Risk of Completed and Attempted Suicide in Middle-Aged Vietnam-Era Veterans:
Results from Two National Samples

Rumi Kato Price¹, David M. Ledgerwood¹², Nathan K. Risk¹, Katherine S. Virgo³⁴,
Edward L. Spitznagel⁵, Collins E. Lewis¹

FOOTNOTES
Author affiliation: ¹ Department of Psychiatry, Washington University School of Medicine, St.
Louis, MO, 63108. ² David M. Ledgerwood is now at the Department of Psychiatry, University
of Connecticut Health Center, Farmington, CT, 06030. ³ Department of Surgery, St. Louis
University Health Sciences Center, St. Louis, MO, 63110. ⁴ Surgical Service, Department of
Veterans Affairs Medical Center, St. Louis, MO, 63103. ⁵ Department of Mathematics,
Washington University, St. Louis, MO, 63105.
Reprint address: Rumi Kato Price, Department of Psychiatry, Washington University School of
Medicine, 40 N. Kingshighway, Suite 2, St. Louis, MO 63108-1332.
Risk of Completed and Attempted Suicide in Middle-Aged Vietnam-Era Veterans:

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Abstract

A lingering controversy exists regarding the extent of suicidal risk among Vietnam veterans. Using two large national data sets, we examined risk for suicidality among Vietnam-era veterans ages 40 to 60 who currently constitute 23% in this age group of U.S. men. Compared to others of this age group, the odds ratio was 1.96 for Vietnam-era veterans’ completed suicide, and 1.51 for attempted suicide. The excess risk appears to result from incremental differences in several demographic and behavioral factors. A comprehensive intervention targeting physical, mental health, and substance abuse problems would reduce suicidal risk among aging at-risk Vietnam-era veterans.
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More attention has recently been given to the prevention of adolescent suicide (Gould, Greenberg, Velting, & Shaffer, 2003; Novick, Cibula, & Sutphen, 2003) and suicide in the elderly (Ron, 2002; Waern, Rubenowitz, & Wilhelmson, 2003) than to suicide in mid-life. Recent statistics for the United States show the suicide rate among the 40 to 60 age group in 2001 as 23.14 per 100,000 for males and 6.89 for females (CDC, 2003), and these rates have been relatively stable over the past three decades (Riggs, McGraw, & Keefover, 1996). Among males, the rate in 2001 compares to a suicide rate of 16.63 per 100,000 in youth (ages 15-24) and 35.29 per 100,000 in the elderly aged 70 years or older (CDC, 2003). These figures indicate that the suicide rate for middle-aged men is actually higher than the rate for men in younger age groups. A critical gap exists in our knowledge about the epidemiology and prevention of suicide in middle-aged men, perhaps reflective of the reluctance of males in this age group to seek help (Moller-Leimkuhler, 2003).

Approximately 9.2 million individuals served in the U.S. military during the Vietnam-era period (August 1964 to April 1975), of whom about 3.4 million were deployed in Vietnam (Department of Veteran Affairs, 2003). Almost three decades later, Vietnam-era veterans currently make up about 23% of men in the age group of 40 to 60 years old in the U.S. (CDC, 2003). The estimates of completed suicide among Vietnam-era veterans, however, have varied among reports (Pollock, Rhodes, Boyle, Decoufle, & McGee, 1990). Evidence for an excess risk for suicide among Vietnam-era veterans is equivocal (Bullman & Kang, 1995) depending on
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many factors including deployment to Vietnam (Watanabe & Kang, 1995), military branch (Crane, Barnard, Horsley, & Adena, 1997), rank, age group, years since discharge (CDC Vietnam Experience Study, 1987), and draft eligibility (Hearst, Newman, & Hulley, 1986). It is difficult to assess accurately the excess risk of suicide among Vietnam-era veterans in part because of a “healthy worker effect” (Crane et al., 1997). Veteran cohorts tend, in general, to be healthier than their civilian counterparts because of the selection process for military service as well as the requirement to maintain a specified level of physical fitness. Indeed, mortality studies of veterans show that their overall mortality rate is significantly lower than the rates of comparable civilian groups. This appears to hold true across different eras, genders (Thomas, Kang, & Dalager, 1991), and nationalities (Crane et al., 1997). Nonetheless, suicide risk appears to be elevated among selected subgroups of veterans, such as Vietnam veterans with combat exposure (Farberow, Kang, & Bullman, 1990) or physical injury (Bullman & Kang, 1996), when compared with other groups of Vietnam veterans or other veterans.

Psychiatric and environmental risk factors for suicidality have been well delineated through decades of research (Clark & Fawcett, 1992; Blumenthal & Kupfer, 1990; Moscicki, 1997). Furthermore, general population and clinical studies have found common predictors of both completed suicide and non-fatal suicidality, such as aging (Owens, 1990), not being married (Petronis, Samuels, Moscicki, & Anthony, 1990), living alone (Owens, 1990), feeling hopeless (Wetzel, 1976), having a physical illness (Perry, Jacobsberg, & Fishman, 1990), having a psychiatric illness (Nordentoft & Rubin, 1993), particularly depression (Hintikka et al., 1998; Kovacs, Goldston, & Gatsonis, 1993), as well as alcoholism (Murphy, 1992; Lewis, Rice, Andreasen, Clayton, & Endicott, 1985) and drug abuse (Saxon, Aldrich, & Kuncel, 1978; Roy,
Among veteran populations, psychiatric disorders in general (Fontana & Rosenheck, 1995; Thompson, Katz, Kane, & Sayers, 2000), but more specifically post-traumatic stress disorder (PTSD) (Kramer, Lindy, Green, Grace, & Leonard, 1994; Drescher, Rosen, Burling, & Foy, 2003) and depression (Farberow et al., 1990), are associated with both suicide and non-fatal suicidality. In addition, predictors of suicidality among combat veterans include physical trauma (Bullman & Kang, 1996) and survivor guilt (Hendin & Hass, 1991; Hyer, McCranie, Woods, & Boudewyns, 1990). Comorbidity of PTSD, depression, and other psychiatric difficulties appears to be associated with greater exposure to traumatic events (Engdahl, Dikel, Eberly, & Blank, 1998; Beckham et al., 1998). Both alcoholism (Windle, 1994; Fu et al., 2002) and drugs (Price, Risk, Haden, Lewis, & Spitznagel, in press) have also been linked to increased suicidality among Vietnam veterans.

No studies, to our knowledge, have systematically compared veterans with non-veteran men of the same age group to identify common and unique risk and protective factors that predict both completed and attempted suicide. The current study analyzes two large general-population data sets to examine death by suicide and non-fatal attempted suicide among Vietnam-era veterans between the ages 40 to 60, compared with all other men of the same age group. The first data set, the 1993 National Mortality Followback Survey (NMFS), contains information about deceased individuals, and provides information about factors that may have contributed to the completed suicide (CDC, 1998). The second data set, the National Longitudinal Alcohol Epidemiologic Survey (NLAES) (Grant, Peterson, Dawson, & Chou, 1994), includes measures of suicidal ideation and suicide attempts from in-person interviews with individuals (Grant &
Hasin, 1999). Both data sets include large numbers of men between the ages of 40 to 60, and both surveys were conducted during the same time period. Furthermore, each data set includes a sufficient number of similar measures of risk and protective factors for suicidality, thus providing a unique opportunity to compare common and unique factors for completed and attempted suicide.

The current study has practical and clinical significance not only for the well-being of veterans but also for their family members and the healthcare system at large. The rate of suicide in this sizable population of Vietnam-era veterans is expected to increase as they grow older. Examining the issue of suicide as a possible long-term adverse consequence of war will allow the mental health system to better understand the needs of military service veterans and prepare for the potentially increasing morbidity of currently active U.S. service men (NYT, 2004) in the future.

MATERIALS AND METHODS

Data sets

The 1993 National Mortality Followback Survey (NMFS) collected data on individuals across the United States who were 15 years and older and who died in 1993. Three linked records for 22,957 decedents constitute the NMFS data set, including death certificate information, a proxy respondent questionnaire, and medical examiner records for deaths. Death certificates from the Current Mortality Sample represented a 10% probability sample of death certificates received by the National Center for Health Statistics (which in turn was about 10% of all deaths occurring in the U.S. in 1993) (NMFS, 1998). The proxy interviews were completed with next-of-kin, or, if
next-of-kin was unavailable, another person who was familiar with the decedent. African Americans and those who died of external causes including suicide were among several oversampled groups.

The National Longitudinal Alcohol Epidemiologic Survey (NLAES) was conducted in 1992 by the Bureau of the Census under the design and sponsorship of the National Institute on Alcohol Abuse and Alcoholism. The NLAES is a national probability household survey of the population aged 18 years and older in the contiguous 48 states. One adult was selected at random from each household resulting in a representative sample of the civilian, non-institutionalized population (n = 42,862) (Grant et al., 1994). This large cross-sectional national survey contains sufficient information on risk and protective factors for non-fatal suicidality (Grant & Hasin, 1999).

The portions of the two data sets available in the public domain without respondents’ identifiers were analyzed. In both data sets, the Vietnam-era veteran category is defined as U.S. men who served in the military between August 1964 through April 1975. This included both those who were, and who were not, deployed to Southeast Asia during the Vietnam conflict. The age group of 40 to 60 years was selected for the current study. This age group represented 76.2% and 81.3% of the Vietnam-era veterans in the NMFS and NLAES respectively. A total of 2,825 men were selected from the NMFS data set, consisting of 494 (17.5%) Vietnam-era veterans and 2,331 “other” men (all men except Vietnam-era veterans). The sample excluded 19.4% (n = 675) of the deceased in this age category of men due to missing proxy interviews. The unweighted rate of completed suicide was 9.0% in the excluded group compared to 8.9% among those included in the current study. From the NLAES, a total sample of 5,462 men were selected, consisting of
1,277 (23.4%) Vietnam-era veterans and 4,185 “other” men.

We did not include men of the entire age range of Vietnam-era veterans because of the study’s focus on middle-aged men. Such inclusion criteria would have reduced the advantage of examining common factors, since predictors of suicidality are substantially different across age groups (Conwell et al., 1998). The excluded age groups of Vietnam-era veterans in the NMFS sample were 14.2% who were younger than 40 and 9.6% who were older than 60. In the NLAES, 13.4% were younger than 40 and 5.3% were older than 60. Given the small numbers of Vietnam-era veterans in these age categories (e.g., n = 62 deceased veterans ages 61 or older in NMFS), analyses separately of these sub-samples were judged under-powered.

**Measures**

**NMFS.** Cause of death was determined by the death certificate. Medical examiner/coroner reports were gathered for individuals whose cause of death was homicide, suicide, accident or undetermined (NMFS, 1998). Two non-fatal suicidality questions concerning the deceased were available from the proxy interviews: communication of suicide intent (“At any time in the last month of life, did (name) ever talk about taking his own life?”) and morbid thought (“During the last month of life, did (name) express a wish to die, or say that he wished that death would come quickly?”). The veteran’s status and a number of variables known to be associated with suicide were included in the proxy questionnaire.

**NLAES.** This survey was designed to assess a variety of psychiatric disorders and substance use disorders, with an emphasis on alcohol-related behaviors, according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (APA, 1994). Three questions were included in the depression section: morbid thought (“During that time...
when your mood was at its lowest/you enjoyed or cared least about things, did you ...feel like you wanted to die?”), suicidal ideation (“... think about suicide from time to time?”) and attempted suicide (“... attempt suicide?”). These questions were asked for lifetime conditioned on depressed mood, but the section also assessed past-year suicidality without depressed mood. Other variables selected for the current study were also obtained from self-report by the probands.

Differences between NMFS and NLAES. The outcome measures of the two data sets were different: while non-fatal suicidality was assessed in both surveys, completed suicide was assessed only in the NMFS, and attempted suicide only in the NLAES. Furthermore, the NMFS identified predictors of completed suicide compared to other deaths, whereas the NLAES identified predictors of attempted suicide in comparison to no suicide attempts.

Ten predictor measures available in both the NMFS and the NLAES were selected after an initial series of analyses. These included age, race, education, employment, marital status, living alone, alcohol problems, drug use problems, depression, and health problems. The measures differed in three important ways. First, the NMFS information was collected from death documents and proxy interviews, and the NLAES information was obtained from live probands. Second, the measures used for each survey differed in scope and time frame (Table 1). The measures of alcohol problems, drug use, and depression were assessed for the past year in the NMFS, whereas they were assessed for lifetime in the NLAES. Third, because the NMFS data were based on proxy interviews, precise diagnostic categorization was not possible. Thus, alcohol problems represented a syndrome approximating alcohol dependence; similarly, depression represented a syndrome suggestive of major depression. DSM-IV diagnoses of
alcohol dependence and major depression were available from the NLAES data set.

Data analysis

Taking advantage of large sample sizes of the two surveys, prevalence rates of suicidality were obtained separately for the Vietnam-era veterans and “others.” Because the NMFS survey contains only the deceased respondents, estimates of the number of suicides were separately obtained by combining the information from the NMSF data and vital statistics for the entire population corresponding to the two groups of men in the age group 40 to 60.

Weighted estimates of prevalence rates, and coefficients for logistic regressions were obtained with standard errors adjusted by the SUDAAN Taylor series linearization method (Shah, Barnwell, & Bieler, 1996). The differences in prevalence rates of suicidality, as well as demographics and behavioral characteristics, between the two groups were assessed for each logistic regression coefficient for Vietnam-era veterans using the Wald $\chi^2$ statistic. Odds ratios and confidence intervals for Vietnam-era veterans’ excess risk for suicidality compared to “other” men of the same age group were also presented. For multivariate logistic regression analyses, the outcome was completed suicide in the NMFS and lifetime attempted suicide in the NLAES. The analyses were conducted separately for Vietnam-era veterans and “others.” Confidence intervals around odds ratios were adjusted with use of the Taylor series method. Even though the age group of 40 to 60 years old was selected, the age distribution was still different between Vietnam-era veterans and “other” men and between the two data sets, thus age by decade was controlled as a covariate in the multivariate analyses. Finer age groups were determined to be unnecessary based on preliminary analyses. The model fit was assessed by an F statistic and a C index. The former assesses the extent of the model’s deviation from the null
hypothesis of no fit; the latter assesses the extent of the model’s predictive power which varies between 0.5 (under the null hypothesis) and 1.0 (perfect prediction). The magnitude of the differences in odds ratios of predictors were individually assessed using the estimates of individual beta coefficients and their standard errors. Additionally, analyses were repeated using the combined two groups to assess the excess risk of suicidality for Vietnam-era veterans controlling for other predictors.

RESULTS

Increased risk for suicidality among Vietnam-era veterans

The estimated proportion of completed suicides among Vietnam-era veterans ages 40 to 60 in 1993 is 22.64 per 100,000. The estimated proportion of completed suicides in the “other” men ages 40 to 60 in 1993 is 20.43 per 100,000. These numbers are based upon the weighted numbers of suicides in the NMSF data for these two categories and the corresponding total numbers in the population. While the veteran population did have a slightly higher death rate (ratio = 1.11), the ratio was not significantly different (95% confidence interval (CI) = 0.64, 1.58). The standard error of the ratio was computed using the delta method (Beers, 1957).

Among the deceased men in the age group of 40 to 60, however, 5.6% of Vietnam-era veterans’ deaths were due to suicide compared to 2.9% of “other” men’s deaths being due to suicide (Table 2). The odds ratio (OR) was 1.96 (95% CI = 1.23, 3.12), significant at p < 0.05 level. Based on proxy interviews, 11.1% of Vietnam-era veterans communicated about their suicidal intent in the last month compared to 4.8% of “others” (OR = 2.50, 95% CI = 0.78, 8.03). The percentage who expressed morbid thoughts in the last month was 25.5% in Vietnam-era
veterans compared to 15.3% among “other” men (OR = 1.89, 95% CI = 0.85, 4.20). Neither measure of non-lethal suicidality was significantly different between the two groups.

**NLAES.** In the 40 to 60 age group, 2.7% of Vietnam-era veterans reported an attempted suicide sometime in their lives compared to 1.8% of “other” men (OR = 1.51, 95% CI = 0.95, 2.39). Suicidal ideation was expressed by 10.7% of Vietnam-era veterans compared to 8.4% of “other” men (OR=1.31, 95% CI = 1.03, 1.66). Morbid thoughts were expressed by 11.0% of Vietnam-era veterans compared to 9.1% of “other” men. Only the percentage of patients with suicidal ideation differed significantly between the two groups.

**Demographic and behavioral characteristics**

In both the NMFS and NLAES data, Vietnam-era veterans compared to “other” men of the same age group were younger and more likely to have completed high school. In the NLAES (but not NMFS), Vietnam-era veterans were also significantly more likely to be employed, to have a DSM-IV diagnosis of alcohol dependence, and to have a history of illicit drug experimentation. Vietnam-era veterans, however, reported fewer health problems than other men.

**Relative importance of risk and protective factors for completed and attempted suicide**

**NMFS.** Results of logistic regression analyses run separately for Vietnam-era veterans and “other” men ages 40 to 60 are presented in Table 3. The overall model fit indicates the model contained important predictors for deceased veterans’ suicide (F = 5.07, df = 10, p < .0001). Among Vietnam-era veterans, deceased African American veterans were only one-fifth as likely as non-African American veterans to have died by suicide. Those who lived alone were over three times more likely to die by suicide. Vietnam-era veterans with alcohol problems were nearly five times as likely to die by suicide as those without alcohol problems. Depression was
also significantly associated with completed suicide, with depressed Vietnam-era veterans more
than three times as likely to die by suicide as non-depressed Vietnam-era veterans. Health
problems and employment were also significantly associated with completed suicide, but both
were in the opposite direction than expected: employment increased the risk of completed suicide
and health problems were a protective factor for completed suicide. However, the results are
confounded, because most deaths were natural deaths that were positively associated with lack of
employment and health problems, both of which were assessed for the year prior to death.

Predictors of completed suicide among “other” men showed patterns similar to those for
Vietnam-era veterans, with a significant overall model fit ($F = 10.68, df = 10, p < .0001$). Being
African American was a significant protective factor in that the risk was roughly one-eighth the
risk of non-African Americans. Drug use, even at an experimental level, tripled the risk for
completed suicide as compared with non-drug users. Again, health problems and employment
were significant predictors; however, the results were confounded by a majority of non-suicide
deaths resulting from serious medical illnesses.

**NLAES.** The overall models are statistically significant for both Vietnam-era veterans
and “other” men ($F = 6.05$ and $F = 10.68$ respectively; $df = 10, p < .0001$ for both). The C index
values of 0.87 and 0.82, respectively, indicate that the predictive power of the NLAES models
was better than in the NMFS models ($C = 0.71$ for Vietnam-era veterans and $C = 0.66$ for other
men). Among Vietnam-era veterans, employed veterans were less than half as likely as non-
employed veterans to attempt suicide (association in the expected direction), and married
veterans were significantly less likely to attempt suicide than unmarried veterans. Drug use and
depression were significant risk factors for attempted suicide, placing a veteran at about three and
half times the risk of non-drug using, or non-depressed veterans. Veterans with health problems were at about five times the risk of attempting suicide as compared to veterans without such problems.

Results for “other” men were similar for employment, depression and health problems, which were all significant predictors in this group. However, being an African American was a significant protective factor in that the risk for attempted suicide was roughly one-sixth the risk level for non-African Americans. On the other hand, marital status was not a significant protective factor. While drug use did not appear to increase risk for attempted suicide significantly, clinical alcohol dependence increased the odds by almost three times.

**Unique predictors among Vietnam-era veterans**

The levels of risk for completing suicide shown from the NMFS were significantly different between Vietnam-era veterans and “other” men for alcohol problems ($p = 0.04$) and depression ($p = 0.02$) (Table 3, 5th column). Those factors are significantly more important risk factors for completed suicide among Vietnam-era veterans in comparison to risk factors for “other” men. For NLAES, age uniquely affected the risk of attempted suicide. For Vietnam-era veterans, being 50 years old or older decreased the risk by more than two-thirds, but age did not make a difference for other men ($p = 0.07$) (Table 3, far right column). Additionally, being married and not having health problems were more important protective factors against suicide attempt ($p = 0.05$ and $p = 0.06$, respectively). However, there were no significant differences in the levels of risk of attempted suicide for any factor.

**Excess risk for Vietnam-era veterans controlling for demographic and behavioral factors**

Combining both Vietnam-era veterans and “other” men, deceased Vietnam-veterans were
found to be 50% (OR = 1.50) more likely to have died from suicide than deceased “other” men, controlling for the demographic and behavioral factors assessed separately for the two groups previously. However, the estimate was non-significant (95% CI = 0.87, 2.59). Excess risk for suicidal attempts for Vietnam-era veterans was 20% (OR = 1.20), and again the estimate was non-significant (95% CI 0.73, 1.97).

DISCUSSION

Among men 40 to 60 years old in the U.S., deceased Vietnam-era veterans were more likely to have died from suicide compared to other deceased men of the same age group. Significant risk factors for completed suicide among Vietnam-era veterans included living alone, alcohol problems, and depression. The sole significant protective factor was being African American. The risk for attempted suicide among Vietnam-era veterans, while elevated, was not significantly different from the risk of “other” men of the same age group. Significant risk factors for attempted suicide among Vietnam-era veterans included drug use, depression, and health problems, whereas significant protective factors were being older, employed, and married. Predictors for completed and attempted suicide among Vietnam-era veterans were similar to those of “other” men of this age group. However, stronger associations of alcohol problems and depression with completed suicide were found for Vietnam-era veterans. Marginal differences were found for age, marital status, and health problems as predictors of attempted suicide between the two groups. When controlling for risk and protective factors simultaneously, Vietnam-era veteran status did not significantly increase the risk for suicide and suicide attempts. The findings are consistent with other studies of male veterans that did not focus on combat
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veterans (e.g., Thoresen, Mehlum, & Moller, 2003).

Employment and health problems in NMFS showed associations with suicide in the opposite direction than expected. Employment was a risk factor for completed suicide and health problems was protective against completed suicide. These anomalies are a result of the nature of the data set. Most of the deceased in the sample died from natural causes. Thus, physical illnesses leading to unemployment toward the end of life had a stronger association with non-suicidal than suicide deaths.

Some limitations are inherent in the study of completed suicide and other non-fatal suicidality. The methodologies for data collection were rather different between the NMFS and NLAES. To obtain the sample size of Vietnam-era veterans who completed suicide available in NMFS (estimated n = 27) from a single data set containing both deceased and live subjects, a survey would have to include about 470,000 live male respondents of this age group at the baseline to be followed up in the subsequent year, including a search of over 2,800 death certificates (with a 0.6% death rate). A survey of that scale has never been done in suicide research, nor is it likely to be conducted in the near future.

The statistically significant finding of the study, an increased risk of completed suicide among Vietnam-era veterans ages 40 to 60 (OR=1.96; 95% CI = 1.23, 3.12) compared to the general population of the same age group, needs a cautionary interpretation, because the overall mortality of the Vietnam-era veterans was likely to be lower than that of “other” men due to a healthy worker effect. Based on the estimated numbers of suicides in 1993 among men ages 40 to 60, the excess risk of completed suicide among Vietnam-era veterans is estimated to be 16% higher than that of the of the other men in the general population in the U.S. (but not statistically
significant). Thus, the significantly elevated risk of death by suicide means not so much that the absolute number of suicides among Vietnam-era veterans is much higher than the number in the general population. Rather, Vietnam-era veterans disproportionately died by suicide in 1993 even though they are generally healthier than the rest of the U.S. male population of this age group.

At issue in suicide deaths are the validity of ICD coding (Moyer, Boyle, & Pollock, 1989) and multiple versus single causes of death (Tardon, Zaplana, Hernandez, & Cueto, 1995; Mackenbach, Kunst, Lautenbach, Bijlsma, & Oei, 1995). Such limitations are ameliorated by the use of mixed methodologies (i.e., death certification, autopsy results, and proxy interview) in the NMFS. Under-reporting is an issue with the measure of non-fatal suicidality. Research has shown that as many as 30% of those who commit or attempt suicide (Clark & Fawcett, 1992) and as many as 50% of depressed individuals who die by suicide (Fawcett et al., 1990) do not report their suicidal intent. Furthermore, there is some indication that uncommunicated suicide increases with age (Conwell et al., 1998). Nonetheless, under-reporting of suicidality applies to almost all suicide research.

Neither the NMFS nor the NLAES included measures on combat and related trauma, or resultant symptoms of PTSD. Thus, it was not possible to examine increased risks for combat Vietnam veterans. In the current study, the odds ratio of depression for completed suicide was 3.14 among deceased Vietnam-era veterans compared to 0.88 among other deceased men. It is possible (and likely) that some symptoms assessed by proxies are surrogates of PTSD symptoms, or depression was exacerbated by PTSD in this sample. Measures of methods used when attempting suicide were not available in NLAES, thus suicide lethality measures could not be included in the analyses. A higher risk of death by suicide among Vietnam-era veterans found in
In summary, limited to men in the age group of 40 to 60 years, this study provides good evidence for a significantly higher proportion of deaths by suicide and inconclusive results for an elevated risk for attempted suicide among Vietnam-era veterans, compared to the rest of the male population. However, our results demonstrate that many of the factors that are characteristics of completed and attempted suicide among Vietnam-era veterans are similar to those for the general population of middle-aged men. Only a few statistically significant differences were found between Vietnam-era veterans and “other” men based on the predictors of suicidality available across the two data sets. The excess risk of completed and attempted suicide among Vietnam-era veterans, compared to other males of the age group 40 to 60, appears in large part to have resulted from incremental differences in several demographic and behavioral factors. When these factors are controlled, Vietnam-era veteran status was not a significant risk factor. Therefore, an intervention that places an emphasis on the combination of physical, mental health, and substance abuse problems could be useful in reducing the suicidality risk among aging Vietnam-era veterans. Consideration should also be given to a similar strategy for the current generation of young military men serving in global war zones to reduce the risk of their suicide in years to come.
ACKNOWLEDGMENTS

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TABLE 1


<table>
<thead>
<tr>
<th></th>
<th>NMFS&lt;sup&gt;a&lt;/sup&gt;</th>
<th>NLAES&lt;sup&gt;b&lt;/sup&gt;</th>
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<tbody>
<tr>
<td><strong>Outcome</strong></td>
<td>Past year</td>
<td>Lifetime&lt;sup&gt;c&lt;/sup&gt;</td>
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<tr>
<td></td>
<td>Completed suicide</td>
<td>Attempted suicide</td>
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<td><strong>Predictors</strong></td>
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<tr>
<td>Education</td>
<td>Time of death</td>
<td>Time of interview</td>
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<tr>
<td></td>
<td>No high school diploma</td>
<td>No high school diploma</td>
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<tr>
<td>Employment</td>
<td>Past year</td>
<td>Time of interview</td>
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<td></td>
<td>Any work at all in the past year</td>
<td>Employed full-time or part-time</td>
</tr>
<tr>
<td>Marital status</td>
<td>Time of death</td>
<td>Time of interview</td>
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<tr>
<td></td>
<td>Being married</td>
<td>Being married</td>
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<tr>
<td>Living alone</td>
<td>Past year</td>
<td>Time of interview</td>
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<td></td>
<td>Lived alone</td>
<td>Living alone</td>
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<tr>
<td><strong>Alcohol problems</strong></td>
<td><strong>Past year</strong></td>
<td>Three or more of alcohol symptoms related to alcohol dependence(^d)</td>
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<tr>
<td><strong>Drug use</strong></td>
<td><strong>Past year</strong></td>
<td>Any non-prescribed use or overuse of psychoactive substances, including 11 types(^e)</td>
</tr>
<tr>
<td><strong>Depression</strong></td>
<td><strong>Past year</strong></td>
<td>Four or more symptoms suggestive of clinical major depression(^f)</td>
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<tr>
<td><strong>Health problems</strong></td>
<td><strong>Lifetime</strong></td>
<td>Two or more major health problems(^g)</td>
</tr>
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</table>

**Note.** Age and race measures are identical across the two surveys.


\(^c\) The combined measure includes lifetime assessment of attempted suicide conditioned on depressive mode and/or attempted suicide in past year without report of depressive mode.
Available symptoms include frequent drinking, spending a lot of time drunk or hungover, failure to cut down, annoyed by criticism of drinking, felt guilty about drinking, morning drinking, or advised by a doctor to stop or decrease drinking.

For NMFS, substances include antidepressants, cocaine, hallucinogens, heroin, marijuana, methadone, pain killers, sedatives, steroids, stimulants, or tranquilizers; for NLAES, substances include cocaine, heroin, marijuana, methadone, pain killers, sedatives, stimulants, tranquilizers, and others.

Available symptoms include change in appetite, drowsy or sluggish, feelings of guilt, having trouble concentrating, long periods of crying, trouble sleeping, and being withdrawn.

For NMFS, health problems include Alzheimer’s, cancer, cirrhosis, diabetes, emphysema, and stroke; for NLAES, problems include arthritis, cancer, cirrhosis, diabetes, epilepsy, emphysema, heart attack, high blood pressure, hepatitis, and stroke.
TABLE 2

Demographic and Behavioral Characteristics of Men 40-60 Years Old in the National Mortality Followback Survey and the National Longitudinal Alcohol Epidemiologic Survey

<table>
<thead>
<tr>
<th></th>
<th>NMFS&lt;sup&gt;a&lt;/sup&gt;</th>
<th>NLAES&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vietnam-era veteran</td>
<td>(n = 494)</td>
<td>(n = 1,277)</td>
</tr>
<tr>
<td>Other</td>
<td>(n = 2,331)</td>
<td>(n = 4,185)</td>
</tr>
</tbody>
</table>

Suicidality

<table>
<thead>
<tr>
<th></th>
<th>NMFS&lt;sup&gt;a&lt;/sup&gt;</th>
<th>NLAES&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed suicide (%)</td>
<td>5.6*</td>
<td>2.9*</td>
</tr>
<tr>
<td>Attempted suicide (%)</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Communication of suicide intent (%)</td>
<td>11.1</td>
<td>4.8</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Group 1</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Suicidal ideation (%)</td>
<td></td>
<td>...</td>
</tr>
<tr>
<td>Morbid thought (%)</td>
<td></td>
<td>25.5</td>
</tr>
<tr>
<td>Demographic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (% 50 years old or older)</td>
<td></td>
<td>39.8*</td>
</tr>
<tr>
<td>Race (% African American)</td>
<td></td>
<td>21.8</td>
</tr>
<tr>
<td>Education (% no high school diploma)</td>
<td></td>
<td>20.7*</td>
</tr>
<tr>
<td>Employment (% employed)</td>
<td></td>
<td>48.3</td>
</tr>
<tr>
<td>Marital status (% currently married)</td>
<td></td>
<td>54.4</td>
</tr>
<tr>
<td>Behavioral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living alone (%)</td>
<td></td>
<td>16.2</td>
</tr>
<tr>
<td>Alcohol problems (%)</td>
<td></td>
<td>35.6</td>
</tr>
<tr>
<td>Drug use (%)</td>
<td></td>
<td>10.9</td>
</tr>
<tr>
<td></td>
<td>Vietnam-era Veterans</td>
<td>Others</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>Depression (%)</strong></td>
<td>29.3</td>
<td>30.5</td>
</tr>
<tr>
<td><strong>Health problems (%)</strong></td>
<td>23.6</td>
<td>31.9</td>
</tr>
</tbody>
</table>

**Note.** The percentages are shown separately for Vietnam-era veterans and others. They are weighted with standard errors adjusted by the SUDAAN Taylor series method. * indicates $p < .05$ based on using the Wald $\chi^2$ statistic testing an unadjusted logistic regression coefficient for Vietnam-era veterans compared to “others” (two-tail test).

*a* The National Mortality Followback Survey, 1993, men aged 40 to 60 years old at the time of death.

*b* The National Longitudinal Alcohol Epidemiologic Survey, 1992, men aged 40 to 60 years old at the time of interview.

*c* See Table 1 for a description of each of the four behavioral measures.
TABLE 3

Comparing the Relative Magnitude of Associations of Predictors for Suicide and Suicide Attempt Between Vietnam-Era Veterans and Other Males of Ages 40 to 60 Years Old

<table>
<thead>
<tr>
<th>Predictors</th>
<th>NMFS(^{a}) (outcome = completed suicide)</th>
<th>NLAES(^{b}) (outcome = attempted suicide)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vietnam-era ((n = 494)) Other ((n = 2,331))</td>
<td>Vietnam-era ((n = 1,277)) Other ((n = 4,185))</td>
</tr>
<tr>
<td></td>
<td>p-value for differences of beta coefficients</td>
<td>p-value for differences of beta coefficients</td>
</tr>
<tr>
<td>Age (50 years or older)</td>
<td>0.54 0.20, 1.50 0.60 0.38, 0.96 0.86 0.26* 0.07, 0.95 0.93 0.54, 1.59</td>
<td>0.07</td>
</tr>
<tr>
<td>Race (African American)</td>
<td>0.20* 0.06, 0.66 0.12* 0.06, 0.22 0.47 0.57 0.17, 1.87 0.16* 0.05, 0.57</td>
<td>0.15</td>
</tr>
<tr>
<td>Variable</td>
<td>Values</td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td>Education (no high school diploma)</td>
<td>0.53, 1.78, 1.43, 0.87, 2.36</td>
<td>0.14, 1.01, 1.28, 3.58, 1.23</td>
</tr>
<tr>
<td>Employment (currently employed)</td>
<td>3.98*, 1.42, 11.11</td>
<td>2.01*, 1.24, 3.25</td>
</tr>
<tr>
<td>Marital status</td>
<td>1.94, 0.67, 5.64</td>
<td>1.02, 0.57, 1.81</td>
</tr>
<tr>
<td>Living alone</td>
<td>3.42*, 1.16, 10.09</td>
<td>1.42, 0.78, 2.57</td>
</tr>
<tr>
<td>Alcohol problem&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4.90*, 2.04, 11.76</td>
<td>1.69, 1.03, 2.78</td>
</tr>
<tr>
<td>Drug use&lt;sup&gt;c&lt;/sup&gt;</td>
<td>2.13, 0.74, 6.15</td>
<td>3.01*, 1.45, 6.26</td>
</tr>
<tr>
<td>Depression&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3.14*, 1.23, 7.98</td>
<td>0.88, 0.49-1.58</td>
</tr>
<tr>
<td>Health problems&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.10*, 0.02, 0.51</td>
<td>.25*, 0.14, 0.46</td>
</tr>
<tr>
<td>Model fit&lt;sup&gt;d&lt;/sup&gt;</td>
<td>F = 5.07</td>
<td>F = 10.68</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td>C = 0.71</td>
<td>C = 0.66</td>
</tr>
</tbody>
</table>

**Note.** The adjusted odds ratios (OR) and 95% confidence intervals (CI) are shown separately for Vietnam-era veterans and “others.” They are weighted with standard errors adjusted by the SUDAAN Taylor series method. * indicates \( p < .05 \) for the regression coefficient for individual logistic regression. A \( p \)-value listed in the last column for each data set is the significance level of the \( t \)-value for the difference of two regression coefficients between Vietnam-era veterans and “others” (two-tail test).

<sup>a</sup> The National Mortality Followback Survey, 1993, men aged 40 to 60 years old at the time of death.

<sup>b</sup> The National Longitudinal Alcohol Epidemiologic Survey, 1992, men aged 40 to 60 years old at the time of interview.

<sup>c</sup> See Table 1 for a description of each of the four behavioral measures.

<sup>d</sup> df = 10, \( p < 0.0001 \) for all F statistics. The C index varies from 0.5 under the null hypothesis to the maximum 1.00.