The IWK Health Centre
Faculty of Dentistry, Dalhousie University
Nova Scotia Dental Association

Fluoride Information Package
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We are writing to you jointly as health professionals to provide updated information on the oral health benefits of fluoride and fluoridating water.

Over the past few years, organized efforts targeted Nova Scotia communities aiming to cease the addition of fluoride to community water systems; in each of these cases, dentistry and other health care providers have successfully argued the benefits fluoride has in preventing dental decay. In the event this becomes an issue raised within the CBRM in the future, the undersigned believe decision makers should have the best possible information about the oral health benefits of fluoridated water.

Early childhood carries (ECC), is the most common chronic infectious disease in infants and toddlers. Recent studies show that like other areas of Canada there are high levels of this disease in Nova Scotia, particularly in non-fluoridated communities. It causes children a great deal of suffering and infection, yet is preventable with the assistance of community water fluoridation.

Attached is our Fluoride Information Package for your viewing. Also included is the Nova Scotia Department of Health and Wellness’ Position Statement on Water Fluoridation, as they firmly believe like we do, that fluoridated water is an important means of preventing dental decay – especially in children.

We would be pleased to answer any questions you might have or provide further information should the need arise.

Sincerely,

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What is Fluoride?

Fluoride is a mineral found in soil, water (both fresh and salt) and various foods. While not essential to life, fluoride is considered to be a mineral nutrient beneficial to human health in safe doses.

How do we get it?

Fluoride can be either ingested (systemic), applied at home by using dental products or by a dental or health care professional. Ingested sources include fluoridated water, food or dietary fluoridated supplements such as tablets, drops or lozenges. Professionally applied sources of fluoride (topical) include fluoride foams, gels and varnishes. Fluoride is also found in toothpaste and mouth rinses.

Dental Benefits of Fluoride

Whether systemic or topical, fluoride provides many dental benefits. Sources of fluoride that are ingested into the body contribute to tooth formation by being incorporated into the tooth’s surface. When ingested regularly during tooth development, fluorides are deposited throughout the entire tooth surface and provide a long lasting protection. Found in the saliva, fluorides prevent tooth decay and facilitate remineralization.

The maximum reduction in dental decay is achieved when fluoride is ingested during tooth formation and post formation locally, once the tooth erupts. The fluoridation of drinking water provides both topical and systemic exposure for optimal dental benefits.

What is Water Fluoridation?

Water fluoridation is the adjustment of the fluoride concentration in the public drinking water supply to the level recommended for optimal dental health. The optimal concentration of fluoride in drinking water to promote dental health in Canada is 0.7 milligrams per liter, and is set well below the maximum acceptable concentration which is 1.5 milligrams per liter. These optimal levels are achieved through the addition of fluoridation chemicals (most commonly hydrofluorosilic acid).
into the drinking water supply. These chemicals are the source of the mineral nutrient fluoride. Regardless of whether fluoride is present in water as a result of natural occurrences or added through carefully controlled conditions, the dental benefits are the same.

**Who is responsible?**

The quality of drinking water is a responsibility shared by all levels of government.

- The Federal government develops guidelines for drinking water and provides continued scientific and technical expertise to the provincial and territorial governments, through the Federal-Provincial-Territorial Committee on Drinking Water.

- The provinces and territories are responsible for the regulation of drinking water systems, setting quality standards and managing water sources, treatment plants and distribution systems.

- Health Canada works in collaboration with the provinces and territories to maintain and continually improve drinking water quality guidelines, which are reviewed and revised regularly to take into account new scientific knowledge. These are known as the Guidelines for Canadian Drinking Water Quality.

- Municipal government is responsible for the treatment and distribution of drinking water to the public.

**Water Fluoridation Risks**

While studies show water fluoridation is effective in reducing dental decay by 20-40%, even with the widespread availability of fluoride from other sources such as toothpaste and mouth rinses, side effects due to overexposure can occur:

- Dental fluorosis is characterized by white spots or “mottling” on the tooth surface. Dental fluorosis is caused when higher than optimal amounts of fluoride are ingested in childhood, while the permanent teeth are developing, up to about age six. Most dental fluorosis is mild and barely visible and does not pose a threat to the child’s overall health.
The occurrence of moderate dental fluorosis in Canada is low, and there is an overall decline in dental fluorosis in Canada.

- Skeletal fluorosis is a bone disease caused by the excessive accumulation of fluoride in the bones. Mild skeletal fluorosis would likely occur at about 10mg/day after about 10 or more years of exposure. The optimal concentration of 0.7mg/L is unlikely to contribute to skeletal fluorosis.

Like many natural substances, fluoride can be harmful in excessive amounts. However, the weight of evidence does not support a link between exposure to optimal levels of fluoridated water and the following adverse health conditions:

- Cancer
- Heart Disease
- Kidney Disease
- Immunotoxicity
- Genotoxicity
- Neurotoxicity
- Reproductive or Developmental Effects (including Down’s Syndrome or Intelligence Quotient Deficit)

**Is Water Fluoridation a Valuable Public Health Measure?**

According to the Centers for Disease Control and Prevention, the fluoridation of public water supply has been deemed one of the ten great public health achievements of the 20th century. Community water fluoridation is a valuable public health measure when considering the following:

- Optimally fluoridated water is accessible to the entire community regardless of socioeconomic status, education attainment or other social variables.
- Individuals do not need to change their behavior to obtain the benefits of fluoridation.
- Frequent exposure to small amounts of fluoride over time makes fluoridation effective through the life span in helping prevent dental decay.
Community water fluoridation is more cost effective than other forms of fluoride treatments or applications. The addition of fluoride into drinking water as a preventative measure in regards to tooth decay is comparable to the use of vitamin D in milk products to promote calcium uptake for healthy bone development.

**Alternative Ways of Preventing Tooth Decay**

The local decision to implement community water fluoridation is made by governments and health professionals who have a responsibility to make educated decisions that best balance the outcomes of a community’s health with an individual’s choices. That said; parents worried about the overexposure of their children to fluoride in an effort to prevent dental fluorosis in the permanent dentition should follow the following guidelines:

- For children from birth to 3 years of age, who are at risk of developing tooth decay, the child’s teeth should be brushed by an adult using a minimal amount (a portion the size of a grain of rice) of fluoridated toothpaste.

- For children from birth to age 3, who are not considered at risk for developing dental decay, the teeth should be brushed by an adult using a toothbrush moistened only with water.

- For children from 3 to 6 years of age, only a small amount (a portion the size of a green Pea) of fluoridated toothpaste should be used. Children in this age group should be assisted by an adult.

- In cases where fluoridated toothpaste is recommended it should be used twice daily to brush teeth.

- It is important to consult with a trained health professional (i.e. Dentist) by one year of age in order to determine the child’s risk of developing tooth decay.

- A child may be at risk of early childhood tooth decay if one or more of the following conditions exist:

  1. The child lives in an area with a non-fluoridated water supply and low (< 0.3 ppm) natural fluoride levels. (Contact the municipal government...
to determine if drinking water is fluoridated).

2. The child has a visible defect, notch, cavity or white chalky area on a baby tooth in the front of the mouth.

3. The child regularly consumes sugar (even natural sugars) between meals. This includes use of a bottle or sippy cup filled with any liquid other than water and consumption of sweetened medications.

4. The child has special health care needs that limit his or her cooperative abilities, thus making it difficult for the parent to brush the child’s teeth.

5. The child’s teeth are brushed less often than once a day.

6. The child was born prematurely with a very low birth weight of less than 1500 grams [3 pounds].

7. The parent or caregiver has tooth decay.

8. The child has visible plaque, such as white or yellow deposits on the teeth.

- Fluoride mouth rinses are an effective preventive measure for at risk individuals and should be used according to the specific needs of the individual. Fluoride mouth rinsing is not recommended for children under 6 years of age.

- The professional topical applications of fluoride gels, foams, and varnishes are recommended in the prevention of dental caries for individuals at risk.

- Fluoride supplements, in the form of chewable tablets, lozenges or drops, are not recommended for the majority of Canadians. However, health professionals may wish to prescribe fluoride supplements to high risk patients in non-fluoridated communities where individuals are not able to obtain fluoride in any other form (e.g. toothpaste) and after they have completed a thorough analysis of the patient’s fluoride intake.

**Water Fluoridation in Alberta**

While community water fluoridation is considered beneficial by an overwhelming majority of the health and scientific communities, with a vast body of scientific literature endorsing water fluoridation as a safe means of reducing the incidence of dental decay, opposition continues. In 2011
Calgary councilors voted on removing fluoride from the city’s water, much to the chagrin of Alberta Health Services and a number of local dentists and physicians. As a result, a recent study done on grade 2 children from Calgary and Edmonton, in 2013-2014, found a statistically significant increase in tooth decay when compared to the same population in 2004-05, when drinking water was fluoridated. The increase in decay was significantly greater in Calgary. The Canadian Dental Association recently published an article about the study including “the study at a glance” shown below.

**The study at a glance**


**The question:** Does removing fluoride from municipal water have a short-term impact on dental caries of children’s tooth surfaces?

**Study population:** Children in Calgary and Edmonton who were in grade 2 in 2004-05 (before fluoride was taken out of municipal water in Calgary) and in 2013-14 (after fluoride was removed in Calgary). Over 5,000 children were included in the study.

**What was measured:** Decayed, extracted (due to caries), and filled primary tooth surfaces (defs) and decayed, missing (due to caries), and filled permanent tooth surfaces (DMFS). Data were analyzed for all tooth surfaces and smooth surfaces only.

For all tooth surfaces among permanent teeth, decay decreased (i.e., there was an improvement in oral health) in both Calgary and Edmonton, although the decrease was statistically significant only in Calgary.

**Results:** For primary teeth, in both Calgary and Edmonton there was a statistically significant increase in tooth decay in 2013-14 (after fluoride cessation) compared to 2004-05 (before Calgary removed fluoride from its drinking water). But the increase was significantly greater in Calgary. For example, in fluoride was removed from city water—whereas in Edmonton, the...
average Calgary, the number of defs rose, on average, by 3.8 between 2004-05 and 2013-14—the time during which increased by 2.1.

However, when focusing on smooth surfaces among those affected (those with DMFS > 0), there was a non-significant trend towards an increase in decay in Calgary (after fluoride cessation) that was not apparent in Edmonton.

**What it means:** The authors conclude that for primary teeth, the study results show that removing fluoride from municipal water supplies in Calgary increased tooth decay over the short term (i.e., 2.5 to 3 years after fluoride cessation). Trends for permanent teeth hint at an early indication of an adverse effect, but it will be very important to continue monitoring these trends.

**References:**


