

The New Dietary Guidelines for Water Intake: Revisiting Some Myths About Hydration

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Key Messages

- Contrary to popular belief, fluid requirements can be met through many sources, not just by drinking water.
- For average healthy women, the Adequate Intake for water is 2.7 litres daily; for men, it is 3.7 litres. This includes water from food and beverages.
- Beverages provide approximately 80 per cent of water consumed. The remaining 20 per cent comes from food.
- The majority of people can meet their daily fluid requirements from habitual beverage intake guided by thirst.

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Myths About Water Needs

Although most people understand the general importance of proper hydration (consuming fluids to prevent dehydration), confusion remains over the total amount of fluid required for good health. Ask almost anyone about the amount of water needed and they will likely say, "Drink at least eight glasses of water daily."

A literature review by Heinz Valtin in 2002 failed to find any scientific evidence to support this "requirement."¹ Valtin suggested this myth may have been created by an erroneous interpretation of this statement made in 1945 by the Food and Nutrition Board of the National Research Council: "A suitable allowance of water for adults is 2.5 litres daily in most instances. Most of this quantity is contained in prepared foods."¹ Valtin suggested the last sentence of this statement was ignored, and hence the recommendation misinterpreted.

In 2004, the Institute of Medicine (IOM) of the National Academies released *Dietary Reference Intakes: Water, Potassium, Sodium, Chloride and Sulfate*. This issue of *Nutrition File for Health Educators* highlights the new recommendations for fluid consumption and examines some of the common concerns and myths about proper hydration.

Thirst

Thirst is defined as the body's desire to drink; it results from a deficit of total body water.² Normally, adequate fluid intake is achieved through habitual drinking rather than through thirst-

motivated drinking.³ Habitual drinking is influenced by the social environment, while drinking because of thirst is driven by perceptual (thirst sensations and palatability of beverages) and physiological (changes in plasma osmolality or volume) triggers.⁴ When people are at rest, thirst is sufficient to trigger adequate fluid intake.² The IOM review concluded that average healthy individuals get adequate fluid from normal drinking behaviour – consumption of beverages at and between meals – and by letting their thirst guide them. Under certain circumstances, however, the thirst mechanism can be compromised or may not be sufficient to maintain adequate hydration.^{4,5}

Dietary Recommendations

Adults

Adequate Intakes (AI) for water are set to help prevent the metabolic and functional abnormalities seen in acute dehydration.⁴ These are for healthy, sedentary people in temperate (21 C) climates. Although associations between low fluid intake and chronic diseases such as kidney stone formation, gallstones and bladder cancer have been reported, the evidence is insufficient to establish a specific fluid intake that would actually reduce the risk of these chronic diseases. Additionally, because of the extreme variability in individual water needs, influenced by homeostatic responses, environmental conditions and activity level, neither an Estimated Average Requirement (EAR) nor a Recommended Dietary Allowance can be provided.

Water from beverages accounts for approximately 80 per cent of total fluid intake; foods provide the remaining 20 per cent. Beverages such as milk and juice contain almost 90 per cent water and therefore are important contributors to overall daily fluid intake. Many foods with high water content, such as fruit, vegetables, yogurt and soup, contribute significantly to our daily fluid intake. Table 1 shows the AI for water for adults.

Infants and Children

The IOM guideline for infants is based on human milk consumption. Data used to determine the AI for older babies take into account both human milk intake and water from complementary foods and beverages.⁴ For older children, the AI is based on median total water intake data from the US Third National Health and Nutrition Examination Survey (NHANES III). Table 2 shows the AI for water for children.

Special Considerations

Older Adults and the Elderly

Dehydration can occur more readily in the elderly. Age-related impairments in the body's ability to maintain fluid balance, including reduced kidney function and a deficit in the thirst

mechanism, can affect overall fluid intake. As total body water decreases with age, dehydration can occur more rapidly when the elderly are faced with fever or hot weather.^{5,6} Fluid requirements appear to be the same for older people as for younger adults. However, attention should be given to ensure adequate intake, especially for the very old and those living in institutions.^{4,5}

Active Adults and Athletes

The stimulus for drinking appears to be blunted during exercise. Consequently, athletes must train themselves to drink on a schedule whether they are thirsty or not.^{2,7,8}

To ensure proper hydration, athletes and others who are physically active, especially in hot climates, must rely on planned fluid intake before, during and after activity. Athletes need to determine how much fluid is right for them. Table 3 shows the general hydration guidelines for athletes.

Young Athletes

Children and adolescents are at greater risk for dehydration and overheating because they sweat less than adults but produce more heat during exercise. Children do not tolerate extreme changes in temperature as well as adults.^{11,12,13} Special consideration must be given to children's hydration needs, particularly when they are very physically active or when the weather is hot.

Children may not instinctively drink enough fluid to replace water lost during prolonged exercise. Plain water is likely adequate for most young athletes¹², however, flavoured water with sodium chloride and carbohydrate added (sports drinks) may result in increased voluntary fluid consumption.¹³ Sports drinks may be appropriate for young athletes participating in sporting events lasting longer than 60 minutes.^{11,12,13}

Some nutrition experts suggest that fruit juices diluted 1:1 with water be offered to children engaged in physical activities. Bar-O¹⁵ suggests that during activity children drink every 15–20 minutes until thirst is quenched, and then have an extra gulp for children 10 years or younger, or two gulps for older kids. This guideline accommodates differences in body size among children.

Overconsumption

A Tolerable Upper Level for water has not been set because healthy individuals are able to excrete excess water to maintain water balance.⁴ Water intoxication is rare. However, overhydration, with resulting hyponatremia and in some cases death, has been seen in military personnel, endurance athletes exercising in hot climates, and overzealous athletes who consume large quantities of fluid prior to an event.¹⁶ Athletes need to educate themselves on proper hydration strategies and should consult with health or sports professionals.

Debunking Hydration Myths

Caffeine

It has long been thought that the diuretic effect of beverages containing caffeine increases total body water losses. On the basis of available data, the IOM concluded that caffeinated beverages do contribute to daily total water intake.⁴ It is worth noting, however, that large doses of caffeine produce other undesirable effects, such as insomnia and irritability. Caffeine intake should be limited to 400-450 mg daily for adults.¹⁷

Alcohol

Alcoholic beverages have been considered diuretics and therefore non-contributors to total fluid intake. Limited data suggests that water losses due to alcohol ingestion are not appreciable over a 24-hour period and that beverages containing alcohol

Nutrition file

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can contribute to overall fluid intake.^{4,18} Guidelines for moderate alcohol intake are no more than one drink per day for women and two drinks per day for men.^{19,20}

Conclusion

The IOM's *Dietary Reference Intakes: Water, Potassium, Sodium, Chloride and Sulfate* provides a thorough review of current research on hydration and health. Some common myths about hydration and fluid intake have been clarified.

Contrary to popular belief, fluid requirements can be met through many sources, not just by drinking water. All values for water refer to intake from all dietary sources. Beverages such as milk and juice contain almost 90 per cent water and therefore are important contributors to overall daily fluid intake. Many foods with high water content contribute significantly to our daily fluid intake.

Special attention must be given to the fluid intakes of infants, children, the elderly and highly active individuals, particularly in hot climates. However, on a day-to-day basis, the majority of healthy people can meet their needs through habitual intake guided by thirst.

Table 1: Adequate Intakes for Adults⁴

	Adequate Intakes (Litres per Day) *includes water from food and beverages	Amount obtained from beverages (Litres per Day) *including water
Men aged 19 to 50 years	3.7	3.0 (approx. 13 cups)
Women aged 19 to 50 years	2.7	2.2 (approx. 9 cups)
Pregnant women, all ages	3.0	2.3 (approx. 10 cups)

Table 2: Adequate Intakes for Children⁴

Age of Children	Adequate Intakes (Litres per Day) *includes water from food and beverages	Amount obtained from beverages (Litres per Day) *including water
Infants up to 6 months	0.7 (assumed to be from human milk)	0.7 (assumed to be from human milk)
Babies 7 to 12 months	0.8	0.6 (approx. 3 cups)
Toddlers 1 to 3 years	1.3	0.9 (approx. 4 cups)
Children 4 to 8 years	1.7	1.2 (approx. 5 cups)
Boys 9 to 13 years	2.4	1.8 (approx. 8 cups)
Girls 9 to 13 years	2.1	1.6 (approx. 7 cups)
Boys 14 to 18 years	3.3	2.6 (approx. 11 cup)
Girls 14 to 18 years	2.3	1.8 (approx. 8 cups)

Table 3: General Hydration Guidelines for Athletes^{9, 10}

When	Fluid Required	Guidelines
2 to 3 hours prior to exercise	400 to 600 ml fluid	Choose water, milk, juice and/or sports drinks.
During exercise	150 to 350 ml fluid every 15 to 20 minutes	Plain water is sufficient for activities lasting less than 1 hour. Beverages containing 4 per cent to 8 per cent carbohydrates (sports drinks) are beneficial during activities lasting longer than 1 hour.
After exercise	450 to 675 ml fluid for every 0.5 kg body weight lost during exercise	Replace fluids and refuel muscles with carbohydrates containing foods and beverages such as milk or chocolate milk, fruit juice, fruit, fruit yogurt or soup.

Signs of Dehydration

Dehydration can occur when there is inadequate water intake or excessive water loss. It can significantly impair well-being and performance (especially for athletes), progress rapidly, and can lead to death. Symptoms include:^{2,5,7}

- thirst
- fatigue, weakness
- dry mouth
- headache, irritability, dizziness
- decreased mental alertness, delirium
- decreased visual perception and motor function

Urine volume and colour are often used as indicators of hydration status. The depth of colour in urine varies inversely with urinary volume, but diet, medication and vitamins can also affect this. Although urine colour is a very crude indicator of hydration status, many sports professionals suggest it is helpful in detecting dehydration.^{4,5,7}

FAQs on Hydration

Q: Are sports drinks the best choices for keeping hydrated?

A: Sports drinks were developed for serious athletes engaged in intense or prolonged physical activity. They need to replace fluids and have an immediate energy source during exercise. This is generally the case when activity lasts longer than 60-90 minutes. Sports drinks with four per cent to eight per cent carbohydrate are best. The flavouring and salt in these drinks may help you drink more, which in turn may help prevent dehydration.

For less strenuous activities, or those lasting less than 60 minutes, plain cool water is enough. After activity, you can replace fluids and nutrients with foods and drinks that contain water, carbohydrates and electrolytes, such as chocolate milk, fruit, fruit juice, fruit yogurt, cereal or soup.

Q: I've heard that I need to drink eight glasses of water a day or I will become dehydrated. I can't possibly drink that much water and manage to drink anything else. How much water do I really have to drink?

A: Ask people how much water they have to drink in a day and they will say eight glasses. The good news is that you don't have to drink eight glasses of water each day, but you do need a variety of fluids to keep hydrated and nourished.

The average woman needs about nine cups (2.2 litres) of fluids daily. The average man needs 13 cups (3 litres).

Consuming this much is easy to do once you get used to the idea that all fluids count. The majority of healthy people can meet their daily fluid needs by drinking when they are thirsty. As for what to drink, it is okay to think outside the bottle. Drink a variety of beverages but focus on nutritious fluids, such as milk and fruit juice, that will give you important nutrients as well as water. And yes, drinks with caffeine count but should be limited to no more than four cups a day.

When you are active, you need to drink more, if you are going to be exercising for a long time, you may not realize that you are thirsty, so drink before, during and after a long sporting event. Cool water is good when exercising for 60 minutes or less, but sports drinks are better during activities lasting longer than 60 minutes.

Keep an eye on your children. They become dehydrated more easily than adults. They sweat less but get hotter during activity or in hot weather and often forget to drink. Encourage them to drink cool water during their activities and once the activity is finished, offer drinks such as chocolate milk, juice or smoothies to help them rehydrate and refuel.

In Alberta, with the long dry winters and furnaces running, it is easy to become dehydrated. It is important to keep hydrated year round as fluid needs are the same.

Q: With my kids going back to school, they will be more active again. How can I ensure they are drinking enough?

A: During activity children may not drink enough on their own. Try these suggestions to make sure they get enough fluid:

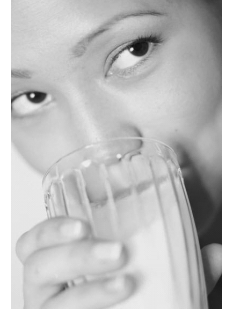
- Ask the coach or teacher to encourage children to drink about 125 ml (1/2 cup) of fluid every 15-20 minutes during activity.
- Cool drinks are better tolerated than very cold or warm beverages, so kids drink more.
- After children have finished their activity, offer white or flavoured milk which will give them the fluids, as well as the carbohydrates and protein, they need to recover.

Beat the Heat and Stay Hydrated

Keeping well hydrated is critical to overall health. Follow these simple tips to stay properly hydrated.

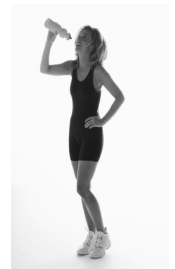
Tips for Keeping Your Tank Full

- Think outside the bottle! Milk and fruit juices are just as hydrating as water.
 - ▶ Milk is around 90 per cent water and contains 15 other essential nutrients such as calcium, vitamin D and protein.
 - ▶ Unsweetened orange juice is about 90 per cent water and contains vitamin C and folate.
 - ▶ That means a 250 ml glass of milk or orange juice gives you about 220 ml (approximately 7 oz.) of water!
- Foods can hydrate too! For example:
 - ▶ Fruits contain 80 to 90 per cent water, and vegetables can be up to 96 per cent water.
 - ▶ Yogurt is 80 to 88 per cent water.
 - ▶ Most meats and cheeses contain between 30 and 70 per cent water.
 - ▶ Even breads provide water—up to 30 per cent or more.
- There are so many great smoothie recipes. Get out your blender, grab some fruit, milk, yogurt and ice, and create your own!
- Freeze single-serving cartons of chocolate milk to use as ice blocks for your lunch bag. They'll keep your food cold and they also make for a cool lunch treat as they start to defrost. Kids will love these icy treats and benefit from chocolate milk's hydrating, nutrient-packed punch.



Hydration Tips for Active Families:

- Drink fluids before, during and after exercise.
- During exercise, adults should consume about 6 oz. (150 ml) of fluid every 15 to 20 minutes.
- Compared to adults, children do not tolerate heat as well because they sweat less and therefore get hotter during exercise. Children should be encouraged to drink about 4 oz. (125 ml) of cool fluids every 15 to 20 minutes during active periods.
- When on outings, particularly on hot days, be sure to pack (on ice) enough fluids and foods with a high water content, such as fruits, vegetables and yogurts.
- Be aware of your own body's needs. When someone is well hydrated, their urine tends to be light coloured. So take note!
- It is still important to keep hydrated in the winter. Try hot chocolate milk with a marshmallow for a warm treat on a cold day.



HYDRATION MYTH-BUSTERS QUIZ

Do you know the facts about hydration? Take Dairy Farmers of Canada's *Hydration Myth-Busters Quiz* to see if you know fact from fiction when it comes to wetting your whistle.

Complete the quiz by circling T (true) or M (myth)

- | | | |
|--|---|---|
| 1. Most of the time you can listen to your thirst to stay well hydrated. | T | M |
| 2. We should aim to drink eight glasses of water a day. | T | M |
| 3. Food supplies an average of 20 per cent of our daily water intake. | T | M |
| 4. Milk is around 90 per cent water. | T | M |
| 5. Specialty drinks are necessary to stay well hydrated when playing sports. | T | M |
| 6. Some meats contain up to 60 per cent water. | T | M |
| 7. Children are at an increased risk of dehydration. | T | M |

Answers:

1. **TRUE** – Research shows that thirst is generally a good indicator of the need for water in healthy individuals, with the exception of the elderly and during intense activity or when it is hot.

2. **MYTH** – Experts do not provide specific rules on the number of glasses of water that you need to drink per day because you can meet your water needs with a number of other sources. Other drinks such as milk and juice provide significant amounts of water. Additional fluids come from the foods we eat.

3. **TRUE** – About 80 per cent of our daily water intake comes from total beverages consumed, while the remaining 20 per cent comes from water in the foods we consume.

4. **TRUE** – Milk is a great choice for you and your family to stay hydrated all year long. Not only is milk around 90 per cent water, it also contains vitamins, minerals and protein, essential to keeping your body well fueled.

5. **MYTH** – Specialty sports drinks were originally developed for endurance athletes who need to replenish their fluids and maintain an immediate

energy source (glucose) during exercise. This is generally the case when physical activity lasts longer than 60 minutes. While sports drinks may be helpful to athletes during competition, there are better ways to replenish fluids, sodium and other nutrients after exercise - with juices, fruits, milk, yogurt, soups and other nutritious foods. Plain cool water is sufficient for moderate sports activities or workouts lasting one hour or less.

6. **TRUE** - Meats contain between 40 to 70 per cent water; cheeses generally consist of 30 to 50 per cent water; and fruits and vegetables contain 80 to 90 per cent water.

7. **TRUE** - Children, especially young children, sweat less than adults and produce more heat, or get hotter, during exercise. Children do not tolerate very high temperatures as well as adults do. It's important to remind children to drink during and after exercise, as they may not instinctively drink enough fluid to replace water losses. During activity, children should be encouraged to consume 125 ml (1/2 cup) of cool fluids every 15 to 20 minutes.