

## Overdoses among friends: Drug users are willing to administer naloxone to others

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### Abstract

The distribution of naloxone to heroin users is a suggested intervention to reduce overdose and death rates. However, the level of willingness of drug users to administer this medication to others is unclear. Drug users recruited from the community between January 2002 and January 2004 completed a structured interview that assessed topics including drug use, overdose history, and attitudes toward using overdose remedies to assist others. Of the 329 drug users, 82% had used heroin and 64.3% reported that they had injected drugs. Nearly two thirds (64.6%) said that they had witnessed a drug overdose and more than one third (34.6%) had experienced an accidental drug overdose. Most participants (88.5%) said that they would be willing to administer a medication to another drug user in the event of an overdose. Participants who had used heroin ( $p = .024$ ), had injected drugs ( $p = .022$ ), had witnessed a drug overdose ( $p = .001$ ), or had a history of one or more accidental drug overdoses ( $p = .009$ ) were significantly more willing to treat a companion who had overdosed. Drug users were willing to use naloxone in the event of a friend's overdose. Specific drug use and overdose histories were associated with the greatest willingness to administer naloxone. © 2006 Elsevier Inc. All rights reserved.

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### 1. Introduction

Mortality caused by opioid overdose has increased dramatically over the last two decades (Centers for Disease Control and Prevention, 2000; Sporer, 1999). During that time, heroin-related visits to United States emergency departments approximately tripled—from 33,884 visits in 1990 to 93,518 visits in 2002 (DAWN, 2003).

Overdose of drugs such as heroin and morphine causes death by respiratory depression secondary to agonist activity at  $\mu$ -,  $\kappa$ -, and  $\delta$ -opioid receptors in the central nervous system (Sporer, 1999). The addition of other central nervous system depressants such as alcohol and benzodiazepine seems to increase risk for life-threatening respiratory

depression in the setting of toxic levels of opioid agonists (Coffin et al., 2003; Cook, Moeschler, Michaud, & Yersin, 1998; Darke, Ross, & Hall, 1996a, 1996b; Darke, Ross, Zador, & Sunjic, 2000; Seal et al., 2001).

In the emergency department, patients who have overdosed on opioids are treated with naloxone, a receptor antagonist that reverses respiratory depression associated with overdose (Sporer, 1999). It can be given intravenously or intramuscularly, but oral administration is not effective secondary to hepatic metabolism. Serious adverse effects are rare, but naloxone can precipitate symptoms of withdrawal in opiate-dependent individuals (Sporer, 1999).

Opioid overdose occurs commonly at home and with others present, a fact that is important because most deaths caused by opioid overdose do not occur immediately but often 1–3 hours after drug use (Darke et al., 2000). Unfortunately, most injection drug users will witness an overdose at least once, and although at least one study indicates the desire of drug users to intervene (Cook et al., 1998), the best interventions are often not used and

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emergency services are frequently not notified (Darke et al., 1996a, 1996b; Davidson et al., 2002).

A suggested strategy to combat increasing morbidity and mortality associated with opioid overdose is the prescribing and dispensing of naloxone to drug users (Darke & Hall, 1997; Sporer, 2003; Strang, Darke, Hall, Farrell, & Ali, 1996). Prior to the initiation of a large-scale trial on take-home naloxone, however, it must be determined whether drug users are receptive to the idea of administering the drug to others.

There are few studies exploring the willingness of drug users to administer naloxone to companions who overdose on opioids. Strang et al. (1999) in London reported that a large percentage of respondents agreed that the distribution of naloxone would be beneficial. Seal et al. (2003) in San Francisco reported that a large percentage of respondents would participate in an overdose management program teaching the administration of naloxone. Many questions regarding attitudes toward naloxone remain, however.

The purpose of this study was to examine the relationship between a history of witnessing or experiencing an overdose and the willingness of a heterogeneous group of drug users to treat overdose in others.

## 2. Materials and methods

### 2.1. Participant recruitment

Between January 24, 2002, and January 24, 2004, participants were recruited for a health service research study on drug users. The study was advertised as a quality-of-life research project with a financial incentive at various community agencies through newspaper advertisements and flyers handed out in the streets. Those interested were directed to call the study telephone number to be screened by study research assistants. During the recruitment period, 1,390 calls were received. If eligible after a telephone screening, individuals were invited to the research site at the Rhode Island Hospital (Providence, RI) for a more detailed assessment. Inclusion criteria assessed on the telephone included the following: (1) aged between 18 and 70 years; (2) heroin or cocaine injection during the preceding 30 days or noninjection heroin or cocaine use at least weekly for the past 6 months; (3) fewer than 30 of the last 90 days spent in institutional settings including prisons and residential drug treatments or hospitalization; (4) ability to speak English; (5) denial of intent to harm self or others; and (6) absence of psychosis. Of the 524 individuals who were eligible for the study based on the telephone screen, 344 scheduled and kept appointments. At this appointment, eligibility was confirmed by reviewing drug use frequency questions and administering the Structured Clinical Interview for DSM Disorders to determine the presence of psychosis. Based on these confirmatory questions, 14 individuals were deemed ineligible for the study, leaving a final sample of 330. The

final sample provided written consent for the study, which had been approved by the Rhode Island Hospital/Lifespan Institutional Review Board. Participants were then administered a 90-minute structured interview that included sections on demographics, mood, drug and alcohol use, health service use, overdose, and attitudes toward overdose remedies. Individuals participating in the interview received a \$20 compensation.

### 2.2. Measures

#### 2.2.1. Demographic characteristics

The following demographic variables were used: age in years, sex, and race or ethnicity.

#### 2.2.2. Substance use severity

Substance use was measured using the fifth edition of the Addiction Severity Index (ASI; McLellan et al., 1992). The ASI is a widely used structured clinical interview that assesses substance use/abuse (including days of use in the last 30 days) and psychosocial functioning in a variety of domains (including medical, employment, legal, family/social, and psychiatric).

#### 2.2.3. Overdose questions

Participants were asked, “Have you ever overdosed by accident?” and “Have you ever witnessed an overdose?” They were then asked four true/false statements: (1) “If there were a medication to treat a heroin overdose, I would be willing to give it to a drug buddy who overdosed”; (2) “I know how to do CPR [cardiopulmonary resuscitation]”; (3) “There is a medication to treat heroin overdoses [reverse the effects of the overdose]”; and (4) “If I witnessed an overdose, I’d be afraid to call an ambulance because the police would get involved.”

### 2.3. Analytical methods

We present a contingency table comparing willingness to administer medication to treat heroin overdose by hypothesized correlates (Table 2). We used the Pearson  $\chi^2$  statistic to assess the likelihood of Type I errors. Odds ratios were used to summarize the magnitude of observed associations. One participant refused to answer questions about experience with drug overdose. Our results are based on the 329 subjects for whom valid information on drug overdose was available.

## 3. Results

Of the participants, 62.0% were male and 54.6% were White (Table 1). The participants’ ages averaged 38.9 years ( $SD = 9.23$  years). Almost 82% had ever used heroin and 64.3% reported that they had injected drugs. Participants reported using heroin and/or cocaine for an average of

Table 1  
Characteristics of the study cohort ( $N = 329$ )

Age ( $M \pm SD$ )	38.90 $\pm$ 9.23
Male [ $n$ (%)]	204 (62.0)
White [ $n$ (%)]	181 (54.6)
Ever used heroin [ $n$ (%)]	270 (81.8)
Ever injected drugs [ $n$ (%)]	221 (64.3)
Ever witnessed overdose [ $n$ (%)]	212 (64.6)
Ever accidentally overdosed [ $n$ (%)]	114 (34.6)
Know CPR [ $n$ (%)]	199 (60.5)
Afraid to call for help [ $n$ (%)]	47 (14.3)
Know overdose medicines exist [ $n$ (%)]	96 (29.2)
Would give overdose drug (naloxone) [ $n$ (%)]	291 (88.5)

18.19 years ( $SD = 9.16$  years). Their mean ASI drug composite score was 0.267 ( $SD = 0.132$ ). Of those participating, 64.6% said that they had witnessed a drug overdose and 34.6% reported that they had experienced an accidental drug overdose. Approximately 60% of the participants said that they know CPR; only 14.3% said that they would be afraid to call for help if they witnessed a drug overdose; and 29.2% said that they knew that a drug existed with which to treat heroin overdose. Most participants (88.5%) said that if such a drug existed, then they would be willing to give it to a companion who overdosed.

Willingness to administer an overdose treatment was not systematically associated with sex ( $p = .876$ ) or age ( $p = .314$ ); however, Caucasians (91.7%) were significantly ( $p = .041$ ) more likely than those of other ethnic minorities (84.5%) to say that they would be willing to administer a drug in the case of heroin overdose.

Participants who had ever used heroin ( $p = .024$ ) and those with a positive history of injection drug use behavior ( $p = .022$ ) were significantly more likely to say that they

would give a drug to a buddy who had overdosed (Table 2). Being afraid to call an ambulance for help if they witnessed a drug overdose ( $p = .205$ ), knowledge of CPR ( $p = .160$ ), and knowledge that a drug to treat heroin overdose, such as naloxone, was available ( $p = .729$ ) were not associated significantly with willingness to administer a drug to a companion who had overdosed.

Participants who had witnessed a drug overdose were significantly ( $p = .001$ ) more likely to express a willingness to administer a drug to others in an overdose event (Table 2). Similarly, those with a history of one or more accidental drug overdoses were more likely to say that they would give a drug to a buddy who had overdosed ( $p = .009$ ) than those who had never overdosed on drugs.

#### 4. Discussion

In this study, most respondents (nearly 9 of 10) reported that they would give a medication to another person during a witnessed opioid overdose. However, a history of using heroin, a history of injecting any drug, a witnessed overdose at any point, and a personal history of overdose were associated with a significantly greater likelihood of administering naloxone in an overdose situation.

These findings are intuitive: a history of living in an injecting community might make one more aware of the risks of overdose. A history of seeing firsthand the devastating results of an opioid overdose might lead a person to be interested in preventing such an event again. A personal history of overdose would likely have a similar impact.

A previous study on 82 participants in the San Francisco Bay Area noted that more than 80% of respondents stated

Table 2  
Willingness to give overdose drug (naloxone) by hypothesized correlates ( $N = 329$ )

	Give naloxone?		OR (95% CI)	$\chi^2$ ( $p$ )
	Yes [ $n$ (%)]	No [ $n$ (%)]		
Ever used heroin				
Yes	243 (90.3)	26 (9.7)	3.61 (1.67–7.75)	5.13 (.024)
No	48 (80.0)	12 (20.0)		
Ever injected				
Yes	191 (91.5)	18 (8.5)	3.90 (2.20–6.94)	5.25 (.022)
No	98 (83.1)	20 (16.9)		
Afraid to call for help				
Yes	39 (83.0)	8 (17.0)	0.58 (0.25–1.36)	1.61 (.205)
No	252 (89.4)	30 (10.6)		
Know CPR				
Yes	180 (90.4)	19 (9.6)	1.62 (0.82–3.21)	1.98 (.160)
No	111 (85.4)	19 (14.6)		
Know of naloxone				
Yes	84 (87.5)	12 (12.5)	0.88 (0.42–1.83)	0.12 (.729)
No	207 (88.8)	26 (11.2)		
Witnessed overdose				
Yes	197 (92.9)	15 (7.1)	3.25 (1.60–6.60)	11.90 (.001)
No	93 (80.2)	23 (19.8)		
Accidentally overdosed				
Yes	108 (94.7)	6 (5.3)	3.15 (1.26–7.86)	6.75 (.009)
No	183 (85.1)	32 (14.9)		

that they would participate in an overdose management training program and would carry naloxone and show others how to use it (Seal et al., 2003). Our study confirms the finding that a large percentage of participants are interested in helping manage overdose and goes on to indicate that personal experience with overdose increases willingness to use a medication to treat overdose in opioid-using companions. Our data suggest that lack of specific knowledge of the existence of naloxone or of how to deliver CPR did not interfere with drug users' willingness to offer treatment.

As seen in several previous studies (Davidson et al., 2001; Seal et al., 2003; Strang et al., 1999), ours found overdose to be a common event in the lives of respondents. Nearly two thirds of the participants stated that they had witnessed an overdose and approximately one third reported overdosing themselves. This prevalence is important because the potential impact of a take-home naloxone trial is directly related to the rates of opioid overdose in the community.

One notable difference from previous studies (and perhaps an indication of a selection bias) is that a very low number (14%) of participants reported that they were afraid to call for help in the event of an overdose. Previous studies have reported much higher rates of fear of calling 911, often with more than 50% of respondents being afraid to call for help (Darke et al., 1996a, 1996b; Davidson, Ochoa, Hahn, Evans, & Moss, 2002). This significantly lower percentage may indicate that drug users who volunteer to participate in a research study might respond differently from those who do not volunteer.

Our findings have several limitations. This study was a cross-sectional survey based on self-report, and willingness to provide naloxone hypothetically may not translate into actual use in the field. In addition, the study sample consisted of a heterogeneous cohort of drug users in Providence, RI, and therefore the findings may not be generalizable to other populations.

In addition, there are risks with any intervention. In recent years, experts have debated on the pros and cons of a large-scale trial on the distribution of naloxone (Ashworth & Kidd, 2001; Bigg, 2002; Blackwood, 2001; Darke, Henry, & Strang, 1999; Galea & Coffin, 2003; Graham & McNaughton, 2001; Mountain, 2001). One of the fears that accompany such an initiative is that the availability of naloxone would result in the use of higher doses of heroin or would reduce the likelihood that the witness of an overdose would place a 911 call. Initial data regarding this subject are mixed. In one study, 35% of respondents reported that they would be comfortable using more heroin and 62% reported that they would less likely call 911 if naloxone were available (Seal et al., 2003). In a Chicago pilot study, participants reported that the experience of administering to others and receiving the drug was very unpleasant (Bigg, 2002). Although the respondents in the Chicago study reported that they were pleased to be alive, they were often disturbed by the overdose and resulting events, including the experience of acute withdrawal.

It has been suggested that the distribution of naloxone will have the greatest impact if it were part of an overdose management program that includes distribution of naloxone, training in the recognition of the signs and symptoms of overdose, and instruction in basic life support. However, the benefits of naloxone distribution may not be limited to those who participate in such a program. The individuals we surveyed responded that they would administer a medication to a companion in the event of an overdose, regardless of their knowledge of CPR or any other training. We have confirmed that the drug users in our community have a high prevalence of overdose; because of this risk, the potential benefits of take-home naloxone are great.

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