

ORIGINAL RESEARCH

# Association of Socioeconomic Status With Ideal Cardiovascular Health in Black Men

Rosevine A. Azap, BS; Timiya S. Nolan, PhD, APRN-CNP; Darrell M. Gray II, MD, MPH; Kiwan Lawson, MS; John Gregory; Quinn Capers IV, MD; James B. Odeh , PhD; Joshua J. Joseph , MD, MPH

**BACKGROUND:** Black men are burdened by high cardiovascular risk and the highest all-cause mortality rate in the United States. Socioeconomic status (SES) is associated with improved cardiovascular risk factors in majority populations, but there is a paucity of data in Black men.

**METHODS AND RESULTS:** We examined the association of SES measures including educational attainment, annual income, employment status, and health insurance status with an ideal cardiovascular health (ICH) score, which included blood pressure, glucose, cholesterol, body mass index, physical activity, and smoking in African American Male Wellness Walks. Six metrics of ICH were categorized into a 3-tiered ICH score 0 to 2, 3 to 4, and 5 to 6. Multinomial logistic regression modeling was performed to examine the association of SES measures with ICH scores adjusted for age. Among 1444 men, 7% attained 5 to 6 ICH metrics. Annual income <\$20 000 was associated with a 56% lower odds of attaining 3 to 4 versus 0 to 2 ICH components compared with ≥\$75 000 ( $P=0.016$ ). Medicare and no insurance were associated with a 39% and 35% lower odds of 3 to 4 versus 0 to 2 ICH components, respectively, compared with private insurance (all  $P<0.05$ ). Education and employment status were not associated with higher attainment of ICH in Black men.

**CONCLUSIONS:** Among community-dwelling Black men, higher attainment of measures of SES showed mixed associations with greater attainment of ICH. The lack of association of higher levels of educational attainment and employment status with ICH suggests that in order to address the long-standing health inequities that affect Black men, strategies to increase attainment of cardiovascular health may need to address additional components beyond SES.

**Key Words:** Black Americans ■ cardiovascular health ■ education ■ health equity ■ income ■ socioeconomic status

Racial and ethnic minorities in the United States have a higher prevalence of chronic diseases compared with non-Hispanic White populations (NHWs).<sup>1</sup> Black individuals particularly have an excess burden of cardiovascular disease (CVD) and the shortest overall life expectancy compared with NHWs and Latinx populations.<sup>2,3</sup> One component of the excess burden of CVD in Black persons is poor levels of modifiable cardiovascular risk factors.<sup>1</sup> In an effort to reduce the prevalence of CVD in the United States, the medical and public health communities have made advancements in the identification and treatment of CVD risk factors including blood pressure, glucose, cholesterol,

smoking, and weight. Despite these advancements, a significant burden of CVD risk factors remain elevated in Black populations.<sup>1</sup> For example, the incidence of diabetes in Black persons has not decreased over the past several decades, compared with observed declines in NHWs.<sup>4,5</sup> Black people have the highest rates of obesity among any racial/ethnic group.<sup>6</sup> The prevalence of hypertension in Black people is the highest in the world at >50%, and Black people achieve blood pressure control less often than NHWs.<sup>1,7</sup> Hypertension is attributed to 40.6% of CVD mortality, and differences in blood pressure control among Black people are a leading cause of the Black-White CVD disparity.<sup>8</sup>

Correspondence to: Joshua J. Joseph, MD, MPH, The Ohio State University College of Medicine, 579 McCampbell Hall, 1581 Dodd Dr, Columbus, OH 43210. E-mail: joseph.117@osu.edu

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## CLINICAL PERSPECTIVE

### What Is New?

- In community-dwelling Black men, only 7% had ideal cardiovascular health (ICH) scores in the highest category (5–6).
- Having lower compared with higher income (<\$20 000 versus ≥\$75 000), and no health insurance and Medicare insurance status compared with private insurance, were associated with lower odds of attainment of 3 to 4 versus 0 to 2 ICH metrics.
- Educational attainment and employment status were not associated with attainment of ICH metrics; collectively, these findings suggest mixed associations of traditional measures of socioeconomic status with cardiovascular disease risk factors in Black men.

### What Are the Clinical Implications?

- It is critical to develop strategies to improve cardiovascular health in Black men because of the low attainment of ICH.
- Successful approaches to improve attainment of ICH may incorporate socioeconomic status and factors beyond socioeconomic status to improve attainment of ICH in Black men.

## Nonstandard Abbreviations and Acronyms

<b>AAMWA</b>	African American Male Wellness Agency
<b>AAMWW</b>	African American Male Wellness Walk
<b>AHA</b>	American Heart Association
<b>ICH</b>	ideal cardiovascular health
<b>NHW</b>	non-Hispanic White
<b>SDOH</b>	social determinants of health

Black men have the highest rates of hypertension-related CVD, ischemic heart disease, heart failure, and cerebrovascular disease in the United States.<sup>9</sup> Black men have the additional burden of the highest rates of out-of-hospital and in-hospital cardiac death with persistent disparities and meager longitudinal declines compared with other race and sex groups.<sup>9,10</sup> Thus, approaches to improve cardiovascular health in Black men are urgently needed.

In 2010, the American Heart Association (AHA) released its 2020 Impact Goals in which they defined the concept of Life's Simple 7, also known as ideal cardiovascular health (ICH), to address cardiovascular health at the population level.<sup>11</sup> The aim of the impact goals was to improve the cardiovascular health of all

Americans by giving targets for modifiable health behaviors and CVD risk factors. The targets can be used in health behavior and health promotion interventions to encourage individuals to reduce blood glucose, control cholesterol, manage blood pressure, stop smoking, get physically active, eat healthfully, and lose weight. Since the inception of Life's Simple 7, numerous studies have shown an association between attainment of better levels of Life's Simple 7 with lower risk of diabetes, heart disease, cancer, heart failure, and cognitive impairment across racial/ethnic groups.<sup>12–15</sup>

Socioeconomic status (SES) is known to influence both CVD risk factors and CVD. Studies have noted that SES may play a significant role in health outcomes and racial health disparities.<sup>16,17</sup> Global inequities exist between SES and CVD.<sup>18</sup> In the United States, Min et al identified an inverse relationship between socioeconomic gradient and CVD burden in the Jackson Heart Study cohort, with lower levels of education and income being associated with an increased prevalence of hypertension, myocardial infarction, and stroke.<sup>2</sup> Likewise, nonmanagement and nonprofessional jobs were also associated with a higher prevalence of CVD.<sup>2</sup> The extant literature also demonstrates an association between low SES and an increased risk of CVD risk factors.<sup>19,20</sup> Clark et al noted that in high-income countries, individuals from a low SES background are more likely to have worse levels of modifiable and behavioral risk factors for CVD, as compared with high SES individuals.<sup>19</sup> Studies have shown an association between higher SES (education, income, and insurance status) and greater attainment of healthy levels of cardiovascular risk factors in majority populations.<sup>21–24</sup> In the Jackson Heart Study, higher levels of income and education were independently associated with better cardiovascular health, but sex-specific findings were not evaluated.<sup>25</sup> While the impact of SES on health outcomes relative to CVD and its affiliated risk factors has been studied in broad populations, there remains a lack of data specifically in Black men, the US group with the highest rates of cardiovascular mortality.<sup>7</sup> Given the paucity of data on the impact of SES on ICH in Black men, we evaluated the association of health insurance status, educational attainment, annual income, and employment status with attainment of ICH in Black men in African American Male Wellness Walks (AAMWWs) from 2017 to 2019. We hypothesized that higher levels of SES would be associated with higher attainment of ICH in Black men.

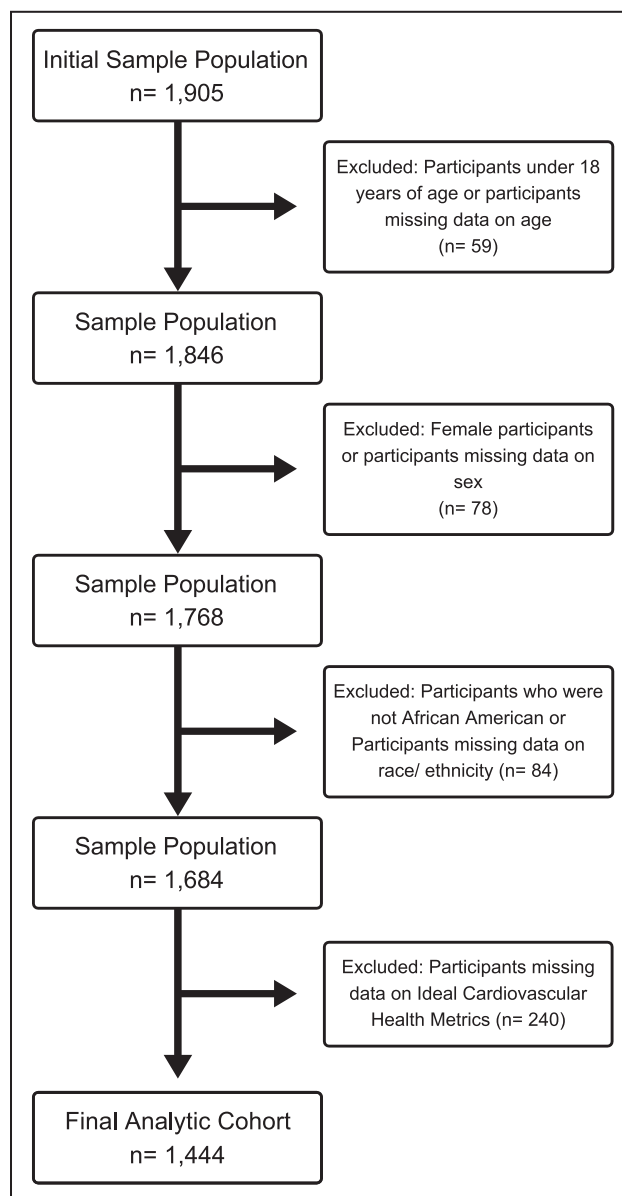
## METHODS

### Study Design and Study Population

The National African American Male Wellness Agency (AAMWA), established in Columbus, Ohio in 2004,

aims to reduce disparities in premature death and chronic diseases among Black men through AAMWWs and annual health events. The AAMWA has expanded to other cities in Ohio and across the nation (eg, New Orleans, LA; Washington DC; Atlanta, GA; Silver Spring, MD; Renton, WA; Niagara Falls, NY; and Charlotte, NC). The AAMWWs (5k walks) host free health screenings for Black men, along with community partners. The events are promoted in the community through various methods (ie, mass and social media). Since its inception, the AAMWW mantra has been: “Know Your Numbers.” The AAMWA encouraged Black men to be more active in self-management of their health through evaluations of blood pressure, glucose, cholesterol, body mass index (BMI), smoking, and physical activity. It has grown to average >50 000 participants annually. In 2016, the AAMWA and researchers at The Ohio State University formed a collaborative academic and community partnership, to move from health promotion awareness to reducing chronic diseases among Black men. In the academic–community partnership, The Ohio State University faculty members collaborate with the AAMWA to enhance quality improvement and catalyze community engagement. The partnership has led to a number of community engagement initiatives, including a community care kit distribution in the wake of the COVID-19 pandemic and an ongoing community-based lifestyle intervention with Black men.<sup>26</sup>

The AAMWA has grown across the nation to average >50 000 participants of diverse ages, sexes, and races/ethnicities. The walks in different regions around the country vary in terms of the size, with the largest of the walks currently in Columbus, Ohio averaging 20 000 to 30 000 participants. The other cities include 5 other Ohio cities: Akron, Cincinnati, Cleveland, Toledo, and Youngstown, and 5 cities nationally including New Orleans, LA; Washington, DC; Niagara Falls, NY; Charlotte, NC; and Renton, WA. Black men may choose to have screenings performed at the walks and approximately 300 to 1100 Black men complete screenings at the various walks annually. In the 2017 to 2019 AAMWWs, 1905 individuals participated in the screenings. The participants who were excluded were <18 years of age (n=59), female or did not answer the question related to sex (n=78), non-Black persons or missing data on race/ethnicity (n=84), or missing any ICH metric (n=240), as shown in Figure. After exclusions, 1444 participants were included in the analytic cohort. A majority of the participants included in the analytic cohort attended AAMWWs in 6 cities across Ohio (n=1234; 85.5%), with 9.6% (n=139) attending a walk in Charlotte, NC. The remaining participants attended walks in Washington, DC or Renton, WA (Table S1). This project used existing data collected for nonresearch purposes from participants in the AAMWW, with no identifiers linking human participants



**Figure.** In the 2017 to 2019 African American Male Wellness Walks, 1905 individuals participated in the screenings.

The participants excluded were <18 years of age (n=59), female or did not answer the question related to sex (n=78), non-Black or missing data on race/ethnicity (n=84), or missing any ideal cardiovascular health metric (n=240). After exclusions, 1444 participants were included in the analytic cohort.

to the data. The project was approved for exempt status by The Ohio State University Biomedical Sciences Institutional Review Board. Because of the sensitive nature of the data collected for this study, requests to access the data set from qualified researchers trained in human subject confidentiality protocols may be sent to AAMWA at dgregory@ausohio.com.

During the AAMWW, a standardized questionnaire was used to collect information on demographics (age, sex [male/female], race/ethnicity [Black/AA,

Asian, Caucasian/White, Native American, Hispanic, Other]), smoking status (Do you smoke? Yes/No), insurance status (Private Insurance, Medicaid, Medicare, No Insurance), chronic diseases (high blood pressure/hypertension, high cholesterol/hypercholesterolemia and diabetes, medications used for the chronic diseases [Yes/No], family history of diabetes [Yes/No], level of physical activity [I exercise 3 or more times per week, Yes/No]). Blood glucose and cholesterol were measured using the Cardio Check Silver (Polymer Technology, Inc., Heath, OH). Blood pressure was measured using Lifesource Automatic Blood Pressure Monitors (Lifesource Medical, Inc., Greensboro, NC). Weight was measured using various zeroed scales and height was self-reported. BMI was calculated by multiplying weight (lb) by 703, and then dividing by height squared (in<sup>2</sup>). During the health screenings, cardiovascular health was measured using 6 of the AHA's ICH metrics, which includes targets for blood pressure, cholesterol, glucose, BMI, smoking, and physical activity.

## Exposures

### Income

Income was categorized as <\$10 000, \$10 000 to \$19 999, \$20 000 to \$29 999, \$30 000 to \$39 999, \$40 000 to \$49 999, \$50 000 to \$74 999, \$75 000 to \$99 999, \$100 000 or more, or Rather Not Say. For the analysis, income was aggregated to <\$20 000, \$20 000 to \$49 999, \$50 000 to \$74 999, and ≥\$75 000 consistent with previous analyses.<sup>25</sup>

### Education

Education was queried using the question, "What is the highest level of education completed?" grammar school, high school or equivalent, vocational/technical school, some college, college graduate (4 year), Master's degree, Doctoral Degree (PhD), Professional Degree (MD, JD, etc.) or other. Education was aggregated for analysis to (1) High School or Less; (2) Some College; (3) Completed College; (4) Professional Degree—Doctoral/Master's/MD, JD, etc., (5) Other—Vocational/Technical School; or (6) Did Not Answer.

### Health Insurance

Uninsured, Medicaid, Medicare, private insurance, combination of insurances, and did not answer were the categories. Combination of insurances was defined as having Medicare and private insurance.

### Employment Status

Participants were asked if they were employed, unemployed, student, or retired.

## Main Outcome: ICH Score

A composite ICH score was defined by the presence of ideal levels of the 6 metrics: untreated blood pressure <120/80 mm Hg, untreated cholesterol <200 mg/dL, untreated fasting glucose <100 mg/dL or an untreated random glucose <140 mg/dL, BMI <25 kg/m<sup>2</sup>, nonsmoking status, and/or physical activity 3 times or more per week. The score was categorized as 0 to 2, 3 to 4, and 5 to 6, as has been performed previously.<sup>27–29</sup>

## Covariates

The covariate in the analyses was age.

## Statistical Analysis

Descriptive statistics were used to compare the baseline characteristics of included participants using appropriate parametric tests for continuous variables (ANOVA, *t* tests) and the  $\chi^2$  or Fisher exact tests for categorical variables. Multinomial logistic regression was used to examine the cross-sectional association of education, employment status, annual income, and health insurance with ICH score. Each of these analyses were performed separately utilizing the total analytical cohort (n=1444). The total analytic cohort included any Black male participant in the AAMWWs who was not missing any data metric for ICH and had data for at least 1 of the SES variables (educational attainment, employment status, annual income, and health insurance status). Odds ratios were estimated for exposures and the outcomes interpreted as odds of an ICH score of 5 to 6 or 3 to 4 compared with 0 to 2 in age-adjusted models. Adjustment for location was not significant in the models and was not included in the final analytic models. Type III analyses were performed to determine the effect of the SES measures on ICH score when these measures were included separately in the age-adjusted models. Sensitivity analyses were performed to determine the robustness of the main findings including (1) baseline characteristics of participants by location, individual SES measures, missingness of SES characteristics, and a complete case cohort (n=588) were analyzed in (Tables S1 through S7); (2) age-adjusted multinomial logistic regression models were performed by location, among participants with data on all 4 SES variables (n=588) and excluding participants missing data for each specific SES variable only in Tables S8 through S10. In addition, age-adjusted multinomial logistic regression models with all the SES measures together in the models were performed to compare ICH score of 5 to 6 or 3 to 4 to 0 to 2 for the final cohort and the complete case cohort in Tables S11 and S13, respectively. Type III analyses were performed to determine the effect of the SES measures on ICH



score when these measures are included all together (Table S12), in the age-adjusted models. All analyses were performed using SAS version 9.4 software (SAS Institute Inc., Cary, NC). Statistical significance was defined as a 2-sided  $P$  value  $<0.05$ .

## RESULTS

### Characteristics of the Analytic Cohort

The characteristics of the cohort overall and stratified by ICH score in categories 0 to 2, 3 to 4, and 5 to 6 are presented in Table 1. Among the 1444 participants in the final analytic cohort, the mean age of participants was 48 years. The percentage of cohort with scores of 0 to 2, 3 to 4, and 5 to 6 were 28%, 64%, and 7%, respectively. Overall, 60% of participants had private insurance, 48% had completed a college or professional degree, and 50% were employed. Only 4% of participants had an income  $< \$20\,000$ . Additionally, 20%, 20%, and 19% of participants had incomes in the  $\$20\,000$  to  $\$49\,999$ ,  $\$50\,000$  to  $\$74\,999$ , and  $\geq \$75\,000$  ranges, respectively. Differences existed across ICH score levels with highest prevalence of private insurance in the ICH 3 to 4 group and the highest incomes in the ICH 3 to 4 groups (all  $P < 0.05$ ). There was no difference by educational status across ICH score categories ( $P = 0.3411$ ). Blood pressure, cholesterol, and glucose were lower across increasing ICH score categories (all  $P < 0.0001$ ). Characteristics of the cohort by location, SES measures, missingness of SES characteristics, and a complete case cohort are summarized in Tables S1 through S7.

### Association of Annual Income With ICH Score

The association of annual income with ICH categories is presented in Table 2. Annual income  $< \$20\,000$  compared with  $\geq \$75\,000$  was associated with 56% lower odds of attaining 3 to 4 versus 0 to 2 ICH components ( $P = 0.016$ ). No categories of income were associated with higher attainment of 5 to 6 versus 0 to 2 ICH metrics, as compared with  $\geq \$75\,000$  (all  $P > 0.05$ ).

### Association of Health Insurance Status With ICH Score

The association of health insurance with ICH categories is presented in Table 2. In age-adjusted models, Medicare, compared with private insurance, was associated with 39% lower odds of attaining 3 to 4 versus 0 to 2 ICH components ( $P = 0.006$ ). No insurance, compared with private insurance, was associated with 35% lower odds of attaining 3 to 4 versus 0 to 2 ICH components ( $P = 0.042$ ). Health insurance status was not associated with odds of 5 to 6 versus 0 to 2 ICH components ( $P > 0.05$ ).

### Association of Educational Attainment and Employment Status With ICH Score

The association of educational attainment and employment status with ICH is presented in Table 2. There was no association of categories of higher levels of education, including some college, completed college, and professional degrees, compared with high school education or less, with odds of 5 to 6 or 3 to 4 versus 0 to 2 ICH metrics. Similarly, there was no association of employment status with attainment of ICH (5 to 6 or 3 to 4 versus 0 to 2 metrics, all  $P > 0.05$ ).

### Overall Effect of SES Measures on ICH Score

For the age-adjusted models, the Type III analysis showed that there was no significant overall effect of educational attainment, employment status, health insurance status, or annual income on ICH scores (Table 3) when included separately in the model (all  $P > 0.05$ ).

### Association of Location and Varying Cohort Exclusions With ICH Score

The AAMWA walk location was not associated with ICH attainment (Table S8). Complete case analyses are shown in Table S9. Among 588 individuals, education status of completed college versus high school was associated with higher odds of 3 to 4 versus 0 to 2 (OR, 1.78 [95% CI, 1.08, 2.93]) ICH measures. Employment status of retired versus employed was associated with higher odds of 5 to 6 versus 0 to 2 (OR, 4.02 [95% CI, 1.05, 15.39]) and unemployed versus employed was associated with lower odds of 3 to 4 versus 0 to 2 (OR, 0.38 [95% CI, 0.17, 0.86]) ICH measures. Insurance status of Medicare versus private insurance was associated with higher odds of 5 to 6 versus 0 to 2 (OR, 3.04 [95% CI, 1.16, 7.99]) and no insurance versus private insurance was associated with lower odds of 3 to 4 versus 0 to 2 (OR, 0.50 [95% CI, 0.26, 0.95]) ICH measures. Annual income  $\$50\,000$  to  $\$74\,999$  compared with  $\geq \$75\,000$  was associated with lower odds of 5 to 6 versus 0 to 2 (OR, 0.26 [95% CI, 0.08, 0.90]) and  $< \$20\,000$  versus  $\geq \$75\,000$  was associated with lower odds of 3 to 4 versus 0 to 2 (OR, 0.37 [95% CI, 0.18, 0.78]) ICH measures. The analyses excluding individuals who were missing data by category of SES were similar to the full sample analyses (Table S10).

For SES measures together with age in the model, Medicare, compared with private insurance, was associated with 33% lower odds of attaining 3 to 4 versus 0 to 2 ICH measures ( $P = 0.039$ ) in the full sample analyses. No SES measure was associated with odds of 5 to 6 versus 0 to 2 ICH measures (all  $P > 0.05$ ) (Table S11).

**Table 1. Characteristics of Participants in the African American Male Wellness Walk by Ideal Cardiovascular Health Score, 2017 to 2019**

Baseline characteristics*	All	0 to 2 ideal cardiovascular health score	3 to 4 ideal cardiovascular health score	5 to 6 ideal cardiovascular health score	P value
	n=1444	n=411	n=926	n=107	
Age, y	48 (14)	52 (13)	48 (14)	41 (16)	<0.0001
Insurance status, % <sup>†</sup>					<0.0001
Uninsured	9	10	8	14	
Medicaid	7	7	6	12	
Medicare	13	17.5	11	15	
Private insurance	60	53	64	50	
Combination	2	4	2	0	
Did not answer	9	8.5	9	9	
Education, % <sup>‡</sup>					0.3411
High school or less	23	23	22	22	
Some college	19	22	18	17	
Completed college	33	29	35	36	
Professional degree	15	15	15	17	
Other	4	5	4	1	
Did not answer	6	6	6	7	
Occupation, % <sup>§</sup>					<0.0001
Student	3	3	2	10	
Unemployed	4	5	4	6	
Employed	50	46	51.5	51	
Retired	12	17	9.5	8	
Did not answer	31	29	33	25	
Income, % <sup>  </sup>					0.0005
≥\$75 000	19	18	20	16	
\$50 000 to \$74 999	20	19	23	7.5	
\$20 000 to \$49 999	20	20	19	29	
<\$20 000	4	5	2	7.5	
Did not answer	37	38	36	40	
Systolic blood pressure, mm Hg	140 (19)	145 (19)	140 (18)	121 (18)	<0.0001
Diastolic blood pressure, mm Hg	87 (13)	91 (12)	87 (13)	76 (11)	<0.0001
Blood glucose: fasting, mg/dL	105 (43)	123 (49)	95 (35)	82 (16)	<0.0001
Blood glucose: nonfasting, mg/dL	111 (42)	143 (61)	103 (28)	92 (21)	<0.0001
Cholesterol	159 (41)	167 (49)	157 (38)	146 (31)	<0.0001
Body mass index, kg/m <sup>2</sup>	30 (6)	32 (6)	30 (6)	24 (4)	<0.0001
Blood pressure medication, %	27	43	22	4	<0.0001
Diabetes medication, %	9	25	4	0	<0.0001
Cholesterol medication, %	13	33	6	0	<0.0001
Fasting status, %	41	52	37	30	<0.0001
Ideal AHA smoking, % <sup>#</sup>	85	72	90	93	<0.0001
Ideal AHA physical activity, % <sup>#</sup>	60	31	69	95	<0.0001
Ideal AHA blood pressure, % <sup>#</sup>	8	1	6	51	<0.0001
Ideal AHA glucose, % <sup>#</sup>	67	25	83	97	<0.0001
Ideal AHA body mass index, % <sup>#</sup>	16	3	14	79	<0.0001
Ideal AHA cholesterol, % <sup>#</sup>	73	42	84	99	<0.0001

AHA indicates American Heart Association.

\*Mean (SD) or percentages are listed, P values calculated using  $\chi^2$  or Fisher exact (categorical variables), and ANOVA (parametric continuous variables).

<sup>†</sup>Health Insurance: No insurance n=134, Medicaid n=100, Medicare n=186, private insurance n=869, combination n=30, did not answer n=125.

<sup>‡</sup>Education: High school or less n=324, some college n=272, completed college n=482, professional degree n=220, other n=57, did not answer n=89.

<sup>§</sup>Occupation: Employed n=719, unemployed n=63, student n=44, retired n=168, did not answer n=450.

<sup>||</sup>Income: ≥\$75 000 n=274, \$50 000 to \$74 999 n=294, \$20 000 to \$49 999 n=292, <\$20 000 n=52, did not answer n=532.

<sup>#</sup>AHA ideal cardiovascular health recommendations were defined by AHA 2020 guidelines with the following modifications. Physical activity was considered ideal if participant exercised ≥3 times per week. Glucose was defined using standard fasting glucose guidelines and random glucose guidelines <140 ideal, 140 to 180 intermediate, and ≥180 "poor."

**Table 2. Association of Educational Attainment, Employment Status, Health Insurance Status, and Annual Income with ICH (n=1444)\***

Multinomial logistic regression	5 to 6 vs 0 to 2 ICH components, odds ratio (95% CI), P value	3 to 4 vs 0 to 2 ICH components, odds ratio (95% CI), P value
Educational attainment <sup>†</sup>		
High school or less	Referent	Referent
Some college	0.88 (0.44, 1.76), P=0.723	0.87 (0.61, 1.24), P=0.444
Completed college	1.33 (0.74, 2.40), P=0.342	1.27 (0.92, 1.76), P=0.151
Professional degree	1.31 (0.65, 2.66), P=0.454	1.11 (0.75, 1.65), P=0.592
Other	0.22 (0.03, 1.76), P=0.154	0.82 (0.45, 1.49), P=0.509
Did not answer	1.31 (0.65, 2.66), P=0.587	1.06 (0.63, 1.80), P=0.823
Employment status <sup>‡</sup>		
Employed	Referent	Referent
Unemployed	1.14 (0.43, 2.04), P=0.791	0.72 (0.41, 1.28), P=0.263
Student	1.84 (0.74, 4.58), P=0.188	0.54 (0.26, 1.11), P=0.095
Retired	1.52 (0.64, 3.59), P=0.343	0.73 (0.49, 1.09), P=0.119
Did not answer	0.91 (0.54, 1.53), P=0.712	1.08 (0.82, 1.42), P=0.585
Health insurance status <sup>§</sup>		
Private insurance	Referent	Referent
Medicaid	1.68 (0.80, 3.51), P=0.172	0.73 (0.45, 1.17), P=0.189
Medicare	1.46 (0.76, 2.78), P=0.254	0.61 (0.42, 0.87), P=0.006
No insurance	1.23 (0.62, 2.42), P=0.553	0.65 (0.43, 0.99), P=0.042
Combination	N/A	0.62 (0.29, 1.32), P=0.215
Did not answer	1.15 (0.53, 2.49), P=0.728	0.84 (0.54, 1.28), P=0.409
Annual income <sup>  </sup>		
≥\$75 000	Referent	Referent
\$50 000 to \$74 999	0.41 (0.17, 1.02), P=0.055	1.08 (0.74, 1.57), P=0.705
\$20 000 to \$49 999	1.32 (0.67, 2.62), P=0.422	0.83 (0.57, 1.21), P=0.326
<\$20 000	1.30 (0.47, 3.63), P=0.613	0.44 (0.23, 0.86), P=0.016
Did not answer	1.10 (0.58, 2.08), P=0.771	0.86 (0.62, 1.20), P=0.385

Model: Adjusted for age.

ICH indicates ideal cardiovascular health.

\*The outcome (ICH score) included blood pressure, glucose, cholesterol, body mass index, smoking, physical activity.

<sup>†</sup>Education: High school or less n=324, some college n=272, completed college n=482, professional degree n=220, other n=57, did not answer n=89.

Example Interpretation: Completing college compared with high school education or less was associated with 33% higher odds of attaining 5 to 6 ideal metrics compared 0 with 2, which was nonsignificant with a P value of 0.342.

<sup>‡</sup>Employment status: Employed n=719, Unemployed n=63, Student n=44, Retired n=168, Missing/Did Not Answer n=450.

Example Interpretation: Student status compared with employed status was associated with 84% higher odds of attaining 5 to 6 ideal metrics compared with 0 to 2, which was nonsignificant with a P value of 0.188.

Student status compared with employed status was associated with 46% lower odds of attaining 3 to 4 ideal metrics compared with 0 to 2, which was nonsignificant with a P value of 0.095.

<sup>§</sup>Health Insurance Status: No insurance n=134, Medicaid n=100, Medicare n=186, private insurance n=869, combination n=30, did not answer n=125.

Example Interpretation: Medicaid compared with private insurance was associated with 68% higher odds of attaining 5 to 6 ideal metrics compared with 0 to 2, which was nonsignificant with a P value of 0.172.

Medicare compared with private insurance was associated with 39% lower odds of attaining 3 to 4 ideal metrics compared with 0 to 2, which was significant with a P value of 0.006.

<sup>||</sup>Annual Income: ≥\$75 000 n=274, \$50 000 to \$74 999 n=294, \$20 000 to \$49 999 n=292, <\$20 000 n=52, did not answer n=532.

Example Interpretation: Annual income \$50 000 to \$74 999 compared with ≥\$75 000 was associated with 59% lower odds of attaining 5 to 6 ideal metrics compared with 0 to 2, which was nonsignificant with a P value of 0.055.

Annual income <\$20 000 compared with ≥\$75 000 was associated with 56% lower odds of attaining 3 to 4 ideal metrics compared with 0 to 2, which was significant with a P value of 0.016.

In the corresponding Type III analysis, each SES measure was found to have no significant overall effect on ICH scores given the other SES measures in the age-adjusted model (all P>0.05) (Table S12).

In the complete case analyses, education status of completed college versus high school or less was

associated with higher odds of 5 to 6 versus 0 to 2 (OR, 3.97 [95% CI, 1.23, 12.76]) ICH measures. Also, professional degree versus high school education or less was associated with higher odds of 5 to 6 versus 0 to 2 (OR, 5.08 [95% CI, 1.23, 21.03]) ICH measures (Table S13).

**Table 3. Type III Analysis of the Effect of Educational Attainment, Employment Status, Health Insurance Status, and Annual Income on Ideal Cardiovascular Health**

Type III analysis of effect			
Effect	Degrees of freedom	Wald $\chi^2$	P value
Educational attainment	5	6.9938	0.2211
Employment status	4	1.5746	0.8134
Health insurance status	5	2.2048	0.8201
Annual income	4	0.9966	0.9103

Model: Adjusted for age.

A P value >0.05 indicates that the corresponding socioeconomic status measure has no effect on ideal cardiovascular health in the model.

## DISCUSSION

In this study of community-dwelling Black men, lower compared with higher income (<\$20 000 versus ≥\$75 000), and no health insurance and Medicare insurance status compared with private insurance, were associated with lower odds of attainment of 3 to 4 versus 0 to 2 ICH metrics. Educational attainment and employment status were not associated with attainment of ICH metrics. Collectively, these findings suggest mixed associations of traditional measures of SES with cardiovascular disease risk factors in Black men. Furthermore, our study demonstrates that factors outside of one's health and the health care system can have a profound impact on health behaviors and health outcomes in Black men.<sup>30</sup>

### Annual Income and ICH

Studies have highlighted that increased access to financial capital may be associated with a healthier lifestyle, better health outcomes, and increased access to care.<sup>31,32</sup> In the United States, a 40-year-old man in the highest 1% of income has a life expectancy that is 14.6 years longer than a man of equivalent age in the lowest 1% of income.<sup>33</sup> Having a higher income may allow individuals to afford healthier food and engage in physical activity more frequently than those with lower incomes.<sup>25</sup> Correspondingly, income may be a key driver of health for many Americans. In Black men and women combined, higher levels of income were associated with higher AHA ICH metrics in the Jackson Heart Study.<sup>25</sup> Similarly, Chetty et al showed that higher income was associated with prolonged life in large US race-adjusted analysis.<sup>33</sup> However, the Gompertz Parameter Estimates for intercepts and slopes at age 40 years appeared to be different for Black men with high income (quartile 4) compared with NHW men, suggesting there may be some variance by race.<sup>33</sup> The findings of the association between annual income and ICH in Black men presented here with the lowest income category having a lower odds of 3 to 4

versus 0 to 2 ICH metrics compared with the highest income category is consistent with the literature that higher income is associated with attainment of better cardiovascular health. Notably, we did not see differences across categories from \$20 000–\$49 999 to \$50 000–\$74 999 compared with ≥\$75 000. These findings may be partially explained by historical disparities in access to generational wealth and social capital between different races/ethnicities. There exists a longstanding history of societal inequities in which Black communities were not afforded equal opportunities to build wealth and social capital. Thus, contemporarily, there exists a Black–White wealth gap. In particular, a study of the median wealth for Black and White households from 1989 to 2019 demonstrated that in 2019, White households had a median wealth that was 7.8 times that of Black households (\$188 200 for White households versus \$24 100 for Black households).<sup>34</sup> The lack of generational wealth may explain why Black men do not achieve better health outcomes across all levels of income. Research studies and public policy should seek to create reformations that impact the deeply rooted historical inequities and not merely just the modern-day manifestations of those inequities. Furthermore, more data are needed addressing income with ICH in Black men.

### Health Insurance and ICH

Health insurance is often regarded as a means to attenuate health inequities in the US health care system. Thus, it is important to understand how insurance status may influence cardiovascular risk factors. A study by McClurkin et al demonstrated that lack of health insurance may be a barrier to attaining ICH for US adults.<sup>24</sup> Likewise, a study conducted by Brooks et al suggested that treatment and control of cardiovascular risk factors are poor among uninsured individuals, which may yield poorer health, as compared with insured individuals.<sup>35</sup> The findings of this analysis are consistent with the extant literature as compared with participants with private insurance. Black male participants with no insurance and Medicare had lower attainment of higher levels of ICH. These findings emphasize the importance of affordable, high-quality health insurance in Black men.<sup>36</sup> There is a concern that health insurance as a proxy for access to health care may not be true for Black men.<sup>36</sup> As a whole, Black men are less likely to access and engage in health care compared with NHW men and all groups of women.<sup>36</sup> Additionally, Black individuals are more likely to experience discrimination in health care settings,<sup>36</sup> which may impact Black men to a greater extent than Black women.<sup>37</sup> The Tuskegee Study of Untreated Syphilis and other harmful medical practices that adversely impacted Black populations may still have modern-day



implications in the propagation of racial differences in mistrust of the medical system.<sup>38,39</sup> In part, this may explain why Black individuals are less likely to utilize primary care, yet more likely to use emergency departments.<sup>40</sup> Thus, there was a concern that health insurance as a proxy for access to care may not accurately contextualize the relationship between SES and cardiovascular health in Black men, but the results show that health insurance may be a reliable proxy for the relation of SES with cardiovascular health in Black men. In regard to the Medicare group having lower odds of ICH than the private group, further research is needed to understand the underlying reasons. This may be because of residual confounding based on age, because we know cardiovascular health decreases over the life course. Individuals on Medicare are generally older, but it is important to note that >31% of AAs in Medicare are <65 years of age.<sup>41</sup> The lack of association of Medicaid with lower levels of ICH was surprising, but while there are income requirements that would normally suggest that individuals would have lower ICH, there are many positive aspects to Medicaid including prescription drug coverage without a co-pay that may influence relationships with ICH.

### Educational Attainment and ICH

Higher education has generally been characterized as a means to promote health equity through its association with healthier, longer lives.<sup>42,43</sup> In broad populations, education is one of the strongest predictors of good health.<sup>44</sup> Previous studies in various racial/ethnic groups have found significant associations of education with cardiovascular risk factors, including AHA ICH metrics. In Europe, higher education levels (college and university education) were associated with more ideal levels of cardiovascular health as compared with those with low (no schooling, incomplete primary education, and primary education) or medium (3 or 4 years of secondary education) educational levels.<sup>21</sup> In a study of NHW, Asian, and LatinX populations in California, attainment of education was associated with higher levels of ICH, except for Asian participants.<sup>45</sup> In an analysis of National Health and Nutrition Examination Survey, including Black, NHW, and Mexican American women, education was associated with improved cardiovascular risk factors—BMI, blood pressure, cholesterol, diabetes status, leisure time physical activity, and current cigarette smoking—among Black women.<sup>46</sup> Accordingly, in the Jackson Heart Study, higher levels of education were associated with higher AHA ICH metrics in Black men and women.<sup>25</sup> The Jackson Heart Study findings were not disaggregated by sex to evaluate the association specifically in men, which is important because two thirds of the Jackson Heart Study participants

are women.<sup>25</sup> Concordant with the current findings, in Chinese adults, higher SES, measured as education and income, was associated with higher attainment of Life's Simple 7 in women, but not in men.<sup>22</sup> The current study extends the literature with the novel finding that education may not be associated with attainment of the AHA's ICH metrics in Black men.<sup>22</sup> Further studies are needed to confirm this association and evaluate mechanisms for the potential discordance with other sex and race populations.

### Employment Status and ICH

The findings of this study suggest that there may be no association between employment status with ICH in Black men, but it was not designed to capture differences across types of occupation, which may exist. Considering occupation, MacDonald et al conducted a cross-sectional study of 6282 employed Black and NHW middle-aged men and women in the REGARDS (Reasons for Geographic and Racial Differences in Stroke) study. The study demonstrated that optimal cardiovascular health was significantly higher for managers, architects, and engineers and significantly lower for those employed in sales, office, and administrative support combined and all service occupations combined.<sup>47</sup> Parks-Yancy et al noted that even when Black persons obtain high-profile occupational positions, these positions are often not essential to organizations and thus, the inhabitant of that position is not truly a part of the organization's power structure.<sup>48</sup> Larger studies assessing employment status and various occupational roles would be beneficial to advance the understanding of the impact on ICH.

### Measures of SES and ICH

These findings collectively exemplify that the relationships between SES, social determinants of health (SDOH), and ICH are likely complex in Black men, who also battle discrimination and mistrust of the medical system. Public policy regards SES and SDOH as important drivers of health outcomes.<sup>49</sup> SDOH are the underlying conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect the livelihood, health care, and health outcomes of individuals.<sup>50–52</sup> Three of the major SDOH components are evaluated in the current analysis including economic stability (employment and income), education, and access to health care (health insurance). These components of SDOH had mixed impacts on the attainment of ICH in Black men. The findings of this study yield a greater question: Why may there be a lack of effect of some measures of SES on ICH among Black men? Previous studies have shown that among individuals with high SES, Black people still have poorer health. In the Cooper Center Longitudinal

Study, among high SES executives in Dallas, TX, Black men and women had a higher proportion of cardiovascular risk factors compared with NHWs.<sup>53</sup> Recently, Colen et al demonstrated that among upwardly mobile young adults in a national sample, the gaps demonstrated in self-rated health were largely because of differential exposure to discrimination.<sup>54</sup> For NHWs, moderate income gains over time resulted in significantly less exposure to both acute and chronic discrimination.<sup>54</sup> Upwardly mobile Black people, however, were significantly more likely to experience acute and chronic discrimination than their socioeconomically stable NHW counterparts.<sup>54</sup> Thus, allostatic load, the physiological wear and tear because of accumulated psychological stresses on the body, may link psychological stress with poorer physiological outcomes in higher SES Black men.<sup>55–58</sup> Allostatic load is a known contributor to the disparate health care status between races and in particular, the overall poor health status of Black people in the United States.<sup>55,58,59</sup> Thus, discrimination and systemic racism may be examples of other SDOH that influence CVD risk factors through their impact on allostatic load and cumulative stress in blunting the positive association of higher SES with improved cardiovascular risk factors. Further research to delineate these and other potential effect modifiers of the association of SES on CVD risk factors in Black men is crucial. The importance is illustrated by the findings of the Meharry-Hopkins Cohort study of Black and White male physicians.<sup>60</sup> Even with similar SES and occupations, there was a higher degree of cardiovascular risk factors, including incident hypertension and diabetes, in the Black physicians. Furthermore, an earlier onset and higher rate of CVD was shown in the Black physicians compared with White physicians.<sup>60</sup> Thus, increasing SES alone may not be the complete panacea to improving cardiovascular health in Black men. Community-engaged and community-based multilevel co-developed (academic-community) approaches using a holistic approach addressing cardiovascular health, mental health, social needs, and patient-provider engagement are one potential strategy.<sup>61</sup>

### Strengths and Limitations

Strengths of our study include the following: (1) The inclusion of a large, socioeconomically diverse cohort of Black men; (2) Structured and consistent questionnaires over the 3-year time period; (3) Clinical assessments were performed by trained medical staff; and (4) De-identified data from community-focused testing that allowed for a diverse sample of community-dwelling Black men. In spite of these strengths, our study should be considered with the following limitations. First, commonly available blood pressure cuffs and scales were used to measure blood pressure and

weight, which may have been noncalibrated in some instances. However, this limitation may have been a potential strength because of the real-world applicability of the measurements. Second, we did not assess dietary intake as a cardiovascular health metric because of the lack of a brief validated measure to assess all the components of AHA ideal diet. However, based on previous studies, only 0% to 1.8% of Black individuals attain ideal dietary intake<sup>12,62,63</sup>; thus, the ICH score may be minimally impacted. Third, our study assessed the frequency of physical activity, but not the duration or intensity via self-report or objective measurement. Accordingly, the measure may underestimate the actual adherence to the original definition of the AHA physical activity goal that is based on minutes of physical activity per week. Fourth, the original intent of the AAMWW was programmatic rather than research focused. Therefore, we used a structured questionnaire that was not assessed for its psychometric properties. Fifth, while community-based testing served as a strength with participants of varying sociodemographic backgrounds, it also poses a limitation in the fact that participants self-selected to participate in the AAMWWs and may be healthier than national representative samples. The prevalence of hypertension (63%), diabetes (16%), and obesity (48%) indicate that the sample was relatively representative and actually slightly less healthy than US prevalence statistics in Black men for hypertension (42%), diabetes (12%), and obesity (38%), respectively.<sup>1</sup> Sixth, employment status was not disaggregated to decipher types of occupations, and this is a potential limitation because we were only able to assess employment status. For example, the employed category can denote anyone from a CEO to frontline staff. Thus, future studies should seek to analyze the effect of various occupations on cardiovascular health in Black men. Seventh, the number of individuals who had combined insurance types represented a small proportion of the overall analytic cohort. Specifically, 30 participants had Medicare and private insurance. Thus, we were unable to assess the association of combined insurance with ICH because of insufficient power in the multinomial logistic regression model. Lastly, the proportion of missing values for income and employment status, although consistent with other studies, may pose a limitation. Nonetheless, our study provides novel knowledge regarding the influence of SES on ICH in Black men.

### CONCLUSIONS

The burden of CVD risk factors in Black men is a persistent disparity in the United States. In the current study, higher SES measures, including income and health insurance status, were associated with higher

attainment of ICH among AA men, while no association existed for educational attainment and employment status. Additionally, <10% of men had 5 to 6 ICH metrics in the ideal range. Thus, it is critical to develop strategies to improve cardiovascular health in Black men because of the high burden of CVD. Successful approaches to improve attainment of ICH may need to focus on multilevel, community-engaged interventions that include SES and factors beyond SES to improve attainment of ICH status in Black men.<sup>64</sup> Potential avenues for future investigation include examining the impact of other SDOH, patient–physician engagement, and discrimination in attainment of ICH in Black men.

## ARTICLE INFORMATION

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### Affiliations

The Ohio State University College of Medicine, Columbus, OH (R.A.A., D.M.G., Q.C., J.J.J.); The Ohio State University College of Nursing, Columbus, OH (T.S.N.); The Ohio State University Wexner Medical Center, Columbus, OH (T.S.N., D.M.G., Q.C., J.J.J.); The Ohio State University James Center for Cancer Health Equity, Columbus, OH (D.M.G.); The African American Male Wellness Agency, National Center for Urban Solutions, Columbus, OH (K.L., J.G.); and The Ohio State University College of Public Health, Columbus, OH (J.B.O.).

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### Disclosures

None.

### Supplementary Material

Tables S1–S13

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# **Supplemental Material**

**Table S1. Characteristics of Participants in the African American Male Wellness Walk by Location.**

Baseline Characteristics*	Ohio n=1,234 85%	North Carolina n=139 10%	Washington State n=25 2%	DMV n=39 3%	Other States n=7 <1%	p-value <sup>a</sup>
Age (years)	48 (14)	48 (15)	51 (11)	42 (11)	58 (17)	p=0.0190
Insurance Status (%) <sup>†</sup>						p<0.0001
Uninsured	9	13	0	7.5	14	
Medicaid	7.5	1	0	13	0	
Medicare	14	6	20	0	29	
Private Insurance	63	41	20	66.5	57	
Combination	1.5	7	4	0	0	
Did Not Answer	5	32	56	13	0	
Education (%) <sup>‡</sup>						p=0.0010
High School or Less	24	14	0	23	14	
Some College	20	10	12	10	14	
Completed College	32	44	44	36	43	
Professional Degree	14	23	32	23	29	
Other	4	2	4	0	0	
Did Not Answer	6	7	8	8	0	
Occupation (%) <sup>§</sup>						p<0.0001
Student	2.5	6	8	0	14	
Unemployed	5	3	0	0	0	
Employed	47.5	70.5	68	44	0	
Retired	11	17	20	0	14	
Did Not Answer	34	3.5	4	56	72	
Income (%) <sup>e</sup>						p=0.0356
≥\$75,000	19	20	20	28	0	
\$50,000- \$74,999	20	20	20	26	43	
\$20,000- \$49,999	22	12	0	10	14	
<\$20,000	4	3	0	3	0	
Did Not Answer	35	45	60	33	43	
Systolic Blood Pressure (mmHg)	140 (19)	141 (21)	144 (18)	139 (18)	141 (22)	p=0.7040
Diastolic Blood Pressure (mmHg)	87 (13)	83 (15)	90 (13)	86 (11)	81 (9)	p=0.0023
Blood Glucose: Fasting (mg/dL)	105 (44)	107 (34)	90 (16)	91 (27)	118 (9)	p=0.6856
Blood Glucose: Non-Fasting (mg/dL)	113 (44)	104 (23)	116 (55)	96 (37)	123 (36)	p=0.1031
Cholesterol	157 (41)	175 (41)	144 (35)	156 (48)	164 (48)	p<0.0001

Body Mass Index (kilograms/meter <sup>2</sup> )	31 (6)	30 (6)	31 (6)	28 (5)		p=0.2437
Blood Pressure Medication (%)	27	22	23	40	57	p=0.1236
Diabetes Medication (%)	9	7	20	5	29	p=0.0936
Cholesterol Medication (%)	13	14	16	8	29	p=0.5887
Fasting Status (%)	43	27	28	31	29	p=0.0026
Ideal AHA Smoking <sup>f</sup> (%)	85	87	88	79	86	p=0.8112
Ideal AHA Physical Activity <sup>f</sup> (%)	59	71	68	72	43	p=0.0232
Ideal AHA Blood Pressure <sup>f</sup> (%)	7	10	0	10	14	p=0.4764
Ideal AHA Glucose <sup>f</sup> (%)	67	73	60	82	57	p=0.1385
Ideal AHA Body mass index <sup>f</sup> (%)	16	16	16	18	14	p=0.5245
Ideal AHA Cholesterol <sup>f</sup> (%)	74	60	80	85	57	p=0.0029
Ideal Cardiovascular Health <sup>g</sup>						p=0.1731
0-2 Metrics	29	26	36	15	57	
3-4 Metrics	64	63	60	80	29	
5-6 Metrics	7	11	4	5	14	

DMV=Washington D.C., Maryland, Virginia; AHA=American Heart Association

\* Mean (SD) or percentages are listed, p-values calculated using chi-square or Fisher's exact (categorical variables), and ANOVA (parametric continuous variables)

<sup>†</sup> Health Insurance: No Insurance n=134, Medicaid n=100, Medicare n=186, Private Insurance n=869, Combination n=30, Did Not Answer n=125

<sup>‡</sup> Education: High School or Less n=324, Some College n=272, Completed College n=482, Professional Degree n=220, Other n=57, Did Not Answer n=89

<sup>§</sup> Occupation: Employed n=719, Unemployed n=63, Student n=44, Retired n=168, Missing/Did Not Answer n=450

<sup>e</sup> Income: ≥\$75,000 n=274, \$50,000 – 74,999 n=294, \$20,000 – 49,999 n=292, <\$20,000 n=52, Did Not Answer n=532

<sup>f</sup> Ideal Cardiovascular (CV) Health recommendations were defined by AHA "2020" guidelines with the following modifications. Physical activity was considered ideal if participant exercised ≥ 3 times per week. Glucose was defined using standard fasting glucose guidelines and random glucose guidelines < 140 ideal, 140-180 intermediate and ≥ 180 "poor"

<sup>g</sup> Ideal Cardiovascular Health: 0-2 n=411, 3-4 n=926, 5-6 n=107

DMV – Washington DC, Maryland, and Virginia



**Table S2. Characteristics of Participants in the African American Male Wellness Walk by Health Insurance Status.**

Baseline Characteristics*	Health Insurance Status						p-value
	Uninsured n=134	Medicaid n=100	Medicare n=186	Private n=869	Combination n=30	Did Not Answer n=125	
Age (years)	43 (13)	46 (15)	57 (17)	47 (12)	68 (10)	47 (13)	p<0.0001
Systolic Blood Pressure (mmHg)	137 (18)	133 (19)	142 (21)	140 (18)	142 (21)	142 (20)	p=0.0002
Diastolic Blood Pressure (mmHg)	86 (13)	83 (13)	86 (13)	88 (13)	87 (16)	87 (14)	p=0.0576
Blood Glucose: Fasting (mg/dL)	109 (42)	104 (31)	105 (33)	102 (32)	156 (168)	112 (73)	p=0.0054
Blood Glucose: Non-Fasting (mg/dL)	110 (46)	113 (45)	113 (40)	111 (43)	117 (43)	107 (32)	p=0.9261
Cholesterol	163 (40)	160 (40)	156 (44)	159 (41)	156 (43)	159 (42)	p=0.8022
Body Mass Index (kilograms/meter <sup>2</sup> )	30 (8)	28 (5)	29 (6)	31 (6)	30 (6)	30 (6)	p=0.0001
Blood Pressure Medication (%)	13	23	41	25	67	26	p<0.0001
Diabetes Medication (%)	5	7	17	9	17	6	p=0.0008
Cholesterol Medication (%)	7	12	24	11	43	10	p<0.0001
Fasting Status (%)	37	40	37	43	30	36	p=0.2274
Ideal AHA Smoking (%) <sup>†</sup>	66	80	77	90	90	87	p<0.0001
Ideal AHA Physical Activity (%) <sup>†</sup>	61	56	59	61	60	62	p=0.9518
Ideal AHA Blood Pressure (%) <sup>†</sup>	10	17	8	7	0.0	7	p=0.0062
Ideal AHA Glucose (%) <sup>†</sup>	71	66	64	68	60	66	p=0.9676
Ideal AHA Body mass index (%) <sup>†</sup>	22	27	20	13	13	19	p=0.0008
Ideal AHA Cholesterol (%) <sup>†</sup>	78	73	63	75	43	75	p<0.0001
Ideal Cardiovascular Health <sup>‡</sup>							p<0.0001
0-2 Metrics	31	29	39	25	50	28	
3-4 Metrics	58	58	52.5	69	50	64	
5-6 Metrics	11	13	8.5	6	0	8	

AHA = American Heart Association

\* Mean (SD) or percentages are listed, p-values calculated using chi-square or Fisher's exact (categorical variables), and ANOVA (parametric continuous variables)

<sup>†</sup> AHA Ideal Cardiovascular Health recommendations were defined by AHA "2020" guidelines with the following modifications. Physical activity was considered ideal if participant exercised  $\geq 3$  times per week. Glucose was defined using standard fasting glucose guidelines and random glucose guidelines < 140 ideal, 140-180 intermediate and  $\geq 180$  "poor"

<sup>‡</sup> Ideal Cardiovascular Health: 0-2 n=411, 3-4 n=926, 5-6 n=107

**Table S3. Characteristics of Participants in the African American Male Wellness Walk by Educational Attainment.**

Baseline Characteristics*	Educational Status						p-value
	High School or Less n=324	Some College n=272	Completed College n=482	Professional Degree n=220	Other Educational Degree n=57	Did Not Answer n=89	
Age (years)	48 (16)	49 (14)	47 (14)	48 (13)	51 (14)	50 (13)	p=0.1395
Systolic Blood Pressure (mmHg)	139 (20)	140 (19)	140 (20)	141 (18)	142 (16)	139 (18)	p=0.8894
Diastolic Blood Pressure (mmHg)	86 (13)	88 (13)	86 (14)	88 (13)	88 (11)	87 (14)	p=0.3456
Blood Glucose: Fasting (mg/dL)	110 (67)	101 (25)	106 (37)	98 (23)	109 (42)	103 (36)	p=0.3234
Blood Glucose: Non-Fasting (mg/dL)	113 (39)	117 (57)	107 (35)	109 (34)	115 (57)	114 (37)	p=0.1945
Cholesterol	156 (41)	160 (44)	159 (39)	165 (41)	150 (50)	155 (38)	p=0.0527
Body Mass Index (kilograms/meter <sup>2</sup> )	30 (7)	30 (6)	31 (6)	31 (6)	31 (7)	29 (6)	p=0.2117
Blood Pressure Medication (%)	24	28	30	28	30	16	p=0.0802
Diabetes Medication (%)	10	10	10	7	14	6	p=0.4673
Cholesterol Medication (%)	12	17	12	13	21	10	p=0.1107
Fasting Status (%)	42	40	38	44	44	46	p=0.5768
Ideal AHA Smoking (%) <sup>†</sup>	78	84	87	94	81	84	p<0.0001
Ideal AHA Physical Activity (%) <sup>†</sup>	58	53	66	61	54	57	p=0.0100
Ideal AHA Blood Pressure (%) <sup>†</sup>	9	7	9	5	2	9	p=0.3242
Ideal AHA Glucose (%) <sup>†</sup>	67	65	69	70	58	65	p=0.4984
Ideal AHA Body mass index (%) <sup>†</sup>	23	16	13	13	11	18	p=0.0070
Ideal AHA Cholesterol (%) <sup>†</sup>	76	68	76	69	70	78	p=0.3730
Ideal Cardiovascular Health <sup>‡</sup>							p=0.3411
0-2 Metrics	30	33	24.5	27	37	29	
3-4 Metrics	63	60	67.5	65	61	63	
5-6 Metrics	7	7	8	8	2	8	

AHA = American Heart Association

\* Mean (SD) or percentages are listed, p-values calculated using chi-square or Fisher's exact (categorical variables), and ANOVA (parametric continuous variables)

<sup>†</sup>AHA Ideal Cardiovascular Health recommendations were defined by AHA "2020" guidelines with the following modifications. Physical activity was considered ideal if participant exercised ≥ 3 times per week. Glucose was defined using standard fasting glucose guidelines and random glucose guidelines < 140 ideal, 140-180 intermediate and ≥ 180 "poor"

<sup>‡</sup> Ideal Cardiovascular Health: 0-2 n=411, 3-4 n=926, 5-6 n=107

**Table S4. Characteristics of Participants in the African American Male Wellness Walk by Employment Status.**

Baseline Characteristics*	Employment Status					p-value
	Employed n=719	Unemployed n=63	Student n=44	Retired n=168	Did Not Answer n=450	
Age (years)	45 (12)	48 (14)	37 (16)	66 (8)	48 (13)	p<0.0001
Systolic Blood Pressure (mmHg)	140 (18)	136 (22)	131 (18)	142 (20)	141 (20)	p=0.0021
Diastolic Blood Pressure (mmHg)	87 (13)	87 (17)	80 (14)	86 (13)	87 (13)	p=0.0102
Blood Glucose: Fasting (mg/dL)	102 (30)	102 (33)	100 (25)	111 (68)	108 (50)	p=0.3733
Blood Glucose: Non-Fasting (mg/dL)	109 (40)	110 (49)	107 (30)	121 (47)	112 (43)	p=0.1546
Cholesterol	157 (40)	155 (38)	156 (54)	155 (44)	164 (41)	p=0.0379
Body Mass Index (kilograms/meter <sup>2</sup> )	31 (6)	31 (9)	29 (7)	30 (5)	30 (6)	p=0.0338
Blood Pressure Medication (%)	22	21	18	47	29	p<0.0001
Diabetes Medication (%)	8	10	5	15	10	p=0.0202
Cholesterol Medication (%)	9	14	9	35	13	p<0.0001
Fasting Status (%)	41	46	32	40	41	p=0.7008
Ideal AHA Smoking (%) <sup>†</sup>	85	76	77	91	85	p=0.0295
Ideal AHA Physical Activity (%) <sup>†</sup>	61	44	59	55	64	p=0.0353
Ideal AHA Blood Pressure (%) <sup>†</sup>	7	16	20	4	8	p=0.0010
Ideal AHA Glucose (%) <sup>†</sup>	69	63	80	57	68	p=0.0843
Ideal AHA Body mass index (%) <sup>†</sup>	15	25	27	14	17	p=0.0602
Ideal AHA Cholesterol (%) <sup>†</sup>	79	76	77	53	71	p<0.0001
Ideal Cardiovascular Health <sup>‡</sup>						p<0.0001
0-2 Metrics	26	33	30	42	26	
3-4 Metrics	66	57	45	53	68	
5-6 Metrics	8	10	25	5	6	

AHA = American Heart Association

\* Mean (SD) or percentages are listed, p-values calculated using chi-square or Fisher's exact (categorical variables), and ANOVA (parametric continuous variables)

<sup>†</sup> AHA Ideal Cardiovascular Health recommendations were defined by AHA "2020" guidelines with the following modifications. Physical activity was considered ideal if participant exercised  $\geq 3$  times per week. Glucose was defined using standard fasting glucose guidelines and random glucose guidelines < 140 ideal, 140-180 intermediate and  $\geq 180$  "poor"

<sup>‡</sup> Ideal Cardiovascular Health: 0-2 n=411, 3-4 n=926, 5-6 n=107

**Table S5. Characteristics of Participants in the African American Male Wellness Walk by Annual Income Status.**

Baseline Characteristics*	Income Status					p-value
	≥\$75,000 n=274	\$50,000- \$74,999 n=294	\$20,000- \$49,999 n=292	<\$20,000 n=52	Did Not Answer n=532	
Age (years)	49 (11)	48 (13)	46 (15)	47 (20)	49 (15)	p=0.1055
Systolic Blood Pressure (mmHg)	140 (18)	142 (18)	139 (20)	135 (19)	139 (20)	p=0.0688
Diastolic Blood Pressure (mmHg)	88 (13)	88 (13)	87 (12)	85 (15)	86 (14)	p=0.0144
Blood Glucose: Fasting (mg/dL)	98 (22)	105 (37)	107 (41)	124 (117)	105 (43)	p=0.1092
Blood Glucose: Non-Fasting (mg/dL)	107 (35)	112 (41)	117 (47)	117 (40)	109 (42)	p=0.2005
Cholesterol	163 (41)	161 (45)	160 (40)	149 (42)	156 (39)	p=0.0527
Body Mass Index (kilograms/meter <sup>2</sup> )	31 (6)	31 (6)	30 (7)	28 (7)	30 (6)	p=0.0202
Blood Pressure Medication (%)	27	27	27	25	27	p=0.9971
Diabetes Medication (%)	7	10	11	19	9	p=0.0484
Cholesterol Medication (%)	12	12	12	19	14	p=0.6274
Fasting Status (%)	47	41	40	38	38	p=0.1899
Ideal AHA Smoking (%) <sup>†</sup>	92	88	83	63	83	p<0.0001
Ideal AHA Physical Activity (%) <sup>†</sup>	63	60	59	48	61	p=0.3943
Ideal AHA Blood Pressure (%) <sup>†</sup>	5	4	11	10	9	p=0.0161
Ideal AHA Glucose (%) <sup>†</sup>	71	68	63	63	68	p=0.4125
Ideal AHA Body mass index (%) <sup>†</sup>	11	11	20	38	17	p<0.0001
Ideal AHA Cholesterol (%) <sup>†</sup>	71	75	76	71	72	p=0.4573
Ideal Cardiovascular Health <sup>‡</sup>						p=0.0005
0-2 Metrics	27	26	28	40	29	
3-4 Metrics	67	71	61	44	63	
5-6 Metrics	6	3	11	16	8	

AHA = American Heart Association

\* Mean (SD) or percentages are listed, p-values calculated using chi-square or Fisher's exact (categorical variables), and ANOVA (parametric continuous variables)

<sup>†</sup> AHA Ideal Cardiovascular Health recommendations were defined by AHA "2020" guidelines with the following modifications. Physical activity was considered ideal if participant exercised ≥ 3 times per week. Glucose was defined using standard fasting glucose guidelines and random glucose guidelines < 140 ideal, 140-180 intermediate and ≥ 180 "poor"

<sup>‡</sup> Ideal Cardiovascular Health: 0-2 n=411, 3-4 n=926, 5-6 n=107



**Table S6. Characteristics of Participants in the African American Male Wellness Walk by Missingness of Socioeconomic Status Characteristics.**

Baseline Characteristics*	Number of Missing Socioeconomic Status Characteristics					p-value <sup>a</sup>
	0 n=588	1 n=544	2 n=266	3 n=34	4 n=2	
Age (years)	48 (14)	48 (14)	48 (14)	57 (11)	52(16)	p=0.9695
Systolic Blood Pressure (mmHg)	140 (19)	140 (20)	141 (18)	142 (26)	137 (4)	p=0.8749
Diastolic Blood Pressure (mmHg)	88 (13)	85 (13)	88 (13)	88 (18)	78 (4)	p=0.0132
Blood Glucose: Fasting (mg/dL)	104 (42)	103 (39)	104 (30)	135 (120)	111 (n/a)	p=0.1197
Blood Glucose: Non-Fasting (mg/dL)	115 (43)	107 (40)	111 (42)	115 (36)	166 (n/a)	p=0.1464
Cholesterol	159 (43)	159 (41)	157 (38)	166 (46)	202 (37)	p=0.4314
Body Mass Index (kilograms/meter <sup>2</sup> )	31 (6)	30 (6)	30 (6)	28 (5)	30 (6)	p=0.0526
Blood Pressure Medication (%)	27	27	25	35	0	p=0.6545
Diabetes Medication (%)	10	10	9	6	0	p=0.8993
Cholesterol Medication (%)	13	15	12	6	0	p=0.4152
Fasting Status (%)	43	40	39	49	50	p=0.7759
Ideal AHA Smoking (%) <sup>†</sup>	86	85	83	79	100	p=0.7486
Ideal AHA Physical Activity (%) <sup>†</sup>	58	61	63	56	50	p=0.6025
Ideal AHA Blood Pressure (%) <sup>†</sup>	7	8	8	15	0	p=0.1227
Ideal AHA Glucose (%) <sup>†</sup>	65	71	67	62	0	p=0.1576
Ideal AHA Body mass index (%) <sup>†</sup>	14	18	16	21	0	p=0.2030
Ideal AHA Cholesterol (%) <sup>†</sup>	75	70	75	71	50	p=0.0918
Ideal Cardiovascular Health <sup>‡</sup>						p=0.4718
0-2 Metrics	30	26	29	26	100	
3-4 Metrics	63	66	64	68	0	
5-6 Metrics	7	8	7	6	0	
Location <sup>§</sup>						p=0.0278
Ohio	89	82	83	82	100	
North Carolina	8	12	9	3	0	
Washington State	1	2	3	6	0	
DMV	2	3	4	9	0	
Other States	0	1	1	0	0	

AHA = American Heart Association; DMV = Washington DC, Maryland, and Virginia

\* Mean (SD) or percentages are listed, p-values calculated using chi-square or Fisher's exact (categorical variables), and ANOVA (parametric continuous variables)

<sup>†</sup> AHA Ideal Cardiovascular Health recommendations were defined by AHA “2020” guidelines with the following modifications. Physical activity was considered ideal if participant exercised  $\geq 3$  times per week. Glucose was defined using standard fasting glucose guidelines and random glucose guidelines  $< 140$  ideal, 140-180 intermediate and  $\geq 180$  “poor”

<sup>‡</sup> Ideal Cardiovascular Health: 0-2 n=411, 3-4 n=926, 5-6 n=107

<sup>§</sup> Location: Ohio n=1234, North Carolina n=139, Washington State n=25, Other State n=7, Washington DC, Maryland, and Virginia, n=39.

**Table S7. Characteristics of Participants in the African American Male Wellness Walk by Ideal Cardiovascular Health Score 2017-2019 in the Complete Case Cohort (n=588).**

Baseline Characteristics*	All n=588	0-2 Ideal CV Health Score n=177	3-4 Ideal CV Health Score n=369	5-6 Ideal CV Health Score n=42	p-value <sup>a</sup>
Age (years)	48 (14)	51 (13)	48 (13)	39 (17)	p<0.0001
Insurance Status (%) <sup>†</sup>					p=0.0123
Uninsured	9	11	7	14	
Medicaid	7	8	7	7	
Medicare	12	16	9	22	
Private Insurance	69	61	75	57	
Combination	3	4	2	0	
Education (%) <sup>‡</sup>					p=0.2171
High School or Less	20	25	18	14	
Some College	19	20	18	21	
Completed College	35	29	38	41	
Professional Degree	19	17	20	21	
Other	7	9	6	3	
Occupation (%) <sup>§</sup>					p=0.0017
Student	3	3	2	9	
Unemployed	5	7	3	5	
Employed	78	70	83	74	
Retired	14	20	12	12	
Income (%) <sup>  </sup>					p=0.0003
≥\$75,000	29	28	30	26	
\$50,000- \$74,999	32	29	36	10	
\$20,000- \$49,999	32	32	30	50	
<\$20,000	7	11	4	14	
Systolic Blood Pressure (mmHg)	140 (19)	144 (19)	140 (18)	122 (15)	p<0.0001
Diastolic Blood Pressure (mmHg)	88 (13)	91 (12)	88 (13)	76 (9)	p<0.0001
Blood Glucose: Fasting (mg/dL)	104 (42)	122 (56)	95 (26)	79 (15)	p<0.0001
Blood Glucose: Non-Fasting (mg/dL)	115 (43)	148 (58)	105 (31)	96 (23)	p<0.0001
Cholesterol	159 (43)	169 (52)	155 (38)	143 (29)	p<0.0001
Body Mass Index (kilograms/meter <sup>2</sup> )	31 (6)	33 (7)	30 (5)	25 (4)	p<0.0001
Blood Pressure Medication (%)	27	42	22	0	p<0.0001
Diabetes Medication (%)	10	24	4	0	p<0.0001
Cholesterol Medication (%)	13	33	4	0	p<0.0001
Fasting Status (%)	43	53	40	21	p=0.0002

Ideal AHA Smoking (%) <sup>#</sup>	86	73	91	95	p<0.0001
Ideal AHA Physical Activity (%) <sup>#</sup>	58	27	69	95	p<0.0001
Ideal AHA Blood Pressure (%) <sup>#</sup>	7	0	5	48	p<0.0001
Ideal AHA Glucose (%) <sup>#</sup>	65	24	81	98	p<0.0001
Ideal AHA Body mass index (%) <sup>#</sup>	14	2	12	74	p<0.0001
Ideal AHA Cholesterol (%) <sup>#</sup>	75	44	88	100	p<0.0001

Analytic cohort limited to only those who had values for all 4 Socioeconomic status variables (education, employment status, health insurance, and income)

AHA = American Heart Association; CV = Cardiovascular

\* Mean (SD) or percentages are listed, p-values calculated using chi-square or Fisher's exact (categorical variables), and ANOVA (parametric continuous variables)

<sup>†</sup> Health Insurance: No Insurance n=51, Medicaid n=41, Medicare n=71, Private Insurance n=409, Combination n=16

<sup>‡</sup> Education: High School or Less n=117, Some College n=113, Completed College n=207, Professional Degree n=113, Other n=38

<sup>§</sup> Occupation: Employed n=460, Unemployed n=27, Student n=16, Retired n=85

<sup>||</sup> Income: ≥\$75,000 n=171, \$50,000 – 74,999 n=186, \$20,000 – 49,999 n=189, <\$20,000 n=42

<sup>#</sup> AHA Ideal Cardiovascular Health recommendations were defined by AHA "2020" guidelines with the following modifications. Physical activity was considered ideal if participant exercised ≥ 3 times per week. Glucose was defined using standard fasting glucose guidelines and random glucose guidelines < 140 ideal, 140-180 intermediate and ≥ 180 "poor"

**Table S8. The Association of Location with Ideal Cardiovascular Health.**

Multinomial Logistic Regression	5-6 vs. 0-2 ICH Components, Odds Ratio (95% CI), p-value	3-4 vs. 0-2 ICH Components, Odds Ratio (95% CI), p-value
Ohio	Referent	Referent
DMV	1.00 (0.20, 5.09), p=0.998	2.01 (0.83, 4.89), p=0.123
North Carolina	1.61 (0.83, 3.13), p=0.160	1.10 (0.73, 1.66), p=0.660
Washington	0.53 (0.07, 4.32), p=0.554	0.78 (0.33, 1.80), p=0.553
Other	1.60 (0.15, 16.59), p=0.695	0.37 (0.06, 2.25), p=0.277

Total cohort is 1444

DMV – Washington DC, Maryland, and Virginia

ICH – Ideal Cardiovascular Health

**Table S9. The Association of Educational Attainment, Employment Status, Health Insurance Status, and Annual Income with Ideal Cardiovascular Health among Participants with Data for all Socioeconomic Status Characteristics (n=588)\*.**

Multinomial Logistic Regression	5-6 vs. 0-2 ICH Components, Odds Ratio (95% CI), p-value	3-4 vs. 0-2 ICH Components, Odds Ratio (95% CI), p-value
Educational Attainment <sup>†</sup>		
High School or Less	Referent	Referent
Some College	1.99 (0.63, 6.34), p=0.242	1.25 (0.72, 2.19), p=0.432
Completed College	2.46 (0.87, 6.97), p=0.091	<b>1.78 (1.08, 2.93), p=0.025</b>
Professional Degree	2.39 (0.75, 7.66), p=0.142	1.61 (0.91, 2.85), p=0.105
Other	0.46 (0.05, 4.26), p=0.495	0.85 (0.40, 1.81), p=0.671
Employment Status <sup>‡</sup>		
Employed	Referent	Referent
Unemployed	0.55 (0.11, 2.75), p=0.470	<b>0.38 (0.17, 0.86), p=0.020</b>
Student	1.37 (0.31, 6.10), p=0.681	0.38 (0.12, 1.20), p=0.098
Retired	<b>4.02 (1.05, 15.39), p=0.042</b>	0.72 (0.40, 1.29), p=0.266
Health Insurance Status <sup>§</sup>		
Private Insurance	Referent	Referent
Medicaid	0.75 (0.19, 2.94), p=0.680	0.65 (0.32, 1.31), p=0.228
Medicare	<b>3.04 (1.16, 7.99), p=0.024</b>	0.57 (0.32, 1.03), p=0.062
No Insurance	1.06 (0.37, 3.05), p=0.909	<b>0.50 (0.26, 0.95), p=0.033</b>
Combination	N/A	0.60 (0.21, 1.77), p=0.358
Annual Income <sup>  </sup>		
≥ \$75,000	Referent	Referent
\$50,000 – \$74,999	<b>0.26 (0.08, 0.90), p=0.033</b>	1.07 (0.67, 1.72), p=0.771
\$20,000 – \$49,999	1.18 (0.50, 2.78), p=0.713	0.82 (0.51, 1.31), p=0.402
< \$20,000	1.08 (0.32, 3.62), p=0.907	<b>0.37 (0.18, 0.78), p=0.009</b>

Model: adjusted for age



## ICH – Ideal Cardiovascular Health

\* The outcome (ideal cardiovascular health score) included blood pressure, glucose, cholesterol, body mass index, smoking, physical activity

<sup>b</sup> Educational Attainment: High School or Less n=117, Some College n=113, Completed College n=207, Professional Degree n=113, Other n=38

Example Interpretation: Completing college compared to high school education or less was associated with 38% higher odds of attaining 5-6 ideal metrics compared to 3-4, which was non-significant with a p-value of 0.522

Completing college compared to high school education or less was associated with 146% higher odds of attaining 5-6 ideal metrics compared to 0-2, which was non-significant with a p-value of 0.091

Completing college compared to high school education or less was associated with 78% higher odds of attaining 3-4 ideal metrics compared to 0-2, which was significant with a p-value of 0.025

<sup>‡</sup> Employment Status: Employed n=460, Unemployed n=27, Student n=16, Retired n=85

Example Interpretation: Retired status compared to employed status was associated with 460% higher odds of attaining 5-6 ideal metrics compared to 3-4, which was significant with a p-value of 0.010

Retired status compared to employed status was associated with 302% higher odds of attaining 5-6 ideal metrics compared to 0-2, which was significant with a p-value of 0.042

Unemployed status compared to employed status was associated with 62% lower odds of attaining 3-4 ideal metrics compared to 0-2, which was significant with a p-value of 0.020

<sup>§</sup> Health Insurance Status: No Insurance n=51, Medicaid n=41, Medicare n=71, Private Insurance n=409, Combination n=16

Example Interpretation: Medicare compared to private insurance was associated with 204% higher odds of attaining 5-6 ideal metrics compared to 0-2, which was significant with a p-value of 0.024

<sup>||</sup> Annual Income: ≥\$75,000 n=171, \$50,000 – 74,999 n=186, \$20,000 – 49,999 n=189, <\$20,000 n=42

Example Interpretation: Annual income < \$50,000-\$74,999 compared to ≥\$75,000 was associated with 74% lower odds of attaining 5-6 ideal metrics compared to 0-2, which was significant with a p-value of 0.033

**Table S10. The Association of Educational Attainment, Employment Status, Health Insurance Status, and Annual Income with Ideal Cardiovascular Health excluding participants missing data for each specific Socioeconomic Status Characteristic in that Category Alone<sup>\*,†</sup>**

Multinomial Logistic Regression	5-6 vs. 0-2 ICH Components, Odds Ratio (95% CI), p-value	3-4 vs. 0-2 ICH Components, Odds Ratio (95% CI), p-value
Educational Attainment <sup>‡</sup>		
High School or Less	Referent	Referent
Some College	0.90 (0.45, 1.79), p=0.753	0.87 (0.61, 1.24), p=0.443
Completed College	1.34 (0.74, 2.42), p=0.332	1.27 (0.92, 1.75), p=0.153
Professional Degree	1.33 (0.66, 2.71), p=0.428	1.11 (0.75, 1.64), p=0.595
Other	0.23 (0.03, 1.79), p=0.159	0.82 (0.45, 1.49), p=0.509
Employment Status <sup>§</sup>		
Employed	Referent	Referent
Unemployed	1.15 (0.42, 3.06), p=0.786	0.72 (0.41, 1.07), p=0.257
Student	1.78 (0.71, 4.47), p=0.220	0.54 (0.26, 1.13), p=0.101
Retired	1.67 (0.71, 4.47), p=0.268	0.71 (0.46, 1.08), p=0.110
Health Insurance Status <sup>  </sup>		
Private Insurance	Referent	Referent
Medicaid	1.69 (0.81, 3.53), p=0.164	0.73 (0.45, 1.17), p=0.188
Medicare	1.43 (0.75, 2.72), p=0.282	<b>0.60 (0.42, 0.86), p=0.005</b>
No Insurance	1.25 (0.63, 2.45), p=0.526	<b>0.65 (0.43, 0.99), p=0.043</b>
Combination	N/A	0.61 (0.29, 1.30), p=0.201
Annual Income <sup>#</sup>		
≥\$75,000	Referent	Referent
\$50,000 – \$74,999	<b>0.39 (0.16, 0.99), p=0.046</b>	1.08 (0.74, 1.57), p=0.695
\$20,000 – \$49,999	1.25 (0.62, 2.49), p=0.534	0.84 (0.57, 1.22), p=0.352
<\$20,000	1.17 (0.41, 3.36), p=0.765	<b>0.45 (0.23, 0.86), p=0.016</b>

Model: adjusted for age

## ICH – Ideal Cardiovascular Health

\* The outcome (ideal cardiovascular health score) included blood pressure, glucose, cholesterol, body mass index, smoking, physical activity

<sup>†</sup> Missing values for each specific socioeconomic status measure were taken out for the respective analysis

<sup>‡</sup> Education: Education analyses included 1,355 individuals after excluding 89 individuals missing data on education. High School or Less n=324, Some College n=272, Completed College n=482, Professional Degree n=220, Other n=57

Example Interpretation: Completing college compared to high school education or less was associated with 34% higher odds of attaining 5-6 ideal metrics compared to 0-2, which was non-significant with a p-value of 0.332

<sup>§</sup> Employment Status: Employment status analyses included 994 individuals after excluding 450 individuals missing data on employment status. Employed n=719, Unemployed n=63, Student n=44, Retired n=168

Example Interpretation: Student status compared to employed status was associated with 78% higher odds of attaining 5-6 ideal metrics compared to 0-2, which was non-significant with a p-value of 0.220

Student status compared to employed status was associated with 46% lower odds of attaining 3-4 ideal metrics compared to 0-2, which was non-significant with a p-value of 0.101

<sup>||</sup> Health Insurance Status: Insurance analyses included 1,319 individuals after excluding 125 individuals missing data on insurance. No Insurance n=134, Medicaid n=100, Medicare n=186, Private Insurance n=869, Combination n=30

Example Interpretation: Medicare compared to private insurance was associated with 43% higher odds of attaining 5-6 ideal metrics compared to 0-2, which was non-significant with a p-value of 0.282

Medicare compared to private insurance was associated with 40% lower odds of attaining 3-4 ideal metrics compared to 0-2, which was significant with a p-value of 0.005

<sup>#</sup> Annual Income: Annual income analyses included 912 individuals after excluding 532 individuals missing data on annual income. Annual income  $\geq$ \$75,000 n=274, \$50,000 – 74,999 n=294, \$20,000 – 49,999 n=292,  $<$ \$20,000 n=52

Example Interpretation: Annual income \$50,000-\$74,999 compared to  $\geq$ \$75,000 was associated with 61% lower odds of attaining 5-6 ideal metrics compared to 0-2, which was significant with a p-value of 0.046

Annual income  $<$ \$20,000 compared to  $\geq$ \$75,000 was associated with 55% lower odds of attaining 3-4 ideal metrics compared to 0-2, which was significant with a p-value of 0.016

**Table S11. The Association of Educational Attainment, Employment Status, Health Insurance Status, and Annual Income with Ideal Cardiovascular Health with all Socioeconomic Status Measures in the Model (n=1444)\***

Multinomial Logistic Regression	5-6 vs. 0-2 ICH Components, Odds Ratio (95% CI), p-value	3-4 vs. 0-2 ICH Components, Odds Ratio (95% CI), p-value
Educational Attainment <sup>†</sup>		
High School or Less	Referent	Referent
Some College	0.97 (0.48, 1.98), p=0.943	0.80 (0.55, 1.15), p=0.223
Completed College	1.78 (0.94, 3.34), p=0.075	1.11 (0.79, 1.56), p=0.550
Professional Degree	2.15 (0.98, 4.74), p=0.057	0.93 (0.61, 1.42), p=0.741
Other	0.27 (0.03, 2.18), p=0.219	0.77 (0.41, 1.42), p=0.402
Did Not Answer	1.56 (0.57, 4.30), p=0.387	0.97 (0.56, 1.67), p=0.901
Employment Status <sup>‡</sup>		
Employed	Referent	Referent
Unemployed	1.07 (0.38, 3.01), p=0.905	0.86 (0.47, 1.55), p=0.608
Student	2.06 (0.79, 5.37), p=0.138	0.62 (0.30, 1.30), p=0.207
Retired	1.49 (0.59, 3.73), p=0.396	0.90 (0.58, 1.39), p=0.637
Did Not Answer	0.86 (0.50, 1.49), p=0.587	1.12 (0.84, 1.49), p=0.453
Health Insurance Status <sup>§</sup>		
Private Insurance	Referent	Referent
Medicaid	1.73 (0.80, 3.76), p=0.165	0.79 (0.49, 1.30), p=0.359
Medicare	1.33 (0.66, 2.68), p=0.429	<b>0.67 (0.45, 0.98), p=0.039</b>
No Insurance	1.23 (0.59, 2.54), p=0.582	0.72 (0.47, 1.11), p=0.137
Combination	N/A	0.70 (0.32, 1.54), p=0.371
Did Not Answer	1.07 (0.49, 2.36), p=0.866	0.86 (0.56, 1.33), p=0.495
Annual Income <sup>  </sup>		
≥\$75,000	Referent	Referent
\$50,000 – \$74,999	0.50 (0.20, 1.25), p=0.139	1.11 (0.76, 1.64), p=0.593
\$20,000 – \$49,999	1.63 (0.78, 3.40), p=0.190	0.91 (0.61, 1.35), p=0.628

<\$20,000	1.54 (0.50, 4.77), p=0.455	0.61 (0.30, 1.24), p=0.170
Did Not Answer	1.20 (0.60, 2.38), p=0.609	0.95 (0.67, 1.36), p=0.794

Model: age + education + employment + insurance + income (SES measures together with age in the model)

The table includes the “Did Not Answer” responses.

ICH = ideal cardiovascular health

\* The outcome (ideal cardiovascular health score) included blood pressure, glucose, cholesterol, body mass index, smoking, physical activity

† Education: High School or Less n=324, Some College n=272, Completed College n=482, Professional Degree n=220, Other n=57, Did Not Answer n=89

Example Interpretation: Completing college compared to high school education or less was associated with 78% higher odds of attaining 5-6 ideal metrics compared 0-2, which was non-significant with a p-value of 0.075

‡ Employment Status: Employed n=719, Unemployed n=63, Student n=44, Retired n=168, Missing/Did Not Answer n=450

Example Interpretation: Student status compared to employed status was associated with 38% lower odds of attaining 3-4 ideal metrics compared to 0-2, which was non-significant with a p-value of 0.207

§ Health Insurance Status: No Insurance n=134, Medicaid n=100, Medicare n=186, Private Insurance n=869, Combination n=30, Did Not Answer n=125

Example Interpretation: Medicare compared to private insurance was associated with 33% higher odds of attaining 5-6 ideal metrics compared to 0-2, which was non-significant with a p-value of 0.429

Medicare compared to private insurance was associated with 33% lower odds of attaining 3-4 ideal metrics compared to 0-2, which was significant with a p-value of 0.039

|| Annual Income: ≥\$75,000 n=274, \$50,000 – 74,999 n=294, \$20,000 – 49,999 n=292, <\$20,000 n=52, Did Not Answer n=532

Example Interpretation: Annual income \$20,000-\$49,999 compared to ≥\$75,000 was associated with 63% higher odds of attaining 5-6 ideal metrics compared to 0-2, which was non-significant with a p-value of 0.190

**Table S12. Type III Analysis of The Effect of Educational Attainment, Employment Status, Health Insurance Status, and Annual Income on Ideal Cardiovascular Health.**

Type III Analysis of Effect			
Effect	Degrees of Freedom	Wald Chi-square	p-value
Educational Attainment	5	6.9322	0.2257
Employment Status	4	1.5577	0.8164
Health Insurance Status	5	1.7180	0.8866
Annual Income	4	0.6989	0.9515

Model: age + education + employment + insurance + income (socioeconomic status measures together with age in the model)

A p-value > 0.05 indicate that the corresponding socioeconomic status measure has no effect on Ideal Cardiovascular Health given the other socioeconomic status measures in the model. In other words, the socioeconomic status measure does not significantly improve the model fit.



**Table S13. The Association of Educational Attainment, Employment Status, Health Insurance Status, and Annual Income with Ideal Cardiovascular Health among Participants with Data for all Socioeconomic Status Characteristics in the Model (n=588)\*.**

Multinomial Logistic Regression		
	5-6 vs. 0-2 ICH Components, Odds Ratio (95% CI), p-value	3-4 vs. 0-2 ICH Components, Odds Ratio (95% CI), p-value
Educational Attainment <sup>†</sup>		
High School or Less	Referent	Referent
Some College	2.73 (0.78, 9.54), p=0.117	1.08 (0.60, 1.95), p=0.788
Completed College	<b>3.97 (1.23, 12.76), p=0.021</b>	1.53 (0.89, 2.63), p=0.127
Professional Degree	<b>5.08 (1.23, 21.03), p=0.025</b>	1.26 (0.66, 2.42), p=0.489
Other	0.80 (0.08, 7.89), p=0.845	0.67 (0.31, 1.47), p=0.318
Employment Status <sup>‡</sup>		
	5-6 vs. 0-2 ICH Components	3-4 vs. 0-2 ICH Components
Employed	Referent	Referent
Unemployed	0.61 (0.11, 3.39), p=0.575	0.44 (0.19, 1.06), p=0.066
Student	1.73 (0.31, 9.62), p=0.529	0.50 (0.15, 1.66), p=0.256
Retired	3.00 (0.61, 14.82), p=0.178	0.95 (0.48, 1.86), p=0.872
Health Insurance Status <sup>§</sup>		
	5-6 vs. 0-2 ICH Components	3-4 vs. 0-2 ICH Components
Private Insurance	Referent	Referent
Medicaid	0.63 (0.15, 2.64), p=0.526	0.76 (0.36, 1.59), p=0.460
Medicare	2.17 (0.66, 7.11), p=0.203	0.65 (0.33, 1.27), p=0.210
No Insurance	0.99 (0.30, 3.25), p=0.987	0.64 (0.32, 1.27), p=0.206
Combination	N/A	0.67 (0.21, 2.10), p=0.488
Annual Income <sup>  </sup>		
	5-6 vs. 0-2 ICH Components	3-4 vs. 0-2 ICH Components
≥ \$75,000	Referent	Referent
\$50,000 – \$74,999	0.32 (0.09, 1.15), p=0.081	1.16 (0.70, 1.91), p=0.572
\$20,000 – \$49,999	1.66 (0.59, 4.74), p=0.340	1.01 (0.59, 1.73), p=0.978

< \$20,000	1.53 (0.32, 7.31), p=0.596	0.69 (0.29, 1.64), p=0.394
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Model: age + education + employment + insurance + income (socioeconomic status measures together with age in the model)

#### ICH – Ideal Cardiovascular Health

\* The outcome (ideal cardiovascular health score) included blood pressure, glucose, cholesterol, body mass index, smoking, physical activity

† Educational Attainment: High School or Less n=117, Some College n=113, Completed College n=207, Professional Degree n=113, Other n=38

Example Interpretation: Completing college compared to high school education or less was associated with 297% higher odds of attaining 5-6 ideal metrics compared to 0-2, which was significant with a p-value of 0.021

‡ Employment Status: Employed n=460, Unemployed n=27, Student n=16, Retired n=85

Example Interpretation: Retired status compared to employed status was associated with 5% lower odds of attaining 3-4 ideal metrics compared to 0-2, which was non-significant with a p-value of 0.872

§ Health Insurance Status: No Insurance n=51, Medicaid n=41, Medicare n=71, Private Insurance n=409, Combination n=16

Example Interpretation: Medicare compared to private insurance was associated with 117% higher odds of attaining 5-6 ideal metrics compared to 0-2, which was non-significant with a p-value of 0.203

|| Annual Income: ≥\$75,000 n=171, \$50,000 – 74,999 n=186, \$20,000 – 49,999 n=189, <\$20,000 n=42

Example Interpretation: Annual income \$50,000-\$74,999 compared to ≥\$75,000 was associated with 16% higher odds of attaining 3-4 ideal metrics compared to 0-2, which was non-significant with a p-value of 0.572