Seattle Police Department – 2016 Naloxone Evaluation

Conducted under contract by the
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Executive Summary

Background

Opioid-related fatalities continue to be public health crisis, with 229 drug-caused deaths involving opioids occurring in King County in 2015 (1), and 28,647 opioid-caused deaths nationally in 2014 (2). In an effort to fight the opioid epidemic the White House announced a $1.1 billion proposal which included $11 million dollars specifically for expanding naloxone to first responders in 2016 (3). The White House's 2013 Drug Strategy recommended greater naloxone availability, with an emphasis on first responders, in particular police, with an example of the Quincy Police Department's naloxone program (4). In 2014, the U.S. Department of Justice released a naloxone toolkit for law enforcement (5). Many police agencies throughout the country, and increasingly in Washington State, have recently begun carrying naloxone for administration during suspected opioid overdoses (6).

Recent evidence from an observational study of police naloxone administrations in California has shown that officers can correctly identify opioid overdoses and administer naloxone without ill effects (7). A community-based study in 19 communities across Massachusetts observed a marked decrease in mortality when naloxone access expanded to heroin users and those within their social networks (8). There has also been an increase in community access to naloxone nationwide, with 42 states currently having statutes which provide protections to bystanders and first responders who administer naloxone, as opposed to just six in 2012 (9). Washington State specifically has laws which have expanded naloxone access to bystanders, and Good Samaritan Laws preventing some criminal charges for those involved in a drug overdose (10).

In light of naloxone expansion, the Seattle Police Department began a naloxone pilot program in March 2016, training officers in the bike unit as well as some community policing officers to carry and administer naloxone in instances where an opioid overdose is suspected (11). In September of 2016, King County's Heroin and Prescription Opiate Addiction Task Force recommended evaluating police and fire department naloxone programs in order to understand the direct impact of naloxone training and utilization on health outcomes (12).

Study Aims

- Census of all opioid-related incidents to which SPD responded from July through August 2016.
    - What is the nature of the opioid-related calls to which SPD responds?
    - How often can SPD expect to arrive first and intervene with naloxone to reverse an overdose?
    - What are the considerations for expanding naloxone to all patrol officers?
- Identification of all SPD Naloxone administrations from March through September 2016
    - What is the nature of the events at which SPD was able to administer naloxone?
    - Describe the nature of the overdose event and naloxone delivery
    - Interview officers following administrations and discuss ways in which to improve future overdose responses if necessary

Case-Identification

Cases were identified through SPD dispatch information relating to a drug-related casualty. Printouts of these cases, which included narrative remarks from both dispatch operators and officers, were then examined and linked to Seattle Fire Department's dispatch and medical data to determine whether the incident was opioid-related. Dispatch times, response times, patient health status and

demographics, and narratives of the events were collected and analyzed in order to categorize the cases: 1) unlikely opioid-related overdose, 2) drug type unknown, 3) probable opioid overdose, and 4) confirmed opioid overdose.

Results

Part 1: Census of drug-related casualties from July-August 2016

A total of 283 calls were dispatched by police as a drug-related casualty from July-August 2016. Of those identified, 38 were categorized as confirmed opioid-related overdoses, 11 probable opioid-related overdoses, 15 were drug unknown overdoses, and 163 were categorized as unlikely opioid-related overdoses. There were 50 which remain undetermined because records could not be obtained for review, with two involving advanced life support paramedic transport and forty-eight involving basic life support.

Final Categorization of Opioid-Related Overdose	N	(%)
Unlikely opioid related overdose	169	(73%)
Drug Unknown	15	(6%)
Probable Opioid Overdose	11	(5%)
Confirmed Opioid Overdose	38	(16%)
Missing Report*	50	(18%)
Total	283	

Of the 49 probable or confirmed opioid-related overdoses, SPD was the first responding unit on scene for 13, and officers carried naloxone for two of those thirteen. When SPD arrived first to a scene, they were on scene on average 51 seconds prior to Seattle Fire Department arrival.

Part 2: Description of all SPD Naloxone administrations

There were eleven incidents in which SPD delivered naloxone, from March through September 2016. Ten of the eleven incidents were determined to be confirmed opioid overdoses, with one incident being an unknown drug overdose. These ten confirmed drug overdoses showed marked increases in the victims' respirations and levels of consciousness following naloxone administration. All of the naloxone administrations took place outdoors in a public location. For these 11 incidents, SPD was able to respond 199 seconds before SFD units on average. For three of these incidents, bike officers had come across the overdose victim while on patrol and notified dispatch to request a medic response.

Seven separate interviews with officers who had administered naloxone were conducted, and we were unable to conduct interviews for five administrations. One officer was interviewed twice, since the officer had responded to two separate naloxone administrations. Over the course of the March-September evaluation period, 9 separate officers had administered naloxone, with 3 officers administering naloxone twice. Officers provided very helpful information and were uniformly supportive of the naloxone program.

Discussion

Expansion of the naloxone program to all SPD officers has the potential to reverse the effects of opioid overdoses in select cases. For cases in which SPD arrived first, SPD was on-scene for 51 seconds prior to SFD, on average, with a range of 1 to 190 seconds. Although it is unlikely for naloxone to take effect within one minute, rescue breathing efforts during the time of SPD arrival to SFD arrival would likely be beneficial towards patient health outcomes, as regular breathing is compromised during the event of an opioid-related overdose. Over the course of the two month evaluation period from July-August 2016, thirteen cases were identified where SPD was able to arrive prior to SFD. Of these, naloxone was carried by officers for two of the thirteen. Based on the results from the two month evaluation period, SPD may be able to expect roughly 6 cases per month in which they may be able to intervene and help reverse an opioid-related overdose with naloxone.

From March through September 2016, the Seattle Police Department administered naloxone in eleven separate incidents. Of those eleven incidents, all were in public places and three were the result of bike units finding a victim while on patrol, suggesting that bike units were uniquely beneficial in both responding more quickly and for identifying victims who may not otherwise who have been found before dying. Officers involved were supportive of the program, and had noted that their naloxone training served them well.

Points for improvement included practicing a mock naloxone administration during training to familiarize officers with assembling and using the kit, and a focus on rescue breathing attempts. Rescue breathing was not attempted in 7 of the cases in which officers were interviewed (in which the victim's breathing was determined to be abnormal or absent), perhaps in part because rescue breathing masks had not yet been made available. Given that naloxone's effects can take up to five minutes to counteract respiratory deficits, rescue breathing training would help provide immediate respiratory benefit.

Overall, it appears that bike patrol sees the highest rate of opioid overdoses and is uniquely suited to identify people who may not otherwise be identified before dying. Expanding naloxone to all patrol officers would increase the number of events at which police could administer naloxone, but the added value is likely moderate given the number of cases and the situational factors in which Fire is more likely to arrive first or more quickly compared to events to which bicycle patrol responds. To document the circumstances and provide ongoing assessment of the police naloxone program we suggest a basic set of questions to be asked routinely following all naloxone administration events.

Report

Background and Introduction

Opioid-related fatalities have continued to increase, with 229 drug-caused deaths involving opioids occurring in King County in 2015 (1), and 28,647 deaths nationally in 2014 (2). The risk of death for opioid use is high due to the inhibition of respiratory function causing the victim to, often slowly, stop breathing. Respiratory function can be restored through the administration of naloxone, an opioid antagonist or "antidote", which can counteract the effects of opioids (e.g. heroin, oxycodone, and morphine), allowing the victim's respiratory system to function normally once again. Naloxone can be administered easily through an intranasal application into each of the victim's nostrils, making it a safe and effective means to temporarily reverse opioid overdoses; intramuscular and intravenous routes of administration are also common.

In an effort to fight the opioid epidemic, the White House recently announced a $1.1 billion proposal which included $11 million dollars specifically for expanding naloxone to first responders (3). The President's 2013 Drug Strategy recommended greater naloxone availability with an emphasis on first responders, in particular police, with an example of the Quincy Police Department's naloxone program (4). In 2014, the U.S. Department of Justice released a naloxone toolkit for law enforcement (5). Many police agencies throughout the country, and increasingly in Washington State, have recently begun carrying naloxone for administration during suspected opioid overdoses (6). Recent evidence from an observational study of police naloxone administrations in California has shown that officers can correctly identify opioid overdoses and administer naloxone without ill effects (7). A community-based study in Massachusetts observed a marked decrease in mortality when naloxone access was expanded to heroin users and those within their social networks (8). There has also been an increase in community access to naloxone nationwide, with 42 states currently having statutes which allow protections to bystanders and first responders who administer naloxone, as opposed to just six in 2012 (9). Washington State specifically has laws which have expanded naloxone access to bystanders, and Good Samaritan Laws preventing some criminal charges for those involved in a drug overdose (10).

In light of naloxone expansion, the Seattle Police Department began a naloxone pilot program in March 2016, training officers in the bike unit as well as some community policing officers to carry and administer naloxone in instances where an opioid overdose is suspected (11). In September of 2016, King County's Heroin and Prescription Opiate Addiction Task Force recommended evaluating police and fire department naloxone programs in order to understand the direct impact of naloxone training and utilization on health outcomes (12). As of October 2016, the Seattle Fire Department (SFD) only allows paramedics (advanced life support) to administer naloxone, excluding Fire units (basic life support) from utilizing the drug. Due to this, there may be a unique opportunity for the Seattle Police Department to intervene on select opioid-related overdoses should they arrive early.

Despite naloxone expansion to many police agencies throughout the country, however, there has been little research regarding the direct effect of these programs on health outcomes or the

incident characteristics regarding when police may be present to administer naloxone. This study aims to: 1) examine in detail all Seattle Police Department naloxone administrations from March-September 2016 and 2) to conduct a descriptive analysis of all possible overdoses to which police responded to understand the proportion and types of cases at which police arrive first as well as the detailed timing and sequencing of police and fire dispatch, arrival, and medical intervention.

Methods

The study consisted of two parts, with one being a descriptive analysis of all overdose-related incidents to which SPD responded from July 1 through August 31 2016, and the other being a case-series analysis of all SPD naloxone administrations from March-September 2016. The study was reviewed and approved by the University of Washington's Institutional Review Board.

Part 1: A description of overdose-related incidents in which SPD responded from July-August 2016

Potential overdose incidents were identified using police dispatch records. To determine which technique was most effective, police records from a one week period were examined using a variety of search terms from dispatch and officer remarks as shown in Table 1 based on suggestions from a Seattle Police Department data analyst. Search terms included keywords such as "overdose" and "heroin," as well as numeric initial dispatch codes as associated with "man-down" and "drug-related casualty" events. We also examined the final officer clearance code of "drug-related casualty." Overdose-related incidents were defined as any incident in which a patient was identified and any drugs (including non-opioids) were noted. Incidents were not determined to be overdose-related if there was no mention of drugs and if the person was fully alert and oriented. Due to limited resources, we were unable to conduct a true sensitivity test for all SPD calls in a given week as there is a 2,000 call a day volume. Instead, we calculated a sensitivity based on the subset of cases identified using our search terms and dispatch codes shown in Table 1. We determined that the initial dispatch code of "drug-related casualty" would be most effective, as it identified 100% of the potential overdose-related incidents from these searches. Appendix C lists the sensitivity, specificity, positive predictive value, and negative predictive value for these tests.

Table 1. Identification of overdose-related incidents from police dispatch records

Identification method	Total Incidents	Overdose-related incidents	Sensitivity
Keyword "overdose"	17	5	50%
Keyword "heroin"	22	5	50%
Initial dispatch code: Man-down	122	0	0%
Initial dispatch code: Drug-related casualty	28	10	100%
Final clearance code: Drug-related casualty	4	1	25%
Calls Identified	178	10	--

Determining if SPD intervened for a possible or suspected overdose

A census of drug-related casualty events to which Seattle Police Department responded was identified from July 1 through August 31, 2016. A printout of these reports, which included narrative remarks from both dispatch operators and officers, were then examined. Many cases initially dispatched for an overdose-related casualty resulted in SPD being cancelled, because a patient was not able to be found, or a person was found to be fully-alert and conscious. For such calls, no follow-up was conducted as they were not calls in which SPD could intervene for a serious opioid-related overdose. SPD dispatch data extracted also included time-related data elements, such as dispatch time and arrival time.

Determining if a case was a possible or suspected opioid overdose

Incidents which were potentially opioid-related overdose based on the information provided were then matched with the Seattle Fire Department's Computer Aided Dispatch (CAD) in order to obtain their specific notes for the incident and which units responded. Matching was done by searching an online, public record of EMS responses based upon the day, time, address and type of event for an EMS record number which could then be used to extract EMS data to be joined with SPD data. Note that there is not a common case number between SPD and SFD incidents. CAD data from SFD sometimes contained additional information such as drug type or severity of the case. Using the remarks from both dispatch sources, cases were then initially classified as one of the following: "Not an Opioid Overdose," "Possible Opioid Overdose," or "Suspected Opioid Overdose." Criteria for each are described in Table 2 below. Time-related data elements such as specific unit dispatch and arrival times from SFD dispatch were also extracted.

Determining if opioids were involved in the case

Possible and suspected opioid overdose cases were further investigated by reviewing Seattle Fire Department's medical incident report forms (MIRFs). MIRFs for ALS events are archived at SFD's Medic One Headquarters and are generally available within a week. MIRFs for BLS events are eventually archived at headquarters, but there can be a multiple month delay, so oftentimes attempts were made to get forms from the local fire station that responded to the event. MIRFs included the patients' demographic information, vitals, and a narrative of the incident. Narratives of the incident would often include additional information such as drugs used or administered (either by patient, bystander, SPD or SFD), description of scene, transport decisions, and vital signs such as pulse, respiratory rate and the Glasgow Coma Score. Pupil size and reactivity was often documented narratively, as standard data fields for these elements are not on the MIRF. A final decision of whether a case was a serious opioid overdose was then made per the criteria in Table 3. The overall order in which data elements were pulled, linked, and evaluated are illustrated in Figure 1.

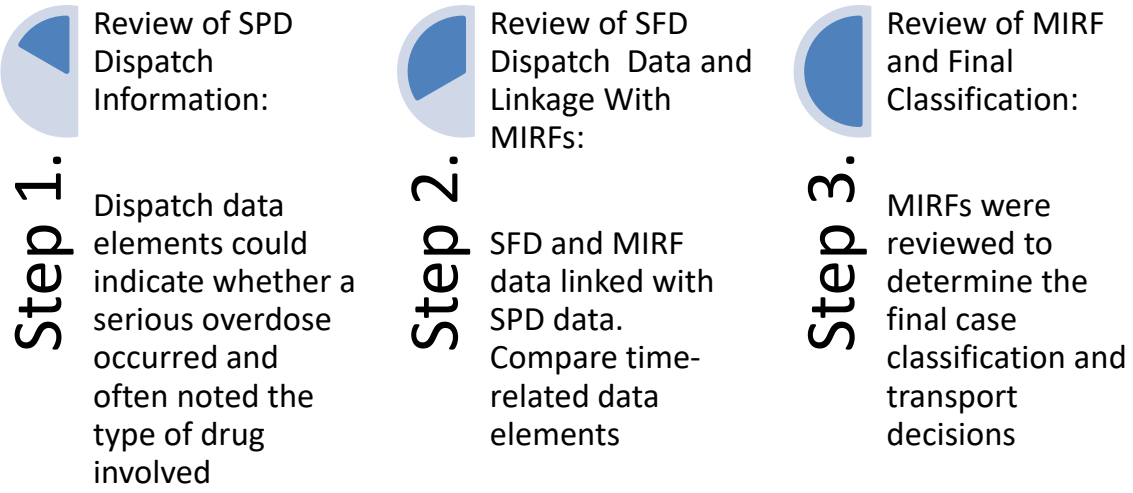
Table 2. Identifying whether an incident involved a serious opioid-related overdose.

Initial Classification from SPD and SFD Data Elements	Rationale	Explanation of Rationale
Not an Opioid Overdose	SPD Cancelled (From SPD Data)	There was no opportunity for SPD to intervene for such calls. The most common reasons for being cancelled include a bystander saying police or fire is no longer needed, or SFD clearing the call before police arrive. No further follow-up was conducted.
	No SFD response (From SPD and/or SFD Data)	Cases in which SFD did not respond were not identified as potentially serious overdoses, as no medical care was determined to be necessary. No further follow-up was conducted.
	Patient fully alert and conscious upon arrival (From SPD and/or SFD Data)	The patient would often be alert and conscious at the scene upon arrival, signifying that there was no immediately life threatening opioid overdose. No further follow-up was conducted.
	Subject not found or left scene (From SPD and/or SFD Data)	There were cases in which neither SFD or SPD could initiate care since the potential patient had left the scene by the time of their arrival. No further follow-up was conducted.
	Other drug identified (From SPD and/or SFD Data)	A non-opioid overdose was clearly identified in the SFD and/or SPD dispatch notes and no signs of opioids were present. No further follow-up was conducted.
Possible Opioid Overdose	Possible (From SPD and SFD data)	SPD and SFD were dispatched for an overdose-related incident, however, no specific drug was noted from either data source. These incidents were then categorized after linking with MIRF data.
Suspected Opioid Overdose	Suspected (From SPD and SFD data)	SPD and SFD were dispatched for an overdose which identified an opioid. These incidents were then diagnosed after linking with MIRF data.

Table 3. Final overdose classification criteria for possible and suspected overdoses

Final Classification	Definition
No serious opioid-related overdose identified	MIRF indicated a non-opioid was the root cause of the overdose, or the case was initially classified as "Not an opioid overdose" and did not require follow-up.
Drug unknown	MIRF did not indicate a specific drug, however, the patient exhibited 1-2 signs of an opioid overdose: • Decrease in LOC (Glasgow Coma Scale <15) • Respirations <10 • Pinpoint pupils (2mm or smaller) • Opioid-related paraphernalia (needles, syringes, opioid medications, admission of specific opioid use)
Probable Opioid Overdose	MIRF indicated signs/symptoms of an opioid-related overdose with at least 3 of the following signs of a drug overdose, however, no naloxone was administered. • Decrease in LOC (Glasgow Coma Scale <15) • Respirations <10 • Pinpoint pupils (2mm or smaller) • Opioid-related paraphernalia (needles, syringes, admission of specific opioid use)
Confirmed Opioid Overdose	An opioid was described as being the root cause of the overdose along with a noted increase in GCS following naloxone administration.

Figure 1. Steps in data linkage and case classification



Part 2: Analysis of all naloxone administrations by SPD officers from March-September 2016.

A case-series analysis of all SPD naloxone administrations from March-September 2016 was also conducted as part of this study. Every incident in which naloxone was administered was reported internally at SPD to the Safety Officer and subsequently forwarded to study staff with dispatch notes and an officer's written narrative of the incident. Follow-up interviews were then conducted with corresponding officers to identify specific call details, reasons for administering naloxone, thoughts regarding the training and administration of naloxone, and thoughts regarding the naloxone program (See officer survey in Appendix 1). SPD naloxone administration cases were then linked with SFD's CAD and MIRF data, abstracting the same data elements as from Part 1 of the study.

All data summaries and analyses were conducted using STATA 14 and Excel 2013.

Results

Part 1: Overdose-related calls to which SPD responded July-August 2016

A total of 283 calls (Table 4) dispatched by police as a drug-related casualty from July-August 2016 were identified. Of those identified, 38 were categorized as confirmed opioid-related overdoses, 11 probable opioid-related overdoses, 15 were drug unknown overdoses, and 163 were categorized as unlikely opioid overdoses. There were 50 which remain undetermined because MIRFs could be obtained for review, with two involving paramedic transport and forty-eight involving basic life support.

Table 4. Final categorization of SPD "drug-related casualty" dispatched incidents from Jul-Aug 2016.

Final Categorization of Opioid-Related Overdose	N	(%)
Unlikely opioid related overdose	169	(73%)
Drug Unknown	15	(6%)
Probable Opioid Overdose	11	(5%)
Confirmed Opioid Overdose	38	(16%)
Missing Report*	50	…
Total	283	

*Missing not included in column percentage.

The distribution of overdose categorization by whether the case was closed by advanced life support (ALS) versus basic life support (BLS) is shown in Table 5. Cases closed by an ALS unit are considered to be a higher severity incident than calls closed by a BLS unit. Although most confirmed opioid overdose cases were closed by ALS, there were five confirmed opioid-related overdose incidents closed by a BLS unit. For these five incidents, naloxone was administered prior to SFD arrival and the patient was either deemed stable and was downgraded to BLS transport, or refused further treatment with BLS providers.

Table 5. Overdose categorization by closure status for incidents to which SPD responded from Jul-Aug 2016 (ALS indicates higher priority).

	Drug Unknown	Probable Opioid	Confirmed Opioid	Total
Advanced Life Support (ALS)	3 (20%)	3 (27%)	33 (87%)	39 (61%)
Basic Life Support (BLS)	12 (80%)	8 (73%)	5 (13%)	25 (39%)
Total	15	11	38	64

Naloxone was administered in 40 incidents by SPD, SFD, King County Metro Transit Police (KCMTP), or bystanders, as shown in Table 6. King County Metro Transit Police started carrying naloxone in May 2016, and responds to incidents within King County transit jurisdiction (13). Of the 40 naloxone administrations to which police responded, Seattle Fire Medics administered naloxone in 27 (68%), bystanders in 8 (20%), Seattle Police 3 (8%) and King County Metro Police Department 2 (5%).

There were two naloxone administration incidents which did not fit the criteria of a confirmed overdose, categorized as drug unknown, due to either a lack of response to naloxone, or no noted use of an opioid. For the SPD incident in which the drug was unknown, the victim initially appeared unconscious, however, he woke up immediately when naloxone was administered. The victim would not state which drugs he had taken and would not answer questions from SPD or SFD. For the bystander naloxone administration in which the drug was unknown, the victim had initially stated that they had taken numerous drugs (of unknown type/origin) and had someone call 911. The victim's condition continued to worsen when medics arrived, despite naloxone being administered by staff on site.

Table 6. Incidents in which naloxone was administered for incidents to which SPD responded from Jul-Aug 2016.

Naloxone Administration: N (%)	Drug Unknown	Probable Opioid Overdose	Confirmed Opioid Overdose	Total
SPD	1 (50%)	0 (0%)	2 (5%)	**3 (8%)**
SFD	0 (0%)	0 (0%)	27 (71%)	**27 (68%)**
KCMTP	0 (0%)	0 (0%)	2 (5%)	**2 (5%)**
Bystander	1 (50%)	0 (0%)	7 (18%)	**8 (20%)**
Total	2 (5%)	0 (0%)	38 (95%)	**40 (100%)**

Incidents which were identified as a probable or confirmed opioid overdoses are shown in Table 7, separated by which agency arrived first. Of the 49 probable or confirmed opioid-related overdoses, SPD was the first responding unit on scene for 13 and officers carried naloxone for two. For one case, we could not determine who arrived first, as the CAD data element for arrival time was missing. Overall, SFD arrived first at 35 of the cases.

Table 7. First agency which arrived, separated by overdose classification for incidents to which SPD responded from Jul-Aug 2016.

Arrived First		Probable Opioid	Confirmed Opioid	Total
SPD				
	SPD unit with naloxone	0 (0%)	1 (3%)	1 (2%)
	SPD unit without naloxone	3 (27%)	9 (24%)	12 (24%)
SFD				
	SPD unit with naloxone	0 (0%)	0 (0%)	0 (0%)
	SPD unit without naloxone	8 (73%)	27 (71%)	35 (71%)
Unknown				
	SPD unit with naloxone	0 (0%)	1 (3%)	1 (2%)
	SPD unit without naloxone	0 (0%)	0 (0%)	0 (0%)
Total				
	SPD unit with naloxone	0 (0%)	2 (5%)	2 (4%)
	SPD unit without naloxone	11 (100%)	36 (95%)	47 (96%)

A summary of sequence and timing for all opioid-related overdoses is shown in Table 8 below. SPD arrived 248 seconds (4 minutes 8 seconds) later than any SFD unit (BLS or Medic), on average, with a median of 174 seconds (2 minutes 54 seconds) and a range of 190 seconds (3 minutes 10 seconds) earlier to 1339 seconds later (22 minutes 19seconds). SPD units were also dispatched 171 seconds (2 minutes 51 seconds) later than SFD units, on average. It is important to note that 911 calls for medical emergencies are directed to SFD first, with the call data later being transferred to SPD. Figure 2 displays a distribution of the difference in time from any the earliest SFD (BLS or Medic) unit's arrival to SPD's arrival.

Table 8. A summary of all time-related data for all opioid overdoses for incidents to which SPD responded from Jul-Aug 2016.

N=49	N	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
Arrival sequence and timing in seconds								
From any SFD (BLS or Medic) arrival to SPD arrival*	48	248	344	-190	-1	174	334	1339
From BLS arrival to SPD arrival*	48	229	354	-335	-7	152	285	1339
From SPD arrival to Medic arrival**	44	82	333	-436	-123	3	236	932
Dispatch sequence and timing in seconds								
From SPD dispatch to SPD arrival	48	296	295	0	130	210	360	1372
From SFD dispatch to SFD arrival	49	237	116	16	170	204	286	663
From SFD dispatch to SPD dispatch*	49	171	189	-63	66	117	199	1077

*Negative integers indicate SPD was first. **Negative integers indicate Medics were first.

Figure 2. Time difference from earliest SFD unit arrival to earliest SPD unit for all opioid overdoses.

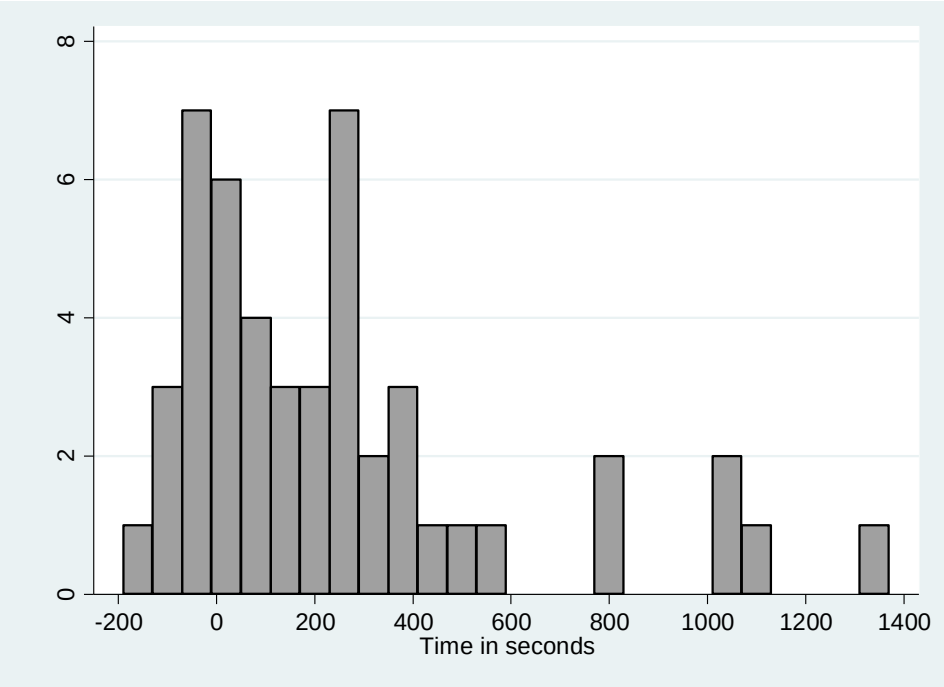


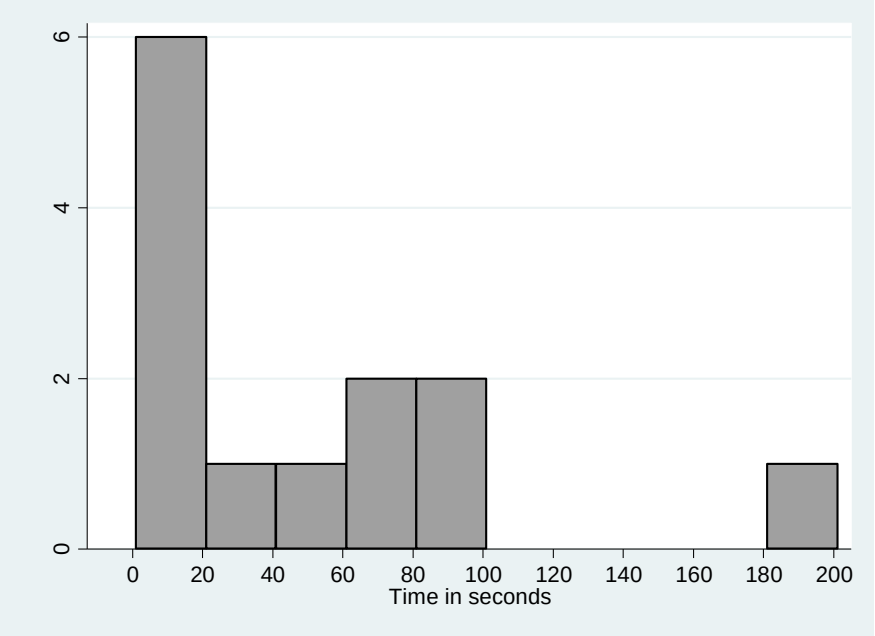
Table 9 describes the time-related data for the 13 opioid-related incidents to which SPD arrived first. For those 13 incidents, SPD arrived 51 seconds earlier, on average, than any SFD unit (Fire or Medic) with a median of 31 seconds. Figure 3 displays a distribution of the difference in time from the first SPD unit to the first SFD unit (BLS or Medic) for incidents in which SPD was first.

Table 9. Timing and sequence of arrival and dispatch for opioid overdoses at which SPD arrived first from Jul-Aug 2016.

	N	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
Arrival sequence and timing in seconds								
From SPD arrival to SFD (BLS or Medic) arrival	13	51	54	1	12	31	80	190
Dispatch sequence and timing in seconds								
From SPD dispatch to SPD arrival	13	108	81	0	35	111	178	210
From SFD dispatch to SFD arrival	13	259	152	112	174	207	304	663
From SPD dispatch to SFD dispatch*	13	-76	81.3	-217	-140	-65	-22	63

*Negative integers indicates SFD was dispatched first.

Figure 3. Time difference from earliest SPD unit arrival to earliest SFD unit (BLS or Medic) for opioid incidents in which SPD was first.



Summaries of the patients' age, sex, and race are shown in Table 10. The median age of all drug unknown, probable opioid, and confirmed opioid overdoses was 31, 27, and 33 years, respectively, with an overall median of 32 years across these groups. The proportion of male patients for drug unknown, probable opioid, and confirmed opioid overdoses was 67%, 45%, and 68%, respectively, with an overall male proportion of 64% across these groups. The proportion of Caucasian patients for drug unknown, probable opioid, and confirmed opioid overdoses was 47%, 33%, and 66%, respectively, with an overall Caucasian proportion of 56% across these groups. The most common type of location for probable and confirmed opioid overdoses was public outdoors.

Table 10. Demographic information of overdose incidents to which SPD responded from Jul-Aug 2016.

N=64		Drug Unknown	Probable Opioid Overdose	Confirmed Opioid Overdose	Total
Age					
	Mean	32.1 years (N=14)	31.4 years (N=11)	35.3 years (N=38)	33.9 years (N=63)
	Median	31 years (N=14)	27 years (N= 11)	33 years (N=38)	32 years (N=63)
Sex					
	Female	5 (33%)	6 (55%)	12 (32%)	23 (36%)
	Male	10 (67%)	5 (45%)	26 (68%)	41 (64%)
Race					
	African American	0 (0%)	0 (0%)	2 (5%)	2 (3%)
	Caucasian	7 (47%)	4 (33%)	25 (66%)	36 (56%)
	Hispanic	1 (7%)	1 (8%)	0 (0%)	1 (2%)
	Unknown/Other	1 (7%)	1 (8%)	0 (0%)	2 (3%)
	Missing	6 (40%)	6 (50%)	11 (29%)	23 (36%)
Location Type					
	Public Outdoors	3 (20%)	7 (64%)	19 (50%)	29 (45%)
	Public Indoors	4 (27%)	0 (0%)	3 (8%)	7 (11%)
	Residence	1 (7%)	1 (9%)	5 (13%)	7 (11%)
	Other Residence	0 (0%)	0 (0%)	1 (3%)	1 (2%)
	Clinic	0 (0%)	1 (9%)	0 (0%)	1 (2%)
	Missing	7 (47%)	2 (18%)	10 (26%)	19 (30%)

Based upon SPD and/or SFD narratives, we found that 18% of the probable opioid overdoses were pharmaceutical in nature, with 82% heroin-related use as shown in Table 11. Of the confirmed opioid overdoses, 8% were pharmaceutical, 87% were heroin, and 5% were an unidentified opioid. Overall, 86% of all the probable and confirmed opioid overdoses involved heroin.

Table 11. Identified drug used separated by overdose type for incidents to which SPD responded from Jul-Aug 2016.

N=11	Probable Opioid Overdose	Confirmed Opioid Overdose	Total
Pharmaceutical	2 (18%)	3 (8%)	5 (10%)
Heroin	9 (82%)	33 (87%)	42 (86%)
Unspecified Opioid	0 (0%)	2 (5%)	2 (4%)

Probable overdose patients were transported by medics (advanced life support) for 27% of the time, as opposed to 76% for the confirmed overdoses as shown in Table 12. Incidents in which the medics downgraded the priority to BLS and transported via AMR constituted 64% of probable overdoses, and 3% of all confirmed overdoses; AMR is a third-party ambulance transport service with basic life support

capabilities. 21% of all confirmed opioid overdose victims refused transport to the hospital, along with 9% of probable opioid overdose victims.

Table 12. Transport of probable and confirmed opioid overdoses.

N=49	Probable Opioid Overdose	Confirmed Opioid Overdose	Total
Medic (ALS)	3 (27%)	29 (76%)	32 65%)
AMR (BLS)	7 (64%)	1 (3%)	8 (16%)
Refusal	1 (9%)	8 (21%)	9 (18%)

PART 2: A DESCRIPTION OF ALL NALOXONE ADMINISTRATIONS BY SPD OFFICERS FROM MARCH-SEPTEMBER 2016.

There were eleven incidents in which SPD delivered naloxone from March through September 2016 as shown in Table 13. Ten of the eleven incidents were determined to be confirmed opioid overdoses, with one incident being an unknown drug overdose. These ten confirmed drug overdoses showed marked increases in the victims' respirations and levels of consciousness following naloxone administration. One confirmed opioid overdose incident included naloxone administration by two different SPD officers. Ten out of the eleven incidents involved a single administration of 2mg/2ml intranasal naloxone. For the one incident in which the drug was unknown, the victim would not state which drug he had used, and had woken up immediately following the naloxone administration. Naloxone typically takes 2-5 minutes to counteract the effects of an opioid, so it is highly unlikely the biological action of naloxone itself was a factor in increasing the level of consciousness for this particular victim, rather having liquid squirted into the nose likely stimulated the person.

Table 13. Final classification of overdose for SPD naloxone administration incidents from Mar-Sept 2016.

Final Classification of Opioid-Related Overdose	**N** (%)
Drug Unknown	1 (9%)
Confirmed Opioid Overdose	10 (91%)
Total	11 (100%)

Demographic information, drugs identified, and transport decisions regarding these 11 incidents are shown in Table 14. For the confirmed opioid overdoses identified, 100% had either a history of heroin use with track marks, admission of heroin use, or a bystander who told SPD or SFD that heroin was involved. Of the ten confirmed cases, 6 were transported to a hospital by medics, 2 were downgraded and transported to a hospital via AMR, and 2 refused any further medical assistance. All SPD cases were in public locations, in contrast to SFD cases which also included residential and one clinic setting.

Table 14. Demographic, drug-type, and transport decisions by overdose classification type for all SPD naloxone administration incidents.

	Drug Unknown	Confirmed Opioid Overdose	Total
Drug used			
Heroin	0 (0%)	10 (100%)	10 (91%)
Unknown	1 (100%)	0 (0%)	1 (9%)
Transport Decision			
Medic	0 (0%)	6 (60%)	6 (55%)
AMR	0 (0%)	2 (20%)	2 (18%)
Refusal	1 (100%)	2 (20%)	3 (27%)
Age			
Mean	27 years (N=1)	36.9 years (N=10)	36 years (N=11)
Median	27 years (N=1)	33.5 years (N=10)	33 years (N=11)
Sex			
Female	0 (0%)	3 (30%)	3 (27%)
Male	1 (100%)	7 (70%)	8 (73%)
Race			
African American	0 (0%)	1 (10%)	1 (9%)
Caucasian	1 (100%)	9 (90%)	10 (91%)
Location Type			
Public Outdoors	1 (100%)	7 (70%)	8 (73%)
Public Indoors	0 (0%)	3 (30%)	3 (27%)

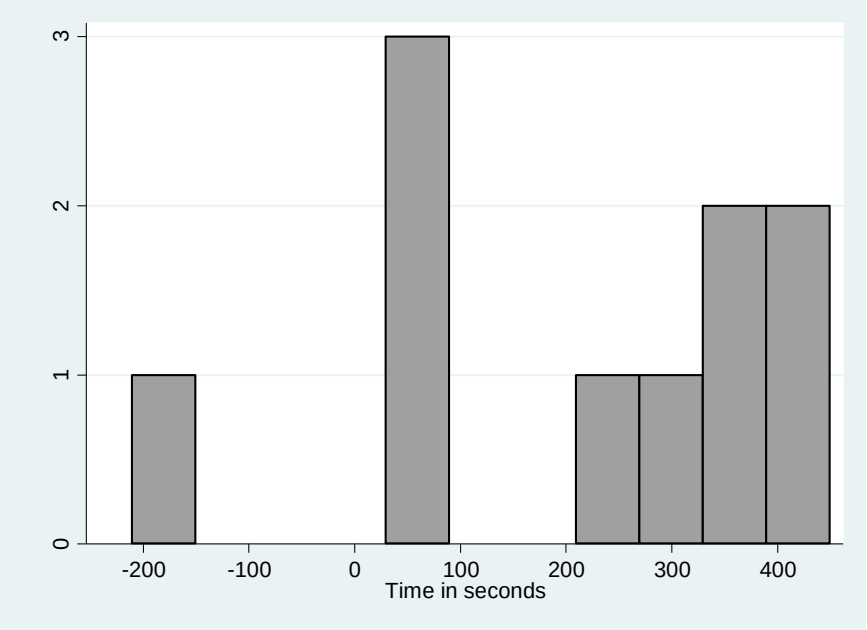
A summary of the timing for these eleven naloxone administrations is shown in Table 15 below. SPD was able to respond 199 seconds (3 minutes 19 seconds) before SFD units (BLS or Medic), and 367 seconds (6 minutes 7 seconds) before Medic units, on average, for these incidents. Some incidents were missing time-stamped information such as arrival time and were not included in time analysis. For three of these incidents, bike officers had come across the overdose victim while on patrol and notified dispatch for medical aid, hence the minimum time of 0 for those cases for SPD dispatch to SPD arrival. Figure 4 displays a distribution of the difference in arrival time from the first SPD unit to the first SFD unit (BLS or Medic) for incidents in which SPD delivered naloxone.

Table 15. Timing summary of all SPD naloxone administration incidents.

	N	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
Arrival sequence and timing in seconds								
From SPD arrival to SFD (BLS or Medic) arrival**	10	199	201	398	364	259	53	-211
Dispatch sequence and timing in seconds								
From SPD Dispatch to SPD Arrival	10	49	59	0	0	37	52	187
From SFD dispatch to SFD arrival	10	265	110	137	177	251	351	435
From SPD dispatch to SFD dispatch**	11	-21	140	193	51	-43	-66	-347

*Negative integers indicate Fire was first. **Negative integers indicate SFD was first.

Figure 4. Difference in arrival time from the first SPD unit to the first SFD unit (BLS or Medic) for incidents in which SPD administered naloxone.



Seven separate interviews with officers who had administered naloxone were conducted, and we were unable to conduct interviews for five administrations. One officer was interviewed twice, since the officer had responded to two separate naloxone administrations. Over the course of the March-September evaluation period, 9 separate officers had administered naloxone, with 3 officers administering naloxone twice. Of the six officers interviewed, two were EMT-trained. Table 16 describes officers' observations of possible opioid overdose symptoms. When asked specifically about actions taken at the scene, an attempt to wake the victim was made in seven incidents was made, and rescue breathing was provided in zero, as shown in Table 17. In five interviews, officers noted that assembling the kit went well, while two indicated at least some level of difficulty in assembling the kit i.e. attaching the nasal atomizer and inserting the naloxone cartridge into the syringe body had to be redone as they were misaligned at first. One officer commented that training could be improved by having officers assemble mock versions of the kit. All interviewed officers stated that they supported the police naloxone program, as seen in Table 18.

In Appendix D. is a set of recommended standard post naloxone administration questions for police that we suggest be used in an electronic data entry tool to be filled out soon after the event.

Table 16. Symptoms of opioid overdose observed.

	Yes	No	Did not Check
Abnormal respirations	7	0	0
Abnormal skin color	7	0	0
Decreased consciousness	7	0	0
Pulse absent	0	6	1
Opioid-related paraphernalia present	7	0	0

Table 17. Actions taken at the scene by officers who administered naloxone.

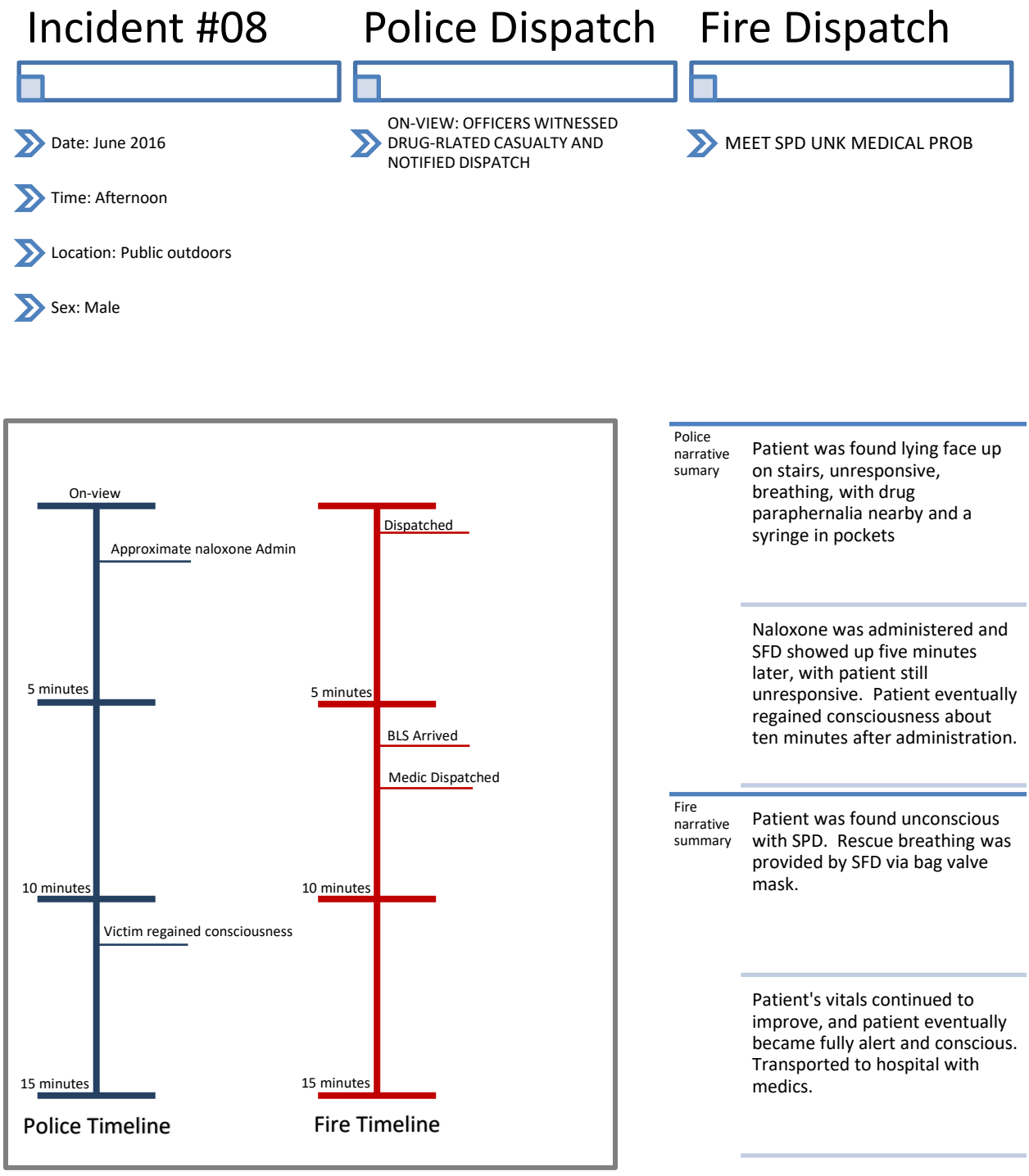
Actions taken	Yes	No
Notified dispatch/called for medics	7	0
Tried to wake victim	7	0
Rescue breathing	0	7
Chest compressions	0	7

Table 18. Officer Views of the naloxone Pilot

	Support
What do you think about patrol officers carrying and administering naloxone	6/6

Interviews were also helpful in determining other details of an event to get a sense of the timings and potential errors associated with relying upon computer aided dispatch data as evidence of the literal timing of arrival and other activities including naloxone administration. For example, it is protocol for SPD officers to report to dispatch the time of naloxone administration, however, there can often be a delay from the time of administration to time of notifying dispatch due to various factors. Due to this, the time of administration recorded can be incorrect or difficult to determine precisely. An example of a graphical representation of the timings and a description of an incident in which SPD delivered naloxone is shown in Figure 5. A description of each naloxone incident can be found in Appendix B.

Figure 5. A description of the eighth naloxone administration



Notes:

-Confirmed opiate overdose per review of records indicating decreased level of consciousness, abnormal breathing, and response to naloxone.

-The medic unit arrival is not shown on this timeline, as it arrived after 15 minutes. The SPD narrative noted that there was a communication issue with requesting SFD units initially, and only an aid unit (non-medic) was initially sent. The medic unit was not called until after the aid unit noticed the lack of medic support.

-Arrival times reflect arrival to the address and do not reflect the time at-patient, which is not recorded

Limitations

Dispatch data from SFD and SPD do not record an at-patient time, so arrival times were used as an imperfect proxy; arrival times reflected the time at which the unit made it to the address of the incident, but units/officers still needed to find their way through buildings, overpasses, alleyways, etc. It would therefore have been possible for a later arriving unit to have made it to the patient earlier, depending on the location type and which side of the building they had arrived at. Overall, we did not expect there to be a difference between time of arrival and time to patient between SFD and SPD units.

For the 49 identified opioid overdoses (probable/confirmed) from July through August, we found that SPD dispatched their units 171 seconds (2 minutes 51 seconds) later than SFD, on average. This lag time is due in part to SFD units being dispatched prior to fully understanding the nature of the medical emergency, as opposed to SPD which waits until the nature of the medical emergency is determined, since SPD only responds to select medical emergencies including overdoses.

For Part 1, the review of all SPD dispatched overdose cases from July through August, there were 50 total missing medical incident report forms (MIRFs) among the 283 events. A much greater proportion of the missing MIRF's were BLS cases (2 medic forms missing, 48 BLS forms missing), as the BLS forms were not centrally located and more difficult to locate quickly than ALS forms. BLS responses are typically a lower severity than responses to which medics are dispatched. Of the BLS incidents which we identified, 23% were determined to be opioid overdoses (probable/confirmed), , as opposed to 81% for the calls to which medics responded. Due to this, we recognize that our estimate of the number of overdoses is somewhat conservative (underestimated). If the missing forms are similar in nature to the forms which were located, we would expect about 13 of the 50 missing forms to be opioid overdoses (probable/confirmed). Finally, our dataset was limited to calls to which SPD responded for opioid overdoses, and we understand that we will have missed SFD opioid overdose responses to which SPD did not respond.

Discussion

Part 1 of the study, reviewing all suspected overdoses to which SPD was dispatched, identified 49 probable/confirmed opioid overdoses to which SPD responded over a two month period. Of these incidents, SPD units arrived 248 seconds (4 minutes 8 seconds) after Seattle Fire Department units, on average. SPD was the first to arrivefor 27% (13) of the probable/confirmed opioid calls, and for those calls in which they arrived first, they arrived 51 seconds prior to SFD units (BLS or Medics) on average. For the 13 opioid-related incidents in which Seattle Police arrived first, only two included officers carrying naloxone, suggesting that **expansion of naloxone to all SPD units may help to render aid more quickly for a small number of cases per month (6.5 per month based on this limited dataset)**. However, due to the narrow response window of an average of 51 seconds, it is unclear whether naloxone expansion to all patrol cars would result in measurable improvement in health outcomes

unless there is also an emphasis on rescue breathing by SPD officers as well, as naloxone typically takes two to five minutes to produce respiratory benefits.

Part 2 of the study focused on all SPD naloxone administrations from March through September 2016. SPD administered naloxone in eleven separate incidents. **Of those eleven incidents, all were in public places and three were the result of bike units finding a victim while on patrol, suggesting that bike units could prove to be beneficial to both responding more quickly to certain calls, and for coming across victims for a small subset of Seattle's opioid overdoses that might not otherwise be identified.** For the incidents in which naloxone was administered by SPD, SPD units had arrived 199 seconds (3 minutes 19 seconds) earlier than SFD, on average. Officers involved were supportive of the program, and noted that their naloxone training served them well. **Points for improvement included using a mock naloxone administration during training to familiarize officers with assembling the kit, and a focus on rescue breathing attempts.** Based on the response times and victims found during Part 2 of the study, bike patrols appeared to be uniquely suited for finding opioid victims in public locations, and for responding quickly to more difficult to access areas of the city in which patrol cars or Fire vehicles would have more difficult access.

From interviews conducted, the victims' breathing was consistently determined to be abnormal or absent, however, there were not any rescue breathing attempts made prior to SFD arrival. Although naloxone is an effective treatment for opioid overdose, a focus on rescue breathing during naloxone training may prove to further benefit overdose victims' health outcomes and reduce neurological deficits following overdose. The Substance Abuse and Mental Health Services Administration (SAMHSA) has published an Opioid Overdose Prevention Toolkit (9) for first responders which highlights the importance of doing rescue breathing prior to naloxone administration. By itself, rescue breathing can help to immediately counteract the respiratory deficiencies caused by opioids, and can be an effective life-saving tool even in the absence of naloxone. In the event of an opioid overdose, the victim's respiratory system becomes compromised, resulting in severely diminished respirations or none at all. The lack of adequate respiration will quickly lead to a lack of oxygenation of the blood, which can result in permanent neurological damage if not managed quickly. Given that naloxone's effects can take minutes to counteract respiratory deficits, training on rescue breathing could help provide immediate respiratory benefits for victims, and an emphasis on rescue breathing during naloxone training should be encouraged in order to better counteract any possible neurological deficits in overdose victims prior to SFD arrival. Note that during the period of evaluation SPD it appears that some officers did not have rescue breathing masks.

References

1. Banta-Green, C., et al. (2015). 2015 Drug Trends for King County, Washington. Retrieved from http://adai.uw.edu/pubs/pdf/2015drugusetrends.pdf.

2. Centers for Disease Control and Prevention. (2016). Increases in Drug and Opioid Overdose Deaths — United States, 2000–2014. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6450a3.htm.

3. The White House. (2016). Fact Sheet: Obama Administration Announces Additional Actions to Address the Prescription Opioid Abuse and Heroin Epidemic. Retrieved from https://www.whitehouse.gov/the-press-office/2016/03/29/fact-sheet-obama-administration-announces-additional-actions-address.

4. Executive Office of the President of the United States. (2013). National Drug Control Strategy. Retrieved from https://www.whitehouse.gov/sites/default/files/ndcs_2013.pdf.

5. Bureau of Justice Assistance. (2014). DOJ Launches the Law Enforcement naloxone Toolkit. Retrieved from https://www.bjatraining.org/media/news/click-below-learn-more-about-recently-launched-department-justice-law-enforcement.

6. Police Executive Research Forum. (2016). Building Successful Partnerships between Law Enforcement and Public Health Agencies to Address Opioid Use. Retrieved from http://ric-zai-inc.com/ric.php?page=detail&id=COPS-P356.

7. Fisher, R., O'Donnell, D., Ray, B., & Rusyniak, D. (2016). Police Officers Can Safely and Effectively Administer Intranasal naloxone. Prehospital Emergency Care, 1-6.

8. Walley, A. Y., Xuan, Z., Hackman, H. H., Quinn, E., Doe-Simkins, M., Sorensen-Alawad, A., Ruiz, S., & Ozonoff, A. (2013). Opioid overdose rates and implementation of overdose education and nasal naloxone distribution in Massachusetts: interrupted time series analysis. BMJ, 346, f174.

9. Substance Abuse and Mental Health Services Administration. (2016). Opioid Overdose Prevention Toolkit. Retrieved from http://store.samhsa.gov/shin/content//SMA16-4742/SMA16-4742.pdf.

10. Washington State Legislature. (2010). RCW 69.50.315. Retrieved from http://apps.leg.wa.gov/RCW/default.aspx?cite=69.50.315.

11. Seattle Times. (2016). Surgeon general hears praise for SPD's Narcan use to treat overdoses. Retrieved from http://www.seattletimes.com/seattle-news/surgeon-general-hears-praise-for-spds-narcan-use-to-treat-overdoses/.

12. Heroin and Prescription Opiate Addiction Task Force. (2016). Heroin and Opiate Addiction Task Force Recommendations Report. Retrieved from http://www.kingcounty.gov/depts/community-human-services/mental-health-substance-abuse/heroin-opiates-task-force.aspx.

13. King County Sheriff's Office. (2016). Sheriff News Releases. Retrieved from http://kingcounty.gov/depts/sheriff/news-media/news/2016/July/King-County-Sheriff-uses-naloxone-on-heroin-overdose.aspx.

Appendix A. Naloxone Administration Interview Conducted by Evaluation Staff

SPD Incident #: Click here to enter text.
SFD Incident #: Click here to enter text.

Pilot SPD Officer Post-Response Interview

This survey is voluntary and confidential. I will not share your specific comments with SPD, but will include them in combination with other officers' feedback. The goal of this evaluation is to understand how the SPD naloxone project is being implemented and what the outcomes are.

Do you have any questions for me? Click here to enter text.
May I ask you some questions? Click here to enter text.

Today's date: Click here to enter text. Survey conducted by: Click here to enter text.

Our records show you responded to a suspected overdose on
Date: Click here to enter text.
Time: Click here to enter text.
Location: Click here to enter text.

Is it correct that you responded to this incident? Click here to enter text.

What drugs do you suspect were used and why? Click here to enter text.
[End interview if it appears opioids were unlikely to have been involved]

Did you find the OD victim before Fire or Medic 1? ☐Yes ☐No
[End interview if Fire or Medic 1 arrived first]

How many people had a suspected overdose at the scene? Click here to enter text.
[If more than one, complete one survey per person who had an overdose]

At this OD- how were you notified of the incident? (circle one)
☐Dispatch ☐Citizen alert ☐Saw person down/ On view

How would you describe the scene: Click here to enter text.

Who was present? Click here to enter text.

Were there any bystanders present? ☐Yes ☐No

Bystander(s) actions: Click here to enter text.

How did the OD victim appear initially:
Normal skin color: ☐Yes ☐No ☐Don't know ☐Did not check
If NO, describe: Click here to enter text.
Breathing normally: ☐Yes ☐No ☐Don't know ☐Did not check
If NO, describe: Click here to enter text.
Conscious and responding verbally: ☐Yes ☐No ☐Don't know ☐Did not check

If NO, describe: Click here to enter text.

Pulse present: ☐Yes ☐No ☐Don't know ☐Did not check

If NO, describe: Click here to enter text.

What did you or another officer with you do: (check all that apply)

☐ Notified dispatch
☐ Tried to wake person up
☐ Chest compressions
☐ AED
☐ Bag valve mask
☐ Rescue breathing
☐ Other (please specify): Click here to enter text.

Was naloxone delivered? ☐Yes ☐No ☐Don't know

If YES, who administered it? (check all that apply):

☐ I administered it ☐ Other police officer ☐ Medic ☐ Bystander/witness ☐ Don't know

Did you notify dispatch that naloxone was administered? ☐Yes ☐No

If YES, did an officer at the scene notify dispatch as the naloxone was being administered? ☐Yes ☐No

If NO, when you or an officer radioed, was dispatch notified of time the naloxone was administered? ☐Yes ☐No

How did assembling the naloxone kit go? Click here to enter text.

How was administration? Click here to enter text.

What was their medical response? Click here to enter text.

How long did the medical response to naloxone take? Click here to enter text.

What was their mood/attitude or what did they say? Click here to enter text.

How did the OD victim appear upon conclusion of the call:

Normal skin color: ☐Yes ☐No ☐Don't know ☐Did not check

If NO, describe: Click here to enter text.

Breathing normally: ☐Yes ☐No ☐Don't know ☐Did not check

If NO, describe: Click here to enter text.

Conscious and responding verbally: ☐Yes ☐No ☐Don't know ☐Did not check

If NO, describe: Click here to enter text.

Pulse present: ☐Yes ☐No ☐Don't know ☐Did not check

If NO, describe: Click here to enter text.

If naloxone was administered, did you or another officer administer naloxone prior to Fire or Medic 1 arrival? ☐Yes ☐No ☐N/A

Did the victim have a positive medical response prior to (list N/A if they did not arrive):
Fire arrival? ☐Yes ☐No ☐N/A
Medic 1 arrival? ☐Yes ☐No ☐N/A

How many minutes after you arrived at the victim did Fire arrive? Click here to enter text.
What actions did Fire perform? Click here to enter text.

How many minutes after you arrived at the victim did Medic 1 arrive? Click here to enter text.
What actions did Medic 1 perform? Click here to enter text.

Was the OD victim transported? Click here to enter text.
If yes, by whom: ☐ AMR ☐ Medic 1?

Was the overdose/naloxone training you received adequate? Click here to enter text.

What do you think about patrol officer's carrying and administering naloxone during an opiate overdose?
☐Support ☐Neutral ☐Against ☐Don't know

What are your reasons for your thoughts about police carrying and administering naloxone: Click here to enter text.

Since you responded to that overdose, what have you thought about the incident? Click here to enter text.

# of years as an SPD officer ☐0-5 ☐6-10 ☐11-15 ☐16-20 ☐20+

2) What type of patrol do you work? ☐Bike ☐Foot ☐Car

Are you an EMT? ☐Yes ☐No

1.) Did you get Good Samaritan OD Wallet Cards at the training?
☐Yes ☐No

2.) Overall, what do you think about handing out the Good Samaritan Wallet Cards?
☐ Positive ☐Mixed ☐Negative
2.a.) Why do you feel that way? Click here to enter text.

3.) How much of an impact to you think handing out Good Samaritan Wallet Cards can have?
☐ A lot ☐A little ☐None
3.a.) Why? Click here to enter text.

4.) Have you handed out any of the wallet cards to people in the community? ☐Yes ☐No ☐Not applicable

4.a.) **IF YES**- How did it go handing out wallet cards?
☐ Positive ☐Mixed ☐Negative

4.b.) Why did you respond the way you did to question 4.a.? Click here to enter text.

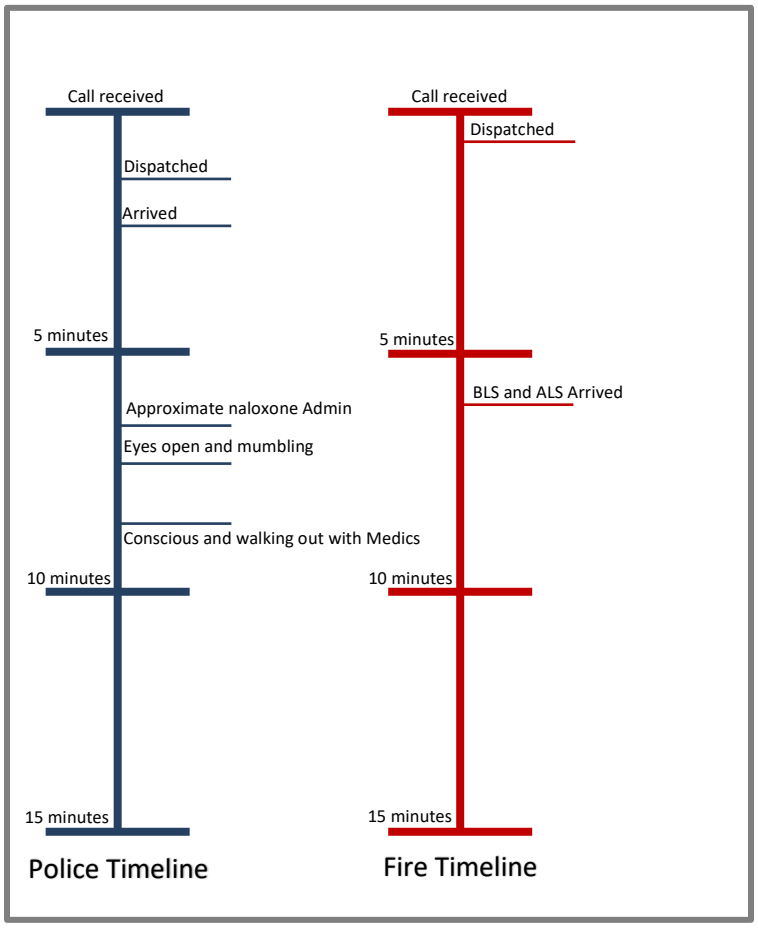
4.c.) Give an example of what you said when you handed out the wallet card: Click here to enter text.

4.d.) **IF NO**- Why did you not hand out the wallet cards? Click here to enter text.

5.) Any other thoughts about the Good Samaritan Wallet Cards? Click here to enter text.

Appendix B. SPD naloxone Administration Timelines

Incident #01	Police Dispatch	Fire Dispatch
Date: April 2016	3 FLOOR BATHROOM, FEMALE POSS OVERDOSE, SCREENING WITH FIRE	FLR 3 BATHROOM
Time: Evening		F DLOC
Location: Public Bathroom		CALLER WILL MEET NEAR [LOCATION]
Sex: Female		POSSIBLE OVERDOSE



Police narrative sumary	Found patient in bathroom stall unconscious with labored respirations
	Slowly regained consciousness following administration (around 30 seconds until eyes opened, and 90 seconds until speaking)
Fire narrative summary	Found patient unconscious and unresponsive
	Patient regained consciousness (GCS from 3 to 15) and transported via AMR

Notes:

-Confirmed opiate overdose per review of records indicating decreased level of consciousness, abnormal breathing, and response to naloxone.

-Arrival times reflect arrival to the address and do not reflect the time at-patient, which is not recorded

Incident #02

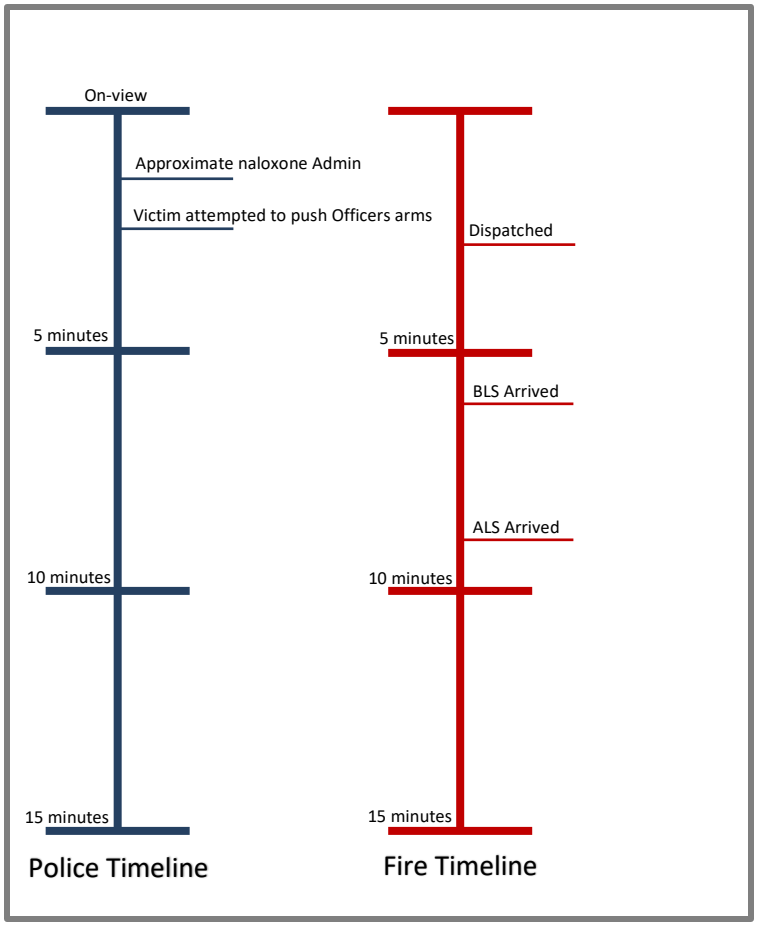
- Date: April 2016
- Time: Afternoon
- Location: Public Outdoors
- Sex: Male

Police Dispatch

- ON-VIEW: OFFICERS WITNESSED DRUG-RLATED CASUALTY AND NOTFIED DISPATCH

Fire Dispatch

- MEET SPD, OD



Police narrative sumary

Bike unit found patient lying unresponsive, foaming at mouth, with little signs of breathing

After naloxone administration, the patient's condition slowly improved and patient eventialy was able to walk off-scene under own power

Fire narrative summary

Patient showing difficulty walking and standing

Patient regained full consciousness (GCS 15) and refused any further medical treatment.

Patient refusal; no transport

Notes:

-Confirmed opiate overdose per review of records indicating decreased level of consciousness, abnormal breathing, and response to naloxone.

-No interview conducted. It was difficult to determine when consciousness was regained from narratives.

-Arrival times reflect arrival to the address and do not reflect the time at-patient, which is not recorded

Incident #03

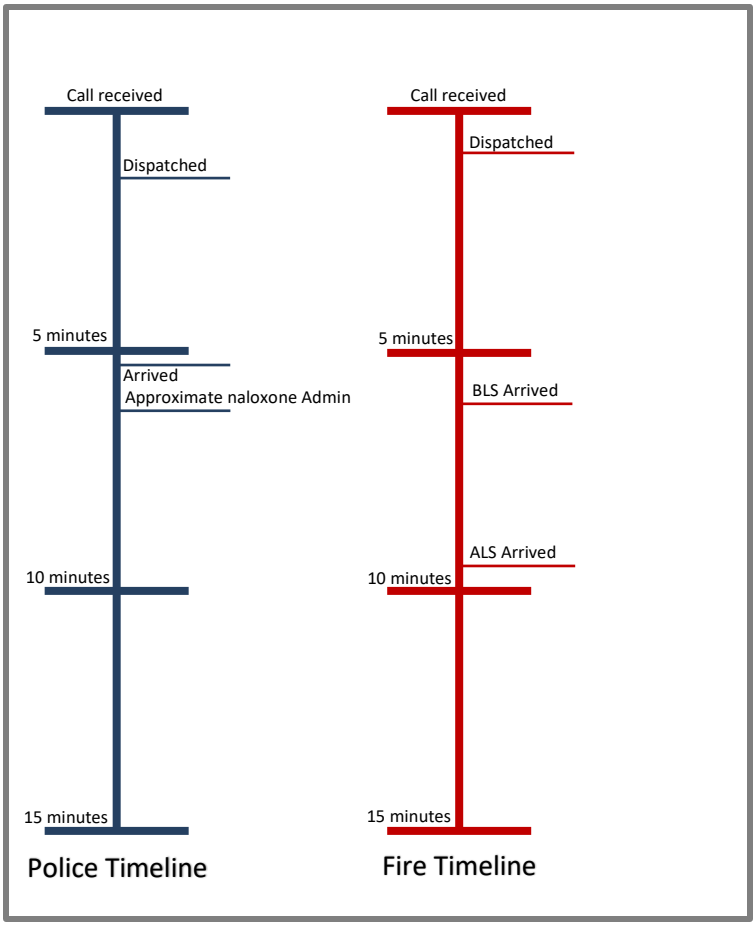
- Date: May 2016
- Time: Late night
- Location: Public outdoors
- Sex: Male

Police Dispatch

- RESPOND WITH FIRE TO MALE OVERDOSING ON HEROIN

Fire Dispatch

- MALE POSS OD PT IS IN ALLEY BETWEEN [LOCATION]
- AND BETWEEN [LOCATION] CALLER WILL BE IN ALLEY TO DIRECT
- PT IS UNCONSCIOUS, IS BREATHING
- HEROIN OD- SPD RESPONDING



Police narrative sumary

Police arrived to find unresponsive patient "foaming at mouth" with no signs of breathing

Needles were found on the ground and naloxone was administered. Patient showed improvements in breathing prior to SFD arrival

Fire narrative summary

Patient was initially unresponsive and "came to" about one minute following SFD arrival

Patient was transported via AMR for evaluation at hospital

Notes:

-Confirmed opiate overdose per review of records indicating decreased level of consciousness, no signs of breathing, and response to naloxone.

-No interview completed, so approximate time to consciousness is unknown

-Arrival times reflect arrival to the address and do not reflect the time at-patient, which is not recorded

Incident #04

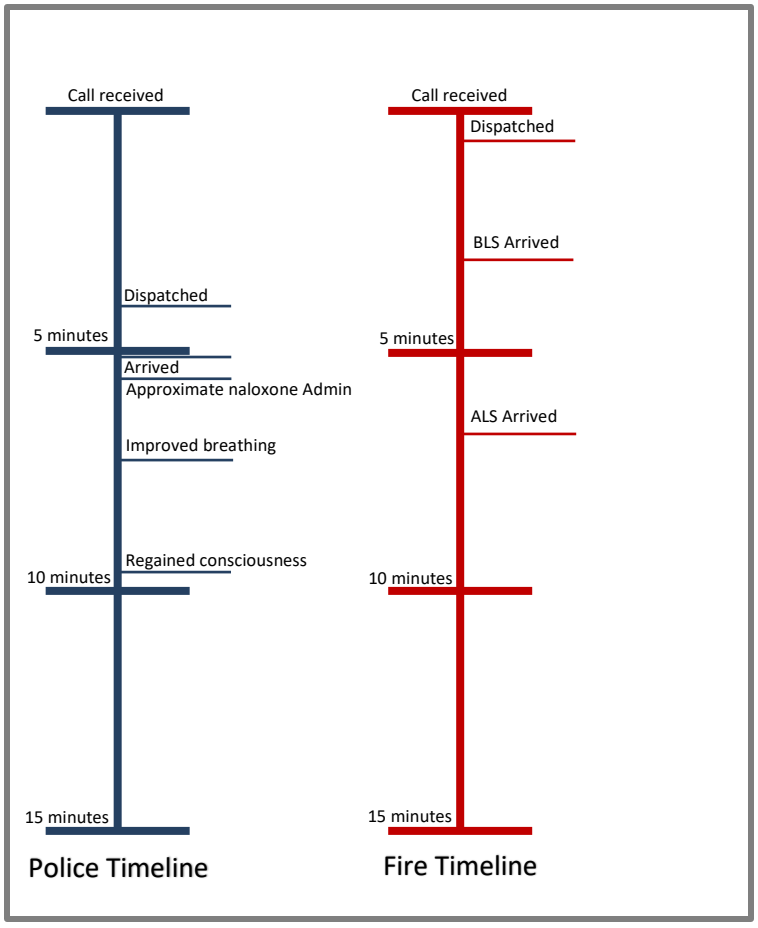
- Date: May 2016
- Time: Afternoon
- Location: Public outdoors
- Sex: Male

Police Dispatch

- GO WITH FIRE FOR HEROIN OD

Fire Dispatch

- DECREASED LOC
- CALLER WILL FLAG
- SPD NOTIFIED HEROIN OD



Police narrative sumary

SPD noted the patient's skin was completely blue, with pinpoint pupils, slow respirations (4/min), and needle marks on the arm

naloxone was delivered by SPD bike officers and the patient regained consciousness five minutes following administration

Fire narrative summary

Patient found supine on sidewalk with pinpoint pupils and GCS of 3

Patient GCS increased to 15

Notes:

-Confirmed opiate overdose per review of records indicating decreased level of consciousness, labored breathing, and response to naloxone.

-SFD was on-scene and treating patient with rescue breathing prior to SPD arrival

-No interview completed, so approximate time to consciousness is from narratives.

-Arrival times reflect arrival to the address and do not reflect the time at-patient, which is not recorded

Incident #05

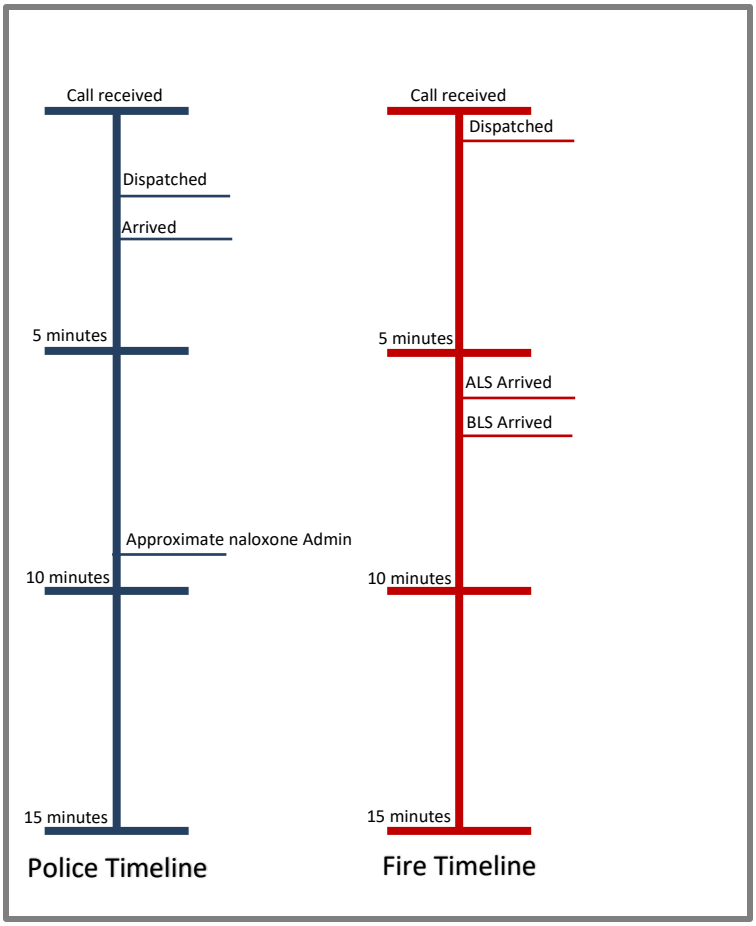
- Date: May 2016
- Time: Evening
- Location: Mall bathroom
- Sex: Male

Police Dispatch

- FIRST FLOOR, MALE FACEDOWN IN BATHROOM STALL, APPEARS TO BE AN OVERDOSE. NEEDLE IN ARM.

Fire Dispatch

- M/POSS OD
- M/30 FLOOR 3
- M/RESTROOM
- NEEDLE IN ARM SPD ALSO GOING



Police narrative sumary

Patient was found in bathroom stall, blue in the face, labored breathing, and a needle protruding from his arm

Bike officers arrived after SFD arrival and delivered naloxone. Patient regained consciousness shortly thereafter and patient refused transport

Fire narrative summary

Patient found initially unconscious with agonal breathing and assisted via bag valve mask and oxygen.

Medics attempted IV but patient refused assistance and refused transport after regaining consciousness (GCS 15)

Notes:

-Confirmed opiate overdose per review of records indicating decreased level of consciousness, labored breathing, and response to naloxone.

-SPD was on-scene first, but did not have naloxone until Bike unit arrived.

-No interview completed. Approximate time to consciousness could not be determined from narratives.

-Dispatch shows ALS arriving before BLS, however, narratives indicate SPD delivered naloxone prior to ALS arrival.

-Arrival times reflect arrival to the address and do not reflect the time at-patient, which is not recorded.

Incident #06

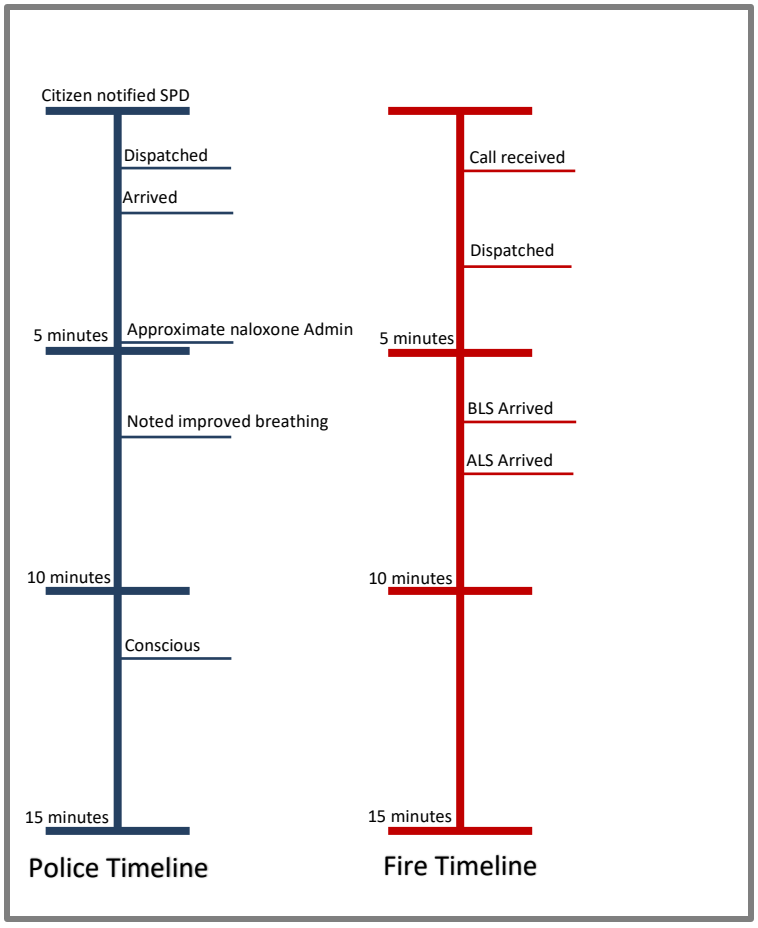
Police Dispatch

Fire Dispatch

- Date: May 2016
- Time: Afternoon
- Location: Outdoors under overpass
- Sex: Female

V6081 WAS APPROACHED BY CITIZEN, ACCORDING TO CITIZEN SUBJ HAS POSS OD'D

HEROIN OD



Police narrative sumary

A witness on-scene provided CPR and had noted the patient had a weak pulse and agonal respirations.

A fresh needle site on the patient's arm was identified and naloxone was administered.

Fire narrative summary

Patient was unconscious and unresponsive. BLS crew provided rescue breathing and oxygen.

Patient regained consciousness and became alert and oriented en route to the hospital.

Notes:

-Confirmed opiate overdose per review of records indicating decreased level of consciousness, agonal breathing, weak pulse, and response to naloxone.

-Citizen notified traffic police of incident, who then notified dispatch

-No interview completed. Approximate time to consciousness could not be determined from narratives.

-Arrival times reflect arrival to the address and do not reflect the time at-patient, which is not recorded.

Incident #07

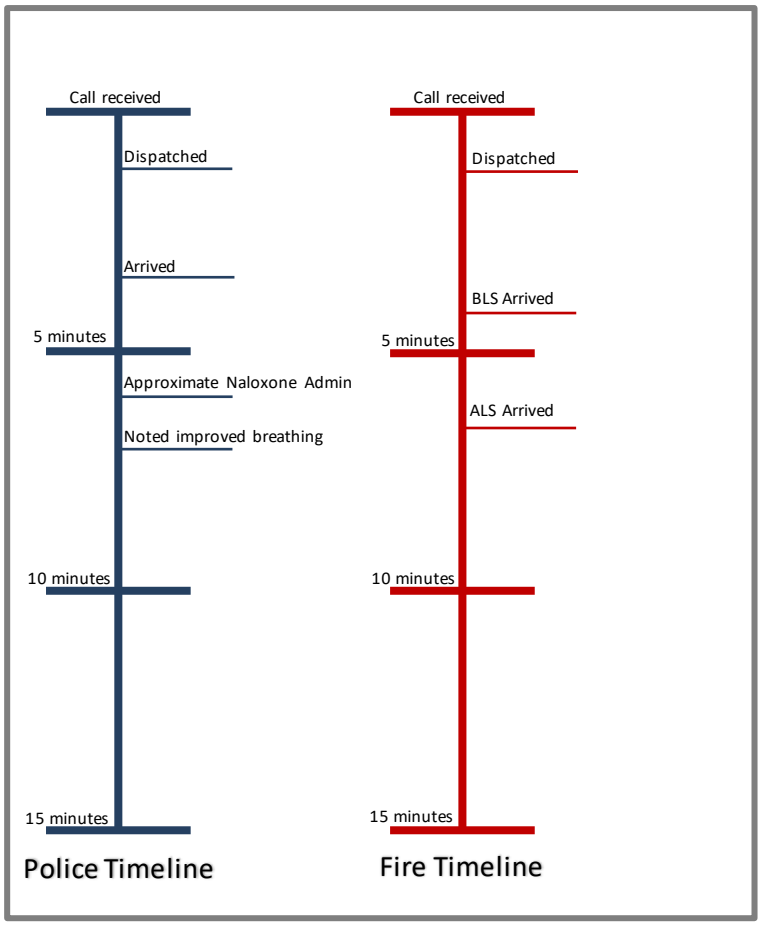
- Date: June 2016
- Time: Evening
- Location: Public outdoors
- Sex: Male

Police Dispatch

- IN THE ALLEY BY THE MCDONALDS, CALLER REPORTING MALE OD'D, SCREENING WITH FIRE

Fire Dispatch

- M/OVERDOSE
- IN ALLEY BEHIND MCDONALDS
- SPD RESP
- HEROIN



Police narrative sumary

Patient was found in alley unconscious and not breathing, with reports of heroin use and needle marks in arm.

Naloxone was administered prior to SFD arrival and patient was put into recovery position. Patient began to start breathing on own, although very slowly, with improvements over time.

Fire narrative summary

Patient found unconscious with labored breathing (respirations 4/min). SFD provided oxygen and bag valve mask.

Patient's vitals continued to improve, and patient eventually became fully alert and conscious. Transported to hospital with medics.

Notes:

-Confirmed opiate overdose per review of records indicating decreased level of consciousness, lack of breathing, and response to naloxone.

-Interview completed, although time to consciousness was uncertain

-Arrival times reflect arrival to the address and do not reflect the time at-patient, which is not recorded.

Incident #08

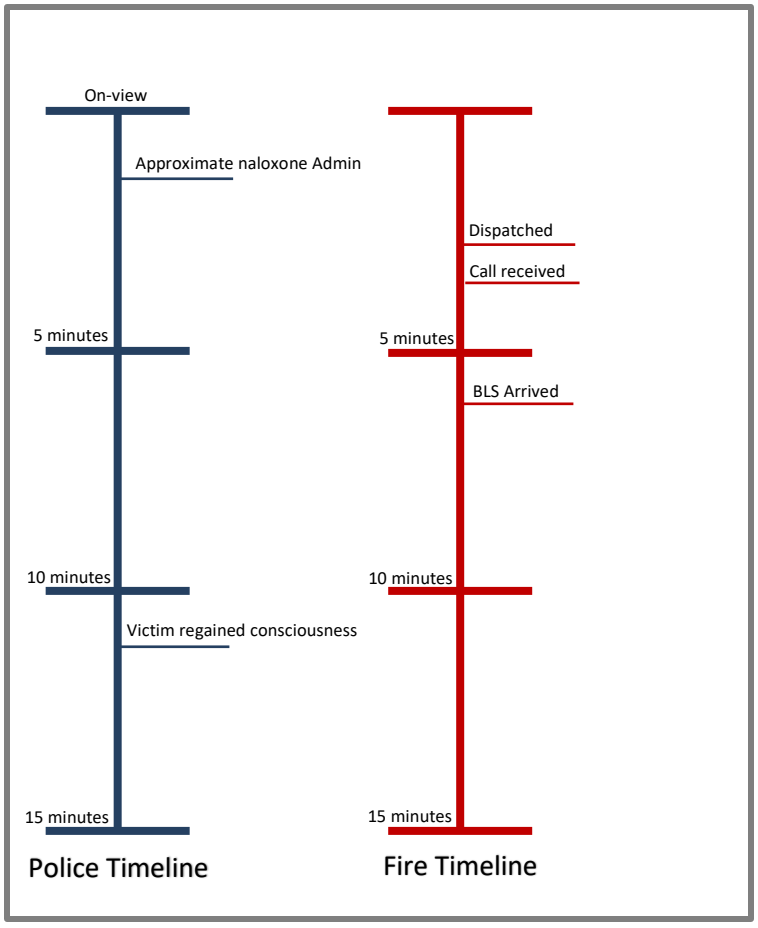
- Date: June 2016
- Time: Afternoon
- Location: Public outdoors
- Sex: Male

Police Dispatch

- ON-VIEW: OFFICERS WITNESSED DRUG-RLATED CASUALTY AND NOTFIED DISPATCH

Fire Dispatch

- MEET SPD UNK MEDICAL PROB



Police narrative sumary

Patient was found lying face up on stairs, unresponsive, breathing, with drug paraphernalia nearby and a syringe in pockets

naloxone was administered and SFD showed up five minutes prior, with patient still unresponsive. Patient eventually regained consciousness about ten minutes after administration.

Fire narrative summary

Patient was found unconscious with SPD. Rescue breathing was provided via bag valve mask.

Patient's vitals continued to improve, and patient eventually became fully alert and conscious. Transported to hospital with medics.

Notes:

-Confirmed opiate overdose per review of records indicating decreased level of consciousness, abnormal breathing, and response to naloxone.

-Medic unit not shown on timeline, as it arrived after 15 minutes. SPD reported an issue with dispatching ALS.

-Arrival times reflect arrival to the address and do not reflect the time at-patient, which is not recorded

Incident #09

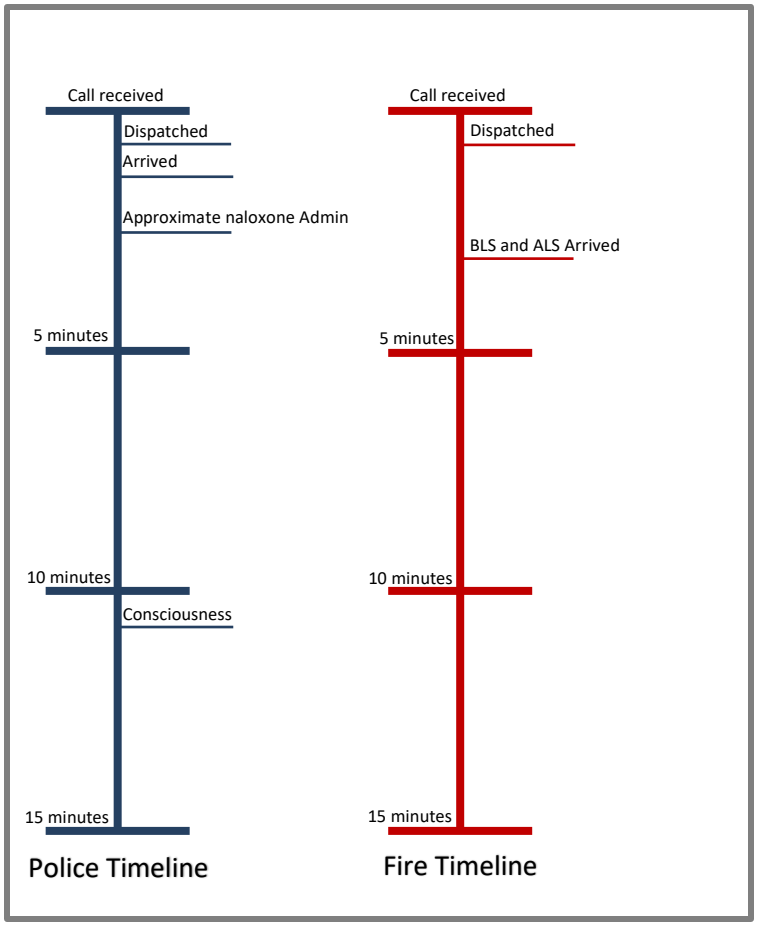
- Date: July 2016
- Time: Evening
- Location: Public outdoors
- Sex: Male

Police Dispatch

- GO WITH FIRE. POSS OVERDOSE. MALE NOT CONSCIOUS, HAVE PULSE

Fire Dispatch

- IN FRONT
- M UNCONC
- SPD RESPONDING FOR POSS OD
- NARCAN ADMINISTERED BY SPD



Police narrative sumary

Patient was found found unconscious, grey/ashen skin and shallow breathing with fresh needle marks on arm.

naloxone was administered and SFD arrived roughly a minute after administration. Approximately 9 minutes to consciousness.

Fire narrative summary

Patient found unconscious and not breathing. SFD provided rescue breathing via bag valve mask.

Patient's vitals continued to improve and was alert and conscious within ten minutes. Patient was transported to hopsital via medic unit.

Notes:

-Confirmed opiate overdose per review of records indicating decreased level of consciousness, lack of breathing, and response to naloxone.

-Arrival times reflect arrival to the address and do not reflect the time at-patient, which is not recorded.

Incident #10

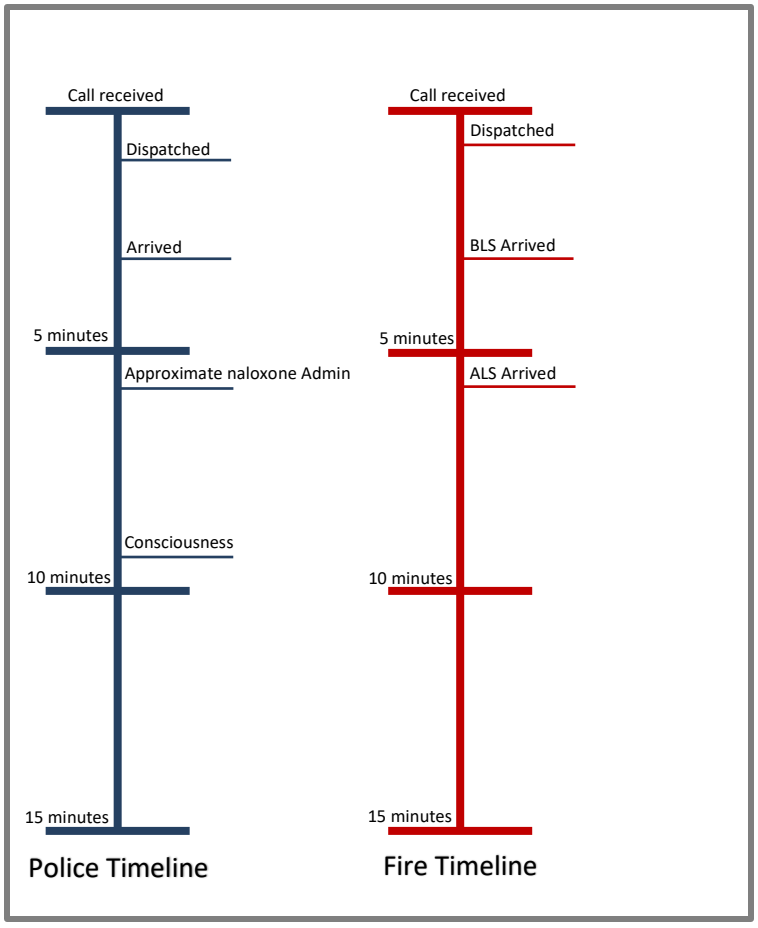
- Date: July 2016
- Time: Evening
- Location: Public outdoors
- Sex: Female

Police Dispatch

- GO WITH FIRE FOR POSS OD, FEMALE IS DOWN BEHIND THE THEATRE

Fire Dispatch

- ADULT F POSSIBLE OD
- BEHIND PARAMOUNT THEATRE
- RIGHT NEXT TO THE FREEWAY
- TRYING TO ADMINISTER NASAL NARCAN



Police narrative sumary

Patient found supine, unconscious, with pale skin and no signs of breathing.

Naloxone was administered as SFD was on-scene, and administered a second time (two doses total) one minute later. Patient slowly regained consciousness and was alert roughly four to five minutes after naloxone administration.

Fire narrative summary

ALS report was lacking information regarding BLS support, although SPD noted that rescue breathing was given via a bag valve mask.

ALS report showed that medics found patient alert and oriented upon arrival. Patient was transported to hospital via medics.

Notes:

-Confirmed opiate overdose per review of records indicating decreased level of consciousness, lack of breathing, and response to naloxone.

-SPD arrival time was missing, and the figure represents an estimated time of arrival for SPD

-SPD administered two doses of naloxone for this patient, and were unsure if a bystander had also administered naloxone prior to their arrival. The patient did not exhibit any signs of aggressiveness.

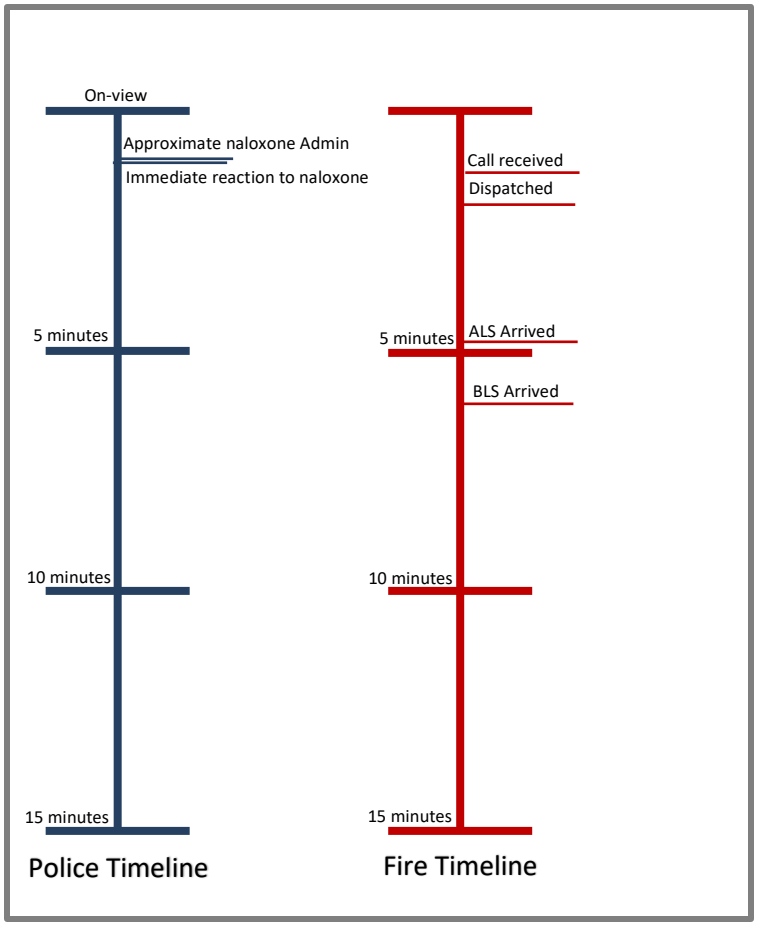
-Arrival times reflect arrival to the address and do not reflect the time at-patient, which is not recorded.

Incident #11 Police Dispatch Fire Dispatch

- Date: Aug 2016
- Time: Evening
- Location: Public outdoors
- Sex: Male

- ON-VIEW: DRUG-RELATED CASUALTY

- REQUEST FROM SPD ON SCENE ADMINISTERING NARCAN



Police narrative sumary

Patient was slumped over on the street unrepsonsive to verbal cues or touching on shoulder, and exhibiting signs of shallow breathing.

naloxone was administered prior to SFD arrival and the patient responded (alert and conscious) nearly instantaneously.

Fire narrative summary

Patient had been seen multiple times throughout the night and showed signs of decreased consciousness.

Patient was combative and would not allow vitals to be taken. Patient refused medical attention.

Notes:

- Drug unknown. The patient was reported to have responded immediately to the naloxone delivery, suggesting that perhaps the stimulus from the administration helped wake him. The patient did not have any drug-related paraphernalia and would not say what drugs he had taken.

-The patient was combative with medics and refused medical evaluation.

-Arrival times reflect arrival to the address and do not reflect the time at-patient, which is not recorded

Appendix C. Statistical tests for different case identification methods

Identification method	Sensitivity	Specificity	Positive Predictive value	Negative Predictive Value
Keyword "overdose"	50%	93%	29%	97%
Keyword "heroin"	50%	90%	23%	97%
Initial dispatch code: Man-down	0%	27%	0%	82%
Initial dispatch code: Drug-related casualty	100%	89%	36%	100%
Final clearance code: Drug-related casualty	25%	98%	25%	95%

The sensitivity of a test is its ability to determine the patient cases correctly.

The specificity of a test is its ability to determine the healthy cases correctly.

Positive predicted value is the probability that a subject with a positive (abnormal) test actually has the disease.

Negative predicted value is the probability that the subject has no disease given a negative test result.

Appendix D. Recommended standard post naloxone administration questions for police.

Date of overdose event __ __ / __ __ / _ _ _ _

Location of overdose	**Type of place**
Latitude _____ **Longitude** _____	☐ Outside *(park,street,car,camp)* ☐ Business ☐ Private home/apt ☐ Social service agency ☐ Hotel/motel ☐ Other _____

How many people had a suspected overdose at the scene? *Complete one report for each victim.*

What type of opioid do you suspect was present? *check all that apply*

☐ Don't know
☐ Heroin
☐ Prescription-type *(OxyContin, Vicodin, etc)*
☐ Other powder/capsule/mention of fentanyl *please describe* _____

How were you notified of the incident? ☐ Dispatch ☐ Citizen alert ☐ Saw person down/on view

Time of arrival: _____

Were you on the scene before Fire or Medics?
☐ Yes ☐ No ☐ N/A neither arrived

↳ How many minutes later did: Fire arrive? _____
ALS Medics arrive? _____
Enter 0 if <1 minute

Were there any bystanders when you arrived at the scene?	**Bystander actions prior to your arrival:** *check all that apply*
☐ Yes ☐ No **Type of bystanders** *check all that apply* ☐ Service provider/other professional ☐ Friend/family/acquaintance of victim ☐ Stranger ☐ Other _____	☐ None ☐ Called 911 ☐ Tried to wake person up ☐ Naloxone ☐ Rescue breathing ☐ Bag valve mask ☐ Oxygen ☐ Chest compressions ☐ AED ☐ Other:_____

How did the victim appear initially?	Yes	No	Didn't check	Don't know
Normal skin color	☐	☐	☐	☐
Normal breathing	☐	☐	☐	☐
Conscious and verbal response	☐	☐	☐	☐
Pulse present	☐	☐	☐	☐

Who administered naloxone at the scene? *check all that apply*

☐ Myself
☐ Another officer

Did you or another officer administer the naloxone prior to Fire and Medic arrival?
☐ Yes ☐ No ☐ Fire/Medic did not arrive

☐ Fire/EMT
☐ EMS/EMT
☐ Paramedic/Advanced Life Support
☐ Bystander/witness
☐ Don't know

Type of naloxone used

☐ Nasal Narcan™ 

☐ Injectable Evzio™ 

☐ Nasal w/ atomizer 

Serial # of naloxone kit
_____

How many doses did you administer? ☐ <1 ☐ 1 ☐ 2 ☐ 3 ☐ 4+

Did you have any problems preparing or administering the naloxone?
☐ No
☐ Yes *Please describe*
_____

Was there a positive medical response to the naloxone you administered?
☐ Yes ☐ No ☐ Not sure

How long after the first dose was there a positive medical response? _____
Enter "0" if <1 minute

Did the victim have a positive medical response prior to:	Yes	No	N/A did not arrive
Fire arrival	☐	☐	☐
Medic arrival	☐	☐	☐

What were the medical responses?	Yes	No	Don't know
Normal skin color	☐	☐	☐
Normal breathing	☐	☐	☐
Conscious and verbal response	☐	☐	☐
Pulse present	☐	☐	☐

What did the victim display after waking up? *check all that apply*

- ☐ Withdrawal symptoms *(nausea, muscle aches, runny nose, sweating, watery eyes)*
- ☐ Vomiting
- ☐ Seizure
- ☐ Anxiety
- ☐ Irritability, anger
- ☐ Physical aggression
- ☐ Appreciation/"Thank you"
- ☐ None
- ☐ Other *(please specify)* _____

Before this event, how many times have you ever administered naloxone? _____

What else did you or another officer do? *check all that apply*

- ☐ Notified dispatch
- ☐ Tried to wake person up
- ☐ Rescue breathing
- ☐ Bag valve mask
- ☐ Oxygen
- ☐ Chest compressions
- ☐ AED
- ☐ Other *(please specify)* _____

Did you arrest anyone at scene? *check all that apply*

- ☐ No If no, did you confiscate or throw away any drugs or paraphernalia? ☐ Yes ☐ No ☐ Don't know
- ☐ Yes, Victim For what charge? _____
- ☐ Yes, Bystander(s) For what charge? _____

What was the outcome?	Yes	No	Don't know
Victim lived	☐	☐	☐
Victim died at scene	☐	☐	☐
Victim died later	☐	☐	☐
Pulse present	☐	☐	☐

Did someone provide information or referrals to the victim? ☐ Yes ☐ No ☐ Don't know

Was the victim transported?

- ☐ No
- ☐ Transported to ER
- ☐ Transported somewhere else **Enter location** _____

Notes: