

Canadian Water Fluoridation Deputation
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I am Professor Emeritus of Medical Biophysics, University of Calgary, a physician and a scientist (biophysicist) and a co-author of a 2010 book on fluoridation. Let me state two disclaimers: I have no financial or material interest in fluoridation and my royalties on sales of the book I co-authored are donated to the Fluoride Action Network.

I urge care in evaluating what you are told by both promoters and opponents of fluoridation. You should insist that we have evidence and common sense to back what we tell you. Promoters rarely cite primary research. Primary research is the definition of a problem and the collection, analysis and interpretation of data. Reviews are not primary research. In the case of fluoridation most reviews have been done by panels of fluoridation promoters selected by governments that promote fluoridation. The members of such panels are often dentists and few if any are scientists or professional risk analysts.

I have heard officials, dental and medical officers of health from Health Canada and from five different provinces, give false statements to city and town councils in their support of fluoridation. For the most part I don't think they were lying; they just didn't know much about the issues and the evidence. But it is difficult to understand how they can deny the very existence of the hundreds of peer-reviewed publications in credible scientific journals that indicate association of fluoridation with adverse effects on health.

We should be wary of diversions such as comparisons of fluoridation with fortifying salt with iodide and milk with vitamin D. The last two are nutrients with wide differences between what is essential and what is toxic. Fluoride is not a nutrient. It has never been shown to be essential for any biochemical or physiological function of the human body. Comparison with chlorination is another diversion. It is done to kill dangerous microorganisms and the chlorine does not stay in the water we use as does fluoride.

Another falsehood often heard is that the City Council of Calgary made an uninformed and hasty decision in stopping fluoridation. That is not only false but also insulting to a group of councillors who educated themselves over a decade on the scientific arguments about efficacy and safety of fluoridation. In the course of their deliberations they explicitly rejected proposals of another expert panel and another plebiscite. They rejected the panel because they believed, correctly, that it would not be possible to have an unbiased panel and that it would be an unnecessary delay. They rejected the plebiscite for the reason that it is absurd to decide whether to take a medicine by asking your neighbors to vote on it. The officials who offer this insulting fabrication show themselves not to be credible.

Another criticism came from promoters in your area, that Calgary's councillors were uninformed because there is no municipal public health department. Such a thing would be redundant because public health is a provincial responsibility. Also they received input extensively from Alberta Health Services which the majority of councillors came to

distrust.

Along with many councillors in many towns and cities I have concluded that fluoridation of public water supplies is not substantially effective, not safe, and not ethical. The science may not be obvious, but it is clear. The ethics is both clear and obvious. According to the Fluoride Action Network, "Since October 2010...29 communities have halted fluoridation. The total population that has been freed from forced fluoridation over the past year is approximately 2,571,500 people...." This is in Canada alone. In Canada and the United States over 300 jurisdictions have rejected fluoridation since 1990. European countries that had fluoridation stopped it during the 1970s for various combinations of three reasons (according to officials of those countries): not effective, not safe, not ethical.

The ethical failings are: hexafluorosilicic acid and fluoride are untested for human toxicity and are unapproved by any government or qualified agency; there is no informed consent; the individual hasn't the option to stop it; there is no monitoring of effects. The medical failings are: especially susceptible groups are not protected; the natural variation in a population of the response to a drug is not accounted for; the dose is not controlled. By the way, hexafluorosilicic acid and fluoride are drugs. They are non-nutrients administered for a medical purpose and the Supreme Court of Canada considered it a drug in a case in 1957.

Controlling the concentration in tap water does not control dose, even less does it control the dose per unit body weight. The amount of water drunk by an individual per day varies easily twenty-fold. Outdoor construction workers in warm climates, athletes, diabetics, infants and young children, among others, drink much more per unit body weight than does the average adult. Furthermore, there is unknown but substantial exposure—from food, processed drinks and residues from pesticides—which is not accommodated for in fluoridating jurisdictions.

Any sizable population includes a spread of sensitivity to any drug. The standard margin of safety to account for this intraspecies variation is 10. For example, if a harm is seen at a dose of 10 mg/day, then a maximum allowable dose would be set at 1 mg/day. In the case of fluoridation especially sensitive groups include infants, persons with low dietary iodine, persons with kidney disease—all consisting of substantial numbers of people in a population of the size under consideration.

Proponents propose that we fluoridate until there is absolute proof of harm (there is for some harms). This is irresponsible. Opponents propose that we don't fluoridate until there is strong evidence that it is not harmful to any component of the population. This is the acceptable procedure, consistent with the duty to protect the health of all. We should ask ourselves, "How would we feel if we allowed a program to continue for sixty years and then found out that it has been harmful?"

The precautionary principle is a useful guide in making a decision of this sort. It requires that the benefit of some procedure must be balanced against the possibilities and consequences of harms. If there is credible evidence of harm and the possible harm would significantly compromise health or well-being then only a procedure that is

sure to produce a benefit greater than the possible harm is justified. So the factors to be considered are the possible benefit, the possible harm, and whether there are feasible alternatives for producing the benefit.

In the case of fluoridation the possibility of harm is great, almost certain for some harms (dental fluorosis, thyroid suppression, hip fracture). The benefit is slight, probably nonexistent. There are harmless and accessible alternatives for attaining the desired benefit. Good diet and fluoridated toothpaste, not swallowed, are two such measures. So fluoridation does not pass the test of the precautionary principle.

Hexafluorosilicic acid is very different from calcium fluoride which is the form of fluoride in lakes, rivers and aquifers, the usual sources of public water supplies. Hexafluorosilicic acid dissociates in water to a large extent but reassociates to some extent in the stomach and apparently causes harm to the stomach and intestines and is associated with higher levels of lead, a recognized neurotoxin, in children's blood. Hexafluorosilicic acid is received as a 23% solution in water with contaminants such as lead, arsenic, uranium and other heavy metals. These impurities are present in small amounts but some of them are very toxic. Curiously it is illegal to dump this into an ocean, lake or river or to put it into or onto the ground yet it is added to tap water. It is listed as a dangerous substance requiring special, and expensive, handling. It is costly in itself and also corrosive enough that water departments that use it face renovations costing millions of dollars every few years.

Proponents often say that fluoridation is merely "topping up" a natural component of a city's water. But the natural fluoride is calcium fluoride. Much of the fluoride as calcium fluoride is excreted while about half of the ingested fluoride ion is sequestered in the body where it accumulates throughout the life of a person using fluoridated water.

It is now widely recognized, even among promoters of fluoridation that any benefit of fluoride in preventing cavities is topical—that is, acting directly on the tooth—not from ingestion. Furthermore, there are ways of getting this benefit—such as using fluoridated toothpaste, topical applications in dentist's offices, and sodium fluoride rinses—which provide alternatives by choice for those who want it.

