



Evaluation of Law Enforcement Officers' Occupational Exposure to Illicit Drugs

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Disclaimer

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Availability of Report

Copies of this report have been sent to the employer, employees, and union at the sheriff's department. The state and local health department and the Occupational Safety and Health Administration Regional Office have also received a copy. This report is not copyrighted and may be freely reproduced.

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Introduction

Request

In May 2018, a county sheriff's department requested a health hazard evaluation (HHE) concerning unintentional exposure to illicit drugs among law enforcement officers (LEOs). The incident occurred during a traffic stop and law enforcement action in early 2018. Two LEOs developed adverse health effects during the incident.

Background

According to the Centers for Disease Control and Prevention, there has been a 100% increase in the rate of overdose deaths involving synthetic opioids (which includes fentanyl and its analogues) in the United States from 2015 to 2016. It is becoming more common to find fentanyl and its analogues mixed with other drugs, especially cocaine. This has raised concerns about the potential for unintentional exposure to illicit drugs among LEOs and other emergency responders in the course of their work.

To learn more about the workplace, go to [Section A in the Supporting Technical Information](#)

Our Approach

On June 25–26, 2018, we visited the sheriff's department. During the site visit, we:

- met with LEOs directly involved with the incident and representatives of the sheriff's department command staff; and
- reviewed sheriff's department policies and procedures.

We also reviewed relevant records:

- sheriff's department incident reports;
- a state trooper incident report;
- state forensic laboratory testing results for substances found at the scene of the response and submitted for testing; and
- medical records related to the incident for the two LEOs.

To learn more about our methods, go to [Section B in the Supporting Technical Information](#)

Our Key Findings

LEOs performed a traffic stop where illicit drugs were present

- In early 2018, a LEO (LEO 1) performed a traffic stop. Two persons (Subjects 1 and 2) were in the vehicle. A K-9 unit was requested to evaluate for the presence of illicit drugs in the vehicle. Another LEO (LEO 2) responded to assist with the incident around the time the K-9 unit arrived. When the K-9 unit identified the presence of illicit drugs, LEOs 1 and 2 initiated a search of the vehicle.
- During the vehicle search, LEOs 1 and 2 saw drug paraphernalia, plant material that appeared to be marijuana, and a locked metal box.
- When LEO 1 tilted the metal box while examining it, a “plume of white powder” emerged from the seam and blew into the faces of LEOs 1 and 2.

LEOs 1 and 2 experienced work-related health effects after the exposure

- After exposure to the white powder, LEOs 1 and 2 experienced symptoms including difficulty breathing, dizziness, and confusion.
- Health effects experienced by LEOs 1 and 2 prevented them from continuing to perform their law enforcement duties.
- Naloxone was administered to one of the LEOs at the scene of the incident. Other LEOs on the scene reported that this LEO had a positive response to the naloxone.
- LEOs 1 and 2 were transported by emergency medical services (EMS) to the emergency department for further evaluation and management.
- LEOs 1 and 2 were monitored in the emergency department for several hours. Their vital signs remained stable and their symptoms resolved during this time.
- The healthcare providers who evaluated LEOs 1 and 2 did not observe objective signs consistent with serious (life-threatening) opioid toxicity. However, the non-specific symptoms experienced by the LEOs could be consistent with milder toxicity related to drug exposure.

LEOs 1 and 2 had multiple potential routes of exposure to illicit drugs

- LEOs 1 and 2 wore long-sleeve uniforms. While searching the vehicle, LEO 1 wore leather gloves, and LEO 2 wore both latex and Kevlar® gloves. Neither wore respirators.
- Multiple exposure routes were possible, including inhalation, mucous membrane (eyes, nose, and mouth) contact, ingestion, or skin absorption.
- LEOs we interviewed reported that powder from the metal box tested presumptively positive for fentanyl in field testing. Further information about the field testing methods was not available.
- After the incident, forensic laboratory testing of evidence samples showed that cocaine, methamphetamine, tetrahydrocannabinol, and alprazolam were present in the metal box. The forensic laboratory did not identify fentanyl or other opioids in the evidence samples sent for testing. Differences between the test characteristics of the different testing methods is one

possible factor contributing to this discrepancy. These analyses were primarily conducted for law enforcement purposes, not as a means of fully characterizing the occupational health risks associated with exposure to the contents of the box.

The sheriff's department identified areas for improvement after the incident

The sheriff's department conducted a review of the incident with LEOs. They are making the following improvements in sheriff's department procedures based on the findings of their review:

- Developing a new department policy and procedure to address personal protective equipment (PPE) requirements for handling opioids and unknown substances.
- Updating existing department policies and procedures for bloodborne pathogens and naloxone use.
- Improving intranasal naloxone access and training.
- Improving access to PPE such as nitrile gloves, disposable sleeves, P100 filtering facepiece respirators, and eye protection.

The sheriff's department is continuing to review standard operating procedures related to potential exposure to illicit drugs.

To learn more about our findings, go to [Section B in the Supporting Technical Information](#)

Our Recommendations

Benefits of Improving Workplace Health and Safety:

- | | |
|--|--|
| ↑ Improved worker health and well-being | ↑ Improved image and reputation |
| ↑ Better workplace morale | ↑ Better products, processes, and services |
| ↑ Better employee recruiting and retention | ↑ Increased medical and legal savings |

The recommendations below are based on the findings of our evaluation. For each recommendation, we list a series of actions you can take to address the issue at your workplace. We encourage the sheriff's department to use an employee-employer health and safety committee or working group to discuss our recommendations and develop an action plan. Those involved in the work can best set priorities and assess the feasibility of our recommendations for the specific situation at the sheriff's department.

NIOSH has issued interim guidance on how to protect emergency responders from exposures to fentanyl and its analogues. We believe that this current NIOSH guidance is applicable to this evaluation, even though drugs other than fentanyl were involved in this incident. Current NIOSH guidance is intended to apply to a range of emergency responders. Recommendations provided below in some

cases expand upon the current NIOSH guidance. In some cases, the recommendations below are unique to the work duties and responsibilities of LEO responders.

Recommendation 1: Continue to revise work practices and procedures that the sheriff's department identified as areas for improvement.

Why? Fentanyl and other drugs pose a potential hazard to responders (such as LEOs, fire fighters, and EMS personnel) who come into contact with these drugs in the course of their work. Possible exposure routes to fentanyl and other drugs can vary based on the source and form of the drug. Responders are most likely to encounter fentanyl and its analogues in powder (including compressed powder), tablet, and/or liquid form. Potential exposure routes of greatest concern include inhalation, mucous membrane contact, ingestion, and percutaneous exposure (e.g., needlestick). Any of these exposure routes can potentially result in toxic effects. Brief skin contact with powdered fentanyl or its analogues is not expected to lead to toxic effects if any visible contamination is promptly removed.

LEOs 1 and 2 experienced symptoms that included confusion, dizziness, and difficulty breathing, during the incident.

How? At your workplace, we recommend these specific actions:



Follow guidance in the NIOSH Topic Page entitled “Fentanyl: Preventing Occupational Exposure to Emergency Responders”

(<https://www.cdc.gov/niosh/topics/fentanyl/risk.html>).

Specific recommendations that are most relevant to this incident include:

- Do not touch the eyes, mouth, and nose after touching any surface potentially contaminated with fentanyl or other drugs.
- Field testing of unknown powders suspected to be fentanyl or its analogues is not recommended due to an increased risk of exposure to responders performing field testing. However, if detection and identification of fentanyl is critical to the incident response, personnel specifically trained to perform the field testing should perform the field testing in the appropriate PPE. In the absence of well-validated field testing methods, LEOs should treat unknown powders as if they may contain fentanyl or fentanyl analogues regardless of the results of the field testing.
- Avoid performing tasks or operations that may make fentanyl or other drugs airborne.
- Wash exposed skin with soap and water (or just water) immediately after a potential exposure and after leaving a scene where fentanyl or other drugs are known or suspected to be present. Do not use hand sanitizers or bleach solutions to clean contaminated skin.

- Wear nitrile gloves when fentanyl or other drugs are suspected to be present. When fentanyl or other drugs are not visible, but suspected to be present, exposure level can be considered "minimal" according to NIOSH guidance for emergency responders. Train officers (1) on how to remove gloves safely and (2) to change or remove gloves after completing work tasks that involve potential contamination with fentanyl or other drugs and before working in an area where fentanyl or other drugs are not suspected to be present.
 - For example, when processing evidence, an officer should remove gloves after handling fentanyl or other drugs before using a computer in a common space.
 - Equipment that may have surfaces contaminated with fentanyl or other drugs should be handled with gloves until decontaminated.
- Based on the situation at the scene, PPE that is more protective might be considered, as outlined in the current guidance.



In addition to NIOSH recommendations, the sheriff's department should be aware of recommendations and guidance from the state's Department of Health Services and Department of Justice and the Interagency Board for Equipment Standardization and Interoperability, available at: <https://www.dhs.wisconsin.gov/news/releases/100517.htm> and <https://www.interagencyboard.org/content/first-responder-ppe-and-decontamination-recommendations-fentanyl-august-2017>.



Continue working with occupational safety and health experts and/or persons with expertise on PPE and LEO work on a job safety analysis.

Specific topics to continue to address include:

- Coordination of proper respirator use. Continue conducting training on:
 - proper respirator use along with the equipment carried by LEOs, such as duty belts, body cameras, and radios; and
 - the assessment of potential hazards in unsafe or unsecured environments to help determine if respiratory protection is needed and can be safely used.
- Use of clear and effective communication, particularly over radios or similar devices, while wearing PPE.
- Procedures for changing gloves and disposing of used gloves after performing tasks with potential for contamination with illicit drugs. Tasks include handling illicit drugs and handcuffing subjects who might have recently handled them.



Train officers on these new departmental practices and procedures.

Recommendation 2: To the extent possible, continue to coordinate joint training and development of uniform standard operating procedures with other nearby local law enforcement agencies, fire departments, and EMS organizations that work together. Training topics include standard safe operating procedures, PPE, and decontamination.

Why? The sheriff's department frequently takes part in mutual aid operations and joint responses in the region. Training can increase responders' understanding of these topics, which can help prevent unintentional exposures. For best coordination and protection of all workers, it will be important for all groups working together to have similar training and standard operating procedures.

Recommendation 3: Encourage LEOs to report possible exposures to and health effects resulting from exposure to illicit drugs to their supervisors.

Why? The sheriff's department can periodically review this information to help determine whether changes in current procedures are needed. The sheriff's department can use this information together with forensic testing results to find any trends affecting the risk of unintentional work-related exposure to illicit drugs and any associated health effects.

Supporting Technical Information

Evaluation of Law Enforcement Officers'
Occupational Exposure to Illicit Drugs

HHE Report No. 2018-0118-3331

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Section A: Workplace Information

The sheriff's department comprises over 170 sworn law enforcement officers (LEOs) and serves a county of approximately 400,000 residents. The sheriff's department also provides police contract services to seven municipalities in the county with populations ranging from approximately 3,500–15,000. In 2018, the sheriff's department and county drug unit have seen an increase in incidents involving synthetic opioids in the county.

Section B: Methods, Results, and Discussion

Our objectives were to:

- Determine whether the LEOs who developed symptoms during the traffic stop in early 2018 might have been exposed to illicit drugs and consider potential routes of exposure.
- Review and discuss information concerning health effects experienced by LEOs 1 and 2 related to the incident in early 2018, including information from available sheriff's department and medical records.
- Assess any changes made by the sheriff's department in response to the incident.
- Make recommendations on how to prevent exposures to illicit drugs among sheriff's department officers.

Methods: Description of the Incident

We visited the sheriff's department on June 25–26, 2018. During the visit, we conducted voluntary, confidential medical interviews with five sheriff's department officers who were on the scene of the incident in early 2018, including LEOs 1 and 2 who became symptomatic. During the interviews, we discussed the incident. We also discussed work history and practices, personal protective equipment (PPE) use, medical history, and any health effects experienced around the time of the incident. We also discussed the incident and departmental policies and procedures with representatives of the sheriff's department command and risk management staff. After our visit, we discussed the methods and results of the analysis of the substances found at the scene of the response and submitted for testing with a representative from the state forensic laboratory where the analysis was completed.

To describe the incident, we also reviewed:

- sheriff's department incident reports;
- a state trooper incident report; and
- state forensic laboratory testing results for substances found at the scene of the response and submitted for testing.

Results: Description of the Incident

In early 2018, LEO 1 stopped a vehicle that had deviated from its lane three times and “nearly sideswiped another vehicle.” Two persons were in the vehicle, the driver (Subject 1) and a passenger (Subject 2). Subject 1 was described as “jittery.” Subject 1 reported “difficulty differentiating the white line from the black pavement.” Based on Subject 1's behavior, LEO 1 requested the assistance of a K-9 unit trained to evaluate for the presence of illicit drugs in the vehicle. LEO 2 also responded to assist with the incident around the time the K-9 unit arrived. Subjects 1 and 2 stepped out of the vehicle while the K-9 unit performed the search. While circling the vehicle, the K-9 unit detected the presence of illicit drugs in the vehicle. LEOs 1 and 2 then placed Subjects 1 and 2 in handcuffs, patted them down, and put them in the back seat of separate LEO squad cars. At this time, another LEO (LEO 3) arrived

to assist with the scene, and LEOs 1 and 2 initiated a hand search of the vehicle. The search was conducted following usual sheriff's department protocols.

At the time of the incident, no written policy was in place regarding the appropriate PPE for handling unknown powders suspected to be illicit drugs. Both LEOs 1 and 2 wore long-sleeve uniforms throughout the incident. While searching the vehicle, LEO 1 wore leather gloves, and LEO 2 wore both latex and Kevlar® gloves. Neither wore respiratory protection.

When LEOs 1 and 2 searched the vehicle, they saw sandwich bags, an open box of baking soda, steel wool, straws cut into short pieces, a multi-colored glass pipe that appeared to have marijuana residue inside, and plant material that appeared to be marijuana. They also found a medium sized locked metal box under the passenger's front seat. LEO 1 removed the metal box and placed it on the trunk of the vehicle. LEOs 1 and 2 did not report seeing any unknown powders suspected to be illicit drugs prior to or during their search of the vehicle. A short time later, LEO 1 lifted and tilted the metal box to examine it further. When the metal box was tilted, a "plume of white powder" emerged from the seam where the lid joins the box and blew into the faces of LEOs 1 and 2. LEO 1 placed the metal box back on the trunk of the vehicle and stepped away from the vehicle. LEO 3 then lifted the metal box to see if the powder had come from anything that may have been under the metal box on the trunk. No powder was seen underneath the metal box on the trunk.

A few minutes later, LEOs 1 and 2 began to experience symptoms that included difficulty breathing, confusion, and dizziness. Emergency medical services (EMS) was called to respond to the scene to evaluate the LEOs. When one of the LEOs appeared to be developing shallow breathing and "quickly losing consciousness," LEO 3 administered a 4 milligrams (mg) intranasal dose of naloxone to this LEO. Within minutes of receiving naloxone, the LEO's breathing was noted to improve. A few minutes later, EMS providers arrived and transported LEOs 1 and 2 to a local emergency department (ED) for further evaluation and treatment.

A sheriff's department detective responded to the scene of the incident to assist with processing Subject 1 and 2's vehicle. State and county agents who specialize in investigating drug and drug trafficking-related incidents also responded to the scene to assist the detective. The detective donned a full body Tyvek® suit that included "rubber gloves" and a self-contained breathing apparatus respirator prior to approaching the vehicle. The agents forced the metal box open. The metal box contained "several glass pipes with burned residue, a small bag of marijuana, an object that appeared to be part of a vape device, a blue pill, a [bag] of a large white powdery substance, a small [bag] believed to contain methamphetamine, and a smaller [bag] with white rock substance." Two of the state agents took custody of the substances in the metal box and transported these substances to a remote location for field testing. The detective remained at the scene to finish photographing the scene for documentation purposes and processing the vehicle. During vehicle processing, the state agents advised the detective that the field testing for one of the substances in the metal box was positive for fentanyl. As a result, the vehicle was towed to a secure sheriff's department fleet evidence storage lot. The state agents who took temporary custody of the substances in the metal box for the purposes of field testing transported these

substances back to the scene of the incident and returned custody to the detective. The detective packaged the suspected illicit substances collected at the scene of the incident and sent them to the state forensic laboratory for testing.

Methods: Medical Record Review

We reviewed the medical records for the evaluation and treatment LEOs 1 and 2 received from EMS and ED providers.

Results: Medical Record Review

When EMS providers arrived at the incident, they found that LEOs 1 and 2 were alert and oriented. One LEO reported feeling dizzy, and the other reported feeling short of breath. Vital signs monitored by EMS providers en route to the ED demonstrated elevated blood pressures, normal to elevated heart and respiratory rates, and normal oxygen saturation without supplemental oxygen provided. No electrocardiographic abnormalities were noted on the three-lead portable electrocardiogram performed on one LEO. Blood glucose measurements for both ranged from mildly decreased to normal. The EMS provider field assessment of LEOs 1 and 2 was “Environment – Poisoning/Drug Ingestion.”

Upon arrival to the ED, the ED physician took a history and performed a physical examination of LEOs 1 and 2. In the medical record, the ED physician noted that the powder had gotten on the face of both LEOs during the incident and into the nose of one of the LEOs. In the ED, oral temperatures were normal, blood pressures were elevated, heart and respiratory rates were normal, and oxygen saturations were normal while breathing room air. On physical examination, both LEOs had normal sized pupils. No laboratory testing was performed on either LEO. The LEOs remained asymptomatic throughout the observation period in the ED of over an hour before being discharged home. The ED provider’s clinical impression for both LEOs was work-related suspected opioid or derivative powder exposure.

Methods: Forensic Analyses of Substances Found at the Response

We spoke with the detective who packaged the suspected illicit substances collected at the scene of the incident and sent them to the state forensic laboratory for testing. Other than the presumptive results, no other information about the field testing was available for review. We reviewed state forensic laboratory testing results for substances from the scene of the incident that were submitted for testing. We also discussed analytic methods and results with a representative of the state forensic laboratory where the substances were tested.

Results: Forensic Analyses of Substances Found at the Response

Powder from the metal box reportedly tested presumptively positive for fentanyl in field testing performed by state agents who specialize in investigating drug and drug trafficking-related incidents. Substances analyzed at the state forensic laboratory included measurable quantities of powdery, crystalline, and chunky materials; a bag with residue; and plant material. Substances identified by the state forensic laboratory are summarized in Table C1. Controlled substances present in measurable quantities included cocaine, methamphetamine, tetrahydrocannabinol, and alprazolam. Cocaine,

methamphetamine, and tetrahydrocannabinol are classified as drugs with a high potential for abuse. The forensic laboratory did not identify fentanyl or other opioids in the evidence samples sent for testing.

Discussion

From 2015 to 2016, there has been a 100% increase in the rate of overdose deaths involving synthetic opioids (includes fentanyl and its analogues) in the United States [Centers for Disease Control and Prevention 2018a]. While the synthetic opioid fentanyl has been the focus of much attention during the current drug abuse epidemic, it is important to realize that multiple drugs of abuse may be involved in any given incident. Illicit fentanyl and its analogues are increasingly being mixed with other drugs, particularly cocaine [Centers for Disease Control and Prevention 2018b]. This has raised concerns about the potential for exposure to illicit drugs among emergency responders (e.g., LEOs and fire fighter-EMS personnel), who might unintentionally come into contact with illicit drugs in the course of their work [Howard and Hornsby-Myers 2018]. Inhalation, mucous membrane contact, ingestion, and percutaneous exposure (e.g., needlestick) are important potential routes of exposure. Brief skin contact with powdered fentanyl or its analogues is not expected to lead to toxic effects if visible contamination is promptly removed [Interagency Board 2017; Moss et al. 2017; NIOSH 2017].

Issues related to health effects

The current drug abuse epidemic frequently involves situations in which: (1) multiple drugs are abused, and (2) the identity of the substances being abused cannot be determined without laboratory analysis [Liu et al. 2018]. In this response, LEOs encountered multiple drugs at the scene, including central nervous system (CNS) stimulants such as cocaine and methamphetamine and CNS depressants such as alprazolam. Although field testing suggested that fentanyl was also present, the state forensic laboratory analysis did not detect the presence of fentanyl in the powder sent for testing.

Classic signs and symptoms of severe opioid toxicity include lethargy or other indications of CNS depression, shallow or slow breathing, miosis, slow heart rate, and low body temperature [Boyer 2012; Ropper et al. 2014]. However, not all patients experiencing opioid intoxication consistently experience all of these components [Boyer 2012]. Low-dose exposure to opioids may result in milder symptomatology; a continuum of signs and symptoms (such as the non-specific symptoms of lightheadedness experienced by one of the LEOs in this incident) experienced upon exposure to opioids has been described [Lynch et al. 2018; Suzuki and El-Haddad 2017].

Various types of stimulant drugs such as cocaine and methamphetamine may lead to similar non-specific symptoms. Classically, toxicity from stimulants involves elevated heart rate and blood pressure, increased alertness, sweating, nausea and vomiting, and hallucinations. Non-specific health effects associated with stimulant drugs may include shortness of breath, dizziness, confusion, and headache [Albertson et al. 1999; Brody et al. 1990; Egred and Davis 2005; Haim et al. 1995]. Cocaine also has local anesthetic effects such as numbness and tingling [Brody et al. 1990]. Alprazolam, a type of benzodiazepine, is a CNS depressant that can cause drowsiness, dizziness, fatigue, headache, and memory impairment [Ait-Daoud et al. 2018].

Non-specific health effects that may be associated with exposure to combinations of agents, particularly at levels of exposure not causing serious (life-threatening) toxicity, may be difficult to differentiate from each other. Additionally, illicit drugs might contain adulterants or contaminants that could, by themselves or in combination, lead to symptoms [Behrman 2008; Cole et al. 2011].

LEOs 1 and 2 reported a range of symptoms during the incident. While the LEOs' symptoms had mostly resolved by the time of arrival in the ED, it is critical to recognize that the symptoms experienced by the LEOs in this evaluation did not allow them to continue conducting their law enforcement duties. The healthcare providers who evaluated LEOs 1 and 2 did not observe objective signs consistent with serious (life-threatening) opioid toxicity. However, the non-specific symptoms experienced by LEOs 1 and 2 could be consistent with milder toxicity related to drug exposure. In our evaluation, it is not possible to determine if other clinical factors and/or perceived risk may have impacted the observed health effects. The concept of "perceived risk," or the subjective judgment that individuals make about the type and severity of any risk, has been associated with increased anxiety and symptom reporting separate from physical exposure to a hazard [Gallacher et al. 2007]. The possible relationships between perceived risk, the types of exposures, and the clinical status of the LEOs discussed in this report were not assessed in this HHE.

Issues related to exposure

While LEOs 1 and 2 were exposed to the powder from the metal box, there are a number of issues that make characterization of the exposure difficult. As with other similar incidents that have occurred among emergency responders, this incident: (1) was evaluated in a retrospective manner four months later; (2) occurred quickly, in a work setting where advance planning is difficult; and (3) involved highly toxic materials, which are not fully characterized from an occupational safety and health perspective. Some work practices may have increased their risk of exposure. Although LEO 1 was wearing leather gloves and LEO 2 was wearing both latex and Kevlar gloves while searching the vehicle, nitrile gloves were not available for the LEOs to use during the incident. LEOs 1 and 2 did not use respirators while searching the vehicle or handling the metal box that contained the powder that blew into their faces. Until the metal box was tilted causing the release of powder, LEOs 1 and 2 did not report seeing any other unknown powders during their search of the vehicle. This incident highlights that first recognition of illicit drugs by a LEO might occur unpredictably or in an unsecured or unsafe environment, preventing the officer from donning a respirator immediately. At the time of the incident, all sheriff's department LEOs were quantitatively fit tested for N95 filtering facepiece respirators, but no written policy was in place regarding the appropriate PPE for handling unknown powders suspected to be illicit drugs.

Overall, LEOs 1 and 2 had multiple potential routes of exposure to the powder in the metal box. Because the powder blew into their faces, inhalation, mucous membrane absorption, ingestion, absorption through the skin, or a combination are all possible routes of exposure. Although brief skin contact with fentanyl and its analogues is not expected to lead to toxic effects if visible contamination is promptly removed [Interagency Board 2017; Moss et al. 2017; NIOSH 2017], it is not clear when or how decontamination of LEOs 1 and 2 occurred. There is also the possibility that cross-contamination

of the LEOs' gloves and/or equipment with small amounts of illicit drugs may have occurred while placing Subjects 1 and 2 in handcuffs, patting them down, putting them in the LEO squad cars, and/or searching their vehicle. If cross-contamination did occur, subsequent hand-to-face contact could have resulted in mucous membrane exposure to LEOs 1 and 2.

As previously discussed, a discrepancy was noted between the field testing and the state forensic laboratory analysis of the powder in the box. Several factors could have led to this discrepancy with the field testing; one possibility is differences between the sensitivity and specificity of the different testing methods. These analyses were primarily conducted for law enforcement purposes, not as a means of fully characterizing the occupational safety and health risks associated with exposure to the contents of the box.

Field testing of unknown powders suspected to be fentanyl or its analogues is not recommended due to an increased risk of exposure to responders performing field testing. However, if detection and identification of fentanyl is critical to the incident response, personnel specifically trained to perform the field testing should perform the field testing in the appropriate PPE [NIOSH 2017]. The test characteristics of field testing methods are highly variable and operators need training to understand the capabilities and limitations of the testing being performed. For example, an instrument used for field testing can only identify drugs that provide a match to drugs in the instrument's presumptive library. In addition, some technologies are acceptable for trace detection of known drugs in the nanogram to microgram range while others are only capable of identifying bulk drugs in microgram to milligram amounts [Baxter and Logan 2017]. Responders should be knowledgeable about the capabilities and limitations of the methods that are being used because the absence of identification of an unknown substance does not completely rule out the presence of a hazardous drug. In the absence of well-validated field testing methods, LEOs should treat unknown powders as if they may contain fentanyl or fentanyl analogues regardless of the results of the field testing.

Limitations

This evaluation is subject to several limitations. The investigation was retrospective in nature. Interviews with the LEOs present at the scene of the incident were conducted four months after the incident. Limitations related to fully characterizing the exposures are discussed above. Although we reviewed the EMS and ED records for the LEOs with health effects related to this incident, we cannot completely rule out the possibility that unrecognized medical conditions may have contributed to the health effects observed.

Conclusions

During a traffic stop and law enforcement action in early 2018, two LEOs developed health effects shortly after exposure to a powder suspected to be illicit drugs. Whereas the powder in the metal box tested presumptively positive for fentanyl during field testing, the state forensic laboratory did not detect the presence of fentanyl or other opioids. The healthcare providers who evaluated both LEOs did not observe objective signs consistent with serious (life-threatening) opioid toxicity. It is possible that the non-specific symptoms they experienced could be consistent with milder toxicity related to

drug exposure. Nevertheless, the symptoms were severe enough that the LEOs needed medical attention and could not continue performing their duties. Improving understanding about illicit drug exposure routes and protective measures and implementing work practices to prevent illicit drug exposure will help prevent future exposures among sheriff's department LEOs.

Section C: Tables

Table C1. Summary of state forensic laboratory testing results from the incident*

Description of item	Weight† (grams)	Substance present
A loose, white, powdery substance	10.2071	Sodium bicarbonate‡
Sealable plastic bag containing one torn plastic baggie and an off-white chunky substance	5.2883	Cocaine
Small sealable plastic bag containing crystalline material	2.6043	Methamphetamine
One knotted plastic bag corner containing plant material	0.6531	Tetrahydrocannabinol
Loose crystalline material	0.0545	Methamphetamine
Small sealable plastic bag containing crystalline material	0.0483	Methamphetamine
Small sealable plastic bag containing a gray powdery substance	0.0117	Cocaine, Methamphetamine
Small sealable plastic bag containing a mixture of tiny yellow chunks and crystalline material	0.0013	Methamphetamine, Cocaine, Alprazolam§
Small sealable plastic bag containing a mixture of off-white and crystalline residue	—	Cocaine, Methamphetamine

*All items listed in the table were in the locked metal box tilted by LEO 1, which resulted in release of powder.

†Does not include the weight of residues.

‡Analysis indicated the presence of sodium bicarbonate, but the laboratory report stated “use of the term ‘indicated’ in this report means the examinations performed did not meet the reporting criteria for identification of that substance.” Sodium bicarbonate, commonly known as baking soda, is not a controlled substance.

§Analysis indicated the presence of alprazolam, but the laboratory report stated “use of the term ‘indicated’ in this report means the examinations performed did not meet the reporting criteria for identification of that substance.”

Section D: References

Alprazolam

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Illicit Drugs

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