



Eastern States 100 Participant Medical Guide

Overview

Welcome to the Eastern States 100 and congratulations on qualifying for what may be the most challenging ultramarathon in the east! This document has been created by the Eastern States 100 Medical Committee, to provide you with valuable information on selected medical concerns that are unique to an ultramarathon of this difficulty. It is important that you recognize that many of these conditions are serious and can result in death. This document also outlines the medical support that will be available on race day and the procedures for medical disqualification and evacuation should either become necessary. Please read this document in its entirety and use the information to prepare for a successful event.

Medical support

Medical support for race participants will be provided through a collaborative effort between the Susquehanna Health System, the Athletic Training and Physician Assistant Programs at Lock Haven University, the Exercise Science Department at Slippery Rock University, Tioga County Emergency Services, and many other local medical professionals. **While there will be many volunteers to assist you during the event, it is the intention of the committee that medical support not be intrusive or interrupt the participant's experience in any way.** The medical personnel, faculty and students involved have years of experience as participants of, and providing medical care for, ultramarathon and marathon length trail races including the Western States 100, Badwater 135, Hyner View Trail Challenge 25k & 50k, Bald Eagle Megatransect, Green Monster, Pine Creek Challenge and a number of others. Through this collaborative effort, participants of the Eastern States 100 will find assistance with all pre-event, aid station and post-event needs, giving confidence to participants as they challenge themselves on what will be an epic course, sure to test each participant's limits.

Aid Stations

On the race course, you will find medical volunteers and basic supplies at the selected aid stations (AS) listed below:

Start/Finish Little Pine State Park	AS 13 Long Branch 73.2mi
AS 4: Browns run 24.1mi	AS 14 Blackwell 78.2mi
AS 7 Hyner Run 40.9mi	AS 15 Sky Top 82.6mi
AS 9 Halfway House 51.8mi	AS 16 Barrens 91.0mi
AS 11 Slate Run 60.9mi	AS 17 Hacketts 97.1m

The volunteers for this race are medical professionals from the community that share with you the common goal of race completion. Please do not hesitate to seek assistance with any medical needs you may have during the race.

In addition to the medical volunteers that are part of the race medical committee, you will be supported by many local Emergency Medical Service volunteers that are there should you need to be evacuated. A considerable amount of pre-race preparation has been devoted to organization of medical coverage for this event. However, please recognize that medical personnel you meet on the course are volunteers that have given their time to help and support you during this race.

While not every aid station will be staffed with medical volunteers, every aid station will have radio communication. However, participants should not expect medical supplies or assistance at any aid station not listed above.

Medical disqualification

While every effort will be made to support your effort and goal of race completion, the potential for serious injury and even death is real and the medical team may determine you are medically unfit to continue. Should this occur, your name and bib number will be reported to the finish line and you will be medically disqualified. At this point you are no longer eligible for a finishing time and are expected to discontinue your participation. If your condition is deemed serious and emergent, local emergency medical services will be activated and you will be medically evacuated in a manner consistent with your condition.

Injured on Course

If you are injured and **CANNOT continue on your own or with assistance**, please stay where you are and send someone to the nearest aid station via the race course. Do not attempt to take a shortcut through the woods; please stay on course. Important information to deliver to the aid station includes:

- 1. Injured participant's bib number**
- 2. If the injured participant is conscious and alert**
- 3. Primary problem the runner is experiencing**
- 4. Exact location of the runner**

If you are injured, **but still able to move on your own or with assistance** please attempt to reach the nearest aid station to notify any medical volunteer or aid station volunteer that you are going to discontinue the race. Again, do not attempt to take a shortcut, stay on the race course. Do not leave the race without notifying one of the volunteers, **WE MUST BE INFORMED THAT YOU HAVE DISCONTINUED THE RACE.** If you are at an aid station, effort will be made to provide you with a ride back to the start/finish at Little

Pine State Park. The race course is remote and covers a large geographic area; please be patient if you are waiting for a ride back to the race start/finish at Little Pine State Park.

If you are injured, **but still able to move on your own or with assistance and come to any drivable road**, stay at the road and send word to the nearest aid station that you cannot continue. Please send the information listed above to the aid station. It is important that you provide accurate information so that a decision can be made regarding the need for an ambulance.

Medical Evacuation

In the event of a medical emergency that requires your evacuation that is beyond the scope of race volunteers to provide transport, you will be transported by ambulance or helicopter to a local medical facility prepared to treat your specific medical emergency. **IT IS IMPORTANT TO RECOGNIZE THAT ALL EXPENSES RELATED TO SUCH A MEDICAL EVACUATION ARE THE SOLE FINANCIAL RESPONSIBILITY OF THE RACE PARTICIPANT.** Please have your insurance information available in the event of an emergency.

Many sections of the course are extremely remote with limited access and are accessible by foot travel only. There will be medical volunteers at several aid stations, ambulance and helicopter services on stand-by, local EMS units on standby, a race sweeper on foot, and other race participants and pacers on the course. However, **the race committee nor the medical committee cannot assure runners that emergency medical services will be able to reach you in a timely manner to provide effective assistance should you become ill or injured and unable to progress without assistance. RUNNERS ASSUME ALL RISK ASSOCIATED WITH PARTICIPATION IN THIS EVENT.**

Given the significant risk to your health and the potential financial burden created by medical evacuation, we strongly encourage all participants to challenge themselves during the race while maintaining a healthy perspective and awareness of personal limitations. Moreover, this race demands prior training and proper preparation. If you have not been able to prepare properly, you should not participate in this event.

Weight Management

Given the unique risks of participation in an ultramarathon as difficult as the Eastern States 100, it is important to track your weight loss or gain during the event. While common practice at ultraendurance events has moved away from specific weight loss or gain restrictions for participants, monitoring your weight will prove valuable to you and/or medical personnel should you experience a medical emergency (see medical conditions below).

As part of the medical plan for this race, **you will be required to weigh in with the medical staff on Saturday morning when picking up your race bib. THIS PRE-RACE WEIGH IN WILL REQUIRE YOU TO BE IN SHORTS AND SHIRT ONLY.** There will be 8 weigh in stations available, but we request that you plan your race preparation time to accommodate for the weigh in. Your pre-race weight will be written on the back of your race bib. You will not be required to weigh in again until the end of the race unless deemed necessary by medical volunteers on the race course. We thank you in advance for your participation in this part of the medical plan.

Medications

As general rule, you should consult with your physician regarding the use of any prescribed medications before, during or after the race. No over the counter, non-prescription medicines should be taken before, during or immediately after the race. Medicines can increase your risk for heat stroke, kidney injury, and dehydration. Of particular concern are amphetamines (Aderall, Concerta etc.), diuretics, ibuprofen/motrin (Advil), acetaminophen (Tylenol), and naproxen (Aleve, Anaprox)

If you have a serious allergy (bee, food, etc.) or respiratory condition (asthma or other) that could require treatment with an epipen or prescribed inhaler, **it is the participant's responsibility to carry these medications on the course at all times.** These medications will not be available at the aid stations.

TRAVELING AT NIGHT

Much of the course will be covered in the dark. All runners are required to have two lights. If your primary and backup light fail, wait for another runner to come by, do not attempt to follow the trail in the dark without a light. The aid stations will NOT have a lights to lend out to runners, please come prepared.

ROAD CROSSINGS

There are several points on the course where you will cross a road. Several of these times you will be crossing route 44 which is a larger road with significant gas drilling company traffic. In addition, given this event is over a weekend, there will be increased road traffic secondary to vacationers visiting the Pine Creek Valley. We encourage all participants to be knowledgeable of the race course, pay attention to all signs on the trail, and take precautions whenever crossing the road with special attention to night travel.

LOST OFF COURSE

The race route has been marked and maps are available. The trail crew for the Eastern States 100 has put many hours into clearing the race course. As such, you should be able to recognize the course at all times. However, the chance of getting lost is real. If

you find yourself on a trail that is not clearly marked or appears to not be unmaintained you are likely off the race course. If this happens, do not continue moving forward off course. If you can be certain of your route, backtrack to the race course. If you are not certain of your location and cannot backtrack, stay where you are. Your chances of being found are better if you stay in one place. If you are with another person, stay together.

MEDICAL CONDITIONS ASSOCIATED WITH PARTICIPATION IN ULTRAENDURANCE EVENTS

OVERVIEW OF DEHYDRATION

A large percentage of our body weight, approximately 60%, is composed of water. This water is critical for the maintenance of normal physiological processes essential for athletic performance and life. While a degree of dehydration can be expected during this race, significant dehydration may reduce your performance and may put you at risk for heat stroke, kidney damage, heat cramps and other injury. Dehydration primarily occurs via sweat. However, vomiting, diarrhea, certain medications, caffeine and alcohol can be significant mechanisms for dehydration.

Dehydration causing as little as 1% of body weight loss can reduce athletic performance and raise your body core temperature putting you at risk for other injury. In races similar to the Eastern States 100, participants were dehydrated to an average of 3% body weight loss at the finish. Any dehydration equal to or greater than 5% body weight loss should be considered a medical risk and is reason for concern. Below is a chart that defines the dehydration:

Condition	% body change	Urine color	Urine Specific Gravity
Well hydrated	+1 to -1	1 or 2	< 1.010
Minimal dehydration	-1 to -3	3 or 4	1.010 to 1.020
Significant dehydration	-3 to -5	5 or 6	1.021 to 1.030
Serious dehydration	>5	>6	>1.030

Signs and symptoms of dehydration

Runners experiencing dehydration may experience the following, and other signs and symptoms:

Thirst, flushed skin, cramps, dizziness, headache, vomiting, nausea, heat sensations on the head or neck, chills, decreased performance and abnormal breathing

Monitoring hydration

The medical committee recommends every participant monitor their weight, urine color and symptoms to make decisions regarding the volume and frequency of fluid intake to help prevent dehydration, hyponatremia, heat stroke, and kidney damage.

The medical team has provided several tools to assist runners in their self-monitoring of hydration status. The following will be available at all aid stations staffed with medical volunteers.

- Calibrated scales to monitor body weight changes
- Urine color charts
- Refractometers for measuring of urine specific gravity
- Percent weight loss charts

Organizations such as the National Athletic Trainers' Association, the American College of Sports Medicine and the Wilderness Medical Society **recommend the following:**

- **Fluid intake of 600 to 900ml/hr (20 to 30 oz/hr) to maintain hydration.**
- **To reduce the risk of hyponatremia (water intoxication) athletes should NOT CONSUME more than 1500 ml/hr (51oz/hr) OF PURE WATER.**

These recommendations should not be interpreted as a rule, or a “cookbook” for everyone to follow. Not every runner will require the same fluid, food and electrolyte consumption plan. Again, the committee recommends participants monitor their weight, urine color and symptoms to make decisions regarding the volume, composition and frequency of fluid intake to help prevent injury.

OVERVIEW OF LOW SODIUM LEVELS

Our bodies maintain a specific level of several different electrolytes (sodium, potassium, etc.) at all times. These electrolytes influence muscle (skeletal and heart) and nerve function. Several also help maintain proper fluid levels in our body. Of all these electrolytes, **the maintenance of sodium levels has been problematic in the ultraendurance athlete.** If your sodium levels become depleted, you can have significant neurological complications. It is important to realize that there have been at least 12 documented deaths resulting from low sodium levels (hyponatremia) in ultraendurance athletes. While there is no “one size fits all” approach to maintenance of sodium levels in ultraendurance athletes, it is important that you are aware of the need to maintain sodium and have a strategy in place for your race.

As with fluid intake, no “cookbook” approach will work for all athletes, but **consuming 300 to 700 mg/L, following the fluid consumption recommendations above, in events lasting longer than 4 hrs has been recommended.**

HYPONATREMIA

Sodium concentration (amount of sodium in a given volume of fluid) can become abnormal by at least two separate mechanisms. The first mechanism involves excess sodium loss via sweat and urine. Individuals have varied levels of sodium lost in sweat, some people lose a lot of sodium, some people lose much less. You may have experienced a white dust on your clothing after your sweat dries. This is evidence of electrolyte loss via sweat. The second and **most common mechanism involves consuming fluid with little or no sodium during the race.** With this mechanism you are effectively diluting your body’s concentration of sodium. This is similar to adding water to a glass of salt water. The concentration of sodium after adding water is lower.

Signs and symptoms of hyponatremia

If your body does not have enough sodium, you may experience the following, and other signs and symptoms:

Headache, nausea, confusion, lack of coordination, weakness, seizures, coma, permanent brain damage, and in rare cases, death.

It is important that you report any of these symptoms to the medical volunteers located at designated aid stations. In most cases, consumption of the correct fluids and food can alleviate your symptoms allowing you to continue the race. In rare instances you may need to withdraw from the race and seek further medical treatment.

HEAT STROKE

Heat stroke is another potential medical emergency for anyone exerting themselves in hot and humid environments for a long period of time. Heat stroke is defined as a body core temperature equal to or greater than 104 degrees F (40 degrees C). Elevation of tissue temperatures to this level causes damage to organs and can lead to death.

Mechanism of heat stroke

Your body has a heat regulating system that is maintained by your nervous and cardiovascular system. This heat regulating system works much like the heating and cooling system in your house. When the thermostat detects a temperature elevation above the set point, the cooling system turns on. In your body, there are several cooling mechanisms. **The most important, and most effective cooling system is evaporation of**

sweat off your body. This mechanism uses the heat from your body, much like the water in a pot uses the heat from a kitchen stove, to evaporate sweat off the surface of your body. This cooling mechanism is least effective when the environmental conditions include low wind and high humidity. Evaporation, and other cooling mechanisms of your body, is also at a disadvantage when you are dehydrated. Therefore, it is important that you monitor and regulate your fluid consumption (see above) during this event.

Signs and symptoms of heat stroke

When your body becomes overheated, you may experience the following, and other signs and symptoms:

Dizziness, irrational behavior, confusion, irritability, disorientation, staggering, vomiting, diarrhea, hyperventilation

It is important that you report any of these symptoms to the medical volunteers located at designated checkpoints.

**Measurement of body core temperature in the armpit (axilla), mouth, ear, or on the surface of your head are not as accurate as a rectal temperature assessment. Given the importance of determining your body core temperature, if heat stroke is suspected, a rectal thermometer may be used to obtain the most accurate assessment.

KIDNEY INJURY

Kidneys serve the function of filtering blood. They rely on a steady supply of blood under adequate pressure so the filtration membrane can function properly. Participants of marathons and ultramarathons tend to dehydrate which diminishes the supply of blood to the kidneys. Runners also cause muscle damage that releases proteins into the blood. When these two events occur in the extreme during a race, your kidneys can get clogged, damaged and become dysfunctional or stop functioning completely. The problem is similar to putting way too many coffee grounds into a coffee filter with holes and then adding too little water. You would brew a very small volume of very strong coffee containing grounds.

An added complication to this scenario is the use of Non-Steroidal Anti-Inflammatory drugs (Advil, Naproxen, etc.). These medicines add insult by damaging the kidney even further and can greatly increase the risk of kidney failure. **DO NOT TAKE ANY OVER THE COUNTER NSAID (IBUPROFEN, ETC.) MEDICINES DURING THE RACE.** These medicines WILL NOT be available at aid stations.

While kidney injury is very possible, there are few signs and symptoms aside from the typical signs of dehydration. Since dehydration can contribute to kidney injury, it is

important to manage your body weight, avoiding any more than a 3% reduction in body weight.

In the hours and days following the race, it is very important that you consume fluids until your urine volume and frequency return to normal and the color returns to light yellow.

SNAKE BITE

There are 21 species of snakes that are native to Pennsylvania, **3 of which are venomous (timber rattlesnake, eastern massasauga rattlesnake, northern copperhead)**. These venomous snakes will have a vertically elliptical eye pupil like a cat, a single row of scales on the underside of the tail, a distinct pit on each side of the head between the eye and nostril and a triangular shaped head. The rattlesnake will display one or more rattles (Note: rattles can be missing due to natural causes). We of course do not recommend you try and identify any snakes while out on the course, but if someone is bitten and you suspect it is a venomous snake, please take the following steps:

- Despite the obvious contradiction, the bitten person should remain calm.
- Do not attempt to capture or kill the snake. Take a picture of it for identification purposes if you can do so without risking a second bite.
- Call 911 if you have cell phone service. If not, send someone to the nearest aid station (all aid stations have radio communication). Take very careful notes about the time of the bite, location of the bite and the victim's location in the woods. Continue to check for cell phone service while in route.
- Apply LIGHT constriction on the side of the bite closest to the victim's heart. You should be able to insert a finger under the band.
- Start to slowly move the victim toward the closest aid station or drivable road for evacuation purposes.

If someone is bitten:

- DO NOT apply ice or cold packs
- DO NOT incise and suction the bite unless instructed by a physician
- DO NOT use a tourniquet
- DO NOT give alcohol or any drugs
- DO NOT wait to see if symptoms develop

Race Medical Committee Members

Joshua Drouin, PhD, LAT, ATC; Lock Haven University, Medical Committee Chair
Josh is a faculty member at Lock Haven University and has served on the race committee for the Hyner View Trail Challenge and Megatransect. If you have any questions or concerns about the race, please contact Josh directly:
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Edward Gusick, DO; Medical Director, Eastern States 100
Dr. Gusick is a Susquehanna Health Primary Care Sports Medicine Physician, Department of Orthopedics and Sports Medicine. He is also the Team Physician for the Williamsport Crosscutters, Little League World Series, Multiple Colleges, and Loyalsock High School. Dr. Gusick is an Assistant Professor of The Commonwealth Medical College and has served previously as medical director of Montour 75 mile bike race and participated in coverage of Rivertown half and full marathon.

Denny Colegrove, EMT; Emergency Management Coordinator, Tioga County,
Department of Emergency Services, Eastern States 100 Race Co-director

Jeffrey Lynn, PhD; Slippery Rock University
Jeff is a faculty member who teaches exercise physiology at Slippery Rock University. Jeff has volunteered on the medical crew and conducted research at the Western States 100, the Badwater 135 and other marathon events. Jeff has participated in multiple marathon and ultramarathon events as well.

Walt Eisenhower, PA-C; Lock Haven University
Walt is a faculty member at Lock Haven University who teaches in the Physician Assistant Program and is actively practicing family medicine in Pennsylvania.

Jennifer Fleming, MS, RD; Instructor at Penn State University.
Jen is a dietitian and avid trail runner. She counsels both elite and recreational runners in areas of sports nutrition. She also serves as an integral member of the Hyner View Trail Challenge and Rothrock Trail Challenge committees.

Dave Hunter, RN; Race Director, Megatransect
Dave is a registered nurse and practices locally. He has participated in marathon and ultramarathon events and serves as the race director for the Megatransect in Lock Haven, PA.

Luke Haile, PhD; Lock Haven University
Luke is a faculty member at Lock Haven University who teaches exercise science and physiology courses. He also serves as a volunteer coordinator for the Eastern States 100.