

# RACIAL DIFFERENCES IN HEALTH-RELATED COMPONENTS OF PHYSICAL FITNESS IN PROFESSIONAL FIREFIGHTERS

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Physical fitness is vital for firefighters (FF) to reduce the risk of injury and chronic disease while enhancing the ability to perform occupational tasks. Beyond the fire service, racial disparities in health-related components of physical fitness (HRCPF) have been reported. Limited research has explored racial disparities in HRCPF among FF, with one study indicating lower levels of aerobic fitness in minority FF.

**PURPOSE:** To assess whether racial differences exist in HRCPF within a large fire department.

**METHODS:** Physical fitness records from 1168 FF (male n=1050; age 38.2±9.7yrs; years of service 12.2±8.5yrs) were retrospectively analyzed. Race data was self-reported during the hiring process (see Table 1 for race options). HRCPF measures included body fat percentage (BF%), muscular fitness (maximum pull-up, sit-up, and push-up repetitions) and estimated VO<sub>2</sub>max via a 3-minute step test. Analysis of variances and chi-square tests of independence were conducted to assess racial differences.

**RESULTS:** A majority of (68.7%) FF identified as white (Table 1). Small to trivial effects (p<0.05) of race were found for push-up, pull-up and VO<sub>2</sub>max (Table 1). In the entire sample, 20.9% were unable to complete a pull-up, 29.3% exhibited a VO<sub>2</sub>max below the recommended value of 42 ml/kg/min for FF, and 41.0% were classified as obese according to BF%. The percentage of white FF (24.2%) unable to perform a pull-up was greater than other races (X<sup>2</sup>=17.66, p<0.001). Race did not impact meeting the VO<sub>2</sub>max recommendation (X<sup>2</sup>=3.42, p=0.332) or obesity classification (X<sup>2</sup>=0.487, p=0.922).

**CONCLUSION:** The findings indicate that while some small differences were observed in certain HRCPF across racial groups, the overall impact may not be practically significant. However, the prevalence of sub-optimal HRCPF in a substantial proportion of FF underscores the potential health challenges facing fire departments, necessitating attention and intervention irrespective of race.

Table 1: Comparison of health-related component of fitness measures by race

<b>Race</b>	<b>Pull-Ups (reps)</b>	<b>Sit-Ups (reps)</b>	<b>Push-Ups (reps)</b>	<b>VO<sub>2</sub>Max (mL/kg/min)</b>	<b>Body Fat (%)</b>
Overall (n=1168)	5.7 (5.4, 6.0)	43.2 (42.7, 43.7)	37.2 (36.5, 38.0)	45.5 (45.1, 45.9)	24.0 (23.5, 24.4)
White (n=802)	5.1 (4.8, 5.5)	43.0 (42.4, 43.6)	35.8 (34.9, 36.7)	45.2 (44.7, 45.6)	24.2 (23.6, 24.7)
African American (n=181)	6.7 (6.0, 7.4)	42.6 (41.5, 43.7)	38.6 (36.9, 40.2)	46.3 (45.3, 47.3)	22.8 (21.7, 23.9)
Hispanic or Latino (n=108)	7.0 (6.1, 8.0)	44.8 (43.4, 46.3)	41.7 (39.5, 43.9)	46.7 (45.2, 48.2)	24.6 (23.3,25.8)
Asian or Pacific Islander (n=77)	7.3 (6.2, 8.5)	44.0 (42.4, 45.7)	42.6 (40.0, 45.2)	45.3 (44.0, 46.6)	24.0 (22.7, 25.4)
p-value	<0.001	0.099	<0.001	0.046	0.129
Effect Size ( $\eta^2$ )	0.030 Small	0.005 Trivial	0.033 Small	0.007 Trivial	0.005 Trivial
Post-hoc comparisons	African American > White; Hispanic or Latino > White; Asian or Pacific Islander > White	N/A	African American > White; Hispanic or Latino > White; Asian or Pacific Islander > White	None were significant	N/A

Note: Values are presented as mean (95% confidence interval). Abbreviations: reps, repetitions.