
DATE: March 1, 2011

REPORT TITLE: **HEALTH BENEFITS OF COMMUNITY WATER FLUORIDATION**

FROM: Janette Smith, Commissioner of Health Services
David L. Mowat, MBChB, MPH, FRCPC, Medical Officer of Health

RECOMMENDATION

That Regional Council reaffirm its position on community water fluoridation and direct the continuation of the current system.

REPORT HIGHLIGHTS

- The Region of Peel water supplies have been fluoridated since the late 1960s for the prevention of tooth decay.
- Community water fluoridation is supported and endorsed by many organizations including: the World Health Organization, the Canadian Medical Association, the Canadian Dental Association, the Canadian Public Health Association and the Association of Local Public Health Agencies.
- Peel's treated water supply is regularly monitored and complies with *Ontario's Safe Drinking Water Act* to protect human health. Fluoride levels in Peel are maintained within the recommended standards of 0.5 – 0.8 mg/L as legislated by the *Act*.
- An extensive and credible body of scientific research supports the findings that water fluoridation is the most effective, equitable and economical way to protect dental health even when other sources of fluoride (e.g. toothpaste, topical fluorides) are used.
- Compared to Ontario, Peel has a higher proportion of children and immigrants. Both groups have a relatively high occurrence of tooth decay. Furthermore, adults over 65 years of age residing in fluoridated communities have significantly lower incidences of root cavities as compared to residents of non-fluoridated communities. Consequently, community water fluoridation is a cost-effective and equitable disease prevention strategy.
- There is strong evidence that discontinuing the fluoridation of drinking water results in an increased rate of dental decay. This would increase demand for the Region's programs aimed at low-income children and seniors by \$2.6 million, over the current annual budget of \$8.1 million. There is also a requirement in the Ontario Public Health Standards to provide individual topical fluoridation applications where there is no fluoridation of drinking water, at an estimated cost of \$7.2 million.
- Water fluoridation has been well studied. To date, concerns about the safety and effectiveness of fluoride in drinking water have been systematically reviewed and disproven by scientific evidence.
- Peel Public Health recognizes the value of community water fluoridation and continues to endorse this public health intervention in the Region of Peel.

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DISCUSSION

1. Background

Region of Peel municipal water supplies have been fluoridated since the late 1960s. Community water fluoridation has been identified, by the United States Centers for Disease Control and Prevention, as one of the 10 great achievements of the 20th century. More than 90 national and international professional health organizations continue to endorse the use of fluoride at recommended levels to prevent tooth decay. These organizations include, but are not limited to:

<ul style="list-style-type: none"> • Association of Local Public Health Agencies • Canadian Association of Public Health Dentistry • Canadian Dental Association • Canadian Medical Association • Canadian Paediatric Society • Canadian Public Health Association • Canadian Dental Hygienists' Association • Health Canada • Ontario Agency for Health Protection and Promotion • Ontario Association of Public Health Dentistry 	<ul style="list-style-type: none"> • Ontario Dental Association • Ontario Dental Hygienists' Association • Ontario Medical Association • Ontario Ministry of Health and Long-Term Care • Ontario Ministry of Health Promotion and Sport • Ontario Public Health Association • Public Health Agency of Canada • United States Centers for Disease Control and Prevention* • United States Food and Drug Administration • World Health Organization
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* The Centers for Disease Control and Prevention has recently proposed a recommendation to the United States government to reduce the optimal concentration of fluoride in water to 0.7mg/L. The proposed level would be in line with the optimal concentration currently recommended by Health Canada and the Ontario Dental Association.

Recently, leaders in the medical and public health communities have re-confirmed their position in support of community water fluoridation. On April 4 2011, Dr. Arlene King, Ontario's Chief Medical Officer of Health, released a statement encouraging municipalities to continue fluoridation of drinking water. Dr. King highlighted that this public health intervention is:

- Supported by strong evidence on the benefits and safety of water fluoridation;
- Related to the reduction of dental care expenditures and inequalities in health; and
- Important part of maintaining good oral health and being healthy overall. (Appendix I)

In October 2010, Dr. Mark MacLeod, President of the Ontario Medical Association, stated the following in a media release:

"We've been adding fluoride to drinking water since the 1940's and it's important that we continually research the practice, but the evidence is clear that adding fluoride to drinking water in Ontario is safe." (Appendix II)

In February 2011, the Association of Local Public Health Agencies stated the following on this issue in a media release:

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“The use of fluoride in drinking water is a safe, effective, and economical way to help prevent dental cavities with no scientifically proven adverse health impacts.”
(Appendix III)

2. Fluoridation of Peel’s Municipal Water Supply

There is a small amount of fluoride added to Peel’s water supply, only enough to help prevent tooth decay. The Ontario Ministry of Health and Long-Term Care, in partnership with the Ontario Ministry of the Environment, set strict guidelines for fluoride in drinking water (*Ontario Safe Drinking Water Act (SDWA)*): 0.5 – 0.8 mg/L). In establishing these guidelines, other potential sources of fluoride ingestion such as fluoridated toothpaste, food, commercial beverages and others are taken into consideration. These guidelines follow Health Canada’s recommended fluoride concentration levels (0.5mg/L – 0.8mg/L).

3. Research on the Safety of Fluoride

Water fluoridation has been well studied. Credible scientific organizations and associations continue to review the evidence on the health risks and benefits of fluoridation. Their reports are publicly available and constitute the basis for the continuing support of water fluoridation.

Health Canada recently completed its review of the health risks associated with fluoride in drinking water (Appendix IV). This review assessed all identified human health risks, taking into account new studies and approaches. Based on this review, 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 (Maximum Acceptable Concentration) and any adverse health effects, including those related to cancer, immunotoxicity, reproductive/developmental toxicity, genotoxicity, intelligence quotient deficit, and/or neurotoxicity.

4. Benefits of Community Water Fluoridation

a) Effective

Fluoridated water helps reduce tooth decay by strengthening the tooth enamel and making it more resistant to decay. It also helps to stop the progression of tooth decay at the early stages and reduces the activity of bacteria that causes tooth decay. There is evidence that further reduction in tooth decay occurs, in communities where water is fluoridated, even when people have access to fluoridated toothpaste and other sources of fluoride.

In Peel, preventable dental decay affects one in three children. Compared to Ontario, Peel has a higher proportion of children and immigrants. Both groups have a relatively high occurrence of tooth decay. Research has also found a significantly lower incidence of root cavities for adults over 65 years of age residing in fluoridated communities, as compared to residents in non-fluoridated communities.

b) Equitable

Community water fluoridation is beneficial to all residents of the community regardless of age, income, education, employment status, disability, geographical location, race or gender. In Peel, school-aged children, recent immigrants and seniors are more likely to need dental treatment, but are least likely to access this care due to cost. Water fluoridation is an equitable prevention strategy that reaches all residents of Peel.

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Community water fluoridation is an economical and effective health promotion intervention. The cost of fluoridating community water supplies is less than one dollar per person per year.

There is strong evidence that indicates discontinuing the use of community water fluoridation will increase dental decay in the Peel population. This will result in increased demand on Regional public health dental programs such as the Children and Teens in Need of Treatment program and the Low-Income Seniors' Dental Program. These programs currently are budgeted at approximately \$8.1 million per year. It is estimated that the resulting treatment from non-fluoridated water would necessitate an additional budget increase of approximately \$2.6 million to Regional dental programs.

Furthermore, the provision of alternate sources of fluoride is mandated by the Ministry of Health and Long-Term Care. An estimated \$7.2 million would need to be budgeted to cover the cost of individual topical fluoride applications instead of water fluoridation which currently costs the Region \$400,000 annually (Table 1). However, such alternative provisions will not provide universal access to all Peel residents in need or be as effective.

Table 1

	Current Budget (with Water Fluoridation)	Forecasted Budget (without Water Fluoridation)
Water Fluoridation Cost	\$400,000	- \$400,000 (savings)
Alternate Fluoride Provision	Not Applicable	\$7,200,000
Regional Dental Program Costs	\$8,100,000	+ \$2,600,000 (additional treatment) \$8,100,000 (annual costs) \$10,700,000
Total Costs	\$8,500,000	\$17,500,000

5. Concerns Regarding Community Water Fluoridation

In spite of the extensive scientific reviews and reports demonstrating the effectiveness of community water fluoridation, Peel Public Health receives concerns about the safety and effectiveness of fluoride use from both residents and non-residents.

For example, opponents of water fluoridation claim this practice to be unsafe and could potentially cause cancers, bone diseases, reproductive issues, Alzheimer's, Multiple Sclerosis and decreased IQ, among others. All such claims have been thoroughly reviewed by leading international health and research organizations including Health Canada, and all have concluded that water fluoridation remains a safe and effective practice at the recommended levels.

Peel Public Health remains committed to the safety and wellbeing of Peel residents as mandated by the Ministry of Health and Long-Term Care; therefore all concerns are thoroughly reviewed and addressed by carefully reviewing all new information and

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resources available to inform our decision-making. To date, health research experts consistently find no association between water fluoridation at the current recommended levels and any adverse health effects.

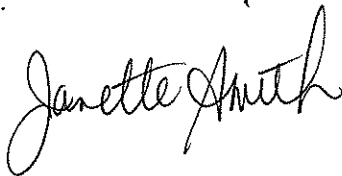
FINANCIAL IMPLICATIONS

The cost-shared and Regional dental programs include Children and Teens in Need of Treatment and the Low-Income Seniors' Dental Program. These programs are budgeted at approximately \$8.1 million per year. There is strong evidence that indicates discontinuing the use of community water fluoridation will increase dental decay in the Peel population. This will result in increased demand on Regional public health dental programs. It is estimated that the resulting treatment from non-fluoridated water would necessitate an additional budget increase of approximately \$2.6 million to Regional dental programs.

Furthermore, the provision of alternate sources of fluoride is mandated by the Ministry of Health and Long-Term Care. An estimated \$7.2 million would need to be budgeted to cover the cost of individual topical fluoride applications instead of water fluoridation which currently costs the Region \$400,000 annually.

CONCLUSION

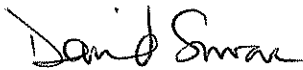
The extensive and credible body of scientific research supports the use of community water fluoridation as an effective, equitable, and economical way of preventing tooth decay. Peel Public Health recognizes the value of community water fluoridation and continues to endorse this beneficial public health intervention in the Region of Peel. It is recommended that Regional Council reaffirm its position on community water fluoridation and direct the continuation of the current system.



Janette Smith
Commissioner of Health Services



David L. Mowat, MBChB, MPH, FRCPC
Medical Officer of Health

Approved for Submission:


D. Szwarc, Chief Administrative Officer

For further information regarding this report, please contact Gayle Burse at extension 2617 or via email at gayle.burse@peelregion.ca

Authored By: Sharanjeet Kaur and Lami Sadare

c. Legislative Services
 Manager, Financial Support Unit (FSU)

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STATEMENT FROM DR. ARLENE KING, ENDORSEMENT OF COMMUNITY WATER FLUORIDATION

News Release

Communiqué

DRINKING WATER FLUORIDATION

STATEMENT FROM DR. ARLENE KING, CHIEF MEDICAL OFFICER OF HEALTH

NEWS

April 4, 2011

As Chief Medical Officer of Health for Ontario, I am very concerned about the loss of fluoridated drinking water in certain communities in spite of consistent evidence that water fluoridation is safe and effective.

Support for Water Fluoridation

More than 90 national and international professional health organizations, 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, have endorsed the use of fluoride at recommended levels to prevent tooth decay.

In fact, the use of fluoride in drinking water has been called one of the greatest public health achievements of the 20th century by the CDC.

Benefits of Water Fluoridation

Combats Tooth Decay

The benefits of water fluoridation are well documented. According to expert research, fluoridated drinking water reduces the number of cavities in children's teeth, which contributes to their healthy development. Reductions of tooth decay have also been observed in adults and seniors who reside in communities with fluoridated water. Even with other sources of fluoride available today, the American Dental Association estimates that water fluoridation continues to be effective in reducing tooth decay by 20-40 per cent.

Conversely, removing fluoride from drinking water systems has the potential to contribute to increased rates of tooth decay. The findings of several studies, including from the CDC, suggest that tooth decay generally increases in a population after water fluoridation is discontinued. In addition, a 2007 report on water fluoridation by the Institut National de Santé Publique du Québec reveals that the percentage of kindergarten children at high risk of developing tooth decay in Dorval, Quebec doubled in the two year period after water fluoridation was halted in 2003.

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Reduces Dental Care Expenditures and Inequalities in Health

Water fluoridation also has the capacity to help reduce dental care expenditures. The Ontario Dental Association has stated that the cost of waiting until tooth decay has manifested is significantly higher than the cost of preventing it in the first place. The CDC estimates \$38 in avoided costs for dental treatment for every \$1 invested in community water fluoridation. With the fluoridation of drinking water playing an important role in the overall promotion of good oral health and prevention of dental decay, I am concerned that removing it from drinking water may put a strain on, and impact the success of, important provincial programs such as the Children in Need of Treatment Program and Healthy Smiles Ontario - both developed to benefit those least able to afford dental services.

And indeed, removing fluoride from drinking water will place those least able to afford or access dental treatment at an increased risk for oral health problems. The health benefits of drinking water fluoridation extend to all residents in a community, regardless of age, socioeconomic status, education or employment.

Safety of Fluoridated Drinking Water

Fluoride in drinking water is also safe. In Ontario, fluoride additives are required to meet rigorous standards of quality and purity before they can be used. When they are added to water at levels recommended in Ontario and across the country, studies have not linked fluoride to cancer, bone fractures or intelligence levels. Studies have also found that water fluoridation is safe for the environment, and poses no risk to plants and animals.

In addition, most dental fluorosis, a condition that occurs when a child receives too much fluoride during tooth development, is mild and appears as white stains on the teeth. In this mildest form, fluorosis may affect the look of a tooth, but will not affect its function. While moderate or severe fluorosis does occur, the Canadian Health Measures Survey: Oral Health Statistics 2007-2009 concludes that, "[so] few Canadian children have moderate or severe fluorosis that, even combined, the prevalence is too low to permit reporting. This finding provides validation that dental fluorosis remains an issue of low concern in this country."

Good Oral Health Means Good Overall Health

The importance of maintaining good oral health should not be taken lightly - it is an important part of being healthy overall. As tooth decay is the single most common chronic disease among Canadians of all ages and poor oral health is linked to diabetes, heart disease and respiratory conditions, water fluoridation is, and must be recognized as, a very important public health measure.

An estimated 70 per cent of Ontarians currently have access to water that is fluoridated, and I would urge all Ontarians to continue to support the fluoridation of their municipal drinking water systems so that everyone can enjoy the lasting health benefits.

Media Contact:
Julie Rosenberg, Ministry of Health Promotion and Sport, 416-326-4833

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ONTARIO MEDICAL ASSOCIATION, ENDORSEMENT OF COMMUNITY WATER FLUORIDATION

Ontario's Doctors Set The Record Straight on Fluoride in Drinking Water

In a news release issued today, Ontario's doctors provided some insight to help ease concerns about some of the false health claims that are being made surrounding water fluoridation.

October 21, 2010, Toronto, ON – Ontario's doctors want to dispel the misconceptions and ease the concerns of those who question the safety of fluoride. The Ontario Medical Association (OMA) has approved a policy that supports the addition of fluoride to drinking water, following extensive research on the issue.

"Ontario's doctors want their patients to know that the process of adding fluoride to our drinking water in Ontario has been and is safe," said Dr. MacLeod, President of the OMA. "We know that some parents have concerns, but they should be confident that in Ontario, the fluoride concentrations are well regulated and will not cause their children harm."

Ontario drinking water systems that fluoridate their water are closely monitored, report continually on fluoride concentrations, and are well within the safety guidelines. There is also a wealth of evidence on the benefits of adding fluoride to drinking water systems, including:

- Health Canada's expert panel, as well as international academics from Europe, Australia, and the US, have found that 0.7 parts per million of fluoride in drinking water is effective for preventing cavities; and
- A Danish study released earlier this year, examined the risk of cavities in children five and 15 years old. Over a period of 10 years, the risk of cavities was reduced by approximately 20 percent with fluoridation levels at the lowest concentration level (0.125-0.25mg/L).

"We've been adding fluoride to drinking water since the 1940's and it's important that we continually research the practice, but the evidence is clear that adding fluoride to drinking water in Ontario is safe," said Dr. MacLeod.

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ASSOCIATION OF LOCAL PUBLIC HEALTH AGENCIES, ENDORSEMENT OF COMMUNITY WATER FLUORIDATION



2 Carlton Street, Suite 1306
Toronto ON M5B 1J3
Tel: (416) 595-0006
Fax: (416) 595-0030
E-mail: mail@alphaweb.org

Providing leadership in public health management

NEWS RELEASE

February 17, 2011

For Immediate Release

Public Health Supports Fluoridation

TORONTO -- The use of fluoride in drinking water is a safe, effective, and economical way to help prevent dental cavities with no scientifically proven adverse health impacts, according to Ontario public health agencies who voted overwhelmingly in support of the fluoridation of community drinking water at an Association of Local Public Health Agencies (alPHa) conference in Toronto last week. When added to water at levels recommended in Ontario and across the country, studies have determined that fluoride is not harmful and the health benefits extend to all residents in a community regardless of age, education or socio-economic status. The fluoridation of drinking water has been used in Canada for over 40 years and between 1979 and 2009 the incidence of dental cavities for children, adolescents and adults has dropped significantly; from 2.5% to 0.5% for children, from 9.2% to 2.5% for adolescents, and from 17.5% to 10.7% for adults.

According to estimates from the Center for Disease Control and Prevention, it costs about 50 cents per person to fluoridate community water and every \$1 invested yields \$38 in avoided costs for dental treatment. While many communities in Ontario continue the practice of fluoridating drinking water for the benefit of all their citizens, a small number of municipalities have made the decision to stop fluoridation in the past few years. "The argument that fluoridation is no longer required because dental health has improved over the past decades is flawed. Dental health has improved in large part because of the addition of fluoride. Removing fluoride now doesn't make sense," says Valerie Sterling, alPHa President and member of the Toronto Board of Health.

In addition to fluoridation, alPHa is calling on the provincial government to provide support, including provincial legislation and funding to municipalities for the fluoridation of community drinking water. "We want to avoid what happened with tobacco legislation. We had a patchwork of local by-laws until the provincial government implemented the Smoke-Free Ontario legislation. A similar situation exists today with fluoridation resulting in some communities losing the benefit to their dental health," explains Sterling.

In a separate meeting on the same day, the Medical Officers of Health that manage the public health agencies across Ontario voted in support of community drinking water fluoridation. Dr. Paul Roumeliotis, Chair of the Council of Ontario Medical Officers of Health, a section of alPHa, sees fluoridation as a basic essential to good health.

"As Medical Officers of Health, we see daily the impacts that poor oral health can have on children, on seniors, and on adults. We are also well aware of the disproportionate impacts of poor dental health upon low income populations and often among those newly arrived in Canada from countries with poor dental services and poor water infrastructure."

HEALTH BENEFITS OF COMMUNITY WATER FLUORIDATION

More than 90 national and international professional health organizations have endorsed the use of fluoride at recommended levels to prevent tooth decay, including the World Health Organization, Health Canada, the Canadian Pediatric Society, the Canadian Dental Association, the Canadian Medical Association and the Ontario Medical Association. alPHA is proud to join their number.

For more information regarding this news release, please contact:

Linda Stewart
Executive Director
(416) 595-0006 ext. 22
linda@alphaweb.org

November, 2010

Fluoride & Drinking Water

Fluoride is a mineral that occurs naturally in the environment. Fluoride is found in soil, air and water.

At appropriate levels, Fluoride in drinking water has been proven to significantly reduce cavities and dental decay. This finding is strongly supported by an extensive body of Canadian and international research, and has been commonly accepted in the scientific community for almost 70 years.

Scientific guidance on optimal fluoridation levels is routinely reviewed by expert panels convened by Health Canada and conveyed to all provinces and territories.

The most recent Health Canada review, undertaken in 2007, assessed the latest available evidence on the benefits and potential risks. This review concluded that there is no harmful health risk from the fluoridation of community drinking water at current levels and that fluoridation continues to be an effective public health strategy to prevent dental disease.

The City of Toronto's policies and practices in drinking water fluoridation are guided by these expert reviews and recommendations. Toronto Public Health and Toronto Water are committed to ensuring the safety of the Toronto drinking water supply, and protecting the health of Toronto residents.

The dental benefits and safety of fluoridation of drinking water are strongly supported by many health organizations, including the Ontario Medical Association, the Canadian Dental Association, the Ontario Dental Association, the American Dental Association, the Public Health Dentists Association, the Chief Dentist of Canada and the International Association for Dental Research.

Fluoride has been added to the Toronto drinking water supply since 1963. Studies of Toronto children 12 years after the introduction of water fluoridation and again in 2000 show that by 2000, there was a 77.4% mean reduction in decayed, missing and filled baby teeth for five year-old children. There was also a 390% increase in the percentage of children with no tooth decay when compared to rates reported prior to the addition of fluoride in 1963.

This dramatic improvement in dental health is due to a combination of water fluoridation, other sources of fluoride (such as toothpaste), better nutrition and better dental preventive care. Water fluoridation plays an important role in a comprehensive approach to good dental health.

HEALTH BENEFITS OF COMMUNITY WATER FLUORIDATION

The current target level of fluoride in Toronto drinking water is 0.6 parts per million - a level which is less than the naturally occurring fluoride levels from a number of European and North American water sources, including parts of Ontario.

Fluoride levels in Toronto's drinking water are regulated in Ontario under the Safe Drinking Water Act administered by the Ministry of the Environment.

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Fluoride & Drinking Water

For more information:

World Health Organization, (WHO)
http://www.who.int/oral_health/events/oral%20healthc.pdf

Health Canada
<http://www.hc-sc.gc.ca/ahc-asc/branch-dirgen/fnihb-dqspni/ocdo-bdc/project-eng.php#a6>

<http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/2008-fluoride-fluorure/index-eng.php>

Chief Medical Officer of Health (Ontario) (CMOH)
<http://www.mhp.gov.on.ca/en/healthy-communities/dental/CMOH-on-Fluoridation.pdf>

Ontario Medical Association
<https://www.oma.org/Mediaroom/PressReleases/Pages/OntariosDoctorsSetTheRecordStraightOnFlourideInDrinkingWater.aspx>

The U.S. Centers for Disease Control and Prevention (CDC)
<http://www.cdc.gov/fluoridation/benefits.htm>

Ontario Dental Association
<http://www.youroralhealth.ca/community-water-fluoridation.html>

Canadian Dental Association
http://www.cda-adc.ca/files/position_statements/Fluorides-English-2010-06-08.pdf

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HEALTH BENEFITS OF COMMUNITY WATER FLUORIDATION

HEALTH CANADA'S REPORT ON FLUORIDE FOR PUBLIC CONSULTATION – EXECUTIVE SUMMARY

A copy of the full report is available upon request from the Office of the Regional Clerk.

*Fluoride For Public Consultations, September 2009
Guidelines for Canadian Drinking Water Quality: Guideline Technical Document*

Fluoride in Drinking Water

Part I. Overview and Application

1.0 Proposed guideline

The proposed maximum acceptable concentration (MAC) for fluoride in drinking water is 1.5 mg/L.

2.0 Executive summary

Low levels of fluoride occur naturally in most sources of drinking water in Canada. Fluoride can occur naturally in surface waters from the deposition of particulates from the atmosphere and the weathering of fluoride-containing rocks and soils, and in groundwater from leaching from rock formations. Fluoride is also introduced in the environment by a variety of human activities such as chemical manufacturing plants and waste ponds; the manufacture of aluminum, steel, glass, enamel, brick, tile, pottery, and cement; production of fluorinated chemical and phosphate fertilizer; and metal casting, welding, and brazing.

Health Canada recently completed its review of the health risks associated with fluoride in drinking water. This review assesses all identified human health risks, taking into account new studies and approaches. Based on this review, the proposed guideline for fluoride in drinking water is a Maximum Acceptable Concentration of 1.5 mg/L.

During its October 2008 meeting, the Federal-Provincial-Territorial Committee on Drinking Water reviewed the proposed guideline for fluoride in drinking water and gave approval for the guideline and the corresponding Guideline Technical Document to undergo public consultations.

2.1 Health effects

Dental fluorosis is the most widely and frequently studied of all adverse effects of fluoride. It is the effect occurring at the lowest level of fluoride exposure in the population. Mild and very mild dental fluorosis are not considered to be adverse effects, whereas moderate dental fluorosis is found to be an adverse effect, based on its potential aesthetic concern, and is used as the endpoint of concern in this risk assessment.

Skeletal fluorosis is the most serious adverse health effect clearly associated with prolonged exposure to high levels of fluoride in drinking water. Skeletal fluorosis can occur at very high exposure levels, and has rarely been documented in Canada.

HEALTH BENEFITS OF COMMUNITY WATER FLUORIDATION

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, including those related to cancer, immunotoxicity, reproductive/developmental toxicity, genotoxicity and/or neurotoxicity. It also does not support a link between fluoride exposure and intelligence quotient deficit, as there are significant concerns regarding the available studies, including quality, credibility, and methodological weaknesses.

2.2 Exposure

Major sources of exposure to fluoride are water, food and beverages, and dental products. Dental products contain high levels of fluoride and can represent a very important source of exposure, particularly in young children who are more likely to swallow toothpaste. Drinking water can be a significant source of exposure to fluoride; in 2005, community fluoridated drinking water was provided to about 43% of Canadians. To a lesser extent, fluorides are also found in Canadian soils and the atmosphere.

2.3 Treatment

Water containing fluoride levels greater than the MAC of 1.5 mg/L can be treated at both municipal and residential scales through various approaches and technologies. At the municipal level, options include blending of fluoride-rich waters with waters of low fluoride content, the selection of low-fluoride sources and the removal of excess fluoride concentration by treatment processes at public water supply or household level. A wide range of technologies such as activated alumina (AA), reverse osmosis, lime softening, and ion exchange, are capable of reducing of excess fluoride levels from drinking water.

At the residential scale, Reverse Osmosis systems can be used at the point of use, and must be capable of reducing the concentration of fluoride in water to a maximum of 1.5 mg/L to be certified. Distillation systems installed at the point of use are effective to remove inorganic contaminants, including fluoride, and must be capable of reducing fluoride levels to a maximum of 2.0 mg/L to be certified.

2.4 Dental health

Health Canada's Chief Dental Officer has reviewed the available science on dental effects of fluoride, and sought external expert advice from the scientific dental community. Experts provided a recommendation on the optimal level, which was accepted by Health Canada's Chief Dental Officer. As a result, the optimal concentration of fluoride in drinking water for dental health has been determined to be 0.7 mg/L for communities who wish to fluoridate. This concentration provides optimal dental health benefits and is well below the MAC to protect against adverse effects. Further information can be found at:

www.hc-sc.gc.ca/ahc-asc/branch-dirgen/fnihb-dgspni/ocdo-bdc/index-eng.php