

8-17-2009

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Recommended Citation

Bradley, Kierst; Kara Martinez; Michelle Barry; Sarah Lathrop; Kathryn Fraser; and Kimberley Peters. "The Sad State of Healthcare in New Mexico: Healthcare Worker Suicide in New Mexico 2004-2005." (2009). <http://digitalrepository.unm.edu/ume-research-papers/100>

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The Sad State of Healthcare in New Mexico:
Healthcare Worker Suicide in New Mexico 2004-
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Abstract

THE SAD STATE OF HEALTH CARE IN NEW MEXICO: HEALTHCARE WORKER SUICIDE IN NEW MEXICO 2004-2005. KL Bradley*, KD Martinez*, MB Barry**, S Lathrop**, K Fraser***, and K Peters****

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PURPOSE. To determine if there is a statistically significant relationship between suicide and the healthcare occupations in New Mexico for the years 2004-2005.

METHODS. We collected suicide and occupational data from the New Mexico Office of the Medical Investigator and the N.M. Bureau of Vital Records and Health Statistics for the years 2004-2005. Other data collected included race, age, veteran status, county of occurrence and residence, location, method, presence of suicide note, toxicology, and psychiatric, medical and other risk factors. Statistical analysis was performed on the data collected. **RESULTS.** Our database included 658 suicides, including 34 healthcare worker suicides during this two-year period. The suicide rate for healthcare workers (HCWs) in 2004 was higher than the suicide rate of the New Mexico adult population. The suicide rate for HCWs in 2005 was lower than that of the New Mexico adult population. There were significantly more women among the healthcare workers who committed suicide than among the non-healthcare workers. The most commonly represented healthcare professionals among the HCWs who committed suicide were: Nurses, Home Health Aides, Obstetrician/Gynecologists, Laboratory Technicians, Social Workers, and Medical Assistants. Healthcare workers who committed suicide in New Mexico in 2004 and 2005 were 3.7 times more likely to commit suicide by ingesting or injecting medication than the non-healthcare workers who committed suicide during this time frame. **CONCLUSION.** This study demonstrates that healthcare workers, particularly females, had a higher rate of suicide than the NM adult population in 2004, but not in 2005. Thus, we cannot comment on a trend at this time. Further investigation would be useful in determining the presence of a trend and guiding prevention efforts.

Introduction

While suicide currently ranks as the 11th leading cause of death in the U.S.¹, rates of suicide in New Mexico remain well above the national average. In 2004, the suicide rate in New Mexico was 73.1% higher than the national average and suicide represented the 7th leading cause of death in the state.² Based on these numbers, one may conclude that suicide constitutes a significant problem for our state. An extensive number of risk factors have been previously implicated in increased risk of death by suicide. These include mental illness, substance abuse, medical illness, financial and legal difficulties, divorced marriage status, older age, male gender, Caucasian race, and lack of social support. While unemployment is associated with a 2-3 fold increased risk of suicide⁴, a number of studies have concluded that specific occupations may also be correlated with higher rates of suicide. Recent data suggests that the incidence of suicide is elevated in health care workers, in particular physicians and nurses, as well as mental health professionals and social workers. The American Foundation for Suicide Prevention Consensus Statement quotes the relative risk of suicide as 1.1 to 3.4 in male physicians and 2.5 to 5.7 in female physicians.³ A 2004 meta-analysis of 25 studies on physicians and suicide concludes that male physicians are at ‘modestly’ increased risk for suicide. Adjusted for demographic variables, male physicians have an approximately 40% higher risk of suicide when compared to the general population. Importantly, female physicians have been shown to have a substantially increased risk of suicide when compared to the general female population.⁶ In a recent consensus statement concerning physicians and suicide published in JAMA, the authors recommend that future research is needed to

“determine the current incidence rate of completed suicide by US physicians, including the effect of sex, ethnicity and specialty.”⁵ In addition to physicians, nurses have been shown to have elevated risk of suicide when other socioeconomic factors are controlled.^{12,13} Because healthcare workers appear at elevated risk for suicide, and no data has been collected in New Mexico, we have analyzed occupational data for suicides in New Mexico from 2004-2005 to determine if healthcare workers in New Mexico are at increased risk of suicide. Additionally, we analyzed factors such as age, race, sex, veteran status, education, toxicology results, location of suicide, presence of suicide note, and medical, psychiatric risk factors.

Methods

The New Mexico Bureau of Vital Records and Health Statistics (BVRHS) is the state repository for all birth and death certificates. For the years 2004 and 2005, BVRHS has electronically coded occupation and industry from death certificates, as well as demographic variables. We requested a query of all death certificates listing “suicide” as the manner of death of individuals 18 years of age and older, for the years 2004 and 2005. In addition to occupation and industry data, we requested, for each decedent, age, sex, race/ethnicity, veteran status, education, and OMI case number. These variables were available electronically from BVRHS and were provided in a SAS file. We manually collected cause of death, location of suicide, county of pronouncement, county of residence, psychiatric, medical, and other risk factors, toxicology results, and presence or absence of a suicide note from OMI electronic case files. This data was collected with a standardized data collection form and was manually entered into the SAS file. This

project did not involve living human subjects and thus was not subject to Human Research Review Board approval.

Statistical Analysis

SAS was used to analyze the available data, generating descriptive statistics for demographic categories such as age, gender, and race/ethnicity for all suicides. We used the occupation and industry codes to classify each decedent by occupation and additionally, as either a health care worker (HCW) or non-HCW. Based on categories used by the New Mexico BVRHS, our designation of “HCW” included physicians, nurses, dentists, physician assistants, medical assistants, chiropractors, emergency medical technicians/ paramedics, pharmacists, occupational therapists, physical therapists, speech-language pathologists, podiatrists, psychologists/ non-physician behavioral health clinicians, social workers, respiratory care practitioners, medical laboratory technicians, caregivers, and veterinarians. We compared categorical variables using chi-square or Fisher exact tests, and compared continuous variables such as age using t-tests. P-values of 0.05 or less were considered significant.

Results

The demographics of the healthcare and non-healthcare worker suicides are summarized in Table 1. There were 338 suicides in New Mexico in 2004 and 320 in 2005, for a total of 658 in the two-year period. Of the 658, there were 34 Healthcare Worker (HCW)-suicides in 2004 and 2005 combined. Of the HCW suicides, 21 occurred in 2004 and 13 occurred in 2005. There were significantly more women among the HCWs who committed suicide (50% vs. 17%, $p < 0.0001$). The death certificates divided

the decedents into 4 different race categories, based on U.S. Census classification: White, American Indian, African American, and Pacific Islander. Based on these categories, there was no statistically significant difference among the racial distributions of suicides by occupation ($p=0.91$). However, there were significantly more non-Hispanics among HCWs who committed suicide than among non-HCWs (85% vs. 67%, $p=0.03$). The median age of the non-HCW suicides was 43, with a range of 18-95; the median age of the HCW suicides was 49, with a range of 21-91. This difference in median age was not statistically significant ($p=0.08$). One-hundred and forty-nine (24%) of the non-HCW suicides were veterans of the U.S Armed Forces. Ten (29%) of the HCW suicides were veterans. This difference was not statistically significant.

The methods of suicide utilized by healthcare and non-healthcare workers in 2004 and 2005 are shown in Table 2. There were statistically significant differences in method of suicide between HCWs and non-HCWs ($p= 0.006$). Healthcare workers who committed suicide were 3.7 times more likely to ingest or inject medication than non-healthcare workers who committed suicide ($p=0.004$, 95% CI: 1.6-8.3). Of the HCW suicides, 31% ingested or injected medication, while 12% on non-HCW suicides used this method. Fifty-one percent of non-HCW committed suicide by self-inflicted gunshot wound; thirty-seven percent of HCW suicides utilized this method. Non-healthcare workers who committed suicide were more likely to choose self-inflicted gunshot wound than healthcare worker who committed suicide, but the difference was not statistically significant.

Table 3 summarizes the locations of suicide by occupation. There were no statistically significant differences in location of suicide by occupation ($p=0.16$).

The frequency of suicide notes and witnessed suicides is summarized in Table 4. One-hundred seventy-four (28%) of the non-HCW workers left a suicide note, while 14 (41%) of the HCW left a suicide note. The healthcare workers who committed suicide were 1.8 times more likely to leave a suicide note than the non-healthcare workers who committed suicide, but this difference was not statistically significant ($p=0.09$).

In 2004 the number of HCW suicides was 21; the number of adult, non-HCW suicides was 317. The 2004 suicide rate for healthcare workers was 24.8 per 100,000, which was higher than the 2004 age-adjusted rate of 17.3/100,000 for the New Mexico adult population. The 2004 rate of HCW suicide was also higher than the rate published by the New Mexico Bureau of Vital Record and Health Statistics (BVRHS): 18.7/100,000. In 2005 there were 13 HCW suicides and 307 adult, non-HCW suicides in New Mexico. The 2005 suicide rate for HCW was 15, which was lower than the age-adjusted rate of 16.8 and the published BVRHS rate of 17.3.

The occupations of healthcare workers who committed suicide are shown in Table 5. The most commonly represented healthcare profession was nursing, which comprised 9 of the 34 HCW suicides, or 25.71%. This was followed by Home Health Aides, which comprised 5 of 34 suicides, or 14.29%. The HCW suicides also included 4 obstetrician/gynecologists, which made up 11.43%. Laboratory technicians were the fourth-most commonly healthcare profession with 3 out of 34 individuals, comprising 8.57%. The fifth most common healthcare professions were Social Workers and Medical Assistants. There were 2 Social Workers and 2 Medical Assistants, representing 5.71% of the healthcare-worker suicides each. Lastly, one of each of the following professionals was included in the HCW suicides, comprising 2.86% each: Chief Hospital Administrator

or Clinical Director, Pharmacologist/ Parasitologist/Medical Researcher, Psychologist, Counselor, Public Health Educator, Respiratory Therapist, Cardiopulmonary Technician, Emergency Medical Technician, and Caregiver.

The number of years of education of New Mexico suicide victims is shown in Table 6. Eleven of the 34 (32%) healthcare worker suicide victims had 17+ years of education; 29 of the 624 (5%) non-healthcare worker suicide victims had 17+ years of education. The healthcare workers who committed suicide in New Mexico in 2004 and 2005 were 8.5 times more likely to have post-secondary education than non-healthcare workers who committed suicide in New Mexico in 2004 and 2005 ($p < 0.0001$, 95% CI: 3.1-25.4).

Toxicology results from suicide victims by occupation are shown in Table 7. There was no statistically significant difference in Blood Alcohol Concentration (BAC) between healthcare workers and non-healthcare workers who committed suicide ($p = 0.69$). There were no statistically significant differences in the presence of opiates, cocaine, amphetamines, or narcotics by occupation ($p = 0.073, 0.14, 0.19, 0.07$, respectively).

Reported psychiatric risk factors including depression, bipolar, schizophrenia, and previous suicide attempts are shown in Table 8. Three hundred and one (48%) of the non-healthcare workers who committed suicide had no known psychiatric risk factors. Eleven (32%) of the healthcare workers who committed suicide had no known psychiatric risk factors. There was no statistically significant difference in the presence of psychiatric risk factors by occupation ($p = 0.07$), though a higher percentage of

healthcare workers had a history of one or more psychiatric risk factors (68% vs. 52%, respectively).

The medical risk factors studied included: terminal illness, loss of function, chronic pain, and other. The majority of non-healthcare workers (78%) and healthcare workers (79%) had no reported medical risk factors. There were no statistically significant differences in the presence of medical risk factors by occupation.

Lastly, this study looked at other risk factors including: financial problems, legal problems, marital/relationship problems, interpersonal problems, job/career problems, family member with terminal illness, death of family member/friend, suicide of family member/friend, other, and more than one of these risk factors. There were no statistically significant differences in the presence of other risk factors by occupation ($p=0.09$).

Discussion

This study demonstrates an increased suicide rate among health care workers (HCWs) for the year 2004 that is consistent with results from previous studies examining the role between occupation and suicide risk. In 2005, the suicide rate among HCWs was lower than the New Mexico adult population, thereby preventing us from commenting on a trend for suicides by HCWs in New Mexico. Despite this result, suicides among HCWs in N.M. continued to exceed the U.S national average suicide rate of 10.8. The most predominant occupations among those healthcare professionals who committed suicide were nurses, home health aides, obstetrician/gynecologists, laboratory technicians, social workers, and medical assistants. A striking finding from our analysis is the significant rate of suicides among female HCWs compared with rates among female non-healthcare workers. In contrast to evidence that males are 4 times more likely to complete suicide than females,

we found an equal distribution of male and females represented in HCW suicides. This is consistent with prior studies examining suicide risk specifically in female HCWs.

An important factor influencing suicide risk among HCWs in NM is likely access to deadly means of self-harm. A number of studies outside the United States have noted that ingestion/injection of lethal drugs is much more common in physician suicides¹⁵, and have lead some to draw the conclusion that depressed physicians may be in a unique position to effectively kill themselves.⁴ Our results show that HCWs in New Mexico were 3.7 times more likely than non-healthcare workers to die as a result of ingesting or inject medications. Though non-HCWs were more likely to commit suicide by self inflicted gunshot wounds, these results were not statistically significant, and firearms remained the most prevalent means of suicide among HCWs.

Female physicians and nurses have been shown to have an increased risk of suicide compared to females in the general population. A Meta analysis of 13 studies demonstrated a statistically significant suicide rate ratio of 2.27 in female physicians.⁵ Likewise, a review by Boxer *et al.* suggests female nurses are at increased risk, and both occupational and home stress are correlated with suicide completion. While completion of suicide by females is one-fourth that of men, rates of attempted suicide are 1.5 times greater for females than for males.⁶ It has been suggested that, again, access to lethal means and a high level of knowledge may allow female physicians and nurses to complete suicide and may contribute to rates that approach the attempted suicide rate in the general female population.¹⁶ Interestingly, while our analysis found that female nurses were the most common health professional to commit suicide in New Mexico, we noted only one suicide among a female physician (an OB-Gyn). While the etiology for

this proportionately smaller rate of suicide among female physicians is unclear, it is possible that changes in female physician's work environments may be responsible. As Females who work in male dominated occupations have been noted to be at higher suicide risk,¹⁶ the changing gender equity within the workforce could play a protective role.

A number of factors, such as low income, limited education, substance abuse, and mental illness have been consistently linked to increased suicide risk. Agerbo *et al* suggest that, except for doctors and nurses, suicides associated with specific occupations can, in fact, be explained by socioeconomic factors. In our analysis, those with occupations in construction, odd jobs, and food service had the highest rates of suicide, suggesting that stressors within these occupations such as job insecurity may influence risk. Alternatively, those with mental illness may self-select into low wage or insecure jobs due to strained capacity to work.¹⁵ Of those HCWs identified in our study, the second most represented group was home health aides. This may again reflect socioeconomic conditions associated with lower wage employment.

Depression and substance abuse in those who commit suicide, including HCWs, surpass rates in the general population.⁵ A study of nurse suicides by Hawton *et al.*, which included a psychological autopsy of 42 suicide cases, found, for example, that three-quarters of nurses examined had sought previous psychiatric care, and it has been suggested that individuals with depressive tendencies may self-select into this specialty⁷,⁸. While HCWs in our study had a higher proportion of one or more reported psychiatric risk factors, there was no statistically significant difference between HCWs and non-HCWs. It has been well documented that alcoholics have higher suicide rates and

alcoholism has been shown to be the strongest predictor of subsequent fatal attempts in persons who have previously made a non-fatal attempt.¹⁵ In HCWs, as in non-health care workers in our study, a significant portion had blood alcohol levels equal to or above 0.08 at autopsy. Inconsistent reporting of prior substance abuse in the cases we examined limits our ability however to assess the extent that drug and alcohol abuse may be correlated with suicide risk in this group.

There are a number of other limitations in our study which may influence our results. Foremost, the assignment of occupation is determined by those recorded on the death certificate and may not reflect unemployment status. As this is a prominent risk factor for suicide and is not coded in industry and occupation codes, we were unable to control for unemployed status. Additionally, the industry code with the second most prevalent suicide rate, represents cases where no occupation was assigned to the decedent by The State Center for Health Statistics. In our analysis, we assumed these cases to be non-HCWs, however there is a possibility that some HCWs were unaccounted for in this group. Mental health and social risk factors were also inconsistently noted in case files examined and it is likely that prior history of psychiatric disorders went unreported for a number of cases. As noted above, we were unable to comment on a trend within HCWs due to the limited number of years examined. This illustrates the utility of industry and occupation codes and points toward future research to follow trends.

While it is beyond the scope of this study to directly determine causal factors within the work environment that may influence suicide in occupations at risk, this may be an avenue for future studies. Additionally, though OMI case files contain information pertaining to risk factors such as past depression, drug abuse, job loss, these rely upon

reporting from those close to the decedent. An in-depth review of medical records, for example, could better elucidate factors that may be unique within occupations. A specific aim of our research was to generate data that will be useful to target suicide prevention to at risk groups. Prevention may utilize a multi-faceted approach: educational campaigns aimed at the public and health professionals, screening for high risk individuals, treatment and restriction of access to lethal means.

Acknowledgements

We would like to thank Dr. Kathy Fraser for the original premise on which this research project was based, Dr. Michelle Barry for her help with project design and for serving as our Research Mentor, Dr. Sarah Lathrop for her help with project design and statistical analysis, and Dr. Kimberley Peters and the staff at the NM Bureau of Vital Records and Health Statistics for compiling the Industry and Occupation data.

Tables and Figures

Characteristic	Non-HCW	HCW	Total
Year of Death			
2004	317	21	338
2005	307	13	320
Sex			
Male	520 (83%)	17 (50%)	537 (82%)
Female	104 (17%)	17 (50%)	121 (18%)
Race			
White	558 (89%)	32 (94%)	590 (90%)
American Indian	56 (9%)	2 (6%)	58 (9%)
African American	7 (1%)	0	7 (1%)
Asian/Pacific Islander	3 (0.5%)	0	3 (0.5%)
Ethnicity			
Hispanic	206 (33%)	5 (15%)	211 (32%)
Non-Hispanic	418 (67%)	29 (85%)	447 (68%)
Age in years			
Median	43	49	44
Range	18-95	21-91	18-95
Ever served in U.S. Armed Forces			
Yes	149 (24%)	10 (29%)	159 (24%)
No	475 (76%)	24 (71%)	499 (76%)
Total	624	34	658

Table 1. Demographic characteristics of suicides in New Mexico by occupation (non-healthcare worker versus healthcare worker), 2004 and 2005

Method	Non-HCW n (%)	HCW n (%)
Self-inflicted gunshot wound	319 (51%)	13 (37%)
Hanged self	125 (20%)	1 (3%)
Ingested or injected medication	72 (12%)	11 (31%)
Ingested or injected illicit substance	6 (0.8%)	1 (3%)
Jumped from a height	9 (2%)	0
Carbon monoxide poisoning	20 (3%)	1 (3%)
Inhaled toxic substance other than carbon monoxide	3 (0.5%)	0

Suicide as pedestrian	9 (2%)	1 (3%)
Slashed/stabbed self	12 (2%)	2 (6%)
Driver of motor vehicle	3 (0.5%)	0
Burned self	2 (0.3%)	1 (3%)
Other	17 (3%)	2 (6%)
Unknown	27 (4%)	1 (3%)

Table 2. Methods of suicide for non-healthcare workers and healthcare workers in New Mexico, 2004-2005

Location	Non-HCW n (%)	HCW n (%)
Residence-inside	193 (31%)	13 (37%)
Residence-outside	81 (13%)	2 (6%)
Residence-garage	27 (4%)	2 (6%)
Other's residence	33 (5%)	0
Public area	74 (12%)	3 (9%)
Motel/hotel	12 (2%)	3 (9%)
Vehicle	41 (7%)	0
Jail	17 (3%)	0
Other's residence	6 (1%)	0
Residence- unspecified	98 (16%)	9 (26%)
Unknown	42 (7%)	2 (6%)

Table 3. Locations of suicides by occupation, New Mexico 2004-2005

	Non-HCW	HCW	Total
Suicide note left	174 (28%)	14 (41%)	188 (29%)
Suicide witnessed	45 (7%)	2 (6%)	47 (7%)

Table 4. Suicide notes and whether or not suicidal act was witnessed, by occupation

Code	Occupation	Number	Percent
35	Chief Hospital Admin./ Clinical Director	1	2.86
170	Pharmacologist/Parasitologist/Medical Res.	1	2.86
182	Psychologist	1	2.86
200	Counselor	1	2.86
201	Social Worker	2	5.71
202	Public Health Educator	1	2.86
306	Ob/Gyn	4	11.43
313	Nurse	9	25.71
322	Respiratory Therapist	1	2.86
330	Laboratory Technician	3	8.57
332	Cardiopulmonary Technician	1	2.86
340	EMT	1	2.86
360	Home Health Aide	5	14.29
365	Medical Assistant	2	5.71
461	Caregiver	1	2.86

Table 5. Occupations of healthcare workers who committed suicide in New Mexico 2004-2005

Years of education	Non-HCW n (%)	HCW n (%)
4	2 (0.3%)	0
5	1 (0.2%)	0
6	9 (1%)	0
7	3 (0.5%)	0
8	12 (2%)	0
9	17 (3%)	0
10	42 (7%)	0
11	44 (7%)	1 (3%)
12	241 (39%)	4 (12%)
13	40 (6%)	3 (9%)
14	58 (9%)	7 (21%)
15	18 (3%)	1 (3%)
16	55 (9%)	6 (18%)
17+	53 (8%)	11 (32%)
Unknown	29 (5%)	1 (3%)

Table 6. Years of education for suicide victims by occupation, 2004-2005

Toxicology		Non-HCW	HCW
BAC			
	Mean	0.065	0.07
	Range	0-0.42	0-.61
Percent equal to or greater than 0.08%		30%	24%
Toxicology performed			
	Yes	333 (53%)	20 (61%)
	No	291 (47%)	13 (39%)
Opiates present			
	Yes	45 (7%)	3 (9%)
	No	579 (93%)	31 (91%)
Cocaine present			
	Yes	37 (6%)	0
	No	587 (94%)	34 (100%)
Amphetamines present			
	Yes	30 (5%)	0
	No	594 (95%)	34 (100%)
Narcotics present			
	Yes	30 (5%)	4 (12%)
	No	594 (95%)	30 (88%)

Table 7. Toxicologic results from suicide victims by occupation, New Mexico 2004-2005

Psychiatric risk factors	Non-HCW n (%)	HCW n (%)
None reported	301 (48%)	11 (32%)
Depression	185 (30%)	9 (26%)
Bipolar disorder	18 (3%)	5 (15%)
Schizophrenia	15 (2%)	0
Previous suicide attempts	94 (15%)	6 (18%)

More than one risk factor	32 (5%)	1 (3%)
Other	43 (7%)	4 (12%)

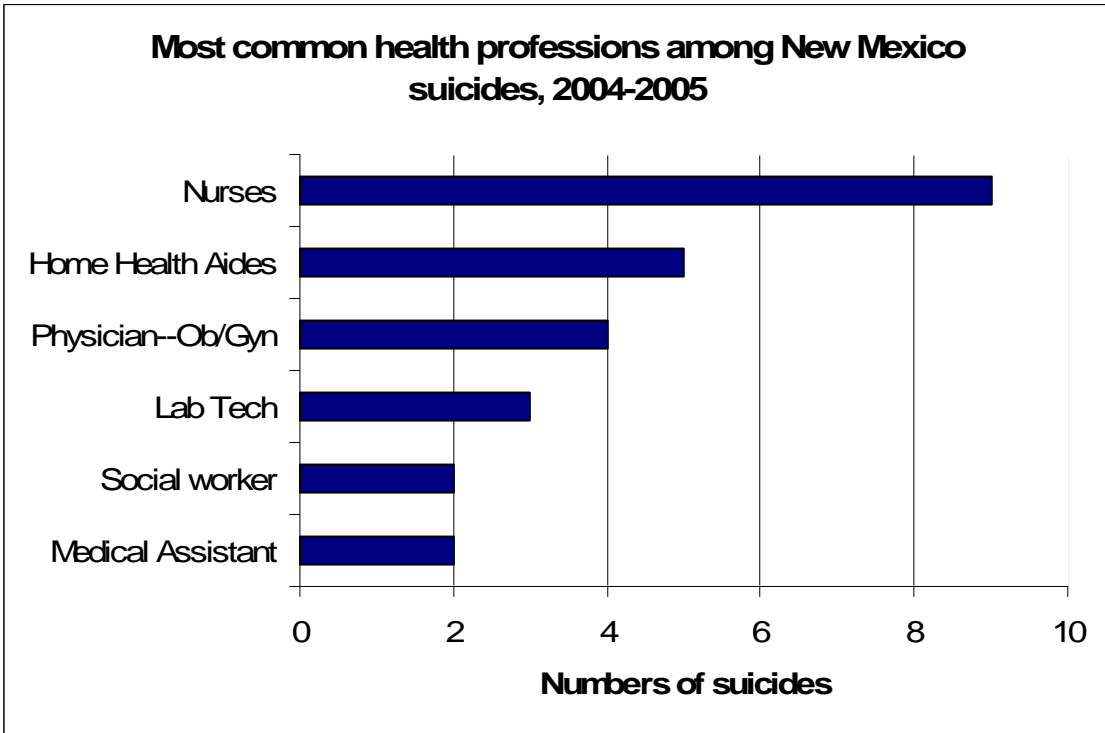
Table 8. Psychiatric risk factors of suicide victims, New Mexico 2004-2005

Medical risk factors	Non-HCW n (%)	HCW n (%)
None reported	479 (78%)	27 (79%)
Terminal condition	35 (6%)	2 (6%)
Loss of function	74 (12%)	3 (9%)
Chronic pain	29 (5%)	2 (6%)

Table 9. Medical risk factors of suicide victims, New Mexico 2004-2005

Other risk factors	Non-HCW n (%)	HCW n (%)
None reported	274 (44%)	20 (59%)
Financial problems	22 (4%)	2 (6%)
Legal problems	69 (11%)	1 (3%)
Marital/relationship problems	147 (24%)	4 (12%)
Interpersonal problems	24 (4%)	0
Job/career problems	17 (3%)	2 (6%)
Family member w/terminal illness	0	0
Death of family member/friend	22 (4%)	1 (3%)
Suicide of family/friend	15 (2%)	0
Other risk factors	10 (2%)	2 (6%)
More than one	74 (12%)	4 (12%)

Table 10. Other risk factors of suicide victims, New Mexico 2004-2005



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