

Testimony In For HB-5350
*An Act Concerning the Department of Public Health's
Recommendations on Fluoridation of the Public Water Supply*

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Mr. Chairman and Members of the committee:

Thank you for the opportunity to submit testimony in favor of amending HB-5350. My name is Stuart Cooper, and I represent the Fluoride Action Network, an international coalition of more than 5,500 Medical and scientific professionals opposed to the addition of fluoride to the public drinking water, as well as over 100,000 U.S. residents who make up our membership.

We support lowering the levels of fluoride in the drinking water, but believe that 0.7ppm isn't low enough. We believe that Connecticut residents, particularly children, will not be safe from overexposure to fluoride chemicals until the artificial fluoridation of the public water supply is prohibited; leaving only trace amounts of naturally occurring calcium fluoride in the groundwater, usually at levels under 0.2ppm. If the committee feels it needs further information to take action to prohibit fluoridation, we suggest amending the bill to create a fluoridation study committee to examine the latest scientific and medical research, as well as require that an infant fluoride notice be placed in all annual water quality reports in fluoridated communities, as has been done in the states of Vermont and New Hampshire, as well as major metro areas including San Francisco, Austin, and Milwaukee.

“If a public water supply is fluoridated, the following notice shall be posted in the water system’s consumer confidence report: “Your public water supply is fluoridated. According to the Centers for Disease Control and Prevention, if your child under the age of 6 months is exclusively consuming infant formula reconstituted with fluoridated water, there may be an increased chance of dental fluorosis. Consult your child’s health care provider for more information.” –New Hampshire Infant Fluoride Notice (signed into law August, 2012)

Currently there is only one substance added to the drinking water anywhere on earth that is meant to treat the consumer rather than the water; that is fluoride. Fluoride chemicals do nothing to treat or disinfect the drinking water, but are added ostensibly for the sole purpose of preventing and treating tooth decay. Because of this, very few countries have adopted this practice. Only eight countries in the world have more than 50% of their populations drinking artificially fluoridated water (Australia, Colombia, Ireland, Israel, Malaysia, New Zealand, Singapore, and the U.S.). In fact, 97% of Europe has either never initiated fluoridation or has directly prohibited the practice. In the U.S., only 12 states mandate fluoridation like Connecticut. The other 38 states give residents a choice in what chemicals they consume, cook with, and bathe in on a daily basis by providing local control over the issue, at the municipal level.

HHS Admits overexposing Residents to fluoride

Ask yourself and the proponents of fluoridation at the hearing today, why this legislation is necessary. Why is the “optimal fluoride level” being reduced by half? The answer: last may the U.S. Department of Health & Human Services (HHS) admitted that the fluoride levels--which they promoted and encouraged as safe--overexposed residents to fluoride, and as a result has damaged children’s teeth, at the very least. Because of the huge increase in dental fluorosis (white spotted, yellow, brown and/or pitted teeth) on the teeth of at least 41% of young teenagers, HHS says that water fluoride levels should be lowered to 0.7 mg/L (formerly most

communities used 1 mg/L while the guideline was 0.7 – 1.2 mg/L) and in ten years they'll check children's teeth to see if they were right about this new level.

HSS did not address the fact that infants who receive formula made with fluoridated water at the new guideline level will receive 175 times more fluoride than the breast-fed infant. David Kennedy DDS, a member of FAN's Board of Directors, noted: "The HHS continues its long term support for a policy that grossly overdoses bottle-fed infants and others in our communities with fluoride."

So the reason you are listening to this legislation today is because the proponents of fluoridation were incorrect in their belief that "optimal fluoride levels" were safe for all residents, and only now are they taking some action to reduce the epidemic harm they have already caused. If they were wrong for the past 70 years, even after being repeatedly told by opponents of fluoridation that this was the case, why should we now believe that the new "optimal" level is safe? We shouldn't. And if new and emerging science is any indicator of the safety of fluoridation, we should end the practice immediately.

New Evidence of Harm From Fluoridation

Scientific reports continue to show the potential for significant adverse effects from the obsolete practice of water fluoridation. The scientific, medical, and ethical case against fluoridation is already [very strong](#). And just when you thought the evidence against the practice couldn't get any more damning, several new studies and reviews were published in 2015 that ought to bring us significantly closer to condemning fluoridation to the history books once and for all.

1. ADHD

A new study--the first to systemically look at the relationship between a behavioral disorder and fluoridation--was published last February linking fluoridation to attention deficit hyperactivity disorder (ADHD) in the United States. The study entitled, "[Exposure to fluoridated water and attention deficit hyperactivity disorder prevalence among children and adolescents in the United States: an ecological association](#)," was published in the journal *Environmental Health*. The authors, psychologists Christine Till and Ashley Malin at Toronto's York University, discovered that states with a higher rate of artificially fluoridated water had a higher prevalence of ADHD. According to the authors:

"State prevalence of artificial water fluoridation in 1992 significantly positively predicted state prevalence of ADHD in 2003, 2007 and 2011, even after controlling for socioeconomic status.

A multivariate regression analysis showed that after socioeconomic status was controlled each 1% increase in artificial fluoridation prevalence in 1992 was associated with approximately 67,000 to 131,000 additional ADHD diagnoses from 2003 to 2011. Overall state water fluoridation prevalence (not distinguishing between fluoridation types) was also significantly positively correlated with state prevalence of ADHD for all but one year examined.

Conclusions: Parents reported higher rates of medically-diagnosed ADHD in their children in states in which a greater proportion of people receive fluoridated water from public water supplies."

2. Hypothyroidism

Also last February, a major new fluoridation study was published in the Journal of Epidemiology and Community Health--a British Medical Journal (BMJ) publication. The study, entitled "[Are fluoride levels in drinking water associated with hypothyroidism prevalence in England? A large observational study of GP practice data and fluoride levels in drinking water](#)," is the first study to ever look at fluoridation and hypothyroidism in a large population (in this case, England).

It found a relatively strong and statistically significant effect, with General Practice (GP) areas being 62% more likely to have high rates of diagnosed hypothyroidism if their drinking water fluoride levels were above 0.7ppm compared to areas with fluoride levels below 0.3ppm. This was after researchers had accounted for key confounders, which are other factors that influence hypothyroid rates.

In an additional comparison of two large metropolitan regions, one that is artificially fluoridated at a level of about 1.0 ppm (greater Birmingham area), and the other which is nearby and similar demographics but is not artificially fluoridated (greater Manchester), the study found a 94% greater probability that GPs in fluoridated Birmingham would have high hypothyroidism rates compared to Manchester.

For all of England, the prevalence rate of hypothyroidism was almost 10% greater in those GPs with higher fluoride levels compared to those with lowest levels. The findings led to the researchers calling for a “rethink of public health policy to fluoridate the water supply,” adding “consideration needs to be given to reducing fluoride exposure, and public dental health interventions should stop [those] reliant on ingested fluoride and switch to topical fluoride-based and non-fluoride-based interventions.”

According to FAN’s Science Director, Chris Neurath, “Scientific and medical research stretching back to the 1920s has shown that fluoride can affect the thyroid. The levels of fluoride exposure known to lower thyroid function overlap with the levels of exposure known to occur in some people drinking artificially fluoridated water. Hypothyroidism is a very common disorder in the US. It can have serious adverse health effects. Reduced thyroid function in pregnant women is linked to reduced IQ in their children. There is accumulating evidence that fluoride, at levels within the range fluoridated populations are exposed to, is associated with lowered IQ. Fluoride’s effect on thyroid function might be the mechanism by which it lowers IQ.”

The article notes that “thyroid dysfunction is a common endocrine disorder...” The first time fluoride was labeled an **endocrine disrupter** was in the 2006 report of the National Resource Council of the National Academies. According to the [National Institutes of Health](#), “Research shows that endocrine disruptors may pose the greatest risk during prenatal and early postnatal development when organ and neural systems are forming.” As far as we know, promoters pushing fluoridation have never referred to this ominous label.

3. New IQ Study Links Fluorosis to Neurotoxicity

There are over 100 animal experiments linking fluoride consumption to a decrease in IQ. There are also 31 animal experiments out of 33 that investigated animal behavior that showed learning and memory problems associated with fluoride consumption, and 43 out of 50 human studies have shown that modest levels of fluoride negatively effect IQ . 27 of these studies were recently reviewed by a team from Harvard School of Public Health. 26 of these studies showed a decrease in IQ (an average drop of 7 points), and the average fluoride level in the water for 20 of these studies was only 3.2 ppm, which is lower than the current safe drinking standard in the U.S. for fluoride of 4.0ppm. Knowing this, it should come as no surprise that a new study on fluoride’s impact on IQ further proves the neurotoxicity of the drinking water additive.

This new pilot study in China (Choi AL, Zhang Y, Sun G, et al. 2015. [Association of lifetime exposure to fluoride and cognitive functions in Chinese children: A pilot study](#). Neurotoxicology and Teratology, 47:96–101.) was carried out at fluoride levels, which overlap levels used in US fluoridation programs. They didn’t measure IQ specifically in this study but reported the results of a very simple test: the child’s ability to repeat a sequence of numbers both forwards and backwards. Even children with very mild dental fluorosis performed less well on this specific mental development test, than children without fluorosis. One of the experts involved in this study was Dr. David Bellenger who is world famous for his studies on lead’s neurotoxicity.

Another co-author was Dr. Philippe Grandjean and in an editorial on his website "[Chemical Brain Drain](#)" he used this study to counteract the claim from proponents that the IQ findings were not relevant to the fluoride levels used in water fluoridation. For the children in this study, Grandjean writes:

“Their lifetime exposures to fluoride from drinking water covered the full range allowed in the US. Among the findings, children with fluoride-induced mottling of their teeth – even the mildest forms that appears as whitish specks on the enamel – showed lower performance on some neuropsychological tests. This observation runs contrary to popular wisdom that the enamel effects represent a [cosmetic problem](#) only and not a sign of toxicity. At least [one of five American children](#) has some degree of mottling of their teeth...Prevention of chemical brain drain should be considered at least as important as protection against caries.” (my emphasis, PC).

For more information, please also see FAN’s webpage on [Fluoride & IQ](#).

4. The Evidence Keeps Piling Up

As if the government admitting to overexposing 41+% of our children to fluoride, increasing rates of ADHD, increasing rates of hypothyroidism, and lowering IQ wasn’t damning enough, 2015 also brought us:

- [UK Cochrane Group](#), conducting a gold standard review of the literature on fluoridation, could find no quality research proving fluoridation reduces tooth decay, but did find that 40% of children in fluoridated areas have dental fluorosis.
- An *American Journal of Public Health* article ([Carstairs, 2015](#)) reports fluoridation was adopted prematurely without harms and risks fully explored.
- A prominent legal scholar reported that fluoridation violates numerous legal and ethical human subjects research protocols ([William & Mary Environmental Law and Policy Review](#))
- In response to a Freedom of Information Act request, [FAN uncovered documents](#) showing that since 1962 officials at the U.S. Public Health Service knew that black Americans were disproportionately harmed by fluoride with significantly higher rates of dental fluorosis (permanent damage to the enamel) rates compared to white Americans. But for over 40 years they hid this information from communities of color.
- At [Least 75 more studies](#) report adverse fluoride effects in animals and humans or about how to protect the body from fluoride toxicity.

Additional Reasons to End Fluoridation:

Fluoride is the only chemical added to water for the purpose of medical treatment. The U.S. Food and Drug Administration (FDA) classifies fluoride as a drug when used to prevent or mitigate disease (FDA 2000). As a matter of basic logic, adding fluoride to water for the sole purpose of preventing tooth decay (a non-waterborne disease) is a form of medical treatment. All other water treatment chemicals are added to improve the water's quality or safety, which fluoride does not do.

Fluoridation is unethical. Informed consent is standard practice for all medication, and one of the key reasons why most of Western Europe has ruled against fluoridation. With water fluoridation we are allowing governments to do to whole communities (forcing people to take a medicine irrespective of their consent) what individual doctors cannot do to individual patients. While referenda are preferential to imposed policies from

government, it still leaves the problem of individual rights versus majority rule. Put another way: Does a voter have the right to require that their neighbor ingest a certain medication (even if it is against that neighbor's will)?

Fluoride is not an essential nutrient (National Research Council [NRC] 1993; Institute of Medicine [IOM] 1997, NRC 2006). No disease has ever been linked to a fluoride deficiency. It has never been shown that ingested fluoride is needed to produce decay-free teeth. Not a single biological process has been shown to require fluoride. On the contrary there is extensive evidence that fluoride can interfere with many important biological processes. Fluoride interferes with numerous enzymes (Waldbott 1978). In combination with aluminum, fluoride interferes with G-proteins (Bigay 1985, 1987). Such interactions give aluminum-fluoride complexes the potential to interfere with signals from growth factors, hormones and neurotransmitters (Strunecka & Patocka 1999; Li 2003). More and more studies are indicating that fluoride can interfere with biochemistry in fundamental ways (Barbier 2010).

The dose cannot be controlled. Once fluoride is put in the water it is impossible to control the dose each individual receives because people drink different amounts of water. Being able to control the dose a patient receives is critical. Some people (e.g., infants, manual laborers, athletes, diabetics, and people with kidney disease) drink substantially more water than others.

People now receive fluoride from many other sources besides water. The total dosage goal of 1 mg of free-fluoride ion/day for a child was adopted in the early 1940's when there was little or no other source of exposure. The 1 mg of free-fluoride ion was to be placed in 1 liter of water, as that was the amount that a child was assumed to drink per day (The very reason for using the public water was the assumption that it would be the child's only access to fluoride).. Other sources of fluoride include food and beverages processed with fluoridated water (Kiritsy 1996; Heilman 1999), fluoridated dental products (Bentley 1999; Levy 1999), mechanically deboned meat (Fein 2001), tea (Levy 1999), and pesticide residues (e.g., from cryolite) on food (Stannard 1991; Burgstahler 1997). It is now widely acknowledged that exposure to non-water sources of fluoride has significantly increased since the water fluoridation program first began (NRC 2006). Independent laboratory analysis now shows that fluoride is in most cola and fruit juices at concentrations of 1 ppm and up; in well known cereals at 2 to 10 times the concentration intended for our water; in products using white grape juice as sweetener or in children's juices at 3 to 7 ppm; and, because of fluoride-based pesticide residue, on lettuce at 180 ppm and raisins (that we know no child is going to scrub) at 55 ppm.

Children in fluoridated countries are greatly over-exposed to fluoride. When fluoridation began in 1940s, 10% of children were expected to develop dental fluorosis (damage to the enamel involving discoloration and/or mottling) in its very mild form. Today, the prevalence in fluoridated countries is much higher—41% of all American children aged 12-15 are now impacted with some form of dental fluorosis (CDC, 2010), with over 10% in categories (mild, moderate and severe) that may need expensive treatment.

The level in mothers' milk is very low. Considering reason it is perhaps not surprising that the level of fluoride in mother's milk is remarkably low (0.004 ppm, NRC, 2006). This means that a bottle-fed baby consuming fluoridated water (0.6 – 1.2 ppm) can get up to 300 times more fluoride than a breast-fed baby. There are no benefits (see reasons #11-19), only risks (see reasons #21-36), for infants ingesting this heightened level of fluoride at such an early age (an age where susceptibility to environmental toxins is particularly high).

The highest doses of fluoride are going to bottle-fed babies. Because of their sole reliance on liquids for their food intake, infants consuming formula made with fluoridated water have the highest exposure to fluoride, by bodyweight, in the population. Because infant exposure to fluoridated water has been repeatedly found to be a major risk factor for developing dental fluorosis later in life (Marshall 2004; Hong 2006; Levy 2010), a number of dental researchers have recommended that parents of newborns not use fluoridated water when reconstituting formula (Ekstrand 1996; Pendry 1998; Fomon 2000; Brothwell 2003; Marshall 2004). Even the American

Dental Association (ADA), the most ardent institutional proponent of fluoridation, distributed a November 6, 2006 email alert to its members recommending that parents be advised that formula should be made with "low or no-fluoride water." Unfortunately, the ADA has done little to get this information into the hands of parents. As a result, many parents remain unaware of the fluorosis risk from infant exposure to fluoridated water.

Fluoride accumulates in the body. Healthy adult kidneys excrete 50 to 60% of 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).

No health agency in fluoridated countries is monitoring fluoride exposure or side effects. No regular measurements are being made of the levels of fluoride in urine, blood, bones, hair, or nails of either the general population or sensitive subparts of the population (e.g., individuals with kidney disease).

There has never been a single randomized clinical trial to demonstrate fluoridation's effectiveness or safety. Despite the fact that fluoride has been added to community water supplies for over 60 years, "there have been no randomized trials of water fluoridation" (Cheng 2007). Randomized studies are the standard method for determining the safety and effectiveness of any purportedly beneficial medical treatment. In 2000, the British Government's "York Review" could not give a single fluoridation trial a Grade A classification – despite 50 years of research (McDonagh 2000). The U.S. Food and Drug Administration (FDA) continues to classify fluoride as an "unapproved new drug."

Benefit is topical not systemic. The Centers for Disease Control and Prevention (CDC, 1999, 2001) has now acknowledged that the mechanism of fluoride's benefits are mainly topical, not systemic. There is no need whatsoever, therefore, to swallow fluoride to protect teeth. Since the purported benefit of fluoride is topical, and the risks are systemic, it makes more sense to deliver the fluoride directly to the tooth in the form of toothpaste. Since swallowing fluoride is unnecessary, and potentially dangerous, there is no justification for forcing people (against their will) to ingest fluoride through their water supply.

The chemicals used to fluoridate water supplies are largely hazardous by-products of the fertilizer industry. These chemicals cannot be disposed of into the sea by international law, and have never been required to undergo randomized clinical trials for safety or effectiveness by any regulatory agency in the world. The U.S. FDA classifies fluoride as an "unapproved drug."

Fluoridation's role in the decline of tooth decay is in serious doubt. The largest survey ever conducted in the US (over 39,000 children from 84 communities) by the National Institute of Dental Research showed little difference in tooth decay among children in fluoridated and non-fluoridated communities (Hileman 1989). According to NIDR researchers, the study found an average difference of only 0.6 DMFS (Decayed, Missing, and Filled Surfaces) in the permanent teeth of children aged 5-17 residing their entire lives in either fluoridated or unfluoridated areas (Brunelle & Carlos, 1990). This difference is less than one tooth surface, and less than 1% of the 100+ tooth surfaces available in a child's mouth. Large surveys from three Australian states have found even less of a benefit, with decay reductions ranging from 0 to 0.3 of one permanent tooth surface (Spencer 1996; Armfield & Spencer 2004). None of these studies have allowed for the possible delayed eruption of the teeth that may be caused by exposure to fluoride, for which there is some evidence (Komarek 2005). A one-year delay in eruption of the permanent teeth would eliminate the very small benefit recorded in these modern studies.

NIH-funded study on individual fluoride ingestion and tooth decay failed to find a significant correlation. A multi-million dollar, U.S. National Institutes of Health (NIH) -funded study (Warren 2009) found no relation between tooth decay and the amount of fluoride ingested by children. This is the first time that tooth decay has

been investigated as a function of individual exposure as opposed to mere residence in a fluoridated community.

Tooth decay is high in low-income communities that have been fluoridated for years. Despite some claims to the contrary, water fluoridation cannot prevent the oral health crises that result from rampant poverty, inadequate nutrition, and lack of access to dental care. There have been numerous reports of severe dental crises in low-income neighborhoods of US cities that have been fluoridated for over 20 years (e.g., Boston, Cincinnati, New York City, and Pittsburgh). In addition, fluoridation has been repeatedly found to be ineffective at preventing the most serious oral health problem facing poor children, namely "baby bottle tooth decay," otherwise known as early childhood caries (Barnes 1992; Shiboski 2003).

Tooth decay does not go up when fluoridation is stopped. Where fluoridation has been discontinued in communities from Canada, the former East Germany, Cuba and Finland, dental decay has not increased but has generally continued to decrease (Maupomé 2001; Kunzel & Fischer, 1997, 2000; Kunzel 2000; Seppa 2000).

Dental fluorosis may be an indicator of wider systemic damage. There have been many suggestions as to the possible biochemical mechanisms underlying the development of dental fluorosis (Matsuo 1998; Den Besten 1999; Sharma 2008; Duan 2011; Tye 2011) and they are complicated for a lay reader. While promoters of fluoridation are content to dismiss dental fluorosis (in its milder forms) as merely a cosmetic effect, it is rash to assume that fluoride is not impacting other developing tissues when it is visibly damaging the teeth by some biochemical mechanism (Groth 1973; Colquhoun 1997). Moreover, ingested fluoride can only cause dental fluorosis during the period before the permanent teeth have erupted (6-8 years), other tissues are potentially susceptible to damage throughout life. For example, in areas of naturally high levels of fluoride the first indicator of harm is dental fluorosis in children. In the same communities many older people develop skeletal fluorosis.

Fluoride affects the pineal gland. Studies by Jennifer Luke (2001) show that fluoride accumulates in the human pineal gland to very high levels. In her Ph.D. thesis, Luke has also shown in animal studies that fluoride reduces melatonin production and leads to an earlier onset of puberty (Luke 1997). Consistent with Luke's findings, one of the earliest fluoridation trials in the U.S. (Schlesinger 1956) reported that on average young girls in the fluoridated community reached menstruation 5 months earlier than girls in the non-fluoridated community. Inexplicably, no fluoridating country has attempted to reproduce either Luke's or Schlesinger's findings or examine the issue any further.

Fluoride causes arthritic symptoms. Some of the early symptoms of skeletal fluorosis (a fluoride-induced bone and joint disease that impacts millions of people in India, China, and Africa), mimic the symptoms of arthritis (Singh 1963; Franke 1975; Teotia 1976; Carnow 1981; Czerwinski 1988; DHHS 1991). According to a review on fluoridation published in Chemical & Engineering News, "Because some of the clinical symptoms mimic arthritis, the first two clinical phases of skeletal fluorosis could be easily misdiagnosed" (Hileman 1988). Few, if any, studies have been done to determine the extent of this misdiagnosis, and whether the high prevalence of arthritis in America (1 in 3 Americans have some form of arthritis - CDC, 2002) and other fluoridated countries is related to growing fluoride exposure, which is highly plausible. Even when individuals in the U.S. suffer advanced forms of skeletal fluorosis (from drinking large amounts of tea), it has taken years of misdiagnoses before doctors finally correctly diagnosed the condition as fluorosis.

Fluoride damages bone. An early fluoridation trial (Newburgh-Kingston 1945-55) found a significant two-fold increase in cortical bone defects among children in the fluoridated community (Schlesinger 1956). The cortical bone is the outside layer of the bone and is important to protect against fracture. While this result was not considered important at the time with respect to bone fractures, it did prompt questions about a possible link to osteosarcoma (Caffey, 1955; NAS, 1977). In 2001, Alarcon-Herrera and co-workers reported a linear correlation between the severity of dental fluorosis and the frequency of bone fractures in both children and adults in a high fluoride area in Mexico.

Fluoride may increase hip fractures in the elderly. When high doses of fluoride (average 26 mg per day)

were used in trials to treat patients with osteoporosis in an effort to harden their bones and reduce fracture rates, it actually led to a higher number of fractures, particularly hip fractures (Inkovaara 1975; Gerster 1983; Dambacher 1986; O'Duffy 1986; Hedlund 1989; Bayley 1990; Gutteridge 1990. 2002; Orcel 1990; Riggs 1990 and Schnitzler 1990). Hip fracture is a very serious issue for the elderly, often leading to a loss of independence or a shortened life. There have been over a dozen studies published since 1990 that have investigated a possible relationship between hip fractures and long term consumption of artificially fluoridated water or water with high natural levels. The results have been mixed – some have found an association and others have not. Some have even claimed a protective effect. One very important study in China, which examined hip fractures in six Chinese villages, found what appears to be a dose-related increase in hip fracture as the concentration of fluoride rose from 1 ppm to 8 ppm (Li 2001) offering little comfort to those who drink a lot of fluoridated water. Moreover, in the only human epidemiological study to assess bone strength as a function of bone fluoride concentration, researchers from the University of Toronto found that (as with animal studies) the strength of bone declined with increasing fluoride content (Chachra 2010). Finally, a recent study from Iowa (Levy 2009), published data suggesting that low-level fluoride exposure may have a detrimental effect on cortical bone density in girls (an effect that has been repeatedly documented in clinical trials and which has been posited as an important mechanism by which fluoride may increase bone fracture rates).

People with impaired kidney function are particularly vulnerable to bone damage. Because of their inability to effectively excrete fluoride, people with kidney disease are prone to accumulating high levels of fluoride in their bone and blood. As a result of this high fluoride body burden, kidney patients have an elevated risk for developing skeletal fluorosis. In one of the few U.S. studies investigating the matter, crippling skeletal fluorosis was documented among patients with severe kidney disease drinking water with just 1.7 ppm fluoride (Johnson 1979). Since severe skeletal fluorosis in kidney patients has been detected in small case studies, it is likely that larger, systematic studies would detect skeletal fluorosis at even lower fluoride levels.

Fluoride may cause bone cancer (osteosarcoma). A U.S. government-funded animal study found a dose-dependent increase in bone cancer (osteosarcoma) in fluoride-treated, male rats (NTP 1990). Following the results of this study, the National Cancer Institute (NCI) reviewed national cancer data in the U.S. and found a significantly higher rate of osteosarcoma (a bone cancer) in young men in fluoridated versus unfluoridated areas (Hoover et al 1991a). While the NCI concluded (based on an analysis lacking statistical power) that fluoridation was not the cause (Hoover et al 1991b), no explanation was provided to explain the higher rates in the fluoridated areas. A smaller study from New Jersey (Cohn 1992) found osteosarcoma rates to be up to 6 times higher in young men living in fluoridated versus unfluoridated areas. Other epidemiological studies of varying size and quality have failed to find this relationship (a summary of these can be found in Bassin, 2001 and Connett & Neurath, 2005). There are three reasons why a fluoride-osteosarcoma connection is plausible: First, fluoride accumulates to a high level in bone. Second, fluoride stimulates bone growth. And, third, fluoride can interfere with the genetic apparatus of bone cells in several ways; it has been shown to be mutagenic, cause chromosome damage, and interfere with the enzymes involved with DNA repair in both cell and tissue studies (Tsutsui 1984; Caspary 1987; Kishi 1993; Mihashi 1996; Zhang 2009). In addition to cell and tissue studies, a correlation between fluoride exposure and chromosome damage in humans has also been reported (Sheth 1994; Wu 1995; Meng 1997; Joseph 2000).

Some individuals are highly sensitive to low levels of fluoride as shown by case studies and double blind studies (Shea 1967; Waldbott 1978; Moolenburgh 1987). In one study, which lasted 13 years, Feltman and Kosel (1961) showed that about 1% of patients given 1 mg of fluoride each day developed negative reactions. Many individuals have reported suffering from symptoms such as fatigue, headaches, rashes and stomach and gastro intestinal tract problems, which disappear when they avoid fluoride in their water and diet. Frequently the symptoms reappear when they are unwittingly exposed to fluoride again (Spittle, 2008). No fluoridating government has conducted scientific studies to take this issue beyond these anecdotal reports. Without the willingness of governments to investigate these reports scientifically, should we as a society be forcing these people to ingest fluoride?

Other subsets of population are more vulnerable to fluoride's toxicity. In addition to people suffering from impaired kidney function discussed in reason #30 other subsets of the population are more vulnerable to fluoride's toxic effects. According to the Agency for Toxic Substances and Disease Registry (ATSDR 1993) these include: infants, the elderly and diabetics. Also vulnerable are those who suffer from malnutrition (e.g., calcium, magnesium, vitamin C, vitamin D and iodine deficiencies and protein-poor diets. See: Massler & Schour 1952; Marier & Rose 1977; Lin Fa-Fu 1991; Chen 1997; Teotia 1998).

There is no margin of safety for several health effects. No one can deny that high natural levels of fluoride damage health. Millions of people in India and China have had their health compromised by fluoride. The real argument is about whether there is an adequate margin of safety between the doses that have been shown to cause harm in published studies and the total dose people receive consuming uncontrolled amounts of fluoridated water and non-water sources of fluoride. This margin of safety has to take into account the wide range of individual sensitivity expected in a large population (a safety factor of 10 is usually applied to the lowest level causing harm). Another safety factor is also needed to take into account the wide range of doses to which people are exposed. There is clearly no margin of safety for dental fluorosis (CDC, 2010) and based on the following studies nowhere near an adequate margin of safety for lowered IQ (Xiang 2003a,b; Ding 2011); lowered thyroid function (Galletti & Joyet 1958; Bachinskii 1985; Lin 1991); bone fractures in children (Alarcon-Herrera 2001) or hip fractures in the elderly (Kurttio 1999; Li 2001). All these harmful effects are discussed in the NRC (2006) review.

Low-income families penalized by fluoridation. Those most likely to suffer from poor nutrition, and thus more likely to be more vulnerable to fluoride's toxic effects, are the poor, who unfortunately, are the very people being targeted by new fluoridation programs. While at heightened risk, poor families are least able to afford avoiding fluoride once it is added to the water supply. No financial support is being offered to these families to help them get alternative water supplies or to help pay the costs of treating unsightly cases of dental fluorosis.

Black and Hispanic children are more vulnerable to fluoride's toxicity. According to the CDC's national survey of dental fluorosis, black and Mexican-American children have significantly higher rates of dental fluorosis than white children (Beltran-Aguilar 2005, Table 23). The recognition that minority children appear to be more vulnerable to toxic effects of fluoride, combined with the fact that low-income families are less able to avoid drinking fluoridated water, has prompted prominent leaders in the environmental-justice movement to oppose mandatory fluoridation in Georgia. In a statement issued in May 2011, the Rev. Andrew Young, a colleague of Martin Luther King, Jr., and former Mayor of Atlanta and former US Ambassador to the United Nations, stated:

"I am most deeply concerned for poor families who have babies: if they cannot afford unfluoridated water for their babies' milk formula, do their babies not count? Of course they do. This is an issue of fairness, civil rights, and compassion. We must find better ways to prevent cavities, such as helping those most at risk for cavities obtain access to the services of a dentist... My father was a dentist. I formerly was a strong believer in the benefits of water fluoridation for preventing cavities. But many things that we began to do 50 or more years ago we now no longer do, because we have learned further information that changes our practices and policies. So it is with fluoridation."

Tooth decay reflects low-income not low-fluoride intake. Since dental decay is most concentrated in poor communities, we should be spending our efforts trying to increase the access to dental care for low-income families. The highest rates of tooth decay today can be found in low-income areas that have been fluoridated for many years. The real "Oral Health Crisis" that exists today in the United States, is not a lack of fluoride but poverty and lack of dental insurance. The Surgeon General has estimated that 80% of dentists in the US do not treat children on Medicaid.

The silicon fluorides may increase lead uptake into children's blood. Studies by Masters and Coplan 1999,

2000, 2007 show an association between the use of fluorosilicic acid (and its sodium salt) to fluoridate water and an increased uptake of lead into children's blood. Because of lead's acknowledged ability to damage the developing brain, this is a very serious finding. Nevertheless, it is being largely ignored by fluoridating countries. This association received some strong biochemical support from an animal study by Sawan et al. (2010) who found that exposure of rats to a combination of fluorosilicic acid and lead in their drinking water increased the uptake of lead into blood some threefold over exposure to lead alone.

Fluoride may leach lead from pipes, brass fittings and soldered joints. Maas et al (2007) have shown that fluoridating agents in combination with chlorinating agents such as chloroamine increase the leaching of lead from brass fittings used in plumbing. While proponents may argue about the neurotoxic effects of low levels of fluoride there is no argument that lead at very low levels lowers IQ in children.

Key health studies have not been done. In the January 2008 issue of Scientific American, Professor John Doull, the chairman of the important 2006 National Research Council review, Fluoride in Drinking Water: A Review of EPA's Standards, is quoted as saying: What the committee found is that we've gone with the status quo regarding fluoride for many years—for too long really—and now we need to take a fresh look . . . In the scientific community people tend to think this is settled. I mean, when the U.S. surgeon general comes out and says this is one of the top 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 absence of studies is being used by promoters as meaning the absence of harm. This is an irresponsible position.

Endorsements do not represent scientific evidence. Many of those promoting fluoridation rely heavily on a list of endorsements. However, the U.S. PHS first endorsed fluoridation in 1950, before one single trial had been completed and before any significant health studies had been published (see chapters 9 and 10 in *The Case Against Fluoride* for the significance of this PHS endorsement for the future promotion of fluoridation). Many other endorsements swiftly followed with little evidence of any scientific rationale for doing so. The continued use of these endorsements has more to do with political science than medical science.

****All references available upon request: stuart@fluoridealert.org**

For these reasons we urge you to use this opportunity to end fluoridation in Connecticut, or at the very least amend the bill to create a fluoridation study committee and add infant fluoride notices on to annual water quality reports, as has been done recently via legislation in New Hampshire.

Sincerely,

Stuart Cooper
National Campaign Manager
Fluoride Action Network