

**Beyond Rescue: Implementation and Evaluation of Revised Naloxone Training for Law Enforcement Officers**

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### Abstract

**Objective:** This study describes the implementation and evaluation of revised opioid overdose prevention and education naloxone training for law enforcement officers (LEOs) that added: 1) a recovery testimony, and 2) the process for deputy-initiated referrals post naloxone administration.

**Design and Sample:** Evaluation regarding the naloxone training included a pre- and post- opioid overdose knowledge surveys (N=114) and subsequent one-year post naloxone training outcomes.

**Results:** Pre- and post- test scores for all knowledge outcome measures were statistically significant ( $p < .001$ ) with favorable comments pertaining to the recovery testimony. Out of 31 individuals who received naloxone, 6 individuals (19.4%) continue to be in treatment or received some treatment services. The most common symptoms reported were unconsciousness/unresponsiveness (40.5%), abnormal breathing patterns (24.3%), and blue lips (16.2%). The majority of the calls (65.6%) were to a residential area and the time for naloxone revival ranged from less than one minute to ten minutes (M 3.48; SD 2.27).

Conclusion: As nearly 20% of individuals sought treatment after a LEO-initiated referral, it is recommended that other agencies consider the referral process into the training. Future research will investigate the impact of the recovery testimony in reducing the stigma of addiction.

Keywords: naloxone, law enforcement officers, opioid overdose prevention and education, evaluation

## Background

Deaths due to opioid overdoses have reached epidemic proportions in the United States. Much of the rise in opioid overdose fatalities has been due to deaths from prescription opioid pain killers combined with a sharp rise in deaths related to heroin and synthetic opioid pain relievers other than methadone (Rudd, Aleshire, Zibbell, & Gladden, 2016). Deaths from opioid overdose occur via respiratory depression, occur minutes to hours after opioid ingestion (Zador, Sunjic, & Darke, 1996; Sporer, 2003), and are witnessed by others (Darke & Zador, 1996; Paulozzi, 2012). Therefore, opportunities exist for prevention and intervention. One key antidote to reverse opioid overdoses is naloxone hydrochloride. Naloxone is a pure opioid antagonist, reversing the respiratory depression caused by opioids, and has been used by medical personnel for more than 40 years (Wermeling, 2015). It is a non-scheduled drug that comes in a variety of formulations (intravenous (IV), intramuscular (IM), subcutaneous (SQ), and intranasal (IN)), has no effect if no opioids are in the body, lasts for 30-81 minutes, and has no potential for abuse (Darke & Hall, 1997).

With increasing rates of opioid overdose mortality, one method to prevent opioid overdose-related deaths has been the implementation of community-wide initiatives and trainings to increase access to and distribution of naloxone. Since 1996, over 640 community organizations have provided naloxone kits to over 152,000 laypersons resulting in nearly 26,500 opioid overdose reversals (Wheeler, Jones, Gilbert, & Davidson, 2015). Recent attention has focused on training law enforcement officers (LEOs) to administer naloxone as they are often first to arrive at the scene of an overdose, especially in rural regions. Since “time is brain” when it comes to opioid overdoses, the quicker naloxone is administered, the less likelihood of damage to the person’s brain and body. As of December 2016, there are 1,214 law enforcement agencies trained to administer naloxone (Childs, 2016).

Naloxone training for LEOs has been shown to increase opioid overdose knowledge, improve attitudes related to competency, and address concerns about naloxone administration (Purviance, Ray, Tracy, & Southard, 2016; Wagner, Bovet, Haynes, Joshua, & Davidson, 2016). Moving beyond education, LEOs can effectively demonstrate the skills to reverse opioid overdoses in real-world settings, reduce opioid overdose mortality in a Midwest state post naloxone implementation, and initiate referrals to assist people into treatment services post naloxone administration (Fisher, O'Donnell, Ray & Rusyniak, 2016; Rando, Broering, Olson, Marco, & Evans, 2015; Wagner et al., 2016).

Statistics from 1999 to 2012 show that the number of unintentional drug poisoning deaths in Michigan has nearly quadrupled from 235 to 941 deaths per year (MDCH, 2014). W. County is not immune to this opioid epidemic. From 2012-2014, there was a twofold increase in opioid overdose related deaths (from 30 to 60 deaths). In response, the W. County Office (WCO) implemented naloxone training for its LEOs in August 2015. The purpose of this descriptive study is twofold. We will describe the implementation of LEO naloxone training that added two topics to the standard naloxone education curriculum: 1) a recovery testimony, and 2) the process for deputy initiated referrals post naloxone administration and subsequent effects of naloxone training over a 12-month period.

## Methods

The WCO has 109 deputies that were required to undergo naloxone training. Out of 109 deputies, 87% are male (N=95) and 13% are female (N=14), with an age range of 21 to 58 years old (M = 40; SD = 8.2). The mean number of years working as an officer was 13.33 (SD =8.35), with a range from new hire to 31 years. Five separate trainings were conducted in a large conference room at the WCO office that lasted for 45-60 minutes. All trainings were co-taught by a Lieutenant (second author) and a doctorally prepared nurse practitioner (first author) that has been teaching opioid overdose prevention education to community organizations since 2013.

### Law Enforcement Naloxone Training Curriculum

The training instructional curriculum was developed and modified using materials from the Harm Reduction Coalition. The curriculum content included benefits and concerns regarding naloxone, myths and facts about overdoses, Michigan legislation, medical facts about opioids,

overdose risk factors, overdose symptom recognition, and protocol for naloxone administration. Included in the training were the documentation procedures for reporting an overdose, administering naloxone, and storing naloxone. The didactic content was delivered through a PowerPoint presentation, and included interactive components through small group discussion, video presentations, and periodic questions to engage the audience's comprehension and experiences. After the didactic content was delivered, the LEOs underwent a simulated opioid overdose scenario where each LEO practiced assembling and administering the non-FDA approved IN naloxone on a mannequin. Each deputy was given a red naloxone bag that contained instructions on assembling the non-FDA approved IN naloxone, referral procedures, nasal atomizer, and one dose of the non-FDA approved IN naloxone immediately after the training. Naloxone was purchased through a State awarded grant from a local community organization.

Two unique components were added to enhance our naloxone training for LEOs: 1) instructions for LEOs to contact a case manager from a local substance use disorder treatment program to connect with the person rescued at the hospital for further assessment and treatment options, and 2) testimony from a person in long-term recovery who shared her personal story of the impact a LEO had in her decision to seek substance use treatment. Specifically, inside each red naloxone bag contained telephone numbers for case managers to local treatment facilities. The LEOs were instructed to call a case manager from a local substance use treatment facility post naloxone administration. The case manager would then meet with the overdosed person at the emergency department for follow up. For the complete training material, contact the first author.

## **Measures**

### Naloxone Training Evaluation Measures

Prior to the naloxone training, each deputy completed a pre-knowledge survey based on a 1-5 point Likert Scale (1= Least Knowledge to 5 = Most Knowledge) regarding his or her knowledge of the benefit of overdose prevention as it applies to LEOs and the community, information related to opioid overdoses (risk factors, signs and symptoms), information related to naloxone and how it reverses an overdose, how to prepare the IN naloxone using the mucosal atomizer device (MAD), how to administer naloxone to a subject having an overdose, and

information related to WCO's procedural guideline related to naloxone (administration, storage, documentation, replacement). After the naloxone training, the LEOs took a 10 point true and false quiz to receive their certification and completed the post-knowledge survey. Included in the post-survey was a general training evaluation that was based on a 1-5 point Likert Scale (1 = Strongly Disagree to 5 = Strongly Agree) regarding trainers' communication effectiveness, usefulness of training materials and hands-on simulation. It also included a section for qualitative comments.

#### Post Naloxone Administration Outcome Measures

Personal and contextual characteristics surrounding the overdose were collected through standard LEO documentation after a 12-month period. The LEO report was de-identified and included gender, age, general description of the location, number of naloxone doses administered, time to revive the patient post naloxone administration, involvement of emergency medical technicians, signs of overdose, and the LEO's free-text description regarding the scenario surrounding the overdose. The post naloxone administration treatment outcome data was collected through a community health database that was connected to substance use treatment facilities to see whether the person was in active treatment after the overdose, or not in treatment. All data collected was de-identified prior to the data analyses that were completed by the first author.

### **Analysis**

Descriptive statistics were calculated for all measures, including the post-naloxone administration data. A paired samples t-test was conducted to compare the LEO's knowledge scores regarding the objectives of the Naloxone Training before and after training. All results were entered into SPSS (Statistical Package for the Social Sciences) Version 23 and analyzed. As the study was a program evaluation and data was de-identified prior to analyses, it was determined as not regulated by the University Institutional Review Board.

### **Results**

#### Naloxone Training Evaluation

Out of 109 deputies trained, 11 surveys were not completed in their entirety; therefore, we had a full survey response rate of 89% (n = 98). A majority of the LEOs had witnessed an



opioid overdose prior to the naloxone training (n=72; 73%). As displayed in Table 1, there are statistically significant differences, at the .001 significance level even after Bonferroni adjustment for multiple testing, in all pre-knowledge to post-knowledge scores. The deputies perceived that the trainers communicated effectively (answered all questions  $M = 4.93$ ,  $SD = .29$ ; communicated clearly  $M = 4.96$ ,  $SD = .19$ ), the training materials were helpful ( $M = 4.94$ ,  $SD = .24$ ), and hands-on simulation was useful ( $M = 4.93$ ,  $SD = .29$ ). Qualitatively, the participants shared, “Great presentation and speakers.” “Straight forward and to the point. Great.” “Good job teaching a good subject.” “I enjoyed the stories of the recovering addicts.” “This was an excellent course!” “The recovering addicts were very instrumental in this training.”

#### Post Naloxone Administration Contextual Characteristics

Since the Naloxone Training from August 2015-August 2016, there have been 32 overdose encounters where the LEOs administered naloxone. Out of 32 naloxone administrations, one case resulted in fatality where the patient was transported to the hospital, but died in the hospital the next day (see Table 2). Therefore, WCSO LEOs successfully reversed 31 overdoses in one year following the naloxone training. The majority of the patients who were rescued were male (n=26; 81%) with a mean age of 31 years ( $SD 7.85$ ). Three out of 32 naloxone administrations required a second dose of naloxone and the majority of the calls (65.6%) were to a residential area. The time for naloxone revival ranged from less than one minute to ten minutes ( $M 3.48$ ;  $SD 2.27$ ). Two out of 32 overdose encounters were repeat naloxone administrations. The most common clinical signs and symptoms reported by LEOs were unconsciousness/unresponsiveness, abnormal breathing patterns, and blue lips (see Table 3). No arrests were made at the scene of the overdoses.

#### Post Naloxone Administration Referral Treatment Outcomes

Out of 31 individuals whose overdoses were reversed, 6 individuals (19.4%) continue to be in treatment or received some treatment services post naloxone administration, 19 (61.3%) individuals did not receive treatment, and 6 (19.4%) individuals were from different counties and treatment records were not available.

### Discussion

The current study demonstrated that naloxone training improved opioid overdose knowledge, which was then applied effectively in real-world settings, and that LEO referrals post naloxone reversals contributed to assisting people into treatment services. Almost 20% of those rescued entered into substance use treatment post-reversal according to our study. Our study is one of the few studies to investigate post naloxone administration entry into treatment as a result of a LEO referral to a case manager and is similar to other studies that indicate one out of four injection drug users sought treatment within 30 days post overdose and those who sought treatment were 5 times more likely to enter into treatment if someone talked to them about drug treatment after an overdose than those who did not seek treatment (Pollini, McCall, Mehta, Viahov, & Strathdee, 2006). Similar results were shown by Wagner et al. (2016), which demonstrated that three out of nine overdose victims entered into treatment due to a LEO referral.

These studies underscore the importance of referrals by LEOs and the possibility of creating a defining or teachable moment for the person revived to guide them into treatment. An overdose situation also creates an opportunity for LEOs to engage with the person rescued and other witnesses for further follow-up in the community. This sentiment along with receiving additional communication strategies was expressed through LEO interviews conducted by Green et al., (2013) in order to improve community-police relationships and prevent overdoses. Promising techniques such as brief motivational interviewing have been found to reduce overdose risk behaviors and non-medical opioid use among adults with a history of prescription opioid misuse (Bohnert et al., 2016). Future research can examine if motivational interviewing skills can be employed by LEOs to further engage with the rescued person and other witnesses, as well as its role in assisting people into treatment after reversals.

Unlike the standard opioid overdose prevention and education curriculum, we included a testimony from a person in long-term recovery who shared how an officer impacted her life and helped her to be aware of her addiction which led to her seeking treatment. The testimony was included to reduce the stigma of addiction and help officers see that recovery is possible. Initial qualitative comments suggest that the testimony was helpful for the training, but we did not quantitatively collect data to examine if LEOs perceptions of addiction changed after hearing the recovery testimony. Research is currently being conducted to qualitatively evaluate the officers' perception of the naloxone training curriculum. Information from the officers that have utilized

naloxone in the field, including their perceptions about drug users and the recovery testimony as a result of the training, will be used to develop an evidence-based curriculum for the LEOs, which will be translated into web-based naloxone training. The web-based naloxone training allows for more efficient process of re-certification and greater dissemination of training for LEOs to deliver the life saving naloxone medication.

Although prior studies have reported pre- and post- opioid overdose attitude and knowledge measures after naloxone training for LEOs (Purviance, Ray, Tracy, & Southard, 2016; Wagner et al, 2016; Saucier, Zaller, Macmadu, & Green, 2016; Ray, O'Donnell, & Kahre, 2015), few studies have examined post naloxone administration data and LEOs' actions through LEO documentation reports. Fisher et al. (2016), was the first study to demonstrate the most common clinical signs of opioid overdose that resulted in administration of naloxone by the LEOs, and the disposition of the patient post naloxone administration. The LEO documentation reports provide basic understanding of the contextual factors regarding opioid overdose and naloxone administration, and indicate topics to emphasize or modify in subsequent trainings for LEOs. For instance, the 2mg IN naloxone was effective in reversing the effects of most opioid overdoses for our suburban Midwest county until EMS arrived to provide additional medical support, the time to revival was around 3 minutes, and the most common signs of overdose included unconsciousness, abnormal breathing, and blue lips. This knowledge can be used to tailor future trainings. In addition, 20% of LEO initiated referrals led to some form of substance use treatment. This information can be used to encourage LEOs in future trainings that people do seek treatment after an overdose and LEOs actions can make a significant impact in a person's recovery.

However, with increasing reports of heroin mixed with fentanyl and carfentanil found in surrounding counties along with the time and dexterity required to assemble the 2 mg IN naloxone, this may suggest utilizing a higher formulation of IN naloxone that is FDA-approved for future naloxone trainings. The fact that over 60% of the overdoses occurred in a person's home further supports community-wide training for laypersons. From 1996-2014, community opioid overdose prevention programs have trained and dispensed naloxone kits to over 152,000 community laypersons (excluding first responders) and has reported over 26,400 reversals (Wheeler, Jones, Gilbert, & Davidson, 2015). Training laypersons to recognize opioid overdoses and administer naloxone can save more lives even before the arrival of first responders.

Our study is limited by its design, small sample size, and data collection methods. The study was designed to evaluate the initial pilot naloxone training for LEOs in a predominantly suburban Midwest county. Due to a small sample size, the results are not generalizable to other locations. The pre- and post- knowledge measures were broad general questions and did not specifically ask questions related to opioid overdose knowledge. However, all LEOs passed the 10-item true and false test that assessed for specific opioid overdose knowledge after the training.

We did not collect data from the local emergency medical services (EMS), which could have provided additional insights into overdose scenarios such as other medical supportive services provided like oxygenation, additional naloxone doses and routes, and situations where EMS arrived first and administered naloxone. Although we evaluated entry into treatment for those who were revived and referred by a LEO to a case manager for treatment, we did not obtain specific treatment data such as what type of treatment, duration of treatment, reasons to enter into treatment, etc. We do not know based on LEO documentation reports and from the community health database what factors influenced the person who was revived to seek treatment. Future research should investigate the best evidence-based outreach practices for post naloxone reversals.

Despite these limitations, we described the implementation of a modified naloxone training curriculum for LEOs that included a recovery testimony and instructions for deputy-initiated referrals post naloxone administration. We further examined personal, contextual characteristics surrounding overdoses, and treatment outcomes as a result of deputy referral post naloxone reversal over a 12-month period. The fact that people entered into treatment after a deputy-initiated referral indicates the need for further investigation into the role that LEOs can play in opioid overdose prevention, and extending into public health efforts to improve the health of the community through reducing opioid overdose mortality and morbidity and improving public relations.

Research is ongoing to evaluate if the recovery testimony had an impact on LEOs' perceptions about people who use drugs. Equipping LEOs with naloxone is one key aspect of fighting against the opioid epidemic and a critical component to recovery, but more research is needed to identify best practices for post naloxone administration to assist drug users' entry into treatment and sustain recovery.

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**Table 1**

Descriptive Statistics and Paired Samples t-test Results for Intranasal Naloxone Training

(N = 98, df = 97)

Outcome	Pretest		Posttest		95% CI	r	t
	M	SD	M	SD			
Recognizing the signs, symptoms and risk factors of an opioid overdose.	2.66	1.23	4.7	.53	-2.32, -1.83	.21	-16.67*
Identifying the benefits of overdose prevention as it applies to law enforcement personnel and the community.	2.68	1.24	4.77	.57	-2.34, -1.83	.16	-16.08*
Understanding what Naloxone is and how it reverses an overdose.	1.74	1.04	4.82	.44	-3.31, -2.83	-.15	-25.63*
How to assemble and prepare the intranasal naloxone.	1.12	.56	4.96	.25	-3.96, -3.71	-.04	-61.18*
Outcome	Pretest		Posttest		95% CI	r	t
	M	SD	M	SD			
How to administer Naloxone to a subject having an overdose.	1.22	.65	4.95	.26	-3.87, -3.58	-.05	-51.58*
Familiarity with WCSO's procedural guideline related to naloxone (administration,	1.05	.27	4.77	.51	-3.84, -3.60	-.14	-59.68*



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storage, replacement)

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\*p<.001

**Table 2**

Post Naloxone Administration Results\* (N = 32)

	n	%
Gender		
Male	26	81.3
Female	6	18.8
# Naloxone		
1 dose	29	90.6
2 doses	3	9.4

Time to Revival\*\*

< 1 min	3	10.7
1-2 min	8	28.5
3-4 min	7	25
5 min	7	25
> 5 min	3	7.2
<b>Location</b>		
Residence	21	65.6
Public Parking Lot	6	18.8
	n	%
Street	2	6.3
Other (under bridge, public parking lot, patrol car)	3	9.4

\*One overdose resulted in fatality

\*\*Four missing data

**Table 3**

Signs and Symptoms of Overdose Reported\* (N=37)

	n	%

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Unconscious	15	40.5
Abnormal Breathing	9	24.3
Blue Lips	6	16.2
Gurgling	2	5.4
Weak Pulse	2	5.4
Half-open Eyes	3	8.2

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\*Signs and symptoms of overdose are not mutually exclusive