



# Understanding Athletes' Sweat

For more than 30 years, the Gatorade Sports Science Institute (GSSI) has worked with athletes – both on and off the field – to study every aspect of hydration. What has GSSI learned? That there is more to sweat than meets the eye.

## SODIUM IS NOT "ONE SIZE FITS ALL"

The amount of sodium found in athletes' sweat can vary drastically from one person to another. Sodium content in sweat ranges from **230-2,070 mg/L**, which is approximately 1/25 to 1 full teaspoon.

## WHO, WHAT & WHERE YOU ARE AFFECTS SWEAT RATE

According to a recent retrospective study, the main factors in predicting sweat sodium concentration include:

<b>Gender</b>	<b>Age</b>	<b>Season of the year</b>
Male > Female	Adult > Youth	Cooler Months > Warmer Months

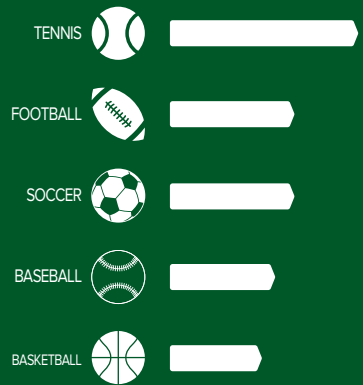
Knowing an individual's hydration needs during exercise enables athletes and coaches to maximize athletic performance and help minimize hydration-related risks and dehydration. An accurate way to assess an individual's hydration needs is by calculating their sweat rate.

$$\frac{(\text{PRE WEIGHT} - \text{POST WEIGHT}) + (\text{FLUID CONSUMED} - \text{URINE VOLUME})}{(\text{EXERCISE TIME} \div 60)} = \text{SWEAT RATE}$$

Visit [GSSIweb.org](http://GSSIweb.org) to utilize the Fluid Loss Calculator

Note: Sweat rate should be measured multiple times throughout a season as it will vary with environmental conditions and level of competition.

## THE SWEATIEST ATHLETES



Relative whole-body sweating rate (ml/kg/h)

## APPLES TO ORANGES: COMPARING LOCAL VS. WHOLE-BODY SWEAT SODIUM CONCENTRATION

Sweat sodium varies across different regions of the body, meaning that:

**Local Sweat Sodium Concentration** ≠ **Whole-Body Sweat Sodium Concentration**

### Best practices for determining whole-body sweat rate:

- Test in conditions (intensity, environment, season, equipment, etc.) relevant and specific to that of the athlete's training/competition
- Have athletes wear minimal clothing for all body mass measures
- Weigh athletes in the same clothing before and after exercise
- Monitor and weigh all fluid/food intake and urine losses during exercise

Laitano, O., J.L. Runco, L. Baker (2014) SSE #128: Hydration Science and Strategies in Football. 27:128. <http://www.gssiweb.org/en/Article/sse-128-hydration-science-and-strategies-in-football>  
Baker, O., K.A. Barnes, M.L. Anderson, D.H. Passe, J.R. Stofan (2016). Normative data for regional sweat sodium concentration and whole-body sweating rate in athletes. J. Sports Sci. 34:4

