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Overdose Prevention and Naloxone Prescription for Opioid Users in San Francisco

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ABSTRACT *Opiate overdose is a significant cause of mortality among injection drug users (IDUs) in the United States (US). Opiate overdose can be reversed by administering naloxone, an opiate antagonist. Among IDUs, prevalence of witnessing overdose events is high, and the provision of take-home naloxone to IDUs can be an important intervention to reduce the number of overdose fatalities. The Drug Overdose Prevention and Education (DOPE) Project was the first naloxone prescription program (NPP) established in partnership with a county health department (San Francisco Department of Public Health), and is one of the longest running NPPs in the USA. From September 2003 to December 2009, 1,942 individuals were trained and prescribed naloxone through the DOPE Project, of whom 24% returned to receive a naloxone refill, and 11% reported using naloxone during an overdose event. Of 399 overdose events where naloxone was used, participants reported that 89% were reversed. In addition, 83% of participants who reported overdose reversal attributed the reversal to their administration of naloxone, and fewer than 1% reported serious adverse effects. Findings from the DOPE Project add to a growing body of research that suggests that IDUs at high risk of witnessing overdose events are willing to be trained on overdose response strategies and use take-home naloxone during overdose events to prevent deaths.*

KEYWORDS *Overdose, Heroin, Naloxone, Injection drug user*

INTRODUCTION

Drug-related deaths are the leading cause of injury mortality among all US adults aged 35 to 55.[1] Opioids are one of the most commonly involved substances in single and polydrug use deaths.[2] Opiate overdose is the single greatest cause of mortality among injection drug users (IDUs) in the USA[3] and accounts for more than half of all deaths among opiate injectors, far exceeding the proportion due to HIV/AIDS and viral hepatitis.[3,4] Opiate overdose deaths increased by 529% between 1990 and 2003 across the USA.[2] In addition, opioid analgesic-related deaths are among the fastest growing causes of drug poisoning deaths in the USA.[1]

While loss of consciousness following overdose can at times be instantaneous, death is usually the result of cardiac arrest that follows hypoxia, which is the result of

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the opiate suppressing the central respiratory drive.[5,6] The time from initial injection to death typically leaves a 1–3-h window for a witness to intervene.[5,6] While this window would leave sufficient time for emergency personnel to respond, studies report that emergency medical services (EMS) are activated in fewer than half of overdose events.[7–9] Although cardiopulmonary resuscitation can be an effective intervention during an overdose event,[10] opiate overdose can almost universally be reversed by the administration of naloxone—a legal, nonscheduled opioid antagonist that can be quickly administered by intramuscular injection.[10–12] Naloxone produces no symptoms of dependence or tolerance and, in the absence of narcotics, has no pharmacological activity.[13] Naloxone is routinely administered by emergency services personnel to revive opiate overdose victims, and serious side effects are rare.[14–17]

Yet, barriers to intervention and overdose reversal remain. Between 1997 and 2000, EMS response was noted in medical examiner's notes for only 26% of fatal opiate overdoses in San Francisco.[8] In surveys, IDUs consistently report a high prevalence of witnessing overdose events,[9,18–22] and in one Bay Area survey, 89% of participants reported witnessing an overdose event.[9] However, IDUs also report reluctance to contact EMS as a witness.[9,21–25] Qualitative research with IDUs indicates that fear of police is a significant barrier to calling emergency services ("9-1-1" in the USA) during an overdose event.[21,23] IDUs report making other attempts to revive overdose victims without EMS assistance,[9,21,22] and demonstrate willingness to administer naloxone during an overdose if it was made available to them directly.[9,18,23,24] This indicates that targeted take-home naloxone prescription and overdose training programs may be an effective intervention to reduce opiate overdose deaths.

In response to increased fatal opiate overdose, community-based programs began distributing naloxone directly to IDUs in Europe in 1995,[26] and underground programs have been distributing naloxone in the USA since 1999.[27] Take-home naloxone prescription programs (NPPs) are currently in place in locales throughout the USA, including large-scale NPPs in Chicago, Baltimore, New York City, New Mexico, and Massachusetts.[27–29] NPPs typically provide overdose response education and naloxone administration training to IDUs and others at high risk of witnessing an opioid overdose, so that participants are able to administer naloxone safely and avert fatalities during overdose events.

Preliminary evaluations of NPPs in several cities have found that overdose response education and naloxone administration training positively affects IDUs' ability to recognize overdose symptoms and identify cases where naloxone is indicated.[24,28–30] Prospective pilot studies in Los Angeles[32] and New York[23,33] and San Francisco[30] tracked small samples of IDUs who were trained and provided with naloxone. In New York and San Francisco, over half reported using naloxone during 3- or 6-month follow-up periods, and the proportion of participant-confirmed reversals ranged from 74%[32] to 100%.[23,30,33]

Fewer studies have examined outcomes of an NPP over an extended period of time. One longstanding NPP in Chicago reported training 3,500 participants from 2001 to 2005, of whom 319 reported overdose reversals (9%).[27] A program dispending intranasal naloxone in Massachusetts recently reported that 19% (74) of 385 trained participants used naloxone after training.[34]

In 2003, the San Francisco Department of Public Health (SFDPH) partnered with a community-based program, the Drug Overdose Prevention and Education Project (DOPE Project) to establish the first health-department sanctioned NPP in the US. Modeled on underground community based NPPs, the DOPE Project was the first NPP to receive staff and support from a county department of public health.

The goal of the DOPE Project is to integrate overdose prevention education and naloxone distribution into all settings serving people at risk for opioid overdose.[31]

We present evaluation findings for the DOPE Project NPP in San Francisco, from the start of SFDPH partnership in September 2003 through December 2009. Our goal was to examine the number and demographics of trained participants prescribed take-home naloxone, as well as the prevalence of and reasons for receiving naloxone refills among trained participants. We present prevalence of naloxone administration among individuals receiving refills from the DOPE Project and outcomes of naloxone administration, including any negative effects reported and overall proportion of successful reversals.

METHODS

The San Francisco DOPE Project Intervention

Since September 2003, DOPE Project staff and SFDPH medical providers have trained and distributed naloxone at sites throughout San Francisco that include syringe exchange programs (SEP), re-entry programs, pain management clinics, methadone maintenance and buprenorphine treatment programs, and single room occupancy (SRO) hotels. The DOPE Project currently conducts trainings and naloxone dispensations approximately eight times per month throughout San Francisco.

Participants are usually recruited and trained while waiting to receive services at clinics, dropping off syringes at SEPs, or in group trainings in SROs and treatment programs. Trainings typically last between 10 and 30 minutes and focus on overdose symptom identification, revival strategies, calling EMS, and administering naloxone (Figure 1). After DOPE Project staff train participants, SFDPH medical providers initiate a medical record (clinical registration) and assign each participant a unique identifier. Providers prescribe and dispense naloxone in two 0.4-mg/mL vials and two 3-cm^3/mL 22-gauge 1-in muscling syringes along with a rescue breathing mask. All trained participants with unique identifiers and clinical registrations may receive refills of two pre-filled syringes at any subsequent dispensation—when participants use naloxone, lose, or have naloxone confiscated. SFDPH providers do not limit the number of refills trained participants may receive.

Data Collection

All participants who receive take-home naloxone complete a brief questionnaire immediately following initial training. The questionnaire is voluntary, self-reported, and administered by DOPE Project or SFDPH staff. Information provided includes date of birth, gender, race/ethnicity, primary language, homeless status, and/or current housing.

All participants who receive subsequent refills also complete an additional brief questionnaire. If receiving naloxone following a loss, participants describe "circumstances of loss (e.g., stolen bag, taken by police, etc.)."

Participants who receive refills following naloxone administration complete a brief interview with DOPE Project staff. The standard questionnaire captures information about to whom naloxone was administered (e.g., "girlfriend," "spouse," "friend," "stranger," "self"), and whether participants used other prevention strategies covered in DOPE Project training: sternum rub; awaken victims; call emergency services; rescue breathing; waited with them. Participants are

Mechanism of opiate overdose
Risk factors for opiate overdose
Prevention strategies
Recognition
Response
Calling 9-1-1
Administration of naloxone
Rescue breathing
Aftercare
Naloxone care
Logistics and refills

FIGURE 1. Components of 10–30-min trainings conducted by DOPE Project staff for all participants receiving take-home naloxone.

also asked whether an ambulance arrived, and to choose from among seven possible outcomes for the event: they [victim] woke up without any help; they woke up because of my help; paramedics came and revived the person [victim]; paramedics came and I do not know what happened next; they [victim] died; do not know; other (specify). Participants report any "negative consequences" of the overdose and naloxone administration that include: arrest of victim or witness; vomiting; harassment by police; harassment by paramedics; seizure; other (specify).

Analysis

All records used in this study were obtained as part of the DOPE Project routine program monitoring and evaluation. We considered all individuals who were trained, prescribed, and assigned a unique identifier (at clinical registration) as participants in the DOPE Project and used a clinical registration database (Microsoft Excel, Seattle, WA, USA) to calculate total number of trained participants, and participant demographics. Participants who reported being homeless, living at a shelter, transitional housing, or street or "couch surfing" were coded as unstably housed.

A separate database of all refills is also maintained by the DOPE Project (Microsoft, Excel, Seattle, WA). Databases were linked by participants' unique identifiers to determine the number of unduplicated participants who received refills following self-reported loss or use of naloxone, as well as the total number of losses and naloxone use reported, the proportion of individuals receiving multiple refills, and the proportion of individuals reporting multiple naloxone use. We excluded from analysis any records of refills where no unique identifier could be linked to an existing clinical registration (n=37).

We coded reports stating that naloxone was taken by police, San Francisco Department of Public Works (DPW) or sheriff's office as confiscation; all reports that naloxone was stolen, lost, or destroyed for any reason was coded as being lost. We use information captured in refill questionnaire to determine outcomes for trained participants who reported administering naloxone. Questionnaires were used to determine proportion of participants who used strategies other than naloxone, including contacting EMS. All events where participants reported that the victim was "revived" after naloxone administration are included here as

successful reversals—whether or not participants specifically attributed the reversal to naloxone administration. Questionnaires were also used here to report proportion of deaths, unknown outcomes, or any negative effects.

RESULTS

From September 2003 to December 2009, the DOPE Project and SFDPH medical providers trained and prescribed naloxone to 1,942 unduplicated individuals in San Francisco. The number of new participants increased steadily from 2003 to 2009, averaging 328 per year.

The majority of participants were male (64%) and the median age at training was 40 years old (Table 1). Race/ethnicity was only captured for 75% of participants overall. Of these, 61% were Caucasian and 18% were African American. Housing status was reported by 88% of participants, of whom over half (59%) reported being homeless or unstably housed (not shown).

Of the 1,942 participants who receive naloxone prescriptions, 24% returned to receive at least one naloxone refill (Table 2), of whom half returned on more than one occasion to receive multiple refills. Participants requested refills for a variety of reasons, including having naloxone stolen on the street, confiscated in a shelter, or destroyed during unstable housing transition. Of 1,020 refills dispensed, 399 (40%) were provided after participants reported using naloxone during an overdose event,

TABLE 1 DOPE Project participants trained and prescribed 2003–2009 ($n=1,942$)

	n	(%)
Gender		
Male	1,239	(64)
Female	644	(33)
Transgender	15	(1)
Unknown (not captured)	44	(2)
Race/ethnicity		
Caucasian/White	901	(46)
African American/Black	263	(14)
Latino/a	131	(7)
Asian/Pacific Islander	32	(2)
Native American	35	(2)
More than one race/ethnicity	53	(3)
Other	51	(3)
Unknown (not captured)	476	(24)
Housing status		
Stable housing	618	(32)
Homeless/unstably housed[a]	893	(46)
Living in shelter	127	(7)
Living in transitional housing	292	(15)
Living on street	241	(12)
Doubling up or "couch surfing"	51	(3)
Homeless, no additional housing information	182	(9)
Unknown housing status	431	(22)

[a]Includes both those who answered "yes" to homeless and those reporting living in shelter, transitional housing, or doubling up

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