

Fluoride Free Arizona

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BRIEFING PAPER

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The City of Phoenix has been adding fluoride to its municipal water system since 1990. Each year, Phoenix spends about \$582,000 on fluoridating the city's water supply. Councilman Tom Simplot questions whether it's a waste of tax dollars if residents are consuming bottled water instead of city tap water.

"Science evolves, and if we haven't studied this for 20 years, we should to make sure science hasn't passed us by," Simplot told the *Arizona Republic*. "In light of our budget issues, let's take the time to see if it's a good, continued, wise investment."

It Has Always Been Controversial

The practice of water fluoridation began in the United States in 1945. It has been portrayed as one of ten great public health achievements of the twentieth century.

When Dr. Richard Carmona from the University of Arizona was appointed to the job of U.S. Surgeon General (2002-2006), he reiterated what every previous Surgeon General had said: "Fluoridation is the single most effective public health measure to prevent tooth decay and improve oral health over a lifetime, for both children and adults."

Fluoridation was carried out year after year in many municipalities, including Phoenix, without official review of the efficacy of the science and/or the program itself. There have been no randomized trials of water fluoridation.¹ Randomized studies are the standard method for determining the safety and effectiveness of any purportedly beneficial medical treatment.

The practice has been controversial from the beginning, primarily because fluoride is recognized as a highly reactive neurotoxin and a potent cellular poison linked to decreased mental IQ, thyroid problems, brittle bones, cancer, lowered immunity, and more. Fluoride was regarded as an environmental pollutant before 1945. At that time, fluoride was responsible for many lawsuits against the aluminum industry and the phosphate fertilizer industry.

An editorial published in the *Journal of the American Dental Association*, October 1, 1944, stated:

"Drinking water containing as little as 1.2 ppm fluoride will cause developmental disturbances. We cannot afford the risk of producing such serious systemic disturbances in applying what is at present a doubtful procedure intended to prevent development of dental disfigurements. The potentialities for harm outweigh those for good."

The practice has been the subject of increased scientific scrutiny in recent years and new findings have raised concerns about safety.

EPA Lowered the Limit

In 2011, the Environmental Protection Agency (EPA) lowered the recommended amount of fluoride in drinking water nationwide from 1.2 to 0.7 milligrams per liter of water (also expressed as parts per million). They did this largely because the landmark 2010 Beltran-Aguilar study showed kids are getting so much fluoride these days from a number of sources, that they are overdosed.² The government study showed that 41% of children aged 12-15 had some level of fluorosis – discoloration of the teeth and pitting of the enamel, changes caused by long-term ingestion of fluoride during the time teeth are forming.



Once you start looking, fluoride is almost everywhere you look: The chemical is put in toothpaste and mouthwash, or course. It is estimated that the swallowing of toothpaste by some children may contribute about 0.50 or 0.75 mg fluoride per child per day (Murray, 1986).

Fluoride is also found in some bottled water and most soda. A study reported in 1999 in the *Journal of American Dental Association* found that 71% of more than 300 soft drinks contained 0.60 ppm fluoride.³ Evian Natural Spring water was found to contain 0.08 ppm, and Gerber Spring Water with fluoride 0.71 ppm, according to a 2003 study.⁴ Some children are given fluoride supplements.

In the field, fruits, vegetables, and grains are often grown with fluorinated water. Food processing tends to concentrate fluoride; a study found that cereals processed in a fluoridated area had fluoride concentrations ranging from 3.8 ppm to 6.3 ppm.⁵ The fluoride content of tea has been found to average about 3 ppm.⁶

The EPA currently allows up to 7.0 ppm of fluoride on more than 30 fruits and vegetables treated with the fluoridated pesticide cryolite: apricots, beets, blackberries, broccoli, Brussels sprouts, cabbage, cauliflower, citrus fruits, collards, cranberries, cucumbers, eggplants, grapes, kale, lettuce, melons, nectarines, peaches, peppers, plums, pumpkins, radishes, raspberries, squash, strawberries, tomatoes and turnip. Grapes, especially those grown for non-organic California wine and white grapes used to “naturally” sweeten many children’s foods, are grown with the fluoridated pesticide cryolite.



Teflon is coated with fluoride. Fluoride is also in drugs, especially anti-depressants.

In 2005, the heads of 11 of the EPA’s own unions, including those representing the agency's scientists, demanded that the agency reduce the permissible level of added fluoride in water to zero, citing research suggesting it can cause cancer. A 2006 report from the National Academy of Sciences (NAS) recommended that the EPA lower its recommended amount of fluoride, citing serious concerns about bone fractures and dental fluorosis.

The Environmental Working Group (EWG), a nonprofit organization whose goal is to protect public health and the environment, pushed governmental officials to reduce fluoride levels for years:

"We've had to wait too long, but the government's official, belated -- and perhaps begrudging -- announcement [to reduce to 0.7 ppm] marks its recognition that fluoride policies have been out of step with the science on the tap-water additive's toxicity to children, and that many American children are at risk from excess fluoride in drinking water and other sources."

- Jane Houlihan, senior vice president for research at the EWG, January, 2011⁷

A 2006 EWG [analysis](#) of fluoride levels of approximately 0.7 milligrams per day in tap water shows that at least one-fourth of the babies in Phoenix who are fed formula made with tap water are over the safe dose of fluoride on any given day:

PHOENIX AVERAGE FLUORIDE LEVELS IN TAP WATER 1998-2002	PERCENT OF ALL BABIES OVER SAFE FLUORIDE EXPOSURE LEVEL	PERCENT OF FORMULA-FED BABIES OVER SAFE FLUORIDE EXPOSURE LEVEL
0.75	14.5	26.7

As of August 4, 2012, the state of New Hampshire required notification that 6-month-olds should not be routinely fed infant formula mixed with fluoridated water to avoid discoloring babies' unerupted teeth (fluorosis). Fluoridated water contains 100-200 times more fluoride than breast milk.



Do cities fluoridate because it works?

It is tough to find evidence that systemic fluoridation – adding it to the municipal water system – *does* work.

Dr. Cornelius Steelink performed a classic study of 23,000 elementary schoolchildren in Tucson in 1992 and found increased cavities with increased levels of fluoride in drinking water. Professor S.P.S. Teotia of India conducted a study of 400,000 children from 1973 to 1993 and also found increased cavities with increased levels of fluoride in drinking water. Dr. Rudolph Ziegelbecker, Director of the Institute for Environmental Research in Austria, examined all the published studies to date of the relationship between fluoride in water and cavities. He reported in the journal, *Fluoride*, in October 1993 that cavities increase as water fluoride increases.

A 2010 study compared the results of two Canadian provinces: Ontario, where three-quarters of the residents have artificially fluoridated water; and Quebec, where almost no one drinks fluoridated water. The two provinces have very little difference in tooth-decay rates. “Fluoridation is no longer effective,” stated Dr. Hardy Limeback, head of the preventive dentistry program at the University of Toronto, in 2011. He described adding the chemical to water is “more harmful than beneficial.”

Dr. Limeback had been the president of the Canadian Association of Dental Research and a long time vocal supporter of adding fluoride to city water. Then, in 1998, he changed his mind. He pointed out that Vancouver, which had never been fluoridated, had a lower cavity rate than Toronto, which had been fluoridated for nearly 40 years. “The CDC is basing its position on data that is 50 years old, and questionable at best.”

In 1999, Dr. Limeback addressed his faculty and students at the University of Toronto, Department of Dentistry. In a poignant, memorable meeting, he apologized to those gathered before him.

"Speaking as the head of preventive dentistry, I told them that I had unintentionally mislead my colleagues and my students. For the past 15 years, I had refused to study the toxicology information that is readily available to anyone. Poisoning our children was the furthest thing from my mind. The truth was a bitter pill to swallow. But swallow it I did."⁸

In Europe, fluoride is rarely added to water supplies. In Britain, only about 10% of the population has fluoridated water. It has been a controversial issue there, with critics arguing people shouldn't have “medical treatment” forced on them. China does not fluoridate its water. Only seven other countries in the

world have more than 50% of their populations drinking artificially fluoridated water: Australia, Colombia, Ireland, Israel, Malaysia, New Zealand, and Singapore.

Most Arizona water supplies already have some level of naturally occurring fluoride. In Casa Grande, for example, the naturally occurring level was so high, they were in violation of EPA standards in 2010. Carefree does not add fluoride; they have a rate of naturally occurring fluoride of about 0.91 ppm that is already higher than the EPA's recommendation of 0.7 ppm. Scottsdale does not add fluoride; the city says their water sources contain naturally-occurring fluoride levels ranging from 0.3 to 1.0 ppm. Flagstaff does not add fluoride; voters have rejected the issue three times since 1954. In the city of Page, fluoridation was on the ballot in 2006 and was firmly voted down.

What's the difference between putting it in toothpaste or in tap water?

When fluoride is in toothpaste, we call that a "topical" application because it is applied to the teeth and rinsed off. When fluoride is put in the municipal water supply, we call that a "systemic" application, meaning the chemical circulates throughout the entire body, from the teeth all the way through the glands and bones, down to the toes.

The CDC says the major effects of fluoride are topical (in toothpaste) and not systemic (in drinking water):

"Fluoride concentrated in plaque and saliva inhibits the demineralization of sound enamel and enhances the remineralization (i.e., recovery) of demineralized enamel ... The laboratory and epidemiologic research that has led to the better understanding of how fluoride prevents dental caries indicates that fluoride's predominant effect is posteruptive and topical and that the effect depends on fluoride being in the right amount in the right place at the right time. Fluoride works primarily after teeth have erupted, especially when small amounts are maintained constantly in the mouth, specifically in dental plaque and saliva."⁹

The label on a box of toothpaste commonly carries this warning:

"Children 2-6 years: Use only a pea sized amount and supervise child's brushing and rinsing (to minimize swallowing).
Warning: Keep out of reach of children under 6 years of age in case of accidental ingestion. In case of accidental ingestion, seek professional assistance or contact a Poison Control Center immediately."

By that standard, if you drink two glasses of fluoridated water, you should contact a Poison Control Center.

Numerous studies in the last decade have come to the same conclusion. Here are excerpts from three:

"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."

– *Warren, Levy 2003*¹⁰

"The major anticaries benefit of fluoride is topical and not systemic."

– *National Research Council, 2006*¹¹

"It is now accepted that systemic fluoride plays a limited role in caries prevention."

– *Pizzo, Piscop 2007*¹²

Once fluoride is put in the water it is impossible to control the dose each individual receives because people drink different amounts of water.

Healthy adult kidneys excrete about half the fluoride they ingest each day (Marier & Rose 1971). The remainder accumulates in the body, largely in calcifying tissues such as the bones and pineal gland (Luke 1997, 2001). Infants and children excrete less fluoride from their kidneys and take up to 80% of ingested fluoride into their bones (Ekstrand 1994). The fluoride concentration in bone steadily increases over a lifetime (NRC 2006).

What exactly is added to the water?

The fluoride compound added to Phoenix city drinking water is not the pharmaceutical quality fluoride in toothpaste and mouthwash.

It is a man-made hexafluorosilicic acid, manufactured by [Solvay Sustainable](#) in Juarez, Mexico, and distributed by Brenntag North America. This form of fluoride does not occur in nature. It is a toxic waste product of the phosphate fertilizer industry, one that is laced with contaminants such as arsenic (a known cancer-causing agent), mercury, and lead (both of which are neurotoxic and especially harmful to children). Studies have shown that the uptake of lead into children's tissues is magnified in the presence of fluoride.

A quart of fluoridated water contains about 1 mg of fluoride. To get that same amount of fluoride in a pill you would need a prescription.

In short, what is added to our city drinking water is an industrial waste product laced with carcinogens and neurotoxins.

Additionally, this kind of fluoride ionizes in a way that creates hydrogen fluoride which readily dissolves lead out of pipes. In Phoenix, the public schools and day care centers which get their water from the city's water plant are not required either by the City Water Services Department or Arizona Department of Environmental Quality to do routine testing of their tap water for presence of lead.

What about the health concerns?

The short list of health concerns primarily revolves around lowered IQ, thyroid disturbances, brittle bones, and cancer. The concerns have been with us for a long time.

Dr. Dean Burk (1904-1988) became the head of the National Cancer Institute's Cytochemistry Sector in 1938. Dr. Burk wrote that "artificial fluoridation appears to cause or induce about 20-30 excess cancer deaths for every 100,000 persons exposed per year after about 15-20 years. Increased death rates due to fluoridated water commence within a few years after initiation of fluoridation with marked continued increase thereafter."

There is almost unanimous agreement that fluorine is not one of the essential trace elements that the human body needs. Rated by degree of toxicity, fluorine would be placed somewhere between lead and arsenic.

A study published in the journal *Cancer Causes and Control* in 2006 found that exposure to large amounts of fluoridated water made seven-year-old boys four times more likely to develop a rare bone cancer known as childhood osteosarcoma.¹³

The EPA describes fluoride as a chemical "with substantial evidence of developmental neurotoxicity."¹⁴ There are more than 100 published studies illustrating fluoride's harm to the brain.¹⁵

In July this year, researchers from Harvard University who reviewed fluoride's impact on children's IQ [concluded](#):

“Findings from our meta-analyses of 27 studies published over 22 years suggest an inverse association between high fluoride exposure and children's intelligence... The results suggest that fluoride may be a developmental neurotoxicant that affects brain development at exposures much below those that can cause toxicity in adults...”¹⁶

Neurologist Dr. Russell Blaylock points out the problem with fluoride in prescription drugs:

“Almost everyone has at least heard the recent news stories citing links between certain antidepressant drugs and suicides and shootings. What most people have not heard is that in most cases these were fluorinated drugs (Paxil and Prozac, etc.), the chemical structure of the drug included the toxic element fluorine. A growing number of studies are showing that fluorine added to drugs and to drinking water can have a profound and prolonged harmful effect on the brain. According to the ‘Physician's Desk Reference,’ used by doctors to prescribe medications, the commonly used fluorinated antibiotics Floxin, Levaquin, and Cipro can cause nightmares, psychotic reactions, paranoia, agitation, manic reactions, aggression and hostility, hallucinations, and even depersonalization, all symptoms associated with acts of homicide and suicide.”

- [*Blaylock Wellness Report, June, 2007*](#)

Eli Lilly, the company that produces Prozac, reports that hypothyroidism can result from taking Prozac. Fluoride is an endocrine disruptor with especially significant effects on the thyroid and parathyroid hormone function.

It has been known for a long time that fluoride mimics the action of the thyroid stimulating hormone (TSH). European doctors used to give fluoride purposely to impair thyroid function if you were hyperthyroid – an over-active thyroid. Fluoride was used up until the 1970s as a thyroid-suppressing medication. And there is concern that current fluoride exposures may have a lot to do with why we see such rampant incidence of hypothyroidism – an under-active thyroid.

Once absorbed into the blood, fluoride readily distributes throughout the body. In infants, about 80 to 90 per cent of the absorbed fluoride is retained; in adults this level falls to about 60 per cent. Fluoride crosses the placenta and is found in mothers' milk at low levels essentially equal to those in blood (WHO, 1996; IPCS, 2002).

A National Research Council (NRC) committee recommended in 2006 that the federal government lower its current limit for fluoride in drinking water because of health risks to both children and adults.

In April 2010, *Time* magazine included fluoride on a list of "The Hazards Lurking at Home." As they pointed out, fluoride is "neurotoxic and potentially tumorigenic if swallowed."

No disease has ever been linked to a fluoride deficiency. Not a single biological process has been shown to require fluoride. There is extensive evidence that fluoride interferes with many important biological processes.

Why did the NRC recommend less fluoridation?

In 2006, the National Research Council issued a landmark report: ["National Research Council \(2003-2006\): Fluoride in Drinking Water: A Scientific Review of EPA's Standards."](#) The report was commissioned by the EPA. It is required to reconsider maximum fluoridation levels every ten years.

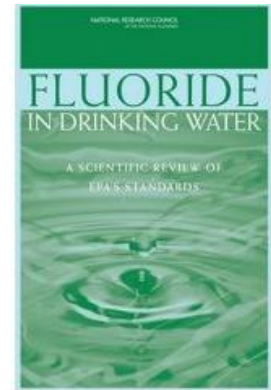
Among the conclusions:

“The difference between the levels of fluoride causing toxic effects and the levels added to water to prevent tooth decay is vanishingly small and deeply troubling.”

- [Dr. J. William Hirzy](#), chemist at American University and vice president of Environmental Protection Agency’s Professionals Union

“We certainly can see that fluoride impacts the way proteins interact with mineralized tissue, so what effect is it having elsewhere at the cellular level? Fluoride is very powerful, and it needs to be treated respectfully.”

- *Researcher Pamela DenBesten of the University of California, San Francisco, School of Dentistry*



“When the U.S. surgeon general comes out and says this is one of the 10 greatest achievements of the 20th century, that’s a hard hurdle to get over. But when we looked at the studies that have been done, we found that many of these questions are unsettled and we have much less information than we should, considering how long this [fluoridation] has been going on ... The thyroid changes do worry me. There are some things there that need to be explored.”

- [Dr. John Doull](#), NRC Panel Chair

"In my opinion, the evidence that fluoridation is more harmful than beneficial is now overwhelming and policy makers who avoid thoroughly reviewing recent data before introducing new fluoridation schemes do so at risk of future litigation."

- [Dr. Hardy Limeback](#), NRC Panel Member

Why do some people still support fluoridation?

Yes, some dentists are still skeptical that lower limits are necessary. [John Liu](#), past-president of the American Academy of Pediatric Dentistry, told NPR last year that "there's a cosmetic risk, not a health risk" if kids consume a lot of fluoride. Liu also said that excess fluoride is more likely to come from too much toothpaste or mouth rinses than water, since kids don't typically drink a lot of it.¹⁷

It seems unlikely that anyone in a position of responsibility could be unaware of the many sources of fluoride and ignore the science that has come to light in the last decade, but sometimes people do not like to change their position on a subject.

For a long time, some people insisted the world was flat, that smoking didn’t cause cancer, that stress caused ulcers... Changing one’s stance on a subject can feel threatening; perhaps people feel it would diminish their credibility, or, in the case of the American Dental Association (ADA), any modification of one’s long-standing position would open the floodgates of legal liabilities.

What is the ADA position on fluoridation?

“The American Dental Association unreservedly endorses the fluoridation of community water supplies as safe, effective and necessary in preventing tooth decay. This support has been the Association's position since policy was first adopted in 1950.”

What is the Position of *Fluoride Free Arizona*?

It saddens us that the ADA continues to stand rigidly firm in positions taken decades ago. The ADA also has no reservations about putting mercury fillings (amalgam) in patients’ mouths without informed

consent, even though a 2006 poll found that 92% of respondents would prefer to be told about mercury in dental amalgam before receiving it as a filling.

Fluoride is not a mere additive such as chlorine. Chlorine kills bacteria. Chlorine evaporates out of water overnight if left in an open pitcher. Fluoride is intended as medication and delivered without informed consent and with no way to control the dose given to people who consume it; most of us are already overdosed on fluoride from other sources.

The FDA has never approved hydrofluorsilicic acid as a drug or medication, yet it is used as such. Officially, the FDA calls it “an unapproved drug.” The EPA is forbidden in the Safe Drinking Water Act from requiring the addition to drinking water of any form of medication. The practice of water fluoridation is a long standing contradiction.

Fact is, we always need to be open to new information. Science evolves. And we need to respect each other’s choices. If you want fluoride, great. Choose a toothpaste or bottled water or a supplement with fluoride. But many people do not want fluoride literally forced down their throats when it comes out of their tap without their having chosen it. It should be up to the individual person to decide whether the benefits purported 60 years ago outweigh the risks we know today about systemic fluoridation.

Municipal fluoridation started because of the unproven assertion that fluoride in water reduces cavities in children. The CDC today describes fluoride’s benefit as topical, not systemic. Since the benefits of fluoride are topical, and the risks are systemic, it makes much more sense to deliver fluoride in the form of toothpaste. It is time to stop buying a toxic waste chemical to add to our water supply.

¹ Cheng KK, et al. (2007). Adding fluoride to water supplies. *British Medical Journal*. 335(7622):699-702.

² NCHS Data Brief, Number 53, November 2012. Centers for Disease Control. Accessed at <http://www.cdc.gov/nchs/data/databriefs/db53.htm>

³ Heilman et al. Assessing fluoride levels of carbonated soft drinks. *Journal of the American Dental Association*. 130: 1593-99. November, 1999

⁴ Johnson SA, DeBiase C. Concentration levels of fluoride in bottled drinking water. *J Dent Hyg*. 2003;77:161-167.

⁵ Warren JJ, Levy SM. (2003). Current and future role of fluoride in nutrition. *Dental Clinics of North America*. 47: 225-43.

⁶ -Levy SM, Guha-Chowdhury N. (1999). *Journal of Public Health Dentistry*. 59:211-23."

⁷ <http://www.cnn.com/2011/HEALTH/01/07/fluoride.recommendations/index.html>

⁸ Barry Forbes. Prominent Researcher Apologizes for Pushing Fluoride. *The Tribune, Mesa, AZ/Thompson Newspapers*. December 5, 1999

⁹ CDC MMWR. [Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States](#) August 17, 2001

¹⁰ Warren JJ, Levy SM. (2003). Current and future role of fluoride in nutrition. *Dental Clinics of North America*. 47: 225-43.

¹¹ National Research Council. (2006). Fluoride in Drinking Water: A Scientific Review of EPA's Standards. National Academies Press. Washington D.C. p 13.

¹² Pizzo G, Piscopo MR, Pizzo I, Giuliana G. Community water fluoridation and caries prevention: a critical review. *Clinical Oral Investigations*. (2007). 11(3):189-93.

¹³ Bassin EB, Wypij D, Davis RB, Mittleman MA. 2006. Age-specific fluoride exposure in drinking water and osteosarcoma (United States). *Cancer Causes Control*. 17(4):421-8.

¹⁴ <http://www.epa.gov/ncct/toxcast/files/summit/48P%20Mundy%20TDAS.pdf>

¹⁵ <http://www.fluoridealert.org/caseagainstfluoride-appendices.html>

¹⁶ Choi AL, Sun G, Zhang Y, Grandjean P. [Developmental Fluoride Neurotoxicity: A Systematic Review and Meta-Analysis](#). *Environ Health Perspectives*. July 2012

¹⁷ NPR. [Feds To Lower Fluoride Limits For Water To Avoid Tooth Damage](#). January 7, 2011