HHS Public Access

Author manuscript

Psychooncology. Author manuscript; available in PMC 2019 July 01.

Published in final edited form as:

Psychooncology. 2018 July ; 27(7): 1750–1756. doi:10.1002/pon.4720.

Circumstances of suicide among individuals with a history of cancer

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Abstract

Objective: Cancer can trigger psychological distress, which may be associated with risk of suicide. We explored precipitating circumstances of suicides among decedents with and without a history of cancer.

Methods: Coroner or medical examiner and law enforcement narratives of adult suicides were coded from 17 participating states in Centers for Disease Control and Prevention's National Violent Death Reporting System during 2004 to 2013. Bivariate and multivariate analyses examined associations between cancer history and factors that precipitated suicide.

Results: Of 90 581 suicides, 4182 decedents (4.6%) had a history of cancer. Significantly more decedents with a history of cancer (versus without) were male, non-Hispanic white, married, veterans, and aged 55 or older ($P < .001$). Decedents with a history of cancer were more likely to die of suicide by firearm and less likely to die of suicide by suffocation compared to poisoning. In matched case analyses controlling for demographic and recent circumstances, fewer decedents with a history of cancer had mental health problems, history of suicide attempts, alcohol use problems, intimate partner problems, financial problems, job problems, and recent crisis.

Conclusions: Findings highlight the potential to identify high-risk populations for suicide prevention in clinical practice.

Keywords

cancer; oncology; psychological distress; self-harm; suicide

1 | INTRODUCTION

People who are living with and beyond a cancer diagnosis often experience psychological distress.[1–3] Symptoms of distress often emerge in response to cancer diagnosis and can include sadness and worry that are within the normal range, as well as more severe and

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CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

disabling conditions such as depression or anxiety.[4,5] Up to half of individuals who are newly diagnosed with cancer and those with recurrent cancer experience significant levels of distress.[2,5] These psychosocial concerns can occur at any time during a cancer survivor's experience and negatively impact quality of life and health.[4] Compared with individuals with no cancer history, persons with a history of cancer are more likely to have significant psychological distress and depression, regardless of time since diagnosis.[6] Although advances in cancer treatment are leading to prolonged survival, many survivors continue to experience physical, psychological, and financial impairments affecting quality of life for years.[3,7–9] Such impairment may result in psychological distress and subsequently increase the risk of suicide.

Several large studies have reported a significant association between chronic disease and risk for suicide.[10] Findings from two literature reviews found that cancer survivors have a higher risk of suicide ideation and completed suicide than the general population.[11,12] These studies identified consistent risk factors for suicide among people with a history of cancer: being male, being older, having a history of mental health problems, and poor physical functioning. In a study examining the association between suicide and chronic diseases, cancer was most consistently associated with increased risk of suicide.[13]

Many studies on suicide risk and cancer focus on assessing suicide among persons with cancer relative to the general population. Studies have assessed suicide and specific cancer sites, or treatment characteristics. Studies have not examined precipitating factors for or circumstances of suicide among decedents. Such data on factors that precipitate suicide[14–17] have guided targeted prevention efforts for groups such as middle-aged men and military and veteran populations.[18–21] Identifying factors that influence suicide risk among people with a history of cancer can identify opportunities for suicide prevention.

We examined the precipitating circumstances for suicide among individuals with a history of cancer compared to those without such a history. This information can improve understanding of the unique precipitating circumstances associated with a cancer history, which could guide suicide prevention efforts in community and healthcare settings. The current study describes demographic and circumstance characteristics, as well as precipitating circumstances of death, of suicide decedents with and without a history of cancer.

2 | METHODS

The Centers for Disease Control and Prevention's (CDC) National Violent Death Reporting System (NVDRS) contains data on all homicides, suicides, and violent deaths of undetermined intent in 32 US states and territories. The present analysis includes data from the 17 states that participated in NVDRS from 2004 to 2013 (Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, North Carolina, New Jersey, New Mexico, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin). NVDRS data include demographics, weapon type, and the circumstances surrounding the death. Such details are abstracted from death certificates, law enforcement (LE), and coroner/medical

examiner (C/ME) reports. Data collected under the auspices of NVDRS are classified as public health practice and thus exempt from Institutional Review Board approval.

Cases, defined as suicides in which the decedent had a history of cancer (a previous cancer diagnosis or cancer treatment), were identified by using a 2-step process. First, NVDRS LE and C/ME narratives were scanned for cancer-related keywords, such as tumor, malignant, neoplasm, carcinoma, and cancer. This process identified 5399 suicide incidents in NVDRS during 2004 to 2013 that included at least 1 cancer-related keyword in the LE or the C/ME narrative. Next, 4 individuals coded 100 cases into categories. Code 0 was assigned if the narratives mentioned no history of cancer for the decedent. For example, several of these cases mentioned that someone to whom the decedent was close had recently died of cancer. Code 1 (history of cancer) was assigned if the narratives mentioned that the individual had a history of cancer (cancer diagnosis or cancer treatment).

Codes for the 100 cases were compared to assess intercoder reliability. High reliability was achieved ($\kappa = 0.849$, $P < .001$). Discrepancies were discussed to refine coding procedures. The remaining 5299 cases were divided among the 4 coders, who coded independently except for cases with ambiguous or unclear narrative details. These cases were discussed, and consensus was reached for coding. Coding yielded 896 out of 5399 suicides that involved no cancer history (code 0) and 4182 cases with history of cancer (code 1). An additional 321 cases were excluded from analyses because narratives could not be definitively coded. These included cases that mentioned cancer in the narratives, but with ambiguous relevance to the suicide; cases that mentioned the decedent feared cancer, but had not sought medical care nor received a diagnosis; and cases where the narrative mentioned benign tumors or noncancer growths (Figure 1).

2.1 | Measures

National Violent Death Reporting System includes information on demographic characteristics of suicide decedents (ie, age, sex, race, ethnicity, and marital status), place and method of death, mechanism of death, as well as relevant precipitating factors as identified by LE, C/ME, and their informants. Precipitating factors have been supported in the literature about suicide (available in Supplemental Web Table).[21] Definitions of all precipitating factors are defined in the NVDRS Coding Manual (www.cdc.gov/violenceprevention/nvdrs/coding_manual.html).[22]

2.2 | Statistical analysis

Of 101 427 suicides, we excluded 10 846 individuals for whom circumstances related to the suicide were not known, resulting in 90 581 cases prior to searching and coding. Following coding and exclusion of 321 ambiguously described cases, chi-squared tests examined differences in demographic characteristics, suicide means, and precipitating circumstances for suicide between decedents with a history of cancer (4182) and those without (86 078). Then, we calculated the odds ratios and 95% confidence interval as the odds of the characteristic among decedents without a cancer history divided by the odds of the characteristic among decedents with a cancer history (Table 1).

We next used matched case-control analysis to account for differences among the groups.[16] This method compared cases with a history of cancer to demographically similar cases without such a history to identify precipitating circumstances uniquely associated with cancer history, rather than as a result of demographic differences between the groups. Cases with cancer history included all of those with code 1. Controls were selected from a pool of all cases with code 0. Matches were based on sex, age (±1 year), race/ethnicity, marital status, year the suicide occurred (±2 years), and state. Matches were identified for 3893 cases, resulting in a final sample size of 7786. Cases with a history of cancer for which no matches were identified were excluded from the matched case analysis (n = 289).

Simple conditional logistic regression models examined differences between suicide decedents with and without a history of cancer by veteran status (individuals who ever served in the armed services) and suicide means. Multivariable conditional logistic regression models were used for comparisons for precipitating circumstances for suicide, adjusted for all demographic and circumstance variables. All analyses were conducted in 2017 in SPSS version 23, and significance level was set at $P < .05$.

3 | RESULTS

Suicide decedents with a history of cancer constituted 4.62% of suicide deaths for 2004 to 2013. Demographic characteristics of suicide decedents are shown in Table 1. The majority of suicide decedents with a history of cancer were male and non-Hispanic white, with a mean age of 65.4 years. Nearly half were married or living with a partner, and about 2 of 5 had served in the armed forces. Compared to decedents without a history of cancer, those with a history of cancer were more likely to be male, aged 55 to 64 years and 65 years or older, non-Hispanic white, married or living with a partner, widowed, divorced or separated, and veterans. The largest demographic differences were in age; more than half of decedents with a history of cancer were 65 or older, and 77% were 55 or older, compared to 28% of decedents without a cancer history who were 55 or older. Decedents with a cancer history were more likely to use a firearm and less likely to die of poisoning or suffocation.

Significant differences emerged on nearly all precipitating circumstances, with the exception of current depressed mood, having disclosed a history of suicidal thoughts, and having disclosed a history of suicidal intent. Decedents with a history of cancer were less likely to have a history of mental health problems, a history of mental health treatment, current mental health treatment, a history of suicide attempts, alcohol and other substance abuse problems, alcohol use immediately prior to suicide, intimate partner problems and other relationship problems, financial problems, eviction or loss of housing, job problems, and criminal or civil legal problems. Decedents with a cancer history were more likely to have experienced a recent crisis and to have left a suicide note.

The matched case-control analysis examined differences not accounted for by differences in demographic characteristics between the groups. There were no significant differences between the groups on veteran status in the matched case analyses (Table 2). Decedents with a history of cancer were significantly more likely to use a firearm and less likely to use suffocation as the suicide mechanism. Unadjusted matched case analyses were significant

for all precipitating circumstance variables, with a lower proportion of decedents with a history of cancer experiencing each of the precipitating circumstances. When controlling for demographic characteristics and all other precipitating circumstance variables, significantly fewer decedents with a history of cancer had mental health problems, current mental health treatment, history of suicide attempts, alcohol use problems, intimate partner problems, other relationship problems, financial problems, job problems, criminal or civil legal problems, and recent crisis. Significantly more decedents with a history of cancer had previously disclosed suicidal thoughts.

4 | CONCLUSIONS

This study found differences in demographic characteristics, suicide mechanism, and precipitating circumstances for suicide between decedents with a history of cancer and those without. More suicide decedents with a history of cancer were male, non-Hispanic white, aged 55 or older, married or widowed, and veterans. These findings indicate unique patterns of demographic risk that can help identify patients with cancer and survivors who may benefit from distress screening and referral to services. Some of these differences, such as older age, also reflect the age-related risk for cancer, as overall cancer risk increases with age and individuals over age 65 are most likely to be diagnosed.[23] Some of the associations, such as the fact that cancer-related suicides were more likely to be married, likely reflect demographic differences between the groups, such as older age. Nearly all precipitating circumstances for suicide were significantly less common among individuals without a history of cancer, with some exceptions. This pattern suggests that decedents with a history of cancer do not consistently exhibit the common precipitating factors for suicide that are often seen among suicide decedents and that a cancer diagnosis may precipitate risk of suicide, independent of other risk factors.

In the matched case analyses, suicide decedents with a history of cancer were less likely to experience most of the problems that commonly precipitate suicide. For example, decedents without a history of cancer were more likely to experience characteristics that indicate a long-standing mental health history. Fewer decedents with a history of cancer had mental health problems, past suicide attempts, and current mental health treatment. These differences indicate that suicide among individuals with cancer is less likely to occur in the context of mental health issues. However, more than 40% of decedents with a history of cancer were experiencing a depressed mood at the time of their suicide. It is important that healthcare providers be aware of the warning signs of suicide and prepared to discuss these with patients and refer them to appropriate services.

Decedents who had a history of cancer were more likely to have experienced a crisis during the 2 weeks before their suicide, and have disclosed suicidal thoughts. Findings suggest important opportunities for identifying individuals at risk for suicide for targeted intervention. Future analyses involving content analysis of the narratives could help determine whether such crises may have been related to cancer diagnosis, prognosis, or symptoms. Such analyses could help to guide suicide prevention efforts by identifying scenarios in which patients with cancer are at particularly high risk of suicidal behavior.

Firearms were the most common means of suicide, and decedents with a history of cancer were significantly more likely to die by firearm. One effective approach to suicide prevention is reducing access to lethal means. Studies have demonstrated that reducing access to firearms, particularly among people in distress, can prevent suicides. CDC's Preventing Suicide: A Technical Package of Policies, Programs, and Practices[24] provides an overview of evidence-supported strategies for preventing and reducing risk of suicide. Practices relevant to present findings include strengthening access and delivery of care to ensure safer suicide care through systems change and identifying and supporting people at risk. For instance, safe care involves access to health and behavioral healthcare and ensures continuity of care, quality improvement, and adequate and effective workforce training. Gatekeeper trainings, such as Applied Suicide Intervention Skills Training, could be used to increase healthcare providers' ability to identify patients with cancer at high risk of suicide and connect them with available resources.

Despite recommendations and standards of care[25,26] that encourage healthcare providers to conduct distress screening and refer patients to treatment and supportive services, provider adherence to these recommendations varies. In 1 study, for example, adherence to distress screening varied across clinics from 47% to 73% of eligible patients.[27]

4.1 | Study limitations

Findings are subject to several limitations. First, cases were identified through keyword search of NVDRS that included terms commonly associated with cancer. Although common misspellings were included, it is possible that some cases were not captured because of exclusion of relevant keywords from the search criteria. Information contained in NVDRS on cancer diagnoses varied in the detail provided; some cases indicated the victim "had a history of cancer," and other cases offered great detail about the cancer experience. Thus, the indication that the victim's cancer was a precipitating factor for suicide was more apparent in some cases than others.

National Violent Death Reporting System narrative data are collected from next of kin and other informants. Informants may not know all stressors and precipitating circumstances that led to suicide. In some cases, informants may be unwilling to share personal information because of stigma associated with certain characteristics, such as medical diagnoses and criminal problems. Data included in these analyses are thus limited by the thoroughness of suicide investigations, the level of detail provided, and informants' knowledge of factors that precipitated suicides. Cancer-related suicides may have thus been underreported, as they rely on awareness and disclosure on the part of informants of the precipitating circumstances of suicide.

Limited information was included regarding the cancer diagnosis. Cancer experiences may have preceded the suicide by a long time. Narratives also do not include information about the malignancy of tumors and rely on what decedents understood and shared about their diagnosis with others.

Finally, suicide data from only 17 states were included; thus, findings are not nationally representative. Analyses rely on multiple sources, including state and local medical

examiner, coroner, law enforcement, toxicology, and vital statistics records. Combining data across sources maximizes the likelihood that suicide cases are classified correctly. Nonetheless, because of the complexity of determining intent in violent deaths, some suicide cases may have been misclassified as homicide or unintentional deaths.

4.2 | Clinical implications

Findings highlight the need for distress screening and interventions to provide timely referrals for mental health services, especially for persons with a history or recent diagnosis of cancer. Universal distress screening and suicide risk assessments among individuals with cancer is important. The present findings indicate that suicide risk among individuals with a history of cancer does not necessarily accompany previous history of mental health or other risks of suicide. The patterns of suicide risk for patients with cancer may differ from the overall population. Clinicians may consider using screening and suicide risk assessments with patients with cancer to provide needed care for individuals with cancer.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

ACKNOWLEDGEMENTS

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention (CDC). We acknowledge the support of our colleague, J. Logan, who provided suggestions regarding the data analysis. This research was supported in part by an appointment (K. Ragan) to the Research Participation Program at CDC administered by the Oak Ridge Institute for Science and Education through an interagency agreement between the US Department of Energy and CDC.

Funding information

CDC; US Department of Energy (Office of Science, Office of Basic Energy Sciences and Energy Efficiency and Renewable Energy, Solar Energy Technology Program)

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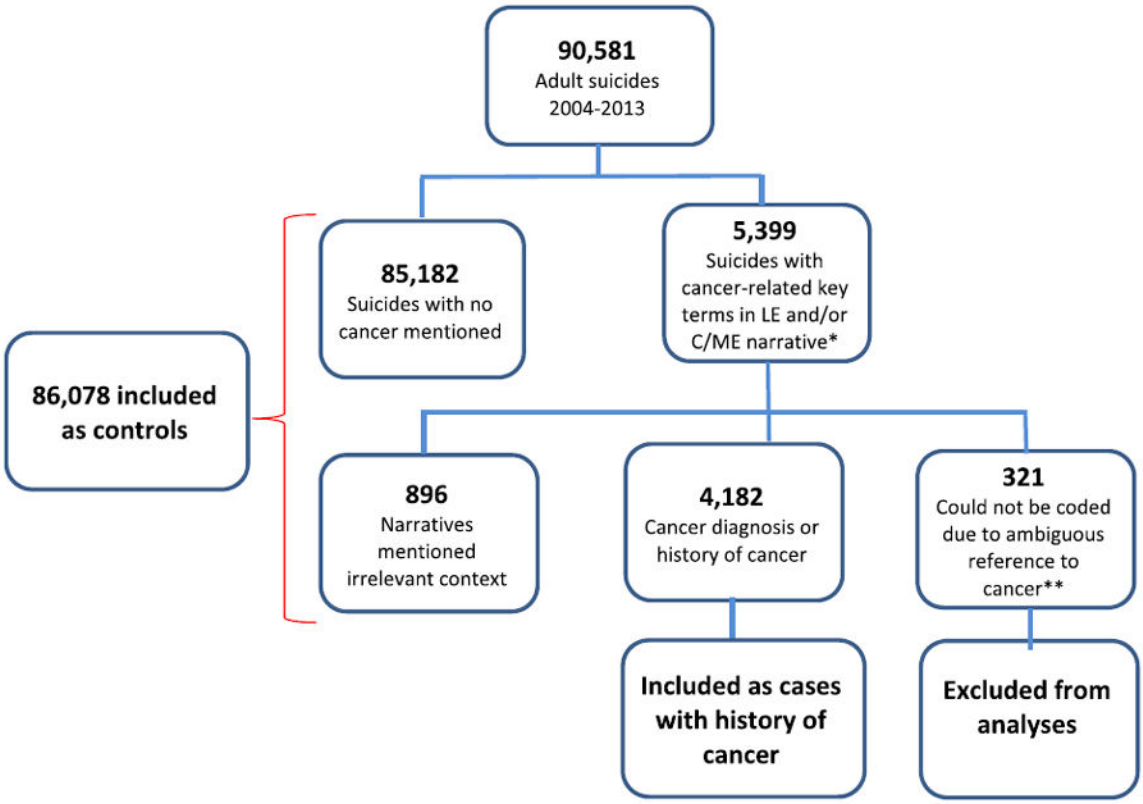

FIGURE 1.
Flow chart of case coding for suicide cases

TABLE 1

Demographic and incident characteristics for suicide decedents with and without a history of cancer

	Percentage (Number) with Characteristic		
Characteristic	**Decedents with a Cancer History (n = 4182)**	**No Cancer history (n = 86 078)**	**Odds Ratio (95% Confidence Interval)**
Male sex	81.8% (3421)	77.5% (66 984)	**1.30 (1.20–1.41)**
Mean age in years (SD)	65.4 (14.4)	45.8 (16.8)	
Age group in years			
18–34	0.4% (17)	11.0% (9471)	.03 (.02–.05)
35–44	6.0% (250)	20.0% (17 239)	.26 (.22–.29)
45–54	14.1% (591)	23.8% (20 529)	.53 (.48–.58)
55–64	22.0% (918)	15.3% (13 198)	**1.56 (1.46–1.68)**
≥65	55.3% (2314)	13.0% (11 275)	**8.25 (7.74–8.80)**
Race/ethnicity			
White, non-Hispanic	91.4% (3824)	84.8% (73 273)	**1.91 (1.71–2.14)**
Black, non-Hispanic	3.6% (151)	6.1% (5306)	.57 (.49–.68)
Hispanic	2.2% (91)	4.5% (3910)	.47 (.38–.58)
Other	2.7% (115)	4.4% (3835)	–
Marital status			
Married/living together as married	46.6% (1949)	36.7% (31 630)	**1.51 (1.42–1.61)**
Single, never married	11.0% (458)	31.9% (27 554)	.26 (.24–.29)
Widowed	15.7% (655)	5.8% (5007)	**3.02 (2.76–3.30)**
Divorced/separated	26.1% (1091)	24.6% (21 273)	**1.08 (1.01–1.16)**
Missing/unknown	0.6% (29)	1.0% (935)	–
Veteran status	41.2% (1706)	18.2% (15 618)	**3.15 (2.95–3.36)**
Suicide mechanism			
Firearm	71.3% (2979)	50.7% (43 714)	**2.41 (2.25–2.58)**
Poisoning	14.4% (600)	18.4% (15 909)	**.74 (.68–.81)**
Suffocation	9.8% (408)	24.3% (20 965)	**.34 (.30–.37)**
Sharp instrument	1.9% (79)	2.0% (1687)	.97 (.77–1.21)
Other	2.7% (111)	4.5% (3893)	–
Mental health problems	31.3% (1308)	45.3% (39 170)	**.550 (.51–.59)**
Current depressed mood	41.6% (1739)	41.4% (35 802)	1.01 (.95–1.07)
History of mental health treatment	26.2% (1094)	39.6% (34 243)	**.54 (.50–.58)**
Current mental health treatment	22.4% (937)	33.7% (29 084)	**.57 (.53–.61)**
History of suicide attempt	10.0% (419)	20.6% (17 764)	**.43 (.39–.48)**
Alcohol use problem	9.8% (411)	18.6% (16 113)	**.54 (.50–.58)**
Other substance abuse problem	5.3% (220)	15.6% (13 481)	**.30 (.26–.34)**
Alcohol use immediately prior to suicide	13.7% (574)	26.8% (23 147)	**.43 (.40–.48)**
Intimate partner problems	9.6% (402)	32.1% (27 712)	**.23 (.20–.25)**
Other relationship problems	3.9% (162)	8.0% (6953)	**.46 (.39–.54)**
Financial problems	6.2% (259)	12.6% (10 911)	**.46 (.40–.52)**
Eviction or loss of housing	1.2% (52)	2.7% (2353)	**.45 (.34–.59)**

Characteristic	Percentage (Number) with Characteristic		
	Decedents with a Cancer History (n = 4182)	No Cancer history (n = 86 078)	Odds Ratio (95% Confidence Interval)
Job problems	4.6% (191)	13.7% (11 878)	**.30 (.26–.35)**
Criminal or civil legal problem	2.9% (122)	10.2% (8815)	**.26 (.22–.32)**
Recent crisis	24.4% (1020)	21.7% (18 784)	**1.16 (1.08–1.25)**
Left a suicide note	34.8% (1455)	33.5% (28 973)	**1.06 (.99–1.13)**
Disclosed history of suicidal thoughts	7.1% (295)	7.6% (6587)	.92 (.82–1.04)
Disclosed history of suicidal intent	29.2% (1221)	28.5% (24 618)	1.04 (.97–1.11)

Notes: Data source: National Violent Death Reporting System. Unknown values are not presented; thus, variable counts may not total 100%. Bolded odds ratios are significant at the $P < .05$ level.

Table 2

Suicide means and precipitating circumstances of death for matched group suicide decedents with a history of cancer and those without a history of cancer

	Percent (No.) with Characteristic		Matched Prevalence Odds Ratios, 95% Confidence Intervals[a]	
Characteristic	**Decedents with a Cancer History (n = 3893)**	**Matched Decedents with No Cancer History (n = 3893)**	**Crude**	
Veteran status	41.2% (1602)	40.4% (1574)	.99 (.96–1.02)	
Suicide mechanism				
Firearm	71.9% (2798)	65.3% (2542)	**1.35 (1.17–1.56)**	
Poisoning	14.2% (553)	15.8% (614)	**Referent**	Adjusted for demographic and recent circumstance variables
Suffocation	9.3% (361)	13.9% (542)	**.75 (.62–.90)**	
Sharp instrument	1.9% (74)	1.9% (76)	1.10 (.77–1.55)	
Other	2.6% (102)	2.3% (111)		
Mental health problems	31.2% (1214)	42.2% (1642)	**.60 (.55–.67)**	**.67 (.56–.81)**
Current depressed mood	41.7% (1622)	45.5% (1770)	**.85 (.777–.93)**	.96 (.87–1.06)
History of mental health treatment	26.0% (1011)	35.4% (1377)	**.62 (.56–.69)**	1.28 (.97–1.70)
Current mental health treatment	22.2% (864)	31.2% (1216)	**.60 (.54–.67)**	**.68 (.53–.88)**
History of suicide attempts	10.1% (394)	14.6% (570)	**.63 (.54–.72)**	**.69 (.58–.81)**
Alcohol use problems	10.1% (394)	13.8% (539)	**.68 (.59–.79)**	**.81 (.69–.96)**
Other substance abuse problems	5.4% (212)	6.7% (259)	**.78 (.64–.96)**	.99 (.72–1.24)
Alcohol use immediately prior to suicide	13.9% (540)	17.7% (691)	**.98 (.96–.99)**	.99 (.97–1.00)
Intimate partner problems	9.7% (379)	18.8% (732)	**.41 (.35–.46)**	**.37 (.32–.44)**
Other relationship problems	3.9% (151)	6.3% (246)	**.57 (.46–.71)**	**.64 (.50–.81)**
Financial problems	6.3% (247)	11.4% (442)	**.50 (.42–.59)**	**.57 (.47–.70)**
Eviction or loss of housing	1.2% (47)	2.1% (81)	**.55 (.38–.81)**	.68 (.48–1.03)
Job problems	4.8% (187)	8.7% (337)	**.51 (.42–.62)**	**.62 (.50–.78)**
Criminal or civil legal problems	3.1% (119)	5.6% (217)	**.53 (.42–.67)**	**.42 (.32–.54)**
Recent crisis	24.9% (970)	20.0% (780)	**1.38 (1.23–1.55)**	**1.72 (1.51–1.96)**
Left a suicide note	35.0% (1362)	33.2% (1292)	1.08 (.99–1.20)	1.11 (1.00–1.23)
Disclosed history of suicidal thoughts	6.9% (267)	4.6% (181)	**1.63 (1.32–2.02)**	**1.98 (1.57–2.49)**
Disclosed history of suicidal intent	29.1% (1133)	29.7% (1156)	.97 (.88–1.07)	1.05 (.94–1.18)

Notes: Data source: National Violent Death Reporting System. Unknown values are not presented; thus, variable counts may not total 100%. Groups were matched on sex, age of decedent ±1 year, race/ethnicity, year of death ±2 years, marital status, and state of death. Bolded values significant at $P < .05$.

NA, not applicable.

[a]All odds ratios accounted for all variables in the match. Odds ratios = odds of the exposure among decedents without a cancer history divided by the odds of the exposure among decedents with a cancer history.