Coastal Carolina University
Athletic Training Department
Policy and Procedure Manual
Exertional Heat Illness Management
Fluid Replacement/Rehydration Protocol

Revised/Reviewed 7/2011

INTRODUCTION:

The following policy on fluid replacement, rehydration, and exertional heat illnesses has been developed in accordance with the NATA Fluid Replacement Position Statement, the NATA Exertional Heat Illnesses Position Statement, and the Coastal Carolina University Department of Athletic Training's Mission Statement to provide quality healthcare services and assure the well-being of each student-athlete at Coastal Carolina University.

DEFINITION OF HEAT ILLNESS:

Heat illness if closely associated with physical activity and its occurrence increases with a rise in temperature and relative humidity. It is usually classified in three categories: heat cramps, heat exhaustion, and heat stroke. Although most often occurring in hot, humid weather, heat illness can also occur with the absence of both heat and/or humidity.

Exercise-Associated Muscle (Heat) Cramps:

- Occurs during or after intense exercise as an acute, painful, and involuntary muscle contraction
- Causes may include dehydration, electrolyte imbalances, neuromuscular fatigue, or a combination of factors.
- *Signs and Symptoms:* dehydration, thirst, sweating, transient muscle cramps, fatigue.

Exercise (Heat) Exhaustion:

- Occurs most frequently in hot, humid conditions and causes an inability to continue exercise.
- May be caused by dehydration, heavy sweating, sodium loss, and energy depletion.
- *Signs and Symptoms:* pallor, persistent muscle cramps, urge to defecate, weakness, fainting, nausea, decreased urine-output, cool and clammy skin, anorexia, diarrhea, body temp between 97-104°F.

Exertional Heat Stroke:

- Occurs when core temperature is elevated (usually greater than 104°F) with associated signs of organ system failure due to hyperthermia and physical activity.

- Caused by an overwhelmed temperature regulation system due to excessive endogenous heat production or inhibited heat loss due to environmental conditions.
- *Signs and Symptoms:* tachycardia, hypotension, sweating (although skin may be wet or dry), hyperventilation, altered mental status, vomiting, diarrhea, seizures, coma, CNS changes
- Life-threatening condition that can be fatal unless promptly recognized and treated.

PREVENTION OF HEAT ILLNESS GUIDELINES:

- All pre-participation examinations will identify student-athletes who may be predisposed to heat illness or have a history of heat illness.
- The Athletic Training Department Staff will be onsite at most practices and competitions to assist in providing hydration and access to further cooling supplies. The staff will be aware of the signs and symptoms of heat illness to properly recognize and intervene on behalf of the student-athlete.
- The certified athletic training staff will help educate athletes and coaches regarding the necessary time needed to have student-athletes adapt to their environment. Acclimatization should be a gradual progression. Well-acclimatized athletes should be able to train 1 to 2 hours under the same heat conditions that will be present for their event.
- In addition, the certified athletic trainer should know how to use a wet-bulb globe temperature (WBGT) and/or a sling psychrometer, decipher the corresponding temperature graphs for these instruments, and base the level of physical activity upon the gathered information. This will be used as one of the factors in determining any risk of heat illness associated with relevant environmental conditions.

TREATMENT OF HEAT ILLNESS

The Athletic Training Department will treat heat illness by recognizing its signs and symptoms, understanding the causes of heat illness, and taking the necessary measures to ensure an efficient and safe recovery for the student-athlete.

Exercise-Associated Muscle (Heat) Cramps

- The student-athlete should stop activity, replace lost fluids (containing sodium), and begin mild stretching and massage of the muscle spasm.
- Instruct the student-athlete to lie down, as this may allow blood flow to be distributed more rapidly to cramping leg muscles.

Exercise (Heat) Exhaustion

- Assess cognitive function and vital signs, taking body-core temperature if possible.
- Transport the athletes to a cool and/or shaded environment, remove excess clothing, start fluid replacement, and cool the

student-athlete with fans, ice towels, or ice bags (placed in armpits, neck, and groin).

- The student-athlete should be referred to the team physician and/or the emergency room of the closest hospital if in the judgment of the attending certified athletic trainer symptoms warrant further immediate attention.

Exertional Heat Stroke

- Activate the emergency medical system.
- Assess cognitive function and vital signs, measuring rectal temperature if feasible to differentiate between heat exhaustion and heat stroke (heat stroke is 104°F or higher).
- Lower the body-core temperature as quickly as possible by removing excess clothing and immersing the body into a tub of cool water (35 - 59°F) while checking temperature every 5 to 10 minutes. Remove athlete from water if temperature reaches 101 to 102°F to prevent overcooling.
- Continue using cooling methods mentioned for heat exhaustion while transporting to decrease body-core temperature.
- Maintain and monitor airway for breathing and circulation.

RECOVERY OF HEAT ILLNESS:

Student-athletes who experience a heat stroke may have impaired thermoregulation, persistent CNS dysfunction, and hepatic or renal insufficiency following recovery. Decreased heat tolerance has been shown to affect 15% to 20% of athletes experiencing a heat stroke-related collapse. Following recovery, the student-athlete's activity should be restricted with a gradual return regulated by the Team Physician.

Coastal Carolina University Department of Athletics will use the Marine Corps Heat Index and Physical Exercise Chart for guidelines in regards to physical activity and/or practices conducted outside:

Heat Index and Physical Exercise Chart		
WBGT Index (F)	**Flag Color**	**Heat Condition Flag Warning System**
80-84.9	Green	Heavy exercises, for unacclimatized personnel will be conducted with caution and under constant supervision.
85-87.9	Yellow	Strenuous exercises, such as marching at standard cadence, will be suspended for unacclimatized troops in their first 2 or 3 weeks. Outdoor classes in the sun are to be avoided.
88-89.9	Red	All physical training will be halted for those troops who have not become thoroughly acclimatized by at least 12 weeks of living and working in the area. Those troops who are thoroughly acclimatized may carry on limited activity not to exceed 6 hours per day.
90 and Above	Black	All strenuous non-essential outdoor physical activity will be halted for all units. Essential activities are defined as those activities associated with scheduled exercises or other major training evolutions where the disruption would cause undue burden on personnel or resources, be excessively expensive, or significantly reduce a unit's combat readiness. Essential outdoor physical activity will be conducted at a level that is commensurate with personnel acclimatization as determined by the unit's commanding officer in coordination with the unit's medical officer or medical personnel. All efforts should be made to reschedule activities during cooler periods of the day.

RATIONALE OF FLUID REPLACEMENT

Student-athletes who are exposed to prolonged practices and competitions in an excessively hot and humid environment may be deprived of essential fluids, carbohydrates, and electrolytes that an ultimately lead to dehydration and potential heat illness.

It has been demonstrated that dehydration of just 1-2% of body weight can alter physiological function and negatively influence a student-athlete's performance. Student-athletes who are not properly hydrated prior to the start of practice or competition can begin to notice the signs of dehydration in just one hour or sooner of exercise. Dehydration has been identified as an increased risk factor for student-athletes developing heat-related illness such as heat cramps, heat exhaustion, and the potentially life-threatening heat stroke.

REHYDRATION GUIDELINES

The Athletic Training Staff at Coastal Carolina University has developed the following rehydration guidelines based on national accepted criteria. The Athletic Training Department Staff will assist in promoting the consumption of beverages. All beverages will be provided onsite when requested or as deemed necessary.

Prior to Exercise

- All student-athletes should be encouraged to drink 17 to 20 fluid ounces of water or sports beverage 2-3 hours before exercise.
- Ten to twenty minutes before the beginning of practice or competition, student-athletes should be encouraged to drink an additional 7-10 fluid ounces of water or sports beverage.

During Exercise

- Encourage student-athletes to drink early and often
- Drink 7-10 fluid ounces or sports drink every 10-20 minutes.
- It is important to stress to the student-athletes to drink prior to becoming thirsty. A student-athlete who is thirsty may already be in the early stages of dehydration.

After Exercise

- Encourage student-athletes to replace any fluid loss due to sweating within 2 hours from the end of exercise. This rehydration should include water, carbohydrates, and electrolytes to allow the immediate return of physiologic function.
- Encourage them to drink 20-24 fluid ounces for every pound of weight lost.

****Sport beverages should ideally contain a carbohydrate level of no more than 8%. A higher carbohydrate level can retard fluid absorption and cause stomach problems.**

****Fruit juices, carbohydrate gels, and carbonated beverages should not be recommended as the sole rehydration beverage of choice. Beverages containing caffeine, alcohol, or carbonation should be avoided and discouraged due to their diuretic effects and decreased fluid retention.**

WEIGHT LOSS/GAIN GUIDELINES

It is recommended that all student-athletes exercising in hot and humid environments be weighed in prior to and after practice or competition. By weighing in, a determination can be made of the percentage body weight lost due to sweating and the amount of rehydration that must occur prior to the next practice session. Furthermore, student-athletes should be weighed preferably in the nude, in clean/dry undergarments, or wearing the same amount of clothing pre-and post-practice. The percentage of weight lost between practice sessions will be used as one factor to determine if a student-athlete can safely continue to practice. Athletes should ideally have their pre-exercise body weight remain relatively consistent.

- A 2% body weight difference should be noted by the athletic trainer and that student-athlete should be closely monitored for any signs or symptoms of dehydration.
- A student-athlete with greater than 2% body weight loss should not be allowed to return to practice until proper fluid replacement has taken place.

INTRAVENOUS (IV) FLUID REPLACEMENT

In certain instances a student-athlete may receive intravenous fluid replacement therapy to combat dehydration or associated heat illnesses. This fluid supplementation is beyond that which can be administered by the preferred oral route. This may be necessary due to the extent of fluid loss, development of medical complications or inability of the student-athlete to ingest sufficient quantities of oral fluids. This form of treatment will be conducted at the discretion of the Team Physician. In the absence of the Team Physician, if the attending certified athletic trainer determines that a student-athlete may be suffering from dehydration or associated heat illness, he/she will make every effort to contact the Team Physician and/or arrange for treatment to be administered through the closest hospital emergency room.