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Recent Overdose Experiences in a Community Sample of Military Veterans Who Use Opioids

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Abstract

Rising rates of overdose mortality underscore the importance of understanding and preventing overdose. We developed a seven-item scale for the assessment of nonfatal opioid-related overdose experiences, adding items on others' perceptions of whether the participant had overdosed and whether an intervention was attempted to frequently used criteria. We administered the scale to 240 primarily male and minority veterans, recruited using venue-based and chain-referral sampling, who separated from the military post-9/11 and reported current opioid use. The items were internally consistent, and correlated well with overdose risk behaviors ($r = .13-.45$). The new scale detected overdose events in a significantly higher proportion of participants (36.5%) than that using either self-report criterion (18.2%) or difficulty breathing and losing consciousness criteria (23.8%). These experiences or perceptions should be investigated to inform and better tailor the development of more effective overdose prevention and response programs.

Keywords

opioids; overdose; drug use; drug poisoning; veterans

Drug poisoning or “overdose” has become the leading cause of injury death in the United States, and has been increasing globally (Martins, Sampson, Cerda, & Galea, 2015; Rudd, Aleshire, Zibbell, & Gladden, 2016; The Lancet, 2016). Most fatal overdoses involve the use of prescription opioids (POs) or heroin, frequently combined with other drugs and/or alcohol (Johnson, Hayes, Brown, Hoo, & Ethier, 2014; Rudd et al., 2016). The increase in opioid-related overdose mortality is related in part to increased use of POs to treat chronic pain and diversion of these drugs by individuals who may not have had them prescribed (Bohnert, Ilgen, et al., 2013; Rudd et al., 2016). Pain patients who use POs may not necessarily be

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Authors' Note

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Declaration of Conflicting Interests

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aware of overdose risks (Bohnert et al., 2012; Bohnert, McCarthy, et al., 2013). Patients who are prescribed POs sometimes are also prescribed other psychoactive drugs, such as benzodiazepines for anxiety, which can interact with POs to increase overdose risk (Bohnert et al., 2012). In the United States, the overdose epidemic has been driven more recently by increasing prevalence of heroin use (Rudd et al., 2016). Heroin users experience heightened risks as potency can vary greatly, sometimes because drugs sold as heroin have been mixed with fentanyl and/or other high-potency synthetic opioids (Stogner, 2014). Overdoses can also occur when individuals increase their opioid dosage because their tolerance has increased, and then return to that higher dosage after a period of abstinence, such as after a period of incarceration or abstinence-based substance use treatment (Binswanger et al., 2012; Wright, Oldham, & Jones, 2005).

Accurate assessment of nonfatal overdose is crucial for research in opioid using populations because experiencing a nonfatal overdose is a leading risk factor for subsequently experiencing a nonfatal or fatal overdose (Caudarella et al., 2016; Coffin et al., 2007). It is estimated that fewer than one in every 20 overdoses is fatal, but nonfatal overdose events can result in substantial morbidity, including peripheral neuropathy, physical injury, and seizures (Darke, Mattick, & Degenhardt, 2003; Warner-Smith, Darke, & Day, 2002). The medical signs of opioid-related overdose include pinpoint pupils (miosis), respiratory depression, and stupor or loss of consciousness (Boyer, 2012; United Nations Office on Drugs and Crime & World Health Organization, 2013). Programs that train nonmedical personnel in opioid overdose reversal techniques often use loss of consciousness and being unresponsive to stimulation to identify victims who are in need of assistance (Harm Reduction Coalition, 2012). Some studies have assessed the occurrence of nonfatal overdose by relying on participants' own definitions of what constitutes an overdose (Caudarella et al., 2016; Frank et al., 2015). Other research has defined overdose as any indication of difficulty breathing, turning blue, collapsing, or losing consciousness and being unable to be roused (Coffin et al., 2007; Darke et al., 2007; Maloney, Degenhardt, Darke, & Nelson, 2009). It is unclear how well these classifications represent what may be a variety or a continuum of nonfatal overdose experiences.

Military veterans represent one group with relatively high rates of PO misuse and high rates of opioid overdose (Bennett, Elliott, Golub, Pouget, & Rosenblum, 2015; Bennett, Pouget, & Golub, 2015; Wilder et al., 2016). Veterans of the recent conflicts in Iraq and Afghanistan were prescribed POs for pain during or shortly after their military service at relatively high rates, sometimes with little guidance regarding potential dependence and drug interactions or contraindications (Ulmer, Van Voorhees, Germain, Voils, & Beckham, 2015; Vazan, Golub, & Bennett, 2013). Research shows increased risks for substance use disorders among formerly deployed military personnel, attributed partly to self-medication for anxiety, depression, and symptoms of posttraumatic stress disorder (Bennett, Pouget, & Golub, 2015; Seal et al., 2011).

To better understand overdose risk and to help tailor prevention and response interventions, we developed a multi-item assessment scale for nonfatal opioid-related overdose events (Recent Overdose Experiences Scale [RODES]) with a sample of veterans.

Method

Sample

As part of an ongoing cohort study, we recruited military veterans through chain-referral, venue-based sampling at veterans-specific housing and opioid treatment facilities, and through participant referrals (Bennett, Elliott, & Golub, 2015). Entry criteria included at least 1 year of military service, discharge after September 11, 2001, and opioid use (POs and/or heroin) within the previous 30 days. All veterans for both components (in-depth interviews and surveys, described below) of the study were discharged from military service after September 2001 (9/11), as evidenced by their DD214 documentation. In-depth interview participants all reported one or more overdose(s) during or following military service and were screened by two experienced interviewers to establish the veracity of their accounts and the involvement of opioids in the event. Survey participants were screened to establish past-month opioid use as well as their veteran status and discharge date.

We first recruited 50 veterans who self-reported personal overdose-related experiences, and conducted in-depth interviews with them about their experiences. These interviews lasted between 30 and 60 min and addressed both proximal and distal precipitants and sequelae of overdose. These interviewees were asked to describe their own personal definitions of overdose, and then to narrate their overdose experiences in as much detail as possible, including any recollections of the immediate antecedents to loss of consciousness or physical collapse. They were also asked to discuss the perceptions of others—friends, family members, or other opioid users—who were present during their overdose events. These 50 narratives were transcribed and analyzed using an inductive approach and open coding techniques drawn from grounded theory to generate a codebook that was used in the development of overdose items in the new scale (Charmaz, 2014; Glaser & Strauss, 1967; Mills, Bonner, & Francis, 2006).

The 50 in-depth interview participants were recruited in advance of the rollout of data collection on the survey component of the study. Fourteen of the 50 were veterans of earlier military eras and not eligible for our study of post-9/11 veterans. Those who reported recent opioid use at time of the qualitative interview were asked whether they wanted to be recontacted to participate in other research. Sociodemographic characteristics of the in-depth interview participants did not differ significantly with those of the survey participants (data not shown), with one exception—the in-depth interview participants were all male.

After developing preliminary versions of the overdose items, potentially confusing wording was identified, and then clarified and/or simplified. We pilot-tested initial items with 10 in-depth interview participants selected sequentially. Participants were compensated US\$40 for in-depth interviews and US\$40 for pilot interviews.

After this process, the research team reconvened and revised item wording for clarity and brevity. At approximately this point, we received additional funding to add a naloxone training and distribution arm of the study. All participants were offered naloxone training and provision, including US\$10 compensation for a brief pre- or posttest assessing overdose response knowledge and attitudes: 83 declined, 27 were interested in receiving training but

had not as of this writing, 84 received training and provision from the study, and 46 were lost to follow-up.

Survey participants were interviewed face-to-face by trained and experienced interviewers, including two of the co-authors, and three trained research associates, with the interviewer reading each question aloud and assuring comprehension. Survey participants were compensated a total of US\$60 for completing the survey (1.5–2 hr) that covered a broad array of topics, including sociodemographic information. Guided by our biopsychosocial life events theoretical model, we also included items and scales regarding potential biological determinants of overdose risk (e.g., pain level, traumatic brain injury history), psychological determinants (e.g., depression self-rating, current mental health treatment), social determinants (e.g., social isolation and support), and important life events (e.g., losing or starting a job, beginning or ending a romantic relationship) (Bennett, Elliott, & Golub, 2015; Pouget et al., 2017). A total of 19 of the in-depth interview participants enrolled in the survey component of the research.

Study procedures and methods were approved by the Institutional Review Board of the first author. A Certificate of Confidentiality was granted by the U.S. Department of Health and Human Services to further protect participant confidentiality. We analyzed data using IBM SPSS (Version 22.0).

Scale Items

We used seven items to assess overdose events, drawing on the existing literature and analysis of in-depth interview transcripts. Item units were ratio scaled from 0 to 30, reflecting the number of days in the past 30 days in which the participant experienced each event. Thus, the mean values can be compared to assess their frequency of occurrence.

The scale as a whole scored 56.7 on the Flesch Reading Ease scale and a 12.3 on the Flesch–Kincaid Grade Level (Wager & Middleton, 2002). However, excluding the naloxone item resulted in Reading Ease of 60.1, which is in the range interpreted as “Easily understood by 13- to 15-year-old students.” Prior to administration of drug-related scales, we carefully defined the term *opioid* and also informed participants about naloxone during the initial interview, so we are confident that most participants understood these terms, which impacted the computer-generated reading level scores. Participants typically completed the RODES in 5 to 10 min or less.

1. *Overdose self-perception*: “On how many days do you think you overdosed on drugs and/or alcohol (you used more opioids, other drugs or alcohol than you should have used or were more sedated, drugged, or high than you wanted to be)?” This item captures self-perceived overdose occurrences; a common single-item method for assessing nonfatal overdose experiences (Caudarella et al., 2016; Frank et al., 2015). Although we initially planned for participants to use their own definitions for overdose in this item, it was clear during in-depth interviews and pilot testing that some participants wanted to be provided with an explanation of the term.

2. *Others' perceptions of overdose:* "On how many days in the past 30 were other people concerned about how sedated, drugged or high you were after you used opioids?" During in-depth interviews, veterans reported that their friends, family members or other people they used drugs with were sometimes concerned that the participant had overdosed after using opioids even when the participant themselves did not perceive that they had. Although this item depends on the presence and the number of others present when they used drugs, many in-depth interview participants reported using opioids with others present; sometimes reporting that they intentionally used opioids in public spaces so that others would be present if they overdosed and lost consciousness.
3. *Difficulty breathing:* "On how many days in the past 30 did you have difficulty breathing or did your face or fingers turn blue after using opioids?" Difficulty breathing, or lips, face or extremities turning blue due to lack of oxygen are frequently used criteria for nonfatal overdose (Coffin et al., 2007; Darke et al., 2007; Maloney et al., 2009). Few participants in in-depth interview reported noticing that their lips, face or fingers turning blue, several reporting that some overdoses happen so quickly as to preclude this form of physiological self-monitoring. We did not include an item on miosis for similar reasons.
4. *Collapsed:* "On how many days in the past 30 did you collapse (fall down) or notice that your muscles felt unusually loose after using opioids?" This item is also part of frequently used overdose criteria (Coffin et al., 2007; Darke et al., 2007; Maloney et al., 2009). We added the language regarding muscles feeling loose based on harm reduction program material (Harm Reduction Coalition, 2016). We assessed "collapsing" separately from losing consciousness because some in-depth interview participants reported that they had collapsed but did not lose consciousness during an overdose experience.
5. *Lost consciousness:* "On how many days in the past 30 did you lose consciousness or pass out so that you could not wake up or others could not wake you up?" This item is perhaps the most clear and frequently used indicator for having experienced an overdose (Coffin et al., 2007; Darke et al., 2007; Maloney et al., 2009). The description indicates that the overdosed participant could not be roused by others, which distinguishes losing consciousness due to overdose from simply falling asleep.
6. *Medical assistance called:* "On how many days in the past 30 did you or someone else call for medical assistance because of how sedated, drugged, or high you were after using opioids?" In-depth interview participants often reported an aversion to calling for medical assistance due to fear of police involvement, despite Good Samaritan protections in the New York State (Ambrose, Amlani, & Buxton, 2016; Bennett, Bell, Tomedi, Hulsey, & Kral, 2011). We included an item on calling for medical assistance assuming that these occurrences would be reported less frequently and could indicate more severe overdose experiences, or that bystanders did not know how to reverse an overdose and did not have naloxone.

7. *Used naloxone*: “On how many days in the past 30 did you use Narcan or naloxone (on yourself) or did someone administer Narcan or naloxone to reverse your opioid overdose?” Some in-depth interview participants who were informed about naloxone reported a reluctance to use naloxone on others because it causes withdrawal symptoms. Therefore, as with calling for medical assistance, we assumed that this item would be endorsed less frequently than other items, and could indicate more severe overdose experiences.

Analysis

We compared overdose item scores with rates of seven drug-using behaviors known to increase risk of overdose: (a) injecting opioids, (b) use of heroin, (c) concurrent use of alcohol and opi-oids, (d) concurrent use of benzodiazepines and opioids, (e) concurrent use of sleep medication and opioids, (f) use of stimulants after using opioids, and (g) concurrent use of alcohol, benzodi-azepines, and opioids. To evaluate the potential for using the mean of the items as a single continuous score, we examined internal consistency using Cronbach’s alpha.

We also report results of items recoded dichotomously to represent the proportions endorsing each item and the proportions reporting any item on one or more of the past 30 days. We defined an overdose as having occurred if participants endorsed any RODES item. We compared the proportions reporting having overdosed using this RODES-based criterion to the proportions reporting having overdosed using self-perception criterion (which we coded using RODES Item 1), and criteria based on reporting any difficulty breathing, turning blue, collapsing, or losing consciousness and being unable to be roused (which we coded using RODES Items 3, 4, and 5) (Darke et al., 2007; Maloney et al., 2009). We tested these proportions for significant differences using binomial tests.

Sample Characteristics

Participant characteristics for 240 veterans who reported on their experiences after using opioids are shown in Table 1. Participants were mostly male, about two thirds of African American, and 21% of Hispanic ethnicity. About a quarter were currently employed, and 18% were currently enrolled in school. Almost half reported a current opioid analgesic prescription, and slightly more than one quarter were current heroin users.

Findings

Scale Results

As shown in Table 2, the most frequently endorsed item was Item 2, referring to the number of days in which others were concerned about how sedated, drugged, or high the participant was after using opioids, followed by the number of days in which the participants themselves thought they had overdosed or were more sedated, drugged, or high than they wanted to be. Items indicating signs of possible overdose (difficulty breathing, collapsing, and losing consciousness) were less frequently endorsed. Calling for medical assistance and using naloxone to reverse the overdose were reported least frequently, which is unsurprising

as they likely reflect more severe overdose events and require access and, usually, another person's assistance.

Looking at the items dichotomously, 18.2% of participants reported overdose self-perception; 23.8% reported others' perceptions of overdose, 9.9% reported difficulty breathing, 17.1% reported collapsing, 13.8% reported losing consciousness, 6.6% reported medical assistance being called, and 1.1% reported having their own overdose reversed with naloxone, on one or more of the past 30 days. Combining across items, 36.5% of participants reported one or more overdose indicators on one or more of the past 30 days.

Some participants who did not meet self-perception of overdose or breathing and consciousness-based criteria for overdose nonetheless reported one or more other overdose indicators. Of the participants who reported no self-perceived overdose, 22.8% endorsed one or more other indicators. Breathing and consciousness-based overdose coding using Items 3, 4, and 5 showed that 23.8% of participants met the criteria for overdose during the previous 30 days. However, of the participants coded as not having overdosed using those criteria, 16.7% endorsed one or more other indicators—15.2% reported perceptions of overdose themselves or by others (Items 1 and/or 2) and 1.4% reported calling for medical assistance. These participants reported using higher PO dosages than directed, and concurrently using cocaine, alcohol, and/or methadone.

Binomial tests showed that the proportions reporting one or more RODES overdose events (.365) were significantly higher than that using difficulty breathing and losing consciousness criteria (.238) and that using single-item self-report criterion (.182) ($p < .001$, two-tailed, for both comparisons).

The items (in the original 30 day units) showed substantial internal consistency, with an alpha value of .71, and item-total correlations above .20, except for naloxone use which showed an item-total correlation of .09. The mean score was 0.81 ($SD = 2.04$). This mean was skewed, with 63.5% reporting no overdose indicators. The interquartile range was 0.0 to 0.57; the maximum mean value was 11.14. Correlations among the items in the scale are presented in Table 3. These correlations ranged from .00 to .60.

Correlations of item scores with criterion validators are presented in Table 4. Self-perception and others' perceptions of overdose were correlated most consistently with concurrent use of alcohol and other drugs. Difficulty breathing was correlated significantly with using heroin and concurrent use of heroin and stimulants (including cocaine). Collapsing and losing consciousness were correlated most strongly with concurrent use of other drugs, especially stimulants, and injecting drugs. Having medical assistance called was significantly correlated with using heroin, and concurrent use of opioids with stimulants and with antianxiety drugs. Having naloxone used to reverse the overdose was not significantly correlated with risk behaviors. The mean of overdose items generally had stronger and more consistent correlations with risk behaviors than the individual items.

Discussion

Some nonfatal opioid-related overdose experiences are not captured by the most frequently used criteria. Using an overdose assessment scale with multiple indicators can provide more detailed information about overdose characteristics and/or severity than is provided using binary classifications based on self-perception or based on commonly used criteria regarding difficulty breathing and losing consciousness. Perceiving oneself to have overdosed and having others perceive that participants overdosed were relatively common in this sample. These perceptions may sometimes reflect subtle behavioral indicators of overdosing. In addition, some people who reported not meeting existing overdose criteria nonetheless reported seeking medical assistance or having naloxone used to reverse the overdose. This may indicate that people who use opioids can perceive that they are experiencing an overdose without recognizing breathing difficulty or losing consciousness. People who use opioids or their friends and family members may be able to perceive early warning signs of overdose beyond those that have been commonly identified in prior research. We speculate that such signs might include drowsiness or “nodding off” that falls short of losing consciousness, or losing consciousness only briefly; perceiving miosis or difficulty keeping eyelids open; and difficulty standing, walking or speaking. These signs should be investigated to assess whether they can be used as early indicators of pending overdose that warrants intervention with nal-oxone. Such signs may also be useful for developing overdose prevention and response interventions that do not involve opioids, such as those involving alcohol and benzodiazepines or stimulants. Asking people who use opioids or other drugs about characteristics of their overdose-related experiences can enhance our understanding of the conditions that lead to overdose morbidity and mortality. Conversely, informing people who use opioids or other drugs of overdose signs and symptoms can increase their risk awareness and the likelihood they respond appropriately to overdose situations (Canadian Agency for Drugs and Technologies in Health 2015; Lott & Rhodes, 2016; Maldjian, Siegler, & Kunins, 2016).

We developed the scale for use in quantitative studies of opioid misuse and overdose risk to assess overdose events. However, the scale may also be useful clinically given that it incorporates signs and symptoms of overdose that would be missed using a single-item self-report or breathing and losing consciousness criteria. The items can be self-administered or administered by an interviewer.

Overdose items had varying patterns of correlation with risk behaviors. Perhaps not surprisingly, concurrent use of opioids with alcohol and other drugs correlated significantly with several overdose indicators. Concurrent use of other drugs complicates overdose response for several reasons. First, naloxone only reverses the effects of opioids, so if the overdose is caused mainly by benzodiazepines, alcohol, or sleep medication, naloxone will fail to revive the victim. If the overdose includes long acting opioids such as methadone, then the use of naloxone may appear to be effective initially, but may wear off, requiring further naloxone administration. Interestingly, heroin use (without concurrent use of other drugs or alcohol) and injecting drugs were not associated with overdose self-perceptions. The lack of correlation of naloxone use with risk behaviors was likely due to the infrequency

of naloxone use in this sample. As a multiple-item measure, the scale may be more reliable than any single-item indicator (Hoeppner, Kelly, Urbanoski, & Slaymaker, 2011).

Limitations

Reporting of overdose symptoms is affected by the presence of bystanders, and many overdose events occur with no others present, which may speak to the low endorsements for nal-oxone use and calls for medical assistance. Participants may have had inconsistent interpretations regarding overdose items. Differential recall and variations in interpretations of experiences, which are characteristic of self-reported data, cannot be excluded. The potential Cronbach's alpha value was limited by the relative infrequency of naloxone use, calling for medical assistance and difficulty breathing. Nonetheless, we retain these items as they can clearly indicate an overdose.

Future Research

These results should be replicated in other populations because the generalizability of our results, with veterans in New York City who use opioids, is unclear. In addition, a prospective-longitudinal study could evaluate predictive validity. Research is needed to determine whether the increased proportion of participants experiencing one or more overdose events as captured by the new scale is informative for developing overdose prevention and response interventions or helping treatment providers communicate overdose risks with their patients. We are currently utilizing RODES as a measure of the range and frequency of nonfatal overdose events to test biopsychosocial hypotheses regarding causes of overdose risk behaviors and overdose events among veterans over time (Bennett, Elliott, & Golub, 2015; Pouget et al., 2017).

Conclusion

Improved understanding of nonfatal opioid overdose experiences is essential because consumption of opioids continues to increase globally, and nonfatal overdose is an indicator for future overdose morbidity and mortality. Results of this study suggest that studying perceptions of specific overdose signs and symptoms may hold the potential to inform the refinement of overdose prevention and response interventions.

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Biographies

Enrique Rodriguez Pouget is an epidemiologist whose work is focused on social determinants of health and racial/ethnic health disparities. His research includes studies of mental disorders, substance use, and transmission of infectious diseases, concentrating on quantitative methods and analyses.

Dr. Alex S. Bennett is a principal investigator and deputy director of NDRI's Center for Community and Health Disparities Research. Dr. Bennett's current work focuses on overdose prevention and response and his projects include a study of Opioid Use/Misuse and Overdose Risk among veterans (R01DA036754) that will help to better understand the biological and psychosocial aspects of opioid use and overdose. Dr. Bennett is also conducting a stakeholder analysis to better understand perspectives on naloxone use and impacts among a range of populations including those who have survived an overdose and the many peers and other first responders that have helped to reverse a potentially fatal OD.

Luther Elliott is a principal investigator and cultural and medical anthropologist who focuses on pathways to substance use and behavioral addictions. Elliott's interests in vulnerable subcultures and populations have involved studies of emergent subcultures of psychedelic drug use, marijuana use (R01DA013690), Hurricane Katrina's evacuees (R01DA021783), and veterans' health (R01AA020178). Dr. Elliott recently served as principal investigator on a 3-year study of developmental relationships between video game and substance use (R01DA027761) and is now serving as project director and co-investigator on a study of military veterans' overdose risks and prevention efforts.

Andrew Rosenblum is NDRI's executive director as well as the director of NDRI's Institute for Treatment and Services Research at NDRI. His recent research has focused on agonist medications in the criminal justice system, prescription opioid abuse, and eHealth interventions for chronic pain patients and PTSD symptomatic substance-misusing veteran.

Peter Britton, Ph.D. is a clinical psychologist at the VISN 2 Center of Excellence (CoE) for Suicide Prevention at the Canandaigua VA Medical Center, and an Assistant Professor in the Department of Psychiatry at the University of Rochester Medical Center. His work is supported by a Career Development Award from Department of Veterans Affairs, Clinical Science Research and Development (CSR&D; IK2CX000641).

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Table 1Participant Characteristics (*N* = 240 Opioid-Using Military Veterans).

Characteristic	%/ <i>M</i> (<i>SD</i>)
Age	36.6 (9.45)
Years since discharge from military service	7.0 (4.94)
Gender (% male)	85.4
Hispanic ethnicity	21.3%
Racial category	
Black/African American	67.1%
White	26.3%
American Indian or Alaska Native	1.3%
Asian	0.8%
Multiple races	2.1%
Not reported	2.5%
Educational level	
Did not complete high school	2.9%
High school graduate or equivalent	36.8%
Some college or Associates degree	46.9%
College graduate	7.5%
More than college	5.8%
Currently enrolled in school	18.0%
Marital status	
Single and never married	52.7%
Married	14.6%
Divorced or separated	32.7%
Current employment	
Working full-time or part-time	24.4%
Unemployed due to disability	24.4%
Unemployed for other reasons	51.3%
Receiving veteran's disability	37.2%
Current medical treatment	
Receiving treatment for drug use	16.4%
Receiving treatment for mental health conditions	27.5%
Current prescriptions for pain, OUD, or psychiatric drugs	
Opioid analgesic	44.8%
Methadone for OUD	6.1%
Buprenorphine for OUD	2.7%
Benzodiazepines	20.4%
Sleep medication	24.9%
Other psychiatric drugs ^a	25.4%
Drug use in the past 30 days (either medically or nonmedically)	
Heroin	26.0%

Characteristic	%/ <i>M</i> (<i>SD</i>)
Injected opioids	12.7%
Used buprenorphine	6.1%
Used antianxiety drugs	39.2%
Used sleep medication	34.3%

Note. OUD = opioid use disorder. Percentages may not add to 100 due to missing data for some items.

^a other psychiatric drugs were those for major depression, epilepsy, Parkinson's disease, psychosis or schizophrenia.

Table 2

RODES Items and Results.

Item	<i>M (SD)</i>	Percent reporting use on 1 or more days	Item-total correlation	Alpha if item deleted
1. Overdose self-perception	1.5 (4.80)	18.2	.60	.59
2. Others' perceptions of overdose	2.1 (6.04)	23.8	.59	.63
3. Difficulty breathing	0.5 (2.51)	9.9	.29	.69
4. Collapsed	0.7 (2.30)	17.1	.59	.63
5. Lost consciousness	0.8 (3.28)	13.8	.60	.61
6. Medical assistance called	0.1 (0.72)	6.6	.34	.70
7. Used naloxone	0.02 (0.17)	1.1	.09	.71

Note. RODES = Recent Overdose Experiences Scale.

Table 3

Correlations of RODES Items and Mean With Criterion Validators.

	Injecting drugs	Heroin use	Concurrent use of alcohol and opioids	Concurrent use of antianxiety drugs and opioids	Concurrent use of sleep aids and opioids	Concurrent use of stimulants and opioids	Concurrent use of alcohol, antianxiety drugs and opioids
1. Overdose self-perception	.05	.02	.35**	.28**	.19*	.37**	.44**
2. Others' perceptions of overdose	.17*	.16*	.28**	.15*	.05	.22**	.36**
3. Difficulty breathing	.01	.29**	.04	.00	-.03	.20**	.07
4. Collapsed	.22**	.07	.24**	.16*	.01	.48**	.31**
5. Lost consciousness	.20**	.25**	.19*	.25**	.18*	.46**	.31**
6. Medical assistance called	.01	.21**	.02	.19*	.09	.31**	.10
7. Used naloxone	.13	.10	-.05	.01	-.04	-.03	-.03
RODES mean	.17*	.20**	.33**	.25**	.13	.45**	.44**

Note. RODES = Recent Overdose Experiences Scale.

* $p < .05$.

** $p < .01$.

Table 4

Correlations Among RODES Items.

	2.	3.	4.	5.	6.	7.
1. Overdose self-perception	.47**	.15	.50**	.60**	.32**	.01
2. Others' perceptions of overdose	—	.38**	.47**	.40**	.19*	.16*
3. Difficulty breathing		—	.12	.15	.14*	.00
4. Collapsed			—	.56**	.18*	.04
5. Lost consciousness				—	.38**	.03
6. Medical assistance called					—	.21**
7. Used naloxone						—

* $p < .05$.

** $p < .01$.