How Hot is Too Hot?

Heat Safety in Hawai‘i Schools

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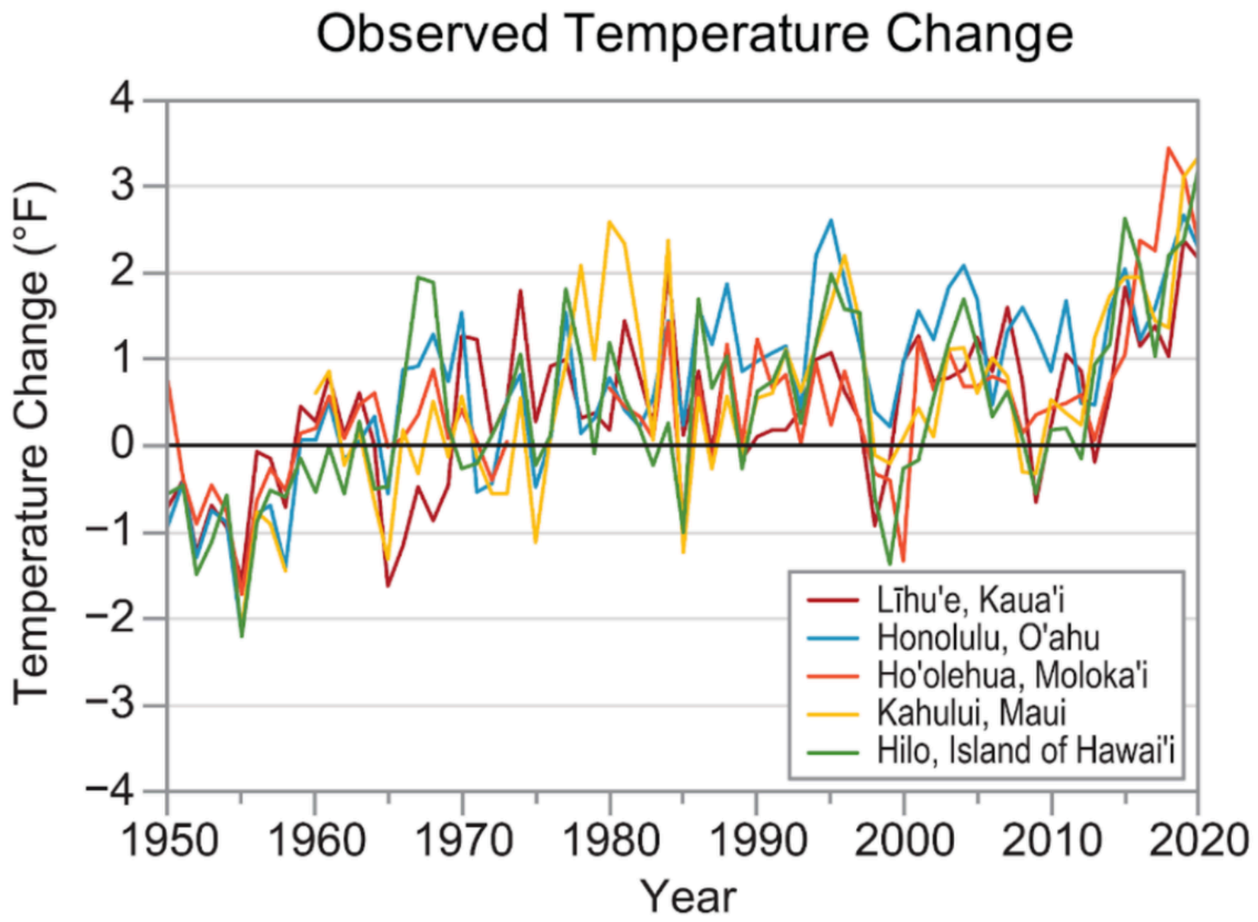
- How to spot heat illness early
- What actually cools a kid down
- What we're proposing + we’d like your input

It's Getting Hotter

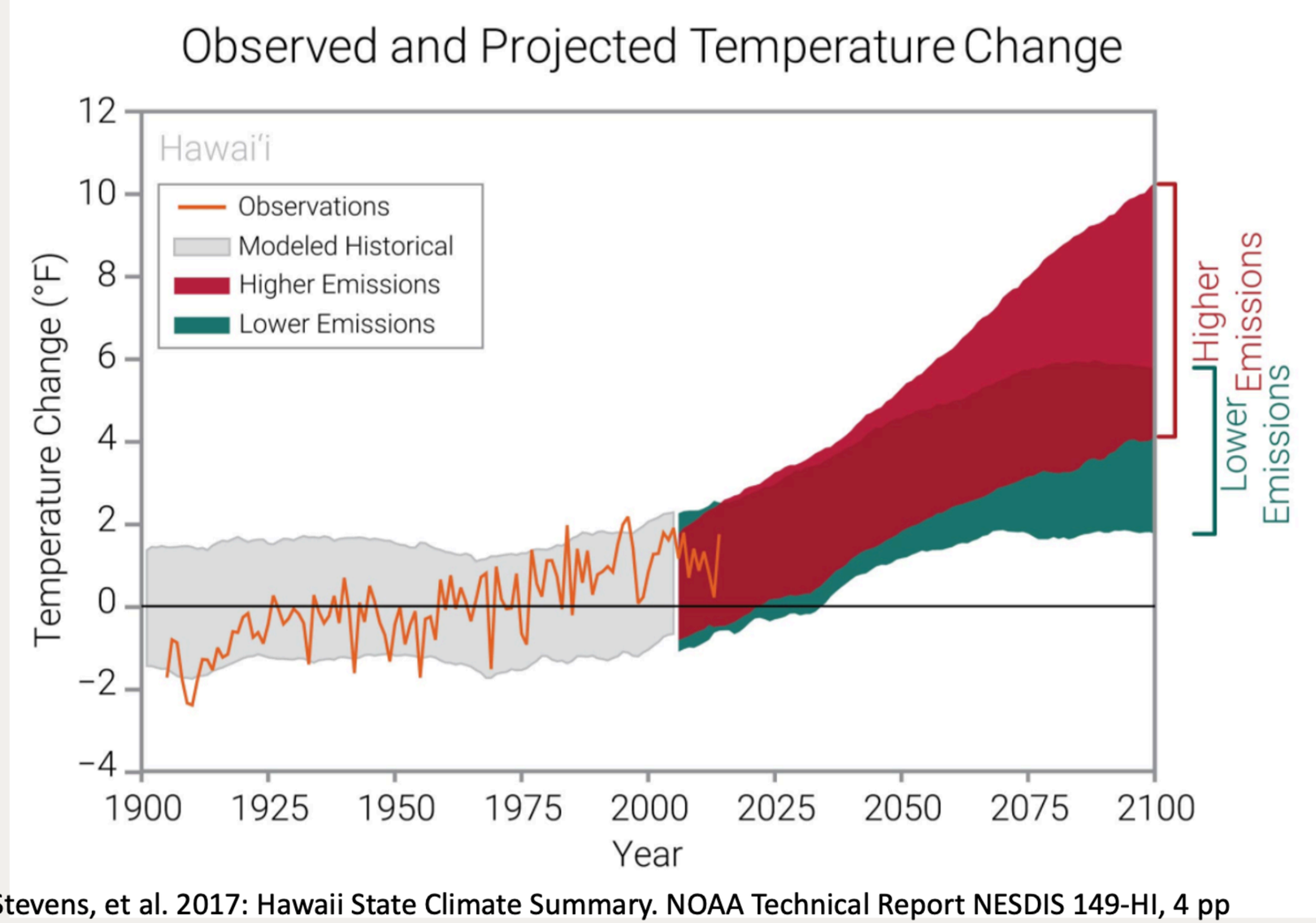


Observed changes (compared to the 1951–1980 average; horizontal black line) in annual near-surface air temperature

- more hot days
- hotter nights
- decreased number of trade wind days

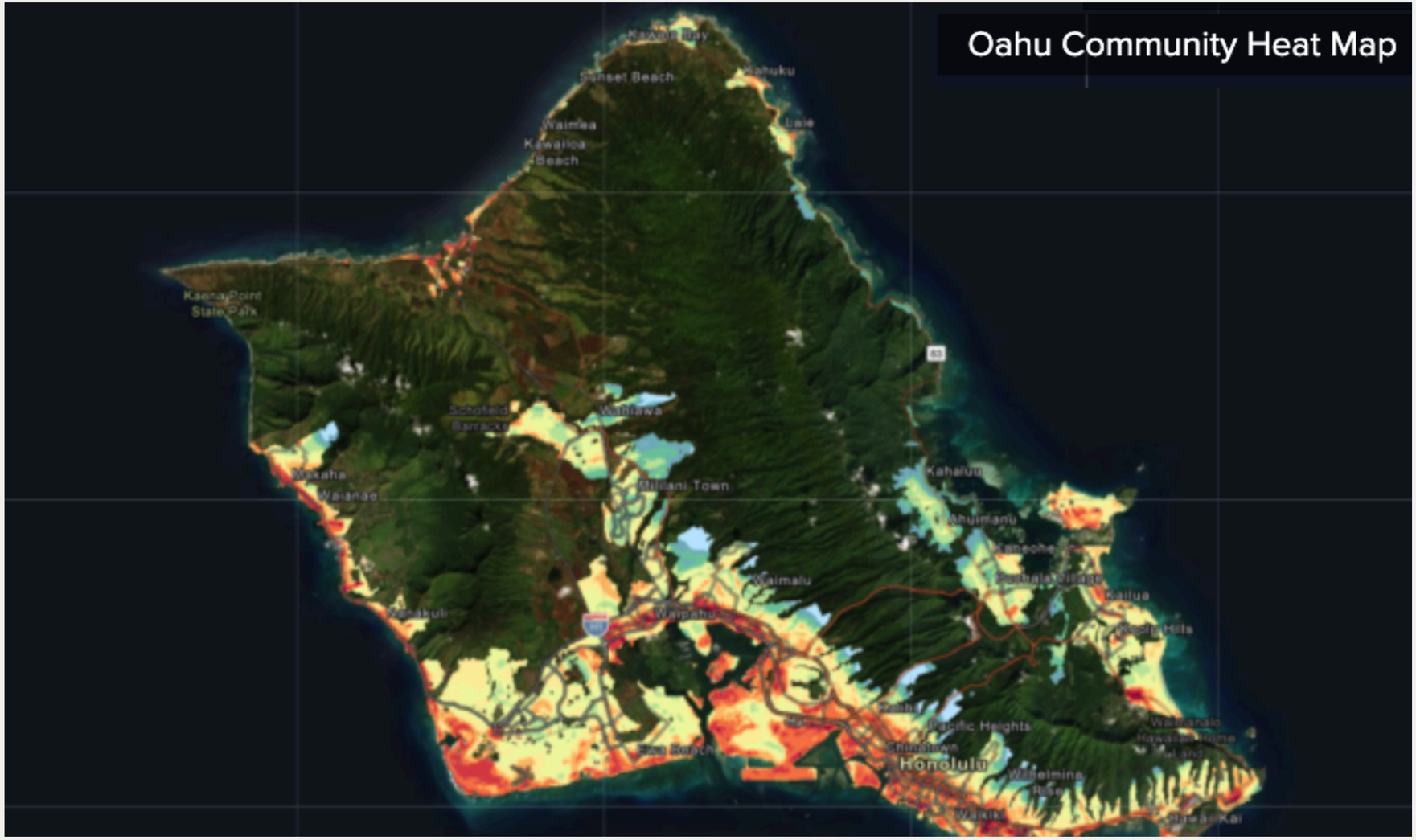
Source: NOAA National Centers for Environmental Information, Hawai'i State Climate Summary 2022, Figure 2. National Oceanic and Atmospheric Administration https://statesummaries.ncics.org/

It Will Get Hotter in the Future



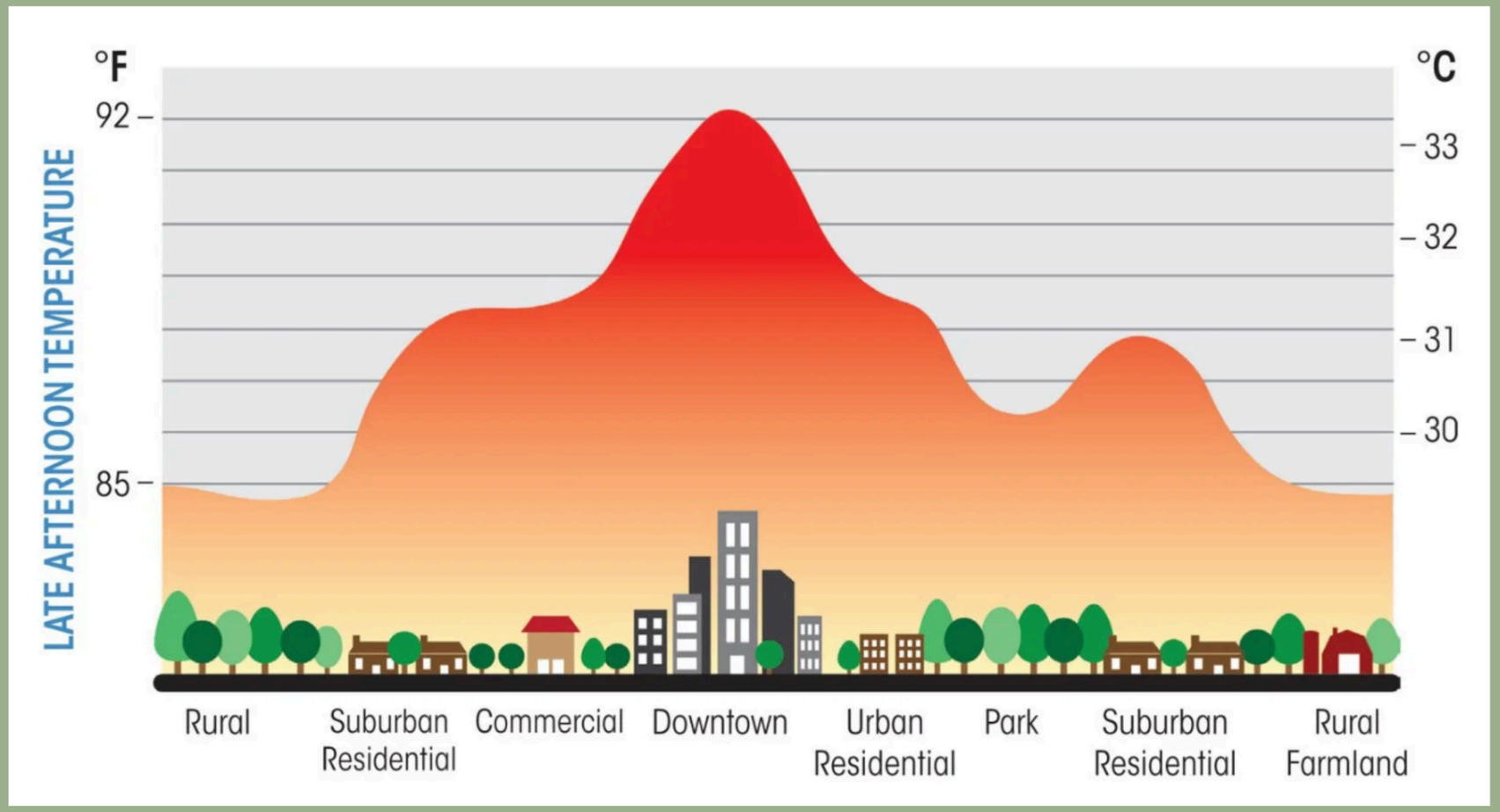
Stevens, et al. 2017: Hawaii State Climate Summary. NOAA Technical Report NESDIS 149-HI, 4 pp

Heat is Not Evenly Distributed



Source: O‘ahu Community Heat Assessment, City and County of Honolulu Office of Climate Change, Sustainability and Resiliency (data collected August 31, 2019)

Heat is Not Evenly Distributed



Urban Heat Island Effect

School Factors Influencing Heat

- No AC
- Portables and metal roofs run hotter
- Peak heat hour varies by location
- Lack of tree canopy
- Concrete

Source: Keep Cool Oahu; https://www.resilientoahu.org/keepcooloahu

At Risk for Heat: Kids

Why Kids Are Different

- Kids produce more heat + absorb more heat
- Take longer than adults to acclimate to heat (10-14 days)
- Sweat less
- Chronic Illness: asthma, diabetes, obesity, sickle cell
- Meds:ADHD, anticholinergics, diuretics



American Academy of Pediatrics

- Well-hydrated, acclimatized kids handle heat about as well as adults
- Sick kids are at higher risk, especially after vomiting or fever
- With preparation, modification, and monitoring, exertional heat illness is usually preventable

Sources: Bytomski & Squire, Curr Sports Med Rep 2003; Naughton & Carlson; J Sci Med Sport 2008
Sources: Centers for Disease Control Overview of Heat and Children and Teens with Asthma

Sources: AAP Policy Statement, Pediatrics 2011 (reaffirmed 2025)

Kids Depend on Adults



- Hydration depends on being reminded, not on thirst
- Heat isn't always recognized or reported, especially by younger and SPED students
- Timing/duration of activity plus rest/shade breaks are set by the schedule, not by conditions
- Athletes: hours in direct sun, gear that traps heat, peer and coach pressure
- PE class, recess, band have no protocol for heat

Sources: AAP Policy Statement, Pediatrics 2011 (reaffirmed 2025)

At Risk for Heat: Teachers & Staff







- **Pregnancy**
  - Heart and kidneys working harder
  - Thirst signal is less reliable
  - First trimester: risk for fetal harm from heat
- **Older teachers and staff**
  - Body is slower to notice overheating
  - Sweat glands produce less sweat
  - Thirst signal is less reliable
- **Teachers with chronic illness**
  - Heart, Diabetes, Kidney, Respiratory diseases
- **Any teacher, staff, or worker!**
  - Heat physiology applies to everyone!

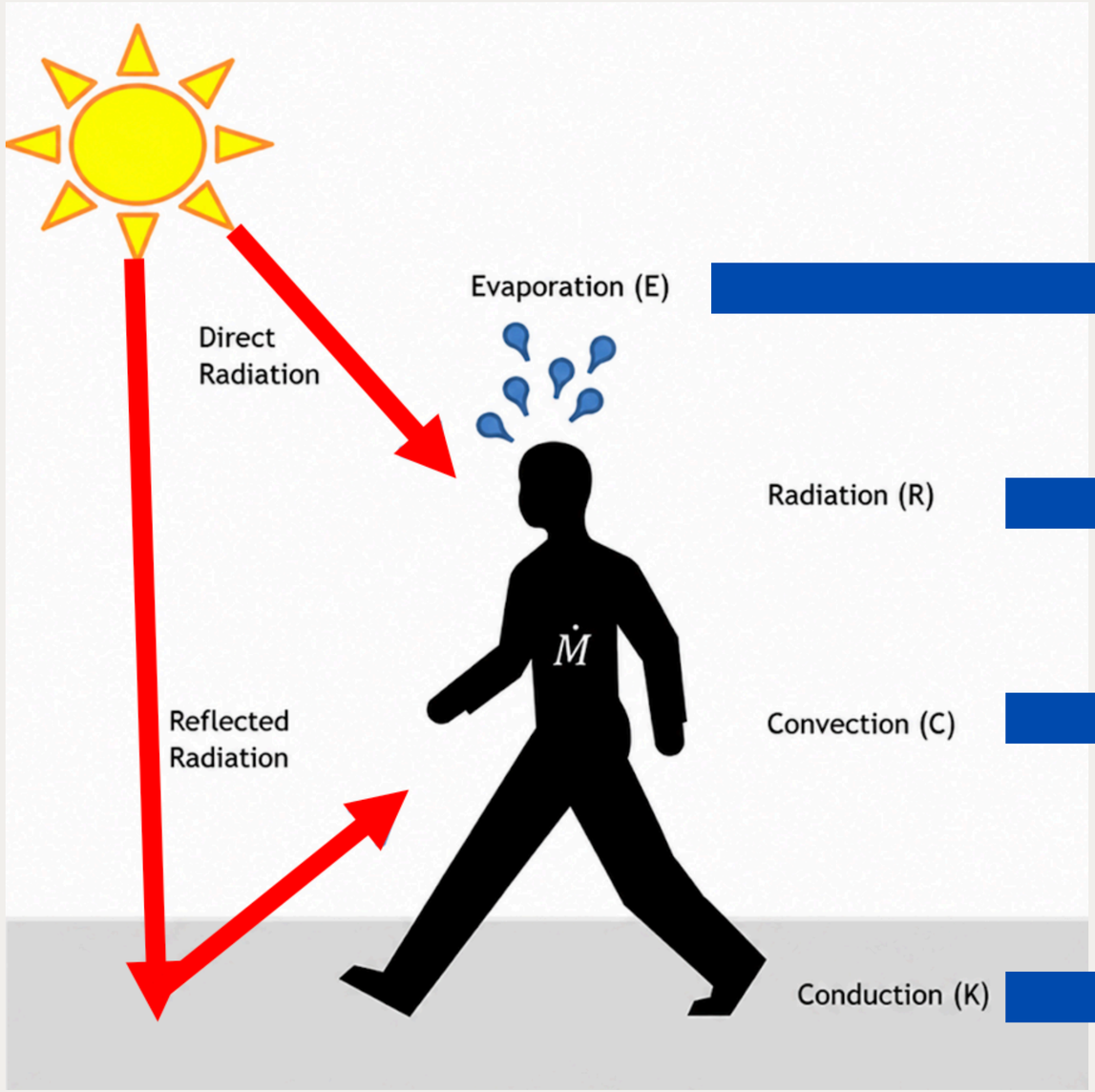
Our Heat Is Different





Source: Pexels

How the Body Cools Down











Source: US Army Research Institute of Environmental Medicine

Recognizing Heat Illness

Early Signs

Irritability

Heat Rash

Cramps

Heat Exhaustion

ACT FAST

- Move to a cooler area
- Loosen clothing
- Sip cool water
- **Seek medical help if symptoms don't improve**

Dizziness

Thirst

Heavy Sweating

Nausea

Weakness

***Heat exhaustion** can lead to heat stroke.*



Heat Stroke

Confusion

Dizziness

Becomes Unconscious

ACT FAST

CALL 911

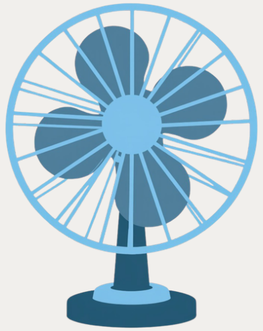
- Move person to a cooler area
- Loosen clothing and remove extra layers
- Cool with water or ice

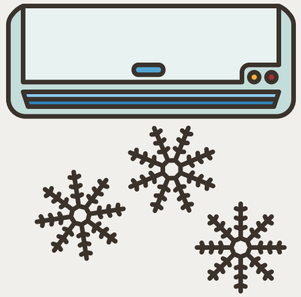
***Heat stroke** can cause death or permanent disability if emergency treatment is not given.*

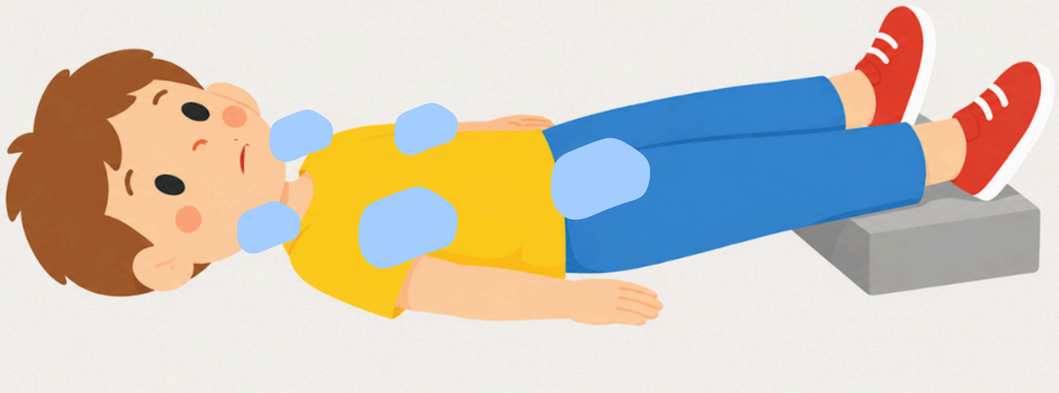
Stay Cool, Stay Hydrated, Stay Informed!

Source: NOAA/CDC/NIOSH/NIHHIS,

Safety and Cooling







WHAT TO DO RIGHT NOW

- Get them out of the sun, into shade or a cooler room, fan, or AC
- Loosen or remove extra clothing
- Lie down, elevate feet
- Cold wet cloths on the neck, armpits, and groin
- Cool water to sip, only if they're fully alert
- Stay with them. Don't send a dizzy kid anywhere alone
- Call 911 for confusion, collapse, seizure, no improvement

Source: NATA Position Statement, J Athl Train 2015; AAP Policy Statement, Pediatrics 2011

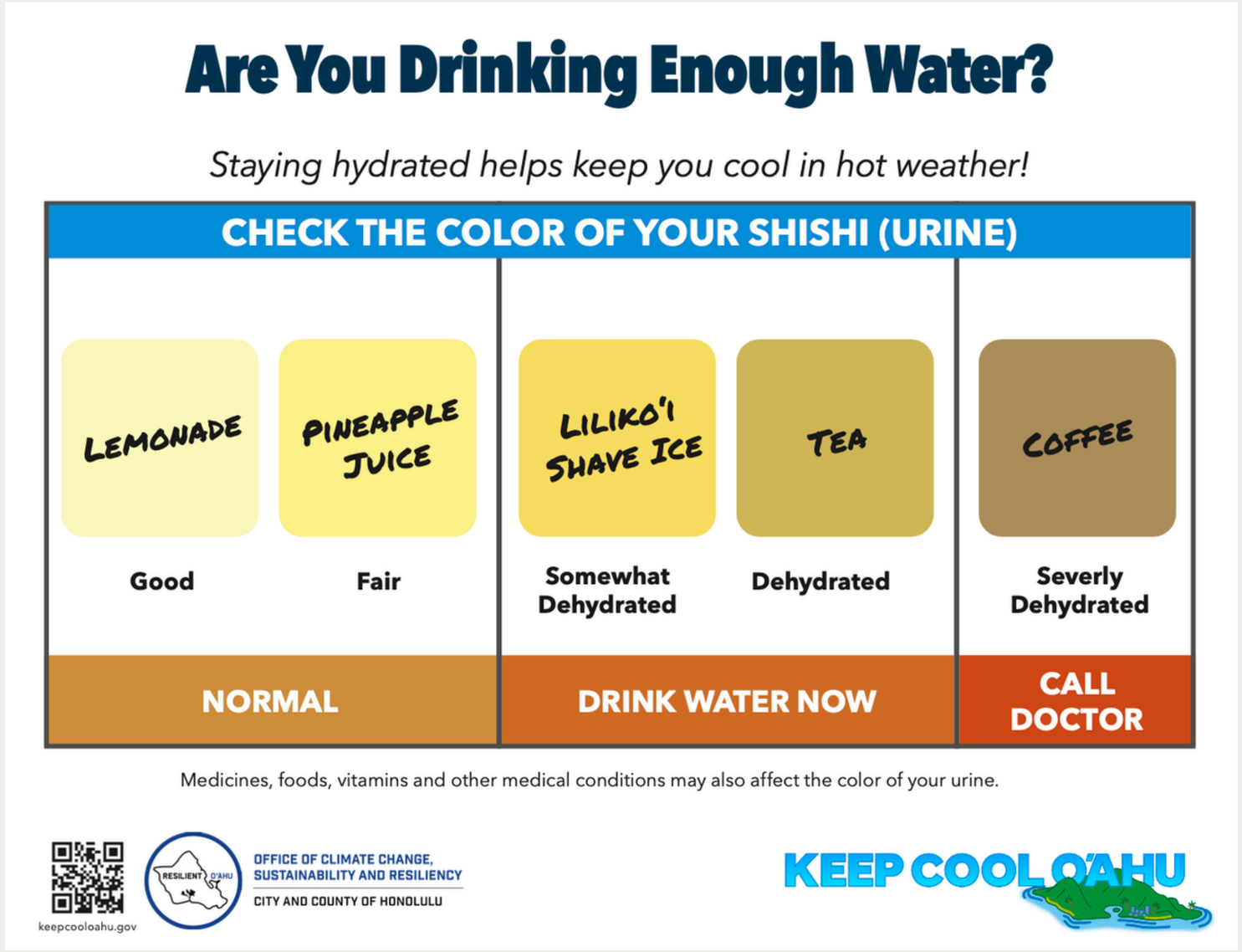
Does a Spray Bottle Help?



- Skin gets cooler
- Core body temperature doesn’t change
- Not a substitute for shade, water, and a shorter activity

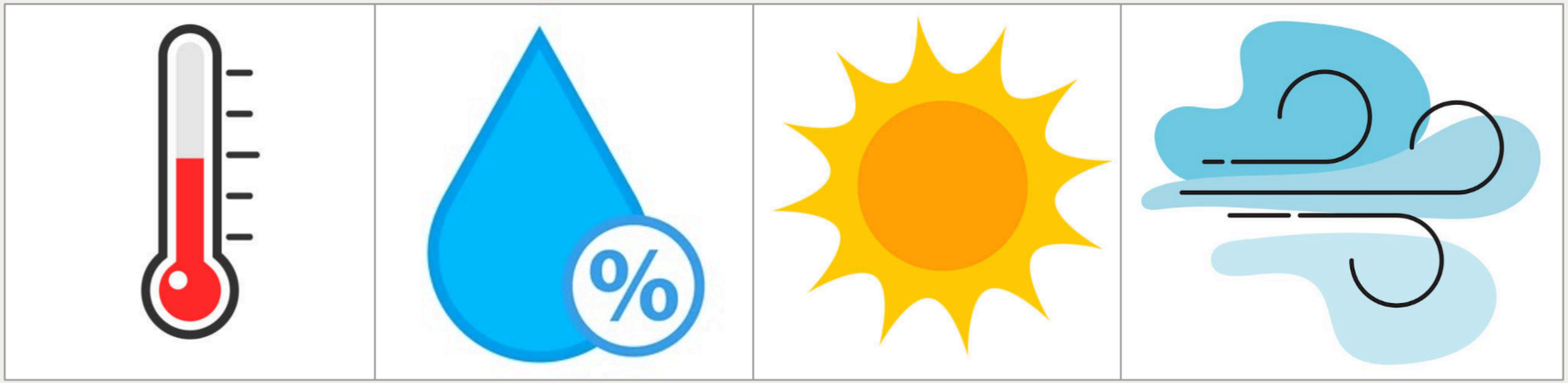
Source: Fukuzawa et al., Safety and Health at Work, 2025

Take Care of Yourself Too



- **Pace your water through the day. Don't wait for thirst**
- **Pale yellow urine means you're keeping up**
- **Some medications affect how you handle heat. Ask your own provider**

How Do You Know When It's Too Hot for Physical Activity?



Air Temp + Humidity

Heat Index = How hot it feels (standing still)

Sunlight

Wind

= **Wet Bulb Globe Temperature**

Is it safe to do sports and physical activity?

Source: NOAA for heat index, NATA 2015 for WBGT.

Wet Bulb Globe Temperature





Source: Kestrel Instruments; Korey Stringer Institute

Wet Bulb Globe Temperature

Cat 1 WBGT (F)	Cat 2 WBGT (F)	Cat 3 WBGT (F)	Activity Guidelines
< 76.1	< 79.7	< 82.2	Normal Activities – Provide at least three separate rest breaks each hour with a minimum duration of 3 min each during the workout.
76.2-81.1	79.8 - 84.6	82.3 - 87.0	Use discretion for intense or prolonged exercise; Provide at least three separate rest breaks each hour with a minimum duration of 4 min each.
81.2 - 84.1	84.7-87.6	87.1 - 90.0	Maximum practice time is 2 h. For Football: players are restricted to helmet, shoulder pads, and shorts during practice. If the WBGT rises to this level during practice, players may continue to work out wearing football pants without changing to shorts. For All Sports: Provide at least four separate rest breaks each hour with a minimum duration of 4 min each.
84.2 - 86.0	87.7 - 89.6	90.1 - 92.0	Maximum practice time is 1 h. For Football: No protective equipment may be worn during practice, and there may be no conditioning activities. For All Sports: There must be 20 min of rest breaks distributed throughout the hour of practice.
≥ 86.1	≥ 89.7	≥ 92.1	No outdoor workouts. Delay practice until a cooler WBGT is reached.

Source: Kestrel Instruments; Korey Stringer Institute

What Other States Have Done



The Robinson family looks at photos of Yahushua Robinson, a 12-year-old boy who loved to sing, dance, and give everyone a smile.
(Samantha Young / KFF Health News)

Gov. Newsom signs Yahushua's Law requiring CA schools to have extreme weather guidelines

Athletic-association policy examples:

- **Georgia**: GHSA By-Law 2.67
- **Texas**: UIL mandate (covers middle school +high school; marching band as well)
- **Florida**: every FHSAA member school monitoring heat stress, modifying activity by WBGT

Department of Health

- **Arizona:** DOH document guides school day including recess, PE, and field trips. Recommends WBGT

Legislation covering the full school day:

- **California** SB 1248 (2024): all grades, PE, recess, band

What Exists in Hawai‘i Now

Hawai‘i Athletic Trainers’ Association is a professional community already doing this right:



Wai‘anae High School varsity football players practice in the sun. (Kevin Fujii/Civil Beat/2024)

- Athletics Association recommends WBGT for high school athletics (not mandated)
- 2022 DOE HS trainers received a Kestrel 5400 WBGT from Korey Stringer Institute; HS trainers are trained to use after school for sports
- Missing: no school day coverage; no devices in middle or elementary

Source: Civil Beat 2024; Hawaii High School Athletic Association

What We've Tried/Why We're Here



Nicholas Chi and Abner Chun wait in the sun on the Punahou School campus to compare wet bulb thermometer readings from different thermometer models. (Leilani Combs/Civil Beat/2025)

- Nānākuli middle school donation/pilot
- HB 245 introduced in 2025, and HB1803 in 2026
- DOE and stakeholders support the goal
- Engaged summer students to help
- Outreach with legislators, DOE, athletic trainers, Sports Med Committee, community members

What We are Proposing

- WBGT devices for all DOE schools K-12 ($549)
- Trained leads at each school to set up devices, report readings (online or flag system)
- Use during the day (recess, outdoor activities) and after school for band and athletics
- Activity modification based on Category 3

Concerns ...

"One more thing on my plate."

- Read a posted color and follow a card. You never take the measurement, interpret the number, or make a call alone.

"Parents will be furious."

- Almost every reading means keep going with more breaks. Cancellation is rare. Posted rule is easier to explain than a judgment call.

"Where do 200 kids go when it's red?"

- We don't have a clean answer yet. Has to be funded, not just mandated.

"What about the kids who need to move?"

- Modify, not cancel. Kids still move, with shade and water built in.

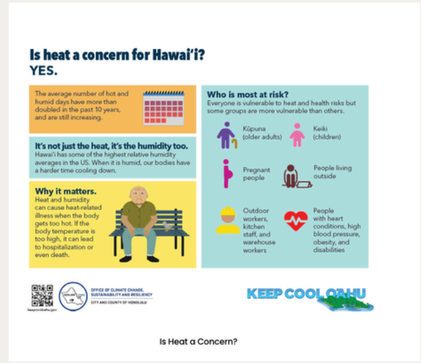
- What Do You Do on Hot Days?

- Tell us your heat stories: what you've seen, what you've done

Asking for Input

- Volunteer your campus for a device pilot
- Tell HSTA if you'd support this in 2027
- Take the survey (2 minutes) ---------->

Further Resources



American Academy of Pediatrics prevention and tips: healthychildren.org

Heat Brochures (+languages): https://www.resilientoahu.org/keepcooloahu

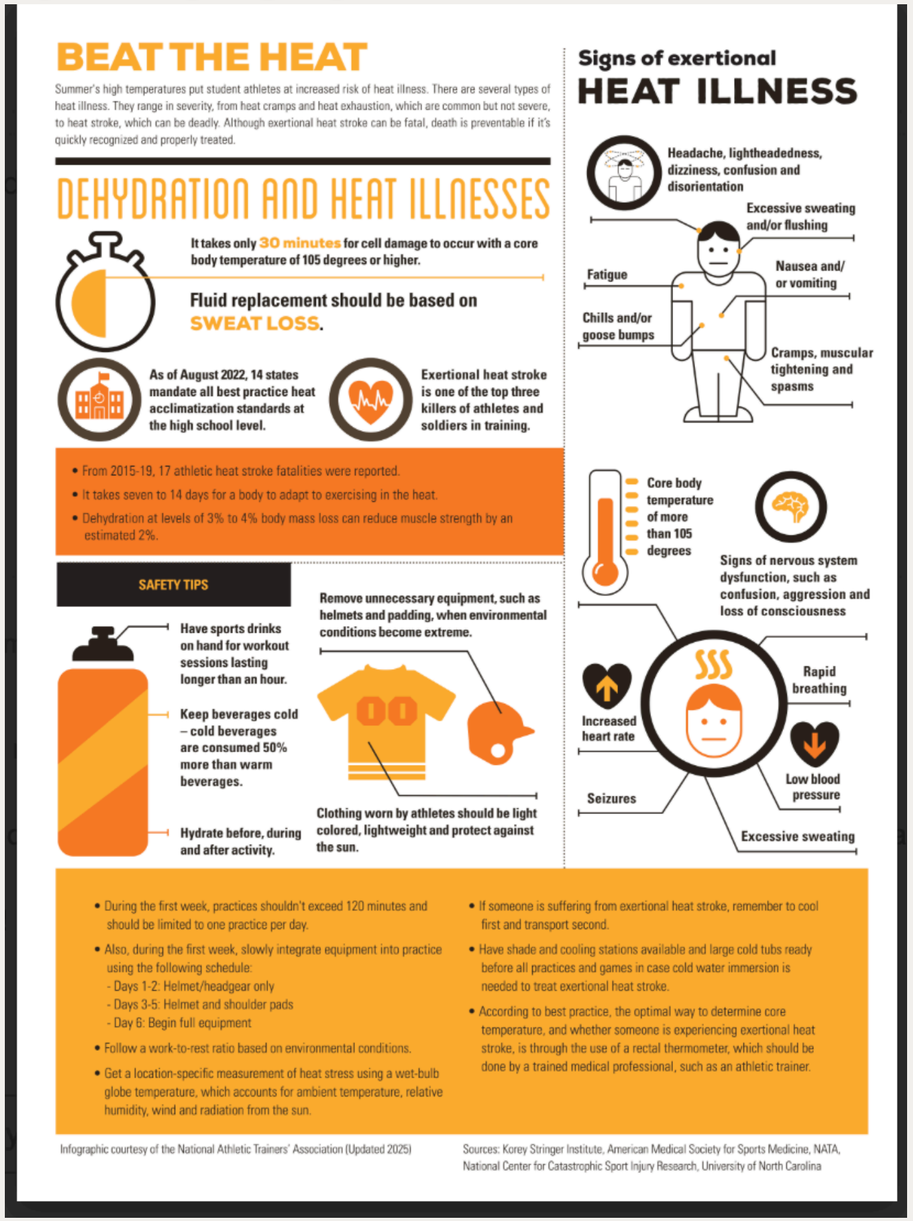
Korey Stringer Institute: https://koreystringer.institute.uconn.edu/

Hawaii High School Athletic Association: heat guideline https://hhsaa.org/assets/content/resources/governing_documents/Heat-Acclimatization-Revised-7-11-17.pdf?1700266275

Further Resources

From our HS Trainers:

[National Federation of High Schools information]



BEAT THE HEAT

Summer's high temperatures put student athletes at increased risk of heat illness. There are several types of heat illness. They range in severity, from heat cramps and heat exhaustion, which are common but not severe, to heat stroke, which can be deadly. Although exertional heat stroke can be fatal, death is preventable if it's quickly recognized and properly treated.

DEHYDRATION AND HEAT ILLNESSES

It takes only 30 minutes for cell damage to occur with a core body temperature of 105 degrees or higher.

Fluid replacement should be based on SWEAT LOSS.

As of August 2022, 14 states mandate all best practice heat acclimatization standards at the high school level.

Exertional heat stroke is one of the top three killers of athletes and soldiers in training.

- From 2015-19, 17 athletic heat stroke fatalities were reported.
- It takes seven to 14 days for a body to adapt to exercising in the heat.
- Dehydration at levels of 3% to 4% body mass loss can reduce muscle strength by an estimated 2%.

SAFETY TIPS

Have sports drinks on hand for workout sessions lasting longer than an hour.

Keep beverages cold – cold beverages are consumed 50% more than warm beverages.

Hydrate before, during and after activity.

Remove unnecessary equipment, such as helmets and padding, when environmental conditions become extreme.

Clothing worn by athletes should be light colored, lightweight and protect against the sun.

Signs of exertional HEAT ILLNESS

Headache, lightheadedness, dizziness, confusion and disorientation

Excessive sweating and/or flushing

Fatigue

Nausea and/or vomiting

Chills and/or goose bumps

Cramps, muscular tightening and spasms

Core body temperature of more than 105 degrees

Signs of nervous system dysfunction, such as confusion, aggression and loss of consciousness

Rapid breathing

Increased heart rate

Low blood pressure

Seizures

Excessive sweating

- During the first week, practices shouldn't exceed 120 minutes and should be limited to one practice per day.
- Also, during the first week, slowly integrate equipment into practice using the following schedule:
  - Days 1-2: Helmet/headgear only
  - Days 3-5: Helmet and shoulder pads
  - Day 6: Begin full equipment
- Follow a work-to-rest ratio based on environmental conditions.
- Get a location-specific measurement of heat stress using a wet-bulb globe temperature, which accounts for ambient temperature, relative humidity, wind and radiation from the sun.
- If someone is suffering from exertional heat stroke, remember to cool first and transport second.
- Have shade and cooling stations available and large cold tubs ready before all practices and games in case cold water immersion is needed to treat exertional heat stroke.
- According to best practice, the optimal way to determine core temperature, and whether someone is experiencing exertional heat stroke, is through the use of a rectal thermometer, which should be done by a trained medical professional, such as an athletic trainer.

Infographic courtesy of the National Athletic Trainers' Association (Updated 2025)

Sources: Korey Stringer Institute, American Medical Society for Sports Medicine, NATA, National Center for Catastrophic Sport Injury Research, University of North Carolina