



EXERTIONAL HEAT ILLNESS

Information, Guidelines and Best Practices

Exertional Heat Illness (EHI) is a term for different conditions that may result from participation in environments of extreme temperature and/or humidity. Heat cramps, heat syncope, heat exhaustion and exertional heat stroke (EHS) are all conditions that could result from prolonged participation in this type of environment. Exertional Heat Stroke (EHS) is a life-threatening condition and one of the leading causes of preventable death in high school activities. Students who do not properly acclimatize to the heat, do not hydrate properly, have a poor diet and/or are ill/recovering from an illness are more susceptible to all types of EHI.

HEAT ILLNESS RISK FACTORS

- 1. High temperature and humidity**
 - a. Wet Bulb Globe Temperature (WBGT) higher than 82° F**

The WBGT level factors in air temperature, relative humidity, wind speed, sun angle and cloud cover. WBGT is the most reliable indicator in determining the overall risk of heat illness during athletic participation in periods of elevated heat and humidity.
- 2. Lack of proper heat acclimatization**
- 3. Inadequate rest/hydration breaks**
- 4. Poor hydration before and during practice/games**
- 5. Body Mass Index greater than 27 (based on height and weight)**
- 6. Low fitness level**
- 7. High intensity training**
- 8. Lack of education, awareness and preparation**
- 9. Sickle cell trait***
- 10. Illness***
 - a. Fever greater than 100.4 degrees**
 - b. Nausea/vomiting/diarrhea**
 - c. Respiratory infection**
 - d. Serious skin rash**
- 11. History of heat illness in the past***

* It is critically important for coaches and school medical personnel to have access to their student-athletes' health history information from the pre-participation physical.



HEAT ILLNESS CONSIDERATIONS & PREVENTION STRATEGIES

Emergency Action Plan (EAP)

Every school should have a written EAP in place for every activity and every venue where activities take place. The EAP should be reviewed and rehearsed annually (at minimum). This plan should include handling heat illness emergencies. When rapid onsite cooling is necessary, **ALWAYS COOL THE ATHLETE FIRST AND TRANSPORT SECOND!** Be sure this protocol is rehearsed and reviewed with your coaches and local EMS personnel BEFORE practices begin each August.

Obtaining a core body temperature (obtained with a rectal thermometer) is currently recommended by medical experts as the most effective method to determine if the athlete is suffering from EHS. **Healthcare professionals at the high school and middle school levels should consult with their school districts and local EMS personnel to determine in advance if obtaining a core body temperature will be part of the emergency action plan (EAP) protocol.**

Click [HERE](#) for emergency action planning information which includes a template you can download to begin building a plan.

Appropriate Medical Personnel

Schools should make every reasonable effort to have an athletic trainer or other healthcare professional onsite during high-risk athletic activities and activities taking place in conditions of extreme temperature/humidity.

1. Follow the KSHSAA heat acclimatization policy (see p. 6).
2. Each school or district should develop a heat contingency policy **based on wet bulb globe temperature (WBGT)**. See recommended policy, p. 4-5.
 - a. The WBGT level factors in air temperature, relative humidity, wind speed, sun angle and cloud cover. WBGT is the most reliable indicator in determining the overall risk of heat illness during athletic participation in periods of elevated heat and humidity.
 - b. The wet bulb globe temperature should be obtained at the site where the activity is taking place.

Click [HERE](#) for information on selecting a WBGT device.

3. A cooling area should be established and available any time the ambient air temperature is 80° or higher. This could be an area of shade, a tent or immediate access to an air-conditioned facility.
 - a. Rapid cooling equipment should be located in the cooling area. Options for rapid cooling equipment are as follows:
 - 1) Cold water immersion tub. **This is the most effective way to rapidly cool someone suspected of suffering from exertional heat stroke.**
 - Person should be immersed up to their torso in a tub of water cooled to approximately 50 degrees.
 - Options to consider are a livestock tank, old whirlpool tub, or large children's swimming pool.



- 2) In the absence of a cold water immersion tub, other acceptable rapid cooling options include:
 - Ice Towels: Towels soaked in a cooler of ice water. When needed, they are removed and used to cover as much of the body as possible.
 - Tarp Assisted Cooling Oscillation (TACO): Ice and cold water are added to an athlete once they have been placed on a tarp with the edges held up by others to create a physical “taco” for the athlete to be encased inside. At least 2 people will be needed to hold the tarp, 1 on each side. Another person will assist by adding the water and ice at the foot end of the athlete, making sure to keep the athlete’s head and chest above water. This is most easily accomplished by dumping coolers of ice and water into the tarp. Once the athlete is in the TACO, water can be oscillated by the 2 people holding the tarp by moving the sides up and down.
 - Cold water dousing: Using a cold shower or a garden hose to douse the athlete with cold water.
 - 3) Cold water immersion or other rapid cooling techniques should continue until medical personnel arrive.
4. Keep athletes hydrated
 - a. Allow unrestricted access to water during practice and games (See *HYDRATION* section of this document).
 5. Don’t allow an athlete with fever, nausea/vomiting, or other illness to practice or play in a contest.
 6. Make sure your athletes are taking care of their overall health
 - a. Adequate sleep
 - b. Proper nutrition
 - c. Proper hydration habits throughout the week
 7. **NEVER allow student-athletes to consume nutritional supplements unless prescribed by a physician.** Energy drinks should NEVER be consumed by your student-athletes. These substances create an even higher risk to athletes exercising in the heat.
 8. Know your athletes and their health histories
 - a. Coaches and other staff, including athletic trainers, should always be aware of each athlete’s risk factors for heat illness. Coaches MUST know their at-risk athletes and modify their activity accordingly. Student athletes who have sickle cell trait, a previous history of exertional heat illness, are obese, are unfit or are recovering from a recent illness are all more susceptible to heat illness.
 9. Educate coaches, staff, athletes and parents to prevent, recognize and treat heat illness. Prevention and early recognition is critical to avoiding heat illness.
 10. Have the proper equipment available to recognize and treat heat illness. The following is a recommended list of equipment that should be available at any warm weather practice:
 - a. Wet bulb globe thermometer
 - b. Rapid cooling equipment:
 - Cold water immersion tub
 - Ice towels (towels submerged in ice water)
 - Tarp (used for TACO method of cooling)
 - c. Ice and water immediately available for immersion tub or TACO
 - d. Rectal thermometer (trained medical personnel only)
 - e. Tent, shaded area or access to an air-conditioned facility



KSHSAA RECOMMENDED ACTIVITY MODIFICATION POLICY

Based on Wet Bulb Globe Temperature (WBGT)

- ◆ Each school shall have a policy in place for appropriate activity modification during periods of excessive heat and humidity. The KSHSAA recommended policy is provided below.
- ◆ Activity modification decisions shall be based on the wet bulb globe temperature (WBGT) which is the most reliable indicator in determining the overall risk of heat illness during athletic participation in periods of elevated heat and humidity. WBGT is a measure of air temperature, relative humidity, wind speed, sun angle, and cloud cover.
- ◆ Each school shall have access to a WBGT monitor. Click [HERE](#) for information on selecting a device.
- ◆ In the absence of a WBGT monitor, a chart is provided with estimated WBGT levels based on air temperature and humidity.
- ◆ WBGT levels shall be obtained anytime the ambient air temperature is 80 degrees or greater. Readings shall be taken at the site of activity, 30-60 minutes before the activity begins. **Schools are recommended to obtain the average WBGT over a 15-20 minute span, and use this value for the day unless there is an obvious change in weather that warrants another measurement.**
- ◆ These recommended modifications shall be applied to any activity taking place outdoors OR in un-airconditioned facilities.
- ◆ Regardless of your zone, all participants shall have unrestricted access to water during activity participation.
- ◆ At-risk athletes shall be monitored more closely when in any elevated zone.

WBGT LEVEL/ZONES	ACTIVITY MODIFICATION
≤ 79.9	<ul style="list-style-type: none">• Normal activities• Provide at least 3 separate rest breaks each hour with a minimum duration of 3 minutes each.
80 - 84.6	<ul style="list-style-type: none">• MINIMUM 3 separate rest breaks each hour with a minimum duration of 4 minutes each.• Cold water immersion tub or other rapid cooling method should be prepared and ready.
84.7 - 87.7	<ul style="list-style-type: none">• MINIMUM 4 separate rest breaks each hour with a minimum duration of 4 minutes each.• 2 HOUR MAXIMUM length of practice (not including rest breaks)• Cold water immersion tub or other rapid cooling method prepared and ready• Consider competition alterations<ul style="list-style-type: none">– Coordinate with contest officials to allow for additional breaks– Shorten length of sub-varsity competitions– Shorten length of course (Cross Country)• Football specific:<ul style="list-style-type: none">– Protective equipment should be limited to helmets and shoulder pads, and these should be removed for conditioning.– If practice begins in a cooler range (green or yellow), but increases to orange during practice, players may continue practice in full protective gear.
87.8 - 89.7	<ul style="list-style-type: none">• 1 HOUR MAXIMUM length of practice (not including rest breaks)• MINIMUM 20 minutes of rest breaks distributed throughout the 1 hour of practice• Cold water immersion tub or other rapid cooling method prepared and ready• Consider competition alterations<ul style="list-style-type: none">– Coordinate with contest officials to allow for additional breaks– Shorten length of sub-varsity competitions– Shorten length of course (Cross Country)• Consider delaying practice/competitions until a cooler WBGT is reached• Football specific:<ul style="list-style-type: none">– No protective equipment should be worn.– No conditioning activities
≥ 89.8	<ul style="list-style-type: none">• No outdoor workouts. Delay practice/competitions until a cooler WBGT is reached.

ESTIMATED WET BULB GLOBE TEMPERATURE CHART

- ◆ Use this chart in the absence of a WBGT monitor.
- ◆ Chart values are based on full sunlight and light wind.

Wet Bulb Globe Temperature (WBGT) from Temperature and Relative Humidity																																	
	Temperature in Degrees Fahrenheit																																
	68.0	69.8	71.6	73.4	75.2	77.0	78.8	80.6	82.4	84.2	86.0	87.8	89.6	91.4	93.2	95.0	96.8	98.6	100.4	102.2	104.0	105.8	107.6	109.4	111.2	113.0	114.8	116.6	118.4	120.2	122.0		
Relative Humidity (%)	0	59.0	60.8	60.8	62.6	64.4	64.4	66.2	66.2	68.0	68.0	69.8	71.6	71.6	73.4	73.4	75.2	75.2	77.0	77.0	78.8	80.6	80.6	82.4	82.4	84.2	84.2	86.0	87.8	87.8	89.6	89.6	
	5	60.8	60.8	62.6	64.4	64.4	66.2	66.2	68.0	69.8	69.8	71.6	71.6	73.4	75.2	75.2	77.0	78.8	78.8	80.6	80.6	82.4	84.2	84.2	86.0	87.8	87.8	89.6	91.4	91.4	93.2	95.0	
	10	60.8	62.6	62.6	64.4	66.2	66.2	68.0	69.8	69.8	71.6	73.4	73.4	75.2	77.0	77.0	78.8	80.6	80.6	82.4	84.2	86.0	86.0	87.8	89.6	89.6	91.4	93.2	95.0	96.8	96.8	98.6	
	15	62.6	62.6	64.4	66.2	66.2	68.0	69.8	69.8	71.6	73.4	73.4	75.2	77.0	78.8	78.8	80.6	82.4	84.2	84.2	86.0	87.8	89.6	91.4	91.4	93.2	95.0	96.8	98.6	100.4	102.2		
	20	62.6	64.4	64.4	66.2	68.0	69.8	69.8	71.6	73.4	75.2	75.2	77.0	78.8	80.6	80.6	82.4	84.2	86.0	87.8	89.6	89.6	91.4	93.2	95.0	96.8	98.6	100.4	102.2				
	25	64.4	64.4	66.2	68.0	68.0	69.8	71.6	73.4	75.2	75.2	77.0	78.8	80.6	82.4	82.4	84.2	86.0	87.8	89.6	91.4	93.2	95.0	96.8	98.6	98.6	100.4	102.2					
	30	64.4	66.2	68.0	68.0	69.8	71.6	73.4	73.4	75.2	77.0	78.8	80.6	82.4	84.2	84.2	86.0	87.8	89.6	91.4	93.2	95.0	96.8	98.6	102.2								
	35	64.4	66.2	68.0	69.8	71.6	73.4	73.4	75.2	77.0	78.8	80.6	82.4	84.2	86.0	87.8	89.6	91.4	93.2	95.0	96.8	98.6	100.4	102.2									
	40	66.2	68.0	69.8	69.8	71.6	73.4	75.2	77.0	78.8	80.6	82.4	84.2	86.0	87.8	89.6	91.4	93.2	95.0	96.8	98.6	100.4	102.2										
	45	66.2	68.0	69.8	71.6	73.4	75.2	77.0	78.8	80.6	80.6	82.4	84.2	86.0	89.6	91.4	93.2	95.0	96.8	98.6	100.4												
	50	68.0	69.8	71.6	73.4	73.4	75.2	77.0	78.8	80.6	82.4	84.2	86.0	87.8	91.4	93.2	95.0	96.8	98.6	102.2													
	55	68.0	69.8	71.6	73.4	75.2	77.0	78.8	80.6	82.4	84.2	86.0	87.8	89.6	93.2	95.0	96.8	98.6	100.4														
	60	69.8	71.6	73.4	75.2	77.0	78.8	80.6	82.4	84.2	86.0	87.8	89.6	91.4	95.0	96.8	98.6	100.4															
	65	69.8	71.6	73.4	75.2	77.0	78.8	80.6	82.4	84.2	87.8	89.6	91.4	93.2	96.8	98.6	100.4																
	70	71.6	73.4	75.2	77.0	78.8	80.6	82.4	84.2	86.0	87.8	91.4	93.2	95.0	96.8	100.4	102.2																
	75	71.6	73.4	75.2	77.0	78.8	80.6	84.2	86.0	87.8	89.6	91.4	95.0	96.8	98.6	102.2																	
80	73.4	75.2	77.0	78.8	80.6	82.4	84.2	86.0	89.6	91.4	93.2	96.8	98.6	100.4																			
85	73.4	75.2	77.0	78.8	82.4	84.2	86.0	87.8	89.6	93.2	95.0	98.6	100.4	102.2																			
90	75.2	77.0	78.8	80.6	82.4	84.2	87.8	89.6	91.4	95.0	96.8	98.6	102.2																				
95	75.2	77.0	78.8	80.6	84.2	86.0	87.8	91.4	93.2	95.0	98.6	100.4																					
100	75.2	78.8	80.6	82.4	84.2	87.8	89.6	91.4	95.0	96.8	100.4	102.2																					
NOTE: This table is compiled from an approximate formula which only depends on temperature and humidity. The formula is valid for full sunshine and a light wind. Table adapted from Bureau of Meteorology																																	

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REFERENCES

1. American College of Sports Medicine Position Stand: Exertional Heat Illness During Training and Competition. Med: Sci Sport Exerc. 2007;39(3):556-72.
2. Grundstein A, et.al. Regional heat safety thresholds for athletics in the contiguous United States. Applied Geography. 2015; 56: 55-60.
3. The Inter-Association Task Force for Preventing Sudden Death in Secondary School Athletics Programs: Best-Practices Recommendations. Journal of Athletic Training. 2013;48(4):546-553
4. National Athletic Trainers' Association Position Statement: Exertional Heat Illness. Journal of Athletic Training. 2015; 50(9): 986-1000.
5. Wet Bulb Globe Temperature Monitoring. Accessed April 2022 at <https://ksi.uconn.edu/prevention/wet-bulb-globe-temperature-monitoring/>.



HEAT ACCLIMATIZATION

One of the most important factors in preventing heat illness is to follow a proper heat acclimatization progression

1. What is heat acclimatization?

Heat acclimatization is the process of the body adjusting to intense physical activity in elevated levels of heat and humidity. The body normally sweats to cool off, but if the heat and humidity (heat index) are too high, sweating may not be enough and the inner body (core) temperature may rise to a dangerous level. During acclimatization the body gradually adjusts and becomes more tolerant to the elevated heat/humidity levels. This takes place through several physiologic mechanisms including increased sweat rate, lower heart rate, and better blood flow to the entire body. With the proper progression, the body can safely adjust to intense physical activity in hot/humid environments over a period of approximately 7 to 14 days. Most research on proper heat acclimatization indicates the first 5 days of the preseason is the most important period of the acclimatization process.

2. Who needs to do go through heat acclimatization?

Every athlete is susceptible to heat illness and needs to acclimatize to the heat no matter their fitness level when they show up to the first day of practice. Even if athletes have been working out all summer their bodies may not be able to immediately adapt to the high temperatures and humidity often present in August in Kansas. In today's culture, we often spend many hours indoors during the summer with air conditioning which makes the body less tolerant to intense exercise in extreme heat and humidity.

3. KSHSAA heat acclimatization rules

KSHSAA Handbook rules 30-1-8 and 35-1-1 address required heat acclimatization rules for all KSHSAA Fall sports. Below are the components of these rules.

KSHSAA Preseason Heat Acclimatization Components KSHSAA Handbook Rule 30-1-8		
	Practice Days 1-5	Practice Days 6+
# Practices permitted per day	1	<ul style="list-style-type: none">• 2 permitted every other day• Double practice days must be separated by a single practice or rest day
Length of practice allowed*	3 hours	<ul style="list-style-type: none">• 3 hours single practice• 5 hours combined (double practice days)
Extra walkthrough time	1 hour (but must be separated from practice by at least 3 hours)	
*Warm-up, stretching, conditioning and weight-room activities are included as part of practice time		

Preseason Football equipment/contact progression (Rule 35-1-1):

- Days 1 & 2 of practice: Helmets only (Air and Bags only are permitted)
- Days 3 & 4 of practice: Helmets and shoulder pads are permitted (Day 3: Control permitted; Day 4: Thud permitted).
- Day 5 through Saturday of SCW #9 of practice: Full Contact (Air, Bags, Control, Thud and Live Action are permitted) may begin with the following guidelines: On any day involving multiple practices, only one practice may involve Thud and/or Live Action.



HYDRATION

In addition to acclimatization, proper hydration is another critical component to prevent heat illness.

1. How do you know if your athlete is hydrated? There are several methods to measure an athlete's hydration level:

a. Urine color

The volume and color of your urine is an excellent way of determining if you're well hydrated. Small amounts of dark urine mean that you need to drink more, while a "regular" amount of light-colored or nearly clear urine generally means you are well hydrated. (See urine chart-next page)

b. Weigh-in before and after practice

Athletes should be weighed before and after warm weather practices in dry clothes. They should drink appropriate amounts of fluid for the amount of weight lost. An athlete should not be allowed to participate if they are at a 2% or greater weight deficit from the beginning of their previous practice.

c. Sweat rate

You can calculate our own sweat rate. Knowing how much an athlete sweats per hour can help you calculate how much fluid to drink to replace your sweat loss and stay hydrated. See how to calculate an athlete's sweat rate on the Korey Stringer Institute website at <http://ksi.uconn.edu/wp-content/uploads/sites/1222/2015/04/Sweat-Rate-Calculator.pdf>.

2. There are many strategies to maintain proper hydration. 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's common for some athletes to lose between 5-8 pounds of sweat during a game or intense practice. So it's 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.
- Encourage GOOD hydration choices: water, sport drinks with low sodium and carbohydrate levels, AVOID: energy drinks, soda, fruit juices, carbonated beverage, and caffeine.
- 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 during practice and games.

3. Hyponatremia Risk

Hyponatremia is a rare, but potentially deadly disorder resulting from the over-consumption of water or other low sodium fluid (including most sports drinks). It is most commonly seen during endurance events, such as marathons, when participants consume large amounts of water or other beverages over several hours, far exceeding fluid lost through sweating. The water in the blood and the sodium content of the blood is consequently diluted to dangerous levels. Affected individuals may exhibit disorientation, altered mental status, headache, lethargy and seizures. A confirmed diagnosis can only be made by testing blood sodium levels. Suspected hyponatremia is a medical emergency and EMS (Emergency Medical Services) must be activated. It is treated by administering intravenous fluids containing high levels of sodium.

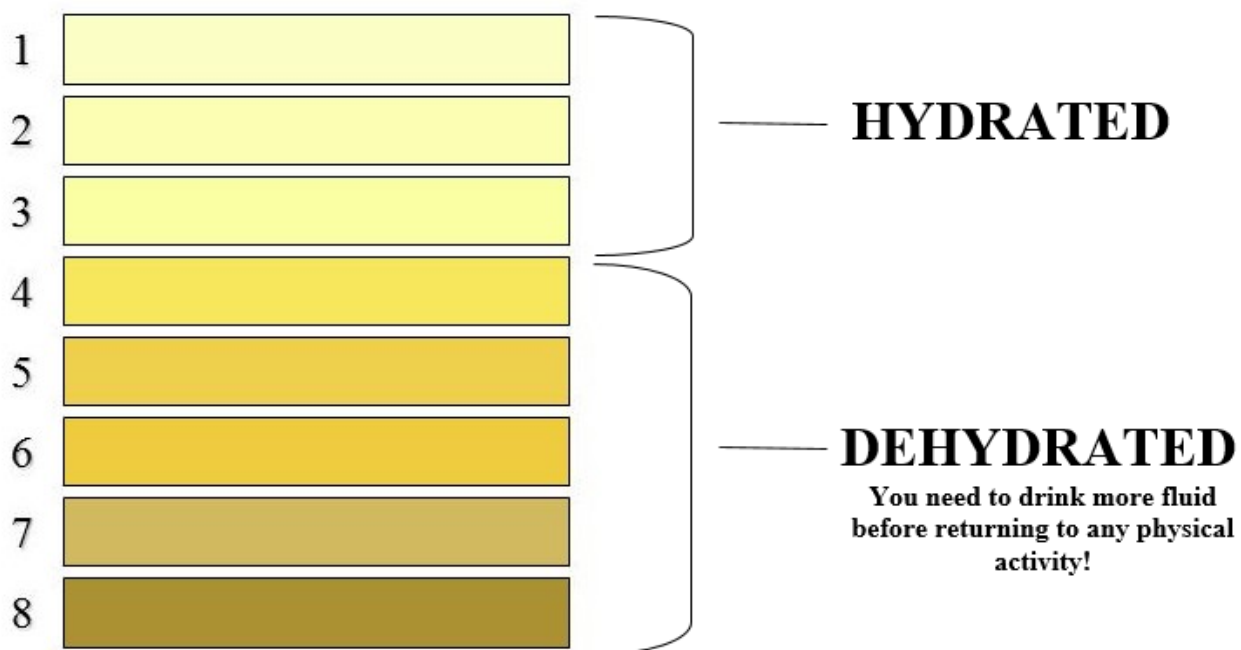


HYDRATION RECOMMENDATIONS

Before Exercise	<p>Drink 16 oz. of fluid before activity/exercise (2 hours)</p> <p>Drink another 8-16 oz. of fluid 10-15 minutes before exercise</p>
During Exercise	<p>Drink 4 - 8 oz. of fluid every 15-20 minutes</p>
After Exercise	<p>Drink 16-20 oz. of fluid for every (one) pound lost during exercise to achieve normal fluid state and not begin the next practice dehydrated. Rehydration should take place over a safe and comfortable period of time. Excessive fluid intake over a short amount of time can be dangerous (see hyponatremia information below).</p>
Fluid counter	<div>  <p> 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 </p> </div>

URINE COLOR CHART

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.



EXERTIONAL HEAT ILLNESS RECOGNITION AND MANAGEMENT

The following information is intended to serve as general guidance for schools in recognizing and managing suspected exertional heat stroke and other heat illnesses. School administrators should consult with their school medical personnel and local emergency medical personnel to determine the appropriate plan for their school.

Heat cramps, heat syncope, heat exhaustion and exertional heat stroke (EHS) are all conditions that could result from prolonged participation in an environment of extreme temperature and/or humidity. Exertional Heat Stroke (EHS) is a life-threatening condition and one of the leading causes of preventable death in high school activities. Exertional heat stroke can occur in the absence of less severe heat illness conditions such as heat cramps and heat exhaustion (these conditions do not necessarily run on a continuum).

EXERTIONAL HEAT STROKE

- Core body temperature (rectal temperature) $>104^{\circ}\text{F}$
- Central nervous system dysfunction
 - Irrational behavior, irritability, emotional instability
 - Altered consciousness, coma
 - Dizziness or disorientation
 - Collapse, staggering or sluggish feeling
 - Confusion, looking “out of it”
 - Loss of muscle function, balance, inability to walk
- Other signs and symptoms
 - Profuse sweating or hot, red, dry skin
 - Dry mouth
 - Poor performance
 - Nausea, vomiting, diarrhea
 - Headache
 - Fast pulse, quick breathing, low blood pressure

CORE BODY TEMPERATURE

Obtaining a core body temperature (obtained with a rectal thermometer) is currently recommended by medical experts as the most effective method to determine if the athlete is suffering from EHS. Healthcare professionals at the high school and middle school levels should consult with their school districts and local EMS personnel to determine in advance if obtaining a core body temperature will be part of the emergency action plan (EAP) protocol. In the absence of a core body temperature, healthcare professionals and coaches can assess other factors (listed above) to determine if EHS is suspected.

MANAGEMENT

- Implement the Emergency Action Plan and call 911
 - Assess the student's airway, breathing and circulation. Begin CPR if indicated.
 - Remove all excess equipment and clothing.
 - If a medical professional is onsite, the student's core body temperature should be obtained if possible.
 - Immediate rapid body cooling is the most effective treatment for EHS.
 - Cold water immersion tub (best rapid body cooling method): Submerge the student up to their torso in water cooled to approximately 50 degrees.
 - Other options: Ice towels, TACO method or cold water dousing
 - Continue monitoring the student's airway, breathing and circulation. NEVER leave the student unattended.
 - Continue cold water immersion (or other rapid body cooling) until medical personnel arrive.
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EXERTIONAL HEAT ILLNESS RECOGNITION AND MANAGEMENT

HEAT EXHAUSTION

Occurs when an athlete cannot effectively exercise in high heat and humidity conditions due to an elevated core body temperature. It can cause heavy sweating, rapid pulse and the athlete may feel tired and be unable to perform athletically.

SPECIAL RISK FACTORS

Risk factors are the same as those listed for general heat illness. These include lack of acclimatization, dehydration, obesity, illness, certain medications and low fitness levels.

SIGNS & SYMPTOMS

- Heavy sweating
- Fast and weak pulse
- Headache/nausea/vomiting
- Cool/clammy skin
- Poor performance
- Dizziness/lightheadedness
- Fatigue/weakness

MANAGEMENT

- Remove excess clothing/equipment
- If conscious give WATER or a sports drink slowly.
- Based on symptoms it may be recommended the athlete waits 24-48 hours before returning to play.
- Move to a cool shaded area
- Cover the extremities and trunk with ice towels or ice bags
- If a medical professional is onsite, the student's core body temperature should be obtained if possible.

It can sometimes be difficult to tell the difference between heat exhaustion and heat stroke. If there is any concern for heat stroke, a medical professional should check the core body temperature with a rectal thermometer (only accurate method.). If a medical professional is not available onsite, cold tub immersion (approx. 50°F) should be initiated and the heat stroke treatment protocol should be followed until medical professionals arrive and can determine the appropriate treatment steps.

HEAT CRAMPS

Typically painful, involuntary muscle contractions of active muscles. These can occur in muscles throughout the body including those in the lower extremities, upper extremities and abdomen. Muscle cramps can be caused by dehydration or electrolyte imbalances.

SPECIAL RISK FACTORS

Sickle cell trait – Heat cramps and exertional sickling can mimic each other. Be aware if an athlete has sickle cell trait.

SIGNS & SYMPTOMS

- Painful muscle cramps that can limit mobility
- Tightness in the muscle can typically be felt by another person
- Most common in abdominals and legs
- Usually last a brief amount of time and are self-limiting

MANAGEMENT

- Remove athlete from play
- Can provide food high in salt or salt replacement solution (1/2 teaspoon salt dissolved in 16-20 oz. water)
- Stretch and massage the muscle
- Drink **WATER** or a sports drink
- Athlete can typically return to play when the muscle cramp stops



EXERTIONAL HEAT ILLNESS RECOGNITION AND MANAGEMENT

HEAT SYNCOPE

A fainting episode associated with high heat and humidity. This typically occurs because adequate blood flow does not return to the brain and will cause a loss of consciousness.

SPECIAL RISK FACTORS

Prolonged standing in high temperature and humidity can increase the risk of heat syncope.

SIGNS & SYMPTOMS

- * Loss of consciousness or fainting
- * Weakness and fatigue
- * Pale, clammy skin
- * Lightheadedness

MANAGEMENT

- ▶ Move athlete to a cool area/shade
- ▶ Have athlete lie down/elevate legs
- ▶ Instruct athlete to drink WATER or a sports drink.
- ▶ Monitor and maintain airway, breathing and circulation. If any concern about ABC's, call 911.
- ▶ Athlete can return to play once evaluated by a medical professional and other complications and medical conditions have been ruled out.

REFERENCES

American College of Sports Medicine Position Stand: Exertional Heat Illness During Training and Competition. *Med: Sci Sport Exerc.* 2007;39(3):556-72.

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

Heat acclimatization. Accessed April 2022 at <http://ksi.uconn.edu/prevention/heat-acclimatization/>.

Heat Illness. Accessed April 2022 at <http://ksi.uconn.edu/emergency-conditions/heat-illnesses/>.

The Inter-Association Task Force for Preventing Sudden Death in Secondary School Athletics Programs: Best-Practices Recommendations. *Journal of Athletic Training.* 2013;48(4):546-553

National Athletic Trainers' Association Position Statement: Exertional Heat Illness. *Journal of Athletic Training.* 2015; 50(9): 986-1000.

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The information in this document is provided by the Kansas State High School Activities Association's Sports Medicine Advisory Committee. The information is intended to provide general information and guidelines for schools to consider when creating or updating their school's heat/hydration policy.

Disclaimer: The information provided by the Kansas State High School Activities Association regarding heat illness and hydration is not intended to be exhaustive of all the relevant information on the subjects. The KSHSAA feels that the sources of the information provided above are very reputable and therefore will provide valuable source material to member schools. At the same time, schools may want to consider other available sources of relevant information and are encouraged to consult with health care professionals regarding these topics.