

Fluoridation of Municipal Drinking Water Systems



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This presentation addresses the issue of why it is in everyone's best interest to continue with fluoridation of community drinking water systems.

It confirms that fluoridation, is safe, cost-effective and reduces cavities for children and adults alike. More importantly, it protects the most vulnerable in society; our poor, our children, the elderly, the disabled, and the mentally ill. Those less fortunate who may not have a voice or the same advantages as you and I.

By choosing to invest in prevention you will be choosing wisely, you will be avoiding higher, costly treatments which will be passed on to those who are least able to afford it, and more importantly you will be showing compassion to the less fortunate by avoiding needless pain and suffering.

Informed



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It is vital to be well informed when making decisions regarding community water fluoridation.

Agenda

- Introduction
- Is Tooth Decay a Problem?
- Is Water Fluoridation Safe?
- Is Water Fluoridation Effective?
- Who Supports Water Fluoridation?
- What is Fluoride?
- How Does Fluoride Work?

There are a number of important questions related to Community Water Fluoridation that need to be answered.

Agenda

- What is Water Fluoridation?
- What are Safe Fluoride Levels?
- Is Water Fluoridation Cost-Effective?
- Is it an Occupational Health and Safety Issue?
- Who Fluoridates their Municipal Drinking Water Systems?
- What Happens When you Don't?
- What Happens When it is Discontinued?

Agenda

- Should we Question the Science?
- What are the Common Anti-fluoridation Arguments?
 - It's Toxic!
 - It's a Fertilizer!
 - It's Unsafe to Handle!
 - It's Harmful to the Environment!
 - It Causes Cancer, Fractures, Lowers I.Q. etc. etc. etc...
 - It Causes Fluorosis!
 - It is Our Right to Choose!

Agenda

- Who Should You Believe?
- What is a Selective vs. Systematic Review?
- Is Peer Review Important?
- What is Fluorosis?
- Is it Your Right to Choose?
- Is Society Equal?

Agenda

- Conclusions
- Recommendation

Finally, what can we conclude and what are the recommendations?



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While this controversial issue has recently received more attention as many municipalities struggle with diminishing revenues, escalating expenditures, and misinformation from anti-fluoridation groups, public health overwhelmingly supports the continued fluoridation of our drinking water supply without hesitation or reservation.

First and foremost, continued fluoridation of the municipal water system will provide residents, especially the most vulnerable, with the best chance of fighting tooth decay.

Is Tooth Decay a Problem?



Single most common chronic disease among Canadians of all ages

Is tooth decay a problem?

Tooth decay is one of the most common childhood diseases and the single most common chronic disease among Canadians of all ages.

In addition to the pain and suffering, poor oral health is linked to many health conditions such as diabetes, heart disease, respiratory conditions, premature birth and low birth weight, osteoporosis, Alzheimer's disease and rarely life-threatening infections.

Psychological consequences arise as well such as poor self-confidence and self-esteem. Poor oral health can also make some people unemployable. Good oral health is essential for good overall health.

When I was growing up, I did not have the benefit of having fluoride in my drinking water. I didn't brush as often as I should have and I suffered the pain and shame of having cavities and poor teeth. I know how awful that feels.



As an anesthesiologist I often looked after very young children for hours at a time under general anesthetic to treat the disease in their mouths.

Prevention is such a better choice.

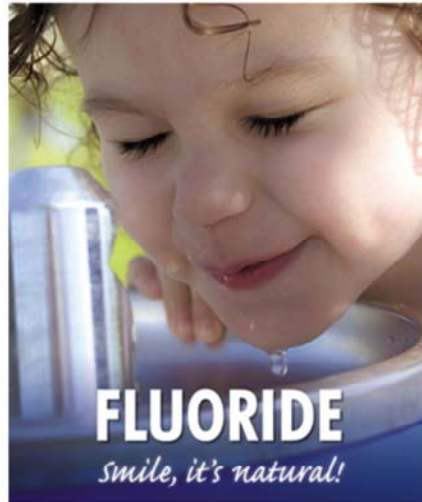


My wife and I raised three children with the benefit of fluoride in our drinking water. They have beautiful teeth. They did not have the cavities that we suffered with.



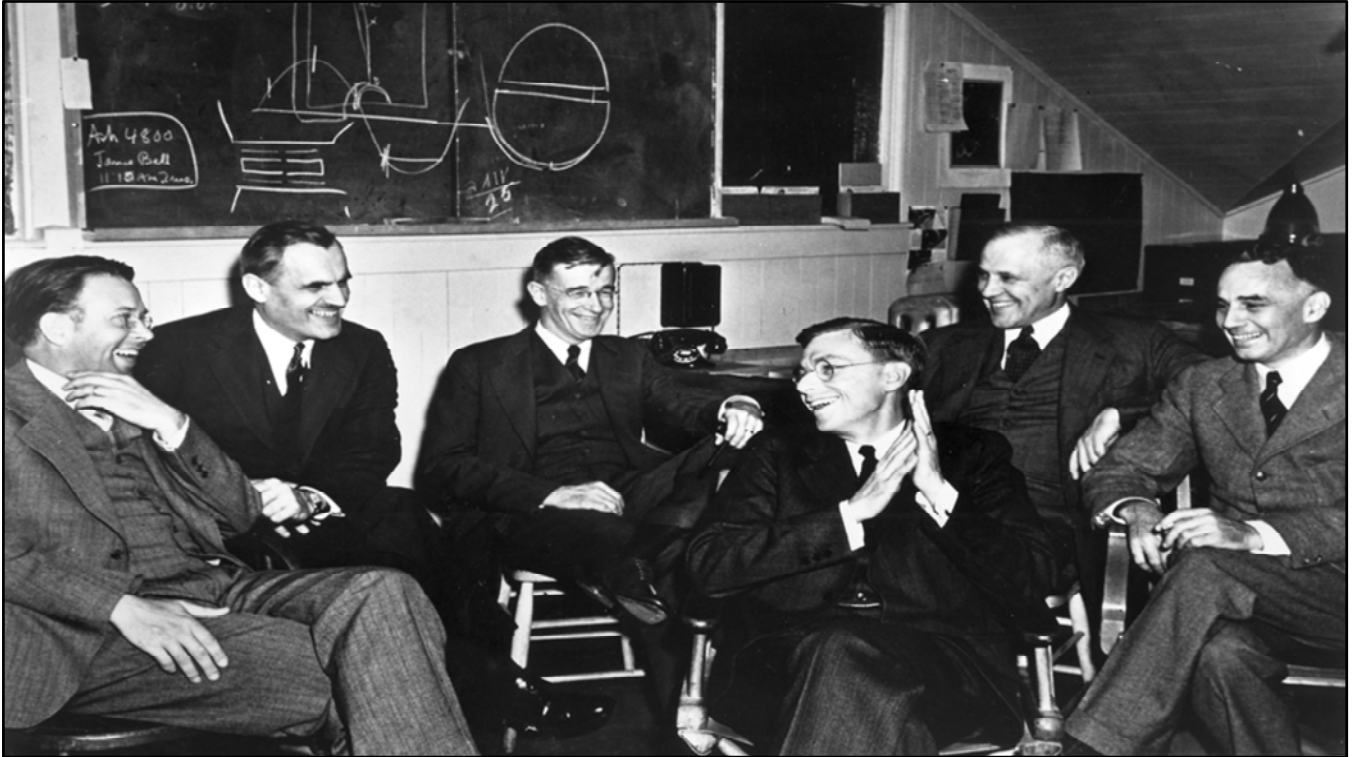
I wouldn't want my kids drinking anything but fluoridated water. But, an anecdotal story isn't scientific.

Is Water Fluoridation Safe?



Is water fluoridation safe?

Yes! Water fluoridation is safe. This topic has been extensively studied and reviewed by expert panels throughout the world for many years. The conclusions remain the same. The best available and most reliable scientific evidence indicates that at maximum permitted levels of fluoride in drinking water, human health is not adversely affected.



Fluoridation is a health strategy that Canadian researchers helped to pioneer in the 1940s. It has greatly reduced the frequency of tooth decay.

It has been so successful that cities in Britain, Spain, Ireland, Brazil, Korea and other countries have followed our lead. After 69 years of studies and good science, what we know is that adjusting fluoride in water to the optimal level is safe and effective against tooth decay both in children and adults.

We don't have to guess the impact it will have because we know the impact it will have.

Is Water Fluoridation Effective?



“One of the greatest Public Health Achievements of the 20th Century”



“Universal access to fluoride for dental health is a part of the basic human right to health”



“Estimated **20-40%** reduction in tooth decay”

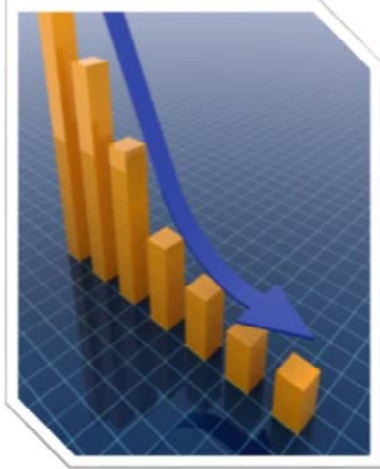
Is water fluoridation an effective public health measure?

The use of fluoride in drinking water has been called one of the greatest public health achievements of the 20th century by the Centers for Disease Control and Prevention (CDC).

The World Health Organization (WHO) affirms that universal access to fluoride for dental health is a part of the basic human right to health.

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.

Declining Rates of Decay in Canada



> **69** Years of Fluoridated Water

✓ Children	2.5% to 0.5%
✓ Adolescents	9.2% to 2.5%
✓ Adults	17.5% to 10.7%

The fluoridation of drinking water has been used in Canada for over 69 years and between 1979 and 2009 the incidence of dental cavities for children, adolescents, and adults has dropped significantly. Research has found significantly lower incidence of root cavities among adults over 65 in fluoridated communities compared to non-fluoridated communities.

Approximately 70% of Ontarians have access to fluoridated water.

Water fluoridation is, and must be recognized as, a very important public health measure.

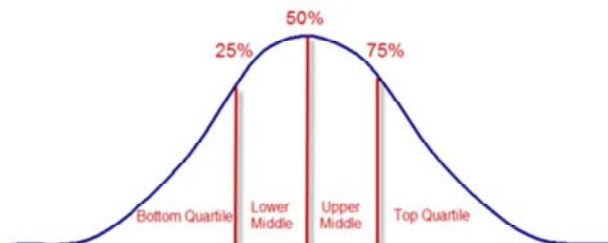
Children in NBPSDHU with Tooth Decay



20%

One in five children (20%) in the North Bay Parry Sound District Health Unit area has some form of tooth decay.

% of Decay in North Bay & Parry Sound District Schools 2013-2014



15%

The % of decay in the North Bay and Parry Sound District Schools with access to municipal fluoridation is 15%, less than our district average.

Supporting Organizations



Who supports adding fluoride to municipal drinking water systems?

More than 90 national and international professional health organizations, including leading dental, medical and scientific organizations such as Health Canada, the Public Health Agency of Canada, the Canadian Public Health Association, the Ontario Public Health Association, Public Health Ontario (Ontario's scientific authority), the Association of Local Public Health Agencies, the former Chief Medical Officer of Health, the Council of Medical Officers of Health, the Canadian Dental Association, the Ontario Dental Association, the Canadian Medical Association, the Ontario Medical Association, the U.S. Centers for Disease Control and Prevention (CDC), the United States Surgeon General, American Dental Association, the World Health Organization (WHO), the Federation Dentaire Internationale/World Dental Federation, and the International Association for Dental Research have endorsed the use of fluoride at recommended levels to prevent tooth decay.

Supporting Organizations



Health Canada

It's Your Health: Fluoride and Human Health, updated 2010

<http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/envIRON/fluor-eng.php>

Canadian Dental Association (CDA)

CDA's Position on the Use of Fluorides in Caries Prevention, revised April 2010

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

CDA supports fluoridation of municipal drinking water (at minimum levels required for efficacy as recommended by the Federal/Provincial Subcommittee on Drinking Water) as a safe, effective and economical means of preventing dental caries in all age groups.

Canadian Public Health Association (CPHA)

Fight the Good Fight: Fluoridation of Drinking Water, 2010

<http://cpa100.ca/12-great-achievements/fighting-good-fight-fluoridation-drinking-water>

The fluoridation of drinking water is considered to be one of the great public health achievements. However, it is obvious that public health still needs to “fight the good fight” so that more Canadians have access to it for better oral health.



Ontario’s Chief Medical Officer of Health

Drinking Water Fluoridation

http://www.health.gov.on.ca/en/news/bulletin/2011/hb_20110404_2.aspx

Ontario Dental Association (ODA)

Community Water Fluoridation

<http://www.oda.on.ca/community-water-fluoridation.html>

Community water fluoridation is a safe and effective means of preventing dental decay. Our position is based on the overwhelming scientific evidence available, and is driven by our dedication to the provision of exemplary oral health care to our patients and communities.

Ontario Medical Association

Ontario’s Doctors Set The Record Straight on Fluoride in Drinking Water, October 2010

<https://www.oma.org/Mediaroom/Pages/default.aspx>

The Ontario Medical Association (OMA) has approved a policy that supports the addition of fluoride to drinking water, following extensive research on the issue.

American Dental Association

ADA Fluoridation Policy & Statements

<http://www.ada.org/4045.aspx>

The American Dental Association unreservedly endorses the fluoridation of community water supplies as safe, effective and necessary in preventing tooth decay.

Supporting Organizations



World Health Organization (WHO)

The World Oral Health Report, 2003

http://www.who.int/oral_health/media/en/orh_report03_en.pdf

Community water fluoridation is effective in preventing dental caries in both children and adults.

Federation Dentaire Internationale (FDI)

Promoting Dental Health through Water Fluoridation, 2008

<http://www.fdiworldental.org/sites/default/files/statements/English/Promoting-dental-health-through-water-fluoridation-2008.pdf>

The FDI recognizes that prevention by using fluoride is the most realistic way of reducing the heavy burden of dental decay worldwide.

What is Fluoride?



What is fluoride?

Fluoride is a mineral that exists naturally in virtually all water supplies. Usually, the amount of fluoride is too low to prevent tooth decay. We're simply adding a small, additional amount of fluoride to protect teeth.

Fluoride is nature's way to fight tooth decay. Fluoride is safe when used in appropriate amounts. It is not mass medication.

How does Fluoride work?

- ✓ Helps prevent mineral loss caused by plaque acids
- ✓ Promotes re-mineralization of early decay



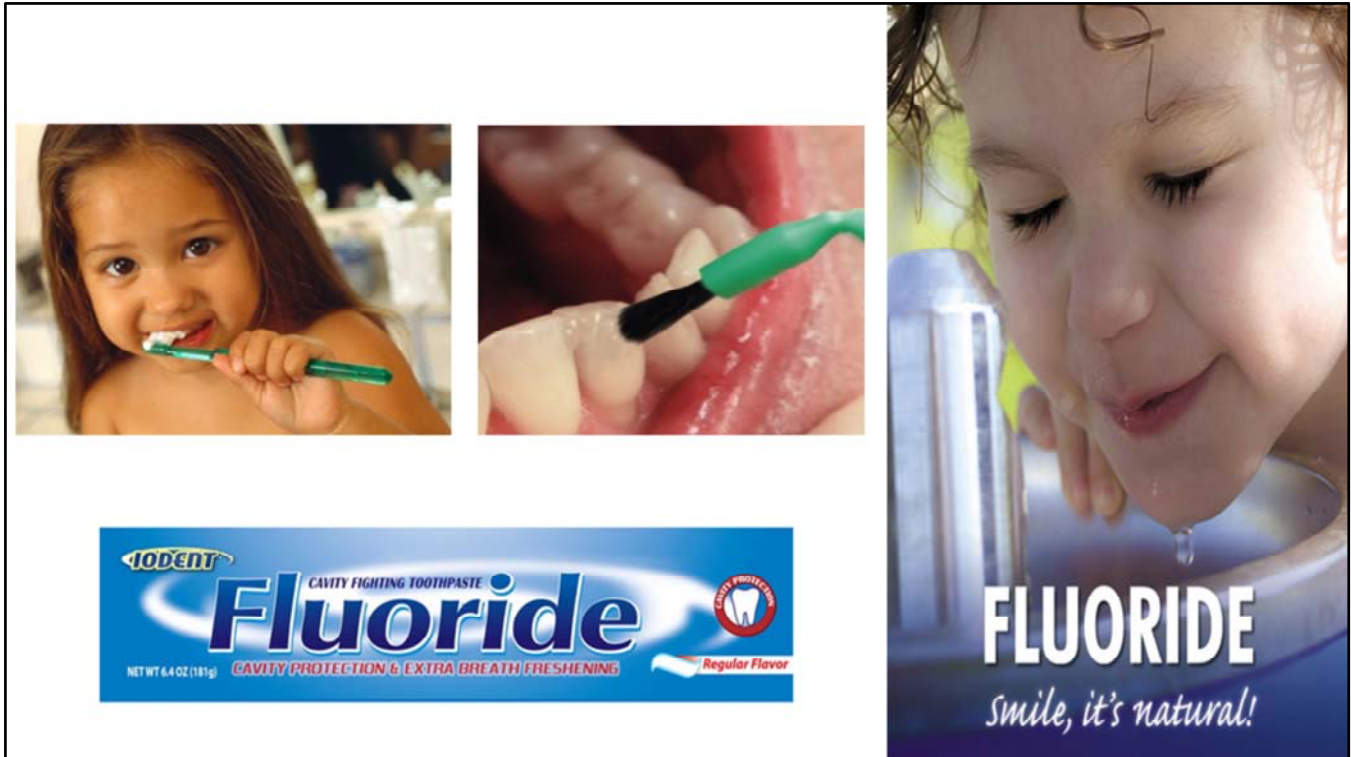
How does fluoride work?

There are two ways that fluoride protects the teeth. Water fluoridation does both.

The first method of fluoride delivery is through topical methods.

The second is systemically where fluoride is ingested into the body and is incorporated into the tooth structures.

Fluoride works by making the outer layer of teeth (called tooth enamel) stronger. When the outer layer is strong, teeth are less likely to get cavities.



Using fluoride toothpaste is important, but it doesn't give maximum protection against cavities. Drinking fluoridated water provides crucial added protection against tooth decay. And many studies prove it.

When it comes to protecting teeth, toothpaste and fluoridated water work together to help prevent cavities. We need both of them.



Seatbelts help protect passengers in a car, but does that mean we should stop putting air bags in cars?

What is Water Fluoridation?



What is water fluoridation?

Water fluoridation is the process whereby fluoride is added to the water supply and adjusted to a level that will optimize dental benefits while avoiding adverse effects.

In Ontario, fluoride additives are required to meet rigorous standards of quality and purity before they can be used. The water fluoridation process is carefully monitored and controlled.

Fluoride Levels in Drinking Water



- Maximum Acceptable Concentration: 1.5 mg/L
- Optimal Drinking Water Level: 0.7 mg/L
- Ontario Range: 2014 0.6 – 0.8 mg/L
- North Bay & Parry Sound Levels: **0.5 – 0.8 mg/L**



2.0 – 4.0 mg/L

In concentrations used for water fluoridation, fluoride is not toxic or harmful.

Ontario's recommended range of 0.6 to 0.8 mg/L is well below the level where severe health effects occur. The optimal range of fluoride use for water fluoridation already has a built-in margin of safety that takes into consideration the use of fluoride from other sources.

The current Maximum Acceptable Concentration (MAC) of fluoride in drinking water is 1.5 mg/L and Health Canada recommends an optimal level of 0.7 mg/L for dental benefits. Canada's Maximum Acceptable Concentration is lower than the United States Environmental Protection Agency's standard for fluoride at 2.0 mg/L to 4.0 mg/L.

The fluoride levels in North Bay and Parry Sound have been consistently within Ontario's recommended range of 0.5 to 0.8 mg/L and the new 2014 level of 0.6-0.8 mg/L.

Standards of Quality and Purity



Certified to
NSF/ANSI 60



American Water Works
Association



In Ontario, fluoridating agents must meet rigorous standards of quality and purity before they can be used. Fluoridating agents must be certified to NSF/ANSI (National Sanitation Foundation/American National Standards Institute) standard 60 as indicated in the licensing requirements for a licensed drinking water system.

The NSF/ANSI standard 60, which deals with the Health Effects of Drinking Water Treatment Chemicals, was developed by a consortium of associations, including NSF International, American Water Works Association, ANSI, the Association of State Drinking Water Administrators, and the Conference of State Health and Environmental Managers. This standard is even more stringent than the fluoride standard in the U.S. to produce pharmaceuticals.

Is Water Fluoridation Cost-Effective?



✓ Water Fluoridation is a cost-saving intervention

✓ **\$38** avoided costs for dental treatment for every **\$1** invested in community water fluoridation

Is water fluoridation cost-effective?

Public Works departments sometimes recommends removing fluoride from municipal drinking water supplies for two reasons. Cost savings and staff safety when handling the chemical fluoride.

Let's first deal with the cost argument. A 2004 report, Economic Evaluation across the Four Faces of Prevention: A Canadian Perspective concluded that water fluoridation is a cost-saving intervention.

According to the U.S. Centers for Disease Control and Prevention, there is an estimated \$38 in avoided costs for dental treatment for every \$1 invested in community water fluoridation.

So, the \$5,000 annual cost for Parry Sound and the \$50,000 for North Bay to fluoridate the water supply is a very cost-effective investment; an estimated \$190,000 and \$1,900,000 in avoided dental treatment costs respectively.

Occupational Health & Safety



The second argument by Public Works is based on an occupational health and safety risk. Handling of all chemicals among municipal workers and the performance of all municipal jobs carries some degree of risk.

The statistics simply do not support such an occupational health and safety risk argument that is the basis for making the recommendation. According to WSIB, of the leading injury events resulting in lost time claims occurred in the motor vehicle and transit drivers occupations.

Additionally, of all work-related traumatic fatalities, motor vehicle incidents caused the majority of them.

Occupational Health & Safety



HFSA

0 Lost-time Injuries
0 Deaths

With the many water treatment systems in Ontario that use HFSA, it is important to note that the Workplace Safety and Insurance Board (WSIB) reports that there have been zero lost-time injuries of municipal water systems workers related to fluoridation chemicals in the last five years and no deaths.

Municipal occupational health and safety risks and liability is far greater for motor vehicle operators than those exposed to fluoride.

If you accept Public Work's logic and "risk" argument, you would have to prohibit all employees from driving municipal vehicles. Is this realistic? No, of course not, because the benefits far outweigh the risk and you reduce municipal risks and liabilities by training your employees to be safe. The same is true with adding fluoride to the drinking water system.

Handling of HFSA



Water plant operators and engineers with proper education, training and maintenance of equipment can safely use fluoride additives, such as HFSA, to fluoridate drinking water.

Careful handling of HFSA is required as with a number of other chemicals/additives used in water treatment, such as hypochlorite or chlorine, quicklime, aluminum sulfate, sodium hydroxide and ferrous sulfate.



Consider those cities with fluoridation such as Toronto. 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.



The anti-fluoridationists will give examples of countries that don't fluoridate their drinking water supplies. What they don't tell you is that it is not because of safety concerns and they won't tell you that over 60 countries and 400 million people do have fluoridated water.

What I can also tell you is that there are examples closer to home in cities that don't fluoridate their drinking water. There is a problem.



A good example is Orillia. It has never fluoridated their water-elementary school children have the most severely decayed teeth among the 10 largest communities in Simcoe Muskoka, at a 66% higher decay rate than fluoridated areas in the region.

What Happens?



Public Health Costs &
Cavities Increase



Consider what happens when fluoride is discontinued in municipal drinking water systems. In general, cavities increase and costs increase especially to those least able to pay for them.

The findings of several studies, including one from the CDC, suggest that tooth decay generally increases in a population after water fluoridation is discontinued.

Other cities and municipalities have recently reaffirmed decisions to fluoridate their water supplies (Ontario: Atikokan, Halton, Hamilton, London, Norfolk, Sarnia, Toronto, Tottenham; Nova Scotia: Cape Breton).

Discontinuation of water fluoridation simply shifts the cost to those who are the least able to afford treatment and most vulnerable in our society; our children, our elderly, and our poor! The financial burden will simply put more pressure on publically funded dental programs like Healthy Smiles Ontario (HSO), Children in Need of Treatment (CINOT), as well as our social support systems.

What Happens?



- ✓ Cavities Doubled
- ✓ Water Fluoridation Re-introduced

In addition, a 2007 report on water fluoridation by the Institut National de Santé Publique du Quebec 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. Water fluoridation has since been reintroduced.

Just this past month, a study looking at the effects of stopping fluoridation in Calgary since 2011 for financial reasons pointed at a negative effect on dental health in children.

But, in keeping with good science, conclusions should not be drawn until it is properly reviewed.



I do understand and agree with you that research can often raise more questions than provide answers, especially when there are opposing opinions.

I know that we should be very careful before adding substances to our water supply. I share your concerns. If fluoridation were a brand-new idea, I would be the first person asking a lot of questions about its safety and effectiveness.

Parents have a lot of things to worry about. But many decades of research have demonstrated that fluoridation isn't one of them.



However, a certain amount of doubt is healthy. Science should be challenged and questioned.

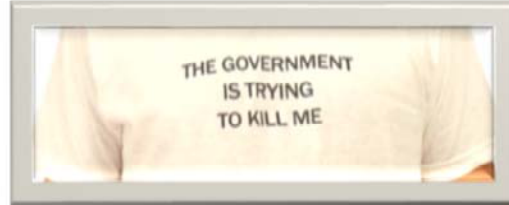


It is how we got here today.



But, change has to be founded on good science not opinion.

Anti-fluoride Movement



What does the anti-fluoride movement want you to believe?

Fluoride is toxic!

The anti-fluoridationists will present you with articles and the usual arguments based on unfounded fear, appealing to people's emotions but not with legitimate science.

Every mineral, element or chemical known to man is toxic if used in excessive amounts.

Toxicity?

- **Dose** = the amount ingested over a period of time



Toxicity of any substance is typically related to the level of exposure or dose (the amount ingested over a period of time).

Oxygen, water and salt, essential for life itself, will kill you if inhaled or ingested in excessive amounts.

Try drinking undiluted chlorine, which is currently added to the municipal drinking water system to prevent water borne diseases such as e-Coli, cholera, and typhoid. You will die.

So, based on the toxic logic professed by the anti-fluoride movement, the use of chlorine should also be banned. The point being, the benefits of adding chlorine or fluoride to our drinking water far outweigh the extremely low risk of adverse effects because the chlorination and fluoridation processes are carefully monitored and controlled to ensure they are safe.

By-products of the Fertilizer Industry!



It's common



It's safe



Fluoridation additives are by-products of the phosphate fertilizer industry!

Hydrofluorosilicic acid (HFSA), the substance added to drinking water, is a by-product of the phosphate industry. It is not uncommon for by-products of one industry to be used in other products of a different industry.

For example, there are numerous by-products of the oil industry that are widely used in society, including: capsules for vitamins, food preservatives, antihistamines and toothpaste.

Harmful to the Environment?



✓ **No** association between water fluoridation and a negative impact on people, plants, or animals



✓ **No** untoward effects from fluoridation on the environment

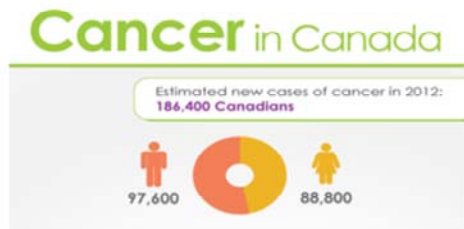
Industrial-grade fluorides are harmful to animals and the environment!

Multiple studies have found that water fluoridation is safe for the environment, and poses no risk to plants and animals. The Centers for Disease Control and Prevention stated the following: The safety of fluoride in drinking water at levels recommended for preventing tooth decay has been affirmed by numerous scientific and professional groups.

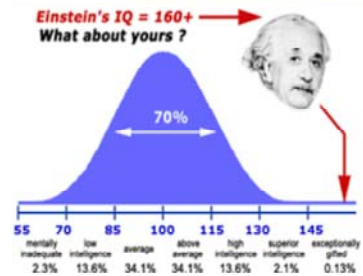
Scientists have found a lack of evidence to show an association between water fluoridation and a negative impact on people, plants, or animals.

Recently in 2011, the European Union Scientific Committee on Health and Environmental Risks (SCHER) concluded that the evidence did not demonstrate any untoward effects from fluoridation on the environment.

Cancer! Fractures! Lower I.Q. !



✓ **No association** based on a
Maximum Allowable Concentration
(MAC) = 1.5 mg/L



Studies show that fluoride causes cancer, bone fractures and lower intelligence levels!

A number of claims have been made for many years in various media in relation to water fluoridation and potential health issues. The weight of evidence does not support a link between exposure to fluoride in drinking water and bone fracture, intelligence quotient, skeletal fluorosis, immunotoxicity, reproductive toxicity, genotoxicity or neurotoxicity based on a Maximum Allowable Concentration (MAC) of 1.5 mg/L.



This is an appropriate time to examine a very important aspect of this controversy. How do you assess the validity of the scientific literature? Who is qualified to do this?

Assessing the literature is complex undertaking and has to be carefully reviewed by panels of skilled experts from many disciplines looking at all of the recent evidence, both positive and negative to reach any meaningful conclusions.

And let me reassure you, fluoridation has been reviewed many times and the same conclusion has been reached. Fluoridation is safe and effective in reducing cavities for children and adults.

Selective vs. Systematic Reviews

“Selective” Review

- Prove a point
- Picks and chooses articles
- No quality criteria
- Not specific



“Systematic” Review

- ✓ Published literature retrieved
- ✓ Reviewed for quality
- ✓ Summarized by experts
- ✓ Results synthesized to draw conclusions by groups of experts

Selective reviews of scientific studies have been conducted by anti-fluoridation groups in an attempt to show that fluoride is not effective and/or not safe. These reviews aim to prove certain points by citing studies supporting those points. To do so, selective reviews ignore a significant majority of the studies and should never be used to inform decision makers.

On the other hand, systematic reviews of scientific literature are an important resource for decision makers to judge the safety of community water fluoridation.

These types of scientific reviews are helpful because they—

- Consider evidence from published studies on a subject.
- Use carefully-designed methods to critically examine scientific evidence.
- Use national and international panels of experts in various health and scientific disciplines. This includes experts that may come from fields outside of oral health; such as, medicine, biophysics, chemistry, toxicological pathology, and epidemiology.
- Judge the quality of individual studies and summarize the strength of the entire body of evidence.
- Identify and summarize research gaps and make recommendations for further research.

This rigorous analysis is complex and confusing. That is why it is a team or panel of experts from credible, trusted, unbiased organizations on a provincial, national and international level that undertake systematic reviews of the literature, draw conclusions and make recommendations.

Systematic Reviews

- Systematic Review of Water Fluoridation. UK/International study, 2000
<http://www.bmj.com/content/321/7265/855.full>
- Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States. US Department of Health and Human Services Centers for Disease Control and Prevention, 2001
<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm>
- A Systematic Review of the Efficacy and Safety of Fluoridation. National Health and Medical Research Council, Australian Government, 2007
<http://www.nhmrc.gov.au/publications/synopses/eh41syn.htm>
- Findings and Recommendations of the Fluoride Expert Panel, health Canada, January 2007
<http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/2008-fluoride-fluorure/index-eng.php>

This is a formidable list of international systematic reviews including those from Canada.

Health Effects of Water Fluoridation. An Evidence Review. Ireland, 2015

http://www.hrb.ie/uploads/tx_hrbpublications/Health_Effects_of_Water_Fluoridation.pdf

Systematic Review of Water Fluoridation. UK/International study, 2000

<http://www.bmj.com/content/321/7265/855.full>

Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States. US Department of Health and Human Services Centers for Disease Control and Prevention, 2001

<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm>

A Systematic Review of the Efficacy and Safety of Fluoridation. National Health and Medical Research Council, Australian Government, 2007

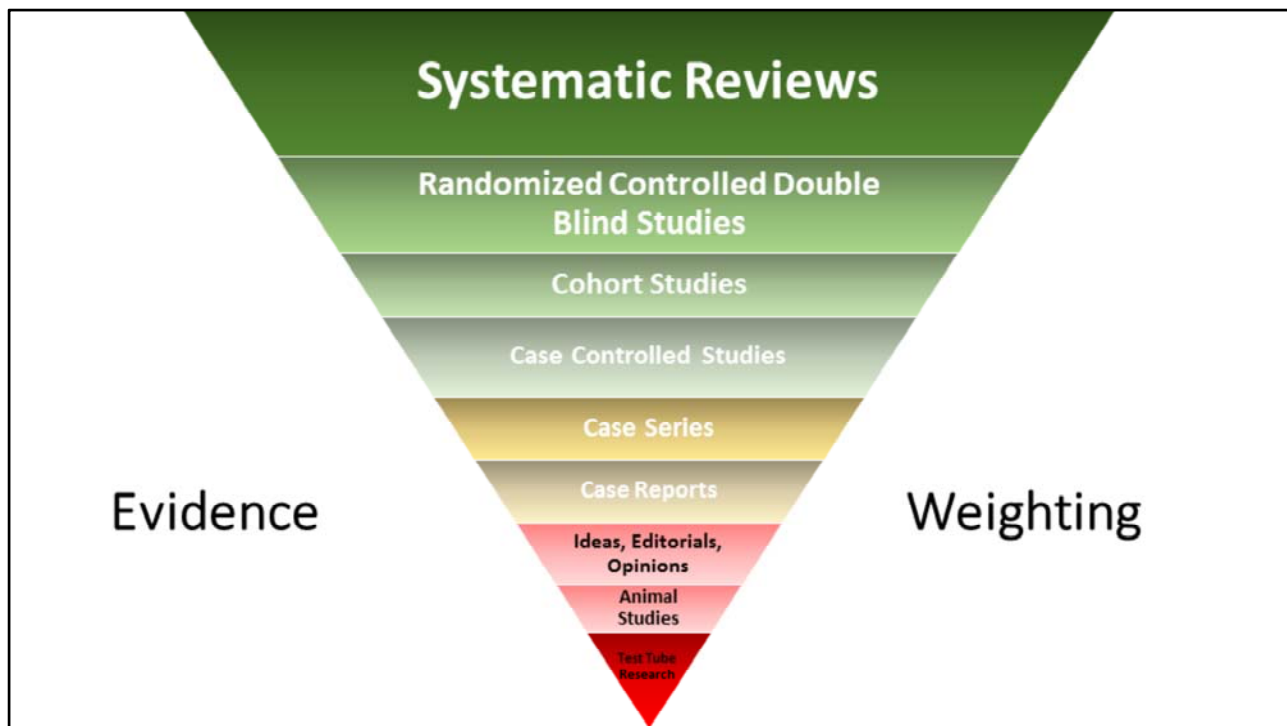
<http://www.nhmrc.gov.au/publications/synopses/eh41syn.htm>

Findings and Recommendations of the Fluoride Expert Panel, Health Canada, January 2007

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



It is also important to look at the quality of the studies. Studies of high quality should be weighted more heavily than low quality studies.



Well-designed systematic reviews are at the top, are the highest quality, carry the most weight and should be used to inform decision makers.

Personal opinion and rat studies are at the bottom which is exactly how much attention should be paid to them.

Vigilance & Scrutiny



Developmental Fluoride Neurotoxicity:
A Systematic Review and Met-Analysis

[Environmental Health Perspectives. 2012 October, 120 (10)]

However, we must always be vigilant and scrutinize even the most reputable institutions to ensure that systematic reviews and meta-analyses are properly conducted. Credibility should not be assumed. That is why peer review is so important.

A good illustration is a recently published systematic review and meta-analysis out of Harvard in October of 2012. They concluded that their results supported the possibility of an adverse effect of high fluoride exposure on children's neurodevelopment.

Criticism

- Harvard faculty – Study flawed
- Publication Bias: 26/27 selected were negative to start
- Excessive natural fluoride levels in China, Mongolia and Iran – 16 X
- Extrapolation to North America invalid
- Measured I.Q. differences only ½ point – meaningless
- I.Q. Confounding factors not accounted for (arsenic levels, genetics, socioeconomic status, school quality, nutrition, parent's education levels, different intelligence measured across 27 studies)

Upon review, the study was heavily criticized even by other Harvard faculty. The analysis was flawed.

The studies included in the review were conducted in China, Mongolia and Iran where the natural fluoride levels were excessive in the order of 16 times what our exposure level is so inferring that the study's conclusions apply to the North American population is invalid.

The measured difference in I.Q. was only a half-point which experts deemed to be meaningless. The authors were criticized for publication bias which means that they only chose negative studies and ignored positive studies.

Even a good meta-analysis of badly designed or biased studies still results in bad statistics.

Criticism

Authors admitted:

- “actual exposures of individual children not known”
- “the decrease in average I.Q. is small and within measurement error of I.Q. testing”
- “each of the [studies] reviewed had deficiencies, in some cases rather serious, which limit the conclusions that can be drawn”
- “studies were cross-sectional, (...) key information was missing”
- “these results do not allow us to make any judgement regarding possible levels of risk at levels of exposure typical for water fluoridation in the U.S.”

To be fair even the authors admitted deficiencies of their review.

They stated, “each of the [studies] reviewed had deficiencies, in some cases rather serious, which limit the conclusions that can be drawn.”
“Studies were cross-sectional, key information was missing.”

They further revealed that the actual fluoride exposures of the individual children are not known and that the estimated decrease in average I.Q. is small and within measurement error of I.Q. testing (0.45 over a range of 20 to > 140 or more that was not standardized among the studies).

They also stated that “these results do not allow us to make any judgement regarding possible levels of risk at levels of exposure typical for water fluoridation in the U.S.”

Does Water Fluoridation at Optimal Levels affect Brain Function or I.Q. Levels?



There is **NO** accepted scientific evidence establishing a **causal relationship** between optimal fluoride consumption and brain function or I.Q.

Does Water Fluoridation at Optimal Levels affect Brain Function or I.Q. Levels? No!

Among other things, this case illustrates that one review or article taken at face value even from credible sources should never be used to make important policy decisions. One must consider a comprehensive analysis of the scientific literature both positive and negative results in order to make informed decisions.

What is clear is that scientific and public health organizations have conducted comprehensive scientific reviews about fluoridation during the past two decades. These reviews which included both positive and negative outcomes provide consistent and compelling evidence that community water fluoridation at the recommended levels is a safe and effective method for reducing tooth decay across all ages.



Essentially, the anti-fluoridation groups are asking politicians to evaluate the authenticity and validity of a select fraction, all negative, of the large volume of material that was recently evaluated by Health Canada and others, and to then arrive at a different conclusion than these experts.

When fluoride is used at the recommended levels for community water fluoridation it has proven to be safe, effective and not associated with health risks.

Does it cause fluorosis of the teeth? Yes.

Fluorosis



Normal
Very Mild



Questionable
Mild



Fluoride causes dental fluorosis!

That is correct. So let's understand the issue and put it into the proper perspective.

Dental fluorosis is a change in the appearance of the tooth's enamel and does not affect its function. These changes can vary from barely noticeable white spots in mild forms to staining and pitting in the more severe forms.

Dental fluorosis only occurs when younger children consume too much fluoride, from any source, over long periods when teeth are developing under the gums.

In Ontario, the greatest risk for dental fluorosis is from the ingestion of toothpaste by children. Only children aged 8 years and younger can develop dental fluorosis because this is when permanent teeth are developing under the gums.

If fluorosis occurs, it is mild and may likely be only detected by a dentist.

Fluorosis



Moderate



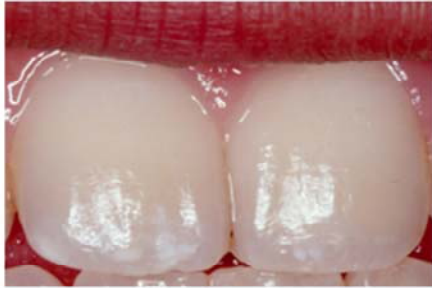
Severe

Canadian Health Measures Survey: “too low to permit reporting”

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.”

Fluorosis vs. Decay



In other words, the tooth decay in children that would result from not having fluoride in the your water system is far more damaging than the small risk of barely noticeable white spots on a child's tooth.

Is it Your Right to Choose?



People have the right to choose whether or not they ingest fluoride.

Now we are getting closer to the actual substance of the controversy. It is not about toxicity. It is not about the environment. It is not about adverse health effects. The scientific evidence simply does not support any of these claims. This is about having the right to decide what is in the water they drink and about control.

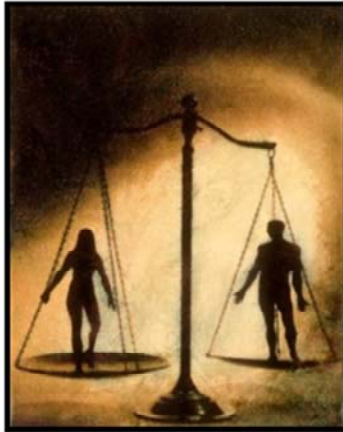
Canadian society has established a core set of values which balance individual autonomy with societal good. Canadians accept that some public policies must put the common good above the desires of some individuals. Current examples include legislation governing smoking in public places, seat belt use, infant car seats, and minimum drinking age to name a few.



Drinking fluoride-free water, which in fact does not exist, is not a basic human right but a question of individual preference. There is no such thing as the right to drink fluoride-free water.

Our water supply belongs to the community and nearly 70 years of experience and research prove that fluoridation is a smart choice for reducing tooth decay. It should not be an individual choice because that would deprive the whole community of a proven form of prevention.

Society is Not Equal



Choice, opportunity and health are not equally distributed across society. Water fluoridation benefits all residents in a community and those people of low socio-economic status benefit most as they are least likely to receive the benefits of fluoride through other means such as brushing their teeth or visiting a dentist's office for topical application of fluoride.

Population Preventive Health Interventions



Community water fluoridation addresses health inequities. It is similar to other population wide preventive health interventions such as:

- Iodine supplementation of table salt to prevent thyroid disease
- Vitamin D supplementation of milk to prevent rickets
- Vitamin C in some beverages for healthy tissues
- Chlorination of drinking water to prevent water borne diseases such as E. coli, cholera and typhoid
- Mandatory Vaccinations

Conclusions

- ✓ Water fluoridation is safe
- ✓ Water fluoridation is effective and cost-effective
- ✓ Water fluoridation reduces health inequities
- ✓ Water fluoridation is carefully monitored
- ✓ Water fluoridation poses minimal OH&S risk to staff



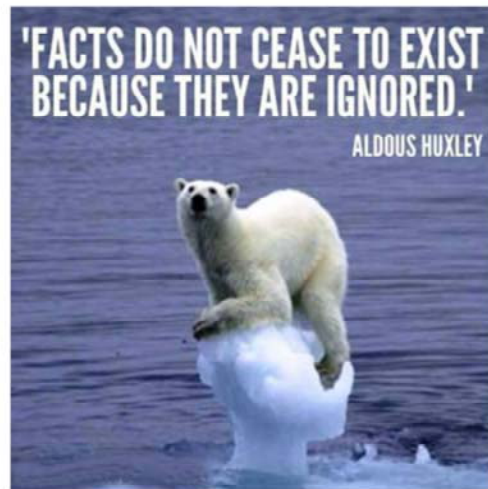
To summarize, what are we able to conclude?

Dental disease is the single most common chronic disease in Canadians but it is declining because of a comprehensive preventive oral health strategy in which municipal water fluoridation plays a significant role.

Removing fluoride from municipal drinking water systems leads to more cavities and cost especially for the most vulnerable in our society.

Water fluoridation is an effective public measure that reduces inequalities in health and benefits all residents in a community.

Well designed systematic reviews by experts qualified to do them have consistently demonstrated that water fluoridation at the levels we current use and monitor carefully is safe, beneficial and cost-effective. That is why so many provincial, national and international organizations continue to support the fluoridation of municipal drinking water systems.



Those against fluoridation are asking politicians to do what they have done.

- Ignore the well-designed systematic reviews
- Ignore the more than 90 organizations that recommend fluoridation
- Ignore the most vulnerable and disadvantaged in society
- Ignore the fact that children, the poor and elderly will be the ones suffering physically, emotionally and financially



As politicians, you often rely upon external expertise to provide analysis and recommendations. For matters pertaining to public health, governments have established local, provincial, federal and international public health agencies to promote wellness, prevent disease, and protect the public's health. These public health agencies provide the expert analysis of current scientific data that governments rely upon to make informed decisions regarding the health of their constituents.

As with other issues of public health policy, there are individuals and organizations who disagree with the conclusions and recommendations of public health agencies regarding water fluoridation. Councils, such as you, periodically receive correspondence from concerned citizens asking that fluoridation be discontinued. Such correspondence typically contains references to purported adverse health effects associated with fluoridation. The authors of such correspondence are essentially asking Council to evaluate the authenticity and validity of a select fraction of the large volume of material that was recently evaluated by Health Canada, and to then arrive at a different conclusion than the Health Canada experts. In essence, Council is being asked to disregard the expert analysis and recommendations of local, provincial, federal and international public health agencies.



Single most common chronic disease among Canadians of all ages

As Medical Officer of Health of the North Bay Parry Sound District Health Unit I am recommending that Council not abandon the practice of relying upon the expertise provided by our public health officials, respected dental, medical and scientific organizations; but rather, that Council affirm its confidence in the integrity and recommendations of the World Health Organization, the Centers for Disease Control and Prevention, Health Canada, Ontario's Chief Medical Officer of Health and myself, and thus support the ongoing fluoridation of our municipal drinking water systems.

Conclusions

Good oral health => Good overall health



Good oral health is essential to good overall health.

Thank you for your time and attention.

