Community Water Fluoridation–The Science Behind the Support by the Ontario Dental Association (ODA)

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Background

A document called “Community Water Fluoridation – The Science Behind the Support – ODA was sent to Waterloo City Councillors. This included a list of 11 research papers, 23 review papers and 4 other papers discussing nutrients. I was asked to review and comment on this document.

4 Papers Discussing Nutrients.

The ODA cites 4 paper discussing the role of fluoride as a nutrient. Here is what Health Canada has to say:

> "Although Health Canada classified fluoride as an essential element in the past, it now recommends that fluoride requirements can 'only be based on the beneficial effect on dental caries' and notes that 'attempts to demonstrate its essentiality for growth and reproduction in experimental animals have not been successful." Available from: http://www.hc-sc.gc.ca/iyh-vsv/environ/fluor_e.html
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> “Health Canada does not consider fluoride as an essential nutrient.” Auditor General of Canada Petition #221, Answer #22: Available from: http://www.oag-bvg.gc.ca/internet/English/pet_221_e_30308.html

National Academy of Sciences. (1989). Recommended Dietary Allowances: 10th Edition. Commission on Life Sciences, National Research Council, National Academy Press, page 235:

> “The status of fluorine as an essential nutrient has been debated...**These contradictory results do not justify a classification of fluorine as an essential element, according to accepted standards**. ” [emphasis added]

To demonstrate that a substance is a nutrient required for health, one has to demonstrate that some disease results from depriving an animal or a human of this substance. This has never been done for fluoride.

11 Research Papers

The ODA misrepresents the findings of several studies cited.

1. Armfield, J.M. & Spencer, A.J. (2004). Consumption of non-public water: implications for children's caries experience. Community Dentistry and Oral Epidemiology, 32, 283-96:

> **ODA statement under this citation:** "Recommendations are made for the addition of fluoride to bottled water, especially with regard to the oral health of younger children."

This study of about 10,000 Australian childen demonstrated that AWF does not prevent cavities. The above statement by a well-known promoter of water fluoridation is totally irrelevant to the findings and conclusions of this paper.

> **Actual Study Conclusion:** "The effect of consumption of nonpublic water [with no fluoride added] on permanent caries experience was not significant."

2. Luke, J. (2001). Fluoride deposition in the aged human pineal gland. Caries Research, 35, 125-28:

> **ODA statement under this citation:** "Fluoride does not accumulate in brain. Of all tissues, brain has the lowest fluoride concentration."

The study's findings demonstrate the opposite to what the ODA claims above. Available from: http://www.icnr.com/articles/fluoride-deposition.html

> "It has shown for the first time that **fluoride readily accumulates in the human pineal gland** although there was considerable inter-individual variation (14-875 mg F/kg). By old age, the average **pineal gland contains about the same amount of fluoride as teeth** (300 mg F/kg) since dentine and whole enamel contain 300 and 100 mg F/kg, respectively [Newbrun, 1986]. Unlike brain capillaries, pineal capillaries allow the free passage of fluoride through the endothelium. If there had been a bloodbrain barrier in the pineal, it would have prevented the passage of fluoride into the pinealocytes and the pineal fluoride content would have been similar to or lower than muscle. This was obviously not the case: the fluoride concentration of the pineal was significantly higher ($p<0.001$) than muscle. **The high fluoride levels in the pineal are presumably due to the large surface area of the HA crystallites both intra- and extracellularly**. In addition, the pineal has a profuse blood flow and high capillary density; pineal blood flow (4 ml/min/g) is second only to the kidney [Arendt, 19951." (emphasis added)

3. Bürgi, H., Siebenhüner, L. & Miloni, E. (1984, June). Fluorine and thyroid gland function: a review of the literature. Klin Wochenschr, 62(12), 564-9.

> **ODA statement under this citation:** "Published data fail to support the view that fluoride, in doses recommended for caries prevention, adversely affects the thyroid."

Selecting one paper that showed no adverse affects is not a scientifically valid way to draw conclusions about an entire area of research. The ODA should read chapter 8 of the National Research Council Review 2006 which concludes: Available from: http://www.nap.edu/catalog/11571.html

> "Fluoride exposure in humans is associated with elevated TSH concentrations, increased goiter prevalence, and altered T4 and T3 concentrations; similar effects on T4 and T3 are reported in experimental animals." p 218
>
> "As little as 0.7mg/L fluoride or 1 liter of artificially fluoridated water can suppress thyroid function if the individual is iodine deficient. (70kg person) "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." p 218
>
> "Intake of nutrients such as calcium and iodine often is not reported in studies of fluoride effects. The effects of fluoride on thyroid function, for instance, might depend on whether iodine intake is low, adequate, or high, or whether dietary selenium is adequate." p 218

4. Brunelle, J.A. & Carlos, J.P. (1990, February). Recent trends in dental caries in U.S. children and the effect of water fluoridation. Journal of Dental Research, 69, 723-7 and 820-3:

> **ODA statement under citation:** "Children who had always been exposed to community water fluoridation had mean DMFS (decayed, missing and filled permanent tooth surfaces) scores about 18% lower than those who had never lived in fluoridated communities…The results suggest that water fluoridation has played a dominant role in the decline in caries and must continue to be a major prevention methodology."

This paper and the abstract cited above is discussed in the new book by Connett, Beck & Micklem, pages 58-60 (The Case Against Fluoride: How Hazardous Waste Ended up in Our Drinking Water *and* the Bad Science and Powerful Politics That Keep It There. Available from Chelsea Green: http://www.chelseagreen.com/

> "However table 6 in their paper shows that this reported saving amounts to an average of just six-tenths of a single tooth surface, and that is out of approximately one hundred tooth surfaces in a child's mouth. Nor did the authors subject this to any analysis to see if the result was statistically significant." Using table 6 cited in the paper, this "represents only an absolute saving of approximately 1.2 percent of the 128 tooth surfaces". Confounding variables such as socio-economic status, delayed tooth eruption caused by fluoride ingestion, were not controlled in this study.

23 Review Papers

The ODA includes virtually no primary research. They use politically sensitive reviews written by fluoridation supporters. In scientific research it is not acceptable to cite only papers which support your position and to ignore all research which does not support your position. The ODA also misrepresents the findings of several papers. Recent reviews such as the York Review 2000 and the Pizzo et al Review 2007 were omitted. 6 examples of concern are provided.

1. National Research Council (NRC) (2006, March). Fluoride in Drinking Water: A Scientific Review of EPA's Standards. Washington, D.C.: National Academies Press.

> **ODA statement under citation:** "…the committee's conclusions regarding the potential for adverse effects from fluoride at 2 to 4 mg/L in drinking water do not apply at the lower water fluoride levels commonly experienced by most U.S. citizens."

This quote is **NOT from the NRC 2006 Review** as implied by the ODA. The actual quote is:

> "The committee's conclusions regarding the potential for adverse effects from fluoride at 2 to 4 mg/L in drinking water do not address the lower exposures commonly experienced by most U.S. citizens." (Page 11)

This quote used by the ODA is from a press release. Neither the author or the date of the above quote provided by the ODA is revealed. This statement was not reviewed, or approved, by the authors of this report (I have emails to me from 3 NRC authors discussing this press release). NRC Report committee required that every word written attain a consensus by all authors. This NAS press brief did not receive the consensus of the NRC 2006 committee. At least three authors were not consulted.

2. Locker, D. (1999, November). 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.

Following are some of the conclusions from this report:

> "In Canada, actual intakes are larger than recommended intakes for formula-fed infants and those living in fluoridated communities. Efforts are required to reduce intakes among the most vulnerable age group, children aged 7 months to 4 years."
>
> "Current studies support the view that dental fluorosis has increased in both fluoridated and non-fluoridated communities. North American studies suggest rates of 20 to 75% in the former and 12 to 45% in the latter."
>
> "The magnitude of [fluoridation's] effect is not large in absolute terms, is often not statistically significant, and may not be of clinical significance."

> “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 remineralization, is much stronger.”

2 years later the author discussed the ethical issues of water fluoridation in: Cohen H, Locker D. 2001 The Science and Ethics of Water Fluoridation Journal of the Canadian Dental Association. 67(10): 578-80.

> “In the absence of comprehensive, high-quality evidence with respect to the benefits and risks of water fluoridation, the moral status of advocacy for this practice is, at best, indeterminate, and could perhaps be considered immoral.”

3. The British Fluoridation Society, The UK Public Health Association, The British Dental Association & The Faculty of Public Health (2004). One in a Million—the Facts About Water Fluoridation, 2nd ed.

Citing the British Fluoridation Society as a “science” is highly questionable. The Chair of the York Review 2000, Trevor Sheldon, states in the Yorkshire Post, July 26, 2006 http://www.yorkshirepost.co.uk/letters-to-the-editor/Chewing-over-the-facts-about.1651774.jp

> “Department of Health's objectivity is questionable—it funded the British Fluoridation Society and, along with many other supporters of fluoridation, it used the York review's findings selectively to give an overoptimistic assessment of the evidence in favour of fluoridation.”

> “We are concerned about the continuing misinterpretations of the evidence and think it is important that decision makers are aware of what the review really found. As such, we urge interested parties to read the review conclusions in full at http://www.york.ac.uk/inst/crd/pdf/summary.pdf.”

4. Health Canada 2008 Findings and Recommendations of the Review of the Expert Panel.

Responses by the international community, including a member of the National Research Council 2006 Review Committee on Fluorides in Drinking Water had many :

Fluoride in Drinking Water - Kathleen M. Thiessen, Ph.D., co-author of the NRC 2006 Review: Fluorides in Drinking water

Response to Health Canada 2009 Review - Paul Connett, PhD

Response to Health Canada 2009 Review - Carole Clinch BA BPHE

Omissions - Carole Clinch BA BPHE

5. ODA states: Water fluoridation, in the correct amount, is a safe, effective and economical means of preventing dental caries (cavities).

Fluoridation products cannot be called SAFE & EFFECTIVE until a determination of safety and efficacy of these products is made by Health Canada, according to the requirements of the Food and Drug Act.

Epidemiological reports periodically make the claim that F intake via water fluoridation may influence caries, these claims remain unconvincing, due to the failure to control for the more than 100 factors known to influence caries, (Harris et al 2004) including the ability of fluoride to delay the eruption of teeth.(Kumarek et al 2005) In order for epidemiological evidence to be convincing, researchers must properly control for confounding variables influencing this complex oral ecosystem.

McDonagh M, et al. (2000). A Systematic Review of Public Water Fluoridation. ("The York Review.") NHS Center for Reviews and Dissemination. University of York. September 2000.

> "Conclusions: Given the level of interest surrounding the issue of public water fluoridation, it is surprising to find that little high quality research has been undertaken. As such, this review should provide both researchers and commissioners of research with an overview of the methodological limitations of previous research."

6. ODA claims: "Toxic levels [of fluoride] cannot be achieved by drinking fluoridated water."

Even a child knows that you cannot control how much fluoride is ingested each day from water, or food and beverages made with fluoride water. Basic pharmacology demonstrates that the daily intake is determined by several important factors: total quantity of F from all sources, the ability of the kidney to excrete F, the size of the individual, and health susceptibilities of the individual. Pleas see a discussion of Margin of Safety, pages 201-211, in the book "Case Against Fluoride: How Hazardous Waste Ended Up in Our Drinking Water *and* the Bad Science and Powerful Politics That Keep It There. Available from: http://www.chelseagreen.com/bookstore/item/the_case_against_fluoride/

> Page 201: "In the case of fluoride, an extra safety factor will be needed when setting a safe level for fluoride in water (either natural or added) to take into account the full range of exposure for a population drinking uncontrolled amounts of water and getting fluroide from other sources as well."

Please see discussion of ODA claims by co-author of the NRC 2006 Review ("Fluorides in Drinking Water") Dr. Thiessen: http://www.newmediaexplorer.org/chris/Dr_Thiessen_2009_Health_Canada_Misrepresents_NRC_Review.pdf

See also discussion by Dr. Thiessen in chapter 14, pages 142-146, in the book "Case Against Fluoride:

Page 144: Hazards of fluoride exposure. “the ranges of intake levels, or estimated average intake levels, associated with anumber of adverse effects, are in the range of intakes expected with fluroidated drinking water in the U.S. Fluoride exposures in the u.S. are driven largely by consumption of drinking water and beverages made with tape water.

Page 145: Carcinogenicity. “The committee did not consider did not consider either “insufficient information” or “clearly not carcinogenic” to be applicable. The committeer report includes a discussion of how EPA establishes drinking water standards for known, probable, or possible carcinogens; such a discussion would not have been relevant ahd the committee not considered fluoride to be carcinogenic. The question becomes one of how strongly carcinogenic fluoride is, and under what circumstances. As mentioned, fluoride may be a cancer promoter rather than an initiator, although the two mehanisms are not mutually exclusive.”

Page 146: Concerns about silicofluorides. “These include increased lead in children's blood, increased leaching of lead into water from plumbing fixtures, and the addition of other substances to the drinking water along with the silicofluorides. For instance, the MCLGs for arsenic and lead are 0, based on health risks; however, the actual level permitted (the Maximum Contaminant Level, or MCL) [MAC in Canada] is above 0 (to account for difficulty in removing it or in measuring it). However, in addition of the impure silicofluorides to drinking water, some arsenic and lead are generally added as well, although the resulting concentration must stay below the MCL. Given that the MCLGs are 0, the obvious question is whether knowingly adding any amoung, however tiny, is appropriate.”

NRC 2006 REVIEW Chapter 2
http://books.nap.edu/openbook.php?record_id=11571&page=23

NRC 2006 REVIEW Appendix B
http://books.nap.edu/openbook.php?record_id=11571&page=416#

Concluding Remarks

1. Is the ODA misrepresentation of the research literature because:

   1) ODA did not read the paper cited;

   2) ODA did not understand the paper cited; and/or

   3) ODA read and understood the paper cited but chose to misrepresent the conclusions and findings because they did not support the policy of artificial water fluoridation which they are trying to defend?
2. Why would any organization who permits their members to use “Dr.” before their name promote the use of an unregulated, unapproved, uncontrolled health product?
3. It is not in the mandate of the ODA to evaluate this research.

4. Dentists have financial and political conflicts of interest regarding this matter. Please see Chapter 26, The Case Against Fluoride for “Promoters Motivations”, pages 258-67.

    1) Dental trade organizations receive considerable money from their endorsements of fluoride products. Dentists and large, lucrative corporations (Colgate, Crest) which provide them with financial support must **p**rotect the image of 'FLUORIDE' to protect these lucrative markets. The dental market is growing for cosmetic repair of fluorosis damaged teeth. Unfortunately, cosmetic repair is only available to those who can afford it.

    2) Dental trade organizations have a dilemma – if they admit that the fluoridation policy which they have promoted is ineffective and potentially harmful, it reflects badly on their profession. These trade groups are unaware of the research because they have never conducted reviews of the research literature.

Dentists refuse to admit that fluorosis diseases of teeth, bones and soft tissue increase with the use of artificial water fluoridation, despite the evidence from their own scientists. The characteristic blemishes ('opacities', brown staining, pits and cracks) of dental fluorosis are actually locations of enhanced vulnerability to future decay and damage, and may lead to a higher risk of cavities in later life.

The Scientific Method underpinning research presupposes a willingness to continually reexamine scientific evidence and assumptions. Science is not a collection of facts but a process of weeding out misinformation and testing preliminary results with care and diligence. Scientific discourse attempts to refute what has been found, not to gather supporting evidence for the status quo.

There is currently no means for holding individuals accountable for things they may say in the public forum by either self-regulation or government legislation. Therefore, any individual(s) who distort(s) or misrepresent(s) scientific evidence and known facts for reasons of ignorance, political expedience, financial gain, or self-interest imperil(s) the integrity of scientific discourse and leads to an erosion of public trust in our government institutions where policy decisions regarding public health are deemed to be made, based on scientific evidence.