



Health Status Report

Oral Health Status and Water Fluoride Levels in Perth County

PURPOSE

The purpose of this report is to:

- Identify fluoride levels in drinking water across Perth County
- Identify the effect of naturally occurring fluoride concentrations in drinking water on the oral health status of Grade 2 students in Perth County, using school water data as an estimate of total exposure to fluoride.
- Identify and explain current local public health trends related to fluoride and oral health.

ROLE OF PUBLIC HEALTH

In Perth County, there are no drinking water systems where fluoride is added. There is, however, naturally occurring fluoride in many parts of Perth County. PDHU monitors the level of naturally occurring fluoride in several drinking water systems in our region. PDHU ensures municipalities and school boards inform their populations of fluoride concentrations above 1.5 mg/L.

SUMMARY OF RESULTS

- Schools with higher fluoride concentrations in their drinking water had less severe dental disease among their students.
- The average percentage of cavity-free Grade 2 students was higher in schools that had higher fluoride concentrations in the drinking water.
- The average severity of cavities was lower in schools that had higher fluoride concentrations in the drinking water.

BACKGROUND

Fluoride can be found in the environment and represents about 0.06 to 0.09% of the earth's crust. In groundwater, water fluoride concentration depends on the rocks and fluoride bearing minerals.

A 2010 review entitled "Fluoride in Drinking Water," which was conducted by Health Canada, concluded:

"The weight of evidence from all currently available studies does not support a link between exposure to fluoride in drinking water at 1.5 mg/L and any adverse health effects."¹

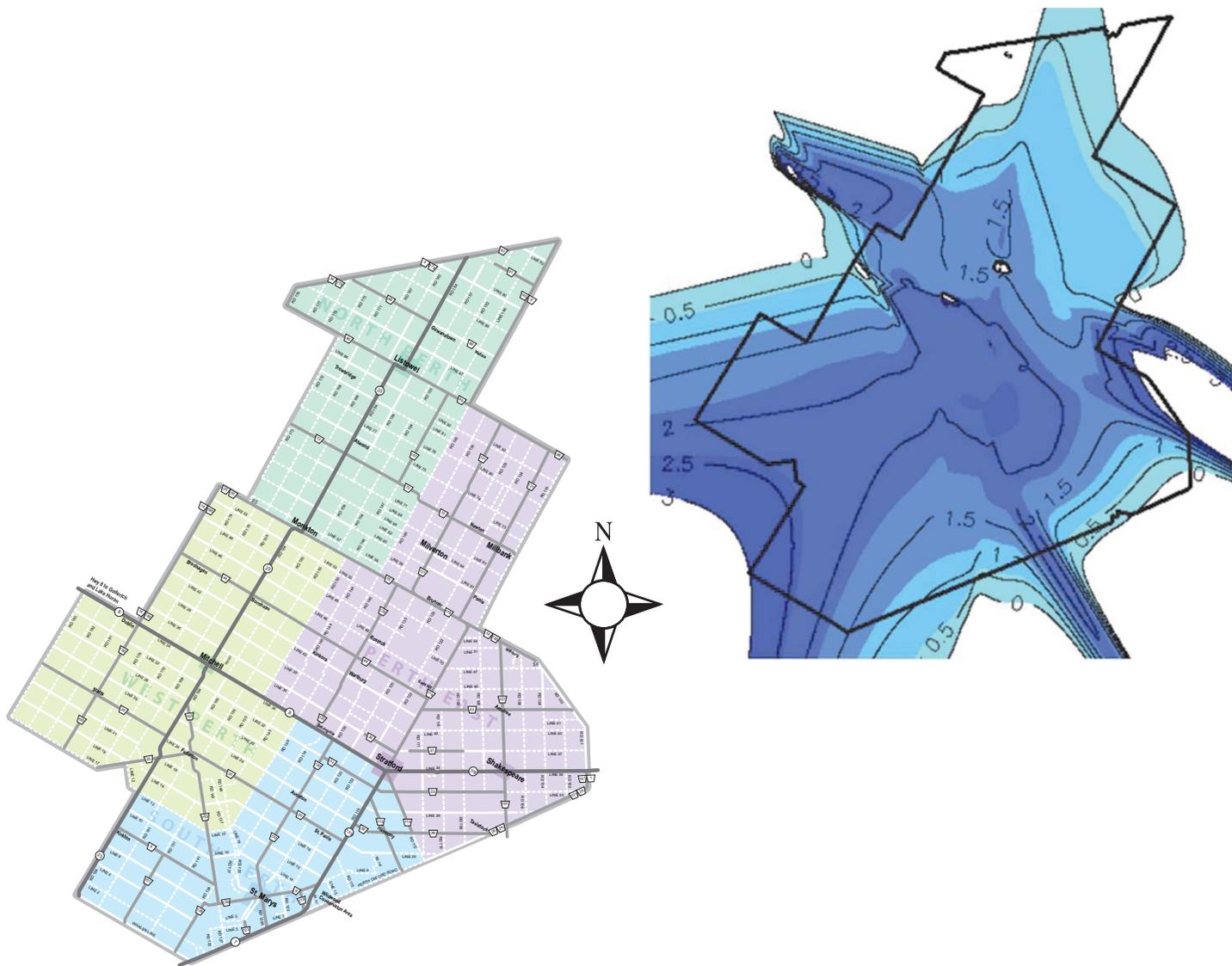
Levels higher than 1.5 mg/L are still associated with improved health but may introduce the risk of dental fluorosis for children between 18 and 24 months of age whose unerupted permanent teeth are developing. Dental fluorosis occurring due to fluoride levels of 1.5 – 4.0 mg/L is generally mild and cosmetic in nature. At levels ≥ 4.0 mg/L, fluoridated drinking water may be associated with adverse health effects, such as bone fractures and skeletal fluorosis. Sources other than - and in addition to - drinking water may contribute to the total fluoride exposure. In Canada, most sources of drinking water have low concentrations of naturally occurring fluoride¹.

Many municipalities add fluoride to drinking water because of the dental benefits. In Perth County, naturally occurring fluoride is present in drinking water and fluoride concentrations in the drinking water systems providing water to schools vary from 0.5 to 2.5 mg/L.

RESULTS

Figure 1:

Isopleth Map of Fluoride Concentrations in Perth County

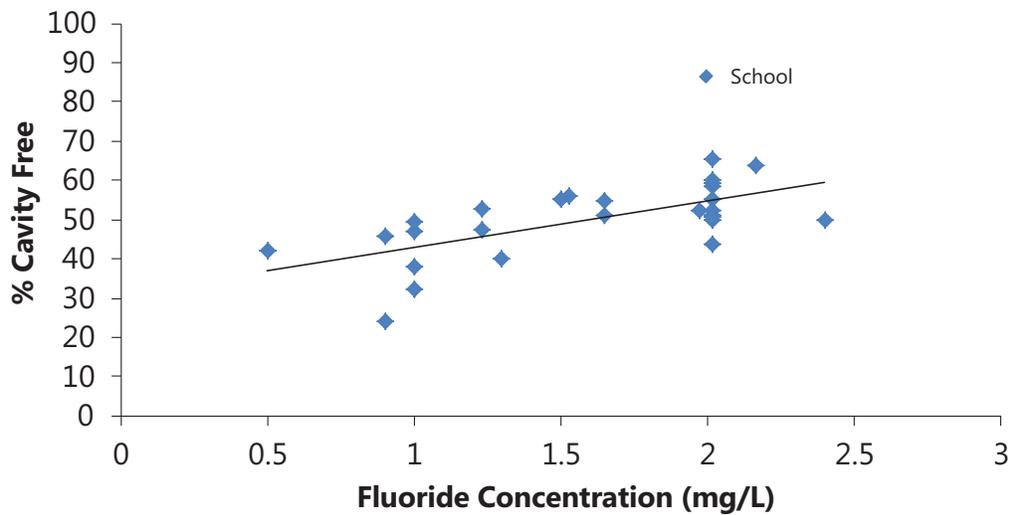


Settlements in Perth County

Source: Ministry of the Environment. Summary of regulated samples results submitted to the Ministry of the Environment and Climate Change in accordance with Ontario Regulation 170/03, 10 Nov 2004 to 10 Nov 2014. Received Nov 2014.

- The concentration of fluoride is the highest (darker blue) west of Stratford and decreases gradually from the centre of the County to the south and north (lighter blue).

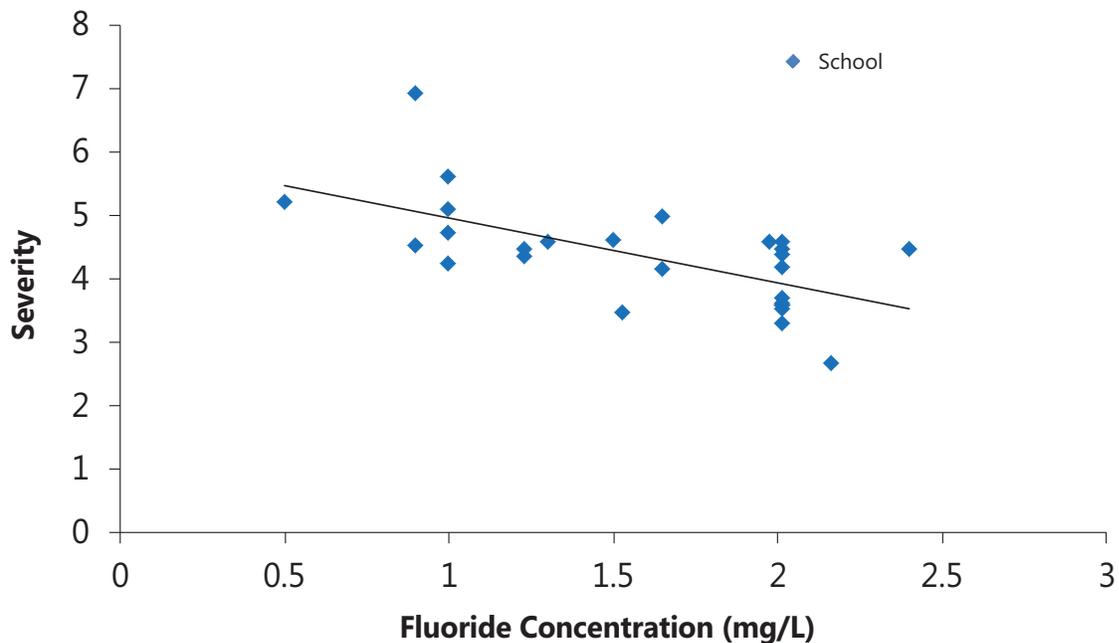
Figure 2: Percentage of cavity-free Grade 2 students by school and fluoride concentration in the drinking water, 2006-2014



Source: Dental Indices Survey 2004-2010, PDHU. Extracted: August 2014; Oral Health Information Support System 2011-2014, Ministry of Health Promotion, 2010; Extracted: August 2014

- Schools with higher fluoride concentrations in the drinking water had a higher percentage of cavity-free students.

Figure 3: The severity of cavities* among Grade 2 students by school and fluoride concentration in the drinking water, 2006-2014



Source: Dental Indices Survey 2004-2010, PDHU. Extracted: August 2014; Oral Health Information Support System 2011-2014, Ministry of Health Promotion, 2010; Extracted: August 2014

- Schools with higher fluoride concentrations in the drinking water had a lower severity of cavities among Grade 2 students

* The severity of cavities was determined by calculating the average number of decayed, missing and filled primary (dmft) and permanent teeth (DMFT) found in children who had cavities.

DATA SOURCES

The drinking water systems supplying water to schools are tested for fluoride in all public schools (*Ministry of the Environment. Summary of regulated samples results submitted to the Ministry of the Environment and Climate Change in accordance with Ontario Regulation 170/03 from 10 Nov 2004 to 10 Nov 2014. Extracted on 10 Nov 2014*).

A median fluoride concentration of all available tests for each school was determined for those schools with more than one result.

For each school, among Grade 2 students from 2006 to 2014, a median was determined for percentage of cavity-free students and for severity of cavities.

LIMITATIONS

The drinking water consumed by students in schools is used as a proxy measure for fluoride intake. Assumed is that the students drink water at their schools and that the drinking water at the students' homes have similar concentrations of fluoride as the school. Other sources of fluoride (such as toothpaste and food) contribute a smaller proportion of total fluoride exposure and are likely similar across Perth County.

CONCLUSION

Naturally occurring fluoride in drinking water reduces tooth decay among school children, and as fluoride content increases, the percentage and severity of cavities among students decreases.

RECOMMENDATIONS AND NEXT STEPS

The Health Unit will continue to advise residents to use area tap water for drinking and cooking.

The Health Unit will continue to educate parents of young children on the dental benefits of tap water along with the risk of mild dental fluorosis.

¹Health Canada, 2010. Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Fluoride. Water, Air and Climate Change Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. Available at http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/water-eau/2011-fluoride-fluorure/2011-fluoride-fluorure-eng.pdf



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