

# Statin Prescription for Patients With Atherosclerotic Cardiovascular Disease from National Survey Data



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**Despite strong evidence for the use of statins for patients with atherosclerotic cardiovascular disease (ASCVD), statin prescription is still suboptimal. We aimed to determine the rates and factors that influence statin prescription using national survey data. This is a cross-sectional retrospective study on 8,468 patients with clinical ASCVD who were drawn from the National Ambulatory Medical Care Survey and the National Hospital Ambulatory Medical Care Survey from years 2011 to 2015. Survey-weighted analysis was conducted to estimate weighted prevalence and odds ratios for statin prescription. There was a significant increase in statin prescription from the years 2011 to 2015. Nevertheless, only 52% of ASCVD patients (55.4% in coronary heart disease and 37.7% in non-coronary heart disease) were prescribed a statin. Based on multivariable regression analysis, after adjusting for covariates, males had 1.28 (1.06, 1.55) higher odds of statin prescription, in coronary heart disease patients only. In the overall study population, Black non-Hispanics had 31% lower odds of statin prescription compared with White non-Hispanics, and patients seen only by a healthcare provider other than a physician were 80% less likely to have a statin prescribed to them. In conclusion, the disparity in statin prescription in patients with ASCVD exists across minority groups, and our findings underscore existing variations in healthcare delivery. © 2019 Elsevier Inc. All rights reserved. (Am J Cardiol 2019;124:1–7)**

According to the 2013 American College of Cardiology and American Heart Association Guidelines,<sup>1</sup> patients with a history of atherosclerotic cardiovascular disease (ASCVD) should be initiated and continued on statin therapy, unless they are intolerant of the drug, without regard for specified low density lipoprotein cholesterol targets. Studies have shown a decrease in mortality and cardiovascular (CV) events in ASCVD patients, adherent to their statin therapy, however, statin prescribing rates for this purpose are still suboptimal. Only 2/3 of ASCVD patients were actually prescribed and optimized on statins,<sup>2</sup> and sex and racial systematic variations in statin prescription have been reported.<sup>3–7</sup> The primary aim of this study was to demonstrate the rates of statin prescription in patients with ASCVD and to look at factors that influence these prescription rates. Through analysis of national survey data, the identification and characterization of these variations may serve to assist in alleviating issues that contribute to the underprescription, and thereby underutilization, of statin therapy for the secondary prevention of ASCVD.

## Methods

We conducted a cross-sectional retrospective study using data from the National Ambulatory Medical Care Survey (NAMCS) and the National Hospital Ambulatory Medical Care Survey (NHAMCS) from years 2011 to 2015. NAMCS, as previously described, is a national probability sample survey conducted by the Centers for Disease Control and Prevention, National Center for Health Statistics (NCHS).<sup>8–11</sup> This survey was designed to meet the need for objective, reliable information about the provision and use of ambulatory medical care services in the United States.<sup>8</sup> NAMCS data consist of nationally representative samples of visits to non-federally employed office-based and community health centers based physicians. Patients were selected using stratified multistage random sampling. Practicing physicians, stratified by specialty, were selected randomly from geographic primary sampling units (PSUs) within the United States and the District of Columbia. In the last stage of the sampling, patients' visits seen by those physicians were randomly selected.<sup>10</sup> The NHAMCS in contrast, was designed to collect data on the utilization and provision of ambulatory care services in hospital emergency and outpatient departments, and in ambulatory surgery centers.<sup>8</sup> Data from this survey were collected through multistage sampling of randomly selected geographic PSUs, hospitals selected within PSUs, and patient visits selected from the emergency departments, outpatient departments, and ambulatory surgery locations of noninstitutional general and short-stay hospitals.<sup>8</sup> Both the NAMCS and NHAMCS protocols have been approved by the NCHS Research Ethics Review Board annually starting in February 2003.

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Data from NAMCS and NHAMCS were collected for patients who were 18 years or older and had a diagnosis of clinical ASCVD such as ischemic heart disease, history of myocardial infarction, stable angina, unstable angina, stroke, transient ischemic attack, or peripheral artery disease. Patients who were pregnant or diagnosed with liver disease, hepatitis, or cirrhosis were excluded from this study. International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes was used for the inclusion and exclusion of the patients' diagnoses.

The outcome variable of interest was statin prescription (Yes/No). This dichotomous variable was defined using the medication codes: 'd04851', '8161', '97157', '9869', 'd05048', 'd08089', 'd05348', 'd07110', '6161', '12164', 'd04787', '12164', 'd04105', '93237', 'd00746', '93237', 'd00746', '91088', 'd00280', '95092', 'd00348', 'd07637', 'd03183', '95140' found in the MED1-MED30 and DRUD1-DRUG30 fields in the selected data. Medications were coded according to a unique classification scheme developed at NCHS and the coding was performed and edited by the NAMCS Drug Database Coordinator.<sup>12</sup>

Covariates included in the analysis were patients' age, sex, race and ethnicity, body mass index (BMI), health insurance type, smoking status, and region (Northeast, Midwest, South, and West), as well as diagnosis of diabetes, hypertension, or hyperlipidemia. Survey year; whether the patient was seen by a physician or physician together with another type of healthcare provider, or the patient was only seen by a provider other than a physician (i.e., physician assistant and/or nurse practitioner/midwife and/or other); methods used to record and track patients' health metrics and information [electronic health record (EHR)/electronic medical record (EMR), paper, or combination of paper and electronic systems]; and type of ASCVD (coronary heart diseases and noncoronary heart disease) were also analyzed. The age variable was categorized into 3 groups: 18 to 39 years, 40 to 75 years, and  $\geq 75$  years.<sup>1</sup> BMI was categorized into underweight (BMI  $< 18.5$  kg/m<sup>2</sup>), normal weight (18.5  $\leq$  BMI  $< 25$  kg/m<sup>2</sup>), overweight (25  $\leq$  BMI  $< 30$  kg/m<sup>2</sup>), and obesity (BMI  $\geq 30$  kg/m<sup>2</sup>).

We conducted survey-weighted analysis of the combined NAMCS and NHAMCS study data. We used the appropriate SAS SURVEY analysis procedures incorporating the developed patient visit probability weights, adjusted by NCHS for survey nonresponse, for producing national

and regional estimates; and the complex multistage design variables CSTRATM and CPSUM to account for the sampling stratification and clustering when estimating variances.<sup>8,13,14</sup> NCHS considers an estimate to be reliable if it has a relative standard error  $\leq 30\%$  and the estimate is based on  $\geq 30$  records.<sup>15</sup> Data were summarized and reported as means and standard errors for continuous variables; and unweighted frequencies and column weighted percentages for categorical variables. Differences in sociodemographic patient characteristics between statin prescription groups were evaluated using the SAS SURVEYREG procedure's Student's *t* Test for continuous variables and the SAS SURVEYFREQ procedure's Rao-Scott F adjusted chi-square statistic for categorical variables. Crude and adjusted odds ratios (OR) and their respective 95% confidence intervals (CI) were calculated using the SAS SURVEYLOGISTIC procedure. DOMAIN statement was implemented in these procedures to conduct domain analyses. To identify independent factors associated with the prescription of statin medication, various multivariable weighted logistic regression models were fitted with variables selected based on the bivariate analysis and controlling for potential confounders. Potential multicollinearity effect and 2-way interactions between the variables included in the models were assessed. The best model was selected using Akaike information criterion. Model's goodness of fit test was performed using SVYLOGITGOF command in STATA. All other statistical analyses were conducted using SAS 9.4 (SAS Institute, Inc). All statistical tests were 2-sided and were performed using a significance (alpha) level of 0.05.

## Results

A total of 8,468 patients who met the inclusion and exclusion criteria were included in this analysis. Table 1 presents a summary of the sociodemographic patient characteristics for the study population. The mean  $\pm$  SE age of the overall study population was 70.5  $\pm$  0.28 years, and patients prescribed statin medications were older than patients who were not prescribed any statin medication (Table 1). Males were predominant (60.7%) in the overall study population, and the majority of patients were White non-Hispanics (77.2%). Most of the studied participants had Medicare (65.2%). There was a high prevalence of overweight (34.6%) and obesity (39.3%), hypertension (74.0%), as well as diabetes

Table 1

Sociodemographic characteristics of patients 18 years or older diagnosed with clinical atherosclerotic cardiovascular disease, National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, 2011 to 2015.

Patient characteristics	All (n = 8,468)	Statin prescribed (n = 3,622)	No statin prescribed (n = 4,846)	Weighted crude OR (95% CI) for statin prescription	p-Value
Continuous variable	mean $\pm$ SE*	mean $\pm$ SE*	mean $\pm$ SE*		
Age (years)	70.5 $\pm$ 0.28	71.0 $\pm$ 0.36	70.1 $\pm$ 0.34	1.01 (1.00, 1.012)	0.0427
BMI (kg/m <sup>2</sup> ) (n = 4,845)	29.4 $\pm$ 0.18	29.5 $\pm$ 0.27	29.2 $\pm$ 0.22	1.01 (0.99, 1.02)	0.4256
Categorical variable	n (%) <sup>†</sup>	n (%) <sup>†</sup>	n (%) <sup>†</sup>	OR (95% CI)	p value
Age groups (years)					
18-40	157 (1.1%)	26 (0.4%)	131 (1.7%)	reference	0.0005
40-75	5,116 (59.2%)	2,241 (59.6%)	2,875 (58.8%)	4.46 (2.49, 7.98)	
$\geq 75$	3,195 (39.7%)	1,355 (40.0%)	1,840 (39.5%)	4.47 (2.48, 8.04)	

(continued)

Table 1 (Continued)

Patient characteristics	All (n = 8,468)	Statin prescribed (n = 3,622)	No statin prescribed (n = 4,846)	Weighted crude OR (95% CI) for statin prescription	p-Value
Continuous variable	mean ± SE*	mean ± SE*	mean ± SE*		
<b>Sex</b>					
Male	5,016 (60.7%)	2,333 (64.5%)	2,683 (56.6%)	1.39 (1.19, 1.63)	<0.0001
Female	3,452 (39.3%)	1,289 (35.5%)	2,163 (43.4%)	reference	
<b>Race/ethnicity</b>					
White only, non-Hispanic	6,764 (77.2%)	3,012 (79.7%)	3,752 (74.7%)	reference	0.0381
Black only, non-Hispanic	813 (9.7%)	261 (7.5%)	552 (12.0%)	0.59 (0.44, 0.79)	
Hispanic	596 (8.7%)	222 (8.2%)	374 (9.2%)	0.83 (0.54, 1.26)	
Other race/multiple race	295 (4.4%)	127 (4.6%)	168 (4.1%)	1.07 (0.58, 1.98)	
<b>BMI groups (kg/m<sup>2</sup>) (n = 4,845)</b>					
<18.5	55 (1.0%)	19 (0.4%)	36 (1.9%)	0.20 (0.10, 0.42)	<0.0001
18.5-25	1,125 (25.1%)	608 (24.2%)	517 (26.3%)	reference	
25-30	1,701 (34.6%)	981 (35.8%)	720 (33.0%)	1.18 (0.89, 1.56)	
>=30	1,964 (39.3%)	1,078 (39.6%)	886 (38.8%)	1.11 (0.84, 1.47)	
Hypertension <sup>†</sup> (n = 7,223)	5,032 (74.0%)	2,591 (77.6%)	2,441 (69.8%)	1.50 (1.24, 1.81)	<0.0001
Hyperlipidemia <sup>§</sup> (n = 7,223)	3,931 (58.8%)	2,370 (71.7%)	1,561 (43.6%)	3.28 (2.70, 3.98)	<0.0001
Diabetes mellitus <sup>¶</sup>	2,428 (29.8%)	1,082 (31.8%)	1,346 (27.7%)	1.22 (1.01, 1.47)	0.0422
Current tobacco use (n = 5,052)	1,197 (22.9%)	686 (23.6%)	511 (22.2%)	1.08 (0.85, 1.37)	0.5181
<b>Health insurance (n = 7,940)</b>					
Private insurance	2,133 (27.3%)	965 (29.0%)	1,168 (25.4%)	reference	0.0002
Medicare	5,043 (65.2%)	2,182 (65.9%)	2,861 (64.5%)	0.90 (0.73, 1.10)	
Medicaid/SCHIP	459 (4.8%)	142 (3.5%)	317 (6.1%)	0.50 (0.31, 0.80)	
Other	305 (2.7%)	72 (1.6%)	233 (4.0%)	0.37 (0.22, 0.63)	
<b>Provider type</b>					
Physician or physician and physician assistant/nurse prac- titioner/midwife/other	6,314 (91.7%)	3,382 (97.9%)	2,932 (84.9%)	8.30 (5.93, 11.61)	<0.0001
Physician assistant and/or nurse practitioner and/or mid- wife and/or other	2,154 (8.3%)	240 (2.1%)	1914 (115.1%)	reference	
<b>HER/EMR (n = 6,389)</b>					
All electronic	4,605 (72.9%)	2,539 (76.0%)	2,066 (69.1%)	1.51 (1.12, 2.05)	0.0172
Part paper and part electronic	752 (11.7%)	387 (10.8%)	365 (12.7%)	1.17 (0.77, 1.79)	
Paper	1,032 (15.4%)	489 (13.2%)	543 (18.2%)	reference	
<b>Region</b>					
Northwest	1,374 (22.6%)	630 (23.3%)	744 (21.8%)	1.28 (0.93, 1.74)	0.0731
Midwest	2,401 (19.2%)	1,066 (21.0%)	1,335 (17.3%)	1.45 (1.08, 1.93)	
South	3,023 (39.8%)	1,176 (36.5%)	1,847 (43.4%)	reference	
West	1,670 (18.4%)	750 (19.2%)	920 (17.5%)	1.30 (0.93, 1.83)	
<b>Year</b>					
2011	1,345 (17.7%)	467 (15.2%)	878 (20.3%)	1.05 (0.76, 1.43)	0.0001
2012	2,115 (15.6%)	814 (13.1%)	1,301 (18.3%)	reference	
2013	1,639 (17.0%)	675 (16.1%)	964 (18.1%)	1.24 (0.95, 1.63)	
2014	2,102 (24.5%)	1,073 (27.8%)	1,029 (21.0%)	1.85 (1.43, 2.40)	
2015	1,267 (25.2%)	593 (27.8%)	674 (22.3%)	1.73 (1.19, 2.52)	
<b>ASCVD</b>					
Coronary heart disease	6,493 (80.7%)	3082 (86.0%)	3,411 (74.9%)	2.05 (1.59, 2.64)	<0.0001
Noncoronary heart disease	1,975 (19.3%)	540(14.0%)	1,435 (25.1%)	reference	

ASCVD = atherosclerotic cardiovascular disease; BMI = body mass index; CI = confidence interval; EMR = Electronic medical record; HER = Electronic health record; OR = odds ratio; SCHIP = State Children's Health Insurance Program; SE = standard error.

\* Continuous variables are reported with weighted means and standard errors.

† Categorical variables are reported with unweighted frequencies and column weighted percentages. Weighted percentages may not reflect the unweighted (sample) percentages due to designed based sampling weights.

‡ Hypertension is based on documentation in the patient's medical record of a diagnosis of hypertension. Hypertension or high blood pressure is a cardiac chronic medical condition in which the systemic arterial blood pressure is elevated.

§ Hyperlipidemia is based on documentation in the patient's medical record of a diagnosis of hyperlipidemia. Hyperlipidemia is the condition of abnormally elevated levels of any or all lipids and/or lipoproteins in the blood. Also known as hypercholesterolemia.

¶ Diabetes mellitus is based on documentation in the patient's medical record of a diagnosis of diabetes mellitus. Excludes diabetes insipidus and gestational diabetes.

(29.8%) in the study population. Majority of the participants were seen by a physician or physician accompanied by another provider (91.7%) as opposed to a nonphysician healthcare provider (physician assistant and/or a nurse practitioner/midwife). EHR/EMR systems were used to record and track health information in 72.9% of the individuals included in this study. Nearly 81% of the ASCVD patients were with coronary heart diseases and the rest of them with noncoronary heart disease (Table 1).

Despite a diagnosis of ASCVD, only 52% of the patients were prescribed a statin medication (Figure 1). The prescription rate (37.7%, Figure 1) was even worse for noncoronary heart disease patients (e.g., those with stroke and peripheral artery disease) even though statin medications are indicated for them too. Atorvastatin was the most prescribed (37.8%) statin medication, followed by simvastatin (31.2%), pravastatin (14.4%), rosuvastatin (14.3%), lovastatin (4.3%), and fluvastatin (0.1%). The weighted crude prevalence of statin medication prescription in males was 55.2% compared with 47% in females ( $p < 0.0001$ ; Figure 1). There was a significant difference in weighted crude prevalence of statin prescription by age groups: 19.7% in ages 18 to 40 years, 50% in ages 40 to 75 years, and 53.3% in those older than 75 years ( $p = 0.0005$ ; Figure 1). Only 40.4% of Black non-Hispanics were prescribed a statin medication, compared with 48.8% of Hispanics, and 53.6% of White non-Hispanics ( $p = 0.0389$ ; Figure 2). There was a significant increase in statin medication prescriptions from the years 2014 (59%) and 2015 (57.3%) compared with the preceding years ( $p = 0.0001$ ; Figure 3).

Variables that were significantly associated with statin prescription in the bivariate weighted analyses (Table 1) were further included in the multivariable weighted regression analyses. Multivariable weighted logistic regression

analysis revealed that in the overall study population, age remained a strong factor associated with statin prescription, controlling for the effects of sex, race/ethnicity, hypertension, hyperlipidemia, diabetes, type of health insurance, type of provider seen, and year (Table 2). Based on the significant interaction effect found between sex and type of ASCVD, males remained with higher odds of statin prescription compared with females in patients with coronary heart disease only, controlling for the rest of the covariates assessed in the model (Table 2). The multivariable model adjusted OR for Black non-Hispanics to White non-Hispanics remained significant with Black non-Hispanic having 31% (OR = 0.69, 95% CI 0.49, 0.97) lower odds of statin prescription compared with White non-Hispanics. The Midwest region had 53% (OR = 1.50, 95% CI 1.13, 2.00) higher odds of statin prescription compared with the Southern region, even after controlling for the effect of all the other variables included in the model (Table 2). Patients who had no health insurance were 51% (OR = 0.49; 95% CI 0.28, 0.85) less likely to have statin prescription compared with patients with private health insurance (Table 2). In multivariable weighted logistic regression analysis, the manner of tracking the patients' health information (EHR/EMR/paper) was not significantly associated with statin prescription. However, patients seen only by a healthcare provider other than a physician were 80% less likely to have a statin prescribed to them even after controlling for the effect of all the other variables included in the model (Table 2).

## Discussion

Using nationally representative data, we found that only a little over 1/2 of patients with ASCVD were prescribed a

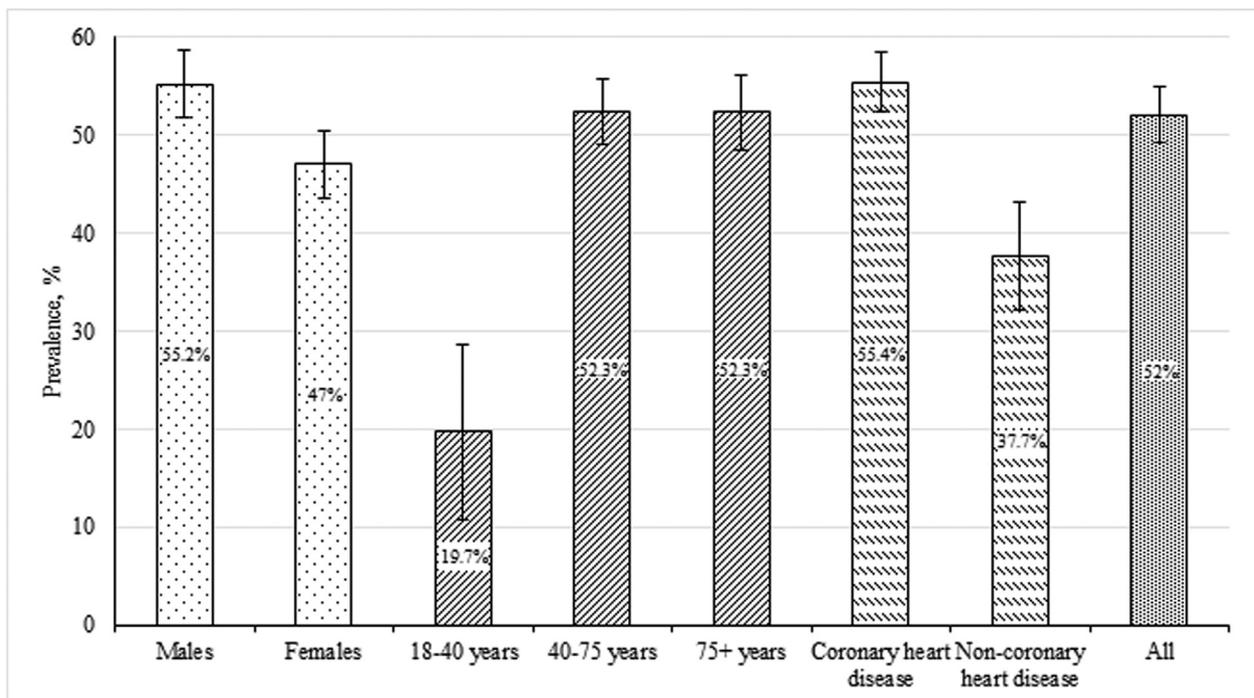


Figure 1. Weighted prevalence (95% confidence interval) of prescribed statin for the study population, and by age and sex groups in patients 18 years or older diagnosed with clinical atherosclerotic cardiovascular disease, National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, 2011 to 2015. The error bars represent 95% confidence intervals.

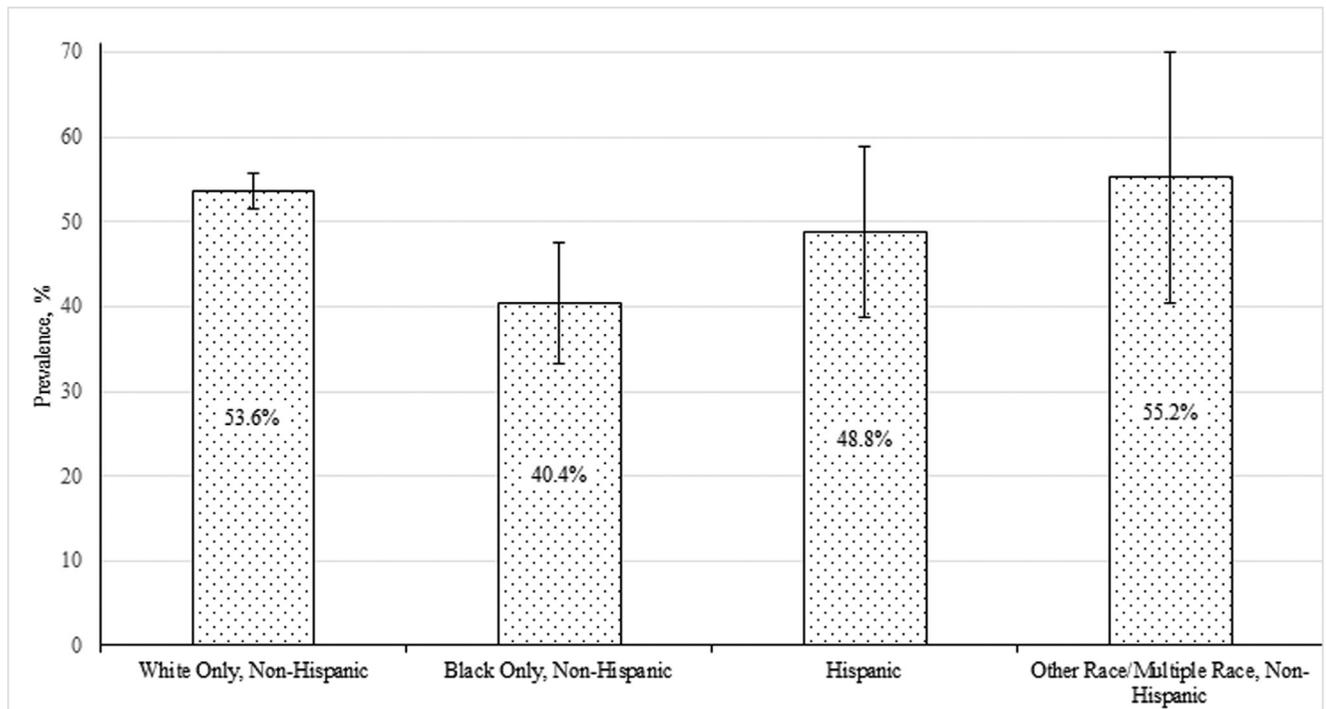


Figure 2. Weighted prevalence (95% confidence interval) of prescribed statin by Race/Ethnicity groups in patients 18 years or older diagnosed with clinical atherosclerotic cardiovascular disease, National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, 2011 to 2015. The error bars represent 95% confidence intervals.

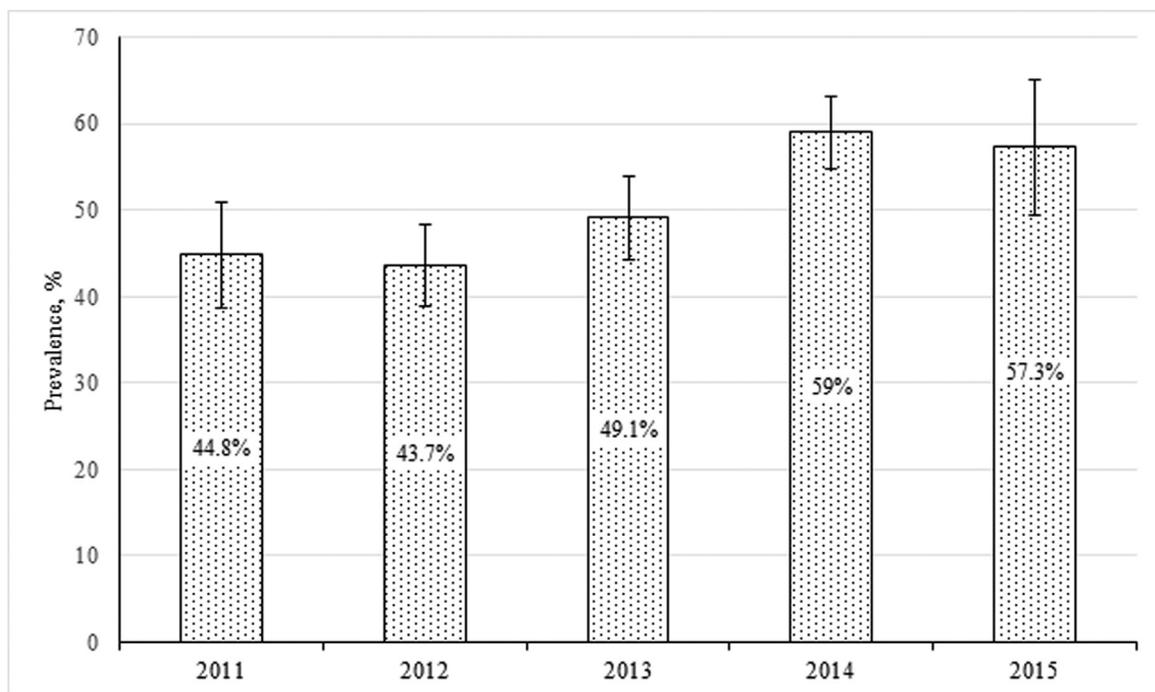


Figure 3. Weighted prevalence (95% confidence interval) of prescribed statin by years in patients 18 years or older diagnosed with clinical atherosclerotic cardiovascular disease, National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, 2011-2015. The error bars represent 95% confidence intervals.

statin, which is a guideline-mandated therapy for these patients. Although there was an increasing statin prescription trend noted in the 5 years included in our study, this statistic is still alarming. We noted a 10% increase in statin

prescription rates in the year 2014 compared with the year prior which likely represents a renewed interest in secondary prevention after the publication of and the controversy surrounding the most current national guidelines which were

Table 2

Survey weighted multivariable logistic regression model for prescribed statin in patients 18 years or older diagnosed with clinical atherosclerotic cardiovascular disease, National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, 2011 to 2015

Patient characteristic	Weighted model based adjusted OR (95% CI) for statin prescription (n = 6,753)	p Value
Age groups (years)		
18-40	reference	
40-75	2.58 (1.31, 5.09)	0.0062
>=75	2.52 (1.26, 5.03)	0.0090
Race/ethnicity		
White only, non-Hispanic	reference	
Black only, non-Hispanic	0.69 (0.49, 0.97)	0.0316
Hispanic	0.96 (0.65, 1.43)	0.8461
Other race/multiple race, non-Hispanic	1.18 (0.66, 2.09)	0.5840
Hypertension*	1.14 (0.93, 1.40)	0.2200
Hyperlipidemia <sup>†</sup>	2.88 (2.38, 3.48)	<0.0001
Diabetes mellitus <sup>‡</sup>	1.15 (0.93, 1.41)	0.2026
Health insurance		
Private insurance	reference	
Medicare	0.90 (0.73, 1.10)	0.2968
Medicaid/SCHIP	0.64 (0.37, 1.08)	0.0924
None	0.49 (0.28, 0.85)	0.0116
Provider type		
Physician or physician and physician assistant/nurse practitioner/midwife/other	4.95 (3.18, 7.71)	<0.0001
Physician assistant and/or nurse practitioner and/or midwife and/or other	reference	
Region		
Northwest	1.27 (0.94, 1.73)	0.1197
Midwest	1.50 (1.13, 2.00)	0.0048
South	reference	
West	1.33 (0.97, 1.83)	0.0802
Year		
2011	1.13 (0.78, 1.64)	0.5288
2012	reference	
2013	1.32 (0.95, 1.82)	0.0988
2014	1.68 (1.26, 2.24)	0.0005
2015	1.69 (1.16, 2.46)	0.0066
Interaction effect: Sex by the levels of interacting variable ASCVD	OR (95% CI)	p value
Coronary heart disease		
Male	1.28 (1.06, 1.55)	0.0107
Female	reference	
Noncoronary heart disease		
Male	0.78 (0.53, 1.16)	0.2261
Female	reference	

ASCVD, atherosclerotic cardiovascular disease; CI, confidence interval; OR, odds ratio; SCHIP, State Children's Health Insurance Program.

\*Hypertension is based on documentation in the patient's medical record of a diagnosis of hypertension. Hypertension or high blood pressure is a cardiac chronic medical condition in which the systemic arterial blood pressure is elevated.

<sup>†</sup>Hyperlipidemia is based on documentation in the patient's medical record of a diagnosis of hyperlipidemia. Hyperlipidemia is the condition of abnormally elevated levels of any or all lipids and/or lipoproteins in the blood. Also known as hypercholesterolemia.

<sup>‡</sup>Diabetes mellitus is based on documentation in the patient's medical record of a diagnosis of diabetes mellitus. Excludes diabetes insipidus and gestational diabetes.

published in 2013. We found continued sex and racial differences in statin prescription in patients with ASCVD, which are supported by older studies as well.<sup>2-7,16-18</sup> In patients with coronary heart diseases, male patients were consistently prescribed more statins compared with females despite similar disease risk burden. In the overall study population, Blacks were less likely to receive guideline-recommended statin therapy compared with other races. Additionally, patients with no health insurance were less likely to have statins prescribed to them, and patients who received care at a clinic without an electronic medical record were also less likely to receive a statin. EMRs make it easier to identify gaps in care, and this finding reinforces the importance of having this technology available to improve patient care.

There are some findings in our study that deserve attention and are worth exploring further. We showed significantly lower odds of receiving a statin prescription when a patient is seen only by a healthcare provider other than a physician. This finding contrasts with a recent study published by CIPHER et al wherein they found that physician assistants, nurse practitioners, and physicians had similar prescribing patterns.<sup>19</sup> However, CIPHER et al did not focus on statin prescription in patients with ASCVD alone, whereas our study specifically asked the question of statin prescribing practices in patients with ASCVD. Physician assistants are an important part of primary healthcare, especially in rural areas and it is important to understand factors that influence statin prescription variance in all healthcare providers. Health care for patients with ASCVD in rural areas may be improved if there was an educational focus targeting nonphysician healthcare providers.

The finding of higher statin prescribing tendencies in the Midwest region compared with the South needs to be explored further, as they may reflect potential systematic variations in clinical guidelines and healthcare delivery practices. Significant geographic variation in preventive care, specifically that the South had the lowest rates of utilization of prevention medications compared with Northeast has been previously reported.<sup>1,17,20</sup>

There are limitations to our study. The overall sample size of 8,468 in our study is small to conclude regional differences as well as to predict national estimates. Another limitation is that the NAMCS and NHAMCS collect data on whether medications were prescribed or continued but do not collect data on patient refusal of prescription or inaccurate diagnosis of ASCVD. In addition, the validity of the ambulatory medical care surveys has been previously questioned.<sup>21,22</sup> However, NAMCS and NHAMCS methodologies are rigorous, and analyses of these data have been published in numerous NCHS reports and journal articles.<sup>9,23,24</sup> Our findings were consistent with previous research.<sup>24</sup>

In conclusion, while the proportion of prescribed statin therapy has increased significantly in the past several years after the adoption of 2013 national guidelines, in our study we have found that still only about 1/2 of patients with ASCVD were prescribed a statin. The disparity in statin prescription in patients with ASCVD exists across minority groups. Female sex, Black non-Hispanic race, and lack of health insurance were all associated with lower odds of statin prescription. Furthermore, patients who were not

seen by a physician were less likely to be prescribed a statin compared with those patients who were seen by a physician. These findings underscore existing variations in healthcare delivery with regards to secondary prevention of ASCVD. Specific interventions targeting practitioners at risk for underutilization of statin therapy for secondary prevention in patients with ASCVD should be implemented, so that we can improve health care delivery for all.

## Disclosures

The authors have nothing to disclose.

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