

# Suicide in the Workplace: Incidence, Victim Characteristics, and External Cause of Death

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*Although there is considerable information on suicide in the general population, little is known about those who kill themselves at work. This research uses data from the National Traumatic Occupational Fatality data base to describe suicide in the workplace. During 1980 to 1985, 8% of deaths in the NTOF data base were suicides, and the average annual rate was 2.3 per million workers. Risk of workplace suicide increases with increasing age. Men have more than seven times the risk of women; whites have a risk ratio of 1.6 compared with blacks. Women use the same methods but in different proportions than men at work or suicide victims in general. Men in military service and in the agriculture/forestry/fishery industry appear at highest risk of killing themselves at work based on these data.*

Violence in the workplace has recently received attention from researchers investigating work-related deaths.<sup>1,2</sup> However, most studies focus on homicide, and there remains little information on those who kill themselves in the workplace. Suicide is an important public health problem; it was the tenth leading cause of death in the United States and the eighth leading cause of years of potential life lost during 1980.<sup>3</sup> National Center for Health Statistics data show that, in 1982, the suicide rate was 13.2/100,000 people.<sup>4</sup> However, no previous research focused on suicide in the workplace and explored the magnitude of the problem this manner of death poses.

Some studies have noted specific occupations to be associated with a low or high risk of suicide. Physicians and psychologists have been identified to be at increased

risk of committing suicide.<sup>5-8</sup> Kan and Levy<sup>9</sup> found that farm workers are at lower risk of suicide than of unintentionally caused death. Most studies investigating work-related suicides evaluate the occupation of the person but not where they inflicted the fatal injury. In this research, only suicides that occur in the workplace are evaluated. For prevention strategies this may be more relevant; the workplace environment is usually more controlled and, therefore, may be more conducive to suicide prevention. One study in Georgia determined that only 1% of suicides occurred in the workplace.<sup>10</sup> This research documents the national occurrence of suicide in the workplace and identifies potential risk factors.

## Methods

Data were obtained from the National Traumatic Occupational Fatality (NTOF) data base maintained by the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR). This data base consists of death certificate information from all 52 US vital statistics reporting units (all 50 states, New York City, and the District of Columbia). Death certificates are included in NTOF if they meet the following criteria: (1) age 16 years or older at time of death, (2) "Injury at Work" item checked "yes" on the death certificate, (3) external cause of death (International Classification of Disease, Ninth Revision) as the underlying or contributory cause of death.

Suicides were identified in the NTOF data base as deaths with the manner of death classified, by the certifier, as "intentionally self-inflicted" injuries. Deaths with unknown or as yet undetermined manner of death were excluded from these analyses. Suicides from Louisiana, Oklahoma, New York City, and Nebraska were

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not included in the analyses because at the time DSR obtained death certificates for the period 1980 to 1985, these states had not provided intentional injury death certificates.

Several different sources were used to obtain denominators for rate calculations because there is no single, national employment denominator specific for age, gender, race, occupation, and industry. Employment denominators were obtained from the following sources: 1983 Annual Employment and Earnings<sup>11</sup> for occupation and industry denominators; 1980 Census for age, race, and gender denominators<sup>18</sup>; and 1983 Geographic Profile of Employment and Unemployment<sup>13</sup> for geographic denominators. Rates were age- or gender-adjusted by taking a weighted average of age- or gender-specific rates and using the age or gender distribution of all workers as the standard population.

## Results

During 1980 to 1985, 1229 suicides occurred in the workplace (as determined by inclusion in the NTOF data base). These accounted for 3% of all NTOF deaths. This was an annual average of 205 suicides with a range of 187 to 242. The average annual rate was 2.3 per million workers, and rates varied from 2.0 to 2.5 per million workers per year. Because rates were not adjusted for states not reporting workplace suicides to DSR, these rates may be underestimated. There was no increasing or decreasing trend during 1980 to 1985.

Thirty-seven percent of suicides occur among workers between 16 and 34 years of age. More than 24% occur in those 55 years or older. Table 1 shows the age distribution and age-specific rates by gender. Generally, there are increasing rates with increasing age for men. Women do not show any increasing or decreasing pattern over age.

Eighty-eight percent of suicide victims were white and 6% were black. The risk ratio for whites compared with blacks was 1.6. There were insufficient numbers to calculate rates by each of the other race categories. Ninety percent of workplace suicides were men; men had a risk ratio of 7.1 compared with women.

There was a different distribution by age for different races, as shown in Table 2. When stratified by gender, there are different patterns emerging; 38% of black men are under 30 years of age, compared with 32% of nonwhite, nonblack men, and less than 25% of white men. Twenty-seven percent of all white men, 12% of black men, and only 8% of nonwhite, nonblack men are 55 years or older. There are differences between races for women also: 34% of whites are under age 30, compared with 17% of blacks and 43% of nonwhite, nonblack women. Twenty-three percent of white women are 55 years or older, compared with 8% of black women and 0% of nonwhite, nonblack women. The distributions of black women and nonwhite, nonblack men are based on small numbers since there were only 19 women in this study who were not white.

The distribution of external cause of suicide in the

**TABLE 1**  
Workplace Suicides by Age and Gender, United States, 1980 to 1985

Age, yr	Male*			Female		
	No.	%	Rate†	No.	%	Rate†
16-19	40	3.6	2.1	4	3.3	0.2
20-24	130	11.8	3.0	21	17.1	0.5
25-34	229	20.7	2.3	25	20.3	0.3
35-44	207	18.7	2.7	26	21.1	0.4
45-54	223	20.2	4.1	22	17.9	0.5
55-59	139	12.6	5.6	12	9.7	0.7
60-64	71	6.4	4.4	5	4.1	0.4
65+	66	6.0	6.5	8	6.5	0.1
Total	1105	100	3.2	123	100	0.4

\* One man with unknown age is excluded.

† Rates are average annual number of suicides per million workers. Denominators are obtained from the 1980 Census and not reduced for states omitting suicide deaths.

**TABLE 2**  
Workplace Suicides by Age and Race, United States, 1980 to 1985

Age, yr	White*		Black		Other†	
	No.	%	No.	%	No.	%
16-19	39	3.6	1	1.4	4	5.5
20-24	130	12.0	10	13.9	11	15.3
25-34	210	19.4	25	34.7	20	27.8
35-44	205	18.9	13	18.0	16	22.2
45-54	212	19.5	15	20.8	16	22.2
55-59	146	13.5	3	4.2	2	2.8
60-64	72	6.6	2	2.8	2	2.8
65+	70	6.5	3	4.2	1	1.4
Total	1084	100	72	100	72	100

\* One white with unknown age is excluded.

† Includes American Indians, Asians, Hispanics, other races, and race unknown.

workplace varies by gender although guns account for the greatest proportion of suicides in the workplace for both men and women. Fifty-eight percent of men kill themselves in the workplace using guns, compared with less than 40% of women. Twenty-six percent of women use poison (in either solid or liquid form), whereas only 6% of men use this method. Twenty-two percent of men use hanging, suffocation, or strangulation, compared with 12% of women. Twelve percent of women jump from an elevated surface, compared with only 3% of males. Four percent of women use a cutting or piercing instrument to kill themselves in the workplace, compared with 2% of men. Women drown themselves in 2% of workplace suicides, whereas in men, 1% drowned. Seven percent of men used gas or vapor poisoning as a manner of death, compared with 4% of women. Other external causes of suicide death in the workplace accounted for only 1% in both men and women.

The suicide incidence rate varies geographically both for workplace suicides and general population suicides. When states are grouped into regions defined by the census,<sup>18</sup> Southern and Western geographic areas have higher workplace suicide rates (2.5 and 2.6 per million per year, respectively) than North-Central (1.8 per million per year) and Northeast (1.3 per million per year) regions. For states not supplying death certificates, the estimated number of suicides were included

to calculate geographic rates. Although suicides from Oklahoma, Nebraska, Louisiana, and New York were not available, about 120 deaths were expected to occur during 1980 to 1985 (based on a 3% proportion of all work-related fatalities).

Workplace suicides rates were found to vary by industry as reported on the death certificate (Table 3). Public Administration (5.0 per million per year) and agriculture/forestry/fishery (4.7 per million per year) have the highest rates. There is little change in industry rates after adjusting for the influence of race, but some change after adjusting for gender. Age-specific industry information was not available at the national level, so industry rates were not adjusted for age. Because there are disproportionate numbers of men and women in different industries (for example, men are more often employed in agriculture),<sup>18</sup> gender-specific rates are also examined within each industry. Men have higher rates for each industry; rates for women (based on small numbers) are much lower and do not vary by industry. Men have the highest rates in public administration (7.8 per million per year) and agriculture/forestry/fishery (5.0 per million per year). Eighteen percent of suicide deaths could not be categorized into an industrial classification because of insufficient industry information on the death certificate.

Suicide rates also vary by usual occupation, as reported on the death certificate (Table 4). People at lowest risk of committing suicide in the workplace were employed in managerial and professional occupations, compared with higher risk for military occupations. After adjusting for gender, the rate for the laborer category (including operations and fabricators) is lower. Age-specific occupation information was not available at the national level, so occupation rates were not age-adjusted.

Only 56% of victims had a post-mortem examination. There were 2% with unknown autopsy status. Autopsies were performed for an equal proportion of men and women. However, one unexpected finding was that autopsy status varied by race. Only 54% of whites and

Hispanics were autopsied, followed by 62% of Asians, 70% of blacks, and 100% of American Indians.

## Discussion

Suicide defines the medicolegal manner of death: Was the death intentionally self-inflicted? It is difficult to assess why suicide is committed in the workplace. Suicide may be associated with job stress, or access to lethal weapons may be increased during work. It may be unrelated to work, but simply the location in which the person commits the act. Some research indicates that suicides are a small, visible portion of mental illness related to work.<sup>14</sup> Another concern, as noted in community studies, is that suicide clusters may be triggered by a single violent death.<sup>15</sup> In this context, it is important to study suicide in the workplace and identify high-risk workers to target intervention strategies and further research.

The magnitude of suicide in the workplace is low compared with the overall suicide rate. This is not

**TABLE 4**  
Workplace Suicide Rates by Occupation, United States, 1980 to 1985

Occupation	Population at Risk (x 1000)	No. of Suicides	Suicide Rate*	Gender-Adjusted Suicide Rate*
Military	1676	76	7.5	-
Farming/forestry/fishing	3700	61	2.7	2.0
Service	13 857	125	1.5	2.0
Production/craft/repair	12 328	108	1.5	2.0
Technical/sales/administration	31 265	223	1.2	1.8
Operator/fabricator/laborer	16 091	157	1.6	0.2
Manager/professional	100 834	119	0.2	0.2
Student	-	31	-	-
Unknown	-	202	-	-

\* Average annual number of suicides per million workers. Denominators are obtained from Employment and Earnings, Bureau of Labor Statistics, and not reduced for states omitting suicide deaths.

**TABLE 3**  
Workplace Suicide Rates by Gender and Industry, United States, 1980 to 1985

Industry*	Male			Female			Suicide Rate†	Gender-Adjusted Suicide Rate†
	No.	%	Rate†	No.	%	Rate†		
Public administration	130	11.8	7.8	8	6.4	0.1	5.0	4.4
Agriculture, forestry, fishing	84	7.6	5.0	0	0.0	0.0	4.7	2.8
Services	232	21.0	3.1	37	30.0	0.3	2.4	1.9
Retail trade	140	12.6	2.9	11	8.9	0.2	2.2	1.8
Transportation, communication	92	8.3	2.9	4	3.5	0.4	1.5	0.8
Construction	90	8.1	2.6	3	2.4	0.1	1.4	1.7
Finance, insurance, real estate	34	3.1	2.0	7	5.7	0.3	1.4	1.8
Mining	8	0.7	1.5	0	0.0	0.0	0.9	0.7
Manufacturing	97	8.8	1.2	6	4.9	0.2	1.0	1.3
Wholesale trade	22	2.0	1.2	0	0.0	0.0	0.8	0.7
Not classified	177	16.0	-	47	38.2	-	-	-

\* Standard Industrial Classification, 1972 Manual.

† Average annual number of suicides per million workers. Denominators are obtained from Employment and Earnings, Bureau of Labor Statistics, and not reduced for states omitting suicide deaths.

surprising because most employed people only spend about one third of their time in the workplace, and not everyone is at risk because not everyone is employed. Rates are calculated per population and not time at risk; however, the high rate in the agriculture industry may be partly related to the farm often being both the workplace and residence of agricultural workers. Because a great amount of time is spent on the farm, the suicide may be likely to occur on the farm and, therefore, may be noted as injury at work on the death certificate. This may also be true for military personnel. The gender, race, age, and geographic distributions of workplace suicides are similar to the distributions of these variables for all suicide victims.<sup>4</sup>

Although other studies<sup>5-8</sup> have identified people in professional occupations (such as physicians) to be at high risk of suicide, this study shows they do not kill themselves in their workplace, or that they are not classified as intentional, self-inflicted injuries on the death certificate. Other studies<sup>5,6,8</sup> noting physicians to be at high risk may reflect increased access to lethal weapons in the workplace; this could explain the high rates in medical personnel—they have access to potentially lethal drugs. A previous study showed that more than half of physicians committing suicide use drugs as the lethal weapon.<sup>8</sup> In the NTOF data base, 52% of physicians who killed themselves used drug injection or ingestion. Studies of Navy and Marine personnel committing suicide show that firearms are the most common weapon and suggest that access to guns is more likely to result in a successful suicide.<sup>10</sup>

The proportions of external cause of suicide in the workplace differ from suicides in general. In 1980, suicides in general were committed by firearms (58%), hanging (14%), liquid/solid poisoning (11%), gas poisoning (7%), jumping (3%), drowning (2%), and cutting 1%.<sup>1</sup> These proportions are similar for men killing themselves at work, but different for women. Women at work use firearms less often, and solid or liquid poisoning and jumping more often.

One reason that men are at higher risk of suicide than women in the workplace may be their choice of weapon. Almost 60% of male workplace suicide victims used firearms, which is a method more likely to result in a successful suicide. Work sites may be more easily controlled than communities, and, if not required by the job, it may be possible to restrict guns from the workplace. However, if the exposure to lethal objects is an integral component of the work task, it may not be possible to intervene by decreasing exposure to these weapons.

There are limitations to using death certificate data for hypothesis-generating studies. One concern is reporting variation between states; this prohibits state-specific comparisons without first evaluating reporting bias. Another potential problem is using the usual industry or occupation on the death certificate. Using broad occupational categories tends to produce less bias because there is less potential for misclassifications; however, using broad categories (as in this study) also diminishes differences between occupations. Some stud-

ies report 21% to 28% disagreement between current (at time of death) and usual occupation.<sup>1,17,18</sup> As Kraus<sup>1</sup> notes in a work-related homicide study, if the death occurs during "moonlighting," the usual occupation noted on the death certificate may be incorrectly linked to the death. This potential for misclassifying the occupation or industry at the time of death needs to be further evaluated by using alternate data sources to determine the occupation the person was engaged in at the time of death.

There are two other potential biases in these results. First, misclassification of manner of death could introduce a bias if the reasons for misclassification are associated with risk factors for suicide in the workplace. For example, if workplace fatalities for women are less likely to be defined as suicides by the death certifier, it could distort the risk ratio for gender. Second, some suicides may not be included in the NTOF data base because different states use different algorithms to determine which death certificates meet the NTOF inclusion criteria. This is less likely to result in bias because the reasons for nonascertainment are related to vital statistics recordkeeping and querying practices within individual states rather than potential risk factors.

There were only two motor vehicle-related suicides in this data base; however, death certificate data bases usually underreport occupational deaths resulting from motor vehicles.<sup>16,19</sup> There may be even more underreporting of motor vehicle-related suicides. This external cause remains a potentially important cause of occupational death and should not be overlooked.

This research reveals that suicide in the workplace is not a problem of great magnitude. However, there do appear to be groups of workers (men in the agriculture industry and military service) who are at higher risk of suicide in the workplace. Further research should be directed at those who appear at highest risk of successfully committing suicide in the workplace. More quantitative studies are necessary to identify risk factors for suicide in the workplace. Because suicide has a complex etiology it may be even more important in terms of prevention to be able to predict who will commit suicide at work. A multivariate, modeling approach could be used to evaluate this research question. This research also shows that potential risk factor patterns for suicides in the workplace are similar to patterns identified in general population suicides, indicating that preventive strategies related to violent deaths in the community may also be useful in the workplace.

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### Does the UN Matter to the US?

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Having pointed out some of these serious problems in the United Nations. . . let me now say categorically that the United Nations matters. . . Further, the United Nations, in many of its activities, indeed does advance US interests.

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—From Richard S. Williamson (Assistant Secretary of State for International Organization Affairs) in *Department of State Bulletin* 1988; 88: no. 2138, p 67.