

Heat/Cold Stress

Field research may take you to unfamiliar places far away from UMass Amherst. Many research activities at field sites can require you to spend extended periods of time outdoors in extreme environments. You have to be prepared to prevent heat and cold stress when there are temperature extremes. All groups engaged in field research should prepare a safety plan that includes precautions for handling environmental stressors, including temperature extremes.

Heat Stress

When you are conducting field studies in hot environments, you may be at risk of heat stress. Heat stress can result in heat stroke, heat exhaustion, heat cramps, or heat rashes. Heat can also increase the risk of injuries as it may result in sweaty palms, fogged-up safety glasses, and dizziness.

Symptoms and First Aid:

Heat Cramps: Muscle spasms that are painful, involuntary and brief.

First aid for heat cramps: Provide shade, water, and electrolytes

Heat Exhaustion: Cool, moist skin, heavy sweating, faintness, dizziness, fatigue, weak/rapid pulse, muscle cramps, nausea, headache.

First aid for heat exhaustion: Move to cool location, give water and electrolytes; call 911

Heat Stroke: High body temperature, the absence of sweating, with hot red or flushed dry skin, rapid pulse, difficulty breathing, strange behavior, hallucinations, confusion, agitation, disorientation, seizure, and/or coma.

First aid for heat stroke: Call 911 and attempt to lower body temperature using whatever means are available, such as spraying with a garden hose, sponging with cool water, or placing ice packs or cool wet towels on the neck, armpits and groin.

For more information, please visit <https://www.cdc.gov/niosh/topics/heatstress/heatrelillness.html>

What to do to prevent heat stress?

1. Work in the immediate vicinity of at least one other person (use the "Buddy System").
2. Monitor the weather frequently:
 - World weather information service: <http://worldweather.wmo.int/en/home.html>
 - National Weather Service (USA): <https://www.weather.gov/>
 - Weather Underground (USA): <https://www.wunderground.com/>
 - Darksky forecast: <https://darksky.net/forecast/>
3. Make sure you have a first aid kit available in case an emergency happens.
4. Apply sunscreen (minimum SPF 30) 30 minutes before going outside, and reapply every two hours and after swimming or sweating excessively.
5. Wear a sun-protective hat when you are doing research under the sun.
6. Wear light-colored, loose-fitting and breathable clothing. If you are going to wear protective clothing or personal protective equipment, please be aware that they may increase the risk of heat stress. Cotton clothing can be soaked in water to aid cooling.
7. Acclimate to heat gradually.

8. Install and use the heat safety tool “Heat Index” app developed by OSHA: https://www.osha.gov/SLTC/heatillness/heat_index/heat_app.html
9. Drink plenty of water even if you are not thirsty. Ensure you have access to at least 2 quarts of water per day. Do not drink sugary beverages instead of water.
10. Limit time in the heat and/or increase recovery time spent in a cool or air-conditioned environment.
11. If shade will not be available in the field, consider bringing a canopy tent to the field to provide shade or use an umbrella when possible.
12. Consider using research equipment and tools that can reduce manual strain.
13. Consider packing water filtration/purification devices if potable water will not be available in the field.

Cold Stress

Field researchers who are exposed to extreme cold or work in cold environments may be at risk of cold stress. Whenever temperatures drop decidedly below normal and as wind speed increases, heat can more rapidly leave your body. These weather-related conditions may lead to serious health problems, such as hypothermia, frostbite, trench foot, and chilblains.

Symptoms and first aids:

Hyperthermia: Early: shivering, fatigue, loss of coordination, confusion and disorientation; Late: blue skin, dilated pupils, slowed pulse and breathing, loss of consciousness.

First aid for hyperthermia: call 911 for medical assistance, remove wet clothing, and move into a warmer place, increase body temperature.

Frostbite: freezing fingers or toes, numbness, tingling or stinging, aching, bluish or pail, waxy skin.

First aid for frostbite: move into warm space, warm up with warm water or using body heat.

Trench foot: Reddening of the skin, numbness, leg cramps, swelling, tingling pain, blisters or ulcers, bleeding under skin, gangrene.

First aid for trench foot: remove wet socks and shoes, dry feet, avoid walking.

Please visit <https://www.cdc.gov/niosh/topics/coldstress/coldrelatedillnesses.html> for more information.

What to do to prevent cold stress?

1. Work in the immediate vicinity of at least one other person (use the “Buddy System”).
2. Monitor the weather frequently:
 - World weather information service: <http://worldweather.wmo.int/en/home.html>
 - National Weather Service (USA): <https://www.weather.gov/>
 - Weather Underground (USA): <https://www.wunderground.com/>
 - Darksy forecast: <https://darksy.net/forecast/>
3. Make sure you have a first aid kit, with chemical hot packs and a thermometer, available in case any emergency happens.
4. Be aware that winter gear is not the same as, and cannot replace, personal protective equipment (PPE) for research.
5. Wear several layers of loose clothing. Layering provides better insulation.
6. Consider using or having hand warmers in your backpack.
7. Bring hot liquids (better if sweetened) in a thermos in your backpack.
8. Do not drink alcohol to help increase body temperature. Alcohol may give you a sense of warmth, but it actually increases loss of body heat by increasing blood flow beneath the skin.

9. Make sure to protect ears, face, hands and feet (better if boots are waterproof and insulated) in extremely cold weather. Chemical hot packs inside gloves and boots can help keep extremities warm. Consider wearing a hat to help keep your body warm.
10. Limit amount of time spent outside on extremely cold days and stay in warm locations during breaks.
11. Keep some extra clothing and winter gear in your backpack if possible, such as socks, gloves, hats, jackets, blankets and other clothing.
12. Do not touch cold surfaces, especially cold metal surfaces, with bare skin.
13. Try to stay dry in the cold because moisture or dampness can increase the rate of heat loss.
14. Use research equipment and tools to reduce physical demands if possible.

For more information, please visit <https://ehs.umass.edu/> or call (413) 545-2682 if you have questions or need further assistance regarding field research safety.