

Mesa Public Schools: Heat and Environmental Protocol

Environmental Monitoring and Activity Modification

During periods of extreme heat and humidity, ATs shall ensure coaches and athletes are following the Arizona Interscholastic Association (AIA) heat acclimatization & exertional heat illness management policy (article 41.4) to prevent the risk of exertional heat illness. This includes ATs obtaining and recording environmental measurements for Wet Bulb Globe Temperature (WBGT) or heat index prior to the start of each practice and continuing to do so every 30 minutes throughout practice. WBGT or heat index should be measured at the practice/event venue on the playing surface. WBGT is considered the gold standard and the preferred method to monitor environmental conditions. However, in the absence of proper equipment, heat index measurements should be utilized.

Results of either WBGT or heat index measurements will dictate the modifications necessary for practice. Practice modifications are meant to be fluid and can be adjusted based on current environmental conditions; if the environment becomes more oppressive, the modifications will become stricter and if the conditions improve, the modifications will be reduced. WBGT or heat index measurements will be taken every 30 minutes beginning at the start of practice. The AT is responsible for obtaining measurement but may delegate the task to an administrator trained in WBGT or heat index.

Heat Acclimatization Policy (AIA):

First 2 weeks of Football practice: Football will practice outside the hours of 1pm-5pm for the first 2 weeks of practice (This will allow athletes to acclimatize and allow coaches to go on with a full practice without worrying about heat restrictions. This also takes the stress off of the athletic trainers by having to constantly monitor the WBGT and tell coaches they have to shut down for heat)

Only applies to football since they wear equipment, no other sport wears heavy equipment

Heat Acclimatization Protocol (A team may not choose to train in a less severe climate)

- Days 1-5: • Days 1 through 5 of the heat-acclimatization period consist of the first 5 days of formal practice. During this time, athletes may not participate in more than 1 practice per day. • If a practice is interrupted by inclement weather or heat restrictions, the practice should recommence once conditions are deemed safe. **Practice time must be at least 45 minutes to count as a day.** Total practice time should not exceed 3 hours in any 1 day. In addition to practice, a 1-hour maximum walk-through is permitted during days 1-5 of the heat acclimatization period. However, a 3-hour recovery period should be inserted between the practice and walkthrough (or vice versa). (Note: a walk-through is defined as no contact with other individuals, dummies, sleds or shields).
 - • During days 1-3 of the heat-acclimatization period, in sports requiring helmets or shoulder pads, a helmet is the only protective equipment permitted. The use of shields and dummies during this time is permissible as a non-contact teaching tool.
 - • During days 4-6, only helmets and shoulder pads may be worn. • Football only: on days 4-6, contact with blocking sleds and tackling dummies may be initiated.
- Days 6-14: • Beginning no earlier than day 6 and continuing through day 14, double-practice days must be followed by a single-practice day.
 - • On single-practice days, 1 walk-through is permitted, separated from the practice by at least

3 hours of continuous rest. When a double-practice day is followed by a rest day, another double-practice day is permitted after the rest day.

- • On a double-practice day, neither practice should exceed 3 hours in duration, nor should student-athletes participate in more than 5 total hours of practice. Warm-up, stretching, cool-down, walkthrough, conditioning and weight-room activities are included as part of practice time. The two practices should be separated by at least 3 continuous hours in a cool environment.
- • Beginning on day 7, all protective equipment may be worn and full contact may begin. • Full-contact sports may begin 100% live contact drills no earlier than day 7.

Modifications based on Wet Bulb Globe Temperature (WBGT):

1. Modifications will be made in accordance with the best practice guidelines for our region; Arizona is considered Category 3 (https://ksi.uconn.edu/wp-content/uploads/sites/1222/2018/08/RegionalWBGT_2015_AppliedGeography.pdf)
2. The table below shows the specific modifications that will be implemented for each zone (green, yellow, orange, red, black) based on WBGT measurements.

Revised Chart without Acclimatization Protocol

WBGT	Activity Guidelines
< 82.0	Normal Activities – Provide at least three separate restbreaks each hour with a minimum duration of 3 min each during the workout.
82.1 - 86.9	Use discretion for intense or prolonged exercise; Provide at least three separate rest breaks each hour with a minimum duration of 4 min each.
87.0 - 90.0	Maximum practice time is 2 h. <u>For Football</u> : players are restricted to helmet, shoulder pads, and shorts during practice. If the WBGT rises to this level during practice, players may continue to workout wearing football pants without changing to shorts. <u>For All Sports</u> : Provide at least four separate rest breaks each hour with a minimum duration of 4 min each.
90.1 - 91.9	Maximum practice time is 1 h. <u>For Football</u> : No protective equipment may be worn during practice, and there may be no conditioning activities. <u>For All Sports</u> : There must be 20 min of rest breaks distributed throughout the hour of practice. <u>Off campus sports</u> , (such as cross country) practices & games should remain on campus. The unless dedicated healthcare providers are immediately accessible in case of heat illness. Reduce or eliminate conditioning drills.
≥92.0	No outdoor workouts. Delay practice until a cooler WBGT is reached.

Modifications based on Heat Index (only to be used by coaches off campus where WBGT is not available):

1. **Heat Index 90-104:** Although modifications are not necessary, prolonged exposure places individuals at risk for heat related illness; Athletes, coaches and staff should be educated on risks of participation in the heat and appropriate prevention measures. Cooling methods should be readily available, but will vary based on available equipment at individual sites.
2. **Heat Index 105-110:** Outdoor practices will occur with shells and helmets only and water breaks at least every 20 minutes, with helmet removal during each water break. Conditioning is permitted with shells and helmets. Sports without additional protective equipment (ie. soccer) may continue regular practice with the exception of increased water breaks as noted above.
3. **Heat Index 111-115:** Outdoor practices occur with helmets ONLY and water breaks at least every 20 minutes, with helmet removal during each water break. Conditioning is permissible, but equipment must be removed beforehand. Sports without additional protective equipment may continue regular practice with the exception of increased water breaks as noted above.
4. **Heat Index 116-120:** Outdoor practices will occur WITHOUT equipment and practice time will be reduced to 90 minutes or less. Water breaks should occur every 10-15 minutes. Increased supervision by athletic training staff and coaches with special attention to signs and symptoms of heat related illnesses.
5. **Heat Index >120:** All outdoor practices will be canceled or moved indoors until a lower index is reached, regardless of sport.

As a reminder, it is NOT appropriate to switch back to utilizing a heat index just because it has lesser restrictions. The WBGT is highly researched, recommended by all heat illness prevention specialists, and is the recommendation from AIA. WBGT is more accurate for local readings and takes into account ambient temperature, radiant heat, and humidity levels for the exact location it is being measured.

HEAT EXHAUSTION/SYNCOPE

Recognition

Critical criteria for determination are:

1. Athlete has obvious difficulty continuing intense exercise in heat
2. Lack of severe hyperthermia (>104°F)
3. Lack of severe CNS dysfunction

If any CNS dysfunction is present, it should be mild and symptoms should subside quickly with treatment. If a patient is experiencing severe CNS dysfunction, or symptoms do not dissipate as expected, the patient should be treated for exertional heat stroke (EHS). Other possible findings of heat exhaustion include fatigue, dizziness, dehydration or hyponatremia, ataxia and coordination problems, syncope, profuse sweating, pallor, headache, nausea, vomiting, diarrhea,

stomach/intestinal cramps, and/or persistent muscle cramps.

Treatment

The following procedures are recommended if heat exhaustion is suspected:

1. Remove patient from play and immediately move to an air-conditioned or shaded area.
2. Remove excess clothing and equipment to expose as much skin as possible, while keeping in mind the patient's relative comfort level with the removal of clothing.
3. Cool the patient with appropriate cooling techniques. The AT should choose the cooling technique based on the patient's signs and symptoms, available equipment, and available assistance. Acceptable treatment options include, but are not limited to, the following:
 - a. Place ice or cold, wet towels over as much of the body as possible (replace towels every 1-2 min) and fan patient.
 - b. Immerse the patient in a tub of cold water (CWI)
 - c. Utilize tarp assisted cooling with oscillation (TACO) technique
 - d. Place patient in cooling shower
4. If the patient is not nauseated, vomiting, or experiencing CNS dysfunction, rehydrate orally with chilled electrolyte drink or water.
5. Monitor heart rate, blood pressure, respiratory rate, and CNS status. AT should note rapid improvement in patient's signs and symptoms.
 - a. If rapid improvement is not noted, activate EAP to summon EMS and enact the protocol for treatment of EHS.
6. The patient will be disqualified from all athletic activities for the remainder of the day.
7. Parent, guardian, or other responsible person will be advised by the AT about the incident. The patient will be released to parent/guardian with instructions to monitor patient and decide if further medical treatment is necessary.

EXERTIONAL HEAT STROKE

Recognition

The ability to rapidly and accurately assess core body temperature and CNS function is critical to the proper evaluation of EHS. Sports medicine staff should be properly trained and equipped to assess core temperature via rectal thermometer. Critical criteria for determination of EHS:

1. Rectal Temperature >105F (If available on site)
2. Severe CNS Dysfunction (ie Altered consciousness, disorientation, irrational behavior, decreased mental acuity, irritability, hysteria, confusion, apathy)

The definition of "severe" can be difficult to assess in the field and the AT should err on the side of caution. When EHS cannot be ruled out, the AT should prioritize the following:

1. Activating EMS
2. Application of rectal thermometer (when available)*
3. Reducing core body temperature as efficiently as possible

Rectal thermometry combined with CWI or TACO are the gold standard treatments, therefore they are recommended in the treatment protocol; The AT should prioritize their use whenever feasible. However, the details of an emergency situation may render a rectal thermometer, CWI, and/or TACO impractical. The AT is granted the ability to utilize the most feasible and efficient cooling modality based on the circumstances.

Treatment

The keys to successful treatment of EHS are:

1. Rapid, effective, and continuous cooling
2. Rapid rehydration
3. Effective control of restlessness and convulsions

Immediate, aggressive, and continuous whole-body cooling via CWI or TACO are the most effective treatments for EHS. Lowering the patient's core body temperature as quickly as possible will prevent mortality and morbidity, therefore, it is recommended to cool the patient first and transport second. The patient should remain in the cooling modality until their core body

temperature reaches 102°F, only then should transport to the ED be initiated. Rectal temperature is the only valid measurement of core body temperature and should be utilized whenever possible. If a rectal thermometer is unavailable, then the patient should be cooled for a minimum of 10 minutes or until they begin shivering.

*If an athlete is cognizant enough to deny rectal thermometry, heat exhaustion and/or dehydration is a more likely diagnosis. However, the AT should continue to activate EMS and cool the athlete as efficiently as feasible.

The following procedures are recommended for patients suspected of EHS:

1. Evaluate vitals and CNS function; Activate facility EAP to summon EMS
2. Move patient to shaded area or indoor facility where CWI or TACO equipment is located
3. Remove equipment and clothing as necessary
4. Insert rectal thermometer (if available)
5. Immerse patient in cold whirlpool or TACO
6. Continue to monitor vitals, core body temperature, and CNS function
 - a. If feasible, an IV should be inserted by EMS when they arrive. An IV will assist with hydrating the patient and may offer an additional cooling effect.
7. Discontinue CWI or TACO under one of the following circumstances, in order of priority:
 - a. Rectal temperature reaches 102F (If available)
 - b. Patient has been immersed for a minimum of 10 minutes
 - c. Patient begins to shiver
 - d. EMS arrives and insists that patient be immediately transported*
8. Transport patient to nearest emergency medical facility via ambulance

**EMS is considered to be a higher-standard of care in an emergency situation. EMS standard operating procedures may dictate they transport the patient to the hospital immediately upon arriving to the scene. Emergency medical personnel need to be educated on the risks of transporting the patient prior to complete cooling, however, the AT will cede to the direction of EMS.*

Return to Play (RTP) after Heat Related Illness

1. Exercise Associated Muscle Cramps
 - a. The AT may return a patient to play at their discretion following evaluation and treatment. Recurrent muscle cramps may indicate the need for sickle cell trait testing.
2. Heat Exhaustion/Heat Syncope
 - a. The patient will be removed from play for remainder of day, evaluated, and treated at the discretion of the AT with the following guidelines:
 - The patient will be withheld from practice for a minimum of 24 hours, but may be withheld from participation for an extended length of time depending on the severity of the condition.
 - Length of time withheld from participation will be determined by the AT in consultation with the medical director.
 - b. Once the patient is cleared to resume activity, the patient will need to follow an acclimatization protocol to demonstrate heat tolerance during activity:
 - Day 1: Light practice, no conditioning, no equipment worn
 - Day 2: Light practice, no conditioning, half equipment worn
 - Day 3: Normal practice, no conditioning, full equipment worn
 - Day 4: Full return to regular practice
3. Heat Stroke Protocol as defined by the AIA (Article 41.4.4):
 - a. Refrain from exercise for at least 7 days following the acute event
 - b. Follow up about 1-week post-incident for evaluation and clearance from a licensed

physician (MD, DO)

- If an outside medical provider refuses to clear a patient to return to practice or competition, the decision of the outside medical provider shall be final; the designated sports medicine staff (AT and medical director) will not override the decision of the outside medical provider.
- If an outside medical provider clears a patient to return to practice or competition, the designated sports medicine staff reserves the right to override clearance and withhold the patient from activity.
- c. When cleared for activity by a licensed physician, the patient will begin exercise in a cool environment and gradually increase the duration, intensity, and heat exposure over 2 weeks to acclimatize and demonstrate heat tolerance.
- d. If return to activity is difficult or abnormal, consider a laboratory exercise-heat tolerance test about one-month post-incident
- e. Patient may be cleared for full competition if heat tolerance exists after 2-4 weeks of training.

Exertional Sickling

Sickle cell trait (SCT) occurs when a patient inherits one of the genes for sickling red blood cells. Patients with SCT are not disqualified from athletic participation, but they are at increased risk of a sickling episode during intense exercise, especially in hot, humid, and/or high altitude environments. This condition may present similarly to exercise-associated muscle cramps; however, the cramping muscle will not be rigid on palpation.

Athletic trainers should be aware of patients with known SCT on pre-participation physical exams (PPE) and work with coaching staff to allow modifications to conditioning sessions for these patients. These individuals should be allowed longer acclimatization periods, additional rest/recovery periods, and closely monitored in hot, humid, and/or higher altitude environments. They should avoid physical activity when ill. No patient with known sickle cell trait should be allowed to return to practice the same day following an episode of exertional sickling.

If a patient is experiencing a sickling event, the athletic trainer should immediately remove the patient from physical activity, activate the site's EAP, cool the patient, and provide oral hydration if conscious and cooperative. Supplemental oxygen will not be available in the secondary school setting, but should be provided immediately upon arrival of EMS.

Exertional Hyponatremia

Exertional hyponatremia is most commonly seen in distance runners. This condition is caused by a combination of factors including excessive hydration with water only, excessive sweat loss, and limited electrolyte replacement. Serum sodium levels drop in the blood and cause intracellular swelling leading to organ failure & brain damage. Early recognition, intervention, and referral are critical to avoid morbidity and mortality.

Athletic trainers should provide hydration and dietary education to athletes emphasizing electrolyte replacement options during participation in hot environments.

If an athlete is suspected of suffering from exertional hyponatremia, the athletic trainer should

activate the site's EAP, cool the patient, and provide salty snacks or drinks as appropriate. Water should not be given.