

# **1 Comment on Draft Report: Fluoride in Drinking Water, by the Federal-Provincial-Territorial Committee on Drinking Water, Health Canada**

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I wish to comment on Health Canada's Fluoride in Drinking Water Document. The document contains some opinion contrary to scientific evidence, underestimates fluoride exposure in the population and omits relevant science. Various areas of the report contain statements that are contradictory to other statements made in the report. It is also fraught with generalization and summarization that the balance of evidence ensures that the practice of water fluoridation is safe and effective however it does not consider vulnerable segments of the population.

These are just a few of my observations. Quotations from various sections of the report are in red. My comments are following in black.

## **Section 5.6 Total daily intake**

**"According to the findings and recommendations from the Expert Panel Meeting on fluoride recently held in Canada, there appears to have a general decline in the overall intake of fluoride in recent years for the Canadian population (Health Canada, 2008)."**

According to various documents in both Canada and USA fluoride intake has increased in the past few decades.

"In 1997, the EPA estimated that Americans were ingesting nearly five times more fluoride than in 1971- from food and drinks alone." Source: Smith G. 2001, Why Fluoride Is An Environmental Issue, Earth Island Institute

3 mg of fluoride per day seems to be an estimated "average" dose according to the following resources:

1. "The average daily intake of fluoride is estimated to be 2.7 mg if you have fluoridated water." US PHS: ATSDR 1993
2. "intake from foods and beverages (in areas with water fluoridated at 1 ppm) of 3.5 to 5.5 mg/day." Canadian NRC 1977 Environmental Fluoride
3. "3.0 mg/day for 40-64 year old males" US NRC 2006 p 31-33

## Section 10.1 Dental Fluorosis

“As well, many infant formula preparations contain high levels of fluoride. Many of these are supplied in concentrated formulations and, when reconstituted with fluoridated water, can lead to an increased risk of dental fluorosis.”

The report acknowledges herewith that infants can be exposed to high levels of fluoride, contrary to the statement made in Section 5.6 that there has been a general decline in overall intake of fluoride. Prior to the introduction of water fluoridation in the 1940's infant formula did not contain high levels of fluoride. INFANTS ARE A VULNERABLE PART OF THE POPULATION AND THEIR DIETS SHOULD BE PRISTINE TO ENSURE PROPER DEVELOPMENT. Numerous medical experts, agencies and organizations have expressed concern over fluoride intake at this stage of life.

“In Canada, actual intakes are larger than recommended intakes for formula-fed infants and those living in fluoridated communities. Efforts are required to reduce intakes among the most vulnerable age group, children aged 7 months to 4 years.”

Ontario Ministry of Health & Long Term Care, 1999 Review of Water Fluoridation

[Vvyvan Howard, Fetal and Infant Toxicologist](#) states his concerns with fluoridated water for infants.

Since the publication of the 2006 NRC report the American Dental Association and the US Centers for Disease Control have recommended fluoride free water for mixing with infant formula. Where is the comparable recommendation and notification for the Canadian public? Why is Health Canada not using the precautionary principle for infant safety in Canada?

“In the 1940s, about 10 percent of the Canadian population displayed very mild and mild dental fluorosis when the concentration of fluoride found naturally in drinking water was about 1 mg/L. Over the last 55 years, in areas where fluoride is added to the drinking water to bring the total level of fluoride to approximately 1 mg/L (optimally fluoridated areas), there have been increases in the total prevalence of dental fluorosis. Also, in non-fluoridated areas, there is clear evidence that the total prevalence of dental fluorosis has increased over the last 40 years (Clark, 2006).”

If there is clear evidence that non-fluoridated areas are presenting problems with dental fluorosis then it is evident that the food supply has an abundance of fluoride due to the use of fluoridated water in the processing of foods and beverages. This leads to increased fluoride intake in the general population even in communities who have chosen not to artificially fluoridate their water supply. Since dental fluorosis is a result of fluoride intake it is unreasonable to claim in this section of the report that dental

fluorosis has increased over the last 40 years while in Section 5.6 it states that overall intake of fluoride has decreased. These comments are inconsistent and contradictory.

“It appears that in most areas of eastern Canada, including Ontario, the prevalence of all levels of dental fluorosis is quite low (between 3% and 28% affected); in western Canada, in contrast, the prevalence appears to be higher.”

This statement is not accurate and not reflective of the fact that 2 provinces in Eastern Canada (Quebec and Newfoundland) have little or no fluoridation. In Ontario many communities which are fluoridated have much higher levels of fluorosis prevalence. The most recent Halton Health and Social Services Report, Water Fluoridation in Halton Region MO-37-08 (chart page 5) reveals that 48% of Oakville 9 and 13 year old children have dental fluorosis (Halton dental surveys 2005-2007).

“Furthermore, the results of all the research on dental fluorosis suggest that it is perhaps more appropriate to focus on the prevalence of either moderate and severe scores or mild to severe scores of dental fluorosis, as these scores are more representative of conditions that may demonstrate an aesthetic concern.”

This statement is strictly opinion. How can Health Canada dictate to parents of children with fluorosis that only moderate and severe levels of fluorosis should be considered aesthetic? If it can be seen then it can be an aesthetic concern. Fluorosis at any level is a malformation of the tooth enamel from fluoride overexposure.

“After fluoridation was ended in Comox, Courtenay, and Campbell River, British Columbia, fluorosis prevalence decreased significantly; notably, the decrease was attributed to changes in the use of fluoride toothpastes and supplements in addition to the loss of community water fluoridation (Clark, 2006).”

This statement offers some unreasonable opinion. Since it is quite obvious from dental surveys across the country that fluorosis is more prevalent in fluoridated communities, it is unreasonable to assume that a decrease in fluorosis prevalence in a fluoridation ended community was attributed to the fact that the populace also reduced the use of supplements and fluoride toothpaste simultaneously. In fact, the discontinuance of water fluoridation probably factored higher in the decreased fluorosis rates as some citizens in the community may have increased the use of supplements and fluoride toothpaste in place of water fluoridation.

## 10.2 Effectiveness of Water Fluoridation

According to the York review (McDonagh et al., 2000), the best available evidence suggests that fluoridation of drinking water supplies does reduce caries prevalence, as measured both by the proportion of children who are caries free and by the mean change in dmft/DMFT score. The degree to which caries are reduced, however, is not clear from the data available. The range of the mean difference in the proportion of caries-free children is - 5.0% to 64%, with a median of 14.6% (interquartile range 5.05-22.1%). The range of mean change in dmft/DMFT score was 0.5-4.4 (median 2.25) teeth. It is estimated that a median of six people need to receive fluoridated water for one extra person to be caries-free. The best available evidence from studies following withdrawal of water fluoridation indicates that caries prevalence increases, approaching the level of the low-fluoride group. Furthermore, there appears to be some evidence that water fluoridation reduces the inequalities in dental health across social classes in 5- and 12-year-olds, using the dmft/DMFT measure. However, the small number of studies, differences between them, and their low quality rating suggest caution in interpreting these results (McDonagh et al., 2000).

The York Review is a systematic review on water fluoridation published in 2000 which specifically looked at the effects on dental caries, social inequalities, and harmful effects. Concerned about the continuing misinterpretations of the evidence, the reviewers released a 2003 follow-up titled **“What the ‘York Review’ on the fluoridation of drinking water really found.”**

**What the reviewers had to say was this:** “We were unable to discover any reliable good-quality evidence in the fluoridation literature world-wide.” “The evidence about reducing inequalities in dental health was of poor quality, contradictory and unreliable.” “Since the report was published in October 2000 there has been no other scientifically defensible review that would alter the finds of the York review.

I have also attached an open letter from the Chair of the York Review (Professor Trevor Sheldon) to include other points which indicate that this review is not worthy as a supporting document to be included in an evaluation of the effectiveness or safety of water fluoridation.

## 11.1 Classification and Assessment

“In 2007, Health Canada convened a panel of experts to provide recommendations on the path forward based on currently available science. The panel recommended that the tolerable daily intake (TDI) of fluoride should be based mainly on estimated total fluoride intake from fluids and foods recorded in the 1940s - when children were exposed to no other major sources of fluoride (Health Canada, 2008). This was deemed appropriate because exposure to fluoride in the 1940s was accompanied by a low incidence (~10%) of mild and very mild dental fluorosis (Clark, 2006). The 1940s estimates are used for calculating the TDI to prevent moderate dental fluorosis (according to Dean's index), for a 1- to 4-year-old child:

fluoride intake of 1.6 mg/L from drinking water, the level at which there was no moderate dental fluorosis in the 1940s, according to Dean's data;

the best food intake value to represent the situation in the 1940s; and

the assumption that the intake of fluoride from soil and air is about the same today as it was in the 1940s.”

It is unreasonable to assume the fluoride intake is the same today as it was in the 1940's. More communities are fluoridated therefore more processed foods and beverages are fluoridated. In the last several decades the wide spread use of fluoride pesticides and increased industrial activities impact air, soil and water.

## 12.0 Rationale

“However, very mild and mild dental fluorosis are not considered to be adverse effects, either from a health or from a cosmetic perspective.”

Again the opinion stated here is not shared by all members of the scientific community or the general population. Chemicals that have the capacity to alter hard tissue in the body often can damage soft tissue as well. Since no long term studies exist on the specific correlation between individuals with dental fluorosis and other health effects it is difficult to support a statement that dental fluorosis is not an adverse effect.

### 9.1.4 Cancer Epidemiology

This section omits an important study from Japan.

Tohyama E. Relationship between fluoride concentration in drinking water and mortality rate from uterine cancer in Okinawa prefecture, Japan. J Epidemiol 1996; 6(4):184-91. “The relationship between fluoride concentration (0.02 mg/L - 0.37 mg/L) in drinking water and uterine cancer mortality rate, before and after termination of fluoridation, was studied in 20 municipalities of Okinawa. Significant positive correlation was found between fluoride concentration in drinking water and uterine cancer mortality ( $r=0.626$ ,  $p<0.005$ ). Even after adjusting for the potential confounding variables, such as tap water diffusion rate, primary industry population ratio, income gap, stillbirth rate, divorce rate, this association was considerably significant. Furthermore, the time trends in the uterine cancer mortality rate appear to be related to changes in water fluoridation practices. (Tohyama et al, 1996).” This quotation is extracted from the Toxicology of Fluoride review by Robert Tardif, presented to Health Canada March 2006.

This Toxicology of Fluoride review by Tardif was supplied to City of Hamilton by Health Canada during fluoridation discussions in July 2008 as a supporting document. **Why**

**has Dr. Tardif (as a member of the expert panel) not included these comments from his previous review in the Cancer Epidemiology section of this document?**

Susceptible Populations:

The 2006 NRC Report Review of Fluoride in Drinking Water identifies and considers various segments of the population that are more sensitive to fluoride exposure including, but not limited to, individuals with thyroid problems, diabetes, impaired renal function and gastrointestinal problems. Health Canada does not seem to adequately address these susceptible populations and therefore the policy of water fluoridation is not equal to all. For this reason and other reasons I have stated I recommend that artificial water fluoridation be discontinued.

General Comments:

Since 1% of artificially fluoridated drinking water is actually consumed and 99% washed in the environment I have many source water concerns in regard to this wasteful practice. Following please read my document included with this submission and linked references prepared for the Hamilton/Halton Source Water Protection Committee in Ontario.

## **Artificial Water Fluoridation - A Source Water Concern**

Prepared for the Hamilton/Halton Source Water Protection Committee

### **Environmental Concerns:**

1) Hydrofluorosilicic Acid (HFSA) is the chemical most commonly used for municipal water fluoridation. Phosphate fertilizer production causes smoke-stack emissions containing fluoride (silicofluoride) and other trace co-contaminants such as arsenic, lead and mercury. All are considered harmful environmental pollutants. By law these pollutants must be washed from smoke stack emissions, and the resultant water-based HFSA is marketed to municipalities as a cheap way to 'fluoridate' drinking water. To date, little or no toxicological research exists which adequately demonstrates HFSA is safe to drink every day, over a lifetime, at any concentration.

2) Halton uses approximately 1000 lbs per day. When Hamilton's new fluoridation equipment is operational Hamilton will use a similar amount per day. The Canadian Environmental Protection Agency classifies HFSA's inorganic silicofluoride as "persistent", "bioaccumulative", "toxic" and "anthropogenic" (made/released by humans). Environment Canada classifies HFSA as a "hazardous substance". The US Environmental Protection Agency classifies HFSA as "class

one hazardous waste". It is illegal to dump HFSA anywhere in our environment, so how are we justifying dumping it into our public's drinking water supply?

3) The background levels of fluoride in the Great Lakes exceed the Canadian Water Quality Guideline (CWQG) of 0.12 ppm. Please see accompanying document Environment Canada - Canadian Water Quality Guidelines for the Protection of Aquatic Life - Inorganic Fluorides and also Environment Canada - [Guidelines at a Glance Fact Sheet on Inorganic Fluorides](#). Fluoride concentration in sewage effluent is much higher in some areas. See point #9 (below).

4) On May 20, 2009 Great Lakes United passed a [resolution concerning water fluoridation](#) to work toward reversing existing government policies supporting artificial drinking water fluoridation.

5) Increasing levels of fluoride in the environment has been a concern for several decades. The [1977 Canadian National Research Council Environmental Fluoride](#) report expressed concern after a thorough review of studies. Fluoride is toxic to aquatic life. British Columbia's salmon industry could be threatened if fluoridation was expanded in that province. At the present time BC has only about 3% of communities fluoridated. Nearby Oregon has discontinued fluoridation in several communities. [Environmental lawyer Brent Foster](#) states his concerns.

6) Less than **1%** of treated drinking water is consumed for drinking water, therefore 99% of the HFSA is wasted and returned to the environment and source water. These stats are confirmed in Hamilton Board of Health report referred to in point #9.

7) Ongoing research indicates that the use of HFSA in treated water leaches lead from infrastructure and fittings in homes so that lead levels at the tap and the sewage outflow are higher than lead levels in treated water leaving the water treatment plant.

Research by Master and Coplan 1999 and Westendorf 1975 provide evidence that fluoride in drinking water increases blood levels and interferes with acetylcholine esterase.

Masters RD, Coplan M. 1999 Water treatment with silicofluorides and lead toxicity. International Journal of Environmental Science 56: 435-449.

Recent analysis in Thunder Bay, Ontario (see below) shows that all 3 chemical compounds used in artificial water fluoridation increase the lead content in drinking water when lead pipes (and fittings containing lead) are used.

Fluoridation Impacts on Water Chemistry P3-4, Report No. 2009.123, Thunder Bay, Ontario, Board of Health Report, July 20, 2009

“The drinking water produced from the Bare Point Water Treatment Plant is taken from Lake Superior and then treated. Water quality testing results of this source water have continually shown that the lake Superior water is of high quality, is soft, and of low alkalinity. Testing has also demonstrated that the water is very low in dissolved major ions and metals. These characteristics mean that the water is of excellent quality and as a result has little buffering capacity - the ability to resist changes in the water chemistry.

The effects on the water chemistry of three fluoridating agents, hydrofluorosilicic acid, sodium silicofluoride and sodium fluoride, were all tested on Bare Point drinking water in a laboratory controlled setting. The impact on the water chemistry with fluoride addition was tested to determine whether the addition of fluoride would have the potential to increase the number occurrences of elevated lead levels in the community.

The results of this preliminary study show that all fluoridating agents, when added to the drinking water at a concentration of 0.7ppm (the optimal fluoride concentration rate as recommended by an expert panel convened by Health Canada in 2007), increased lead leaching from the lead pipe.”

8) Fluoride and lead are both persistent bio-accumulative elements. The amount consumed together with the life span of individuals results in the total accumulative effect. The ideal goal for these contaminants would be zero. Provincial allowable levels should only be viewed as maximum safe limits with a “less is better” goal in mind.

9) Some Ontario municipal reports are now stating concerns about fluoride levels in source water and waste water. The City of **Hamilton's** [Water Fluoridation Report BOH08024](#) presented to the Board of Health July 9<sup>th</sup>, 2008 states source water and waste water concerns (page 7):

#### **“Environmental Pollution**

The Woodward WTP produces approximately 350 million liters of water per day and adds HFS to reach a level about 0.7 mg/L of fluoride. Less than 0.1% (in an email from the General Manager of Public Works, City of Hamilton it was confirmed that this figure is incorrect and should read 1% not 0.1%) of this water is consumed for drinking water and given that the primary target of water fluoridation are children, the water fluoridation therefore potentially serves only less than 0.5% of the total water produced. Most of the water provided to the community returns back in the form of sewage. The wastewater has high concentration of fluoride compared with potable water because of the fluoride added due to toothpaste use and some industrial discharges. A sample of the wastewater was tested for fluoride and the concentration was approximately 1.2 mg/L. Very little fluoride is removed in the wastewater treatment process and effluent had fluoride concentration of 1.05 mg/L.

There are many studies about the impacts of fluoride in aquatic environment and generally there is a consensus that fluoride concentration of about 0.6-0.7 mg/L has detrimental impact on aquatic life. If water fluoridation is stopped, it may be possible that the wastewater fluoride concentration would drop by 0.5-0.6 mg/L, which will be beneficial to aquatic environment.



The Canadian Council for Ministers of the Environment (CCME) is currently in the process of finalizing a Canada-wide Strategy for the Management of Municipal Wastewater. The draft strategy was posted for public consultation and comments. The draft strategy proposed a compliance requirement of end of the pipe toxicity testing for the wastewater treatment plants. It is anticipated that this requirement will be included in the Certificate of Approval for the Woodward WWTP upgrades. **The fluorides in wastewater can't be removed in the treatment processes and as such the toxicity associated with it will be a significant challenge, if source controls are not implemented. Failure to achieve toxicity targets will require substantial future investments in the wastewater treatment systems."**

**Toronto's** recent report on biosolids included some concern about sewage sludge fluoride levels. The [Biosolids Master Plan Update](#) states that as a requirement of the US EPA ongoing review of the Targeted National Sewage Sludge Survey (TNSSS) data on levels of fluoride along with other pollutants are being collected because of their **widespread use and emerging concern**. (Appendix G, Section 2.7)

Land application of pellets produced from biosolids or sewage sludge can add further fluoride to surface water and possibly ground water therefore increasing the source water areas that are affected in addition to the Great Lakes. Adding more fluoride to soil in agricultural areas in turn further contaminates our food supply.

### **Health Concerns:**

As Source Water Committees are generally focused on an environmental frame of reference it is not typical that health concerns are generally reviewed. However, human health partially depends on potable source water. The following points are presented to provide evidence that increasing exposure to fluorides is becoming a health concern.

- 1) The 2006 NRC report Fluoride in Drinking Water reveals evidence of health effects from overexposure to fluoride which can include neurotoxic, endocrine, bone, immune system and gastrointestinal problems. In the Fall of 2008 The Canadian Association of Physicians for the Environment (CAPE) established a [policy statement in opposition to water fluoridation](#). Please also view the [Professionals Statement to End Fluoridation](#) signed by over 2600 medical, scientific and environmental professionals.
- 2) Dental Fluorosis is a biomarker of systemic overdose of fluoride. It ranges from very mild presenting as white flecks in tooth enamel to a severe state where the tooth enamel is brown and chipping off. The City of Hamilton does not have the resources to produce formal dental reports to indicate the level or prevalence of this malformation in children's teeth. Halton produces formal dental reports approximately every two years. The most recent Halton Health and Social Services Report, [Water Fluoridation in Halton Region MO-37-08](#) (chart page 5) reveals that 48% of Oakville 9 and 13 year old children have dental fluorosis (Halton dental surveys 2005-2007). This percentage is almost 5 times higher than the expected rate of 10% of dental fluorosis which was anticipated in the population when the practice of water fluoridation began in the 1940's.

3) Total intake of dietary and environmental fluoride is a concern as there are numerous fluoride sources from processed food and beverages, dental products/treatments, consumer products, emitting industries, [fluoride and fluorinated pesticides](#), and use of sulfuryl fluoride as a fumigant (residue remains on many foods such as almonds, cashews which are not washed prior to consumption.)

4) On May 29<sup>th</sup> of this year (announced October 15<sup>th</sup>), the California State Proposition 65 [Carcinogen Identification Committee](#) provided the EPA Office of Environmental Health Hazard Assessment advice on the relative priority of 38 chemicals for possible Hazard Identification. The committee also recommended 9 of these 38 chemicals be placed in a 'high' priority group, including fluoride and its salts (including silicofluoride). [US EPA scientists](#) have previously stated cancer as one of their concerns with water fluoridation.

5) There is evidence that our food supply is becoming contaminated with fluoride. This is especially a concern for infants because of their decreased ability to excrete toxins. A recent study published in the Journal of the American Dental Association, October 2009 found that all infant formulas, whether ready to use or concentrated, contain fluoride [Table 1](#) JADA, Vol. 140 a.1231. [Health Canada's Fluoride in Drinking Water](#) document also states infant formula contains high levels of fluoride. Section 10.1 Dental Fluorosis

“As well, many infant formula preparations contain high levels of fluoride. Many of these are supplied in concentrated formulations and, when reconstituted with fluoridated water, can lead to an increased risk of dental fluorosis.”

**Should Source Water Protection Committees be concerned with this ever increasing exposure to fluorides and subsequent environmental and health harm?**

**Do we trade water sustainability for a firmly held but unscientific belief that adding toxic waste endlessly into the downstream environment is justified because it may minimally reduce cavities?**

Information compiled by Cindy Mayor, Citizens for a Safe Environment

If you have received this document in printed form and would like an electronic copy to access hyperlinked references, please email [cindymayor@hotmail.com](mailto:cindymayor@hotmail.com)