A Cross-Sectional Examination of 10-Year Atherosclerotic Cardiovascular Disease Risk Among US Firefighters by Age and Weight Status

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Objective: Examine atherosclerotic cardiovascular disease (ASCVD) risk scores by age and weight status in career firefighters. **Methods:** Medical examinations for firefighters more than or equal to 40 years ($n = 644$) were examined. ASCVD 10-year risk scores were calculated from sex- and race-specific equations and were reported by three age (40 to 44.9, 45 to 49.9, more than or equal to 50 years) and weight (normal, overweight, obese) categories. **Results:** Mean risk scores were 1.8%, 3.5%, and 6.2% for firefighters 40 to 44.9, 45 to 49.9, and more than or equal to 50 years, respectively. The association of weight status with increased ASCVD risk was higher ($P < 0.01$) among older firefighters, where risk was 0.8% (95% confidence interval [CI]: 0.6 to 1.1) and 2.3% (95% CI: 2.0 to 2.6) among normal versus obese 40 to 44.9 year olds, and 4.1% (95% CI: 3.1 to 5.3) and 7.8% (95% CI: 6.7 to 8.9) among normal versus obese more than or equal to 50 year olds. **Conclusions:** While firefighters cannot avoid aging, physicians should counsel firefighters with weight-maintenance or weight-loss advice to prevent and manage elevated ASCVD risk.

Keywords: atherosclerosis, cardiovascular disease, firefighters, occupational health

Although firefighters face multiple hazards, more than half of firefighter duty-related deaths each year are due to cardiovascular disease (CVD) events.[1–3] According to the National Fire Protection Association (NFPA), sudden cardiac death accounts for a higher proportion of duty-related deaths among older firefighters.[1] Both nonmodifiable (age, sex, family history) and modifiable risk factors (obesity, hypertension, dyslipidaemia, elevated

blood glucose, smoking, and low cardiopulmonary fitness level) affect coronary heart disease risk.[4]

Risk calculators combine risk factors to estimate the 10-year risk of a cardiovascular event for an individual. Though the Framingham Risk Calculator[5] has been used for years, it may not be appropriate in all populations.[6] The American College of Cardiology (ACC) and American Heart Association (AHA) jointly recommend a newer risk calculator based on the pooled cohort (PC) equations.[7] These equations provide sex- and race-specific estimates of 10-year risk of "hard" atherosclerotic cardiovascular disease (ASCVD) events (defined as nonfatal myocardial infarction, fatal coronary heart disease, and nonfatal or fatal stroke), that were developed using men and women 40 to 79 years of age.[7] The PC equations have been widely validated and are broadly useful for the general US clinical population.[8] NFPA 1582, Standard on Comprehensive Occupational Medical Program for Fire Departments,[9] now recommends calculating ASCVD risk score using the PC equation annually for firefighters 40 years of age and beyond. However, these risk scores remain understudied among firefighters, and it is unclear how occupational physicians can most powerfully use this data. We are aware of only one study to examine risk scores among firefighters. Li et al[10] examined 10-year ASCVD risk and its association with body fat percentage, metabolic syndrome, and physical fitness in a small sample of career firefighters in Colorado. Even in a small sample, they found that body fat percentage was independently associated with 10-year ASCVD risk[10] although body mass index (BMI) was not. While calculated risk scores have been developed and used in the civilian population, it is possible that calculated risk scores could underestimate the risk of on-duty ASCVD events among firefighters because of the multiple physiological stressors associated with firefighting. Research has shown clearly that the physiological and psychological stress of firefighting can trigger a sudden cardiac event in vulnerable individuals.[11]

There are numerous risk factors that impact cardiovascular health. Increasing age is a strong, independent predictor of CVD risk among the general population[12] and among firefighters.[2] Farioli et al[13] have reported the incidence of sudden cardiac death among male firefighters significantly increases with age. While aging cannot be halted, firefighters can focus on improving other modifiable risk factors to lessen the risk of ASCVD.

A large portion of the general population is obese, and obesity is associated with multiple cardiometabolic risk factors.[14,15] However, obesity may present a specific challenge in the fire service due to the reported high prevalence of obesity[16,17] and because firefighting activity can trigger a sudden cardiac event in vulnerable individuals.[18,19] Smith et al[20] recently reported that 29% of a large cohort of career firefighters were obese and that over a 5-year period firefighters gained an average of 2.5 kg. Those who gained weight also had worse changes in cardiovascular health metrics than those who maintained or lost weight.[21] Korre et al[22] found BMI to be the strongest and most consistent independent predictor of left ventricular (LV) mass, which, when elevated, is associated with increased

risk of CVD.[23] Soteriades et al[16] found that BMI was associated with a clustering of other major CVD risk factors. Despite concerning data about individual risk factors, little work has been done to characterize aggregate risk scores in this important occupational group. The purpose of the present investigation was to examine ASCVD risk scores in a large cohort of career firefighters from multiple departments in the United States and report risk scores by age and BMI category.

METHODS

Cross-sectional data are from occupational medical examinations from two clinics that conduct medical evaluations for firefighters; one clinic provided data on career firefighters from a countywide fire department in Northern Virginia, and the second clinic provided data from career firefighters from four city fire departments across Arizona. Medical evaluations, required annually, were performed in 2015 to 2016 in the Northern Virginia cohort and in 2018 in the Arizona cohort. Because the PC equation was developed using individuals aged 40 years and older, only firefighters aged 40 years and over were analyzed for this study. Two firefighters with implausible body weights (less than 30 lbs and more than 1700 lbs) were excluded. A total of 13 firefighters were not included in the final sample due to missing data ($n = 7$ ASCVD risk score; $n = 6$ body mass index). The final sample from Cohort 1 (Northern Virginia) consisted of 465 firefighters (420 men, 45 women) aged 40 years and over. The sample from Cohort 2 (AZ) consisted of 179 firefighters (171 men, 8 women) aged 40 and over. All firefighters included in analysis had a medical examination record with all the data necessary to calculate an ASCVD risk score (age, sex, race, blood pressure, medication usage, cholesterol levels, and diabetes status). Indicators of a prior ASCVD event were not available and therefore it was assumed that all firefighters in the dataset had not yet had a first hard ASCVD event. Data from a medical screening questionnaire, medical examination, and blood lab report were entered into a database by the clinic staff, and the de-identified dataset was transferred by the occupational clinic to researchers. The study protocol was reviewed and approved by the college Institutional Review Board.

The estimated 10-year risk of a first hard ASCVD event was calculated based on a weighted input from age, treated or untreated systolic blood pressure, total and HDL cholesterol levels, smoking status, and history of diabetes.[7] As recommended by the ACC and the AHA, risk scores were categorized into four risk categories according to 10-year risk of developing a first ASCVD event: low (less than 5%), borderline (5% to 7.5%), intermediate (more than or equal to 7.5% to less than 20%), and high risk (more than or equal to 20%).[24] To provide context for the potentially modifiable portion of the risk scores reported, firefighters in the dataset who had values that did not reach any threshold to be identified as having the risk factor (total cholesterol less than $200 \, \text{mg dL}^{-1}$; HDL cholesterol more than or equal to $40 \, \text{mg dL}^{-1}$ among men or more than or equal to $50 \, \text{mg dL}^{-1}$ among women; systolic blood pressure less than $120 \, \text{mmHg}$, not taking blood pressure medication, non-smoker, without history of diabetes) were identified and average risk scores were reported within each age category. Ten-year risk was defined as "the risk of developing a first ASCVD event, defined as nonfatal myocardial infarction or coronary heart disease death, or fatal or nonfatal stroke, over a 10-year period among people free from ASCVD at the beginning of the period."[7]

The medical evaluations were consistent with NFPA 1582 and included assessment of modifiable CVD risk factors.[9] The examinations included height and weight, recorded using a digital scale, and stadiometer. BMI was calculated as weight in kilograms divided by height (squared meters) and BMI classifications were based on Centers for Disease Control and Prevention cut points.[25] Firefighters were classified as normal (BMI = 18.5 to 24.9 kg/m^2), overweight (BMI = 25.0 to 29.9 kg/m^2), or obese (BMI more than or equal to 30 kg/m^2).[25]

Descriptive statistics were calculated within each of three age categories (40 to 44.9, 45 to 49.9, and more than or equal to 50 years of age). Distributions of ASCVD scores across the three age and BMI categories were reported as percentiles (5th to 95th). The mean ASCVD score for the firefighters without modifiable risk factors were predicted using separate linear regression models for each age category and included categorical variables for with/without modifiable risk factors (yes/no), sex (male/female), and Race/Ethnicity (White/African American-Black/Other) to ensure that the predicted values were based on a theoretical subgroup with the same demographics as the respective age category. For the statistical models focused on reporting statistical significance (linear regression and

TABLE 1. Descriptive Statistics of a US Firefighter Cohort by Age Category

| | Total | Age Category, yr | | |
		40–44	45–49	50+
n (%)	644 (100)	241 (37)	191 (30)	212 (33)
Age, yr	47.7 ± 5.2	42.6 ± 1.7	47.4 ± 1.1	53.8 ± 3.1
Male *n* (%)	591 (92)	216 (89)	178 (93)	197 (93)
White *n* (%)	504 (78)	183 (76)	154 (81)	167 (79)
African American/Black *n* (%)	84 (13)	31 (13)	23 (12)	30 (14)
Other *n* (%)	56 (8)	27 (11)	14 (7)	15 (7)
Height, m	1.8 ± 0.1	1.8 ± 0.1	1.8 ± 0.1	1.8 ± 0.1
Weight, kg	92.4 ± 15.2	92.0 ± 15.3	93.1 ± 15.3	92.1 ± 15.0
Body mass index, kg/m^2	29.2 ± 4.0	29.1 ± 4.1	29.5 ± 3.9	29.0 ± 4.0
Normal *n* (%)	87 (14)	36 (15)	21 (11)	30 (14)
Overweight *n* (%)	303 (47)	111 (46)	89 (47)	103 (49)
Obese *n* (%)	254 (39)	94 (39)	81 (42)	79 (37)
Pooled cohort risk score (%)*	3.7 ± 3.4	1.8 ± 1.3	3.5 ± 2.5	6.2 ± 4.1
<5% *n* (%)	494 (77)	232 (96)	164 (86)	98 (46)
≥5%–7.5% *n* (%)	91 (14)	9 (4)	18 (9)	64 (30)
≥7.5%–20% *n* (%)	54 (8)	0 (0)	9 (5)	45 (21)
≥20% *n* (%)	5 (1)	0 (0)	0 (0)	5 (2)

Values are means ± SD or *n* (%).
*10-year ASCVD risk based on PC algorithm published in 2013 ACC/AHA Guideline on the Assessment of Cardiovascular Risk.

TABLE 2. 10-Year Risk of ASCVD Among a Cohort of US Firefighters by Age Category

	Percentiles (10-year Risk of ASCVD)								
Age Category	5th	10th	25th	50th	75th	90th	95th	Mean (95% CI)	P for Trend*
40–44, yrs	0.4	0.6	1.0	1.5	2.4	3.4	4.5	1.8 (1.7–2.0)	
45–49, yrs	0.8	1.3	2.0	3.0	4.2	5.6	7.2	3.5 (3.1–3.8)	<0.001
≥50, yrs	2.0	2.5	3.6	5.2	7.1	10.5	15.0	6.2 (5.6–6.7)	

ASCVD, atherosclerotic cardiovascular disease.
*The trend was tested using a simple linear regression model with age categories modeled as a continuous variable.

ordered logit) rather than predicted values, the three age and BMI categories were modeled as continuous variables. These models were conducted with the intent to examine differences across groups and report generalized trends rather than estimating effect sizes. Separate simple linear regression models were used for age and BMI and a *P*-value for trend was reported to examine if ASCVD scores were higher in older age or higher BMI categories. Separate ordered logit cholesterol less than 200 mgdL models with ASCVD score categories (less than 5%, 5% to less than 7.5%, more than or equal to 7.5% to less than 20%, more than or equal to 20%) were conducted for age and BMI to determine if the likelihood of being in a higher ASCVD score category was higher among older firefighters or those in a higher BMI category. Percentages within a given ASCVD category were graphed using descriptive tabulations. A linear regression model and an ordered logit model that included age, BMI, and an interaction term were conducted to examine the interaction of age and BMI with respect to mean ASCVD risk scores and likelihood of being in a higher ASCVD risk category. Descriptive mean ASCVD risk scores and percentages within ASCVD risk categories along with 95% confidence intervals for each point estimate for each of the nine combinations of age and BMI category were reported. The level of significance for all analyses was considered at *P* < 0.05 and was two-sided for all tests. All analyses were conducted using Stata 15.1 (StataCorp, College Station, TX).

RESULTS

Participants were firefighters aged 40 to 69 years; 92.4 ± 15.2 kg. Demographic data for the combined sample ($n = 644$; 92% men) are reported in Table 1. The largest percentage of the sample was between 40 and 44.9 years ($n = 241$, 37%). About 8% of our sample were women, which is higher than the national average (4%) for career departments.[26,27] Most firefighters (78%) were white, which is similar to the national average (82%) in the fire service.[27] Only 15%, 11%, and 14%, of those aged 40 to 44.9, 45 to 49.9, and 50+ years, respectively, were in the normal weight category according to BMI (kg/m²). Almost 40% of the firefighters were categorized as obese according to BMI. The mean ASCVD risk score was 1.8% (SD = 1.3, low risk) for those aged 40 to 44.9 years, 3.5% (SD = 2.5, low risk) for 45 to 49.9 years, and 6.2% (SD = 4.1, borderline risk) for firefighters aged 50 years or beyond. The sample size and mean ASCVD scores of firefighters without modifiable risk factors that were part of the ASCVD risk score equation were ($n = 31$, 1.1%) among firefighters aged 40 to 44.9 years, ($n = 23$, 1.9%) among those 40 to 44.9 years, and ($n = 9$, 3.0%) among firefighters 50+ years. The distribution for the entire group (represented as percentiles) and the mean values of risk score were reported by age (Table 2) and BMI (Table 3) categories. The mean ASCVD risk scores were 2.2% (95% CI = 1.7 to 2.7), 3.3% (95% CI = 3.0 to 3.6), and 4.9% (95% CI = 4.3 to 5.2) for normal, overweight, and obese firefighters, respectively.

The results from the simple linear regression and ordered logit models showed that mean ASCVD scores and the likelihood of being in a higher ASCVD risk category were higher as age category (*P* < 0.001) and BMI category (*P* < 0.001) increased. The results of the linear regression model that included age, BMI, and an interaction term showed that the terms for age category (*P* < 0.001), BMI category (*P* = 0.001), and their interaction (*P* = 0.001) were all significant and additive with respect to mean ASCVD risk score. For the ordered logit model, the beta coefficients for age category and BMI category were independent, positive, and significant (*P* < 0.001). The beta coefficient for the interaction of age and BMI was negative (*P* = 0.006), indicating that the likelihood of being in a higher ASCVD risk category with increasing age and BMI was less than what would be expected if age and BMI were multiplicative when combined.

The majority of normal weight firefighters (88.5%, 95% CI = 79.8 to 93.8) were at low risk (less than 5%) of suffering 10-year ASCVD event (Fig. 1). While the majority of overweight firefighters (81.5%, 95% CI = 76.7 to 85.5) were at low risk based

TABLE 3. 10-Year Risk of ASCVD Among a Cohort of US Firefighters by BMI Category

	Percentiles (10-year Risk of ASCVD)								
BMI Category†	5th	10th	25th	50th	75th	90th	95th	Mean (95% CI)	P for Trend*
Normal	0.2	0.3	0.6	1.4	3.4	5.3	6.2	2.2 (1.7–2.7)	
Overweight	0.7	0.9	1.6	2.6	4.3	6.1	8.4	3.3 (3.0–3.6)	<0.001
Obese	1.0	1.2	2.2	3.6	5.8	10.1	12.8	4.8 (4.3–5.2)	

ASCVD, atherosclerotic cardiovascular disease; BMI, body mass index.
*The trend was tested using a simple linear regression model with BMI categories modeled as a continuous variable.
†BMI categories were defined as normal (less than 25 kg/m²), overweight (more than or equal to 25 kg/m² to less than 30 kg/m²), and obese (more than or equal to 30 kg/m²).
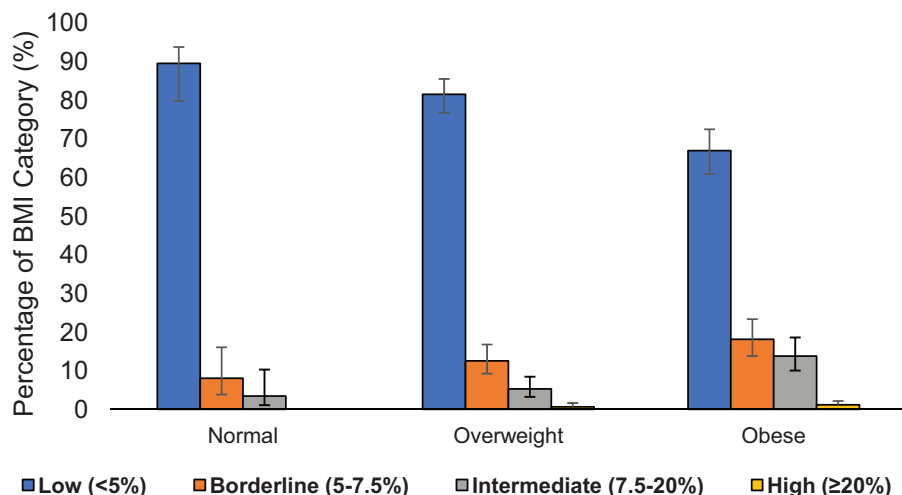
FIGURE 1. Percentages of firefighters within categories of ASCVD risk by body mass index (BMI) categories. Error bars represent 95% confidence intervals. BMI categories were defined as normal (less than 25 kg/m^2), overweight (more than or equal to 25 to less than 30 kg/m^2), and obese (more than or equal to 30 kg/m^2). ASCVD, atherosclerotic cardiovascular disease.

on risk score, 12.5% (95% CI = 9.2 to 16.8) were at borderline risk (5% to 7.5%) and 5.3% (95% CI = 3.3 to 8.5) were at intermediate risk (7.5% to 20%). Only 66.9% (95% CI = 60 to 72.5) of obese firefighters were considered low risk, while 18.1% (95% CI = 13.8 to 23.4), 13.8% (95% CI = 10.0 to 18.6), and 1.2% (95% CI = 0.4 to 3.6) were at borderline, intermediate, and high risk, respectively. As weight status increased, so did the percentage of firefighters in elevated risk categories (Fig. 1). Values and 95% confidence intervals for the percentages in ASCVD risk categories across age and BMI categories are reported in Supplemental Tables 1 and 2, http://links.lww.com/JOM/A827.

Figure 2 presents mean ASCVD scores by age within each BMI category. Obese firefighters had mean ASCVD risk scores of 2.3% (95% CI = 2.0 to 2.6), 4.6% (95% CI = 3.9 to 5.3), and 7.8% (95%CI = 6.7 to 8.9) across the three age categories 40 to 44.9, 45 to 49.9, and 50+ years, respectively. In contrast, normal weight fire-fighters' ASCVD risk scores were 0.8% (95% CI = 0.6 to 1.1), 1.6% (95% CI = 1.1 to 2.2), and 4.1% (95% CI = 3.1 to 5.3), respectively (Fig. 2). The descriptive point estimates for percentages with ASCVD scores (less than 5%, 5% to less than 7.5%, more than or equal to 7.5% to less than 20%, and more than or equal to 20%)

with BMI categories by age category are presented in Fig. 3. Only 33% of normal weight firefighters over age 50 had ASCVD risk scores more than 5%, while 50% and 67% of overweight and obese firefighters over age 50, respectively, had ASCVD risk scores more than 5%. While 2% of overweight firefighters over 50 years of age were at high risk, 4% of obese firefighters over 50 were at high risk of suffering a 10-year ASCVD event. Values and 95% confidence intervals for mean ASCVD risk scores and the percentages in ASCVD risk categories across the nine age and BMI subgroups are reported in Supplemental Table 3, http://links.lww.com/JOM/A827.

DISCUSSION

The major findings of this study are that 23% of our sample had a risk score above low ASCVD risk (more than or equal to 5%) and over 8% had intermediate ASCVD risk scores which includes a 10-year risk between 7.5% and 20%. Age and weight status (BMI) were independent and significant predictors of ASCVD 10-year risk score and the association of weight status with increased ASCVD risk score was higher among older firefighters. These findings suggest that health and wellness initiatives are necessary to address
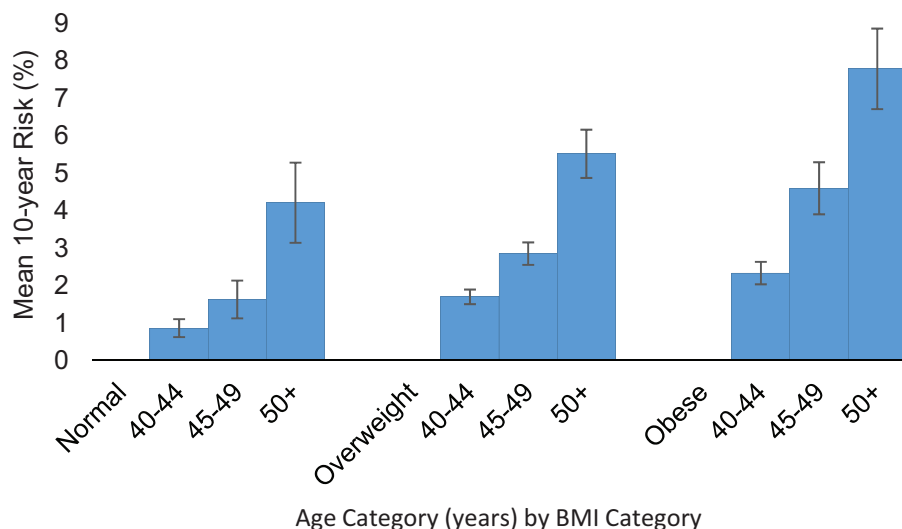
FIGURE 2. 10-year risk of ASCVD by age and BMI categories. Error bars represent 95% confidence intervals. A linear regression model including age, BMI, and an interaction term was conducted, and all terms were significant ($P < 0.05$). The three age categories and three BMI categories were modeled as continuous variables. Age is represented in years. BMI categories were defined as normal (less than 25 kg/m^2), overweight (more than or equal to 25 kg/m^2 to less than 30 kg/m^2), and obese (more than or equal to 30 kg/m^2). The means and 95% confidence intervals reported are descriptive. ASCVD, atherosclerotic cardiovascular disease; BMI, body mass index.

FIGURE 3. Percentages of firefighters within categories of 10-year ASCVD risk by age categories and BMI categories. Age is represented in years. BMI categories were defined as normal (less than 25 kg/m²), overweight (more than or equal to 25 kg/m² to less than 30 kg/m²), and obese (more than or equal to 30 kg/m²). An order logit model including age, BMI, and an interaction term was conducted and all terms were significant ($P < 0.05$). The three age categories and three BMI categories were modeled as continuous variables. The percentages reported are descriptive tabulations. ASCVD, atherosclerotic cardiovascular disease; BMI, body mass index.
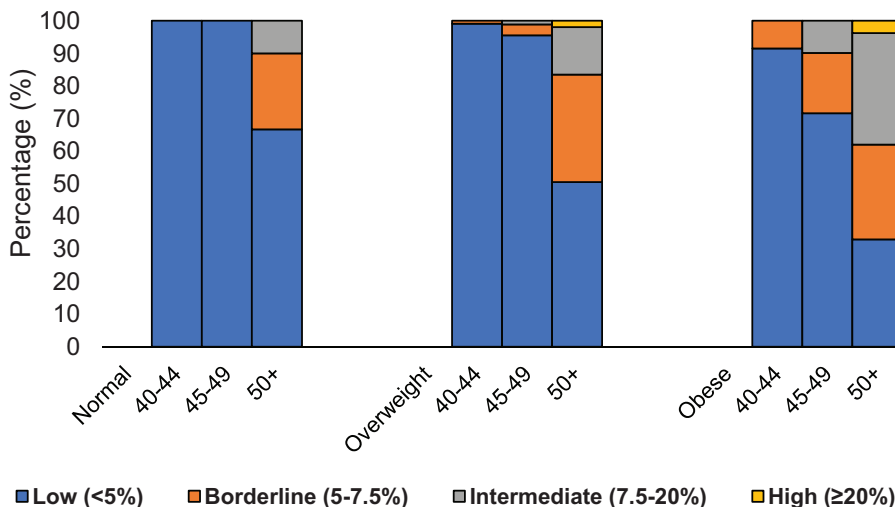
obesity and other CVD risk factors in the fire service. Occupational health care providers are in a unique position to counsel firefighters about the benefits of these programs to manage body weight and reduce the risk of CVD. Our results also highlight the inevitable increase in CVD risk associated with aging and suggest that additional screening may be necessary among older firefighters to ensure that they are healthy enough to continue with the strenuous and stressful work of firefighting.

The primary rationale for the annual medical evaluation for fire department members is to ensure that firefighters do not have an unacceptable risk for sudden incapacitation. Occupational medical examinations also offer the opportunity for early detection of disease and for consultation and referral to address those conditions. Cardiovascular events are the leading cause of duty-related deaths and are related to many retirements from the fire service.[28] Thus, the NFPA recommends using the PC risk calculator to determine 10-year risk of ASCVD event and to make appropriate recommendations based on the results. Although occupational health care providers are encouraged to use the risk calculator, risks scores were developed primarily to guide physicians in prescribing statin therapy. Currently, there is little information available about risk scores among firefighters or how to counsel firefighters once their risk score is known. Li et al[10] were the first to examine ASCVD risk scores among firefighters. Out of 294 career firefighters in Colorado (47 ± 6 years of age), they found only 9% had a 10-year ASCVD risk more than 5%.[10] In contrast, 23% of our sample (47 ± 5.2 years of age) had more than 5% risk of 10-year ASCVD event. The greater prevalence of firefighters in higher risk categories in our cohort may be due to the difference in populations examined. Colorado is the least obese state (20% to 25% obesity) in the nation.[25] Our diverse sample consisted of firefighters from the north-eastern and southwestern US.

Even with what may have been a healthier sample, Li et al[10] found that body fat percentage was independently associated with increased risk of ASCVD events; however, they also reported that BMI was not related to ASCVD risk. In contrast, we found ASCVD risk was higher across BMI and age categories and further, there was an additive and significant interaction between age and BMI. The discrepant findings between studies may be due to a larger sample size or to a greater range of BMI values in our study.[10] Previous research confirms that higher BMI is associated with a higher prevalence of cardiovascular and diabetes risk factors.[29]

The PC equation for calculating ASCVD risk includes multiple individual risk factors (age, total and HDL-cholesterol, systolic blood pressure, diabetes, and current smoking status).[7] Advancing

age is clearly a risk factor for cardiovascular disease in the general population[12] and among firefighters.[30] Farioli et al[13] observed incident rates (IR) of sudden cardiac death in groups of 10-year age increments and found the highest IR among firefighters aged 55 to 64 years (IR 45.2 per 100,000 person-years, 95% CI = 31.2 to 65.5) and the lowest IR in the group aged 25 to 34 years (IR 3.8 per 100,000 person years, 95% CI = 2.1 to 6.9).[13] While age is a documented CVD risk factor, aging cannot be prevented. However, the ASCVD risk scores among firefighters in the sample without modifiable risk factors were approximately half of the reported scores in each of the three age categories. These findings suggest that a large portion of the ASCVD 10-year risk among firefighters in this sample is potentially modifiable across all age groups.

In contrast to aging, obesity is a modifiable risk factor for CVD[10,16,22,31,32] that can be prevented or slowed. Smith et al[20] recently reported an average weight gain of 0.5 kg/yr in male career firefighters over a 5-year period. While weight increases are problematic, firefighters vary greatly in weight gain and maintenance.[21] Among a large cohort of career firefighters, Mathias et al[21] found 50% of the sample gained weight, but 12% actually lost weight and 38% remained weight stable. The 50% ($n = 327$) of the sample who gained weight (more than 3% body weight) also had adverse changes in several measures of cardiovascular health over the course of 5 years.[21] Further, using ACC/AHA calculated risk scores could potentially underestimate the risk of on-duty ASCVD event in firefighters because firefighting involves strenuous work under stressful conditions, both of which can trigger a cardiac event in individuals with underlying atherosclerosis or structural enlargement of the heart.[11]

A limitation of this analysis was that while two geographically distinct cohorts were included, the sample may not represent all firefighters at a national level. However, this study had numerous strengths. Our study included a large, geographically diverse sample of firefighters aged 40 to 69 years with a mean age of 48, which aligns well with an NFPA report that found approximately 49% of the fire service was aged 40 years or older.[27] Further, because of our large sample size, we were able to stratify the sample and examine ASCVD risk scores in three different age and BMI categories, as well as firefighters without modifiable risk factors that are part of the ASCVD risk score equations.

In conclusion, our study found 23% of firefighters had ASCVD risk scores above low risk (more than or equal to 5%) and 2% were considered high risk (more than or equal to 20% risk of 10-year ASCVD event) based on the ASCVD risk score equations. Aging is associated with a significant increase in CVD risk, but

aging cannot be prevented. However, overweight and obesity status added to CVD risk in all categories of firefighters over 40 years of age. A high prevalence of obesity and slow consistent weight gain are common over the course of a career in the fire service.[16] While firefighters cannot avoid aging, it is important for occupational physicians to counsel firefighters with weight-loss advice and consider referring firefighters to their primary care physician to manage CVD risk. Research suggests that physicians are less likely to counsel younger firefighters regarding weight-loss until they are older.[33] Maintaining a healthy weight and being aware of individual cardiovascular risk factors is essential to mitigate risk of sudden cardiac death in the fire service. Occupational physicians should use the ASCVD risk score as an opportunity to educate firefighters about the risk of CVD and the important impact of excessive body weight on that risk. Obesity may not prevent an occupational physician from medically clearing a firefighter for duty, but these findings demonstrate that it is an important risk factor that medical providers should address.

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