

Omissions of Science in City of Austin's Artificial Water Fluoridation Report

Neil J. Carman, Ph.D.

Sierra Club, Lone Star Chapter, December 2, 2009

Omission #1: Hydrofluorosilicic is one of the most deadly chemicals used in Austin by the City.

Omission #2: Hydrofluorosilicic is one of the most deadly chemicals transported in Austin.

Omission #3: Chemical Used in Artificial Water Fluoridation Contains Other Toxic Industrial Chemicals as Impurities Added to City's Drinking Water — Not a Single Chemical.

Omission #4: Artificial Water Fluoridation Chemical Classified as a "Hazardous Waste" by EPA.

Omission #5: The fluoride chemical added to the Austin water is not pharmaceutical grade.

Omission #6: Lack of Peer-Reviewed Science Literature Cited Regarding Fluoride's Adverse Effects.

Omission #7: Synergistic Effects of Fluoride with Lead, Aluminum and Iodine: Fluoride Inhibition of Acetylcholine Esterase Enzyme, Increases Aluminum Uptake, and Endocrine Disruption of Thyroid.

Omission #8: Bioavailability Differences of Industrial Fluorides vs Natural Fluoride Mineral Salts.

Omission #9: Recent Carcinogenicity Research - Fluoride Link to Osteosarcoma.

Omission #10: Fluoride Dose from Drinking Fluoridated Water not Controlled or Evaluated by City.

Omission #11: Sensitive Subpopulations at Risk of Fluoride Exposure and Over Dose.

Omission #12: Infants at Risk of Fluoride - American Dental Association's November 8, 2006 release.

Omission #13: Fluorinated Drinks, Foods Sold in Austin were not Evaluated by City.

Omission #14: Fluorinated Prescription Drugs Used in Austin were not Evaluated

by City.

Omission #15: Acute or Chronic Toxicity in Toothpaste is Due to Fluoride, not Toothpaste.

Omission #16: Confounding Variables.

Omission #17: Epidemiologic Study on Fluoride's Health Effects never performed in Austin.

Omission #18: Safety Studies on Fluoride including an Epidemiologic Study needed in US.

Omission #19: Safe Level of Fluoride is Zero or Close to Zero Based on Latest Science.

Omission #20: Austin has not Conducted an Environmental Impact Statement (EIS) on Fluoride.

Omission #21: City did not mention 216 U.S. Cities Have Rejected Artificial Water Fluoridation.

Omission #22: Environmental Devastation of Phosphate Ore Strip Mining, Phosphate Fertilizer Plants and Toxic Pollution.

Omission #23: The Third Party Entity Used to Audit Fluoride Chemical is not a Regulatory Body.

Omission #24: Is the City's Fluoride Chemical Purified or Unrefined?

Omission #25: Fluoride is Bioaccumulative – City ignored evidence of toxic fluoride bioaccumulating

Omission #26: Fluoride and Evidence of Oxidative Stress

Science on fluoride is shifting. City relied on old science, not new science. New peer-reviewed evidence needs full evaluation by an independent expert panel.

A preliminary list of the City's omissions follows but is not complete.

OMISSIONS IN THE CITY OF AUSTIN'S CURSORY FLUORIDE REPORT 11-13-2009

Neil J. Carman, Ph.D.

Sierra Club Lone Star Chapter, December 2, 2009

Omission #1: Hydrofluorosilicic is one of the most deadly chemicals used in Austin.

The City's Fluoride Review makes no mention that hydrofluorosilicic acid is a dangerous, deadly chemical.

Omission #2: Hydrofluorosilicic is one of the most deadly chemicals transported in Austin.

The City's Fluoride Review makes no mention that hydrofluorosilicic acid is a dangerous, deadly chemical to transport through Austin's streets and neighborhoods.

Omission #3: Chemical Used in Artificial Water Fluoridation Contains Other Toxic Industrial Chemicals as Impurities Added to Austin's Drinking Water — Not a Single Chemical.

The City's Fluoride Review failed to describe the cocktail of fluoride chemicals and impurities present, which is scientifically unacceptable in a discussion of whether there are any undesirable side effects from their use. The City mistakenly suggests it only adds one chemical — fluoride, but this is totally deceptive and erroneous based on the chemistry of the fluoridation mixture of detectable chemicals being added. The American Water Works Association (AWWA) writes in their latest standard: "**The transfer of contaminants from chemicals to processed water or the residual solids is becoming a problem of greater concern.**" page ix, **AWWA Standard for Fluoride B-703-06.**

Hydrofluorosilicic acid (H₂SiF₆) - a liquid compound that has been used for artificial water fluoridation in the US for over 60 years. This fluorine chemical was chosen because of its low cost and widespread availability (as a waste byproduct from chemical processing of phosphate rock, especially for separation of uranium from other ores).

The fluoride chemicals (hydrofluorosilicic acid and impurities) are collected from the wet scrubbers of the phosphate fertilizer industry mainly in Florida. The scrubber liquors contain contaminants such as **arsenic, lead, cadmium, mercury, and radioactive particles**, are legally regulated as toxic waste, and are prohibited from direct dispersal into the environment, according to the National Sanitation Foundation International. (2000) Letter from Stan Hazan, General Manager, NSF Drinking Water Additives Certification Program, to Ken Calvert, Chairman, Subcommittee on Energy and the Environment, Committee on Science, US House of Representatives. July 7, 2000. http://www.keepersofthewell.org/product_pdfs/NSF_response.pdf

The artificial water fluoridation chemical used by the City of Austin contains 20 to 30%

hydrofluorosilicic acid and trace amounts of **arsenic, lead, mercury, cadmium, radionuclides and other heavy metals** (AWWA Standard B703-06), all considered to be toxic substances under the federal **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Priority List of Hazardous Substances**.
<http://www.atsdr.cdc.gov/cercla/>

Statements by the EPA union of scientists, including Dr. J. William Hirzy (2000), have given testimony to Congress on why artificial water fluoridation is bad public policy:
<http://nteu280.org/Issues/Fluoride/flouridestatement.htm>

“Upon being sold (unrefined) to municipalities as fluoridating agents, these same substances are then considered a “product”, allowing them to be dispensed through fluoridated municipal water systems to the very same ecosystems to which they could not be released directly.”

“99.97% of fluoridated water is released directly into the environment. This water is NOT used for drinking or cooking.”

“When asked by the U.S. House Committee on Science for chronic toxicity test data on sodium fluoro- silicate and hydrofluorosilicic acid, Charles Fox of the EPA answered on June 23, 1999, “EPA was not able to identify chronic toxicity data on these chemicals”.⁵ Further, EPA's National Risk Management Research Laboratory stated, on April 25, 2002, that the chemistry of silicofluorides is “not well understood” and studies are needed.”

“The EPA defines the Maximum Contaminant Level Goal (MCLG) for toxic elements in drinking water thus: the level below which there are no known or anticipated effects to health.” The MCLG for arsenic, lead, and radioactive particles, all contaminants of the scrubber liquors used for fluoridation, is 0.0 ppb (zero parts per billion). Therefore, any addition of fluorine-bearing substances to drinking water that include these contaminants is contrary to the intent of EPA's established health goals.”

Note that EPA's own scientists have testified that **“the MCLG for arsenic, lead, and radioactive particles, all contaminants of the scrubber liquors used for fluoridation, is 0.0 ppb (zero parts per billion).”** The City of Austin incorrectly states it is adding a safe level of fluoridation chemicals including the toxic heavy metals.

Omission #4: Artificial Water Fluoridation Chemical Classified as a “Hazardous Waste” by EPA.

According to the U.S. Environmental Protection Agency, hydrofluorosilicic acid is a hazardous waste from industrial processes. EPA classifies it as a hazardous waste under the Resource Conservation & Recovery Act due to its highly toxic, corrosive and acidic characteristics. The City's Report does not mention the Hazardous Waste status of the fluoride purchased from Lucier Chemicals in Florida. Austin residents would not

appreciate the City Water Utility adding a dangerous hazardous waste to the water supply. Why add a **toxic industrial hazardous waste chemical cocktail** to drinking water? Hydrofluorosilicic Acid is the only **toxic industrial hazardous waste chemical** added to Austin's water and contains a **cocktail of highly toxic substances** also added to drinking water.

Omission #5: The fluoride chemical added to the Austin water is not pharmaceutical grade. Why?

The City buys a cheap industrial grade of Hydrofluorosilicic Acid, not the highest pharmaceutical grade for drugs.

Omission #6: Lack of Peer-Reviewed Science Literature Cited Regarding Fluoride's Adverse Effects.

The City's scientific literature cites on health effects of fluoride on p. 9 are inadequate and outdated; it cited three peer-reviewed scientific studies and ignored the National Research Council's 2006 expert science report *Fluoride in Drinking Water* drafted by twelve scientists citing 1100 peer-reviewed scientific studies. The City's Report had a scant 14 citations on health and 11 (80%) of the cites are not scientific studies from peer-reviewed journals. The City's literature review was biased citing only pro-fluoride information. National Research Council (NRC) report:

<http://www.nationalacademies.org/morenews/20060322.html>

The City's Report ignored the extensive peer-reviewed scientific studies on fluoride's health effects that document harmful biological effects. The science journal *Fluoride* has published hundreds of articles since 1968 on the harmful biological effects of fluoride. The City's Report inadequately evaluated extensive peer-reviewed scientific literature that describes fluoride as an extremely toxic substance in biological systems. Fluoride is a known enzyme poison.

Omission #7: Synergistic Toxic Effects of Fluoride with Lead, Aluminum and Iodine: Fluoride Inhibition of Acetylcholine Esterase Enzyme, Increases Aluminum Uptake, and Endocrine Disruption of Thyroid.

In addition, a discussion of the synergistic effects of the compounds in use for water fluoridation is completely omitted from the City's cursory Fluoride Review. A discussion of some of the synergistic effects with lead and aluminum are discussed in the National Research Council's 2006 Review as recognition of this serious scientific issue, but entirely omitted in the City's Review. The synergistic effects of fluoride compounds is important to consumers in Austin since the City has not addressed the presence of lead and aluminum in the water system entering homes and businesses. It's doubtful the City has conducted a suitable detailed study of the problem of lead and brass metals contacting the drinking water.

"Both Urbansky (2002) and Morris (2004) indicate that other substances in the

water, especially metal cations, might form complexes with fluoride, which, depending on pH and other factors, could influence the amount of fluoride actually present as free fluoride ion.” p. 53 NRC 2006

“Although neither Urbansky (2002) nor Morris (2004) discusses such beverages, both indicate that at pH < 5, SiF6 2– would be present, so it seems reasonable to expect that some SiF6 2– would be present in acidic beverages but not in the tap water used to prepare the beverages. Consumption rates of these beverages [fruit juice from concentrate, tea, and soft drinks] are high for many people, and therefore the possibility of biological effects of SiF6 2-, as opposed to the free fluoride ion, should be examined.” p. 53 NRC 2006

Fluoride species & Lead: No mention by City of Austin of lead-fluoride-chlorine concerns

Recent research by Maas et al 2007 in the journal *Neurotoxicology* demonstrate that lead in solder and brass metal in water pipes, connections and other materials is also released by all fluoride chemicals used in Austin’s artificial water fluoridation. Their synergistic effects with chlorine and/or chloramine were demonstrated to increase the lead levels even further and yet the City of Austin has no discussion of this lead concern. Maas et al. found levels of lead leaching from brass when coming in contact with fluorosilicic acid and chloramine:

CHLORAMINE & FLUOROSILICIC ACID & LEAD LEACHING FROM BRASS

Median Lead level

Chlorine	145.9µg/DL (1.5mg/L)
Chloramine *	23.3µg/DL (0.23mg/L) or 233ppb
Chlorine & sodium fluoride	185.3µg/DL (1.85mg/L)
Chloramine* & sodium fluoride	28.1µg/DL (0.28mg/L)
Chlorine and fluorosilicic acid	362.8µg/DL (3.63mg/L) doubled
Chloramine* & fluorosilicic acid	42.6µg/DL (0.43mg/L) doubled
Chloramine** & fluorosilicic acid	83.1µg/DL (0.83mg/L) quadrupled

* with 100% extra ammonia added, to neutralize effect; note difference of one sample of chloramine without this extra ammonia (at **)

** without extra ammonia.

Research by Masters and Coplan (1999) and Westendorf (1975) provide evidence that fluoride in drinking water increases blood lead levels and interferes with acetylcholine esterase activity. Acetylcholine esterase is a key enzyme playing a vital role in neurotransmission throughout the human nervous system and one of the most fundamental enzymes in the body. The City’s Report made no reference to fluoride disrupting acetylcholine esterase enzyme activity. Masters and Coplan (1999) stated:

Unfortunately, and as surprising as it may seem, neither of these commercial-grade Sifts have been properly (or officially) tested for safety in fluoridating drinking water. Indeed, their use in water fluoridation has even been called an “ideal solution to a longstanding problem”¹¹ as a way to dispose of a highly toxic by-product that is otherwise an enormous health hazard to the local environment. Meanwhile, our own research has revealed¹² and recently confirmed¹³ a statistically significant association between silicofluoride-treated water and elevated blood lead levels, which, in turn, have disturbing implications in relation to their very unwelcome neurological and sociological consequences.

Masters and Coplan (2001) raised further concerns about silicofluorides interference effects on enzymes.

As pointed out in a recent comprehensive review,¹⁰ among the many different enzymes that initiate, control, and terminate various chemical changes in the body, acetylcholinesterase is one of the most fundamental. Therefore, in view of the extensive use of SiFs for water fluoridation (estimated to be 200,000 tons per year in the United States), Westendorf’s seminal findings take on added importance in that they reveal that fluorosilicates are more potent in interfering with acetylcholinesterase activity than uncomplexed fluoride. These SiFs are industrial grade materials derived from HF and SiF₄ emissions that are collected in water as toxic by-products in the manufacture of phosphate fertilizers from fluoride-bearing rock phosphate. During that step concentrated aqueous solutions of fluosilicic acid, H₂SiF₆, are formed containing residual HF and SiF₄, together with variable low concentrations of contaminants like lead, arsenic, cadmium, beryllium, and heavy-metal radionuclides.

Recent analysis in Thunder Bay, Ontario, Canada (see below) shows that all 3 chemicals (H₂SiF₆, NaF – sodium fluoride, Na₂SiF₆ – sodium silicofluoride) used in artificial water fluoridation increase the lead content in drinking water when lead pipes are used.

Fluoridation Impacts on Water Chemistry P3-4, Report No. 2009.123, Thunder Bay, Ontario, Board of Health Report, July 20, 2009:

“The drinking water produced from the Bare Point Water Treatment Plant is taken from Lake Superior and then treated. Water quality testing results of this source water have continually shown that the Lake Superior water is of high quality, is soft, and of low alkalinity. Testing has also demonstrated that the water is very low in dissolved major ions and metals. These characteristics mean that the water is of excellent quality and as a result has little buffering capacity – the ability to resist changes in the water chemistry.

The effects on the water chemistry of three fluoridating agents, hydrofluorosilicic acid, sodium silico- fluoride and sodium fluoride, were all tested on Bare Point

drinking water in a laboratory controlled setting. The impact the water chemistry with fluoride addition was tested to determine whether the addition of fluoride would have a potential to increase the number occurrences of elevated lead levels in the community.

The results of this preliminary study show that all fluoridating agents, when added to the drinking water at a concentration of 0.7 ppm (the optimal fluoride concentration rate as recommended by an expert panel convened by Health Canada in 2007), increased lead leaching from the lead pipe.”

Fluoride species & Aluminum: No mention by City of Austin of fluoride-aluminum concerns

The research on aluminum and fluoride interactions is well documented. AlF_x is a phosphate mimic, capable of interfering with many cellular processes and pathways (e.g., G-proteins, energy production and transfer). The gut has a pH of about 3. Aluminum is a common metal used in cooking utensils, piping, faucets and other items in the water system. The City of Austin did not evaluate fluoride and aluminum interactions in Austin consumers and therefore seems to assume it is not occurring.

“For example, P.J. Jackson et al. (2002) have calculated that at pH 7, in the presence of aluminum, 97.46% of a total fluoride concentration of 1 mg/L is present as fluoride ion, but at pH 6, only 21.35% of the total fluoride is present as fluoride ion, the rest being present in various aluminum fluoride species (primarily AlF_2^+ and AlF_3). Calculations were not reported for $pH < 6$.”

Fluoride species & Iodine: No mention by City of Austin of fluoride blocking iodine in the thyroid

Fluoride interferes with the essential nutrient iodine via multiple pathways according to Clinch (2009). “Described as an ‘endocrine disruptor’ in a recent U.S. National Research Council (NRC) 2006 Review, fluoride (F^- , as the F^- anion) has the potential to disrupt the function of the many tissues that require iodine (I_2) or iodide (I^-). The NRC Review goes on to state that; “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.1b”

Omission #8: Bioavailability Differences of Industrial Fluorides vs Natural Fluoride Mineral Salts.

Another gap in the City’s Report is **not presenting crucial facts on the biological absorption differences between the industrial hydrofluorosilicic acid** used in Austin’s water versus naturally occurring fluoride mineral salts. The City simply refers to Hydrofluorosilicic acid as “fluoride” in its report including the title (“Water Fluoridation Report”) and mistakenly lumps this toxic industrial chemical with other forms of fluoride found in City water.

According to the science of chemistry, hydrofluorosilicic acid is a different molecule (H_2SiF_6) than naturally occurring fluoride mineral salts like calcium fluoride (CaF_2) with two fluorine atoms (not six fluorine atoms in hydrofluorosilicic acid) and the industrial fluoride behaves differently in the human body compared to natural fluoride mineral salts. But the City of Austin mistakenly assumes that the different fluoride compounds all act in an identical way chemically, biochemically and toxicologically, which is grossly inaccurate. Each fluoride compound dissociates in water at different rates and depending on the chemistry of the water as noted by Westendorf (1975) and Masters and Coplan (2001). Uptake in the body likewise varies from one fluoride compound to another and the City should not assume that the biological uptake of different fluoride compounds is identical, according to the NRC 2006 Review.

The medical concern is that the industrial hydrofluorosilicic acid increases absorption of toxic metals in the body based on several peer-reviewed studies ignored by the City as noted in **Omission #4: Synergistic Toxic Effects of Fluoride with Lead, Aluminum and Iodine: Fluoride Inhibition of Acetylcholine Esterase, Increased Aluminum Uptake, and Endocrine Disruption of Thyroid.**

Omission #9: Recent and Relevant Carcinogenicity Research - Fluoride Linked to Osteosarcoma.

Emerging evidence on cancer linked to fluoride intake is critical to a science-based review. The City's cursory Fluoride Report entirely ignored new scientific research published in 2006 and 2009 [identifying fluoride as a potent carcinogenic substance](#). Yet other regulatory agencies are taking action on fluoride as a potential human carcinogen.

1. California Carcinogen Identification Committee (CIC) provided advice to the Office of the Environmental Health Hazard Assessment (OEHHA) at the California Environmental Protection Agency, that fluoride and its salts are now on the high priority list as a carcinogen.
2. The available research satisfies EPA 2005 cancer risk assessment guidelines to classify fluoride as "likely to be carcinogenic to humans."
3. Published paper by Bassin et al 2006 at Harvard and other studies.
4. National Research Council 2006 concerns on fluoride as a potential carcinogen.

1. The California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA) is the lead agency for the implementation of the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).

The Carcinogen Identification Committee (CIC) of OEHHA's Science Advisory Board serves as the State's qualified experts for rendering an opinion whether a chemical has been clearly shown through scientifically valid testing according to

generally accepted principles to cause cancer.

On [May 29, 2009](#), the CIC considered the priority ranking of 38 chemicals of which they recommended that nine of the chemicals be placed in the High priority category. OEHHA has initially selected five of the nine chemicals for the CIC's review for possible listing under Proposition 65 and is initiating the development of hazard identification materials for these chemicals. [The remaining four chemicals will be the subject of a future public notice or notices.] The five chemicals listed **include fluoride and its salts**.

These chemicals were selected using the procedure described in the document entitled: "Process for Prioritizing Chemicals for Consideration under Proposition 65 by the State's Qualified Experts," adopted in 2004, and available on the Internet at <http://www.oehha.ca.gov>.

2. US EPA Guidelines for Carcinogenicity 2005

The conclusions of the City of Austin's Fluoride Report do not agree with the US EPA guidelines for carcinogenicity. If the evidence discussed in the NRC 2006 Review is objectively reviewed (Bassin et al. 2006, Cohn 1992, Hoover 1991, NTP 1991) and more recent evidence (Sandhu 2009) regarding fluoride, it seems to fit the category called "Likely to be Carcinogenic to Humans" - Category 2 (see below) in the following categories adopted by EPA (2005):

"rare animal tumor response in a single experiment that is assumed to be relevant to humans" (NTP 1991)

"a single positive cancer result" There are several positive cancer results. (Bassin 2006, Cohn 1992, Hoover 1991, NTP 1991)

"a positive tumor study that raises additional biological concerns beyond that of a statistically significant result, for example, a high degree of malignancy, OR AN EARLY AGE AT ONSET"- my emphasis (Bassin et al 2006, Cohn 1992, Hoover 1991 all demonstrated age-specific, sex-specific association that was STATISTICALLY SIGNIFICANT)

"a positive tumor study that is strengthened by other lines of evidence, for example, either plausible (Bassin et al 2006) (but not definitively causal) association between human exposure and cancer or evidence that the agent or an important metabolite causes events generally known to be associated with tumor formation (such as DNA reactivity or effects on cell growth control) likely to be related to the tumor response in this case." (mitogenesis of fluoride is "well-established" according to the NRC 2006 review and it would seem that fluoride is at least a promoter of cancer)

"mode of action" is known (see below), therefore strengthening the evidence. If you read the EPA Guidelines and actually follow them, fluoride or the

silicofluorides used (e.g. hydrofluorosilicic acid), seems **LIKELY TO BE CARCINOGENIC IN HUMANS**. The new paper by Sandhu et al. 2009 demonstrates an association between fluoride osteosarcoma and other bone-forming tumours, and musculo-skeletal pain syndromes using biochemical analysis. Sandhu et al. 2009. Of course there is also the introduction of other contaminants like arsenic and lead in fluorosilicates which are an additional “confounding variable” which may influence cancer and other health effects.

3. Bassin et al. 2006 and Sandhu et al. 2009 demonstrate an association between fluoride osteosarcoma and other bone-forming tumours. Bassin et al. (2006) at Harvard state in Conclusions on p. 421:

“Our exploratory analysis found an association between fluoride exposure in drinking water during childhood and the incidence of osteosarcoma among males but not consistently among females.
Further research is required to confirm or refute this observation.”

Bassin et al. (2006) further state on p. 428 sentence in last paragraph of the study:s

“In summary, this exploratory analysis found an association between exposure to fluoride in drinking water and the incidence of osteosarcoma, demonstrating a peak in the odds ratio for exposure at ages 6–8 years among males diagnosed less than 20 years old, but no consistent association among females.”

4. National Research Council 2006 Review states:

“Fluoride appears to have the potential to initiate or promote cancers, particularly of the bone but the evidence is tentative and mixed.” p336

The NRC Review was concluded shortly before Dr. Elise Bassin and a team of Harvard scientists published their study linking fluoride with osteosarcoma in young boys (Bassin et al. 2006).

Omission #10: Fluoride Dose from Drinking Fluoridated Water not Controlled or Evaluated by City.

Once put in the water supply, it is impossible to control the dose each individual receives. This is an error in the City’s Fluoride Report by neglecting to evaluate the health risk of over consumption of fluoride when thirsty people drink lots of fluoridated water and receive a higher fluoride daily dose than is healthy. People drink varying amounts of water depending on their hydration needs and absorb higher amounts of fluoride.

The key issue is whether or not there is an adequate margin of safety between the doses that cause health effects and the full range of doses people will get in a

fluoridated community. In addition, that margin of safety would also have to protect for the whole range of sensitivity expected for any toxic substance in a human population which contains, the very young, the very old, those with impaired kidney function, and those who have a poor diet, including borderline or outright iodine deficiency. By no stretch of the imagination is there an adequate margin of safety to protect for either the range of dose or the range of sensitivity, and certainly not both.

Omission #11: Sensitive Subpopulations at Risk of Fluoride Exposure and Over Dose.

The City's Report ignored the sensitive subpopulations in Austin such as **diabetic patients, kidney patients, infants, children, elderly, osteoarthritis patients, hyperallergic persons, and athletes** consuming high volumes of water.

Omission #12: Infants at Risk of Fluoride — American Dental Association's November 8, 2006 Release.

The American Dental Association (ADA) issued a public statement on November 8, 2006 recommending that infants be breast fed with mother's milk and not a fluoridated-based formula. The City of Austin's Fluoride Report ignored the medical concern that babies receive 100-200X more fluoride in fluoridated drinking water than from mother's milk. Until November 2006, the ADA had not previously stated that babies should not be exposed to fluoridated drinking water due to concerns of getting too high a dose. The National Research Council's 2006 Report cited that relative to their body weight, infants and young children are exposed to three to four times as much fluoride as adults.

ADA Interim Guidance on Fluoride Intake for Infants and Young Children – November 8, 2006

“Recent studies cited in the report of the National Research Council (NRC), “Fluoride in Drinking Water: A Scientific Review of EPA's Standards,” have raised the possibility that infants could receive a greater than optimal amount of fluoride through liquid concentrate or powdered baby formula that has been mixed with water containing fluoride during a time that their developing teeth may be susceptible to enamel fluorosis.” ADA (2006)

“The ADA offers these recommendations so parents, caregivers and health care professionals who are concerned have some simple and effective ways to reduce fluoride intake from reconstituted infant formula.” ADA (2006)

“* Breast milk is widely acknowledged as the most complete form of nutrition for infants. The American Academy of Pediatrics recommends human milk for all infants (except for the few for whom breastfeeding is determined to be harmful).” ADA (2006)

“* For infants who get most of their nutrition from formula during the first

12 months, ready-to-feed formula is preferred to help ensure that infants do not exceed the optimal amount of fluoride intake.” ADA (2006)

“* If liquid concentrate or powdered infant formula is the primary source of nutrition, it can be mixed with water that is fluoride free or contains low levels of fluoride to reduce the risk of fluorosis. Examples are water that is labeled purified, demineralized, deionized, distilled or reverse osmosis filtered water. Many grocery stores sell these types of drinking water for less than \$1 per gallon.” ADA (2006)

Omission #13: Fluorinated Drinks, Foods Sold in Austin were not Evaluated by City.

An error is the City’s Report **provided no mention of hundreds of consumer products containing fluoridated water or fluoride** where Austinites are receiving daily fluoride exposures. <http://www.fluoridealert.org/sc.am.jan.2008.html>

Once fluoride is put in the water it is impossible to control the dose each individual receives. This is because 1) some people (e.g. manual laborers, athletes, diabetics, and people with kidney disease) drink more water than others, and 2) we receive fluoride from sources other than the water supply. Other sources of fluoride include food and beverages processed with fluoridated water (Kiritsy et al. 1996, Heilman et al. 1997 and 1999), fluoridated dental products (Bentley et al. 1999 and Levy 1999), mechanically deboned meat (Fein 2001), teas (Levy 1999), and pesticide residues on food (Stannard et al. 1991 and Burgstahler et al. 1997). Total fluoride exposure to citizens in Austin is not known since the City has not evaluated the fluoride consumption in the beverages and foods commonly sold every day.

Omission #14: Fluorinated Prescription Drugs Used in Austin were not Evaluated by City.

A major error in the City’s Fluoride Report is it **made no mention that by the year “...1990, 220 pharmaceutical drugs contained Fluorine and 1500 more under development.”** Twenty percent of all drugs contain fluorine by 1990 and maybe even higher today. Thousands of Austinites use fluorinated drugs each day and receive daily fluoride exposures. The City’s fluoridated water adds to exposures of people prescribed fluorinated drugs. The City ignored fluoridated drug exposures in use for several decades according to Dr. Basil Wakefield’s (2000) article. Moore (2009) lists 75 fluorinated pharmaceutical drugs on the market under 14 types: 9 general anesthetics, 2 antacids, 3 anti-anxiety, 14 antibiotics, 6 antidepressants, 3 anti-fungal antibiotics, 2 antihistamines, 4 antilipemics (cholesterol lowering), 2 anti-malarial, 2 antimetabolites, 3 appetite suppressants, 5 arthritis, 3 psychotropic, and 17 steroids/anti-inflammatory agents.

Omission #15: Acute or Chronic Toxicity in Toothpaste is Due to Fluoride, not Toothpaste.

The City ignored an additional exposure of fluoride in toothpaste for young children that causes acute or chronic toxicity, and the City omitted fluoridated toothpaste from discussion as another source of fluoride exposure to residents. All fluoride-containing toothpaste has a TOXICITY WARNING label required by the FDA – call a local poison control center if a small amount of a fluoride toothpaste is swallowed by a child. The TOXICITY WARNING label demonstrates the harmful effect of fluoride. Why is there a TOXICITY WARNING label? Each tube contains enough fluoride to kill a child!

**“WARNING: Keep out of reach of children under 6 years of age.
If you accidentally swallow more than used for brushing,
seek professional help or contact a poison control center immediately.”**

Omission #16: Confounding Variables

The total lack of discussion of the poor quality epidemiology evidence now available, as discussed in the York Review 2000, is an extraordinary oversight in this review. The following variables are known to affect cavities and must be controlled in any epidemiological analysis:

1. Socio-economic status
2. Exposure to sugars which combine with bacteria to form acid leading to tooth decay
3. Exposure to nutrients known to protect against tooth decay (e.g. calcium, magnesium, Vitamin D, xylitol)
4. Dental hygiene
5. Access to dental education and dental care
6. Fluoride ingestion delays eruption of teeth, therefore delays development of cavities.
7. Fluoride ingestion delays detection of cavities, increasing severity of cavities when detected (Fluoride Bombs)
8. Fluoride ingestion potentially causes mis-diagnosis because dental fluorosis looks like cavities. Smoking (Shenkin et al 2004) <http://www.york.ac.uk/inst/crd/fluorid.htm>

Omission #17: Epidemiologic Study on Fluoride’s Health Effects has never been performed in Austin.

A science omission in the City’s fluoride report is a failure to explain that an epidemiological study on fluoride’s health effects in Austin has never been conducted since 1973 to evaluate the health impacts of fluoride exposure to residents. Without a peer-reviewed epidemiological fluoride study in Austin, the City’s opinion of “no harmful impact to human health” of fluoridation relies more on speculation than on a science-based study with concrete evidence. Omissions #1-16 need to be evaluated in an epidemiological study.

Omission #18: Safety Studies on Fluoride including an Epidemiologic Study

needed in US.

A science omission is the City's fluoride report does not cite a single peer-reviewed epidemiological study on fluoride's health effects in an American city using the exact same toxic industrial fluoride chemical used in Austin. No such epidemiologic study exists in the scientific literature because none has ever been done.

EPA scientists raised health concerns that there is an absence of safety studies on silicofluorides (US EPA 2001):

"When asked by the U.S. House Committee on Science for chronic toxicity test data on sodium fluorosilicate and hydrofluorosilicic acid, Charles Fox of the EPA answered on June 23, 1999, "EPA was not able to identify chronic toxicity data on these chemicals".⁵ Further, EPA's National Risk Management Research Laboratory stated, on April 25, 2002, that the chemistry of silicofluorides is "not well understood" and studies are needed."

Ingestion of fluoride linked to many health effects

<http://nteu280.org/Issues/Fluoride/flouridestatement.htm>:

"Contrary to assertions that the health effects of fluoride ingestion already have been scientifically proven to be safe and that there is no credible scientific concern, over the last fifteen years the ingestion of fluoride has been linked in scientific peer-reviewed literature to neurotoxicity⁷, bone pathology⁸, reproductive effects⁹, interference with the pineal gland¹⁰, gene mutations¹¹, thyroid pathology¹², and the increasing incidence and severity of dental fluorosis¹³. This has caused professionals who once championed the uses of fluoride in preventing tooth decay, to reverse their position and call for a halt in further exposures.¹⁴ It is of significance that 14 Nobel Prize winning scientists, including the 2000 Nobel Laureate in Medicine & Physiology, Dr. Arvid Carlsson, have expressed reservations on, or outright opposition to, fluoridation.¹⁵" (Connett 2000)

Some of the earliest opponents of fluoridation were biochemists. One of those early opponents was one of the world's leading authorities on enzyme chemistry, Nobel laureate Dr. James Sumner at Cornell University. He said:

"We ought to go slowly. Everybody knows fluorine and fluorides are very poisonous substances...We use them in enzyme chemistry to poison enzymes, those vital agents in the body. That is the reason things are poisoned; because the enzymes are poisoned and that is why animals and plants die." (Connett 2000)

Dr. James Sumner was one of 14 Nobel Prize winners in Chemistry (8) and Medicine (6), who opposed fluoridation or had reservations about it. They are: Arvid Carlson (Nobel Prize in Medicine & Physiology, 2000), Joshua Lederberg (Medicine, 1958),

Hugo Theorell (Medicine, 1955), Walter Rudolf Hess (Medicine, 1949), Corneille Jean-François Heymans (Medicine, 1938), William P. Murphy (Medicine, 1934), Giulio Natta (Chemistry, 1963), Nikolai Semenov (Chemistry, 1956), Sir Cyril Norman Hinshelwood (Chemistry, 1956), Sir Robert Robinson (Chemistry, 1947), James B. Sumner (Chemistry, 1946), Artturi Virtanen (Chemistry, 1945), Adolf Butenandt (Chemistry, 1939), and Hans von Euler-Chelpin (Chemistry, 1929). The list makes absurd the claim that there is “no scientific debate” over this issue and that the only people who oppose it are ‘crackpots’. Connett, 2000

A recent Nobel Laureate in Medicine and Physiology, Dr. Arvid Carlsson (2000), is a leading opponent of fluoridation in Sweden, and on a panel that recommended the Swedish government reject the practice, which they did in 1971. According to Carlsson:

“I am quite convinced that water fluoridation, in a not-too-distant future, will be consigned to medical history...Water fluoridation goes against leading principles of pharmacotherapy, which is progressing from a stereotyped medication - of the type 1 tablet 3 times a day - to a much more individualized therapy as regards both dosage and selection of drugs. The addition of drugs to the drinking water means exactly the opposite of an individualized therapy.”(Carlsson (1978) cited by Connett, 2000)

The U.S. Food and Drug Administration has never approved systemic use of fluoride in the United States

“The U.S. Food and Drug Administration in December 2000 stated to the U.S. House Committee on Science they have never provided any specific approval for safety or effectiveness for any fluoride substance intended to be ingested for the purpose of reducing tooth decay.¹⁶” (Connett, 2000)

U.S. Centers for Disease Control (1999) concession – minimal value of fluoride ingestion (Connett, 2000)

“The CDC now concedes that the systemic value of ingesting fluoride is minimal, as fluoride’s oral health benefits are predominantly topical¹⁹, and that there has been a generalized increase in dental fluorosis²⁰.”

Omission #19: Safe Level of Fluoride is Zero or Close to Zero Based on Latest Science.

The City’s fluoride report ignored a growing public health concern based on the extensive peer-reviewed scientific literature **that the safe level fluoride exposure is zero or close to zero** and a level significantly lower than the fluoride concentration the City of Austin is adding to the drinking water.

Dr. Robert J. Carton is a former EPA risk assessment scientist. He published a scientific article in the Journal *Fluoride* in 2006 presenting a review of the 2006 National

Research Council's report on *Fluoride in Drinking Water*. He states in the summary: **"The recommended Maximum Contaminant Level Goal (MCLG) for fluoride in drinking water should be zero."** Carton's five conclusions of the NRC 2006 Review state:

"1 Moderate dental fluorosis is an adverse health effect occurring at fluoride levels of 0.7–1.2 mg/L, the levels of water fluoridation."

"2 The Lowest Observed Adverse Effect Level (LOAEL) for bone fractures is at least as low as 1.5 mg/L and may be lower than this figure."

"3 Stage II and Stage III skeletal fluorosis may be occurring at levels less than 2 mg/L."

"4 Stage I skeletal fluorosis, (arthritis, clinically manifested as pain and stiffness in joints) is an adverse health effect which may be occurring with a daily fluoride intake of 1.42 mg/day, which is less than the amount the average person already obtains in their diet in non-fluoridated areas. **The Maximum Contaminant Level Goal (MCLG) should be zero.**"

"5 Decreased thyroid function is an adverse health effect, particularly to individuals with inadequate dietary iodine. These individuals could be affected with a daily fluoride dose of 0.7 mg/day (for a "standard man"). **Since this is less than the amount already in the diet, the MCLG should be zero.**"

"6 Fluoride has adverse effects on the brain, especially in combination with aluminum. Seriously detrimental effects are known to occur in animals at a fluoride level of 0.3 mg/L in conjunction with aluminum. **The goal for this effect should also be zero.**"

Omission #20: Austin has not Conducted an Environmental Impact Statement (EIS) on Fluoride Use.

Austin has never conducted an EIS on industrial fluoride's effects on wild life and plants in the Austin watershed area to properly assess whether adverse effects are occurring. A scarcity of EIS's have been conducted on fluoride's impacts. Without an EIS, assessing the impact of fluoride is challenging.

Omission #21: City Failed to Mention 216+ U.S. Cities Have Rejected Fluoridation.

The City only cited American cities still adding fluoride and ignored 216 cities that have stopped. <http://www.fluoridealert.org/communities.htm>

Omission #22: Environmental Devastation of Phosphate Ore Strip Mining, Phosphate Fertilizer Plants and Toxic Pollution

The City's Fluoride Report excluded critical facts by ignoring the environmentally devastating phosphate ore strip mining in Florida and the fact that the hydrofluorosilicic acid is a toxic industrial waste byproduct from phosphate fertilizer mfg plants.

Omission #23: The Third Party Entity Used by City to Audit Fluoride Chemical is not a Regulatory Body.

City relies on a third party, non-regulatory, non-governmental private entity to certify the authenticity of the fluoride purchased. Who is auditing and regulating the private firm. The City places faith that the third party entity is honest.

Omission #24: Is the City's Fluoride Chemical Purified or Unrefined?

The City claims the fluoride chemical it uses is purified while producing no laboratory documentation indicating it's pure hydrofluorosilicic acid without toxic impurities and data suggests that toxic impurities are present. The City does not conduct its own analysis of the product. Are radionuclides present? Radionuclides reportedly may be present.

Omission #25: Fluoride is Bioaccumulative – City completely ignored evidence of fluoride bioaccumulating

“Fluoride accumulates in the body. On average, only 50% of the fluoride we ingest each day is excreted through the kidneys, the remainder accumulates in our bones, teeth, pineal gland, and other calcifying tissues. Because of our bone mass, 99% of the total fluoride accumulates there, but that does not mean that concentrations reached in smaller tissues are not significant. This may be particularly true of the pineal gland (see section 18 below). If the kidney is damaged, more fluoride will accumulate, especially in the bone. To a certain extent the accumulation of fluoride in the bone could be viewed as “protective” by keeping fluoride away from other tissues. However, there are two problems. First, when the fluoride concentrates in the bone it might cause damage to the bone and connective tissues (see sections 20 -23) and second, it may prove problematic for other tissues during bone turnover.” 12.18 (Connett 2008)

Omission #26: Fluoride and Evidence of Oxidative Stress

The journal *Fluoride* had a 2009 editorial by Albert W. Burgstahler, Ph.D. (editor) noting new studies on the biochemical connections between fluoride and oxidative stress. Burgstahler states: “Over the last several decades, increasing numbers of studies have reported far-reaching effects of fluoride on a very important, wide-ranging biochemical process, viz., oxidative stress in living organisms—human, animal, and plant. With its completely filled and tightly held valence electron shell, the fluoride ion, F⁻, is *not* an oxidizing (electron-acceptor) agent. It is also *not reactive* chemically as a reducing (electron-releasing) species. However, because of its high electro negativity, [the fluoride ion] F⁻ has a proclivity to form strong hydrogen bonds, especially with –OH and –NH moieties in biomolecules, as well as a marked ability to form stable complexes with

polyvalent metal cations like Al^{3+} , Fe^{3+} , and Mg^{2+} . In this manner [the fluoride ion] F^- is able to exert powerful influences on various enzymes and endocrine gland functions that affect or control the status of oxidant/antioxidant systems in living organisms. ...These and many previous studies emphasize the importance of oxidative stress that can be induced by fluoride." Burgstahler (2009).

Conclusion

Fluoride's potent enzyme toxicity is the principal cause of the very low margin of safety involved in fluoridating water. A concentration of about 1 part per million is the maximum recommended level for fluoridation whereas in countries severe skeletal fluorosis has been documented from water supplies containing only two or three parts per million. In the development of drugs, even for life-threatening diseases, we generally insist on a therapeutic index (margin of safety) of the order of 100; a therapeutic index of 2 or 3 is totally unacceptable, yet that is what has been proposed for public water supplies; Statement by James B. Patrick, Ph.D. (1982) in Congress. Finally, the City's fluoride report contains scientific gaps, omissions, errors and missing evidence and would not likely earn a passing grade in undergraduate biology at the University of Texas at Austin. An independent panel is needed to review the new science of fluoride.

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This report is not meant to be complete.

Error will be corrected upon notification.

As provided by,

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Texans for Accountable Government

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