

HRLax Heat and Dehydration Guidelines

Environmental factors:

Ambient air temperature and humidity have a direct effect on the ability for a body to cool itself through the evaporation of sweat. When the air temperature is above 90, and/or the relative humidity is high, the body is at a higher risk to not effectively stay cool, which may be compounded by the level of dehydration of the body's fluids. The following chart is a simple method to determine the amount of increased risk with variations of heat and humidity, and subsequent suggestions to modify participation in physical activities.

This chart can be used by inputting the temperature and humidity available via local radio stations, Internet locations, etc. Simply cross-reference the relative humidity (top row) with the temperature (first column) to determine the humidity. Follow guidelines outlined below.

Humiture or Apparent Temperature Chart (After R.G.Steadman, 1979)

Temp	RELATIVE HUMIDITY (%)									
	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
105°	100	105	113	123	135	149				
104°	98	104	110	120	132	143				
102°	97	101	108	117	125	139				
100°	95	99	105	110	120	132	144			
98°	93	97	101	106	110	125	132			
96°	91	95	98	104	108	120	128			
94°	89	93	95	100	105	111	122	128		
92°	87	90	92	96	100	106	115	122		
90°	85	88	90	92	93	100	106	114	122	130
88°	82	86	87	89	93	95	100	106	115	125
86°	80	84	85	87	90	92	96	100	109	111
84°	78	81	83	85	86	89	91	95	99	105
82°	77	79	80	81	84	86	89	91	95	96
80°	75	77	78	79	81	83	85	86	89	91
78°	72	75	77	78	79	80	81	83	85	86
76°	70	72	75	76	77	77	77	78	79	80

HUMITURE

105° and up:

95° to 104°:

90° to 94°:

Below 89°:

HRLax RECOMMENDATION

Recommend no outside activities.

Recommend no equipment (helmets, pads, etc) be used during activity. Limit activity.

Recommend equipment be removed as often as possible (during rest breaks, on sideline, etc). Careful monitoring of all athletes for signs of heat problems.

Recommend adequate water supply at all practices and competitions with breaks every 20 to 30 minutes for rehydration.

HEAT INJURIES CAUSE MULTIPLE DEATHS EACH YEAR IN HIGH SCHOOL SPORTS.

Heat illness and injury can range from a simple muscle cramp to life threatening heat stroke. Catastrophic heat injuries are preventable. Following the recommendations found in this document, the risk of heat injuries can be reduced significantly. The most important components in preventing heat injury are the prevention of dehydration and limiting activity when temperature and humidity make it near impossible for the body to cool through evaporation of sweat.

The body produces heat at rest, this heat production increases 10 to 20 times with exercise. Evaporation is the major method of cooling the body during exercise. Evaporation of sweat dissipates the heat from the core of the body, keeping the internal organs cool. Exercising in a dehydrated state reduces the ability to sweat, therefore compromising the ability to cool. Dehydration also causes a reduction in blood volume, compromising cardiac output. The air temperature and humidity have a direct effect on the efficiency of this cooling process. Based on the effects of dehydration and exercising in the heat and humidity, the following guidelines have been established to provide administrators, coaches, and athletic training staff, with a sound plan to prevent heat injury.

Signs and Symptoms of Heat Problems:

The following are common signs and symptoms related to heat illness, but are not intended to represent a complete list. In the event an athlete is suffering from one or more of the following, the athlete should be referred to appropriate allied health care or medical professional for full evaluation.

- Muscle spasms/cramps
- Heavy or profuse sweating
- Skin is flushed or cool and pale
- Headache
- Dizziness
- Rapid pulse, nausea, weakness
- Disoriented, confusion
- Elevated body core temperature
- Cessation of sweating
- Red, dry skin
- Shallow breathing and rapid pulse
- Loss of consciousness

Heat Illness/Injury Facts:

- Adolescents and children take longer to acclimatize to the heat than adults
- Weight loss of water greater than 3% of body weight significantly increases the risk of heat related illness.
- 1.5 times the amount of water lost must be consumed to replace lost weight.
- Unrelated illnesses causing vomiting and/or diarrhea will increase risk of heat related illnesses. These conditions should be brought to the attention of the coaching staff prior to participation and close monitoring of these individuals should take place during practice sessions and competition.
- Athletes taking certain medications including diuretics, antihistamines, beta blockers and anti-cholinergics are at higher risk for heat illnesses.
- Light colored breathable clothing can assist the body in cooling.
- Athletes who are overweight, poorly conditioned, recovering from illness, lacking in sleep, or taking medications are at added risk for heat illnesses and should be monitored closely and/or have their participation level modified.

Recommendations for Fluid Replacement:

- All athletes should inform their coaches and/or athletic training staff of any pre-existing heat illness, gastro- intestinal condition and/or medical complication prior to exercising in the heat.
- Athletes should be educated in the process of hydrating themselves as a 24 hour a day process.
- Athletes should begin every athletic activity well hydrated.
- During exercise, the average person should drink 8 – 12 oz of fluid every 20 to 30 minutes.
- Urine color is an easy method to determine hydration status. Light yellow to clear urine indicates a well-hydrated athlete.
- Water should be available to athletes at all times and never be withheld from exercising individuals.

National Athletic Trainers Association's Recommendations on Fluid Replacement:

- Educate athletes on the effects of dehydration on physical performance.
- Inform athletes on how to monitor hydration status.
- Convince athletes to participate in their own hydration protocols based on sweat rate, drinking preferences, and personal responses to different fluid quantities.
- Encourage coaches to mandate rehydration during practices and competitions, just as they require other drills and conditioning activities.
- Provide the optimal oral rehydration solution (water, CHOs, electrolytes) before, during, and after exercise.
- Implement the hydration protocol during all practices and games, and adapt it as needed.
- Finally, encourage event scheduling and rule modifications to minimize the risks associated with exercise in the heat.

Acclimatization to Heat:

Another way to help prevent heat stress is to become acclimatized to the weather. Acclimatization means becoming adapted to the weather or climate. The process takes 7 to 12 days. Studies have shown adolescents take longer to acclimatize to heat than adults. As a result of acclimatization, the sweating mechanism of a person is enhanced:

- onset of perspiration occurs earlier
- perspiration increases
- increase in blood volume with the more training an individual does
- improves supply of oxygen to the muscles
- heart rate decreases
- core body temperature does not rise as high during exercise

Other facts about heat illnesses and exercising in the heat:

- Dehydration of 1% to 2% of body weight begins to impact athletic performance
- Dehydration greater than 3% of body weight may increase an athlete's risk of heat illness.
- Sports drinks should contain less than 8% carbohydrate. Carbohydrate content greater than 8% compromises the rate of gastric emptying and should be avoided.
- Wear light weight and light colored clothing
- Avoid wearing articles that prevent water absorption
- Early morning commonly produces a humid environment and lower temperatures. Usually, as the sun rises, the temperature will increase and the humidity decreases. As the evening hours approach, the temperature decreases and the humidity will rise. Often, the most critical times to monitor athletes ability to exercise in hot weather occurs when the temperature rises quickly during the early morning prior to the sun burning off the humidity, or during storms when the humidity remains high due to cloud cover, etc.
- A mild breeze can reduce the humidity on a particular field, as well as improve the evaporative process.
- Field watering after practice sessions are complete can help reduce the ambient humidity on or near an athletic field, thus reducing the heat stress on athletes.