

Fluoridation of Public Water Supplies

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The decision on whether to start or to discontinue fluoridation must rest on the answers to some questions. Here I omit those of economic and political nature and focus on the scientific and ethical questions.

Is fluoridation effective?

Fluoridation of public water supplies has been in effect somewhere in the world for seven decades now. Over that time the prevalence of dental caries (cavities) has fallen in industrialized countries. This has been taken by many to indicate efficacy. But research has consistently shown that the decrease has occurred in countries without fluoridation to the same or greater degree as in those with fluoridation. Furthermore it is observed that in jurisdictions where fluoridation has been discontinued the incidence of caries has not risen.

Early studies claimed to show effectiveness in preventing cavities are faulty to the point of uselessness. Some investigations show a slightly lower prevalence of cavities, but they are not adjusted for the known effect that fluoride has on eruption, the appearance in the mouth, of teeth. Fluoride swallowed during the process of tooth development delays eruption so that the teeth are not exposed as soon to the causes of cavities. In reality those small “benefits” are not due to a protective effect of fluoride in drinking water, but rather due to damage to the development of the teeth. Other known factors were not accounted for in these studies. One of those factors is the well-established correlation between family income and cavities in children: the lower the income, the higher the prevalence of cavities. This relationship occurs in fluoridated as well as in non-fluoridated communities.

Meanwhile research has been widely interpreted to show that there is a slight beneficial effect due to topical application of fluoride to teeth but not due to swallowing fluoride.

The answer to this first question, Is it effective?, is clearly no.

Is fluoridation safe?

The question of toxicity is easy to answer with respect to some body systems, difficult for others. The most obvious toxic effect has been dental fluorosis. In mild cases it appears as mottling discolouration of tooth surfaces. In moderate and severe cases it involves discolouration, pitting and weakening of the enamel and has serious consequences. In Canada the treatment of this condition costs tens of thousands of dollars per patient. Even if this effect were only cosmetic, it can have serious negative effects on a child's or teenager's life.

Evidence uncovered over the last two decades has shown an association of fluoride in drinking water, at concentrations comparable with those where water is artificially fluoridated, with lower IQ (so-called intelligence quotient) in children. There are now twenty-four published studies showing this effect. There is a paper published in 2011 showing association between higher levels of fluoride in urine with lower IQ and another paper in 2011 shows a similar association between higher levels in blood with lower IQ. In over 100 laboratory studies of animals and in three studies of spontaneously aborted human fetuses an association with abnormal cellular effects on cells of the brain has been found. It has been shown that fluoridation with hexafluorosilicic acid is associated with high levels of lead, a known neurotoxin, in the blood of children.

On the basis of strong evidence widely accepted it is clear that fluoride intake is a cause of impaired thyroid function. Indeed fluoride was once used medically to suppress thyroid function.

Deleterious effects on reproductive systems in humans have been found to be associated with fluoridation: in girls, early onset of menstruation; in men, low sperm counts and impaired sperm.

We now have strong evidence of the association of osteosarcoma in boys and young adult males with fluoridation. Osteosarcoma is a bone cancer which is often fatal.

The possible incidence of bone fracture with fluoridation has been studied with mixed results. One of the strongest studies is presented in a paper by Li et al. published in 2001 which shows a rising incidence of hip fracture correlated with a rising intake of fluoride starting with concentrations comparable with those used in fluoridation in North America. And this is just one example that suggests that hip fracture is caused by fluoridated water.

Fluoride adversely affects kidneys. Recently papers have appeared on studies showing adverse effects on the heart and the aorta. And there are other toxicities.

The multiplicity of demonstrated and possible toxicities has been cited by some proponents of fluoridation as discrediting the arguments of opponents. That tactic

appears as an assertion that opponents are scaremongers, that nothing would cause so much trouble for so many body systems. But these effects of fluoride are not so surprising to anyone who recognizes that the element fluorine is the most reactive element in the periodic table and that it reacts with many components of the human body. For example, fluoride has been used in thousands of laboratory investigations as an inhibitor of enzymes, the proteins that catalyze (facilitate) biochemical reactions. It is also well known that fluoride, in combination with other elements such as aluminum and with components of cell membranes, disrupts the normal signalling across the membranes of hormones and other messengers that activate or moderate cellular functions. Really, the multiple toxicities are to be expected rather than dismissed.

So the answer to the second question, Is it safe?, is clearly no.

All said here is backed up by peer-reviewed scientific reports in credible journals. It is this body of knowledge that responsible opponents of fluoridation, including dentists, physicians, risk analysts and scientists are responding to. Proponents of fluoridation also include scientists, physicians and dentists. Many of them are working for governments or organizations that expect them to defend and promote fluoridation. They usually cite reviews from panels formed and funded by governments or organizations that promote fluoridation. They generally do not cite primary research supporting safety or efficacy that stands up to careful scrutiny.

Is fluoridation ethical?

Given the evidence that fluoridation is ineffective or only very slightly so and that it is unsafe, the question of ethicality is easily answered in the negative. But even if it were effective, it would not be acceptable for the following reasons.

It is unethical to administer a substance or procedure to a person without the consent of that person, consent informed by a qualified professional who must answer questions from that person and who must inform the recipient of the reasons for the administration and of possible side effects. It is unethical to administer a substance or procedure that has not been approved by a qualified body. Dosage and/or intensity must be monitored and controlled and the effects on individuals must be monitored by a qualified professional. The recipient must be able to stop the administration at will. These are simple precepts of medical ethics and they are a matter of human rights.

The substance used to fluoridate (HFSA) has not been tested for safety or approved for human consumption (nor has fluoride ion); the dosage is not controlled; consent has not been obtained; the effects on individuals are not monitored. Fluoridation of public water supplies fails on all these requirements.

And there is another aspect to the problem. Judgement on fluoridation of a public water

supply must be based not only on the possible or certain effects on the average healthy adult. In addition to the fact that humans vary in sensitivity to any substance, there are subgroups of the population that are especially susceptible to the risks of fluoride: infants and young children, persons with lowered thyroid function or low iodine intake, persons with kidney disease, male children from 8 to 16 years of age, workers and athletes who drink a lot of water and other groups. They, too, must be considered.

So the answer to the third question, Is it ethical?, is clearly no.

And finally, if there is uncertainty about possible harm, then the reasonable procedure is *not* to continue the possible risk until a perfect study produces absolute proof of harm. The reasonable and responsible procedure is to stop, or not to start, the medication until there is very strong certainty that it is safe for all members of the population that is to receive it. Such certainty for fluoridation does not exist.

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