

Fentanyl & First Responder Safety

First Responders (e.g. medical, fire, law enforcement personnel) commonly encounter persons engaged in drug use, transport, and/or manufacture. The substances involved (e.g. stimulants, sedatives, hallucinogens, and opiates) can present occupational hazard. Efforts to mitigate the risks to First Responders involve education with respect to the substances themselves and the methods of avoidance and protection available for use in the course of various encounter scenarios. The focus of this paper is fentanyl, and it is written to provide information of use to First Responders.

Fentanyl Characteristics & Toxicity Risks

Pure fentanyl (and its pharmaceutical and non-pharmaceutical illicit analogs) is an oily substance. Purification methods typically create a fentanyl salt that forms dry crystals – typically fentanyl hydrochloride. Pure fentanyl hydrochloride is white, and the crystals are not prone to forming a loose powder that can be suspended in the air to form aerosols. When fentanyl hydrochloride is ‘cut’ with other agents – or when other substances are cut with fentanyl – the resulting solids may not be white, and they may form powder aerosols. Inhalation of such aerosols could result in significant absorption of fentanyl and other biologically active agents depending on the density of the aerosol in air and the quantities of drugs in the aerosol. There are currently anecdotal sources that indicate fentanyl found in product seizures have increasing fentanyl relative purity. Such high concentration dry fentanyl (and analog) crystals would present an increased risk, although pure crystals are less likely to aerosolize. In circumstances involving manufacturing of fentanyl, it is estimated that several hours of exposure would be required to reach a significant dose of fentanyl. Symptoms of significant drug absorption by inhalation would be expected within minutes. The effectiveness of various forms of masks (e.g. N95 or P100) in preventing significant inhalation doses of fentanyl in aerosols is not well established, but these masks would only be useful in circumstance where significant amounts of powder aerosols are likely. Toxic inhalation of fentanyl in aerosols by First Responders have not been documented.

Fentanyl salts are not easily absorbed through skin – the barrier functions of the skin can be overcome using solvents that promote drug absorption (e.g. fentanyl patches), but incidental short duration contact with fentanyl salts carries minimal risk of acute absorption. Toxic absorption of fentanyl salts (dry or in solution) by First Responders through skin have not been documented.

Fentanyl salts are easily absorbed through ingestion. Powders containing fentanyl and/or other substances can be ingested if the powders are allowed to contaminate food and drink. The risk of ingestion can be largely eliminated by wearing gloves when handling suspected drug containing items, and by careful handling of contaminated clothing and skin by cleaning with soap and water.

Published Recommendations

ACMT and AACT position statement: preventing occupational fentanyl and fentanyl analog exposure to emergency responders

Moss, M.J., et.al CLINICAL TOXICOLOGY, 2017

<https://doi.org/10.1080/15563650.2017.1373782>

Recommendations

The American College of Medical Toxicology and American Academy of Clinical Toxicology recognize the challenges in issuing recommendations where available data are incomplete.

We believe that recommendations should be protective of emergency responders, but not result in unnecessary delays in care to patients with time-sensitive conditions. We also recognize that PPE can interfere with task performance by emergency responders and law enforcement officials. Due to the limited available data, the following recommendations primarily represent consensus expert opinion.

General Precautions and Management of Exposure

- Workers who may encounter fentanyl or fentanyl analogs should be trained to recognize the symptoms and objective signs of opioid intoxication, have naloxone readily available, and be trained to administer naloxone.
- For opioid toxicity to occur, the drug must enter the blood and brain from the environment. Toxicity cannot occur from simply being in proximity to the drug.
- Toxicity may occur in canines utilized to detect drug. The risks are not equivalent to those in humans given the distinct contact that dogs, and not humans, have with the local environment.

Dermal Precautions

- Incidental dermal absorption is very unlikely to cause opioid toxicity. For routine handling of drug, nitrile gloves provide sufficient dermal protection.
- In situations where an enclosed space is potentially heavily contaminated with a highly potent opioid, water-resistant coveralls should be worn.
- Incidental dermal exposures should immediately be washed with water. Alcohol-based hand sanitizers should not be used for decontamination as they do not wash opioids off the skin and may increase dermal drug absorption.

Respiratory Precautions

- In the unusual circumstance of significant airborne suspension of powdered opioids, a properly fitted N95 respirator or P100 mask is likely to provide reasonable respiratory protection.

Mucous Membrane/Splash Exposure

- OSHA-approved protection for eyes and face should be used during tasks where there exists possibility of splash to the face.

Naloxone Administration and Airway Management

- Naloxone should be administered to those with objective signs of hypoventilation from opioid intoxication.
- If hypoventilation persists following initial naloxone dose and personnel with advanced airway training are not available, repeat naloxone until reversal is seen or 10mg is administered.
- Personnel with advanced airway training should provide airway support for patients who are in extremis or those who do not improve with naloxone.

Long-term Sequelae of Exposure

- In the absence of prolonged hypoxia, no persistent effects are expected following fentanyl or fentanyl analog exposures. Those with small subclinical exposures and those who awaken normally following naloxone administration will not experience long-term effects.

Fentanyl and Carfentanil Exposures in First Responders

Northern New England Poison Center, 2017

Adapted from: *ACMT/AACT position statement Preventing Occupational Fentanyl and Fentanyl Analog Exposure to Emergency Responders*

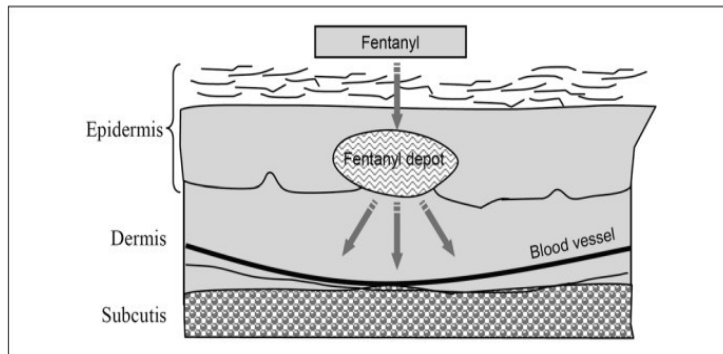
**Precautions for First Responders
Encountering Fentanyl or Fentanyl Analogs**

- **Recognize opioid effects:**
 - Drowsiness (naloxone **NOT** indicated)
 - Pinpoint pupils (naloxone **NOT** indicated)
 - Respiratory depression (naloxone indicated)
- **Dermal protection:**
 - Use nitrile gloves for routine handling
 - Wear coveralls in heavily contaminated areas
- **Eye protection:**
 - Safety goggles/glasses if face splashing is expected
- **Respiratory protection:**
 - N95 or P100 **ONLY IF** there are significant amounts of powder in the air
- **After skin or eye exposure:**
 - Wash with large amounts of water if skin or eyes are exposed
 - Do not use hand sanitizer

Questions? Call the Northern New England Poison Center - 1-800-222-1222

Sources

Transdermal Fentanyl: Pharmacology and Toxicology [Transdermal fentanyl: Pharmacology and toxicology \(nih.gov\)](https://pubmed.ncbi.nlm.nih.gov/23881111/)



Fentanyl becomes detectable in the serum within 1–2 hours of application of a transdermal fentanyl device. However, therapeutic serum fentanyl concentrations are not achieved until approximately 12–16 hours after transdermal device application.

Figure 1: Cross section of skin, demonstrating that fentanyl, given its high lipid solubility, readily enters the epidermal lipids and forms a depot at the dermal-epidermal junction. This slowly dissolves in the hydrophilic dermis and enters the cutaneous blood circulation.

Illicit Non-Pharmaceutical Fentanyl and Its Analogs - A Short Review of Literature *Kansas Journal of Medicine* 2023 [Kansas Journal of Medicine, Volume 15 \(nih.gov\)](https://www.kjofm.com/article/doi/10.2310/KJOFM.2023.150101)

Occupational Safety and Health and Illicit Opioids: State of the Research on Protecting Against the Threat of Occupational Exposure [Occupational Safety and Health and Illicit Opioids: State of the Research on Protecting Against the Threat of Occupational Exposure \(nih.gov\)](https://www.cdc.gov/nceo/odhqq/occupational-safety-and-health-and-illicit-opioids-state-of-the-research-on-protecting-against-the-threat-of-occupational-exposure.html)

Accidental Occupational Exposure to a Large Volume of Liquid Fentanyl on a Compromised Skin Barrier with No Resultant Effect [Accidental Occupational Exposure to a Large Volume of Liquid Fentanyl on a Compromised Skin Barrier with No Resultant Effect - PubMed \(nih.gov\)](https://pubmed.ncbi.nlm.nih.gov/35881111/)

ACMT and AACT position statement: preventing occupational fentanyl and fentanyl analog exposure to emergency responders [Fentanyl Position Statement 2017.pdf \(clintox.org\)](https://www.clintox.org/position-statement-2017)

Fentanyl Fact Sheet Northern New England Poison Center [Fentanyl and Carfentanil Exposures in First Responders \(healthvermont.gov\)](https://www.healthvermont.gov/health-education/fentanyl-and-carfentanil-exposures-in-first-responders)

Cops say they're being poisoned by fentanyl. Experts say the risk is 'extremely low'
By Brian Mann, May 16, 2023 [Are cops really being poisoned by fentanyl exposure? : NPR](https://www.npr.org/2023/05/16/1158811111/cops-say-theyre-being-poisoned-by-fentanyl-experts-say-the-risk-is-extremely-low)