

THE CASE AGAINST
Fluoride



**How Hazardous Waste
Ended Up in Our Drinking Water
and the Bad Science and
Powerful Politics
That Keep It There**

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A Response to Pro-Fluoridation Claims

Proponents of fluoridation have made a number of claims that have been effective with an ill-informed public. However, when those claims are examined carefully, they are found to have little merit. Although opponents have pointed out the weaknesses and fallacies in some of these “chestnuts” over the many years of this debate, they continue to crop up. Let’s take a look at them.

Claim 1: There is no difference in principle between chlorination and fluoridation.

This is wrong. Chlorination treats water; fluoridation treats people. Water is treated with chlorine to make the water safe to drink. It kills the bacteria and other vectors that carry disease. Chlorination is not without its critics, but millions of lives have been saved by this process.

Fluoridation, on the other hand, is not used to make the water safe. It simply uses the public water supply to deliver medicine. Such a practice is rare, indeed, for obvious reasons. Once medicine is added to tap water, key controls are lost. You cannot control the dose, and you cannot control who gets the medicine. Moreover, you are forcing medication on people without their informed consent and, especially in the case of low-income families, without their ability to avoid the medicine if they wish.

Claim 2: Fluoride is “natural.” We are just topping up what is there anyway.

Natural does not necessarily mean good. Arsenic, like fluoride, leaches naturally from rocks into groundwater, but no one suggests topping that up. Besides, there is nothing “natural” about the fluoridating chemicals, as they are obtained largely from the wet scrubbers of the phosphate fertilizer industry (see chapter 3). The chemicals used in most fluoridation programs are either hexafluorosilicic acid or its sodium salt, and those silicon fluorides do not occur in nature. What is more, under international law they cannot be dumped into the sea, yet a dilution of about 180,000 to 1 is supposed to protect against all harm when the same chemicals are added to the domestic water supply. In chapter 3, we discussed the language used in a recent Q&A pamphlet from the Victoria (Australia) Department of Human Services in

an effort to persuade citizens that the chemicals used in fluoridation are not hazardous waste products of the fertilizer industry.

Claim 3: Fluoride is a nutrient.

As we explained in chapter 1, in order to establish that a substance is an essential nutrient, a researcher has to remove the substance from the diet and demonstrate that disease results. This has not been shown to occur with a lack of fluoride, nor is fluoride known to contribute to any normal metabolic process.

Claim 4: Fluoridation is no different than adding iron, folic acid, or vitamin D to bread and other foodstuffs.

There is a world of difference:

1. Iron, folic acid, and vitamin D are known essential nutrients. Fluoride is not.
2. All of those substances have large margins of safety between their toxic levels and their beneficial levels. Fluoride does not.
3. People who do not want those supplements can seek out foods without them. It is much more difficult to avoid tap water.

Claim 5: The amount of fluoride added to the public water system, 1 ppm, is so small it couldn't possibly hurt you.

Promoters use analogies such as 1 ppm is equivalent to one cent in \$10,000 or one inch in sixteen miles to make it appear that we are dealing with insignificant quantities of fluoride. Such analogies are nonsensical without reference to the toxicity of the chemical in question. For example, 1 ppm is about a million times higher than the safe concentration to swallow of dioxin, and 100 times higher than the safe drinking water standard for arsenic; it is also up to 250 times higher than the level of fluoride in mother's milk¹ (see chapter 12).

Claim 6: Everything is toxic given a high enough dose, even water.

This is correct, but one has to be careful when using the word *high*. Fluoride is extremely toxic, especially for young children, as the following quote from Dr. Gary Whitford, a leading fluoride researcher at the Medical College of Georgia, illustrates:

It may be concluded that if a child ingests a fluoride dose in excess of 15 mg F/kg, then death is likely to occur. A dose as low as

5 mg F/kg may be fatal for some children. Therefore, the probable toxic dose (PTD), defined as the threshold dose that could cause serious or life-threatening systemic signs and symptoms and that should trigger immediate emergency treatment and hospitalization, is 5 mg F/kg.²

Thus, according to Whitford, a 7 kg infant could be killed by a dose of just 35 milligrams of fluoride. To get such a dose would require swallowing 35 liters of water at 1 ppm (1 mg per liter). No infant could possibly drink 35 liters of water in one sitting, so we are *not* talking about killing babies with fluoridated water. But there is a world of difference between a *chronic* toxic dose and a lethal dose. What we are particularly concerned about is the impact of consuming water at 1 ppm *over an extended period of time*. In the case of infants, a huge concern is the possible impact on their mental development over the first few years of life, since studies have shown that levels as low as 1.9 ppm fluoride in water are associated with a lowering of IQ in China.³ In the case of adults, we are concerned about lifelong exposure to levels of 6 mg per day or even lower and what damage that might do to bones and ligaments.⁴

Claim 7: You would have to drink a whole bathtub of water to get a toxic dose of fluoride.

Here again, proponents are confusing a *toxic* dose with a *lethal* dose—that is, a dose causing *illness or harmful effect* as opposed to a dose causing *death*. Opponents of fluoridation are not suggesting that people are going to be killed outright from drinking fluoridated water, but we are suggesting that it may cause immediate health problems in those who are very sensitive (chapter 13) and, with long-term exposure, persistent health problems in others (chapters 14–19).

Claim 8: Fluoridated water is only delivered to the tap. No one is forced to drink it.

Unfortunately, that is not a simple option, especially for families of low income who cannot afford bottled water or expensive fluoride filtration systems. Even those who can afford alternatives cannot easily protect themselves from the water they get outside the home. Fluoridated tap water is used in many processed foods and beverages (soda, beer, coffee, etc.).

Claim 9: Fluoridation is needed to protect children in low-income families.

This is a powerful and emotional argument. However, it ignores the fact that poor nutrition is most prevalent in families of low income, and the people most vulnerable to fluoride's toxic effects are those with a poor diet. Thus, while children from low-income families are a special target for this program, they are precisely the ones most likely to be harmed. Moreover, in chapter 8 we referenced some of the many distressing newspaper accounts of children suffering from tooth decay in low-income areas located in cities that have been fluoridated for over thirty years. Also in chapter 8 we reference the numerous state oral health reports indicating the continued disparity in tooth decay between low-income and high-income families, even in states with a high percentage of the population drinking fluoridated water.

Claim 10: Fluoridation has been going on for over sixty years; if it caused any harm, we would know about it by now.

Such statements would start to be meaningful only if fluoridated countries had conducted comprehensive health studies of their fluoridated populations. Most have not. Only a few health studies have been performed in the United States, most many years ago (see chapters 9 and 10); very few health studies have been performed in Australia, Canada, New Zealand, or the UK; and none has been performed in Colombia, Ireland, Israel, or Singapore (all countries with more than 50 percent of the population drinking fluoridated water). We discussed this and other examples of the very inadequate science involved in the promotion of fluoridation in chapter 22.

Claim 11: According to the Centers for Disease Control and Prevention, fluoridation is one of the top ten public health achievements of the twentieth century.

Most journalists, newspaper editors, and officials who quote this claim have little or no idea how poorly it is supported by the report that supposedly justifies the statement.^{5,6} We have discussed this matter in several places, including chapter 23.

Claim 12: For every dollar spent on fluoridation, \$38 is saved in dental costs.

This statement is taken from another report written by members of the Oral Health Division of the CDC.⁷ Two of its three authors, Susan Griffin and Scott Tomar, also wrote the report mentioned in Claim 11 above.

Griffin et al. inflated the benefits of fluoridation and ignored the costs of any side effects, including the one effect no one can deny, dental fluorosis. Cosmetic veneer treatment for fluorosis costs upward of \$1,000 per tooth. The CDC authors also allowed a loss of earnings of \$18 an hour for time off work to get a dental filling. Not all people lose pay when they get dental treatment, and certainly children don't.

Claim 13: The majority of the U.S. population drinks fluoridated water.

This statement is misused to put pressure on communities that do not fluoridate their water. They are led to believe that they are the odd ones out, behind the times, blocking progress. They are not. Only about 400 million people worldwide drink fluoridated water, and most of them live in North America. Globally, those who do are a distinct minority. Only eight countries have more than 50 percent of their population drinking fluoridated water; only 2 percent of the population of Europe drinks fluoridated water (see chapter 5).

Claim 14: The majority of U.S. cities are fluoridated.

There is a far longer list of cities in the rest of world that do not fluoridate than of cities in the United States that do. Moreover, low-income areas in some major fluoridated cities in America and Australia still have major childhood dental problems (see chapter 8).

Claim 15: Every major dental and medical authority supports fluoridation.

Here we return to the dubious nature of endorsements not backed up by independent and current reviews of the literature. Many of the major associations on the list frequently cited by the American Dental Association endorsed fluoridation before a single trial had been completed and before the first health study had been published, in 1954 (see chapters 9 and 10).

Claim 16: When fluoridation is stopped, tooth decay rates go up.

There now have been at least four modern studies showing that when fluoridation was halted in communities in East Germany, Finland, Cuba, and British Columbia (Canada), tooth decay rates did not go up. This issue was discussed in chapters 5 and 8.

Claim 17: Fluoridation is "safe and effective."

This empty phrase is parroted so many times by pro-fluoridation officials and dentists at meetings considering fluoridation that one begins to wonder if they

receive some kind of commission every time it is uttered! Be that as it may, mechanically repeating a phrase, no matter how often, without backing it up with solid supporting evidence does not make it true.

Claim 18: Hundreds (or thousands) of studies demonstrate that fluoridation is effective.

On the contrary, the UK's York Review was able to identify very few studies of even moderate quality, and the results were mixed⁸ (see chapter 6).

Claim 19: Fluoridation reduces tooth decay by 20–60 percent.

In chapters 6–8, we examined in detail the evidence for fluoridation's benefits and found it to be very weak. Even a 20 percent reduction in tooth decay is a figure rarely found in more recent studies. Moreover, we have to remember that percentages can give a very misleading picture. For example, if an average of two decayed tooth *surfaces* are found in a non-fluoridated group and one decayed *surface* in a fluoridated group, that would amount to an impressive 50 percent reduction. But when we consider the total of 128 surfaces on a complete set of teeth, the picture—which amounts to an absolute saving in tooth decay of a mere 0.8 percent—does not look so impressive.

Claim 20: Hundreds (or thousands) of studies demonstrate that fluoridation is safe.

When proponents are asked to produce just one study (a primary study, not a governmental review) that has convinced them that fluoridation is safe, they are seldom able to do so. Apparently, they have taken such assurances from others at face value, without reading the literature for themselves. The fact is, it is almost impossible to prove conclusively that a substance has no ill effects. A careful and properly controlled study may show that, under the conditions and limitations of the investigation, no harm is apparent. A hundred such studies may permit a considerable degree of confidence—but in the case of fluoridation, very few studies have even been attempted. As fluoride accumulates progressively in the skeleton and probably the pineal gland, studies need to extend over a lifetime. In chapter 22, we listed the many health concerns that simply have not been investigated in fluoridated countries. Meanwhile, fluoride at moderate to high doses can cause serious health problems, leaving little or no margin of safety for people drinking fluoridated water (see chapter 20).

Claim 21: Opponents of fluoridation do not have professional qualifications.

Some opponents of fluoridation do not have professional qualifications (of course); many do. Many highly qualified doctors, dentists, and scientists have opposed fluoridation in the past and do so today. Currently, over 3,000 individuals from medicine, dentistry, science, and other relevant professions are calling for an end to fluoridation worldwide.⁹ Furthermore, many opponents without professional qualifications have educated themselves on the science relevant to fluoridation and are qualified to evaluate many aspects of it.

Claim 22: Opponents of fluoridation are a vocal minority.

In a democratic society, opponents should not have to apologize for being vocal. As far as being a minority is concerned, it is frequently true that for any controversial issue only a minority of people get actively involved. However, it is our experience that the more educated people are on this issue, the more likely they are to oppose fluoridation. Usually, it is only when the matter is resolved by an appeal to “authority,” with little resort to scientific information, that proponents prevail.

Claim 23: Opponents of fluoridation use “junk science.”

The epithet “junk” is rarely defined and almost entirely subjective. It tends to mean scientific data that the speaker considers (1) inconclusive or (2) inconsistent with his or her personal prejudices. “Junk” is not a term that is used in respectable scientific discourse, but it crops up frequently when science impinges on politics, big business, or the law, where conflicts of interest lead to mudslinging.

Claim 24: Opponents of fluoridation get their information from the Internet.

No one denies that plenty of rubbish appears on the Internet. But just because a published study can be found using the Internet does not invalidate it. In fact, scientists now do much of their reading of the scientific literature online. The Fluoride Action Network maintains a Health Effects Database on its Web site, which provides citations, excerpts, abstracts, and in some cases complete pdf files of many published studies. Proponents would do well to read some of these papers, rather than trying to dismiss them because they are available online.

Claim 25: There is no evidence that fluoride at the levels used in fluoridation schemes causes any health problems.

There are three weaknesses to this argument. First, it does not make clear that fluoridating countries have done few basic health studies of popula-

tions drinking fluoridated water. Absence of studies does not mean absence of harm. Second, just because a study is conducted at a higher water fluoride level than 1 ppm does not mean that it is not relevant to water fluoridation. Toxicologists are nearly always extrapolating from high-dose animal experiments to estimate safe doses for humans. In the case of fluoride, we have the luxury of a large number of human studies conducted in countries with moderate to high levels of exposure to naturally occurring fluoride. What is required here is a “margin-of-safety” analysis (see chapter 20) to see if there is a sufficient safety margin between the doses that cause harm and the doses likely to be experienced in fluoridated communities. In our view, there is not. And third, it is not true that there is no evidence of ill effects from fluoride at present levels of fluoridation (see chapters 10–19).

Claim 26: There is no evidence that fluoridation harms the thyroid.

Even though many animal experiments show that fluoride can affect thyroid function, and even though some doctors between the 1930s and the 1950s used fluoride to lower thyroid function in hyperactive patients, governments that promote fluoridation have not taken this issue seriously. Very little research has been supported in fluoridating countries, but two studies raise concerns.^{10,11} See chapter 16 for a full discussion of this issue.

Claim 27: There is no evidence that fluoridation is associated with an increase in hip fractures.

Not true: The evidence is mixed. Some studies show an increase in hip fractures among the elderly in fluoridated areas, and others do not. One of the better studies (Li et al.¹²) showed an increase in hip fractures in the elderly (in a series of villages) as the fluoride levels in the water rose from 1 ppm to 4.3 ppm (see chapter 17).

Claim 28: There is no evidence that fluoride causes cancer.

Again, the evidence is mixed. Some studies show an increase in osteosarcoma (a rare but frequently fatal bone cancer) among young men in fluoridated communities, and others do not. Even though the study results are mixed, a study by Elise Bassin from Harvard, with the most robust methodology to date, has shown a positive relationship between exposure to fluoride in the sixth, seventh, and eighth years of age and a fivefold to sevenfold increased risk of contracting osteosarcoma in young men by the age of twenty.¹³ Although a large study has been promised that allegedly rebuts this finding,¹⁴ after four

years it has not appeared, nor does it appear in principle to be capable of refuting Bassin's conclusion (see chapter 18).

Claim 29: There is no evidence that fluoride lowers IQ.

There have now been twenty-three published studies showing that moderate to high levels of natural fluoride in source waters are associated with a lowered IQ in children. While proponents point to weaknesses in some of the IQ study designs, what is truly impressive is the fact that, apart from one small study in New Zealand,¹⁵ fluoridated countries have chosen not to replicate them. Moreover, these IQ studies are buttressed by over eighty animal studies that show that fluoride damages the brain, as well as three Chinese studies that show fetal brain damage in areas endemic for fluorosis (see chapter 15).

Claim 30: There is no evidence that any individuals are particularly sensitive to fluoride's toxic effects.

It would be far more accurate to state that governments practicing fluoridation have shown no interest in testing scientifically the many anecdotal reports from citizens (along with case studies published by a number of authors) that they are sensitive to fluoride. Patients complain of a number of symptoms that disappear when the source of fluoride is removed and return when the source is reintroduced (see chapter 13).

Claim 31: Dental fluorosis is only a "cosmetic" problem.

Dental fluorosis is the one condition caused by fluoride that proponents do not deny. However, they commonly claim that the condition is not a health effect but merely a cosmetic effect. Fluoridation opponents, on the other hand, maintain that dental fluorosis—the result of fluoride's interference with the growing tooth cells—is the first visible evidence that fluoride has had an adverse *systemic* effect on the body, and they wonder what other developing tissues may have been affected while the tooth cells were being damaged. Of particular concern are the skeletal system, the brain, and the endocrine system, where damage could be happening without visible telltale signs. Proponents offer no evidence that other tissues have not been affected while dental fluorosis is occurring.

Nor are cosmetic effects necessarily trivial. Moderate dental fluorosis, which involves discoloration of 100 percent of a tooth surface and affects over 1 percent of children living in fluoridated communities,¹⁶ is likely to cause psychological damage to teenagers¹⁷ (see chapter 11) and is very expensive to treat.

Of some pertinence are the CDC's stated objectives of the fluoridation program: "Adjusted fluoridation is the conscious maintenance of the optimal fluoride concentration in the water supply for reducing dental caries and *minimizing the risk of dental fluorosis*" [emphasis added].¹⁸ Regardless of whether the CDC's first objective has been met, with 32 percent of American children now affected by dental fluorosis,¹⁹ the second objective has clearly not been.

Claim 32: Most cases of dental fluorosis are so mild that only a trained professional can recognize the problem.

This may be true of some cases of the *very mild* condition of fluorosis, which impacts over 22 percent of children in fluoridated areas, but is certainly not true of the *mild* condition, which involves up to 50 percent of the tooth surface and affects 5.8 percent of children in fluoridated areas, or the *moderate* condition, which involves 100 percent of the tooth surface and affects over 1 percent of children in fluoridated areas²⁰ (see chapter 11).

Claim 33: Some cases of dental fluorosis actually improve the appearance of the teeth.

This claim dates back to a famously cynical comment made in 1951 by Dr. Frank Bull, the state dental director for Wisconsin. His remarks are quoted in full in chapter 11, under "Promoters' Spin."

Claim 34: Skeletal fluorosis is very rare in fluoridated countries.

It is difficult for promoters of fluoridation to deny that high natural levels of fluoride have caused severe bone damage in millions of people in India, China, and several other countries. However, proponents insist that skeletal fluorosis is a rare occurrence in countries with artificial fluoridation like the United States. What they really mean by this is that the crippling phase (stage III) of this condition is rare in the United States; they fail to recognize that the earlier phases (stage I and stage II) are associated with pains in the joints and bones, symptoms identical to the early symptoms of arthritis, a condition that affects many millions of adults in the United States (see chapter 17). The 2006 NRC review recommends that stage II skeletal fluorosis be considered an adverse effect: "The committee judges that stage II is also an adverse health effect, as it is associated with chronic joint pain, arthritic symptoms, slight calcification of ligaments, and osteosclerosis of cancellous bones."²¹ No fluoridating country has undertaken a study to see if there is a relationship between fluoridation and arthritis (see chapter 17).

Claim 35: Opponents use “scare tactics.”

In reality, the potential that fluoride might be causing a number of harms (including osteosarcoma in young men; arthritis and hip fractures in the elderly; lowered IQ in children; and lowered thyroid function) in some of the 400 million people who are drinking fluoridated water daily is indeed worrying (see chapters 10–19). The risks for one individual may be small, but if millions of people drink fluoridated water, a small risk multiplies up to a lot of cases. If we suppose a risk of some harm to 1 in 1,000, that would mean 400,000 cases worldwide or 10,000 in a large city.

Claim 36: Opponents are “poison mongers.”

This bizarre claim originates from a piece of work authored by Dr. Stephen Barrett, a retired psychiatrist from Allentown, Pennsylvania, who started an organization called Quackbusters.²² Another article (coauthored by Barrett) that makes the same silly charge is titled “Fluoridation: Don’t Let the Poisonmongers Scare You.”²³

The notion that people opposed to putting a known toxic substance into the drinking water supply are “poison mongers” is *Alice in Wonderland* nonsense. Fluoridation opponents are not selling a poison; in fact, they are not selling anything. It is the proponents, or their friends in the phosphate fertilizer industry, who are doing just that. This is a classic ploy of propagandists: Accuse your opponent of doing exactly what you are doing, or simply take your opponents’ arguments and turn them upside down.

Claim 37: Opponents are “conspiracy theorists.”

This was true of one faction of the anti-fluoridation movement in the 1950s, whose members believed that fluoridation was a “communist plot,” as parodied in Stanley Kubrick’s famous movie *Dr. Strangelove*. However, even in those early days many reputable scientists were opposed to fluoridation on scientific grounds and many more on the very rational grounds that it is unethical to deliver medicine through the public water supply, because it removes the individual’s right to informed consent to medical treatment. Today, there are still conspiracy theorists around, as there are in almost any field, but most opponents are increasingly well informed.

Claim 38: Opponents are members of a fringe element who propagate discredited myths.

It is true that a *few* people who oppose fluoridation do so based on claims that

Nazi Germany and other totalitarian regimes used it as a method of mind control. There is little evidence that would satisfy a historian to support such claims. The vast majority of fluoridation opponents repudiate such views and base their opposition on science and ethics.

Claim 39: Over sixty countries practice water fluoridation.

A large majority of countries in the world do *not* fluoridate their water. They include China, India, Japan, nearly all the European countries, and almost all the industrialized nations. Only about thirty countries have some percentage of their population drinking fluoridated water, and of those only eight have more than 50 percent of their population doing so (see chapter 5).

Claim 40: The consensus of medical and dental professionals and scientists is that there is no valid debate on fluoridation.

Nothing in science is beyond debate. As far as *consensus* is concerned, we are reminded of what the late Michael Crichton said:

I regard consensus science as an extremely pernicious development that ought to be stopped cold in its tracks. Historically, the claim of consensus has been the first refuge of scoundrels; it is a way to avoid debate by claiming that the matter is already settled . . . The greatest scientists in history are great precisely because they broke with the consensus . . . There is no such thing as consensus science. If it's consensus, it isn't science. If it's science, it isn't consensus. Period.²⁴

Even if there are some areas of science where consensus seems legitimate, Crichton's statement is certainly relevant to the fluoridation debate.

Summary

Proponents of fluoridation possess a wide repertoire of incorrect statements about the science and unfounded generalizations about those who disagree with them. We have reproduced and refuted some of the commoner ones in this chapter.