

# ICE VS AMBIENT WATER



THE WILDFIRE  
CONSERVANCY

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

**W**orking on wildland and urban interface fires can involve environmental and physiological extremes beyond which the human body was meant to endure, all while being exposed to a cocktail of respiratory and skin contaminants that are hazardous, toxic, and carcinogenic. Our past research shows that firefighters regularly experienced sustained and unsafe peak heart rates, maintained 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.<sup>1</sup>

It is well recognized that drinking fluids is important for replenishing electrolytes and maintaining safe hydration levels throughout the day, especially when doing hard work in hot and humid conditions. OSHA encourages workers to drink a liter of water every hour (about one cup every fifteen minutes).<sup>2</sup> Additionally, it is well known that drinking water can help reduce cardiovascular stress and mitigate rising core body temperatures. Whether you follow a prescribed hydration regimen or practice *ad libitum* drinking (drinking when thirsty), it is important to drink enough water to help avoid heat-related injuries and reduce thermal and cardiac stress.

There is a distinct advantage to drinking colder water, especially when it comes to core temperature and heart rate. In our recent research we tracked firefighters across a variety of duties including trainings, controlled burns, fuels reduction, and actual wildfire incidents. Comparing firefighters who drank iced water (~32° F) to those that drank ambient temperature water (~75° F) showed significant differences.



Conservancy  
Research



SCAN ME

### 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



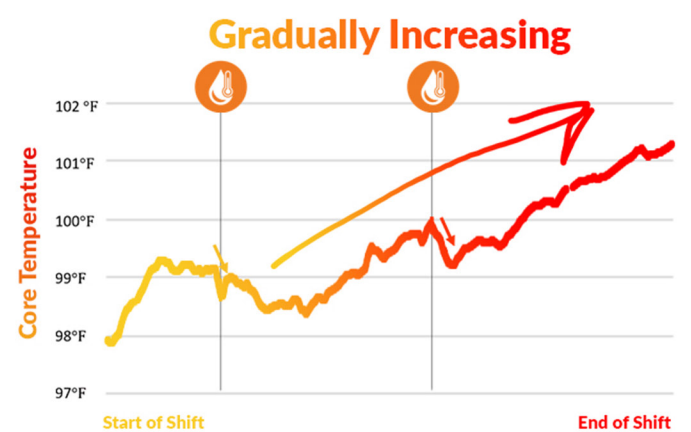
Had lower skin temperatures



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.