Work-Related Opioid Exposure Among Virginia’s First Responders

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Introduction

• 2015 to 2016: 207% Increase in illicit fentanyl case submissions.

• 2013 to 2016: 1,656% increase in illicit fentanyl cases submitted.

Rate of submission, per 100,000 population.

Source: (Virginia Departments of Forensic Science and Criminal Justice Services, 2017)
Introduction

• 2011: Virginia mortality rate in for fentanyl and/or heroin overdose is 1.9 per 100,000 residents

• 2015
  • Slight decrease in prescription opioid fatalities.
  • Sharp increase in fentanyl/heroin fatalities.

• 2016: Virginia mortality rate for fentanyl and/or heroin overdose is 9.6 per 100,000 residents

• Illicit fentanyl fatalities appears to be driving the rise in total number of opioid fatalities.

Source: (Virginia Department of Health Office of the Chief Medical Examiner, 2018)
Introduction

• Partnership:
  • Virginia Department of Health (VDH)
  • University of Kentucky’s Central Appalachian Regional Education and Research Center (CARERC)
  • National Institute of Occupational Health and Safety (NIOSH)

• Study purpose:
  • Identify the extent of opioid exposure among first responders in Virginia
  • Assess first responder risk of opioid exposure and its adverse health effects
  • Assess knowledge and perspectives regarding protective measures
Hypothesis

• Virginia’s first responders will have an increased risk of exposure and health effects related to occupational opioid drug exposure.
• Knowledge and utilization regarding guidelines and protective measures will vary between first responders.
Participant Selection and Recruitment

• Convenience base sampling of first responders

• Survey distribution and administration
  • Planning committee:
    • Office of Emergency Medical Services
    • Community Health Services
    • State and Local Police
    • Virginia Fusion Center
  • Organizational ListServs
Research Timeline

- Award Received: Jul 15
- Planning Meeting: Sep 29
- REDCap Survey Received: Aug 23
- REDCap Survey Distributed for Feedback: Nov 22 - Jan 12
- REDCap Survey Distributed for Data Collection: Jan 12 - Mar 12
- SouthON Abstract Submitted: Jan 10
- SouthON Abstract Accepted: Feb 6
- REDCap Survey Reminder: Mar 1
- Data Analysis: Mar 5 - Apr 2
Methods and Procedures

• REDCap Survey
  • Central Appalachian Regional Education Research Center (CARERC)
  • National Institute for Occupational Safety and Health (NIOSH)
  • Voluntary and anonymous

• Data analysis
  • Descriptive analysis
  • R and Microsoft Excel
First Responder Information

Respondents
- Mostly EMS/Fire
- Urban settings
- Full-Time
- Experience
  - Mean: 16.3 years
  - Median: 15 years
  - Range: 0.05 to 56 years
EVER had skin or respiratory contact with or been exposed to opioids?

- Responders reporting skin or respiratory contact with opioids:
  - Yes: 97
  - No: 1,346
  - Didn’t Answer: 194

First Responders Reporting Exposure to Opioids (n = 1,443)
<table>
<thead>
<tr>
<th>Type of Drugs Exposed</th>
<th>Fire n = 34</th>
<th>Law Enforcement n = 20</th>
<th>EMS n = 41</th>
<th>Rescue n = 2</th>
<th>Total n = 97</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heroin</td>
<td>14 (41%)</td>
<td>18 (90%)</td>
<td>25 (61%)</td>
<td>0 (0%)</td>
<td>57 (59%)</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>13 (38%)</td>
<td>4 (20%)</td>
<td>23 (56%)</td>
<td>0 (0%)</td>
<td>40 (41%)</td>
</tr>
<tr>
<td>Prescription Opioids</td>
<td>4 (12%)</td>
<td>2 (10%)</td>
<td>5 (12%)</td>
<td>2 (100%)</td>
<td>13 (13%)</td>
</tr>
<tr>
<td>Prescription Medications</td>
<td>0 (0%)</td>
<td>1 (5%)</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>Methamphetamine</td>
<td>2 (6%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>Cocaine</td>
<td>1 (3%)</td>
<td>0 (0%)</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>Other</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>5 (15%)</td>
<td>0 (0%)</td>
<td>3 (7%)</td>
<td>0 (0%)</td>
<td>8 (8%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health Effects</th>
<th>Fire n = 34</th>
<th>Law Enforcement n = 20</th>
<th>EMS n = 41</th>
<th>Rescue n = 2</th>
<th>Total n = 97</th>
<th>Chi-squared p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>30 (88%)</td>
<td>17 (85%)</td>
<td>39 (95%)</td>
<td>2 (100%)</td>
<td>88 (91%)</td>
<td>0.4978</td>
</tr>
<tr>
<td>Yes</td>
<td>2 (6%)</td>
<td>3 (15%)</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>6 (6%)</td>
<td></td>
</tr>
<tr>
<td>No Response</td>
<td>2 (6%)</td>
<td>0 (0%)</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>3 (3%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medical Treatment</th>
<th>Fire n = 34</th>
<th>Law Enforcement n = 20</th>
<th>EMS n = 41</th>
<th>Rescue n = 2</th>
<th>Total n = 97</th>
<th>Chi-squared p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>30 (88%)</td>
<td>17 (85%)</td>
<td>39 (95%)</td>
<td>2 (100%)</td>
<td>88 (91%)</td>
<td>0.6440</td>
</tr>
<tr>
<td>Yes</td>
<td>2 (6%)</td>
<td>3 (15%)</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>6 (6%)</td>
<td></td>
</tr>
<tr>
<td>No Response</td>
<td>2 (6%)</td>
<td>0 (0%)</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>3 (3%)</td>
<td></td>
</tr>
</tbody>
</table>
**Most common routes of exposure (n = 97):**
- Dermal: 75 (77%)
- Respiratory: 36 (37%)

<table>
<thead>
<tr>
<th>Route of Exposure</th>
<th>Fire n = 34</th>
<th>Law Enforcement n = 20</th>
<th>EMS n = 41</th>
<th>Rescue n = 2</th>
<th>Total n = 97</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naloxone/Narcan administration</td>
<td>1 (3%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Intubation</td>
<td>1 (3%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Transport to emergency dept.</td>
<td>2 (6%)</td>
<td>1 (5%)</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>4 (4%)</td>
</tr>
<tr>
<td>Decontamination protocol</td>
<td>1 (3%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>No medical response required</td>
<td>0 (0%)</td>
<td>2 (10%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>2 (2%)</td>
</tr>
</tbody>
</table>
How concerned are you about developing health effects from exposure to opioids through your work as a first responder?

Most respondents expressed concern regarding developing health effects from opioid exposure

- Law enforcement appears to be the most concerned.
  - 95% reported being “very mildly concerned” to “very concerned.”
Opioid Exposure Prevention

**Employer/Agency Provided PPE (n = 1,391)**

- **Rescue**
  - Don't Know (n = 62)
  - No (n = 101)
  - Yes (n = 1,228)
  - Proportion: 6% 5% 89%

- **Law Enforcement**
  - Don't Know (n = 62)
  - No (n = 101)
  - Yes (n = 1,228)
  - Proportion: 1% 16% 83%

- **Fire**
  - Don't Know (n = 62)
  - No (n = 101)
  - Yes (n = 1,228)
  - Proportion: 3% 5% 92%

- **EMS**
  - Don't Know (n = 62)
  - No (n = 101)
  - Yes (n = 1,228)
  - Proportion: 6% 8% 86%

**Employer/Agency Provided PPE Training (n = 1,392)**

- **Rescue**
  - Don't Know (n = 140)
  - No (n = 286)
  - Yes (n = 966)
  - Proportion: 16% 12% 72%

- **Law Enforcement**
  - Don't Know (n = 140)
  - No (n = 286)
  - Yes (n = 966)
  - Proportion: 5% 21% 74%

- **Fire**
  - Don't Know (n = 140)
  - No (n = 286)
  - Yes (n = 966)
  - Proportion: 7% 18% 75%

- **EMS**
  - Don't Know (n = 140)
  - No (n = 286)
  - Yes (n = 966)
  - Proportion: 13% 24% 63%
Opioid Exposure Prevention Training.

Most respondents reported having annual training after being hired (48%)

However, ~34% reported no requirements or don’t know of any.

<table>
<thead>
<tr>
<th>Required Opioid Prevention Training</th>
<th>Fire</th>
<th>Law Enforcement</th>
<th>EMS</th>
<th>Rescue</th>
<th>Total</th>
<th>Chi-Squared p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once at hire only</td>
<td>11 (2%)</td>
<td>10 (5%)</td>
<td>25 (3%)</td>
<td>3 (3%)</td>
<td>49 (3%)</td>
<td></td>
</tr>
<tr>
<td>Once at hire and then annually</td>
<td>200 (35%)</td>
<td>31 (17%)</td>
<td>202 (26%)</td>
<td>27 (28%)</td>
<td>460 (28%)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Once at hire, then as required by a physician (based on medical necessity)</td>
<td>17 (3%)</td>
<td>2 (1%)</td>
<td>34 (4%)</td>
<td>3 (3%)</td>
<td>56 (3%)</td>
<td></td>
</tr>
<tr>
<td>No requirements</td>
<td>84 (15%)</td>
<td>35 (19%)</td>
<td>79 (10%)</td>
<td>12 (12%)</td>
<td>210 (13%)</td>
<td></td>
</tr>
<tr>
<td>Other Schedule</td>
<td>19 (3%)</td>
<td>16 (9%)</td>
<td>26 (3%)</td>
<td>5 (5%)</td>
<td>66 (4%)</td>
<td></td>
</tr>
<tr>
<td>Don’t Know</td>
<td>49 (9%)</td>
<td>16 (9%)</td>
<td>48 (6%)</td>
<td>10 (10%)</td>
<td>123 (8%)</td>
<td></td>
</tr>
<tr>
<td>No Response</td>
<td>196 (34%)</td>
<td>73 (40%)</td>
<td>366 (47%)</td>
<td>38 (39%)</td>
<td>673 (41%)</td>
<td></td>
</tr>
</tbody>
</table>
PPE Use for Opioid Exposure Prevention

Respirator Use (n = 1,193)
- Rescue: 18%
- Law Enforcement: 40%
- Fire: 43%
- EMS: 98%

Glove Use (n = 1,329)
- Rescue
- Law Enforcement
- Fire
- EMS

Protective Clothing Use (n = 1,217)
- Rescue
- Law Enforcement
- Fire
- EMS

Safety Glasses/Goggles Use (n = 1,236)
- Rescue
- Law Enforcement
- Fire
- EMS
First Responder Respiratory Protection

What is the minimum level of respiratory protection required to be used when opioid exposure is suspected?

<table>
<thead>
<tr>
<th>Minimum Respiratory Protection Used</th>
<th>Fire</th>
<th>Law Enforcement</th>
<th>EMS</th>
<th>Rescue</th>
<th>Total</th>
<th>Chi-Squared p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>295 (51%)</td>
<td>81 (44%)</td>
<td>344 (44%)</td>
<td>35 (36%)</td>
<td>755 (46%)</td>
<td>0.0397</td>
</tr>
<tr>
<td>Surgical mask</td>
<td>48 (8%)</td>
<td>18 (10%)</td>
<td>88 (11%)</td>
<td>15 (15%)</td>
<td>169 (10%)</td>
<td></td>
</tr>
<tr>
<td>N95 filtering face piece</td>
<td>85 (15%)</td>
<td>20 (11%)</td>
<td>88 (11%)</td>
<td>10 (10%)</td>
<td>203 (12%)</td>
<td></td>
</tr>
<tr>
<td>Elastomeric half-face N95</td>
<td>4 (1%)</td>
<td>1 (1%)</td>
<td>7 (1%)</td>
<td>2 (2%)</td>
<td>14 (1%)</td>
<td></td>
</tr>
<tr>
<td>PAPR</td>
<td>1 (0%)</td>
<td>1 (1%)</td>
<td>1 (0%)</td>
<td>0 (0%)</td>
<td>3 (0%)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>5 (1%)</td>
<td>1 (1%)</td>
<td>2 (0%)</td>
<td>0 (0%)</td>
<td>8 (0%)</td>
<td></td>
</tr>
<tr>
<td>Don't Know</td>
<td>49 (9%)</td>
<td>23 (13%)</td>
<td>87 (11%)</td>
<td>15 (15%)</td>
<td>174 (11%)</td>
<td></td>
</tr>
<tr>
<td>No Response</td>
<td>89 (15%)</td>
<td>38 (21%)</td>
<td>163 (21%)</td>
<td>21 (21%)</td>
<td>311 (19%)</td>
<td></td>
</tr>
</tbody>
</table>
Knowledge and Use of Protective Measures

Knowledge of guidelines outlined by NIOSH/CDC appears to be lacking among all first responders.
Conclusions

• Reported opioid exposure among first responders in Virginia appear to be low.
  • 7% reported having an exposure.
  • Mostly dermal exposures
  • Available PPE and training
  • Glove use adherence

• First responders are concerned about occupational exposures to opioids and its related health effects.
  • Area for improved public health communication
    • NIOSH/CDC recommendations
    • Exposure risk
    • PPE Training effectiveness
Acknowledgements

• Central Appalachian Regional Education and Research Center
  • a CDC/NIOSH-funded training program led by the University of Kentucky and Eastern Kentucky University
References:

• Virginia Departments of Forensic Science and Criminal Justice Services (2017). Drug Cases Submitted to the Virginia Department of Forensic Science Calendar Year 2016.


