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California Interscholastic Federation

SPORTS MEDICINE BULLETIN

Position Statement and Recommendations for Hydration to Minimize the Risk for Dehydration and Heat Illness National Federation of State High School Associations (NFHS) Sports Medicine Advisory Committee (SMAC)

Dehydration, its effects on performance & its relationship to heat illness:

- ▶ Appropriate hydration before, during & after exercise is an important ingredient to healthy and successful sports participation.
- ▶ Rapid weight loss represents a loss of body water and athletes should be weighed before & after warm weather practice sessions/contests to assess fluid losses. 1-2% loss of body weight (1.5-3 pounds for a 150 pound athlete) can negatively impact performance ≥ 3% loss of body weight can increase risk for exertional heat-related illness
- ▶ Athletes with high body fat percentages can become dehydrated faster than those with lower body fat percentages while working out under the same environmental conditions.
- ▶ All athletes have different sweat rates and some tend to lose much more salt through their sweat.
- ▶ Poor acclimatization/fitness levels can greatly contribute to an athlete's dehydration problems.
- ▶ Medications, fevers, environmental temperatures and humidity can each greatly attribute to dehydration and risk for heat illness.
- ▶ Clothing, such as dark, bulky or rubber protective equipment can drastically increase the chance of dehydration and heat illness.
- ▶ Wet bulb temperature measurements should be taken 10-15 minutes before practices/contests. The results should be used with a heat index to determine if practices/contests should be started, modified or stopped.
- ▶ Dry climates can have high humidity if sprinkler systems are scheduled to run before early morning practices start. This collection of water does not evaporate until environmental temperatures increase and dew points lower.
- ▶ A heat index chart should be followed to determine if practices/contests should be held: The NOAA National Weather Service's heat index <http://www.weather.gov/om/heat/index.shtml>

To determine the heat index for your location, enter your postal zip code: The OSAA (Oregon School Activities Association) Heat Index Calculator <http://www.osaa.org/heatindex/>

▶ Relative Humidity & Temperature can contribute to heat illness & heat stroke:

Relative Humidity & Temperature	Heat Illness	Heat Stroke
35% & 95 degrees	Likely	Likely
70% & 95 degrees	Very Likely	Very Likely

What to Drink during Exercise:

- ▶ For most exercising athletes, cold water is the ideal fluid for pre- and re-hydration. Water is quickly absorbed, well tolerated, an excellent thirst quencher & cost effective.

► The use of a cold sports drink with appropriate carbohydrates (CHO) and sodium may prove beneficial in some situations and for some individual conditions:

Situations	<ul style="list-style-type: none"> ► Prolonged continuous activity > 45 minutes ► Extremely intense activity with risk of heat injury ► Extremely hot & humid conditions
Individual Conditions	<ul style="list-style-type: none"> ► Poor hydration prior to participation ► Increased sweat rate ► Poor caloric intake prior to participation ► Poor acclimatization to heat & humidity

► A 6-8% addition of CHO to water is the maximum that should be utilized. Any greater concentration will produce slow emptying from the stomach and may produce a bloating feeling. A low concentration (0.3-0.7g/L or 300-700mg/L) of sodium may help with cramping.

What NOT to drink during exercise:

Type of fluid	Reasons NOT to drink
Fruit juices with >8% CHO content Soda	Bloating Abdominal cramping
Beverages with excessive caffeine Alcohol	Increases risk of dehydration associated with: Increased urine production Decreased voluntary fluid intake

► Nutritional supplements are not limited to pills and powders; many of the new fluids contain stimulants such as caffeine, ephedrine/ephedra, guarana and mahuang.

- These stimulants may increase the risk of heart or heat illness problems when exercising
- As with other forms of supplements these “power drinks or fluid supplements” are not regulated by the FDA. Thus, purity and accuracy of contents on the label are not guaranteed.
- Many of these beverages, which claim to provide additional power, energy, etc., have additional ingredients that are not necessary, some that are potentially harmful, and some that actually include substances banned by such governing bodies as the NCAA and the USOC.

Hydration Tips and Fluid Guidelines:

► In general, athletes do not voluntarily drink sufficient water to prevent dehydration during physical activity. Drink early, by the time you’re thirsty, you’re already dehydrated.

► The American College of Sports Medicine (ACSM) Exercise & Fluid Recommendations 2007:

Before Exercise	Encourage fluid intake several hours (2-4) before exercise and ensure adequate urine output and urine color (clear-pale yellow)
During Exercise	Encourage to drink every 10-15 minutes; Routine measurement of pre- and post-exercise body weight is useful for determining estimated individual fluid needs
After Exercise	Drink 16-24 oz.

► The volume and color of your urine is an excellent way of determining if you’re well hydrated:

Large amounts of clear urine = Hydrated

Small amounts of dark urine = Not hydrated and need to drink more

A Urine Color Chart can be accessed at <http://at.uwa.edu/admin/UM/urinecolorchart.doc>

► *The NFHS SMAC strongly recommends that coaches, certified athletic trainers, physicians, and other school personnel working with athletes not provide or encourage use of any beverages for hydration other than water and appropriate sports drinks that meet the above criteria. They should also make information on the potential harm and lack of benefit associated with many of these other beverages available to parents and athletes.*

References:

Sawaka MN, Burke L, Eichner ER, Maughan RJ, Montain SJ, Stachenfeld NS. American College of Sports Medicine Position Statement: Exercise and Fluid Replacement. *Medicine & Science in Sports & Exercise.* 377-390, 2007.

Casa DJ, Armstrong LE, Hillman SK, Montain SJ, Reiff RV, Rich BSE, Roberts WO, Stone JA. National Athletic Trainers' Association Position Statement: Fluid Replacement for Athletes. *Journal of Athletic Training.* 35(2):212-224,2000.

McKeag DB, Moeller JL. ACSM's Primary Care Sports Medicine. 2nd Ed, Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins, 2007.

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These guidelines are from the ACSM Exercise and fluid replacement position stand.

At least 4 hours before exercise	5-7 ml/kg body weight (240 ml=8 ounces)
During Exercise	4-9 ounces every 15-20 minutes See fluid calculator chart below
After Exercise	1.5 L/kg body weight lost (1 Liter= 32 ounces)

Fluid calculator to calculate sweat rate:

	Example	My calculation
1. Actual weight before exercise (no clothes)	150	
2. Run or walk for ~1 hour		
3. Amount of fluid intake (ounces) during exercise	16	
4. Actual weight after exercise (no clothes)	149	
5. Weight before exercise minus weight after exercise	1	
6. Convert weight to ounces: #5 value times 16 ounces	X16	
7. Weight change in ounces	16	
8. Determine hourly sweat rate: Add #7 value to #3 value	32	
9. Determine how much to drink every 20 minutes: Divide #8 value by 3-4	8-11	

