

# Accidental or Undetermined Opioid-Involved Drug Overdose Deaths in Rhode Island and Usual Occupation – Higher Rates Observed in Natural Resources, Construction, and Maintenance Occupations

RACHEL SCAGOS, MPH; LEANNE LASHER, MPH; SAMARA VINER-BROWN, MS

The drug overdose epidemic has had an increasing impact for more than a decade in the United States.<sup>1</sup> According to the Centers for Disease Control and Prevention (CDC), Rhode Island (RI) had the 10th highest rate of drug overdose deaths in the country in 2017.<sup>2</sup> It remains a complex issue in the state despite a 6.5% decrease from 2016 to 2018.

To help combat the epidemic, the Rhode Island Department of Health (RIDOH) utilizes a robust fatal overdose surveillance system to identify, track, and respond to changes. Rhode Island’s State Unintentional Drug Overdose Reporting System (SUDORS) is a CDC-funded database that contains information abstracted from multiple data sources, including medical examiner records, death certificates, and law enforcement records, and aims to increase the comprehensiveness of reporting fatal opioid-involved overdoses. SUDORS includes detailed information on demographics, toxicology results, circumstances surrounding the death, and other risk factors that may be associated with a fatal overdose.<sup>3</sup> SUDORS can enhance our understanding of the populations most affected by fatal opioid-involved overdoses and the risk factors associated with a fatal overdose.

Occupation is one characteristic that may improve our understanding of the epidemic. In 2018, Massachusetts analyzed occupation among fatal overdose victims utilizing vital records data and found a higher rate of fatal opioid overdose among specific occupations, particularly among those working in construction.<sup>4</sup> Using 2007–2016 data from the National Occupational Mortality System (NOMS), the CDC conducted an analysis of occupational patterns in opioid-involved overdose deaths and found that construction occupations had the highest proportional mortality ratios (PMRs).<sup>5</sup> Rhode Island analyzed SUDORS data to understand if trends were similar in Rhode Island, to understand differences in fatal overdose risk across occupation groups, and further inform prevention efforts.

## METHODS

Opioid-involved unintentional (aka Accidental) or undetermined overdose deaths (herein referred to as overdose deaths) occurring in Rhode Island between July 2016 and June 2018 were identified using SUDORS. Occupation was identified using the ‘usual occupation’ variable, abstracted based on corresponding information on death certificates. Usual occupation refers to the type of work a person usually does to earn a living, and does not necessarily indicate occupation

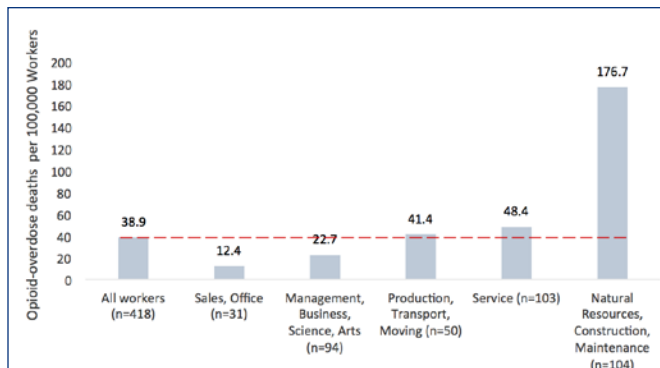
at time of death. Occupation was coded into standard occupation categories (SOCs) according to the Standard Occupational Classification System,<sup>6</sup> followed by manual review.

The data were used to describe rates of overdose death by SOC. Information on the average number of workers in each SOC in Rhode Island was obtained from the American Community Survey, 2017.<sup>7</sup> Of the 569 victims, 418 had occupations that could be coded into a SOC. Of the 151 victims whose occupation could not be categorized within the SOCs, 48 were categorized as ‘Not Seeking Paid Work’, 45 were disabled, 39 were unspecified/unknown, and 19 were unemployed. The Not Seeking Paid Work category included 20 students and 28 listed as ‘homemaker’, ‘caretaker’, or similar. Rates of opioid-involved overdose death were calculated for the SOCs. To further describe factors associated with higher risk occupations, the characteristics of the victims in the SOC with the highest rate of opioid-involved overdose death were compared with victims whose occupation was within one of the other SOCs using chi-squared tests. Fisher’s exact tests were performed for comparisons involving small cell counts (<5). Analyses were performed using SAS 9.4.

## FINDINGS

From July 2016 to June 2018, there were 569 opioid-involved overdose deaths in Rhode Island. A quarter (140/569) of all victims’ occupation was within the Natural Resources,

**Figure 1.** Rate of Opioid-Involved Accidental or Undetermined Drug Overdose Death in Rhode Island by Standard Occupation Category



Source: SUDORS, RIDOH. Updated as of March 2019. Population denominator from the ACS 2017.

Notes: Rates for 151 victims with occupations outside of the Standard Occupation Categories could not be calculated.

Construction, and Maintenance (NRCM) category, which includes occupations such as carpenter, construction worker, laborer, fisherman, mechanic, and others. Of these 140 victims, 104 had an occupation specifically within construction and extraction. Thus, one in five (of all 569) victims had an occupation specifically in construction and extraction. The second largest SOC was Service (18%; n=103), followed by Management, Business, Science, and Arts (17%; n=94), Production, Transport, and Material Moving (9%; n=50), Not Seeking Paid Work (8%; n=48), Disabled (8%, n=45), Unspecified/NA (7%, n=39), Sales and Office (6%, n=31), and Unemployed (3%, n=19).

Rates were calculated for the 418 victims whose occupation could be categorized into an SOC (Figure 1). Among these victims, the rate of opioid-involved drug overdose death was 38.9 per 100,000 workers. The rate differed by SOC, and victims in NRCM occupations had the highest rate of opioid-involved overdose death at 176.7 per 100,000 workers.

We compared the distribution of select characteristics among victims in NRCM occupations to victims in other occupations. In comparison to victims in other occupations, victims in NRCM occupations were more likely to be male (99% compared to 68%) and had a larger representation of Hispanics (17% compared to 9%). Although the drug type contributing to cause of death (COD) did not differ significantly between the two groups, victims in NRCM occupations were more likely to have had alcohol contribute to COD (32% compared to 23%) and less likely to have antidepressant(s) contribute to COD (6% compared to 15%) than compared to victims in other occupations. Victims in NRCM occupations were also less likely to have a known mental health problem (35% compared to 49%), and less likely to have a mental health diagnosis of anxiety (16% compared to 26%), depression (19% compared to 31%), or diagnoses of both anxiety and depression (6% compared to 15%) than compared to victims in other occupations. They were also less likely to have both a known mental health problem and known substance abuse problem (29% compared to 40%) than compared to victims in other occupations. (Table 1.)

**Table 1.** Characteristics of Accidental or Undetermined Opioid-Involved Drug Overdose Victims: Natural Resources, Construction, and Maintenance Occupations Versus Other Standard Occupation Categories

	Other Standard Occupation Categories (SOCs)	Natural Resources, Construction, and Maintenance
	n (%)	n (%)
Total	278 (67%)	140 (33%)
<b>Sex*</b>		
Female	88 (32%)	<5
Male	190 (68%)	139 (99%)
<b>Age Category</b>		
34 years or younger	99 (36%)	44 (31%)
35-54 years	133 (48%)	71 (51%)
55 and older	46 (17%)	25 (18%)
<b>Education Level</b>		
Less than 12th grade	67 (24%)	43 (31%)
High School/GED	120 (43%)	68 (49%)
Some College	41 (15%)	17 (12%)
Associates Degree or Higher	41 (15%)	10 (7%)
Unknown	9 (3%)	<5
<b>Race ethnicity*</b>		
White, non-Hispanic	225 (82%)	110 (80%)
Black, non-Hispanic	20 (7%)	5 (4%)
Other, non-Hispanic	<5	0 (0%)
Hispanic	25 (9%)	23 (17%)
<b>Treated for Pain at Time of Fatal Overdose</b>		
Yes	63 (23%)	24 (17%)
No	215 (77%)	116 (83%)
<b>Drug Type Contributing to Cause of Death</b>		
Prescription Only	55 (20%)	20 (14%)
Illicit Only	140 (50%)	83 (59%)
Prescription and Illicit	346 (17%)	22 (16%)
Unknown or Missing	37 (13%)	15 (11%)
<b>Substances Contributing to Cause of Death<sup>^</sup></b>		
Alcohol*	63 (23%)	45 (32%)
Antidepressants*	42 (15%)	8 (6%)
Benzodiazepines	60 (22%)	22 (16%)
Cocaine	98 (35%)	57 (41%)
Fentanyl	212 (76%)	112 (80%)
Heroin	16 (6%)	8 (6%)
<b>Mental Health and Substance Abuse Circumstances<sup>^^</sup></b>		
Known mental health problem*	135 (49%)	49 (35%)
Known substance abuse problem <sup>^^^</sup>	222 (80%)	118 (84%)
Known mental health and substance abuse problem*	111 (40%)	41 (29%)
<b>Mental Health Diagnoses<sup>^^^</sup></b>		
Anxiety*	72 (26%)	22 (16%)
Depression*	85 (31%)	26 (19%)
Anxiety and Depression*	43 (15%)	8 (6%)

Source: SUDORS, RIDOH.

\* Indicates statistical significance at p<.05

<sup>^</sup> Substance categories are not mutually exclusive or exhaustive.

<sup>^^</sup> Mental Health Problem and Substance Abuse Problem may be coded based on information in either the medical record or obtained during the investigation.

<sup>^^^</sup> Excludes alcohol

<sup>^^^</sup> Mental health diagnoses are not mutually exclusive or exhaustive.

## DISCUSSION

SUDORS provides a rich amount of information about the characteristics associated with fatal overdoses in Rhode Island that can support prevention efforts. This analysis showed a significant difference in rates of opioid-involved overdose death by occupation category. Victims in NRCM occupations had the highest rate of opioid-involved overdose death and accounted for approximately 25% of all overdose victims in the time period. Approximately 20% of all victims were specifically in construction and extraction occupations.

These findings are consistent with previous studies examining opioid-involved overdose death across occupation categories. Studies have also shown that construction occupations have high rates of work-related injuries and illness, and lower availability of paid sick leave and job security.<sup>4</sup> Workers compensation data has indicated high proportions of injured workers receive pain medications as well.<sup>5</sup> These data could not determine if victims in NRCM occupations had a previous work-related injury. This study also did not find a significant difference in drug type contributing to cause of death, and the majority of victims in NRCM occupations died of illicit substances and not prescription medications. Among victims in NRCM occupations, 80% had fentanyl contribute to cause of death compared to 75% among all victims in the time period. More research is needed to understand opioid use or initiation and the work environment.

This analysis also showed significant differences related to mental health between victims in NRCM occupations and victims in other occupations. Victims in NRCM occupations were significantly less likely to have a known mental health problem and less likely to have a dual known mental health problem and known substance abuse problem (excluding alcohol). Additionally, this study highlighted the high proportion of victims who had a known substance abuse problem (excluding alcohol); 80% of non-NRCM occupations and 84% of NRCM occupations. These findings suggest the need for enhanced coordination between substance use and mental health professionals, the importance of occupation history during patient evaluation, and for increased mental health screening.

These findings are subject to some limitations. First, circumstance information in SUDORS is based on information found in the medical record or witness report obtained during the investigation. Therefore, misclassification leading to an underestimate in circumstance information is possible. Second, usual occupation does not necessarily indicate current occupation and it is possible that some victims in the study were misclassified. However, studies have shown high consistency between current and usual occupation, including those based on data found on the death certificate.<sup>8,9</sup>

This study identified rates of opioid-involved overdose deaths by occupation category and provided added information on the characteristics associated with the highest risk occupation group, but further studies are needed to identify work-related factors along the causal pathway from drug

use/initiation to overdose death. To support safe opioid prescribing, Rhode Island's updated regulations require prescribers to have a conversation that includes discussion of alternative treatments with patients/guardians about the risks of opioid medications *before* prescribing an opioid. Considering the high proportions of deaths that involve illicit drugs, patient education including information on the utility and availability of naloxone are encouraged as well. Rhode Island's Governor's Task Force on Opioid Overdose and Intervention is developing guidelines for Recovery Friendly Workplaces and has targeted prevention education and training to high-risk populations including members of the construction industry. Other efforts include academic detailing to providers on medication assisted treatment (MAT), and cross-sector partnerships with trades seen as 'trusted sources', such as barbers/hairstylists. For more information and resources on Rhode Island's response to the opioid epidemic see PreventOverdoseRI.org.

## References

1. <https://www.cdc.gov/drugoverdose/epidemic/index.html> Accessed August 19 2019
2. [https://www.cdc.gov/nchs/pressroom/sosmap/drug\\_poisoning\\_mortality/drug\\_poisoning.htm](https://www.cdc.gov/nchs/pressroom/sosmap/drug_poisoning_mortality/drug_poisoning.htm) Accessed 9/5/2019
3. <https://www.cdc.gov/drugoverdose/foa/state-opioid-mm.html> Accessed August 19 2019
4. Massachusetts Department of Public Health, Occupational Health Surveillance Program (2018); Opioid-related Overdose Deaths in Massachusetts by Industry and Occupation, 2011-2015.
5. Harduar Morano, Laurel et al. "Occupational Patterns in Unintentional and Undetermined Drug-Involved and Opioid-Involved Overdose Deaths - United States, 2007-2012." *MMWR. Morbidity and mortality weekly report* vol. 67,33 925-930. 24 Aug. 2018, doi:10.15585/mmwr.mm6733a3
6. US Department of Labor, Bureau of Labor Statistics. Standard Occupational Classification System. <https://www.bls.gov/soc/2018/home.htm> Accessed 9/5/2019.
7. U.S. Census Bureau, American Fact Finder, American Community Survey, 2017.
8. Luckhaupt, S. E., Cohen, M. A., & Calvert, G. M. (2013). Concordance between current job and usual job in occupational and industry groupings: assessment of the 2010 national health interview survey. *Journal of Occupational and Environmental Medicine/American College of Occupational and Environmental Medicine*, 55(9), 1074-1090.
9. Schade, W. J., & Swanson, G. M. (1988). Comparison of death certificate industry and occupation data with lifetime occupational histories obtained by interview: variations in the accuracy of death certificate entries. *American Journal of Industrial Medicine*, 14(2), 121-136.

## Acknowledgments

The authors thank the following RIDOH staff: Laura Chambers, PhD, Risk and Protective Factor Epidemiologist; Jennifer Koziol, MPH, Drug Overdose Prevention Program Manager; Annemarie Beardsworth, CCPH, Communications; James Rajotte, MS, Chief Center for Health Promotion; James McDonald, MD, MPH, Medical Director, for their contributions to this report.

## Authors

Rachel P. Scagos, MPH, Fatal Overdose Epidemiologist, Center for Health Data and Analysis (CHDA) at RIDOH.

Leanne Lasher, MPH, Drug Overdose Surveillance Program Manager, CHDA, RIDOH.

Samara Viner-Brown, MS, Chief, CHDA, RIDOH.