

ICE VS AMBIENT WATER

Temperature's Effect on Firefighter Hydration, Core Temperature, Heart Rate, and Skin Temperature



Working on wildland and urban interface fires can involve extreme environmental and physiological conditions. Firefighters regularly experience sustained and unsafe peak heart rates above recommended limits, maintain dangerously high core body temperatures, rapid respiratory rates, and high levels of dehydration. Not surprisingly, sudden cardiac death is the leading cause of on-duty fatalities.¹

Drinking fluids is important for replenishing electrolytes and maintaining safe hydration levels throughout the day, especially when doing hard, physical work in hot and humid conditions. OSHA encourages workers to drink a liter of water every hour (about one cup every fifteen minutes).²

Drinking water can reduce cardiovascular stress and mitigate rising core body temperatures. It is important to drink enough water to help avoid heat-related injuries and reduce thermal cardiac stress. This can be done through a prescribed hydration regime or through ad libitum drinking (drinking when thirsty).

There is a distinct advantage to drinking colder water. Any water is good water, but iced water is better at reducing core temperatures and heart rates than ambient temperature water and is more protective against cardiac stress. Our recent study demonstrated that firefighters who drank iced water (32°F) had lower heart rates and core temperatures than firefighters who drank ambient temperature water (75°F) across multiple types of duties including trainings, controlled burns, fuels reduction, and wildfire incidents.



DRINKING ICED WATER MEANS FIREFIGHTERS



Were less likely to be dehydrated at the end of the shift



Were more likely to maintain safer levels of hydration throughout the shift



Had lower heart rates



Had lower skin temperatures



Were able to return to “normal” heart rates and core temperatures faster after hard work



Were able to maintain more “normal” and “stable” core temperatures and heart rates throughout their shift



When comparing **Iced** vs **Ambient** water consumption on individual firefighters across multiple days we noted several important differences:

1. The core body temperature of firefighters who consumed **iced water** (32°F) were dramatically reduced, while those that drank **ambient water** (75°F) gradually increased their core temperatures throughout the day.
2. **Iced water** consumption helped reduce heart rates and respiratory rates significantly more than **ambient water**.
3. This has potential implications for mitigating exposures from smoke exposure on wildland and urban interface fires.

1. Fahy, R. F., & Molis, J. L. (2020). Firefighter Fatalities in the US-2019. NFPA Research, 1-26.
2. OSHA (2011). Using the Heat Index: A Guide for Employers. Retrieved from <https://www.osha.gov/heat/heat-index>