Heat Injury Mitigations

Individual Risk Factors:
The more factors, the higher the risk

Sources of Heat
Internal heat generated by physical labor

Environmental conditions
- High heat environments can restrict the body’s ability to evaporate sweating and cool itself
- Direct sunshine can increase heat index values up to 15°F

Not acclimatized
- Initial exposure (<4-5 days) of any of the following:
  - Increased heat exposure
  - Increased exertion levels of work/training
  - Lack of quality sleep

Lower fitness level requires more acclimatization time.

Overweight

Minor illness

Taking medications, either prescribed or over-the-counter and/or dietary aids. Example: Allergy or cold remedies, certain antibiotics, statins (cholesterol lowering drugs), and caffeine and creatine

Dehydration occurs during prolonged exertion when fluid loss is greater than fluid intake.

Excessive caffeine intake

Supplements are not regulated and have potential to impact firefighters.

Prior history of heat illness – a heat stroke event at any point, or an episode of lesser HRI in previous 24-48 hours

Skin disorders such as heat rash and sunburn that prevent effective sweating

HIP Pocket Guide
(Heat Illness Prevention Guide)

The intent of this guide is to provide a concise collection of Heat Related Illness (HRI) prevention information for operational field use. Its contents are not absolute rules and HRI potential and prevention mitigations should be evaluated and balanced with all the risks associated with wildfire fire operations.

This Guide includes:
- Hazards
- Individual Risk Factors
- Fluid Replacement and Work/Rest Guide
- Heat Illness Mitigation
- Warning Signs and Symptoms of HRI

Hazards:
- Heat Index, high ambient temperature and relative humidity
- Exertion level of training or work output, especially on several sequential days
- Acclimatization (and other individual risk factors – see reverse side)
- Time of exposure, duration of exposure will determine level of mitigation

Heat Index Risk and Mitigation Chart

<table>
<thead>
<tr>
<th>Heat Index</th>
<th>Risk Level</th>
<th>Moderate Work Mitigation</th>
<th>Arduous Work Mitigation</th>
<th>Protective Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rest per Hour</td>
<td>Water Intake per Hour</td>
<td>Rest per Hour</td>
</tr>
<tr>
<td>Very Warm 80°F - 89°F</td>
<td>Caution</td>
<td>10 min.</td>
<td>3/4 qt.</td>
<td>20 min.</td>
</tr>
<tr>
<td>Hot 90°F - 104°F</td>
<td>Moderate</td>
<td>20 min.</td>
<td>3/4 qt.</td>
<td>30 min.</td>
</tr>
<tr>
<td>Very Hot 105°F - 129°F</td>
<td>High</td>
<td>30 min.</td>
<td>1 qt.</td>
<td>40 min.</td>
</tr>
<tr>
<td>Extremely Hot ≥130°F</td>
<td>Very High</td>
<td>40 min.</td>
<td>1 qt.</td>
<td>50 min.</td>
</tr>
</tbody>
</table>

HVAC 100% of the day
- Neutral or muggy, light wind, light clothing
- Individuals acclimatized

HVAC 80-95% of the day
- Neutral or muggy, light wind, light clothing
- Individuals acclimatized

HVAC 60-80% of the day
- Neutral or muggy, light wind, light clothing
- Individuals acclimatized

HVAC 60-80% of the day
- Neutral or muggy, light wind, light clothing
- Individuals acclimatized

HVAC 40-60% of the day
- Neutral or muggy, light wind, light clothing
- Individuals acclimatized

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Download the OSHA Heat Safety Tool App. free online through your application store.

Radiant Heat = sun/fire. can increase H values by 150
### Warning Signs and Symptoms of Heat Stress and Illness

#### Indications of Possible Heat Related Illness

<table>
<thead>
<tr>
<th>COMMON SIGNS/SYMPTOMS</th>
<th>IMMEDIATE ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dizziness</td>
<td>• Stop current activity</td>
</tr>
<tr>
<td>Headache</td>
<td>• Allow person to rest in shade</td>
</tr>
<tr>
<td>Nausea</td>
<td>• Take sips of water</td>
</tr>
<tr>
<td>Unsteady walk</td>
<td>• Call for medical assistance to evaluate individual</td>
</tr>
<tr>
<td>Weakness or fatigue</td>
<td></td>
</tr>
<tr>
<td>Muscle Cramps</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SERIOUS SIGNS/SYMPTOMS</th>
<th>IMMEDIATE ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot body, high temperature</td>
<td>If no emergency medical personnel are available, call for ambulance or medical transport.</td>
</tr>
<tr>
<td>Altered mental status</td>
<td>Immediately implement medical emergency plan and call for an ambulance and/or medivac for emergency transport while doing the following:</td>
</tr>
<tr>
<td>Vomiting</td>
<td>• Lay individual down in shade until MEDEVAC or ambulance arrives</td>
</tr>
<tr>
<td>Involuntary bowel movement</td>
<td>• Remove clothing from individual</td>
</tr>
<tr>
<td>Convulsions</td>
<td>• Apply ice packs, or move individual to vehicle with air conditioning</td>
</tr>
<tr>
<td>Weak or rapid pulse</td>
<td>• Pour or immerse body in cold water and fan</td>
</tr>
<tr>
<td>Unresponsive/Unconscious</td>
<td>• Give sips of water while awaiting ambulance (if conscious)</td>
</tr>
<tr>
<td>Hyperventilating</td>
<td>• Monitor airway and breathing until ambulance or MEDEVAC arrive</td>
</tr>
<tr>
<td></td>
<td>• Continue cooling during transport or until body reaches 100°F</td>
</tr>
</tbody>
</table>

### Warning Signs and Symptoms of Heat Stress and Illness

An important sign that the firefighter is in a serious life-threatening condition is an altered mental status (with or without increased temperature).

**Ask the following questions:**
- What is your name? (Does not know their name.)
- What month is it? What year is it? (Does not know the month or year.)
- Where are we/you? (Is not aware of location or surroundings.)
- What were you doing before you became ill? (Does not know the events that led to the present situation.)

**Call for emergency MEDEVAC or ambulance**

### Indications of Possible Water Intoxication (Over-Hydration)

Water intoxication (hyponatremia) occurs when an individual drinks excessive amounts of water and decreases the sodium to water concentration in the body.

**Signs and Symptoms:** Confusion, Weakness, and Vomiting

For a full reference list for the HIP Pocket Guide, go to: [http://www.nwcg.gov/branches/pre/rmc/index.htm](http://www.nwcg.gov/branches/pre/rmc/index.htm)