

Managing Heat and Cold



**PACIFIC NORTHWEST AGRICULTURAL
SAFETY AND HEALTH CENTER**
farming • fishing • forestry



**OCCUPATIONAL SAFETY AND HEALTH
CONTINUING EDUCATION**
ENVIRONMENTAL & OCCUPATIONAL
HEALTH SCIENCES



WASHINGTON STATE UNIVERSITY
EXTENSION



Managing Heat and Cold

Learning Objectives

- Understand symptoms and risks of heat stress and cold stress.
- Identify early warning signs of heat and cold stress and how to respond.
- Employer requirements and employee responsibilities

Heat Stress





ACTIVITY

Activity 1

Have you received training on heat stress?

What actions do you or your supervisor take on hot days?

How many of you have experienced heat stress at work?

What is heat stress?

Heat Stress

Occurs when the body's core temperature rises due to excessive heat exposure.

Causes of Heat Stress

Environment

- Temperature
- Humidity
- Wind

Work

- Heavy workload
- Heat generated by machinery
- Fast paced
- Long hours

Clothing

- Dark
- Heavy
- Non-breathable
- PPE

What are heat-related illnesses?

Heat-related illness

Occurs when the body overheats, typically from hot conditions and heavy physical work. It can also happen in cooler environments if a person is exposed to heat for extended periods.

Types of Heat-related illness

- Heat stroke
- Heat exhaustion
- Heat syncope (fainting)
- Heat cramps
- Rhabdomyolysis (breakdown of damaged muscles which can cause kidney damage)

Symptoms and treatments for heat illness

Symptoms of heat illness can be mild or severe. Know symptoms and treatments to prevent serious heat illness and death.

TYPES AND SYMPTOMS

Rash

Red, itchy skin bumps



Cramps

Painful muscle spasms in the arms, legs, and belly



Dizziness or Fainting



Exhaustion

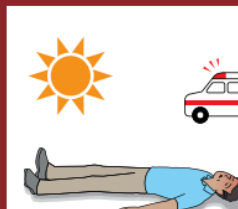
- Feeling sick to stomach, vomiting
- Cool, clammy, sweaty, pale skin
- Weak, tired, light-headed, headache



EMERGENCY! CALL 911!

Heat Stroke

- Feeling sick to stomach, vomiting
- Hot, dry, red skin (some sweat possible)
- Confusion, irritability, seizure, no response



TREATMENTS

- Keep skin clean and dry
- Apply powder



- Water, rest, shade
- Have a snack
- Tell supervisor



- Water, rest, shade
- Elevate legs
- Tell supervisor



- Water, rest, shade
- Elevate legs
- Lay on side if vomiting
- Cool, wet cloths
- Tell supervisor
- Take worker to clinic or call 911 if medical care is unavailable



- Move to shade
- Lay on side if vomiting
- Place cool, wet cloths over head, chest, arms and legs, use ice. Replace cloths to keep them cool.
- Elevate legs and fan
- Tell supervisor and call 911





Activity 2

Responding to Heat Stroke in the Field

You are deep in the woods, and a co-worker starts showing signs of heat stroke (e.g., confusion, very hot skin, rapid heartbeat, or unconsciousness).

Think about the following:

1. What would be the first thing you do?
2. How would you cool them down in the field?
3. What information would you need to give emergency responders?
4. What steps would you take while waiting for help to arrive?

Employer Responsibilities

- **Develop a safety program and evaluate risks**
- **Provide annual training**
- **Ensure breaks, shade, and water**
- **Adjust tasks and schedules**
- **Modify tasks/schedules to help workers adjust to heat**
- **Establish procedures for high heat days**
- **Maintain communication and observation**
- **Encourage regular rest breaks**

Employee Responsibilities

- Follow safety program
- Look out for early signs
- Know personal risk factors and notify supervisor
- Take frequent breaks, shade, and water
- Ask for breaks or schedule adjustments
- Buddy system

WA Outdoor Heat Exposure Rule

**Who does it apply to? Anyone working outdoors
>15 min in any 60 min period.**

Key Action Levels	Outdoor (dry air) temperature action level
Non-breathable clothing	52°F (11°C)
All other clothing	80°F (26.6°C)

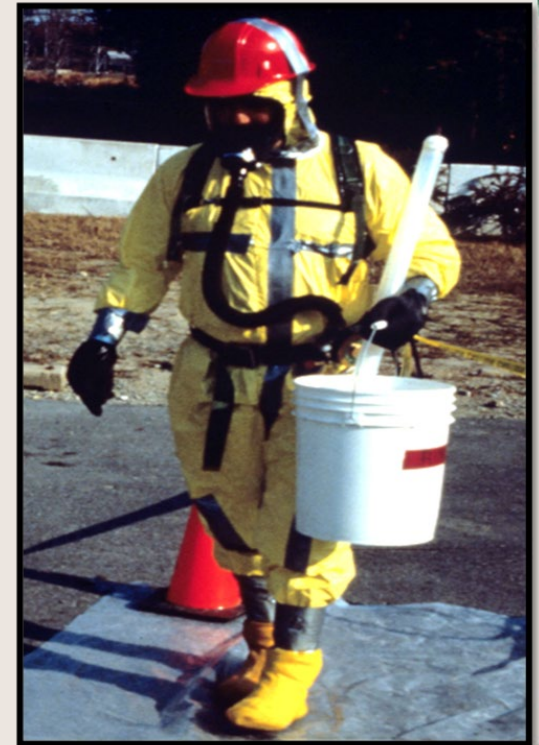


Photo Credit: WA LNI

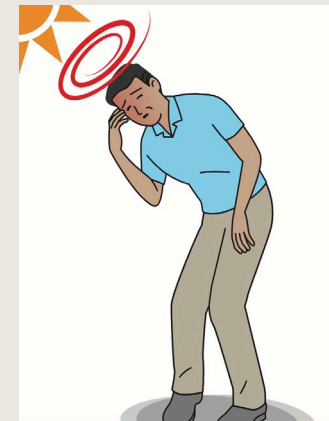
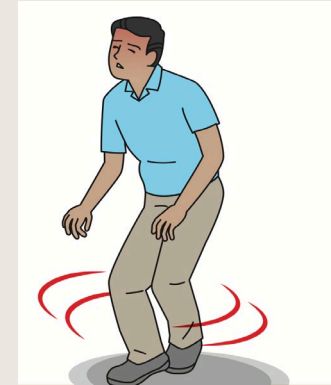
Required Breaks

During high temperatures, paid rest breaks are required.

- **90°F (32.2°C) or higher, employers must require a 10-minute paid cool-down break every two hours**
- **100°F (37.8°C) or higher, employers must require a 15-minute paid cool-down break every hour**
- **These breaks can be taken during meal or rest periods, but must be paid unless taken during a meal period**

Recognize early signs

- Thirst
- Sweat
- Headache
- Dizziness
- Weakness
- Irritability
- Nausea
- Cramps

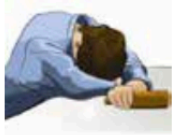


Risk factors for heat illness

There are personal, work-related, and weather-related causes of heat illness.
Awareness of your risk factors can help prevent heat illness!



Personal



Coming to work dehydrated



Heart disease



Diabetes



High blood pressure



Not enough sleep



Certain medications



Previous heat illness



Out of shape



Pregnancy



Cold, flu, fever

Work



Heavy workloads



Working near hot machines



Indoors with no cooling or ventilation



Wearing personal protective equipment



Wearing dark clothes and lots of layers



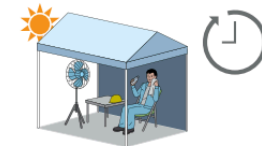
Too much sugar



Not being used to hot weather



Not drinking enough water



Not enough shaded rest breaks

Weather



Direct sun



High temperature



No wind or hot wind



High humidity

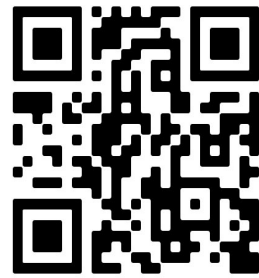
Acclimatization (Adjusting to Heat)

The body's temporary adaptation to work in heat that occurs as a person is exposed to it over time.

- Can take 4-14 days to develop, with a substantial amount of adaptation occurring in the first 4-5 days.
- Can be lost after a week away from working in the heat.
- Particularly important for new workers, workers returning from a prolonged absence, and sudden increase in temperatures.

Adjusting to the heat (Acclimatization)

Acclimatization is the body's slow adjustment to working in the heat that occurs as a person is exposed to hot conditions over time.



Source: Heat Toolkit,
UW Pacific Northwest
Agricultural Safety
& Health Center

Your job requires you to work in high temperatures...



You will need to acclimatize if you:

- Are a new worker
- Have not worked in the heat for a week
- Are working on days with sudden temperature increase

Be prepared to adjust work for workers who are not acclimatized to working in the heat.



Work Week	Day 1	Day 2	Day 3	Day 4	Day 5
New Work in the Heat Add 2 hours each day	 2 hrs	 4 hrs	 6 hrs	 8 hrs	 10 hrs

Note: This example is based on a 10 hour workday. For an 8 hour workday, it would be about 1.5 hour increase per day.

Remember to give yourself and others time to adjust to working in the heat.



Schedule work during cooler hours of the day.



Look out for signs of heat illness and take shaded water breaks often.



During hottest parts of the day, modify work to lighter tasks or other tasks in cooler environments.

Staying hydrated at work

If you are thirsty, you are already dehydrated. Sip water throughout the day when it is hot to make sure you drink enough water.

Every 1/2 hour, drink 1/2 liter of water

1/2 liter = 16 oz.



photo: CAL/OSHA

Urine Color

GOOD

BAD

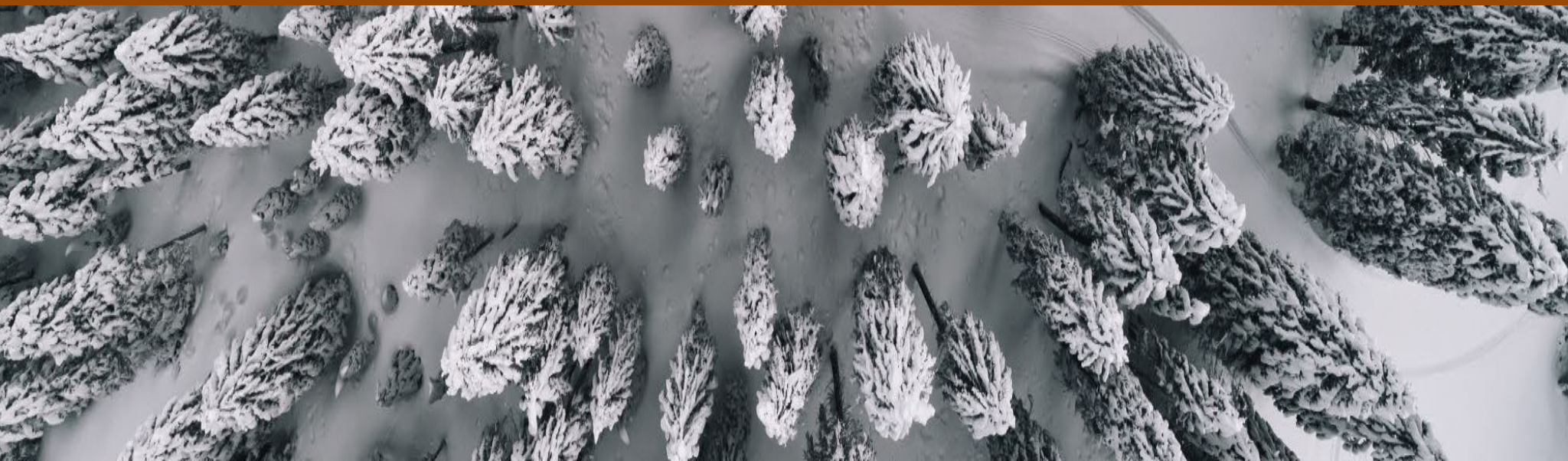


Knowledge Check



What are the three key employer requirements for the outdoor heat rule?

Cold Stress



What is cold stress?

Cold Stress

Occurs when the body loses heat faster than it can produce it, leading to a drop in core body temperature.

Causes of Cold Stress

- Environmental conditions such as: temperature, wind speed, wet/damp conditions
- Wetness or dampness, even from body sweat, also causes heat loss from the body

Types of cold stress

Cold stress

Over time, the body will begin to shift blood flow from the extremities (hands, feet, arms, and legs) and outer skin to the core (chest and abdomen).

Types of Cold Stress

- Trench foot
- Frostbite
- Chilblains
- Hypothermia

Photo credit: NW Forest Worker Center



Trench Foot

Trench Foot

Immersion foot syndrome



Cleveland
Clinic
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Photo by: Cleveland
Clinic

What is it?

A non-freezing injury of the feet caused by prolonged exposure to wet and cold conditions

What are signs?

Redness of the skin, numbness, tingling, pain, swelling, leg cramps, blisters, bleeding under the skin, and Gangrene.

How do I treat it?

- Remove wet shoes/boots and wet socks.
- Dry the feet and avoid working on them.
- Keep affected feet elevated and avoid walking on feet as this may cause tissue damage and seek medical attention.

Frostbite

What is it?

A cold injury that occurs when body tissues freeze as a result of prolonged exposure to freezing temperatures.

What are signs?

Reddened skin develops gray/white patches in the fingers, toes, nose, or ear lobes; tingling, aching, a loss of feeling, firm/hard, and blisters may occur in the affected areas.

How do I treat it?

- Get into a warm room as soon as possible.
- Unless necessary, do not walk on frostbitten feet or toes.
- Protect the frostbitten area by wrapping loosely in a dry cloth
- DO NOT rub or massage the affected area
- DO NOT try to re-warm the frostbitten area
- Give warm sweetened drinks if alert (no alcohol)



Image from: Shutterstock

Chillblains

What is it?

Chilblains are painful inflammation of small blood vessels in the skin, caused by the repeated exposure of skin to temperatures just above freezing to as high as 60°F.



Photo by zhikun sun

What are signs?

Redness, itching, possible blistering, inflammation, and possible ulceration in severe cases.

How do I treat it?

- Avoid scratching.
- Use corticosteroid cream to relieve itching and swelling.
- Slowly warm the skin.
- Keep blisters and ulcers clean and covered.

Hypothermia

What is it?

Exposure to cold temperatures that causes the body to lose heat faster than it can be produced.

What are signs?

Uncontrollable shivering, loss of coordination, confusion, slurred speech, heart rate/breathing slow, unconsciousness and possibly death.

How do I treat it?

- Call 911 immediately
- Move to warm location
- Remove wet clothing and replace with dry clothing.
- Give warm sweetened drinks if alert
- Place warm bottles or hot packs in armpits, sides of chest, and groin
- If the worker has no pulse, CPR should be provided by a trained person



Photo credit: NW Forest Worker Center

Employer Responsibilities

Provide training on:

- 1. Preventing and recognizing cold stress illnesses**
- 2. How to apply first aid treatment**

Provide controls such as radiant heaters

Monitor weather and workers

Employee Responsibilities

- Wear layered clothing
- Keep head, hands, and feet covered
- Stay Dry
- Take regular breaks
- Eat warm food
- Get enough sleep

Knowledge Check



What are three effective strategies for preventing cold stress?

Acknowledgements

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