Veteran Population Projection Model 2016

Overview

Introduction

The Veteran Population Projection Model 2016 (VetPop2016) provides the latest official Veteran population projection from the Department of Veterans Affairs (VA). A Veteran, as defined in the U.S. Code Title 38, is a person who served in the active military, naval, or air service, and who was discharged or released therefrom under conditions other than dishonorable. Active military, naval, or air service includes (1) active duty which represents full-time duty in the Armed Forces, other than active duty for training or (2) any period of active/inactive duty for training which the individual concern was disabled. For Veterans and their families, VA provides a broad range of benefits and services. VetPop is used for strategic, policy planning, and budgeting within VA and by external organizations such as other federal agencies, Congress, state governments and other organizations.

The office of Predictive Analytics and Actuary (PAA), formerly known as the Office of the Actuary, produces projections of Veteran population using a cohort-component method that uses base population and future trends in new Veterans, deaths, and net county migration. Based on military service information from the Department of Veterans Affairs (VA) and the Department of Defense (DoD) and demographic information from national surveys and commercial databases, the Veteran population is estimated and projected by the following main categories: State, County, Age, Gender, Period of Service, Race/Ethnicity, Rank (Officer/Enlisted), and Branch of Service for each fiscal year from Fiscal Year (FY) 2015 to FY2045. Projections are updated every two to three years to incorporate the new Veteran data and revised assumptions about the future trends for these components. This overview provides the history, what's new in VetPop2016, data sources, model process, and model output.

History

VetPop2016 represents the eighth generation of the Veteran Population Projection Model. The history of VetPop is shown in the following milestones:

- The original VetPop model was developed in the early 1990s prior to the establishment of PAA. The model relied heavily on data from the 1990 Census and DoD's Defense Manpower Data Center (DMDC) which provided information on monthly separations by Age, Gender, and State.
- PAA's first population model was VetPop2000. Continuous enhancements were made in developing PAA's subsequent models: VetPop2001 in November, 2001; VetPop2001Adj in early 2003; VetPop2004 in December, 2004; VetPop2007 in December, 2007; VetPop2011 in December, 2012; VetPop2014 in October, 2014; and VetPop2016 in June, 2017.
- VetPop2000 and VetPop2001 relied more on DMDC data to project post-Vietnam era Veteran population. Census data was used to determine the number of Vietnam-era or earlier period of service Veterans:
  - o DMDC: Age 38 or younger on April 1, 1990 or who left service after May 8, 1975
  - o 1990 Census: Age 39 or older on April 1, 1990 or who left service by May 8, 1975.

- VetPop2001Adj (officially named "VetPop2001 Adjusted to Census 2000") was a modification of the VetPop2001 model, with population totals adjusted to be consistent with totals obtained from early releases of Census 2000 data as shown in Summary File 3.
- VetPop2004 used detailed Census 2000 data to provide more comprehensive and updated estimates and projections.
- VetPop2007 followed the same approach asVetPop2004. In addition to accounting for more recent military service data, state to state migration estimations were enhanced using the American Community Survey and a summary table of Gulf War Veterans was introduced.
- VetPop2011 incorporated a new bottom-up modeling approach. Veteran population was projected at the county level in contrast to prior models that were developed at the state level and subsequently allocated to county. In VetPop2011, a set of time series models were used to project separations based on historical DoD data. County to county migration was modeled with longitudinal data from VA and Internal Revenue Service. County level projections (by gender and five-year age groups) were aggregated to provide Veteran information at larger geographic units such as congressional districts, states, and national level. In addition, Veteran characteristics such as Race/Ethnicity, Rank (Officer/Enlisted), Period of Service, and Branch of Service were derived from ACS and data from VA and DoD.
- VetPop2014 was modeled in the same approach as VetPop2011 and included two more years of military service data.

What's New?

The overall modeling approach in VetPop2016 is consistent with the VetPop2014. However, in VetPop2016, significant improvements were made in the baseline estimation, and DoD's projected separations were used as the main source of new entrants to the Veteran population. The baseline estimates as of September 30, 2015 was developed with administrative data from VA and DoD and national survey data from Bureau of the Census. The county level baseline estimate was then projected for the next 30 years to produce living and deceased Veteran counts by single year of age, gender, county, state, and other characteristics. The new VetPop2016 model reflects an update of several data sources and methodological enhancements as noted below:

- VetPop2016 incorporates more recent DoD data on actual separations through September 30, 2015.
- The baseline estimation process was updated by using the latest ACS, DoD and VA data.
- Projected separations from DoD OACT were used as the main source of new entrants to the Veteran population to more directly reflect the impact of changes in future military strength.
- Mortality rates were updated from the latest VA and DoD data and the 2016 OASDI Trustees Report from the SSA.
- Projected Veterans by congressional district for the 114th Congress are included.
- Race/Ethnicity, Rank (Officer/Enlisted), Branch of Service, and Period of Service projections are updated by including more recent years of data from VA, DoD and ACS.

Data Sources

These are the main data sources for VetPop2016:

- Department of Commerce, Census Bureau – Decennial Census 2000/2010
- Department of Commerce, Census Bureau – American Community Survey (ACS)
- Department of Defense (DoD)
    - Active and Reserve Components (Defense Manpower Data Center (DMDC))
    - Projected Future Separations – Active Component (Office of the Actuary (OACT))
- Department of Veterans Affairs (VA) – Administrative data collection

A combination of Decennial Census 2000/2010, ACS, VA, and DoD information was used to determine the Veteran counts by the specific characteristics such as age, gender, and geographic levels. While DoD data provided the actual separations and deaths through September 30, 2015, information from VA was used to validate and supplement missing information. Additionally, Census 2000/2010 and ACS data were incorporated to account for older Veterans since DoD data and VA data were limited due to lack of electronic record technology in historic times and the data loss at the National Personnel Records Center in mid-1970. For younger Veterans (under age 66), PAA compared Veteran population by single year age and gender at the national level from the ACS 1-Year data and the data from VA and DoD. The results showed that the VA and DoD data were more reasonable than the ACS 1-Year estimates among the younger Veterans. Additional information and a few notable data highlights for each data source are described below.

Decennial Census 2000/2010 and ACS

In VetPop2016, Decennial Census 2000/2010 and ACS continue to serve as major data sources. Although the reference time of Census 2000 data is not current, the data was based on a significantly large sample size, and it was determined to be useful especially in the estimation and validation phase for older age groups and island areas in the U.S. territory. The current information on Veterans was supplemented by ACS, which is designed to provide demographic data on a yearly basis instead of every 10 years as in the Decennial Census. For the migration study, special tabulations of the Veteran population by Age, Gender, Period of Service, and Race/ethnicity from ACS were prepared. The 2015 one-year ACS was used for national tabulations while three one-year (2013, 2014, and 2015) and a five-year (2011-2015) ACS were used for state and county tabulations.

Highlights

- State data include 50 states, DC, Puerto Rico, and U.S. territory island areas (Virgin Islands, American Samoa, Guam, and Northern Marianas). 2010 Decennial Census was used to get the Veteran data for four Island Areas, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and Virgin Islands.
- Age ranges from 17 to 95 (represents ages 95 and over). There is a small number of Veterans who were discharged at very young age, possibly due to the result of a disease or injury incurred during active military service.
- Due to data limitation in VA and DoD, ACS data was used to supplement the missing information on the older Veterans. For ages 66 and older, ACS data was used for estimating VetPop2016 baseline. VA and DoD data were used for the ages under 66.

- Race is grouped into seven categories (White, Black, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Some other race, and Two or more races) and ethnicity is grouped into two categories for Hispanic origin (Hispanic and Not Hispanic).
- Period of Service is categorized by the 13 periods specified by VA, distinguishing peacetime and war periods such as the Vietnam Era.

 To address disclosure concerns, the Census Bureau rounded each cell in the files received by VA as follows:

- 0 rounds to 0
- 1–7 rounds to 4
- 8–12 rounds to 10
- above 12, round to the nearest multiple of 5

Department of Defense

DoD data was used to estimate the Veteran population at the baseline as of September 30, 2015, and for modeling future separations from military service. For historical separations, DoD data contained person level information with active duty from the regular military (Active Component) and the Guard/Reserve Forces (Reserve Component); however, the future separations data was aggregated by age and gender. Active Component data contains demographic and military data on all service members from the regular military who have separated from active duty since July 1, 1970. Coast Guard data is available beginning July 1, 1988. In recent years, the National Oceanic and Atmospheric Administration (NOAA) Corps and the Public Health Service (PHS) also became part of the file.

Reserve Component data contains personnel information on present and past members of National Guard and Reserve Forces. According to federal law, Veterans, for purposes of receiving VA benefits and services, are those who have been discharged from federal active duty. This excludes Reserve Forces whose only active duty was for training – unless disabled during training – and National Guard members whose only active duty was in state service.

DoD Office of the Actuary projects future separations as a part of the annual valuation of DoD Military Retirement System. Based on the military service data from DMDC and the projected military end strength, future separations from the military services (Army, Air Force, Navy, and Marines) are projected for 100 years.

Active Component Data

Data on separations from active duty military components – reside in extracts from DMDC.

Highlights

The DMDC person level data used in VetPop2016 contains the following information: Date of Birth, Gender, Branch, Rank, Race, Activation and Separation dates, Date of Death, and Active status.

- Age at Separation is calculated from the Date of Birth and Separation period. (Separation period indicates the respective fiscal year based on the separation date.)
- Period of Service is calculated from the Activation and Separation dates.

- Date of Death is verified with the Social Security Administration (SSA) Death file, which includes only deaths that were reported to SSA.

Reserve Component Data

The DMDC Reserve data contains information on Reserve and National Guard members serving in the Reserve Forces as of September 30, 2015, as well as those who had served and was discharged in the past. As such, the data include persons who completed their tour of duty, retired from service, or died before being discharged. In addition, all types of Reserves - Selected, Active/Guard Reserve (AGR), Military Technician, Individual Ready Reserve/Inactive National Guard, Standby Reserve, and Retired Reserve - are considered, but only those with presidential activation or disabled in line of duty are counted as Veterans in VetPop.

Highlights

Person level data obtained from DMDC provides information such as Age, Gender, Branch, Rank, Race, Activation and Separation dates (from contingency data), Date of Death, and Active status.

- Age is calculated from the Date of Birth and the Separation period. (Separation period indicates the respective fiscal year based on the separation date.)
- Period of Service is calculated from the Activation and Separation dates.
- Date of Death is verified with the SSA Death file, which includes only the deaths that were reported to SSA.
- Veteran Status is determined using the Contingency data, which indicates a presidential activation such as Desert Storm, and thus a "Veteran" in accordance with the provisions of U.S.C. Title 38.

Future Separations Data

DoD Office of the Actuary projections contain information on future separations such as age and officer status for 100 years from the base year.

Highlights

- Future separations from military services (Army, Air Force, Navy, and Marines) are projected.
- Projected military end strength is incorporated into the projection.

Department of Veterans Affairs

VA data provided additional demographics and military service information that supplemented service member data from DoD. With the information from various VA benefits and services, VetPop2016 was able to incorporate more comprehensive representation of Veterans.

Highlights

- VA data contains longitudinal information of military service that may not be included in DoD data.
- Utilization of various VA benefits and services are included.
- County of residence is retained for most of those included in VA data.

Process

The VetPop2016 model projects Veteran population using a cohort-component method that consists of three processing phases: (1) baseline development, (2) core demographics modeling, and (3) additional characteristics development. It begins with an estimated base population as of September 30, 2015, and three components (death, net county migration, and separation) of population change are projected separately for each year from 2016 to 2045. The population is projected for each year by subtracting deaths, adding net county-level migration counts, and adding separations. The cohort component method is shown in the diagram below.
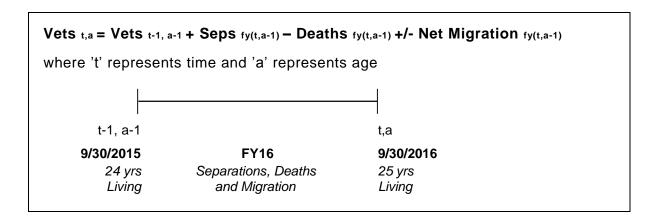
Baseline

The baseline phase utilizes data from VA and DoD to count Veterans who separated through September 30, 2015. However, due to data limitation of incomplete military service data prior to mid-1970, Decennial Census 2000/2010 and ACS data are also used to estimate Veteran population at the baseline, September 30, 2015.

Core Demographics

In the core demographics development, three major modules are integrated to project Veteran population at the end of each of fiscal years from 2016 to 2045. Starting with the Veteran population estimate from the baseline, Veteran population for September 30, 2016, through September 30, 2045 is projected as follows:

- start with the number of Veterans at the end of the previous year (for example, 24-year-old males in a county for September 30, 2015)
- add new separations
- subtract deaths
- account for the county's net migration count

The number of Veterans in the next year is determined as shown in the equation below:

$$\text{Vets}_{t,a} = \text{Vets}_{t-1,\,a-1} + \text{Seps}_{fy(t,a-1)} - \text{Deaths}_{fy(t,a-1)} +/- \text{Net Migration}_{fy(t,a-1)}$$

where 't' represents time and 'a' represents age

t-1, a-1		t,a
9/30/2015	**FY16**	**9/30/2016**
24 yrs	*Separations, Deaths*	*25 yrs*
Living	*and Migration*	*Living*

Core Demographics Modules

VetPop2016 consists of three major modules: (1) the Separation Module, (2) the Mortality Module, and (3) the Migration Module. These modules are used for estimating and projecting Veteran population from the baseline at September 30, 2015 by the core demographics of age and gender at the county level. Four additional characteristics – Branch of Service, Race/Ethnicity, Period of Service, and Rank – are modeled separately at the state or national level. These components are described in Table 1.

Table 1. VetPop2016 Model Components

Phase	Module	Purpose
Core Demographics		
	Separation Module	Project new entrants to the Veteran population
	Mortality Module	Project mortality rate
	Migration Module	Determine county to county migration
Characteristics		
	Branch	Project Veterans by Branch at the national level
	Race/Ethnicity	Project Veterans by Race/Ethnicity at the state level
	Period of Service	Project Veterans by Period of Service at the state level
	Rank (Office/Enlisted)	Project Veterans by Rank at the national level

Additional Characteristics

In addition to the core demographics, VetPop2016 includes other characteristics of Veteran population such as Period of Service, Race/Ethnicity, Rank (Officer/Enlisted), and Branch of Service. Each of these characteristics is modeled separately, based on ACS and data from VA and DoD, and then applied to the core demographic projections.

Model Output

VetPop2016 estimates and projections from September 30, 2015 to September 30, 2045 are prepared in two formats – Statistical Analysis System (SAS) and Microsoft Excel. The output files contain living Veterans at the following levels: national, county, state, 114th Congressional District (CD), and Veterans Integrated Service Networks (VISN). These output files are also stored as a set of Microsoft Excel PivotTables which give users an easy access to tabulations of model output and offer flexibility in the choice of row and column variables. A list of Excel PivotTables is provided in Table 2 below.

The Excel PivotTables are posted to the VA Internet (http://www.va.gov/vetdata/Veteran_Population.asp)

Table 2. VetPop2016 National, State, County, Congressional District, and VISN

Table	Row	Column	Pages
The following are national tables.			
1	Age (15 Groups)	Year	Gender
2	Year	Period Of Service*	Gender
3	Year	Race/Ethnicity	Gender
4	Year	Branch of Service	Gender
5	Year	Officer/Enlisted	Gender
The following are state tables.			
6	State	Age (15 groups)	Gender, Year
7	State	Period Of Service*	Gender, Year
8	State	Race/Ethnicity	Gender, Year
The following are county, Congressional District, and Veteran Integrated Service Network level data			
9	FIPS, County Name	Year	State, Gender, Age (4 groups)
10	State, Congressional District (114th Congress)	Age (2 groups)	Gender, Year
11	VISN Number, VISN Name	Age (4 groups)	Gender, Year

* Differs from the "Period of Service" variable appearing in all other tables in that it contains subtotals of certain periods.

System/Software

The majority of the work was done in SAS in a PC environment, and Microsoft Excel was used in some modules and for characteristics developments.

You can request additional information via e-mail at VANCVAS@VA.GOV.