Published in final edited form as:

J Community Health. 2018 April ; 43(2): 304–311. doi:10.1007/s10900-017-0422-8.

Descriptive Epidemiology for Community-wide Naloxone Administration by Police Officers and Firefighters Responding to Opioid Overdose

Sarah Cercone Heavey, PhD, MPH¹, Alan M. Delmerico, PhD², Gale Burstein, MD, MPH^{3,4}, Cheryll Moore, BSN⁴, William F. Wiecezorek, PhD², R. Lorraine Collins, PhD⁵, Yu-Ping Chang, PhD⁶, and Gregory G. Homish, PhD^{3,5}

¹Department of Psychiatry, University of Rochester Medical Center

²Institute for Community Health Promotion, Center for Health and Social Research, Center for Development of Human Services, SUNY Buffalo State

³Departments of Pediatrics and Family Medicine, Jacobs School of Medicine & Biomedical Sciences, State University of New York at Buffalo

⁴Erie County, NY Department of Health

⁵Department of Community Health & Health Behavior, School of Public Health & Health Professions, State University of New York at Buffalo

⁶School of Nursing, State University of New York at Buffalo

Abstract

Recently implemented New York State policy allows police and fire to administer intranasal naloxone when responding to opioid overdoses. This work describes the geographic distribution of naloxone administration (NlxA) by police and fire when responding to opioid overdoses in Erie County, NY, an area of approximately 920,000 people including the City of Buffalo. Data are from opioid overdose reports (OORs; $N=800$) filed with the Erie County Department of Health (July 2014--June 2016) by police/fire and include the overdose ZIP code, reported drug(s) used, and NlxA. ZIP code data were geocoded and mapped to examine spatial patterns of NlxA. The highest NlxA rates (range: 0.01 to 84.3 per 10,000 population) were concentrated within the city and first-ring suburbs. Within 3 minutes 27.3% responded to NlxA and 81.6% survived the overdose. The average individual was male (70.3%) and 31.4 years old ($SD=10.3$). Further work is needed to better understand NlxA and overdose, including exploring how the neighborhood environment creates a context for drug use, and how this context influences naloxone use and overdose experiences.

Keywords

community health; opioid overdose; naloxone administration; health geography

National data indicate that deaths from drug overdose are increasing at an unprecedented rate. Of the 47,055 deaths nationally due to drug overdose (more deaths than those caused by motor vehicle accidents in 2014), 61% are due to nonmedical and illicit opioids [1]. These 28,647 opioid-related deaths are triple the rate in 2000, and represent a 26% increase in heroin deaths and an 80% increase in nonmedical opioid deaths over one year [between 2013 and 2014; 1]. These data indicate that while all opioid overdose deaths are increasing, this trend is driven by nonmedical opioids.

With so many deaths and an increasing trend, opioid overdose is a national epidemic that merits immediate action. Counties and states are largely responsible for addressing overdose-related mortality, with unique policies and programs that vary by location. For example, in areas that experienced high mortality due to intravenous heroin use, prevention programs were built into existing syringe exchanges [e.g., 2]. Additional programs focus exclusively on overdose education and naloxone distribution to combat the mortality associated with opioid overdose.

Naloxone Effects and Access

Naloxone is an opioid antagonist that safely and effectively addresses opioid overdose by reversing respiratory depression that limits oxygen to the brain [3]. Whether naloxone is effective largely depends on whether the medication is given in a timely manner, providing a window of opportunity to reverse the overdose and save the individual's life. In addition, naloxone has no abuse potential [3].

Naloxone's ability to reverse overdose and prevent the associated mortality positions it as a critical tool in combating the opioid overdose epidemic. Public health officials have begun programs to expand naloxone access [e.g., 4] and regulatory changes have taken effect to facilitate this. What was once only available to paramedics, now is available to a wider range of emergency response personnel as well as 'lay people,' including opioid users, concerned significant others, and citizens in general [5]. Between 2010 and 2015, across the US, there was a dramatic increase in legislation that allow for naloxone prescription and distribution, as well as 'Good Samaritan Laws' that protect well-meaning individuals who administer naloxone or call for emergency services [5].

This expanded access is important because drug use is a social activity. Most heroin overdoses occur with other individuals in attendance; estimates for witnessing an overdose fall between 56% [6] and 85% [7] of heroin users. These overdoses result in mortality in part because the witnesses lack access to naloxone and fellow users are reticent to contact emergency services [8]. Most often users delay or do not call for help because they do not want to incur criminal charges or face police response [6]. This concern can be addressed when police engage in positive practices. For example, research has indicated a significant interaction between fear of arrest and previous exposure to police, such that fear of police was reduced if the individual had witnessed the police at the scene of an overdose [9]. Thus, positive policing practices in combination with 'good Samaritan laws' allow police to act as an important source of access to naloxone in the community.

The Administration of Naloxone by Police and Fire Personnel

Emergency responders who first arrive at the scene of an overdose are an important source of naloxone for several reasons. First, as mentioned previously, naloxone is only effective if administered in time; the sooner an individual is given naloxone, the better the chance of survival. As police officers or firefighters often are first on the scene [10, 11], they represent an important leverage point for naloxone distribution.

Further, emergency responders who can administer naloxone have been systematically trained and provisioned as a part of a larger hierarchy of naloxone access. While friends and family can be important naloxone administrators, they are not uniformly given naloxone training and access. Friends and family may elect to carry naloxone in some localities, but do not represent the systematic, organized, and linked presence of emergency responders.

States and counties are individually addressing which emergency responders are equipped with naloxone. Nationally, only paramedics have naloxone administration as part of their scope of practice; however, there are 10-times as many police as paramedics and they are often the first on scene after a 911 call [11]. The large number of and immediate response by police means they can be an excellent route for administering naloxone when responding to overdose. Davis and colleagues described police officers and firefighters as integral to public health through their roles in public safety [12]. There is limited but persuasive research that supports the idea that police and fire personnel can effectively administer naloxone. For example, Fisher, O'Donnell [13] found that police officers/firefighters were able to accurately recognize overdose and administer naloxone. However, this study is limited by the brief nature of the report form that did not account for scene characteristics (e.g., drug(s) indicated, location of overdose), officer actions (e.g., whether the officer used a sternal rub or engaged in Cardio-Pulmonary Respiration; CPR), or specific naloxone administration characteristics (e.g., number of and response time for the naloxone dose(s)). In addition, only one area police agency implemented the naloxone distribution program, unlike the present work which examines a County-wide naloxone distribution program, across more than 23 police and fire agencies.

Police on scene at an overdose may also address a primary concern with naloxone distribution programs. That is, an apprehension about whether naloxone administration causes precipitated withdrawal, in which an individual become combative or angry. Davis, Ruiz [12] contend that this is a major concern and poses a risk to those at the scene. In addition, Banta-Green, Beletsky [10] note that a majority of officers feel that it is important they are at the scene to protect emergency medical personnel. It is unclear whether officers' concerns are based on frequent experiences with individuals becoming aggressive/combatative after overdose, or if such experiences are more limited and only related to perceptions and stereotypes about individuals who overdose. To address this gap, the present research examines whether precipitated withdrawal is present and/or common in police and fire naloxone administration reports.

The Role of *Place*

Beyond addressing the mortality associated with opioid overdose, police/fire naloxone administration can provide important information about the nature of overdose, including demographic characteristics and geographic patterns. Emerging work has indicated geographic patterns in opioid mortality; what was once confined to urban locations is now wide-spread across urban, suburban, and rural areas [14]. Understanding these patterns will help prevention and intervention efforts, as well as provide important information on the individuals who are succumbing to the opioid overdose epidemic.

The Current Study

Given the limited research on the role of police and fire personnel in providing naloxone to address opioid overdoses, we examined opioid overdose reports from a single county (Erie) in northwestern New York State. Reports were submitted to the Erie County Department of Health during a 2-year period (July 2014 through June 2016). The data represent a county-wide naloxone distribution program across more than 23 police and fire agencies that include urban, suburban and rural areas, with a total population of 920,000 (CENSUS, 2010).

This descriptive study aimed to use police and fire naloxone administration reports to understand the characteristics of opioid overdose reversal. Specifically, we will describe the demographic characteristics (e.g., gender, age) of those who overdose; characterize the naloxone administration, including the individual's disposition after naloxone administration and the occurrence of precipitated withdrawal. To characterize the role of place in opioid overdose, we geocoded the locations/ZIP codes in which the overdoses occurred, thereby providing spatial depiction of opioid overdose in the region.

METHODS

Procedures

The present research uses secondary analysis of Opioid Overdose Reports (OORs) to understand the demographics, characteristics, and naloxone administration by police and fire agencies in Erie County, NY. Trainings began in February 2014 with the Buffalo Police Department. The Buffalo Fire Department and additional agencies began trainings and carrying naloxone in spring and summer of 2014 (except for four suburban locations).

Trainings reviewed symptoms of overdose, with an emphasis on slow/no pulse, slow/no breathing, and unresponsive subject. Police officers/firefighters were also taught how to assemble and administer the naloxone intranasally, using an atomizer. Instruction also indicated when to re-administer if the subject did not regain consciousness within 2 to 3 minutes after initial administration. At the conclusion of training, each police officer/firefighter was given an overdose response kit with two doses of intranasal naloxone, as well as the intranasal atomizer, gloves, and an instruction card. All agencies receive naloxone from the New York State Department of Health.

Police and fire are required to complete an Opioid Overdose Report (OOR) whenever they administer naloxone while on duty. These reports collect data about the overdose, including: date; location of overdose (i.e., ZIP-code); demographics (e.g., age, gender), police reported nature of overdose (e.g., drugs used, disposition of patient upon arrival), administration of naloxone (e.g., number of vials used, patient's disposition after administration), and outcome of case (e.g., patient survival, transportation to hospital). The police officer/firefighter who administered naloxone completes a paper-and-pencil OOR and submits it to the ECDOH on a rolling basis. The ECDOH then sent OORs to the research team; reports from July 2014 through July 2016 were included in this analysis.

Data Management and Analytic Plan

OOR data were entered and managed using REDCap (Research Electronic Data Capture), a secure, web-based application designed by Vanderbilt University under contract from the NIH [15]. REDCap tools are hosted by the University at Buffalo to support data capture for research studies, and provide an intuitive interface for validated data entry, as well as audit trails and data export to statistical packages [15]. Research staff dual-entered data from the original paper forms into REDCap. Data were compared, and any discrepancies between two entries were reviewed and compared to the original form; once this was complete, data were merged and finalized. The University at Buffalo Institutional Review Board determined the present work was not human subjects' research due to the de-identified nature of the reports.

Descriptive statistics were used to characterize the demographic characteristics of those who overdose as well as to characterize naloxone administration. ZIP code data were geocoded and matched to the corresponding ZIP Code Tabulation Area (ZCTA). US Census data (2010) for adults age 18 years and older were used for the population size in these analyses. Population rates were determined based on the number of overdose reversal attempts in each ZCTA by the population age 18 and older (within that ZCTA). Finally, ZCTA populations were specific to Erie County; that is, if a ZCTA crossed between two counties, the population for that ZCTA only included those census blocks for the ZCTA within Erie County and did not include any population that fell in census blocks outside of the county. Rates were ranked and mapped by quantile using ArcGIS 10.2 geographic information system software.

RESULTS

Reversal Attempts: Demographics

Of the 800 reversal attempts between July 2014 and July 2016, the majority were male (70.3%) and had an average age of 31.4 years ($SD = 10.3$). There was a wide range of ages, from 15 to 71 years. Of all reversal attempts, heroin was the primary drug indicated by responding police officers/firefighters, based on scene observation and drug user disclosure. Polydrug use was indicated in a majority of cases (e.g., heroin and alcohol were both observed on scene). Additional substances are presented in Table 1.

Disposition on Arrival of Police and Fire Personnel

The majority of drug users (97.5%) were unresponsive or responsive but sedated upon police officer/firefighter arrival. As instructed in training sessions, police officers/firefighters checked the individual's breathing and pulse. Breathing was absent or slow in 92% of respondents upon police officer/firefighter arrival. As overdose mortality occurs primarily because of depressed breathing, this is an important indicator for naloxone administration. The police officer/firefighter also indicated the drug user's pulse on arrival. Nearly half of respondents had a slow or no pulse (46.8%), although police officers/firefighters did not check the individual's pulse in a quarter of the cases. Additional subject disposition results are presented in Table 2.

Responses to Naloxone

Of all reversal attempts, 81.6% were successfully reversed ($n = 653$). The remaining attempts were either unsuccessful (6.3%) or unknown (12.0%), meaning care of the individual was transferred to Emergency Medical Services (EMS) without the police officer/firefighter knowing if the individual survived the overdose. Police officers/firefighters administered 1.76 naloxone doses, per drug user, on average ($SD = 0.72$). There was a wide range of doses administered, from one to six doses. Though each kit contains two doses, additional police officers/firefighters on scene or occasionally EMS arrival provided additional doses that were reported on the OORs and accounts for the up to six doses administered on scene. In rare instances, reports indicated that additional naloxone was supplied by laypeople at the scene.

Response times to naloxone varied, with 26.6% responding within 3 minutes and an additional 21.7% responding within 5 minutes. Approximately 22% of drug users did not respond to the police/fire naloxone administration. Many of the individuals who did not respond to police/fire naloxone administration were unsuccessful (22.9%) or the outcome was unknown (20.7%). Although half of those who were unresponsive to police officers/firefighters naloxone administration were revived upon EMS arrival on scene (56.4%). Additional results for response time are presented in Table 3.

Of the drug users who did respond to naloxone, some were 'dope sick' (12.9%) or vomited (4.9%), but very few experienced seizures or respiratory distress (3.4%). The majority of were responsive and alert (19.9%) or sedated (34.0%) after the administration. Very few individuals became angry or combative (6.3%). Additional results for naloxone response can be found in Table 3.

Reversal Attempt Rates and Associated Geographic Distribution

Figure 1 presents the geographic distribution of naloxone administration rates by police and fire agencies. The highest distribution of rates was in the City of Buffalo, although there were notably high areas in suburban and rural areas. The highest 25% of administration rates fell within the range of 19.4 to 84.3 per 10,000 population, and were within an urban area (City of Buffalo). First ring suburbs as well as rural areas within the southern portion of Erie County experienced the next highest 25% of rates, ranging from 9.5 to 19.4 per 10,000 population. Second ring suburban and rural areas had the lower rates, although not all areas

had overdose reversal attempts and/or did not participate in the police/fire naloxone administration program. Within the urban area, there were uniformly high rates (Figure 1, inset). The highest rates are shown along the waterfront area (14207, 14203) as well as the inner-city core (14202). These areas also align with major roads and highways.

DISCUSSION

Overall, these results indicate that police and fire naloxone administration is successful; for example, the large number of reversals (82% or $n = 610$) indicates that police and fire are reducing opioid overdose mortality. In addition, results suggest that police and fire personnel are effectively evaluating the scene upon arrival at an overdose and are administering naloxone within the recommended indications. However, the success of this program should not eliminate the subsequent response by EMS. Our data indicate that more than half of those who did not respond to police officer/firefighter naloxone administration were revived when EMS arrived on scene and administered intravenous (IV) naloxone. Therefore, the police officers and firefighters timely response was supported by EMTs in the cases that required additional doses of naloxone for overdose reversal.

There is a concern that when someone is revived from an overdose they may be dangerous or combative at the scene [12, 16]. Naloxone causes precipitated withdrawal for the person experiencing an overdose, and this may cause the individual to become aggressive. However, our results do not support this conclusion. Our findings indicate that less than five percent of the sample became aggressive or combative. This is an important finding given the concern in the literature that responders could find themselves in a dangerous situation when responding to an overdose.

The present results are driven by heroin consumption; the overwhelming majority of reversal attempts occurred with heroin as the indicated drug (heroin could also contain fentanyl). This is in-line with the sharp increase in heroin use and overdose seen nationally [1]. However, despite this increase in national deaths due to heroin, the majority of opioid overdose deaths are still associated with nonmedical opioids [1]. Our results differ from this trend; relatively few overdoses (<10%) in the present research were exclusively due to nonmedical opioids. It is possible that this region has seen an expedited transition from nonmedical to illicit opioids. Other research has documented that users transition from nonmedical to heroin when it is easier or less expensive to obtain [17–19]. In 2013, New York State implemented a prescription monitoring program which likely limited access to licit opioids [20]. Thus, the expedited transition from nonmedical to illicit opioid overdose in this region may indicate what other areas could experience as additional prescription monitoring programs are implemented.

The naloxone administration rates were distributed across urban, suburban, and rural areas. The distribution across different geographic areas indicated that opioid overdose was not exclusively an urban issue, but was widespread across all regions. In addition, these geographic trends indicated where rates were highest, acting as a form of public health surveillance and illustrating where efforts should focus on overdose prevention [cf., 21]. The

present results provide an overview of the demographic characteristics those who experienced an opioid overdose in the area, specifically, a male and in his early 30s.

The highest rates are in the urban areas, however, some of those rates are artificially high because the population that lives in those areas is relatively low. For example, the 14203 ZIP code had a rate in the top 25%, but that area is composed mostly of waterfront, green space, industry, and highway. There is very little residential housing in that area; as such, the large number of overdoses by the relatively small population in that ZCTA (the population for 14203 is 1,144 people age 18 and older) resulted in a large naloxone administration rate. These high rates of overdose in low-population, urban communities indicate that people are coming to urban areas to purchase and/or use and overdose on opioids, but reside elsewhere.

The migration to purchase and use opioids in the urban setting is further supported by the high overdose reversal rate in the 14213 ZIP code. Anecdotally, this area of the city has historically been a large opioid drug market, and thus one would expect that the rate would be high. These results suggest the persistence of traditional locations of drug distribution and use, despite the evolving spatial pattern to more suburban and rural locations. Thus, although there is a change in where users come from, locations where people acquire the drugs are also the same locations as people overdosing, since many use so quickly after purchasing the drugs.

This study has some limitations. First, as this is de-identified, secondary data, we could not determine whether each overdose was a unique individual, or if the same individual overdosed multiple times. Further, the drug(s) of overdose were not confirmed with chemical analysis, and thus likely under-represent the number of overdoses associated with substances such as powdered fentanyl. However, as the area under study has a ‘Good Samaritan laws’ in place, drug users were likely more truthful when disclosing substances used because they were protected from criminal prosecution for the substances in their possession.

Finally, the geographic data were at ZIP code level and did not include point-level data, such as the address of the overdose. This did not allow us to examine geographic differences at a more fine-grain level, such as census blocks, or use point-pattern analysis. However, ZIP codes are drawn based on community factors [22, 23] and thus provide an excellent way to look at community trends in an area. In addition, the City of Buffalo is an older metropolitan area with low overall physical growth. As such, ZIP codes and ZCTAs closely align and minimize any error that would occur in areas with extensive metropolitan growth. Therefore, these results indicate which communities are experiencing higher rates of opioid overdose reversal and provide important targets for future programs. Our results have implications for future research, which should examine differences in location of overdose compared to location of individual’s residence.

In conclusion, the present work indicates that in this region, police officers and firefighters are successfully administering naloxone at overdoses; a large number of individuals have been saved during the program’s relatively short duration. The average individual who experienced an overdose was a male in his early 30s, who required just fewer than two vials

of naloxone for revival. Overall, the reversals were well-tolerated, with few negative side effects. Finally, we see that the rates of naloxone administration were concentrated in urban areas, but are wide-spread throughout suburban and rural locations as well. Some of these urban overdoses are due to individuals migrating in and overdosing in low-population areas. Understanding where these individuals are coming from is an important next step for future research.

Acknowledgments

This work was supported by the Mark Diamond Research Fund, State University of New York at Buffalo.

References

1. Rudd, RA., et al. Morbidity and Mortality Weekly Report. Centers for Disease Control and Prevention; 2016. Increases in Drug and Opioid Overdose Deaths—United States, 2000–2014.
2. Pollini RA, et al. Response to overdose among injection drug users. American journal of preventive medicine. 2006; 31(3):261–264. [PubMed: 16905039]
3. Boyer EW. Management of opioid analgesic overdose. New England Journal of Medicine. 2012; 367(2):146–155. [PubMed: 22784117]
4. Tobin KE, et al. Evaluation of the Staying Alive programme: training injection drug. users to properly administer naloxone and save lives. Int J Drug Policy. 2009; 20(2):131–6. [PubMed: 18434126]
5. Davis CS, Carr D. Legal changes to increase access to naloxone for opioid overdose reversal in the United States. Drug and alcohol dependence. 2015; 157:112–120. [PubMed: 26507172]
6. Tracy M, et al. Circumstances of witnessed drug overdose in New York City: implications for intervention. Drug Alcohol Depend. 2005; 79(2):181–90. [PubMed: 16002027]
7. Sporer KA. Strategies for Preventing Heroin Overdose. British Medical Journal. 2003:326.
8. Strang J, Darke S, Hall W. Heroin overdose: the case for take home naloxone. British Medical Journal. 1996:312.
9. Tobin KE, Davey MA, Latkin CA. Calling emergency medical services during drug overdose: an examination of individual, social and setting correlates. Addiction. 2005; 100(3):397–404. [PubMed: 15733253]
10. Banta-Green CJ, et al. Police officers' and paramedics' experiences with overdose and their knowledge and opinions of Washington State's drug overdose–naloxone–Good Samaritan law. Journal of Urban Health. 2013; 90(6):1102–1111. [PubMed: 23900788]
11. Davis CS, et al. Engaging law enforcement in overdose reversal initiatives: authorization and liability for naloxone administration. American journal of public health. 2015; 105(8):1530–1537. [PubMed: 26066921]
12. Davis CS, et al. Expanded access to naloxone among firefighters, police officers, and emergency medical technicians in Massachusetts. Am J Public Health. 2014; 104(8):e7–9.
13. Fisher R, et al. Police Officers Can Safely and Effectively Administer Intranasal Naloxone. Prehosp Emerg Care. 2016:1–6.
14. Cicero TJ, et al. The changing face of heroin use in the United States: a retrospective analysis of the past 50 years. JAMA psychiatry. 2014; 71(7):821–826. [PubMed: 24871348]
15. Harris PA, et al. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform. 2009; 42(2):377–81. [PubMed: 18929686]
16. Kim D, Irwin KS, Khoshnood K. Expanded access to naloxone: options for critical response to the epidemic of opioid overdose mortality. Am J Public Health. 2009; 99(3):402–7. [PubMed: 19150908]
17. Dasgupta N, et al. Observed transition from opioid analgesic deaths toward heroin. Drug and alcohol dependence. 2014; 145:238–241. [PubMed: 25456574]

18. Mars SG, et al. “Every ‘Never’ I Ever Said Came True”: Transitions from opioid pills to heroin injecting. *Int J Drug Policy*. 2014; 25(2):257–266. [PubMed: 24238956]
19. Carlson RG, et al. Predictors of transition to heroin use among initially non-opioid dependent illicit pharmaceutical opioid users: A natural history study. *Drug Alcohol Depend*. 2016; 160:127–34. [PubMed: 26785634]
20. New York State Department of Health. I-STOP/PMP - Internet System for Tracking Over-Prescribing - Prescription Monitoring Program. Oct 2. 2016 2013 Available from: https://www.health.ny.gov/professionals/narcotic/prescription_monitoring/
21. Knowlton A, et al. EMS runs for suspected opioid overdose: implications for surveillance and prevention. *Prehosp Emerg Care*. 2013; 17(3):317–29. [PubMed: 23734988]
22. Krieger N, et al. Zip Code Caveat: Bias due to Spatiotemoral Mismatches between Zip Codes and US Census-Defined Geographic Areas - The Public Health Disparities Geocoding Project. *American Journal of Public Health*. 2002; 92(7):1100–1102. [PubMed: 12084688]
23. Grubestic TH, Matisziw TC. On the use of ZIP codes and ZIP code tabulation areas (ZCTAs) for the spatial analysis of epidemiological data. *Int J Health Geogr*. 2006; 5:58. [PubMed: 17166283]

Figure 1.
Naloxone Administration by Police & Fire Agencies, Erie Co., NY

Table 1

Demographics & Characteristics for Overdose Reversal Reports (n=800)

	Mean (SD) or % (N)
Average Age	31.4 (10.3)
Gender	
Male	70.3% (562)
Female	27.5% (220)
Drug(s) of Overdose	
Heroin	79.1% (633)
Benzodiazepines	0.75% (6)
Cocaine	1.1% (9)
Buprenorphine/Suboxone	0.25% (2)
Pain pills	4.3% (34)
Unknown pills	4.0% (32)
Unknown injection	2.3% (18)
Alcohol	2.6% (21)
Methadone	0.50% (4)
Unknown Drug	10.6% (85)
Reversal Success	
Successful	81.6% (653)
Unknown	12.1% (97)
Unsuccessful (death)	6.3% (50)

Note: Drug of overdose determined based on individual's disclosure and/or what was found on scene. Polydrug use was indicated in 98% of cases.

Table 2

Disposition on Police Officer/firefighter's Arrival

	% (N)
Disposition on Police Officer/Firefighter Arrival	
Unresponsive	90.9% (727)
Responsive but sedated	6.5% (52)
Alert & responsive	0.88% (7)
Other	0.13% (1)
Missing	1.6% (13)
Breathing on Police Officer/Firefighter's Arrival	
Breathing fast	1.3% (10)
Breathing slow	66.1% (529)
Breathing normally	2.3% (18)
Not breathing	26.1% (209)
Missing	4.3% (34)
Pulse on Police Officer/Firefighter's Arrival	
Fast pulse	18.8% (150)
Slow pulse	36.1% (289)
No pulse	10.6% (85)
Did not check pulse	24.3% (194)
Missing	7.6% (61)

Table 3**Naloxone Administration & Results**

	Mean (SD) or % (N)
Naloxone Doses	1.76 (0.72)
Response Time	
<1 minute	8.4% (67)
1–3 minutes	18.9% (151)
4–5 minutes	22.3% (178)
>5 minutes	9.0% (72)
Do not know	5.6% (45)
Did not work	20.5% (164)
Response to Naloxone	
Combative	2.0% (16)
Responsive & angry	4.4% (35)
Responsive & alert	20.1% (161)
Responsive but sedated	34.1% (273)
No response to naloxone	22.9% (183)
Unresponsive but breathing	8.1% (65)
Transition of Care	
Care transferred to EMS	88.5% (708)
EMS transport refused	0.13% (1)
Other	3.62% (29)