

# FIREFIGHTER FITNESS: IMPROVING PERFORMANCE AND PREVENTING INJURIES AND FATALITIES

## SUMMARY

In the course of their work, firefighters encounter toxic fumes, dangerous products of combustion, high radiant heat loads, and a chaotic work environment. These physical stressors contribute to the high rate of injury and sudden cardiac death related to fire suppression tasks. High levels of aerobic and anaerobic work capacity, muscular strength, and endurance are required to perform these tasks safely and efficiently; yet many firefighters have substandard aerobic/anaerobic work capacity and modifiable risk factors for cardiovascular disease. The safety of the public and the health and safety of firefighters would be enhanced if firefighters followed well-designed fitness programs to improve overall health and fitness.

### Heavy PPE

Increased metabolic work  
Decreased heat dissipation  
Restrictive

### Strenuous Work

Attack and suppression  
Climbing stairs  
Search and rescue

### Dangerous Environment

Extreme temperatures  
Chaotic  
Smoke/low visibility



## FINDINGS

- Firefighter fitness profiles are likely to vary greatly depending upon region of the country, career or volunteer status, the age of the firefighter, and the hiring, medical, and fitness policies of the department.
- The high rate of injury and sudden cardiac death among firefighters may indicate a mismatch between some firefighters' physical fitness status and the demands of the job.
- Firefighting results in considerable physiological strain. A well-designed fitness program provides multiple benefits and helps prepare the firefighter for the demands of firefighting.
- The benefits of physical fitness, including improved thermoregulation and heat tolerance, enhanced cardiovascular capacity, and increased plasma volume, may better prepare firefighters to meet the demands of their job.
- Although current standards recommend that firefighters participate in a fitness program, it is the responsibility of individual departments to determine whether or not to provide one.

### Authors:

Denise L. Smith, PhD  
dsmith@skidmore.edu

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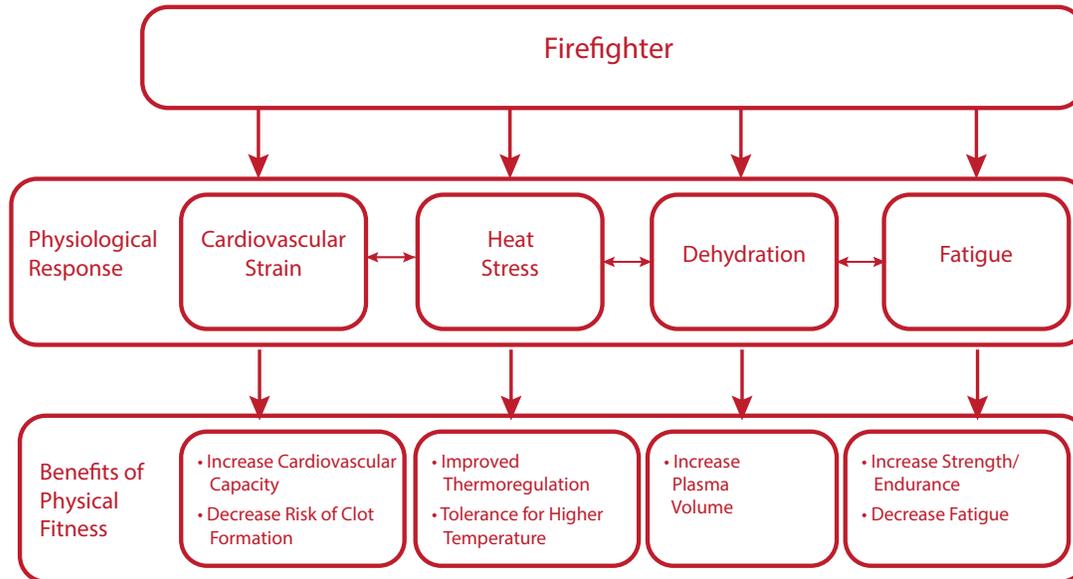


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## FINDINGS (continued)

- Exercise prescriptions to help firefighters meet their unique physical challenges must include individual and progressive programs, appropriate to the individual needs, across a broad range of physical fitness levels.
- Firefighter-specific exercise prescriptions should include aerobic training, Sprint Interval Training (SIT), functional training, resistance training, and guidance on lifestyle modification.



- Appropriate fitness programs can enhance overall health, improve performance, and lessen the risk of firefighter injury or fatality.

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## TAKEAWAYS

- Exercise scientist's/fitness professions can be important partners in enhancing firefighter's fitness, thereby improving public health and safety.
- Fit firefighters have increased mobility, energy, and endurance, allowing them to better perform job duties efficiently and safely.
- Fit fighters are less likely to jeopardize the safety of their fellow firefighters or the public they serve.
- The safety of the public and the health and safety of firefighters would be greatly enhanced if firefighters followed well-designed fitness programs to improve overall health and fitness.
- Specific fitness programs that meet the diverse needs of a broad range of individuals must be tailored to the unique set of physical requirements that firefighters face.
- Each individual firefighter and Fire Department must set short- and long-term goals that are realistic, measureable, and easy to implement within the constraints of space, equipment, and other duties.
- Fitness prescriptions for firefighters must meet certain criteria in order to adequately meet job demand. These recommendations/training goals need to address the unique and specific physiological demands of the job. This is difficult to accomplish because of the current diversity in fitness and health status of firefighters.

### Prescription Recommendations

1. Aerobic Training – mimics the endurance demands needed on the fire ground. Aerobic training provides several health benefits, including improved body composition, serum lipids, glucose metabolism, and maximal aerobic capacity
2. Sprint Interval Training (SIT) - mimics actual energy expenditure during an emergency. SIT is a type of high-intensity interval training (HIT) that is designed to improve endurance, increase anaerobic threshold, and improve maximal performance. Noted - it may be prudent to initiate exercise programs at a lower intensity and increase progressively.
3. Functional Training - mimics the high-intensity demands of firefighting. Functional training utilizes full-body, dynamic movements to increase muscular strength and endurance as well as aerobic capacity using equipment such as medicine balls, physioballs, and exercise bands to provide resistance.
4. Resistance Training - mimics the muscle strength and repetitive motion required of firefighters. Resistance training can improve work capacity and is likely to provide protection against injuries, especially muscular strains.
5. Lifestyle Modifications - should include a fitness program designed to improve aerobic capacity, muscle strength and endurance, and functional capacity, along with a sound dietary plan to promote healthy weight for firefighters.

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## FIRE STATION TALK

**Set short- and long- term goals that are realistic and measurable as well as easy to implement within the constraints of space, equipment, and other duties.**

- Utilize the American Council on Exercise’s SMART method – which stands for specific, measurable, attainable, relevant and time-based – to set short-term fitness goals helps you achieve long-term results. Example – A short-term fitness goal of walking 30 minutes per day, five days a week, which propels you toward your long-term goal of running a 5K race in six –nine months
- Change things up. Create safe fire ground simulation training type workouts to incorporate the five recommended prescriptions. Example: Fire fighter Functional Training in Full PPE on Air <https://www.youtube.com/watch?v=xtJoloAM6ml>

**Implement fitness programs geared toward improving health, safety, and performance while being sensitive to the diverse needs of each crew member.**

- Identify members in the department who you would like to be trained and utilized as certified peer fitness trainers [PFT] or advocates.
- Consider lifestyle choices that could help to maintain a healthy body weight and reduce modifiable cardiac risk factors.
- Encourage all your crew members to participate in regular physical activity.
- When exercising with other crew members, make allowances for the diverse needs of each individual.

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## CONSIDERATIONS FOR CHIEFS

**Department leaders should consider the following:**

**Develop a social support system with adequate leadership and incentives to promote healthy lifestyle changes.**

- Create policies that encouraging safe physical activity during shift.
- Ensure all participants are medically cleared before they participate in strenuous activities and enforce appropriate rehabilitation and monitoring during and after training.
- Send key firefighters through IAFF/IAFC/ACE Peer Fitness Trainer certification program to become qualified to help implement and lead a firefighter fitness program.
- Just starting a wellness program?
  - Create a good communication plan to build trust and solidarity.
  - Facilitate labor and management working together to make the program positive and non-punitive.
  - Acquire baseline data before starting to measure the success of each component you offer to evaluate your ROI.

**Consider consulting an exercise science professional.**

- Invite your local or regional colleges and/or university sports medicine departments to become involved with your fitness programs.
- Verify consultants are capable of developing fitness programs to serve a broad and diverse range of abilities within your department.
- Have programs/trainings tailored to the specific job requirements of firefighters.
- Ensure individual and progressive programs to meet the individual needs of low-fit to highly-trained firefighters.

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## TERMS

**Prescriptions** - Instructions intended to remediate a specific condition. (Dictionary.com's link to thesaurus.com)

\*The term “prescription” is typically reserved for physicians and physical therapists. However, “well-designed programs” can be developed by fitness professionals such as exercise physiologists, athletic trainers, physical educators, and kinesiologists.

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