

GETTING THE BALANCE RIGHT: OPTIMISING OPERATIONAL READINESS OF RURAL FIREFIGHTERS FOR MITIGATION, RESPONSE AND RECOVERY.



Sally Ferguson¹, Sarah Jay¹, Brad Smith¹, Grace Vincent¹, Alex Wolkow², Brianna Larsen², Michael Cvirn¹, Cara Walker², Brad Aisbett²

¹ Appleton Institute, School of Human Health and Social Sciences, CQUniversity, South Australia

² Institute for Physical Activity and Nutrition, School of Exercise and Nutrition Sciences, Deakin University, Victoria

The Project

The Operational Readiness research program employed an end-user designed, simulated fireground deployment to examine firefighters under conditions of reduced sleep opportunity and increased heat exposure:

- ▶ Across three days and nights, under conditions of elevated ambient temperature and reduced sleep opportunity, we tested performance on: physical work tasks simulating handtool and hose operations; analogues of cognitive functions required of tanker-based firefighters including reaction time, vigilance and memory; and measured responses of the body's immune and stress systems.
- ▶ To date, the project has produced 20+ academic publications, dozens of presentations, featured in three media segments, and provided data for six PhD students. Three of these graduates are pursuing careers in occupational health and safety research that will continue to benefit the Australasian Fire and Emergency Services.
- ▶ These outputs have contributed to a sector-specific evidence-base about issues such as; physical performance changes under sleep restriction, sleep outcomes in elevated temperatures, and changes to stress markers over consecutive shifts. Below we have integrated our findings with work from other groups to provide recommendations for managing operational readiness under certain scenarios.

If HOT

- Need to allow breaks and access to fluids.
- Elevated skin and core temperatures may indicate need for monitoring.
- Continue to encourage preparatory fluid intake. Sleep minimally affected up to overnight temperature of 23 degrees.
- Performance on self-paced tasks involving intermittent breaks is likely to be unaffected.
- Lower order cognitive tasks are also likely to be minimally affected but we do not know about more complex decision-making functions.



If SLEEP RESTRICTED

- Physical work performance is probably unaffected where tasks are rotated and self-paced.
- Reduced physical movement during rest periods may suggest a reduced inclination to move to areas for rest, fluid or food.
- Likely to be impairments to vigilance, concentration and reaction time.
- Increase in communications within teams and from incident control.
- Provide rest and nap opportunities.
- Be aware of increased impairment toward end of shift and with consecutive shifts.



If HOT and SLEEP RESTRICTED

- Physical tasks unaffected but there may be some adverse implications for operational performance on monotonous, externally paced tasks.
- Cognitive capacity likely to be impaired to a degree. Individuals are likely to be less accurate in predicting their own impairment, especially across each work period and with each consecutive shift.



This work would not have been possible without the time and energy of 91 firefighters, spanning 100 nights of data collection, and drawing on generous in-kind support from six AFAC member agencies.

