Lightning Safety

Prior to any athletic event weather forecasts should be monitored for the threat of inclement weather. Options for monitoring forecasts include but are not limiting to the national weather service at www.weather.com and verified lightning detection services including but not limited to WeatherSentry and WeatherBug. This policy should be discussed during medical time outs prior to events, with all relevant stakeholders.

The following emergency action plan was developed using the most current recommendations of the National Weather Service, the National Lightning Safety Institute, the NATA Position Statement on Lightning Safety for Athletics and Recreation as well as the NCAA Sports Medicine handbook. In the situation where **a clap of thunder is heard, a flash of lightning is seen or a storm capable of producing lighting is within a 12-mile radius**:

1. Seek safe shelter at the **first sound** of thunder. "When Thunder Roars, Go Indoors"
2. When Lightning is observed and no audible thunder is present
    a. Open weather app with independently verified lightning detection to view proximity of storm to venue
    b. **If the storm and/or any lightning strike** is within **12 miles** safe shelter should be sought immediately.
        i. Lightning is capable of striking 10 miles from the rain shaft of a storm
        ii. Continue to monitor movement and location of storm.
            1. Seek Safe Shelter Immediately once storm is within the 12 mile radius
    c. In the event the WeatherSentry or WeatherBug applications is not available or in operation immediately seek safe shelter
3. Safe shelter is any **fully enclosed building** that involves **plumbing and/or electrical wires** that act to electrically ground the structure. "No Place outside is safe when thunderstorms are in the area."
4. If such a shelter cannot be found, take shelter in any **vehicle with a hard metal roof and closed windows**.
5. While indoors, **stay away** from any the walls, windows, plumbing and electronic devices attached to the walls (including landline telephones). If in a vehicle, avoid contact with the metal frame and radio use.
6. **Designate** a weather watcher to monitor the weather from a safe location.
    a. **During events where Athletic Training Services are providing on-site coverage, Athletic Training Services will make all decisions regarding suspension and resumption of outdoor activities as outlined in this policy. The web-based application will be used as a resource however the Athletic Trainer will make a clinical decision. This decision will be unchallengeable. These decisions will be communicated to Athletics Administration, Facilities Management, Coaches, Officials, etc. as appropriate. Further, Athletic Training Services will designate a specific weather watcher without additional responsibilities during the delay.**
    b. Decisions regarding suspension and resumption of outdoor activities in circumstances where Athletic Training Services are not present will be made in accordance with this policy by Athletics Administration, Facilities Management, Coaches and/or their appropriate designees. The individual responsible for this decision will designate a weather watcher.
7. No outdoor activities including but not limited to practices, games, conditioning, individual sessions etc. are to be resumed until 30 minutes after the last sign of lightning/thunder or once the storm is outside of the 12-mile radius. The timer will be reset for every clap of thunder heard or lightning strike within the 12-mile radius.

Weather Policies

Management of Storm-Induced Injuries

- Individuals that are struck by lightning do not carry residual charge and may be handled without danger to the medical personnel. The medical personnel should:
    1. Evaluate whether the scene is safe. On-going lightning may still be a threat.
    2. Determine whether moving the individual to a safe shelter is warranted. Safely move the injured individual to a safe shelter.
    3. Activate emergency medical response systems if deemed necessary.
    4. Apply any first aid necessary.

- When managing storm-induced injuries, first triage lightning victims who appear dead. Most deaths from lightning strikes are caused by cardiac arrests and aggressive CPR and defibrillation may resuscitate these patients.

- Activate EMS by calling BUPD from a cell phone: **(617) 353-2121**
  BU campus landline phone/Blue Box: **3-2121**

Mechanisms of Lightning Injury

- **Direct strike:** Occurs to the head, current may enter the orifices causing eye and ear injuries. When assuming the lightning-safe position, one can cover their ears to help avoid this type of trauma.
- **Contact injury:** Occurs when the victim is touching an object that is in the pathway of a lightning current.
- **Side flash:** Lightning may strike an object near the victim and then jumps from that object to the victim. The chance of a side flash is increased under a shelter such as a small picnic shelter or next to a tree.
- **Step voltage** or **ground current:** Current from lighting radiates outward from strike point. When assuming lightning safety position, place feet close together to avoid injury.
- **Blunt injury**: Lightning current can create abrupt heating/cooling of air leading to explosive/implosive forces that cause injury.

COLD WEATHER POLICY

Cold Weather Policy

The following policy guides decision making for patient safety regarding environmental cold injuries. Exposure to cold presents an inherent risk of injury. It is important to note that the following guidelines for activity and associated limitations apply only in the ***absence of precipitation***. Precipitation, most notably rain and snow, will affect the risk of environmental cold injury. It is unclear in the literature at exactly what rate of rain or snow fall, in conjunction with the air temperature and wind rate, conditions become unsafe. However, it is clear that precipitation significantly increases the risk of environmental cold injury. Therefore, in circumstances involving precipitation, decisions about participation restrictions will be made by Athletic Training Services on an individual basis based upon the current conditions.

All outdoor athletic events at Boston University operate under the guidelines in the following table. The certified athletic trainer is responsible for communicating to all athletic personnel and employing these guidelines. Please note the following temperatures ranges account for wind-chill.

Wind-Chill Temperature	***Guidelines/adjustment***
< 25°F	- Be aware and ready for possibility of cold injuries. - All practice participants will take reasonable precautions to cover exposed skin. This includes, at minimum: practice participants should wear long sleeves, pants, gloves, and hats during warm up activities. Hats and gloves should remain on during practice. All non-participating student-athletes should have exposed skin covered.
≤ 20°F	- All practice participants must wear appropriate clothing/equipment at all times while outdoors. This includes, at minimum: long sleeves, pants, gloves, and hats. Athletic Training Services will make additional clothing or equipment recommendations as seen fit. Any practice participant not in appropriate clothing/equipment must be removed from practice and remain indoors until appropriate clothing/equipment is worn. - All non-participating student-athletes should remain indoors.
≤ 15°F	- Must comply with previously stated clothing/equipment requirements. - Warm up and cool down activities should occur indoors. - Practice plan should be altered to decrease “down time” where participants are not moving. - Appropriate practice length should be determined, in advance, by head coach and Athletic Training Services based upon the intensity of the practice plan. - All non-participating student-athletes should remain indoors.

≤ 10°F	-Must comply with previously stated clothing/equipment requirements. - Warm up and cool down activities must occur indoors. - Practice plan should be altered to decrease "down time" where participants are not moving. - Maximum exposure time: 60 minutes (*any further exposure that day must follow a period time that includes complete re-warming and the changing of all base layer clothing)* - All non-participating student-athletes should remain indoors.
≤ 0°F	- Cancel event and reschedule

All temperature readings for interpretation of the above chart will be taken by Athletic Training Services immediately preceding the scheduled practice or game, using the Kestrel® 4500 Pocket Weather Tracker. Communication regarding readings taken prior to this will occur between the head coach and Athletic Training Services on an individual basis. **NOTE**: *the above guidelines may be altered by Athletic Training Services in the presence of other mitigating factors, such as, portable heaters, temporary re-warming facilities, altering game play rules (e.g. extended half-times for rewarming), etc. These decisions will be made on an individual basis.*

For events involving participants subject to this policy that are not directly covered by Athletic Training Services and occur off campus, decision will be made based upon the most currently available data from the National Weather Service. This information can be located at:
http://www.weather.com/weather/today/Boston+MA+USMA0046?lswe=boston%20ma&from=searchbox_localwx

Prevention of Cold-Related Injuries During Rowing

- Rowing in cold weather can be dangerous. Cold weather is defined as:
  - Air temperature (including wind chill) + Water temperature < 90°F
    OR
  - Water temperature < 50°F

- Water temperature will be determined by the thermometer (Kestrel Weather Tracker) housed at the DeWolfe Boathouse. When rowing in cold weather, Boston University strictly advocates that all of the following criteria be met for each boat:
  1. Use of 4-oars
  2. Use of a personal floatation device or neoprene suit for each member on the boat
  3. Ability to activate 911 from the boat

Recognition of Cold-Related Injuries

Recognizing early signs of cold-induced stress may prove to be important in preventing cold-related injuries. The following signs and symptoms are considered to be early warning signs:

- shivering
- dysesthesia at the distal extremities (e.g. numbness, pain, or burning sensation)
- disorientation
- slurred speech

Signs & Symptoms of Cold-Related Injuries

Mild Hypothermia • Vigorous shivering • Increased blood pressure • Rectal temperature between 95-98.6°F • Fine motor skill impairment • Lethargy • Apathy • Mild amnesia	***Frostbite*** • Edema • Erythema • Stiffness • Tingling or burning • Mottled or gray skin appearance • Tissue that feels hard and does not rebound • Vesicles • Numbness or anesthesia
Moderate/Severe Hypothermia • Cessation of shivering • Depressed vital signs • Rectal temperature less than 95°F • Impaired mental function • Slurred speech • Unconsciousness • Gross motor skill impairment	***Immersion (trench) foot*** • Burning, tingling, itching • Loss of sensation • Cyanotic/blotchy skin • Swelling • Blisters • Skin fissures ***Chilblain/pernio*** • Small erythematous papules • Edema • Tenderness • Itching •

Any situation where an individual has been exposed to cold-weather and would like to lay down and rest should be considered a medical emergency and necessitate activation of the EAP.

Weather Policies

Management of Cold-Related Injuries

- Activate EMS by calling BUPD from a cell phone: **(617) 353-2121**
  BU campus landline phone/Blue Box: **3-2121**

- If a certified athletic trainer is NOT PRESENT:
  1. Assist the student-athlete to the best of your ability
  2. Activate EMS if deemed necessary
  3. If during normal business hours, call and refer the athlete to Case Athletic Training Room at 285 Babcock Street, Boston, MA (**617-353-2746**)
  4. If outside normal business hours, refer the athlete to the Boston Medical Center Emergency Room or emergency room with a burn unit for immediate care
  5. Ensure notification of the athletic trainer who coordinates care for the patient

- If a certified athletic trainer is PRESENT:
  1. Determine if EMS needs to be activated. If so, designate another individual to activate the EAP.
  2. Treat the individual according to current medical practices per table below
  3. Ensure notification of a Head Athletic Trainer, Director of Athletic Training Services, and Medical Director

- Any patient who is treated for a cold-related illness MUST follow up with a Boston University team physician for clearance PRIOR to returning to activity.

Management of Cold-Related Injuries During Rowing

In a situation where an individual falls into cold water (< 60°F):

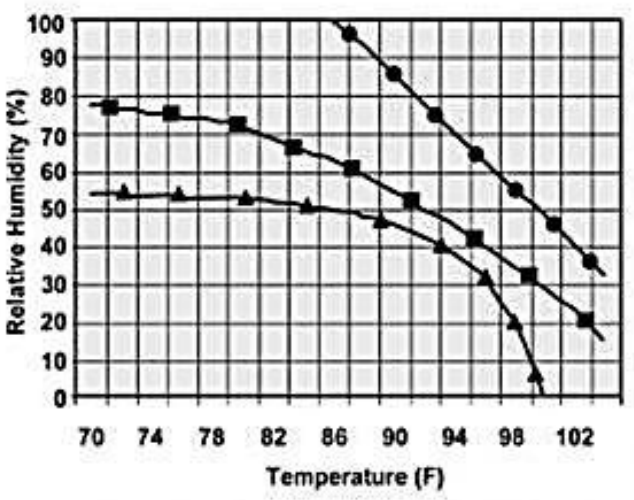
1. Quickly remove the individual from the water
2. Follow steps above listed immediately under 'Treatment'
3. Carefully move the individual to a safe and warm location

<table>
<tr>
<td>Mild Hypothermia
Treat for any life-threatening conditions
Assess and monitor rectal temperature
Remove wet or damp clothing, insulate with warm dry fabrics (including covering the head), and move to a warm environment, if possible
Apply heat to trunk, axilla, chest wall, and groin
Avoid applying friction massage</td>
<td>Frostbite
Rule out hypothermia
Tissue plasminogen activators (tPA) may be used to prevent amputation in severe cases
Immerse area in warm water (98.0 – 104°F)
Protect area
If tissue sloughing involved, infection control warranted.</td>
</tr>
<tr>
<td rowspan="2">Moderate/Severe Hypothermia
Treat for any life-threatening conditions
Assess and monitor rectal temperature
Remove wet or damp clothing, insulate with warm dry fabrics (including covering the head)
If signs of cardiac arrhythmia are present, move with extreme caution to avoid paroxysmal ventricular fibrillation
Apply heat to trunk, axilla, chest wall, and groin
Avoid applying friction massage</td>
<td>Immersion (trench) foot
Clean and dry area
Apply warm packs or soak in warm water (102-110°F)
Replace with dry socks & footwear</td>
</tr>
<tr>
<td>Chilblain/pernio
Remove wet or constrictive clothing
Wash and dry the area gently
Elevate the affected area and cover with warm, loose, dry fabrics
Do not disturb blisters, do not apply friction massage, do not apply creams or lotions, do not use high levels of heat, and do not allow weight bearing on affected area</td>
</tr>
</table>

HOT WEATHER POLICY

Prevention of Heat-Related Injuries

- All outdoor athletic events at Boston University operate under guidelines highlighted in the following table. The certified athletic trainer is responsible for communicating to all athletic personnel and employing these guidelines.



Temperature	Chart Area	Guidelines/Recommendations
Low Risk Zone (WBGT < 65°F)	Beneath the triangles	• Perform activity as planned • Include 5-10 minute fluid breaks every 20-30 minutes
Mild Risk Zone (65°F < WBGT < 75°F)	Above triangles, but beneath squares	• Include 5-10 minute fluid breaks every 20-25 minutes • If applicable, only upper body pads are to be worn
Moderate Risk Zone (75°F < WBGT < 85°F)	Above squares, but beneath circles	• Include 5-10 minute fluid breaks every 15-20 minutes • If applicable, no pads are to be worn
High Risk Zone (WBGT > 85°F)	Above circles	• Consider canceling outdoor activities

Signs & Symptoms of Heat-Related Injuries

Exercise-associated muscle cramps • Intense pain/cramping • High sweat rate • Dehydration/Thirst • Fatigue	**Heat Syncope** • Dizziness/lightheadedness/syncope • Fatigue • Tunnel vision • Pale, sweaty skin • Bradycardia
Exercise (heat) exhaustion • Core temp (97.0 – 104.0°F) • Dehydration • Dizziness/lightheadedness/syncope • Headache • Nausea • Intestinal cramps/diarrhea • Profuse sweating • Cool, pale, clammy skin	**Exertional heat stroke** • Core temp (> 104.0°F) • Dizziness • Irrational behavior • Confusion/disorientation • Altered level of consciousness • Hot skin • Tachycardia (100-120 bpm) • Hypotension • Hyperventilation • Vomiting
Exertional hyponatremia • Core temp (< 104.0°F) • Excessive fluid consumption • Nausea • Vomiting • Swelling of extremities • Progressive headache • Confusion/disorientation • Altered level of consciousness	**Exertional sickling** • Muscle cramping • Pain • Swelling • Weakness • Inability to catch one's breath • Fatigue

Weather Policies

Assessing Core Temperature

Assess the individual to determine nature and degree of illness. Use of a rectal thermometer is the most accurate method of accessing core temperature and allows for differentiation between many of the similar sign & symptoms between heat-related injuries. Core temperature should be assessed rectally in all circumstances where the necessary equipment is available.

Management of Heat-Related Injuries

- Activate EMS by calling BUPD from a cell phone: **(617) 353-2121**
  BU campus landline phone/Blue Box: **3-2121**

- If a certified athletic trainer is NOT PRESENT:
  1. Assist the student-athlete to the best of your ability
  2. Activate EMS if deemed necessary
  3. If during normal business hours, call and refer the athlete to Boston University Athletic Training Services at 285 Babcock Street (**617-353-2746**)
  4. If outside normal business hours, refer the athlete to the Boston Medical Center Emergency Room or comparable emergency room for immediate care
  5. Ensure notification of the athletic trainer who coordinates care for the patient

- If a certified athletic trainer is PRESENT:
  1. Determine if EMS needs to be activated. If so, designate another individual to activate the EAP.
  2. Treat the individual according to current medical practices per table below
  3. Ensure notification of a Head Athletic Trainer, Director of Athletic Training Services, and Medical Director

- Any patient who is treated for a heat-related illness MUST follow up with a Boston University team physician for clearance PRIOR to returning to activity.

Exercise-associated muscle cramps • Replace lost fluids w/ high sodium drink • Mild stretching & massage • Consider IV fluids, as available through physician	**Heat syncope** • Move athlete to shaded area • Monitor vital signs • Elevate legs above head • Rehydrate
Exercise (heat) exhaustion • Measure core temp w/ rectal thermometer • Remove excess clothing • Cool athlete w/ fans, ice towels, or ice bags if temp > 102°F • Consider referral to physician if recovery is not rapid	**Exertional heat stroke** • Active EMS • Measure core temp w/ rectal thermometer • Assess cognitive function • Lower core temp to 102°F quickly (cold water immersion 35 – 59°F) • EMS transport
Exertional hyponatremia • Rule out heat stroke and heat exhaustion • Differentiate from heat stroke w/ core temp (should be < 104°F) • Activate EMS	**Exertional sickling** • Administer oxygen with nonrebreather mask at rate of 15L/min • Monitor vital signs • Consider referral to physician or activation of EAP if vital signs decline or recovery is not rapid • Sickling collapse should be treated as a medical emergency

Cold-Water Immersion

Cold-water submersion (35 - 59°F) is the most effective way of cooling the body is heat stroke is suspected. Use of a rectal thermometer is the most effective means of monitoring core temperature. The athlete should be removed from the water when core temperature reaches 102°F and transported via EMS.

Return to Play after Exertional Heat Stroke

There are currently no evidence-based guidelines concerning the proper return to play progression after suffering from exertional heat stroke. The following are the most recent guidelines published:

1. Refrain from exercise for at least 7 days following release from medical care
2. Follow up in about 1 week for physical exam and repeat lab testing or diagnostic imaging of affected organs that may be indicated, based on the physician's evaluation
3. When cleared for activity, begin exercise in a cool environment and gradually increase the duration, intensity, and heat exposure for 2 weeks to acclimatize and demonstrate heat tolerance
4. If return to activity is difficult, consider a laboratory exercise-heat tolerance test about one month post-incident
5. Consider clearance for full competition if heat tolerance exists after 2-4 weeks of training