

AWAKE, SMOKY AND HOT – THE EFFECT OF CARBON MONOXIDE ON FIREFIGHTER HEALTH AND PERFORMANCE.

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Background:

Carbon monoxide (CO) is a colourless, odourless, poisonous gas that is a common constituent of wildfire smoke. The concentration of CO in wildfire smoke depends on the fuel source, fireground task and fireground conditions.

Aim:

To investigate the effect of carbon monoxide exposure combined with heat and sleep deprivation, on firefighter health, work output, stress and cognitive function.

Methods:

Up to 100 volunteer firefighters will take part in a four-day simulated fire tour, performing physical and cognitive work, physiological tests and sleeping under smoky conditions.



What do we know about the effects of carbon monoxide?

	Physical work	Physiology	Stress response	Cognitive function
Carbon monoxide only	↓ endurance and pace of work	↓ energy expenditure, ↑ cardiac output and systolic blood pressure	?	↓ performance in some mental tasks
Carbon monoxide and sleep deprivation	?	?	?	?
Carbon monoxide and heat	↓ self-paced work and work tolerance time	↑ heart rate, breathing rate and perception of effort., ↑ core temperature	?	↓ driving performance
Carbon monoxide, sleep deprivation and heat	?	?	?	?

As you can see, there are a number of gaps in the knowledge of the effects of carbon monoxide on physical work, physiology, stress response and cognitive function. The literature indicates, however, that the effects may be cumulative and therefore the results more pronounced in combination conditions.

Outcomes:

Help fire agencies understand and manage the consequences of firefighters' responses to carbon monoxide to better preserve their health and safety.