Circumstances contributing to Installation, Maintenance, and Repair Worker Death by Suicide

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Abstract

Objective: To examine risk factors related to death by suicide among Installation, Maintenance, and Repair (IMR) workers compared to workers in other occupational groups.

Methods: National Violent Death Reporting System (NVDRS) data for the years 2013 to 2018 was used to identify suicide deaths. Circumstance variables were used to examine differences between IMR workers and other workers.

Results: Having a physical health problem (1.13, 95% CI: 1.03–1.23) or diagnosis of post-traumatic stress disorder (1.24, 95% CI: 1.03–1.50) were more likely to contribute to IMR worker suicide compared to other occupations. IMR workers were less likely to receive treatment for a mental health diagnosis or substance use disorder (0.88, 95% CI: 0.81–0.94).

Conclusions: Additional support for physical health problems, PTSD diagnoses, and mental health care access among IMR workers may reduce suicide deaths.

Keywords

Suicide; Occupational Health; Firearms; Physical Health; Mental Health

Introduction

Installation, Maintenance, and Repair (IMR) is a Bureau of Labor Statistics' Standard Occupational Classification group that includes workers in occupations such as automotive repair, computer repair, and industrial installation (1, 2). IMR workers are mostly white (non-Hispanic) males with a median age of 41.8 years (3). Suicide rates among IMR workers are significantly higher compared to other occupational groups. Male IMR workers have a suicide mortality rate of 36.9 per 100,000 compared to 27.4 per 100,000 for all male

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workers in all other occupations (2). Previous studies have examined death by suicide among automotive repair workers – a subgroup in the IMR group - and found that exposure to solvents may lead to increased risk (4, 5). Chronic exposure to solvents may lead to mental health issues such as depressive symptoms and emotional stability which are associated with greater risk of suicide (4, 5). However, risk factors for suicide have not been examined in IMR workers as a whole, including well-established risk factors for suicide in the general population such as physical health problems, injuries at work, receiving treatment for a mental health or substance use problem, or a mental health diagnosis (6–16).

In addition to having a higher overall suicide rate, IMR workers have a higher proportion of suicides related to firearms (56.5%) relative to the general population (51.2%) (17). Little is known about firearm-related suicides in the IMR occupational group, but previous studies examining firearm-related suicides in the US population have indicated that firearm ownership, storage, and type of firearm are risk factors for suicide (18–21). A potential explanation for the higher rate of suicide observed for IMR workers may be differences in firearm ownership and storage.

IMR occupations are also physically challenging. These positions can require standing for long periods of time, lifting heavy objects, working in extreme hot or cold work environments, and working in cramped positions, all of which increase the risk for occupational injuries and chronic pain (1, 22, 23). Chronic pain has been associated with a higher rate of suicide (22, 23). According to the Bureau of Labor Statistics (BLS), IMR occupations have the fourth highest injury rate among all occupational groups (10), with common types of injuries including sprains and strains, and complaints of general soreness and pain (24).

The primary purpose of this study is to examine demographic, psychosocial and firearm-specific circumstances related to death by suicide among IMR workers in the U.S., compared to workers from all other occupations.

Methods

Data Source and Study Sample

The National Violent Death Reporting System (NVDRS) is a case-only national database which tracks violence-related mortality (e.g., suicide, homicide). Data for NVDRS comes from police reports, death certificates, medical examiner reports, and toxicology reports (25). Data abstracted from these sources include demographics, mental health conditions and treatment, physical conditions, toxicology results, life stressors, and event-specific characteristics including weapons used. Additionally, NVDRS data provides detailed information about work-related injuries, and weapons used in the violent death including firearm storage behaviors and firearm ownership.

All suicide deaths in the NVDRS were requested for the years 2013 to 2018 (Figure 1). Decedents of all other occupational groups were included in this study as a comparison (n=88815, 72.7%) to IMR workers (n=6469, 5.3%) except those who were classified as "Not in workforce," "military," or "missing, unknown, inadequate response to code"

(n=26908, 22%). As suggested by the NVDRS guidelines, only individuals with at least one known circumstance related to suicides were included in this study (i.e., any information is available in the coroner/medical examiner report or law enforcement report about the circumstances related to the suicide death), as cases with no circumstance may reflect missing information or low quality information (26). Finally, individuals were only included if they were between the ages of 16 and 64, which is considered "working age" in occupational research (Figure 1) (2).

Study Design and Measures

We used a cross-sectional study design to examine risk factors for suicide and firearm-related suicides, comparing IMR workers and all other occupational groups. IMR occupations were identified using the two-digit Standard Occupational Classification (SOC) System code 49–0000 (27). SOC codes are provided with each data release of NVDRS and are coded based on a descendant's usual occupation recorded on the death certificate. Usual occupation is the longest held occupation and does not necessarily indicate that the suicide decedent had the occupation or was currently employed at the time of their death. Demographic variables included age, biological sex, race/ethnicity, educational level, marital status, and veteran status. Age was categorized as 16–24 years, 25–34 years, 35–44 years, 45–54 years, and 55–64 years. Several psychosocial variables are available in the NVDRS data, including mental health or substance abuse treatment or conditions and physical health problems (i.e., chronic pain, cancer) that were observed prior to the suicide. The presence of these circumstances is identified by trained abstractors who review medical examiner reports, law enforcement reports, and other data sources related to the death. Rules for recording the presence of these circumstances are described in the NVDRS coding manual (28). Briefly, treatment related to mental health or substance abuse include having a prescription for a psychiatric medication at the time of death, seeing a mental health professional in the prior two months, or receiving outpatient treatment or attending alcohol anonymous at the time of death. Mental health diagnoses (i.e., depression, bipolar disorder, anxiety, post-traumatic stress disorder [PTSD], schizophrenia, other) were identified as present or not present based on reports from law enforcement or the medical examiner and recorded by NVDRS abstractors. Decedents with mental health diagnoses were combined into the "other" category (e.g., attention deficit/hyperactivity disorder, eating disorders) for mental health diagnoses where twenty or fewer IMR workers were identified. If no diagnosis was identified, a decedent was categorized as "no, not available, or unknown" because the absence of each diagnosis is not specifically recorded. Additionally, ever having a mental health diagnosis was examined for IMR workers and compared to workers in other occupations.

Physical health problems that appear to have contributed to suicides are recorded in the NVDRS record when a terminal or debilitating disease was present at the time of death or there is evidence of chronic pain for the decedent. If a physical health problem was not indicated in the data sources, suicide decedents were recorded in NVDRS as "no, not available, or unknown." Firearm-related variables including the type of firearm used in the suicide, whether the firearm used was known to be locked in storage, whether the firearm used was always stored loaded, and the owner of the firearm used were examined to

compare firearm-related suicides among IMR workers to firearm-related suicides among all other workers. Type of firearm used was divided into three categories (handgun, long gun, unknown), and firearm ownership was grouped to compare whether the suicide decedent owned the firearm or not (i.e., shooter, any other owner). Unknown data from all firearm variables were included as a descriptive category given the volume of missing or unknown data in NVDRS.

Statistical Analysis

All demographic, psychosocial and firearm-related variables were compared across occupation designation using Chi-square tests. Multivariable logistic regression was used to examine risk factors for suicide among IMR workers, compared to all other occupational groups. Male and female decedents were separated into two distinct models given the proportional difference between the two groups (male: 98.3%; female: 1.7%). Because of the small sample size among female decedents (n=77), the primary analysis included males only. Models for female IMR decedents are reported in the supplemental materials (Appendix A, Appendix B). Age, race/ethnicity, educational level, and marital status were controlled for in each model. Models were built examining the likelihood of psychosocial variables contributing to suicide among IMR occupations relative to other occupations. The model for firearm-related suicides examined type of firearm used in the suicide, whether the firearm used was typically locked in storage, whether the firearm used was always stored loaded, and the owner of the firearm used. Odds ratios with 95% confidence intervals were reported for each variable. The data analysis was conducted using SAS (copyright © 2016 SAS Institute Inc).

Results

Among IMR workers, 4629 (71.6%) met inclusion criteria, while among all other occupations, 64921 (73.1%) met inclusion criteria (Figure 1). Comparisons of demographic variables (i.e., age, race/ethnicity, biological sex, educational level, marital status) between included and excluded suicide deaths did not differ by more than 5%. IMR workers represented 6.0% of the total workers used in this analysis. More than one-third of the IMR suicides occurred among automotive technicians and repairers (n=1784, 34.6%), followed by general maintenance and repair workers (n=502, 9.7%) and industrial machinery installation, repair, and maintenance workers (n=466, 9.0%) (Appendix C).

Most IMR suicide decedents among all suicides were white (non-Hispanic) males (Table 1). More than one-quarter of deaths were between 46 and 55 years of age. A higher percentage of IMR suicide decedents had their high school diplomas or some college credits compared to all other occupations and were more likely to be married, divorced, or separated compared to all other occupations. A higher percentage of IMR workers had a physical health problem that likely contributed to suicides compared to workers from all other occupations. A smaller percentage of IMR workers were not being treated for a mental health or substance abuse problem compared to all other workers. A smaller percentage of IMR workers also had a mental health diagnosis except for post-traumatic stress disorder (PTSD). Among

suicide decedents, a larger percentage of IMR workers were veterans (16.2%) than all other occupations (10.2%) (Table 1).

Among firearm-related suicides for IMR decedents and all other occupational groups, circumstances were known for 2,677 (89.8%) and 30,755 (90.9%) workers, respectively. IMR workers represented 8% of the total workers used in this analysis. Firearm-related suicides among IMR workers accounted for 55.4% of all suicides compared to 45.5% of the suicides in all other occupational groups. Firearm-related suicides among IMR workers most frequently occurred among those who were white (non-Hispanic) males, between 46–55 years old, had a high school diploma or college credits, and were married or in a domestic partnership (Table 2). The prevalence of firearm type, storage, and ownership were similar between IMR and all other worker groups. Handguns were used in most firearm-related suicides for both worker groups. How the firearms were usually stored and who owned them was unknown in the majority of records for both IMR and other occupation workers (Table 2).

After adjusting for age, race/ethnicity, educational level, and marital status, male IMR decedents were more likely (1.12, 95% CI: 1.03–1.23) to have a physical health problem that contributed to the suicide compared to other occupations (Table 3). IMR worker decedents were less likely to have been treated for a mental health or substance abuse problem (0.88, 95% CI: 0.82–0.95). IMR workers were also less likely to be diagnosed with depression (0.91 95% CI: 0.85–0.97) but were 24% more likely to have been diagnosed with post-traumatic stress disorder (PTSD) (1.24, 95% CI: 1.03–1.50), compared to all other occupations (Table 3). When the model is adjusted for veteran status, PTSD diagnosis is no longer significant (Adjusted OR: 1.06, 95% CI: 0.87–1.28). There were no significant associations between any of the firearm related variables and death by suicide among IMR decedents compared to other occupations for males (Table 4) or females (Appendix B).

Discussion

In this study, we hypothesized that physical health problems appearing to contribute to suicides would disproportionately be higher among IMR workers compared to workers in other occupations. Consistent with this hypothesis, we found a higher proportion of male IMR suicide decedents to have physical health problems appearing to contribute to suicides compared to male suicide decedents in all other occupational groups. We also found that IMR workers were less likely have been treated for a mental health or substance abuse problem around the time of suicide death but more likely to have been diagnosed with post-traumatic stress disorder (PTSD), compared to workers from all other occupations.

Physical health problems have been found to be associated with death by suicide in previous studies among populations with chronic health complications (6–9). In these studies, physical health problems included cancer, chronic pain, dementia, chronic obstructive pulmonary disorder (COPD) and many others (26). Automotive technicians and repairers, which represent 34.6% of the IMR occupational group (Appendix C), are at higher risk of injury compared to others outside of the IMR occupations with overexertion being the second most common type of injury (29, 30). Overexertion injuries are associated

with chronic pain, which could partially explain the higher proportion of physical health problems observed for IMR workers (31). Previous studies have observed an increase in the rate of suicide for people with chronic pain (22, 23). Therefore, developing injury prevention strategies that prevent injury or relieve chronic pain in IMR workers could reduce suicide rates for this occupational group.

Additionally, IMR workers were less likely to receive treatment for a mental health or substance abuse problem compared to other occupations. This finding may suggest that IMR workers have less access to this type of treatment or less frequently choose to seek treatment for mental health or substance use related diseases compared to workers in other occupations. IMR workers have similar but slightly higher healthcare access compared to workers in other occupations (32). Despite the comparable level of access, we observed less frequent use of mental health or substance use treatment compared to workers in other occupations. Lower utilization of insurance benefits by IMR workers is a potential explanation for the less frequent treatment observed relative to other workers. Mental health treatments – pharmacologic and non-pharmacologic – have been suggested to decrease the risk of suicide and suicidal ideation among at-risk adults (14, 15). Improving utilization of mental health treatment by IMR workers may be another mechanism to reduce the suicide rate for these workers.

The odds of having a mental health diagnosis of Post-Traumatic Stress Disorder (PSTD) were 24% higher among IMR workers compared to all other occupations. This effect was partially due to the higher proportion of veterans in the IMR occupation. PTSD is one of the most frequently diagnosed disorders among veterans (33, 34). Previous studies have suggested that individuals who are diagnosed with PTSD are at higher risk for suicidal ideation and dying by suicide (35, 36). Suicide prevention programs that support veterans should consider the occupation specific stressors that may further contribute to suicide risk and seek out occupations with a higher proportion of veterans like the IMR occupation.

There was no difference between firearm type, storage, and ownership and suicides, comparing IMR workers with workers from other occupations. While we did not find an occupational specific difference in firearm storage or ownership, this finding does not dispute the importance of safely storing firearms as a strategy to deter suicide attempts because firearms are the primary weapon used to commit a suicide among men (18–21).

This study has several strengths. First, this is one of the first studies to examine risk factors related to death by suicide among IMR workers, an occupation group at elevated risk for suicide. Moreover, this study utilized a database that includes decedents from thirty-nine states, the District of Columbia, and Puerto Rico suggesting that findings are likely generalizable to United States workers.

This study also had limitations. Among firearm-related variables, most suicide cases had missing or unknown information. The firearm storage variable alone was missing or unknown for approximately 90% of the suicide cases. While this may affect the power, there was not a meaningful difference between IMR workers and other workers regarding the proportion of response categorized as unknown, so we believe the analysis results

were not biased by the missing data. Missing responses were less prevalent for the non-firearm circumstance variables and not impacted by occupational group. Second, this study compares IMR workers to all other occupational groups represented among NVDRS suicides. Therefore, there is variation within the control group and therefore heterogeneity of suicide risk may exist. Despite the comprehensiveness and coverage of NVDRS, we were unable to report on each individual occupation within the group. Finally, there is lack of data in NVDRS that investigates occupational exposures (e.g., chemical exposure) that may contribute to IMR workers having higher suicide rates.

Conclusions

This study examines risk factors that contribute to death by suicide among IMR workers and how they may differ from other occupations. Reducing injuries and increasing mental health access may decrease the odds of suicides and should be considered when developing suicide interventions among IMR workers. Mental health services for PTSD should also be considered when developing suicide prevention strategies, especially for IMR workers who are veterans. Finally, researchers should further examine differences across specific occupations within the IMR group to identify specific worker groups who may be at higher risk. There is further need to investigate the experience of female IMR workers and how their circumstances may differ from male IMR workers as additional years of surveillance are included in the NVDRS data.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements:

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Learning Outcomes

1.   Understand the differences in demographics and health conditions of Installation, Maintenance, and Repair workers who died by suicide compared to workers in other occupations.

2.   Summarize which circumstances more frequently contribute to suicides among Installation, Maintenance, and Repair workers relative to other workers.
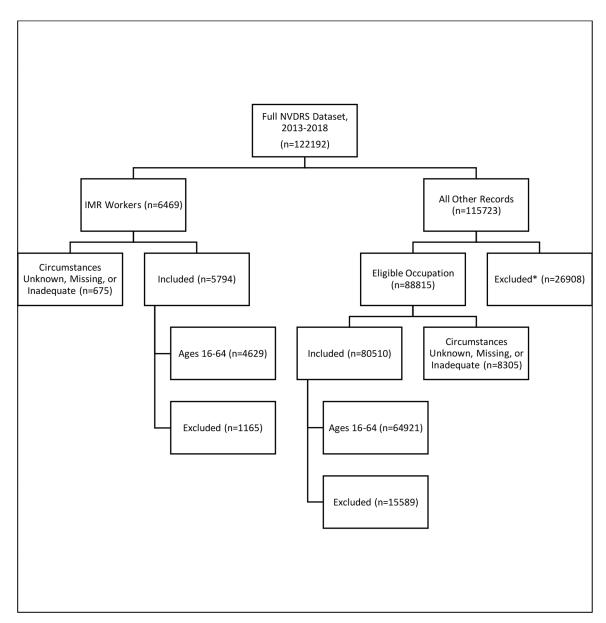
Fig. 1 |. Flow chart of study participants, NVDRS (2013–2018),
IMR workers (n=6,469) were identified based on two-digit Standard Occupational Classification (SOC) system codes. Eligible occupations among all other records include all SOC system code groups except for those who were classified as "Not in workforce," "military," or "missing, unknown, inadequate response to code" (n=88,815). Decedents were included if they had at least one known circumstance related to their death and were aged 16 to 64 years (IMR, n=4,629; all other workers, n=64,921).
*Suicide decedents who were "not in workforce," "military," or "missing, unknown, inadequate response to code"

Table 1.

Distributions and Chi-Square Tests of Demographic and Psychosocial Factors among Suicides in IMR Workers (n=4629) and all other Occupational Groups (n=64921), N=69550.

Variable	Level	IMR Workers		Workers from All Other Occupations		X²
		N	%	N	%	P-value
Age	16–24 years	394	8.5	6396	9.9	**0.005**
	25–34 years	975	21.1	13281	20.5	
	35–44 years	998	21.6	13566	20.9	
	45–54 years	1227	26.5	16392	25.2	
	55–64 years	1035	22.4	15286	23.5	
Race/Ethnicity	Black, Non-Hispanic	139	3.0	3688	5.7	**<.001**
	Hispanic	268	5.8	4303	6.6	
	Other, Non-Hispanic	141	3.0	3005	4.6	
	White, Non-Hispanic	4081	88.2	53925	83.1	
Biological Sex	Male	4552	98.3	50621	78.0	**<.001**
	Female	77	1.7	14300	22.0	
Educational level as measured by the highest degree attained or level completed	Less than high school	640	13.8	7470	11.5	**<.001**
	High school diploma/Some college credit, but no degree	2396	51.8	27374	42.2	
	College degree and above	1593	34.4	30077	46.3	
Marital Status	Married/Civil Union/ Domestic Partnership	1524	32.9	20067	30.9	**<.001**
	Never Married	1549	33.5	24214	37.3	
	Widowed	104	2.2	1432	2.2	
	Divorced	1140	24.6	15292	23.6	
	Married/Civil Union/ Domestic Partnership, but separated	218	4.7	2597	4.0	
	Single, not otherwise specified	94	2.0	1319	2.0	
Treatment for a mental health problem or substance abuse problem (Current)	Yes	1018	22.0	18137	27.9	**<.001**
	No, Not Available, Unknown	3611	78.0	46784	72.1	
Physical health problem(s) appear to have contributed to the death	Yes	761	16.4	10073	15.5	0.094
	No, Not Available, Unknown	3868	83.6	54848	84.5	
Diagnosis of depression (Ever)	Yes	1511	32.6	24867	38.3	**<.001**
	No, Not Available Unknown	3118	67.4	40054	61.7	
Diagnosis of bipolar disorder (Ever)	Yes	285	6.2	5133	7.9	**<.001**
	No, Not Available Unknown	4344	93.8	59788	92.1	
Diagnosis of anxiety (Ever)	Yes	337	7.3	6004	9.2	**<.001**
	No, Not Available Unknown	4292	92.7	58917	90.8	
Diagnosis of PTSD (Ever)	Yes	129	2.8	1460	2.2	**0.018**
	No, Not Available Unknown	4500	97.2	63461	97.8	
Diagnosis of schizophrenia (Ever)	Yes	108	2.3	1638	2.5	0.425

Variable	Level	IMR Workers		Workers from All Other Occupations		X²
		N	%	N	%	P-value
	No, Not Available Unknown	4521	97.7	63283	97.5	
Other Mental Health Diagnosis (Ever) [**]	Yes	238	5.1	3904	6.0	**0.015**
	No, Not Available Unknown	4391	94.9	61017	94.0	
Has the person ever served in the U.S. Armed Forces?	No	3800	82.1	57088	88.0	**<.001**
	Yes	749	16.2	6599	10.2	
	Missing	<5	-	84	0.1	
	Unknown	78	1.7	1150	1.8	

[**] Other Mental Health Diagnoses include ADD or hyperactivity disorder, eating disorder, obsessive-compulsive disorder, autism spectrum (includes Asperger's Syndrome), fetal alcohol syndrome, down syndrome, dementia (e.g., Alzheimer's disease, Lewy Body Dementia), personality disorders, and others not included.

Table 2.

Distributions and Chi-Square Tests of Demographic and Firearm-Related Risk Factors among Firearm-Related Suicides in IMR Workers (n=2580) and all other Occupational Groups (n=29658), N=32238.

Variable	Level	IMR Workers		All Other Occupations		X^2
		N	%	N	%	P-value
Age	16–24 years	233	9.0	3134	10.6	0.075
	25–34 years	514	19.9	5733	19.3	
	35–44 years	517	20.0	5663	19.1	
	45–54 years	657	25.5	7277	24.5	
	55–64 years	659	25.5	7851	26.5	
Race/Ethnicity	Black, Non-Hispanic	81	3.1	1774	6.0	**<.001**
	Hispanic	100	3.9	1445	4.9	
	Other, Non-Hispanic	76	2.9	1000	3.4	
	White, Non-Hispanic	2323	90.0	25439	85.8	
Biological Sex	Male	2549	98.8	25430	85.7	**<.001**
	Female	31	1.2	4228	14.3	
Educational level as measured by the highest degree attained or level completed	Less than high school	335	13.0	2988	10.1	**<.001**
	High school diploma/Some college credit, but no degree	1337	51.8	13036	44.0	
	College degree and above	908	35.2	13634	46.0	
Marital Status	Married/Civil Union/Domestic Partnership	927	35.9	10314	34.8	**0.018**
	Never Married	803	31.1	10200	34.4	
	Widowed	62	2.4	633	2.1	
	Divorced	621	24.1	6734	22.7	
	Married/Civil Union/Domestic Partnership, but separated	117	4.5	1161	3.9	
	Single, not otherwise specified	50	1.9	616	2.1	
Type of Firearm Used in the Suicide	Handgun	1790	69.4	21448	72.3	**0.006**
	Long Gun	638	24.7	6624	22.3	
	Unknown	152	5.9	1586	5.3	
Storage of Firearm Used in Suicide	Locked	100	3.9	1273	4.3	0.370
	NA	151	5.9	1644	5.5	
	Not locked	130	5.0	1678	5.7	
	Unknown	2199	85.2	25063	84.5	
Firearm Used in Suicide Always Stored Loaded	Loaded	108	4.2	1249	4.2	0.809
	NA	151	5.9	1629	5.5	
	Unloaded	64	2.5	682	2.3	
	Unknown	2257	87.5	26098	88.0	
	Any other Owner	168	6.5	2786	9.4	**<.001**
Ownership of Firearm Used in Suicide	Shooter	804	31.2	9017	30.4	
	Unknown	1608	62.3	17855	60.2	

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Table 3.

Unadjusted and adjusted odds ratios with 95% confidence intervals examining the association between psychosocial factors and suicide among IMR workers (n=4552) and workers from all other occupational groups (n=50,621) (males only) (N=55173).

Covariate	Level	N	Unadjusted Odds Ratio (95% CI)	Adjusted[***] Odds Ratio (95% CI)
Treatment for a mental health problem or substance abuse problem (Current)	Yes	13210	0.87 (0.81–0.94)[*]	0.88 (0.82–0.95)[*]
	No, Not Available, Unknown	41963	-	-
Physical health problem(s) appear to have contributed to the death	Yes	8215	1.13 (1.04–1.23)[*]	1.12 (1.03–1.23)[*]
	No, Not Available, Unknown	46958	-	-
Diagnosis of Depression (Ever)	Yes	19007	0.91 (0.85–0.97)[*]	0.91 (0.85–0.97)[*]
	No, Not Available Unknown	36166	-	-
Diagnosis of Bipolar Disorder (Ever)	Yes	3561	0.92 (0.81–1.05)	0.93 (0.82–1.06)
	No, Not Available Unknown	51612	-	-
Diagnosis of Anxiety (Ever)	Yes	4257	0.93 (0.82–1.04)	0.93 (0.82–1.04)
	No, Not Available Unknown	50916	-	-
Diagnosis of PTSD (Ever)	Yes	1234	1.26 (1.05–1.52)[*]	1.24 (1.03–1.50)[*]
	No, Not Available Unknown	53939	-	-
Diagnosis of schizophrenia (Ever)	Yes	1387	0.91 (0.74–1.11)	0.98 (0.80–1.20)
	No, Not Available Unknown	53786	-	-
Other Mental Health Diagnosis (Ever)[**]	Yes	3193	0.85 (0.74–0.98)[*]	0.90 (0.79–1.04)
	No, Not Available Unknown	51980	-	-

[*]
p<0.05

[**]
Other Mental Health Diagnoses include schizophrenia, ADD or hyperactivity disorder, ADD or hyperactivity disorder, eating disorder, obsessive-compulsive disorder, autism spectrum (includes Asperger's Syndrome), fetal alcohol syndrome, down syndrome, dementia (e.g., Alzheimer's disease, Lewy Body Dementia), personality disorders, and others not included.

[***]
Adjusted for age, race/ethnicity, educational level, marital status

Table 4.

Unadjusted and adjusted odds ratios with 95% confidence intervals examining the association between firearm-related factors and suicide among IMR workers (n=2549) and workers from all other occupational groups (n=25430) (males only) (N=27979).

Covariate	Level	N	Unadjusted Odds Ratio (95% CI)	Adjusted* Odds Ratio (95% CI)
Type of Firearm Used in the Suicide	Handgun	19598	0.97 (0.88–1.07)	1.02 (0.93–1.12)
	Long Gun	1498	-	-
	Unknown	6883	1.09 (0.91–1.32)	1.13 (0.94–1.37)
Storage of Firearm Used in Suicide	Locked	1136	0.96 (0.73–1.27)	0.98 (0.74–1.29)
	NA	1521	1.10 (0.86–1.42)	1.12 (0.87–1.44)
	Not locked	1375	-	-
	Unknown	23947	1.01 (0.83–1.22)	1.02 (0.84–1.23)
Firearm Used in Suicide Always Stored Loaded	Loaded	1080	0.91 (0.65–1.26)	0.90 (0.64–1.25)
	NA	1506	0.94 (0.69–1.28)	0.93 (0.68–1.27)
	Unloaded	599	-	-
	Unknown	24794	0.84 (0.65–1.10)	0.83 (0.64–1.09)
Ownership of Firearm Used in Suicide	Any other Owner	2045	0.87 (0.73–1.04)	0.86 (0.72–1.03)
	Shooter	8763	-	-
	Unknown	17171	1.03 (0.94–1.12)	1.02 (0.93–1.12)

*
Adjusted for age, race/ethnicity, educational level, marital status