

When it comes to drinking water, there is some discrepancy in the advice of physicians, nutritionists, and mothers as to how much is enough. Yet they all agree on one thing — water is vital for health. You can survive for weeks, maybe even months, without food, but three days without water would be deadly. The average adult body contains 10 gallons of water. Even a two-gallon loss would be enough to cause the internal organs, including heart, liver, and brain, to dry out faster than a beached flounder.

To maintain these 10 gallons, which make up 70 percent of the body by weight, you will drink almost seven times your body weight in fresh water this year, writes Peter Lindner, MD, in his book *Fat, Water, Fluid Retention and You*. But what happens to all that liquid? Every day, under normal health and weather conditions, the body loses two-and-a-half quarts through skin diffusion (the skin is not watertight and water constantly escapes from the body), waste removal, perspiration, and respiration. For removal of fluid wastes, the body pumps its three-and-a-half quarts of blood through the kidneys, which act as filters. This process moves a quart of fluid through the kidneys every minute, and one-and-a-half quarts of body pollution are expelled as urine every day.

According to H. Emerson Thomas, M.D., of Boston's Medical Care Affiliates, when you're taking medication like sulfa drugs, which are often prescribed for bacterial infections, it is frequently necessary to increase your urine output by drinking six to eight glasses of water per day, since these drugs may concentrate in the urine and crystallize to form kidney stones. Thomas says that "a high volume of water keeps the urine diluted and clears the urinary tract." Other drugs, such as antibiotics prescribed for acne and urinary-tract infections, similarly tend to concentrate in the urine and kidneys, and their use may also require that more water be drunk to dilute the urine and to flush hazardous wastes out of the body.

During a fever, drinking water in order to increase the flushing and filtering process may be significant in lowering the body temperature. When the body combats a bacterial invasion, the by-products often include toxins called pyrogens that cause heat sensors in the brain to raise the body temperature. By internally rinsing the body with water, you replace essential fluids and filter



Down the hatch: promoting good health with tap water

Drink to your health

The benefits of water

by Randy Ross

blood through the kidneys at an increased rate. This helps to speed the removal of fever-causing pyrogens from the bloodstream, thus lowering the body temperature.

Dieting is another situation that puts stress on the body and requires extra water for waste removal. Since food supplies almost half of your daily water intake, cutting down on food means that you also receive less water. Most popular diets recommend six to eight glasses of water per day for other reasons, as well. First, many people feel hungry when they are actually thirsty; water, though it contains no calories, provides a feeling of satiety. Second, some popular diets include large amounts of

protein. Patricia Simmons, director of clinical services for Boston's Medical Nutrition Associates, says that "when the body metabolizes protein, large amounts of urea are produced, and this waste must be filtered out by the kidneys." Without adequate urine output, toxic wastes accumulate, and when they reach a certain level, the liver is called on for detoxification. To do its job, the liver must neglect its regular work, which includes the metabolizing of fats. This leads to increased obesity, since the fats are now stored rather than processed for energy.

People who eat fiber foods for relief of constipation should also pay attention to their fluid intake. According to Simmons, "Con-

stipation is often due to a lack of fluid, as moisture normally keeps the bowels soft." Fibrous food absorbs fluid in the digestive tract, thereby creating bulk; if you are dehydrated, your body often reabsorbs extra water from the large intestine, which aggravates the problem. Simmons says, "Some people feel bloated and have abdominal pain from fiber foods. An increase in fluid can often relieve the discomfort."

Even normal digestion requires plenty of water; saliva is 99.5 percent water and the digestive secretions of the small intestine, liver, and pancreas about 90 percent. Each day the body requires about four quarts of water just for digestion, according to Lindner. Under usual circumstances most of this water recirculates in the body, but in cases of severe diarrhea or vomiting, up to five quarts can be lost.

The amount of water you need to drink for temperature regulation varies, because sweat, unlike digestive juices, cannot be recirculated. In the case of a severe fever, you can lose up to 10 quarts of water each day. A fully padded football player practicing in August may lose as much as 13 quarts. This water, however, never leaves the body unsupervised. The skin contains three million sweat glands that are directed by the body's thermostat, the hypothalamus. When the hypothalamus switches on, blood is conducted to the skin, where moisture is filtered through the sweat glands directly from the blood plasma. This fluid then oozes onto the skin, providing a cooling sensation as it evaporates. The hypothalamus also regulates the feeling of thirst; it thus manages much of the body's water movement.

When your body loses more water than it gains, it enters a state of dehydration. If this process continues over a period of days, your blood volume drops to inadequate levels, resulting in a state of shock or advanced heat exhaustion. Heatstroke occurs when the volume suddenly drops so low that the blood can no longer supply both the skin and the internal organs. At that point, the body is forced to make a choice and the skin loses. Once the cooling process has been shut down, body temperature rises uncontrollably — sometimes to as high as 100 degrees Fahrenheit — and emergency treatment is necessary.

Very humid weather can cause heat illness. Humidity is conducive to overheating because when the air is already saturated

with moisture it cannot effectively absorb the evaporation of your sweat. So if you work out on a hot, humid day, sweat will be expelled without evaporating or cooling your body. Your body fluids will decrease as your body temperature increases.

Body fluids can be depleted by covering the skin with airtight plastic. The marketers of quick weight-loss gimmicks have long exploited this method, and this year the fashion-conscious (and eventually dehydrated) will be wearing rubberized pants and sauna suits. Rose Marie Knickles, director of exercise training for Gloria Stevens Figure Salons, emphasizes the dangers associated with this method of weight loss: "These suits trap heat next to the body and prevent sweat from evaporating, thereby making the heart work harder to supply blood to both muscles and skin." Excessive sweating causes the body to lose many pounds in the form of water and essential fluids. This dehydration can lead to heatstroke. So, to avoid heat illness, you should expose as much skin as possible to air, be aware of humidity, and drink fluids before, during, and after exercise.

After a heavy workout, caffeine and alcohol should be avoided. Both act as diuretics and dehydrate the body. Sugar drinks may also be harmful, as even small amounts of sugar slow gastric emptying. For fast fluid reabsorption, drinking cold water is the best measure. Chris Ryan, an environmental scientist in the water-supply division of the Environmental Protection Agency, recommends tap water. "People are as safe drinking tap water as they are drinking bottled spring water," he affirms. "Most buy spring water for the taste, but the things that carry taste and odor in tap water are generally harmless."

The few dangers associated with drinking water occur in kidney or heart patients, for whom excessive fluid intake taxes organs that are functioning poorly. But according to a study cited by Gabe Mirkin, MD, in *The Sports Medicine Book*, healthy adults can tolerate up to 80 glasses of water per day. "Even if you don't exercise," writes Mirkin, "your body requires at least six glasses of fluids a day. (Some of the fluid requirement can be met in the food you eat.) When you exercise you need far more fluid. Drink at least a glass of fluid with every meal and whenever you are thirsty." In fact, from all accounts, you can't go wrong chugging water through the day. □