Children are at a greater risk of dehydration than adults as they have higher water requirements in relation to their body weight. 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 during times that can drive up their body fluid losses, for example when they 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.

### CHILDREN’S CURRENT HYDRATION HABITS

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\(^1\). 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.

In a recent 14-day water consumption survey of 164 children aged 11-12 years, 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\(^2\). A French study found that more than two-thirds of children aged 9-11 years were inadequately hydrated when they went to school in the morning by assessing their hydration status from urine samples. The amount of fluid ingested at breakfast time was found to be inadequate in terms of being able to maintain suitable hydration levels for the morning period\(^3\). This could have broader implications for learning, as discussed later in this factsheet.

When it comes to beverage habits, an updated reanalysis of the UK National Diet and Nutrition Survey in children aged 4-10 years found that the average daily fluid intake from water was 276 ml per day, with 620 ml per day coming from other beverages (milk supplied 216 ml per day)\(^4\). In children aged 11-18

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years, daily fluid intake from water was 453 ml per day, with an additional 680 ml per day coming from other beverages (of which milk supplied 150 ml)\textsuperscript{4}. Another survey has raised concerns that children aren’t drinking enough when compared with the European recommendations for adequate intake\textsuperscript{5} (Table 1). Approximately a third of 4 – 8 year olds drank less than the recommended value and over 50 % of 9 – 13 year olds weren’t drinking enough\textsuperscript{6}.

\section*{WATER AND CHILDREN’S COGNITION}

Research suggests that mild dehydration (1\% body weight loss) can lead to reductions in concentration and mental performance in children\textsuperscript{7,8}. Studies suggest that children’s mental performance 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\textsuperscript{9}. 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\textsuperscript{10}.

A study in 2012\textsuperscript{11} 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\textsuperscript{11}. 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.

\section*{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\textsuperscript{12}. 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\textsuperscript{2}.

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\textsuperscript{13}. There is no evidence to suggest that avoiding drinking for a long time before bedtime reduces the risk of bedwetting\textsuperscript{13}. Children should always be reassured that bedwetting is a common problem and that they are not on their own.
In the UK the Children’s Food Trust aims to encourage healthy hydration habits in children and recommends that schools should serve only plain, natural drinks such as water, milk and pure fruit/vegetable juices. The Trust’s voluntary code of practice for drinks aims to encourage the consumption of healthier drinks that are unsweetened and additive-free whenever possible\textsuperscript{14}. The Natural Hydration Council in collaboration with the British Nutrition Foundation has also developed a children’s hydration glass as a clear guide for parents and teachers. The glass advises that drinking water is a good choice throughout the day, as it hydrates without providing calories and risking harm to teeth\textsuperscript{15} (see page 4).

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, aim to drink 6-8 glasses of fluid a day (on top of the water provided by the food in their diet). Younger children need relatively smaller drinks (e.g. 150 ml serving) and older children need larger drinks (e.g. 250–300 ml serving)\textsuperscript{16}. The European Food Safety Authority (EFSA) has also developed a set of fluid requirements for children of different ages\textsuperscript{5} (Table 1).

Table 1: EFSA’s recommendations for water intake in children

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age group</th>
<th>Amount of fluid from drinks and food (litres/day)\textsuperscript{1}</th>
<th>Amount of fluid from drinks only (litres/day)\textsuperscript{2}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys and girls</td>
<td>4 to 8 years</td>
<td>1.6</td>
<td>1.1-1.3</td>
</tr>
<tr>
<td>Girls</td>
<td>9 to 13 years</td>
<td>1.9</td>
<td>1.3-1.5</td>
</tr>
<tr>
<td>Boys</td>
<td>9 to 13 years</td>
<td>2.1</td>
<td>1.5-1.7</td>
</tr>
</tbody>
</table>

Key: \textsuperscript{1}It is estimated that 70-80% of the recommended fluid comes from drinks and 20-30% from food. \textsuperscript{2}Estimated amounts of fluid from beverages only.

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\textsuperscript{17}. 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\textsuperscript{17}. Furthermore, giving children water at mealtimes may help children to eat vegetables, as it can help to dilute their strong (and sometimes bitter) taste\textsuperscript{18}.  

HYDRATION GUIDELINES FOR CHILDREN
Water is one of the most natural, healthy beverages that children can drink. Encouraging children to quench their thirst with water will help children 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 children 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\(^{19}\). 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.
Children should aim to hydrate healthily with plain, natural drinks that are unsweetened and free from additives. Children should be encouraged to drink fluids in the morning with breakfast, and at regular intervals during the day. Research suggests that adequately hydrated children may perform better in school. Children should aim to have 6-8 drinks per day which should ideally be water, milk or fruit/vegetable juices. Repeated tastings of water may help children to develop a taste for water. Giving children water at mealtimes may help children to eat vegetables, as it can help to dilute their strong (and sometimes bitter) taste. Children taking part in sports or exposed to warm weather need to replenish the lost fluids by drinking more water. 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.

**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.

**References**

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