



# A DESCRIPTIVE PHYSIOLOGICAL PROFILE OF RURAL, VOLUNTEER FIREFIGHTERS IN THE SOUTHEASTERN UNITED STATES

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SCHOOL OF EDUCATION

## INTRODUCTION

- A majority (~72%) of United States fire departments fail to provide employees with the resources to maintain basic health.<sup>1</sup>
- Volunteer fire departments face unique challenges (e.g., limited financial support) that may be prohibitive to such resources. Consequently, this population may demonstrate inadequate levels of physical fitness to safely execute essential job tasks.
- The aim of this study was to evaluate the health and fitness of rural firefighters (FF) from a mostly-volunteer department.**

## METHODS

- FF (n = 15; male = 12, female = 3) from a mostly-volunteer department in a rural region of the United States participated in this study.
- Health data were obtained in accordance with guidelines set forth by the American College of Sports Medicine (ACSM)<sup>2</sup>:
  - anthropometrics
  - blood pressure (BP) / heart rate
  - body composition
  - lung function
- Fitness was evaluated with the guidelines described within the fire service's Wellness Fitness Initiative<sup>3</sup>:
  - power
  - aerobic endurance
  - muscular strength
  - muscular endurance
- Descriptive data were interpreted using ACSM criteria and compared against normative data when available.<sup>2</sup>

## RESULTS

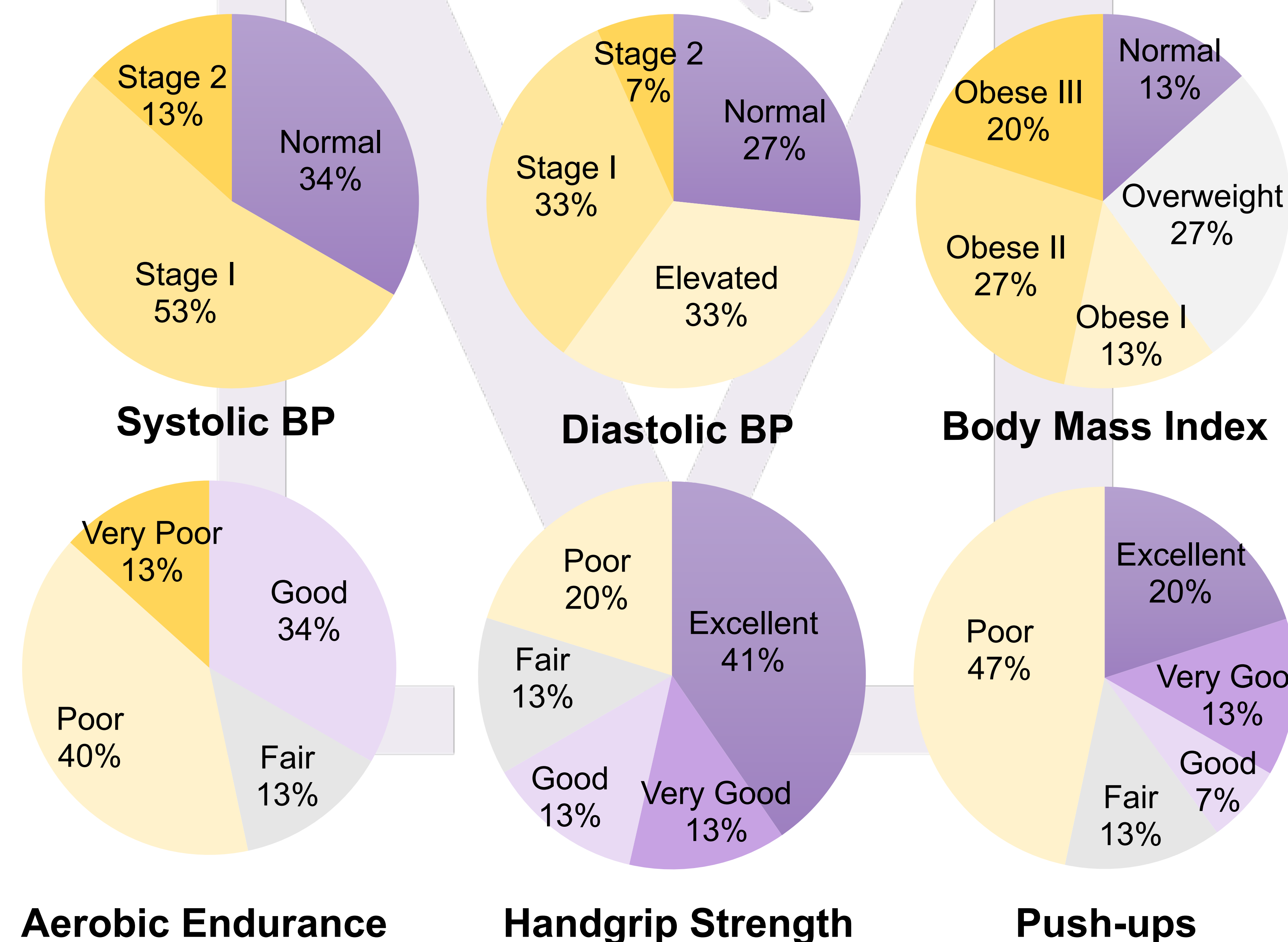
- The mean age was 36 ± 13 years old (max = 55; min = 18).
- 93% (n = 14) were considered to have "very poor" levels of body fat, with the remaining one considered "excellent."
- Only three FF met the recommended aerobic endurance for FF (i.e., 42 mL/kg/min).<sup>4</sup>**

## RESULTS

**Table 1.** Health outcomes from volunteer firefighters.

	Mean ± SD	Max	Min
Height (cm)	175.6 ± 7.9	189.2	160.6
Body mass (kg)	105.4 ± 27.4	150.2	66.9
Body mass index (kg/m <sup>2</sup> )	33.9 ± 7.1	47.8	21.1
Body fat (%)	36.5 ± 9.8	51.3	10.4
Waist circumference (cm)	104.9 ± 18.6	136.5	74.6
Systolic BP (mmHg)	127 ± 10	149	111
Diastolic BP (mmHg)	81 ± 8	100	71
RHR (bpm)	74 ± 12	99	54
FEV <sub>1</sub> (L)	4.0 ± 0.7	5.4	3.0
FVC (L)	4.6 ± 0.8	6.3	3.0
FEV <sub>1</sub> /FVC	0.88 ± 0.06	0.98	0.79

BP: blood pressure; RHR: resting heart rate; FEV1: forced expiratory volume in 1 second; FVC: forced vital capacity



## RESULTS

**Table 2.** Fitness outcomes from volunteer firefighters.

	Mean ± SD	Max	Min
Vertical jump (cm)	40.5 ± 12.7	70.9	26.9
Right HGS (kg)	49 ± 13	70	32
Left HGS (kg)	46 ± 14	70	28
Arm curl (kg)	54 ± 17	85	18
Leg pull (kg)	168 ± 46	240	71
Sit-and-Reach (cm)	28.7 ± 10.6	48.5	15.3
Push-up (#)	14 ± 11	37	0
Plank (s)	62 ± 22	100	27
Est. VO <sub>2max</sub> (mL/kg/min)	35.6 ± 7.0	47.9	22.2

HGS: handgrip strength; VO<sub>2max</sub>: maximal oxygen uptake

## CONCLUSIONS

- These results suggest that volunteer firefighters demonstrate alarmingly poor health and fitness outcomes, which appear greater in magnitude than what has been observed in career departments.<sup>5</sup>

## PRACTICAL APPLICATIONS

- Inadequate levels of preparedness could increase the risk of overexertion-related injuries, consequently jeopardizing personal and public safety.
- Volunteer fire departments may seek support from the local government or nearby universities to implement cost-effect wellness initiatives structured around physical health and fitness.
- Specifically, interventions centered around weight reduction are an apparent need among this population.

## REFERENCES

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