

SPORTS MEDICINE

The KHSAA recognizes the Kentucky Medical Association Physical Education and Medical Aspects of Sports Committee (KMA-SMAC) as its official Sports Medicine Advisory Committee (SMAC) and shall provide staff assistance as needed for this group.

POLICY- SPORTS MEDICINE - POSITION STATEMENTS OF THE NFHS SPORTS MEDICINE ADVISORY COMMITTEE

Unless action is taken to the contrary by the Board of Control, any official position statement of the Sports Medicine Advisory Committee of the National Federation of High School Associations (NFHS) shall be considered adopted by the KHSAA Board of Control.

These policies are located on the website of the NFHS at <https://www.nfhs.org/>

POLICY- SPORTS MEDICINE - COACH REQUIREMENTS AND SEASON PREPARATION

SEC. 1) COACHING REQUIREMENTS

- (1) KHSAA Bylaw 25 defines the various requirements for coaches in all sports and sport-activities.
- (2) These requirements are in effect no matter what level of high school coaching (freshman, Junior Varsity, Varsity), position (Head or Assistant) or pay level (paid or unpaid).
- (3) Many requirements are also listed in various KRS citations, including KRS 156.070 (2), KRS 17.165, and KRS 160.380.
- (4) All coaches (paid or unpaid) must comply with the provisions of KRS 160.445 and KRS 158.162 regarding all emergency preparedness training including seasonal EAP rehearsal.
- (5) All coaches (paid or unpaid) must complete with 160.445 and be current in KHSAA/KMA Sports Safety Course, with all of the required modules to include Module 1 - The Emergency Action Plan (EAP), Module 2 - Recognizing Athletic Emergencies, Module 3 - First Aid Elements, Module 4 - RED-S, Module 5 - Heat Illness, Module 6 - Concussion in Sports, Module 7 - Conditioning and Injury Prevention, and Module 8 - Psychological Concerns in The Student Athlete
- (6) All coaches must have record, per Bylaw 25, of the completion of the required Coaching Education Course to ensure:
 - a. proper acclimation to sport through the phasing in of conditioning periods gradually and progressively to minimize the risk of injuries during transitional periods,
 - b. awareness of the need for considerations during periods when athletes have been out for at least fourteen (14) days;
 - c. The gradual phasing in of conditioning, particularly during the early stages of practice;
 - d. the progressive introduction of strength and conditioning to ensure acclimation;
 - e. Reiteration that exercise and conditioning should be consistent with daily training objectives and not used as discipline or punishment or be such to put the student athlete at risk; and
 - f) The all exercise must have on site supervision by a staff member who has met all coaching safety preparedness requirements.

POLICY- SPORTS MEDICINE - REQUIRED EMERGENCY ACTION PLANS

SEC. 1) REQUIREMENT AND COMPONENTS OF EMERGENCY ACTION PLAN (EAP)

- a) Each member school, through its principal and designated representative (per Bylaw 1) shall:
 - (1) In compliance with KRS 158.162 and 160.445, each member school shall develop a venue specific, Emergency Action plan to deal with serious injuries and acute medical conditions in which the condition of the patient may deteriorate rapidly; and
 - (2) Shall maintain accurate records regarding any training required training under KRS 160.445 including the sports safety course and emergency and cardiac emergency action plans.

SEC. 2) REQUIREMENT FOR EMERGENCY RESPONSE PLAN (KRS 158.162)

- a) Each member school shall:
 - (1) develop an emergency response plan to include medical emergency, fire, severe weather, earthquake, or a building lockdown as defined in KRS 158.164;
 - (2) develop a written cardiac emergency response plan; and a

diagram of the facility that clearly identifies the location of each automated external defibrillator; and

- (3) comply with all provisions of KRS 158.162, including cardiac emergency plans and requirements regarding automated external defibrillators as a condition precedent to membership.

SEC. 3) ANNUAL SEASONAL REHEARSAL AND PLANNING FOR EXECUTION OF EMERGENCY RESPONSE PLAN (KRS 158.162)

- a) Each member school shall:
 - (1) Plan and execute a simulation of an athletics event emergency (including heat and cardiac emergencies) as defined in KRS 158.162 and KRS 160.445 before the first contest of each sports season as contemplated in these statutes;
 - (2) Plan and execute a strategy to require key elements of the plan to be reviewed and compliance and understanding attested by any coach or other staff member defined in the statute if such member is hired after the initial execution of the simulation, but require attendance at the next simulation conducted by the school in any sport;
 - (3) The training should use the adopted KRS 160.445 sports safety course curriculum as an additional resource as well as ensuring that all access points to the facility are covered, a review of the locations of all emergency equipment, and emergency steps to be taken while waiting additional medical providers to arrive.
 - (4) Ensure that the plans are as unique to the sport as needed to be to allow for the rehearsal to include situations without a certified or licensed trainer present, without a certified or licensed trainer present but available within five (5) minutes, and with a certified or licensed trainer present and coaches acting in a support role to the plan.
 - (5) Maintain attendance and compliance records for each training session conducted, included specifically detailed and logged attendance for all coaches, paid or unpaid, at all levels of play for the school.

SEC. 4) PER CONTEST REVIEW OF EMERGENCY ACTION PLAN PROVISIONS

- a) Prior to each contest, and routinely before practices, each school shall review:
 - (1) Advanced Cardiovascular Life Support (ACLS);
 - (2) AED placement on the sidelines and at venue and emergency procedures in the event of cardiac issues;
 - (3) Sentinel seizure/agonal respiration awareness procedures;
 - (4) Backboard provisions including assignment of roles for responders;
 - (5) Face Mask Removal and tools in relevant sports;
 - (6) C-Spine injury protocol;
 - (7) Environmental risk status (e.g. heat, lightning, cold);
 - (8) Cool prior to transport provisions including cooling tub or TACO procedures;
 - (9) Lightning plan and assigned individuals from participating teams for collaboration; and
 - (10) Hemorrhage control kit and assigned roles;
 - (11) If in a non-school site, ensure that all elements of an emergency action plan are known and able to be rehearsed, and all equipment, including AEDs are accessible and locations known; and
 - (12) Plans should contemplate the on-site 1) lack or presence of an athletic trainer; 2) situations where an athletic trainer is not present but is within five (5) minutes of the scene; and 3) the presence of an athletic trainer and required collaboration of all coaches.
- b) Contact information should be clearly recorded for:
 - (1) Athletic Trainer(s);
 - (2) Team Physician(s) who might be present that night/day;
 - (3) EMS Squad Status and on-site or on-call status; and
 - (4) Designated hospital in the event of transport.
- c) Practitioners should be clear in any signals and signs to be utilized
- d) Additional emphasis for consideration should be:
 - (1) Consider placing all equipment on stretcher for easy transport;
 - (2) Entire group should visually check and review any equipment guidelines well in advance of contest;
 - (3) Consider following responsibilities to be assigned to ensure smooth operations in an emergency, which may be adjusted to different personnel as part of the venue specific plan:
 - a. Athletic Trainer- Emergency Response Plan, Player Medical

History, Multi-tool equipment removal (including face mask and helmet, Knowledge of equipment in play, backboard and Location (if EMS not on site), AED and other EMS supplies if EMS not on site (transition to EMS at appropriate time upon arrival);

- b. Doctor or Assigned Medical Staff- Sports injury experience essential in selection, care coordination if necessary;
- c. EMS Provider- AED, C-collar; Towel Rolls, Stretcher, Backboard and straps, 2 inch securing tape, sheets, King Airway, Cold Packs, BLS or ALS First Out Med Bag;
- d. School Officials and Law Enforcement- Keys to Gates and Doors, Egress Routes, Directions to Hospital, Aeromedical landing coordinates, Scene control, equipment retrieval if necessary.

POLICY- SPORTS MEDICINE – AUTOMATIC EXTERNAL DEFIBRILLATOR (AED) GUIDANCE

SEC. 1) AED BASIC GUIDANCE

- a) Each public high school in this state which has an interscholastic athletics program must comply with state law and regulations and should have at least one functional automated external defibrillator on site at such school at all times and easily accessible during any school related function, including athletic practices, athletic competitions, and other occasions where students and others will be present, for use during emergencies.
- b) A person or entity that acquires an automated external defibrillator shall Comply with all regulations governing the placement of an automated external defibrillator.
- c) All coaches are required to have successful completion of CPR/AED training prior to coaching and maintain current CPR/AED training in compliance with state law and regulation.

SEC. 2) AED USE AND LOCATION REQUIREMENTS

- a) An AED should be on site at each venue, or accessible within 1-3 minutes.
- b) The AED should be used in conjunction with enacting the EMS system.
- c) AED should be stored in a safe place.
- d) All athletic trainers, coaches, administrators, school nurses and physical education teachers should have access to an AED on the school property.
- e) Institutions sponsoring athletic events/activities should have an AED onsite (or access to one) at each athletic venue for practices, games or other athletic events.
- f) An AED should be located within three minutes of the location of any athletic activity and available at any time.
- g) The location of the AED should be well marked, publicized, accessible and known among all trained staff.
- h) AEDs should be inspected regularly in accordance with manufacturer guidelines to ensure proper working order, including making sure the batteries are charged, and wires and electrodes are in good condition.
- i) The owner of the AED must be aware of manufacturer guidelines on warranty and safe use life, and be prepared for replacement as necessary.

POLICY- SPORTS MEDICINE - PROTOCOL RELATED TO CONCUSSIONS AND CONCUSSED STUDENT-ATHLETES INCLUDING RETURN TO PLAY

This policy applies to all Interscholastic Athletics in the Commonwealth of Kentucky. Released: June, 2010, Commissioner Julian Tackett, Updated per General Assembly Action, April, 2012, Reviewed per General Assembly Action, April, 2017

SEC. 1) FOUNDATIONAL RECOMMENDATIONS

- a) The treatment of concussions and suspected concussions should be conducted within the recommended protocols and procedures of the Consensus statement on concussion in sport: the 6th International Conference of Concussion in Sport-Amsterdam, October 2022." Drs. Cantu & Hainlain, among many others, were included as authors when this was published 6/14/23.

SEC. 2) SUSPECTED CONCUSSION REQUIREMENTS

- a) A student-athlete suspected by an interscholastic coach, school athletic personnel or contest official of sustaining a concussion (displaying signs/symptoms of a concussion) during an athletic practice or contest shall be removed from practice or play

immediately.

- b) The student-athlete shall not return to play prior to the ending of practice or competition until the student-athlete is evaluated to determine if a concussion has occurred.
- c) A physician or licensed health care provider whose scope of practice and training includes the evaluation and management of concussions and other brain injuries is empowered to make the on-site determination that a student-athlete has or has not been concussed. This will generally include an MD (Medical Doctor), DO (Doctor of Osteopathy), PA (Physician Assistant), ARNP (Advanced Registered Nurse Practitioner), ATC (Certified Athletic Trainer); or LAT (Licensed Athletic Trainer).
- d) The player should be medically evaluated on-site using standard emergency management principles, and particular attention should be given to excluding a cervical spine injury. The appropriate disposition of the player must be determined by the treating health care provider in a timely manner.

(1) Once the first aid issues are addressed, then an assessment of the concussive injury should be made using the SCAT2 or another similar tool.

(2) The player should not be left alone following the injury, and serial monitoring for deterioration is essential over the initial few hours following injury.

- e) If any one of these individuals listed in (b) answers that "yes", there has been a concussion, that decision is final and is not appealable.
- f) If medical coverage by a person empowered to make the concussion assessment is not on-site, and signs/symptoms of concussion have been observed, a concussion is presumed until such evaluation can be performed.
- g) If no health care provider is available, the player should be safely removed from practice or play and an urgent referral to a physician arranged.

h) No student-athlete may return to practice or play in interscholastic athletics that day in the event that a concussion is diagnosed or presumed.

i) A student-athlete may return to play at the time of a suspected concussion if it is determined by appropriate medical personnel that no concussion has occurred.

SEC. 3) REQUIRED ROLE OF COACHES IN ADMINISTERING THE POLICY

- a) Coaches are to be current in their certification regarding the KMA/KHSAA Sports Safety Course, including the specific segment(s) related to identifying the signs and symptoms of concussions.
- b) Coaches must review and know the signs and symptoms of concussion and direct immediate removal of any student-athlete who displays these signs or symptoms for evaluation by appropriate medical personnel.
- c) Coaches have no other role in the process with respect to diagnosis of concussion or medical treatment.
- d) It remains the ultimate responsibility of the coaching staff in all sports to ensure that players are only put into practice or contests if they are physically capable of performing.

(1) Upon completion of the required evaluation, a coach may return a student athlete to play if the physician or licensed health care provider determines that no concussion has occurred; or shall not return a student athlete to play if the physician or licensed health care provider determines that a concussion has occurred.

(2) If no physician or licensed health care provider described in paragraph 2(b) of this policy is present at the practice or competition to perform the required evaluation, a coach shall not return a student athlete to play who is suspected of sustaining a concussion. The student athlete shall not be allowed to participate in any subsequent practice or athletic competition unless written clearance from a physician is provided.

SEC. 4) REQUIRED ROLE OF CONTEST OFFICIALS IN ADMINISTERING POLICY

- a) Officials are to review and know the signs and symptoms of concussion and direct immediate removal of any student-athlete who displays these signs or symptoms.
- b) Officials have no other role in the process with respect to diagnosis of concussion or medical treatment.

SEC. 5) REQUIRED RETURN TO PLAY POLICY FOR A STUDENT-ATHLETE RECEIVING A CONCUSSION, AFTER THE MANDATORY REMOVAL THAT DAY

- a) Once a concussion has been diagnosed (or presumed by lack of

POLICY- SPORTS MEDICINE - KMA/KHSAA **PROCEDURE FOR AVOIDING HEAT INJURY/ILLNESS,** **HEAT INDEX AND MONITORING**

examination by an appropriate health care provider), only an MD or DO can authorize Return To Play (RTP) on a subsequent day, and such shall be in writing to the administration of the school after the completion of all concussion protocols.

- b) Such RTP approval should not be given unless a stepwise protocol has been observed by all practitioners with separate periods for
 - (1) No activity;
 - (2) Light aerobic exercise;
 - (3) Sport-specific exercise;
 - (4) Non-contact training drills;
 - (5) Full-contact/competition practice; and
 - (6) Return to normal game play.
- c) Any student-athlete with a concussion should complete a graduated return to learn strategy in accordance with best practices prior to unrestricted return to sport.
- d) Any student-athlete with a concussion shall have a graduated return to sport strategy in accordance with best practices must be implemented for all student-athletes returning to participation.
- e) Graduated RTP and Return to Learn (RTL) can occur simultaneously, however, RTL should lead the way in terms of prioritization..
- f) It is highly recommended that each of these protocol steps be no less than twenty-four hours in length.
- g) It is highly recommended that no student-athlete return to play unless he/she has been properly recommended to also return to school.
- h) Full-day activity should be able to be completed, including learning and athletic participation, without more than mild symptom exacerbations prior to authorization to return.
- i) School administration shall then notify the coach as to the permission to return to practice or play.
- j) If an event continues over multiple days, then the designated event physician has ultimate authority over return to play decisions and such return to play may not be prior to the third day following the initial diagnosis, and until all steps of the protocol in Section (b) have been followed.

SEC. 6) HISTORY AND BACKGROUND

- a) In various sports playing rule codes, the National Federation of High Schools (NFHS) has implemented standard language dealing with concussions in student-athletes.
- b) The basic rule in all sports (which may be worded slightly differently in each rule book due to the nature of breaks in time intervals at contests in different sports) states:
 - (1) Any athlete who exhibits signs, symptoms, or behaviors consistent with a concussion (such as loss of consciousness, headache, dizziness, confusion, or balance problems) shall be immediately removed from the contest and shall not return to play until cleared by an appropriate health-care professional. (Please see NFHS Suggested Guidelines for Management of Concussion in the Appendix in the back of each NFHS Rules Book).
 - (2) The NFHS also has recommended concussion guidelines through its Sports Medicine Advisory Committee (SMAC). These recommendations include:
 - a. No student-athlete should return to play (RTP) or practice on the same day of a concussion.
 - b. Any student-athlete suspected of having a concussion should be evaluated by an appropriate health-care professional that day.
 - c. Any student-athlete with a concussion should be medically cleared by an appropriate health-care professional prior to resuming participation in any practice or competition.
 - d. After medical clearance, return to play should follow a step-wise protocol with provisions for delayed return to play based upon the return of any signs or symptoms.
 - (3) To implement these rules, and based on KRS 160.445 and 156.070(2) as amended by the Kentucky General Assembly in 2012, the KHSAA has defined this policy and parameters to guide all interscholastic school athletic representatives and all KHSAA licensed sports officials.
 - (4) References to signs and symptoms of concussion are detailed by the NFHS through its SMAC upon consultation with the Centers for Disease Control and Prevention (CDC).

SEC. 1) REQUIREMENTS FOR USE OF THE WET BULB TEMPERATURE (WBGT) FOR HEAT MONITORING AND ACTIVITY REVISIONS

- a) The WBGT is:
 - (1) a measure that estimates the effect of temperature, relative humidity, wind and solar radiation on humans; and
 - (2) is generally measured in the sun (at outdoor venues) and uses temperature, relative humidity, wind speed, sun angle, cloud cover and the sun angle (at outdoor venues) to make its calculations;
 - (3) has no possible conversion chart to determine its calculation and must be measured by a properly calibrated device to yield a single measurement accurately; and
 - (4) is a measurement of ambient temperature, relative humidity, radiant heat from the sun and wind speed.
 - a. When outdoor activities are conducted in the direct sun, the WBGT is the most pertinent to use.
 - b. Although read in degrees, it does not reflect degrees of air temperature.
 - (5) is the Gold standard for measuring the climate to determine if activity should be altered.

SEC. 2) ON-SITE DATA MONITORING REQUIREMENTS

- a) All sports and sport-activities are impacted by this policy, and all organized activity (practice or play) is covered by the requirement.
- b) The policy calls for determining the WBGT at the practice/contest site.
- c) A WBGT device is required to properly monitor this requirement.
- d) Measurements using a WBGT device shall adhere to the following provisions:
 - (1) The measurements will be taken ONLY using the WBGT device at the site of practice or competition.
 - (2) No website, phone app or other computer programs can substitute and allow a school to remain compliant as only on-site readings are valid.
 - (3) It is important to note that media-related temperature readings (such as the Weather Channel, local radio, etc.) or even other readings in general proximity are not permitted as they may not yield accurate results when considering the recommended scale, and there is no website, phone app or other computer programs that can substitute and allow a school to remain in compliance.
 - (4) A 2024 KSI study showed that smartphone apps may underestimate heat risk compared to dedicated WBGT monitors, which provide more accurate readings for critical safety decisions.
- e) The following procedures will be used to monitor environmental conditions via WBGT:
 - (1) Heat stress (WBGT) monitoring will be conducted on site at the activity location with a device on a tripod 3-4 feet above the playing or competition surface for any activity in football, field hockey or distance running (greater than 800 meters, including cross country).
 - (2) An on-campus comprehensive, permanently installed WBGT measuring tool may be used to measure the WBGT for other sports and sport-activities provided that it is self contained to record the measurement and is on on the same physical plant facility as the competition, practice or workout.
 - (3) No phone or computer app deriving WBGT measurements may substitute for the provisions of (1) or (2) above.
 - (4) The WBGT should remain exposed to the environmental conditions for >15 minutes before activity.
 - (5) WBGT measurements should be taken every 30 min for the duration of the athletic activity.
 - (6) If risk categories of consecutive measurements frequently reflect different levels of activity modification, the activity modification for the higher risk category should be followed.
- f) Neither the KHSAA nor KMA-SMAC has endorsed any particular WBGT measuring device brand and receives no endorsement fee or other consideration for any device sold, and several models on the market will adequately perform the functions.
- g) The KHSAA or your local certified/licensed athletic trainer has easy access to catalogs with this type of equipment.
- h) The Korey Stringer Institute (KSI) emphasizes that WBGT guidelines

must be region-specific, based on the varying climate and heat acclimatization levels of local populations.

- i) This region-based approach is used by state high school athletic associations and other organizations to establish tiered activity modifications based on local conditions.
- j) Based on research by Grundstein et al., the contiguous U.S. is divided into three regions for heat safety thresholds, though specific WBGT values may be adjusted by local authorities.
- k) An example of a generalized template shows how WBGT categories translate to different levels of activity modification with Kentucky being in Region 3 (Warmer Climate) states.

SEC. 3) DEFINITIONS AND REQUIRED PROCEDURES FOR TESTING

a) Definitions

- (1) Game/Contest: any KHSAA sanctioned event applicable to Bylaw 23.
- (2) Practice: the period of time that a participant engages in coach-supervised, school-approved sport or conditioning-related activity, with practices timed from the time the players report to the field until they leave.
- (3) Walk through: this period of time shall last no more than one hour and is not considered to be a part of the practice time regulation, and may not involve conditioning or weight-room activities or the wearing of protective equipment.

b) Required Procedures for Testing

- (1) The measurements should be taken at any practice or contest setting where the current temperature is at or above 82.2 degrees, regardless of what time of year.
- (2) The measurements should be taken in the sun in a location where any applicable wind and solar radiation is present.
- (3) Any readings are to be taken at the location of practice at the specific competition/practice area where the activity will occur.
- (4) Thirty (30) minutes before the start of activity, WBGT readings should be taken at the specific practice/competition site, and periodically measured after that point until the end of the practice or competition.
 - a. In segmented competitions (i.e. track or cross country meets), this periodic measurement is appropriate and is not necessary between each and every event, except for the notations subsection Sec. b(4)(b) below.
 - b. In segmented competitions (i.e. track and field or cross country meets), additional measurements should be taken before any race of 1600 meters or longer, even if following a periodic measurement by less than thirty (30) minutes.
- (5) Readings must be taken on the practice and game site a minimum of every hour, beginning 30 minutes before the beginning of the practices and games.
- (6) The measurements should be recorded on KHSAA Form GE20 and these records should be available for inspection upon request.
- (7) All schools are to maintain measurement records in either a paper or electronic format for the duration of the district/school records retention schedule.
- (8) Activities must be altered per the adopted alternation table regardless of the device used.
- (9) If a reading is determined whereby activity is to be decreased (above 86.9 WBGT), then re-readings would be required every thirty (30) minutes to determine if further activity should be eliminated or preventative steps are taken, or if an increased level of activity can resume.

SEC. 4) REQUIRED ACTIVITY ALTERATION.

a) WBGT Reading

- (1) WBGT <82.0°F, Green, Very Low Risk for Heat Illness
 - a. All Sports
 - i. Normal activities
 - ii. Provide at least three separate rest breaks each hour of minimum duration of 3 minutes each during workout
- (2) WBGT 82.1°F - 86.9°F, Yellow, Low Risk for Heat Illness
 - a. All Sports
 - i. Use discretion for intense or prolonged exercise;
 - ii. watch at-risk players carefully;
 - iii. Provide at least three separate rest breaks each hour with a minimum duration of 4 minutes each;
 - iv. Cold Water immersion tub or other rapid cooling method should be prepared and ready to go.

(3) WBGT 87.1°F - 90.0°F, orange, Moderate Risk for Heat Illness

- a. All Sports
 - i. Maximum practice time is 2 hours, not including rest breaks,
 - ii. provide at least four separate rest breaks each hour with a minimum duration of 4 minutes each; and
 - iii. Cold Water immersion tub or other rapid cooling method should be prepared and ready to go.
- b. Consider competition alterations (other than Football, Lacrosse, Field Hockey):
 - i. Coordinate with contest officials to allow for additional breaks;
 - ii. Shorten length of sub-varsity competitions; and
 - iii. Shorten length of course (Cross Country, Track Distance Events);
- c. For Football, Lacrosse and Field Hockey:
 - i. Protective equipment should be limited to helmets and shoulder pads, and these should be removed for conditioning; and
 - ii. If the WBGT rises to this level during practice, football players may continue to work out wearing protective gear without changing into shorts.

(4) WBGT 90.1°F - 91.9°F, Red, High Risk for Heat Illness

- a. All Sports
 - i. Maximum practice time is 1 hour.
 - ii. No post-practice or contest conditioning
 - iii. There must be 20 minutes of rest breaks distributed throughout each hour of practice, at least 10 minutes every 30 minutes.
 - iv. In sports or sport-activities with multiple simultaneous contests or practices, the required monitoring and rest breaks shall be taken at the same time for all contests or practices;
 - v. All breaks should be taken in areas outside of direct sunlight;
 - vi. Cold Water immersion tub or other rapid cooling method should be prepared and ready to go.
 - vii. Have towels with ice for cooling of athletes as needed with full preparatory steps for on-site rapid cooling in place;
 - viii. Consider delaying practice ? competitions until a cooler WBGT is reached; and
 - viii. Watch/monitor athletes carefully for necessary action
 - b. For Football, Lacrosse and Field Hockey
 - i. No protective equipment may be worn during practice.
- ##### (5) WBGT >=92.0°F, Black, Extremely High Risk for Heat Illness
- a. No Outdoor Workouts.
 - b. Delay practice until a cooler WBGT level is reached.

SEC. 5) ADDITIONAL IMPLEMENTATION GUIDANCE FOR CONTESTS

a) Baseball

- (1) WBGT must be measured 15 minutes prior to start of contest and coaches notified.
- (2) If WBGT is equal or above 86.0 F, an ice immersion tub must be present and ready for use.
- (3) If WBGT is equal or above 88.0 F, Umpires will take a 3-minute hydration break at the beginning and mid-point of inning 3 and continuing until the conclusion of the game.

b) Cross Country

- (1) WBGT is to be measured 15 minutes prior to start of contest and coaches notified.
- (2) If WBGT is equal or above 86.0 F, an ice immersion tub is to be present and ready for use at finish line.
- (3) If WBGT is equal or above 88.0 F, a minimum of two (2) hydration stations must be placed throughout the racecourse as well as at the finish line.

c) Football Contests During Season

- (1) Any football contest is to have an on-site WBGT monitor and take measurements 15 minutes prior to the start of the contest and again during halftime. The following requirements for hydration breaks must be followed:
- (2) If kick-off WBGT equal or above 87.0 F – referees to take a mandatory hydration break at or near the 6-minute mark of each quarter lasting 3 minutes (change of possession or touchdown and PAT).
 - a. All participants must remove their helmets and no coaches are permitted on the field at this time.
 - b. It is recommended that players who are actively engaged in the competition and come to the sideline remove their helmets

- and hydrate until such time that they re-enter the field of play.
- (3) If kick-off WBGT equal or above 90.0 F – referees will take a mandatory hydration break at or near the 4-minute and 8-minute mark of each quarter lasting 3 minutes (change of possession or PAT).
 - a. All participants must remove their helmets and no coaches are permitted on the field at this time.
 - b. It is recommended that players who are actively engaged in the competition and come to the sideline remove their helmets and hydrate until such time that they re-enter the field of play.
- d) Football Pre-season 7-on-7 during Bylaw 23 allowed period
- (1) 7-on-7 play between 2 or more teams where there are NOT any officials present will be viewed as a “PRACTICE” and therefore will fall under the guidelines for practices without exception, including:
 - a. Teams that participate in back-to-back play periods lasting a maximum of 60 minutes, and be followed by a 30-minute break in a shaded area before resuming activity.
 - b. It is recommended that medical personnel (athletic trainer or EMT) be present during said practice session.
 - (2) 7-on-7 play between 2 or more teams in the presence of officials will constitute a “CONTEST” and therefore will follow the guidelines below:
 - a. WBGT Temperature will be taken and recorded prior to the start of all contests.
 - b. The host school will notify the Head Official and both Head Coaches of the WBGT reading prior to the start of the contest.
 - c. Hydration breaks will be implemented when the WBGT is equal or above 90.0 F. Referees will take a mandatory 3-minute hydration break at the 10-minute mark of each contest.
 - d. Ice immersion tub on-site and ready for use when WBGT is equal or above 86.0 F.
 - e. Medical Time-out taken prior to start of contest to discuss procedures for possible heat exhaustion or heat stroke treatment.
 - f. Teams that participate in back-to-back play periods lasting a maximum of 60 minutes, must be followed by a 30-minute break in a shaded area before resuming activity.
 - g. It is recommended that medical personnel (athletic trainer or EMT) be present on each field during all contests.
- e) Lacrosse (Boys)
- (1) WBGT is to be measured 15 minutes prior to start of contest and coaches notified.
 - (2) If WBGT is equal or above 86.0 F, an ice immersion tub must be present and ready for use.
 - (3) If WBGT is equal or above 88.0 F, Referee’s will take a 3-minute hydration break at or near the midway point of each 12-minute period (ball out of bounds/foul assessed or goal scored). Teams to the bench area during hydration break, no coaches permitted on field.
- f) Lacrosse (Girls)
- (1) WBGT is to be measured 15 minutes prior to start of contest and coaches notified.
 - (2) If WBGT is equal or above 86.0 F, an ice immersion tub must be present and ready for use.
 - (3) If WBGT is equal or above 88.0 F, Referees will take a 3-minute hydration break at or near the midway point of each half (ball out of bounds/foul assessed or goal scored). Teams to the bench area during hydration break, no coaches permitted on field.
- g) Soccer
- (1) WBGT must be measured 15 minutes prior to start of contest and coaches notified.
 - (2) If WBGT is equal or above 86.0 F, an ice immersion tub must be present and ready for use.
 - (3) If WBGT is equal or above 88.0 F, Referees will take a 3-minute hydration break at or near the midway point of each half (ball out of bounds/foul assessed or goal scored) and send teams to the bench area during hydration break, no coaches permitted on field.
- h) Softball
- (1) WBGT must be measured 15 minutes prior to start of contest and coaches notified.
 - (2) If WBGT is equal or above 86.0 F, an ice immersion tub must be present and ready for use.
- (3) If WBGT is equal or above 88.0 F, Umpires will take a 3-minute hydration break at the beginning and mid-point of inning 3 and continuing until the conclusion of the game.
- i) Off-season and pre-season conditioning
- (1) Conditioning periods should be phased in gradually and progressively to minimize risk of injury during transitional periods.
 - (2) The first 5 days of any new conditioning cycle or new physical activity (including but not limited to return to sport from any circumstance that has caused a removal from sport for 14 or more consecutive days) are referred to as transitional periods.
 - (3) New conditioning activities should be phased in gradually, especially during the early stages of a conditioning period. See table below for example.
 - (4) If no previous strength and conditioning history exists, default to the most conservative workload from other athletes.
- SEC. 6) REQUIREMENTS FOR HYDRATION AND REST BREAKS
- a) Rest time must involve unrestricted access to fluids (e.g. water or electrolyte beverages).
 - b) With sports requiring helmets (e.g. football, lacrosse, field hockey), the helmets must be removed during rest time.
 - c) The site of the rest time must be in a shaded area.
 - d) When the WBGT reading is >85.0°F
 - a. Ice towels, spray bottles filled with ice water or equivalent must be available to aid in the cooling process within the shaded area.
 - e) Rest breaks may not be combined with any other type of activity and players must be given unlimited access to hydration.
 - f) In the event of a serious Exertional Heat Illness (EHI), such as an athlete about to collapse, one who has collapsed, or who has a core temperature of 104° the principle of “Cool First, Transport Second” should always be utilized and implemented by the first medical provider onsite until cooling is completed (core temperature of 102 or less); or a minimum of fifteen (15) minutes if unable to obtain a core temperature measurement.
- SEC. 7) EHS, EHI AND ON-SITE RAPID COOLING REQUIREMENTS
- a) Exertional heat stroke (EHS) is relatively uncommon among exercise associated medical conditions, but is a frequent cause of exercise related death.
 - b) EHI is more common than EHS and it is important to prepare all involved for any situation that might occur whether it is EHI or EHS.
 - c) Medical evidence shows that early implementation of body cooling is the most effective method of decreasing mortality in EHS and a more positive outcome in the case of EHI.
 - d) Many methods of body cooling, including tubs, iced towels (towels with water that have been frozen), water, fans, and shade, have been considered but cold-water immersion (CWI) by either tub or Tarp Assisted Cooling Oscillation (TACO) is the most effective method for severe EHI or EHS.
 - e) TACO is a method in which a combination of ice and cold water are added to an athlete once they have been placed on a tarp with the edges held up by clinicians to create a physical “taco” for the patient to be encased inside, and a demonstration of the technique can be found at <https://www.youtube.com/watch?v=A9gbbLj5Hh4>.
 - f) Whatever cooling method is utilized, it must be set up at all warm weather practices and competition, and readily available, regardless of weather conditions.
 - g) If EHS is suspected, onsite cooling using a cold water immersion tub (preferred) or the TACO method should be done immediately and prior to transportation to the hospital noting that cooling first, transporting second is the priority.
 - (1) While best supervised by a licensed athletic trainer, trained medical professional, or EMS provider, this step should not be delayed in this case.
 - h) The recommendations regarding rapid cooling are classified as essential (foundational to the implementation of treatment, should-have resources that are to be considered required and personnel directed towards implementation), and desirable (important in maximal implementation, should have resources and personnel directed towards implementation as budget and resources allow).
 - i) These guidelines should be considered in the care of athletes who can be expected to be at risk of EHS due to the sport or the environmental situation of the activity.
 - j) Sports, especially at risk, include football, with and without equipment, boys’ lacrosse, soccer, and long distance track.
 - k) Other sports and activities, such as cycling, golf, baseball, lacrosse,

- tennis, track and field, and band (per the NFHS SMAC), may also be at risk due to long-duration exposure to extreme environmental conditions.
- l) It is essential and required that the school and school officials:
- (1) Establish a written plan for emergency treatment of EHS, and conduct rehearsal related to the implementation of the plan;
 - (2) Know how to assess environmental conditions and determine when extreme conditions exist;
 - (3) Identify a specific spot at the athletic facility that has shade;
 - (4) Have immediate access to ice and bags containing ice;
 - (5) Have access to water, and provide water breaks; and
 - (6) Know the most effective sites for application of ice to the body;
 - (7) Provided examples of the motivation behind cooling first, such as the video found at www.youtube.com/watch?v=X1-g3dVVvaM&feature=youtu.be.
- m) Schools and school officials are to:
- (1) Obtain and use, when environmental conditions are determined to be extreme, a tub or pool or tarp to ensure on-site rapid cooling;
 - (2) Understand and practice that cold water immersion, cool first, transporting second is essential
 - i. In the event of potential Exertional Heat Stroke (EHS), each school participating in interscholastic sports must be properly prepared and equipped to initiate Cold Water Immersion (CWI) or equivalent whole body cooling techniques and EMS concurrently contacted, noting that the focus is to cool first and then transport. The water should be aggressively stirred during the cooling process.
 - ii. The best practices shall be carried out by a licensed athletic trainer, designated healthcare provider, or EMS provider.
 - iii. The cooling modality must be set up at all warm weather practices, but should also be readily available if the need arises.
 - (3) Provide a cooling tub filled with water and ice being available before practice or game, to be used in body immersion for maximal cooling and have personnel trained in this technique at it is the "gold" standard;
 - i. NOTE: If used, this tub be large enough to place an athlete into the cold, ice and water filled tub and cool the athlete ensuring that both the groin and armpits are in the cooling ice and water;
 - ii. NOTE: In some events, such as distance running or golf, other methods may need to be used in an emergency due to proximity the tub and the need for immediate cooling; and this is to include rotating ice-water soaked towels to all other areas of the body which can be effective in cooling an affected athlete or having a tarp available to implement the TACO cooling method;
 - (4) Ensure that the athlete is monitored at all times when in the cooling tub, with individuals designated to control the head and neck at all times in case the athlete becomes unconscious;
 - (5) That the required emergency plan ensures that cooling of an athlete that is showing signs and symptoms of exertional heat illness is begun immediately including the availability of a CWI technique such as a tub or the TACO;
 - (6) Include in its required emergency action plan (EAP) the re-stating and practicing of the fundamental principle that the objective is to cool first, transport second, and that the potentially impacted athlete should be monitored continuously until appropriate emergency personnel arrive on the scene;
 - (7) Reiterate as part of its EAP that for heat illness emergencies, emphasis must be placed on Onsite Rapid Cooling prior to transport;
 - (8) The NFHS Sports Medicine Advisory Committee, in its November, 2022 revisions to its Heat Illness Position statement, reiterated that Immediate medical treatment and prompt rapid cooling can prevent death or minimize further injury in the athlete with EHS;
 - (9) The NFHS Statement also reiterated that while pools or tubs of ice water remain the gold standard to be used for rapid cooling of athletes, rapid cooling is vital, and not only must equipment be provided, but all personnel should be trained and practiced in using these facilities for rapid cooling; and
 - (10) Have trained and authorized medical personnel routinely review and update the school's emergency action plan for athletic emergencies.
- n) It is highly desirable that schools and school officials:
- (1) Have a certified/licensed athletic trainer on staff to develop and implement these guidelines;
 - (2) Have immediate access to additional water and ice at all times;
 - (3) Provide shade breaks;
 - (4) Provide cooling fans when environmental conditions are determined to be extreme;
 - (5) Have close access to an air conditioned room; and
 - (6) Have access to and use iced towels that can be rotated to appropriate areas of the body, including the axilla, groin, and back of the neck.
- o) It is desirable that schools and school officials:
- (1) Have trained and authorized medical personnel in place to be able to monitor the rectal temperature of an athlete in an appropriate contained environment in the event of a heat emergency where an athlete is placed in a cooling tub to ensure the effectiveness and timeliness of treatment until appropriate emergency personnel arrive on the scene.
- SEC. 8) REQUIRED CORRELATION OF ON-SITE RAPID COOLING AND WBGT**
- a) As part of its required Emergency Action Plan, all schools must have a comprehensive detailed plan including being properly prepared and equipped to initiate cold water immersion (CWI) or other approved cooling technique.
 - b) The plan should anticipate starting cooling techniques immediately, and concurrently with contacting EMS (Emergency Medical Services).
 - c) This must be followed during all official practice sessions on school grounds on any day in which the ambient air temperature is 83 degrees or higher.
- SEC. 9) COLD WATER IMMERSION TUB REQUIRED GUIDELINES**
- a) WBGT <82.0°F, Green, Very Low Risk for Heat Illness
 - (1) Mandatory alternative cooling measures of a cooler with ice and towels or a tarp (TACO method) must be available at the practice, game and event site in case conditions change.
 - b) WBGT 82.1°F - 87.0°F, Yellow, Low Risk for Heat Illness
 - (1) It is required a 150 gallon cold water immersion tub or a tarp (TACO method) must be filled with water temperature of less than 60°F and accessible for cooling within 5-10 minutes of the practice/contest site.
 - (2) Remove external clothing/equipment prior to cooling or immediately after entering tub.
 - (3) Aggressively stir water during cooling process.
 - c) WBGT 87.1°F - 90.0°F, orange, Moderate Risk for Heat Illness
 - (1) It is required a 150 gallon cold water immersion tub or a tarp (taco/burrito method) must be filled with water temperature of less than 60°F and accessible for cooling within 5-10 minutes of the practice/contest site.
 - (2) Remove external clothing/equipment prior to cooling or immediately after entering tub.
 - (3) Aggressively stir water during cooling process..
 - d) WBGT 90.1°F - 91.9°F, Red, High Risk for Heat Illness
 - (1) Maximum length of practice is 1 hour.
 - (2) For Football, Lacrosse and Field Hockey: No protective equipment may be worn during practice and there must be no conditioning activities.
 - (3) For All Sports: there must be no conditioning and there must be 20 minutes of rest breaks distributed throughout the hour of practice.
 - e) WBGT >92.0°F, Black, Low Risk for Heat Illness
 - (1) No Outdoor Workouts.
 - (2) Delay practice until a cooler WBGT level is reached.
- SEC. 10) SUMMARY OF WBGT MONITORING AND HEAT ILLNESS PREPAREDNESS**
- a) Adherence to these guidelines represents a conscious effort by the interscholastic community to emphasize health and safety on a much higher level than any loss of competitive preparation.
 - b) Any further revisions or enhancements will be distributed to the members of the KHSAA.
- SEC. 11) TREATMENT OF EXERTIONAL HEAT STROKE**
- a) All school representatives on site are to immediately implement the district provided Emergency Action plan to begin cooling immediately.
 - b) If the athletic trainer/medical staff is onsite:

- (1) Utilize the principle of Cool First, Transport Second.
- (2) When cooling, use CWI or other approved cooling technique, until core temperature is at 102°F.
- c) If the athletic trainer/medical staff is not onsite
 - (1) Cool immediately until the athlete starts to shiver, or for a minimum of 15 minutes based upon the known cooling rate of 1 degree per 3 minutes.
 - (2) EMS assumes control of the EHS patient upon arrival and continues cooling for the minimum of 20 minutes or until rectal temperature is obtained.

SEC. 12) HISTORY, CHRONOLOGY AND REFERENCES

a) This procedure requires Analysis of current heat conditions and their impact on the body and subsequent restructuring of activities and recommendations for cooling methods to prevent heat-related illness.

b) original procedure developed by the Kentucky Medical Association Committee on Physical Education and Medical Aspects of Sports (KMA-SMAC) to and for the KHSAA, and adopted by the KHSAA Board of Control as a recommendation for all schools, May 2002.

Following months of study, after one year of implementation and in an effort to help protect the health and safety of student-athletes participating in high school sports, the KMA-SMAC issued a recommended procedure to the KHSAA for immediate implementation in 2002.

This procedure originally called for determining the Heat Index using on-site devices to measure the conditions, and a guideline for activity to be conducted at that time based on the Heat Index reading.

Though other procedures and measurements were considered, the application of the Heat Index appeared to be most readily implementable on a statewide basis and appeared to be reliably tested in other areas.

Through the years of use of the procedure, regular adjustments were made in the reporting requirements and the on-site devices to be used.

c) On-site procedures have been revised on multiple occasions and reported to the KHSAA Board of Control for consent and now, as part of the KHSAA Approved Board policies, have force of state regulation.

d) In May 2005, the Board of Control, through its policies directed that all member schools comply with the testing and reporting requirements.

This statewide adoption as state regulation was the first of its kind in the country.

e) In October 2006, the member schools of the Association overwhelmingly approved at their Annual Meeting a proposal to make such reporting not simply a Board of Control policy but a school-supported and approved Bylaw as it approved Proposal 9 to amend the KHSAA bylaws.

f) In March 2007, the KMA-SMAC recommended eliminating all devices except the Digital Sling Psychrometer (DSP) as a means of measuring at the competition/practice site.

g) In June 2009, the KMA-SMAC recommended that specific cooling procedures, including practicing in the event of an emergency, be implemented at the local school level.

h) In August 2010, the KMA-SMAC recommended that the heat index monitoring procedures apply to the sports played in the spring in Kentucky's high schools.

i) In August 2019, a phase-in was approved to transition from the use of the DSP to the use of the WBGT as the official device for heat measure, to be fully implemented before the 2024-2025 school year with further delineation within these policies.

While the gold standard for heat index measurement is the WBGT, the KHSAA originally allowed the use of the DSP as the measurement instrument for heat index as the next best available and a cost effective alternative.

j) Throughout its existence, these policies have been edited and clarified in accordance with the latest research reviewed by both the KHSAA and NFHS Sports Medicine Advisory Committees and the NATA and Korey Stringer Institute.

k) The following revision dates have seen changes made and subsequently given regulatory approval:

- (1) Revised by KHSAA Board of Control, February 13, 2003
- (2) On-site procedures further revised and made mandatory for all

schools by the KHSAA Board of Control, May 2005

(3) On-site procedures further revised concerning testing instruments, March 2007.

(4) Cooling Procedures modified as recommended by KMA-SMAC, June 2009.

(5) Heat Index expanded to spring sports, August 2010.

(6) Further revised, April, 2016 with clarifications.

(7) Revised, August, 2019.

(8) Updated, July, 2023 to reflect sunset of Heat Index provisions.

(9) Updated, June, 2024 revisions recommended by the KMA SMAC following collaboration with attendees and the Team Up for Sports Safety Initiative in Lexington and following review by the KMA SMAC..

https://ksi.uconn.edu/prevention_trashed/wet-bulb-globe-temperature-monitoring/

https://ksi.uconn.edu/prevention_trashed/sports-medicine-policies-procedures/

https://ksi.uconn.edu/prevention_trashed/heat-acclimatization/

<https://www.nfhs.org/media/5919613/nfhs-heat-acclimatization-april-2022-final.pdf>

POLICY- SPORTS MEDICINE – POSITION STATEMENT AND RECOMMENDED GUIDANCE - EXERTIONAL HEAT ILLNESS, STROKE AND EXHAUSTION RECOGNITION, TREATMENT AND RETURN TO PLAY

Following lengthy research, the KHSAA / KMA Sports Medicine Committee has issued guidance to medical practitioners on the Return-to-Play steps for student-athletes and others who have suffered an event with exertional heat illness.

Information in this guidance is adapted from the sources listed in references and based on current best practices recommended by the opinions of those considered experts in the field.

Each case of heat illness is individual, and this guidance is meant to aid in the education of providers about best practices current to the time of publication but does not supersede the providers clinical judgement in each individual circumstance or any other guidance or updates from relevant sources.

SEC. 1) RECOGNITION OF EXERTIONAL HEAT STROKE AND HEAT ILLNESS/EXHAUSTION

a) Exertional Heat Illness comprises several different conditions that are related and most likely on a spectrum.

(1) These conditions include Heat Cramps, Exertional Heat Exhaustion, Exertional Heat Injury (hyperthermic organ injury without neurologic involvement), and most severe Exertional Heat Stroke.

b) This guidance focuses mostly on the most severe conditions including severe Heat Exhaustion (EHE), and Heat Stroke (including organ damage from Heat Injury) (EHS).

(1) Exertional heat stroke (EHS) is a life-threatening condition characterized by central nervous system disturbances and hyperthermia, usually >40°C (104°F) rectal (core) temperature. The term "heat stroke" reflects the presence of focal "stroke-like" symptoms associated with warm environments and hyperthermia, although the symptoms in most victims are more global than focal." (Roberts W. O., April 2023)¹.

(2) Exertional Heat Exhaustion (EHE) if not recognized and treated can progress to EHS. In EHE Core temperatures are generally 101° F to <104°F without mental status or neurological changes. Athletes are typically still coherent but may show other signs of heat illness and can develop organ injury in some cases.

SEC. 2) EXAMPLE SIGNS AND SYMPTOMS OF EHE/EHS:

<i>Exertional Heat Illness/Exhaustion</i>	<i>Exertional Heat Stroke</i>
Dizziness	Persistent mental status changes
Headache	Personality changes (frontal lobe)
Nausea	Inappropriate behavior or aggressiveness
Unsteady walk	Delirium
Generalized weakness	High rectal temperature, >40°C (104°F)
Muscle cramps	Loss of ambulatory function (ataxia)

<i>Exertional Heat Illness/ Exhaustion</i>	<i>Exertional Heat Stroke</i>
Fatigue	Flaccid muscles or persistent rigidity
Chills	Stool incontinence
Eyes closed	Seizure
Missing assigned tasks (cognitive function)	Coma
Sweaty skin (not dry), warm or cool to touch	Recurrent vomiting
Skin color varies from pale to flushed	
Tachycardia	
Systolic hypotension	
Weak or rapid pulse	

c) Current research shows that most individuals recover within a few weeks if the EHS was recognized quickly, and rapid cooling occurred.

(1) However, more serious cases can take months to recover from and the athlete may never be able to safely return to sports due to permanent organ system dysfunction.

(2) This document is intended to serve as guidance to assist the treating provider in determining when, in that provider's opinion, an athlete can safely Return to Play (RTP).

(3) Please refer to the KHSAA/KMA Sports Safety Course for more information on the recognition and treatment of Exertional Heat Illness. Information can also be found about the policies and procedures for requirements for heat monitoring and for preparedness for treatment on the KHSAA website.

SEC. 3. BASIC TENETS OF RECOGNITION AND TREATMENT OF EXERTIONAL HEAT EXHAUSTION (EHE) AND EXERTIONAL HEAT STROKE (EHS)

a) Early detection and treatment are key to best outcomes. If an athlete collapses while exercising in the heat and cardiac issues are not suspected as the primary cause then EHS should be at least suspected (always remember basic life support (BLS) protocols and to check Airway, Breathing and Circulation and treat accordingly).

b) If an athlete has severe or progressive symptoms or is unconscious or has mental status changes and EHS suspected, then core (rectal) temperature should be obtained if possible.

c) If EHS suspected and athlete is unconscious or has mental status changes or if EHS is confirmed (core temp > 104° F) then:

(1) move to shaded area, remove excess equipment and clothing,

(2) start rapid cooling with Cold Water Immersion (tub) or TACO method, (KHSAA regulations state it is mandatory that one or the other be prepared and ready to use if WBGT is 82.1° or above and available at all times in case conditions change).

d) For EHS, aggressive cooling with Tub or TACO method is recommended to be initiated immediately on site prior to transport.

(1) It is recommended that the affected individual should be cooled to a core temp of 102°F then transported for definitive care as soon as possible. If core (rectal) temp is not available, then cooling should occur for 10-15 minutes before transport.

e) If athlete is conscious and coherent but exertional heat exhaustion (EHE) is suspected, then:

(1) remove from activity, move to shaded area;

(2) remove excess equipment and clothing;

(3) hydrate with cool fluids;

(4) use cooling techniques such as iced towels and depending on severity of clinical situation can obtain core temperature if possible; and

(5) use Cold Water Immersion or TACO method for progressive or more severe or persistent cases.

f) Once an athlete suffers an EHS (core temp > 104, mental status changes) or if has more than just mild symptoms of EHE (i.e. if suffers from collapse, mental status changes, or any symptoms that don't improve rapidly with cooling and rest) or if has any signs of organ damage or if they had to be cooled in tub/TACO method then it is recommended they be evaluated by an MD/DO prior to return to activity.

(1) This gives an opportunity to assess for any organ damage that can present as a consequence of EHE/EHS and to evaluate for modifiable risk factors to prevent future episodes of EHE/EHS.

g) Return to activity after EHS or severe EHE should be individualized based on the severity of condition and based on organ systems involved.

(1) After an initial rest period of at least 7 days and evaluation by physician for fitness to start a return to activity, then an individualized gradual progression should occur with monitoring for symptoms or signs of any recurrent issues. (2) Steps should also be taken to reduce risk factors for recurrence of heat illness.

(3) When reintroducing activity steps should be taken to gradually acclimatize the athlete to exercise in hot environments.

(4) This typically should occur over the course of at least 2-4 weeks and sometimes can be months for more severe cases 1.

SEC. 3) LABORATORY STUDIES AND TESTS

a) The following labs and tests may be used by the treating provider to assess the condition of the athlete and assess for any signs of end organ damage and can also aid in determining when to begin the RTP protocol and/or return to sport:

ECG	Creatinine kinase
CBC	PT & aPTT
Comprehensive Metabolic Profile (to include BUN/ Cr, Glucose, Electrolytes, Liver function Profile, LDH)	Fibrinogen/Fibrinogen Degradation Products
Serum calcium & phosphorus	Blood & urine myoglobin
Serum lactate	Urinalysis
Serum uric acid	Arterial Blood Gases

b) Clinical judgement should be used to determine which of the above needs to be done based on the severity of symptoms and any known end organ damage diagnosed at the time of EHS to establish return to baseline.

SEC. 4) RISK FACTORS FOR HEAT ILLNESS THAT CAN POSSIBLY BE MODIFIED OR MONITORED

a) The following factors should be reviewed by the practitioner in helping assess the individual situation.

Medications and drugs
Diuretics
Anticholinergics
Adrenergic blockers
Antihistamines
Antidepressants
Stimulants (amphetamines, cocaine, ecstasy, ephedra)
<i>Health conditions</i>
Viral or bacterial infections
Fever
Diarrhea or vomiting
Skin disorders (rash, large area of burned skin)
Diabetes mellitus
Cystic fibrosis/traut
Cardiovascular disease
<i>Environmental Factors</i>
Warm-hot weather conditions
Unusually hot for region and season
Heat wave defined as >3 d of >32°C (90°F)
Wearing heavy clothes, equipment, or uniforms

<i>Individual factors</i>
Age (infants, older adults)
Overweight, high body mass index
Poor physical fitness
Inappropriate work to rest ratios
Inadequate heat acclimatization for current conditions
Heat stress in the previous 1 to 3 days
Hypohydration
Behavioral
Self-imposed motivation to excel
Leadership or organizational structure
Peer or coach pressure to excel

SEC. 5) RETURN TO PLAY ACTIVITY / CONDITIONING GUIDELINES

Below is an example return to play guideline. This may need to be individualized to the circumstances of the athlete, severity of illness, sport, and current medical condition.

Stage	Aim/Responsibility/Goal	Activity	Duration/Intensity	Example: HS Cross Country Runner
1	Medical recovery Physician guided organ system recovery	Activities of daily living for 1 to 2 wk	Gradual increase in home activities without fatigue	Home rest and return to school
2	Medical Recovery Physician Guided Sustain minimal aerobic fitness and develop confidence	Self-paced comfortable walk in low heat stress conditions (e.g., an air-conditioned gymnasium)	20 to 60 min at Maximal Intensity of HR < 100 or <50% Age Adjusted maximal HR	Return to practice and walk through the warm-up and practice, if the environmental conditions are not stressful. If not, use an air conditioned area of the school
3	Early Exercise Adaptation Athletic trainer guided with physician Gradually improve aerobic exercise capability	Walk at 3.5 mph in low heat stress conditions	60 min at HR < 140 bpm or <70% of age adjusted Maximal HR	Warm up & cool down with team, 1 of 4 reps at half speed
4	Mid Exercise Adaptation Athletic Trainer Guided with Physician Gradually improve aerobic exercise capability & fitness	Walk & run in low heat stress conditions	60 min of progressively increasing run to walk ratio until constant run for 60 min	1 of 3 reps, half speed 1 of 2 reps, ¾ speed
5	Heat Acclimatization Athletic Trainer Guided Gradually improve heat Acclimatization status	Run in ambient warm or hot conditions	60 min of progressively increasing run until constant run for 60 min;	All reps, ¾ speed
6	Sports-specific acclimatization/training Athletic trainer and/or coach guided Improve sport-specific heat acclimatization & fitness	Participate in practice in ambient conditions	Initially participate in sports-specific drills with sports-specific equipment then progress to training and scrimmage.	All reps, full speed
7	Return to Sport Athletic trainer monitors during warm up and game	Normal game or competition participation in ambient conditions		Meet 1—run to finish the race Meet 2 — race to place in the race

POLICY- SPORTS MEDICINE - SEVERE WEATHER/ LIGHTNING POLICY FOR ACTIONS BY OFFICIALS AT OUTDOOR EVENTS

SEC. 1) LIGHTNING POLICY BACKGROUND INCLUDING PRACTICE

- a) Preparedness is the key to execution of any policy designed to help safeguard all individuals at a scrimmage, contest or practice.
- b) The following is a suggested list of steps from the KHSAA and the National Federation of State High School Association (NFHS) Sports Medicine Advisory Committee (SMAC) that should be taken in advance of any practice or contest, as amended January, 2021.
- c) These represent optimal standards and where they cannot be logistically implemented, best practice alternatives shall be developed as part of the Emergency Action Plan (EAP) or Emergency Response Plans (ERP) for after school activities.
 - (1) Assign staff to monitor local weather conditions before and during practices and contests.
 - (2) Develop an evacuation plan, including identification of appropriate nearby safer areas and determine the amount of time needed to get everyone to a designated safer area:
 - a. A designated safer place is a substantial building with plumbing and wiring where people live or work, such as a school, gymnasium or library.
 - b. An alternate safer place from the threat of lightning is a fully enclosed (not convertible or soft top) metal car or school bus.
 - c. For scrimmages and contests, this information should be relayed to the game officials and representatives of all competing teams.
 - (3) Develop criteria for suspension and resumption of practice which should mirror the policy directives in Sec. 2 for scrimmages and contests.
 - a. When thunder is heard or lightning is seen*, the leading edge of the thunderstorm is close enough to strike your location with lightning. Suspend play for at least 30 minutes and vacate the outdoor activity to the previously designated safer location immediately;
 - b. 30-minute rule. Once play has been suspended, wait at least 30 minutes after the last thunder is heard or lightning is witnessed* prior to resuming play;
 - c. Any subsequent thunder or lightning* after the beginning of the 30-minute count will reset the clock and another 30-minute count should begin;
 - d. When independently validated lightning-detection devices are available, this technology could be used to assist in making a decision to suspend play if a lightning strike is noted to be within 10 miles of the event location. However, hearing thunder or seeing lightning or detecting through an on-location device should always take precedence over information from any other type of mobile app where the primary antenna is not on the property of the facility.
 - (4) Review the lightning safety policy annually with all administrators, coaches and game personnel and train all personnel.
 - (5) Inform student-athletes and their parents of the lightning policy at start of the season.

SEC. 2) KHSAA LIGHTNING POLICY IMPLEMENTATION

- a) Contest officials are encouraged to learn the weather forecast prior to contest time and to work cooperatively with home contest administration prior to making weather-related decisions.
- b) At sites without on-location advanced lightning detection systems permanently installed: (does not include any form of phone app, website or weather-channel type information from a third-party monitoring station not located at the venue)
 - (1) The Referee (Lead Official/Crew Chief) has authority once jurisdiction has begun as to suspensions and play, resumption once the sound of thunder or sight of lightning is detected.
 - a. As always, officials are advised to work with the administration of the home team on all suspension decisions; and
 - b. As always, officials are advised to work with the administration of the competing teams on resumption decisions, being mindful of any rules that might exist for continuation.
 - (2) The Referee (Lead Official/Crew Chief) shall stop play in a contest or scrimmage at:
 - a. the first sound of thunder heard at the site and ensure

adherence to this policy.

- b. the first sight of lightning at the site and ensure adherence to this policy.
- (3) Note that when thunder is heard or lightning is seen, the leading edge of the thunderstorm is close enough to strike your location with lightning.
- (4) In either case (sight or sound):
 - a. Suspend play for at least 30 minutes and vacate the outdoor activity to the previously designated safer location immediately.
 - b. Wait at least 30 minutes after the last thunder is heard or lightning is witnessed prior to resuming play.
- c) When permanently installed, on-location advanced lightning-detection devices are on the property: (does not include any form of phone app or weather-channel type information from a third-party monitoring station not located at the venue)
 - (1) When lightning is detected within 15 miles of the competition site, the non-biased individual monitoring the on-site lightning detection device shall notify the head referee-umpire-official.
 - (2) When lightning is detected within a minimum of 10 miles from the competition site, the non-biased individual monitoring the on-site lightning detection device shall notify the head referee-umpire-official and home administration is directed to utilize the public address system and all other means to inform those in attendance that inclement weather including lightning is within 10 (or more) miles and that should patrons consider vacating the facility for safe shelter, and if they do, they will be allowed to re-enter with a ticket stub.
 - (3) When lightning is detected within eight (8) miles of the competition site, competition shall be suspended by the Referee (Lead Officials/Crew Chief) following notification.
 - (4) Play shall be suspended for at least 30 minutes and the outdoor activity area vacated to the previously designated safer location immediately.
 - (5) Competition may be resumed after 30 minutes of no detected lightning strikes within an eight-mile radius.
- d) Upon resumption, a 10-minute warm-up period may be granted and the determination as to the need for this period should be based on consultation with the administration of both teams, the contest officials, and perhaps, the host site representative in the case of on-location advanced lightning-detection equipment being in use..
- e) At all sites where play is suspended due to lightning, any subsequent thunder or lightning after the beginning of the 30-minute count either by site or sound, or by being within eight miles at a site with on-site advanced lightning detection equipment will reset the clock and another 30-minute count should begin.
- f) Even at sites with on-site, advanced lightning detection equipment, hearing thunder or seeing lightning shall always take precedence over a lack of indicators from lightning-detection devices.
- g) Event managers shall determine, through all available data, the optimum time to begin returning individuals to the competition areas for warming up, etc., but in no case may play (competition) resume until the 30-minutes count has elapsed.
- h) If severe weather appears to be of great length or intensity, the Referee (Lead Official/Crew Chief) shall work collaboratively with home contest administration and participating teams on decisions related to the resumption of play.
- i) All involved in suspension/resumption decisions should be familiar with any sport-specific rules that might be contained in the KHSAA Competition Rules.
- j) Safety of the public and participants is the most important factor in any decision of this type.

POLICY- SPORTS MEDICINE - AIR QUALITY CONCERNS WITH ATHLETICS FOR LOCAL DISTRICT CONSIDERATION

SEC. 1) BACKGROUND (PER NFHS SMAC)

- a) Air pollution is due to a mixture of solid particles and gases that may result from a variety of sources including wildfires, internal combustion engines, and industrial emissions. In people without lung disease, the immediate effects and long-term consequences of air pollution upon athletic performance are not well understood. There is some evidence to indicate that chronic exposure may adversely affect blood vessels throughout the body, but more

studies are needed before making definitive statements. However, air pollution has long been known to worsen the symptoms of respiratory diseases such as asthma. When compared to adults, children may be more susceptible to having problems while exercising in polluted air.

- b) There are two key components of air pollution that cause respiratory problems, especially in people with underlying respiratory problems: ozone and particulate matter. Ozone is found in smog and is often at its worst in the late afternoon and early evening on hot summer days. It forms through a variety of complex chemical interactions, all of which require sunlight as a catalyst. Ozone can travel significant distances and, contrary to conventional wisdom, is more predominantly a rural pollutant.
- c) The particulate matter found in air pollution can be a hazard at any time of the year, especially when the air is still. Particle pollutants can be high near busy roads and factories, and at times when there is smoke in the air from wood stoves, fireplaces, or wildfires. Other potentially harmful air pollutants include carbon monoxide, nitrogen oxides and sulfur dioxide. Smoke from late summer forest and grass fires has very high levels of particulate matter and is of special concern in the western U.S., often causing severe air pollution coinciding with the beginning of the fall sports season.
- d) It is important to realize air pollution may also occur indoors. Potential sources include tobacco smoke in any situation, dust in indoor rodeo arenas, and exhaust fumes from ice resurfacing equipment in ice arenas. Consequently, athletes with asthma should always have their medication available and be especially cautious in these venues.

SEC. 2) RECOGNITION AND MANAGEMENT (PER NFHS SMAC)

- a) The Air Quality Index (AQI) is a system developed by the US Environmental Protection Agency that describes the general health effects associated with different pollution levels, as well as whatever precautionary steps may need to be taken if air pollution levels rise into an unhealthy range. During times of suspected high air pollution, the AQI should be checked prior to all practices and contests. A particular location's AQI can be found at <https://www.airnow.gov/>
- b) The AQI takes into consideration the five major determinants of air pollution: ozone, particulate matter, carbon monoxide, nitrogen dioxide, and sulfur dioxide. The measured pollutant concentrations are then converted into a number on a scale of 0 to 500. Higher numbers correlate to a greater level of air pollution. Under the Clean Air Act, the National Ambient Air Quality Standard is 100. An AQI level greater than 100 indicates that a pollutant is in the unhealthy range. As specific public health department recommendations may vary, it is critical that state associations and schools consult local or state health departments for guidelines on when outdoor activities should be modified or cancelled.
- c) Many western states have additional online resources to track air quality. These websites may use the AQI or a PM2.5 concentration. The PM2.5 describes fine inhalable particulate matter with diameters that are generally less than 2.5 micrometers. As a frame of reference, PM10 is less than the width of a single human hair and is small enough to get into the lungs while matter that is PM2.5 can only be seen with an electron microscope. Because it is so light and small, these tend to stay in the air longer than heavier particles and can penetrate deep into the lung tissue.
- d) Both the AQI and the PM2.5 are reported by a color-coded chart which remains consistent across these different tools. A red "unhealthy" day will be the same whether it is reported as an AQI or a PM2.5 value. The state or local health department is available to serve as a resource to learn more about how this data is reported.
- e) School personnel should locate the air monitors closest to practice and competition venues at <https://www.airnow.gov/>. Not all schools and venues will have a nearby monitor, and weather variation (wind) and geographic features (hills and valleys) can account for large differences between relatively close locations. Therefore, anyone assessing air quality must be familiar with the 5-3-1 Visibility Index Method. Based on previous air pollution research, we know that there is a correlation between air quality and visibility.
- f) The 5-3-1 Visibility Index Method is a simple way to use visibility to estimate air quality and health effects and is particularly useful with rapidly changing weather conditions, like smoke from wildfires. The

key to successful use is preparation, as it requires knowledge of large landmarks visible from the venue. Using an online satellite map, locate three landmarks that can be seen from a specific venue. The landmarks you choose should be 1 mile away, 3 miles away and 5 miles away. If you use multiple venues, you will need to do this for each separate location. Standing with the sun behind you, look at the three objects and when the outline of the landmark can no longer be seen, then the visibility range is less than the distance marker. When the air is smoky and hazy, monitoring the AQI or the Visibility Index should be done at least hourly during competitions and practices as conditions can change quickly.

- g) Some students may be more susceptible to the health effects of poor air quality. The Preparticipation Physical Examination helps to identify those students with underlying ailments that make them more affected by poor air quality. Conditions that put students at risk include asthma, recent respiratory infection, and chronic heart or lung disease.
- h) All schools must have an Emergency Action Plan (EAP) in place for every practice and competition venue in case of respiratory or other medical emergencies. Students diagnosed with asthma should have an Asthma Action Plan that they follow if symptoms occur during or after exercise. If poor air quality persists over several days, at risk students will have symptoms triggered more easily than those without pre-existing conditions.
- i) If the health effect category is in a zone where your state or local health department discourages outdoor activity, all practices and contests should be moved indoors or cancelled. If activities are moved indoors, you must check with the maintenance staff to ensure existing HVAC systems provide properly filtered indoor air. If the HVAC system cannot appropriately manage the burden of pollutants in the air, indoor air quality may be worse than the outdoor air and it is not appropriate to practice or workout indoors. Furthermore, when moving indoors, Heat and Hydration Guidelines must be followed as temperatures may be hotter inside a gymnasium on a hot summer day than outside. If indoor practices are not an option, practices may be held earlier in the day to avoid warmer temperatures or moved to a location with better air quality.
- j) Please note that all of the above principles are not limited to athletic events and should also be followed for physical education classes and other outdoor activities involving physical activity in order to protect both students and staff.

SEC. 3) AIR QUALITY INDEX (PER EPA)

- a) AirData uses the Air Quality Index (AQI) in some of its reports and tables and to display data using the visualization tools. The AQI is an index for reporting daily air quality. It tells how clean or polluted the air is, and what associated health effects might be a concern, especially for ground-level ozone and particle pollution.
- b) Think of the AQI as a yardstick that runs 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 300 represents hazardous air quality.
- c) An AQI value of 100 generally corresponds to the national air quality standard for the pollutant, which is the level EPA has set to protect public health. AQI values below 100 are generally thought of as satisfactory. When AQI values are above 100, air quality is considered to be unhealthy-at first for certain sensitive groups of people, then for everyone as AQI values get higher.
- d) The AQI is divided into six categories:
When the AQI is in this range: ..air quality conditions are symbolized by this color:

Air Quality Index (AQI) Values	Levels of Health Concern	Color
0-50	Good	Green
51-100	Moderate	Yellow
101-150	Unhealthy for Sensitive Groups	orange
150-200	Unhealthy	Red
201-300	Very Unhealthy	Purple

Air Quality Index (AQI) Values	Levels of Health Concern	Color
301-500	Hazardous	Maroon

e) Each category corresponds to a different level of health concern. The six levels of health concern and what they mean are:

“Good” AQI is 0 - 50. Air quality is considered satisfactory, and air pollution poses little or no risk.

“Moderate” AQI is 51 - 100. Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people. For example, people who are unusually sensitive to ozone may experience respiratory symptoms.

“Unhealthy for Sensitive Groups” AQI is 101 - 150. Although general public is not likely to be affected at this AQI range, people with lung disease, older adults and children are at a greater risk from exposure to ozone, whereas persons with heart and lung disease, older adults and children are at greater risk from the presence of particles in the air.

“Unhealthy” AQI is 151 - 200. Everyone may begin to experience some adverse health effects, and members of the sensitive groups may experience more serious effects.

“Very Unhealthy” AQI is 201 - 300. This would trigger a health alert signifying that everyone may experience more serious health effects.

“Hazardous” AQI greater than 300. This would trigger health warnings of emergency conditions. The entire population is more likely to be affected.

SEC. 4) POLICY RECOMMENDATIONS FOR DISTRICT IMPLEMENTATION

- a) No statewide policy directive exists in this area.
- b) However local districts and schools should strongly consider implementing guidelines that would clearly identify, via <https://www.airnow.gov/>, the risk to participation.
- c) Policy considerations should consider that readings of 100 to 149 (PM2.5) indicate that people with heart or lung disease, older adults, children and teens – take any of these steps to reduce your exposure:
 - (1) Choose less strenuous activities (like walking instead of running) so you don’t breathe as hard.
 - (2) Shorten the amount of time you are active outdoors.
 - (3) Be active outdoors when air quality is better.
- d) Districts and schools should consider cessation of outdoor activities when AQI reaches 150 or higher (Unsafe) per <https://www.airnow.gov/>.