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# Core temperature and heart rate response to repeated bouts of firefighting activities

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During live-fire firefighting operations and training evolutions, firefighters often consume multiple cylinders of air and continue to wear their personal protective equipment even after fire suppression activities have ceased. However, most studies have only reported core temperature changes during short-term firefighting activities and have shown a very modest increase in core temperature. Therefore, the purpose of this study is to evaluate core temperature and heart rate (HR) during repeated bouts of firefighting activity over ~3 h. The results of this study show that core temperatures increase by an average of 1.9°C – to a larger magnitude than previously reported – and continue to increase during subsequent work cycles (38.4 vs. 38.7) even after long breaks of more than 30 min. The rate of core temperature increase during work continues to increase later in the training exercise (from 0.036 to 0.048°C/min), increasing the risk for exertional heat stress particularly if long-duration firefighting activity is required at these later times.

**Practitioner Summary**: To date, core temperature and HR changes during firefighting have been reported for short-term studies, which may significantly underestimate the physiological burden of typical firefighting activities. Firefighter core temperatures are shown to increase to a larger magnitude than previously observed and the rate of rise in core temperature increases during subsequent firefighting activities.

**Keywords:** firefighting; core temperature; heart rate; heat stress