SACRAMENTO STATE™
SPORT CLUBS

Environmental Conditions Guidelines

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Risk Factors and Types of Heat Illness

Potential Risk Factors

Potential Risk Factors	Information
Intensity of Activity	This is the leading factor that can increase the core body temperature higher and faster than any other
Environmental Conditions	Heat and humidity combine for a high wet-bulb globe temperature that can quickly raise the heat stress of the body
Duration and frequency of activity	Minimize multiple activity sessions during the same day and allow at least three hours of recovery between sessions
Dehydration	Fluids should be readily available and so used to aid the body's ability to regulate itself and reduce the impact of heat stress
Nutritional supplements	Nutritional supplements may contain stimulants and/or can cause a negative impact on hydration levels and/or increase metabolism and heat production.
Medication/drugs	Certain medications and drugs have similar effects as some nutritional supplements.
Medical conditions	Examples include illness with fever, gastrointestinal illness, previous heat illness.
Acclimatization/ fitness level	Lack of acclimation to the heat or poor conditioning
Clothing	Dark clothing absorbs heat. Moisture wicking-type material helps dissipate heat
Protective Equipment	Heavy and bulky protective equipment may interfere with sweat evaporation and increase heat retention

Potential Risk Factors	Information
Limited knowledge of heat illness	Signs and symptoms can include elevated core temperature, pale or flushed skin, profound weakness, muscle cramping, rapid weak pulse, nausea, dizziness, exercise fatigue, fainting, confusion verbal disturbances and others

Heat and Hydration

Definition: Heat illness is inherent to physical activity and its incidence increases with rising ambient temperature and relative humidity. Students who begin training in the late summer, experience exertional heat-related illnesses more often than students who begin training during the winter and spring. Traditional classification of heat illness defines three categories: heat cramps, heat exhaustion, and heat stroke. Heat illness is more likely in hot, humid weather, but can occur in the absence of hot humid conditions.

Heat Rash

Heat rash occurs when sweat ducts become clogged and the sweat cannot get to the surface of the skin. Instead, it becomes trapped beneath the skin's surface causing a mild inflammation or rash.

Signs and Symptoms:

- Looks like a red cluster of pimples or small blisters
- Most likely to occur on the neck and upper chest, in the groin, under the breasts, and elbow creases.

Heat Cramps

Heat cramps usually affect people who sweat a lot during strenuous activity. This sweating depletes the salt and moisture levels. Low salt levels in muscles causes painful cramps. Heat cramps can also be a symptom of heat exhaustion.

Signs and Symptoms:

- Painful spasms usually in the muscles of legs and abdomen, usually accompanied by heavy sweating.

First aid: Firm pressure on cramping muscles or gentle massage to relieve spasms. Give sips of water. If nausea occurs, discontinue water.

Heat Exhaustion

Heat exhaustion is the body's response to an excessive loss of water and salt, usually through excessive sweating. Individuals most prone to heat exhaustion are those that are elderly, have high blood pressure, and those working in a hot environment. Symptoms range in severity from mild heat cramps to heat exhaustion to potentially life-threatening heatstroke. Heat exhaustion can begin suddenly, usually after working or playing in the heat, perspiring heavily or being dehydrated.

Signs and Symptoms:

- Muscle cramps
- Nausea/vomiting
- Headache
- Dizziness
- Fatigue
- Blurred vision
- Heavy sweating usually with cool and clammy skin

First aid: Untreated heat exhaustion can lead to heat stroke which is a life-threatening condition. If you suspect heat exhaustion, take these steps immediately.

- Move the person out of the heat and into a shady or air-conditioned place.
- Lay the person down and elevate the legs and feet slightly.
- Remove tight or heavy clothing.
- Have the person sip cool water or other nonalcoholic beverage without caffeine if they are not vomiting and they are fully conscious
- Cool the person by spraying or sponging with cool water and fanning.
- Monitor the person carefully.
- Call 911 if the person's condition deteriorates, especially if he or she experiences: fainting, confusion, seizures, uncontrolled vomiting or a fever of 104° F (40° C) or greater

Heat Stroke

Heat Stroke is the most serious form of heat illness and is considered a medical emergency. The body becomes unable to control its temperature. Heat stroke may occur, but not always, as a progression from milder heat –related illnesses such as heat cramps, heat syncope, and heat exhaustion. Heat stroke can kill or cause damage to the brain or other internal organs.

Signs and Symptoms:

- High body temperature: A body temperature of 104° F (40° C) or higher
- Altered mental state or behavior: Confusion, agitation, slurred speech, irritability, or delirium,
- May lose consciousness
- Alteration in sweating: skin will feel hot and dry to the touch.
- Nausea and vomiting
- Hot Red Skin
- Rapid heart rate
- Headache

First Aid: CALL 911 IMMEDIATELY

- Move the person out of the heat and into a shady or air-conditioned place.
- Lay the person down and elevate the legs and feet slightly.
- Remove tight or heavy clothing.
- Try to rapidly cool the person (put in a cool tub of water or a cool shower, spray with a garden hose, sponge with cool water, fan while misting with cool water or place ice packs or cold, wet towels on the person's head, neck, armpits and groin)
- Do not give fluids

Prevention of Heat Illness

Staying Cool on Warmer Days

- Warm up in the shade
- Increase the rest times between exercises
- Schedule water and cool down breaks in the shade if possible
    - Drinks (Water and sport drinks)
    - Wet towels kept in iced water
    - Ice bath after practice
    - Fans
- Wear light colored, moisture wicking, loose fitted clothing
    - The less the gear the better
- Avoid workouts during the hottest times of the day
- Progress exercise time and intensity slowly throughout a warmer week. Get the body slowly used to the heat
    - Example: Start with an easy 30-minute workout and each day slowly increase the length of the workout and intensity
- Wear sunscreen
- Avoid hot and heavy meals before working out, they add heat to your body

Hydration

Drinking enough fluids is one of the most important things you can do to prevent heat illness

- Drink 20 oz of water 2-3 hours before you workout
- Drink 8 oz of water for every 15 minutes of exercise
- Drink sport drinks when possible
- Have adequate nutrition
    - Eating a balanced diet to fuel the body that contains proportions of carbohydrates, fats, and proteins
- Monitor weight loss
- Stay away from sugary and alcoholic drinks
    - These can cause you to become dehydrated more quickly
- Monitor the color of your pee (see chart below)

Provision of Water

When environmental risk factors for heat illness are present, students should have access to potable water provided in sufficient quantity at the beginning of the activity to provide one quart per student per hour for drinking for the entire activity. Students may begin the activity with smaller quantities of water if effective procedures for replenishment of water during the activity have been implemented. The water shall be located as close as practical to the area where the students are engaged. Water should be sufficiently cool, pure, fresh, and free of charge. The nearest access to potable water should be as close as practicable. Usually this should mean that water should be reachable within a 2 1/2 minute walk, but in no case more than 1/4-mile or a five-minute walk away, whichever is shorter.

Coaches/instructors/presidents/safety officers should never limit the amount of fluid consumed by students and should encourage athletes to drink frequently. Students should inform their coach/instructor/president/safety officer if water is inadequate. Students should be made to understand that thirst is not an effective indicator of a person's need for water.

Access to Shade

Coaches/instructors/presidents/safety officers are responsible to ensure that students have access to a shaded area. Shaded areas should be large enough to accommodate the students engaged in the activity and allow students to sit in the shade without touching each other.

The nearest shaded area should be as close as practicable. Usually this should mean that shade should be reachable within a 2 1/2 minute walk, but in no case more than 1/4-mile or a five-minute walk away, whichever is shorter.

Canopies, umbrellas or other temporary structures may be used to provide shade, provided they block direct sunlight. Trees and dense vines can provide shade if the canopy of the trees is sufficiently dense to provide substantially complete blockage of direct sunlight. Areas shaded by artificial or mechanical means, such as by a pop-up canopy as opposed to a tree, should provide means for students to avoid contact with bare soil.

The interior of a vehicle may be used to provide shade if the vehicle is air-conditioned and the air conditioner is operating.

If the National Weather Service, as of 5 p.m. the previous day, forecasts the temperature to be over 80 degrees Fahrenheit, shade structures should be available at the beginning of the activity and present throughout the day. Regardless of predicted temperatures, coaches/instructors/presidents/safety officers should always have the capability to provide shade promptly if a student requests it. If the temperature exceeds 80^0F, shade should actually be present regardless of the previous day's predicted temperature high.

Students should inform their coach/instructor/president/safety officer if shade is inadequate.

Acclimatization

Students may become acclimatized to higher temperatures. Heat acclimatization requires a gradual increase of daily heat exposure for seven to fourteen days. Gradually increase the length of exposure each day until an appropriate schedule adapted to the required activity level for the environment is achieved. This will allow the athlete to acclimate to conditions of heat while reducing the risk of heat illness.

It should be noted that students new to the activity are among those most at risk of suffering the consequences of inadequate acclimatization. Coaches/instructors/presidents/safety officers with new students should be extra-vigilant in monitoring those individuals during the 14-day acclimatization period, and respond immediately to signs and symptoms of possible heat illness.

Preventative Cool-down Rest Periods

The purpose of the recovery period is prevention of heat illness. The coach/instructor/president/safety officer is required to provide access to shade for students who believe they need a preventive recovery period from the effects of heat and for any who exhibit indications of heat illness.

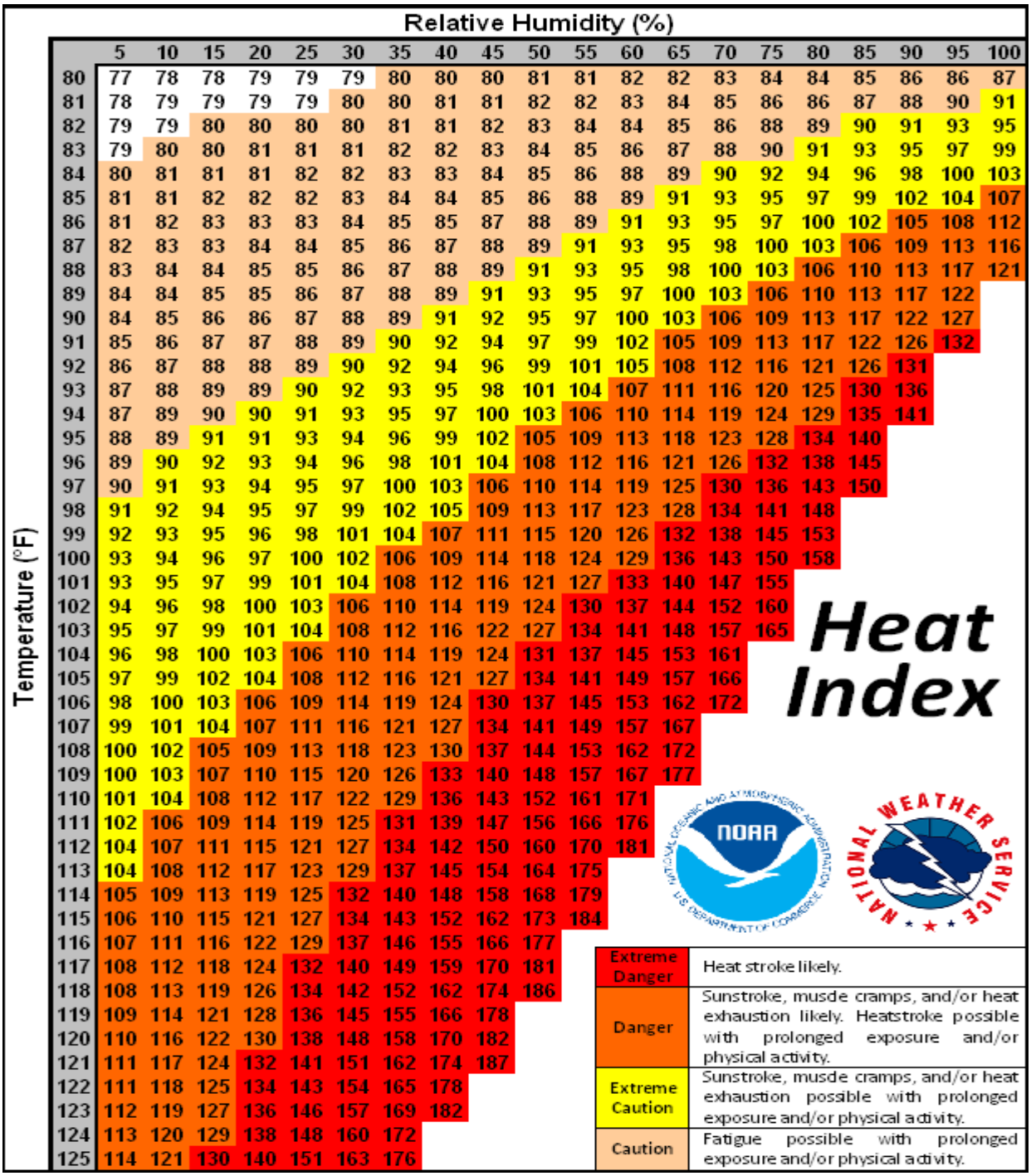
Access to shade should be allowed at all times, and students should be allowed and encouraged cool-down rest in the shade when they feel they need to protect themselves from overheating. Students who need a recovery period shall be monitored for symptoms and allowed to recover for no less than 5 minutes before being instructed to return to the activity.

The preventive recovery period is not a substitute for medical treatment. If a student exhibits signs or reports, symptoms of heat illness while taking a preventative cool-down rest or during a preventative

cool-down rest period, the coach/instructor/president/safety officer shall provide appropriate first aid or emergency response.

Monitoring Current Weather Conditions - Heat Index

- The heat index is a measure of how hot it really feels when relative humidity is factored in with the actual air temperature
- Coaches and instructors are expected to check current weather conditions as well as forecasted conditions for the current day regarding temperatures and relative humidity.
    - If a club does not have a coach or instructor, the club's safety officers and president are responsible for this.
- If the heat index (shown below) is in the yellow, practice should not exceed 2 hours and there should be mandatory water breaks every 20 minutes
- If the heat index (shown below) is in the orange or red students shall not participate in outdoor activities.
- In order to utilize the heat index utilize www.weather.gov/ or download the weather app
    - **Link to HEAT INDEX CALCULATOR** (https://www.wpc.ncep.noaa.gov/html/heatindex.shtml)



Emergency Procedures

If a student has any symptoms of heat illness, first-aid procedures such as applying cooling measures, creating shade, calling 911 etc. should be initiated without delay. Common early signs and symptoms of heat illness include headache, muscle cramps, and unusual fatigue. However, progression to more serious illness can be rapid, and can include loss of consciousness, seizures, mental confusion, unusual behavior, nausea or vomiting, hot dry skin, or unusually profuse sweating.

Any student exhibiting any of the above-mentioned symptoms requires immediate attention. Students exhibiting symptoms of severe heat illness should be attended to by emergency services by calling 911 or (916) 278-6000 if on campus. No student with symptoms of possible serious heat illness should be left unattended or sent home without medical assessment and authorization. Additionally, students should report signs and symptoms of heat illness in themselves or other students by notifying Megan Boone at 916-278-2049.

Coaches/instructors/presidents/safety officers should be able to provide clear and precise directions to the activity site and should carry cell phones or other means of communication to ensure that emergency services can be called.

Air Quality

Definition: The Air Quality Index (AQI) is an index for reporting daily air quality. The AQI focuses on potential health effects experienced from exposure to breathing polluted air. AQI accounts for five major air pollutants: ground-level ozone, particle pollution (also known as particulate matter, including PM2.5 and PM10), carbon monoxide, sulfur dioxide, and nitrogen dioxide. The AQI air pollution ranges from 0 to 500. The higher the AQI value, the greater the level of air pollution, and the greater the health concern. For example, an AQI value of 50 represents good air quality with little potential to affect public health, while an AQI value over 200 represents very unhealthy air quality.

Air Quality Monitoring

All students are responsible for monitoring air quality/projected air quality and proceeding according to the information outlined below.

- Monitor using these links
  - www.purpleair.com (we have purple air sensors on campus)
  - www.sparetheair.com
  - www.airnow.gov
  - www.noaa.gov
  - www.weather.com
- The following table will be used to determine activity restrictions
  - level of 151 (or higher), all outdoor activities must be moved indoors, postponed or cancelled
  - Please ensure you are routinely checking the AQI before outdoor participation so that way you can be proactive and proceed accordingly

Air Quality Index (AQI)	Color	Description	Practice/Competition Restrictions
0-50	Green	Good	Air quality is satisfactory and air pollution poses little or no risk.
51-100	Yellow	Moderate	Student-athletes with unusual severe respiratory illnesses shall not participate in outside activity.
101-150	Orange	Unhealthy for sensitive groups	Those student-athletes with respiratory illnesses shall reduce prolonged or heavy outdoor exertion. All other student-athletes shall monitor themselves closely for distress.
150-200	Red	Unhealthy	ALL student-athletes shall not participate in outside activities
201-300	Purple	Very Unhealthy	ALL student-athletes shall not participate in outside activities
>300	Maroon	Hazardous	ALL student-athletes shall not participate in outside activities

Cold

Definition: The Windchill Temperature Index is a "measure of the combined cooling effect of wind and temperature." When the wind picks up speed, it draws more heat away, so if your skin is exposed to the wind, your body will cool more quickly than it would have on a still day. If you combine freezing temperatures with a frigid wind, the danger of frostbite and hypothermia increases.

Wind Chill Temperature Chart

- The Windchill Temperature index gives the perceived temperature equivalent for the combination of cold air and wind. It shows air temperature in degrees Fahrenheit and wind speed in miles per hour.
- The chart also includes a frostbite indicator, showing the points where temperature, wind speed and exposure time will produce frostbite on humans. Each of the three shaded area shows how long a person can be exposed before frostbite develops.
- If frostbite times get to 30 minutes or less outdoor activity must be cancelled or moved indoors

Temperature (°F)

Wind (mph)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
	55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
	60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Dangers of Windchill

- Frosbite
    - Frostbite is body tissue that has frozen and usually starts with the fingers, toes, tips of the nose, and ear lobes. You may lose feeling in these area or they are turning pale or white
        - Get inside
        - Warm gradually with body heat, do not rub
        - Immerse affected area in warm water
        - Apply sterile dressing to blisters
        - Do not thaw if risk of re-freezing

        - Get medical attention
- Hypothermia
    - When your body's temperature drops too low, hypothermia sets in. Uncontrollable shivering, disorientation, and incoherence are signs of this issue.
        - Move into warm shelter if possible
        - Remove wet clothing and wrap into warm clothing
        - Apply dirrect body heat
        - Re warm neck,chest,abdomen,and groin
        - Give warm sweet drinks if conscious
        - Monitor breathing
        - Get Medical Attention

Prevention

- Provide additional protective clothing, cover as much exposed skin as practical, and provide opportunities and facilities for rewarming.
    - Clothing should allow for sweat evaporation, insulation, and wind and water resistance
        - Cover exposed flesh (especially face and hands)
        - Mittens are more useful than gloves
        - Wear a hat
    - Have alternate plans in place for deteriorating conditions and activities that must be adjusted or cancelled.
    - Consider modifying activity to limit exposure or to allow more frequent chances to rewarm.

Resources

https://www.nata.org/practice-patient-care/health-issues/heat-illness
https://www.nata.org/sites/default/files/EnvironmentalColdInjuries.pdf
Sacramento State Athletics- Environmental Conditions Policy. (2020)
CSU Student Activities Heat Illness Prevention Reference Guide