

Hawaii High School Athletic Association Heat Acclimatization and Practice Policy

May 2017

Prepared by
Hawaii Athletic Trainers Association, Secondary Schools Committee
Ad Hoc Committee on Heat Illness
and
HHSAA Sports Medicine Advisory Committee

Table of Contents

Introduction	3
Definitions	4
Heat Acclimatization Rules	
Football	5
All Other Sports	7
Monitoring of Temperature and Humidity	8
Preparation for Heat Illness	
Signs and Symptoms	10
Treatment	10
Education and Awareness	12
Administrator’s Responsibility	12
Frequently Asked Questions	13
Resources	16
Appendix	4
I. List of States and Organizations with Heat Acclimatization Guidelines.....	18
II. Fundamentals of a Heat Acclimatization Program	19
III. Sample Emergency Action Plan for Heat Illness	21
IV. Hydration Strategies to Prevent Heat Illness.....	22
V. Urine Color Chart: How Hydrated Are You?	23
VI. Monitoring Core Temperature- How to Use a Rectal Thermometer	24
VII. Sick Cell Trait (SCT).....	25

Introduction

Participation in any sport is associated with inherent risks. The establishment of rules and guidelines will help to reduce these risks of injury. Each year, high school athletes experience serious injuries, and even death, as a result of heat-related illnesses. Exertional heat stroke is the second leading cause of death in sports after cardiac conditions, according to the National Center for Catastrophic Sports Injury Research, 2009. That statistic becomes more alarming given that heat-related illness and death are almost entirely preventable. The need to dramatically increase awareness of the issue, recognize the symptoms of heat illness, and treatment of suspected cases has become a focus for early season practice routines. The National Federation of State High School Associations (NFHS) has placed an emphasis on reducing the incidence of heat-related illness by encouraging its members to establish guidelines and increase educational efforts. Heat Acclimatization is a complex series of adaptive responses that demonstrate improved homeostatic balance in multiple organs and usually requires 10 to 14 days for responses to develop adequately (Casa, D & Stearns R, Emergency Management for Sport and Physical Activity, 2015).

The Korey Stringer Institute's (www.ksi.uconn.edu) mission is to educate the public and health care professionals about life-threatening situations such as heat stroke, and concussions. According to the KSI, in 2003, the NCAA began implementing heat acclimatization guidelines. Since the NCAA instituted these guidelines there has only been 1 death in collegiate football during the pre-season period, when there had been an average of 1-2 every pre-season (saving a projected 15 lives). In 2009 the National Athletic Trainers' Association (NATA) released guidelines very similar to those of the NCAA. Since the guidelines have been released, KSI has been working with many state athletic associations in the adoption of the guidelines for high schools as well as other sport levels.

In states that have passed these heat acclimatization guidelines, there have been ZERO heat-related deaths in high school athletics.

Definitions

1. Heat Acclimatization period: This 14 calendar day period begins during the first day of the HHSAA start date calendar for the designated sport or the first day an athlete reports to practice, if this is a later date than the designated sport start date. This period of time applies to all student-athletes participating in HHSAA-sanctioned sports. The goal of this period is to enhance an individual's exercise heat tolerance and ability to exercise safely and effectively in warm to hot conditions.
2. Contact definitions:
 - a. Air. Players run a drill unopposed without contact, with no resistance
 - b. Bags. Drill is run against a bag or another soft-contact surface.
 - c. Control. Drill is run assigned speed until the moment of contact; one player is predetermined the "winner" by the coach. Contact remains above the waist and players stay on their feet. This applies to simulations and drills involving any number of players.
 - d. Thud. Drill is run at assigned speed through the moment of contact; no predetermined "winner." Contact remains above the waist, players stay on their feet and a quick whistle ends the drill. This applies to simulations and drills involving any number of players.
 - e. Live Action. Drill is run in game-like conditions and is the only time that players are taken to the ground. This applies to simulations and drills involving any number of players
3. Practice. A period of time a student-athlete engages in physical activity during a supervised, school-approved sports or conditioning-related activity. Each individual practice should last no more than 3 hours. The following are all included in the 3 hour time period: warm-ups, stretching, weight training, and cool-down periods. Film and chalk talk are not considered physical activity and thus not a part of the 3 hour limit in practice.
4. Walk-Through. A teaching opportunity when an athlete is not wearing any protective equipment, including but not limited to helmets, shoulder pads, catcher's gear or shin guards, or using other sports-related equipment (e.g., footballs, blocking sleds, pitching machines, soccer balls, marker cones).
5. Recovery Time. The time between the end of one practice or walk-through and the beginning of the next practice or walk-through. Recovery time between practices should be done in a cool environment when possible.
6. Controlled Scrimmage.
 - a. At least one coach from each team must be on the field for the purpose of instruction.
 - b. No official scorekeeper, timekeeper, or "game clock" can be used.
 - c. The event is to be conducted as a practice, and, therefore must follow practice guidelines and the allotted time of a maximum of 3 hours. The coaches are allowed to stop play from time to time to make observations and provide instruction on player positioning, etc.
 - e. No uniforms will be used
 - f. No admission fee will be charged.

Heat Acclimatization and Practice Rules for Football

All practices shall allow for unrestricted water breaks and general acclimatization to hot and/or humid weather. Ample amounts of water shall always be available and a student's access to water shall not be restricted (see Appendix IV, Hydration Strategies to Prevent Heat Illness)

All Football players shall have a 14-Calendar Day heat acclimatization period (If a student athlete misses a day(s) they must restart their heat acclimatization period from the day they missed):

All Football players shall have a 14-Calendar Day heat acclimatization period:

1. At the start of each football season all students on their first five days of practice will only have one practice per day and practices shall not exceed 3 hours.¹ Practice includes warm-ups, cool down, weight training, conditioning, and walk-through.
 - a. On days 1-2 students shall only wear helmets with no contact during these practices.
2. On days 3-7 students may wear helmets and shoulder pads. Contact only with blocking sleds and dummies (see below 1.a.i-ii). No tackling to the ground. Tackling/blocking techniques should be emphasized.
3. On days 8-14, students may participate in multiple practices per day but not on consecutive days.
 - a. Each multiple practice day must be followed by a single practice day or total rest day.
 - b. If a multiple practice day is followed by a rest day then a multiple practice day is allowed.
 - c. On days with multiple practice sessions, students shall not engage in more than 5 hours of total practice, including warm-ups, cool-down, weight training, conditioning, and walk-through. Neither practice should exceed 3 hours.
 - d. Contact shall be limited to only one of the practice sessions.
 - e. On days with multiple practices, each practice must be separated by at least 3 hours of recovery time. During the recovery time students may not engage in other physical activity (i.e. weight training, walk-through, conditioning). Recovery time between practices should be done in a cool environment when possible.
 - f. Scrimmages are allowed starting on day 11.
4.
 - a. During this time period, students may participate in contact practice in which full football gear may be worn.
(Source, NATA, JAT June 2009)

Beginning the third week of the football season until the state championship game:

1. Students may participate in a maximum of three days of full contact each week, excluding games. Practices shall not exceed 3 hours.

¹ Official start of practice will be determined by each league. Meaning, for purposes of Heat Acclimatization, practice may begin during the yellow period of the HHSAA Start Date Calendar if approved by a member school's league.

- a. No-Contact or light contact
 - i. Air. Players run a drill unopposed without contact with no resistance.
 - ii. Bags. Drill is run against a bag or another soft-contact surface.
 - iii. Control. Drill is run at assigned speed until the moment of contact; one player is predetermined the “winner” by the coach. Contact remains above the waist and players stay on their feet. This applies to simulations and drills involving any number of players.
 - b. Contact (no more than 2-3 practices per week. No more than 30 minutes per day and no more than 60-90 minutes per week)
 - i. Thud. Drill is run at assigned speed through the moment of contact; no predetermined “winner”. Contact remains above the waist, players stay on their feet, and a quick whistle ends the drill. This applies to simulations and drills involving any number of players.
 - ii. Live Action. Drill is run in game-like conditions and is the only time that players are taken to the ground. This applies to simulations and drills involving any number of players.
- *Source USA Football. <http://usafootball.com/health-safety/levels-of-contact>*
- c. First game is allowed on or after day 18.
2. A student may practice, scrimmage, or participate in pre-season or in-season games for no more than 6 consecutive days without a rest day. A rest day must be complete rest (no organized team activity is allowed).

Off-season, (spring football):

1. To minimize the student’s total exposure to head impacts and concussion risk, off-season conditioning and spring football shall consist of learning opportunities for skill and physical development. No equipment shall be worn and no contact shall occur during this time.

**Source: NFHS 2014 Recommendations and Guidelines for Minimizing Head Impact*

Heat Acclimatization and Practice Rules for All Other Sports

All practices shall allow for unrestricted water breaks and general acclimatization to hot and or humid weather. Ample amounts of water shall always be available and a student's access to water shall not be restricted (see Appendix IV).

All student athlete shall have a 14-Calendar Day heat acclimatization period (If a student athlete misses a day(s) they must restart their heat acclimatization period from the day they missed):

1. At the start of each season, all students, on their first five days of practice, shall only have one practice per day and practices shall not exceed 3 hours. Practice includes warm-ups, cool down, conditioning, weight training, and walk through.
2. On days 6-14, students may participate in multiple practices per day but not on consecutive days.
 - a. Each multiple practice day must be followed by a single practice day or total rest day.
 - b. If a multiple practice day is followed by a rest day then a multiple practice day is allowed.
 - c. On days with multiple practice sessions, students shall not engage in more than 5 hours of total practice, including warm-ups, cool down, conditioning, weight training and walk-through. Neither practice shall exceed 3 hours.
 - i. Contact shall be limited to only one of the practice sessions.
 - d. On days with multiple practices, each practice must be separated by at least 3 hours of recovery time. During the recovery time students may not engage in other physical activity (i.e. weight training, walk-through, conditioning). Recovery time between practices should be done in a cool environment when possible.
3. First scrimmage /game is allowed on day 6 (To be implemented in 2018-2019 school year, subject to approval). A student may practice for no more than 6 consecutive days without a rest day. A rest day must be complete rest (no organized team activity is allowed).

Beginning the third week of the season until their state championship game:

4. Students may participate in multiple practices per day but not on consecutive days.
 - a. Each multiple practice day must be followed by a single practice day or total rest day.
 - b. If a multiple practice day is followed by a rest day, then a multiple practice day is allowed.
 - c. On days with multiple practice sessions, students shall not engage in more than 5 hours of total practice, including warm-ups, cool-down, conditioning, weight training and walk-through. Neither practice should exceed 3 hours.
 - i. Contact shall be limited to only one of the practice sessions.

- d. On days with multiple practices, each practice must be separated by at least 3 hours of recovery time. During the recovery time students may not engage in other physical activity (i.e. weight training, walk-through, conditioning). Recovery time between practices should be done in a cool environment when possible.
5. A student may practice, scrimmage, or participate in pre-season or in-season games for no more than 6 consecutive days without a rest day. A rest day must be complete rest (no organized team activity is allowed including “optional” voluntary workouts).

Monitoring of Temperature and Humidity

A schools' designee can monitor temperature and humidity in a variety of ways. However, best practice is to utilize wet bulb global thermometer which is a device that monitors temperature, wet bulb global temperature, relative humidity, and wind speed (i.e., Kestrel heat monitor). A sling psychrometer may be used to establish relative humidity and temperature from which the heat index can be used to determine practice modifications.

To provide flexibility due to available equipment, each school may choose one of the following charts to determine practice modifications or cancellations.

Wet Bulb Globe Temperature (WBGT) Chart

WBGT °F	Activity Guidelines	Rest Break Guidelines
<82	Normal Activities.	Provide at least 3 separate rest breaks each hour of minimum of 3 minutes.
82-86.9	Use discretion for intense or prolonged exercise; watch at-risk players carefully	Provide at least 3 separate rest breaks each hour of a minimum of 4 minutes.
87-89.9	Maximum practice time is 2 hours. For football: players restricted to helmets, shoulder pads, and shorts during practice. All protective equipment must be removed for conditioning activities.	Provide at least 4 separate rest breaks each hour of a minimum of 4 minutes.
90-92	Maximum length of practice is one hour, no protective equipment may be worn during practice, and there may be no conditioning activities.	There must be 20 minutes of rest breaks provided during the hour of practice.
>92.1	No outdoor workouts	Cancel exercise; delay practices until a cooler WBGT reading occurs.

Georgia High School Athletic Association
Source NATA, JAT September 2015

Heat Index Chart



<p>≥105°F</p> <p>DANGER</p>	<ul style="list-style-type: none"> • Stop all outside activities and inside activities if air conditioning unavailable.
<p>≥ 100 °F to < 105°F</p> <p>WARNING</p>	<ul style="list-style-type: none"> • Alter uniform by removing items if possible--allow for changes to dry t-shirts and shorts. • Contact sports and activities with additional equipment--helmets and other possible equipment removed, if not involved in contact or necessary for safety. • Reduce time of planned outside activity as well as indoor activity if air conditioning is unavailable. • Provide ample amounts of water. • Water should always be available and athletes should be able to take in as much water as they desire. • Watch/monitor athletes for necessary action.
<p>≥ 95 °F to < 100°F</p> <p>CAUTION</p>	<ul style="list-style-type: none"> • Contact sports and activities with additional equipment---helmets and other possible equipment removed if not involved in contact or necessary for safety.
<p>≥ 80°F to < 95°F</p> <p>NOTICE</p>	<ul style="list-style-type: none"> • Provide ample amounts of water. • Water should always be available and athletes should be able to take in as much water as they desire.
<p><80°F</p> <p>SAFE</p>	<ul style="list-style-type: none"> • Provide ample amounts of water.

Source: Oregon School Activities Association (<http://www.osaa.org/heatindex>)

Preparation for Heat Illness

1. Measure Wet Bulb Globe Temperature or relative humidity and temperature.
2. List of equipment that should be available
 - a. Ice
 - b. Coolers with water and ice
 - c. Tub, tarp, wading pool
 - d. Blood Pressure cuff/stethoscope
 - e. Pulse oximeter
 - f. Rectal thermometer
 - g. AED (Automated External Defibrillator)
 - h. Location for cooling
3. Written EAP (written and practiced)

Treatment (source NATA, JAT September 2015)

<u>Heat Illness</u>	<u>Signs and Symptoms</u>	<u>Treatment</u>
<u>Heat Cramps</u>	<ul style="list-style-type: none"> • Dehydration • Thirst • Sweating • Transient muscle cramps • Fatigue 	<ul style="list-style-type: none"> • Stop activity • Replace fluids • Mild stretching of area containing muscle spasm • If available, provide sports drinks that contain sodium • Recumbent position may allow more rapid redistribution of blood flow to cramping leg muscles
<u>Heat Syncope</u>	<ul style="list-style-type: none"> • Dehydration • Fatigue • Tunnel vision • Pale or sweaty skin • Decreased pulse rate • Dizziness • Lightheadedness • Fainting 	<ul style="list-style-type: none"> • Move student athlete to shaded area • Monitor vital signs • Elevate legs above level of the head • Rehydrate
<u>Heat Exhaustion</u>	<ul style="list-style-type: none"> • Normal or elevated body core temperature • Dehydration • Dizziness • Lightheadedness • Syncope • Headache • Nausea 	<ul style="list-style-type: none"> • If feasible, measure core temperature and assess cognitive function and vital signs • If temperature elevated, remove excessive clothing to facilitate cooling • Remove student athlete to cool or shaded area, if possible

	<ul style="list-style-type: none"> • Diarrhea • Decrease urine output • Persistent muscle cramps • Pallor • Profuse sweating • Chills • Cool, clammy skin • Weakness • Hyperventilation 	<ul style="list-style-type: none"> • Cool with fans, ice towels, ice bags or whole body immersion in appropriate device • Start fluid replacement • Transfer to physician or Emergency Medical System (EMS) if intravenous fluids are needed or if recovery is not rapid and uneventful
<p><u>Heat Stroke</u></p>	<ul style="list-style-type: none"> • High core temperature (>104 °F) • Central nervous system changes <ul style="list-style-type: none"> ○ Dizziness ○ Drowsiness ○ Irrational or unusual behavior ○ Confusion ○ Irritability ○ Emotional instability ○ Hysteria ○ Apathy ○ Aggressiveness ○ Delirium ○ Disorientation ○ Staggering ○ Seizures ○ Loss of consciousness ○ Coma • Dehydration • Weakness • Hot and wet or dry skin • Tachycardia (100 to 120 Beats per minute) • Hypotension (Blood Pressure < 100mHG) • Hyperventilation • Vomiting • Diarrhea 	<ul style="list-style-type: none"> • Best Practice is measurement of Rectal Temperature (See Appendix IV: How to Use a Rectal Thermometer) to differentiate between heat exhaustion and stroke • Assess cognitive function and vital signs • Call EMS • Lower core temperature as quickly as possible <ul style="list-style-type: none"> ○ Remove equipment and clothing ○ Best practice is full body cold water immersion (35 °F to 59 °F) <ul style="list-style-type: none"> ▪ Immersion tub, wading pool, taco wrap ▪ Keep circulating water to enhance cooling ▪ Monitor cooling every 5 to 10 minutes ▪ Once temperature is 101 °F to 102°F, the student athlete should be removed ○ Alternative methods of cooling: sponging down, ice towels, ice bags, and fanning the body ○ Transport once temperature is below 102°F

Education and Awareness

Students shall:

1. Monitor their body weight before and after practice to ensure they are replacing fluids lost, especially during hot and humid events (practices and games).
2. Monitor the color of their urine to ensure proper hydration levels. (See Appendix V): Urine Color Chart: How Hydrated Are You?)
3. Replace fluids with water and/or sports drinks to replace fluids and electrolytes.
4. Be encouraged to get 6 to 8 hours of sleep and eat a well-balanced diet.

Annually Coaches shall:

1. Attend an educational session approved by the HHSAA, watch HHSAA Heat Acclimatization DVD at annual coaches' meeting, or take NFHS online Heat Illness Prevention course (<http://nfhslearn.com/courses/34000>).

Administrator's (AD and/or School) Responsibility

Administrators shall enforce if temperatures are in danger zones:

1. School's designee shall notify coaches of temperature and humidity and the type of modifications or cancellations that should be implemented. Coaches may not overrule the modifications.
2. Coaches shall provide the appropriate rest breaks and water for students.
3. Coaches and athletic trainers shall monitor students at high risk of heat stroke.

Penalties and/or Sanctions TBD by HHSAA
Monitoring and Reporting TBD by HHSAA

Frequently Asked Questions

1. Does this apply to all Sports?

Yes

2. Who will monitor the temperature (WBGT or sling psychrometer)?

Each school shall designate an individual.

3. Who will perform the rectal temperature?

The athletic trainer.

4. Who is responsible to ensure student athletes are monitoring their weight before and after practices?

Each school shall designate an individual.

5. Does this policy apply to games?

No. Based upon research conducted in other states, the consensus of most high school athletic associations is that there are enough built-in opportunities for players to get rest and hydration breaks during the course of a game. Everyone on a team is not participating vigorously at the same time. Officials, coaches, and athletic trainers are able to monitor players more closely than in practice where all athletes are practicing at the same time. Athletic administrators and officials already have the ability to alter and reschedule games if needed. Officials may also extend the length of time outs or halftimes to allow more opportunities for hydration and rest. However, these policies do apply to scrimmages (which are considered practices) as they often are scheduled early in the acclimatization period when players are at higher risk.

6. How often should the WBGT readings be taken?

This will vary based on environmental conditions. Readings will need to be taken prior to the start of practice to determine what type of practice is permissible. Multiple readings may be necessary if temperature and humidity are increasing during the course of practice.

7. What is the best placement of the wet bulb thermometer when measuring temperature. Where the wet bulb can get a fair reading of the current temperature, ideally near where the student athletes are the most during practice, but this is not always safe for the wet bulb thermometer.
8. What is the best practice for weighing students in and out, how long does this have to happen, ie only during acclimatization period or all season long? What change in weight is okay? For those that are weighing student athletes in and out; The next day's weight should be within 1-2% of the previous days weigh in weight. We want them to get rehydrated.
9. Is there a 3 hour time limit during practice after week three? Yes it will be made clear in an update.
10. When can pre-season tournaments start, can it start during the acclimatization period. For this school year 2017-2018 pre-season tournaments start dates are determined by each league.
11. What happens if a student athlete misses a day in the acclimatization period, do they need to make that day up, who keeps track of the athletes and their practices during the heat acclimatization period? This should be the coaches responsibility, athletic directors and athletic trainers are there to assist.
12. If its too hot during the acclimatization period example during days 3-5 and they can't get 3 days in top half /shoulder pads, can they still go in full pads on day 6? Yes.
13. Who is in charge of monitoring the length of practice and how much contact is being done? This is the coaches and AD's responsibility

Resources

Position Statements:

Binkley, Helen, Joseph Beckett, Douglas Casa, Douglas Kleiner, and Paul Plummer. "National Athletic Trainers' Association Position Statement: Exertional Heat Illnesses." *Journal of Athletic Training*. National Athletic Trainers Association, July-Sept. 2002. 37(3): 329-343..

Casa DJ, Armstrong LE, Hillman SK, et al. National Athletic Trainers' Association position statement: Fluid replacement for athletes. *Journal of Athletic Training*. 2000; 35(2): 212-224.

Casa DJ, Csillan D. Preseason heat-acclimatization guidelines for secondary school athletics. *Journal of Athletic Training*. 2009; 44(3): 332-333.

National Federation of State High School Associations. Fluid replacement and dehydration. *Sports Medicine Handbook, 4th Edition*. 2011; 64-66.

NATA Consensus statement: Sickle cell trait and the athlete, June 2007.

National Federation of State High School Associations Sports Medicine Advisory Committee, Heat acclimatization and heat illness prevention position statement, April 2012.

NFHS Sports Medicine Handbook, Fourth edition May 2011

State and National Associations:

Korey Stringer Institute

National Federation of State High School Associations (NFHS)

Georgia High School Association_Heat policy: <http://www.ghsa.net/practice-policy-heat-and-humidity>

Kansas State High School Athletic Association

National Athletic Trainers Association

Oregon State High School Athletic Association

USA Football

Weblinks:

<http://ksi.uconn.edu/prevention-strategies/heat-acclimatization/>

<http://www.kshsaa.org/Public/PDF/Heat.pdf>

[https://www.ue.org/Libraries/Shared_RML/You Asked UE Sickle Cell -- 07-10.sflb.ashx](https://www.ue.org/Libraries/Shared_RML/You_Asked_UE_Sickle_Cell_--_07-10.sflb.ashx)

[http://www.cchoe.com/pdf/Model Policy for Heat Acclimatization Guidelines1.pdf](http://www.cchoe.com/pdf/Model_Policy_for_Heat_Acclimatization_Guidelines1.pdf)

<http://www.nata.org/sites/default/files/ExternalHeatIllnesses.pdf>

Oregon State Athletics Association: http://www.osaa.org/governance/handbooks/osaa#_Toc393093199

[https://www.ue.org/Libraries/Shared_RML/You Asked UE Sickle Cell -- 07-10.sflb.ashx](https://www.ue.org/Libraries/Shared_RML/You_Asked_UE_Sickle_Cell_--_07-10.sflb.ashx)

<http://usafootball.com/health-safety/levels-of-contact>

NATIONAL ATHLETIC TRAINERS' ASSOCIATION (NATA) PRESEASON HEAT-ACCLIMATIZATION GUIDELINES FOR SECONDARY SCHOOL ATHLETICS CONSENSUS STATEMENT

<http://www.nata.org/jat/readers/archives/44.3/attr-44-03-332.pdf>

Appendix I: List of states and organizations that have implemented heat acclimatization guidelines

State/Entity	Date Guidelines Were Adopted
NCAA	May, 2003
New Jersey	May, 2011
National Football League	July, 2011
Texas	October, 2011
North Carolina	February, 2012
Georgia	March, 2012
Arkansas	June, 2012
Florida	June, 2012
Arizona	June, 2012
Connecticut	March, 2013
Iowa	April, 2013
Missouri	May, 2013
Utah	August, 2013
Mississippi	August, 2013
Alabama	June, 2014

Appendix II: Fundamentals of a Heat Acclimatization Program

Fundamentals of a Heat Acclimatization Program

1. Physical exertion and training activities should begin slowly and continue progressively. An athlete cannot be “conditioned” in a period of only two to three weeks.
 - A. Begin with shorter, less intense practices and training activities, with longer recovery intervals between bouts of activity.
 - B. Minimize protective gear (helmets only, no shoulder pads) during the first several practices, and introduce additional uniform and protective gear progressively over successive days.
 - C. Emphasize instruction over conditioning during the first several practices.

Rationale: The majority of heat-related deaths happen during the first few days of practice, usually prompted by doing too much, too soon, and in some cases, with too much protective gear on too early in the season (wearing helmet, shoulder pads, pants and other protective gear). Players must be allowed the time to adapt safely to the environment, intensity, duration, and uniform/equipment.

2. Keep each athlete’s individual level of conditioning and medical status in mind and adjust activity accordingly. These factors directly affect exertional heat illness risk.

Rationale: Athletes begin each season’s practices and training activities at varying levels of physical fitness and varying levels of risk for exertional heat illness. For example, there is an increased risk if the athlete is obese, unfit, has been recently ill, has a previous history of exertional heat illness or has Sickle Cell Trait.

3. Adjust intensity (lower) and rest breaks (increase frequency/duration), and consider reducing uniform and protective equipment, while being sure to monitor all players more closely as conditions are increasingly warm/humid, especially if there is a change in weather from the previous few days.

Rationale: Coaches must be prepared to immediately adjust for changing weather conditions, while recognizing that tolerance to physical activity decreases, and exertional heat illness risk increases, as the heat and/or humidity rise. Accordingly, it is imperative to adjust practices to maintain safety and performance.

Use the heat index or wet bulb globe temperature charts on the following pages as a general guide in determining when activity modifications are necessary.

4. Athletes must begin practices and training activities adequately hydrated.

Rationale: While proper hydration alone will not necessarily prevent exertional heat illness, it will decrease risk.

(See Appendix II: Hydration Strategies to Prevent Heat Illness)

5. Recognize early signs of distress and developing exertional heat illness (EHS) and promptly adjust activity and treat appropriately. First aid should not be delayed!

Rationale: An athlete will often show early signs and/or symptoms of developing exertional heat illness. If these signs and symptoms are promptly recognized and the athlete is appropriately treated, serious injury can be averted and the athlete can often be treated, rested, and returned to activity when the signs and symptoms have resolved.

6. Recognize more serious signs of exertional heat illness (clumsiness, stumbling, collapse, obvious behavioral changes, and/or other central nervous system problems). Immediately stop activity and promptly seek medical attention by activating the Emergency Medical System (Call 911). **On-site rapid cooling should begin immediately. Additionally, the athlete's core body temperature should be monitored to determine when safe transport by EMS can begin. Best Practice is by use of a rectal thermometer. (see Appendix IV. How to use a rectal thermometer)**

Rationale: Immediate medical treatment and prompt rapid cooling can prevent death or minimize further injury in the athlete with EHS. Ideally, pools or tubs of ice water to be used for rapid cooling of athletes should be available on-site and personnel should be trained and practiced in using these facilities for rapid cooling. Ice water baths are the preferred method for rapid cooling. If ice water pools or tubs are not available, then applying ice packs to the neck, axillae and groin; and rotating ice water-soaked towels to all other areas of the body, can be effective in cooling an affected athlete.

Review the heat illness signs and symptom information in the section below (Preparing for Heat Illness).

7. An Emergency Action Plan (See Appendix III: Sample EAP for Heat Illness) with clearly defined written and practiced protocols should be developed and in place ahead of time.

Rationale: An effective Emergency Action Plan (EAP) should be in place in case of any emergency, as a prompt and appropriate response in any emergency situation can save a life. The EAP should be designed and practiced to address all teams (intermediate, junior varsity, varsity) and all practice and game sites. (Source. NATA, JAT, September 2015)

Appendix III: Sample Emergency Action Plan (EAP) for Heat Illness

A venue-specific plan should be in place, reviewed, and practiced on a regular basis. The following areas should be addressed. It is expected that there will be some variation based on location, personnel and equipment available.

Prevention

1. Pre-season screening through an annual physical examination should include questions regarding the athlete's knowledge and history of heat illness risk factors, and should be reviewed by medical staff.
2. Education for coaches and students.
3. Review of plan with coaches and school staff.

Emergency Communication

1. Describe how athletic staff will communicate initial illness, contact EMS, and contact parents/guardians.

Emergency Equipment (list equipment available and location of each per venue)

1. WBGT unit or sling psychrometer.
2. Pulse oximeter to assess heart rate and oxygen levels.
3. Blood pressure cuff.
4. Thermometer (preferably rectal thermometer)
5. Ice source available on site or in close proximity
6. AED

Emergency Management

1. Evaluate athlete and treat based on symptom determination
2. Remove athlete from current playing area
3. Cool core body temperature by cold-water immersion
4. Activate EAP for venue
5. Provide EMS with appropriate information and/or permission-to-treat form

Return to Play (See NATA, JAT September 2015)

1. A period of 7 to 21 days of inactivity is recommended
2. No return to activity until cleared by physician and asymptomatic
3. Activity progression at low intensity in cool environment and slowly progress to high intensity under medical supervision


Appendix IV: Hydration strategies to Prevent Heat Illness

Proper **HYDRATION** and **ACCLIMATIZATION** practices stand out as the two primary prevention methods for decreasing the risk of heat illness. The following are some basic hydration principles to follow:

Appropriate hydration before, during and after exercise is important for maintaining peak athletic performance. Fluid losses of as little as 2% of body weight (less than 4 pounds in a 200-pound athlete) can impair performance by increasing fatigue. This is important because it is common for some athletes to lose between 5-8 pounds of sweat during a game or intense practice. It is easy for athletes to become dehydrated if they don't drink enough to replace what is lost in sweat.

Recognize and respond to early warning signs of dehydration.

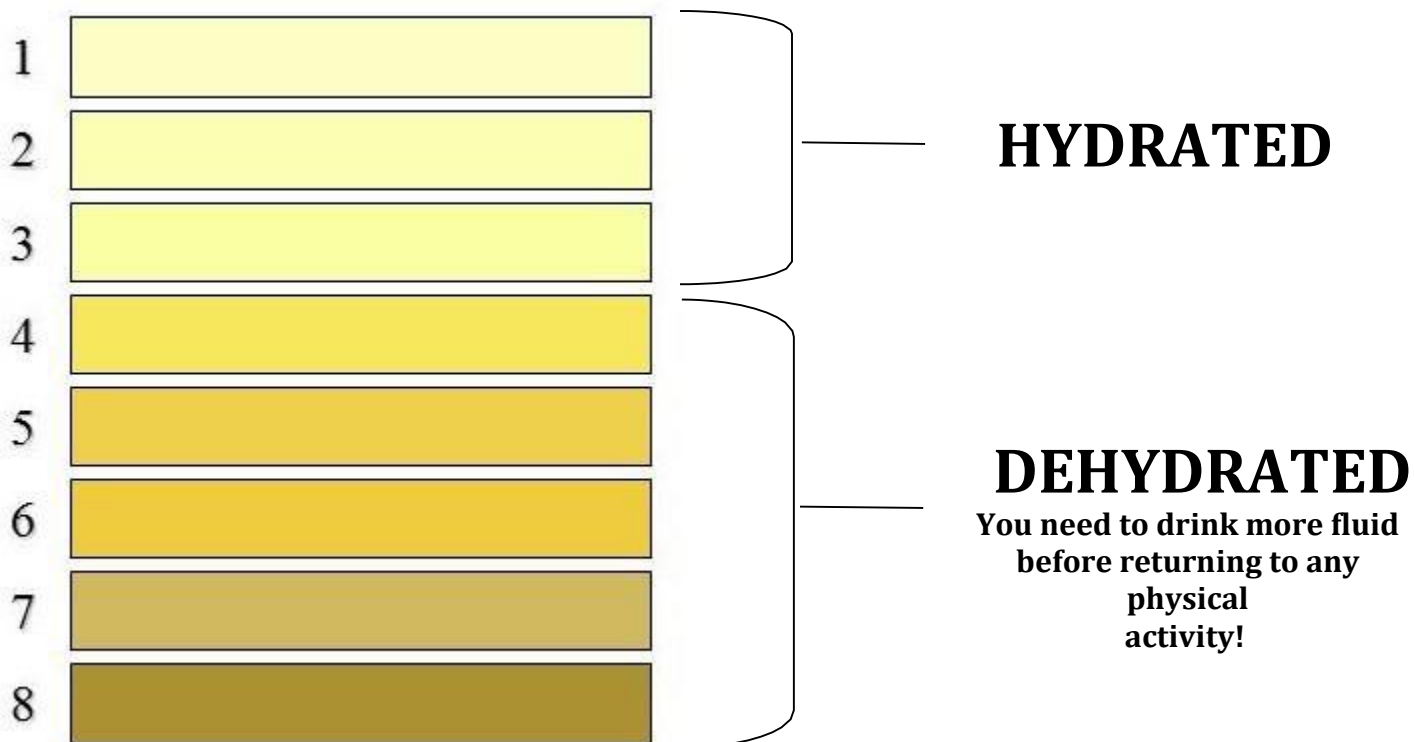
- **DRINK EARLY** and **DRINK OFTEN** during activity. Do not let athletes rely on thirst. Schedule frequent fluid breaks for re-hydrating. If athletes wait until they are thirsty it may be too late.
- Athletes should be weighed before and after warm weather practices. They need to drink appropriate amounts of fluid for the amount of weight lost. Also, use a urine color chart to determine hydration levels before activity.
- Encourage GOOD hydration choices: **water, sport drinks with low sodium and carbohydrates,**
AVOID: soda, fruit juices, carbonated beverages, and caffeine and "energy drinks".
- Encourage drinking fluids, not pouring them. Dumping fluid over the head won't help restore body fluids or lower body temperature.
- Provide easily accessible fluids.

Before Exercise	Drink 16 oz. of fluid before activity/exercise (2 hours) Drink another 8-16 oz. of fluid 10-15 minutes before exercise
During Exercise	Drink 4-16 oz. of fluid every 15-20 minutes
After Exercise	Drink 24 oz. of fluid for every (one) pound lost during exercise within 6 hours of stopping the activity. This is to achieve normal fluid state and not begin the next practice dehydrated.
Fluid counter 	24 oz. of fluid = 1-½ of water bottle 16 oz. of fluid = 1 full water bottle 7 oz. of fluid = ½ full water bottle or 10 BIG gulps of water 4 oz. of fluid = ¼ full water bottle or 5 BIG gulps of water

Source Kansas Heat Acclimatization program

Appendix V: Urine Color Chart- How Hydrated are You?

This urine color chart is a simple tool you can use to assess if you are drinking enough fluids throughout the day to stay hydrated.



Be Aware! If you are taking vitamin supplements they can change the color of your urine for a few hours, making it bright yellow or discolored.

Appendix VI: Monitoring Core Temperature – How to Use a Rectal Thermometer

Using a rectal thermometer is safe, simple, and requires no forethought, which is why its use is highly recommended by the National Athletic Trainers' Association. In fact, reading rectal temperature can be boiled down into 12 simple steps:

1. Remove the athlete from the playing field, if appropriate, to a shaded area (such as an EZ-Up tent, locker room/athletic training room, or tree shade).
2. Drape the patient appropriately (with towels or sheets) for privacy, if possible.
3. Position the patient on their side with their top knee and hip flexed forward.
4. Lubricate the disposable, one time use probe.
5. Make sure the probe is plugged into the thermometer.
6. Turn the thermometer on.
7. Insert the probe 10 centimeters past the anal sphincter. Measure this ahead of time and draw a line on the probe.
8. If you meet resistance while inserting, stop and remove the probe, then try again.
9. Leave the probe in for the duration of treatment.
10. After treatment has ended, remove the probe gently.
11. Please read instructions thoroughly before use.

Appendix VII: Sickle Cell Trait (SCT)

Sickle Cell Trait (SCT)

Sickle cell trait (SCT) is the inheritance of one gene for sickle hemoglobin and one for normal hemoglobin. During intense or extensive exertion, the sickle blood hemoglobin can change the shape of red blood cells from round to quarter-moon, or “sickle”, causing a blockage of blood vessels and a rapid breakdown of muscles, including the heart. This change, exertional sickling, can pose a grave risk for some athletes. When this occurs, the person may collapse and, in rare cases, die. Athletic teams need to be particularly careful when acclimatizing students during preseason conditioning and sports activities. There have been student-athlete deaths in which SCT was a known or suspected factor.

In most cases athletes who are SCT-positive can participate in sports, often with minimal or no restrictions. A positive diagnosis of SCT should result in a consultation among the student, his or her parents, the personal and team physicians, coaches, and training staff.

The following precautions are usually recommended:

- Encourage the athlete to participate in preseason or year-round strength and conditioning programs.
- Build up slowly and train the athlete with paced progressions, allowing longer periods of rest and recovery.
- Athletes with sickle cell trait should be excluded from participation in performance tests such as mile runs, serial sprints, etc., as several deaths have occurred from participation in this setting.
- Cease activity if symptoms occur, such as muscle cramping, pain, swelling, abnormal weakness, tenderness, difficulty breathing, or undue fatigue or inability to catch breath.
- Educate the athlete to report any symptoms to the coach or athletic trainer immediately. Any signs or symptoms such as fatigue, difficulty breathing, leg or low back pain, or leg or low back cramping in an athlete with sickle cell trait should be assumed to be sickling
- Take extra precautions during conditions of extreme heat or altitude, or if the athlete has asthma or is otherwise ill. Ambient heat stress, dehydration, asthma, illness, and altitude predispose the athlete with sickle trait to an onset of crisis in physical exertion.
- Seek prompt medical care when an athlete experiences unusual duress

In the event of a sickling collapse, athletic department staff, coaches and medical staff should treat it as a medical emergency by doing the following:

- Call 911.
- Check vital signs.
- Administer high-flow oxygen, if available, with a non-rebreather face mask.
- Cool the athlete, if necessary.
- If the athlete appears to have slowed mental responses, or vital signs decline, attach an AED and monitor until EMS arrives.

Tell the EMS Personnel to expect explosive rhabdomyolysis and grave metabolic complications