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“You never know what you’re getting”: Opioid users’ perceptions of fentanyl in southwest Pennsylvania

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Abstract

Background: Urban areas in the United States have experienced a dramatic surge in fentanyl overdose deaths since 2014, a trend affecting both larger and smaller metropolitan areas. Encompassing only 1.2 million residents, Allegheny County, Pennsylvania, nevertheless saw 412 fentanyl-involved deaths in 2016, a number surpassed only by New York City and Cook County (Chicago), Illinois.

Objectives: This paper seeks to describe opioid users’ perceptions of fentanyl in Allegheny and three adjacent counties; it further considers how the drug’s emergence shapes some users’ market behaviors and consumption practices.

Methods: This paper reports on qualitative interview data (N=30) collected as part of a larger, multi-phase, mixed methods study (N = 125) among individuals reporting past-year prescription opioid misuse or heroin use in four southwest Pennsylvania Counties.

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Results: Most interviewees reported past-year suspected exposure to fentanyl, and many reported suffering or seeing suspected fentanyl overdoses. Where roughly one-third reported strategies for avoiding fentanyl, a small group of interviewees identified advantages to fentanyl, while still acknowledging its associated risks.

Conclusions/Importance: Given users' diverse opinions around fentanyl, the distribution of fentanyl test strips may represent an effective response to the current crisis.

Keywords

Fentanyl; Heroin; Prescription Opioids; Overdose; Harm Reduction

Introduction

The *Washington Post* recently reported an unprecedented surge in urban overdose deaths linked to the synthetic opioid, fentanyl (Lewis, Ockerman, Ochenbach, & Lowery, 2017). According to the Centers for Disease Control, overdose deaths involving synthetic opioids other than methadone rose 512% from 2013 to 2016, claiming approximately 20,000 lives in 2016; the bulk of this increase has been attributed to illegally-manufactured fentanyl (O'Donnell, Halpin, Mattson, Goldberger, & Gladden, 2017). New York and Chicago topped the 2016 fentanyl fatality ranking, followed by a much smaller locale – Allegheny County, Pennsylvania. Encompassing approximately 1.2 million residents and the city of Pittsburgh, Allegheny County confirmed 412 fentanyl-related deaths in 2016, a fifty-fold increase from 2013 (Bell, Bennett, Jones, Doe-Simkins, & Williams, 2018). At 50.2 deaths per 100,000 residents, Allegheny County had the highest rate of fentanyl-involved mortality among all U.S. counties with over one million residents that year (United States Centers for Disease Control, 2018). Fentanyl emerged as the drug most frequently contributing to fatal overdose in not only Allegheny (66% of deaths), but also three of the surrounding counties composing the Pittsburgh metropolitan area: Fayette (45%), Greene (42%), and Washington (63%) (Drug Enforcement Administration, 2017b). All four counties reported 2016 overdose mortality rates that exceeded national estimates by over 100% (Drug Enforcement Administration, 2017b).

Drawing on data from individuals who misuse opioids in the above four counties, this article describes how the rapid emergence of fentanyl in local drug supplies affected patterns of use and perceptions of risk. This focus bolsters a growing body of scholarship on individuals' "adaptations to heroin adulteration," and can inform innovative harm reduction interventions (Ciccarone, Ondoscin, & Mars, 2017, p. 146). Although inconsistent purity is a hallmark of illicit drug markets, the presence of fentanyl may encourage individuals to pursue different substances, new sources, or use patterns. It may inspire the adoption of heightened precautions or entry into treatment – or, alternatively, increase the frequency of use among individuals who view it as a desirable "contaminant." In discussing user perceptions of fentanyl as both danger and opportunity, this article considers the risk environment created by individual perceptions and particular geographic contexts (Rhodes, 1999). The four-county region under study is seated at the center of the U.S. Rust Belt – a string of deindustrialized cities and small towns spanning the northeast seaboard to the Great Lakes, which have broadly experienced significant increases in synthetic opioid overdose deaths

since 2015 (CDC/NCHS, 2016). It is also an economically diverse, sprawling, and racially segregated region that spatially and socioeconomically constrains opportunities for risk reduction (American Communities Project, n.d.; Bee, 2013). Although demographically diverse and spanning the rural-urban continuum, each of the counties under consideration have seen sharp increases in fatal opioid overdoses in the past five years (OverdoseFreePA, n.d.).

Background

Where the Centers for Disease Control have recently documented skyrocketing rates of synthetic opioids-related deaths, law enforcement surveillance systems have concomitantly reported dramatic increases in drug seizures containing fentanyl (Gladden et al., 2016). Moreover, a growing body of research has attempted to capture reactions “on the ground” from persons who use opioids. For example, a “rapid ethnographic assessment” of individuals who use heroin in northeast Massachusetts documented participants’ knowledge and perceptions around “fentanyl-adulterated and –substituted heroin” or “FASH” (Ciccarone, Ondoscin, & Mars, 2017). Revealing diverse opinions on the preference of fentanyl vs. heroin, the authors concluded that the overarching unpredictability of FASH “demands different usage patterns” (p. 152). Although sometimes prized for the intensity of its rush, fentanyl was additionally associated with unpleasant physiological side effects and a shorter intoxication that required more frequent administration. Likewise, individuals reporting regular heroin use expressed “strong dislike” for the effects of (suspected) fentanyl in a 2016 study conducted in another New England state (Carroll, Marshall, Rich, & Green, 2017). A near-simultaneous study in southeast Massachusetts interviewed individuals who experienced/witnessed an opioid overdose, with a specific focus on respondents’ familiarity with fentanyl (Somerville et al., 2017). Respondents engaged in some risk reduction measures (e.g., using only half of a stamp bag at a time), but most did not report changes to opioid seeking behaviors in the wake of increasing fentanyl availability. Similarly, a previous study of user reactions to widespread heroin adulteration in London showed an ambiguous impact on risk reduction practices and no uniform cutback in use; where a number of respondents described stopping or reducing heroin use, the authors report that “perceptions of low purity and heavy adulteration rarely deterred participants from purchase” (Harris, Forseth & Rhodes, 2015, p. 53). More recently, qualitative research among syringe exchange users in New York City concluded that while “a handful” of participants were moved to reduce or desist from heroin use, it was common practice to deploy other harm reduction measures against fentanyl, such as using test shots or carrying naloxone (McKnight & Des Jarlais, 2018).

Several studies of fentanyl perception and heroin preferences expose a more marked appreciation of fentanyl within a larger “connoisseurship of potency” (Mars et al., 2016, p. 11). In Baltimore, study participants referenced fentanyl’s intense rush – a desirable attribute for individuals with lengthier drug use careers and higher tolerance – while dividing on its duration of action relative to heroin (Mars et al., 2017). The specific appeal of fentanyl among individuals with “more extensive drug use experience” was also documented in a recent research into young adult opioid users in Rhode Island (Macmadu, Carroll, Hadland, Green, & Marshall, 2017). Another study in Philadelphia and San Francisco likewise

showed fentanyl's appeal among participants in the latter city who were accustomed to lower-purity heroin (Mars et al. 2016). Such participants described a discrepancy between drug purity and perceived quality, with the latter more properly aligned with potency – and association with overdose. The resulting “connoisseurship of potency” may appear to flout public health recommendations advising avoidance of high-strength or fentanyl-“tainted” stamp bags, but may reflect individuals’ limited financial means and physical dependence (Mars et al., 2016, p. 11).

Earlier research on illicit drug connoisseurship likewise found that persons who use heroin did not see purity as synonymous with quality, nor did they define adulteration as unilaterally negative; indeed, the authors of this study around “darknet” buyers of diverse drugs (including heroin) concluded that many factors drove a particular product’s desirability such as “reliability...effective potency, predictability of effect, security of supply, and financial value” (Bancroft & Reid, 2015, p. 44). Overall, the current study sought to describe perceptions of fentanyl within a population of past-year opioid users, while capturing how their motivations for choosing, or avoiding, fentanyl were shaped by similar contextual factors.

Methodology

We draw primarily on qualitative interview data collected as part of a larger, multi-phase study on social networks and opioid use in southwest Pennsylvania. In addition to 30 semi-structured interviews, we completed surveys with 125 individuals reporting past-year prescription opioid misuse or heroin use. The study protocol was approved by [BLINDED FOR REVIEW’s] Institutional Review Board.

We used a targeted sampling design to recruit individuals reporting past-year opioid use in four counties in western Pennsylvania (Allegheny, Fayette, Greene, and Washington). Table 1 describes county-level population characteristics.

Sampling people who use illicit drugs is challenging because they are a “hidden population” that lacks a sampling frame and is difficult to identify (Heckathorn, 1997; Kalton, 1999). Targeted sampling is a common approach to surveying such groups, wherein researchers attempt to reach respondents by a wide variety of means (e.g., flyers, online advertisements, recruitment at known gathering spots, and word of mouth referrals). We advertised the survey in local drug treatment clinics, known halfway houses, public locations (e.g., laundromats, emergency departments, community health clinics, bus stops, and drug courts), Craigslist (which has been successfully used to recruit in prior work on drug using populations), and Facebook (targeted to residents of the counties where our data collection was focused) (Dombrowski, 2012). Word of mouth recruitment also resulted in 17 respondents. In addition to these approaches, we allowed respondents to recruit others into the study consistent with the procedures of respondent-driven sampling although uptake via this recruitment method was low (5 participants) (Heckathorn, 1997; WHO, 2013)

From July 2017 to July 2018, we recruited 125 survey respondents, which is within the range of typical studies of hidden populations (Malekinejad et al., 2008). Sample

participants completed a primary survey that included a battery of demographic questions and measures of current and historical drug use. Two survey items, described later, specifically sought to capture participants' concern around and suspected use of fentanyl-"tainted" drugs in the past year. Five questions concerning participants' current possession of naloxone, and past experiences using, or witnessing the use of, naloxone were added after the initial pilot survey (N=32), and completed by the final 93 participants, in order to better align survey questions with the interview instrument. Respondents were compensated \$25 for their participation in the survey portion of the data collection.

Thirty respondents additionally participated in a one-hour, semi-structured, in-depth interview that elicited rich description of their substance use "careers," impact of social relationships on use and vice versa, and past episodes of accidental overdose and drug treatment. Respondents' experiences with and attitudes toward fentanyl were not initially solicited but emerged organically in discussions of current use and overdose. Questions concerning the types of opioids currently used, pattern of opioid use on a "typical day," and historical experiences with overdose (as victim and witness) were most likely to elicit discussions of fentanyl. Interview participants were chosen for their diversity relative to the pool of individuals sampled and were paid an additional \$25 for participating in the interview. All interviews were transcribed and entered into NVivo (Version 11) for both directed and exploratory analysis by two study team members. Although both investigators approached the data with an initial set of codes corresponding to the primary interview sections (e.g., opioid initiation), analysis also allowed for identifying emergent themes, including the salience of fentanyl to participants' opioid use behaviors. Coding proceeded both collaboratively and iteratively, until analysts achieved agreement on thematic saturation. Major interview themes surrounding fentanyl – accidental overdose, heroin avoidance/desistance and treatment, fentanyl desirability, and market inconsistency – are explored below. All names are pseudonyms.

Results

Survey and Interview Contexts

Table 2 shows demographic characteristics of interviewees and the full survey sample. Interview respondents ranged from age 20 to 50 (mean=32). As with the overall sample, men were overrepresented in the interviews (56.7%). The majority of interview respondents (80%) were non-Hispanic white. Most were unmarried, but nearly half lived with a partner. Over half had a high school degree or less. Over half were employed, but the majority had annual incomes below \$30,000, and nearly two-thirds were insured through a government health insurance program. Three-quarters of the interview sample came from Allegheny County, and over half reported living in their county of residence for more than 10 years.

Table 3 shows the opioid use characteristics of interviewees compared to the full sample. Ninety percent of interview participants (N=27) attested to past-year heroin use; only three reported exclusive use of prescription opioids in the preceding 12 months. The majority reported first prescription opioid and first heroin use between ages 18 and 25. Most who reported prescription opioid misuse have consumed tablets orally (85%) and sniffed/snorted opioids (70%). Just over one-quarter (26%) reported injecting prescription opioids. Among

those who reported heroin use, the most common methods were sniffing/snorting (89%) and injecting (74%).

In-depth discussions around fentanyl were more likely to occur in the context of interviews with heroin users, but two individuals reporting exclusive prescription opioid misuse also referenced FASH in their interviews, a phenomenon discussed below. Overall, past-year perceived use of fentanyl – intended or unintended – was limited to interviewees who had also consumed heroin. 16 out of 27 heroin users agreed that they “worried” the heroin they used was “laced or cut with fentanyl,” and 21 of 27 affirmed the intentional pursuit of FASH – a discrepancy often preceded by a sardonic quip among participants who admittedly sought out fentanyl.

Overdose experiences were common. About 30% of interviewees reported a personal overdose requiring medical intervention, while over half reported passing out but waking up without intervention; 80% reported having a friend or family member die of an overdose. About 30% of the post-pilot survey sample and of interviewees reported having access to Naloxone, although only 15.1% and 12.5%, respectively, reported carrying it at all times. Half of respondents (in both groups) reported seeing Naloxone used on others, and over half (61% overall and 73% of interviewees) believe that someone else would have and be able to administer Naloxone within 15 minutes of an overdose.

In interviews, fentanyl was most often invoked in conjunction with overdose, a finding that echoes earlier studies in Rhode Island and Baltimore (Carroll et al., 2017; Mars, Ondocsin, & Ciccarone, 2017). Yet, fentanyl was not overwhelmingly avoided or stigmatized. Whereas many individuals reported heroin avoidance, opioid desistance, or treatment entry as means of managing fentanyl exposure, a significant minority spoke to the perceived superiority of fentanyl over heroin, noting they had explicitly sought out fentanyl in the past year. Both those who sought to avoid and those who sought to use fentanyl identified market inconsistency and opacity as primary obstacles to effective risk reduction.

Fentanyl and Overdose Risk

Fentanyl was frequently cited as the (suspected) cause of overdoses both experienced and witnessed by participants. Many remarked that fentanyl introduced substantial uncertainty into local drug markets and users’ lives; interviewees were usually unsure whether a particular stamp bag sold as heroin contained fentanyl before, or after, use. None of the overdose incidents described were followed by toxicological testing. In the absence of formal evidence of fentanyl ingestion, participants instead referenced experiential knowledge, or “embodied effects,” believed to betray its presence, much like participants in Ciccarone et al.’s (2017, p. 146) study of FASH perception in Massachusetts. Several interviewees recounted overdose events in which they or a partner had ingested a relatively low quantity of what they believed to be heroin, only to quickly lose consciousness. Recounting a recent occasion, Carrie, a white woman in her mid-30s, explained that she typically needed three or four bags to “catch something,” yet reported “falling out” after merely one, an event that (for her) indicated fentanyl:

“The stuff”s that’s been going around is very potent...I don’t even think it’s heroin, but fentanyl, or what’s that? Carfentanil. Cause I was at the time on 80 mg of methadone, did one bag and I fell out. So, dead. That should never have happened.” (Interview 19)

Claiming a similarly lengthy career with heroin, Evan, 43, emphasized moderation for avoiding overdose. Yet, he also recognized the limitations of such a strategy in a market saturated with fentanyl, alluding to his fiancé’s overdose:

“I still, you can still OD on two bags though, you maybe get some shit, especially with fentanyl or something like that, [fiancé’s name], that’s what she overdosed on, fentanyl. (Interview 13)

Perhaps the most extreme testament to respondent perceptions of fentanyl’s potency, and potential threat, came from Charlie, a 25-year-old white man, who by his own account, largely subsisted on “scrapes” (leftover cooker residue). In the past month, he identified a particular bag of suspected FASH as causing him to overdose twice in one day:

“I did one bag...well, actually this was the second time I OD’d that day. The first time I don’t think I even did one bag...there was a bunch of residue left in the filters, and I shot it, and just totally like died.....And I was revived....So I decide to use some stimulants to counteract it, so I did a pretty decent amount of speed with it, with one bag and whatever residue was in there, and I was good for a few minutes, and then [*indicates falling down with hands*] (Interview 5)

Yet another embodied indicator invoked by participants was the immediacy of overdose following drug administration. Tina, 28, noted only one overdose within a five-year career of heroin use, an anomalous event she believed to involve fentanyl:

“For me, I think it’s because it was fentanyl and it was in the middle of the night where I had just woken up. And I was hurting so I did it and I don’t even think it was five minutes later, I was out of it...” (Interview 7)

Other interviewees without direct overdose experience also made passing reference to fentanyl and its implications for escalating opioid mortality in the region. Citing recent reports, Jeffrey, a 46-year-old Teamster who began injecting heroin in the early 1990s, commented that an Illinois couple was recently busted with enough fentanyl to “wipe out the whole state of Illinois” (Interview 3). Having been exposed to similar media coverage, Jason, 25, admitted that fentanyl “scared the hell out of [him]” (Interview 1).

Fentanyl, Heroin Avoidance, and Opioid Desistance

Although the association of fentanyl with overdose did not deter most interviewees, many still described attempts to avoid fentanyl specifically, heroin more generally, or to stop using opioids overall, a finding more common among occasional opioid users, and individuals receiving treatment. Some linked these avoidance behaviors to past experiences with suspected fentanyl overdose. One 25-year-old participant, Johnny, maintained that he would return or discard any so-called heroin believed to contain fentanyl. Johnny’s partner had survived a suspected fentanyl-related overdose in the past year, an event that left both thoroughly fearful of fentanyl, detectable by its “too white” appearance:

“Now if we get fentanyl in stuff, we turn right around, take it right back. We won’t even do it.” (Interview 7)

Mason, 23, narrated an extensive history of overdose, and was currently attempting to reduce his illicit substance use in light of both his probation status and perceived drug market changes. While reporting a recent cocaine binge, Mason was explicitly cautious in his approach to heroin:

“Ending up going out and meeting my coke man, getting \$1,000 worth of stuff. Coming down after a day or so, I decided to do some dope, and I’ve done it a couple times since the first use, but it hasn’t been that serious. Other than, here and there, dabble. Like I said, I do use, so dope scares me nowadays. All that fentanyl scares me.” (Interview 11)

Others, quoted previously, stated that the increasing prevalence of FASH had solidified their current preference for prescription opioids. Jason, a 25-year-old white male who used opioids “a few days a week,” turned to heroin only when facing a “drought...with the pills” in his neighborhood; Jeffrey, 46, and Harrison, 40, were more staunch in their decisions to avoid heroin in the past year:

“When I relapsed, I would do coke or pills. I haven’t done heroin...I would never buy on the street. Never. You never know what you get nowadays.” (Jeffrey, Interview 3)

“I wouldn’t do it now because of fentanyl. I know a lot of people who have died in the past few months.” (Interview 6)

A handful of interviewees cited fear of fentanyl as motivation for maintaining a recent pattern of abstinence. Kevin, 37, had achieved just over eight months of sobriety after eight years of heroin use; having witnessed the overdose of a close friend in the bathroom of his sober house, he ruminated:

“It’s like everything out right now is killing everybody. And I think I quit at the best time I could have before it was too late.” (Interview 2)

Such grateful, if morose, reflection was echoed by Oliver, 29, and Valerie, 35, who, respectively, claimed nearly one year, and five months, without opioids. Summing up the changed landscape for heroin in southwest Pennsylvania, Oliver stated flatly: “That’s one of the things that keeps me clean...you use, you die. It’s not the same stuff anymore” (Interview 22).

Fentanyl as Desirable

The association of fentanyl with overdose was not lost on individuals who indicated a preference for the synthetic opioid, or spoke to its desirable characteristics – namely, a higher potency that broke through tolerance and allowed for snorting; indeed, nearly all reported a personal association between perceived fentanyl use and accidental overdose. Yet, for this group of participants, fentanyl’s potential harms were outweighed by its relative advantages; alternatively, these participants chose to prioritize certain physiological, social, and economic risks that fentanyl was seen to mitigate. Such risks, and their salience for

some participants, reflected the unique circumstances of each individual's use - circumstances structuring choices that might be painted as irrational in the absence of informative context.

Even among individuals who narrated a history of suspected fentanyl-related overdose, fentanyl's potency was identified as a positive trait, particularly for those with longer opioid careers and/or higher tolerance. Johnny, quoted above, labeled the stamp bags resulting in his partner's FASH-suspected overdose as "the best stuff," a designation perhaps reflecting 12-plus years of heroin use in a rural outpost an hour outside Pittsburgh. Jen, a 28-year-old, self-identified "traveler," also valued fentanyl's predictable potency. In her own words, she needed to "do five times as much as everybody else" to feel intoxicated with any drug aside from alcohol - an "expensive" problem that was both solved and exacerbated by bags sold as fentanyl:

"I've never done fentanyl until this round of Pittsburgh. Yeah, it's the only shit I can fucking do anymore. Once you've used fentanyl you can't do dope (heroin) anymore. It doesn't touch you." (Interview 9)

Cammie, 25, also discussed this self-reinforcing property of fentanyl, which quickly became the "only thing that [she] could do that got [her] high" (Interview 24). Despite noting that her partner (Ryan, also interviewed) had overdosed after their first suspected exposure to FASH, Cammie branded fentanyl in highly positive terms, as "the best stuff ever," an appraisal that makes little sense when decontextualized. Both Ryan and Cammie were averse to injection, and thus appreciated snorted fentanyl's potency. Said potency was also associated with an economic advantage, as fentanyl was believed to be more effective than heroin in delaying the onset of withdrawal. In their accounts, this allowed the couple to use fewer bags, administered less frequently, while still remaining functional caretakers of their 5-year-old daughter. Ryan further opined that withdrawal from heroin was comparatively worse, whereas fentanyl offered an additional benefit for individuals seeking work:

"I feel like the sickness is worse on heroin, then there's Fentanyl. Also, as far as working, taking drug tests and stuff like that, it won't show up." (Interview 25)

Where Cammie and Ryan sought out fentanyl but settled for heroin, one participant who was well-connected in the past discussed intentional, co-occurring use of both drugs. Though several months abstinent, Valerie discussed a period when she was living in a "trap house" (site of drug sales and consumption) and using opioids heavily:

"I had access to raw dope, so I didn't have to cut stuff. I had fentanyl powder and I had raw heroin, and I always kept them in baggies that I kept stuffed in my bra." (Interview 17)

The respondents quoted above reported they would hypothetically choose to use fentanyl, over or alongside heroin; however, the volatility and uncertainty of the illicit opioid market often prevented the exercise of such consumer agency.

Opioid Market Inconsistency

Both respondents who sought and avoided fentanyl identified unpredictability in local heroin markets as the main cause of overdose, a risk that was exacerbated by major deficits in

product information. Jeffrey, previously quoted, explained his recent heroin abstinence with reference to the inconsistency of street opioids, stating: “You never know what you get nowadays.” The variability in purity and potency of products sold as heroin was framed as both a financial and physiological problem by participants, who had little room for error in either area. As Cammie, who preferred to purchase bags sold as fentanyl or FASH framed the dilemma:

“It’s a really high risk because we don’t know what we’re getting, or it’s garbage, or it’s not real. You’re wasting money on it.” (Interview 24)

A rash of low quality bags of heroin threatened to drain precarious funds but also encouraged individuals to fall into a pattern of using larger quantities, which enhanced overdose risk, as explained by Valerie, 35:

“It seems like the heroin is such crappy quality, which helped me a lot by making the appeal just not there... It’s amazing to me that so many people are dying from it, cause they keep taking so much extra because it’s so crappy in quality, and then, all of a sudden they come across something that’s really, really good....” (Interview 17)

Charlie, 25, summarized the current market situation even more succinctly, saying:

“It’s mostly all been pretty crappy lately. Either really crappy or they’ll kill you.” (Interview 5)

He went on to recount an episode in the past week where he used four bags of heroin and “barely got buzzed,” only to “die” after injecting one more bag from the same bundle (10-pack of stamp bags). Similarly, Arnold, a 32-year-old white man who had just enrolled in opioid maintenance therapy, framed inconsistency, not fentanyl, as a barrier to harm reduction:

“Right before I went on Suboxone I was trying, I was using heroin or Fentanyl whatever, I was trying to wean myself down, but it was like there was no way. The consistency you could never keep up with...” (Interview 14)

For individuals unwilling or unable to desist, the identification of a single, trustworthy seller emerged as a popular risk reduction strategy, previously reported by Carroll et al. (2017). Ryan, already quoted, favored fentanyl, but otherwise sought out consistency in “regular heroin”:

“There’s one guy I go to....That’s the guy I like to go to. It’s the same stuff all the time....No one’s saying good stuff as in the best. It’s the good stuff as in, we can trust it.” (Interview 25)

Others, such as Evan, 43, described cultivating relationships with sellers they believed would not deal in fentanyl, or would at least alert buyers to its presence:

“He’ll let me know if it’s regular heroin or its Fentanyl...He’ll tell me, he’ll tell you be careful with this shit.” (Interview 13)

Such reliance on a trusted connection may represent an effective, ground-up harm reduction strategy in a place and time characterized by a rising tide of FASH and accidental overdose, albeit one limited by retail-level sellers' own knowledge of their product.

Discussion

This study gives voice to individuals using opioids within a region that has seen significant increases in synthetic opioid overdose deaths, specifically revealing nuanced perspectives around fentanyl (Gladden, 2016). Focusing on street buyers of prescription opioids and heroin, our sample differs from those studied in prior research on drug connoisseurship, yet our findings confirm the contingency of perceived drug quality on individuals' experience, reasons for and purpose of use, and social and spatial context (Bancroft & Reid, 2015). Although a larger number of interview participants voiced their desire to avoid fentanyl for fear of overdose, those who expressed a preference for fentanyl were hardly ignorant of its risks; indeed, all had either experienced overdose or witnessed the overdose of an intimate partner, while 80 percent of the larger survey sample reported the overdose death of a friend or family member. Rather than identifying fentanyl itself as the problem, however, such participants instead lamented their inability to reliably identify fentanyl in bags sold as heroin. In fact, a common thread running through interviews with participants both seeking, and eschewing fentanyl, was a desire for more information.

As also documented by Carroll et al. (2017), some respondents identified sellers as a source of lifesaving information regarding FASH; yet such actors may serve as unreliable sentries, lacking in-depth knowledge of their product, or an explicit incentive for notifying users to the presence of fentanyl. Given such realities, the distribution of fentanyl test strips for pre-consumption drug checking may represent an appropriately flexible and proactive response to the issues participants outlined. Recent research suggests that individuals who purchase street drugs are highly willing to use test strips; Krieger et al. (2018) found that 95% of young adults who used heroin or cocaine expressed their intention to use take-home fentanyl test strips. Even individuals who purchase prescription opioids may benefit from test strips, given ongoing surveillance that has detected fentanyl in counterfeit OxyContin and benzodiazepines (Frank and Pollack, 2017).

Post-consumption fentanyl testing, which can rapidly reveal individuals' exposure to fentanyl in the past 72 hours, may also represent an effective risk reduction intervention, particularly in an area with limited harm reduction services. A recent study from rural British Columbia suggests that people who use illicit drugs may newly adopt harm reduction strategies after testing positive for fentanyl (Mema et al., 2018). Given the existence of merely one syringe exchange in southwest Pennsylvania, with limited resources, locations, and hours, alternative venues for test strip distribution or post-consumption fentanyl checking might be explored, with community health care providers as potential partners. As discussed in detail by McGowan et al. (2018, p. 34), there is still relatively little evidence on the acceptability of fentanyl test strips among people who use drugs, as well as their long-term effect on consumption practices; thus, testing should ideally be accompanied by both "harm reduction advice," access to naloxone, and information to guide test interpretation.

In all likelihood, fentanyl is here to stay. The Drug Enforcement Administration estimates that raw heroin costs nearly twenty times that of a similar quantity of fentanyl, which makes it highly attractive to traffickers and distributors (Drug Enforcement Administration, 2017a). Moreover, the current study, among others, demonstrates the existence of some demand for fentanyl specifically, even in a climate characterized by widespread fear and avoidance of fentanyl. One study limitation is the non-directed way in which participants' fentanyl observations were captured; comments around fentanyl and its impact upon opioid market behaviors arose organically. Another limitation concerns the generalizability of the sample, and, indeed, the case: the Pittsburgh metropolitan area is, after all, a hotspot for fentanyl overdoses. As fentanyl-related deaths overtake those attributed solely to heroin or other opioids in this region, and potentially in others, harm reduction approaches that empower individuals with information and allow them to better manage their risks, may pay large public health dividends (OverdoseFree PA, 2018).

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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 (63.5%)	1685	12.8	79.4	76.1	37.2
Fayette	134,229	81,981 (61.1%)	170	18.6	92.3	70.7	44.7
Greene	37,669	24,036 (63.8%)	65	15.3	92.6	35.1	43.1
Washington	208,269	127,501 (61.3%)	243	10.1	92.8	62.5	39.6
PA Overall	12,783,977	7,946,462 (62.2)	286	13.4	77.7	64.6	28.6

^a Sources: U.S. Census Bureau, American Community Survey 5-year estimates (2012-16);

^b Pennsylvania Health Care Cost and Containment Council (years 2016-17)

^c CDC WONDER Online Database, Underlying Cause of Death (years 2014-16)

Table 2.

Demographic Characteristics of Overall Sample and Interview Sample

	Overall Sample (N=125)			Interview Sample (N=30)		
	Mean (SD)	Min	Max	Mean (SD)	Min	Max
Age	34.5 (8.7)	20	62	31.8 (7.4)	20	51
Number of other adults living in household	1.4 (1.3)	0	7	1.3 (1.1)	0	4
Number of children <18 living in household	0.5 (1.1)	0	5	0.7 (1.0)	0	5
	Percent			Percent		
Sex						
Male	66.4			56.7		
Female	32.0			43.3		
Other	1.6					
Race						
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						
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						
Did not complete high school	6.4			10.0		
High school diploma or GED	41.6			43.3		
Attended college but did not complete degree	26.4			33.3		
2-year college degree	13.6			13.3		
4-year college degree	12.0			0.0		

	Overall Sample (N=125)			Interview Sample (N=30)		
	Mean (SD)	Min	Max	Mean (SD)	Min	Max
Employment status (past 30 days)						
Employed	56.8			56.7		
Not employed	43.2			43.3		
Total personal income (past year)						
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						
Not insured	24.8			20.0		
Insured through employer/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						
Allegheny	85.6			73.3		
Fayette	4.0			10.0		
Greene	3.2			6.7		
Washington	7.2			10.0		
County duration of residence						
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		

Table 3.

Opioid Use Characteristics of Overall Sample and Interview Sample

	Overall Sample (N=125)		Interview Sample (N=30)	
	N	Percent	N	Percent
PRESCRIPTION OPIOID MISUSE				
Last prescription opioid misuse	125		30	
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	27	10.0
<i>Among those who ever misused Rx opioids (N=119):</i>				
Age at first Rx opioid misuse	119		27	
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	119		27	
Consumed tablet or capsule orally	103	86.6	23	85.2
Smoked	19	16.0	4	14.8
Sniffed or snorted	92	77.3	19	70.4
Transdermal (fentanyl patch)	30	25.4	5	18.5
Injected with needle	32	26.9	7	25.9
<i>Among those reporting Rx opioid misuse in past 30 days (N=27):</i>				
Frequency of Rx opioid misuse in past 30 days	27		4	
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 a week	13	48.2	1	25.0
HEROIN USE				

	Overall Sample (N=125)		Interview Sample (N=30)	
	N	Percent	N	Percent
Last heroin use	125		30	
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	27	10.0
Among those who ever used heroin (N=108):				
Age at first heroin use	108		27	
Under 18	15	13.9	4	14.8
18 to 25	52	48.1	17	62.9
Older than 25	39	36.1	6	22.2
Unknown	2	1.9	0	0.0
Ways ever used heroin ^a	108		27	
Smoked	29	27.1	6	22.2
Sniffed/snorted	96	89.7	24	88.9
Injected with needle	79	73.8	20	74.1
Among those reporting heroin in past 30 days (N=68):				
Frequency of heroin use in past 30 days	68		18	
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 a week	8	11.8	3	16.7
Fentanyl and Overdose				
Among respondents who reported Rx opioid misuse in the past 12 months:				
Was worried the Rx pain relievers was using were cut or laced with fentanyl past 12 months	10	13.0	2	12.5
Consumed Rx pain relievers knew were cut or laced with fentanyl	10	13.0	3	18.8
Among respondents who reported heroin use in the past 12 months				
Was worried the heroin was using was cut or laced with fentanyl	61	59.8	16	59.3
Consumed heroin knew was cut or laced with fentanyl	71	69.6	21	77.8

	Overall Sample (N=125)		Interview Sample (N=30)	
	N	Percent	N	Percent
<i>Among respondents who reported Rx opioid misuse and/or heroin use in the past 12 months</i>	125		30	
Overdosed and needed medical intervention to be revived				
No	93	74.4	21	70.0
Yes, once	13	10.4	3	10.0
Yes, more than once	19	15.2	6	20.0
Passed out when using, but woke up without medical intervention			30	
No	55	44.0	13	43.3
Yes, once	21	16.8	5	16.7
Yes, more than once	47	37.6	11	36.7
Unknown	2	1.6	1	3.3
Respondent ever had family member or friend die from overdose ^b	93		16	
No	19	20.4	3	18.8
Yes, one	16	17.2	3	18.8
Yes, more than once	58	62.4	10	62.5
How often does respondent carry Naloxone (Narcan)? ^b	93		16	
Never	65	69.9	11	68.8
Only when knows will be using or will be with someone else who is using	0	0.0	0	0.0
All the time	14	15.1	2	12.5
Keeps at home	14	15.1	3	18.8
Has respondent ever used Naloxone on someone else? ^b	93		16	
No	69	74.2	12	75.0
Yes, once	3	3.2	0	0.0
Yes, more than once	21	22.6	4	25.0
Respondent has seen Naloxone used on someone else ^b	49	52.7	8	50.0
Respondent thinks someone else would have and be able to administer Naloxone with 15 mins of an overdose? ^b	51	60.7	11	73.3

Notes:

^aPercentages exceed 100 because respondents were asked to select all that apply

These questions were added to the survey after the initial pilot of 32 respondents. Therefore, they were only answered by 93 respondents.

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