



Short communication

Provision of naloxone to injection drug users as an overdose prevention strategy: Early evidence from a pilot study in New York City

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**Abstract**

*Introduction:* Naloxone, an opiate antagonist that can avert opiate overdose mortality, has long been prescribed to drug users in Europe and in a few US cities. However, there has been little documented evidence of naloxone distribution programs and their feasibility in the peer reviewed literature in the US.

*Methods:* A pilot overdose prevention and reversal program was implemented in a New York City syringe exchange program. We assessed demographics, drug use, and overdose history, experience, and behavior at baseline, when participants returned for prescription refills, and 3 months after baseline assessment.

*Results:* 25 participants were recruited. 22 (88%) participants were successfully followed-up in the first 3 months; of these, 11 (50%) participants reported witnessing a total of 26 overdoses during the follow-up period. Among 17 most-recent overdoses witnessed, naloxone was administered 10 times; all persons who had naloxone administered lived.

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*Discussion:* Naloxone administration by injection drug users is feasible as part of a comprehensive overdose prevention strategy and may be a practicable way to reduce overdose deaths on a larger scale.

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*Keywords:* Naloxone; Overdose; Overdose prevention; Syringe exchange program; Harm reduction; Injection drug users

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## 1. Introduction

Approximately half of all illicit drug users report at least one nonfatal overdose during their lifetime, and death rates from accidental drug overdose have been increasing throughout the United States over the past decade (CDC, 2000a, 2000b; Davidson, Ochoa, Hahn, Evans, & Moss, 2002; Ochoa, Hahn, Seal, & Moss, 2001; Seal et al., 2001). Naloxone is a specific opioid receptor antagonist used clinically to reverse an opiate overdose or the effects of opiate analgesia. Effects occur within 1–2 min of administration and last 45 to 90 min (Chamberlain & Klein, 1994). Opiate overdose reversal with naloxone is nearly universal, and adverse effects are rare at therapeutic doses (Sporer, 1999; Strang, Darke, Hall, Farrell, & Ali, 1996).

Naloxone was prescribed to illicit drug users in conjunction with rescue breathing training in a trial in 2001–2002 in San Francisco, California, since 1999 in Chicago, Illinois, as part of a state overdose prevention initiative in New Mexico since 2001, and beginning in 2003, through the Baltimore Department of Health (Bigg & Maxwell, 2002; Seal et al., 2005). Since the 1980s, naloxone has been available as an over-the-counter medication in Italy and distributed through low-threshold services in Berlin, Germany, and Jersey, United Kingdom (Campana, 2000; Dettmer, Saunders, & Strang, 2001). Preliminary results from Berlin, Jersey, and San Francisco document lifesaving events through peer administration of naloxone without observed adverse effects (Lenton & Hargreaves, 2000; Seal et al., 2005; Strang et al., 1999).

There has been little documented evidence, however, of naloxone distribution programs and their feasibility in the peer reviewed literature in the US. This is a particular problem when recognizing that opposition to all manners of risk reduction strategies persist in the US and that drug overdose deaths continue substantially unabated in many large US cities. Nationwide, the largest number of drug-induced deaths are in New York City (NYC); approximately 800 to 900 persons a year die from a drug-induced death in New NYC (Coffin et al., 2003). For the past 5 years, the annual overdose death rate has been higher than the annual homicide death rate and deaths due to drug abuse currently rank among the five leading causes of death in 15–54 year olds (New York City Department of Health and Mental Hygiene, 2003). This report summarises pilot data about the first systematic naloxone distribution program in NYC.

## 2. Methods

The Overdose Prevention and Reversal Program was organized and administered by the Lower East Side Harm Reduction Center (LESHRC) and launched in June 2004. LESHRC is a syringe exchange program in the Lower East Side of NYC and serves 9000 injection drug users annually. Volunteers for the

pilot study were recruited from LESHRC's clients for this program. The program had three components. First, participants underwent an overdose risk and response training. The training focused on systematic response to overdose, including (a) assessing overdose victim, (b) activation of Emergency Medical Services systems, (c) positioning and rescue breathing, (d) and administration of up to two doses of 0.4 mg naloxone intra-muscularly in a major muscle group, preferably the overdose victim's thigh or buttocks. The training lasted approximately one hour and was conducted in small groups or individually by a designated LESHRC program coordinator. Standardized training material, developed in conjunction with clinic medical staff, guided the training. This training material is available from the authors upon request. Second, a physician met with each participant, reviewed the training and each individual's suitability for naloxone distribution, and then prescribed two 1 cm<sup>3</sup> syringes (preloaded for intra-muscular injection with 0.4 mg naloxone) to each participant. LESHRC staff used the prescriptions to obtain the naloxone syringes from a national pharmaceutical distributor; LESHRC paid for the naloxone and participants were then provided with the naloxone free-of-charge. Third, program staff contacted all participants for follow-up 3 months after their initial program participation. If naloxone was used before the 3-month follow-up period, participants could return to refill their prescription.

A standardized, brief, assessment instrument was administered to all participants before their participation in the program. A modified version of the assessment instrument was used to reassess participants at their 3-month follow-up and at any interim visits for prescription refill. The baseline instrument assessed demographics, drug use, and overdose history, including overdoses experienced, witnessed, and behaviors during witnessed overdose. The follow-up instrument asked about overdoses experienced or witnessed since the last assessment; if multiple overdoses were witnessed, detailed information about the most recent overdose witnessed was collected. All overdose outcome information was based on participant report. Measures of comfort with naloxone administration were also collected in the follow-up instrument.

### 3. Results

Twenty-five (25) participants were recruited in the program between June 2004 and January 2005. 23 (92%) participants were male, 16 were white (64%), 4 black (16%), and 5 Latino (20%). 17 (68%) of the participants had ever experienced a drug overdose; of these, 13 (52%) had experienced more than one overdose during their lifetime. 19 (83%) of participants had witnessed another person overdose during their lifetime; of these, 10 (44%) had witnessed five or more overdoses. During the 6 months prior to their baseline assessment, 20 (80%) participants had injected heroin, 12 (48%) had injected cocaine or crack, 17 (68%) had been in a methadone maintenance program and 4 (16%) had used street-bought methadone. Other drugs used included alcohol (12; 50%), sniffing or snorting cocaine (10; 40%), sniffing or snorting crack (7; 29%).

Twenty-two (22; 88%) participants were successfully followed-up in the first 3 months after their initial enrolment. There were no notable differences between drugs used in the period between assessments and drugs that had been used prior to the baseline interview. [Table 1](#) shows the respondents' actions during the last witnessed overdose as documented during the baseline and follow-up assessments. Although the small sample size precluded statistical differences between the two assessments, notably 11/19 respondents (58%) during the baseline assessment reporting calling an ambulance for the last witnessed overdose compared to 9/11 respondents (82%) during the follow-up assessment.

Table 1  
Responses to most recent overdose witnessed among baseline and follow-up participants

	Baseline ( <i>n</i> = 19) <sup>a</sup>		Follow-up ( <i>n</i> = 11) <sup>b</sup>	
	<i>N</i>	%	<i>N</i>	%
Called ambulance	11	57.9	9	81.8
Called their name to try to wake them up	10	52.6	8	72.7
Tried to wake person by causing pain, applying ice	14	73.7	5	45.5
Injected with cocaine, water or salt	3	15.8	0	0
Took to hospital	1	5.3	3	27.3
Placed in rescue position (on their side)	1	5.3	2	18.2
Mouth to mouth or cardiopulmonary resuscitation	1	5.3	3	27.3
Did nothing	4	21.0	0	0.0
Other	5	26.3	1	9.1

<sup>a</sup> Only participants who had witnessed an overdose are included.

<sup>b</sup> Only participants who witnessed an overdose during the period between assessments are included.

Among the 22 participants who were successfully followed-up, 11 (50%) participants reported witnessing a total of 26 overdoses during the follow-up period. There were 3 participants who had more than one follow-up visit and 7 who saw more than one overdose. Information on 17 specific overdoses was collected. Among these 17 overdose instances, naloxone was administered 10 times; all persons who had naloxone administered lived. Among the 7 witnessed overdoses where naloxone was not administered, 5 lived, 1 died, and the outcome of 1 was unknown.

15 of 20 participants (75%) said they felt comfortable or very comfortable using naloxone if indicated; 15 of 18 (83%) said they would want naloxone administered if they were overdosing. 12 of 20 (60%) reported having kept the naloxone with them at all times or in their house where they usually used drugs; 4 of 20 (20%) reported that their naloxone had been stolen. Only 1 of 19 (6%) participants reported police harassment over their possession of naloxone.

#### 4. Discussion

This initial evidence suggests that naloxone administration by injection drug users as part of a comprehensive overdose prevention strategy is feasible in NYC and may be a practicable means for reducing overdose deaths on a larger scale.

Participants in this assessment reported high levels of comfort with naloxone administration and no adverse consequences following administration. All instances of naloxone use during this brief period of assessment appeared to be appropriate and associated with near-immediate reversal of the opiate overdose. The limited available evidence in this regard concurs that there are few complications or problems with naloxone administration in this context. Dettmer and colleagues found only one inappropriate naloxone administration (for a cocaine overdose) among 34 peer naloxone administrations (Dettmer et al., 2001). A recent report about a pilot naloxone distribution project in San Francisco reported no participant arrests among those who had been prescribed naloxone (Seal et al., 2005).

Although North American data on the efficacy of naloxone distribution programs are limited, early evidence from Chicago suggests a decrease in overdose deaths concurrent with the implementation of a citywide naloxone distribution program (Chicago Recovery Alliance, 2005). Consistent with this data,

this pilot highlights the lifesaving potential of naloxone distribution in conjunction with overdose prevention education programs aimed at improving drug user responses to a witnessed overdose.

We note that this pilot study has a number of limitations including its small sample size, use of self-reported data on all measures including overdose outcome, and the recruitment of early volunteers who may be more optimal participants than would be other, more representative drug users. However, its demonstration of project feasibility and potential benefit can guide the development of a citywide naloxone distribution program. Such a program may have the potential to prevent a substantial proportion of opiate overdose deaths in NYC.

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