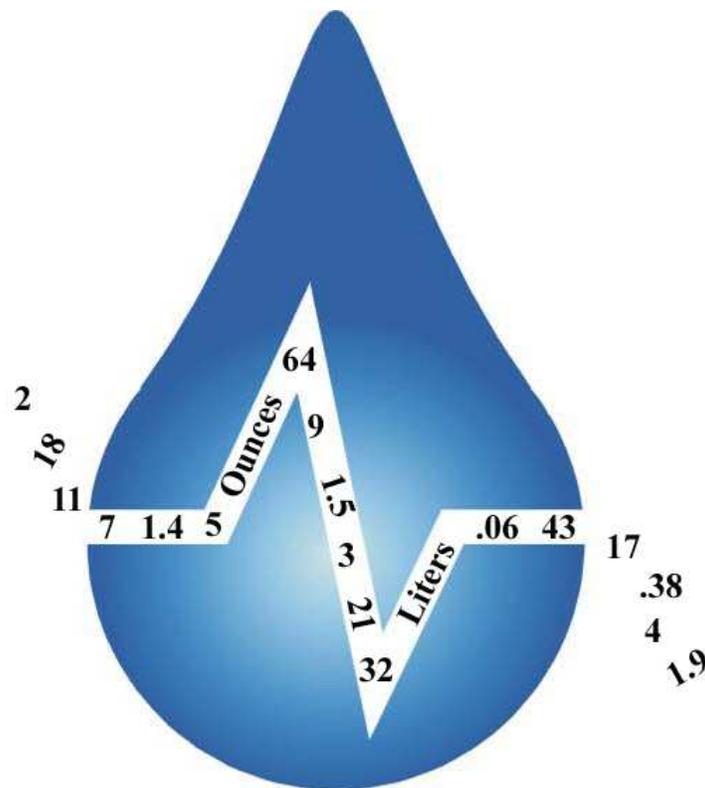


# Interactive Hydration: When Fluids Count



*Monitoring Hydration Goals,  
One Sip at a Time*

# Hydration Overview

*Either you subscribe to the belief that staying well hydrated is good for your health, or you don't. If you don't, this document may very well revolutionize your thinking.*

## What Are We Made Of?

At birth, approximately six pounds of an eight-pound baby consists of water. As we age, total body water decreases primarily due to muscle mass. For example, the newborn that is 74% water at birth will be 47% water by age 51.

### Water and the Body: a Job Description.

- Transports nutrients/oxygen to cells
- Ensures adequate blood volume
- Protects against heat exhaustion
- Acts as insulation in the cold
- Regulates body temperature
- Cushions joints
- Suppresses appetite
- Assists in metabolizing stored fat
- Relieves fluid retention problems
- Reduces sodium buildup in the body
- Helps to maintain proper muscle tone
- Rids the body of waste and toxins
- Relieves constipation
- Helps convert food into energy
- Maintains strength and endurance
- Protects organs

### Dehydration Is Easier To Prevent Than To Treat

Loss of Body Water	Progressive Effects of Dehydration
0-1%	Thirst
2-5%	Dry mouth, flushed skin, fatigue, headache, impaired physical performance
6%	Increased body temperature, rate of breathing and pulse rate; dizziness; weakness
8%	Dizziness, increased weakness, labored breathing with exercise
10%	Muscle spasms, swollen tongue, delirium
11%	Poor blood circulation, failing kidney function

*Table: The American Dietetic Association's Complete Food & Nutrition Guide (Minneapolis: Chronimed Publishing; 1996), p.168*

## When Is Hydration Important?

### According to the Mayo Foundation for Medical Education and Research:

- ❖ **Exercise.** If you exercise or engage in any activity that makes you sweat, you'll need to drink extra water to compensate for that fluid loss. Drink 2 cups of water two hours before a long endurance event, for example, a marathon or half-marathon. One to 2 cups of water is also adequate for shorter bouts of exercise. During the activity, replenish fluids at regular intervals, and continue drinking water or other fluids after you're finished. During intense exercise involving significant sweating, for example, during a marathon, sodium is lost in sweat, and you may need an energy bar to supplement your sodium and electrolyte loss.

- ❖ **Environment.** You need to drink additional water in hot or humid weather to help lower your body temperature and to replace what you lose through sweating. You may also need extra water in cold weather if you sweat while wearing insulated clothing. Heated, indoor air can cause your skin to lose moisture, increasing your daily fluid requirements. And altitudes greater than 2,500 meters (8,200 feet) also can affect how much water your body needs. Higher altitudes may trigger increased urination and more rapid breathing, which uses up more of your fluid reserves.
- ❖ **Illnesses or health conditions.** Some signs and symptoms of illnesses, such as fever, vomiting and diarrhea, cause your body to lose extra fluids. Increased water intake is nearly always advised in people with urinary tract stones. On the other hand, you may need to limit the amount of water you drink if you have certain conditions that impair excretion of water — such as heart failure and some types of kidney, liver, adrenal and thyroid diseases.
- ❖ **Pregnant or breast-feeding.** Women who are pregnant or breast-feeding need additional water to stay hydrated and to replenish the fluids lost, especially when nursing. The Institute of Medicine recommends that pregnant women drink 2.3 liters (nearly 10 cups) of fluids a day and women who breast-feed consume 3.1 liters (about 13 cups) of fluids a day.

### **According to the Beverage Institute for Health & Wellness:**

- ❖ **Children are more vulnerable to the effects of dehydration than adults:** Although children's hydration needs are not much different than adults, they have a lower capacity for sweating. As a result, they overheat faster than adults.
- ❖ **Elderly Considerations:** Dehydration can be a serious problem in older adults. It is associated with increased risk of falls, urinary tract infections, dental disease, bronchopulmonary disorders, kidney stones, cancer, constipation, and impaired cognitive function.  
  
Elderly adults tend to drink less than their bodies need for a number of reasons. With age, the body loses its ability to detect thirst. Some of the elderly also suffer from poor memory, immobility, or illness -- all of which can result in decreased fluid intake. In addition, certain medications can also block the thirst mechanism.
- ❖ **Building Muscles:** Our muscles are made up of 70% water, and optimal hydration is essential for muscle function and growth. Furthermore, protein synthesis is actually increased when the muscles are fully hydrated.
- ❖ **Improve Digestion:** Water is the major ingredient in blood plasma, which transports nutrients and gases to and between cells. Water is also a necessary part of many chemical reactions in the body. An example of the benefit of drinking water is that it carries off the waste products of energy metabolism from the cell and provides the fluid needed to get rid of the body's wastes.
- ❖ **Heat Regulation:** Our body constantly works to keep our heat levels stable. Perspiration cools us off and keeps us from boiling over which could lead to some serious side effects such as heat stroke.
- ❖ **Losing Weight:** Water acts as a natural appetite suppressant and is constantly working moving nutrients in and out of the body. That is, it transports the good stuff to your cells where it's needed and it helps to move the bad stuff out. You simply need to keep your body well hydrated in order for this transport system to work to its fullest.
- ❖ **Joint Lubrication:** The benefit of drinking water also helps out with the lubrication of your joints. Water is an ingredient in the makeup of the synovial fluid, which is the lubricating fluid between your joints.

## Hydration Behavior

### According to a survey of American adults conducted by Yankelovich Partners for the International Bottled Water Association:

- ❖ Nearly three-quarters (73 percent) of Americans know that health and nutrition experts recommend drinking eight or more eight-ounce servings of water daily. However, 51 percent admit to drinking less than this amount.
- ❖ Only 34 percent claim they drink eight or more servings per day. Twenty-eight percent drink three or fewer servings, and nearly 10 percent say they don't drink water at all.
- ❖ In addition, Americans claim to experience health problems on a frequent basis that are symptomatic of dehydration. These include frequent tiredness or grogginess when waking up or at mid-day (19 percent), dry or itchy skin (14 percent), headaches (11 percent), indigestion (9 percent), lapses in concentration (7 percent) and constipation (4 percent).

### Inconvenience Biggest Obstacle to Proper Hydration

- ❖ Americans give a variety of reasons for not drinking enough water, with lack of time or being too busy cited most often (21 percent). Other reasons include: don't like the taste (13 percent), prefer other beverages (12 percent), forgetting (10 percent), not feeling thirsty (8 percent), no bottled water available (4 percent), can't leave their desks for a hydration break (4 percent), worry about too many restroom breaks (2 percent).

### Highly Conscious About Health Benefits of Water

- ❖ Most Americans are aware of the importance of water consumption to their overall health. Overwhelming, Americans (91 percent) know that drinking enough water is important for pregnant and breast-feeding women, and that water is the best choice to replace fluids after exercising. In addition, 88 percent know people shouldn't wait until they're thirsty to drink water, and 77 percent are aware that caffeine and alcohol can cause the body to lose water.
- ❖ Bottled water users are significantly more health conscious and cite health as a reason for beverage consumption twice as often as others (15 percent vs. 7 percent).

### Knowledge Gaps Persist

- ❖ Americans are unclear about hydration as it relates to certain physiological conditions. Thirty-two percent of respondents do not know that giving a child water instead of juice or regular soda may prevent childhood obesity. Nearly half (49 percent) believe the body loses less water while asleep. Thirty-seven percent think people need fewer fluids when the weather is cold than when it is warm. And 39 percent do not realize that a headache may be a sign of dehydration.

## Why Interactive Hydration (IH)?

Understanding fluid behavior during daily activities better enable athletes, medical professionals and health/diet conscious individuals plan and monitor personal hydration needs.

**Available:** First and foremost, water must be available and accessible to be beneficial. One can live weeks without food, but only days without water.

**Quantifiable:** Fluids need to be more than just available and accessible. While much has been written about the importance of proper hydration, including how much one should drink, **individuals need tools to adhere to the expert’s recommendations.**

**Meaningful:** The key to meeting ones proper hydration needs is being able to see the **cumulative** rate of fluid intake at any given time as it relates to ones personal goals, and adjust as necessary. Hence, the future of hydration is interactive, an evolutionary leap that will change the way we think about drinking.

## Who Will Benefit from Interactive Hydration?

Proper hydration is critical to the health and well being of all people regardless of age, sex or level of fitness. However, most individuals find it difficult to simply remember to drink fluids on a regular basis, especially during exercise, let alone calculate and track their daily intake.

An interactive, affordable portable hydration tool will provide far-reaching benefits by monitoring the unique needs of its users. Serious athletes to everyday health conscious users could take measures to help prevent the ill-effects of both dehydration and over-hydration (hyponatremia).

A sample list includes:

Athletes	Coaches	Trainers
Nutritionists	Doctors	Exercise Physiologists
Pregnancy	Backpacking	Soccer
Running	Cycling	Mountain Biking
Special Forces	Military	Elderly
Health Club	Weight Loss	Day Spa
Spinning	Boating	Adventure Racing

## What The Experts Say

- ❖ The National Research Council (NRC) uses a sliding scale of 1 milliliter of water for every calorie burned. The NRC says the average man — who burns about 2,900 calories daily — needs 2,900 milliliters, or about 12 cups, of water each day. The average woman — who burns 2,200 calories daily — needs about 2,200 milliliters, or about 9 cups, of water each day. For your own calculations: One measuring cup (8 ounces) of water equals 236 milliliters of water.  
Mayo Clinic, Consumer Health Tips and Products, June 25,2002.
- ❖ The American College of Sports Medicine (ACSM) recommends drinking about 17 ounces of liquid 2 hours before exercise and drinking early and at regular intervals during exercise (5-8 oz every 15-20 minutes).  
“Exercise and Fluid Replacement,” ACSM, Vol.28, No.1, 1-1996.
- ❖ Mild to severe dehydration commonly occurs among athletes, even when fluid is readily available. Consequently, it is in the athlete’s best interest to adopt fluid-replacement practices that promote fluid intake in proportion to sweat loss.  
Int J Sport Nutr 1995 Jun;5 Suppl:S62-73.
- ❖ Vigorous exercise may delay the thirst mechanism, making it difficult to replace fluid loss without a plan for periodic consumption. Athletes should become accustomed to consuming fluid at regular intervals (with or without thirst) during training sessions so that they do not experience discomfort during competition.  
Position Stand, J Am Diet Assoc 1993 Jun;93(6):691-6.

- ❖ Increasing dehydration, due to inadequate fluid consumption, directly impairs stroke volume, cardiac output, and skin blood flow, which results in larger increases in body core temperature, heart rate, and ratings of the difficulty of exercise.  
Med Sci Sports Exerc 1992 Sep;24 (9 Suppl):S324-30.
- ❖ Hyponatremia (low blood sodium levels) as a result of over-hydration, has become more and more common in endurance athletes, and many governing bodies are changing their hydration recommendations accordingly. To prevent complications, endurance athletes are advised to be aware of the effect of dehydration as well as over-hydration and plan their fluid intake according to their individual needs.  
The Physician and SportsMedicine - Vol 31 - No. 7 - July 2003
- ❖ The average American is chronically dehydrated and consumes only 4.6 servings of water per day.  
Survey of 3003 Americans, Nutrition Information Center, New York Hospital-Cornell Medical Center (April 14, 1998).
- ❖ DRINK LOTS OF water and keep yourself on schedule” is an old health adage. Recent studies have demonstrated that drinking water is, indeed, associated with a substantial physiological response. Drinking 500 ml of water increased metabolic rate by 30%. The increase occurred within 10 min and reached a maximum after 30–40 min. The total thermogenic response was about 100 kJ (which equals about 96 kcal per day or a loss of 5.5 lbs per year).  
Journal of Clinical Endocrinology & Metabolism 88(12):6015–6019, 03’.
- ❖ Dehydration is one of the ten most common causes for hospitalization among Medicare patients. In 1991, 6.7% (731,695) of Medicare hospitalizations had dehydration listed as a principal diagnosis, costing Medicare more than \$446 million in hospital payments. Most importantly, the study revealed that about half of the people over age 65 who were hospitalized with illnesses accompanied by dehydration die within one year of admission.  
Am J Public Health 1994 Aug;84(8):1265-9.
- ❖ Nursing facility residents are particularly at risk for dehydration. As many as 75% of residents have average fluid intakes below 1,500 cc per day, while a minimum recommendation is between 1,500 to 2,000 cc of fluid a day. These residents may need more opportunities and reminders to drink.  
Practical Solutions to Preventing Dehydration, Illinois Council on Long Term Care, 1997 Feb, 7 (#198).
- ❖ New research indicates that fluid consumption in general and water consumption in particular can have an effect on the risk of urinary stone disease; cancers of the breast, colon, and urinary tract; childhood and adolescent obesity; mitral valve prolapse; salivary gland function; and overall health in the elderly. Dietitians should be encouraged to promote and monitor fluid and water intake among all of their clients through education and to help them design a fluid intake plan.  
J Am Diet Assoc 1999 Feb;99(2):200-6

## Case Study

A new hydration study presented June 1, 2001, at the 48th annual meeting of the American College of Sports Medicine (ACSM) in Baltimore shows many athletes may be running on empty.

New research on athletes' perceptions of sweat loss and fluid consumption shows how critical it is for active people to drink on a schedule to prevent dehydration.

The study, conducted by scientists at the Gatorade Sports Science Institute (GSSI) in Barrington, Ill., looked at how accurately athletes could estimate their sweat losses and fluid consumption during a 10-mile race. Eighteen seasoned runners participated in the study.

The results showed that the runners drastically underestimated how much sweat they lost and consequently drank too little to stay well hydrated. The runners underestimated their sweat losses by an average of 46 percent and their fluid intake by an average of 15 percent, resulting in the runners replacing only 30 percent of their fluids lost through sweat.

"These data show that even the most experienced runners are unable to accurately estimate their sweat losses and cannot subjectively judge how much fluid to drink to prevent dehydration," said Mary Horn, M.S., co-author of the study and exercise sensory scientist at GSSI. "If seasoned athletes such as these do such a poor job of judging their fluid needs, the potential for dehydration may be more severe for the average exerciser, especially during the hot summer months."

Horn emphasizes the importance of drinking on a schedule every 15 minutes before, during and after activity and that the study demonstrates how relying on thirst is not enough to keep dehydration at bay.

## Sites to Visit

<http://www.bottledwater.org/public/InfoForRepNatFactSheettest.htm>

<http://www.purewaterplanet.com/hydration.htm>

<http://www.mayoclinic.com/health/water/NU00283>

<http://www.purewaterplanet.com/hydration.htm>

## Top Reasons Why You Need to Hydrate

### **PREGNANCY AND HYDRATION**

Fluid consumption affects all aspects of pregnancy, including maintaining your energy. Good hydration also helps prevent dry skin, miscarriage, pre-term labor, constipation, hemorrhaging and electrolyte imbalances.

The hormones of pregnancy change the way the body stores and uses fluids, making you salvage water and store it. Kidney filtration is greatly increased in pregnancy, and fluid supplementation by the mother can reduce stress on the kidneys. In addition, pregnant women have an increased water loss through the lungs.

Preterm labor can be induced by dehydration and stopped, many times, by dehydration.

In order to satisfy the fluid requirements of pregnancy, nutritionists and medical professionals recommend pregnant women consume six to eight eight-ounce glasses of water every day, in addition to juices. Such intake will assure that the changes that encourage water retention will not result in dehydration.

### **REDUCES RISK OF KIDNEY STONES**

The body excretes excess salt and other chemicals in the urine. Plenty of fluid intake dilutes the salts and lessens the risk of excess salts forming crystals and eventually stones.

### **FLUSHES OUT WASTE PRODUCTS**

The body has to excrete various waste products. The kidneys can only concentrate these so much. Drinking lots of fluids increases urine production and thus helps flush the toxins away.

### **ENCOURAGES HEALTHY SKIN; MOISTENS EYES, MOUTH AND NOSE**

All these organs need lots of moisture to function properly. If the body is dehydrated it deprives these organs of the moisture they need.

### **HELPS CURB APPETITE AND DISCOURAGE SNACKING**

When the stomach fills to a certain point, the appetite response is suppressed. Filling the stomach with fluids can be a low calorie way to suppress appetite.

### **ENSURES ADEQUATE BLOOD VOLUME**

The blood is composed of 80 to 90% water. The body will pull water from the blood if it is very dehydrated. Low blood volume can lead to blood flow problems.