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Multiple Chronic Conditions Among Veterans and Nonveterans: United States, 2015–2018

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Abstract

Objectives—This report describes the prevalence of multiple (two or more) chronic conditions (MCC) among veterans and nonveterans and examines whether differences by veteran status may be explained by differences in sociodemographic composition, smoking behavior, and weight status based on body mass index.

Methods—Data from the 2015–2018 National Health Interview Survey were used to estimate the prevalence of MCC among adults aged 25 and over by veteran status and sex. Estimates (age-stratified and age-adjusted) were also presented by race and Hispanic origin, educational attainment, poverty status, smoking status, and weight status. Multivariate logistic regression models examined the odds of MCC by veteran status after age stratification (65 and over or under 65) and further adjustment for age and other covariates.

Results—Among adults aged 25 and over, age-adjusted prevalence of MCC was higher among veterans compared with nonveterans for both men and women (22.2% compared with 17.0% for men aged 25–64, 66.9% compared with 61.9% for men aged 65 and over, 25.4% compared with 19.6% among women aged 25–64, and 74.1% compared with 61.8% among women aged 65 and over). Following stratification by age and adjustment for selected sociodemographic characteristics, the prevalence of MCC remained higher among veterans compared with nonveterans for both men and women. After further adjustment for smoking status and weight status, differences in the prevalence of MCC by veteran status were reduced but remained statistically significant, with the exception of men aged 65 and over.

Keywords: military • multimorbidity • smoking • National Health Interview Survey

Introduction

While chronic conditions are commonly studied and treated in isolation, they often occur concurrently. Among adults with at least one chronic condition, more than one-half had two or more chronic conditions (1). This has implications for health care delivery and cost, as the presence of multiple (two or more) chronic conditions (MCC) in adults is associated with increased mortality, increased health care spending, and decreased health-related quality of life (2–4). In 2010, 71% of health care spending in the United States was for patients with MCC (5). Veterans who have MCC account for approximately two-thirds of Veterans Affairs health care expenditures (6).

A previous report using National Health Interview Survey (NHIS) data found a higher overall prevalence of MCC among male veterans aged 25–64 than male nonveterans, but differences varied by age (7). While the prevalence of MCC was similar for male veterans and nonveterans among those aged 25–34 and 35–44, the prevalence of MCC was higher for male veterans aged 45–54 and 55–64 compared with nonveterans. One potential explanation for this observed difference by age is the differing sociodemographic composition of veterans and nonveterans. Previous research has found the prevalence of MCC to be higher among the elderly, non-Hispanic white adults, and women (8). Relatedly, the veteran population is predominantly elderly, non-Hispanic white, and male compared with the nonveteran population (9). Alternatively, the prevalence of certain health behaviors and risk factors linked to chronic conditions, such as smoking and obesity, is higher among veterans compared with nonveterans (10,11).

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This report provides national estimates of the prevalence of multiple diagnosed chronic conditions among veterans and nonveterans aged 25 and over, when 10 different conditions (arthritis, cancer, chronic obstructive pulmonary disease [COPD], coronary heart disease, current asthma, diabetes, hepatitis, hypertension, stroke, and weak or failing kidneys) were considered (12,13). Differences in the number and type of underlying conditions by veteran status and sex are also provided. The report explores whether differences in the prevalence of MCC by veteran status may be explained in part by age, other sociodemographic characteristics, or select health behaviors and conditions that may increase the risk of MCC.

Methods

Data source

Data from the 2015–2018 NHIS were pooled for this analysis. NHIS is a multipurpose health survey of the U.S. civilian noninstitutionalized population. Interviews are conducted in respondents' homes, but follow-up interviews to complete the survey may be done over the telephone. Through 2018, the survey consisted of four main components: Household Composition, Family, Sample Adult, and Sample Child. The Household Composition section collects basic demographic and relationship information about all members within a household. The Family component collects basic demographic, health insurance, and health information about all family members from a single family member (the "family respondent"). For the Sample Adult component, one adult per family (the sample adult) is randomly selected to respond to detailed questions about their personal health. For the Sample Child component, one child per family (the sample child) is randomly selected, and a knowledgeable adult (usually a parent) responds on the child's behalf to detailed questions about the child's health. Detailed information regarding the design, content, use of NHIS, and annual sample sizes and response rates of NHIS are available in the annual NHIS Survey Description document (14–17). For this analysis, information from the Household Composition, Family, and Sample Adult components was used. Analyses in this report were based on a total of 108,723 sample adults aged 25 and over who completed the survey in 2015–2018. Data from 2015–2018 were pooled to take advantage of the consistent measurement of MCC for these data years before the survey questionnaire's redesign in 2019 (18). All analyses in this paper were limited to adults aged 25 and over to better compare veterans and nonveterans, as there are few veterans under age 25 in the general population and among NHIS respondents (n = 112). The response rate for the sample adult component ranged from 53.0% in 2017 to 55.2% in 2015.

Veteran status

All family members aged 18 and over in the Family Core component of NHIS were asked "[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?" Veterans were defined as adults who had ever served on active duty in the U.S. Armed Forces, military reserves, or National Guard and were not currently on full-time active duty with the Armed Forces. NHIS does not sample homeless persons or those in institutional settings, such as nursing homes and prisons, so veterans in these living situations were not included in the analysis. In 2015–2018, 11,831 NHIS respondents aged 25 and over reported they were veterans (10.9% of respondents aged 25 and over).

Measures of chronic conditions

The 10 chronic conditions examined in this report are conditions covered in NHIS and included in a list of 20 chronic conditions identified by the U.S. Department of Health and Human Services as part of an effort to foster a more consistent and standardized approach to measuring chronic conditions (12,13). Information on the remaining chronic conditions was not captured in NHIS and therefore could not be included in the study. Adults were asked if they had ever been told by a doctor or health care provider that they had hypertension, coronary heart disease, stroke, diabetes, cancer, arthritis, or hepatitis; had experienced weak or failing kidneys during the past 12 months; currently had asthma; or had chronic obstructive pulmonary disease (COPD) (that is, ever had emphysema, ever had COPD, or had chronic bronchitis in the past 12 months). For this analysis, adults responding positively to 2 or more of these 10 conditions were identified as having MCC.

Selected sociodemographic characteristics and behavioral risk factors

Sociodemographic characteristics of adults presented in this report include age, sex, race and Hispanic origin, educational attainment, and poverty level. These characteristics were reported by the family respondent, although age and sex were verified by the sample adult at the beginning of their interview.

Race and Hispanic origin are shown for five specific race and Hispanic-origin groups: Hispanic, non-Hispanic white, non-Hispanic black, non-Hispanic Asian, and non-Hispanic other races. Adults categorized as Hispanic may be any race or combination of races. Adults categorized as non-Hispanic white, non-Hispanic black, and non-Hispanic Asian indicated one race only. Non-Hispanic adults of multiple or other races are combined into the non-Hispanic other races category.

Poverty level is based on the federal poverty level (FPL) and was derived using the U.S. Census Bureau's poverty thresholds for the previous calendar year, which take into consideration family size and age (19). Families were classified as poor (income below FPL), near poor (income of 100% to less than 200% of FPL), or not poor (income 200% or greater of FPL). Family income in NHIS was imputed for approximately 20% of persons (20–23).

Cigarette smoking status was determined with two questions. Sample adults were asked "Have you smoked at least 100 cigarettes in your entire life?" Sample adults who answered "yes" were

asked, "Do you now smoke cigarettes every day, some days, or not at all?" Sample adults who smoked 100 cigarettes in their lifetime and currently smoke were classified as current smokers. Sample adults who smoked 100 cigarettes in their lifetime but do not smoke at all now were classified as former smokers. Sample adults who smoked fewer than 100 cigarettes in their lifetime were classified as never smokers.

Weight status was calculated using information from self-reported height and weight. For both men and women, obesity was defined as a body mass index (BMI) of 30.0 or higher and overweight was defined as a BMI of 25.0 to 29.9. Sample adults with a BMI under 25.0 were classified as healthy or underweight. Of note, self-reported height and weight has been shown to underestimate measured BMI (24).

Statistical analysis

Percent distributions of selected sociodemographic characteristics, cigarette smoking status, and weight status were calculated for adults aged 25 and over to examine the distribution of these characteristics by veteran status. Chi-square tests were used to evaluate the statistical significance of these differences by veteran status. Additionally, differences between individual percentages were evaluated using two-sided significance tests. Statistical significance was set at p value less than 0.05. No adjustments were made for multiple comparisons. All analyses were conducted for men and women separately, as 91.8% of sample respondents who identified as veterans were male (data not shown).

For the prevalence of MCC, an interaction between veteran status and age group (over and under 65) was significant. Therefore, all prevalence estimates were stratified by age group, including estimates of the number of chronic conditions, individual component conditions of MCC, and MCC by sociodemographic, smoking status, and weight status subgroup. Because the distribution of age differs between veterans and nonveterans, all estimates were also adjusted for age within stratified age groups, to better understand differences by veteran status and sociodemographic subgroup. Age adjustment was done by direct standardization using the projected 2000 U.S. population as the standard population and the age groups 25–34, 35–49, 50–64, 65–79, and 80 and over (25).

Multivariate logistic regression was used to evaluate whether differences in the prevalence of MCC persist between veterans and nonveterans following adjustment for differences in selected sociodemographic characteristics, smoking status, and weight status. To do this, three models were developed using a stepwise modeling approach. Model 1 (stratified by over and under 65) further adjusted for age (as a continuous variable). Model 2 added selected demographic characteristics (race and Hispanic origin, education, and poverty status) in addition to age, and Model 3 added cigarette smoking status and weight status to the model in addition to age and other selected demographic characteristics. The dichotomous outcome was two or more chronic conditions compared with zero or one chronic condition. Adjusted odds ratios (AORs) and their 95% confidence intervals (CIs) are shown for all three models. All models were run separately by sex.

Estimates in this report that did not meet NCHS standards of reliability as specified in "National Center for Health Statistics Data Presentation Standards for Proportions" (26) were suppressed. The 95% CIs for the point estimates were generated using the Korn–Graubard method for complex surveys. To account for the sampling design of NHIS, estimates and standard errors presented in this report are based on weighted data that were analyzed using SAS-callable SUDAAN version 11.0.01 (RTI International, Research Triangle Park, N.C.). All analyses used sample adult weights to produce national estimates.

Results

Sociodemographic characteristics

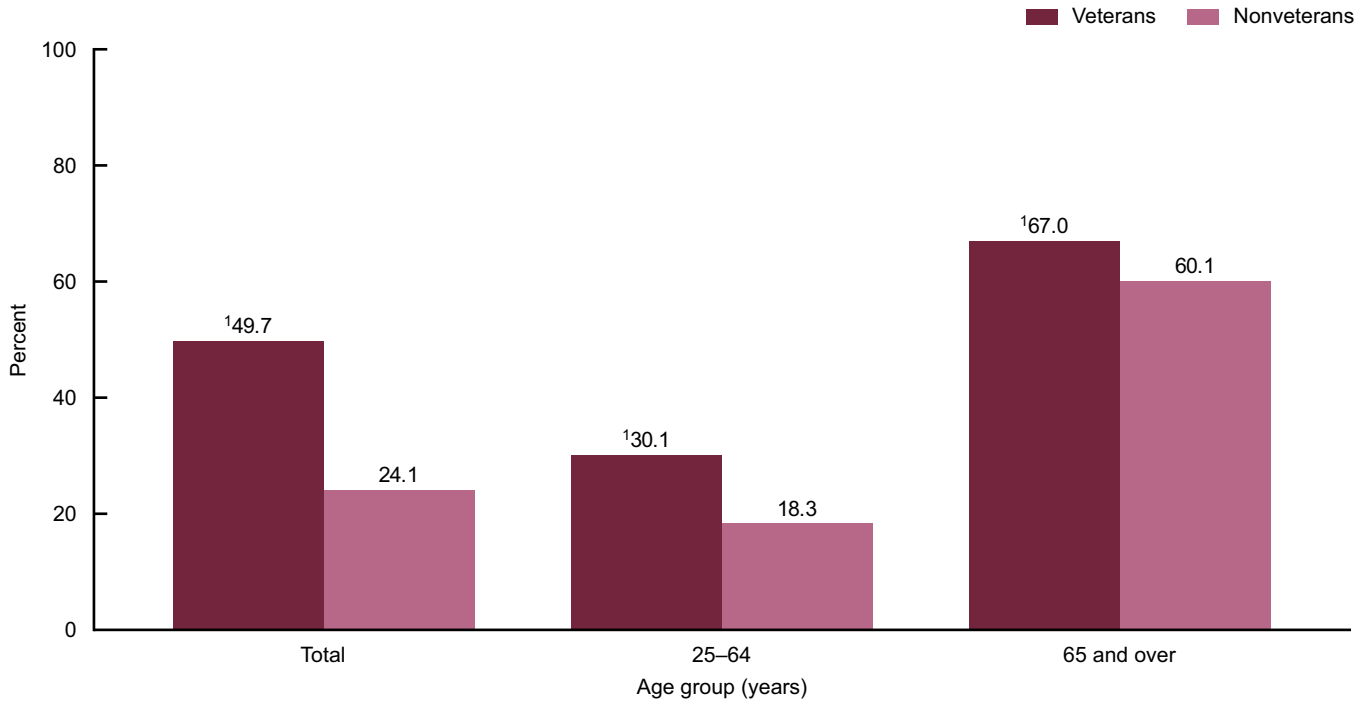
Male veterans were more likely to be older than nonveteran males (53.1% of male veterans versus 13.7% of male nonveterans were aged 65 or over), whereas female veterans were less likely to be older than nonveteran females (17.8% of female veterans versus 24.1% of female nonveterans were aged 65 or over) (Table 1). Differences by veteran status were also seen by race and Hispanic origin (male veterans were generally more likely to be non-Hispanic white and less likely to be Hispanic and non-Hispanic Asian; female veterans were generally more likely to be non-Hispanic black and less likely to be Hispanic), education (male and female veterans tended to be more likely to have some college and less likely to have a high school diploma or less), and poverty status (male and female veterans were generally less likely to be poor). Differences were also seen by veteran status in smoking status for both males and females (male and female veterans were generally less likely to be never smokers) and among males in weight status (male veterans tended to be less likely to have a normal weight status compared with nonveterans).

Multiple chronic conditions

Among both men and women, the crude prevalence of MCC was higher among veterans than nonveterans (30.1% compared with 18.3% for men aged 25–64 and 67.0% compared with 60.1% for men aged 65 and over [Figure 1], and 27.1% compared with 21.6% for women aged 25–64 and 73.7% compared with 61.7% for women aged 65 and over [Figure 2]).

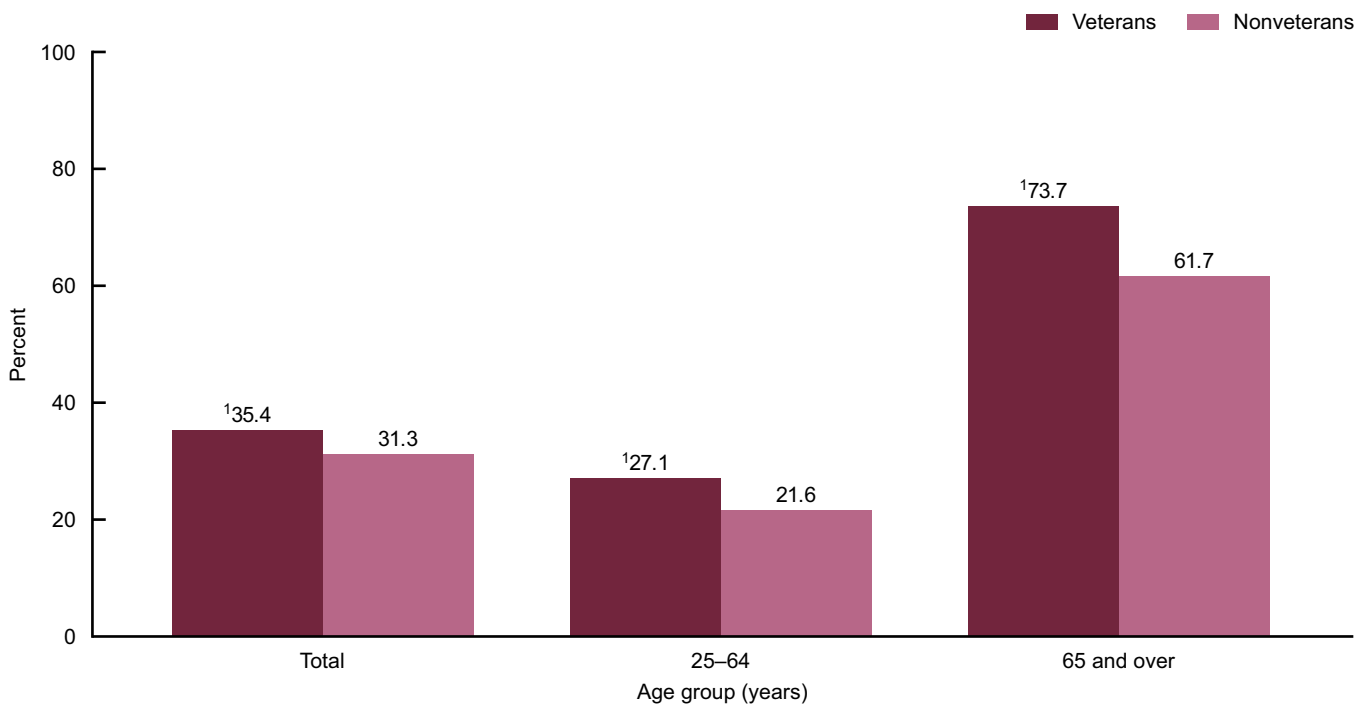
After adjusting for age, the three most prevalent conditions from the individual component list of MCC for male veterans aged 25–64 were hypertension (32.2%), arthritis (24.1%), and diabetes (8.2%) (Table 2). For male veterans aged 65 and over, the three most prevalent individual conditions were hypertension (64.9%), arthritis (47.3%), and cancer (31.6%). Among female

Figure 1. Crude percentage of men aged 25 and over with multiple chronic conditions, by veteran status and age: United States, 2015–2018



[1]Significantly different from nonveterans ($p < 0.05$).
NOTES: Multiple chronic conditions include arthritis, cancer, chronic obstructive pulmonary disease, coronary heart disease, current asthma, diabetes, hepatitis, hypertension, stroke, and weak or failing kidneys. Estimates are based on household interviews of a sample of the civilian noninstitutionalized population.
SOURCE: National Center for Health Statistics, National Health Interview Survey, 2015–2018.

Figure 2. Crude percentage of women aged 25 and over with multiple chronic conditions, by veteran status and age: United States, 2015–2018



[1]Significantly different from nonveterans ($p < 0.05$).
NOTES: Multiple chronic conditions include arthritis, cancer, chronic obstructive pulmonary disease, coronary heart disease, current asthma, diabetes, hepatitis, hypertension, stroke, and weak or failing kidneys. Estimates are based on household interviews of a sample of the civilian noninstitutionalized population.
SOURCE: National Center for Health Statistics, National Health Interview Survey, 2015–2018.

veterans aged 25–64, the three most prevalent age-adjusted conditions from the component list were arthritis (29.0%), hypertension (25.6%), and asthma (9.7%). Among female veterans aged 65 and over, the three most prevalent conditions were hypertension (69.8%), arthritis (62.8%), and cancer (30.9%).

Following adjustment for age within age group, the prevalence of MCC was still higher among veterans than nonveterans (22.2% compared with 17.0% for men aged 25–64, 66.9% compared with 61.9% for men aged 65 and over, 25.4% compared with 19.6% among women aged 25–64, and 74.1% compared with 61.8% among women aged 65 and over) (Table 3). Among men aged 25–64, the prevalence of MCC was higher among veterans than nonveterans for all sociodemographic subgroups, though not all were significantly higher. Some subgroups had limited power to detect significant differences (for example, those who are non-Hispanic other races, and those aged 25–34). Among men aged 65 and over, the prevalence of MCC was higher among veterans than nonveterans for most sociodemographic subgroups, although not all differences were significant. However, as with younger men, some subgroups had limited power to detect significant differences. Among women, differences by veteran status by sociodemographic subgroups were similar in effect size as was observed among men. However, fewer of these differences were statistically significant, likely due to the smaller number of female veterans.

Among men aged 25–64 who currently smoked or who had never smoked, veterans were more likely than nonveterans to have MCC (27.6% and 21.6% of current smokers, respectively; 18.5% and 14.2% of never smokers). Among men aged 65 and over who were former smokers, veterans (72.8%) were more likely than nonveterans (67.9%) to have MCC. Among women aged 25–64 who had never smoked, MCC was significantly more likely among veterans (23.1%) compared with nonveterans (16.1%). Among women aged 65 and over who were former smokers, MCC was significantly more likely among veterans (82.9%) than nonveterans (67.3%). Additionally, among all weight statuses, male veterans aged 25–64 were more likely to have MCC than nonveterans (15.0% and 10.8% of healthy weight or underweight men, respectively; 19.1% and 13.6% of overweight men; 28.7% and 25.9% of men with obesity). Among men aged 65 and over, prevalence of MCC was higher among veterans for men who were at a healthy weight or underweight (56.9% and 52.1%, respectively) and for men who were overweight (64.9% and 59.9%). Among women aged 25–64 who were at a healthy weight or underweight, veterans (20.1%) were more likely than nonveterans (11.4%) to have MCC. The observed differences between veterans and nonveterans among women aged 25–64 who were overweight or those with obesity was not significant. Among women aged 65 and over who were overweight, the prevalence of MCC was higher among veterans (77.2%) than nonveterans (62.1%). The observed differences between veterans and nonveterans among women aged 65 and over who were at a healthy weight or underweight or those with obesity were not significant.

To explore the extent to which differences in the prevalence of MCC by veteran status may be explained by sociodemographic characteristics and specific health behaviors, three stepwise regression models were used (Table 4). Model 1 examined the odds of MCC after adjusting for age within each age group. Model 2 adjusted for age and selected sociodemographic characteristics (race and Hispanic origin, education, and poverty status). Model 3 adjusted for age, selected sociodemographic characteristics, smoking status, and weight status. All models were stratified by age group (25–64 and 65 and over).

Veterans had higher odds of having MCC relative to nonveterans among men aged 25–64 (AOR: 1.42, CI: 1.29–1.57) and among men aged 65 and over (AOR: 1.20, CI: 1.09–1.32). Following adjustment for age and selected sociodemographic characteristics, differences were reduced for both age groups (AOR: 1.36, CI: 1.22–1.50 for men aged 25–64; AOR: 1.15, CI: 1.04–1.27 for men aged 65 and over), but both remained significant. The addition of smoking and weight status to the model further reduced the difference among men by veteran status. Differences remained significant among men aged 25–64 (AOR: 1.24, CI: 1.11–1.38) but not among men aged 65 and over (AOR: 1.07, CI: 0.96–1.18).

Veterans had higher odds of MCC relative to nonveterans among women aged 25–64 (AOR: 1.29, CI: 1.04–1.61) and among women aged 65 and over (AOR: 1.74, CI: 1.23–2.48). Adjustment for age and selected sociodemographic characteristics had little effect on the odds of MCC among female veterans compared with female nonveterans (AOR: 1.29, CI: 1.02–1.63 for women aged 25–64; AOR: 1.81, CI: 1.26–2.58 for women aged 65 and over). The effect of adding smoking and weight status to the model was negligible on the estimate for younger women (AOR: 1.30, CI: 1.02–1.65 for women aged 25–64), and slightly decreased the estimate for women aged 65 and over (AOR: 1.71, CI: 1.18–2.48), though the sample size for female veterans aged 65 and over is limited.

Discussion

This report examined the prevalence of MCC among men and women aged 25 and over by veteran status. Overall, the crude prevalence of MCC was higher among male and female veterans than among their nonveteran counterparts. Within each examined sociodemographic subgroup, for example adults aged 25–64 with a bachelor's degree or higher, the differing prevalence of MCC by veteran status generally remained for men but fewer significant subgroup differences could be discerned for women. It is important to note that less than 10% of veterans in this analytic sample were women, and therefore, effect sizes that were statistically significant among men may not be statistically significant among women. After accounting for differences in sociodemographic characteristics, smoking behavior, and weight status, differences persisted by veteran status for all women and for men aged 25–64.

Overall, following model adjustment for selected sociodemographic characteristics (age, race and Hispanic origin, educational attainment, and

poverty status), male and female veterans continued to have a higher prevalence of MCC. However, among women, adjustment for the selected sociodemographic characteristics did not lower the relative differences in MCC between veterans and nonveterans. This may be due to sociodemographic differences between veterans and nonveterans varying by sex. For instance, differences in age composition between male veterans and nonveterans are more pronounced than among female veterans and nonveterans, whereas differences in education composition are more pronounced among female veterans and nonveterans than among male veterans and nonveterans.

To investigate whether differences in health behaviors and risks between veterans and nonveterans contribute to the higher prevalence of MCC among veterans, further model adjustment for smoking status and weight status was conducted. This adjustment lowered the odds of MCC between veterans and nonveterans for men. The odds of MCC remained 1.24 times higher among male veterans aged 25–64 but was no longer significantly higher among male veterans aged 65 and over than among nonveterans. For women, the odds of MCC remained 1.30 times higher among veterans aged 25–64, and 1.71 times higher among veterans aged 65 and over. The drivers of higher prevalence of MCC among veterans were not fully explained by the factors included in the models. There may be other behavioral risk factors that may be associated with MCC that were not included in this analysis, such as diet, alcohol use, and physical activity. While information on some of these topics is captured in this survey, NHIS is a cross-sectional survey and questions on behaviors such as alcohol use and physical activity are in reference to the past year, as opposed to across one's lifetime. In addition, the small number of female veterans precluded further adjustment.

This report found that several chronic conditions differed by veteran status for both men and women, although there were some differences by age. Among men, veterans were more likely to have hypertension and arthritis regardless of age, although the difference in prevalence of both of these conditions was smaller among those 65 and over compared with younger men. Among men, veterans aged 25–64 (4.6%) and 65 and over (13.7%) were also more likely to have COPD compared with nonveterans (3.6% and 11.2%, respectively). Additionally, among men aged 65 and over, veterans were more likely to have coronary heart disease and cancer than nonveterans. Among women, veterans aged 65 and over were more likely to have hypertension and arthritis than nonveterans. Female veterans aged 25–64 were more likely to have arthritis compared with nonveterans. Among women aged 65 and over, veterans were more likely to have asthma (15.4%) than nonveterans (8.9%).

The higher burden of these individual chronic conditions (particularly hypertension and arthritis) among veterans may explain the higher prevalence of having at least two chronic conditions among veterans. Other studies, using national data collection systems such as the Behavioral Risk Factor Surveillance System and the National Health and Nutrition Examination Survey, observed higher prevalence or likelihood of having cardiovascular disease, hypertension, and diabetes among veterans in the United States (11,27–29). Similarly, among veterans aged 65 and over receiving care in the Veterans Affairs health care system, hypertension, hyperlipidemia, and coronary heart disease were the three most common conditions (30). Steinmen et al, found that among male veterans, the most common three-way combination of conditions was hypertension, hyperlipidemia, and coronary heart disease (30). For female veterans, the most common three-way combination of conditions was hypertension, hyperlipidemia, and arthritis.

Findings in this report are subject to several limitations. First, while NHIS data are nationally representative of the civilian noninstitutionalized population, the exclusion of institutionalized and homeless adults may lead to underreporting of the prevalence of chronic conditions, particularly given evidence that veterans are at greater risk of homelessness than other adults (31). Second, analyses of significant differences in MCC among women by veteran status, and for some sociodemographic subgroups among men, were potentially limited due to small sample sizes of female veterans (particularly those aged 65 and over). Both male and female estimates were included in this report, as there are few recent studies that have looked at national prevalence estimates of the composite measure of MCC among veterans and nonveterans separately for both men and women. Third, NHIS only captures 10 of the 20 chronic conditions outlined by the U.S. Department of Health and Human Services (12). For example, some mental health conditions, such as depression, were not included in this report's definition of MCC and are known to be higher among veterans than nonveterans (7). If these conditions were included, observed differences in MCC by veteran status may have been larger. Fourth, data are based on self-reporting of diagnosed conditions, which may result in recall bias as well as undiagnosed conditions not being reported. Finally, this paper did not examine the specific combinations of conditions comprising the MCC measure.

This report adds to the literature by examining selected sociodemographic and health behavior factors that may be associated with higher prevalence of MCC among male and female veterans compared with their nonveteran counterparts. These results may inform efforts to improve both veterans' health and better serve their health care needs, as MCC in adults is associated with increased mortality, increased health care spending, and decreased health-related quality of life (2–4).

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Table 1. Percent distribution of selected demographic characteristics, current cigarette smoking status, and body mass index among adults aged 25 and over, by sex and veteran status: United States, 2015–2018

Characteristic	Male veterans (95% CI)	Male nonveterans (95% CI)	Female veterans (95% CI)	Female nonveterans (95% CI)
Total	100.0 (…)	100.0 (…)	100.0 (…)	100.0 (…)
Age group (years)[1,2]				
25–64	46.9 (45.6–48.2)	86.3 (85.9–86.7)	82.2 (79.3–84.9)	75.9 (75.5–76.4)
25–34	7.0 (6.3–7.7)	24.0 (23.4–24.6)	20.2 (16.9–23.9)	19.6 (19.1–20.0)
35–49	15.3 (14.4–16.3)	31.9 (31.3–32.5)	27.9 (24.4–31.6)	27.5 (27.0–28.0)
50–64	24.6 (23.5–25.7)	30.4 (29.8–31.0)	34.1 (30.6–37.8)	28.8 (28.4–29.3)
65 and over	53.1 (51.8–54.4)	13.7 (13.3–14.1)	17.8 (15.1–20.7)	24.1 (23.6–24.5)
65–79	38.1 (36.9–39.3)	11.8 (11.4–12.1)	13.6 (11.3–16.2)	18.0 (17.6–18.4)
80 and over	15.0 (14.2–15.9)	2.0 (1.8–2.1)	4.2 (3.0–5.7)	6.1 (5.9–6.3)
Race and Hispanic origin[1–3]				
Hispanic	6.5 (5.8–7.3)	17.6 (16.9–18.4)	5.0 (3.2–7.5)	14.7 (14.1–15.4)
Non-Hispanic white	78.6 (77.4–79.8)	62.9 (61.9–63.8)	67.6 (63.4–71.5)	64.7 (63.9–65.5)
Non-Hispanic black	10.9 (10.0–11.7)	10.7 (10.1–11.2)	21.6 (18.3–25.2)	12.1 (11.6–12.6)
Non-Hispanic Asian	1.7 (1.3–2.0)	6.6 (6.3–7.0)	1.8 (0.9–3.3)	6.2 (5.9–6.6)
Non-Hispanic other races	2.3 (1.9–2.8)	2.2 (1.9–2.5)	4.0 (2.7–5.6)	2.2 (2.0–2.5)
Education[1,2]				
High school diploma or GED or less	31.8 (30.6–32.9)	37.9 (37.2–38.7)	14.6 (12.0–17.6)	35.4 (34.8–36.0)
Some college	37.4 (36.2–38.6)	25.6 (25.0–26.2)	44.7 (40.6–48.9)	29.5 (29.0–30.0)
Bachelor's degree or higher	30.9 (29.7–32.1)	36.5 (35.7–37.3)	40.7 (36.7–44.8)	35.2 (34.5–35.8)
Poverty status[1,2,4]				
Poor	5.8 (5.2–6.4)	9.5 (9.1–9.9)	9.8 (7.4–12.6)	12.1 (11.7–12.6)
Near poor	14.5 (13.6–15.4)	16.5 (16.0–17.1)	14.1 (11.5–17.0)	18.3 (17.8–18.8)
Not poor	79.7 (78.6–80.7)	74.0 (73.3–74.7)	76.1 (72.7–79.3)	69.6 (68.9–70.2)
Cigarette smoking status[1,2]				
Current	16.2 (15.3–17.1)	17.2 (16.7–17.7)	19.0 (16.0–22.4)	13.1 (12.8–13.5)
Former	44.5 (43.3–45.6)	24.8 (24.2–25.3)	25.3 (22.1–28.7)	20.9 (20.4–21.3)
Never	39.3 (38.1–40.6)	58.1 (57.4–58.7)	55.6 (51.5–59.7)	66.0 (65.4–66.6)
Weight status[1,5]				
Healthy or underweight	22.6 (21.6–23.6)	26.3 (25.7–26.9)	35.1 (31.3–39.0)	38.8 (38.3–39.4)
Overweight	42.7 (41.5–43.9)	41.9 (41.3–42.6)	32.0 (28.3–36.0)	29.5 (29.0–30.0)
Obese	34.7 (33.6–35.9)	31.8 (31.1–32.4)	32.9 (29.1–36.8)	31.6 (31.1–32.2)

… Category not applicable.
[1]Chi-square test significant for men ($p < 0.05$).
[2]Chi-square test significant for women ($p < 0.05$).
[3]Hispanic refers to persons who are of Hispanic or Latino origin and may be of any race or combination of races. Non-Hispanic refers to adults who are not of Hispanic or Latino origin, regardless of race.
[4]Poor adults are defined as having income below the poverty threshold. Near-poor adults have incomes of 100% to less than 200% of the poverty threshold. Not-poor adults have incomes that are 200% of the poverty threshold or greater.
[5]Calculated from information that respondents supplied in response to survey questions regarding height and weight. For both men and women, healthy or underweight is indicated by body mass index (BMI) of up to 25.0; overweight is indicated by BMI of 25.0 up to 30.0; and obesity is indicated by BMI of 30.0 or higher. Note that self-reported height and weight may differ from actual measurements. The weighted percentage of unknown with respect to BMI among adults aged 25 and over was 3.5%.

NOTE: CI is confidence interval.

SOURCE: National Center for Health Statistics, National Health Interview Survey, 2015–2018.

Table 2. Age-adjusted percentages of multiple chronic conditions and individual component parts of multiple chronic conditions among adults aged 25 and over, by age group, sex, and veteran status: United States, 2015–2018

Age group (years), number, and component parts of multiple chronic conditions	Male veterans (95% CI)	Male nonveterans (95% CI)	Female veterans (95% CI)	Female nonveterans (95% CI)
25–64				
Number of chronic conditions:				
0	†48.2 (46.0–50.3)	57.6 (56.9–58.3)	†48.8 (44.4–53.2)	54.3 (53.7–55.0)
1	†29.6 (27.7–31.6)	25.4 (24.8–26.0)	25.8 (22.1–29.8)	26.1 (25.5–26.6)
2 or more	†22.2 (20.7–23.8)	17.0 (16.5–17.5)	†25.4 (21.5–29.5)	19.6 (19.1–20.1)
Individual component parts:				
Hypertension	†32.2 (30.3–34.1)	26.6 (25.9–27.2)	25.6 (21.8–29.6)	22.4 (21.9–22.9)
Coronary heart disease	2.8 (2.3–3.3)	2.5 (2.3–2.7)	1.7 (0.9–2.9)	1.4 (1.3–1.6)
Stroke	†2.6 (2.0–3.2)	1.7 (1.6–1.9)	2.1 (1.0–3.8)	1.6 (1.5–1.8)
Diabetes	8.2 (7.2–9.3)	7.3 (6.9–7.6)	7.3 (5.2–9.9)	6.9 (6.6–7.3)
Cancer	4.3 (3.7–5.0)	3.9 (3.7–4.2)	8.9 (6.5–11.7)	6.6 (6.3–6.9)
Arthritis	†24.1 (22.3–26.0)	14.3 (13.8–14.8)	†29.0 (25.2–33.1)	19.9 (19.4–20.4)
Hepatitis	2.6 (2.1–3.3)	2.5 (2.3–2.7)	2.0 (1.0–3.5)	2.4 (2.2–2.6)
Kidney problem	1.3 (1.0–1.7)	1.2 (1.0–1.3)	0.9 (0.2–2.2)	1.4 (1.3–1.6)
Asthma	†4.5 (3.8–5.4)	5.5 (5.1–5.8)	9.7 (7.1–12.8)	10.1 (9.7–10.5)
COPD[1]	†4.6 (3.9–5.4)	3.6 (3.3–3.9)	6.1 (4.3–8.5)	5.8 (5.6–6.1)
65 and over				
Number of chronic conditions:				
0	†10.9 (9.9–11.9)	12.9 (11.9–13.9)	†9.8 (5.8–15.3)	13.2 (12.6–13.9)
1	†22.3 (21.0–23.7)	25.2 (23.9–26.6)	†16.1 (11.2–22.1)	25.0 (24.2–25.8)
2 or more	†66.9 (65.3–68.4)	61.9 (60.4–63.4)	†74.1 (66.8–80.5)	61.8 (60.8–62.7)
Individual component parts:				
Hypertension	†64.9 (63.4–66.4)	62.4 (60.8–64.0)	†69.8 (62.4–76.5)	61.9 (61.0–62.9)
Coronary heart disease	†21.5 (20.2–22.9)	18.9 (17.6–20.2)	13.2 (7.9–20.2)	10.3 (9.7–10.8)
Stroke	9.5 (8.6–10.5)	9.3 (8.4–10.3)	12.9 (7.3–20.5)	8.0 (7.5–8.5)
Diabetes	24.5 (23.1–25.9)	23.2 (21.9–24.5)	20.4 (14.2–27.8)	18.2 (17.5–19.0)
Cancer	†31.6 (30.2–33.0)	25.3 (24.0–26.7)	30.9 (23.2–39.4)	23.8 (23.0–24.6)
Arthritis	†47.3 (45.8–48.9)	43.5 (41.8–45.1)	†62.8 (54.6–70.5)	55.0 (54.0–55.9)
Hepatitis	4.3 (3.7–5.0)	5.1 (4.3–5.9)	*	3.2 (2.9–3.6)
Kidney problem	6.9 (6.1–7.7)	6.7 (5.8–7.7)	*	5.0 (4.6–5.4)
Asthma	5.1 (4.4–5.8)	5.0 (4.4–5.8)	†15.4 (9.7–22.8)	8.9 (8.3–9.4)
COPD[1]	†13.7 (12.7–14.7)	11.2 (10.2–12.2)	17.9 (12.6–24.4)	12.6 (12.0–13.2)

† Significantly different from nonveterans ($p < 0.05$).
* Estimate is not shown as it does not meet National Center for Health Statistics standards of reliability.
[1]COPD is chronic obstructive pulmonary disease.

NOTES: Multiple chronic conditions include arthritis, cancer, COPD, coronary heart disease, current asthma, diabetes, hepatitis, hypertension, stroke, and weak or failing kidneys. Estimates are age-adjusted using the projected 2000 U.S. population as the standard population and age groups 25–34, 35–49, 50–64, 65–79, and 80 and over. CI is confidence interval.

SOURCE: National Center for Health Statistics, National Health Interview Survey, 2015–2018.

Table 3. Age-adjusted percentages of multiple chronic conditions among adults aged 25 and over, by age group, veteran status, sex, selected sociodemographic characteristics, current cigarette smoking status, and body mass index: United States, 2015–2018

Age group (years) and characteristics	Male veterans (95% CI)	Male nonveterans (95% CI)	Female veterans (95% CI)	Female nonveterans (95% CI)
25–64				
Total	†22.2 (20.7–23.8)	17.0 (16.5–17.5)	†25.4 (21.5–29.5)	19.6 (19.1–20.1)
25–34	6.2 (3.9–9.3)	4.3 (3.7–4.9)	10.6 (5.7–17.7)	6.0 (5.4–6.6)
35–49	†16.9 (14.5–19.6)	13.0 (12.2–13.8)	†25.8 (19.0–33.5)	15.9 (15.1–16.7)
50–64	†45.1 (42.4–47.8)	34.9 (33.8–36.0)	38.0 (31.8–44.5)	37.8 (36.8–38.8)
Race and Hispanic origin[1]:				
Hispanic	†21.9 (16.7–27.8)	13.7 (12.5–15.0)	*	17.2 (15.9–18.4)
Non-Hispanic white	†22.1 (20.3–24.0)	17.9 (17.2–18.5)	23.1 (18.7–28.1)	20.1 (19.4–20.7)
Non-Hispanic black	21.4 (17.8–25.4)	19.7 (18.2–21.3)	28.6 (20.5–37.8)	24.7 (23.3–26.1)
Non-Hispanic Asian	15.1 (7.9–25.2)	11.0 (9.2–12.9)	*	10.5 (8.9–12.3)
Non-Hispanic other races	35.0 (24.2–47.1)	24.3 (21.0–28.0)	*	27.8 (24.7–31.0)
Education:				
High school diploma or GED or less	20.8 (18.1–23.6)	20.5 (19.6–21.4)	23.7 (14.3–35.4)	24.0 (23.1–25.0)
Some college	†24.7 (22.3–27.2)	18.7 (17.7–19.7)	28.3 (22.2–35.1)	23.1 (22.2–24.1)
Bachelor's degree or higher	†19.1 (16.6–21.9)	12.2 (11.5–12.9)	†22.9 (17.5–29.0)	13.1 (12.5–13.8)
Poverty status[2]:				
Poor	33.2 (25.7–41.3)	26.4 (24.6–28.3)	*	32.5 (31.0–34.0)
Near poor	†28.3 (24.1–32.9)	21.5 (20.0–23.1)	29.5 (19.2–41.5)	25.3 (24.1–26.5)
Not poor	†20.3 (18.6–22.1)	14.9 (14.4–15.5)	†22.4 (18.1–27.0)	16.1 (15.6–16.7)
Cigarette smoking status:				
Current	†27.6 (24.1–31.2)	21.6 (20.4–22.9)	33.8 (24.6–44.0)	30.6 (29.2–32.0)
Former	23.2 (20.7–25.9)	20.5 (19.4–21.6)	23.2 (16.2–31.6)	23.5 (22.2–24.8)
Never	†18.5 (16.3–20.8)	14.2 (13.6–14.8)	†23.1 (18.2–28.6)	16.1 (15.5–16.6)
Weight status[3]:				
Healthy or underweight	†15.0 (12.2–18.2)	10.8 (10.0–11.7)	†20.1 (14.0–27.6)	11.4 (10.8–12.1)
Overweight	†19.1 (16.7–21.6)	13.6 (12.9–14.2)	21.2 (14.5–29.3)	16.9 (16.1–17.8)
Obese	†28.7 (26.2–31.3)	25.9 (24.8–27.0)	35.6 (28.4–43.4)	31.0 (30.0–32.0)
65 and over				
Total	†66.9 (65.3–68.4)	61.9 (60.4–63.4)	†74.1 (66.8–80.5)	61.8 (60.8–62.7)
65–79	†65.3 (63.5–67.2)	59.3 (57.7–60.9)	†70.4 (61.3–78.5)	59.8 (58.6–60.9)
80 and over	71.0 (68.4–73.6)	69.1 (65.5–72.6)	†**84.4 (71.9–92.9)	67.4 (65.6–69.0)
Race and Hispanic origin[1]:				
Hispanic	63.9 (55.1–72.1)	60.2 (55.8–64.5)	*	60.9 (57.4–64.4)
Non-Hispanic white	†66.4 (64.7–68.1)	62.9 (61.1–64.7)	†74.2 (66.1–81.2)	60.8 (59.8–61.9)
Non-Hispanic black	†75.0 (70.0–79.5)	61.8 (57.2–66.3)	*	72.2 (69.5–74.8)
Non-Hispanic Asian	50.0 (36.4–63.5)	52.0 (45.7–58.3)	*	53.6 (48.6–58.5)
Non-Hispanic, other races	76.5 (67.2–84.3)	71.2 (60.1–80.6)	*	71.2 (64.0–77.7)
Education:				
High school diploma or GED or less	†70.3 (67.8–72.8)	65.1 (62.9–67.3)	74.2 (57.7–86.8)	64.9 (63.5–66.2)
Some college	†68.6 (66.1–71.1)	63.0 (59.3–66.6)	73.9 (62.2–83.5)	63.7 (62.0–65.4)
Bachelor's degree or higher	†61.2 (58.5–63.9)	57.0 (54.2–59.9)	†74.7 (60.7–85.7)	54.0 (52.1–55.9)
Poverty status[2]:				
Poor	68.1 (60.4–75.1)	65.8 (61.1–70.2)	*	70.7 (67.8–73.4)
Near poor	†70.1 (66.1–74.0)	64.1 (60.8–67.3)	†**86.0 (69.5–95.6)	66.2 (64.2–68.1)
Not poor	†66.2 (64.5–67.9)	60.7 (58.8–62.7)	†72.8 (64.2–80.3)	59.1 (57.9–60.3)
Cigarette smoking status:				
Current	62.7 (57.4–67.7)	60.2 (54.1–66.1)	*	62.6 (59.0–66.1)
Former	†72.8 (70.9–74.7)	67.9 (65.8–70.0)	†82.9 (72.3–90.7)	67.3 (65.8–68.9)
Never	58.2 (55.4–61.0)	56.2 (53.9–58.4)	66.7 (55.3–76.9)	58.7 (57.5–60.0)
Weight status[3]:				
Healthy or underweight	†56.9 (53.9–59.8)	52.1 (49.3–55.0)	61.2 (46.4–74.6)	49.8 (48.3–51.4)
Overweight	†64.9 (62.6–67.1)	59.9 (57.6–62.3)	†77.2 (65.7–86.4)	62.1 (60.5–63.7)
Obese	79.0 (76.4–81.4)	76.0 (73.4–78.6)	**86.9 (74.9–94.6)	77.9 (76.3–79.4)

† Significantly different from nonveterans ($p < 0.05$).
* Estimate is not shown as it does not meet National Center for Health Statistics standards of reliability.
** Estimate meets National Center for Health Statistics standards of reliability, its complement does not.
[1]Refers to adults who are of Hispanic or Latino origin and may be of any race or combination of races. "Non-Hispanic" refers to adults who are not of Hispanic or Latino origin, regardless of race.
[2]Poor adults are defined as having income below the poverty threshold. Near-poor adults have incomes of 100% to less than 200% of the poverty threshold. Not-poor adults have incomes that are 200% of the poverty threshold or greater.
[3]Calculated from information that respondents supplied in response to survey questions regarding height and weight. For both men and women, healthy or underweight is indicated by a body mass index (BMI) of up to 25.0, overweight is indicated by a BMI of 25.0 up to 30.0, and obesity is indicated by a BMI of 30.0 or higher. Note that self-reported height and weight may differ from actual measurements. The weighted percentage of unknown with respect to BMI among adults aged 25 and over was 3.5%.

NOTES: Multiple chronic conditions include arthritis, cancer, chronic obstructive pulmonary disease, coronary heart disease, current asthma, diabetes, hepatitis, hypertension, stroke, and weak or failing kidneys. Estimates are age-adjusted using the projected 2000 U.S. population as the standard population and age groups 25–34, 35–49, 50–64, 65–79, and 80 and over. Estimates for individual age groups are not age adjusted. CI is confidence interval.

SOURCE: National Center for Health Statistics, National Health Interview Survey, 2015–2018.

Table 4. Adjusted odds ratios from three models of multiple chronic conditions among adults aged 25 and over comparing veterans with nonveterans, by sex and age: United States, 2015–2018

Sex and age group (years)	Model 1[1] (95% CI)	Model 2[2] (95% CI)	Model 3[3] (95% CI)
Male			
25–64	1.42 (1.29–1.57)	1.36 (1.22–1.50)	1.24 (1.11–1.38)
65 and over	1.20 (1.09–1.32)	1.15 (1.04–1.27)	1.07 (0.96–1.18)
Female			
25–64	1.29 (1.04–1.61)	1.29 (1.02–1.63)	1.30 (1.02–1.65)
65 and over	1.74 (1.23–2.48)	1.81 (1.26–2.58)	1.71 (1.18–2.48)

[1]Odds ratios were adjusted for age.
[2]Odds ratios were adjusted for selected sociodemographic characteristics including age, race and ethnicity, poverty status, and education.
[3]Odds ratios were adjusted for selected sociodemographic characteristics including age, race and ethnicity, poverty status, education, smoking, and weight status.

NOTES: Multiple chronic conditions include arthritis, cancer, chronic obstructive pulmonary disease, coronary heart disease, current asthma, diabetes, hepatitis, hypertension, stroke, and weak or failing kidneys. CI is confidence interval.

SOURCE: National Center for Health Statistics, National Health Interview Survey, 2015–2018.

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