

There seems to be little argument against the idea of increasing access for pupils to water during the school day, but there is still too little hard evidence, other than the countless anecdotal stories of how pupils have more energy, how they concentrate better and are much calmer in class.

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Water in schools

The increasing number of school initiatives, to make water more accessible, are raising issues about its image and whether drinking it is a middle-class fashion.

In children it is estimated that they turn over about 15% of their body weight as water each day so that an average 7-10 year old boy will need to replace about 3000 ml (girls 2600 ml) of water each day.

The Water for Health Alliance is a growing body of people that have an interest in finding out more about the effects of this essential ingredient for life and promoting it to all ages.

There are new initiatives emerging around access to water in hospitals and care homes but for the last few years, because of the links found, between dehydration and impaired mental performance, there has been a growing pressure in schools to make water more easily accessible for pupils to drink. Potentially, it is a really simple way that schools can increase the performance of their pupils in class, which many schools are interested in and willing to build it into their normal school policy and practice.

Dehydration

The human body is composed of between 50-60% water. One third of this is outside of the cells (blood, fluid between cells etc.) and two-thirds is within the cells themselves. Dehydration is said to occur at 1% or greater loss of body weight as a result of fluid loss. Dehydration of more than 3-5% loss of body weight decreases endurance and strength and is the primary cause of heat exhaustion. Thirst is triggered when the kidneys are unable to retrieve enough water to balance the sodium levels in the blood. Therefore, by the time you feel thirsty, you are already dehydrated.

How much water do children need?

This obviously depends on how much they are losing each day. About half of the water you lose occurs through the skin and lungs and this

increases in high temperature, high altitude, dry air and as a result of increased activity levels. In children it is estimated that they turn over about 15% of their body weight as water each day so that an average 7-10 year old boy will need to replace about 3000 ml (girls 2600 ml) of water each day. If they replace about a third through solid food, then a conservative estimate is about a further 1.5 litres per day, and more during hot weather or when exercising, is needed. During the time they are at school therefore they need to be drinking roughly 3-4 cups of water. In order to enhance mental performance they should be able to drink little and often.

Where do they get it?

Traditionally, the provision of water is from the fountains that we all remember from our own school days, from which you didn't want to drink unless you really had to. Schools have a duty to provide drinking water to children, free of charge, every day and school catering guidelines expect that they will provide drinking water at lunchtime.

The Enuresis Resource and Information Centre (ERIC)¹ published research in conjunction with the Royal College of Paediatrics and Child Health in 2000 that concluded:

- ▷ Drinking water provision in schools was variable and generally inadequate to meet the needs of students
- ▷ Few schools allowed free access to drinking water throughout the day
- ▷ The commonest location for water facilities was the toilet area
- ▷ About 10% of schools provided no drinking water at all

ERIC (www.eric.org.uk) has a specific interest in the issues around water consumption among children because for those children that do have problems of bedwetting (1 in 11 nine year olds in the UK), the immediate response of children and parents is to cut down the quantities of fluid intake to help avoid an incident.

ERIC maintains that there is actually a link between low fluid intake during the day and wetting incidents. If urine becomes too concentrated it can irritate the bladder and cause daytime wetting. They also state that if children don't drink sufficiently during the day they can reduce their bladder capacity. ERIC is campaigning hard for schools to make water more accessible to pupils and have launched their campaign 'Water is Cool in School' (www.wateriscoolinschool.org.uk). In addition to this they are working with school nurses to launch a campaign entitled 'Bog Standard' to raise the standard and provision of access to toilet facilities in schools.

Fit to Succeed

SHEU first became involved with the issue of access to water in schools as part of the 'Fit to Succeed' project in Exeter schools. The aims of this project were to increase levels of activity in pupils with the expectation that the more energy that pupils had, the better that they would be able to perform in class.

In trying to convince busy teachers that they might achieve better results by building in regular bouts of activity into the school day we also suggested that making sure that pupils were properly hydrated would also prove beneficial to pupils' ability to concentrate.

Some of the schools really took this idea forward and were sponsored by their local supermarkets with individual water bottles which pupils kept on their desk in class.

Feedback from the schools was extremely positive. Some said that they did have initial teething problems with the novelty of having water bottles in class but this was very short-lived and teachers and pupils alike were seeing the benefits.

Parents were also commenting upon the increased energy levels that their children had at the end of the day; 'Instead of coming home and flopping down in front

of the TV, children had more energy to do other things'.

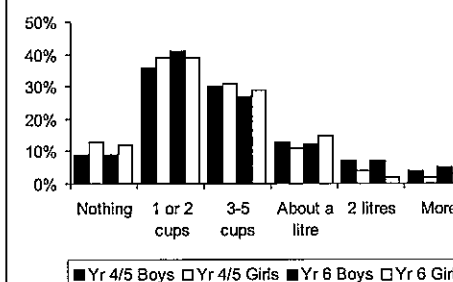
All this information was anecdotal and in an attempt to provide more reliable evidence we added questions to our monitoring questionnaire to see if we could collect some evidence for the benefits of water.

Our initial results were based on the Fit to Succeed activity questionnaire but we thought that the issues were important enough to have their own place in our main primary and secondary health-related behaviour questionnaires (HRBQ).

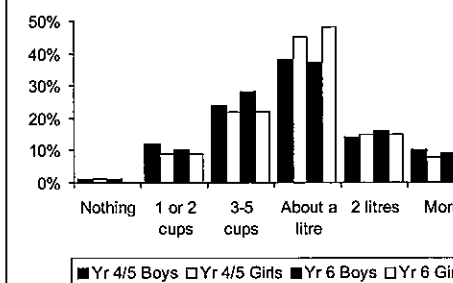
Water UK and the Water for Health Alliance asked us to insert some additional questions so for the surveys that we were involved with in the summer term 2003 we also asked local co-ordinators for permission to enclose a loose sheet containing additional 'water' questions. The initial data we collected were from over 2000 primary pupils from schools in the West Midlands.

The following are the results for some of these questions:

How much water did you drink yesterday?



How much water do you think that you need to be healthy?



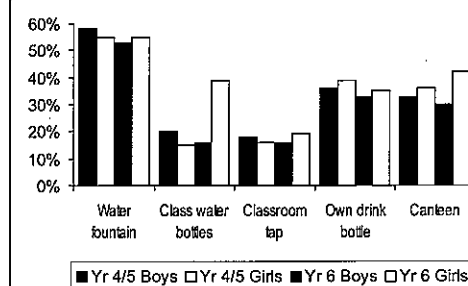
There is an interesting mismatch between these two questions. Pupils seem to be aware that they need to drink more water than they currently do.

When asked if they liked to drink water, up to 85% of the sample said 'Yes'. Most pupils could also easily get water at school with up to 96% of the sample saying 'Yes'. There was little difference between the boys and girls and between

the two year groups for both questions.

Of those that could easily get water at school the majority, around 55%, used the school water fountain, their 'own drinking bottle' and the school canteen.

If you get water easily at school, where do you get it from?



The sample were also asked to choose words, from a list of 12, that they associated with drinking water. The top three, chosen by over 50% were: 'Healthy', 'Fresh' and 'Clean'. Pupils were also asked how often they saw their parents or carers drink water. The majority, up to 45%, said 'more than once a day' and up to 27% said 'most days'.

Each year the Schools Health Education Unit surveys thousands of pupils from across the UK and for a number of years the Unit has asked primary and secondary pupils the question 'How much water did you drink yesterday?' Results from the latest sample show that the majority, up to 39% of primary pupils and up to 32% of secondary pupils, say '1 or 2 cups of water'. We now have a sample of over 5600 pupils including schools from the North West, the Midlands, the East and Wales.

Water consumption and other health behaviours

We have used the current 'water data' and looked at the correlation between water consumption and other general health behaviours. We took the figures from our new water questions and looked for connections in the primary and secondary databanks for the most recent surveys.

First, we looked for statistically significant correlations between the volume of water that the pupils reported drinking and other social and health-related attitudes and behaviours. From this list we then looked in more detail at the tables, to see whether we could make sense of the associations we saw.

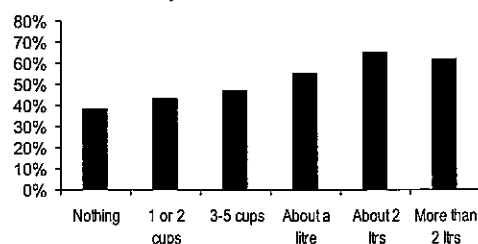
Healthy students drink water

The first trawl produced a lot of connections that we might expect: students who drink more water are more likely to be diet-conscious and to take more exercise. We can see this type of association in tables like the one below.

Water consumption and exercise - How many days last week did you exercise and have to breathe harder? (eg. Bold/italic numbers - 19 - highlight the trends)

Year 6	Nothing	1 or 2 cups	3-5 cups	About a litre	About 2 litres	More than 2 litres
B None	19	10	7	6	6	6
One	11	14	11	10	9	13
Two	21	25	21	22	19	13
Three +	49	52	60	62	66	68
G None	18	10	7	8	6	7
One	17	21	16	14	9	7
Two	25	31	27	24	23	26
Three +	40	37	50	54	63	59
Year 10	Nothing	1 or 2 cups	3-5 cups	About a litre	About 2 litres	More than 2 litres
B None	17	8	7	9	7	11
One	19	18	16	12	11	13
Two	25	31	30	24	18	13
Three +	38	43	47	55	65	62
G None	19	13	13	8	10	13
One	31	27	25	23	13	22
Two	26	36	30	34	27	34
Three +	23	24	32	35	50	31

Association between drinking water and exercising last week in Year 10 boys



In secondary schools we ask about their height and weight; students who drink more water are likely to be taller and to be lighter. In fact, across a whole range of health-related behaviours (hygiene, legal and illegal drug use, safety) drinking more water is associated with more health-promoting and less health-risky behaviour.

Good students drink water

The second group of results showed us connections between drinking water and pro-school attitudes: students who drink more water are more likely to be diligent about their school work and to have better attitudes to school attendance.

We can see this type of association in

the following table.

Did you spend any time doing homework after school yesterday?

Year 6	Nothing	1 or 2 cups	3-5 cups	About a litre	About 2 litres	More than 2 litres
B Any	29	38	42	42	34	23
G Any	39	47	48	48	38	41
Year 10	Nothing	1 or 2 cups	3-5 cups	About a litre	About 2 litres	More than 2 litres
B Any	49	60	65	66	69	52
G Any	49	6	65	66	69	52

The association seems to fall off for higher volumes of water, but the low participation in homework among those drinking no water is clear. In secondary schools, where we have more questions available, we can also see drinking more water associated with better rating of school lessons by students.

Is drinking water a middle-class fashion?

Elsewhere in the data we found lots of connections between drinking water and the sorts of attitudes and behaviour that might be termed 'middle-class'.

Students in primary and secondary schools who drank more water

were also more likely to have played a musical instrument last night, to have read a book for pleasure last night, to have played tennis, to have worn a hat to protect against the effects of the sun, and to be more worried about global concerns like wars and terrorism.

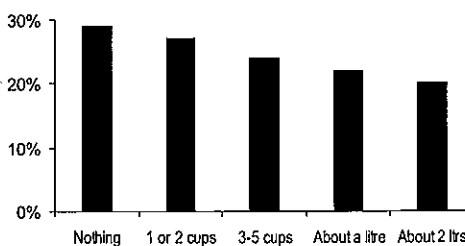
We don't have any very direct measures of social class in our survey, because some young people find their parents' occupational status too difficult or too embarrassing to describe to us. However, we have for a long while asked about newspapers available at home (see table below).

Association between drinking water and popular tabloids at home in Year 10

Year 10	Nothing	1 or 2 cups	3-5 cups	About a litre	About 2 litres	More than 2 litres
B Group I (Broadsheet)	13	17	20	23	18	23
Group II (Tabloid)	17	20	18	18	22	19
Group III (Popular tabloid)	34	28	24	27	25	19
[No papers given]	35	35	39	33	35	39
G Group I (Broadsheet)	12	17	21	20	26	9
Group II (Tabloid)	17	20	22	23	20	6
Group III (Popular tabloid)	29	27	24	22	20	4
[No papers given]	42	35	33	34	34	41

Not all homes have a national daily paper, but where they do, they can be reported, and we can see differences between the habits of pupils who have 'broadsheet' newspapers to read, which are more likely to be found in middle-class homes, and the habits of pupils who have 'red-top tabloid' newspapers to read, which are more likely to be found in working-class homes.

Association between drinking water and popular tabloids at home in Year 10 females



Water in Schools

As part of the government initiative around the Food in Schools Programme we have been involved in processing the baseline questionnaires for the Water in Schools pilot, which is being conducted by EdComs (www.edcoms.co.uk), and is taking place in 40 schools in the North West and East Midlands regions. The questionnaire will look to pick up changes in provision of, access to and consumption of water, and attitudes about its benefits. The following extracts are taken from the progress report ² that has so far involved 2044 pupils. The most popular drinks are 'Fizzy drinks' with up to 41% of choosing this option. A long way behind, as the second favourite drink, is 'fruit juice' (16% of all students) followed by Tea, coffee, hot chocolate (12% of all students). Water is the fourth favourite drink for 10% of all students.

The report also suggests that the image of water is one that needs addressing, since, when asked, many students in the EdComs sample commented that water was boring and not very exciting. The taste of water was a key issue amongst students and improvements in taste would be likely to encourage consumption. In schools where drinking water was only available from taps the water was thought to be unappealing and unpalatable. Students were asked (see table below) what would encourage them to drink more water, some of the responses included:

- ▷ If it tasted better
- ▷ If it was chilled
- ▷ If it was flavoured

Factors that would encourage students to drink more water N.B. multi-response question

	All	Primary	Secondary
The water was chilled	50%	39%	55%
My teacher let me get it whenever I wanted it	41%	27%	49%
It tasted better	40%	42%	39%
The water was in the classroom	33%	24%	38%
My friends drank it	8%	7%	8%
My mum or carer told me to	6%	7%	5%
My teacher told me to	5%	7%	4%
My dad or carer told me to	5%	5%	5%
None of the above (or missing data)	4%	5%	4%
Total Sample (Count)	2044	933	1111

In terms of the knowledge on the benefits of water (see table below), discussions revealed that there were some difference between boys and girls. Girls talked about the benefits in terms of water helping to cleanse skin and hair and act as a slimming aid.

used both inside and outside the county. The Welsh Assembly, in partnership with Welsh Water, is encouraging all schools in Wales to have water coolers in schools. These are all initiatives that have been little or no cost to schools; the question as to who is responsible for providing

Students' knowledge of the benefits of drinking water N.B. multi-response question

	All	Male	Female	Primary	Secondary
You need to drink more water when you're playing sport or exercise	81%	80%	81%	72%	85%
Drinking 3 or 4 cups of water every day at school makes you more healthy	59%	58%	60%	60%	59%
Drinking water helps your body digest food more easily	55%	52%	58%	50%	57%
Drinking water can help you think	53%	55%	52%	60%	50%
Drinking water is good for your skin	51%	41%	60%	39%	57%
Drinking water is good for your teeth	41%	42%	41%	45%	39%
Drinking squash is as good for your health as drinking water	17%	18%	17%	15%	19%
Total Sample (Count)	2044	979	1036	933	1111

We are looking forward to seeing the results of the pilot work being conducted by EdComs and their evaluation which will also investigate physical and attitudinal barriers to increased water consumption, and strategies for overcoming them.

Water Company initiatives

A number of water companies have been approached, or are taking the initiative to work with schools. Yorkshire Water have worked with pupils to design water bottles that they fill up from plumbed in systems that provide cool water in accessible places around school.

In Norfolk a school resource pack 'Water is Cool in Norfolk Schools' is being

better, more attractive access to water in schools is an interesting one.

Conclusion

We appear to have come a long way forward in a relatively short space of time. The Healthy Schools initiative is bring the water issue into an increasing number of schools and the messages are starting to have an impact on pupils and staff alike. There is still too little hard evidence, other than the countless anecdotal stories of how pupils have more energy, how they concentrate better and are much calmer in class. There seems to be little argument against the idea of increasing access for pupils to water during the school day, the issue is more about how can we make this possible in a safe and attractive way so that pupils top up their 'brain juice' without even thinking about it. If, as our data suggest, higher levels of water consumption is something of a middle class trait, schools have a key role to play in the extension of this to all pupils. A headteacher commented recently that even though the school has really tackled the water issue head on, it is still those pupils who need water the most that lose their bottles, or forget to drink.

References and useful websites:

1. ERIC. (2000). Drinking water in schools. *Nursing Times*. 96:5th October
 2. EdComs. (2003). *Dept. of Health Food in Schools: Pilot Water Provision Programme. Needs Assessment of Pilot Participating Schools: Draft Report.*
- Water UK (www.water.org.uk) report on the published scientific literature on the impacts of water on health
 Water for Health Alliance (www.waterforhealth.org.uk)
 Yorkshire Water initiative (www.yorkshirewater.com)
 Food in Schools programme www.wiredforhealth.gov.uk
 Welsh Assembly Health Promotion www.healthschool.org.uk
 Developing Patient Partnerships www.dpp.org.uk