

## **Water Consumption, Long-Term Exposure and Total Fluoride Intake**

### **Surely, drinking water doesn't coat the teeth for long...?**

The dental benefits of drinking water containing fluoride at 1ppm comes both from fluoride coating the tooth (a 'topical' effect) and from incorporation of fluoride into the tooth enamel whilst it is developing (a 'systemic' effect). The World Health Organisation (WHO) suggests that the topical effect is more important. Water fluoridation provides an ongoing topical effect by ensuring that there is fluoride present in saliva, plaque and fluids around the teeth.

A low level of fluoride in saliva, plaque and gingival fluids (fluid secreted by the gums where it meets the tooth) will help remineralise teeth during times when they are not being exposed to sugar. Saliva and gingival fluids are produced during sleep in order to keep the mouth and throat wet. Fluoride from these sources is thought to be stored in dental plaque, which particularly accumulates in areas prone to tooth decay.

### **But small children don't drink much tap water...?**

Children will consume water in numerous ways, including drinking water as well as water used to make up other drinks and to prepare food.

The evidence for the benefit of water fluoridation is based on actual comparisons of dental health outcomes in fluoridated and non-fluoridated areas and so do take account of population water consumption, despite the inevitable variation in consumption between individuals.

### **Isn't Fluoride toxic...?**

At high concentrations fluoride is toxic to health. The health warning on fluoridated toothpastes says not to swallow and to seek medical advice if ingested, because toothpaste contains fluoride in concentrations over 1000ppm, one thousand times the level in fluoridated water. Fluoride is toxic at these concentrations, hence the warning. However, the key point is that low levels of exposure from fluoride in water at 1ppm have not been shown to be harmful to health.

Simply because something is toxic under certain circumstances (e.g. high dose) does not make it toxic under all circumstances, and certain "toxic substances" are actually necessary for life. Iodine (which is in the same 'chemical family' as fluorine) is also toxic when ingested in large quantities. However if iodine were not added to table salt, the incidence of thyroid disease (goitre) would increase because this element is necessary for health. Oxygen in air is vital for life, but when administered at 100 per cent under pressure is also toxic, which is why divers do not use pure oxygen in their air tanks. Even pure water can be toxic if you drink too much of it (hyperhydration).

### **What about bottled water...?**

Bottled mineral water can contain up to 5ppm fluoride but has to be labelled if it contains more than 1.5ppm

### **What about long term exposure and total fluoride intake in individuals...?**

For the purposes of water quality, fluoride is treated the same as other dissolved substances found in water, and an upper level is set to protect public health. (See separate document on Water Quality and Fluoridation)

Please note, this document will be updated as and when we receive more feedback on this particular topic.

The WHO upper guideline value of 1.5ppm is intended to protect against potential harmful effects over a lifetime of exposure to fluoride from all sources. Water fluoridation schemes in the UK stipulate an even lower limit of 1ppm.

With this limit in place, there is no requirement for individuals to be assessed and monitored for total fluoride intake. There is only a requirement to monitor the health of populations served by water fluoridation schemes (Water Industry Act 1991) – see PHE 2014 Health Monitoring Report – and there is no evidence after more than 50 years in UK and more than 70 years in USA of any harm to health from fluoride below the WHO upper level of 1.5ppm.

### **How can individual dosage be controlled....?**

People do drink different amounts of water, depending on lifestyle and environment, and fluoride is consumed, absorbed and excreted at different rates depending on factors such as age. However, for a person to receive a high fluoride 'dose' from water containing 1ppm, would mean drinking an impossibly large amount, which therefore eliminates any risk.

The safe limits for fluoride in water are designed to take account of a lifetime's intake of fluoride from all sources.

However, if a water fluoridation scheme were to be introduced locally then dentists would be advised not to prescribe fluoride supplementation with drops or tablets (even though PHE no longer recommends these methods of supplementation).

### **Aren't there safer alternatives to water fluoridation....?**

There are no safety concerns as such with water fluoridation.

There are alternative ways of exposing teeth to fluoride, such as brushing with fluoride toothpaste, using fluoride tablets and using fluoride varnishes. The Oral Health Action Plan for Hull already contains measures similar to those in the NHS Scotland 'Childsmile' programme.

[Childsmile \(Scotland\)](#)

Hull's Oral Health Action Plan sets out the approach to improving oral health in Hull. It is a wide ranging approach that aims to:

- increase exposure to fluoride through a number of routes
- improve regular attendance rates of children and adults at dentists
- improve the quality of preventative practice within dental practices locally
- work with a wide range of partners and settings to promote good oral health in children and adults
- and promote healthy eating, in particular reducing the amount of sugar that is consumed.

The local approach includes all of the key elements of 'Childsmile' such as encouraging holistic approaches in nurseries/schools, providing parents and children with dental packs (feeder cups, toothbrushes and toothpaste), education and supervised tooth brushing in nurseries and schools. The additional consideration of water fluoridation is to try and increase the expected impact of these other measures and to close the gap in dental decay rates between Hull and other areas of the country.

PHE's 2014 guidance to Local Authorities on oral health improvement among children and young people recommends a blend of interventions, not an either/or toothpaste versus water fluoridation.

[Local authorities improving oral health: commissioning better oral health for children and young people - An evidence-informed toolkit for local authorities \(2014\)](#)

So, alternative approaches to water fluoridation are not being discounted, many approaches work together to reduce oral health inequalities at a population level, for the common good.

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