interview modules was derived from existing measures, e.g., DAST-10, previous studies (Lankenau et al. 2007b), and themes that emerged during the CAP.

Data Analysis

Data consisted of SPSS files, transcripts, and field notes. Responses to structured questions were uploaded from QDS case files and into a SPSS database. All digital recordings were transcribed verbatim into a Word document. Following each interview, ethnographers completed field notes summarising key characteristics and primary patterns of illegal drug use. All qualitative data were entered into Atlas.ti.

The qualitative coding process began with a set of primary codes of interest, such as "opioid: rx family," or "opioid: inject initiation." Based upon these primary codes, four analysts coded all transcripts using Atlas.ti. All transcripts were reviewed by two or more analysts to ensure the consistent use of codes within and between transcripts. Following this primary level of coding, emergent themes were labelled during a secondary level of coding, such as "sources of prescription drugs," which continued until all relevant themes were identified.

All first names within narrative quotes are pseudonyms. Names beginning with the letter "L" designate Los Angles respondents while names beginning with "N" indicate New York respondents. Comparisons between Los Angeles and New York, while not a focus of this analysis, are noted where differences emerged.

RESULTS

Sample Characteristics

Overall, the sample was typically male, white, heterosexual, and in their early 20s (Table 1). Many did not complete high school, were expelled from school or held back a grade. Some reported being in foster care or a group home as a minor. Nearly all were homeless at some point, most were currently homeless, and most regarded themselves as "travellers," that is, moving from city to city in search of work, housing, or adventure. Nearly all had been arrested and served jail time. Most had a psychological diagnosis, such as depression, anxiety, or Attention Deficit Hyperactivity Disorder (ADHD), many had a history of drug treatment, some reported being HCV positive but none reported being HIV positive.

Initiation into Prescription Opioid Misuse

Vicodin (hydrocodone and acetaminophen), followed by OxyContin (oxycondone) and Percocet (oxycodone and acetaminophen), were the most commonly reported drugs at initiation into opioid misuse, while modes of administration included swallowing (n=41), sniffing or snorting (n=8), and injecting (n=1). Initiation of opioid misuse typically followed first use of alcohol, marijuana, and prescription stimulants and preceded initiation of harder drugs, such as cocaine, methamphetamine, and heroin (Table 2). All reported lifetime misuse of both prescription opioids and heroin. Over four-fifths (n=43) initiated opioid misuse prior to heroin, which occurred two years earlier on average. Three sources of opioids at initiation were reported: a family member's prescription; their own prescription; and a friend or street contact who had access to prescription opioids.1 Describing these sources in greater detail provides important context for both initiation into opioid misuse and later patterns of misuse, including sniffing and injecting opioids.

[1]LA and NY IDUs were comparable regarding the proportion reporting each of these initiation modalities.

Misusing a family member's opioid prescription

Households were both primary sources for prescription opioids as well as locations where participants and family members misused opioids and other drugs. Three-fifths (n=30) grew up in households or visited extended family member's homes where opioids were prescribed. Among these households, one-third (n=11) reported initiating with an opioid pilfered from a family member's prescription. Initiating with a family member's prescription, which typically began at 12.6 years old, was the youngest pathway into opioid misuse. For these initiates, first misuse was often motivated by curiosity and access to family members' medications as suggested by Neal who took his stepfather's Percocet:

> I did it because I was very curious. It was right in the kitchen in a cabinet next to the sink where they kept all the Tylenol. It was really easily accessible. Me and two friends took them and then I started selling them.

Another nine participants misused a family member's opioid prescription after initiating opioid misuse via other sources. Furthermore, one third (n=10) of young people from households where opioids were prescribed, reported parents or relatives who misused their own prescription. Naheem described observing his father's progression into opioid dependence while living at home, which foreshadowed his own bouts with opioid dependence and withdrawal years later:

> It seemed like he [father] always has pain medication for something, but the last big thing was he ripped a tendon helping his friend lift a pool table. They had him on oxymorphone and he got hooked. He wanted to stop so he locked himself in a room for like 2 days to get through the withdrawal. I could hear him going crazy in there.

In addition to opioids, youth commonly reported parents or siblings who misused other types of substances, such as prescription tranquillizers or stimulants, alcohol, crack or cocaine, heroin, and methamphetamine. Overall, four-fifths (n=40) grew up in a household where a parent or sibling misused one or more substances.

Misuse of own opioid prescription

Participants were commonly prescribed prescription drugs for both physical ailments and psychological conditions. Nearly three-quarters (n=36) had been prescribed an opioid in their lifetime, which occurred on average at 14.6 years old. Prescriptions were often for pain conditions common among children and adolescents, such as dental procedures or sports injuries. Two-fifths (n=8/36) reported their own prescription as the source of first opioid misuse, which typically occurred at 15.3 years old. These participants described enjoying the euphoria or pain relief provided by a prescribed opioid, which eventually resulted in misuse. In several cases, misuse escalated when respondents had access to additional opioid prescriptions, which also provided opportunities to trade or sell pills. In this instance, Larry was prescribed Dilaudid (hydrocodone) and Percocet for a fishing injury which jumpstarted his pathway into opioid misuse:

> I was taking it as prescribed but I still got a high feeling. It wasn't intentional - doing it to actually get high. Then, I told all my friends that I was getting pain pills and they're like, "Get 'em, and then we'll buy 'em." So, when we went back to the doctor, I lied and said "Yes, it still hurts." They prescribed me a lower dose and I traded some off and got Oxy [OxyContin].

An additional 16 participants misused their own prescription after initiating via other sources. Apart from being prescribed opiods for pain conditions, three-quarters (n=38) were diagnosed with one or more psychological conditions, such as depression, bipolar, anxiety, schizophrenia, and ADHD, and treated with various psychiatric medications, including prescription tranquillizers, antidepressants, and stimulants. In some instances, misuse of a

prescribed opioid occurred in the context of self-medicating for an undiagnosed psychological condition or as a substitute for a psychiatric medication. In this case, Nancy, who had been previously prescribed an antidepressant, initiated opioid misuse with Vicodin to self-medicate for depression:

> When I was prescribed it [Vicodin] following my surgery, I remember being like, "It's kind of nice to not feel much at all for like 6 to 8 hours." Depending on how many I would take, I could be out for a good 12 [hours]. It was kind of a relief. At that point, I was really depressed and happy with not feeling anything.

Acquiring an opioid from a friend or acquaintances

Friends or acquaintances were the most common sources of opioids at initiation. Two-thirds (n=31) reported acquiring an opioid from a friend or acquaintance at initiation, which typically occurred at 15.3 years old. For these participants – none of whom reported paying for pills – their friends often obtained the opioid from their own prescription or a family member's prescription. Initiation typically occurred in a group setting, such as at a party, at a friend's house, or in school. In this case, Lloyd describes initiating with OxyContin at a time when many of his friends were also experimenting with the drug:

> I was like 14 when I tried Oxycontin. Someone was like, "Here, this is a painkiller." A lot of my friends were getting into it in Oregon - it was a big thing there for a while. I kind of had a curiosity for it and that is how I got started on heroin.

Sniffing or snorting as a mode of administration, while occurring in less than one-fifth of all opioid initiations, happened almost exclusively within the context of friends who supplied the opioid. Sniffing was frequently suggested by friends or undertaken by those who had sniffed other drugs previously – particularly prescription stimulants or cocaine – as indicated by Natalie:

> When I was like 16, I sniffed Vicodin with my sister and her friend in my mom's house. I had snorted coke and Xanax, which we'd steal from the friend's uncle. And since there was nothing [Xanax] we were like, "Well, we could sniff these [Vicodin] too." But, it's nasty – it burns and shit.

Additionally, friends commonly offered the know-how to break down durable, time-release pills, such as OxyContin, into powder. Overall, three-fifths (n=30) progressed into sniffing prescription opioids. For most, sniffing marked a transitional mode of administration between earlier patterns of opioid misuse and higher risk practices, such as injecting opioids.

Trajectories involving opioids, heroin, and injection drug use

In addition to misusing prescription opioids, all participants used heroin and injected drugs. Three general trajectories involving opioids, heroin, and injection drug use emerged (see Table 3): IDUs who injected a prescription opioid before injecting or using heroin (n=15); IDUs who injected heroin before injecting or using opioids (n=25); and IDUs who never injected opioids (n=10). Comparing these three groups provides context for both trajectories into injection drug use and transitions between misusing opioid and heroin.

Injected a Prescription Opioid Before Heroin

Amongst this group (n=15), most initiated injection drug use with a prescription opioid while others initiated with either cocaine or methamphetamine (see Table 3). Misuse of opioids and heroin commonly followed an initiation sequence of: opioid misuse; opioid injection; heroin; and heroin injection (see Table 3). Friends were commonly the source of opioids at injection initiation and typically provided the drugs for free. Only one described

withdrawal from opioids as a rationale for injection initiation. Rather, as described by Landon, seeking a more potent high was typically a rationale for initiating opioid injection:

> I started snorting them [OxyContin]. I had a friend who was shooting up and he said it was a rush. He hit [injected] me. I enjoyed it.

OxyContin was the most typical opioid injected at initiation. IDUs frequently recognised OxyContin – which was commonly sniffed before being injected – as the most powerful and versatile prescription opioid, with the fewest impurities as indicated by Landon:

> Oxycontin is one of the only prescription painkillers that doesn't have any type of binder in it. There's no cornstarch or acetaminophen in them, like Vicodin. Basically, Oxycontin can be injected, snorted, smoked, or taken orally.

Heroin was typically initiated – but not injected - during the same period of time that IDUs began injecting opioids. In these cases, the introduction of heroin often marked a new phase of opioid misuse and dependence. For instance, Larry began sniffing heroin due to its lower costs, soon after transition from sniffing to injecting OxyContin. Though he did not begin injecting heroin until four years later due to its potency:

> It was all in between the age of 17 and 18 that I got introduced to pain pills and heroin. I traded a few Percocets [his own prescription] for Oxy and the dude was like, "Instead of snorting two, shoot one." So I started shooting Oxy like once or twice a week. Then, a friend told me you can get a bundle [a gram of heroin] for $75 instead of buying two eighties [80 milligram of OxyContin] which is $150. You can get high for two days off the bundle. But, it was too strong to shoot. Like I'd snort a cap and I'd be gone so I just didn't do it [inject].

This group contained the highest proportion of participants who had been prescribed an opioid, had a family member with an opioid prescription, and who reported selling opioids (see Table 3). This group also contained the highest proportion of IDUs who reported an opioid as the most frequently used drug during the previous month. However, daily use of heroin was more commonly reported than daily misuse of opioids. Notably, two IDUs did not transition to injecting heroin. A majority of IDUs in this group were recruited from Los Angeles.

Injected Heroin Before a Prescription Opioid

Among this group (n=25), most initiated injection drug use with heroin while others initiated with either cocaine or methamphetamine (see Table 3). Misuse of opioids and heroin commonly followed an initiation sequence of: opioid misuse; heroin; heroin injection; and opioid injection. While OxyContin was also the most typical opioid injected at initiation, these IDUs injected a wider variety of other opioids – including methadone and buprenorphine. Rationales for opioid injection initiation commonly focused on substituting for heroin due to a dependence on heroin or withdrawal from heroin, as described by Newton:

> I was 22. I didn't even know I could do that [inject an opioid]. I was going through withdrawal from my heroin. A friend of mine cooked up a shot [of Dilaudid]. I was really bad [sick] at the time so he thought it would just be a better bet just to mainline [inject] it, rather than take it orally. I was having a hard time keeping water down.

Somewhat particular to this group of IDUs were those who described injecting a liquid opioid at initiation, such as methadone or morphine. Discovering that some opioids could be easily injected – including powder forms of the drug – resulted in escalated patterns of misuse among some, as described by Ned:

> It was actually the guy that shot me up with heroin the first time. He was like, "You can just break these [oxycodone capsules] open and cook them really easy. It [injecting] was great and felt really good…I use to get oxycodones capsules filled with pure powder - 180 of them a month. My girlfriend would sell me her father's entire script [of oxycodone] every month. I would sell some – make my money back - and have 90 [capsules] left. I would break apart 2 or 3 capsules - maybe 4 or 5 - if I really wanted to blast it. In the end, I wasn't selling any. I was doing all of them.

This group had the second highest proportion of participants who had been prescribed an opioid, had a family member with an opioid prescription, and who reported selling opioids (see Table 3). Also, heroin was both used more frequently than opioids and more commonly on a daily basis. Four IDUs who reported frequent opioid misuse, described misusing methadone obtained from street sources while also receiving prescribed methadone from a clinic. A majority of IDUs in this group were recruited in New York.

Never Injected an Opioid

In this group (n=10), most initiated injection drug use with heroin while others initiated with methamphetamine; one had never injected heroin. These IDUs reported an initiation sequence of opioid misuse, heroin, and heroin injection, which occurred at the oldest ages of any group (see Table 3). IDUs in this group never injected an opioid for two primary, sometimes overlapping, reasons: use of heroin or opioids never approached levels where injecting became a necessity; and a desire to control their drug use by limiting the types of drugs injected. Furthermore, several described themselves as primarily methamphetamine users, or viewed injecting opioids as a stigmatised practice. For instance, Neha limited herself to only injecting heroin so as not to become a "junkie":

> I like injecting [heroin], but I don't like junkies. I don't wanna be a junkie so I limit myself so I don't get strung out. I don't really want to inject other drugs. I'm not saying I never will.

Among this group, opioids were used as a substitute for heroin or when opioids were "kicked down" for free. Sniffing or swallowing were the preferred modes of administration, while none reported using opioids on a daily basis. Also, this group had the lowest proportion of those who had been prescribed an opioid, had a family member with an opioid prescription, and who sold opioids. These IDUs were evenly divided between New York and Los Angeles.

Discussion

This is the first study, to our knowledge, to describe the context for initiation into prescription opioid misuse, subsequent pathways into injecting opioids, and implications for current patterns of opioid and heroin misuse among a sample of young IDUs.

Initiation into opioid misuse was characterised by access or exposure to three primary sources of opioids – family members, personal prescription, or friends – while friends were the most commonly reported source. However, as young people progressed to sniffing and/or injecting opioids, they often had access to two or more sources of opioids, e.g., family and friends. Understanding sources of opioids as multiple and often overlapping – rather than mutually exclusive categories - is an important distinction made in previous research on young non-IDUs (McCabe & Boyd, 2005; Schepis & Krishnan-Sarin, 2009). Additionally, the young people clearly regarded prescription opioids – regardless of source – as readily accessible, valued commodities that could be traded or sold (McCabe et al. 2006). In numerous cases, the desire to experiment with a prescription opioid combined with financial

incentives or pressures from friends to sell available quantities, resulted in escalated patterns of opioid misuse. Furthermore, the progression from initiating misuse with Vicodin – amongst the most widely prescribed opioid in the U.S. (Schneider et al. 2009) – to later sniffing and/or injecting OxyContin – a less commonly prescribed but more potent opioid (Schneider et al. 2009) – indicates increasingly sophisticated users with access to varied sources of opioids (Davis & Johnson, 2008).

The broader context of initiation into prescription opioid misuse was characterised by the substance misuse of family members and young people with psychological conditions. Most witnessed family members misuse one or more substances during childhood and adolescence, which ranged from alcoholism to misusing opioids to injecting heroin (Finestone and Fischer, 2008). In households where problematic drug use by parents and siblings became "normalised" (Parker, 1998; MacDonald & Marsh, 2002), young peoples' misuse of opioids or other drugs was seldom discovered by adults or viewed as aberrant. In these environments, young people were confronting a range of mental health issues or stressful life events, as suggested by the high frequency of prescribed psychological medications. Initiation into prescription opioid misuse often occurred during the same time periods that young people witnessed substance use by family members or received psychological diagnoses and medications.

An emerging dynamic among opioid and heroin misuse and injection drug use is suggested by two findings. First, four of five IDUs misused an opioid before injecting heroin, which is in contrast to more conventional patterns of using opioids as a substitute drug after initiating heroin use (Chein et al., 1964; Faupel, 1991; Daniulaityte et al., 2006). Second, nearly one out of four young IDUs initiated injection drug use with a prescription opioid – substances that are infrequently reported at initiation into injection drug use among young IDUs (Lankenau et al., 2007b). All but two of these IDUs later transitioned into injecting heroin. These initiation patterns corroborate findings from recent research on broader samples, i.e., not exclusively young adults or IDUs, suggesting that opioid misuse (Siegal et al. 2003; Daniulaityte et al., 2006; Inciardi et al. 2009) or polyopioid misuse (Grau et al., 2007) may serve as a gateway to heroin. However, this is the first study to our knowledge, among a sample of young IDUs - amidst this recent epidemic of prescription drug misuse (c.f., Courtwright, 1982; Hernandez & Nelson, 2010) – to report a trajectory from opioid misuse to injecting heroin or injecting both opioids and heroin. Identifying emerging pathways into injection drug use that begins with misuse of opioids is important given the prevalence of prescription opioid misuse among adolescents (Johnston et al., 2010) and young adults (SAMSHA, 2010a) and the risks associated with transitioning into injection drug use (Fuller et al., 2002; Sherman et al., 2006; Roy et al., 2008).

Trajectories into opioid injection were related to variability in access or exposure to sources of opioids in some cases. IDUs who injected an opioid first had the greatest access to prescription opioids – either through family or their own prescription – and were most involved in selling prescription opioids. These IDUs also initiated opioid injection at the youngest age and currently reported the most frequent misuse of prescription opioids. In contrast, IDUs who injected heroin first were the most heroin-involved group; a majority reported current daily heroin use. They frequently initiated prescription opioid injection as a substitute for heroin when experiencing withdrawals from heroin. IDUs who never injected an opioid were the least opiate-involved: they initiated opioid misuse at the latest age, had the least access to opioids as adolescents, were the least involved in selling opioids, and currently misused opioids less frequently. This last group - an important counterpoint to the other two – suggests that less exposure to prescription opioids among other factors, such as stigma associated with injecting opioids or "junkie behavior" (Small et al., 2009) and less use of heroin, may mitigate transitions into injecting prescription opioids.

Changes in the broader illicit markets for heroin and prescription opioids in Los Angeles and New York at the time of the study may be relevant to overall reported patterns of drug use. Between 2005 and 2008, the cost of heroin – Colombian "powder" commonly found in New York and Mexican "tar" typically found in Los Angeles - increased while purity declined in both cities (NIDA, 2010), though, powder heroin found in New York was cheaper and purer than tar heroin found in Los Angeles. Meanwhile, retail sales of hydrocodone and oxycodone increased between 2007 and 2008 in Los Angeles, which may suggest an increase in overall supply for illicit use. These differences in the heroin and prescription opioid market costs could partially explain why New York IDUs were more likely to report heroin as the most frequently used drug, while Los Angeles IDUs were more likely to report a prescription opioid. In both cities, the practice of substituting a prescription opioid for heroin – even among IDUs who became regular heroin injectors – could be linked to issues of increasing costs and declining heroin purity. Additionally, the greater challenges associated with converting tar heroin to a soluble form, which requires heating (Ciccarone 1999) versus crushing a pill, could help explain the finding that a larger proportion of IDUs who injected a prescription opioid before heroin were from Los Angeles.

Prevention efforts should focus on the three to four years during adolescence that typically separated first opioid misuse from initiation to opioid injection – especially since heroin initiation commonly occurred between these two events. Towards this end, study data suggests that parents and guardians need to exert greater control over all prescription medications within the household, opioids in particular, given the increasing rate that these potent medications are being prescribed (NIDA, 2010). A complication for prevention efforts - as suggested by this study - are those households where illicit and/or licit drug use is normalised. In such environments, access to prescription opioids among adolescents is likely to be linked to broader social or psychological problems, such as illnesses, addiction, and/or numerous types of inequalities, which are more difficult to remedy through prevention efforts or policy changes. Nonetheless, future research should examine prescription opioid misuse among a range of adolescents and young adults - both IDUs and non-IDUs - to better understand the contextual and environmental factors that inhibit or accelerate transitions to both heroin and injection drug use.

Limitations

The study has several limitations. First, data may be subject to recall bias since the events reported often occurred years prior to being interviewed, such as ages of initiation or details of particular injection events. Second, the enrollment criteria were designed to capture young IDUs who were currently misusing prescription drugs. However, even though all participants misused prescription opioids, current misuse of opioids was not an enrollment criterion. Nonetheless, results may be biased towards IDUs who more frequently misused a range of prescription drugs, including opioids. Third, the sampling methods captured a sample that was largely white, male, and heterosexual. Hence, young people of colour, women, or sexual minorities who inject drugs may evidence different patterns of prescription drug misuse.

Conclusions

Prescription opioid misuse was a key feature of trajectories into injection drug use and/or heroin use among this sample of young IDUs. In particular, a new pattern of drug use may be emerging, whereby young people begin experimenting with prescription opioids before initiating heroin. The broader context of initiation into opioid misuse was characterised by substance misuse by family members and varied psychological conditions among participants and easy access to opioids via their own prescription, family, or friends. The

progression to sniffing and injecting opioids was common to participants who had access to multiple sources of opioids, including particularly potent opioids, such as oxycodone.

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Table 1

Demographics (n=50)

	Total (n=50) n (%)	New York (n=25) n (%)	Los Angeles (n=25) n (%)
Mean age	21.4	22.2	20.6
Gender: Male	35 (70%)	17 (68%)	18 (72%)
Sexual Orientation			
Straight	41 (82%)	20 (80%)	21 (84%)
Bisexual	8 (16%)	5 (20%)	3 (12%)
Gay/Lesbian	1 (2%)	0	1 (4%)
Racial and ethnic group			
White/Caucasian	36 (72%)	18 (72%)	18 (72%)
African American	2 (4%)	2 (8%)	0
Asian/Pacific Islander	0	0	0
Native American	0	0	0
Multiracial	10 (20%)	3 (12%)	7 (28%)
Other (including Hispanic only)	2 (4%)	2 (8%)	0
Is Hispanic	5 (10%)	2 (8%)	3 (12%)
Did not complete high school	24 (48%)	8 (32%)	16 (64%)
Held back a grade	10 (20%)	5 (20%)	5 (20%)
Expelled from school	22 (44%)	10 (40%)	12 (48%)
History of foster care/group home	11 (22%)	1 (4%)	10 (40%)
Currently homeless	33 (66%)	16 (64%)	17 (68%)
Ever homeless	49 (98%)	24 (96%)	25 (100%)
Mean age at 1st homelessness	17.4	17.3	17.4
Currently a traveler	30 (60%)	15 (60%)	15 (60%)
History of arrest	47 (94%)	22 (88%)	25 (100%)
History of jail time	45 (90%)	22 (88%)	23 (92%)
History of psychological diagnosis	37 (75%)	12 (50%)	25 (100%)
History of drug treatment	22 (44%)	11 (44%)	11 (44%)
Blood borne pathogens			
HCV test (ever)	39 (78%)	22 (88%)	17 (68%)
HCV+ ** (self-report)	13 (26%)	7 (28%)	6 (24%)
HIV test (ever)	47 (94%)	25 (100%)	22 (88%)
HIV+ ** (self-report)	0	0	0

** Among participants who were tested for HCV or HIV

Table 2

Age of Initiation via any Mode of Administration and Lifetime Misuse (n=50)

Substance	Mean Age of Initiation (s.d.)	Total n (%)
Marijuana	12.5 (2.8)	50 (100%)
Alcohol	12.8 (2.6)	50 (100%)
Stimulants[§]	14.1 (3.2)	41 (82%)
Opioids[†]	14.5 (2.9)	50 (100%)
Cocaine	15.4 (2.7)	49 (98%)
Tranquilizers[‡]	15.6 (2.9)	46 (92%)
Mushrooms	15.7 (2.6)	47 (94%)
GHB	15.9 (3.4)	18 (36%)
Muscle Relaxants	15.9 (3.0)	29 (58%)
Over-the-Counter	16.0 (3.7)	34 (68%)
LSD	16.3 (2.3)	45 (90%)
Methamphetamine	16.6 (3.2)	41 (82%)
Heroin	16.6 (3.3)	50 (100%)
Ecstasy	17.0 (2.7)	48 (96%)
Ketamine	17.1 (2.2)	36 (72%)
PCP	17.3 (2.8)	30 (60%)
Crack	17.6 (2.5)	43 (86%)
Sleeping Pills	17.9 (3.4)	21 (42%)

[†]Includes Vicodin, Codine, Oxycontin, Morphine and similar medications.

[‡]Includes Xanax, Valium, Klonopin, and similar medications.

[§]Includes Ritalin, Adderall and Desoxyn.

Table 3

Patterns of Opioid and Heroin Use (n=50)

	Total (n=50)	Inject Opioid Before Heroin (n=15)	Inject Heroin Before Opioid (n=25)	Never Inject Opioid (n=10)
Initiated Injection Drug Use				
Opioid	11 (22%)	11 (73.3%)	0	0
Heroin	25 (50%)	0	18 (72%)	7 (70%)
Cocaine or Methamphetamine	14 (28%)	4 (26.7%)	7 (28%)	3 (30%)
Means Ages of Initiation				
Opioid Misuse	14.6	13.9	14.2	16.9
Opioid Injection	17.7	16.6	18.3	--
Heroin	16.6	16.6	16.4	17.0
Heroin Injection	17.5	17.9	16.8	18.8
First Opioid Injected				
Oxycontin	18 (36%)	9 (60%)	9 (36%)	0
Dilaudid	7 (14%)	3 (20%)	4 (16%)	0
Morphine	6 (12%)	2 (13.3%)	4 (16%)	0
Other	9 (18%)	1 (6.7%)	8 (22%)	0
Prescription Opioids				
Self: ever prescribed	36 (72%)	13 (86.6%)	18 (72%)	5 (50%)
Family: ever prescribed	31 (62%)	11 (73.3%)	15 (60%)	5 (50%)
Self: ever sold	33 (66%)	12 (80%)	17 (68%)	4 (40%)
Most Frequently Used				
Opioids	19 (38%)	9 (60%)	6 (24%)	4 (40%)
Heroin	26 (52%)	5 (33.3%)	17 (68%)	4 (40%)
Other	5 (10%)	1 (6.6%)	2 (8%)	2 (20%)
Daily Use				
Opioids	8 (16%)	2 (13.3%)	6 (24%)	0
Heroin	25 (50%)	5 (33.3%)	17 (68%)	3 (30%)
Never Injected Heroin	3 (6%)	2 (13.3%)	0	1 (10%)
Recruitment Site				
New York	25 (50%)	4 (26.7%)	16 (64%)	5 (50%)
Los Angeles	25 (50%)	11 (73.3%)	9 (36%)	5 (50%)