Published in final edited form as:

Drug Alcohol Depend. 2012 January 1; 120(1-3): 168–173. doi:10.1016/j.drugalcdep.2011.07.018.

Characteristics of drug users who witness many overdoses: Implications for overdose prevention

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Abstract

Background—Programs to improve response of drug users when witnessing an overdose can reduce overdose mortality. Characteristics of drug users may be associated with the number of overdoses ever witnessed. This information could inform overdose prevention programs.

Methods—Participants in New York City, who were age 18 and older with heroin and/or with cocaine use in the past two months, were administered structured interviews (n = 1,184). Survey topics included overdose response, drug use behavior, treatment history, and demographic information.

Results—In a multivariable negative binomial regression model, those persons who are male (IRR [Incidence Rate Ratio] = 1.7, CI [95% Confidence Interval] = 1.4,2.2), have experienced homelessness (IRR = 1.9, CI = 1.4,2.6), have used heroin (IRR = 2.0, CI = 1.3,3.2), have overdosed themselves (IRR = 1.9, CI = 1.6,2.4), and have attended Narcotics Anonymous (IRR = 1.3, CI = 1.1,1.6) witnessed a greater count of overdoses in their lifetime. Those persons who have witnessed more overdoses were less likely to have sought medical assistance (OR [Odds Ratio] = 0.7) and more likely to report counter-productive or ineffective actions (ORs between 1.9 and 2.4) at the last overdose they witnessed compared to persons who had only ever witnessed one or two overdoses.

Conclusions—Persons at high risk for overdose are likely to witness more overdoses. Persons who had witnessed more overdoses were more likely to report taking ineffective action at the last overdose witnessed; individuals who have witnessed many overdoses are likely key targets of overdose response training.

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Contributors: All authors contributed to the conceptualization and design of the analyses. Sandro Galea contributed to the design of the data collection. Authors Amy Bohnert took responsibility for conducting analyses and writing the first draft of the manuscript. Sandro Galea and Melissa Tracy provided substantive and conceptual feedback on all drafts.

Conflict of Interest: All authors declare they have no conflicts of interest.

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Keywords

overdose; heroin; cocaine; prevention

1. Introduction

Accidental drug overdoses are a major cause of mortality among opiate and cocaine users (Bargagli et al., 2001; Pavarin, 2008). Non-fatal overdoses are also associated with a number of potential harms (Warner-Smith et al., 2002; Warner-Smith et al., 2001) and are a relatively common event among chronic drug users (Bennett and Higgins, 1999; Darke et al., 1996; Gossop et al., 1996; Kaye and Darke, 2004; Latkin et al., 2004; McGregor et al., 1998; Tracy et al., 2005; Warner-Smith et al., 2002). Consequently, reducing the frequency of overdoses and improving the outcome of overdoses by reducing morbidity and mortality through prompt medical care are important objectives towards the goal of reducing harm related to drug use.

Drug overdoses frequently occur in the presence of witnesses (Baca and Grant, 2007; Darke et al., 1996; Powis et al., 1999; Zador et al., 1996); among drug users who have had an overdose, as many as 85% report that at least one person was present at the time of their last overdose (Powis et al., 1999). Survey-based studies have indicated that the prevalence of witnessing among drug users may range between 24% and 94% (Baca and Grant, 2007; Bennett and Higgins, 1999; Best et al., 2002; Davidson et al., 2002; Kaye and Darke, 2004; Pollini et al., 2006a; Tracy et al., 2005). These data suggest that drug users may frequently be witnesses at the overdoses of other drug users. Witnesses at an overdose are able to intervene and reduce the risk of fatality through actions such as calling for medical help and providing first aid, and research indicates that overdose witnesses frequently do attempt to intervene (Best et al., 2002; Davidson et al., 2002; Pollini et al., 2006a; Tracy et al., 2005). Drug users also report barriers to seeking medical help when witnessing an overdose, such as fear of legal consequences and the belief that it could be handled without medical help, (Pollini et al., 2006a; Tracy et al., 2005). A number of recent intervention trials with heroin users suggest that psychoeducational programs can improve response when witnessing an overdose, address barriers to seeking medical help, and train participants on how to administer take-home doses of naloxone to reverse opioid overdoses (Green et al., 2008; Markham Piper, 2008; Seal et al., 2005; Strang et al., 2008; Tobin et al., 2008).

The implementation of overdose prevention and response trainings within communities would be aided by research to identify individuals who are key targets for such trainings. Previous studies have suggested that drug users who are embedded in social networks including large numbers of injection drug users (Latkin et al., 2004) and those who are cocaine users and/or non-injection drug users (Bohnert et al., 2009) may benefit from overdose prevention and response trainings. Another potentially key group to target with such interventions is drug users who witness many overdoses over the course of their drug use career. Drug users with a history of witnessing many overdoses are likely to witness more overdoses in the future, and consequently are important to engage in overdose fatality prevention training. However, little is known about the characteristics of drug users who find themselves witness to many overdoses. Information on the drug use and demographic characteristics as well as treatment experiences of those drug users who witness many overdoses may inform the tailoring of witness-based overdose prevention efforts.

Additionally, in order to identify sub-groups who are less likely to respond to overdoses effectively and who may be appropriate targets of overdose response trainings, data on how particular sub-groups of drug users vary in their response to overdoses are needed. In

particular, it is not known how response to overdose relates to past frequency of witnessing overdoses. Those persons who have witnessed a greater number of overdoses may have more knowledge of appropriate actions to take at an overdose, but those same persons may have had more prior negative experiences responding to overdose (e.g., police involvement) or be more likely to attempt to help the overdose victim on their own and without seeking medical help.

The objectives of the present investigation were two-fold. First, in order to identify characteristics of drug users who may witness many overdoses throughout their drug use career, we examined demographic, drug use, drug treatment, and overdose characteristics associated with the count of overdoses witnessed within a sample of urban drug users. Second, in order to assess whether drug users who have witnessed many overdoses react appropriately in such situations, we examined the actions taken at the last witnessed overdose among those with a history of witnessing many overdoses in comparison to the actions taken by those who have witnessed only a few overdoses in their lifetime.

2. Methods

2.1 Study Design and Sample

The present study used cross-sectional survey-based data and was part of a larger study concerned with determinants of HIV and concurrent HCV (Diaz et al., 2001a,b). Participants were recruited from the Central Harlem and South Bronx neighborhoods of New York City ($n = 1,184$) in November of 2001 through February of 2004. Prior to the initiation of the larger study, ethnographic research was used to identify locations where drug use was common at the time. These locations were then chosen as sites of recruitment. Recruitment was conducted through targeted sampling with street outreach techniques (Diaz et al., 2001a,b; Ompad et al., 2005). Study recruiters were residents of the same neighborhoods from which participants were recruited. Recruiters approached potential participants in public areas known to be locations where drug users congregate and assessed eligibility through structured questions. Eligibility criteria included being at least 18 years of age and having used cocaine or heroin in the prior two months. Eligible and interested individuals were escorted by the recruiters to study offices located within each neighborhood.

Data collection methods have been described in detail elsewhere (Galea et al., 2006; Tracy et al., 2005). Structured in-person interviews were conducted in English or Spanish by trained interviewers. Oral informed consent was obtained from all participants at the time of interview. Interviews were conducted in private and participant responses were protected by a federal certificate of confidentiality. Study data were double-entered and stored on password-protected computers, with hard copies of data destroyed at the end of the study. Participants received \$5 to participate. The New York Academy of Medicine Institutional Review Board approved the study protocol. Referrals to substance use treatment were made as appropriate.

2.2 Measurement

The study survey included questions on demographic characteristics, experiences having and witnessing drug overdoses, and other experiences related to drug use. "Overdose" was defined as when someone collapses, has blue skin, has convulsions, has difficulty breathing, loses consciousness, cannot be woken up, has a heart attack or dies while using drugs (McGregor et al., 1998; Ochoa et al., 2001). To determine lifetime count of witnessed overdoses, participants were asked "In your life, how many times have you seen someone else overdose?" Participants were also asked about lifetime use of specific types of substance use treatment services, whether they had ever experienced a non-fatal overdose,

whether they had ever used specific substances, and whether they had ever injected drugs. Those who reported having injected drugs were also asked whether they had ever injected multiple drugs together (e.g., cocaine and heroin as in a speedball) and whether they currently usually inject alone or with others. Demographic variables included sex, race (categorized as Black, Hispanic, or White/Other), marital status (categorized as married, never married, or separated/divorced/widowed/other), educational attainment, and whether the participant has ever been homeless.

Those who had ever witnessed at least one overdose were asked a series of questions about the last overdose they had witnessed. Participants were asked to list all actions that they or another witness took in response to the overdose, and interviewers checked off items from a list of sixteen behaviors. These behaviors included calling an ambulance; taking the victim to the hospital; checking the victim for consciousness; checking the victim for a pulse or breathing; giving the victim a shower or bath or applying ice; giving the victim CPR; injecting the victim with salt, water, speed, or bleach; and causing pain to try to wake the victim. Participants who reported that they or others present called or got medical help for the victim at the last overdose witnessed were asked whether they had delayed getting such help. Reasons for delaying getting help or not getting help were ascertained, using a list of thirteen common reasons (e.g., fear of police involvement, thought could take care of it without help). Participants were also asked whether the overdose victim survived.

2.3 Statistical Analysis

We calculated frequency distributions for the variables of interest. We also calculated the percent of last overdoses that were witnessed by individuals also using drugs among those participants who themselves had had at least one overdose in this sample to further validate the drug network approach to overdose prevention.

We used multivariable negative binomial regression modeling of the count of witnessed overdoses with simultaneous entry of demographic, drug use, treatment and overdose history characteristics. Model results are reported in terms of incidence rate ratios, which reflect the ratio of the count of witnessed overdoses for groups that are one unit apart on an independent variable, holding other variables constant. Negative binomial regression modeling was chosen over Poisson regression because the data were overdispersed. Akaike and Bayesian Information Criteria also confirmed that a negative binomial regression model better fit the data than Poisson or zero-inflated regression models. We fit two additional models among subsets of the respondents: one included only those respondents who reported ever injecting drugs in order to be able to examine associations with factors specific to injection drug use, and one included only those respondents who reported ever using heroin because the extant research has focused on developing witness-based interventions specifically for heroin users through naloxone distribution.

Next we used logistic regression modeling to examine the association between the number of overdoses ever witnessed and the actions taken at the last overdose witnessed. This analysis was restricted to individuals who reported witnessing at least one overdose, and separate models were fit for each of the seven most common actions reportedly taken at the last overdose. The independent variable for each model was a four-category variable that roughly represented quartiles of the distribution of the number of overdoses witnessed for the sample, with categories of 1-2, 3-5, 6-10, and 11 or more witnessed overdoses. All models adjusted for respondent length of drug use career and overdose history. The model for the action of injecting the overdose victim with water, salt, speed, or bleach was further adjusted for respondent injection status.

2.4 Missing Data

The final sample for the primary analysis for the present study was 1,093 because 91 (7.7%) observations were missing data on variables included in modeling. Individuals not included in analysis were not different from those included in terms of the mean count of witnessed overdoses or any of the independent variables of interest except having a history of overdose (46% among those not included compared to 36%, $p = 0.05$) and race (40% Black among those not included compared to 27%, $p = 0.02$). For the model restricted to the 899 individuals with a lifetime history of injecting drugs, 830 (92.3%) individuals were not missing data and included in analysis. Those missing from this analysis were not different than those retained on the additional injection-specific variables that were added to modeling for this step. For the model restricted to the 1,044 individuals reporting lifetime heroin use in the original sample, 16 (1.5%) individuals with a known history of heroin use could not be included due to missing data on variables included in the model.

The analysis of actions taken during the last witnessed overdose included all individuals from the original sample who had witnessed at least one overdose. Of the 797 individuals who qualified for inclusion, 86 (10.7%) were missing data on at least one of the actions or outcomes of the last witnessed overdose that were examined. Each model included all observations with complete data for the variables included in that model.

3. Results

Among the 1,093 individuals in the analytic sample, 94.1% reported lifetime heroin use, 75.9% reported injection drug use, 73.2% were male, 35.7% had experienced a non-fatal overdose, and 73.4% had been using drugs for sixteen years or more. The count of overdoses ever witnessed ranged between 0 and 200. The distribution of witnessed overdoses was highly skewed. The median number of witnessed overdoses was 2 and the mean number of witnessed overdoses was 7.8. Over 30% of the sample reported witnessing zero overdoses. Among the 390 individuals in the analytic sample who reported having had at least one non-fatal overdose themselves, 64.5% reported that someone else was present at their last overdose. At least one witness was also using drugs at the time for 85.9% of those whose last overdose was witnessed by someone else (56.3% of all who had overdosed).

3.1 Multivariable Models of Number of Witnessed Overdoses

Table 1 reports the results of multivariable negative binomial regression models of the count of overdoses ever witnessed among the entire analytic sample, among those who ever injected drugs, and among those who ever used heroin. For all three models, having attended Narcotics Anonymous, having been homeless, being male, and having had a non-fatal overdose was associated with an increase in the count of overdoses ever witnessed after adjustment for other demographic characteristics. A history of heroin use was also associated with a higher count of overdoses ever witnessed. Among injectors, usually injecting alone was associated with a lower count of overdoses ever witnessed, while a history of injecting multiple drugs simultaneously was associated with a higher count of overdoses ever witnessed. All injectors had used heroin at least once, so heroin use could not be included in the model specific to injectors. Among heroin users, a history of attending methadone maintenance treatment was not associated with the count of overdoses witnessed.

3.2 Associations between Number of Overdoses Ever Witnessed and Events at Last Witnessed Overdose

The count of overdoses ever witnessed was associated with actions taken at the last overdose witnessed, adjusting for respondent overdose history and length of drug use career (Table 2). We found that individuals who had witnessed eleven or more overdoses were less likely to

report that medical help was sought for the victim during the last overdose they witnessed compared to individuals who had only ever witnessed one or two overdoses. We also found evidence that individuals who had witnessed more overdoses were *more* likely to report potentially dangerous or counterproductive actions at the last overdose they witnessed; compared to individuals who had only witnessed one or two overdoses, those individuals who had witnessed three to five or eleven or more overdoses were more likely to report that the victim was injected with water, salt, speed, or bleach. Those individuals in these same groups were also more likely to report that the victim was showered, bathed, or ice was applied to the victim's body, and that witnesses caused pain to try to wake up the victim, strategies which, while potentially effective at reviving an overdose victim, are also potentially dangerous.

Among those who delayed or did not get medical help, those individuals who had witnessed eleven or more overdoses were more likely to report that the belief that the overdose could be handled without medical help was the reason for not getting help promptly. However, despite having more experience with responding to an overdose, those who had witnessed more overdoses in their lifetime were no more likely to report that the overdose victim lived (which occurred 77.5% of the time) during the last overdose witnessed compared to those who had only witnessed one or two overdoses.

4. Discussion

The present study examined characteristics of urban drug users in a community sample who have witnessed many overdoses throughout their drug use career and how the actions taken at the last witnessed overdose relate to the number of overdoses ever witnessed. We found a number of factors to be significantly associated with the count of overdoses ever witnessed. Persons who are male, who have experienced homelessness, who have used heroin, and who have overdosed themselves may witness more overdoses over their drug use careers. Additionally, a key finding of this study was that those persons who have witnessed more overdoses were less likely to have sought medical assistance and more likely to report potentially dangerous, counter-productive or ineffective actions at the last overdose they witnessed compared to persons who had only ever witnessed one or two overdoses.

We found evidence that individuals who themselves have greater overdose risk witness more overdoses. If the majority of overdoses witnessed by drug users are those of individuals in their drug network, the apparent correlation between personal overdose risk and the count of overdoses ever witnessed suggests that overdose risk may be concentrated within particular drug networks with riskier drug use norms (e.g., preferences in drugs or drugs used in combination, route of administration) (Latkin et al., 2004), though more research is still needed to support this conclusion. Similarly, among injectors, higher numbers of witnessed overdoses were reported by those individuals who have injected multiple drugs together, a behavior which is also associated with greater overdose risk (Ochoa et al., 2001; Seymour et al., 2000). These findings suggest that individuals who themselves have increased overdose risk are potentially key targets of overdose witness training intervention efforts, consistent with prior studies that have found that individuals who have overdosed are less likely to call for emergency medical services when witnessing an overdose (Tobin et al., 2005; Tracy et al., 2005). The present findings (including the finding that 56.3% of non-fatal overdoses experienced by those in the sample were witnessed by someone using drugs) also provide some validation of the network-based approach to interventions to date (Green et al., 2008; Markham Piper, 2008; Seal et al., 2005; Strang et al., 2008; Tobin et al., 2008).

The implications of the association with Narcotics Anonymous are complicated due to the unknown temporality of the cross-sectional data. Individuals who have witnessed more overdoses may be more likely to enter treatment as a result of those experiences (Pollini et al., 2006b). Consequently, many of the overdoses witnessed by those participants who have attended Narcotics Anonymous may have occurred before, rather than after, attendance at Narcotics Anonymous. Treatment history is likely associated with severity of substance use problems in this sample, which may explain the association between Narcotics Anonymous attendance and count of overdoses ever witnessed. However, we did not find evidence that persons who had attended methadone maintenance treatment have also witnessed more overdoses than those who do not. Nonetheless, given the particularly notable increases in methadone-related overdoses in recent years (Fingerhut, 2008), programs which distribute methadone may still have an important role in overdose prevention efforts.

Several aspects of the present findings raise particular concern for overdose prevention efforts. We found that those individuals who witness more overdoses are more likely to report not getting medical help for the victim at the last overdose they witnessed. It is possible that past negative experiences with calling for help during previously witnessed overdoses have discouraged drug users with a history of many witnessed overdoses from calling for help at the most recent overdose. However, the likelihood of delaying or preventing calling for help because of fear of police involvement did not differ across groups. Further research is needed to examine if other aspects of getting help, such as interactions with emergency medical staff (Neale, 1999), differs between these groups. We did find that individuals who had witnessed eleven or more overdoses were more likely than individuals who had witnessed few overdoses to report not seeking or delaying getting medical help for the victim because they believed that they could handle it on their own. Despite this belief, individuals with a high count of witnessed overdoses were no more likely to report that CPR was provided to the victim, that the victim was checked for consciousness, or that the victim lived. Additionally, individuals who had witnessed more overdoses were also more likely to report taking potentially dangerous and/or less effective actions in response to the overdose, including injecting the victim with salt, water, speed, or bleach. These associations were not accounted for by length of drug use career. Taken together, these findings suggest that those individuals who may have the most frequent opportunities to intervene and reduce the risk of death are no more likely to intervene appropriately, and are actually more likely to intervene inappropriately, than individuals who have only had few opportunities to intervene. More research is needed to understand the specific psychoeducational needs for these individuals to combat myths about effective reversal of an overdose and overcoming resistance to seeking medical help for the victim.

This finding has important implications for witness-based overdose prevention efforts. Clearly, individuals who have witnessed many overdoses are a key target of network-based overdose witness interventions because of the association of count of overdoses witnessed with ineffective or potentially dangerous actions taken at the last witnessed overdose. Stakeholders such as law enforcement officials and emergency medical service staff may be well-positioned to provide referrals or other information to the witnesses at an overdose or to identify individuals who have been present at multiple overdoses and link those persons to witness training services.

There are several limitations to this study. The data were retrospective and cross-sectional, and subject to errors and biases in recall. Longitudinal data would aid in understanding causal relations between individuals' characteristics and behaviors with the frequency of witnessing overdoses. It is possible that individuals who witnessed more overdoses preferred revival strategies that are potentially dangerous and/or were hesitant to call for medical help

prior to having witnessed any overdoses, with these beliefs remaining unchanged by experience, rather than their prior overdose witnessing experiences affecting these beliefs and behaviors. However, this distinction does not alter the inference that individuals who have witnessed many overdoses are an important target of response training. The recruitment methods do not allow for a calculation of the percentage of eligible participants who refused participation. Participants may have underreported the number of overdoses they have witnessed in an effort to expedite the interview. The study was also limited to one geographic region, and findings may be different for other geographic areas with other drug use norms. Data were collected prior to the passing of a law in New York in 2006 which legalized the use of naloxone by non-medical persons for the purpose of treating an overdose (New York State Department of Health, 2011), and findings regarding actions taken at overdoses may have been influenced by this change. The present study is not able to address ways to reduce overdose fatality that occur when the overdose victim is alone.

Despite these limitations, this study has several important implications for overdose fatality prevention. Individuals who themselves are at high risk for an overdose, such as those individuals who have had a prior non-fatal overdose (Coffin et al., 2007) and who inject multiple drugs together (Ochoa et al., 2001; Seymour et al., 2000), are likely to witness more overdoses and consequently are important targets of overdose prevention interventions. Males, heroin users, and individuals who have experienced homelessness also are also likely to witness more overdoses than individuals without these characteristics. Community-based programs for homelessness may be one appropriate setting for overdose fatality prevention training. Unfortunately, individuals who have witnessed more overdoses also are more likely to report that potentially dangerous and/or less effective actions were taken and less likely to report that medical help was sought for the victim at the last overdose witnessed. This finding suggests that targeting overdose fatality prevention interventions for individuals likely to witness many overdoses is sorely needed in order to have an impact on witness behavior.

Acknowledgments

Role of Funding Source: This research was funded by grants MH-053399, DA-06534, DA-12801-S1, and DA-017642 from the National Institutes of Health and VA HSR&D grant CDA-09-204. The funding agencies had no additional role in study design, data collection, analysis and interpretation of the data, nor in the preparation and submission of the report, including the decision to submit.

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Table 1

Multivariable negative binomial regression models of the lifetime count of witnessed overdoses.

Covariates	Model 1: Entire Sample			Model 2: Injectors ^a			Model 3: Heroin Users ^b		
	Entire Sample	N (%)	IRR	95% CI	N = 1,093	95% CI	IRR	95% CI	N = 1,028
<i>Treatment (lifetime)</i>									
Narcotics Anonymous		390 (35.7)	1.3	1.1, 1.6	1.5	1.2, 1.9	1.4	1.1, 1.7	
Methadone Maintenance		738 (71.8) ^c	--	--	--	--	0.9	0.7, 1.1	
<i>Overdose experience</i>									
Has Ever Overdosed		390 (35.7)	1.9	1.6, 2.4	1.9	1.5, 2.4	1.8	1.5, 2.3	
<i>Drug Use</i>									
Ever used heroin		1,028 (94.1)	2.0	1.3, 3.2	--	--	--	--	
Usually inject alone		534 (64.3) ^d	--	--	0.7	0.5, 0.9	--	--	
Ever inject multiple drugs together		627 (75.5) ^d	--	--	1.6	1.2, 2.1	--	--	
<i>Length of drug use career</i>									
-less than 16 years		291 (26.6)	REF.		REF.		REF.		
-16 to 21 years		290 (26.5)	0.7	0.5, 0.9	0.7	0.5, 1.0	0.7	0.5, 0.9	
-22 to 27 years		266 (24.3)	0.8	0.6, 1.1	0.8	0.6, 1.2	0.8	0.6, 1.1	
-28+ years		246 (22.5)	1.3	1.0, 1.8	1.2	0.9, 1.8	1.4	1.0, 1.9	
<i>Demographics</i>									
Sex, male		800 (73.2)	1.7	1.4, 2.2	2.0	1.5, 2.6	1.7	1.3, 2.2	
<i>Race</i>									
-Black		290 (26.5)	REF.		REF.		REF.		
-Hispanic		667 (61.0)	1.3	1.0, 1.7	1.3	0.9, 1.8	1.3	1.0, 1.8	
-White/Other		136 (12.4)	1.1	0.8, 1.6	1.2	0.8, 1.8	1.1	0.8, 1.6	
<i>Marital Status</i>									
-Never Married		689 (63.0)	REF.		REF.		REF.		
-Married		148 (13.5)	0.8	0.6, 1.0	0.7	0.5, 1.0	0.8	0.6, 1.0	
-Separated/Widowed/Divorced/Other		256 (23.4)	1.2	1.0, 1.6	1.4	1.0, 1.8	1.2	1.0, 1.6	
High School Degree		543 (49.7)	1.1	0.9, 1.4	1.0	0.8, 1.3	1.1	0.8, 1.3	

Covariates	Model 1: Entire Sample		Model 2: Injectors ^a		Model 3: Heroin Users ^b	
	Entire Sample	N = 1,093	N = 830	N = 1,028		
	N (%)	IRR	95% CI	IRR	95% CI	IRR
Homelessness (lifetime)	953 (87.2)	1.9	1.4, 2.6	1.6	1.1, 2.3	1.4, 2.7

^a Defined by whether respondents reported ever injecting heroin, cocaine, speed, or methadone alone or in combination.

^b Defined by whether respondents reported ever using heroin via any route of administration.

^c Among heroin users in sample, n = 1,028.

^d Among injectors in sample, n = 830.

IRR = incidence rate ratio; bold indicates significant at $p < 0.05$

Table 2

Associations of actions taken by witnesses at last witnessed overdose with overdose witnessing history, among those who had witnessed at least one overdose, n = 797 (witnessed 1-2 overdoses ever is the reference).^a

Dependent Variables	Count of Lifetime Witnessed Overdoses (WODs)			
	3-5 WODs	6-10 WODs	11+ WODs	
<i>Actions Taken</i>	N (%)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Took to hospital or called ambulance	346 (44.3)	0.9 (0.6, 1.4)	0.9 (0.6, 1.4)	0.7 (0.4, 1.0)
Gave victim CPR	70 (9.0)	1.3 (0.7, 2.5)	0.9 (0.4, 1.9)	1.0 (0.5, 2.0)
Checked consciousness, breathing or pulse	163 (20.8)	1.0 (0.6, 1.7)	1.2 (0.7, 1.9)	1.2 (0.7, 1.9)
Injected victim with water, salt, speed or bleach	140 (17.9)	1.9 (1.1, 3.4)	1.3 (0.7, 2.4)	2.4 (1.4, 4.3)
Showered, bathed, or applied ice to victim	292 (37.4)	1.5 (1.0, 2.3)	1.1 (0.7, 1.7)	2.1 (1.4, 3.2)
Caused pain to try to wake the victim	130 (16.7)	1.8 (1.0, 3.1)	1.5 (0.8, 2.7)	1.9 (1.1, 3.3)
Delayed or did not call for help due to fear of police involvement ^b	204 (54.8) ^b	1.1 (0.6, 1.9)	1.7 (0.9, 3.1)	1.5 (0.9, 2.8)
Delayed or did not call for help due to belief they could handle it ^b	96 (27.3) ^b	1.2 (0.6, 2.4)	1.3 (0.6, 2.7)	2.2 (1.1, 4.3)
<i>Outcome of Response</i>				
Victim Died	162 (22.5)	1.0 (0.6, 1.7)	1.0 (0.6, 1.6)	0.9 (0.6, 1.5)

^a All models adjusted for respondent length of drug use career and overdose history. Model of “injected victim with water, salt, speed, or bleach” additionally adjusted for respondent injection drug use status.

^b Among those who delayed or did not call for medical help

OR = odds ratio; bold indicates statistically significant at $p < 0.05$