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# HYDRATION FOR CHILDREN

Children are at a greater risk of dehydration than adults as they have higher water requirements in relation to their body weight<sup>1</sup>. Whilst adults generally have good access to supplies of water, for children this is not always as easy. Children usually have to ask to be provided with water, often relying on their caregivers to provide drinks.

In addition, children don't always recognise the early stages of thirst which can make them particularly vulnerable to becoming dehydrated, especially when body fluid losses are greater for example, when children are playing sport or during warm weather.

This factsheet sets out to explain why water consumption is important in childhood. It also reviews the latest hydration guidelines, scientific evidence and provides some top tips to help children stay hydrated.



## HYDRATION GUIDELINES FOR CHILDREN

Water requirements are related to the rate at which food energy is metabolised by the body. Energy metabolism is higher per kilogram body weight in children than in adults, and is much higher in boys who are going through puberty<sup>2</sup>. Consequently, children need to drink more water in relation to their body size than adults do. It is for these very reasons that children need to keep topped up with fluids throughout the day.

While the amount of water a child needs depends on many different factors including their age, gender, the

weather and how much physical activity they do, it is advised that children aged 4-13 years old should aim to drink 5-8 200ml glasses of water per day, on top of the water provided by food sources. Whilst they can meet their body's water requirements from other drinks, water is one of the healthiest ways to hydrate as it has no calories or sugar. The European Food Safety Authority (EFSA)<sup>3</sup> has also developed a set of fluid requirements for children of different ages (Table 1).

**Table 1: European fluid requirements for children<sup>3</sup>:**

Gender	Age Group	Amount of fluid from drinks and food (litres/day) <sup>a</sup>	Amount of fluid from drinks only (litres/day) <sup>b</sup>
Boys and girls	4 to 8 years	1.6	1.1 – 1.3
Girls	9 to 13 years	1.9	1.3 -1.5
Boys	9 to 13 years	2.1	1.5- 1.7
Females	14 years+	2	1.4 – 1.6
Males	14 years+	2.5	1.75 - 2

Key:

a – It is estimated that 70-80% of the recommended fluid comes from drinks and 20-30% from food.

b – Estimated amounts of fluid from beverages only.

# CHILDREN'S CURRENT HYDRATION HABITS

When it comes to beverage habits, the Liq.in7 study provides a valuable insight into the fluid intakes of children and adolescents from cross-sectional surveys in 13 countries worldwide. UK data within the Liq.in7 study showed that mean daily water intakes for girls aged 4 to 9 years were 434 ml and boys 529 ml. For the older children aged 10 to 17 years mean daily water intakes were 457 ml for boys and 506 ml for girls<sup>4</sup>. This data indicates that both younger and older girls have higher intakes of water than boys. Boys were found to have a significantly higher regular soft beverage intakes compared with girls<sup>4</sup>.

The UK National Diet and Nutrition Survey looks at what children aged 1 -18 are drinking during mealtimes. The survey groups water, tea and coffee together and suggests that 25% of children are drinking fewer than one glass of water a day with meals<sup>5</sup>.

## Other interesting findings

When looking at patterns of water consumption in children in the UK, a 14-day survey of 164 children aged 11-12 years highlighted that only 6.1% drank water in the morning or sipped water during the day. Most (24.4%) drank water at lunchtime or in the afternoon (33.5%), indicating that children may not drink enough water in the morning<sup>6</sup>.

Furthermore, similar findings emerged from a French study which suggested that more than two-thirds of children aged 9-11 years were not drinking enough when they went to school in the morning based on urine assessments<sup>7</sup>. This could have broader implications for learning, as discussed later in this factsheet.

# WATER AND CHILDREN'S COGNITION

Research suggests that mild dehydration (1% body weight loss) can lead to reductions in concentration and cognitive function in children<sup>8,9</sup>.

Studies suggest that children's cognitive function can be improved when they are given access to water. In one study, 58 children aged 7 to 9 years were divided into two groups; one group followed their normal drinking habits, while the other was offered extra water (250ml). The results showed that children provided with extra water reported less thirst and performed better when visual attention tasks were carried out<sup>10</sup>. Similarly, another study found that having access to a drink (a 250 ml bottle of water) significantly improved children's visual attention and fine motor skills in school such as their handwriting and ability to copy text<sup>11</sup>.

A study in 2012<sup>12</sup> also found that children's auditory number span (the number of items that can be repeated in sequence) was significantly reduced if they became dehydrated. Authors also found that drinking extra water (1,000 ml over the course of the day) at

school helped to improve their short-term memory. However, it should be considered that while these examples of studies in children suggest that drinking extra water helps to improve cognitive function, further controlled clinical studies are also needed.



## DEVELOPING HEALTHY HABITS

It should also be considered that children often copy their parents' behaviour, so showing your enjoyment of water will help encourage them to drink it. Studies also suggest that a dislike of a food or drink can be overcome by repeating tastings five to 10 times over a two week period, but avoid using excessive coercion or pressure to get them to drink it<sup>13</sup>. Equally, giving children tangible rewards,

such as stickers, may help to encourage them to drink water or eat foods that they dislike. It is best to reward them with something that is not food or drink otherwise this may devalue the food or drink you are trying to get them to accept. Furthermore, giving children water at mealtimes may help children to eat vegetables, as it can help to dilute their strong (and sometimes bitter) taste<sup>14</sup>.

## A NOTE ON BEDWETTING

Bedwetting (also known as nocturnal enuresis) can be common in children and it can have considerable effects on their confidence and self-esteem<sup>15</sup>. Although more research is needed, it is possible that bedwetting could be linked to children not drinking enough fluids during the school day, and then overloading in the evening. This drinking pattern has been identified in a UK school survey<sup>6</sup>.

It has been suggested that there is no need to stop a child drinking before going to bed. Ideally, they should drink normally until an hour and a half before going to bed and then drink only mouthfuls instead of full glasses to relieve thirst<sup>16</sup>. There is no evidence to suggest that avoiding drinking for a long time before bedtime reduces the risk of bedwetting<sup>17</sup>. Children should always be reassured that bedwetting is a common problem and that they are not on their own.



## CONCLUSIONS



Water is one of the most natural, healthy beverages that children can drink. Encouraging children to quench their thirst with water will help them to develop a taste for it, which is

an important first step towards developing lifelong healthy preferences. Parents and caregivers play

an important role in helping children to develop healthy hydration habits and in making sure that they are offered sufficient amounts of water to maintain optimal hydration. Finally, there is a need to highlight the importance of adequate hydration among schoolchildren themselves<sup>17</sup>. In particular, children should be encouraged to make use of any water supplied at school, as this could potentially have an effect on their mental performance throughout the day.

# TOP TIPS FOR CHILDRENS' HYDRATION

- 1 Children aged 4-13 years old should aim to drink 5 to 8 200 ml glasses of water per day, on top of the water provided by food sources. Whilst they can meet their body's water requirements from other drinks, water is one of the healthiest ways to hydrate as it has no calories or sugar<sup>3</sup>.
- 2 Children should be encouraged to drink fluids in the morning and at regular intervals during the day.
- 3 Foods can also contribute to daily water intakes<sup>2</sup>. Those with a high water content; for example melon, soups, stews, fruit and vegetables, will make the greatest contribution.
- 4 Research suggests that adequate hydration helps children to maintain cognitive function and concentration at school.
- 5 Repeated tastings of water may help children to develop a taste for water.
- 6 Giving children water at mealtimes may help children to eat vegetables, as it can help to dilute their strong (and sometimes bitter) taste<sup>14</sup>.
- 7 Children taking part in sports or exposed to warm weather need to replenish the lost fluids by drinking more water.
- 8 Parents and other care givers can play a key role in helping to ensure that children are provided with drinks on a regular basis and by actively encouraging their consumption.
- 9 An easy way to monitor changes in hydration status is to check the colour of the urine. This should be pale straw colour – anything darker and more fluid is needed<sup>18</sup>.

## Please note

This information sheet has been based on scientific evidence available. The information contained in this fact sheet is not a substitute for medical advice or treatment, and we recommend consultation with your doctor or health care professional if you have any concerns your child's health.

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The Essential Guide to Hydration  
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Hydration and Dental Health  
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Urinary Tract Health  
Hydration and Kidney Health  
Hydration for Pregnancy  
and Motherhood



Natural Hydration Council

FURTHER INFORMATION

[www.naturalhydrationcouncil.org.uk](http://www.naturalhydrationcouncil.org.uk)

## References

1. D'Anci KE et al. (2006) Hydration and cognitive function in children. *Nutr Rev.* 2006 Oct;64(10 Pt 1):457-64.
2. Constant F (2013) Hydration de l'enfant. *Médecine & Nutrition.* 49 1 (2013) 44-49.
3. EFSA (2010) Scientific Opinion on Dietary Reference Values for water. *EFSA Journal* 8(3):1459.
4. Guelinckx L et al. (2015) Intake of water and beverages of children and adolescents in 13 countries. *Eur J Nutr* 54 Suppl (2): S69-79.
5. Bates B et al (2014) National Diet and Nutrition Survey Headline results from Years 1, 2 and 3 (combined) of the Rolling Programme (2008/2009 – 2011/12). Department of Health and the Food Standards Agency, London.
6. Derbyshire EJ (2012) An intervention to improve cognition and hydration in UK school children using bottled water. *Complete Nutrition* 12(2), 18-20.
7. Bonnet F et al. (2012) French children start their school day with a hydration deficit. *Ann Nutr Metab.* 60(4),257-63.
8. D'Anci KE et al. (2006) Hydration and cognitive function in children. *Nutrition Reviews* 64(10 Pt 1), 457-64.
9. Adan A (2012) Cognition performance and dehydration. *Journal of the American College of Nutrition* 31(2), 71-78.
10. Edmonds CJ & Burford D (2009) Should children drink more water?: The effects of drinking water on cognition in children. *Appetite* 52(3), 776-9.
11. Booth P et al. (2012) Water supplementation improves visual attention and fine motor skills in schoolchildren. *Education and Health* 30(3), 75-79.
12. Fadda R et al. (2012) Effects of drinking supplementary water at school on cognitive performance in children. *Appetite* 59(3), 730-7.
13. Cooke LJ et al. (2011) Facilitating or undermining? The effect of reward on food acceptance: a narrative review. *Appetite* 57(2), 493-7.
14. Cornwell TB & McAlister AR (2013) Contingent choice. Exploring the relationship between sweetened beverages and vegetable consumption. *Appetite* 62, 203-8.
15. Caldwell PH et al., (2005) Bedwetting and toileting problems in children. *Med J Aust* 182(4), 190-5.
16. ERIC (Education and Resources for Improving Childhood continence) (2013). Available at: <http://www.eric.org.uk/assets/Fluid%20intake.pdf> (accessed July 22nd 2016).
17. Gibson-Moore H (2013) Improving hydration in children: a sensible guide. *Nutrition Bulletin* 38, 236-42.
18. Armstrong, LE (2000). *Performing in Extreme Environments*. Champaign IL: Human Kinetics..

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