

Strong Youth Project Trail Notes: Managing Heat and Its Effects for Utah High School Cycling Coaches

How many of you have felt this before? It is a scorching day. You are in the thick of a race, pushing down the course to claim a better position. You feel strong, one solid push from securing that spot you've eyed all race. Suddenly, an excruciating pain shoots through your quads. You can't bend your leg, and the pain stops you in your tracks. Welcome to the harsh reality of the impact of heat on performance.

Heat-related illnesses are more than an inconvenience. It can disrupt rides and practices, sideline riders and coaches or, in extreme cases, lead to life-threatening injuries. Seven high school athletes died from July 2020-August 2021 due to exertional heat illness. Understanding and managing heat is critical to keeping your athletes safe and having fun in Utah's intense summer conditions.

How Heat Affects the Body

The body maintains a stable internal temperature of about 98.6° through a process called thermoregulation. During exercise, muscles generate heat. Normally, the body releases heat through:

- Radiation (heat moving from the body to cooler surroundings)
- Convection (airflow carrying heat away)
- Evaporation (sweating)

When body temperature rises, blood flow shifts to the skin's blood vessels to promote cooling. This reduces blood available to muscles and increases heart rates.¹ The body also takes steps to reduce your metabolism to help reduce heat production. In hot environments, radiation loses its effectiveness, making sweating the main way that the body cools itself.

In Utah's dry climate, evaporation is efficient, but high temperatures can still be hazardous, especially for unacclimatized youth whose developing physiological systems can be less efficient at cooling.²

Signs and Symptoms of Heat Illnesses

Heat illness occurs with rising core temperature and mild dehydration. It is usually accompanied by fatigue, muscle cramps, and reduced endurance. Athletes will notice a reduction in performance when stressed by the heat. To limit the negative effects of environmental heat strain on performance and prevent the development of exertional heat illnesses (EHI), gradual introduction to environments you haven't trained in before should be emphasized.

Exertional heat exhaustion is a moderately severe form of heat injury. It happens when we don't adequately replace our fluids. As sweat evaporates, it takes body heat with it. But

without enough fluids, the body's ability to adapt becomes less efficient and we can't adequately cool our bodies and maintain the same exercise intensity. Symptoms may include:

- Noticeable fatigue / exhaustion
- Cool, moist, pale, ashen (gray) or flushed skin
- Heavy sweating
- Rapid, weak pulse
- Headache, nausea, dizziness
- General weakness

Treating heat exhaustion is urgent:

- Remove from activity and move the athlete to shade or inside.
- Provide circulating air or fan them.
- Loosen clothing.
- Apply wet towels or use a water bottle shower.
- Hydrate with electrolytes, juice, milk, or water.

The most severe EHI is exertional heat stroke (EHS). As EHS develops, the body's ability to cool itself is no longer functioning properly and core temperature will continue to rise until proper whole-body cooling is started. Individuals experiencing EHS often have core temperatures exceeding 104°F. The higher the core temperature, the less likely it is for cells that help maintain bodily functions to survive. This can lead to serious damage to organs if not treated quickly.³ Studies show that exertional heat stroke is more common during preseason or unacclimatized periods.⁴ Symptoms include:

- Altered mental status.
 - Confusion
 - Aggressiveness / Irritability
- Collapse / Unconsciousness / Warm, dry skin (sweating may stop)
- Seizures

Heat stroke is a medical emergency:

- Call 911 immediately
- Monitor the athlete.
- Submerge in cool or cold water as soon as possible.
 - If cooled within 30 minutes of collapse, odds of survival without permanent organ damage increases!
- Watch for and treat shock.

Strategies for Managing Heat in Cycling

Preventing heat-related issues starts with preparation. With race season starting in August, heat training will be critical to help your athletes be prepared for race conditions. This is

especially critical for your JV B+ Girls, JV B+ Boys and Freshmen Boys racing during peak heat.

1. Heat Acclimatization

A 10–14-day gradual exposure to hot conditions will help your athletes and coaches adapt to the heat.⁵ Physiologically, the body improves sweating efficiency through earlier onset, higher perspiration rates, and through adapting for lower sodium loss. The body also adapts to increase blood plasma volume for better cardiovascular stability and reducing core and skin temperatures during exercise.⁶ These adaptations lower heart rates and enhance performance in heat.²

- Start with shorter, easier rides of 30-45 minutes in hot conditions.
- Gradually increase ride duration and intensity over days 6-14.
- Avoid difficult and long rides for the first few weeks of riding in the heat.

2. Hydration

Hydration is non-negotiable. Sweat losses increase in heat, leading to fluid and electrolyte loss. Commercially available sports drinks, such as Gatorade and Powerade, that contain electrolytes and carbohydrates are especially helpful for maintaining energy levels while cycling and replacing sodium, chloride, and potassium lost in sweat. The easiest way to monitor your hydration status is through urine color and via pre/post-ride weigh-ins. Your goal urine color is pale yellow. When urine color is lighter (e.g., clear), you need more electrolytes and if your urine color is darker, you need more water. Being hydrated is a daily pursuit and personal hydration strategies should be practiced during training to identify what works best for you.

- Before rides: 16-20 ounces of fluid two hours before.
- During rides: 7-10 ounces every 20 minutes.
- After rides: Replace fluids with electrolyte drinks, water, and/or milk.

3. Follow NICA Weather Guidelines

NICA's Hot Weather Assessment Process provides specific heat index thresholds to modify or cancel practices and races. Heat index includes humidity and other factors and is displayed in most weather apps as the “feels like” temperature.

- Heat index = 95-100° - 2 hours maximum
- Heat index = 100-105 - 1 hour maximum
- Heat index > 105° - cancel or delay practice.

Follow the NICA guidelines even after heat acclimatization.

4. Have a Heat Response Protocol

- Train athletes and assistant coaches to recognize symptoms.
- Have shade, water, and cooling aids available.
- Keep 5-gallon water jug(s) full of ice water at practice for hydration, cooling, and emergencies.

- Encourage breathable clothing and use cooling towels on hot days.
- Build recovery into your program with hydration and nutrition after every ride.

Utah's heat can turn a promising race into a painful lesson. But with smart preparation, you can keep your riders safe, strong, and focused on the joy of cycling. As coaches, your vigilance will ensure that athletes perform their best and build lifelong resilience and love for the sport.

Coach's Heat Safety Checklist

- ☐ Begin heat training with a **10–14 day heat acclimatization plan** (shorter, lower-intensity rides)
- ☐ Ensure athletes **hydrate properly**: 16–20 oz before, 7–10 oz every 20 minutes during rides
- ☐ Use **shade breaks, breathable clothing, and cooling tools** (towels, ice water)
- ☐ Train athletes to **recognize heat illness symptoms** early (fatigue, cramps, dizziness, confusion)
- ☐ Keep a **heat response protocol** ready: shade, water, ice, and an emergency plan
- ☐ Follow **NICA Hot Weather Guidelines** for safe decision-making

References:

1. Racinais S, Alonso JM, Coutts AJ, et al. Consensus recommendations on training and competing in the heat. *Br J Sports Med*. 2015;49(18):1164-1173. doi:10.1136/bjsports-2015-094915
2. Heat Acclimatization. Accessed August 25, 2025. <https://koreystringer.institute.uconn.edu/heat-acclimatization/>.
3. Casa DJ, DeMartini JK, Bergeron MF, et al. National Athletic Trainers' Association Position Statement: Exertional Heat Illnesses. Exertional Heat Illnesses. Accessed August 19, 2025. https://www.nata.org/sites/default/files/exertional_heat_illnesses.pdf.
4. Armstrong LE, Casa D, Millard-Stafford M, Moran DS, Pyne SW, Roberts WO. Exertional Heat Illness during Training and Competition. *Medicine and Science in Sports and Exercise*. March 2007. Accessed August 25, 2025. https://journals.lww.com/acsm-msse/fulltext/2007/03000/exertional_heat_illness_during_training_and.20.aspx.
5. Sawka MN, Périard JD, Racinais S. Heat acclimatization to improve athletic performance in warm-hot environments. *Sports Science Exchange*. January 2016. Accessed August 25, 2025. <https://www.gssiweb.org/en/sports-science-exchange/Article/sse-153-heat-acclimatization-to-improve-athletic-performance-in-warm-hot-environments>.

6. Périard JD, Racinais S, Sawka MN. Adaptations and mechanisms of human heat acclimation: Applications for competitive athletes and sports. *Scand J Med Sci Sports*. 2015;25 Suppl 1:20-38. doi:10.1111/sms.12408

For more information on managing heat:

American Red Cross Heat Exhaustion –

<https://www.redcross.org/take-a-class/resources/learn-first-aid/heat-exhaustion?srsId=AfmBOoYvkPkcjHDhxmiaH7lg1ncucR4JpEuONAHXcd74coRqGDSIljF>

Gatorade Sports Science Institute: Heat Acclimatization –

<https://www.gssiweb.org/en/sports-science-exchange/Article/sse-153-heat-acclimatization-to-improve-athletic-performance-in-warm-hot-environments>

Gatorade Sports Science Institute: The Healthy Youth Athlete: Reinforcing the Role of Hydration

<https://www.gssiweb.org/en/sports-science-exchange/Article/the-healthy-youth-athlete-reinforcing-the-role-of-hydration>

Korey Stringer Institute: Heat Acclimatization –

<https://koreystringer.institute.uconn.edu/heat-acclimatization/>

NATA Position Statement: Exertional Heat Illnesses –

https://www.nata.org/sites/default/files/exertional_heat_illnesses.pdf

NICA Weather Assessment –

<https://docs.google.com/document/d/1o-LLglfCam2ACy-SzAx5rGiaxd3cmpkYuEr6iW0D4dY/edit?tab=t.0>

Strong Youth Project: Preventing Heat Illnesses in Youth Sports –

https://youtu.be/W3xoeEKiTLw?si=zwKCUDdmRDF_NJQr

Utah High School Activities Association Handbook (see page 76)

–<https://www.uhsaa.org/Publications/Handbook/Handbook.pdf>