7.1(b)(i)

Document 1

City of Hamilton

Examining the Risks of Artificial Water Fluoridation

Meeting of the Board of Health April 16, 2012

Information submission by: Sheldon Thomas
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Good day, Mr. Mayor and Hamilton Councillors.

My name is Sheldon Thomas.

I am a retired Manager of Water Distribution for the City of Hamilton.
I am also the principal of 'Clear Water Legacy', a company that trains water system operators across the province.

I am writing to strongly advise against Hamilton's continuance of the practice of artificial water fluoridation.
In fact, the word 'artificial' should be your first red flag.

Prove it!

A number of red flags were raised last January in the Region of Peel. Faced with the Medical Officer of Health's recommendation to continue the practice of water fluoridation, the mayors and councillors of Peel Region, led by highly-respected Mississauga Mayor Hazel McCallion, voted to go a different direction.

Peel's response to the MOH and to Health Canada's Chief Dental Officer was along the lines of, 'We've have heard the claims, now provide the *proof*'.

The mayors and councilors drafted a resolution requiring:

- That Health Canada provide absolute proof that HFSA (fluorosilicic acid) is safe for use in drinking water
- That randomized, double-blind toxicological tests be conducted on HFSA as a single chemical
- That Health Canada designate HFSA a drug (it is used for the single purpose of reducing dental caries, a disease by definition), and regulate it as such.
- That at least one properly conducted, double blinded, randomized, placebo-controlled clinical trial be conducted to prove that water fluoridation works to reduce cavities, as claimed. **See appendix A**

The Region of Peel will certainly share the results of that resolution with all communities, if, and when, answers emerge.

Promoting fluoridation

On April 16th fluoridation will be promoted again in Hamilton as something that your community *needs* to reduce caries (cavities).

You will hear about the 90 national and international organizations that endorse artificial water fluoridation. But you will *not* be told that 46 of the 90, half of that group, are *dental* organizations.

Those 46 dental organizations will again invite Hamilton residents to swallow a small concentration of fluoride (a known protoplasmic poison 1) *for a lifetime*, with absolutely no regard for what the fluoride ion can do after it enters the bloodstream and is shared throughout the entire body.

A strong contingent of dentists and dental hygienists usually attends municipal fluoridation debates, passing along their message that fluoridation is essential for cavity control, and that adding 0.7 ppm of fluoride ion to drinking water is absolutely safe.

Please do not lose sight of this one fact ... dentists are experts in conditions that exist among the bones, teeth and soft tissue *within the oral cavity.*
We need them to be as good as they are .. *in that area.*

But there is no dental school on this continent that teaches any dentist, in any dental discipline, the biological effects of turning the fluoride ion loose against the bones, soft tissue, organs and cells throughout the rest of the body.

Dentists do not have the specific training or knowledge base to assure you that ingested fluoride is either *safe* or *effective*.

Toxicologists, biochemists, teratologists and pharmacologists are included among the professionals who *do know* the fluoride ion.
They can present to you a library of animal and clinical studies that link fluoride to a long list of diseases and debilitating conditions. 2

It is just inconceivable to expect the fluoride ion, the most aggressive electro-negative non-metallic element on earth, to find its way from the stomach directly to the teeth without seeking targets to bond with along the way.
With every bonding, fluoride alters or corrupts a bodily mechanism, creating substantial biological change.

Fluoride bonds strongly with every chemical, metal and mineral in its path. The only thing that it does not bond with is itself.
There is no reason to believe that the fluoride ion will spare the human body.

It's also inconceivable that Health Canada can claim, in the face of all of the emerging studies that point to fluoride harm, that there is "no credible evidence" that fluoride causes anything worse than mild dental fluorosis. 3

The claimed benefits

If there are any benefits to the use of fluoride to reduce cavities, the Centers for Disease Control (CDC) and the American Dental Association (ADA) state that fluoride's benefit is primarily *topical .. applied* to the surface of the tooth, and not systemic (swallowed in drinking water).

The CDC has held that position for better than 13 years. The CDC has also issued findings that state that it is not established that higher fluoride content in tooth enamel will prevent cavities. 4

Yet the CDC remains the most cited pro-fluoridation agency on the 'List of 90'.

It might help you to know that all pro-fluoridation statements credited to the CDC are, in fact, the sole opinion of the Oral Health (Dental) Division of the CDC.
No other scientific or medical arm of the CDC is invited to study, or to comment on, the health effects of artificial water fluoridation.

A Statistics Canada Report, compiled between 2007 and 2009, studied dental caries rates between the virtually non-fluoridated province of Quebec and heavily-fluoridated Ontario.

If fluoridation works as promoted, readers of that report would have expected to see the caries reduction among fluoridated Ontario youth in the oft-quoted range of 25% to 40%, compared to those studied in Quebec.

Statistics Canada, instead, reported that fluoridated Ontario children had virtually the same cavity rates as those in non-fluoridated Quebec.
The difference in cavity rates between the two provinces amounted to less than ½ a cavity per child .. almost statistically insignificant. 5

There are serious risks associated with artificial water fluoridation, particularly from the chemical that Hamilton currently places into its drinking water.
To even *consider* living with those risks, one has to be convinced that there is *great* benefit.

A possible savings of less than a half a cavity per child is not a strong enough benefit to warrant exposing your residents to the injury that fluoride can cause.

There are dozens of studies, assembled from all over the world, that show there to be no correlation between artificial water fluoridation and cavity reduction. 6

Even Health Canada's own 2008 review of fluoridated water failed to identify even one double-blinded, randomized clinical trial to prove that fluoridation works, after correcting for diet and delay in tooth eruption. 7

You drink natural fluoride anyway ..

It will be suggested to you that water fluoridation is just a means of 'topping up' the already present levels of natural fluoride that exists in Hamilton's source water.

The *natural* mineral in surface and ground water is calcium fluoride.
If you decide to continue artificial water fluoridation, you will not be topping up calcium fluoride with *more* calcium fluoride.

The fluoridating chemicals being used across Ontario are primarily synthetic silicofluorides, such as sodium fluoride (used in smaller systems mainly, but expensive), hydrofluorosilicic acid and hexafluorosilicic acid (shortened, HFSA or fluorosilicic acid).

Hamilton's chemical of choice is hydrofluorosilicic acid (HFSA).

These chemicals are category 1 toxins, and extremely dangerous to handle.
They are primarily the waste byproducts of the phosphate fertilizer industry in the southern states.
Arriving by specially modified tanker trucks, these chemicals can be polluted by any of a dozen contaminants, including lead, arsenic, and mercury. 8

The USEPA classifies lead as a 'probable human carcinogen', likely to cause cancer. 9
It classifies arsenic as an outright 'human carcinogen'. 10

Lead and arsenic are nearly always on the chemical 'certificates of analysis' for HFSA shipments sent to water plants. **Appendix B**
They are there in *very* small concentrations (parts per million), and will later be highly diluted in drinking water, but dilution will not make them disappear.

Arsenic and lead, as well as fluoride itself, are persistent bio-accumulative toxins which build up in the human body over time.

HamiltOn
Water is Life

Artificial water fluoridation would require Hamilton residents to absorb those 'insignificant' carcinogens *for a lifetime*, in the fluoridated water that they drink, from the foods that are prepared in fluoridated water, and through the pores of their skin at every fluoridated shower and bath.

Those who drink and absorb more water than most (children, athletes, diabetics, labourers) will have an understandably greater exposure to these 'insignificant' contaminants.

There are no studies to predict how many *additional* cancers are going to be created in a community that allows its residents to drink and cook with fluoridated water that is further corrupted by these trace contaminants.

There are also no studies to suggest that the number of *additional* cancers will be zero.

Unfortunately, no one *makes*, and no one *sells*, pure HFSA.

According to the AWWA B703 Fluorosilicic Acid Standard, Hamilton *could* ask the chemical plants in the states to remove all of the dozen or so trace contaminants in the chemical shipments to this city. 11
But Hamilton, the purchaser, would have to advise the plants as to *how* removal is to be carried out, and the costs of the 'purified' product would certainly sky-rocket.

Hamilton would also have to be especially careful that all radioactive contaminants (radionuclides) are removed from the chemical 'batch' that supplies their shipments.

Uranium is often present in the phosphate rock that is ground up, processed and cooked in sulfuric acid to make super phosphate fertilizer.
Radioactive uranium is commonly released in the process.

The city will be told that radioactive readings at the plants are below detection. 12
At some point, the City of Hamilton may learn that the chemical plants that make HFSA are inspected, and the batch contaminants measured, *only once a year.* 13

Hamilton is not *compelled* to fluoridate

There is no wording in the Fluoridation Act that compels any municipality to artificially fluoridate its drinking water. The Act simply states that it is legal to do so, should it be done. It remains a voluntary decision of the municipality.

Hamilton may elect to continue fluoridation, but the City should know that it stands alone to face the consequences of that decision, and the consequences of voluntarily electing to administer into the drinking water of its citizens a chemical that has not been proven safe for such a use.

Going into this decision, Hamilton should understand that no government or health agency in Canada regulates, takes ownership of, or is accountable for the use of any fluoridation chemicals in common use today.

Fluorosilicates are being fed to millions of Canadians, even though there has never been a single toxicological study or clinical trial performed on these chemicals to prove that they are safe for short or long-term ingestion.

Health Canada has been forced to admit that it does ***no*** research on HFSA. 14
It relies primarily on its own internal reviews of research done elsewhere.

Unfortunately for Health Canada, there has been very little research into the health effects of HFSA to support its position that the chemical is safe for use in drinking water.

In 2001, the US EPA admitted, under oath before the US Congress, that it had **"no information on the effects of silicofluorides on health and behavior."** 15

The entire Scientific and Technology Arm of the USEPA could not come up with *anything*, even though proponents had claimed for 60 years that hundreds, maybe thousands, of studies existed, all proving that artificial water fluoridation was safe.

Despite a subsequent 2002 EPA Request For Assistance (RFA) for further research into the safety of HFSA and other silicofluorides, no useful information has surfaced to date.

If the fluoridation chemicals cannot be proven safe, then the practice of water fluoridation cannot be proven safe.

Legal actions ahead

Hamilton councillors should be forewarned that legal actions have commenced in the United States against municipalities and water authorities that have chosen to impose artificial water fluoridation upon their residents. **16**

Lawyers are charging water authorities, *and others*, with :

- non-disclosure of the injurious side-effects of fluoride
- illegal use of an untested chemical in drinking water
- misrepresentation of the benefits of fluoridation
- suppression of data that would have proven fluoridation hazardous

As these lawsuits gain traction south of the border, similar charges may be filed in Canadian jurisdictions.
The City of Hamilton may be wading back into the fluoridation waters just as those waters are beginning to heat up.

Separate fact from promotion

Mr. Mayor and councillors, I ask you to put on a doubter's face throughout the entire Board of Health proceedings of April 16, 2012.
Demand proof of everything spoken, and written.

If water fluoridation is as safe and effective as Health Canada states, then demand proof of both.
If proof exists, then you shouldn't have to wait too long.
But be willing and ready to examine carefully all that is presented as 'proof'.

On the issue of artificial water fluoridation, you would be well-advised to follow Mayor McCallion's lead.

With respect,

Sheldon Thomas
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references follow

References

1. *Journal of the American Medical Association*, Sept 18, 1943, Editorial.
"Fluorides are general protoplasmic poisons, probably because of their capacity to modify the metabolism of cells by changing the permeability of the cell membrane and by inhibiting certain enzyme systems. The exact mechanism of such actions is obscure."

2. **Cancers** Taylor A, Taylor NC. (1965). 'Effect of sodium fluoride on tumor growth'. Society for Experimental Biology and Medicine 119:252-255.

Coronary artery disease 'Association of vascular fluoride uptake with vascular calcification and coronary artery disease' Yuxin Li, Gholam R Berenji et al., Nucl Med Commun. 2012 Jan ;33(1):14-20. PMID: "There was significant correlation between history of cardiovascular events and presence of fluoride uptake in coronary arteries."

Increased bone fracture in both the young and the elderly Riggs BL, et al. (1990). Effect of Fluoride treatment on the Fracture Rates in Postmenopausal Women with Osteoporosis. New England Journal of Medicine 322:802-809.

Calcification (stiffening) of tendons and joints, arthritic symptoms Bang S, et al. (1985). Distribution of fluoride in calcified cartilage of a fluoride-treated osteoporotic patient. Bone 6: 207-210.

Brain injury producing Alzheimer's-like symptoms 'Chronic administration of aluminum–fluoride or sodium–fluoride to rats in drinking water: alterations in neuronal and cerebrovascular integrity', Julie A. Varner et al., *Psychology Department, Binghamton University, Binghamton, NY, USA* 1997

Reduced IQ Li Y, et al. (2003). The effects of endemic fluoride poisoning on the intellectual development of children in Baotou. Chinese Journal of Public Health Management 19(4):337-338.

Attention deficit disorders Dr. Phyllis J. Mullenix, Toxicology Department Forsyth Research Institute, Boston, MA., 'Neurotoxicity of Sodium Fluoride in Rats', 1995

Enzyme poisoning "There is plenty of evidence to indicate that fluorine in the amount of 1 ppm or slightly more interferes with enzyme systems and these enzyme systems are involved in the growth of bones, in the functioning of nerve tissue and so forth. It is clear that fluoridation is a calculated risk." Dr. Robert S. Harris, Ph.D, Director of Nutritional Biochemistry Laboratories, Massachusetts Institute of Technology.

Hypothyroidism "In humans, effects on thyroid function were associated with fluoride exposures of 0.05-0.13 mg/kg/day when iodine intake was adequate and 0.01-0.03 mg/kg/day when iodine intake was inadequate." National Research Council (2006) Fluoride in Drinking Water: A Scientific Review of EPA's Standards, p 218.

Elevated lead uptake into the bloodstream 'Fluoride increases lead concentrations in whole blood and in calcified tissues from lead exposed rats', Sawan RM et al., 2010, Journal Toxicology, pg 21-26

Depleted immune systems Gibson, 1992, Effects of Fluoride on Immune System Function, Complementary Medical Research, Issue 6, pg 11-113; Sutton P, 1991, 'Is the Ingestion of Fluoride an Immunosuppressive Practice?', Medical Hypotheses 35, 1-3,

Alarming prevalence of dental fluorosis (mottled, discoloured and porous tooth enamel) "An increase in fluoride content and decrease in calcium content in fluorosed human teeth were observed when compared to the control." Susheela AK, Bhatnagar M. 1999. Structural aberrations in fluorosed human teeth: Biochemical and scanning electron microscopic studies. *Current Science* 77: 1677-1680.

"Fluorosed enamel has a reduced amount of mineral when compared with control enamel." Denbesten PK, et al. 1985. Changes in the fluoride-induced modulation of maturation stage ameloblasts of rats. *Journal of Dental Research* 64: 1365-70.

3. Health Canada Statement on Fluoride in Drinking Water June 23, 2011 "Currently available peer-reviewed scientific studies continue to indicate that there are no adverse health effects from exposure to fluoride in drinking water at or below the maximum acceptable concentration."

4. "The prevalence of dental caries in a population is not inversely related to the concentration of fluoride in enamel, and a higher concentration of enamel fluoride is not necessarily more efficacious in preventing dental caries."

Centers for Disease Control and Prevention (2001) 'Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States' *Morbidity and Mortality Weekly Report* 50(RR14): 1-42.

5. Globe and Mail, Martin Mittelstaedt, Thursday, Apr. 15, 2010, "After a request from The Globe and Mail for a breakdown of the cavity rates by province, Statistics Canada tabulated the figures for Ontario and Quebec. Results showed that if fluoridation is the only major difference between the two provinces, the chemical is preventing fewer than half a cavity per child in Ontario. Health Canada down played the significance of the findings."

6. Foulkes RG, Review of Report: Investigation of Inorganic Fluoride and its Effect on the Occurrence of Dental Caries and Dental Fluorosis in Canada -- Final Report

Centers for Disease Control and Prevention (2001) Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States. *Morbidity and Mortality Weekly Report* 50(RR14): 1-42.

The largest study of tooth decay in America, by the U.S. National Institute of Dental Research in 1986-1987, showed that there was no significant difference in the decay rates of 39,207 fluoridated, partially fluoridated, and non-fluoridated children, ages 5 to 17, surveyed in the 84-city study. *("New Studies cast doubt on fluoridation benefits," by Bette Hileman, Chemical & Engineering News. Vol 67, No. 19, May 8,1989).*

The observed world-wide decline in tooth decay over the past four decades has occurred at the same rate in areas that are not fluoridated as in areas that are. *("The Mystery of Declining Tooth Decay", Mark Diesendorf. Nature, July 10, 1986, pp. 125-129).*

"Agreement is universal that excessive fluoride intake leads to loss of calcium from the tooth matrix, aggravating cavity formation throughout life rather than remedying it, and so causing dental fluorosis."
UNICEF's Position on Water Fluoridation; Water, Environment & Sanitation.
(www.unicef.org/programme/wes/info/fluor.htm)

Dr. Richard Foulkes, special consultant to the B.C. Minister of Health, wrote in 1992: "There is evidence that fluoridation does not prevent tooth decay and may cause serious illness, birth defects and premature death."

Dr. John Colquhoun, former Principal Dental Officer, Auckland, New Zealand : "I looked at the new dental statistics that had been collected while I was away for my own Health District, Auckland. These were for all children attending school dental clinics — virtually the entire child population of Auckland. **To my surprise, they showed that fewer fillings had been required in the non-fluoridated part of my district than in the fluoridated part.** When I obtained the same statistics from the districts to the north and south of mine — that is, from "Greater Auckland," which contains a quarter of New Zealand's population — the picture was the same: tooth decay had declined, but **there was virtually no difference in tooth decay rates between the fluoridated and non-fluoridated places. In fact, teeth were slightly better in the non-fluoridated areas**. I wondered why I had not been sent the statistics for the rest of New Zealand. When I requested them, they were sent to me with a warning that they were not to be made public. Those for 1981 showed that in most Health Districts the percentage of 12- and 13-year-old children who were free of tooth decay - that is, had perfect teeth - was greater in the non-fluoridated part of the district."

BENEFITS AND RISKS OF WATER FLUORIDATION.. An update of the 1996 Federal-Provincial Sub-committee Report Prepared under contract for:
Public Health Branch, Ontario Ministry of Health, Dr David Locker, Community Dental Health Services Research Unit, Faculty of Dentistry, University of Toronto, November 15, 1999 ..
" Although current studies of the effectiveness of water fluoridation have design weaknesses and methodological flaws, the balance of evidence suggests that rates of dental decay are lower in fluoridated than non-fluoridated communities. **The magnitude of the effect is not large in absolute terms, is often not statistically significant and may not be of clinical significance.**"

7. Statement of Dr. Hardy Limeback BSc, PhD, DDS, Professor and Head, Preventive Dentistry, Faculty of Dentistry University of Toronto, Nov. 15, 2011
   http://www.hc-sc.gc.ca/ewh-semt/pubs/watereau/ 2008-fluoride-fluorure/index-eng.php

8. NSF Fact Sheet on Fluoridating Chemicals, Table 1, pg 7

9. USEPA Integrated Risk Information System (IRIS), Lead and Compounds (inorganic) (CASRN 7439-92-1), 11.A.: Evidence for Human Carcinogenicity .. Classification B: 'probable human carcinogen'

10. USEPA Integrated Risk Information System (IRIS), Arsenic (inorganic)(CASRN 7440-38-2) 11.A.: Evidence of Human Carcinogenicity .. Classification A: human carcinogen

11. AWWA Standard B703 Fluorosilicic Acid, Sec. 4.3 *Impurities,* 4.3.4 Additional Impurity Limits

12. NSF International July 2007 letter by Stan Hazan, General Manager, NSF Drinking Water Additives Certification Program, to Congressman Ken Calvert, Chairman of the Subcommittee on Energy and the Environment Committee on Science, U. S. House of Representatives

13. NSF/ANSI 60-2009 Drinking Water Treatment Chemicals – Health Effects

14. Petition: No. 221B, Office of the Auditor General of Canada, Petitioner: Carole Clinch
    Health Canada response to Q7, Q8, Q9, Q10, Q13, Q19:
    "Health Canada does not conduct research on the chemistry of fluoride species."

15. "Masters and Coplan, besides showing that silicofluorides are probably increasing lead in children, have discovered a 1975 Ph.D. thesis in German showing that silicofluorides are far from completely dissociate in water, and these partially dissociated residues are potent acetyl cholinesterase inhibitors. **As a result of their work, EPA was forced to admit to Congressman Calvert that they have absolutely "no information on the effects of silicofluorides on health and behavior."** \
Further, EPA officials now admit that they are not sure that hydrofluosilicic acid completely dissociates when added to water supplies and are planning on studies to determine what does happen. Silicofluorides have been added to drinking water supplies for 50 years without any idea of the possible consequences."
Robert J. Carton, Ph.D. Chief, Environmental Protection Office of Regulatory Compliance & Quality U.S. Army Medical Research & Material Command

16. SAN DIEGO, Aug. 10, 2011 /PRNewswire/ -- Alleging willful misrepresentation and deceptive business practices by Metropolitan Water District of Southern California, attorneys for citizen/consumers from San Diego, Los Angeles and Ventura Counties filed a lawsuit in the public interest of millions of consumers in Southern California, citing that MWD of SoCal has made claims of safely and effectively treating and preventing dental disease in recipient consumers, while selecting and delivering a hydrofluosilicic acid drug through their water system that has never been approved for safety and effectiveness, nor in the expected dosages delivered by MWD through retail water districts, either topically, systemically through ingestion, or trans-dermal exposures through baths and showers.

Appendix A

Resolution

Date: January 12, 2012

Moved By: Councillor Mullin
Seconded By: Councillor Sprovieri

That the Region of Peel request that Health Canada regulate the fluorosilicates hexafluorosilicic acid (H2SiF6) and sodium silicofluoride (Na2SiF6), used as a treatment for dental cavities in drinking water, as drugs under the Food and Drugs Act;

And further, that all chemicals, especially fluorosilicates, added to drinking water for the purpose of treating dental decay undergo new drug applications and be assigned drug numbers by Health Canada;

And further, that classification of fluorosilicates as drugs shall be based on at least one long-term toxicology study to determine health effects in humans;

And further, that at least one properly conducted, double blinded, randomized placebo controlled clinical trial be used to provide effectiveness as the basis for a new drug classification;

And further, that the Region of Peel make the above recommendations to Health Canada to reassure the citizens of Peel that the use of fluorosilicates added to drinking water for the purpose of treating dental decay is safe and what the health effects are;

And further, that a copy of this resolution be sent to the Federal and Provincial Minister of Health, and Peel area MPs and MPPs;

And further, that Peel MPs and MPPs be requested to follow up on this issue with the Ministers of Health and report back to Regional Council with a response.

CARRIED

Appendix B

Mosaic
3813 Highway 41 South - Riverview, Florida 33569
Telephone (813) 677-9111 - Telex 52466
FAX - Accounting (813) 671-6283

CERTIFICATE OF ANALYSIS

FLUOROSILIC ACID

Results of Analysis of a Weighted Average Sample

CAR NO: SHPX204535

Date: August 31, 2006

ANALYSIS	RESULT
NET H_2SiF_6	23.67 %
P_2O_5	0.13 %
FREE ACID*	0.34 %
DENSITY	1.216 g/ml
COLOR (APHA Std Method)	40
LEAD	< 1 ppm
ARSENIC	34.75 ppm
CHLORIDE	

WE CERTIFY THAT PRODUCT SHIPPED WITH THIS CERTIFICATE OF ANALYSIS MEETS AWWA STANDARD B703A-97 AND ANSI/NSF STANDARD 60 REQUIREMENTS

* AWWA B-703-00

NSF Certified to ANSI/NSF 60 Max. Use: 6 mg/L

Iowasi Sakyi-Amafo / QC lab manager

NOTICE: A PORTION OF THE ABOVE MATERIAL IS RETAINED FOR FORTY-FIVE DAYS.

Document 2

Artificial Water Fluoridation

The disproportionate harm caused to Hamilton's Aboriginal, Black, and Hispanic communities

Prepared by: Sheldon Thomas, Principal, Clear Water Legacy
shelthomas@cogeco.ca

March 2012

Artificial Water Fluoridation:
The disproportionate harm caused to Hamilton's Aboriginal, Black, and Hispanic communities

To be clear, the harm that we are speaking of is only partially captured in the list below.

Where every human is injured by fluoride, some ethnic groups are disproportionately harmed by fluoride exposure.

Hamilton's Aboriginal, Black, and Hispanic communities are among those groups.

Researchers have linked fluoride to :

- cancers [1]
- increased bone fracture in both the young and the elderly [2]
- calcification (stiffening) of tendons and joints, arthritic symptoms [3]
- brain injury producing Alzheimer's-like symptoms [4]
- reduced IQ [5]
- attention deficit disorders [6]
- enzyme poisoning [7]
- hypothyroidism, [8]
- elevated lead uptake into the bloodstream [9]
- depleted immune systems [10]
- and an alarming prevalence of dental fluorosis (mottled, discoloured and porous tooth enamel) [11]

The claim of 'disproportionate harm' is built upon two common denominators shared by all three ethnic communities.

1. All three Hamilton groups demonstrate high incidence of diabetes. Diabetics often experience excessive thirst, leading to the consumption of elevated quantities of water, and consequent elevated dosages of fluoride.

2. All three Hamilton groups demonstrate high incidence of kidney disease. Impaired kidneys interfere with the body's ability to eliminate ingested fluoride via the urine, causing the body to retain more fluoride than would be retained by a healthy individual.

The more fluoride stored throughout the body, the greater its damaging effects.

The 2006 Report of the National Research Council of the National Academy of Sciences has designated kidney patients, diabetics, seniors and babies as 'susceptible sub-populations' that are especially vulnerable to harm from ingested fluorides. [12]

Hamilton's Aboriginal community numbers **13,700** residents.
Hamilton's Black community numbers **14,000** and the Hispanic community numbers **5,500**. [13]

That's **33,200** residents of this city that suffer more than most by being compelled, by shared physical predisposition and by individual genetic predisposition, to drink greater amounts of fluoridated water.

Add to that number the thousands among those ethnic groups who travel to Hamilton for work, and consume fluoridated water while employed there.

Health conditions shared by the three communities

Diabetes

There is a greater prevalence of diabetes and kidney disease in **Aboriginal** communities. Each of these conditions leads to an even greater exposure to fluoride, and greater subsequent injury. 14

There is a marked prevalence of diabetes and kidney disease in **Black** communities. 15

Hispanics are nearly twice likely to suffer from diabetes than Caucasians. 16

Kidney disease

Although **Native Americans** make up just 1.5 percent of the U.S. population, they have the highest rate of diabetes in the world and one of the highest rates of end stage renal disease (ESRD). 17

Diabetes-related kidney failure affects a much higher percentage of **Black** Americans than whites. 18

Hispanics are at increased risk. There is an increased risk for kidney disease if you:

- belong to a population group that has a high rate of diabetes or high blood pressure, such as African Americans, **Hispanic** Americans, Asian, Pacific Islanders, and American Indians. 19

Fluorosis

Fluorosis is a condition of the tooth enamel caused by ingesting too much fluoride, resulting in mottled white spotting on teeth, worsening to corrosion, pitting and chipping of the tooth surface.

In areas where the water is fluoridated, lactose intolerant **Aboriginals** (80 to 100%) can be expected to ingest considerably more fluoride by having to drink more fluoridated water and fluoridated beverages in substitution of milk. 20

It has been known for many decades that **Hispanics** are at increased risk of developing dental fluorosis, and have a higher risk of suffering from the more severe forms of this condition. 21

Studies show that dental fluorosis is higher among **Blacks**.
Despite water fluoridation, tooth decay is also higher among Blacks. 22

Lactose intolerance:

Aboriginals are 80 -100 percent lactose intolerant. 20

Blacks are 75 percent lactose intolerant. 23

50-80% of **Hispanics** are lactose intolerant. 24

Lactose intolerance will do two things to the affected:

- cause them to drink greater quantities of fluoridated water and fluoridated juices and pop in place of milk and dairy beverages, and
- deprive them of natural sources of calcium (milk and dairy products) which would serve to buffer fluoride's harmful effects

Lactose intolerance, and the consequent greater reliance upon fluoridated water and beverages, explains why greater prevalence and severity of dental fluorosis is evident in all three ethnic communities.

Genetic disposition

The Pima Indians of Arizona, a group of **Native Americans** develop kidney failure at a rate 20 times greater than the general population.
The Pima Indians may share one or more genes that make them more likely to contract the kidney disease of diabetes (KDDM), which often leads to kidney failure. They also found a link between high blood pressure and kidney disease among the Pimas. 25

About 70 percent of **Black** Americans with non-diabetic forms of kidney disease have the MYH9 gene, and many of them end up on dialysis.

The gene predisposes Black Americans to the kidney disease that was thought to stem from high blood pressure. "The MYH9 gene association in African-American kidney disease is the most powerful genetic cause of a common disease yet discovered," said Dr. Barry Freedman, professor of internal medicine and nephrology at Wake Forest University, who led a team of researchers in isolating the gene.

Community leaders in all three Hamilton communities mentioned here will have been made aware of their elevated vulnerability to water fluoridation by the April 16, 2012 Hamilton Board of Health meeting.

References

1. Taylor A, Taylor NC. (1965). 'Effect of sodium fluoride on tumor growth'. Society for Experimental Biology and Medicine 119:252-255.

2. Riggs BL, et al. (1990). *Effect of Fluoride treatment on the Fracture Rates in Postmenopausal Women with Osteoporosis.* New England Journal of Medicine 322:802-809.

3. Bang S, et al. (1985). Distribution of fluoride in calcified cartilage of a fluoride-treated osteoporotic patient. Bone 6: 207-210.

4. 'Chronic administration of aluminum–fluoride or sodium–fluoride to rats in drinking water: alterations in neuronal and cerebrovascular integrity', Julie A. Varner et al., *Psychology Department, Binghamton University, Binghamton, NY, USA* 1997

5. Li Y, et al. (2003). *The effects of endemic fluoride poisoning on the intellectual development of children in* Baotou. Chinese Journal of Public Health Management 19(4):337-338.

6. Dr. Phyllis J. Mullenix, Toxicology Department, Forsyth Research Institute, Boston, MA JOURNAL TITLE: Neurotoxicity of Sodium Fluoride in Rats, 1995

7. "There is plenty of evidence to indicate that fluorine in the amount of 1 ppm or slightly more interferes with enzyme systems and these enzyme systems are involved in the growth of bones, in the functioning of nerve tissue and so forth. It is clear that fluoridation is a calculated risk." Dr. Robert S. Harris, Ph.D, Director of Nutritional Biochemistry Laboratories, Massachusetts Institute of Technology.

8. "In humans, effects on thyroid function were associated with fluoride exposures of 0.05-0.13 mg/kg/day when iodine intake was adequate and 0.01-0.03 mg/kg/day when iodine intake was inadequate." National Research Council. (2006) Fluoride in Drinking Water: A Scientific Review of EPA's Standards, p 218.

9. 'Fluoride increases lead concentrations in whole blood and in calcified tissues from lead exposed rats', Sawan RM et al., 2010, Journal Toxicology, pg 21-26

10. Gibson, 1992, Effects of Fluoride on Immune System Function, Complementary Medical Research, Issue 6, pg 11-113; Sutton P, 1991, 'Is the Ingestion of Fluoride an Immunosuppressive Practice?', Medical Hypotheses 35, 1-3,

11. "An increase in fluoride content and decrease in calcium content in fluorosed human teeth were observed when compared to the control." Susheela AK, Bhatnagar M. 1999. Structural aberrations in fluorosed human teeth: Biochemical and scanning electron microscopic studies. *Current Science* 77: 1677-1680.

"Fluorosed enamel has a reduced amount of mineral when compared with control enamel." Denbesten PK, et al. 1985. Changes in the fluoride-induced modulation of maturation stage ameloblasts of rats. *Journal of Dental Research* 64: 1365-70.

12. National Research Council info on kidney patients and others as fluoride-susceptible groups - see p. 350 ff at: http://www.nap.edu/openbook.php?record_id=11571&page=351

13. 1996, 2001, and 2006 Censuses of Canada, Statistics Canada / referenced in Social Planning and Research Council of Hamilton- May 2011 Report

14. James R. Gavin III, MD, chair of the American Diabetes Association's African-American Program / African American Community Health Advisory Committee

15. James R. Gavin III, MD, chair of the American Diabetes Association's African-American Program / African American Community Health Advisory Committee

16. American Diabetes Association. 2010. Latino Programs.

17. Agency for Healthcare Research and Quality, US Department of Health and Human Services www.ahrq.comn

18. Perneger TV, Brancati FL, Whelton PK, Kiag M. End-stage renal disease attributable to diabetes mellitus. *Ann Intern Medicine* 1994;121:912-8. (AHRQ Grant HS06978).

19. National Kidney Foundation statement , December 2009

20. National Institute of Child Health and Human Development, 2006

21. Russell, 1962; Butler et al., 1985; Williams and Zwemer, 1990; Beltrán-Aguilar et al., 2005; Martinez-Mier and Soto-Rojas, 2010

22. CDC Surveillance for Dental Caries, Dental Sealants, Tooth Retention, Edentulism, and Enamel Fluorosis --- United States, 1988--1994 and 1999—2002

23. de Vrese et al., 2001

24. Cuatrecasas P, Lockwood DH, Caldwell JR. Lactase deficiency in the adult: a common occurrence. Lancet, 1965;1:14-8. / Woteki CE, Weser E, Young EA. Lactose malabsorption in Mexican-American adults. American Journal of Clinical Nutrition, 1977;30:470-5. / Scrimshaw NS, Murray EB. The acceptability of milk and milk products in populations with a high prevalence of lactose intolerance. American Journal of Clinical Nutrition, 1988;48:1083-5.

25. DaVita, Inc. one of the largest kidney care companies in the United States, with corporate headquarters in Denver, Colorado.

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Document 3

Artificial Water Fluoridation

Injury caused by Fluoride to the Newborn in the City of Hamilton

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Artificial Water Fluoridation

Injury caused by fluoride to the Newborn in the City of Hamilton

Every child that is born in a fluoridated community may enter the world physically and/or mentally injured to some degree.

The evidence of injury may soon reveal itself (hyperactivity, attention deficit and diminished IQ) or only in later decades (fragile bones with propensity for fractures).

The 2006 Report of the National Research Council of the National Academy of Sciences has designated kidney patients, diabetics, seniors and **babies** as 'susceptible sub-populations' that are especially vulnerable to harm from ingested fluorides. [1]

In 2011, there were roughly **6,600 babies born** in the City of Hamilton. [2]

Though hospital records are, at times, hard to access, we can reasonably assume that 90%, or close to 6000, of these births were to Hamilton resident mothers.

In 2011, every baby born of Hamilton parents may have been subtly, but irreversibly, injured in the womb by the fluoride in the tap water.

Fluoride interferes from the very start of life

How many mothers-to-be are aware that the fluoride in the water they drink prior to and throughout their pregnancy could be interfering with their child's earliest development?

The food, water and products a pregnant mother consumes does affect the mental, physical and nervous systems of the baby, including pre-birth and during breast feeding after birth.

If the mother's blood contains levels of fluoride, that fluoride is passed on to the fetus through the blood supply to the placenta.
Upon reaching the fetus, fluoride passes through the immature blood-brain barrier and can begin to impair the development of the fetal brain.

Fluoride's ability to damage the brain at all stages of life represents one of the most active areas of research on fluoride toxicity today.

Studies conducted in China on fluoride's effects upon fetal development revealed unanticipated results. [3, 4, 5, 6]

The results suggest that the accumulation of fluoride in the brain tissue can disrupt the synthesis of certain neurotransmitters and receptors in nerve cells, leading to delayed cell maturation, or other damage. [4]
Stated simply, processes leading to normal brain function will be compromised.

The higher the concentration of fluoride in the mother's bloodstream, the greater the amount of fluoride made available to interfere with cerebral development of the fetus. 3, 4, 5, 6, 7

Fluoride in the womb can affect behaviour and intelligence

In 1995, a celebrated neuro-pharmacologist named Dr. Phyllis Mullinex discovered that, when female laboratory rats were given fluoride in their water, their offspring displayed mannerisms associated with hyperactivity. They remained hyperactive for life.

Dr. Mullinex had established that fluoride *could* enter the brain, and was neurotoxic.

As well as hyperactivity, the weanlings also displayed behavior-specific changes more related to learning disabilities.
"Their behavior was consistent with interrupted hippocampal development (a brain region generally linked with memory)". 7

Dr. Mullinex concluded that the rat study flagged potential for motor dysfunction, IQ deficits and/or learning disabilities in humans. 7

Her study suggested strongly that exposure to fluoride could impair brain development of a human fetus, as it did her test animals, and could diminished both motor skills and intelligence.

Dr. Mullinex was fired for publishing her results.

Over 40 animal studies published since 1992 support the findings of Dr. Mullinex. Those studies consistently found a link between fluoride exposure and impairment in learning and memory processes among the fluoride-exposed subjects. 8

Even the USEPA agrees that fluoride is neurotoxic.
The EPA's National Health and Environmental Research Laboratory established fluoride as a '**chemical with *substantial* evidence of developmental neurotoxicity**'. 9

ADHD unheard of before water fluoridation

How many children suffer from ADHD (Attention Deficit Hyperactivity Disorder) today?

ADHD is one of the most common behavioral problems in children, characterized by *difficulty in sustaining attention, impulsivity and hyperactivity.*

Artificial water fluoridation was introduced in 1944. Before that time, symptoms of ADHD were seldom seen.
In 1985, 500,000 children were diagnosed with ADHD.
By the year 2000, the number had climbed to 7 *million.* 10

The National Institutes of Health (NIH) estimates that as many as 20 percent of children suffer from the syndrome. And by some estimates, approximately 30-70 percent of children who manifest symptoms of ADHD will continue to do so into adulthood. 11

Dr. Mullinex predicted those very developments.

Fluorosis – more than a 'cosmetic' issue, a measure of fluoride poisoning

The level of dental fluorosis that a child may later endure is greatly determined by the fluoride intake in the first year. 12, 13, 14, 15, 16, 17

Dental fluorosis describes the white spots and mottling that can be seen on the smooth surfaces of the tooth. Spotting and streaks can darken and the enamel become corroded and chipped in more severe cases.

Fluoridated water contains more than 200 times more fluoride than breast milk (1000 ppb in fluoridated tap water vs 5-10 ppb in breast milk). 18
As a result, babies consuming formula made with fluoridated tap water are exposed to much higher levels of fluoride than a breast-fed infant.

A baby drinking fluoridated formula *receives the highest dosage of fluoride among all age groups in the population* (0.1-0.2+ mg/kg/day), whereas a breast-fed infant receives the lowest.

More than 50 percent of infants are currently formula-fed by 1 month of age, and these infants are likely to be continuously exposed to high intakes of fluoride for 9 or 10 months - a circumstance quite rare in the 1960s and early 1970s." 19

Infant fluoride exposure sets the stage for problems in old age

The uptake of fluoride into bone is greatest in infants and young children. Thus, infants who drink mainly powdered formula reconstituted with fluoridated water are likely to be a high-risk group for developing both skeletal fluorosis and hip fractures in old age. 20

Overall, an average of 86.8% of fluoride dose is retained by infants, which is about 50% higher than would be expected for adults... There is a clear need for more information about the renal handling and general metabolism of fluoride in young children... 21

Conclusion

There is existing and emerging evidence that fluoride introduced to the fetus, even at drinking water concentrations, will greatly interfere with biological processes during what is the most important stage of human development.

By our unwillingness to recognize the full impact of fluoride, we may be condemning our children to be born with irreversible mental and physical shortcomings.

References follow

References

1. *National Research Council info on kidney patients and others as fluoride-susceptible groups - see p. 350 ff at: http://www.nap.edu/openbook.php?record_id=11571&page=351*

2. Hamilton Spectator article by Joanna Frketich, Dec. 16, 2011 jfrketich@thespec.com

3. "Fifteen therapeutically aborted fetuses at the 5th-8th gestation month from the endemic fluorosis area were compared with those from the non-endemic area. Stereological study of the brains showed that the numerical density of volume of the neurons and the undifferentiated neuroblasts as well as the nucleus-cytoplasm ratio of the neurons were increased. The mean volume of the neurons was reduced. The numerical density of volume, the volume density and the surface density of the mitochondria were significantly reduced. **The results showed that chronic fluorosis in the course of intrauterine fetal life may produce certain harmful effects on the developing brain of the fetus."**
SOURCE: Du L. (1992). [The effect of fluorine on the developing human brain]. Chung-hua Ping Li Hsueh Tsa Chih. 21:218-20.

4. "The levels of neurotransmitters and receptors in brain tissue of aborted fetuses from areas of endemic fluorosis were tested. The results showed that in 10 subjects from a high fluoride area ranging in age from 5 to 7 months, the levels of norepinephrine, 5-hydroxyltryptamine, and α1-receptor were lower and the level of epinephrine higher as compared with levels seen in the control fetuses from a non-fluorosis endemic area; each of these results was statistically significant ($P<0.05$). Other monoamine neurotransmitters and metabolic products, such as dopamine, 5-hydroxy-indole acetic acid, and 3,4-dihydroxybenzoic acid showed no significant differences ($P>0.05$). **The results suggest that the accumulation of fluoride in the brain tissue can disrupt the synthesis of certain neurotransmitters and receptors in nerve cells, leading to neural dysplasia or other damage."**
SOURCE: Yu Y, et al. (1996). Changes in neurotransmitters and their receptors in human foetal brain from an endemic fluorosis area. Chinese Journal of Endemiology 15:257-259.

5. "The effects of excessive fluoride intake during pregnancy on neonatal neurobehavioural development and the neurodevelopment toxicity of fluoride were evaluated. Ninety-one normal neonates delivered at the department of obstetrics and gynecology in five hospitals of Zhaozhou County, Heilongjiang province, China were randomly selected from December 2002 to January 2003. The subjects were divided into two groups (high fluoride and control) based on the fluoride content in the drinking water of pregnant women. The results showed that the urinary fluoride levels of mothers from the high fluoride group were higher than those of the control group. There were significant differences in the neonatal behavioral neurological assessment score and neonatal behavioral score between the subjects in endemic areas and the control group. There were also significant differences in the non-biological visual orientation reaction and biological visual and auditory orientation reaction between the two groups. **It is concluded that fluoride is toxic to neurodevelopment. Excessive fluoride intake during pregnancy can cause adverse effects on neonatal neurobehavioural development."**
SOURCE: Li J, Yao L, Shao Q-L. (2004). Effects of high-fluoride on neonatal neurobehavioural development. Chinese Journal of Endemiology 23:464-465.

6. "Fluoride can pass through the blood-brain barrier and accumulate in brain tissue, thus in our study the brain tissue of the fetuses from the fluoride endemic area showed higher fluoride levels than the control. The mechanisms involved are not yet clear. Besides increased amounts of fluoride, the brain tissue of the endemic subjects also showed nerve cells with swollen mitochondria, expanded granular endoplasmic reticula, grouping of the chromatin, damage to the nuclear envelope, a lower number of synapses, fewer mitochondria, microtubules, and vesicles within the synapses, and damage to the synaptic membrane. **These changes indicate that fluoride can retard the growth and division of cells in the cerebral cortex. Fewer mitochondria, microtubules, and vesicles within the synapses could lead to fewer connections between neurons and abnormal synaptic function, influencing the intellectual development after birth. These questions await further research."**
SOURCE: Han H, et al. (1989). The effects of fluorine on human fetus. Chinese Journal of Control of Endemic Diseases 4:136-138.

7. Mullenix PJ; Denbesten PK; Schunior A; Kernan WJ, Toxicology Department, Forsyth Research Institute, Boston, MA 02115, USA. 'Neurotoxicity of sodium fluoride in rats', Neurotoxicol Teratol (NAT), 1995 Mar-Apr; 17 (2): 169-77

8. **ANIMAL STUDIES - Fluoride's Impact on Brain**

"**Overall, these results suggest that moderate intoxication with sodium fluoride has potentially deleterious effects on learning and memory.**"
SOURCE: Chioca LR, et al. (2007). Subchronic fluoride intake induces impairment in habituation and active avoidance tasks in rats. European Journal of Pharmacology Oct 25; [Epub ahead of print]

"**The results of the present study indicate that** perinatal exposure to **sodium fluoride (NaF),** at dose levels below those associated with gross malformations and/or overt neurotoxic effects, **produces** both short and long term sex and dose **specific neurobehavioural alterations in rat offspring.**"
SOURCE: Bera I, et al. (2007). Neurofunctional effects of developmental sodium fluoride exposure in rats. European Review for Medical and Pharmacological Sciences 11(4):211-24.

"Additional animal studies designed to evaluate reasoning are needed. These studies must be carefully designed to measure cognitive skills beyond rote learning or the acquisition of simple associations, and test environmentally relevant doses of fluoride."
SOURCE: National Research Council. (2006). Fluoride in Drinking Water: A Scientific Review of EPA's Standards. National Academies Press, Washington D.C. p. 187.

"**In comparison with control rats, the learning and memory ability of the offspring rats was depressed by high fluoride, low iodine, or the combination of high fluoride and low iodine.**"
SOURCE: Wang J, et al. (2004). Effects of high fluoride and low iodine on biochemical indexes of the brain and learning-memory of offspring rats. Fluoride 37: 201-208.

"**Fluoride intoxicated animals also performed poorly in motor co-ordination tests and maze tests. Inability to perform well increased with higher fluoride concentration in drinking water.**"
SOURCE: Bhatnagar M, et al. (2002). Neurotoxicity of fluoride: neurodegeneration in hippocampus of female mice. Indian Journal of Experimental Biology 40: 546-54.

"**Administration of sodium fluoride with drinking water produced both behavioural and dental toxicities** and not lethality in the present study. **A suppression of spontaneous motor activity**, a shortening of rota-rod endurance time, a decreased body weight gain and food intake, a suppression of total cholinesterase and acetylcholinesterase activities and dental lesion were observed in test animals."
SOURCE: Ekambaram P, Paul V. (2001). Calcium preventing locomotor behavioral and dental toxicities of fluoride by decreasing serum fluoride level in rats. Environmental Toxicology and Pharmacology 9(4):141-146.

"The main results showed that the **learning capability of mice drinking higher concentration of fluoride presented remarkable deterioration."**
SOURCE: Zhang Z, et al. (2001). [Effects of selenium on the damage of learning-memory ability of mice induced by fluoride]. Wei Sheng Yan Jiu. 30(3):144-6.

"**Learning and memory abilities of high-fluoride exposed groups were significantly lower than that of the control group**, while the brain ChE activities of high-fluoride exposed groups were significantly higher. Conclusions: High fluoride concentration in drinking water can decrease the cerebral functions of mice. Fluoride is a neurotoxicant."
SOURCE: Sun ZR, et al. (2000). Effects of high fluoride drinking water on the cerebral functions of mice. Chinese Journal of Epidemiology 19: 262-263.

"**The main results are as follows: the learning ability of mice drinking high concentration of fluoride presented remarkable deterioration... The results suggested that the impairment on the learning capability induced by fluorosis may be closely related with the pathological changes of synaptic**

structure in the brain of mice."
SOURCE: Zhang Z, et al. (1999). [Effect of fluoride exposure on synaptic structure of brain areas related to learning-memory in mice] [Article in Chinese]. Wei Sheng Yan Jiu 28(4):210-2.

"Sodium fluoride treatment suppressed spontaneous motor activity But no change was observed in the motor coordination of these animals. **A suppression of spontaneous motor activity suggests that fluoride has, by a central action, inhibited motivation of these animals to exhibit locomotor behavior."**
SOURCE: Paul V, et al. (1998). Effects of sodium fluoride on locomotor behavior and a few biochemical parameters in rats. Environmental Toxicology and Pharmacology 6: 187–191.

"**In this experiment, the freeze response to auditory stimuli in the pups showed significant delay, indicating that relatively high doses of fluoride can negatively influence the development of auditory nerves.** Guan Zhizhong et al[8] report that **the offspring of rats exposed to fluoride have retarded cerebral development and exhibit changes in neural cell ultrastructure**. The results of the present experiment suggest that the effects of high doses of fluoride on the behavior development of the offspring are visible primarily as slight delays in response times, particularly with regard to motor and coordination function and well as muscle strength. The measurement of the thickness of the cerebral cortex of offspring on day 21 revealed that the 25 mg/L group had a significantly thinner cerebral cortex as compared to the control; **this histological analysis indicates that fluoride slows the growth of brain cells."**
SOURCE: Wu N, et al. (1995). Research on the abnormal behavior of rats exposed to fluoride. Chinese Journal of Control of Endemic Diseases 14(5):271.

"**This study demonstrates a link between certain fluoride exposures and behavioral disruption in the rat.** The effect on behavior varied with the timing of exposure during CNS development. Behavioral changes common to weanling and adult exposures were different from those after prenatal exposures... Experience with other developmental neurotoxicants prompts expectations that changes in behavioral function will be comparable across species, especially humans and rats... [A] **generic behavioral pattern disruption as found in this rat study can be indicative of a potential for motor dysfunction, IQ deficits and/or learning disabilities in humans.**"
SOURCE: Mullenix P, et al. (1995). Neurotoxicity of Sodium Fluoride in Rats. Neurotoxicology and Teratology 17:169-177.

" When rats were treated 6 hr a day for 5 mo. with HF concentrations of 3, 1, 0.5, and 0.1 mg/m-3, it caused functional changes in the CNS, as shown by the condition reflex method and the measurement of chronaxy. There was inhibition of the blood alkaline phosphatase activity and pathomorphological changes in the CNS, bone and tooth tissues and internal organs. The extent of the changes depended on the concentration of HF. The maximum allowable concentration of HF for the air at working places presently accepted, 0.5 mg/m-3, is too high."
SOURCE: Vishnevskii VL, El Nichnykh LN. (1969). (A toxicological and morphological characterization of the action of different concentrations of inhaled hydrogen fluoride on the body.). Tr Tsentr Nauchno-Issled Proektn-Konstr In. 2: 143-147.

"**General malaise, asthenia, and apathy developed to a marked degree in the monkeys exposed to the BeF2 (beryllium fluoride) aerosol**, and in those under the heaviest BeHPO4 exposure. The monkeys retreated to the furthest corner of their cages and paid no attention to light flashed at them. **They remained in this withdrawn and listless condition until death.** Monkeys which inhaled the BeSO4 aerosol faired best of all."
SOURCE: Schepers GWH. (1964). Biological action of beryllium: Reaction of the monkey to inhaled aerosols. Industrial Medicine and Surgery 33: 1-16.

"**Lipids and phospholipids, phosphohydrolases and phospholipase D, and protein content have been shown to be reduced in the brains of laboratory animals subsequent to fluoride exposure.** The greatest changes were found in phosphatidylethanolamine, phosphotidylcholine, and phosphotidylserine. Fluorides also inhibit the activity of cholinesterases, including acetylcholinesterase. **Recently, the number of receptors for acetylcholine has been found to be reduced in regions of the brain thought to be most important for mental stability and for adequate retrieval of memories.**

It appears that many of fluoride's effects, and those of the aluminofluoride complexes are mediated by activation of Gp, a protein of the G family. G proteins mediate the release of many of the best known transmitters of the central nervous system. Not only do fluorides affect transmitter concentrations and functions but also are involved in the regulation of glucagons, prostaglandins, and a number of central nervous system peptides, including vasopressin, endogenous opioids, and other hypothalamic peptides. The AlFx binds to GDP and ADP altering their ability to form the triphosphate molecule essential for providing energies to cells in the brain. Thus, AlFx not only provides false messages throughout the nervous system but, at the same time, diminishes the energy essential to brain function.

Fluorides also increase the production of free radicals in the brain through several different biological pathways. These changes have a bearing on the possibility that fluorides act to increase the risk of developing Alzheimer's disease. Today, the disruption of aerobic metabolism in the brain, a reduction of effectiveness of acetylcholine as a transmitter, and an increase in free radicals are thought to be causative factors for this disease. More research is needed to clarify fluoride's biochemical effects on the brain."
SOURCE: National Research Council. (2006). Fluoride in Drinking Water: A Scientific Review of EPA's Standards. National Academies Press, Washington D.C. p. 186.

"**Studies of rats exposed to NaF or AlF3 have reported distortion in cells in the outer and inner layers of the neocortex. Neuronal deformations were also found in the hippocampus and to a smaller extent in the amygdala and the cerebellum**. Aluminum was detected in neurons and glia, as well as in the lining and in the lumen of blood vessels in the brain and kidney. The substantial enhancement of reactive microglia, the presence of stained intracellular neurofilaments, and the presence of IgM observed in rodents are related to signs of dementia in humans. The magnitude of the changes was large and consistent among the studies."
SOURCE: National Research Council. (2006). Fluoride in Drinking Water: A Scientific Review of EPA's Standards. National Academies Press, Washington D.C. p. 187.

"In the present study, levels of glutathione and activities of catalase, GSH-PX, and SOD were significantly decreased, whereas lipid peroxide levels were enhanced in the brain of adult rats by treatment with NaF, As2O, or NaF + As2O3, in agreement with earlier reports."
SOURCE: Chinoy NJ, et al. (2004). Biochemical effects of sodium fluoride and arsenic trioxide toxicity and their reversal in the brain of mice. Fluoride 37: 80-87.

"The histology of the cerebral hemisphere was altered by NaF and/or Arsenic trioxide [As2O3] treatment for 30 days, wherein the effect by As2O3 was greater than by NaF treatment. This result is in agreement with others... The reduced brain acetylcholinesterase (AChE) enzyme activity observed in the present study corroborates data of others in rats exposed for three months to arsenic trioxide and in the brain of NaF-treated mice and rats as compared to controls... The DNA and RNA levels in the cerebral hemisphere were significantly lower in NaF and/or As2O3-treated mice in the present study, which could affect brain function. The ingestion of the antidotes vitimans C and E as well as calcium phosphate, either indivdually or in combination, during the 30-day withdrawal period resulted in significant recovery, probably due to the antioxidant-properties of vitamins C and E and modulation of fluoride-induced toxicity in rats by calcium."
SOURCE: Shah SD, Chinoy NJ. (2004). Adverse effects of fluoride and/or arsenic on the cerebral hemisphere of mice and recovery by some antidotes. Fluoride 37: 162-171.

"Superoxide dismutase (SOD) activity and the malondialdehyde (MDA) content in the brain of the combined high fluoride and low iodine group were significantly higher during and at the end of the 90-day period than in the control group, but the SOD/MDA ratio in this high fluoride and low iodine group was consistently lower than in the control group. **These results suggest that [oxidative] stress from high fluoride and low iodine is one of the causes of reduction in learning and memory in offspring rats**."
SOURCE: Wang J, Ge Y, Ning H, Wang S. (2004). Effects of high fluoride and low iodine on biochemical indexes of the brain and learning-memory of offspring rats. Fluoride 37: 201-208.

"**Brain protein was decreased by low iodine and even more by the combined interaction of high fluoride and low iodine**. The activity of cholinesterase (ChE) in the brain was affected to some extent by

high fluoride and low iodine but was especially affected by high fluoride and low iodine together."
SOURCE: Wang J, et al. (2004). Effects of high fluoride and low iodine on biochemical indexes of the brain and learning-memory of offspring rats. Fluoride 37: 201-208.

"**Recently, we have detected the alterations of nicotinic acetylcholine receptors (nAChRs) in rat brains and PC12 cells affected by fluoride toxicity**... [O]xidative stress, including protein oxidation of the receptors and lipid peroxidation in cellular membrane, might be a mechanism of the deficit of the receptors."
SOURCE: Shan KR, Qi XL, Long YG, Wang YN, Nordberg A, Guan ZZ. (2004). Decreased nicotinic receptors in PC12 cells and rat brains influenced by fluoride toxicity—a mechanism relating to a damage at the level in post-transcription of the receptor genes. Toxicology 200: 169–177.

"**Fluorosis had obvious influence on phospholipid and fatty acid composition in brain cells of rats**, and its mechanism might be associated with action of lipid peroxidation, and 0.03 mg/L KI (potassium iodine) is the optimal concentration for the antagonistic action with this influence from fluorosis."
SOURCE: Shen X, Zhang Z, Xu X. (2004). [Influence of combined iodine and fluoride on phospholipid and fatty acid composition in brain cells of rats] Wei Sheng Yan Jiu. 33:158-61.

"**These findings suggest that selective decreases in the number of nAChRs may play an important role in the mechanism(s) by which fluoride causes dysfunction of the central nervous system**."
SOURCE: Chen J, Shan KR, Long YG, Wang YN, Nordberg A, Guan ZZ. (2003). Selective decreases of nicotinic acetylcholine receptors in PC12 cells exposed to fluoride. Toxicology 183: 235-42.

"**These neurotoxic changes in the brain suggested that there was a direct action of fluoride upon the nerve tissue which was responsible for central nervous system problems such as tremors, seizures, and paralysis indicating brain dysfunction seen at the two highest doses.**"
SOURCE: Shashi A. (2003). Histopathological investigation of fluoride-induced neurotoxicity in rabbits. Fluoride 36: 95-105.

"CONCLUSION: **Fluoride may go through the blood-brain barrier and accumulate in rat hippocampus, and inhibit the activity of cholinesterase."**
SOURCE: Zhai JX, et al. (2003). [Studies on fluoride concentration and cholinesterase activity in rat hippocampus]. Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi 21:102-4.

"**Light microscopic study of hippocampal sub-regions demonstrated significant number of degenerated nerve cell bodies in the CA3, CA4 and dentate gyrus(Dg) areas of sodium fluoride administered adult female mice**. Ultrastructural studies revealed neurodegenerative characteristics like involution of cell membranes, swelling of mitochondria, clumping of chromatin material etc, can be observed in cell bodies of CA3, CA4 and dentate gyrus (Dg)."
SOURCE: Bhatnagar M, et al. (2002). Neurotoxicity of fluoride: neurodegeneration in hippocampus of female mice. Indian Journal of Experimental Biology 40: 546-54.

"**The DNA damage in pallium neurons in rats of the fluoride group was much more serious compared with those of the control group...Sodium fluoride could induce DNA damage and apoptosis in rats brain.**"
SOURCE: Chen J, Chen X, Yang K, Xia T, Xie H. (2002). [Studies on DNA damage and apoptosis in rat brain induced by fluoride]. Zhonghua Yu Fang Yi Xue Za Zhi 36: 222-224.

"In order to investigate the molecular mechanism(s) underlying brain dysfunction caused by chronic fluorosis, neuronal nicotinic acetylcholine receptors (nAChRs) in the brain of rats receiving either 30 or 100 ppm fluoride in their drinking water for 7 months were analyzed in the present study employing ligand binding and Western blotting... Since nAChRs play major roles in cognitive processes such as learning and memory, the decrease in the number of nAChRs caused by fluoride toxicity may be an important factor in the mechanism of brain dysfunction in the disorder."
SOURCE: Long YG, Wang YN, Chen J, Jiang SF, Nordberg A, Guan ZZ. (2002). Chronic fluoride toxicity decreases the number of nicotinic acetylcholine receptors in rat brain. Neurotoxicology and Teratology 24:751-7.

"**These results suggest that fluoride enhances oxidative stress in the brain, thereby disturbing the antioxidant defense of rats. Increased oxidative stress could be one of the mediating factors in the pathogenesis of fluoride toxicity in the brain.**"
SOURCE: Shivarajashankara YM , et al. (2002). Brain lipid peroxidation and antioxidant systems of young rats in chronic fluoride intoxication. Fluoride 35: 197-203.

"**Rats exposed to 100 ppm fluoride showed significant neurodegenerative changes in the hippocampus, amygdala, motor cortex, and cerebellum... These histological changes suggest a toxic effect of high-fluoride intake during the early developing stages of life on the growth, differentiation, and subcellular organization of brain cells in rats.**"
SOURCE: Shivarajashankara YM , et al. (2002). Histological changes in the brain of young fluoride-intoxicated rats. Fluoride 35: 12-21.

"The extent of DNA damage in the fluoride + selenium + zinc group was significantly slighter than that in the fluoride group ($P < 0.05$). **It suggested that fluoride and selenium could induce DNA damage in pallium neural cells of rats respectively.**"
SOURCE: Chen J, Chen X, Yang K. (2000). [Effects of selenium and zinc on the DNA damage caused by fluoride in pallium neural cells of rats]. Wei Sheng Yan Jiu. 29:216-7.

"**This study therefore shows that both brain and muscle are affected by fluoride with inhibition of some enzymes associated with free-radical metabolism, energy production and transfer, membrane transport, and synaptic transmission, but with an enhanced activity of XOD.**"
SOURCE: Lakshmi Vani M, Pratap Reddy K. (2000). Effects of fluoride accumulation on some enzymes of brain and gastrocnemius muscle of mice. Fluoride 33: 17-26.

"There is a tendency for neurone apoptosis in chronic fluorosis in rats. It is most evident with changes in pathology. It is not likely that only one form of neurone damage exist in the process of chronic fluorosis. There are recessive changes and apoptosis in the process at the same time."
SOURCE: Lu XH, et al. (2000). Study of the mechanism of neurone apoptosis in rats from the chronic fluorosis. Chinese Journal of Epidemiology 19: 96-98.

"**Over uptake of fluoride for a long term could cause potential increase in the level of oxidative stress in the brain tissue.**"
SOURCE: Shao Q, Wang Y, Guan Z. (2000). [Influence of free radical inducer on the level of oxidative stress in brain of rats with fluorosis]. Zhonghua Yu Fang Yi Xue Za Zhi 34:330-2.

"**It was concluded that aluminium interferes with the metabolism of the neuronal cytoskeleton and that this interference is potentiated by fluoride.**"
SOURCE: van der Voet GB, et al. (1999). Fluoride enhances the effect of aluminium chloride on interconnections between aggregates of hippocampal neurons. Archives of Physiology and Biochemistry 107:15-21.

"[T]he thickness of post-synaptic density (PSD) was decreased, and the width of synaptic cleft was remarkably increased. **The results suggested that the impairment on the learning capability induced by fluorosis may be closely related with the pathological changes of synaptic structure in the brain of mice.**"
SOURCE: Zhang Z, et al. (1999). [Effect of fluoride exposure on synaptic structure of brain areas related to learning-memory in mice] [Article in Chinese]. Wei Sheng Yan Jiu 28:210-2.

"**The results demonstrate that the contents of phospholipid and ubiquinone are modified in brains affected by chronic fluorosis and these changes of membrane lipids could be involved in the pathogenesis of this disease.**"
SOURCE: Guan ZZ, Wang YN, Xiao KQ, Dai DY, Chen YH, Liu JL, Sindelar P, Dallner G. (1998). Influence of chronic fluorosis on membrane lipids in rat brain. Neurotoxicology and Teratology 20: 537-542.

"While the small amount of AlF in the drinking water of rats required for neurotoxic effects is surprising, perhaps even more surprising are the neurotoxic results of NaF at the dose given in the present study [1.0 ppm F]... The results of the present study indicate that more intensive neuropathological evaluations of F effects on brain may prove to be of value... In summary, **chronic administration of AlF and NaF in the drinking water of rats resulted in distinct morphological alterations in the brain, including effects on neurons and cerebrovasculature.**"
SOURCE: Varner JA, et al. (1998). Chronic administration of aluminum-fluoride and sodium-fluoride to rats in drinking water: Alterations in neuronal and cerebrovascular integrity. Brain Research 784: 284-298.

"**These results indicate that fluoride may penetrate the blood brain barrier, interact with AChE located on cell membranes, and interfere with their physiological functions and thus induce the neurotoxicities.**"
SOURCE: Zhao XL, Wu JH. (1998). Actions of sodium fluoride on acetylcholinesterase activities in rats. Biomedical and Environmental Sciences 11(1):1-6.

"**The metabolism of brain phospholipid might be interfered by fluoride accumulated in brain tissue, which is related with the degeneration of neuron.** The changes of brain phospholipid could be involved in the pathogenesis of chronic fluorosis."
SOURCE: Guan Z, Wang Y, Xiao K. (1997). [Influence of experimental fluorosis on phospholipid content and fatty acid composition in rat brain]. Zhonghua Yi Xue Za Zhi. 77: 592-6.

"Neuronal abnormalities were observed in the NaF treated animals- especially in the deeper cell layers... **The NaF treatment also produced distortions of cells and, in some rats, cell losses could be demonstrated in particular brain regions**. Both AlF3 and NaF induced vascular inclusions, although of a different character..."
SOURCE: Issacson R, et al. (1997). Toxin-induced blood vessel inclusions caused by the chronic administration of aluminum and sodium fluoride and their implications for dementia. Annals of the New York Academy of Science 825: 152-166.

"Coenzyme Q content of brain tissue in rats fed with fluorine-containing water decreased at early stage of fluorosis, but increased significantly at late stage. It is speculated that changes in content of coenzyme Q could correlate with changes in free radical levels induced by fluorine."
SOURCE: Wang Y, Guan Z, Xiao K. (1997). [Changes of coenzyme Q content in brain tissues of rats with fluorosis]. Zhonghua Yu Fang Yi Xue Za Zhi. 31: 330-3.

"**Excessive fluoride intake decreased 5-hydroxy indole acetic acid and increased norepinephrine in rat brain.**"
SOURCE: Li Y, et al. (1994). [Effect of excessive fluoride intake on mental work capacity of children and a preliminary study of its mechanism] Hua Hsi I Ko Ta Hsueh Hsueh Pao. 25(2):188-91.

"**The results reported here indicate that fluoride has a specific effect on the synthesis of proteins in the brain which may lead to degenerative changes** in the form of ballooning degeneration of neurons, various degrees of loss of nisal substance, and changes in the purkinje cells of the cerebellar cortex. **Such changes would provide a plausible explanation for some of the diverse neruological complaints in arms and legs such as numbness, muscle spasms and pains, tenaniform convulsions, and spastic paraplegia, encountered in patients with skeletal fluorosis.**"
SOURCE: Shashi A, et al. (1994). Effect of long-term administration of fluoride on levels of protein, free amino acids and RNA in rabbit brain. Fluoride 27: 155-159.

"**The neurotoxic effect of fluoride on lipid content of brain was assessed in rabbits during experimental fluorosis... Fluoride exerts an inhibitory effect on the free fatty acids in brain of both sexes. The relevance of these results in experimental fluorosis is discussed.**"
SOURCE: Shashi A. (1992). Studies on alterations in brain lipid metabolism following experimental fluorosis. Fluoride 25:77-84.

9. *Building a Database of Developmental Neurotoxicants: Evidence from Human and Animal Studies*

W. Mundy1, S. Padilla1, T. Shafer1, M. Gilbert1, J. Breier1,2, J. Cowden1, *K. Crofton1, D. Herr1, K. Jensen1, K. Raffaele3*, N. Radio4, and K. Schumacher5.
1**Neurotoxicology Div. U.S. EPA**, RTP, NC 27711; 2Curriculum in Toxicology, Univ. of N.C. at Chapel Hill, Chapel Hill, NC, 27514; 3 **NCEA/ORD, U.S. EPA**

10. Attention Deficit Hyperactivity Disorder. NIH Publication No. 3572, National Institute of Mental Health (NIMH), Margaret Strock et al., 1996. Article by Dr. Al Sears, M.D., a practicing physician with extensive experience in the fields of complementary and natural healthcare

11. Attention Deficit Hyperactivity Disorder. NIH Publication No. 3572, National Institute of Mental Health (NIMH), Margaret Strock et al., 1996

12. "**Fluoride intakes during each of the first 4 years were individually significantly related to fluorosis on maxillary central incisors, with the first year most important** ($P < 0.01$), followed by the second ($P < 0.01$), third ($P < 0.01$), and fourth year ($P = 0.03$)."
SOURCE: Hong L, Levy SM, et al. (2006). Timing of fluoride intake in relation to development of fluorosis on maxillary central incisors. Community Dentistry and Oral Epidemiology 34(4):299-309.

13. "**It appears that, at least under some circumstances, high intakes of fluoride during the early months of life may make the difference between developing or failing to develop dental fluorosis**. A study conducted in Sweden of 12- and 13-year-old children who had lived since birth in a community with 1.2 ppm of fluoride in the drinking water demonstrated that dental fluorosis was less common in those who had been breast-fed during the first 4 months of life than in those who had been fed powdered formulas reconstituted with tap water (Forsman, 1977). A somewhat similar study in the United States demonstrated that among 7- to 13-year-old children (most of them living in a community with fluoride concentration of the drinking water 1 mg/L), the prevalence of mild enamel fluorosis was significantly greater in those who had been fed concentrated liquid formula diluted with tap water during the first 3 months of life than in those who had been breast-fed during this time (Walton and Messer, 1981). **It seems reasonable to conclude that the lower prevalence of fluorosis of the permanent teeth of individuals who were breast-fed during the early months of life is related to the low fluoride concentrations of human milk - concentrations less than 7 ug/L regardless of the concentration of fluoride in the women's drinking water.**"
SOURCE: Ekstrand J, et al. (1994). Absorption and retention of dietary and supplemental fluoride by infants. Advances in Dental Research 8:175-80.

14. "**The findings indicate that early mineralising teeth (central incisors and first molars) are highly susceptible to dental fluorosis if exposed to fluoride from the first and – to a lesser extent – also from the 2nd year of life.**"
SOURCE: Bardsen A, Bjorvatn K. (1998). Risk periods in the development of dental fluorosis. Clinical Oral Investigations 2:155-160.

15. "**Our data suggest that the fluoride contribution of water used to reconstitute infant feedings is a major determinant of primary tooth fluorosis.**"
SOURCE: Marshall TA, et al. (2004). Associations between Intakes of Fluoride from Beverages during Infancy and Dental Fluorosis of Primary Teeth. Journal of the American College of Nutrition 23:108-16.

16. "**There was a strong association between mild-to-moderate fluorosis on later forming enamel surfaces and infant formula use in the form of powdered concentrate** (OR=10.77, 95% CI 1.89-61.25)."
SOURCE: Pendrys DG, Katz RV. (1998). Risk factors for enamel fluorosis in optimally fluoridated children born after the US manufacturers' decision to reduce the fluoride concentration of infant formula. American Journal of Epidemiology 148:967-74.

17. "**Breastfeeding of infants should be encouraged, both for the many documented, general health benefits and the relative protection against ingestion of excessive fluoride** from high quantities of

intake of fluoridated water used to reconstitute concentrated infant formula early in infancy."
SOURCE: Levy SM, Kiritsy MC, Warren JJ. (1995). Sources of fluoride intake in children. Journal of Public Health Dentistry 55: 39-52.

18. "[I]nfant formulas reconstituted with higher fluoride water can provide 100 to 200 times more fluoride than breastmilk, or cows milk."
SOURCE: Levy SM, Guha-Chowdhury N. (1999). Total fluoride intake and implications for dietary fluoride supplementation. Journal of Public Health Dentistry 59: 211-23.

19. SOURCE: Fomon SJ, Ekstrand J. (1999). Fluoride intake by infants. Journal of Public Health Dentistry 59(4):229-34.

20. SOURCE: Diesendorf M, Diesendorf A. (1997). Suppression by medical journals of a warning about overdosing formula-fed infants with fluoride. Accountability in Research 5:225-237.

21. SOURCE: Whitford GM. (1994). Intake and metabolism of fluoride. Advances in Dental Research 8:5-14.

Document 4

Artificial Water Fluoridation

Injury caused by Fluoride to the Children of the City of Hamilton

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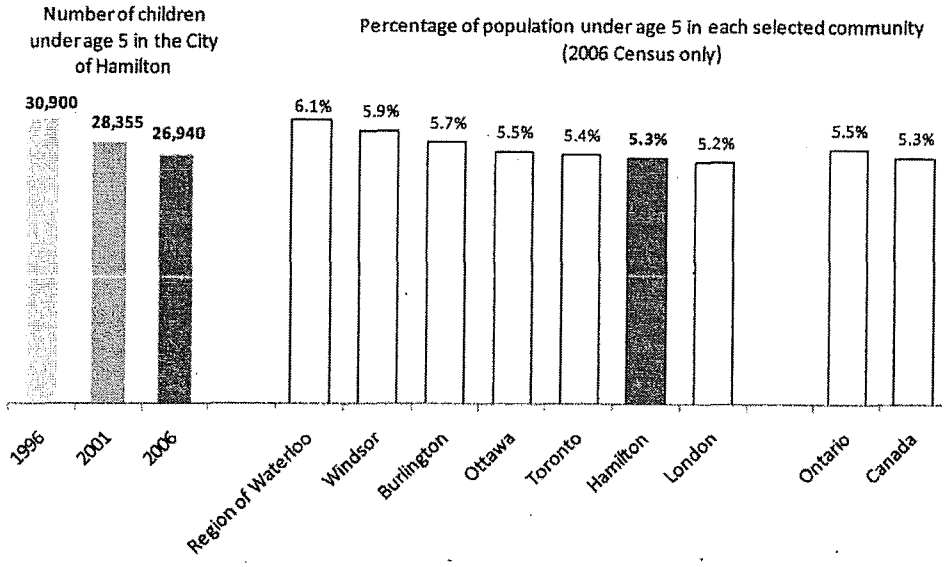
March 2012

Artificial Water Fluoridation

Injury caused by Fluoride to the Children of the City of Hamilton

Chart 7. Young children



Data source: 1996, 2001 and 2006 Censuses of Canada, Statistics Canada

Graph from Hamilton's Social Landscape / Social Planning and Research Council of Hamilton, May 2011

Based upon 2006 Census results, there were approximately **27,000 children** under the age of 5 in the City of Hamilton. Let's assume that this number has not changed significantly in 6 years.

It is *this* under-five age group that is the most affected by ingested fluoride. Only the fetus might be impacted more.

Children weigh barely 50 lbs by age five. Their body weight to fluoride concentration ratios make them far more vulnerable than an adult to the injurious effects of fluoride.

Obstructed immune system

A child's immune system is not fully developed until approximately 5 years of age. Studies show that fluoride has the effect of limiting the response of white blood cells to defend the body against infection. 1

Fluoride interferes with the natural defense mechanisms of a healthy adult. Imagine how it could obstruct the immature immune system of a young child.

Dental fluorosis .. irreparable damage to tooth enamel

Fluorosis is down-played by fluoridation promoters as a mere 'cosmetic effect', a barely-noticeable 'white dusting' on the surface of the tooth.

The white spots of fluorosis is a tell-tale sign that the body has absorbed too much fluoride.
Fluorosis is a sign that the tooth has been injured.. permanently.

Fluorosed tooth enamel is *damaged* enamel.

Claims that fluoride hardens enamel are true. But hardened enamel is *brittle* enamel, more easily given to chipping and breakage.
Fluorosis spots are porous, which explains why spots darken with age and staining.

Fluorosis threatens this young age group

A 1999 study for the Ontario Ministry of Health concluded that this age group was at elevated risk of dental fluorosis. 2

"Efforts are required to reduce intakes among the most vulnerable age group, children aged 7 months to 4 years.
Children of this age who are consuming the maximum dose are at risk of moderate levels of dental fluorosis and are consuming amounts only 20% less than that at which skeletal fluorosis is possible if maintained over long periods." 2

The Ministry of Health report went on to say, in the same study, that:

"Canadian studies do not provide any evidence that water fluoridation is effective in reducing decay among children.

The balance of evidence suggests that rates of dental decay are lower in fluoridated than non-fluoridated communities, *but the difference between fluoridated and non-fluoridated is often not statistically significant, and may not be of clinical significance."*

In a nutshell, the Ontario Health Ministry report stated that:

- the very young among us are at heightened risk of developing fluorosis
- the young drink fluoridated water to reduce caries (cavities)
- water fluoridation has not been proven to substantially reduce cavities

Could it be that we are placing our children at risk *for nothing*?

In another study, fluoride ingested in the first year was found to be the most contributory to the severity of developed fluorosis, followed in importance by years 2, 3 and 4. 3

Fluorosis levels and lower IQ

The fluoride exposure in the early childhood years determines the severity of the fluorosis that a person will endure for life. [3]

The severity of dental fluorosis is a reliable indicator of the concentration of fluoride that is being stored throughout the rest of the body.
It is also an indicator of the damage that is being done to bone and soft tissue, including the brain.

Researchers have found a correlation between the severity of dental fluorosis and the prevalence of learning disabilities and lower IQ among children and adults. [4]

The National Academy of Sciences, in their 2006 landmark report, stated:

"IQ deficits have been strongly associated with dental fluorosis, a condition caused by fluoride in tap water.
Consistency of study results appears significant enough to warrant additional research on the effects of fluoride on intelligence." [5]

The NAS 2006 report also stated that children are vulnerable for developing dental fluorosis, because the condition occurs only when there is exposure while teeth are being formed (the pre-eruption stages). [5]

*More than just this younger group, NAS concludes that "Children **up to the age of 8** are the susceptible sub-population of concern for developing dental fluorosis"* [5]

Fluoride and Attention Deficit Hyperactivity Disorder (ADHD)

The National Institutes of Health (NIH) estimates that as many as 20 percent of children suffer from the ADHD. [6]

The human brain develops rapidly to age 15, but in the earliest days, weeks, months and years that development is the most intense.
Young children's brains are more vulnerable to developmental problems from environmental pressures. [7]

Fluoride is known, by animal studies, to breach the blood-brain barrier and to accumulate in brain tissue.
Fluoride interferes with the normal development of the brain, creating problematic behavioural changes. [8]

Cerebral damage often begins with the fetus, but consequent chronic exposure to fluoride, such as in fluoridated drinking water, will worsen the behavioural and IQ deficit effects throughout early childhood, and beyond.

Lead poisoning increases with water fluoridation

One of the greatest threats to childhood physical and mental development is the absorption of lead from the environment.

Lead is known to enter drinking water by corrosion processes that occur out in the water distribution system.
When silicofluorides (chemicals commonly used to accomplish water fluoridation) are added to drinking water the amount of lead corrosion accelerates substantially. 9

Child and adult blood tests taken in fluoridating communities can show an increase in blood lead uptake between 300% and 900%. 9

The under-5 group, with their lower body weights, will be disproportionately injured by this much lead contamination in their drinking water.

Elevated blood lead levels are linked to :

- delayed mental developmental in children under the age of 6, fetuses being especially vulnerable
- damage to the central nervous system, particularly in children
- damage to kidneys and the reproductive system
- anemia (a lack of oxygen in the blood)
- lasting behavioral disorders and hyperactivity
- damage to bones and the skeletal system
- irreversible neurological damage 10

The best way to avoid this kind of excessive childhood lead exposure is to stop using silicofluorides, and to cease artificial water fluoridation.

Conclusion:

Exposure to fluoride must be minimized, especially in the formative years. We owe our children the best start in life that can be afforded them.
Fluoride has demonstrated, in hundreds of studies, to be detrimental to human development and injurious at all stages of life. 11

References follow

References

1. Dr. D. Allman, from Indiana University School of Medicine / Journal of Dental Research, Vol. 55, Sup B, p. 523, 1976, " *Effect of Inorganic Fluoride Salts on Urine and Tissue Cyclic AMP Concentration in Vivo*".

Fluoride depletes the energy reserves and the ability of white blood cells to properly destroy foreign agents by the process of phagocytosis. As little as 0.2 ppm fluoride stimulates superoxide production in resting white blood cells, virtually abolishing phagocytosis. Even micro-molar amounts of fluoride, below 1 ppm, may seriously depress the ability of white blood cells to destroy pathogenic agents.
John Curnette, et al, " *Fluoride-mediated Activation of the Respiratory Burst in Human Neutrophils*," Journal of Clinical Investigation, Vol. 63, pp. 637-647 (1979);

2. BENEFITS AND RISKS OF WATER FLUORIDATION / An Update of the 1996 Federal-Provincial Sub-committee Report / Prepared under contract for Public Health Branch, Ontario Ministry of Health First Nations and Inuit Health Branch, Health Canada / Submitted by: Dr David Locker, Community Dental Health Services Research Unit Faculty of Dentistry, University of Toronto, November 15, 1999

3. **"Fluoride intakes during each of the first 4 years were individually significantly related to fluorosis on maxillary central incisors, with the first year most important** ($P < 0.01$), followed by the second ($P < 0.01$), third ($P < 0.01$), and fourth year ($P = 0.03$)."
SOURCE: Hong L, Levy SM, et al. (2006). Timing of fluoride intake in relation to development of fluorosis on maxillary central incisors. Community Dentistry and Oral Epidemiology 34(4):299-309.

4. "The main results are as follows: the learning ability of mice drinking high concentration of fluoride presented remarkable deterioration... The results suggested that the impairment on the learning capability induced by fluorosis may be closely related with the pathological changes of synaptic structure in the brain of mice."
SOURCE: Zhang Z, et al. (1999). [Effect of fluoride exposure on synaptic structure of brain areas related to learning-memory in mice] [Article in Chinese]. Wei Sheng Yan Jiu 28(4):210-2.

"[T]he thickness of post-synaptic density (PSD) was decreased, and the width of synaptic cleft was remarkably increased. The results suggested that the impairment on the learning capability induced by fluorosis may be closely related with the pathological changes of synaptic structure in the brain of mice."
SOURCE: Zhang Z, et al. (1999). [Effect of fluoride exposure on synaptic structure of brain areas related to learning-memory in mice] [Article in Chinese]. Wei Sheng Yan Jiu 28:210-2.

5. 2006 National Academy of Science A SCIENTIFIC REVIEW OF EPA'S STANDARDS / Committee on Fluoride in Drinking Water, pg 175

6. Attention Deficit Hyperactivity Disorder. NIH Publication No. 3572, National Institute of Mental Health (NIMH), Margaret Strock et al., 1996

7. Zero to Three National Centre for Infants, Toddlers and Families http://www.zerotothree.org/about-us/

8. Mullenix PJ; Denbesten PK; Schunior A; Kernan WJ, Toxicology Department, Forsyth Research Institute, Boston, MA 02115, USA. 'Neurotoxicity of sodium fluoride in rats', Neurotoxicol Teratol (NAT), 1995 Mar-Apr; 17 (2): 169-77

9. Maas RP, Coplan MJ, Patch SC, Christian AM, Masters RD, Bachman MS. 2007 'Effects of fluoridation and disinfection agent' / Confirmation of and explanations for elevated blood lead and other disorders in children exposed to water disinfection and fluoridation chemicals. Neurotoxicology. Sep;28(5): 1032-42.

10. 'Lead in Drinking Water', WHO Guidelines for Drinking Water Quality, 03/04/2009, Pg 5, 'Effects on Humans'

11. International Society for Fluoride Research (ISFR), founded 1966 / thousands of peer-reviewed fluoride related studies and articles

Document 5

Artificial Water Fluoridation

Injury caused by Fluoride to the Elderly in the City of Hamilton

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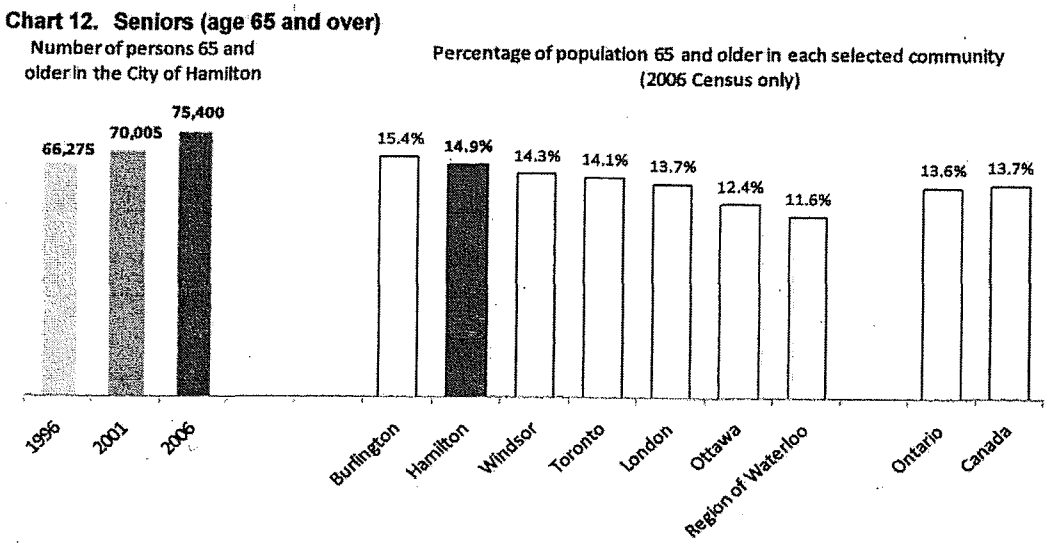
March 2012

Artificial Water Fluoridation

Injury caused by Fluoride to the Elderly in the City of Hamilton



Graph from Hamilton's Social Landscape / Social Planning and Research Council of Hamilton, May 2011

With a population of approx. 507,000 in 2006, there were 75,000 elderly aged 65 or over in the City of Hamilton. 1

The Baby Boomer generation will, for the most part, turn 65 in a few years at which point that number will balloon. But let's use 75,000 as a workable number, for now.

The Ministry of Finance's (2) projection for Hamilton's senior population is that it will grow by 93% by 2033. This is due to the aging of the baby boomer cohort including the aging of immigrants who arrived in previous decades.

The Ministry's prediction means that, in a little more than 20 years, the proportion of seniors in Hamilton's population will rise to 24%, up from the 15% reported in 2006. 2

In 20 years, a quarter of Hamilton's population will be 65 or older.

With that increase in numbers, any problems that commonly affect Hamilton's elderly will soon enough begin to place massive stress on the community's health care system, and on the families of the elderly.

The question that we all ask of ourselves is, "What condition will I be in when I reach old age?"

In spite of the claims of fluoride promoters, water fluoridation will undermine all chances of arriving into old age with a sound body and a sharp mind.

The 2006 Report of the National Research Council of the National Academy of Sciences has designated kidney patients, diabetics, **seniors** and babies as 'susceptible sub-populations' that are especially vulnerable to harm from ingested fluorides.

Increased bone fractures in the elderly

Hamilton's elderly are at risk of bone fracture injury because of the long-term bio-accumulation of fluoride in their bones.

Fluoride seeks out calcium in the body, and there are great calcium reserves in the skeletal system. Most of the fluoride in the body, about 99%, is contained in bone. 3

Where water is fluoridated, bones are high in fluoride by old age. Studies based upon autopsies of deceased elderly have revealed as much as 8000 ppm/kg fluoride in bone ash. 4

Fluoride will seriously weaken the bone structure of elderly Hamiltonians.

The action of fluoride causes the bone to lose elasticity, the tensile strength required to resist bending fractures. 5

The elderly (and their families) live in fear of falling because falls often result in incapacitating bone fractures, with hip fractures being among the most serious. 5

There is solid scientific evidence that hip fractures increase significantly in fluoridated communities. Increases appear to range from 40-100%, depending on the age of the subjects. 6

Fluoride, cancer and the elderly

Thanks to water fluoridation, Hamilton's entire community may face more cancers than would otherwise be the case.

It is well-known that fluoride is mutagenic. It has the ability to corrupt cell function. 7
Fluoride is an enabler, a promoter and an outright cause of cancers. 8

In 1990, the US Public Health Service's National Toxicology Program conducted a well-designed study that showed sodium fluoride to cause cancer *at cumulative doses comparable to those ingested by humans over a number of years.* 7

The risk of developing cancer increases dramatically with age.
Approximately 2 out of every 5 Canadians will develop cancer in their lifetime. 9

88% of new cases of cancer will be diagnosed in people over the age of 50. 9

Bone cancer (osteosarcoma)

Fluoride's particular affinity for bone explains the link to bone cancers.

Hamilton's elderly residents who have consumed fluoridated water throughout their lives can be expected to have typically high concentrations of fluoride in their bones.

In 1992, Dr. Paul Cohn conducted a thorough peer-reviewed large human population study for the State Board of Health in New Jersey.
He found that males aged 10 -19 were nearly 7 times more likely to get bone cancer if they lived in a fluoridated community than if they lived in a non-fluoridated community.

The *general population* in Cohn's fluoridated study area was 5 times as likely to develop bone cancer. *General* population would include the elderly. 10

In 2006, Dr. Elise Bassin, a researcher affiliated with Harvard University, established that adolescent males living in fluoridated communities had a 5 times greater chance of developing bone cancer than males of the same age group in non-fluoridating communities.
Her findings were very similar to Cohn's study results 14 years earlier.

Dr. Bassin's study joins other studies that show cancers to be active in the areas of the body where fluoride accumulates. 11

Bone cancer appears to have two peaks, first in adolescence (15 to 19) and second with the on-set of old age (50+). 12

Osteosarcoma was more common in men aged 60+ than women of the same age group in most countries. 12

For some reason, Canadian men aged 75+ have a strikingly higher incidence of bone cancer, better than double the norm in other countries. 12

Thyroid disease

In 1955, a report in the New England Journal of Medicine indicated a 400 percent increase in thyroid cancer in San Francisco since that city began fluoridating its drinking water just 5 years earlier. 13

Fluoride is well-known to interfere with the functioning of the thyroid gland. The thyroid gland produces vital hormones which control metabolism.

Fluoride displaces iodine in the thyroid, greatly depressing thyroid function and rendering a person *hypo*thyroid from iodine deficiency. 14

With age comes a progressively greater accumulation of fluoride in the body.
Inevitably, this points to the elderly as being particularly affected by hypothyroidism.

Hypothyroidism has become epidemic on this continent. One out of three may suffer from it by mid-life. 15
People become tired, cold, overweight, depressed, constipated; they suffer arthritis, hair loss, infertility, atherosclerosis and chronic illness.

In the elderly, thyroid disease is very common.

Upon autopsy, finding a "normal thyroid gland" is rare, testifying to the incredible high prevalence of thyroid disorders among the elderly. 16

Fluoride and aging

Fluoride is a powerful enzyme poison.
All the chemical reactions necessary to the life and function of the body depend on enzymes. 17

Austrian researchers proved in the 1970s that ***as little as 1 ppm*** fluoride concentration can disrupt DNA repair enzymes by 50%.
When DNA can't repair damaged cells, we get old .. *fast.* 18

Fluoride ages the body, mainly by distortion of enzyme shape. When enzymes get twisted out of shape, they can't do their jobs.
This results in collagen breakdown, eczema, tissue damage, skin wrinkling, genetic damage, and immune suppression.
Practically any disease that you can name may then result. 19

Water Fluoridation and Alzheimer's

Those Hamiltonians who are presently close to retirement are part of what has been called 'The Alzheimer's Generation'. 20
Alzheimer's has become the defining disease of the Baby Boomers, those born just after WWII.

Why this generation? Why did Alzheimer's spike so suddenly across a single generation? What was so different after the war?
Look to water fluoridation for a strong link. Water fluoridation was just getting underway as the war ended.

Recent studies have shown that fluoride enables aluminum to penetrate into the brain.

Without the presence of fluoride, aluminum would not pass the 'blood-brain barrier', the brain's natural defense against harmful chemicals.

Fluoride *plus* aluminum work in synergy to create in the brain what appear to be Alzheimer's-like symptoms. 21

Fluoride combines with trace amounts of aluminum every day in Hamilton's drinking water.

Hamilton uses aluminum salts to help clarify the raw water at the treatment stage.

A trace amount of that aluminum remains (22), and forms 'alumino-fluoride complexes' when it comes into contact with the fluoride that is added before water is piped to consumers.

Alumino-fluoride complex is neurotoxic. 23

It is chemically impossible for fluoride *not* to combine with aluminum at the treatment plant. 24
For it *not* to happen, all post-treatment traces of aluminum would have to be removed before the addition of fluoride .. and that is *not* done. 22

It is, therefore, a certainty that Hamiltonians will ingest alumino-fluoride neurotoxins for as many days as they dwell in this city.

Is it any wonder that the Alzheimer's Association has dubbed the post-war generation 'Generation Alzheimer's'?

Conclusion

There is much that Hamilton's 75,000 elderly citizens are not being told. They remain at risk of physical and mental impairment, and a sad loss of quality of life, until fluoride is removed from Hamilton's drinking water.

Fluoride is not a friend to any, but it is especially hard on the elderly.

References

1. Hamilton's Social Landscape / Social Planning and Research Council of Hamilton - May 2011 / *2001 and 2006 Censuses of Canada, Statistics Canada*

2. Ministry of Finance: Ontario Population Projections Update 2008-2036, Spring 2010 based on the 2006 Census

3. Fluoride in Drinking Water: A Scientific Review of EPA's Standards (2006)

4. Kaj Roholm's 1937 study on phases of skeletal fluorosis

5. SØGAARD CH *et al.* (1994) Marked decrease in trabecular bone quality after five years of sodium fluoride therapy-assessed by biomechanical testing of iliac crest bone biopsies in osteoporetic patients *Bone* 15 (4), 393-399 Jul/Aug

A 1994 report by P. Fratzl et al in the Journal of Bone & Mineral Research described abnormal bone mineralization after fluoride treatments.

6. Fluoride (Vol. 26 No. 4, pages 274-277, 1993). All studies of fracture rates relative to long-term fluoridation exposure indicate a significant increase in fracture risk from fluoridation. For women in their seventh decade who have been exposed to life-long fluoridation, the risk of hip fracture is approximately

doubled. The risk increases with fluoride concentration at all levels over 0.11 ppm. Increased bone and connective tissue injuries of US youngsters should alert us to the probability that our high fluoride environment is adversely affecting our youngsters as well as our elderly. / John R Lee, MD, is the former director of the Marin Medical Society in California and the author of Optimal Health Guidelines, Optimal Fluoridation and Gilbert's Disease and Fluoride Toxicity.

Three notable studies, all published in the Journal of the American Medical Association, showed a relationship between water fluoridation and increased hip fractures. These were major studies on large populations :

JACOBSEN SJ GOLDBERG J MILES TP BRODY JA STIERS W & RIMM AA (1990) Regional variation in the incidence of hip fracture: US white women 65 years and older. *J American Medical Assoc* **264**, (4) 500-502, Jul 25th

COOPER C WICKHAM CAC BARKER DIR & JACOBSEN SJ (1991) Water fluoridation and hip fracture *J American Medical Assoc* 266 (4), 513 July 24/31

1992, C. Danielson et al reported that the risk of hip fracture was approximately 30% higher for women and 40% higher for men in fluoridated communities. Among women at age 75, the risk was about twice as high in fluoridated communities.

An Australian review of scientific literature in 1997 revealed there is strong evidence that fluoride disrupts bone structure, increasing prevalence of hip fractures, skeletal fluorosis, and osteosarcomas

A French study found an 86% increase in hip fracture rates amongst elderly French people living in regions with fluoride in the water (i.e. nearly double the normal rate).

Australian and New Zealand Journal of Public Health, 1997

JACQUMIN-GADDA H COMMENGES D DARTIGUES J-F (1995) Fluorine concentration in drinking water and fractures in the elderly *J American Medical Assoc* **273** (10), 775-776

"'Hip Fractures and Fluoridation in Utah's Elderly Population,' a study by C. Danielson et al [Journal of the American Medical Association, August 12, 1992, 268:746-8], compared the incidence of femoral neck fractures in a community with long-standing water fluoridation (to 1 ppm) with the incidence in two communities without water fluoridation (less than 0.3 ppm). **The findings of this report support other epidemiologic studies suggesting that fluoride increases the risk of hip fracture.**"
- Journal of the American Medical Association

7. NTP TECHNICAL REPORT (1990) *Toxicology and Carcinogensis Studies of Sodium Fluoride in F344/N Rats and B6C3F1 Mice*, **NTP TR 393** (Draft), National Toxicology Program, US Dept of Health & Human Services: Washington, DC, 106pp + 370pp of appendices

Mohamed AH, Chandler ME. (1982). 'Cytological effects of sodium fluoride on mice'. Fluoride 15: 110-18.
"Cytological studies on bone marrow cell chromosomes and spermatocytes showed that 1-200 ppm F (as sodium fluoride) was able to induce chromosomal changes in a dose-dependent manner. The frequency of the induced chromosomal damage was significantly higher in each treatment than in the controls. The observed abnormalities included translocations, dicentrics, ring chromosomes, and bridges plus fragments, or fragments by themselves. There was a significant correlation between the amount of fluoride in the body ash and the frequency of the chromosomal abnormalities."

Voroshilin SI, et al. (1973). 'Cytogenetic effect of inorganic fluorine compounds on human and animal cells in vivo and in vitro'. Genetika 9: 115-120.
"On the grounds of the results obtained during our experiments F compounds are able to produce certain changes in chromosomes from somatic cells of animals treated in vivo by them... Most of the aberrations observed in the case of bone marrow cells were chromatid-type aberrations... [W]e entertain the opinion that the main damage to chromosomes during our experiments with F compounds also took part during the S-phase... [T]hese data enable us to consider as sufficiently established the conclusion that inorganic fluorine

compounds may present a mutagenic danger to human beings."

Taylor A, Taylor NC. (1965). 'Effect of sodium fluoride on tumor growth'. Proceedings of the Society for Experimental Biology and Medicine 119:252-255. "In 54 tests involving 991 mice bearing transplanted tumors and 58 tests including 1817 tumor-bearing eggs, data were obtained which indicated a statistically significant acceleration of tumor tissue growth in association with comparatively low levels of NaF."

8. 1990 Dr. William Marcus, an EPA senior science advisor and toxicologist, maintained that, "fluoride is a carcinogen by any standard that we use. I believe EPA should act immediately to protect the public, not just on the cancer data, but on the evidence of bone fractures, arthritis, mutagenicity, and other effects."

9. Canadian Cancer Statistics 2011 / 'Cancer in Quebec and in Canada: Fast Facts', May 18, 2011

10. COHN PD (1992) *An epidemiologic report on drinking water and fluoridation Trenton*, NJ: State of New Jersey, Dept. of Health

11. Revisiting the Fluoride-Osteosarcoma connection in the context of Elise Bassin's findings: Part I By Dr. Paul Connett, Chris Neurath and Michael Connett / Submitted to the NRC review panel on the Toxicology of Fluoride in Water, March 2, 2005

12. Int. J. Cancer: 125, 229–234 (2009) 'International osteosarcoma incidence patterns in children and adolescents, middle ages and elderly persons' / Lisa Mirabello1, Rebecca J. Troisi2,3 and Sharon A. Savage1*

13. Gladys Caldwell and Philip Zanfagna, MD, in their 1974 book "Fluoridation and Truth Decay" (1).

14. *Dr. Barry Durrant-Peatfield, ' The Effects of Fluoride on the Thyroid Gland'*

Goldemberg, L. *La Semana Med.* 28:628 (1921), cited in Wilson RH, DeEds F. "The Synergistic Action Of Thyroid On Fluoride Toxicity" *Endocrinology* 26:851 (1940).

15. 'Hypothyroidism Type 2: The Epidemic' / Mark Starr M.D. Board certified by the American Board of Pain Medicine and the Arizona State Board of Homeopathic Medical Examiners

16. Fleischmann A, Hardmeier T (1999) A normal thyroid gland upon autopsy: a relatively uncommon finding. Schweiz Med Wochenschr 129:873-882 37.

17. Dr. James B. Sumner, Director of Enzyme Chemistry, Department of Biochemistry and Nutrition, Cornell University; Nobel Prize winner for his work in field of enzyme chemistry / "Everybody knows fluorine and fluorides are very poisonous substances and we use them in enzyme chemistry to poison enzymes, those vital agents in the body. That is the reason things are poisoned, because the enzymes are poisoned and that is why animals and plants die."

18. Wolfgang Klein, et al., "DNA Repair and Environmental Substances," Zeitschrift fur Angewanilte Rader und Klimaheilkunde, Volume 24, No. 3, pp. 218-223 (1977).

Wolfgang Klein, et al., "Biochemical Research on the Action of Sodium Fluoride on Mammalian Cells. The Effect on Biosynthesis of Nucleic Acid and Proteins on Mouse Spleen Cells in in Vivo Studies," Report ofthe Austrian Society of Atomic Energy, Seibersdorf Research Center, No. 2355, pp. 1-10 (1974).

Wolgang Klein, et al., "DNA Repair and Environmental Substances," Report of the Austrian Society of Atomic Energy, Seibersdorf Research Center, No. 2613

19. John Yiamouyiannis, Ph.D., Biochemistry and By John R. Lee, M.D. 'Fluoride - The Aging Factor' / "The prime physiological effect of fluoride is enzyme inhibition; it does this by forming hydrogen bonds with amides which comprise the operative chemical structure of enzymes; it therefore disrupts collagen synthesis which results in dental fluorosis as well as damaged cartilage, ligaments, bone, skin, arteries and other

elements of connective tissue in a manner identical with aging. Furthermore, this fluoride-induced enzyme inhibition interferes with our immune system so that it "not only causes the immune system to act like the immune system of an 'old' person, it causes autoimmune damage to the entire body and accelerates the aging process of that body." And, finally, fluoride interferes with DNA repair, damages chromosomes, and induces higher cancer death rates yet another morbid characteristic of aging."

20. 'Generation Alzheimer's' / Alzheimer's Association National Office, 225 N. Michigan Ave., Fl. 17, Chicago, IL 60601

21. Dr. Julie A. Varner, EPA neurotoxicologist, Binghamton University, Binghamton, N.Y., Karl F. Jensen, William Horvath, Robert L. Isaacson, *Brain Research*, Vol.784:I998, Elsevier Science. / 'Chronic administration of aluminum-fluoride or sodium-fluoride to rats in drinking water: alterations in neuronal and cerebrovascular integrity'.
An animal study links low levels of fluoride in water to brain damage [Brain Res. 784, 284 (1998)]. "Fluoride in water may complex with the aluminum in food and enable it to cross the blood-brain barrier. Both treated groups also suffered neural injury and showed increased deposits of ß-amyloid protein in the brain, similar to those seen in humans with Alzheimer's disease. While the small amount of AlF3...required for neurotoxic effects is surprising, perhaps even more surprising are the neurotoxic effects of NaF at 2.1 ppm."

Following the Varner, et al aluminium fluoride studies in which 80% of the experimental rats died before the end of the experiment the United States Environmental Protection Agency was sufficiently alarmed to push the National Toxicology Program (NTP) to do further research.

Varner and associates appear to have found TOXIC SYNERGISTIC ACTION between FLUORIDE and ALUMINIUM in drinking water. This has now been made a part of PUBLIC RECORD in the US FEDERAL REGISTER as of December 4, 2000.

The National Institute of Environmental Health Sciences concurs with the EPA and has formally called for NTP to commission studies.

For the first time, synergistic action is officially acknowledged, along with the fact that FLUORIDE in the water COMBINES WITH OTHER MINERALS.

22. Currently Posted Drinking Water Quality Report for Halton Region, 'Analytical Averages of Distribution System Water', Table 4 Chemical / Physical Parameters 'Aluminum' / 2 Halton water systems ***fed by Hamilton supply*** registered greater than 100ppb aluminum, exceeding the MOE Guideline for aluminum in drinking water

23. Varner, Horvath et al. 1994; Varner, Jensen et al. 1998

24. ALUMINUM TRIFLUORIDE / Fluorine can also bond with aluminum. Aluminum has three extra electrons and will easily let the Fluorine atoms use them. Because Aluminum has three, that means three Fluorines can bond. The make the formula AlF_3, also known as Aluminum trifluoride.

Document #6

Artificial Water Fluoridation

In a word .. Ineffective

The 65 year fluoride experiment needs to end

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Water Fluoridation is INEFFECTIVE

It is important to know the following

1. Ingested fluoride's cavity prevention benefit has never been proven

2. Cavity rates are virtually the same comparing fluoridated communities with non-fluoridated communities .. *throughout the world.*

3. Cavity rates are often lower and dental health better in non-fluoridating communities

4. Cavities are still a problem in communities that have been fluoridated for decades .. water fluoridation has not delivered the promised benefits

5. Fluoridation is not the great social equalizer. The program has failed to reduce cavities among the poor and disadvantaged where cavity rates remain high

6. Once hailed as 'Safe for All!', the risk of excessive fluoride to infants and children is now clear in warnings issued by the Centres for Disease Control (CDC) and the American Dental Association (ADA).

7. Water fluoridation was long-promoted as necessary to fortify enamel during early tooth formation (pre-eruption). Now it is accepted that any benefit from fluoride is from direct topical application to fully emerged teeth.

Pro-fluoride claim #1: Ingested fluoride protects dental enamel by allowing the saliva to continually bathe the teeth with systemic fluoride

Actual finding: Major dental researchers concede that **fluoride is ineffective** at preventing pit and fissure tooth decay, which is 85% of the tooth decay experienced by children (*JADA 1984; Gray 1987; White 1993; Pinkham 1999*).

The saliva 'fluoride bath' **does not protect** the chewing surfaces of teeth. Fluoride presence in saliva is so minute that its benefit anywhere in the oral cavity is questioned.

Even though the teeth are bathed 24/7 by fluoridated saliva, cavities continue to decimate the chewing surfaces of teeth.
Because fluoride is so utterly ineffective at these surfaces, dentists resort to expensive multiple applications of sealants to reduce the chances of cavities forming.

It is widely accepted today that *direct topical application* of pharmaceutical quality fluoride may help reduce cavities, but only on the smooth surfaces of teeth.

There was never a need before, and there is not any need now, to swallow fluoride with drinking water

Pro-fluoride claim #2: Water fluoridation assists in the fortifying of tooth enamel during early tooth formation (pre-eruption)

Actual finding: There is a great risk in supplying fluoridated water to infants, and fluoride's limited benefits can only be known by having a dentist apply pharmaceutical grade fluoride directly to *fully emerged* teeth.

- "**Fluoride incorporated during tooth development is insufficient to play a significant role in caries protection.**"
  SOURCE: Featherstone, JDB. (2000). The Science and Practice of Caries Prevention. *Journal of the American Dental Association* 131: 887-899.

- "The case is essentially a risk-benefit issue - **fluoride has little pre-eruptive impact on caries prevention, but presents a clear risk of fluorosis.**"
  SOURCE: Burt BA. (1999). The case for eliminating the use of dietary fluoride supplements for young children. *Journal of Public Health Dentistry* 59: 260-274.

- "Current evidence suggests that **the predominant beneficial effects of fluoride occur locally at the tooth surface, and that systemic (pre-eruptive) effects are of much less importance.**"

- "Until recently the major caries-inhibitory effect of fluoride was thought to be due to its incorporation in tooth mineral during the development of the tooth prior to eruption...**There is now overwhelming evidence that the primary caries-preventive mechanisms of action of fluoride are post-eruptive through 'topical' effects for both children and adults.**"
  SOURCE: Featherstone JDB. (1999) Prevention and Reversal of Dental Caries: Role of Low Level Fluoride. *Community Dentistry & Oral Epidemiology* 27: 31-40.

20 other similar studies follow in Appendix A

Pro-fluoride claim #3: Artificial water fluoridation protects the teeth of the poor and the disadvantaged who cannot afford dental services.

Actual findings:

- "**The prevalence of dental caries in a population is not inversely related to the concentration of fluoride in enamel, and a higher concentration of enamel fluoride is not necessarily more efficacious in preventing dental caries.**"
  SOURCE: Centers for Disease Control and Prevention. (2001). Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States. *Morbidity and Mortality Weekly Report* 50(RR14): 1-42.

- "Until recently most caries preventive programs using fluoride have aimed at incorporating fluoride into the dental enamel. **The relative role of enamel fluoride in caries prevention is now increasingly questioned**, and based on rat experiments and re-evaluation of human clinical data, **it appears to be of minor importance**... "
  SOURCE: Fejerskov O, Thylstrup A, Larsen MJ. (1981). Rational Use of Fluorides in Caries Prevention: A Concept based on Possible Cariostatic Mechanisms. *Acta Odontologica Scandinavica* 39: 241-249.

The worst tooth decay in the United States occurs in the poor neighborhoods of the largest cities, the vast majority of which have been fluoridated for decades.

Income level is strongest indicator of tooth decay, regardless of water fluoridation

"Low income is the single best predictor of high caries [cavity] experience in children. Analysis of data shows that the amount of tooth decay in children is inversely related to income level." American Dental Association (ADA, 2009)

In 1988, an editorial published in the Journal of Dental Research (Newbrun, 1988) reported that "About 20 to 25 percent of children are at relatively high risk of caries, despite the declining caries prevalence in the 'fluoride generation'." **The high-risk children included the poor.**

Edelstein and Douglass, 1995 : ***"Minority, low-income and under-served groups continue to experience extensive destruction in both primary and permanent teeth."***

The most recent oral health statistics (1999-2004) show a direct link with tooth decay and poverty level. For example, the incidence of caries is much higher in children from families with lower income levels:

% Caries rate for 3-5 year-olds	% Caries rate for 6-9 year-olds	% Caries rate for 13-15 year-olds	Family Income as % Federal Poverty Limit
48	68	62	<100
36	63	60	100-199
28	46	53	200-399
19	44	51	400-499
11	31	34	>500

In 2008, the U.S. Government Accountability Office (GAO) reported that **the extent of dental disease in children has not decreased**, and estimated that 6.5 million children two through 18 years of age on Medicaid suffer with untreated tooth decay (GAO, 2008).

In November 2010, the GAO reported "**high rates of dental disease and low utilization of dental services by children in low-income families**, and the challenge of finding dentists to treat them are long-standing concerns" (GAO, 2010).

Despite claims to the contrary by promoters of fluoridation, low-income children still have high rates of tooth decay even when their drinking water is artificially fluoridated.

In Georgia where fluoridation is state-mandated, 44 percent of 2 to 5-year-old Head Start children have tooth decay.

And although fluoridation is required in North Dakota, tooth decay is present in 82 percent of Native American third grade children (who are often from very low-income families) compared to 54 percent of white children .

In New York City - which is 100 percent fluoridated - 56 percent of low-socioeconomic third grade children have tooth decay, compared to 38 percent of high-socioeconomic third grade children.

Likewise, in Kentucky, with a nearly 100 percent fluoridation rate, nearly 60 percent of third grade children have experienced tooth decay, yet for nearly 35 percent of these children that decay went untreated.

West Virginia, which is 92 percent fluoridated. West Virginia's tooth decay rate is 66 percent for 15 year-olds. By the time these children graduate from high school, the proportion has increased to 84 percent.

More than 60 Oral Health Care Reports from the 50 States reaffirm that low-income people have the worst dental health.

Proponents of fluoridation would have us believe that as fluoridation rates go up, tooth decay rates will go down. But that hasn't happened.

Instead, **oral health continues to decline among children - especially those from lower income families** - and symptoms of fluoride overexposure and toxicity have increased to epidemic proportions, as evidenced by the 41 percent of adolescents aged 12-15 now afflicted with dental fluorosis. (Beltrán-Aguilar et al., 2010).

Pro-fluoride claim #4: Water fluoridation will bring about a reduction in cavities ranging between 40% and 70%

Actual finding: Cavity rates were declining worldwide before the introduction of artificial water fluoridation and have continued a steady decline. There is no proof that water fluoridation has single-handedly resulted in any cavity reductions.

Non-fluoridated communities all over the world have demonstrated the same decline in cavity rates as have been trumpeted in fluoridated communities.

Non-fluoridated communities often report lower cavity rates than fluoridated, and healthier dental assessments.
Residents in non-fluoridated communities also suffer far less dental fluorosis than those in fluoridated communities.
Fluorosis describes mottled, porous, damaged tooth enamel caused by excessive fluoride intake.

- Several studies indicate that **dental decay is coming down just as fast, if not faster, in non-fluoridated industrialized countries** as fluoridated ones (*Diesendorf, 1986; Colquhoun, 1994; World Health Organization, Online*).

- The **largest survey** conducted in the US **showed only a minute difference in tooth decay** between children who had lived all their lives in fluoridated compared to non-fluoridated communities. The difference was not clinically significant nor shown to be statistically significant (*Brunelle & Carlos, 1990*).

- "Although the prevalence of caries varies between countries, **levels everywhere have fallen greatly in the past three decades**, and national rates of caries are now universally low. This trend has occurred **regardless of the concentration of fluoride in water or the use of fluoridated salt**, and it probably reflects use of fluoridated toothpastes and other factors, including perhaps aspects of nutrition."
  SOURCE: Cheng KK, et al. (2007). Adding fluoride to water supplies. *British Medical Journal* 335(7622):699-702.

14 additional studies that support this conclusion are located in Appendix B

Pro-fluoride claim #5: When communities cease water fluoridation, cavity rates will climb substantially.

Actual finding: This claim amounts to nothing more than unsubstantiated intimidation, and an attempt to frighten municipal leaders into maintaining the status quo.

It is a matter of record that a general decline in cavities was underway even before the introduction of artificial water fluoridation in the mid 40's.

Promoters of fluoridation have never proven that ingested fluoride has any impact on cavity reduction.

Study after study demonstrates the expected .. that the ending of water fluoridation will **not** result in a spike in dental cavities.

Water fluoridation cessation has two effects .. a continued decline in cavities, and a marked reduction in dental fluorosis.

- A recent Canadian study done by the dental officer of health for Toronto, (Azarpazhooh A, Stewart H. 2006) co-authored a meta-analysis of the research which compared communities still using artificial water fluoridation with communities which had stopped artificial water fluoridation (12 papers met the inclusion criteria).
  North American communities that discontinued fluoridation did not experience an increase in the incidence of dental caries. **The communities which *stopped* artificial water fluoridation experienced a *reduction* in the incidence of dental caries in both absolute terms and relative to communities that continued to fluoridate their drinking water.**

- Canadian research paper (Clark et al 2006) concluded that "**Following fluoridation cessation** of the public water supply, the ***prevalence and severity of dental fluorosis decreased significantly***."

- Canadian study by Maupome et al. 2001 reported: "**The prevalence of caries (assessed in 5,927 children, grades 2, 3, 8, 9) decreased over time in the fluoridation-ended community while remaining unchanged in the fluoridated community**."

- **When fluoridation** has been **halted** in communities in Finland, former East Germany, Cuba and Canada, **tooth decay did not go up but continued to go down.** *(Maupome et al, 2001; Kunzel and Fischer, 1997, 2000; Kunzel et al, 2000 and Seppa et al, 2000).*

15 additional studies that describe fluoridation cessation are found in Appendix C

Appendix A Fluoride's effects are *topical*, no need to ingest

- "Although it was initially thought that the main mode of action of fluoride was through its incorporation into enamel, thereby reducing the solubility of the enamel, **this pre-eruptive effect is likely to be minor. The evidence for a post-eruptive effect**, particularly its role in inhibiting demineralization and promoting re-mineralization, **is much stronger**."
  SOURCE: Locker D. (1999). Benefits and Risks of Water Fluoridation. An Update of the 1996 Federal-Provincial Sub-committee Report. Prepared for *Ontario Ministry of Health and Long Term Care.*

- "Laboratory and epidemiologic research suggests that **fluoride prevents dental caries predominately after eruption of the tooth into the mouth, and its actions primarily are topical** for both adults and children."
  SOURCE: Centers for Disease Control and Prevention. (1999). Achievements in Public Health, 1900-1999: Fluoridation of Drinking Water to Prevent Dental Caries. *Morbidity and Mortality Weekly Report* 48: 933-940.

- "Recent research on the mechanism of action of fluoride in reducing the prevalence of dental caries (tooth decay) in humans shows **that fluoride acts topically** (at the surface of the teeth) and that **there is negligible benefit in ingesting it**."
  SOURCE: Diesendorf, M. et al. (1997). New Evidence on Fluoridation. *Australian and New Zealand Journal of Public Health* 21 : 187-190.

- Major dental researchers concede that fluoride's benefits are **topical not systemic** (*Fejerskov 1981; Carlos 1983; CDC 1999, 2001; Limeback 1999; Locker 1999; Featherstone 2000*).

- "It is now accepted that **systemic fluoride plays a limited role in caries prevention**."
  SOURCE: Pizzo G, Piscopo MR, Pizzo I, Giuliana G. (2007). Community water fluoridation and caries prevention: a critical review. Clinical Oral Investigations 11(3):189-93.

- "The major **anti-caries benefit of fluoride is topical and not systemic**."
  SOURCE: National Research Council. (2006). Fluoride in Drinking Water: A Scientific Review of EPA's Standards. National Academies Press, Washington D.C. p 13.

- "Laboratory and epidemiologic research suggests that fluoride prevents dental caries predominately after eruption of the tooth into the mouth, and **its actions primarily are topical for both adults and children**" *(US Centers for Disease Control 1999, MMWR 48: 933-940).*

- "Fluoride is **most effective when used topically**, after the teeth have erupted."
  SOURCE: Cheng KK, et al. (2007). Adding fluoride to water supplies. British Medical Journal 335(7622):699-702.

Appendix A

- "Since the current scientific thought is that the cariostatic activity of fluoride is mainly due to its topical effects, the **need to provide systemic fluoride supplementation for caries prevention is questionable**."
  SOURCE: European Commission. (2005). *The Safety of Fluorine Compounds in Oral Hygiene Products for Children Under the Age of 6 Years*. European Commission, Health & Consumer Protection Directorate-General, Scientific Committee on Consumer Products, September 20.

- "The results of more recent epidemiological and laboratory studies can be summarized by stating that **post-eruptive (topical) application of fluoride plays the dominant role in caries prevention**."
  SOURCE: Hellwig E, Lennon AM. (2004). Systemic versus topical fluoride. *Caries Research* 38: 258-62.

- "Current evidence strongly suggests that **fluorides work primarily by topical means through direct action on the teeth and dental plaque**. Thus ingestion of fluoride is not essential for caries prevention."
  SOURCE: Warren JJ, Levy SM. (2003). Current and future role of fluoride in nutrition. *Dental Clinics of North America* 47: 225-43.

- "**The majority of benefit from fluoride is now believed to be from its topical, rather than systemic, effects.**"
  SOURCE: Brothwell D, Limeback H. (2003). Breastfeeding is protective against dental fluorosis in a nonfluoridated rural area of Ontario, Canada. *Journal of Human Lactation* 19: 386-90.

- "For a long time, the systemic effect of fluoride was regarded to be most important. However, **there is increasing evidence that the local effect of fluoride at the surface of the erupted teeth is by far more important.**"
  SOURCE: Zimmer S, et al. (2003). Recommendations for the Use of Fluoride in Caries Prevention. *Oral Health & Preventive Dentistry* 1: 45-51.

- " **With today's knowledge about the mechanisms of fluoride action, it is important to appreciate that, as fluoride exerts its predominant effect... at the tooth/oral fluid interface**, it is possible for maximum caries protection to be obtained without the ingestion of fluorides to any significant extent."
  SOURCE: Aoba T, Fejerskov O. (2002). *Critical Review of Oral Biology and Medicine* 13: 155-70.

- "**Fluoride's predominant effect is post-eruptive and topical**."
  SOURCE: Centers for Disease Control and Prevention. (2001). Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States. *Morbidity and Mortality Weekly Report* 50(RR14): 1-42.

- "Researchers are discovering that the **topical effects of fluoride** are likely to mask any benefits that ingesting fluoride might have... This has obvious implications for the use of systemic fluorides to prevent dental caries."
  SOURCE: Limeback, H. (1999). A re-examination of the pre-eruptive and post-eruptive

Appendix A

mechanism of the anti-caries effects of fluoride: is there any caries benefit from swallowing fluoride? *Community Dentistry and Oral Epidemiology* 27: 62-71.

- "Critical reviews of the evidence have led to the conclusion that the effect of fluoride in decreasing the prevalence and severity of dental caries is **not primarily systemic but exerted locally within the oral cavity**.."
  SOURCE: Ekstrand J, et al. (1994). Fluoride pharmacokinetics in infancy. *Pediatric Research* 35:157–163.

- "It is now well-accepted that the primary anti-caries activity of fluoride **is via topical action.**"
  SOURCE: Zero DT, et al. (1992). Fluoride concentrations in plaque, whole saliva, and ductal saliva after application of home-use topical fluorides. *Journal of Dental Research* 71:1768-1775.

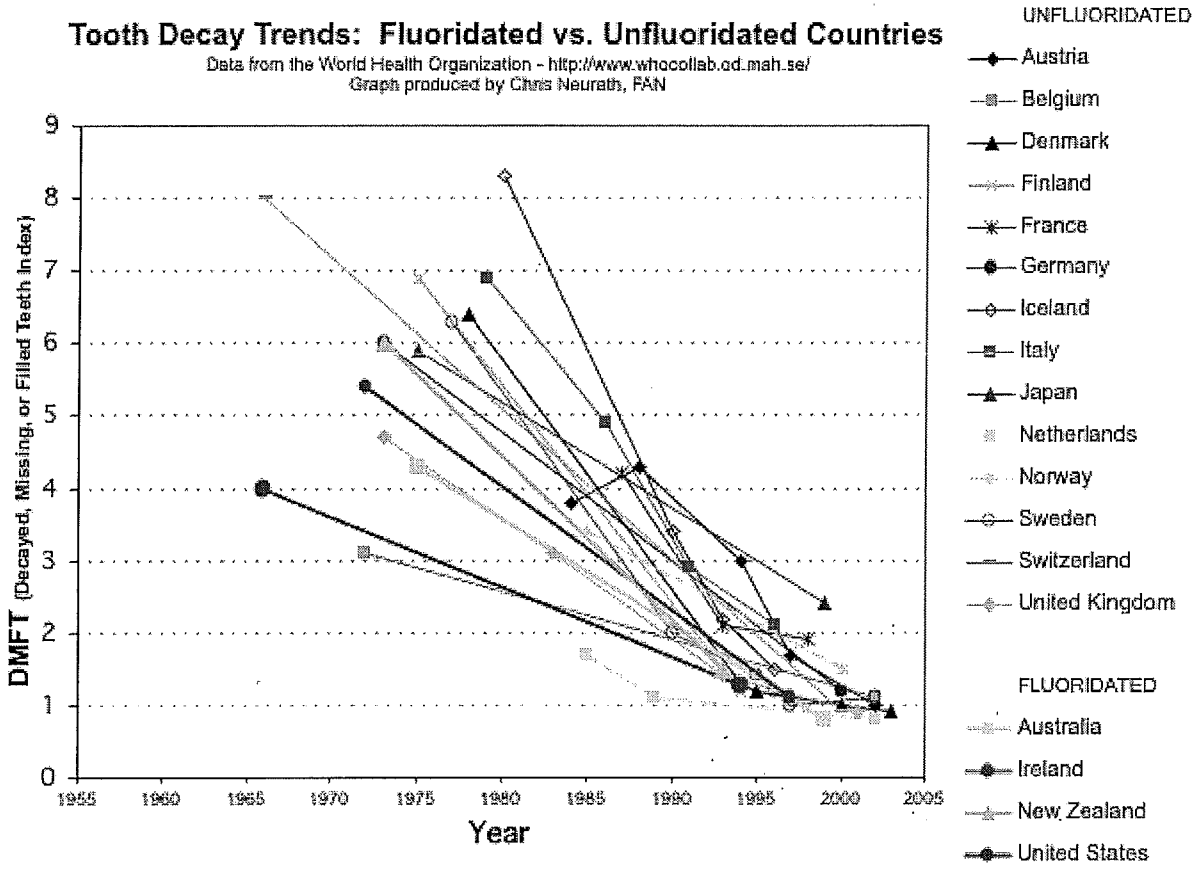
- "I have argued in this paper that desirable **effects of systemically administered fluoride are quire minimal or perhaps even absent altogether**."
  SOURCE: Leverett DH. (1991). Appropriate uses of systemic fluoride: considerations for the '90s. *Journal of Public Health Dentistry* 51: 42-7.

- "It, therefore, becomes evident that a shift in thinking has taken place in terms of the mode of action of fluorides. Greater **emphasis is now placed on topical rather than on systemic mechanisms**..."
  SOURCE: Wefel JS. (1990). Effects of fluoride on caries development and progression using intra-oral models. *Journal of Dental Research* 69(Spec No):626-33;

Appendix B follows

Appendix B Universal decline in cavities worldwide. Fluoridated communities show no advantage in dental decay

World Health Organization Data (2004) -
Tooth Decay Trends (12 year olds) in Fluoridated vs. Un-fluoridated Countries



DMFT (Decayed, Missing & Filled teeth) Status for 12 year olds by Country - World Health Organization Data (2004) -			
Country	**DMFTs**	**Year**	**Status***
Germany	0.7	2005	No water fluoridation, but salt fluoridation is common
Australia	0.8	1999	More than 50% of water is fluoridated; no salt fluoridation
Denmark	0.8	2006	No water fluoridation or salt fluoridation
Netherlands	0.8	2002	No water fluoridation or salt fluoridation
Zurich,	0.9	2000	No water fluoridation, but salt

Switzerland			fluoridation is common
UK *(England & Wales)*	0.9	2000	11% of water supplies are fluoridated; no salt fluoridation
Austria	1.0	2002	No water fluoridation, but salt fluoridation is available to a limited extent.
Sweden	1.0	2005	No water fluoridation or salt fluoridation
Italy	1.1	2004	No water fluoridation or salt fluoridation
Belgium	1.1	2002	No water fluoridation or salt fluoridation
Ireland	1.1	1997	More than 50% of water is fluoridated; no salt fluoridation
Finland	1.2	2006	No water fluoridation or salt fluoridation
US	1.28	1992-1994	More than 50% of water is fluoridated; no salt fluoridation
Iceland	1.4	2005	No water fluoridation or salt fluoridation
New Zealand	1.7	2005	More than 50% of water is fluoridated; no salt fluoridation
Norway	1.7	2004	No water fluoridation or salt fluoridation
France	1.9	1998	No water fluoridation, but salt fluoridation is common
Data from WHO Oral Health Country/Area Profile Programme Department of Noncommunicable Diseases Surveillance/Oral Health WHO Collaborating Centre, Malmö University, Sweden http://www.whocollab.od.mah.se/euro.html			

- "In most European countries, **where community water fluoridation has never been adopted, a substantial decline in caries prevalence has been reported in the last decades**, with reductions in lifetime caries experience exceeding 75%."
  SOURCE: Pizzo G, et al. (2007). Community water fluoridation and caries prevention: a critical review. *Clinical Oral Investigations* 11(3):189-93.

- "The most recent World Health Organization data, show that the decline in dental decay in recent decades has been comparable in 16 non-fluoridated countries and 8 fluoridated countries. **The WHO data do not support fluoridation as being a reason for the decline in dental decay** in 12 year olds that has been occurring in recent decades." SOURCE: Neurath C. (2005). Tooth decay trends for 12 year olds in nonfluoridated and fluoridated countries. *Fluoride* 38:324-325.

- "It is remarkable... that the **dramatic decline in dental caries** which we have witnessed in many different parts of the world has **occurred without the dental profession being fully able to explain the relative role of fluoride** ... the wide distribution of fluoride from toothpastes may be a major explanation .. **dental caries is not the result of fluoride deficiency**."
  SOURCE: Aoba T, Fejerskov O. (2002). Dental fluorosis: chemistry and biology. *Critical Review of Oral Biology and Medicine* 13: 155-70.

- "A very marked decline in caries prevalence [in Europe] was seen in children and adolescents...The number of edentulous adults in Europe has also been declining considerably."
  SOURCE: Reich E. (2001). Trends in caries and periodontal health epidemiology in Europe. *International Dentistry Journal* 51(6 Suppl 1):392-8.

- "**Caries prevalence data from recent studies in all European countries showed a general trend towards a further decline for children and adolescents...**The available data on the use of toothbrushes, fluorides and other pertinent items provided few clues as to the causes of the decline in caries prevalence."
  SOURCE: Marthaler TM, O'Mullane DM, Vrbic V. (1996). The prevalence of dental caries in Europe 1990-1995. ORCA Saturday afternoon symposium 1995. *Caries Research* 30: 237-55

- "**There is a general agreement that a marked reduction in caries prevalence has occurred among children in most of the developed countries in recent decades**."
  SOURCE: Petersson GH, Bratthall D. (1996). The caries decline: a review of reviews. *European Journal of Oral Science* 104: 436-43.

- "**The regular use of fluoridated toothpastes has been ascribed a major role in the observed decline in caries prevalence in industrialized countries during the last 20 to 25 years**, but only indirect evidence supports this claim."
  SOURCE: Haugejorden O. (1996). Using the DMF gender difference to assess the "major" role of fluoride toothpastes in the caries decline in industrialized countries: a meta-analysis. *Community Dentistry and Oral Epidemiology* 24: 369-75.

- "**The marked caries reduction in many countries over the last two decades is thought to be mainly the result of the widespread and frequent use of fluoride-containing toothpaste**... There seem to be no other factors which can explain the decline in dental caries, which has occurred worldwide during the same period, in geographic regions as far apart as the Scandinavian countries and Australia/New Zealand."
  SOURCE: Rolla G, Ekstrand J. (1996). *Fluoride in Oral Fluids and Dental Plaque.* In: Fejerskov O, Ekstrand J, Burt B, Eds. Fluoride in Dentistry, 2nd Edition. Munksgaard, Denmark. p 215.

- "Although difficult to prove, it is reasonable to assume that **a good part of the decline in dental caries** over recent years in most industrialized countries, notably those Northern European countries without water fluoridation, **can be explained by the widespread use of fluoride toothpastes**.

This reduction in caries has not been paralleled by a reduction in sugar intake..."
SOURCE: Clarkson BH, Fejerskov O, Ekstrand J, Burt BA. (1996). *Rational Use of Fluoride in Caries Control.* In: Fejerskov O, Ekstrand J, Burt B, Eds. Fluoride in Dentistry, 2nd Edition. Munksgaard, Denmark. p 354.

- "During the past 40 years dental caries has been declining in the US, as well as in most other developed nations of the world... The **decline in dental caries has occurred both in fluoridated and in non-fluoridated communities**, lending further credence to the notion that **modes other than water fluoridation**, especially dentrifices, **have made a major contribution**."
  SOURCE: Leverett DH. (1991). Appropriate uses of systemic fluoride: considerations for the '90s. *Journal of Public Health Dentistry* 51: 42-7.

- "The current reported **decline in caries tooth decay** in the US and other Western industrialized countries has been observed **in both fluoridated and non-fluoridated communities**, with percentage reductions in each community **apparently about the same**."
  SOURCE: Heifetz SB, et al. (1988). Prevalence of dental caries and dental fluorosis in areas with optimal and above-optimal water-fluoride concentrations: a 5-year follow-up survey. *Journal of the American Dental Association* 116: 490-5.

- "During the period 1979-81, especially in western Europe where there is little fluoridation, a number of dental examinations were made and compared with surveys carried out a decade or so before. It soon became clear that large reductions in caries had been occurring in un-fluoridated areas. **The magnitudes of these reductions are generally comparable with those observed in fluoridated areas over similar periods of time**."
  SOURCE: Diesendorf, D. (1986). The Mystery of Declining Tooth Decay. *Nature* 322: 125-129.

- "Even the most cursory review of the dental literature since 1978 reveals a wealth of data documenting a secular, or long term, generalized decline in dental caries throughout the Western, industrialized world. **Reports indicate that this decline has occurred in both fluoridated and fluoride-deficient areas**, and in the presence and absence of organized preventive programs."
  SOURCE: Bohannan HM, et al. (1985). Effect of secular decline on the evaluation of preventive dentistry demonstrations. *Journal of Public Health Dentistry* 45: 83-89.

Appendix C follows

Appendix C

Additional published, peer-reviewed research that describe positive dental results after cessation of water fluoridation :

1. Burt BA, et al. 2000. The effects of a break in water fluoridation on the development of dental caries and fluorosis. *Journal of Dental Research* 79(2):761-9.
2. Clark DC, Shulman JD, Maupome G, Levy SM. 2006 Changes in Dental Fluorosis Following Cessation of Water Fluoridation. Community of Dental and Oral Epidemiology Jun;34(3):197-204.
3. Kalsbeek H, Kwant GW, Groeneveld A, Dirks OB, van Eck AA, Theuns HM.1993 Caries experience of 15-year-old children in The Netherlands after discontinuation of water fluoridation. Caries Res. 27(3):201-5.
4. Kobayashi S, Kawasaki K, Takagi O, Nakamura M, Fujii N, Shinzato M, Maki Y, Takaesu Y. 1992 Caries experience in subjects18–22 years of age after 13 years' discontinued water fluoridation in Okinawa. Community Dentistry and Oral Epidemiology. 20(2):81-83.
5. Künzel W, Fisher T 2000 Caries prevalence after cessation of water fluoridation in La Salud, Cuba. Caries Res 34:20–25.
6. Kunzel W, et al. 2000. Decline in caries prevalence after the cessation of water fluoridation in former East Germany. Community Dentistry and Oral Epidemiology 28(5): 382-389.
7. Lekesova I, Rokytova K, Salandova M, Mrklas L 1996 Zastaveni fluoridace pitne vody v Praze. Progresdent 6:15-17.
8. Maupome G, et al. 2001. Patterns of dental caries following the cessation of water fluoridation. Community Dentistry and Oral Epidemiology 29(1): 37-47.
9. Seppa L, et al. 2000 Caries trends 1992-98 in two low-fluoride Finnish towns formerly with and without fluoride. Caries Research 34(6): 462-8.

Recent Reviews of Cessation Studies

11. Natick Fluoridation Committee. 1997 The Natick Report: An Analysis of Water Fluoridation. Sept 27.
12. Ziegelbecker R. Natural Water Fluoridation: Multifactorial Influences on Dental Caries in the 21 Cities Study. Abstracts. International Society for Fluoride Research, XVIIth Conference, Hotel Thermal, BUDAPEST, Hungary, June 22 - 25, 1989
13. Ziegelbecker R. Fluoridation in Europe (Letter to the Editor) FLUORIDE[1] August 1998;31(3):171-174.

14. Pizzo G, Piscopo M, Pizzo I, Giulliana G. 2007 Community water fluoridation and caries prevention: a critical review. Clinical and Oral Investigations Sep;11(3):189-193.

15. Azarpazhooh A, Stewart H. 2006 Oral Health Consequences of the Cessation of Water Fluoridation in Toronto.

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