

Heat Guidelines & Protocols for Athletics

HEAT ACCLIMATIZATION

A proper heat-acclimatization plan in secondary school athletic programs is essential to minimize the risk of exertional heat illness during the preseason practice period. Gradually increasing athletes' exposure to the duration and intensity of physical activity and to the environment minimizes exertional heat-illness risk while improving athletic performance. Progressive acclimatization is especially important during the initial 3 to 5 days of summer practices. When an athlete undergoes a proper heat-acclimatization program, physiologic function, exercise heat tolerance, and exercise performance are all enhanced.¹⁻⁶ In contrast, athletes who are not exposed to a proper heat-acclimatization program face measurable increased risks for exertional heat illness.¹

Recommendations

1. Days 1 through 6 of the heat-acclimatization period consist of the first 6 days of formal practice. During this time, athletes may not participate in more than 1 practice per day.
2. If a practice is interrupted by inclement weather or heat restrictions, the practice should recommence once conditions are deemed safe. Total practice time should not exceed 3 hours in any 1 day.
3. A 1-hour maximum walk-through is permitted during days 1-6 of the heat-acclimatization period. However, a 3-hour recovery period should be inserted between the practice and walk-through (or vice versa).
4. During days 1-3 of the heat-acclimatization period, in sports requiring helmets or shoulder pads, a helmet should be the only protective equipment permitted (goalies, as in the case of field hockey and related sports, should not wear full protective gear or perform activities that would require protective equipment).
5. During days 4 & 5, only helmets and shoulder pads should be worn.
6. On day 6, all protective equipment may be worn and full contact may begin.
 - a. Football only: On days 4 & 5, contact with blocking sleds and tackling dummies may be initiated.
 - b. Full-contact sports: 100% live contact drills should begin no earlier than day 6.
7. Beginning no earlier than day 6 and continuing through day 14, double-practice days must be followed by a single-practice day. On single-practice days, 1 walk-through is permitted, separated from the practice by at least 3 hours of continuous rest. When a double-practice day is followed by a rest day, another double-practice day is permitted after the rest day.
8. On a double-practice day, neither practice should exceed 3 hours in duration, and student-athletes should not participate in more than 5 total hours of practice. Warm-up, stretching, cool-down, walkthrough, conditioning, and weight-room activities are included as part of the

practice time. The 2 practices should be separated by at least 3 continuous hours in a cool environment.

PREVENTION OF EXERTIONAL HEAT ILLNESS

Athletes should remain well hydrated and replace fluids lost through sweat during activity, including conditioning/training sessions, practices and games. It should be emphasized that athletes should have free access to readily available fluids at any time, not just during breaks. It is imperative that relevant personnel be trained in prevention, signs and symptoms, and treatment of exertional heat illness.²

When high temperatures and/or humidity is forecasted, those supervising practices and competitions should make accommodations based on these conditions, including:

- Increasing frequency and duration of water breaks
- Increasing frequency and duration of rest breaks
- Reducing the amount of equipment worn during activity
- Modifying total amount of time engaged in practice
- Changing activity location

Signs and Symptoms of Dehydration

- Thirst
- Irritability
- General discomfort
- Headache
- Weakness
- Dizziness
- Cramps
- Chills
- Vomiting
- Nausea
- Decreased performance

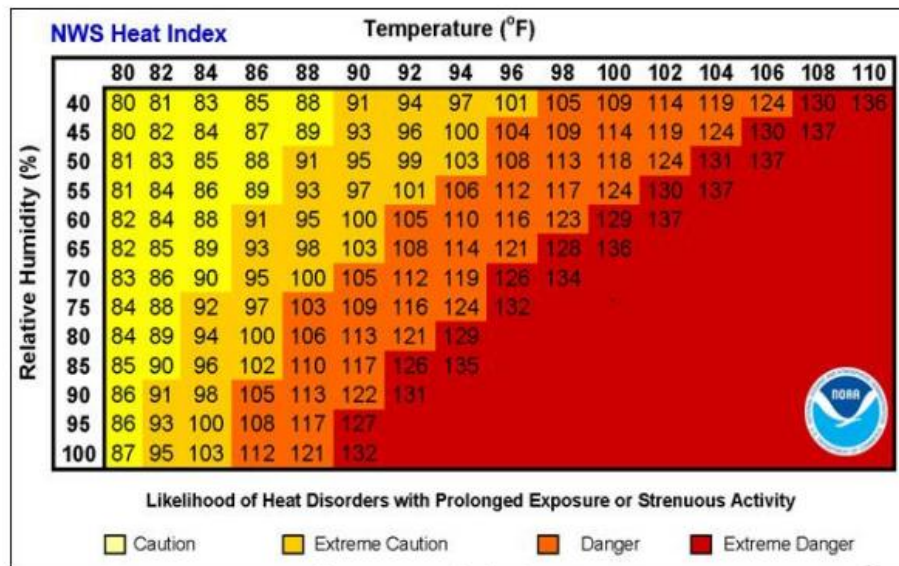
Recommendations for Fluid Replacement

- Establish a fluid replacement protocol that meets the needs of the athlete and the sport.
- Supervised monitoring of pre and post practice weight.
- Restrict or modify activity of those athletes who are not within 1% of their previous day's pre-practice weight.
- During activity, 7-10 oz of fluid should be taken in every 10-20 minutes.³
- Water should be available at all times and access should never be denied to exercising individuals.
- Athletes should replace fluid at 24 oz per pound lost.

WET BULB TEMPERATURE (WBT) and WET BULB GLOBE TEMPERATURE (WBGT) PARTICIPATION RECOMMENDATIONS

Level	WBT	WBGT	Duration	Fluid Consumption	Practices
1	<66°	<80°	3 hours maximum	Insist that adequate fluid be ingested	Full gear; minimum of 2 water breaks per hour
2	66.0°-74.9°	80.0°-82.4°	3 hours maximum	Insist that 4 – 6 oz fluid be ingested every 20 minutes	Full gear; minimum of 3 water breaks per hour
3	75.0°-76.9°	82.5°-84.9°	3 hours maximum	Insist that 6 – 8 oz fluid be ingested every 20 minutes	Remove helmets unless active in drill; monitor athletes, rest as needed.
4	77.0°-78.9°	85.0°-87.4°	3 hours maximum, every 45 minutes of work ≥ 15 minutes of rest each hour*	Insist that 8 – 10 oz fluid be ingested every 15 minutes	No equipment during non-contact drills; remove helmet unless active in drill, remove pads when teaching or non-contact portions of practice exceed 10 minutes in length
5	79.0°-80.9°	87.5°-89.9°	3 hours maximum every 45 minutes of work ≥ 20 minutes of rest each hour*	Insist that 8 – 10 oz fluid be ingested every 15 minutes.	Shirt and shorts only, no helmets or equipment; reduce intensity of activity, no equipment or helmets
6	81.0° +	90.0° +	NO OUTDOOR PRACTICES, SCRIMMAGES or COMPETITIONS	Re-hydrate 24 oz for every pound of body weight loss per day.	Practices conducted indoors must follow the Heat Policy

HEAT INDEX PARTICIPATION RECOMMENDATIONS



Heat Index	Recommendations
105° and up	No outdoor activities
95° to 104°	No equipment (helmets, shoulder pads, etc.) during activity
90° to 94°	Equipment removed as often as possible (during rest breaks, while on sideline, etc.). Careful monitoring for signs of heat illness.
Below 89°	Unrestricted access to water during all practices and competitions; breaks every 20 to 30 minutes.

TYPES OF EXERTIONAL HEAT ILLNESS

Exercise Associated Muscle Cramp²

Exercise associated muscle cramps are sudden or sometimes progressively and noticeably evolving, involuntary, painful contractions of skeletal muscle during or after exercise. These cramps are sometimes incorrectly termed heat cramps, as these cramps are not directly related to elevated body temperature and can present during exercise in warm, cool or temperature-controlled environments, though excessive sweating is often present. Proposed contributing factors to exercise associated muscle cramps are as followed: dehydration, electrolyte imbalances, altered neuromuscular control, fatigue or any combination of these factors.

Signs and Symptoms

- Visible cramping in part or all of the muscle (group)
- Localized pain
- Dehydration
- Thirst
- Sweating
- Fatigue

Treatment

- Rest
- Passive Stretching
- Rehydration using a high sodium/carbohydrate beverage

Heat Syncope²

Heat syncope often occurs in unfit or heat-unacclimatized people who stand for a long period of time in the heat or during sudden changes in posture (moving from sitting to standing) in the heat. This condition is often attributed to dehydration, venous pooling of blood and low blood pressure. Heat syncope often occurs in the first five days of unaccustomed heat exposure, before blood volume expands and cardiovascular adaptations are complete, and in those with heart disease or taking diuretics.

Signs and Symptoms

- Dizziness
- Tunnel vision
- Pale or clammy skin
- Decreased pulse rate

Treatment

- Move athlete to shaded or cool, indoor area
- Monitor vital signs

- Allow athlete to rest lying on their back
- Elevate legs above heart
- Cool athlete
- Rehydrate

Heat Exhaustion²

Heat exhaustion is the inability to effectively exercise in the heat, secondary to a combination of factors, including cardiovascular insufficiency, low blood pressure, energy depletion and central fatigue. This condition is manifested by an elevated core body temperature, usually less than 105 degrees F, and is often associated with a high rate or volume of skin blood flow, heavy sweating and dehydration. It often occurs in hot or humid (or both) conditions, but it can also occur in normal environmental conditions with intense physical activity. Heat exhaustion occurs most often in individuals who are heat-unacclimatized or dehydrated.

Signs and Symptoms

- Excessive fatigue
- Syncope
- Collapse
- Headache
- Dizziness
- Confusion
- Vomiting
- Nausea
- Lightheadedness
- Low blood pressure

Treatment

- Remove equipment and clothing to facilitate cooling
- Move to a cool, shaded or indoor area
- Cool with cold towels and fans as needed
- Monitor vital signs
- Have athlete rest lying on their back
- Elevate legs above heart
- Activate EMS if athlete does not show signs of improvement within 30 minutes

Exertional Heat Stroke^{2,3}

Exertional heat stroke is the most severe heat illness and is characterized by neurological impairment combined with a core body temperature above 105 degrees. This condition is a product of the body's heat production due to exercise and or inhibited heat loss. While exertional heat illness most often occurs in hot,

humid weather, it can also present due to intense physical activity in the absence of extreme environmental conditions. The risks of morbidity and mortality increase the longer that athletes body temperature remains elevated above 105 degrees, while risk of morbidity and mortality are greatly reduced if body temperature is lowered promptly after onset.

Signs and Symptoms

- Central nervous system dysfunction
- Core body temperature above 105 degrees
- Disorientation
- Confusion
- Dizziness
- Loss of balance
- Staggering
- Irritability
- Irrational or unusual behavior
- Apathy
- Aggressiveness
- Hysteria
- Delirium
- Collapse
- Loss of consciousness
- Coma
- Hot, sweaty skin
- Hot, dry skin
- Dehydration
- Hypotension
- Hyperventilation

Treatment

- MEDICAL EMERGENCY- activate EMS per emergency action plan
- Remove excess clothing and equipment
- Cold water immersion until core body temperature reaches 102 degrees or athlete begins to shiver

REFERENCES

1. Casa, DJ, Csillan D. Preseason Heat-Acclimatization Guidelines for Secondary School Athletics. J Athl Train. 2009;44(3):332-333.
2. Casa, DJ, DeMartini JK, Bergeron MF, et al. National Athletic Trainers' Association Position Statement: Exertional Heat Illness. J Athl Train. 2015;50(9):986-1000.
3. Casa, DJ, Almquist, JL, Anderson, SA, et al. The Inter-Association Task Force for Preventing Sudden Death in Secondary School Athletics Programs: Best-Practices Recommendations. J Athl Train. 2013;48(4):546-553.
4. Casa, DJ, Armstrong, LE, Hillman, SK, et al. National Athletic Trainers' Association Position Statement: Fluid Replacement for Athletes. J Athl Train. 2000;35(2):212-224.