Fluoridation of the City of London's Drinking Water

FACT SHEET fact sheet

Why is fluoride added to drinking water?

Fluoride is added to drinking water to prevent cavities in children and adults. Approximately half of all children have had at least one cavity. Tooth decay is the single most common chronic childhood disease - 5 times more common than asthma, 4 times more common than early- childhood obesity, and 20 times more common than diabetes. In Canada, tooth decay accounts for one-third of all day surgeries performed on children between the ages of 1 and 5.

Preventing cavities in adults is also very important because more adults are keeping their teeth as they age and few programs exist to help adults who cannot afford dental care. Caries reductions of approximately 15-35% have been observed in adults and seniors who reside in communities with fluoridated water. Older adults are especially vulnerable to tooth decay. This is linked to a variety of factors, including gum recession and decreased saliva production associated with certain medications prescribed to treat chronic illness.

It has also been well established that the benefits of fluoridation are greatest for people who live in conditions of material deprivation. Community level factors such as housing, education, income and access to oral health care greatly influence health and contribute to inequity in oral health status. Water fluoridation promotes equality amongst all segments of the population, particularly the underprivileged and the hardest to reach poor for whom other preventive measures, such as regular dental visits, may be inaccessible.

If left untreated, cavities can lead to pain, infection of the mouth and occasionally in the body, and tooth loss. Tooth loss can result in difficulties eating and speaking and poor self-esteem. Treatment of cavities results in missed time from school and work, is costly, and sometimes needs to be done under general anesthetic.

How does fluoride work to prevent cavities?

Cavities are the result of acid in the mouth that removes minerals from the enamel on the surface of the teeth. Acid forms when bacteria in the mouth react with sugars in food or drinks. Fluoride works by stopping or even reversing the effect of acid on the enamel. Fluoride also makes the teeth stronger in order to resist the effects of the acid.

Fluoride's main effect occurs after the teeth have erupted into the mouth, as small amounts of fluoride in saliva bathe the tooth. Even with other sources of fluoride available, fluoridation of drinking water results in approximately an additional 15% of children having no cavities.

Is fluoride safe?

The levels of fluoride used in London's drinking water are safe. A small number of people will develop a cosmetic condition called dental fluorosis. At the levels of fluoride in London's drinking water, this can appear as a few white spots that are usually undetectable except by a dental professional.

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A study by Health Canada found very little fluorosis among Canadian Children – 4% of children had mild fluorosis and 12% had very mild fluorosis; no severe fluorosis was noted and hardly any moderate fluorosis was noted in the study. High levels of fluoride in water, such as those in other countries where fluoride occurs naturally in water, can cause moderate or severe dental fluorosis. In these cases, the spots can be brown and more noticeable. Fluorosis results from fluoride exposure when the teeth are forming, and is mostly a problem in the permanent front teeth which form at around 22 to 26 months of age.

Numerous reviews, including a 2010 review by Health Canada of over 430 studies, have not identified any other risks from the levels of fluoride added to London's drinking water. Specifically, the reviews did not identify any risk of fractures, thyroid problems or cancer and no effects on IQ. Like any substance, a very high level exposure can cause health risks such as increased risks of bone problems. These risks would only occur at much higher levels of fluoride exposure than London's drinking water.

Is water fluoridation still needed in the modern era?

In October 2018, Public Health Ontario (PHO), an organization that provides scientific evidence and expert guidance that shapes policies and practices to prevent illness and improve health, released its Evidence Review for Adverse Health Effects of Drinking Optimally Fluoridated Water. This review provides a summary of the evidence published since the 2010 Health Canada fluoride document regarding the adverse health effects of optimally controlled fluoridated water with a scope specific to optimally controlled fluoridated community drinking water.

PHO reported that studies conducted and the organizational reports published after the 2010 Health Canada fluoride document corroborate the Health Canada findings there is no evidence to support a link between exposure to fluoride in drinking water at or below 1.5 mg/L (Health Canada's maximum acceptable concentration) and any adverse health effects such as any types of cancer, developmental defects, neurobehavioral effects, or genotoxicity. The existing literature indicates that mild dental fluorosis (generally unnoticeable white specks on teeth) is the only adverse effect experienced from the consumption of optimally fluoridated water.

How much fluoride is added to London's drinking water?

Fluoride is added to London's drinking water to bring the levels to 0.7 mg / litre (mg/L) or parts per million (ppm). This is the level recommended by Health Canada to prevent tooth decay and minimize the risk of dental fluorosis. The level of fluoride in the drinking water is closely monitored by the City of London and the Middlesex-London Health Unit.

What else should be done to decrease the risk of dental fluorosis?

The risk of fluorosis increases when young children swallow fluoridated toothpaste. To decrease this risk, it is recommended that children less than 3 years of age not use fluoridated toothpaste, unless suggested by their dentist. For children 3 years of age and older, only a rice grain size amount of fluoridated toothpaste should be used and children should be encouraged not to swallow the toothpaste. Children 3 to 6 years of age should be helped by an adult with brushing their teeth. In fluoridated areas, children should not receive fluoride supplements such as pills or drops.

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Can London's water be used to mix infant formula from liquid concentrate or powder?

Yes, there is no problem mixing infant formula from concentrate or powder with London's water. The fluoride in formula comes mainly from the water and not the formula itself. Children drink formula when they are very young; this is followed by lower levels of fluoride intake as they switch to solid food. The main risk for fluorosis of the permanent front teeth is between 22 and 26 months of age, when children are no longer drinking formula.

Does fluoride in water affect the environment?

Fluoride concentrations in water is reduced by treatment in the sewage treatment plant and by mixing with water in the river into which waste water flows. At this very low concentration, there are no known effects on the environment.

What is the history of fluoride in London's drinking water?

The City of London receives its water from two sources – about 85% from Lake Huron and 15% from Lake Erie. The natural level of fluoride in both these water sources is approximately 0.1 mg/L. This level is too low to prevent tooth decay. As per Ontario's Fluoridation Act, a plebiscite was held in London in 1966 through which residents voted to have fluoride added to the water. Beginning in 1967, Lake Huron water has been fluoridated at the Arva Pumping Station before distribution within London. In 1996, the City of London connected to the Lake Erie system which adds fluoride at the Elgin Area Water Treatment Plant.

How is fluoride added to London's drinking water?

Hydrofluorosilicic acid (also called hexafluorosilicic acid, fluorosilicic acid or fluosilicic acid) is the product used to add fluoride to London's drinking water. The source of this product is an ore that is mined and processed in Florida which is rich in fluoride and phosphorus. The processing involves separating the fluoride from the phosphorus, with the fluoride being used to create hydrofluorosilicic acid and the phosphorus being used to create phosphoric acid, which is used as a food additive and as an ingredient in fertilizer.

Any substance that is added to drinking water is required to pass rigorous testing to ensure that it meets the high standards that are required for the water industry such as the National Sanitation Foundation and American National Standards Institute (NSF/ANSI) Standards. Hydrofluorosilicic acid dissolves completely when added to water. The NSF 60 standard for fluoridation products provides a toxicological assessment of the components of hydrofluorosilicic acid after they have dissolved in water. This ensures the product is safe at the levels used to fluoridate water.

What is the cost of fluoridating London's drinking water?

In 2017, the cost to purchase London's fluoride was $82,457. The amortized capital equipment costs and annual operating expenses brought the total cost of fluoridation to approximately $98,000 in 2017, or about 26¢ per Londoner. It is estimated that for every $1 invested in water fluoridation, $38 in dental treatment costs are avoided. People who do not have dental insurance can end up in the emergency room for treatment. If water fluoridation were discontinued, the Middlesex-London Health Unit estimates that London's children would have at least 40,000 additional cavities over the next ten years. Many of these children would end up seeking care in London's emergency rooms. This expensive service model would place an even greater strain on the healthcare system.

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How widespread is fluoridation of water?

The Ontario Ministry of the Environment, Conservation and Parks (MECP) estimates that 70% of Ontario residents receive water that is fluoridated, either naturally or by adding fluoride to the water. As of 2017, fluoridated drinking water was provided to approximately 39% of Canadians. In the United States, approximately 74% of the population receives optimally fluoridated water. Fluoridation of drinking water is less common in European countries, although some countries fluoridate their salt.

Which organizations support the fluoridation of water?

Many public health, medical and dental / oral health organizations support the fluoridation of drinking water including Health Canada, the Canadian Public Health Association, the Public Health Agency of Canada, the Canadian Dental Association, the Canadian Medical Association, the U.S. Centers for Disease Control and Prevention (CDC) and the World Health Organization. Fluoride has been recognized by the United States Center for Disease Control and Prevention as one of the ten great public health achievements of the twentieth century.

Where can I get additional information about fluoride and dental health?

Additional information is available on the Middlesex-London Health Unit web site at www.healthunit.com Click on Dental Health and follow the link to water fluoridation. You can also call the Middlesex-London Health Unit at 519-663-5317 ext. 2330.

To speak to a Public Health Inspector on the Environmental Health Team about drinking water or water quality, please call 519-663-5317 ext. 2300.

The City of London website also includes information on water fluoridation.

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