



# Mortality Rates and Life Expectancy of Veterans from 1980 to 2017, and by Education, Income, and Period of Service

Department of Veterans Affairs

National Center for Veterans Analysis  
and Statistics

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## **EXECUTIVE SUMMARY**

This report generates estimates of mortality rates and life expectancy for Veterans at ages 20 to 85, in the 8 to 10 years periods of 1980-89, 1990-99, 2000-09, and 2010-17, and compares them to the U. S. population. The expected life-years for Veterans at age 25 in the years 2010-17, an averaged estimate of the 8 years, is about 0.9 life-years shorter than those of U. S. population in 2014<sup>5</sup>, the mid-year of the 8 years, for both males and females. The estimated education differentials in life expectancy for Veterans in 2010-17 are 0.2 to 0.8 life-years smaller than those of U. S. population in 1979-89<sup>3</sup>. Much smaller income differentials in life expectancy, 0.2 to 3.6 life-years smaller for Veterans in 2010-17 are estimated. For example, life expectancy of Veterans at age 25 with household incomes less than \$20,000 are estimated to be 4.3 and 2.8 less life-years than those of \$50,000+ income, compared to 7.9 and 3.3 life-years in the U. S. population, thus 3.6 and 0.5 life-years smaller income differentials for male and female Veterans, respectively, shown in Tables 17 and 18. At age 55, World War 2 Veterans were estimated to live 21.4 and 26.1 life-years, 1.4 and 0.3 more life-years for Korean Conflict Veterans, and 3 and 1.5 more life-years for Vietnam Era Veterans for male and female, respectively. The report discusses missing older Veterans and other limitations in data which may have caused computing shorter life expectancy estimates.

### **Introduction**

Veterans are a preselected group of healthy people from the general population. A soldier has to be fit both physically and mentally to endure the hardship in an adverse environment such as a battlefield. The healthy soldier/worker effect gradually subdued over time. This is similar to the selection effect of underwriting requirement provision in the insurance industries. It has been well-documented in epidemiology studies.<sup>1,2</sup> The phenomenon of healthy soldier effect could be confirmed with the established database for U.S. Veterans Eligibility Trends and Statistics, USVETS, a data source for Veterans undertaken by the Data Governance and Analytics business line in the Department of Veterans Affairs. The mortality rates of recently released Veterans are expected to be lower than those of the U. S. population and the mortality rates will become very similar as Veterans get older.

Life expectancy, a measure summarizing the mortality experience over a lifetime, is an estimate of expected life-years at a specific age. Life expectancy is computed directly from the mortality rate at each age. Similar to the mortality rates, the life expectancy of Veterans should be close to the life expectancy of the U. S. population. The gaps in life expectancy by socioeconomic factors have been observed in the U. S. population<sup>3</sup>. This

paper attempts to measure the socioeconomic differentials in life expectancy such as education and income in Veterans and compare them with the U.S. population.

The study design bases on available data. For example, the socioeconomic differential estimates started in 2010. A direct comparison of mortality of Veterans to U. S. population from the literature may be difficult. This study draws conclusions based on the known facts from the current study and other studies in the literature.

## Study Data

The Data Governance and Analytics (DGA) business line developed the Veterans Eligibility Trends and Statistics (USVETS) dataset in fiscal year 2018. USVETS is a data environment consisting mainly of data sources from the Veterans Benefit Administration, the Veterans Health Administration, the Department of Defense's (DoD) Defense Manpower Data Center, and other data sources including commercial data sources. This dataset contains information about individual Veterans including demographics, details of military service, VA benefit usage, and more. The dataset contains one record per Veteran. It includes all living and deceased Veterans. The dates of death of deceased Veterans include National Death Index (NDI) data obtained from VA Center of Excellence for Suicide Prevention, Joint VA and DoD Suicide Data Repository (SDR) - NDI, <http://vaww.virec.research.va.gov/Mortality/Overview.htm>; December 20, 2016. DGA uses its database to conduct statistical analysis, predictive modeling, and reporting. USVETS includes the software, hardware, and the associated processes that allow staff to create various USVETS work products. Like any other dataset, USVETS has its limitations and assumptions that users need to consider.

1. USVETS tends to be more accurate for underlying Veteran population below the age of 67 than for older Veterans due to missing DoD records for older Veterans. This limitation will gradually decrease over time.
2. USVETS is mixed data. It uses internal VA administrative and external commercial vendor data. For the internal VA administrative data, DGA does not have control over input data production or quality of these sources. Although DGA applies rigorous data quality techniques to ensure the high quality of these data, there may be flaws in data inputs that are not identified.
3. For the commercial vendor data, the contractor collects data from a variety of sources such as public records, surveys, and on-line and off-line registrations. The accuracy and completeness of the data are determined by these sources. The data may not be complete and in some cases the data may not be current due to timing of updates from these sources.

4. Like all other databases, USVETS relies on business rules that allow the data manager to select one data element over another data element for achieving validity, reliability and consistency. Thus, counts derived from USVETS may differ from other internal VA administrative databases.
5. Some of USVETS administrative variables may have special limitations based on how the data was collected and imputed. For certain variables USVETS may use commercial vendor data to supplement or replace VA administrative data.
6. USVETS is subject to continuous scrutiny, revision and refresh in the pursuit of producing the best Veteran data for Veteran analysis, planning and policy. Accordingly, USVETS versions may vary.

The data in the study is from the 2018 USVETS database, combining Veterans data from Department of Defense, Veterans Benefit Administration, Veterans Health Administration, and others, with a total of 39,372,027 administrative records (of living and deceased Veterans). We applied rigorous exclusion rules that reduced the number of records for this analysis to 33,189,277. The top three reasons for excluding a record were: (1) the Veteran died prior to 1980 because the study focuses on the years 1980 to 2017; (2) the Veteran's record did not have a separation date; and (3) the Veteran's identity information did not pass SSA validation test.

Table 1. shows the number of records by gender, living status and median birth year in 1980-2017. Those records without a separation date are older with a median birth year of 1931 versus those with a separation date and median birth year of 1946.

**Table 1. Gender, Living Status and Median Birth Year, USVETS, 1980-2017**

	Total	Male	Female	Unknown	Living	Dead	Median birth year
In Analysis	33,189,277	30,903,803	2,270,797	14,677	17,491,983	15,697,294	1946
(percent)	100	93	7	0	53	47	
No Separation Date	2,091,540	1,858,184	232,120	1,236	718,932	1,372,608	1931
(percent)	100	89	11	0	34	66	

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
Prepared by the National Center for Veterans Analysis and Statistics

A consumer-data collecting company has provided socioeconomic data for 29,608,786 records in this analysis. By excluding Veterans who died before year 2010, we have a total of 21,181,619 records to compute the socioeconomic differentials in life expectancy in the years of 2010-2017. The education variable has 4 levels: 'Completed high school,' 'Completed college,' 'Completed graduate school,' and 'Attended vocational/technical.' Roughly 23 percent are unknown. These education levels are grouped into 3 categories: 'None or Unknown', 'High School', and 'College or More;' 'College or More' includes 'Completed college', 'Completed graduate school', and 'Attended vocational/technical'.

The estimated household income of commercial vendor data has 13 brackets:

- 'Less than \$15,000',
- '\$15,000-\$19,999',
- '\$20,000-\$29,999',
- '\$30,000-\$39,999',
- '\$40,000-\$49,999',
- '\$50,000-\$59,999',
- '\$60,000-\$69,999',
- '\$70,000-\$79,999',
- '\$80,000-\$89,999',
- '\$90,000-\$99,999',
- '\$100,000-\$124,999',
- '\$125,000-\$149,999', and
- 'Greater than \$149,999.'

Roughly 9 percent are unknown and grouped into 3 categories: 'Less than \$20,000 or Unknown', '\$20,000-\$49,999', and '\$50,000 or More.' The unknown has been shown to be similar to the low income brackets and therefore is combined with the 'Less than \$20,000' category.

Table 2. shows the number of records by gender, living status and median birth year, by education and income categories, for the years 2010-2017. The group of no high school or unknown education and the groups of lower or unknown income have higher percentage of deaths. The relative high percentage of deaths for the group of 'College or more' education can be explained by older ages of this group of the median birth year of 1952, compared to all groups of median of 1956.

**Table 2. Gender, Living Status and Median Birth Year by Education and Income, USVETS, 2010-2017**

	Total	Male	Female	Unknown	Living	Dead	Median birth year
All	21,181,619	19,239,814	1,941,805	0	17,298,944	3,882,675	1956
(percent)	100	91	9	0	82	18	
None or Unknown	4,911,463	4,540,485	370,978	0	3,898,874	1,012,589	1957
(percent)	100	92	8	0	79	21	
High School	8,516,475	7,689,283	827,192	0	7,175,919	1,340,556	1959
(percent)	100	90	10	0	84	16	
College or More	7,753,681	7,010,046	743,635	0	6,224,151	1,529,530	1952
(percent)	100	90	10	0	80	20	
< \$20K or Unknown	3,940,753	3,531,942	408,811	0	3,089,607	851,146	1959
(percent)	100	90	10	0	78	22	
\$20K-\$49K	6,466,345	5,880,168	586,177	0	5,021,148	1,445,197	1954
(percent)	100	91	9	0	78	22	
\$50K or More	10,774,521	9,827,704	946,817	0	9,188,189	1,586,332	1956
(percent)	100	91	9	0	85	15	

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

## Cohorts of Period of Service

Veterans of various period of service would have different mortality experience. The study population are grouped into 5 cohorts of period of service: World War II, Korean Conflict, Vietnam Era, Gulf Wars, and Peace Time. Tables 3 and 4 showed the numbers of total and living records, percentage of living, VetPop estimate, median age, and percentile range of birth year by period of service, in the years 1980-2017, for male and female, respectively, where VetPop is for the 2018 Veterans Population Projection. The numbers of living WWII, KC, and VNE Veterans at the end of study period are smaller than the VetPop estimates due to missing older Veteran records in USVETS.

Regardless the living counts on 12/31/2017 would be slightly smaller than the VetPop estimates at early date of 9/30/2017. The age calculated at the beginning of the study,

1/1/1980, should be appropriate for all Veterans except the GW Veterans of median birth year of 1977, and the percentile range of birth year may show how ages are different among all cohorts of period of service.

**Table 3. Living Status, Median Age, and Percentile Range of Birth Year by Period of Service, USVETS, 1980-2017, Male Veterans**

	Total	Living	% of living	VetPop estimate	Median age as of 1980	Median birth year	10th percentile birth year	90th percentile birth year
All	30,903,803	16,226,400	53	19,088,341	34	1945	1917	1975
WWII	7,667,198	274,367	4	558,076	59	1920	1911	1926
KC	3,198,255	660,631	21	1,355,521	48	1931	1923	1934
VNE	7,810,591	5,139,917	66	6,408,586	32	1947	1936	1954
GW	6,662,750	6,427,740	96	6,417,214		1974	1957	1989
Peace Time	5,565,009	3,723,745	67	4,348,944	22	1957	1928	1965

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
Prepared by the National Center for Veterans Analysis and Statistics

**Table 4. Living Status, Median Age, and Percentile Range of Birth Year by Period of Service, USVETS, 1980-2017, Female Veterans**

	Total	Living	% of living	VetPop estimate	Median age as of 1980	Median birth year	10th percentile birth year	90th percentile birth year
All	2,270,797	1,923,462	85	1,973,651		1966	1929	1988
WWII	186,983	9,830	5	29,463	59	1920	1910	1924
KC	50,521	11,961	24	43,006	49	1930	1919	1934
VNE	207,294	163,114	79	221,155	29	1950	1941	1955
GW	1,293,721	1,271,783	98	1,238,116		1977	1961	1991
Peace Time	532,278	466,774	88	441,911	19	1960	1948	1967

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
Prepared by the National Center for Veterans Analysis and Statistics

### Person-Years Method

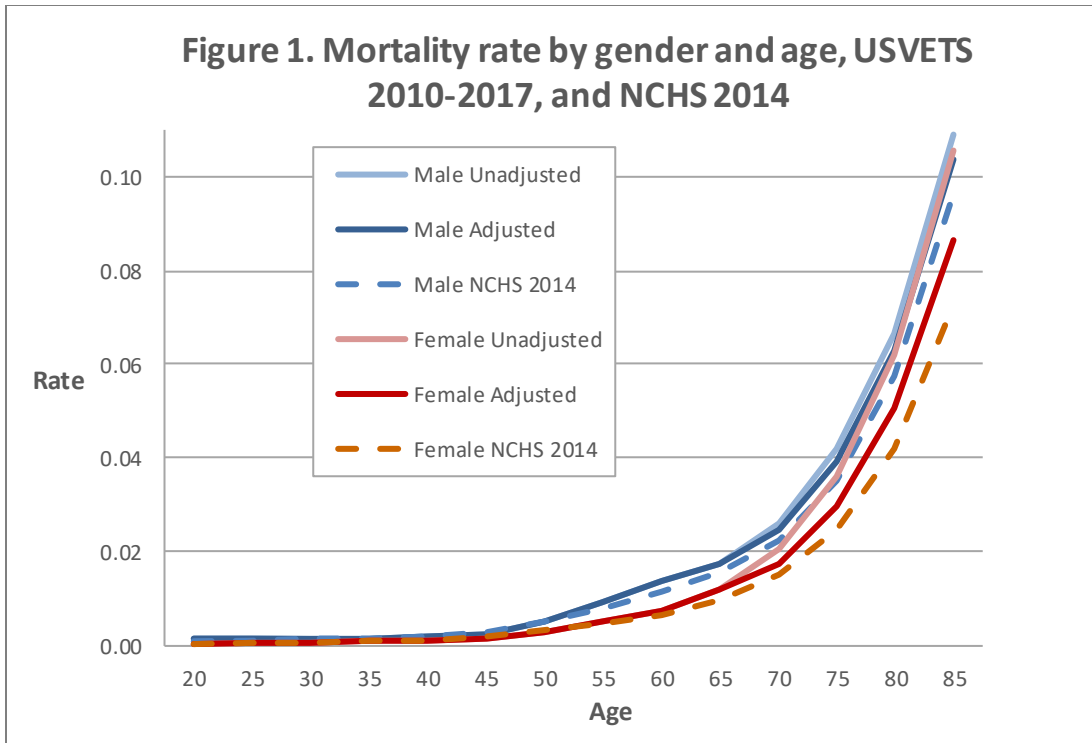
Person-years are computed for each attained age and calendar year. For example, a Veteran born on March 19, 1949, would get 0.2 person-year at age 30 and year 1980,

0.8 person-year at age 31 and year 1980, 0.2 person-year at age 31 and year 1981, and so on if no death occurred in the years of study. The same person would only get 0.5 person-year at age 31 and year 1980 if he or she died on July 1, 1980, and he or she would get no further person-year contribution. Person-years are then combined at each age for all Veterans in the study from January 1, 1980, through December 31, 2017. The mortality rate at each age is computed by dividing the number of deaths at the age by the number of persons surviving to the age which is the sum of person-years and half of number of deaths at the age. It assumes uniform distribution of deaths during the year last for the age. Then, these rates are applied in a life table to compute the life expectancy at each age. The standard error of life expectancy shown in parentheses in the tables is computed based on Chiang's formula<sup>4</sup>.

## Results

Mortality rate and life expectancy at each age, from ages 20 to 85, and each 8-10 years period, 1980-1989, 1990-1999, 2000-2009, and 2010-2017, were computed for male and female Veterans, respectively. Tables 5 and 6, and Figures 1 and 2, compare the Veteran mortality rate and life expectancy, before and after adjusted for older ages, in years 2010-2017 to those of U. S. population in 2014<sup>5</sup>. Only the mortality rate and life expectancy at ages 20, 25, 30... 85 are shown for demonstration purposes. Compared to the U. S. population, the mortality rates of Veterans are higher at older ages, and the life expectancy of Veterans are estimated to be 0.9-1.2 life-years shorter before adjusted for older ages using SSA mortality rates<sup>6</sup> and 0.6-1.0 life-years shorter after the adjustment for males, and to be 1.7-1.9 life-years shorter before and 0.9-1.0 life-years shorter after the adjustment for female at age 25, 45, and 65. The tables and figures afterwards only use the estimate of mortality rate and life expectancy after the adjustment.



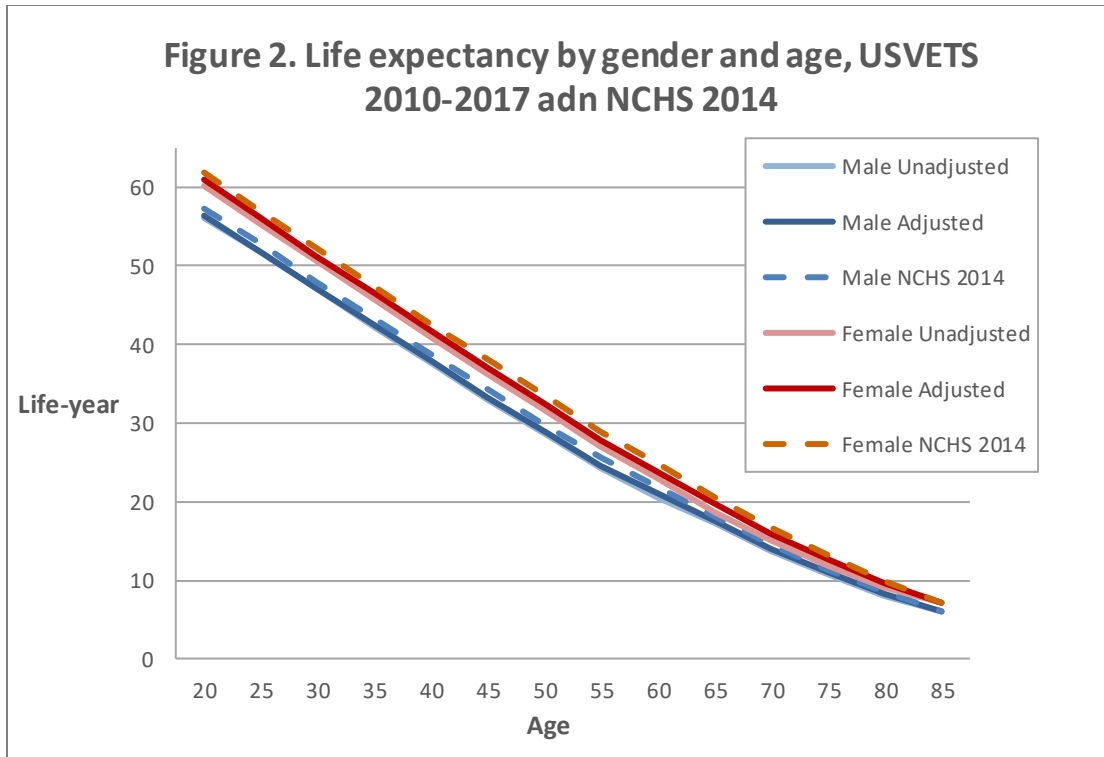


Source: U.S. Veterans Eligibility Trends and Statistics, 2018, National Center for Health Statistics, 2017<sup>5</sup>  
 Prepared by the National Center for Veterans Analysis and Statistics

**Table 5. Mortality Rate by Gender and Age, USVETS, 2010-2017 and NCHS 2014**

Age	Male Unadjusted	Male Adjusted	Male NCHS 2014	Female Unadjusted	Female Adjusted	Female NCHS 2014
20	0.0016	0.0016	0.0010	0.0004	0.0004	0.0004
25	0.0016	0.0016	0.0013	0.0007	0.0007	0.0005
30	0.0015	0.0015	0.0015	0.0007	0.0007	0.0007
35	0.0015	0.0015	0.0017	0.0009	0.0009	0.0009
40	0.0018	0.0018	0.0021	0.0012	0.0012	0.0013
45	0.0027	0.0027	0.0031	0.0016	0.0016	0.0020
50	0.0050	0.0050	0.0050	0.0031	0.0031	0.0032
55	0.0092	0.0092	0.0078	0.0050	0.0050	0.0048
60	0.0139	0.0139	0.0114	0.0077	0.0077	0.0067
65	0.0176	0.0176	0.0156	0.0122	0.0122	0.0097
70	0.0261	0.0248	0.0227	0.0206	0.0176	0.0151
75	0.0419	0.0391	0.0353	0.0361	0.0296	0.0246
80	0.0668	0.0629	0.0575	0.0620	0.0506	0.0421
85	0.1090	0.1037	0.0964	0.1056	0.0865	0.0727

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics



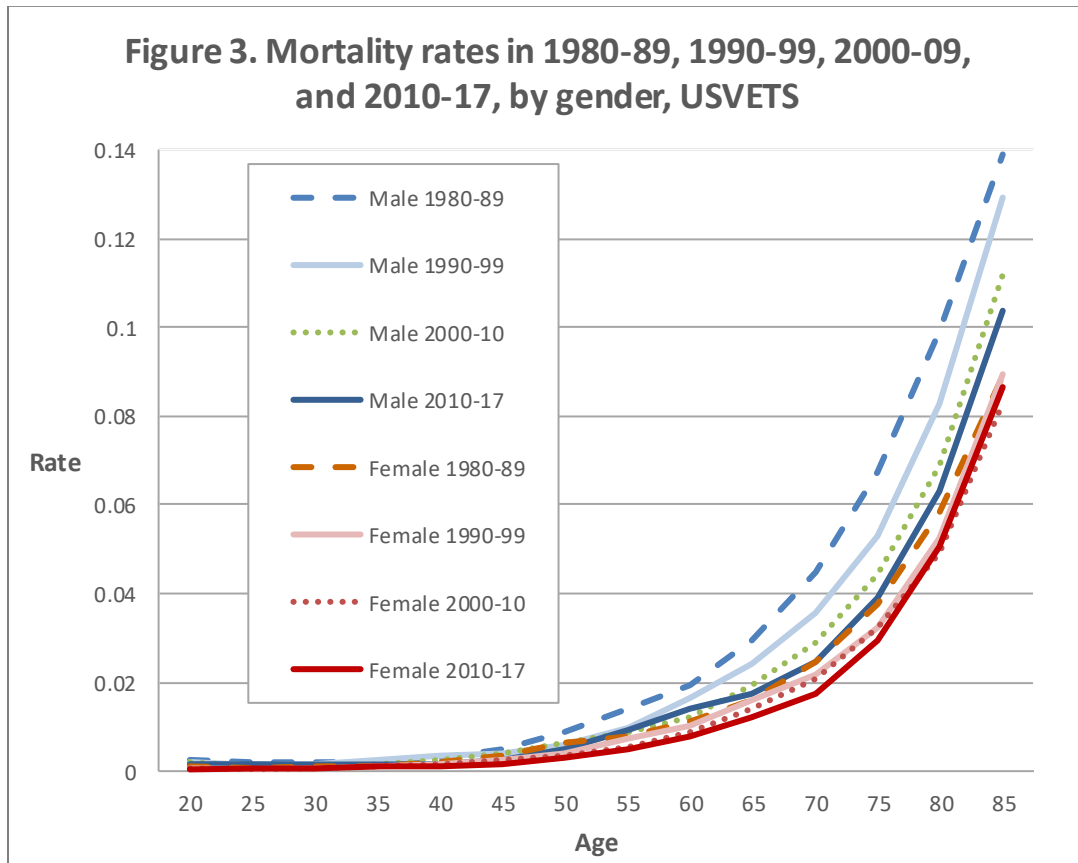
Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

**Table 6. Life Expectancy by Gender and Age, USVETS, 2010-2017 and NCHS 2014**

Age	Male Unadjusted	Male Adjusted	Male NCHS 2014	Female Unadjusted	Female Adjusted	Female NCHS 2014
20	56.1	56.4	57.3	60.2	61.0	61.9
25	51.6	51.8	52.7	55.3	56.1	57.0
30	47.0	47.2	48.0	50.5	51.3	52.2
35	42.3	42.5	43.4	45.7	46.5	47.4
40	37.6	37.9	38.8	40.9	41.7	42.6
45	33.0	33.2	34.2	36.2	37.0	38.0
50	28.5	28.8	29.8	31.5	32.3	33.4
55	24.4	24.6	25.6	27.1	27.9	29.0
60	20.6	20.9	21.7	22.8	23.7	24.7
65	17.1	17.4	18.0	18.7	19.6	20.6
70	13.7	14.0	14.5	15.0	15.9	16.7
75	10.6	10.9	11.2	11.7	12.5	13.1
80	8.0	8.2	8.4	9.0	9.5	9.8
85	6.0	6.0	6.0	7.1	7.1	7.1

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

Tables 7a, 7b, 8a, and 8b, and Figures 3 and 4, show the numbers of person-years and deaths, mortality rates, and life expectancy at ages 20, 25, 30...85 and in each 8-10 years period, 1980-1989, 1990-1999, 2000-2009, and 2010-2017, for male and female Veterans, respectively. The mortality rates decrease over these decades, and the life expectancy at age 25 increases from 46.6 to 51.8 and from 52.7 to 56.1 life-years for male and female, respectively. The observed lower mortality rate of 0.0829 in 2000-10 vs. 0.0865 in 2010-17 at age 85 for female Veterans in Table 8b may be due to the difficulty of obtaining sufficient death information for this small group of old persons.



Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

**Table 7a. Person Years, Number of Deaths, by Decade and Age, USVETS, 1980-2017, Male Veterans**

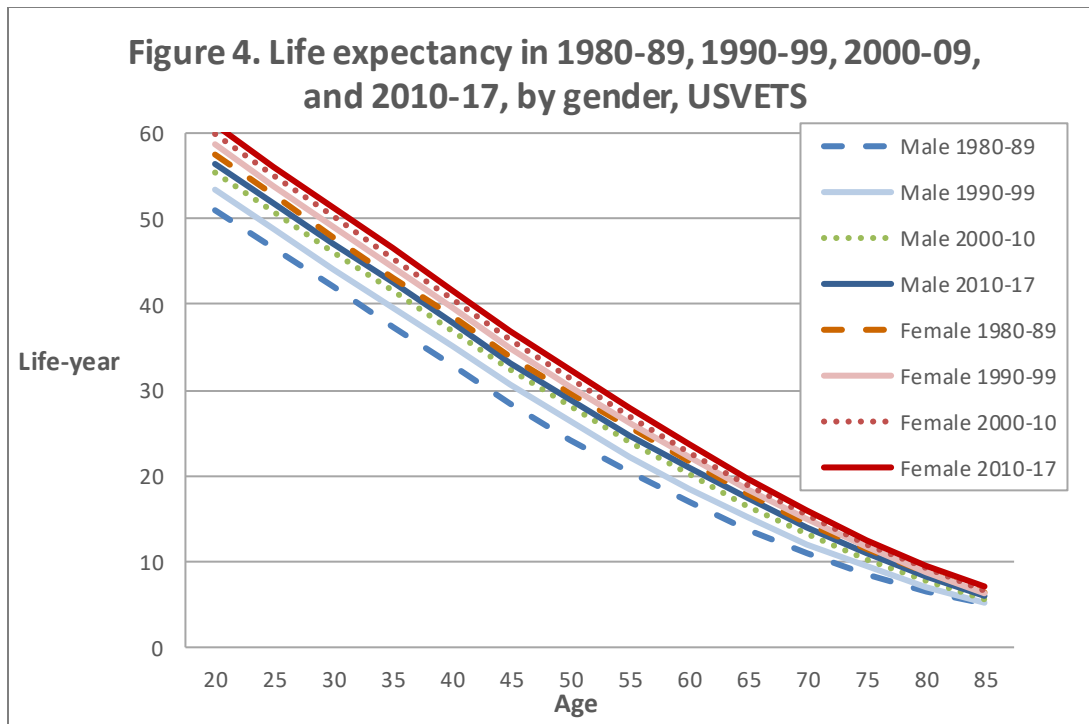
Age	Person Years 1980-89	Person Years 1990-99	Person Years 2000-10	Person Years 2010-17	Number of Deaths 1980-89	Number of Deaths 1990-99	Number of Deaths 2000-10	Number of Deaths 2010-17
20	817,833	482,050	326,943	237,842	2,078	953	694	376
25	2,910,896	1,992,500	1,226,620	907,023	5,716	2,871	1,646	1,416
30	4,007,473	2,946,148	1,829,681	1,290,200	8,168	5,299	2,150	1,913
35	5,212,027	3,551,944	2,519,038	1,367,321	11,080	9,122	3,862	2,118
40	4,607,976	4,194,474	3,208,621	1,693,654	13,282	14,032	7,542	3,062
45	3,191,826	5,281,280	3,725,608	2,277,378	15,902	21,614	15,286	6,125
50	3,720,228	4,571,244	4,152,083	2,701,449	32,377	26,241	27,149	13,480
55	4,750,213	3,028,456	5,022,324	2,883,246	68,136	29,421	44,079	26,579
60	5,297,172	3,304,273	4,215,434	3,104,337	115,470	54,257	51,639	43,313
65	4,311,474	3,887,071	2,636,466	3,761,062	141,916	100,642	51,987	66,898
70	2,276,570	3,924,488	2,634,958	2,480,007	113,650	148,160	81,100	65,689
75	942,887	2,779,332	2,750,711	1,477,082	71,993	155,858	128,693	63,279
80	329,663	1,160,510	2,334,471	1,385,423	37,430	102,471	167,834	95,812
85	256,111	327,159	1,247,038	1,077,847	40,307	46,429	144,247	124,224

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
Prepared by the National Center for Veterans Analysis and Statistics

**Table 7b. Mortality Rate, Life Expectancy by Decade and Age, USVETS, 1980-2017, Male Veterans**

Age	Mortality Rates 1980-89	Mortality Rates 1990-99	Mortality Rates 2000-10	Mortality Rates 2010-17	Life Expectancy 1980-89	Life Expectancy 1990-99	Life Expectancy 2000-10	Life Expectancy 2010-17
20	0.0025	0.0020	0.0021	0.0016	51.0(0.01)	53.4(0.01)	55.4(0.01)	56.4(0.01)
25	0.0020	0.0014	0.0013	0.0016	46.6(0.01)	48.8(0.01)	50.9(0.01)	51.8(0.01)
30	0.0020	0.0018	0.0012	0.0015	42.0(0.01)	44.2(0.01)	46.2(0.01)	47.2(0.01)
35	0.0021	0.0026	0.0015	0.0015	37.4(0.01)	39.6(0.01)	41.5(0.01)	42.5(0.01)
40	0.0029	0.0033	0.0023	0.0018	32.9(0.01)	35.2(0.01)	36.8(0.01)	37.9(0.01)
45	0.0050	0.0041	0.0041	0.0027	28.4(0.01)	30.7(0.01)	32.3(0.01)	33.2(0.01)
50	0.0087	0.0057	0.0065	0.0050	24.2(0.01)	26.4(0.01)	28.1(0.01)	28.8(0.01)
55	0.0142	0.0097	0.0087	0.0092	20.4(0.01)	22.3(0.01)	24.0(0.01)	24.6(0.01)
60	0.0194	0.0163	0.0122	0.0139	17.0(0.01)	18.5(0.00)	20.1(0.00)	20.9(0.01)
65	0.0295	0.0241	0.0195	0.0176	13.7(0.01)	15.2(0.00)	16.5(0.00)	17.4(0.01)
70	0.0446	0.0356	0.0288	0.0248	10.9(0.01)	12.1(0.00)	13.3(0.00)	14.0(0.00)
75	0.0672	0.0532	0.0443	0.0391	8.5(0.01)	9.4(0.00)	10.3(0.00)	10.9(0.00)
80	0.0990	0.0826	0.0688	0.0629	6.6(0.01)	7.0(0.00)	7.7(0.00)	8.2(0.00)
85	0.1389	0.1292	0.1118	0.1037	5.1	5.2	5.6	6

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
Prepared by the National Center for Veterans Analysis and Statistics



Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

**Table 8a. Person years, Number of deaths by Decade and Age, USVETS, 1980-2017, Female Veterans**

Age	Person Years 1980-89	Person Years 1990-99	Person Years 2000-10	Person Years 2010-17	Number of Deaths 1980-89	Number of Deaths 1990-99	Number of Deaths 2000-10	Number of Deaths 2010-17
20	107,677	102,618	105,011	71,030	95	62	58	29
25	308,974	290,160	286,398	212,027	215	143	144	156
30	296,722	413,686	352,622	307,400	279	317	234	212
35	191,714	444,207	401,529	318,064	214	514	363	277
40	100,233	348,903	467,884	320,252	193	639	683	381
45	60,691	209,850	478,248	357,040	200	507	1,103	585
50	55,876	103,639	361,074	394,426	359	404	1,345	1,211
55	59,715	59,318	208,576	370,803	644	442	1,133	1,851
60	128,358	51,477	99,090	258,199	1,736	651	875	1,998
65	134,235	51,518	53,638	131,431	2,598	1,054	754	1,607
70	58,537	105,449	43,126	56,657	1,760	2,578	1,065	1,182
75	27,601	103,319	39,313	31,017	1,222	3,463	1,476	1,140
80	12,747	38,676	74,077	23,326	854	2,218	3,866	1,492
85	6,743	14,087	60,763	16,488	629	1,427	5,152	1,839

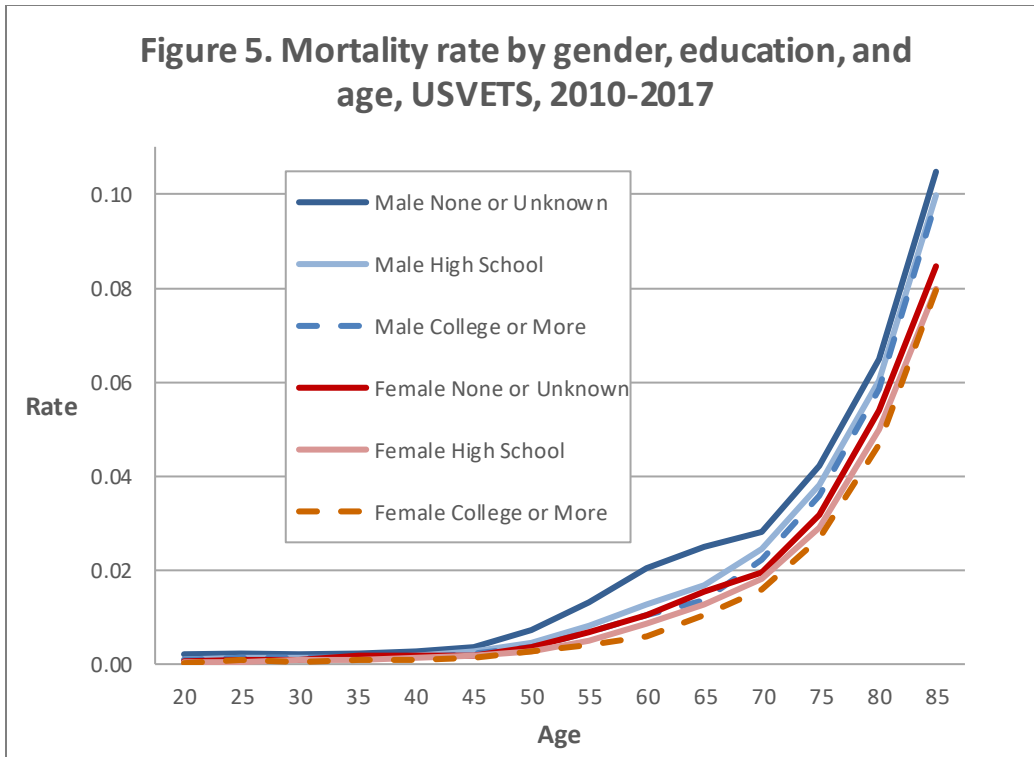
Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

**Table 8b. Mortality Rate, Life Expectancy by Decade and Age, USVETS, 1980-2017, Female Veterans**

Age	Mortality Rates 1980-89	Mortality Rates 1990-99	Mortality Rates 2000-10	Mortality Rates 2010-17	Life Expectancy 1980-89	Life Expectancy 1990-99	Life Expectancy 2000-10	Life Expectancy 2010-17
20	0.0009	0.0006	0.0006	0.0004	57.5(0.05)	58.7(0.04)	59.9(0.04)	61.0(0.04)
25	0.0007	0.0005	0.0005	0.0007	52.7(0.05)	53.9(0.04)	55.0(0.04)	56.1(0.04)
30	0.0009	0.0008	0.0007	0.0007	47.9(0.05)	49.0(0.04)	50.2(0.04)	51.3(0.04)
35	0.0011	0.0012	0.0009	0.0009	43.2(0.05)	44.3(0.04)	45.3(0.04)	46.5(0.04)
40	0.0019	0.0018	0.0015	0.0012	38.5(0.05)	39.5(0.04)	40.6(0.04)	41.7(0.04)
45	0.0033	0.0024	0.0023	0.0016	33.9(0.05)	34.9(0.04)	35.9(0.04)	37.0(0.04)
50	0.0064	0.0039	0.0037	0.0031	29.6(0.05)	30.4(0.04)	31.4(0.04)	32.3(0.04)
55	0.0079	0.0074	0.0054	0.0050	25.6(0.04)	26.1(0.04)	27.0(0.04)	27.9(0.04)
60	0.0110	0.0101	0.0088	0.0077	21.7(0.04)	22.3(0.04)	22.8(0.04)	23.7(0.04)
65	0.0162	0.0161	0.0140	0.0122	18.0(0.04)	18.5(0.03)	19.0(0.04)	19.6(0.04)
70	0.0248	0.0219	0.0207	0.0176	14.5(0.04)	15.0(0.03)	15.4(0.03)	15.9(0.04)
75	0.0374	0.0321	0.0322	0.0296	11.4(0.04)	11.8(0.02)	12.1(0.02)	12.5(0.04)
80	0.0581	0.0527	0.0489	0.0506	8.7(0.04)	8.8(0.02)	9.2(0.01)	9.5(0.04)
85	0.0890	0.0894	0.0829	0.0865	6.4	6.3	6.6	7.1

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

Tables 9 and 10, and Figures 5 and 6, show the mortality rate by education and income, for male and female, at ages 20, 25...85, in years 2010-2017.

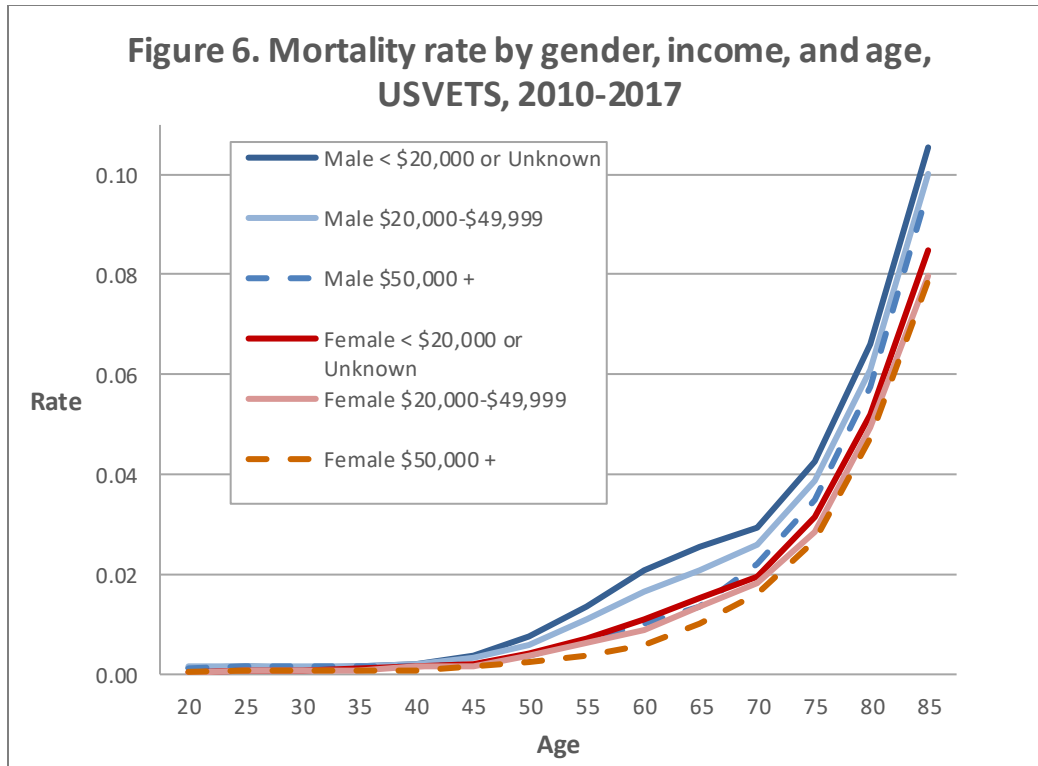


Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

**Table 9. Mortality Rate by Gender, Education and Age, USVETS, 2010-2017**

Age	Male None or Unknown	Male High School	Male College or More	Female None or Unknown	Female High School	Female College or More
20	0.0021	0.0010	0.0009	0.0006	0.0004	0.0002
25	0.0022	0.0012	0.0015	0.0011	0.0006	0.0008
30	0.0021	0.0013	0.0013	0.0009	0.0007	0.0006
35	0.0023	0.0014	0.0013	0.0016	0.0007	0.0008
40	0.0026	0.0016	0.0015	0.0017	0.0012	0.0010
45	0.0037	0.0025	0.0021	0.0019	0.0016	0.0015
50	0.0072	0.0045	0.0038	0.0037	0.0029	0.0026
55	0.0132	0.0082	0.0069	0.0067	0.0051	0.0039
60	0.0202	0.0127	0.0104	0.0104	0.0084	0.0058
65	0.0248	0.0168	0.0136	0.0154	0.0129	0.0102
70	0.0282	0.0245	0.0223	0.0196	0.0183	0.0159
75	0.0422	0.0379	0.0357	0.0317	0.0291	0.0269
80	0.0648	0.0605	0.0586	0.0540	0.0499	0.0469
85	0.1047	0.0997	0.0984	0.0846	0.0798	0.0795

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics



Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
Prepared by the National Center for Veterans Analysis and Statistics

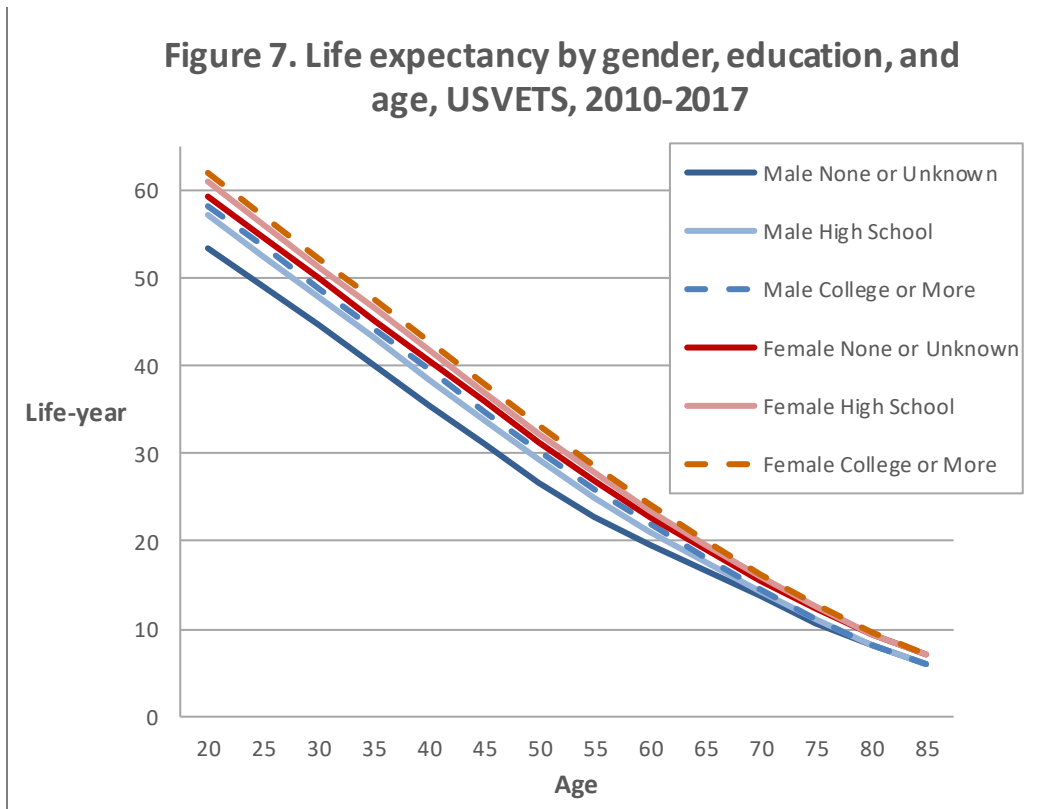
**Table 10. Mortality Rate by Gender, Income and Age, USVETS, 2010-2017**

Age	Male < \$20,000 or Unknown	Male \$20,000-\$49,999	Male \$50,000+	Female < \$20,000 or Unknown	Female \$20,000-\$49,999	Female \$50,000+
20	0.0013	0.0018	0.0012	0.0004	0.0003	0.0005
25	0.0014	0.0016	0.0017	0.0006	0.0008	0.0008
30	0.0013	0.0016	0.0015	0.0007	0.0007	0.0007
35	0.0016	0.0017	0.0014	0.0010	0.0009	0.0008
40	0.0022	0.0021	0.0015	0.0014	0.0015	0.0009
45	0.0037	0.0033	0.0021	0.0019	0.0018	0.0014
50	0.0074	0.0060	0.0039	0.0042	0.0037	0.0023
55	0.0137	0.0110	0.0068	0.0070	0.0061	0.0037
60	0.0208	0.0167	0.0102	0.0110	0.0090	0.0059
65	0.0254	0.0207	0.0136	0.0151	0.0135	0.0103
70	0.0292	0.0259	0.0221	0.0197	0.0181	0.0160
75	0.0425	0.0389	0.0349	0.0315	0.0286	0.0267
80	0.0660	0.0608	0.0574	0.0521	0.0493	0.0474
85	0.1055	0.1002	0.0970	0.0849	0.0798	0.0788

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
Prepared by the National Center for Veterans Analysis and Statistics



Tables 11 and 12, and Figures 7, and 8, show the life expectancy by education and income, for male and female, at ages 20, 25...85, in years 2010-2017.

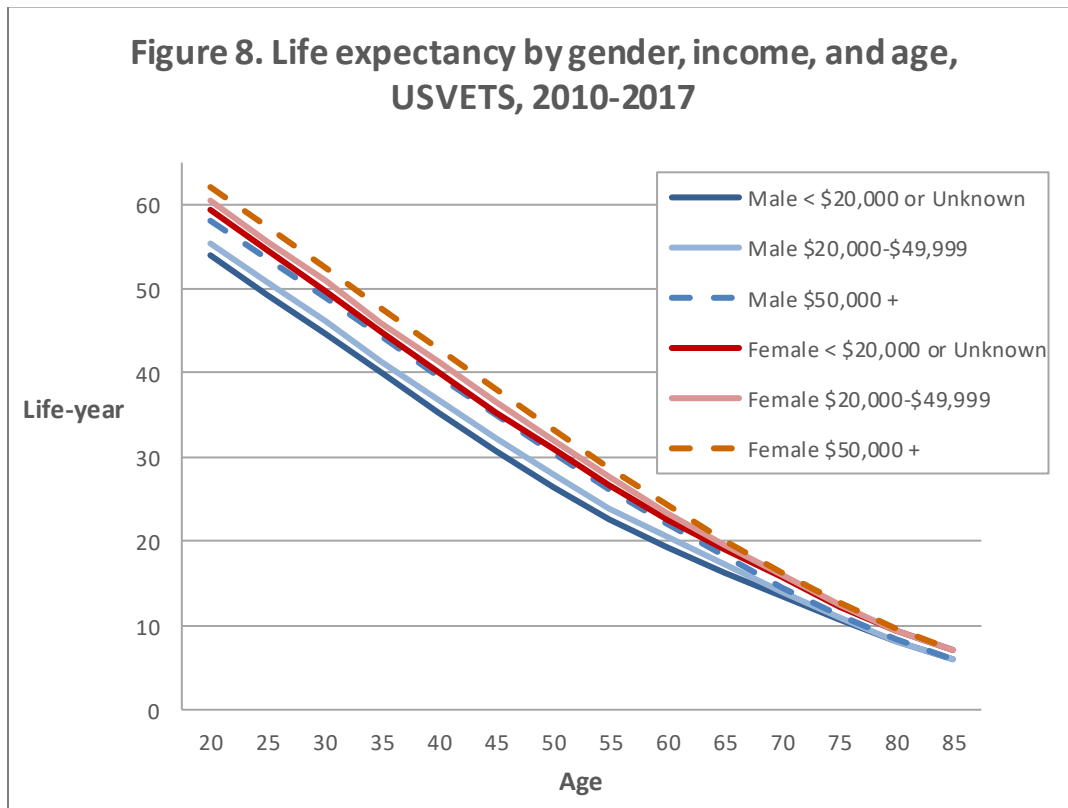


Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
Prepared by the National Center for Veterans Analysis and Statistics

**Table 11. Life Expectancy by Gender, Education, and Age, USVETS, 2010-2017**

Age	Male None or Unknown	Male High School	Male College or More	Female None or Unknown	Female High School	Female College or More
20	53.4(0.03)	57.2(0.02)	58.2(0.02)	59.3(0.09)	61.0(0.07)	62.0(0.06)
25	49.0(0.02)	52.5(0.01)	53.6(0.02)	54.6(0.09)	56.1(0.07)	57.1(0.06)
30	44.6(0.02)	47.8(0.01)	48.9(0.01)	49.9(0.08)	51.3(0.07)	52.3(0.06)
35	40.0(0.02)	43.1(0.01)	44.2(0.01)	45.1(0.08)	46.5(0.07)	47.5(0.05)
40	35.5(0.02)	38.4(0.01)	39.5(0.01)	40.5(0.08)	41.7(0.06)	42.7(0.05)
45	31.0(0.01)	33.8(0.01)	34.8(0.01)	35.8(0.08)	36.9(0.06)	37.9(0.05)
50	26.7(0.01)	29.3(0.01)	30.3(0.01)	31.3(0.08)	32.3(0.06)	33.2(0.05)
55	22.9(0.01)	25.0(0.01)	26.0(0.01)	27.0(0.08)	27.8(0.06)	28.7(0.05)
60	19.6(0.01)	21.2(0.01)	22.0(0.01)	22.9(0.08)	23.6(0.07)	24.3(0.05)
65	16.6(0.01)	17.6(0.01)	18.1(0.01)	19.2(0.08)	19.6(0.07)	20.1(0.05)
70	13.7(0.01)	14.2(0.01)	14.4(0.01)	15.6(0.08)	16.0(0.06)	16.2(0.05)
75	10.7(0.01)	11.0(0.01)	11.2(0.01)	12.3(0.07)	12.5(0.06)	12.7(0.05)
80	8.1(0.01)	8.3(0.01)	8.3(0.00)	9.4(0.06)	9.5(0.05)	9.6(0.04)
85	6	6	6	7.1	7.1	7.1

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

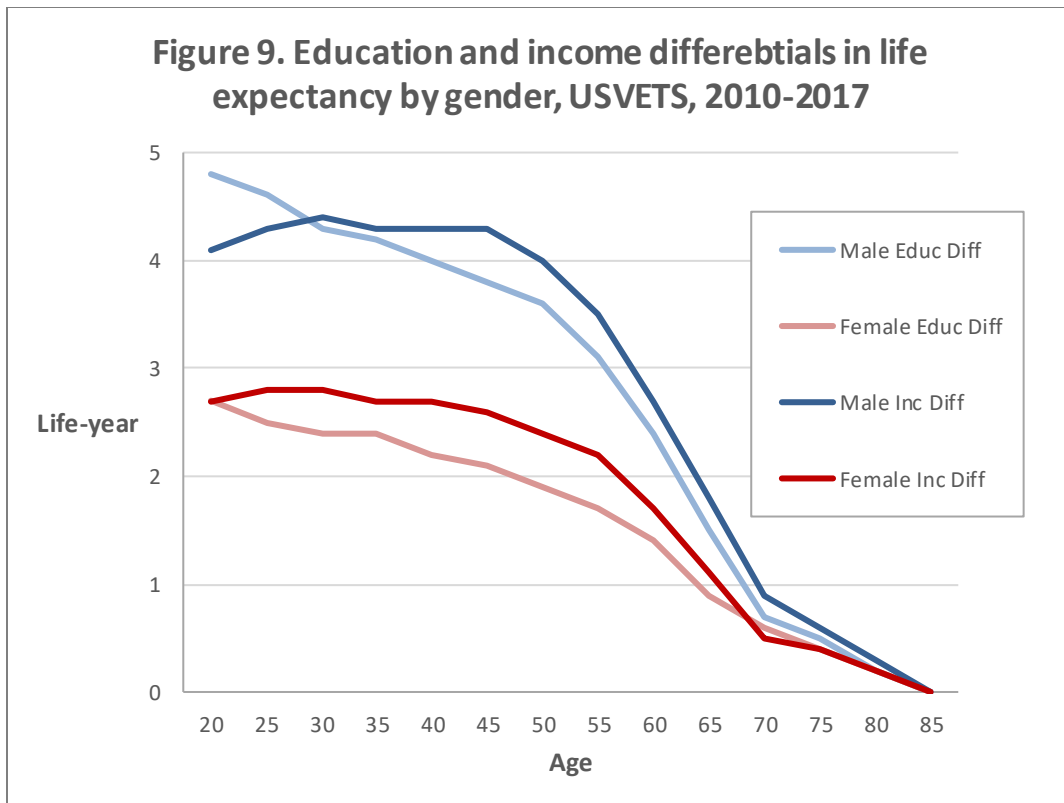


Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

**Table 12. Life Expectancy by Gender, Income and Age, USVETS, 2010-2017**

Age	Male < \$20,000 or Unknown	Male \$20,000-\$49,999	Male \$50,000+	Female < \$20,000 or Unknown	Female \$20,000-\$49,999	Female \$50,000+
20	54.0(0.02)	55.4(0.02)	58.1(0.02)	59.4(0.09)	60.5(0.07)	62.1(0.06)
25	49.3(0.02)	50.8(0.02)	53.6(0.01)	54.5(0.09)	55.7(0.06)	57.3(0.06)
30	44.6(0.02)	46.2(0.02)	49.0(0.01)	49.7(0.08)	50.9(0.06)	52.5(0.06)
35	40.0(0.02)	41.5(0.01)	44.3(0.01)	44.9(0.08)	46.0(0.06)	47.6(0.06)
40	35.3(0.02)	36.9(0.01)	39.6(0.01)	40.1(0.08)	41.3(0.06)	42.8(0.06)
45	30.7(0.02)	32.3(0.01)	35.0(0.01)	35.4(0.08)	36.6(0.06)	38.0(0.06)
50	26.4(0.02)	28.0(0.01)	30.4(0.01)	30.9(0.08)	32.0(0.06)	33.3(0.06)
55	22.6(0.02)	24.0(0.01)	26.1(0.01)	26.6(0.08)	27.6(0.06)	28.8(0.06)
60	19.4(0.01)	20.5(0.01)	22.1(0.01)	22.7(0.08)	23.5(0.06)	24.4(0.06)
65	16.4(0.01)	17.2(0.01)	18.2(0.01)	19.1(0.08)	19.7(0.06)	20.2(0.06)
70	13.6(0.01)	14.1(0.01)	14.5(0.01)	15.7(0.07)	16.0(0.06)	16.2(0.06)
75	10.7(0.01)	11.0(0.01)	11.3(0.01)	12.3(0.07)	12.6(0.05)	12.7(0.06)
80	8.1(0.01)	8.3(0.01)	8.4(0.01)	9.4(0.05)	9.5(0.04)	9.6(0.04)
85	6	6	6	7.1	7.1	7.1

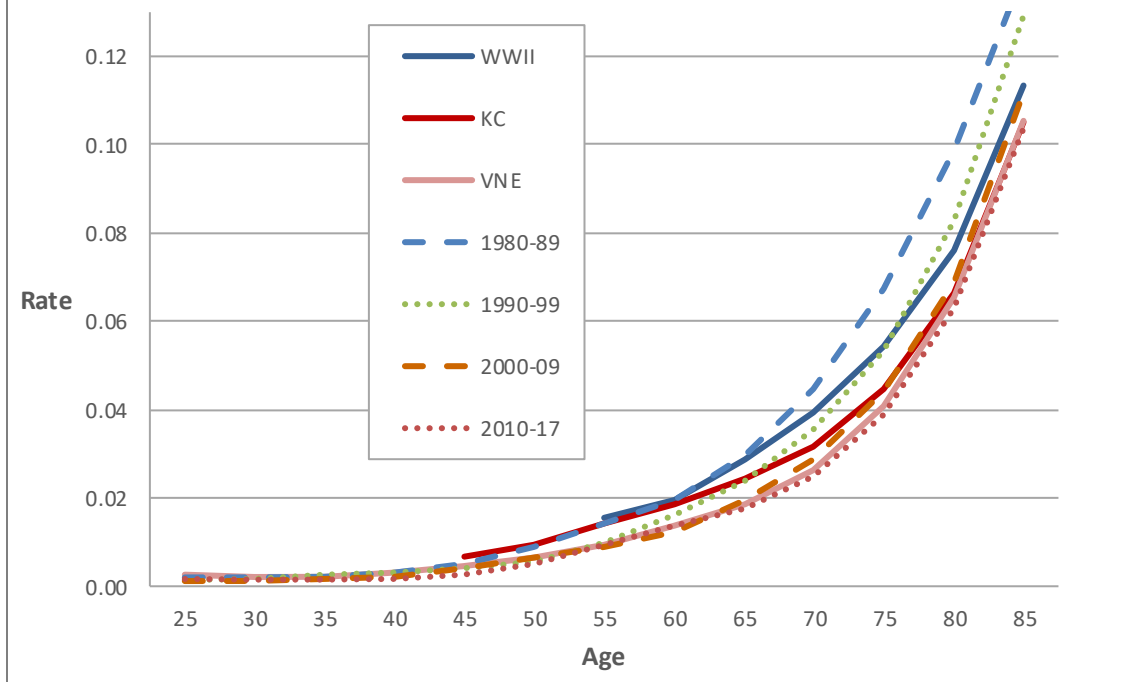
Figure 9 showed differences in life expectancy between Veterans with no high school or unknown education and college education, and between having less than \$20,000 or unknown income and \$50,000 or more income, for male and female. A male Veteran with no high school or an 'unknown education' would live, on average, 4.6, 3.8, and 1.5 less life-years at ages 25, 45, and 65, respectively, than a male Veteran who completed a college education, and a female Veteran with no high school or 'unknown education' would live, on average, 2.5, 2.1, and 0.9 less life-years at ages 25, 45, and 65, respectively. Compared to Veterans with greater than \$49,999 estimated household income, Veterans having less than \$20,000 or unknown estimated household income would, on average, live 4.3, 4.3, and 1.8 less life-years for male Veterans and live 2.8, 2.6, and 1.1 less life-years for female Veterans at ages 25, 45, and 65, respectively.



Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

Tables 13 and 14, and Figures 10 and 11, show the mortality rate by period of service and decade, for male and female, at ages 20, 25...85, in years 1980-2017. Korean Conflict (KC) Veterans have lower mortality rates compared to World War 2 (WWII) Veterans and Vietnam Era (VNE) Veterans have the lowest mortality rates among the 3 periods of service, for male and female. For male Veterans, the mortality rates of WWII Veterans are lower than the mortality rates in 1980-1989 and further lower than the mortality rates in 1990-1999 at older ages, similar pattern holds as comparing the mortality rates of KC and VNE Veterans against mortality rates in 1990-1999 and 2000-2009. The differences of mortality rates of female Veterans in each period of service and decade are closely resembled to those of male Veterans but in a smaller scale. The mortality rates are only computed at ages 55 and above for the WWII Veterans and at ages 45 and above for the KC Veterans due to insufficient information at younger ages.

**Figure 10. Mortality rate by period of service, decade, and age, USVETS 1980-2017, male Veterans**



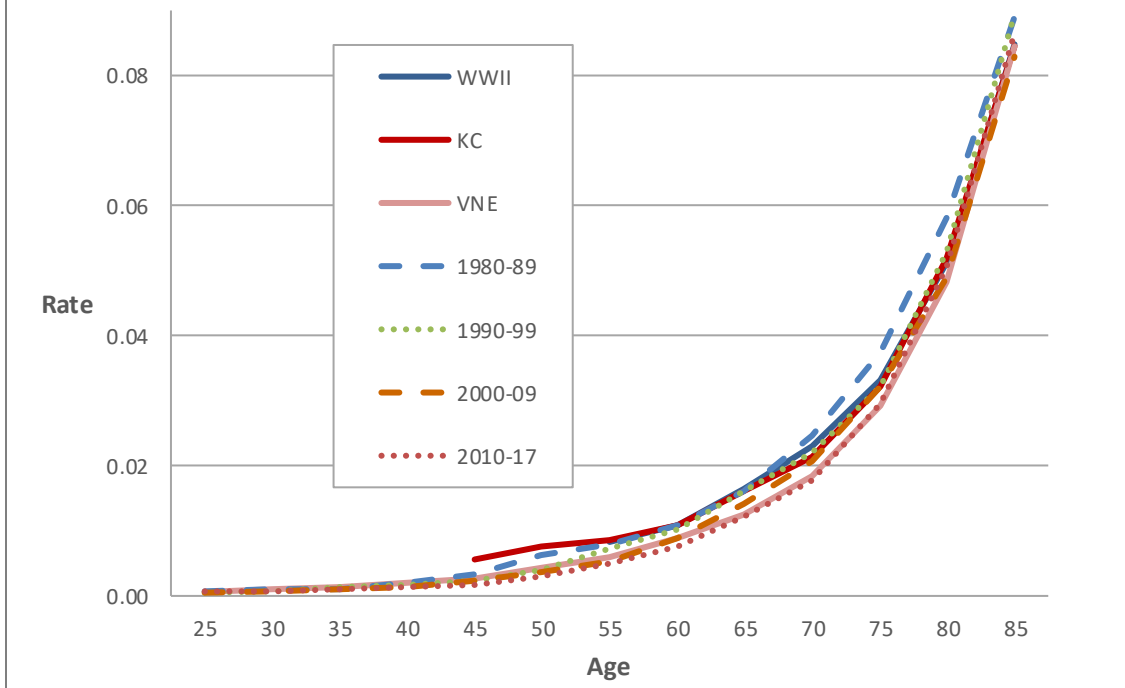
Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

**Table 13. Mortality Rate by Period of Service, Decade, and Age, USVETS 2010-2017, Male Veterans**

Age	WWII	KC	VNE	1980-89	1990-99	2000-09	2010-17
25			0.0025	0.0020	0.0014	0.0013	0.0016
30			0.0021	0.0020	0.0018	0.0012	0.0015
35			0.0023	0.0021	0.0026	0.0015	0.0015
40			0.0032	0.0029	0.0033	0.0023	0.0018
45		0.0067	0.0044	0.0050	0.0041	0.0041	0.0027
50		0.0095	0.0063	0.0087	0.0057	0.0065	0.0050
55	0.0155	0.0140	0.0093	0.0142	0.0097	0.0087	0.0092
60	0.0197	0.0184	0.0135	0.0194	0.0163	0.0122	0.0139
65	0.0285	0.0243	0.0187	0.0295	0.0241	0.0195	0.0176
70	0.0395	0.0318	0.0261	0.0446	0.0356	0.0288	0.0248
75	0.0545	0.0448	0.0410	0.0672	0.0532	0.0443	0.0391
80	0.0761	0.0663	0.0653	0.0990	0.0826	0.0688	0.0629
85	0.1134	0.1051	0.1054	0.1389	0.1292	0.1118	0.1037

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

**Figure 11. Mortality rate by period of service, decade, and age, USVETS 1980-2017, female Veterans**



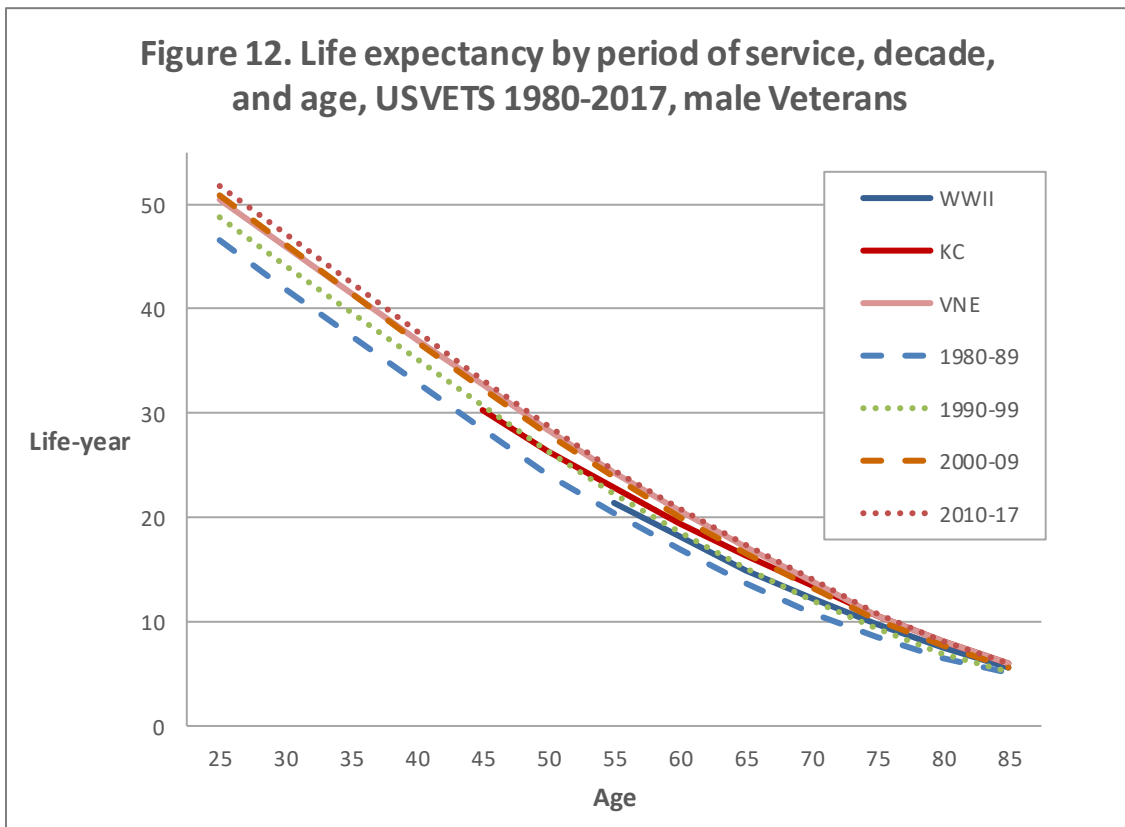
Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

**Table 14. Mortality Rate by Period of Service, Decade, and Age, USVETS 2010-2017, Female Veterans**

Age	WWII	KC	VNE	1980-89	1990-99	2000-09	2010-17
25			0.0006	0.0007	0.0005	0.0005	0.0007
30			0.0010	0.0009	0.0008	0.0007	0.0007
35			0.0012	0.0011	0.0012	0.0009	0.0009
40			0.0019	0.0019	0.0018	0.0015	0.0012
45		0.0056	0.0026	0.0033	0.0024	0.0023	0.0016
50		0.0075	0.0043	0.0064	0.0039	0.0037	0.0031
55	0.0083	0.0086	0.0059	0.0079	0.0074	0.0054	0.0050
60	0.0109	0.0109	0.0088	0.0110	0.0101	0.0088	0.0077
65	0.0165	0.0160	0.0126	0.0162	0.0161	0.0140	0.0122
70	0.0231	0.0214	0.0184	0.0248	0.0219	0.0207	0.0176
75	0.0333	0.0323	0.0294	0.0374	0.0321	0.0322	0.0296
80	0.0511	0.0520	0.0484	0.0581	0.0527	0.0489	0.0506
85	0.0848	0.0845	0.0845	0.0890	0.0894	0.0829	0.0865

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

Tables 15 and 16, and Figures 12 and 13, show the life expectancy by period of service and decade, for male and female, at ages 20, 25...85, in years 1980-2017. KC Veterans have higher life expectancy compared to WWII Veterans and VNE Veterans have higher life expectancy compared to KC Veterans, for male and female. The life expectancies are not computed at ages below 55 for the WWII Veterans and ages below 45 for the KC Veterans because of lack of mortality rates at these ages.

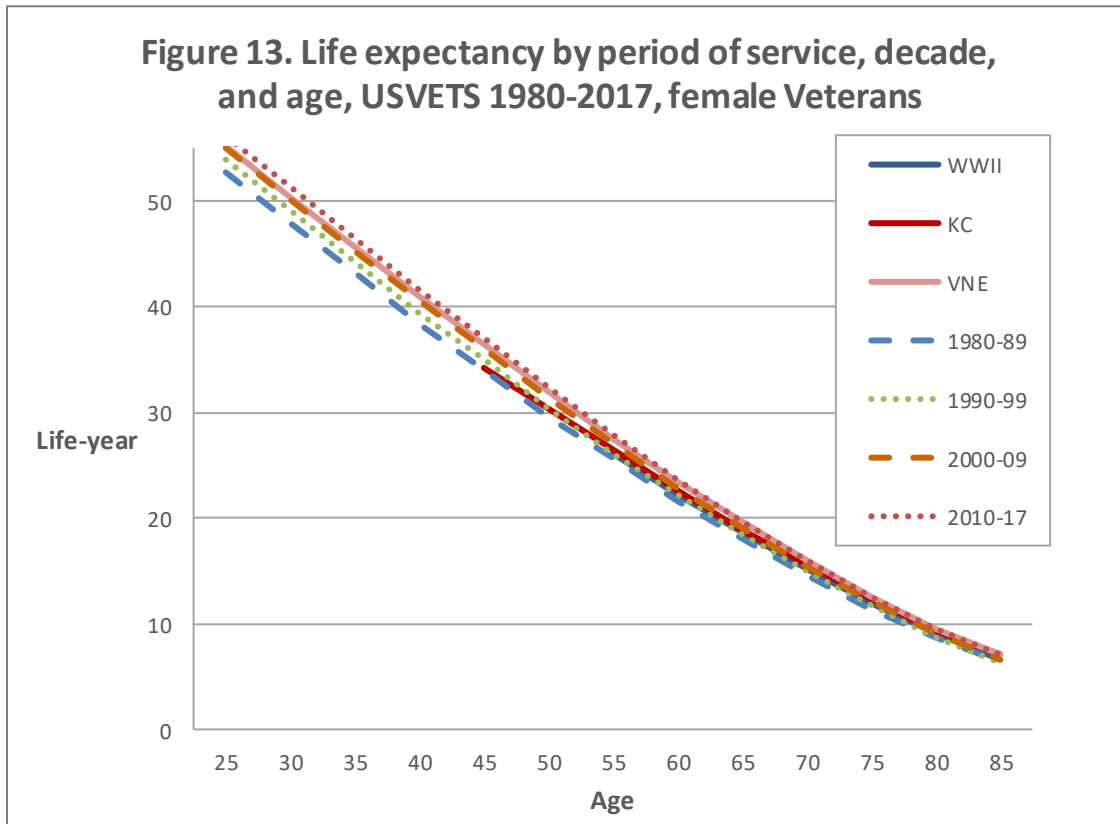


Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

**Table 15. Life Expectancy by Period of Service, decade, and Age, USVETS 2010-2017, Male Veterans**

Age	WWII	KC	VNE	1980-89	1990-99	2000-09	2010-17
25			50.5	46.6	48.8	50.9	51.8
30			46.1	42.0	44.2	46.2	47.2
35			41.5	37.4	39.6	41.5	42.5
40			37.0	32.9	35.2	36.8	37.9
45		30.3	32.7	28.4	30.7	32.3	33.2
50		26.4	28.4	24.2	26.4	28.1	28.8
55	21.4	22.8	24.4	20.4	22.3	24.0	24.6
60	18.1	19.4	20.6	17.0	18.5	20.1	20.9
65	15.0	16.3	17.1	13.7	15.2	16.5	17.4
70	12.3	13.4	13.8	10.9	12.1	13.3	14.0
75	9.8	10.6	10.7	8.5	9.4	10.3	10.9
80	7.6	8.1	8.1	6.6	7.0	7.7	8.2
85	5.6	6.0	6.0	5.1	5.2	5.6	6.0

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics



Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics



**Table 16. Life Expectancy by Period of Service, decade, and Age, USVETS 2010-2017, Female Veterans**

Age	WWII	KC	VNE	1980-89	1990-99	2000-09	2010-17
25			55.2	52.7	53.9	55.0	56.1
30			50.4	47.9	49.0	50.2	51.3
35			45.7	43.2	44.3	45.3	46.5
40			41.0	38.5	39.5	40.6	41.7
45		34.2	36.4	33.9	34.9	35.9	37.0
50		30.3	31.9	29.6	30.4	31.4	32.3
55	26.1	26.4	27.6	25.6	26.1	27.0	27.9
60	22.2	22.6	23.5	21.7	22.3	22.8	23.7
65	18.6	18.9	19.6	18.0	18.5	19.0	19.6
70	15.2	15.5	16.0	14.5	15.0	15.4	15.9
75	12.0	12.3	12.5	11.4	11.8	12.1	12.5
80	9.1	9.4	9.6	8.7	8.8	9.2	9.5
85	6.6	7.1	7.1	6.4	6.3	6.6	7.1

Source: U.S. Veterans Eligibility Trends and Statistics, 2018  
 Prepared by the National Center for Veterans Analysis and Statistics

## Discussion

The exclusion of those without separation date, about 5% of USVETS and older and higher percentage of female, may have contributed to the higher mortality rates of Veterans than those of the U. S. population in Table 5 and Figure 1. Other reasons for the higher mortality rates may be because many Veterans come to VA for benefits only such as compensation, health care, and burial, and the data has not fully accounted for Veterans who never used VA medical facilities or never enrolled in VA benefit programs and therefore inflated the estimated mortality rates. In addition, the government may have been less attentive to collecting Veterans information in earlier decades. The missing Veterans in records would generally be thought older and healthier. The mortality rate for older Veterans is adjusted due to missing older Veterans by averaging Veterans' mortality rate and SSA mortality rate<sup>6</sup>.

The Figure 9 and Table 17 showed the education differentials in life expectancy of 4.6, 3.8, and 1.5 life-years for male Veterans and 2.5, 2.1, and 0.9 life-years for female Veterans in 2010-17 are at least 0.2-0.8 smaller than those of the U. S. population in years 1979-89 at ages 25, 45, and 65, respectively<sup>3</sup>:

- 5.4, 4.0, and 2.3 life-years for non-Hispanic White males,
- 6.7, 4.7, and 2.6 life-years for non-Hispanic Black males,
- 2.8, 2.5, and 1.5 life-years for non-Hispanic White females, and
- 5.9, 4.6, and 2.0 life-years for non-Hispanic Black females.

The education differentials in life expectancy at age 25 is at least 0.8 life-years smaller for male Veterans and 0.3 life-years smaller for female Veterans compared to those of the U. S. population.

**Table 17. Comparing Education Differentials in Life Expectancy, Veterans vs. U. S. Population**

Gender	Age	Race and Ethnicity	None or Unknown Education	College+	< 12 <sup>a</sup>	13+ <sup>a</sup>	Education Differential	Less Differential for Veterans <sup>b</sup>
Male	25	Veterans	49.0	53.6			4.6	-0.8
		U.S. NHW			47.2	52.6	5.4	
		U.S. NHB			43.5	50.2	6.7	
	45	Veterans	31.0	34.8			3.8	-0.2
		U.S. NHW			29.6	33.6	4.0	
		U.S. NHB			27.0	31.7	4.7	
	65	Veterans	16.6	18.1			1.5	-0.8
		U.S. NHW			14.6	16.9	2.3	
		U.S. NHB			14.4	17.0	2.6	
Female	25	Veterans	54.6	57.1			2.5	-0.3
		U.S. NHW			55.1	57.9	2.8	
		U.S. NHB			50.2	56.1	5.9	
	45	Veterans	35.8	37.9			2.1	-0.4
		U.S. NHW			36.1	38.6	2.5	
		U.S. NHB			32.9	37.5	4.6	
	65	Veterans	19.2	20.1			0.9	-0.6
		U.S. NHW			19.6	21.1	1.5	
		U.S. NHB			18.7	20.7	2.0	

<sup>a</sup> Highest grade completed, U. S. Population 1979-1989

<sup>b</sup> Only showed the difference between Veterans and U. S. Non-Hispanic Whites, the difference of education differentials could be larger

The Figure 9 and Table 18 showed the income differentials in life expectancy of 4.3, 4.3, and 1.8 life-years for male Veterans and 2.8, 2.6, and 1.1 life-years for female Veterans in 2010-17 are 0.2-0.5 larger than the education differentials except for aged 25 male, but are much smaller than those of the U. S. population in years 1979-89 at ages 25, 45, and 65, respectively<sup>3</sup>, except for aged 65 female:

- 7.9, 6.9, and 3.3 life-years for non-Hispanic White males,
- 8.6, 7.8, and 2.8 life-years for non-Hispanic Black males,

- 3.3, 3.0, and 0.9 life-years for non-Hispanic White females, and
- 5.0, 3.5, and 0.9 life-years for non-Hispanic Black females.

The income differentials in life expectancy at age 25 is at least 3.6 life-years smaller for male Veterans and 0.5 life-years smaller for female Veterans compared to those of the U. S. population.

**Table 18. Comparing Income Differentials in Life Expectancy, Veterans vs. U. S. Population**

Gender	Age	Race and Ethnicity	< \$20K or Unknown Income	\$50K+	< \$10K <sup>a</sup>	\$25K+ <sup>a</sup>	Income Differential	Less Differential for Veterans <sup>b</sup>
Male	25	Veterans	49.3	53.6			4.3	-3.6
		U.S. NHW			45.0	52.9	7.9	
		U.S. NHB			41.6	50.2	8.6	
	45	Veterans	30.7	35.0			4.3	-2.6
		U.S. NHW			27.0	33.9	6.9	
		U.S. NHB			24.7	32.5	7.8	
	65	Veterans	16.4	18.2			1.8	-1.5
		U.S. NHW			13.8	17.1	3.3	
		U.S. NHB			14.0	16.8	2.8	
Female	25	Veterans	54.5	57.3			2.8	-0.5
		U.S. NHW			54.5	57.8	3.3	
		U.S. NHB			50.3	55.3	5.0	
	45	Veterans	35.4	38.0			2.6	-0.4
		U.S. NHW			35.5	38.5	3.0	
		U.S. NHB			32.8	36.3	3.5	
	65	Veterans	19.1	20.2			1.1	-0.2
		U.S. NHW			19.7	20.6	0.9	
		U.S. NHB			18.8	19.7	0.9	

<sup>a</sup> Family Income (1980 \$), U. S. Population 1979-1989

<sup>b</sup> Only showed the difference between Veterans and U. S. Non-Hispanic Whites, the difference of income differentials could be larger

The life expectancy has changed since the 1980s. If the education and income categories are compatible, the comparison of differentials in life expectancy, which have cancelled out the differences in life expectancy over time, should be appropriate. A high school education may not represent the same level of education achievement as in the 1980s, but a person without a high school diploma will be in a much greater

disadvantaged social status now compared to over 20 years ago. Therefore, the differential of without high school and with college education for Veterans now should be adjusted lower in comparing them to an earlier study of the U. S. population. Also, the differential of no high school education to above high school education including college years before graduation in the earlier study of U. S. population should be adjusted higher compared to the differential of no high school and college education in the current study. In either case, the education differential in the Veteran population is smaller than those in the U. S. population. In comparing income categories, the cut-off dollar amount of \$20,000 and \$50,000 in the estimated household income of Veterans in years 2010-17 are presumably similar to 1980-dollar amount of \$10,000 and \$25,000 for family income, respectively.

Even though the data may not be available for all categories in our comparison, we can draw some conclusions based on what we observed in the data that we have. For example, the life expectancy for the group of 'None or unknown' education would have been lower if all unknown records had no high school education. Therefore, the life expectancy for Veterans without a high school education would have been smaller than the life expectancy of 'None or unknown' of Highest Education Completed in Table 11. Likewise, the life expectancy for Veterans with less than \$20,000 income would be smaller than those of 'Less than \$20,000 or unknown' of Estimated Household Income in Table 12. This is because the life expectancy for the group of unknown or less than \$20,000 income would have been shorter if all unknown had less than \$20,000 income. Hence, the education and income differentials in life expectancy would be more than those shown in Tables 11 and 12.

Longer life expectancy of VNE Veterans compared to WWII and KC Veterans are due to the younger cohort had benefited more from mortality improvement over decades than the older cohorts, the median age of VNE Veterans in 1980 is 27 and 30 years younger than that of WWII Veterans and 16 and 20 years younger than that of KC Veterans for male and female, respectively. Tables 14 and 15 showed, at age 55, the VNE Veterans are estimated to live 3 and 1.5 life-years more than the WWII Veterans for male and female, respective. At age 45, the VNE Veterans are estimated to live 2.4 and 2.2 life-years more than the KC Veterans for male and female, respective. Life expectancy is not computed for the Gulf Wars Veterans for not enough mortality information of the young cohort.

As Veterans were aged in and out from decade to decade, the life expectancy of the cohorts should be compared accordingly to each decade, for example, in Tables 14, to compare the life expectancy of 41.5 life-years of the male VNE Veterans at age 35 in 1985 to 37.4 life-years in 1980-89, 32.7 vs. 30.7 life-years at age 45 in 1990-99, 24.4

vs. 24 life-years at age 55 in 2000-09, and 17.1 vs. 17.4 life-years at age 65 in 2010-17, the longer life expectancy for the VNE Veterans should be because of mortality improvement over decades.

Comparing the life expectancy of the cohorts to that of decades in which the cohorts aged, similar reduction in life expectancy between older and younger Veterans observed, for example, the life expectancy of 26.4 and 19.4 life-years at ages 50 and 60 of KC male Veterans in 1985 in Table 14 showed the 7 life-years difference vs. the 7.2 life-years difference from the life expectancy in 1980-89, 6 vs. 6.4 life-years difference between ages 60 and 70 in 1990-99, and 5.3 vs 5.6 life-years difference between ages 70 and 80 in 2000-09.

As the mortality rates are known to be unreliable at old age. The life expectancy of older Veterans is computed using the life expectancy at age 85, from the U. S. life tables <sup>5,7,8,9</sup>, which are 5.1, 5.2, 5.6, and 6 life-years for male Veterans and of 6.4, 6.3, 6.6, and 7.1 life-years for female Veterans in years 1980-89, 1990-99, 2000-2009, and 2010-17, respectively. The 6 and 7.1 life-years from the U. S. life table of 2014<sup>5</sup> were used for KC and VNE Veterans, for male and female, respectively. However, the 5.6 and 6.6 life-years from the U. S. life table of 2005<sup>9</sup> were used for WWII Veterans, for male and female, respectively, as most had reached 80 years old in 2000-2009.

## **Conclusion**

The mortality rates and life expectancy have been computed using data from USVETS. The higher mortality rate estimated for Veterans compared to U. S. population may be explained, in part by the missing of older and healthier Veterans in administrative records. The education and income differentials in life expectancy are computed with acquired data from an external commercial vendor. The education differential is in general smaller than the income differential. Veterans are observed to have smaller education and income differentials compared to the U. S. population. KC Veterans were estimated to have longer life expectancy than WWII Veterans have, VNE Veterans have the longest life expectancy estimate among the three cohorts of period of service.

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