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Fentanyl: Preventing Occupational Exposure to Emergency Responders

Protecting Workers at Risk

Emergency Responders

Fentanyl and its analogues pose a potential hazard to a variety of responders who could come into contact with these drugs in the course of their work. Possible exposure routes to fentanyl and its analogues can vary based on the source and form of the drug. Responders are most likely to encounter illicitly manufactured fentanyl and its analogues in powder, tablet, and 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 a variety of symptoms that can include the rapid onset of life-threatening respiratory depression. Skin contact is also a potential exposure route, but is not likely to lead to overdose unless large volumes of highly concentrated powder are encountered over an extended period of time. Brief skin contact with fentanyl or its analogues is not expected to lead to toxic effects if any visible contamination is promptly removed. There are no established federal or consensus occupational exposure limits for fentanyl or its analogues.

NIOSH has identified the following job categories as positions where responders might come into contact with fentanyl or its analogues.

- **Pre-Hospital Patient Care**: Emergency medical services (EMS) providers, including first responders, fire department and private companies who attend to individuals with suspected fentanyl overdose. Responders may encounter drugs or drug paraphernalia on or near the patient.
- **Law Enforcement**: Law enforcement officers who perform day-to-day law enforcement duties. Law enforcement officers may come into contact with fentanyl during the course of their daily

activities such as traffic stops, apprehending and searching subjects, and responding to fentanyl overdose calls.

- **Investigation and Evidence Handling**: Law enforcement personnel who conduct investigations related to fentanyl. Activities may include executing search warrants and collecting, transporting, and storing evidence. Evidence collection activities in the field have the potential to aerosolize powders. Also, law enforcement personnel who handle evidence in the chain of custody have the potential to come into contact with fentanyl unless controls are in place to prevent exposures.
- **Special Operations and Decontamination**: Workers who conduct special operations where exposure to large amounts of fentanyl are expected. Examples include hazardous material incident response teams responding to a release or spill, and law enforcement officers executing search warrants on opioid processing or distribution sites, or participating in other tactical operations. These activities may aerosolize powders.

NIOSH has no occupational exposure data on fentanyl or its analogues for emergency responders. These recommendations are based on the reported toxicity and the chemical and physical properties of fentanyl and its analogues; NIOSH guidance for other similar chemicals (or in the same family); recommendations from previous NIOSH health hazard evaluation reports about law enforcement personnel exposures to other drugs and chemicals; and the basic principles of industrial hygiene. As new research becomes available, these recommendations will be updated.

Standard Safe Operating Procedures

With all first responder operations involving hazardous materials, standard safe work practices must be followed when fentanyl or its analogues are known or suspected to be present. When arriving at a scene, all responders should analyze the incident, assess the risk for hazards, and determine whether fentanyl or other drugs are suspected to be present. Responders should follow established work practices as well as these recommendations when fentanyl or its analogues are known or suspected to be present.

- Do not eat, drink, smoke, or use the bathroom while working in an area with known or suspected fentanyl.
- Do not touch the eyes, mouth, and nose after touching any surface potentially contaminated with fentanyl.
- Field testing of 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, develop an incident specific plan to perform the field testing in accordance with agency policies and procedures. Personnel specifically trained to perform the field testing should perform the field testing in the appropriate personal protective equipment (PPE). Never handle fentanyl or its analogues without the appropriate PPE.

- Avoid performing tasks or operations that may aerosolize fentanyl due to increased exposure risks. Activities that aerosolize fentanyl require higher levels of PPE and should be conducted by appropriately trained personnel and in accordance with agency policies and procedures.
- Wash hands with soap and water immediately after a potential exposure and after leaving a scene where fentanyl is known or suspected to be present to avoid potential exposure and to avoid cross contamination. Do not use hand sanitizers or bleach solutions to clean contaminated skin.

Training

Responders who perform jobs where fentanyl or its analogues are reasonably anticipated to be present should receive special training in conducting an on-scene risk assessment related to fentanyl and its analogues and demonstrate an understanding of the following:

- How to recognize the form and determine the quantity of the suspected fentanyl and other drugs.
- When to use PPE; what PPE is necessary; how to properly put on, use, take off, properly dispose of, and maintain PPE; and the limitations of PPE.
- What the potential exposure routes are for fentanyl and its analogues.
- How to recognize the signs and symptoms of opioid exposure.
- When and how to seek medical help.

Employers must comply with OSHA's hazardous materials standard (29 CFR 1910.120 (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9765)) when conducting clean-up operations involving hazardous substances. When required, responders should be trained on the potential hazards they might encounter and the necessary knowledge and skills to perform their work with minimal risk to their own safety and health and that of other responders.

Personal Protective Equipment

The following table provides PPE recommendations for protection against fentanyl and its analogues. Identifying the PPE appropriate for the risk is done by first selecting the correct job category, as defined above, and then the level of exposure anticipated. Exposure levels are defined as follows:

- **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

It is important to recognize that the exposure level initially selected can change and PPE should be adjusted accordingly. Additionally, higher levels of PPE may be necessary to protect responders from exposure to other chemicals that may also be present in addition to fentanyl.

These recommendations cover examples of common exposures, but are not intended to prescribe PPE for every responder or exposure or discuss all PPE options. In all cases, employers must identify hazards to which their workers might be exposed and provide appropriate PPE to protect them. All PPE should be used in accordance with OSHA's PPE standard (29 CFR 1910.132 (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9777)). When required, respirator use should be in the context of a comprehensive respiratory protection program in accordance with the OSHA respiratory protection standard (29 CFR 1910.134 (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=12716)) and other requirements. Responders who need to wear respirators must be medically cleared, trained, and fit-tested for respirator use. Detailed information on respiratory protection programs, including fit-testing procedures, can be accessed at OSHA's respiratory protection eTool at http://www.osha.gov/SLTC/etools/respiratory (http://www.osha.gov/SLTC/etools/respiratory) .

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
Respiratory Protection												
Disposable N100, R100, or P100 FFR[1]		✓	Not recommended		✓	Not recommended		✓			✓	
Elastomeric APR[2]								●	✓		●	✓
PAPR[3]									●		●	●
SCBA[4]									■			■
Face and Eye Protection												
Safety goggles/glasses[5]		✓			✓			✓	✓		✓	✓
Hand Protection												
Nitrile gloves[6]	✓	✓		✓	✓		✓	✓		✓	✓	
Nitrile gloves, double or use of thicker gloves		●			●			●	●		●	✓
Dermal Protection												
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)									●			●

1. FFR: filtering facepiece respirator, N: not resistant to oil, P: oil=proof, R: resistant to oil.
2. APR: air-purifying respirator; configurations recommended: half facepiece APR with N-,P-, or R100 cartridges; full facepiece APR with N-, P-, or R100 cartridges or a chemical, biological, radiological, and nuclear (CBRN) canister.
3. PAPR: powered air-purifying respirator, configuration recommended: PAPR with high efficiency particulate air (HEPA) filter.
4. SCBA: self-contained breathing apparatus; certified to NFPA 1981: *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services.*
5. Face and eye protection is recommended when the respirator does not provide this type of protection, e.g., when wearing a disposable N-, P-, or R100 respirator or an elastomenic half facepiece APR with N-, P-, or R100 cartridges.
6. Powder-free nitrile gloves should be worn with a minimum thickness of 5+- 2 mil (i.e. 0.127 +- 0.051 millimeters; 1 mil=0.0254 millimeters), unless manufacturer data provides performance breakthrough data for thinner gloves.
7. Wrist/arm protection may include one or more of the following: on-duty uniform with sleeves, sleevecovers, gowns, or coveralls.

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)

Decontamination

Responders who come into contact with fentanyl should immediately use soap and water to thoroughly wash and rinse contaminated skin. They should take care not to break the skin during the decontamination process and to cover all open wounds. Do not use hand sanitizers or bleach solutions to clean contaminated skin. All contaminated clothing should be removed and laundered, being careful not to disturb any areas of contamination. Shower immediately after a potential exposure.

Decontamination of reusable PPE and equipment should be done according to the manufacturer's recommendations. Contaminated single use PPE should be placed in labeled durable 6 mil polyethylene bags and disposed of appropriately.

Working Dogs

Working dogs, especially police K-9s performing detection activities, are also at risk of exposure to fentanyl and its analogues. As is recommended by the Interagency Board's August 2017 document regarding opioids (see Other Resources), working dogs should be removed from an area where suspect synthetic opioids are encountered. If exposed, residual drug powder might remain on the dog's body; therefore, the proper precautions and procedures mentioned above should be employed by those handling the dog.

A video (http://vetmed.illinois.edu/overdose-working-dogs-script/) , created by the University of Illinois, College of Veterinary Medicine, is available as an educational tool for licensed veterinarians who might be asked to assess and treat potentially exposed working dogs (see Other Resources). This video should not be used as a substitute for a consultation with a treating veterinarian. In the case of a suspected canine overdose, contact the canine's treating veterinarian immediately.

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