



EMS Information Bulletin 2018-22

DATE: October 22, 2018

SUBJECT: Personal Protective Equipment and Responder Safety Related to Fentanyl

TO: PA EMS Providers

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A handwritten signature in black ink, appearing to read "Dylan J. Ferguson".

There has been recent media regarding EMS providers, other first responders and the general population experiencing various symptoms when coming into contact with numerous types of drugs. One specific substance of note includes fentanyl and its derivatives.

While first responders across the commonwealth face a myriad of threats on a daily basis, fortunately, *"The likelihood of prehospital providers suffering ill effects from opioid exposure during routine operations is extremely low."*¹

It is important to share some of the best practices related to personal protective equipment (PPE), other operational components and a brief review of the pharmacological properties of some the more common substances first responders are likely to come across.

Characteristics of Fentanyl-Based Substances

- Fentanyl is a powerful synthetic opioid analgesic. As an opioid, it will respond to naloxone.
- Fentanyl can come in many different forms: powder, tablets, capsules and liquid.
- Fentanyl and fentanyl analogs are increasingly involved in opioid overdose deaths.
- Fentanyl is 50-100 times more potent than morphine.
- Carfentanil, which is primarily utilized in veterinary medicine, is 10,000 times more powerful than morphine. It is the most potent fentanyl substance known in the United States.²

¹ Michael J. Lynch, Joe Suyama, and Francis X. Guyette, "Scene Safety and Force Protection in the Era of Ultra-Potent Opioids," *Journal of Prehospital Emergency Care*, September 28, 2017, doi:<http://dx.doi.org/10.1080/10903127.2017.1367446>.

² Julie O'Donnell et al., "Notes from the Field: Overdose Deaths with Carfentanil and Other Fentanyl Analogs Detected -- 10 States, July 2016 - June 2017," *Morbidity and Mortality Weekly Report*, July 12, 2018, accessed September 7, 2018, <https://www.cdc.gov/mmwr/volumes/67/wr/mm6727a4.htm>

Routes of Entry

There are a variety of ways that substances can enter the body. Different substances have different effects based on the route of entry. Additionally, some substances are able to enter the body more easily based on the route.

- **Absorption:** **Some** substances can enter your body by passing through your skin or eyes. Abrasions and punctures in your skin's surface can increase the rate at which the substance is absorbed into your body.
- **Injection:** Substances can enter your body, and particularly the blood stream, through lacerations, punctures or needles.
- **Inhalation:** Is one of the most common ways in which substances can enter the body. Substances can be inhaled through your mouth or nose and travel into your lungs where they can begin to cause damage.
- **Ingestion:** Some substances can easily be absorbed through your digestive system. This can occur if you have a substance on your hands and you eat without adequately washing your hands.

Fentanyl and Skin Absorption

- Transdermal fentanyl patches have been prescribed for pain control for decades. However, in order to facilitate absorption through the skin it must have a pharmaceutical delivery mechanism. This is accomplished by producing the fentanyl in an alcohol-based solution to facilitate therapeutic effects.³
- Depending on the specific product, transdermal patches can take 3-13 hours to produce a therapeutic concentration.⁴
- In order for any substance to be absorbed there must be sufficient surface area and moisture.
- Breaks in the skin have the potential to speed up the absorption process.⁴
- Universal precautions, including nitrile gloves, provide adequate protection for the overwhelming majority of emergency responses.

Fentanyl and Inhalation

- With an extremely low vapor pressure, there is no conceivable risk of fentanyl becoming a gas.⁴
- Avoid unnecessarily disturbing loose powder, as powder can enter the air and be inhaled by responders.
- Mucous membranes can rapidly absorb powdered fentanyl that is introduced into the air.⁵
- Of all the routes of entry, inhalation and absorption by the mucous membranes are the most concerning for first responders.

³ Michael J. Lynch, Joe Suyama, and Francis X. Guyette, "Scene Safety and Force Protection in the Era of Ultra-Potent Opioids," *Journal of Prehospital Emergency Care*, September 28, 2017, doi:<http://dx.doi.org/10.1080/10903127.2017.1367446>.

⁴ "ACMT and AACT Position Statement: Preventing Occupational Fentanyl and Fentanyl Analog Exposure to Emergency Responders," editorial, *American College of Medical Toxicology*, July 2017, , accessed September 7, 2018, https://www.acmt.net/_Library/Positions/Fentanyl_PPE_Emergency_Responders_.pdf

⁵ Michael Lynch, MD, "'Fentanalogs' and Other Potent Synthetic Opioids: Implications for First Responders" (lecture, Pittsburgh Poison Center).

Personal Protective Equipment Recommendations ⁶

- Despite the minimal risk that fentanyl and its analogues pose to first responders, it is still prudent to work to minimize any opportunity for exposure.
- The National Institute for Occupational Safety and Health (NIOSH) has set forth PPE recommendations to help keep first responders safe. They have created three separate levels of PPE based on the situation encountered.
 - **Minimal:** Response to a situation where it is suspected that fentanyl may be present but no fentanyl products are visible.
 - Example: An EMS response to a suspected fentanyl overdose or law enforcement operation where intelligence indicates fentanyl products are suspected but are not visible on scene.
 - **Moderate:** Response to a situation where small amounts of fentanyl products are visible.
 - Example: An EMS response to a suspected fentanyl overdose or law enforcement operation where fentanyl products are suspected and small amounts are visible on scene.
 - **High:** Response to a situation where liquid fentanyl or large amounts of fentanyl products are visible.
 - Example: A fentanyl storage or distribution facility, fentanyl milling operation, or fentanyl production laboratory.
- Based on the risk level present, first responders can utilize the chart from NIOSH on the following page to assist in selection of the proper PPE for their situation.

⁶ "The National Institute for Occupational Safety and Health (NIOSH)," Centers for Disease Control and Prevention, August 30, 2017, , accessed September 07, 2018, <https://www.cdc.gov/niosh/topics/fentanyl/risk.html>

Personal protective equipment recommendations for protection against fentanyl													
Personal Protective Equipment	Pre-Hospital Patient Care			Law Enforcement Routine Duties			Investigations and Evidence Collection			Special Operations and Decontamination			
	Exposure Level	Minimal	Moderate	High	Minimal	Moderate	High	Minimal	Moderate	High	Minimal	Moderate	High
<i>Respiratory Protection</i>													
Disposable N100, R100, or P100 FFR ¹		✓				✓			✓	✓		✓	✓
Elastomeric APR ²								●	✓			●	✓
PAPR ³									●			●	●
SCBA ⁴									■				■
<i>Face and Eye Protection</i>													
Safety goggles/glasses ⁵			✓			✓		✓	✓			✓	✓
<i>Hand Protection</i>													
Nitrile gloves ⁶		✓	✓		✓	✓		✓	✓	●	✓	✓	✓
Nitrile gloves, double or use of thicker gloves			●			●			●	●		●	✓
<i>Dermal Protection</i>													
Wrist/arm protection ⁷			✓			✓			✓			✓	✓
Particulate hazards protective ensemble (i.e., NFPA 1999 Single or Multi-Use or NFPA 1994 Class 4 Ensemble)										✓			✓
Chemical hazards protective ensemble (i.e., NFPA 1994 Class 3 Ensemble or Higher)										●			●
Key													
✓ Minimum protection recommended.													
● When an on-scene health risk assessment is conducted and higher protection is warranted.													
■ If particulate + gas/vapor hazard is expected above the immediately dangerous to life or health (IDLH) values or concentration is unknown, SCBA is recommended.													
Not recommended, refer scene to special operations response workers (such as local hazmat team)													

Table 1.1 NIOSH's Personal Protective Equipment Recommendations for Protection Against Fentanyl⁷

⁷ "The National Institute for Occupational Safety and Health (NIOSH)," Centers for Disease Control and Prevention, August 30, 2017, , accessed September 07, 2018, <https://www.cdc.gov/niosh/topics/fentanyl/risk.html>

How to Respond if You Come into Contact with Fentanyl

- Do not panic - the risk of adverse effects is extremely small
- If fentanyl has gotten on your skin, brush off any loose powder with a gloved hand
- Avoid touching the areas of your eyes, nose or mouth⁸
- Wash the area thoroughly with soap and water⁸
- **DO NOT utilize alcohol-based hand sanitizers or bleach solutions. Use of these products introduces the possibility of speeding up the absorption process⁹**
- Do report the incident through your agencies' internal chain of command
- Remember the signs and symptoms of an overdose: lethargy, decreased respiratory rate, pinpoint pupils and loss of consciousness.
- If these symptoms are present in yourself or a fellow responder, transport to the nearest hospital emergency department
- Remember naloxone is given to restore breathing, it should not be given prophylactically¹⁰

Additional Resources

- [Fentanyl: The Real Deal, U.S. Customs and Border Protection](#)
- [NIOSH Fentanyl Resources](#)

Keeping first responders of all disciplines safe is a priority of the Department of Health. Utilization of this information will help keep you safe, while you care for others. Questions regarding any of this information, or requests for additional information can be directed to the Department's Bureau of Emergency Medical Services.

⁸ "The National Institute for Occupational Safety and Health (NIOSH)," Centers for Disease Control and Prevention, August 30, 2017, , accessed September 07, 2018, <https://www.cdc.gov/niosh/topics/fentanyl/risk.html>

⁹ "ACMT and AACT Position Statement: Preventing Occupational Fentanyl and Fentanyl Analog Exposure to Emergency Responders," editorial, *American College of Medical Toxicology*, July 2017, , accessed September 7, 2018, https://www.acmt.net/_Library/Positions/Fentanyl_PPE_Emergency_Responders_.pdf

¹⁰ Michael Lynch, MD, "'Fentanalogs' and Other Potent Synthetic Opioids: Implications for First Responders" (lecture, Pittsburgh Poison Center).