

Cardiovascular responses during CFA recruit training

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Background

Victoria's Country Fire Authority (CFA) volunteers respond to a variety of fire and emergency incidents including bushfire, structural fire, urban search and rescue, and hazardous materials containment. Though the primary interest of our group is the volunteers' responses to bushfire suppression, we recently conducted an initial pilot investigation into the cardiovascular demands of specific training scenarios faced by CFA trainee firefighters. We feel this data provides a rudimentary understanding of the physiological demands faced by rural firefighters, be they volunteer or salaried personnel.

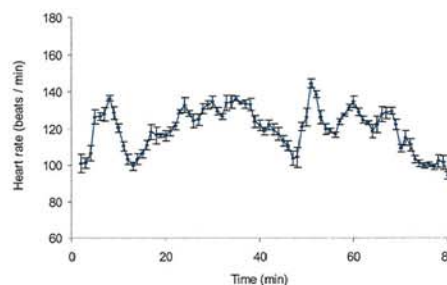
Methods

- Ten male CFA recruits aged 20 – 40 years, with an average weight of 90.1 ± 12.3 kg (range: 72.3 – 114 kg) participated in testing.
- Heart rate was measured during;
 - 1) Residential firefighting scenario
 - 2) Underground search & rescue
 - 3) High-rise salvage operation
 - 4) Hazardous material (hazmat) containment
- Blood pressure and body weight were measured before and after hazmat work where recruits wear encapsulated gas suits.

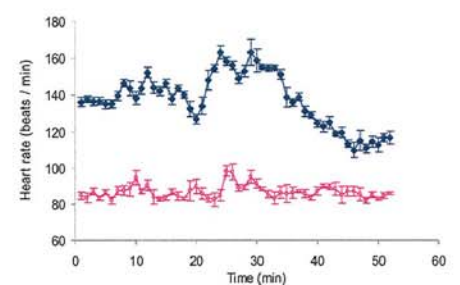
Results

- Simulated firefighting scenarios elevate recruits heart rates to ~ 50 – 80% of their maximum for prolonged periods.
- Heavy turn out clothing, breathing apparatus, and possibly, apprehension through inexperience are all likely contributors to the elevated starting heart rates observed for most tasks.
- No significant differences were found between blood pressure (pre: 141/77 mm Hg vs. post: 140/77 mm Hg, $P = 0.55$) and weight (pre: 90.1 ± 12.3 kg vs. 89.8 ± 12.7 kg, $P = 0.18$) before and after the hazmat simulation.
- Four of the eight recruits did lose weight during hazmat containment despite the cool ambient conditions (10 - 15° C). It is expected that in hotter environments, the weight loss and cardiovascular strain experienced by firefighters would be exaggerated.

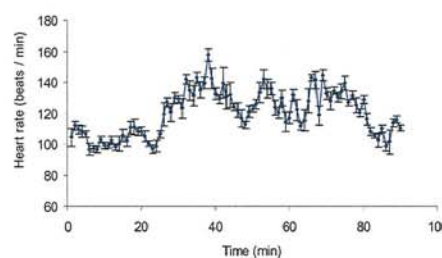
1) Residential firefighting scenario



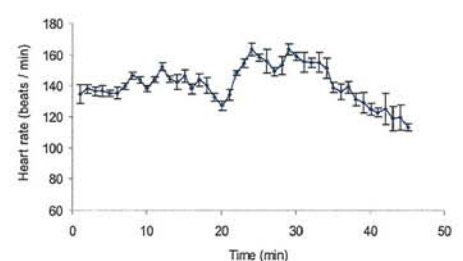
2) Underground search & rescue



3) High-rise salvage operation



4) Hazmat containment



Conclusion

The data presented, though limited, clearly demonstrates the high cardiovascular workload experienced by CFA firefighters during training. It would be expected that CFA firefighters would exhibit similar or elevated responses during 'live' firefighting work. Though this data was not obtained from CFA volunteers, the recruits' cardiovascular responses provides an initial insight into the physiological load experienced in these scenarios for volunteers and salaried personnel alike.