



Recommendations for the Traveling Athlete: Heat/Humidity & Hydration

By Dr. Trent Stellingwerff (PhD) (adapted from 2008 Beijing and 2010 Delhi Games material)

- Athletic performance may be reduced in those individuals (especially events with long exposure) not acclimatized to the anticipated heat and humidity.
- Proper preparation for training and competing in hot and possibly humid conditions will minimize, or even eliminate the negative effects of high body core temperature and dehydration during exercise.
- The likelihood of dehydration increases when heat is combined with high humidity. In an effort to cool itself, the body's response is to sweat more, which can quickly lead to dehydration. Two important points to consider: the dehydrated athlete will acclimatize slower **and** only ~2 to 4% BW dehydration can result in a decrease in performance and increased risk for injury (e.g. muscle cramps/pulls). In general, the sensation of being thirsty lags behind dehydration; if you are thirsty you are already dehydrated.
- **Whenever there are large temperature changes for athletes, or temperatures over 20 to 25°C there can be a significant risk for dehydration and/or heat related illnesses (e.g. heat stroke) •**

Heat & Humidity Adaptation Strategies

- A minimum of 7-14 days of heat acclimatization is required for complete adaptation – please see attached document for practical recommendations. This will allow sweat rates to increase, decrease the amount of sodium lost in sweat, resting and exercise heart rates to return to normal, and resting body temperature to return to normal. During the initial days of training in hot weather, the volume intensity and duration should be reduced to help the athlete adapt to the added heat stress.
- If coming from a cool environment, *simulated* heat exposure (such as use of a steam room) during the few weeks *prior* to departure will advance the rate of acclimatization. Seek sound advice from your sport physiologist.
- Modify the normal warm-up period (i.e., shorten time and reduce intensity) so that athletes do not overheat prior to 'main training' or competition days.
- Establish *Pre and Post Cooling Strategies*, which can include ice baths, or even 'ice/cold water' towels in a hand-cooler that can be transported to the track, or even for field-events, onto the field of play. Seek expert advice from your sport physiologist regarding performance and recovery cooling strategies.
- Minimize "accumulative heat load" between training sessions by avoiding mid-day socializing, sightseeing, shopping, etc.
- Choose light and breathable clothing. Dark colored clothing will absorb more radiant heat and thus add to the heat load. Ensure clothing does not restrict evaporation of sweat.



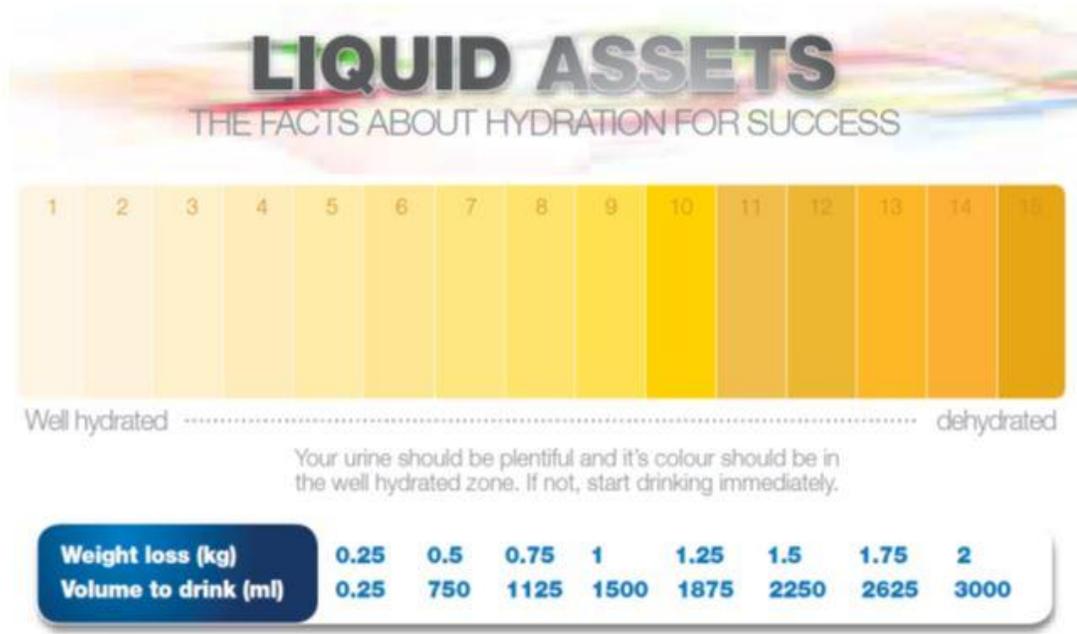
- Athletes, coaches, and team managers should be aware of the symptoms related to heat illness: headache, nausea, dizziness, excessive sweat, loss of coordination. Seek medical advice for any of these symptoms. Be aware that some common headache medications are vasoconstrictors and may reduce the body's ability to dissipate heat.
- Keep cool at night to ensure a good night's sleep. Quality sleep is critical for recovery and regeneration. Cold/Cool showers and ice-tubs can assist in this!

Hydration Strategies

- Develop individualized re-hydration plans well in advance. Each athlete may respond to the heat and humidity in unique ways. Before competitions in the heat, determine during training how much each athlete needs to drink before, during, and after exercise in order to avoid dehydration (practice this at home in different weather conditions by looking at pre- to post-training body weight, see below).
- Advise the athletes to drink beyond the *sensation of thirst*, especially during the initial acclimatization to heat and humidity.
- Begin all training and competition well hydrated. If possible drink throughout, but in small amounts to avoid sensation of 'bloating'.
- Accurate hydration status can be monitored with Urine Specific Gravity strips or Urine Osmolarity assay. Your team physiologist and or nutritionist should be able to provide further information on these testing protocols.
- As you will be in a new environment, with not only different temperatures, but also food choices, it is recommended to regular monitor morning weight prior to championships. Large decreases or gains should be flagged-up to the medical staff who can offer advice.
- Measure body-weight before and after training to determine water loss and % body weight loss. It is normal for exercise to induce ~2% body weight loss. More than 2% means you did not drink enough, less than 2% means you drank *TOO* much! **[1Kg weight loss = 1 Litre water loss]; rehydrate with 1.5 L – please see image below.**
- Hydration supplements (which may contain carbohydrates, electrolytes, etc.) should be tested *well in advance* and in consultation with your sports nutritionist. Caution: If re-hydration is the goal, drinks with high sugar content will slow down the rate of water absorption from the stomach. If re-hydrating with an energy drink, the solution should contain ~2-3% carbohydrate.
- Athletes should be aware of their urine color when well hydrated. If the color is *4 or above* on the chart at bottom, they are already de-hydrated enough to negatively impact performance. (Note that urine color is affected by vitamin supplements).
- Other very rare in hot environments, athletes can *OVER*-hydrate and flush out electrolytes. Urine should be pale yellow, *NOT* clear! If you are waking during the night to urinate more than two times, you are probably over-hydrated.



Urine Hydration Chart



1 L of sweat = 1 kg body weight