Technical Notes for Veteran's Health Statistics Tables: National Health Interview Survey 2015-2018

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Introduction

The National Health Interview Survey (NHIS), is the principal source of information on the health of the civilian noninstitutionalized population of the United States, and the oldest continuous national health survey (since 1957). It is also one of the major data collection programs of the National Center for Health Statistics (NCHS) which is part of the Centers for Disease Control and Prevention (CDC), Department of Health and Human Services (DHHS). Through personal interviews, the NHIS documents the health status and health care access and use of the U.S. population, and selected subgroups, and identifies disparities in these areas by race and ethnicity, socioeconomic status, other population characteristics, and geographic region.

The Office of Health Equity (OHE) in the Department of Veterans Affairs (VA) supports and coordinates efforts to understand and reduce disparities in health and health care affecting Veterans. As part of the Health Equity Action Plan (HEAP) (1), the Veterans Health Administration (VHA) aims to develop an understanding of where health and health care inequities exist and identify factors that contribute to inequity in Veteran populations and intervene to eliminate the inequities.

Given that the NHIS is a large in-person survey which collects information on Veteran status each year, the NHIS data files provide a unique opportunity to conduct nationally generalizable research on the health of civilian noninstitutionalized Veterans. To facilitate this research, the Division of Health Interview Statistics (DHIS) at the National Center for Health Statistics (NCHS) and the VA Office of Health Equity (OHE) have collaborated through an Interagency Agreement (IAA) to produce online tables with prevalence estimates for select health outcomes and behaviors using 2015 to 2018 NHIS data files.

The two-fold purpose of the online tables was to examine and characterize population differences in the prevalence of health and health behaviors among a) Veterans by various socio-demographic and other health related characteristics, and b) Veterans compared with nonveterans by the same characteristics.

Methods

Data Source

The target population for NHIS is the civilian noninstitutionalized population of the United States. Persons excluded are patients in long-term care institutions (e.g., nursing homes for the elderly, hospitals for the chronically ill or physically or intellectually disabled, and wards for abused or neglected children); inmates of correctional facilities (e.g., prisons or jails, juvenile detention centers, and halfway houses); active-duty Armed Forces personnel (although their civilian family members are included); homeless persons; and U.S. nationals living in foreign countries. Sampling and interviewing are continuous throughout each year. The sampling plan follows an area probability design that permits the representative sampling of households and noninstitutional group quarters (e.g., college dormitories). Trained interviewers from the U.S. Census Bureau visit each selected household and administer the NHIS in person. Detailed interviewer instructions can be found in the NHIS field representative's manual (2).

The NHIS questionnaire, which is administered annually, consists of four main components: Household Composition Section, Family Core, Sample Adult Core, and Sample Child Core. The Household Composition Section of the questionnaire collects some basic demographic and relationship information about all persons in the household. The Family Core, which is administered separately for each family in the household, collects

information for all family members. Topics on the Family Core include sociodemographic characteristics, basic indicators of health status, limitations in activities, injuries, health insurance coverage, and access to and use of health care services. At least one family member whose age is equal to or over the age of majority for the given state responds to questions about all family members in the Family Core. In most states, this age is 18 years, but in Alabama and Nebraska it is 19 years, and in Mississippi it is 21 years. Although considerable effort is made to ensure accurate reporting, information from both proxies and self-respondents may be inaccurate because the respondent is unaware of relevant information, has forgotten it, does not wish to reveal it to an interviewer, or does not understand the intended meaning of the question.

The Sample Adult Core obtains additional information on the health of one randomly selected adult (the "sample adult") in the family. The sample adult responds for himself or herself, but in rare instances when the sample adult is mentally or physically incapable of responding, proxy responses are accepted. The Sample Adult Core collects information on health conditions, functional limitations, health behaviors, and access to and use of health care services from one randomly selected adult per family. Estimates of these health outcomes for adults are obtained from the Sample Adult Core, while information regarding demographic characteristics is obtained from the Family Core.

The NHIS sample is redesigned and redrawn approximately every 10 years to better measure the changing U.S. population and to meet new survey objectives. The sample design for NHIS that was first implemented in 2006 remained in use through 2015 (3). Its fundamental structure was very similar to the previous 1995–2005 NHIS sample design. Oversampling of black and Hispanic populations allowed for more precise estimation of health characteristics in these growing minority populations. This sample design also oversampled the Asian population. In addition, when black, Hispanic, or Asian adults aged 65 and over were in the family, they had an increased chance of being selected as the sample adult.

A new sample design was implemented with the 2016 NHIS. Sample areas were reselected to take account of changes in the distribution of the U.S. population since 2006, when the previous sample design was first implemented; commercial address lists were used as the main source of addresses, rather than field listing; and the oversampling procedures for black, Hispanic, and Asian persons that were a feature of the previous sample design were not implemented in 2016.

National level prevalence estimates are included in these tables. Detailed information about overall annual sample sizes and response rates of the NHIS are available in the annual NHIS Survey Description documents (4–7), available at https://www.cdc.gov/nchs/nhis/quest_data_related_1997_forward.htm. Sample size (n) and weighted population size (N) of Veterans and non-veterans, by year and sex are included in Appendix 1.

Estimation Procedures

The Sample Adult weights were used to produce the national estimates contained in these tables. Beginning with 2012 NHIS data, the NHIS sample weights were calibrated to 2010 Census-based population estimates for age, sex, and race/ethnicity of the U.S. civilian noninstitutionalized population. The NHIS data weighting procedure is described in more detail at: https://www.cdc.gov/nchs/data/series/sr_02/sr02_165.pdf.

All tables are based on four years of data (2015-2018), however the prevalence estimates reported are annualized estimates, and the weighted frequencies available in Appendix 1 reflect the number of persons in the U.S. population for each year during the data period described.

Counts for persons of unknown status (responses coded as “refused,” “don’t know,” or “not ascertained”) with respect to health characteristics of interest are not shown separately in the tables, nor are they included in the calculation of percentages (as part of either the denominator or the numerator), to provide a more straightforward presentation of the data. For all health measures in these tables, the percentages with unknown values are typically small (generally less than 1%) and would not support disaggregation by the demographic characteristics included in the table. Estimates based on health outcomes and behaviors with unknown percentages greater than 2% are indicated in the footnotes for the appropriate tables. In addition, some of the sociodemographic (and other health characteristic) variables that are used to delineate various population subgroups have unknown values. For most of these variables, the percentage unknown is small (generally less than 1%), however ‘serious psychological distress’ is missing 3.6%, ‘sexual orientation’ is missing 2.7%, and ‘physical limitation’ is missing 4.3%.

Age Adjustment

In addition to the crude percentages provided for veterans, age-adjusted percentages are provided for both veterans and non-veterans to facilitate comparisons between the two populations. Given differences in age structures between veterans and non-veterans, comparison of crude percentages could be confounded by age. Similarly, age-adjusted percentages permit within group comparisons (Veterans or nonveterans) by various sociodemographic subgroups that may have different age structures (8–9).

Age-adjusted estimates for adults aged 20 and over were age-adjusted by the direct method to the projected 2000 U.S. population using age groups 20-34, 45-49, 50-64, 65-79, and 80 and older. Educational attainment was limited to adults aged 25 and older and age-adjusted using age groups 25-34, 45-49, 50-64, 65-79, and 80 and older. For more information on the derivation of age-adjustment weights for use with NCHS survey data, see Klein and Schoenborn (9),

Variance Estimation and Statistical Reliability

Because NHIS data are based on a sample of the population, the data are subject to sampling error. Confidence intervals are reported to indicate the reliability of the estimates. Estimates and standard errors were calculated using SUDAAN software, which takes into account the complex sampling design of NHIS. The Taylor series linearization method was used for variance estimation in SUDAAN (10). 95% confidence intervals were generated using the Korn-Graubard method for complex surveys.

Confidence Intervals are shown for all percentages. All estimates are assessed according to the NCHS standards of reliability as specified in National Center for Health Statistics Data Presentation Standards for Proportions (11). Unreliable estimates are indicated with an asterisk (*) and are not shown. Reliable estimates with an unreliable complement are shown but are indicated with two asterisks (**). Complements are calculated as 100 minus the percentage.

Definitions of Selected Terms

Sociodemographic and other Subgroup Terms

Age – Recorded in single year for each person at time of interview.

Education – Categories of education are based on years of school completed or highest degree obtained for adults aged 25 and over.

Employment – NHIS respondents were asked “What was [person]/were you doing last week?” for each person aged 18 and older. Those who were “working for pay at a job or business,” “with a job or business but not at work,” or “working, but not for pay, at a family-owned job or business” were classified as employed. Those who were “looking for work” were classified as not employed and looking for work. Persons “not working at a job or business and not looking for work” were classified as not employed and not looking for work.

County of residence – Classified into urban and rural based on 2013 National Center for Health Statistics Urban-Rural Classification Scheme for Counties which is based on the Office of Management and Budget’s (OMB) February 2013 delineation of metropolitan statistical areas (MSA) and micropolitan statistical areas (derived according to the 2010 OMB standards for defining these areas) and Vintage 2012 postcensal estimates of the resident U.S. population. Counties that were classified as large central metro (in MSAs of 1 million or more population that contain the entire population of the largest principal city of the MSA, have their entire population contained in the largest principal city of the MSA, or contain at least 250,000 inhabitants of any principal city of the MSA.), large fringe metro (in MSAs of 1 million or more population that did not qualify as large central metro counties), medium metro (in MSAs of populations of 250,000 to 999,999), and small metro (in MSAs of population less than 250,000), were categorized as urban. Whereas counties classified as micropolitan (in a micropolitan statistical area) and noncore (did not qualify as micropolitan) were categorized as rural. For more information on the urban-rural classification scheme, see https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf.

Marital status – Marital status at the time of interview is obtained for all respondents aged 14 and over. Five categories are possible:

Married – Includes all persons who identify themselves as married and who are not separated from their spouses. Married persons living apart because of circumstances of their employment are considered married. Persons may identify themselves as married regardless of the legal status of the marriage or sex of the spouse.

Widowed – Includes persons who have lost their spouse due to death.

Divorced or separated—Includes persons who are legally separated from their spouse or living apart for reasons of marital discord, and those who are divorced.

Never married – Includes persons who were never married (or who were married and then had that marriage legally annulled).

Living with partner – Includes unmarried persons regardless of sex who are living together as a couple, but do not identify themselves as married. Adults who are living with a partner (or cohabiting) are considered to be members of the same family.

Disability status – Disability is defined by the reported level of difficulty (no difficulty, some difficulty, a lot of difficulty, or cannot do at all) in six functioning domains: seeing (even if wearing glasses), hearing (even if wearing hearing aids), mobility (walking or climbing stairs), communication (understanding or being understood by others), cognition (remembering or concentrating), and self-care (such as washing all over or dressing). Sample adults who responded "a lot of difficulty" or "cannot do at all" to at least

one question were considered to have a disability. This measure of disability is unrelated to having a "Service connected disability" as defined and assessed by the U.S. Department of Veterans Affairs.

Overseas deployment – Based on responses to the following survey question, asked of NHIS respondents aged 18 or older who had ever served in the armed forces: "Did [fill: you/alias] ever serve in a foreign country during a time of armed conflict or on a humanitarian or peacekeeping mission?"

Poverty status – Each member of a family is classified according to the total income of all family members. Family members are all persons within the household related to each other by blood, marriage, cohabitation, or adoption. The income recorded is the total income received by all family members in the previous calendar year. Income from all sources includes wages, salaries, military pay (when an Armed Forces member lived in the family), pensions, government payments, child support or alimony, dividends, and help from relatives. Unrelated individuals living in the same household (e.g., roommates) are considered to be separate families and are classified according to their own incomes.

Poverty status refers to the ratio of the family income in the previous calendar year to the appropriate poverty threshold (given family size and number of children) defined by the U.S. Census Bureau for the previous calendar year (13). Persons who are categorized as "Poor" had incomes of less than 100% of the poverty threshold; that is, their family income was strictly below the poverty threshold. The "Near poor" category includes persons with family incomes of 100% to less than 200% of the poverty threshold. "Not poor" persons have family incomes that are 200% of the poverty threshold or greater.

Item nonresponse for questions on family income is relatively high, as is common in large population surveys. To reduce biases associated with missing data, information on family income and personal earnings is imputed by NCHS analysts for each survey year using multiple-imputation methodology. Five data sets containing imputed values for each survey year and additional information about the imputed income files can be found on the NHIS website (14).

Race and Hispanic origin – Hispanic origin and race are two separate and distinct concepts. Thus, Hispanic persons may be of any race. Hispanic includes persons of Mexican, Puerto Rican, Cuban, Central and South American, or Spanish origins.

Region – In the geographic classification of the U.S. population, states are grouped into four regions used by the U.S. Census Bureau:

Region	States included
Northeast	Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, and Pennsylvania
Midwest	Ohio, Illinois, Indiana, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Kansas, and Nebraska
South	Delaware, Maryland, District of Columbia, West Virginia, Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Oklahoma, Arkansas, and Texas
West	Washington, Oregon, California, Nevada, New Mexico, Arizona, Idaho, Utah, Colorado, Montana, Wyoming, Alaska, and Hawaii

Serious psychological distress – An indicator of psychological distress based on six separate questions in the Sample Adult Core that asked respondents how often during the preceding 30 days they felt 1) so sad that nothing could cheer them up, 2) nervous, 3) restless or fidgety, 4) hopeless, 5) that everything was an effort, or 6) worthless. Each question had five response categories: all of the time, most of the time, some of the time, a little of the time, or none of the time. For these tables, response values of 0 to 4 were assigned to each of the five response categories (with all of the time assigned 4 and none of the time assigned 0). The response values were then summed to yield a scale with a 0--24 range. A value of 13 or more on this scale was used to identify adults experiencing serious psychological distress (15).

Sexual orientation – Respondents were asked to self-identify as gay/lesbian, straight, bisexual, something else, or I do not know the answer. Response categories were then collapsed into Straight, and sexual minority, with Sexual minority being comprised of Gay/Lesbian, Bisexual. The sexual orientation of respondents who answered something else or I do not know the answer was imputed as either straight or sexual minority using ancillary sociodemographic information, as described by Elliott et. al, 2019 (16). Imputation of sexual orientation was completed in order to improve precision and validity of estimates by better classifying adults who identify as a sexual minority other than gay, lesbian or bisexual as well as adults who are unfamiliar with the terms in the question (16).

Veteran status – Questions about armed forces service were asked of all family members age 18 and older in the Family Core component of the NHIS. Veterans were defined as adults (aged 18 and over) who had ever served on active duty in the U.S. Armed Forces, military Reserves, or National Guard and are not currently on full-time active duty with the Armed Forces. This definition is based on response to the questions, "[fill: Is anyone in the household/Are you/Is alias] now on full-time active duty with the Armed Forces?" and "Have you ever served on active duty in the U.S. Armed Forces, military Reserves, or National Guard?". NHIS does not sample homeless persons or those in institutional settings such as nursing homes and prisons, so Veterans from these living situations were not included in the analysis.

Health Characteristics or Outcome Terms

Alcohol consumption – Estimates of the percentages who reported 'Excessive weekly drinking' and 'Heavy drinking days' were based on responses to the questions "In the past year, how often did you drink any type of alcoholic beverage?"; "In the past year, on those days that you drank alcoholic beverages, on the average, how many drinks did you have?"; and "In the past year, on how many days did you have 5 or more/4 or more drinks of any alcoholic beverage?" Excessive weekly drinking was defined as averaging more than 14 drinks a week in the past year for men and more than 7 drinks per week for women. Heavy drinking was defined as having 5 or more drinks for men or 4 or more drinks for women on at least one day in the past year.

Body mass index or BMI – Calculated from the sample adult's responses to survey questions regarding height and weight and defined as BMI = Weight (in kg)/[Height (in m)]^2. BMI is then collapsed into one of four categories: Healthy weight" (BMI greater than or equal to 18.5 and less than 25.0); "Overweight" (BMI greater than or equal to 25.0 and less than 30.0); and "Obese" (BMI greater than or equal to 30.0). The same categories are used for both men and women. Estimates of "Underweight (BMI less than 18.5)" were not included due to small sample sizes.

Chronic pain – Based on responses to the following survey question: "In the past three months, how often did you have pain? Would you say never, some days, most days, or every day?" Chronic pain defined as pain on most days or every day in the past 3 months. Respondents who answered most or

every day were asked “Thinking about the last time you had pain, how much pain did you have? Would you say a little, a lot, or somewhere in between?”.

Hearing and vision trouble – To assess degree of hearing difficulty, sample adults were asked “Without the use of hearing aids or other listening devices, is your hearing excellent, good, a little trouble hearing, moderate trouble, a lot of trouble, or are you deaf?” Respondents who answered, “a little trouble” and “moderate trouble”, or “a lot of trouble,” were categorized as having hearing trouble. Vision trouble was assessed using responses to the following question: "Do you have any trouble seeing, even when wearing glasses or contact lenses?" Respondents were also asked "Are you blind or unable to see at all?". Since being deaf or blind would preclude a person from being initially eligible for military service, respondents indicating that they were deaf and/or blind were excluded from the analyses of those with hearing or vision trouble since they were not comparable groups between Veterans and nonveterans.

Leisure-time physical activity – All survey questions related to leisure-time physical activity were phrased in terms of current behavior and lack a specific prior reference period. Measures of physical activity reflect the federal “2008 Physical Activity Guidelines for Americans” (available from: https://health.gov/our-work/physical-activity). The 2008 federal guidelines recommend that for substantial health benefits, adults should perform at least 150 minutes (2 hours and 30 minutes) a week of moderate-intensity or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination. Aerobic activity should be performed in episodes of at least 10 minutes and preferably should be spread throughout the week. The 2008 federal guidelines also recommend that adults perform muscle-strengthening activities of moderate or high intensity that involve all major muscle groups on 2 or more days a week for additional health benefits.

Adults who met neither the aerobic nor muscle-strengthening 2008 federal guidelines may have engaged in lesser amounts of activity. In addition, estimates presented in these tables are limited to leisure-time physical activity only. The 2008 federal physical activity guidelines refer to any kind of aerobic and muscle-strengthening activities, not just to leisure-time aerobic and muscle-strengthening activities. Therefore, the leisure-time aerobic and muscle-strengthening activity estimates in these tables may underestimate the frequencies and percentages of adults who met the guidelines for aerobic and muscle-strengthening activities.

Multiple chronic conditions: Adults were identified as having 0, 1, or 2 or more chronic conditions based on responses to questions asking about 10 selected chronic conditions. The conditions selected were based on previous research (17, 18) and included whether an adult had ever been diagnosed by a doctor or other health care professional with hypertension, cancer, stroke, coronary heart disease, diabetes, arthritis (including rheumatoid arthritis, gout, lupus, and fibromyalgia), or hepatitis. Also included was a current diagnosis of asthma, a diagnosis of weak or failing kidneys in the past 12 months, and a diagnosis of chronic obstructive pulmonary disease (COPD) (indicated by having ever been diagnosed with COPD or emphysema or having been diagnosed with chronic bronchitis in the past 12 months).

Serious psychological distress – An indicator of psychological distress based on six separate questions in the Sample Adult Core that asked respondents how often during the preceding 30 days they felt 1) so sad that nothing could cheer them up, 2) nervous, 3) restless or fidgety, 4) hopeless, 5) that everything was an effort, or 6) worthless. Each question had five response categories: all of the time, most of the time, some of the time, a little of the time, or none of the time. For these tables, response values of 0 to 4 were assigned to each of the five response categories (with all the time assigned 4 and none of the

time assigned 0). The response values were then summed to yield a scale with a 0-24 range. A value of 13 or more on this scale was used to identify adults experiencing serious psychological distress (19).

Sleep – An indicator of sleep duration based on a question that asked, "On average, how many hours of sleep do you get in a 24-hour period?" Response options were limited to whole hours. Sufficient sleep is defined according to the Healthy People 2020 criteria: 7 hours or more for adults, on average, in a 24-hour period (available from: https://www.healthypeople.gov/node/5261/data_details).

Smoking –

Current smoker – Adults who had smoked 100 cigarettes in their lifetime and currently smoked cigarettes every day (daily) or some days (nondaily).

Past-year quit attempts – Current cigarette smokers were asked if they had stopped smoking for more than 1 day in the past 12 months because they were trying to quit. Former smokers, adults who had smoked 100 cigarettes in their lifetime but currently do not smoke, were asked how long it had been since they quit smoking. Among current smokers and former smokers who quit in the last year, past-year quit attempts is the percentage that either stopped smoking for more than 1 day because they were trying to quit (still current smoker) or successfully quit (former smokers). Current smokers who smoked for less than two years were excluded from the analysis.

Recent cessation success – Among current smokers and former smokers who quit in the last year, recent cessation success is the percentage that either successfully quit smoking in the past year (former smokers). Current smokers who smoked for less than two years were excluded from the analysis.

Electronic-cigarette (E-cigarette) user – Adults who had ever used an e-cigarette in their lifetime and currently used an e-cigarette every day (daily) or some days (nondaily).

Usual source of care – Based on a survey question that asked respondents, "Is there a place that you usually go to when you are sick or need advice about your health?" and if there was at least one such place, a follow-up question was asked: "What kind of place [is it\do you go to most often]?" The response categories for this second question were: "clinic or health center," "doctor's office or HMO," "hospital emergency room," "hospital outpatient department," "some other place," and "doesn't go to one place most often." For this table outcome, those who report that they do not know the kind of place, do not go to one place most often, or refuse to answer either question are defined as having an unknown usual place of care and are not shown. Persons who report the emergency department as their usual place of care are defined as not having a usual place of care. HMO is health maintenance organization.

Vaccination –

Receipt of Influenza Vaccine – Based on survey question that asked whether respondents aged 18 and over had received an influenza vaccination in the past 12 months. Prevalence of influenza vaccination during the past 12 months is different from season-specific coverage (20). Responses to the influenza vaccination questions used to calculate the influenza vaccination

estimates presented in this report cannot be used to determine when, during the preceding 12 months, the survey participant received the influenza vaccination.

Receipt of Pneumococcal Vaccine – Based on survey question that asked whether respondents aged 18 and over had ever had pneumonia shot or the pneumococcal vaccine. Estimate shown restricted to those aged 65 and over, given that CDC recommends vaccination for all adults aged 65 and over.

Receipt of Shingles Vaccine – From 2015 through 2017, adults aged 50 and over were asked, "Have you ever had the Zoster or Shingles vaccine, also called Zostavax?" In 2018, adults aged 50 and over were asked, "There are two vaccines now available for shingles; Zostavax, which requires 1 shot, and Shingrix, a new vaccine which requires 2 shots. Have you had a vaccine for shingles?" Therefore, the estimate is restricted to adults aged 50 years and older.

Further Information

Data users can obtain the latest information about NHIS by periodically checking the website https://www.cdc.gov/nchs/nhis.htm. This website features downloadable public-use data and documentation for NHIS, as well as important information about any modifications or updates to the data or documentation.

Analysts may also wish to join the NHIS electronic mailing list. To do so, go to https://www.cdc.gov/subscribe.html. Complete the appropriate information and click the "National Health Interview Survey (NHIS) researchers" box, followed by the "Subscribe" button at the bottom of the page. The list consists of approximately 4,000 NHIS data users worldwide who receive e-news about NHIS surveys (e.g., new releases of data or modifications to existing data), publications, conferences, and workshops.

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Suggested Citations

Recommended citations for specific tables are included in the notes at the end of each table. The citation for the Technical Notes is as follows but should also include the date accessed as it may be edited periodically when new tables are added.

NCHS. Technical Notes for Veteran's Health Statistics Tables: National Health Interview Survey 2015-2018. Available from: [ADD URL].

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