2024
National Veteran Suicide Prevention ANNUAL REPORT

Methods Summary

Office of Suicide Prevention

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VA | U.S. Department of Veterans Affairs

Overview

This document provides background regarding the methods used by the Department of Veterans Affairs (VA) Office of Suicide Prevention (OSP) to assess suicide mortality among Veterans.

This work is conducted by the OSP Suicide Prevention Program Data and Surveillance Team, which includes VA staff from the Center of Excellence for Suicide Prevention (COESP) and the Serious Mental Illness Treatment Resource and Evaluation Center (SMITREC). Suicide surveillance processes include close coordination with federal colleagues in the Department of Defense (DoD) and the Centers for Disease Control and Prevention (CDC).

This document summarizes VA suicide surveillance processes, including conduct of VA/DoD searches of death certificate data from the CDC National Death Index (NDI), data processing, and determination of decedent Veteran status.

The report includes Veteran mortality data from all 50 states and the District of Columbia. Accompanying the report are suicide data sheets for each state, the District of Columbia, Puerto Rico, and U.S. island territories.

Annual VA/DoD NDI Search: Building Search List

VA analysts coordinate with staff at the DoD Defense Manpower Data Center (DMDC) to compile a list of identifiers for all known Veterans, current and former service members, and other VA-engaged persons. To develop this list, data is combined from multiple sources, including Veterans Health Administration (VHA) clinical, administrative, and enrollment records; the United States Veterans Eligibility Trends and Statistics (USVETS) database maintained by the VA Office of Enterprise Integration; and service-era rosters and registry files maintained by the VA Health Outcomes Military Exposures (HOME) program. To this data, DMDC staff adds records of all current and former service members from DoD personnel files.

National Death Index

The combined list of identifiers is sent to CDC NDI staff to be used to identify possible matching death certificates. Data available from the NDI includes reports of mortality from vital statistics systems in all 50 U.S. states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. Deaths from Guam, American Samoa, and the Northern Marianas are included as available. CDC conducts checks and validation of these records. Additionally, NDI includes some records of out-of-country deaths of U.S. military personnel; no information is available on the out-of-country deaths of civilian U.S. citizens.[1]

Identifying Death Records

NDI returns all submitted records to VA/DoD. Match records are returned with a score indicating the probability that a given set of provided identifiers matched to a death certificate present in the NDI. Following receipt and initial review of the results returned by NDI, analysts use an algorithm to identify what is considered true match death certificate data. This algorithm selects the best matching death certificate, based on the probability score and other criteria from all possible matches returned for a given set of identifiers. Matching results returned from the NDI, although derived from state death certificate data, do not include any added demographic information. Rather, they indicate whether select identifiers (e.g., SSN, name, birth date, sex) that were submitted to NDI for the search corresponded with those of a

[1] Centers for Disease Control and Prevention, National Center for Health Statistics. NCHS Fact Sheet August 2020. National Death Index. cdc.gov/nchs/data/factsheets/factsheet_ndi.pdf.

potentially matching NDI death certificate record. Results of VA/DoD searches of the NDI are maintained in the VA/DoD Mortality Data Repository.

Suicide deaths are identified based on the underlying cause of death recorded on the death certificate per the NDI data. Suicides include all deaths with International Classification of Diseases, Tenth Revision (ICD–10) underlying cause-of-death codes X60-X84, U03, and Y87.0. Method of injury for suicide deaths are identified based on ICD–10 codes: firearm (X72-X74), suffocation (X70), poisoning (X60-X69), and all other (U03, X71, X75-X84, Y87.0).

Veteran Status

VA analysts use a data-defined approach to best identify a decedent's Veteran status at their time of death, relying on the most current data available from DMDC and from VA. Specifically, for this report and based on the available data, Veterans are identified as persons who served on federal active duty, other than for training, and were not currently serving at the time of their death. For all military service members with service after 1974, when the DoD electronic personnel data begins, DMDC provides VA with data indicating: if a given decedent has a personnel record and was federally activated and whether the individual died while still in service. DMDC information is used to distinguish Veterans from those who were currently serving at their time of death or without indications of having been federally activated other than for training. For decedents not identified in DMDC electronic personnel data sources (e.g., military service prior to 1974), VA data, including the Veteran Object data, administrative patient records, and service-era rosters, is used to determine if individuals were Veterans.

Additional Notes on Death Certificate Data

State death certificates include "ever served in the U.S. armed forces." This has a broader definition than the identification of Veteran status per this report. "Ever served in the U.S. armed forces" would include decedents who were never federally activated other than for training and those who were current service members at their time of death. In addition to identifying a different population, this information recorded on the state death certificates can be unreliable.[2] Regardless, CDC does not make this information available through the NDI and VA does not have access to this data.

At present, there is no comprehensive roster of all Veterans, particularly those who served prior to the implementation of DoD's electronic personnel data in the 1970s. The largest single data source, the USVETS database, acknowledges that identification of Veterans over age 65, estimated to refer to those born in the 1950s or earlier, is incomplete. For this report, we rely on a broad combination of data sources, including available DoD personnel data, the Veteran Object data, and HOME service-era rosters, to identify the entire Veteran population. Individual data sources are updated over time, and each annual VA suicide report includes the most current available data. Consequently, annual report information is updated and enhanced with each new report. This improves ongoing Veteran suicide surveillance.

The NDI is limited to deaths occurring in the 50 U.S. states, the District of Columbia, and Puerto Rico from 1979 onward. Deaths in other U.S. territories are included as available but are not considered complete for all years. U.S. citizen civilian deaths outside the United States and territories or any deaths prior to 1979 are not included in the NDI.

[2] Hoffmire CA, Piegari RI, Bossarte RM. 2013. Misclassification of Veteran Status on Washington State Death Certificates for Suicides from 1999 to 2008.Annals of Epidemiology. 23(5):298-300.

Mortality Rate Calculations

Unadjusted suicide rates are calculated as the number of suicide deaths in the year divided by the "population at risk." For the Veteran population, risk time was assessed using the mid-year (July 1) population estimate derived from the Veteran Population Projection Model 2020 (VetPop2020).[3] The National Center for Health Statistics (NCHS) population estimates[4] were used for the general U.S. adult population, and the non-Veteran adult population was estimated by subtracting Veterans from the general U.S. adult population. Where data enabled calculation of time at risk for suicide for each individual, rates are presented as "per 100,000 person-years."

Calculating adjusted rates (e.g., age-adjusted) enables rate comparisons while adjusting for population demographic differences. Per standard practice, age-adjusted and age- and sex-adjusted rates reported are directly adjusted, using the 2000 U.S. projected population as the standard.[5]

2024 Updates

The 2024 report incorporates several areas of new or enhanced content, including assessment of suicide rates for Veterans with VHA diagnoses of attention-deficit hyperactivity disorder, cancer, COVID-19 infection, nicotine use, and menopausal hormone therapy; with VHA documented non-fatal suicide attempts and behavioral patient record flags; with positive screening assessments for military sexual trauma; and with documented contacts with the Veterans Crisis Line. For recipients of VA-funded Community Care, new content includes population demographic, clinical, and health care utilization indicators. New content also includes suicide rates following military separations for Veterans with Defense Health Agency diagnoses indicating suicide attempts, suicidal ideation, mental health conditions, or substance use disorders.

The present report represents the most complete, current assessment of Veteran suicide mortality, and findings from this report supersede information reported previously.

[3] Veteran Population Projection Model 2020 (VetPop2020), Predictive Analytics and Actuary, Office of Enterprise Integration, Department of Veterans Affairs.

[4] Centers for Disease Control and Prevention, National Center for Health Statistics, Single-Race Population Estimates, United States, 2022. July 1st resident population by state, age, sex, single-race, and Hispanic origin, on CDC WONDER Online Database. Vintage 2022 estimates released by U.S. Census Bureau on June 22, 2023. Accessed at wonder.cdc.gov/single-race-single-year-v2022.html.

[5] Klein RJ, Schoenborn CA. Age Adjustment Using the 2000 Projected U.S. Population. Healthy People Statistical Notes, No. 20. Hyattsville, Maryland: National Center for Health Statistics. January 2001. The report includes age-adjusted rates stratified by sex. Age- and sex-adjusted rates, standardized to the U.S. adult population of 2000, are included in the national data appendix for the purpose of comparison to prior reporting.

Glossary

Term	*Brief Explanation*
adjusted rate	Adjusted rates translate the unadjusted rate for a population into a measure of what the rate would be if the compared populations had the same distributions of the demographic factors that are adjusted for (e.g., age).
Department of Veterans Affairs (VA)	An independent federal agency under the president of the United States, with a mission of serving Veterans and their families. VA includes three organizations: Veterans Health Administration, Veterans Benefits Administration, and National Cemetery Administration.
Lethal Means	Lethal Means describes the method by which a person dies by suicide. We categorize as firearm, poisoning (including intentional overdose), suffocation, and other means (including cutting, drowning, falling, fire, motor vehicle, being struck, or an unspecified injury).
Other Veterans	In this report, annual cohorts of "Other Veterans" are defined as Veterans who were alive as of the start of the year of interest and who were not categorized as "Recent Veteran VHA Users" that year.
person-years	"Person-years" in this report refers to the cumulative amount of time (expressed in years) at risk for the specified outcome of interest in a population during a defined period, summing time contributed by each person, in units of years.
rate	A measure of how commonly something occurs in a population, with time explicitly included in the denominator. A rate is calculated as the number of events divided by the cumulative person-years at risk for the event in the population.
rate ratio	A method of comparing rates in two populations. The rate in the first population is divided by the rate in the second population.[6]
Recent Veteran VHA Users	In this report, "Recent Veteran VHA Users" are defined as Veterans who were alive at the start of the year of interest and received VHA health care that year or the prior year.
standardized mortality ratio (SMR)	A method of comparing mortality in two populations that controls for demographic differences, calculated as the ratio of the number of deaths observed in a population to the number of deaths that would be expected in the population if the population experienced the same rates as those of a comparison population. An SMR greater than 1.0 indicates more deaths than expected. An SMR less than 1.0 indicates fewer deaths than expected.
suicide	Death caused by self-injury or harm, with the intent to die. In this report, suicide deaths are identified based on the underlying cause of death indicated on the death certificate.
suppression	To protect privacy, counts or rates of overdose mortality are suppressed (i.e., not reported) when based on fewer than 10 deaths, per CDC standards.
Veteran	For this report, Veterans were defined as people who had been activated for federal military service and were not currently serving at the time of their death.

[6] If the ratio is greater than 1.0, that means the rate is greater in the first population. If the ratio is exactly 1.0, that means the rates are the same. If the ratio is less than 1.0, that means the rate is greater in the second population.

Highlighting Select Measures

Suicide ***COUNTS*** tell us the *number* of suicide deaths in a given population during a time period.

Veterans (population size: 18,468,000)	Non-Veteran U.S. Adults (population size: 242,368,730)
6,407 Veterans died by suicide in 2022.	**41,484 non-Veteran U.S. adults** died by suicide in 2022.

For considering suicide **risks**, comparing **suicide COUNTS** is insufficient, as the populations have different sizes.

A ***RATE*** presents information accounting for differences in population sizes (e.g., "suicide rate per 100,000").

Veterans in 2022:

	Suicide Count	Population	Rate=(Count/Population) x 100,000
Veterans	6,407	18,468,000	**34.7** per 100,000
Female Veterans	271	2,014,000	**13.5** per 100,000
Male Veterans	6,136	16,454,000	**37.3** per 100,000

Non-Veteran U.S. Adults in 2022:

	Suicide Count	Population	Rate=(Count/Population) x 100,000
Non-Veteran Adults	41,484	242,368,730	**17.1** per 100,000
Female Non-Veterans	9,447	130,613,446	**7.2** per 100,000
Male Non-Veterans	32,037	111,755,284	**28.7** per 100,000

Among U.S. adults, suicide rates differ by Veteran status. Rates also differ by **sex** (see above) and by **age** (see below). The report presents **ratios of unadjusted suicide rates**, stratified by sex and age groups, for 2001-2022. These highlight differences in suicide mortality by Veteran status for specific age and sex subgroups of U.S. adults. They offer many separate points of comparison.

To synthesize to a single point of comparison, it can also be helpful to adjust for differences in population demographics. For example, the ***AGE-ADJUSTED RATE*** for female adults estimates the count of cases that would be **"expected"**[7] among female Veterans and female non-Veteran U.S. adults if each population had the same age distribution as the standard population (2000 U.S. adult population) and divides these estimates by the total standard population.[8]

$$\text{Age-Adjusted Suicide Rate for Veterans} = \frac{\text{Expected Count in Standard Population}}{\text{Total Standard Population}}$$

	Veteran Suicide Rate	Standard Population	Expected Count=Rate x Standard Population
Female Veterans 18-34	17.1 per 100,000	63,491,000	10,830.8

	Non-Veteran Suicide Rate	Standard Population	Expected Count=Rate x Standard Population
Female Non-Veterans 18-34	7.1 per 100,000	63,491,000	4,502.8

[7] A statistical term, the "expected" count is calculated as the observed subgroup-specific suicide rate multiplied by each subgroup's portion of the standard population; these are summed for an overall expected count.

[8] Klein RJ, Schoenborn CA. Age Adjustment Using the 2000 Projected U.S. Population. Healthy People 2000 Statistical Notes, No. 20. Hyattsville, Maryland: National Center for Health Statistics. January 2001.

Female Veterans 35-54	15.6 per 100,000	81,689,000	12,748.0
Female Veterans 55+	10.1 per 100,000	58,671,000	5,914.1
Sum		**203,851,000**	**29,492.9**

Adjusted Rate = $\frac{29{,}492.9}{203{,}851{,}000}$ = **14.5 per 100,000**

Female Non-Veterans 35-54	8.3 per 100,000	81,689,000	6,790.4
Female Non-Veterans 55+	6.5 per 100,000	42,097,000	3,807.6
Sum		**203,851,000**	**15,100.8**

Adjusted Rate = $\frac{15{,}100.8}{203{,}851{,}000}$ = **7.4 per 100,000**

The ***AGE-ADJUSTED RATE RATIO*** **for females in 2022 was** $\frac{\text{14.5 per 100,000}}{\text{7.4 per 100,000}}$ **= 1.953**. This means that, accounting for age differences, the suicide rate for female Veterans in 2022 was 1.953 times that of female non-Veteran U.S. adults (95.3% higher).

	Veteran Suicide Rate	**Standard Population**	**Expected Count=Rate x Standard Population**
Male Veterans 18-34	54.8 per 100,000	63,491,000	34,803.5
Male Veterans 35-54	39.5 per 100,000	81,689,000	32,303.4
Male Veterans 55-74	33.5 per 100,000	42,097,000	14,097.0
Male Veterans 75+	34.7 per 100,000	16,574,000	5,743.7
Sum		**203,851,000**	**86,947.5**

Adjusted Rate = $\frac{86{,}947.5}{203{,}851{,}000}$ = **42.7 per 100,000**

	Non-Veteran Suicide Rate	**Standard Population**	**Expected Count=Rate x Standard Population**
Male Non-Veterans 18-34	26.8 per 100,000	63,491,000	17,030.6
Male Non-Veterans 35-54	28.3 per 100,000	81,689,000	23,119.1
Male Non-Veterans 55-74	27.4 per 100,000	42,097,000	11,531.7
Male Non-Veterans 75+	51.7 per 100,000	16,574,000	8,562.3
Sum		**203,851,000**	**60,243.7**

Adjusted Rate = $\frac{60{,}243.7}{203{,}851{,}000}$ = **29.6 per 100,000**

The ***AGE-ADJUSTED RATE RATIO*** **for males in 2022 was** $\frac{\text{42.7 per 100,000}}{\text{29.6 per 100,000}}$ **= 1.443**. This means that, accounting for age differences, the suicide rate for male Veterans in 2022 was 1.443 times that of male non-Veteran U.S. adults (44.3% higher).

The ***STANDARDIZED MORTALITY RATIO*** provides another way to compare suicide risk in two groups.

It compares the OBSERVED number of deaths in a group to the number that would be EXPECTED in that group if it had the same subgroup-specific rates as a comparison population. (This is a different expectation than in the adjusted rate above.) Here, we might want to know how many suicide deaths would be expected among **Veterans** if they had the same subgroup-specific rates as **non-Veteran U.S. adults**. The **expected count** is the **Veteran population** multiplied by the observed **rate among non-Veteran U.S. adults**.

Standardized Mortality Ratio= $\frac{\textbf{Observed Count among Veterans}}{\textbf{Expected Count among Veterans}}$

	Non-Veteran U.S. Adult Female Suicide Rate	Female Veteran Population	Expected Female Veteran Suicide Count=Rate x Population
18-34	7.1 per 100,000	340,000	24.1
35-54	8.3 per 100,000	801,000	66.6
55-74	7.2 per 100,000	734,000	52.5
75+	4.6 per 100,000	139,000	6.4
Sum		**2,014,000**	**149.7**

The female age-**STANDARDIZED MORTALITY RATIO** for Veterans is:

$$\frac{271}{149.7} = 1.811$$

The female age-standardized mortality ratio was 1.811, meaning that, adjusting for age, there were 1.811 times as many suicide deaths among **female** Veterans as would be expected if they had the same rates as **female** non-Veteran U.S. adults (81.1% more).

	Non-Veteran U.S. Adult Male Suicide Rate	Male Veteran Population	Expected Male Veteran Suicide Count=Rate x Population
18-34	26.8 per 100,000	1,443,000	387.1
35-54	28.3 per 100,000	3,907,000	1,105.7
55-74	27.4 per 100,000	6,513,000	1,784.1
75+	51.7 per 100,000	4,591,000	2,371.8
Sum		**16,454,000**	**5,648.7**

The male age-**STANDARDIZED MORTALITY RATIO** for Veterans is:

$$\frac{6,136}{5,648.7} = 1.086$$

Adjusting for age, there were 1.086 times as many (or 8.6% more) suicide deaths among **male** Veterans as would be expected if they had the same rates as **male** non-Veteran U.S. adults. (Information for this example does not appear in the report.)

In the report, we provide age- and sex-standardized mortality ratios for each year, 2001-2022. For 2022, the standardized mortality ratio was 1.105. This means that the number of Veteran suicides in 2022 was 10.5% higher than if the Veteran population had experienced the same suicide rates as non-Veteran adults.

For questions regarding the methods used in this report, contact: **VASPDATAREQUEST@va.gov**.

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