INFANT MORTALITY AND EXPOSURE

Effective interventional approach to control anaemia in pregnant women

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Anaemia in pregnancy and low birth weight babies, a serious public health problem, troubles India and several other nations. This article reports the results of a approach to address the issue. Women up to 20 week pregnancy with haemoglobin (Hb) 9.0 g/dl or less, those with urinary fluoride beyond 1.0 mg/l and not suffering from any other ailments, were selected. Out of the 205 pregnant women attending antenatal clinics (ANCs) during 1st and 2nd trimesters, the sample and control groups were selected through computerized random sampling procedure. Ninety pregnant women formed the sample group and 115 formed the control group. The sample group was introduced to two interventions, viz.: (1) removal of fluoride from ingestion through drinking water, food and other sources, (2) counselling based intake of essential nutrients, viz. calcium, iron, folic acid, vitamins C, E and other antioxidants through dairy products, vegetables and fruits. No intervention was introduced for the control group. Sample and control groups were monitored for urinary fluoride and Hb until delivery during their visits to ANC. Birth weight of the babies were recorded from the labour room register. Results reveal that (1) the urine fluoride levels decreased in 67% and 53% of the pregnant women respectively, who attended ANCs during 1st and 2nd trimester of pregnancy. (2) An increase in Hb upon withdrawal of fluoride followed by nutritional intervention in 73% and 83% respectively has also been recorded. (3) Body mass index (BMI) also enhanced. (4) The percentage of pre-term deliveries was decreased in sample group compared to control. (5) Birth weight of babies enhanced in 80% and 77% in sample group women who attended ANC in 1st and 2nd trimester respectively as opposed to 49% and 47% respectively in the control group. (6) The number of low birth weight babies was reduced to 20% and 23% respectively in sample as opposed to 51% and 53% in control groups.

Keywords: Anaemia, haemoglobin, low birth weight, pregnancy, urine fluoride.

INDIA and many other nations face a serious problem of anaemia in pregnancy, resulting in low birth weight babies. The Government took cognizance of the issue in 1970 (ref. 1). Considering that the diet is deficient in iron requirement for haemoglobin (Hb) biosynthesis, the decision to supplement iron along with folic acid to pregnant women visiting antenatal clinics (ANCs) was implemented throughout the country. Iron (60 mg) and folic acid (500 µg) was administered orally as a tablet for 90 days during the 1st and 2nd trimesters. Based on a review conducted during 1985–86 in 11 states in India, by the Indian Council of Medical Research (ICMR), it was observed that the intervention had not made any difference in the haemoglobin level/anaemia in pregnant women of more than 37 weeks of gestation[2]. This led to changing the strength of the tablet to 100 mg iron and 500 µg folic acid and this has been in vogue since 1992 (ref. 3).

The problem continues to plague the country even as late as 2009. According to UNICEF 2008 Report, the highest percentage of low birth weight babies below 5 years of age, namely 43%, is in India. The prevalence in South Asia is 42%; it is 35% in the least developed countries; 26% in developing countries and 25% in the world[4]. The situation is alarming and requires to be addressed with a relook at the risk factors, other than dietary deficiencies, parasitic infestation, urinary tract infection and malaria. The literature is voluminous. Consequences of iron deficiency anaemia in pregnant women could result in (i) increased maternal mortality and morbidity, (ii) increased foetal morbidity and mortality, (iii) increased risk factor of low birth weight babies resulting in brain and thyroid gland damage which may be irreparable[5–8].

While dealing with iron deficiency anaemia, if rectification is approached through iron and folic acid supplementation besides diet counselling, it is important to address factors enhancing non-haeme iron absorption, viz. vitamin C and low pH achieved through lactic acid production. The inhibitors of non-haeme absorption such as phytates, polyphenols, tannins besides soya protein are to be avoided[9]. While counselling, if the women are expected to practise the interventions, the information should be packaged in a manner that can be put into practice with ease. It has been our observation that any number of IEC (information, education and communication) materials printed and distributed is unlikely to achieve the same results as those that can be achieved by discuss-

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ing and explaining the requirements of dietary changes to the pregnant women with concern and compassion.

Iron cum folic acid supplementation and diet counselling offered by ANCs ought to have corrected iron deficiency anaemia in India; but it has not happened as desired in spite of massive efforts and investments. Breymann[10] is of the view that haemoglobin alone is insufficient to guide management of pregnant women with iron deficiency and anaemia. In Nepal, iron and folic acid supplementation reduced the incidence of low birth weight by 16%. Supplementation of 14 micronutrients including iron, folic acid and zinc reduced low birth weight by 14%, thus confirming no added advantage of multiple micronutrients over iron and folic acid[11]. Other factors need to be investigated, and one such factor is fluoride intake. Fluoride causes serious damage to the gastrointestinal (GI) mucosa by destroying microvilli resulting in non-absorption of nutrients from the diet[12–15]. Fluoride is also known to destroy erythrocytes, thereby contributing to loss of haemoglobin which results in anaemia[16,17].

Fluoride is a toxic chemical and it is a risk factor for thyroid hormone production in children when the exposure to fluoride occurs during intrauterine growth period[18]. Pagin's report in *Scientific American* 'on second thoughts about fluoride' during 2008 is a warning to all concerned as he has revealed the risk of fluoride causing disorders affecting teeth, bone, brain and thyroid gland[19]. As early as 1979, US dairy scientists have reported that thyroxine and triiodothyronine in serum decreased with increasing urinary fluoride in cattle. Cattle affected with fluorosis developed hypothyroidism and anaemia[17]. Thyroid hormone status in married women prior to conception may therefore be required to be assessed.

Keeping in view the information available on fluoride and fluoride toxicity, a protocol was designed with prime objective of controlling anaemia in pregnant women with high fluoride intake who are on routine iron and folic acid supplementation. ANC approach was preferred, as the study could be executed and monitored until delivery.

Material and methods

A general hospital located in the National Capital Territory of Delhi (NCTD), India, where women from the lower strata of society attend ANCs, was identified and necessary clearance to work in the hospital was obtained from the administration and the head of the obstetrics and gynaecology (OBGY) department. The project was launched in 2005. A total of 2055 pregnant women were screened over a period of 2 years and 6 months. Pregnant women who were more than 20 weeks into gestation and those suffering from diabetes, tuberculosis, bleeding during pregnancy, high blood pressure, HIV AIDS, malaria and other medical problems were excluded. Only those women who were anaemic (Hb ≤ 9.0 g/dl) were considered for investigations. These exclusion criteria reduced the target population size to 249.

Computerized random sampling procedure

The study population was grouped into sample and control using computerized random sampling procedure. The sample and control groups were subjected to the following three laboratory tests: (i) Hb test, (ii) Fluoride content in drinking water, and (iii) Fluoride content in urine sample.

Hb content was measured using HemoCue 201+, a digital, portable unit, so that the women can see the results instantaneously. HemoCue is used extensively for field-based studies[20,21].

The fluoride test was conducted in both drinking water and urine samples based on the method of Hall *et al.*[22]. The equipment used is Ion meter model, ION 85 Ion Analyser, Radiometer, Copenhagen.

Information on the following confounding factors was gathered using a specially designed proforma for the dietary regime, economic status, literacy status of the women, employment status, first pregnancy or the women had earlier issues, any miscarriage/intra-uterine death, history of previous or present ailment; and consumption of iron and folic acid tablets provided by the hospital.

Height and weight measurements were made. Blood pressure measurements from hospital records were transferred to the study proforma. Wherever any of these were missing, measurements were done by the investigating team. The information thus collected was used for analysis.

Sample population: All pregnant women in the sample population were anaemic (Hb ≤ 9.0 g/dl, though anaemia is denoted when Hb is <11.0 g/dl, anaemic women with Hb from 9.0–5.0 g/dl were chosen for the study), with urinary fluoride more than 1.0 mg/l during the first visit to the ANC. Only those with Hb level up to 5.0 g/dl were selected. The sample population was subjected to two intervention procedures.

(i) *Intervention procedure 1: to avoid consumption of fluoride containing water and food items.* Counselling was provided to avoid consumption of fluoride containing food, water and other substances for arrest of injury to cells/tissues and for enabling regeneration of the damaged GI mucosa.

Upon reviewing the data on fluoride content in drinking water and if fluoride was beyond normal limits (more than 1.1 mg/l, the national guideline for fluoride in drinking water is 1.0 mg/l, as the upper limit, less the better), the subjects were shifted to an existing safe source of water in their neighbourhood for collecting water for drinking and cooking purposes. In the event that drinking water fluoride was below 1.0 mg/l and therefore safe but urinary fluoride was high (reference range 0.1–1.0 mg/l), the source(s) of fluoride was traced through retrieving

information on diet and dietary habits to find the food items consumed and the sources known to contain high fluoride.

Consumption of all items including food enriched with fluoride was withdrawn. Items leading to high fluoride intake are (i) use of black rock salt (CaF_2) with 157 ppm fluoride (analytical data 2007 – unpublished) in cooking – black rock salt is toxic and harmful to health; (ii) all items including Indian street food (junk food) enriched with black rock salt to enhance the aroma and tangy taste; (iii) black tea without milk, *churans*, and toothpaste with high fluoride and (4) salted snacks and spices smeared with rock salt.

Counselling to avoid drinking water and food containing fluoride is an intervention that the pregnant women in sample group were introduced to for rectifying the damage caused to the GI mucosa[23]. The mucosa is known to regenerate within a short interval of 10–15 days upon withdrawal of fluoride and absorption of nutrients including orally administered iron and folic acid tablets would commence thereafter.

(ii) *Intervention procedure 2: promotion of intake of essential nutrients through diet.* Diet counselling was given for promoting adequate intake of essential nutrients, viz. calcium, iron, folic acid, vitamins C, E and other antioxidants for repair and maintenance of the damaged cells and tissues as well as for enhancing rise in Hb.

The focus of counselling was on the importance of consuming a nutritive diet and the need to acquire essential nutrients through dairy products, vegetables and fruits. Antioxidant intake is essential since fluorine, being a powerful oxidizing agent, produces oxygen free radicals and these need to be eliminated from the system. Vegetables and fruits rich in antioxidants act as scavengers for eliminating free radicals and restoring the system to normalcy. In addition to counselling, a little pictorial booklet in local language on dietary details was also given to pregnant women.

The pregnant women followed the advice as it involved simple recipes, affordable by the poor, rural and urban population. Besides, they found the information easy to practice. It was also indicated that the information imparted was not only for the benefit of one member, and that other members of the family, could consume the same food. The counselling was for improving the health of all members of the household and not 'pregnancy specific'. Such advice is found more acceptable to the women as food is cooked for the entire family and not particularly for one individual.

Distribution of IEC materials followed by discussion with concern and compassion had an impact on the sample group.

Control population

The control population is the same in all respects as the sample population with Hb ≤ 9.0 g/dl and urinary fluoride > 1.0 mg/l. The only difference is that they were not counselled for intervention procedures 1 and 2.

Monitoring the subjects: The sample and control population were monitored until delivery by testing for urinary fluoride and haemoglobin during every visit to the ANC. The pregnant women were informed about their Hb levels. A target number of Hb to be attained, prior to the next visit to the ANC was also indicated. It turned out that a few women came only once or twice due to personal reasons while the majority visited the ANC 3–7 times prior to delivery. Those who came only once or twice, were not included for reporting the data.

Some women did not come to the same hospital for delivery; but went to different hospitals closer to their homes. The investigating team was alert to this fact, since every woman was followed up through telephone calls and information about the mother and baby was being monitored. The information collected and recorded in the labour room register was checked and all relevant information transferred to the project proforma.

Results and discussion

Various sources of fluoride starting from drinking water (naturally contaminated with fluoride), food, food products and beverages like black tea (without milk) were identified and withdrawn. The impact of such an approach along with promotion of nutritive diet, and the outcome in 90 sample group women who attended ANC during 1st and 2nd trimester of pregnancy are reported in Tables 1 and 2. As there are reports to suggest that iron deficiency during 1st trimester results in significant reduction in foetal growth[24,25] and not beyond, the focus was to evaluate the results trimester-wise.

Withdrawal of fluoride source(s) possibly resulted in the expected regeneration of GI mucosa and microrvilli, and this in turn enhanced the absorption of nutrients as evidenced by the reduction in urinary fluoride followed by rise in Hb levels.

Those women who either withdrew or reduced fluoride intake irrespective of whether they attended the ANC during the 1st or 2nd trimester of pregnancy not only showed reduced levels of urinary fluoride but also benefitted in terms of raising their Hb levels. This is amply evident from the data reported in Tables 1 and 2. In sample group, the urinary fluoride was reduced from 2.082 ± 1.058 to 1.628 ± 1.631 in women who attended ANC during 1st trimester of pregnancy, showing a concomitant rise in Hb from 8.2 ± 0.9 to 10.8 ± 2.0. In a similar manner, when urinary fluoride is reduced from 1.939 ± 1.122 to 1.441 ± 0.894, the Hb enhanced from 8.4 ± 0.8 to 10.1 ± 1.8 in the women who attended ANC first time during 2nd trimester. Reduction in urinary fluoride is recorded in 20 out of the 30 women of the sample

Table 1. Urine fluoride, haemoglobin of pregnant women of sample and control groups during the initial and prior to delivery in those who first attended ANC during the 1st trimester of pregnancy (10–15 week) and birth weight of babies

	Urinary fluoride level (UFL) (mg/l)			Haemoglobin (Hb) (g/dl)			Birth weight of babies (kg)		
		UFL initial	UFL prior to delivery		Hb initial	Hb prior to delivery		Low birth wt (< 2.5 kg)	Normal birth wt (≥ 2.5 kg)
Sample $n = 30$	Mean ± SD	2.082 ± 1.058	*1.628 ± 1.631	Mean ± SD	8.2 ± 0.9	**10.8 ± 2.0	Mean ± SD	2.21 ± 0.17	***2.94 ± 0.27
	Range	1.082–6.256	0.254–7.749	Range	5.7–9.0	5.4–13.3	Range	1.95–2.45	2.5–3.5
	Reduction in UFL in 20/30 = 67%			Rise in Hb in 22/30 = 73%			Normal birth weight born in 24/30 = 80%		
							Low birth weight born in 6/30 = 20%		
Control $n = 37$	Mean ± SD	1.617 ± 1.158	*1.702 ± 1.709	Mean ± SD	8.3 ± 0.9	**9.3 ± 1.5	Mean ± SD	2.00 ± 0.58	***2.76 ± 0.27
	Range	0.403–4.094	0.263–8.768	Range	5.6–9.0	6.3–12.0	Range	1.3–2.43	2.5–3.3
	Reduction in UFL in 18/37 = 49%			Rise in Hb in 22/37 = 59%			Normal baby weight 18/37 = 49%		
							Low birth weight 19/37 = 51%		

*$P > 0.01$ (nonsignificant); **$P < 0.001$; ***$P < 0.1$; SD, Standard deviation.

Table 2. Urine fluoride, haemoglobin of pregnant women of sample and control groups during the initial and prior to delivery in those who first attended ANC during the 2nd trimester (16–20 week) and birth weight of babies

	Urinary fluoride level (UFL) (mg/l)			Haemoglobin (Hb) (g/dl)			Birth weight of babies (kg)		
		UFL initial	UFL prior to delivery		Hb initial	Hb prior to delivery		Low birth wt (< 2.5 kg)	Normal birth wt (≥ 2.5 kg)
Sample $n = 60$	Mean ± SD	1.939 ± 1.122	*1.441 ± 0.894	Mean ± SD	8.4 ± 0.8	**10.1 ± 1.8	Mean ± SD	2.24 ± 0.19	***2.94 ± 0.32
	Range	0.130–5.464	0.549–5.446	Range	6.3–9.0	5.6–13.2	Range	1.87–2.48	2.5–3.89
	Reduction in UFL in 32/60 = 53%			Rise in Hb in 50/60 = 83%			Normal birth weight 46/60 = 77%		
							Low birth weight 14/60 = 23%		
Control $n = 78$	Mean ± SD	1.364 ± 1.038	*1.723 ± 0.986	Mean ± SD	8.0 ± 1.2	**9.1 ± 1.6	Mean ± SD	2.01 ± 0.64	***2.72 ± 0.21
	Range	0.231–6.134	0.387–4.778	Range	5.1–9.0	5.1–12.2	Range	1.25–2.48	2.5–3.3
	Reduction in UFL in 29/78 = 37%			Rise in Hb in 42/78 = 54%			Normal birth weight in 37/78 = 47%		
							Low birth weight in 41/78 = 53%		

*$P > 0.01$; **$P < 0.001$; ***$P < 0.0001$; SD, Standard deviation.

group of trimester 1, and 32 out of 60 women of trimester 2, which is about 67% and 53% respectively. The rise in Hb is recorded in 22 out of the 30 women which is about 73% and 50 out of the 60 women which is about 83%. This is a significant change arising as a result of withdrawal or reduction in fluoride ingestion followed by a dietary improvement by the pregnant women.

The women in the control group (1st trimester of pregnancy) on the contrary reveal a rise in urinary fluoride instead of reduction from 1.617 ± 1.158 to 1.702 ± 1.709. The Hb has been minimally increased, i.e. 8.3 ± 0.9 to 9.3 ± 1.5. In a similar manner, for women in 2nd trimester of pregnancy, the urinary fluoride was enhanced from 1.364 ± 1.038 to 1.723 ± 0.986; the Hb level had also minimally increased from 8.0 ± 1.2 to 9.1 ± 1.6.

In the control, urinary fluoride reduction is recorded in 49%, i.e. 18 out of the 37 women of 1st trimester. This shows 51% women showed rise or no change in urinary fluoride. Similarly in women of 2nd trimester, 37% showed reduction in urinary fluoride level (UFL), i.e. reduction is recorded in 29 out of the 78 women investigated during 2nd trimester. This again showed 63% women revealed rise/no change in urinary fluoride.

In the control group, rise in Hb is observed in 22 out of the 37 women of the 1st trimester, i.e. 59%; and Hb rise is in 42 out of the 78 women of 2nd trimester which is only 54% of women who participated in the study.

The next obvious issue probed into is whether the rise in Hb in pregnant women has in any manner affected the birth weight of the babies. In the 30 pregnant women of trimester 1, the initial Hb range being 5.7–9.0 g/dl, the practice of interventions led to rise in Hb in the range 5.4–13.3 g/dl prior to delivery. The rise in Hb is recorded in 22 out of the 30 women investigated, which works out to about 73% of the study group. How many among the 30, gave birth to normal birth weight babies and how many delivered low birth weight babies?

Table 1 shows that 24 out of the 30 women delivered normal birth weight babies (i.e. 80%), whose birth weight ranged from 2.5 to 3.5 kg (mean 2.94 ± 0.27). Among the sample group, 6 women out of the 30 (i.e. 20%) delivered low birth weight babies; birth weight range was from 1.95 to 2.45 kg (mean 2.21 ± 0.17).

Reviewing the outcome of the interventions in sample group ($n = 60$) who attended ANC during 2nd trimester, the Hb range was initially 6.3–9.0 g/dl (mean 8.4 ± 0.8);

after practice of interventions, it was in the range of 5.6–13.2 g/dl (mean 10.1 ± 1.8). The rise in Hb is recorded in 50 out of the 60 women investigated which is to the tune of 83%. The rise in Hb in 83% pregnant women and its impact on the birth weight of the babies is reported in Table 2. It is evident that 46 out of the 60 women delivered normal birth weight babies, i.e. 77%. The normal birth weight of babies ranged from 2.5 to 3.89 kg (mean 2.94 ± 0.32). Among the 60 women, 14 delivered low birth weight babies (i.e. 23%). The weight of the babies ranged from 1.87 to 2.48 kg (mean 2.24 ± 0.19).

The impact of interventions among the pregnant women who attended the ANC first either during 1st or 2nd trimester has been manifested in terms of rise in Hb, resulting in birth of normal birth weight babies to the extent of 80% and 77% respectively. The number of low birth weight babies (< 2.5 kg) has been reduced to 20% and 23% respectively. This is considered highly significant (P value < 0.01 in 1st trimester; P value < 0.0001 in 2nd trimester, Tables 1 and 2).

In the women of the control group of 1st trimester, the initial Hb range recorded is 5.6–9.0 g/dl (mean 8.3 ± 0.9) and prior to delivery the changes recorded in Hb is 6.3–12.0 g/dl (mean 9.3 ± 1.5). The rise in Hb was observed in 22 out of the 37 which is about 59%. Similarly, among the control group women who attended the ANC during the 2nd trimester, the Hb range during the initial phase was 5.1–9.0 g/dl (mean 8.0 ± 1.2) and prior to delivery, the range was 5.1–12.2 (mean 9.1 ± 1.6). Among the 37 women of the 1st trimester, 18 delivered normal birth weight babies (i.e. 49%), whereas among the 78 control group women of 2nd trimester, 37 delivered normal birth weight babies (i.e. 47%). In the control group of trimesters 1 and 2, 51% and 53% babies born respectively are of low birth weight; birth weights ranging from 1.3 to 2.43 kg (mean 2.00 ± 0.58) and 1.25 to 2.48 (mean 2.01 ± 0.64) (Tables 1 and 2).

Tables 1 and 2 provide evidence that fluoride ingestion arrests the absorption of nutrients including orally administered iron and folic acid. Therefore, withdrawal of fluoride from ingestion does provide beneficial results in controlling anaemia and improving the birth weight of babies.

The interventions have also been of advantage to the women in terms of increasing body mass index (BMI)[26] and reducing pre-term deliveries[25]. These results are reported in Tables 3 and 4.

The data reveals that among the 90 women in the sample group, 22 had BMI at the initial stages < 18.5 (range 14.4–18.4), suggesting prevalence of underweight/undernutrition. However, prior to delivery the number in this category was reduced to 2. This is an impact of interventions. Initially there were 63 women, with BMI 18.5–24.9 (i.e. normal range) but prior to delivery improvement was observed in 67 women, yet again showing impact of interventions. In the BMI category, 25.0–29.9 is normally considered overweight but in pregnancy the rise in weight is desirable. Initially there were 5 women in the category; this number was increased to 21 prior to delivery. In the category of BMI ≥ 30.0 which is obese, there were none, which is also a healthy sign.

The impact of interventions on gestation period at delivery is an added advantage to the sample group women. Table 4 shows that pre-term delivery, i.e. < 34 weeks of gestation, was recorded in 2 out of 90 (i.e. 2%); whereas it is 9 out of 115 in the control (i.e. 8%); four times more in the control group who were not introduced to interventions. Delivery between 34 and 37 weeks of gestation was 30% and 42% respectively, in sample and control groups. Delivery at gestation period > 37 weeks was 68% in sample and 50% in control groups. There were two stillbirths in control and none in sample group. The overall benefits accrued through the intervention procedures have undoubtedly been extraordinary.

Statistical analysis

The overall interventional impact was assessed through different statistical parameters. Very significant reduction in urinary fluoride level (UFL) along with substantial gains in the Hb level and BMI are observed in the sample group subjected to interventions. The quantified gains are

Table 3. Impact of intervention(s) on body mass index (BMI)

	Body mass index							
	Initial				Prior to delivery			
BMI categories	< 18.5	18.5–24.9	25.0–29.9	≥ 30.0	<18.5	18.5–24.9	25.0–29.9	≥ 30.0
Sample group n = 90	n = 22	n = 63	n = 5	n = nil	n = 2	n = 67	n = 21	n = nil
BMI range	14.4–18.4	18.5–24.7	25.2–26.0	–	18.2–18.4	18.8–24.8	25.3–28.9	–
Mean ± SD	17.2 ± 1.3	20.8 ± 1.8	25.7 ± 0.4	–	18.3 ± 0.1	22.3 ± 1.6	27.1 ± 1.2	–
Control group n = 115	n = 36	n = 73	n = 6	n = nil	n = 4	n = 88	n = 20	n = 3
BMI range	15.6–18.3	18.5–24.5	25.2–29.0	–	17.3–18.2	18.5–24.9	25.0–28.2	30.1
Mean ± SD	17.2 ± 0.9	20.9 ± 1.6	27.3 ± 1.7	–	17.8 ± 0.4	22.1 ± 1.7	26.2 ± 0.9	30.1 ± 0.0

SD = Standard deviation.

Table 4. Gestation period at delivery

	Gestation period					
	< 34 Weeks (pre-term delivery)		34–37 Weeks (term delivery)		> 37 Weeks (full-term delivery)	
Sample $n = 90$		$n = 2$		$n = 27$		$n = 61$
	Mean ± SD	33.0 ± 0.0	Mean ± SD	36 ± 1.1	Mean ± SD	39.3 ± 1.1
	Range (weeks-days)	33.0–33.0	Range (weeks-days)	34.0–37.0	Range (weeks-days)	38.0–42.0
	< 34 weeks (pre-term delivery) in 2/90 = 2%		34–37 weeks (term delivery) in 27/90 = 30%		> 37 weeks (full-term delivery) in 61/90 = 68%	
Control $n = 115$		$n = 9$*		$n = 48$**		$n = 58$***
	Mean ± SD	31.2 ± 4.6	Mean ± SD	36 ± 1.1	Mean ± SD	39.2 ± 1.0
	Range (weeks-days)	31.0–33.0	Range (weeks-days)	34.0–37.0	Range (weeks-days)	38.0–41.0
	< 34 weeks (pre-term delivery) in 9/115 = 8%		34–37 weeks (term delivery) in 48/115 = 42%		> 37 weeks (full-term delivery) in 58/115 = 50%	

*One spontaneous abortion at 19 weeks. ***Two pre-term stillbirth at 30th and 31st weeks. SD, Standard deviation.

far greater in this group as compared to the control group that was not subjected to interventions. Additionally, the sample groups had higher average baby weight as compared to the control group. The proportion of babies born with normal weight was also higher in the sample group.

Quantifications of all these parameters suggest that interventions for control of anaemia in pregnant women have been highly impactful. The benefit accrued to the families is highly significant and this was possible due to elimination of fluoride and promotion of a nutritive diet rich in essential nutrients.

The results have been as critically evaluated as possible, with a view to identify the major detrimental and confounding factors statistically. The goal is to understand the merits of the results better so that such a process can be replicated/scaled-up within the country and elsewhere in the world.

We conjectured the following two hypotheses and validated them statistically: (1) Pregnant women with high urinary fluoride have low Hb levels. (2) Reduction in urinary fluoride of pregnant women results in increase in Hb.

The analysis indicated a positive impact of the withdrawal of urinary fluoride on Hb levels in pregnant women. The analysis also reveals that our hypothesis (2) is statistically valid. It signifies that interventions have played a key role in increasing Hb levels with lowering of urinary fluoride in the pregnant women, an approach hitherto unknown.

Evaluation of data based on hypotheses 1 and 2

At the overall level, it is observed that urinary fluorides were reduced to normal levels in 35% sample group cases as against 26% in the control group (Table 5). It should be pointed out that in statistical evaluation, the data analysis is based on the total number in sample and control groups; there is no bifurcation into trimesters 1 and 2.

This observation alone is misleading if conclusions are made regarding an impact of the intervention programme on account of the following facts.

- UFLs were observed to have fluctuated drastically in the intervening periods due to non-adherence to dietary guidelines.
- In table, we observe only the difference between UFLs during the first and the last patient visits.
- Changes in Hb and BMI levels are equally critical for any conclusions to be made about the interventions.
- It will also be important to find the factors detrimental to the reduction of UFL and Hb through interventions.

It is, therefore, important to assess the impact of changes in UFLs in conjunction with changes in Hb and BMI levels. We have made an attempt to set up a few relevant hypotheses and justify them using the observed data.

Hypothesis 1

Pregnant women with high urinary fluoride have low Hb levels. It is observed (Table 6) that Hb levels improved to normalcy in 71% of the sample cases as against 37% in the control group. Clearly some strong impact of interventions to control urinary fluoride and thereby Hb levels is visible. Further, studying UFLs in those cases where Hb levels were low would provide a better understanding of the impact of interventions.

Percentage of pregnant women with high urinary fluoride and low Hb levels has decreased from 99% at their first visit to 85% prior to delivery in the sample group (Table 7). It means a substantial 14% of these women have improved their Hb levels. On the other hand, comparable women in the control group indicated an equivalent rise in their percentage (15%; from 54% at first visit to 69% prior to delivery). This clearly indicates a very

Table 5. Percentage distribution of pregnant women by urinary fluoride levels (UFLs)*

	Sample group (90)			Control group (115)		
	High UFL (%)	Normal UFL (%)	Total (%)	High UFL (%)	Normal UFL (%)	Total (%)
On first visit	99	1	100	54	46	100
Prior to delivery	64	36	100	28	72	100
Percentage change	–35	+35		–26	+26	

UFL (normal) means urinary fluoride less than 1.0 mg/l on the 1st visit. In Materials and methods, all pregnant women have UFL more than 1.0 mg/l.

Table 6. Pregnant women by Hb levels (% distribution)

	Sample group (90)			Control group (115)		
	Low Hb (%)	Normal Hb (%)	Total (%)	Low Hb (%)	Normal Hb (%)	Total (%)
On first visit	100	0	100	100	0	100
Prior to delivery	29	71	100	63	37	100
Percentage change	–71	+71		–37	+37	

Table 7. Pregnant women by UFLs with low Hb (% distribution)

	Sample group (26/90)			Control group (72/115)		
	High UFL (%)	Normal UFL (%)	Total (%)	High UFL (%)	Normal UFL (%)	Total (%)
On first visit	99	1	100	54	46	100
Prior to delivery	85	15	100	69	31	100
Percentage change	–14	+14		+15	–15	

positive correlation between withdrawal of urinary fluorides and the rise in Hb levels of pregnant women.

Hypothesis 2

Interventions do not result in significant increases in Hb levels with reduction in UFLs of pregnant women. Interventions, either direct (withdrawal of drinking water source and food contaminated with fluorides) or indirect (advice on proper dietary methods) are intended to be preventive in nature. A simple correlation analysis (Table 8) indicates that interventions have acted as huge stimuli for improved Hb levels in sample group of pregnant women as compared to the control group. Correlation between UFLs and Hb levels increases (in absolute terms) from –0.14 to –0.39 for the sample group between first and last visits of the pregnant women. Starting from a negative relationship (corr = –0.14) between the two factors at the first visits, it strengthens by a margin of 25 points in the negative direction. A similar differential for the control group is only 17 points. This differential is highly significant and nullifies the hypothesis of 'no impact of intervention'. It signifies that interventions have played a key role in increasing Hb levels with lowering of UFLs (Table 9; Figures 1 and 2) in the pregnant women.

Confounding factors detrimental to improvement in Hb levels

It is observed that despite subjecting the pregnant women to interventions, in 29% (26 cases) of the sample group, Hb levels remained below normal (Table 6). Therefore, it is pertinent to study the factors that caused this adversity. Amongst the prominent factors that we could consider and for which data was collected were – family income, subject's age, subject's literacy, subject's occupation, husband's occupation, subject's locality type, subject's family size, etc. For our analysis, as required and appropriate, data had to be either regrouped (e.g. create age groups instead of age in years) or transformed (e.g. compute per capita income instead of absolute family income).

Data transformation

Understanding data transformations and any assumptions is equally important to appreciate the analytical results. While the important ones are listed here, others are non-critical.

HB_LowLow: A dummy variable for low Hb level at the first contact remaining low at the last contact. Vari-

Table 8. Correlation analysis

	Sample group	Control group
Correlation between UFL and Hb levels – first visit	–0.14	0.00
Correlation between UFL and Hb levels – prior to delivery	–0.39	–0.17
Average number of visits	4.13	3.55
Number of valid observations	90	115

Table 9. Summary of interventional impact

	With intervention			Without intervention		
	At 1st visit	Prior to delivery	Percentage change (%)	At 1st visit	Prior to delivery	Percentage change (%)
Median* Hb level	8.65	10.60	22.54	8.60	9.40	9.30
Median UFL	1.72	1.13	–34.22	1.14	1.34	17.65
Median BMI level	19.80	23.28	17.58	20.15	22.65	12.41
Average intervention period (days)		120.0			111.0	
Average baby weight at birth (kg)		2.78			2.44	
Percentage babies born with ≥ 2.5 kg		78%			48%	
Percentage patients with decline in UFLs		73%			40%	
Number of valid observations		90			115	

*Median is a point above/below which 50% of the cases lie.

able HB_LowLow is equal to 1 if low Hb remains low; and is equal to 0 otherwise.

Occupation: Subject's occupation is grouped as housewife = 1, unskilled worker = 2, other workers (all cases unclassified as 1 or 2) = 3. This grouping incorporates the level of occupation, 1 being low and 3 being high. Wherever subject's occupation was not mentioned, it was assumed to be the same as that of husband's occupation. It is expected that occupation (thus defined) would have a negative relationship with HB_LowLow.

Age: Subject's age is grouped as 1 if age is less than 20 years, 2 if age ranges between 20 and 24 years, 3 if age ranges between 25 and 29 years and 4 if age is 30 years or more. We expect Hb to remain low in lower age groups of subjects.

Locality: Subject's locality is grouped as 1 = government colony, 2 = village/developing colony and 3 = slum. It would be expected that subjects from slum areas would be more prone to non-improvements in their Hb levels.

Literacy: Subject's and husband's literacy is grouped as illiterate = 1, literate = 2, matric = 3, graduate and above = 4. It is expected that low Hb levels could remain low in literacy groups 1 and 2.

Identifying factors

Data analysis is aimed at finding the major factors that are detrimental to rise in subject's Hb level. We use logistic regression approach for this purpose. It may be noted that at this stage we are not really keen to know the exact magnitudes of impact of various factors. Therefore, any inferences from analytical results need to be made in light of the objective.

Table 10 presents a snapshot of logistic regression analyses carried out to identify such key factors that are detrimental to growth in subject's Hb level. Prominently, per capita income (which is defined as total family income divided by family size – that takes into account both absolute incomes as well as the family size) and number of times the subject visits the ANC in the hospital for medical and interventional advice are the most significant factors that determine the improvements in Hb levels. On the other hand, most of the demographic characteristics – subject's age, education level (either of the subject or that of the husband), their occupations and the type of locality they lived in – are observed to be nonsignificant factors. Income in absolute terms is also a nonsignificant factor towards lower Hb levels. Very interestingly, all the factors show correct direction of impact (signs of coefficients, see Table 10, Logit 1).

It is logical to ask if application of intervention itself is a factor for improvements in Hb levels. This is tested by introduction of a dummy variable for application of intervention (Int_applied = 1 if subject belongs to the sample group, Int_applied = 0 if subject belongs to the control group). It is observed that application of intervention is a critical factor for improvements in Hb levels. This also strongly supports our results in earlier sections.

Evaluating the background information retrieved from the pregnant women belonging to the sample and control groups is informative in the sense that in the sample group, members of a household are from a minimum of 2 to a maximum of 12. In the control group the maximum

Table 10. Summary of logistic regression results – dependent variable Y = HB_LowLow = 1

Factor	Logit 1		Logit 2	
	Direction of impact	Significance level	Direction of impact	Significance level
Per capita income (PCI)	Negative	5%	Negative	7%
Subject's age (age_gr)	Negative	Nonsignificant	Negative	Nonsignificant
Subject's occupation (Occ_gr)	Negative	Nonsignificant	Negative	Nonsignificant
Number of contacts (No_visits)	Negative	1%	Negative	1%
Subject's locality type (loc_type_gr)	Negative	Nonsignificant	Negative	Nonsignificant
Intervention applied or not (Int_applied = 1 if yes, = 0 if no)	–	–	Negative	1%

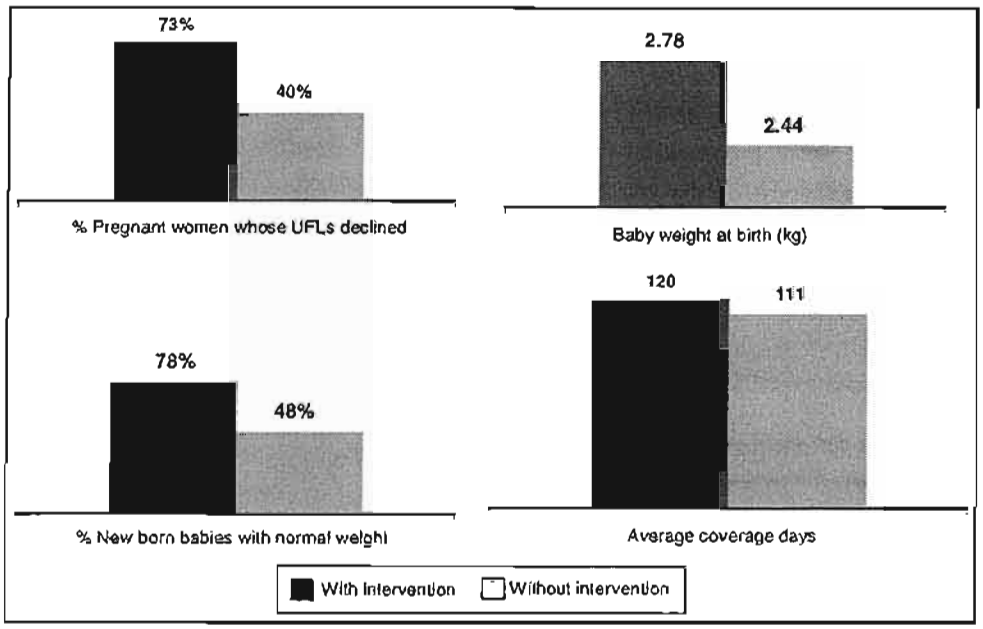

Figure 1. Impact of intervention.

number was 7 and not beyond. The income per day varies from a minimum of Rs 83 (US$ 2.0) to a maximum of Rs 500/day (US$ 12.5) in the sample group. In control group, the income was a minimum of Rs 66 (US$ 11.5) to a maximum of Rs 300/day (US$ 7.5). The per capita income in the sample and control groups is a meagre amount. It ought to be noted that the pregnant women never came alone but were accompanied by family members. To and fro transport charges for two at frequent intervals may be beyond the means of the family. It would appear therefore that the cash availability was a deterrent for frequent hospital visits. This would also suggest that there may be constraints in the purchasing power for food as well and is likely to have an adverse impact.

This analysis also brings out the fact that application of intervention and number of visits by the subject for regular antenatal follow-up are interdependent. This means that, even if a particular subject is put under an intervention programme, the subject may or may not visit for regular antenatal follow-up. However, for success/effectiveness of interventions, subject's number of visits (contacts) for antenatal follow-up should be highly associated with application of intervention. And, we should be expecting this to be so. This clearly indicates that there is a missing link here.

This brings up a question – 'Are there any specific factors that govern how many times the subject is likely to be present for regular antenatal follow-ups?' This is tested through a regression analysis. Table 11 depicts a snapshot of factors influencing number of contacts/visits.

It is observed that there is a significant influence of application of intervention on the subject and the locality type where the subject comes from on the number of subject's visits.

Subject's locality type is observed to be a highly significant factor determining number of contacts by the subject. The negative sign indicates that the number of

Table 11. Summary of regression analysis (dependent variable Y = No_visits)

Factor	Direction of impact	Significance level
Intervention applied or not (Int_applied = 1 if yes, = 0 if no)	Positive	5%
Subject's age (age_gr)	Positive	Nonsignificant
Subject's occupation (Occ_gr)	Positive	Nonsignificant
Per capita income (PCI)	Positive	Nonsignificant
Subject's locality type (loc_type_gr)	Negative	5%

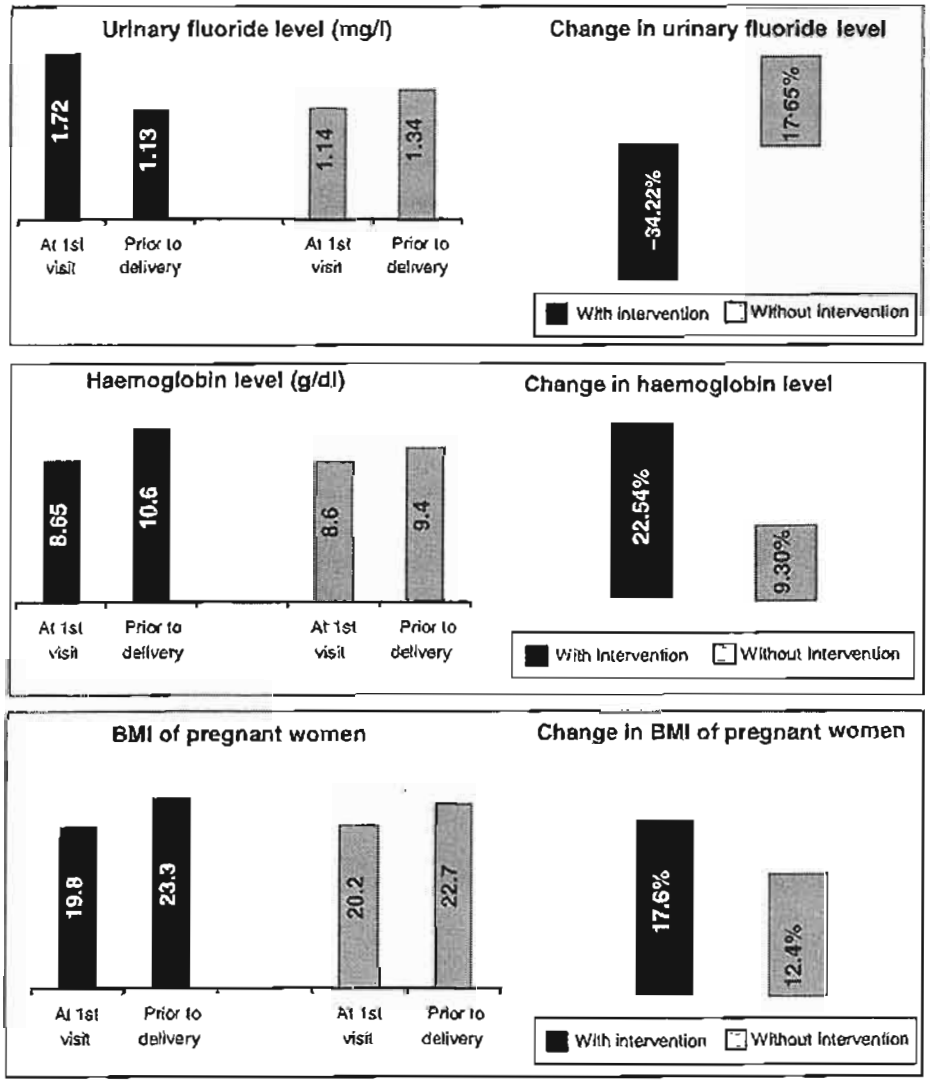

Figure 2. Impact of intervention on UF, Hb and BMI.

contacts declines from government locality to a slum area. We further performed a similar analysis only for subjects from the slum areas and, apparently, none of the factors explains any specific influence on the slum dweller's behaviour. There appears to be more for further investigation.

The first factor (application of intervention) throws up a bit of a confusing result to which we do not have a concrete answer at the moment. We could dig deeper into this relationship in a further analysis of our subsequent intervention programmes.

Though fluoridation of a variety of products is still in vogue in many nations, it is difficult to overlook the high percentage of pregnant women exposed to fluoride ingestion and being anaemic in developing countries[24]. A

simple procedure of assessing fluoride in urine and Hb levels in women is adequate to introduce interventions for controlling anaemia in such high percentage of pregnant women. It is evident from the data reported in this communication that maternal and child under-nutrition and anaemia is not necessarily due to insufficient food intake but because of the derangement of nutrient absorption due to damage caused to GI, mucosa by ingestion of undesirable chemical substance, viz. fluoride through food, water and other sources. These aspects have so far been unexplored, and this is the first time such a possibility is investigated and results reported. The findings of this approach in the context of anaemia in pregnancy provide a new path for reducing the burden of disabled and mentally challenged children[25,27] by reducing percentage of low birth weight babies.

In a small percentage in sample group, though the urine fluoride was reduced, Hb did not rise. Low per capita income and not consuming adequate nutritive diet and possibly other reasons such as low thyroid hormone for non-production of adequate RBCs need to be explored.

In conclusion, a novel and effective intervention approach therefore has scope for reducing anaemia in pregnancy and improve birth weight of babies. Fluoride toxicity, as a risk factor was never considered even in the highly endemic regions for fluoride and fluorosis in India and around the globe. This is the first report dealing with fluoride, pregnancy, anaemia, low birth weight babies and the linkages to act upon for the benefit of maternal and reproductive child health programmes.

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Received 17 March 2009; revised accepted 22 Ma

study linking Fluoride consumption by pregnant mothers to low birth weight babies. See summary to right

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NOVEMBER 20, 2009 11:00AM

Study Links Fluoride to Premature Births

New York -- November 2009 – State University of New York (SUNY) researchers found more premature births in fluoridated than non-fluoridated upstate New York communities, according to a presentation made at the American Public Health Association's annual meeting on November 9, 2009 in Philadelphia. (1)

Fluoridation is the addition of fluoride chemicals into public water supplies ostensibly to prevent tooth decay. Many groups oppose fluoridation because of its scientifically-documented health risks. (2)

Human pregnancy lasts about 40 weeks or just more than 9 months. A baby born before 37 weeks of pregnancy is considered a preterm (or premature) birth. About 12 percent of US pregnancies are preterm and this is one of the top causes of infant death in the US, according to the US National Institutes of Health. (3)

The SUNY researchers used 1993-2002 data from the NY Statewide Planning and Research Cooperative System (SPARCS), which collects patient characteristics, diagnoses, treatments, services and charges for every hospital discharge, ambulatory surgery patient and emergency department admission in New York State. They recorded fluoridation residence status (under or over 1 milligram fluoride per Liter of water) and adjusted for age, race/ethnicity, neighborhood poverty level, hypertension and diabetes.

"Domestic water fluoridation was associated with an increased risk of PTB [preterm birth]. This relationship was most pronounced among women in the lowest SES [socio-economic-status] groups (>10% poverty) and those of non-white racial origin," write Rachel Hart, et al. Department of Epidemiology & Biostatistics, SUNY School of Public Health.

Previous published research by others has shown that fluoride can interfere with the reproductive system. (4)

"It would be wise to follow the lead of the 7,000 Environmental Protection Agency scientists and public health professionals (5) who asked Congress to place a moratorium on fluoridation until definitive studies are conducted to prove fluoridation is safe for every human consuming it," says attorney Paul Beeber, President, New York State Coalition Opposed to Fluoridation, Inc. "Clearly fluoridation is not safe for everyone," says Beeber.

At the request of the US Environmental Protection Agency (EPA), a National Research Council (NRC) panel of experts reviewed current fluoride toxicology. In 2006 they concluded that the maximum amount of fluoride allowed in drinking water is too high to be protective of health. At least three NRC panel members believe water fluoride levels should be as close to zero as possible. The EPA has yet to perform a fluoride risk assessment based on the NRC's findings leaving millions of Americans at risk of fluoride's adverse health effects.

According to Dr. Bill Hirzy, Chair of American University's Chemistry Department and former EPA scientist from 1981 to 2008, the EPA fears "setting a maximum contaminant level goal of zero because that would mean the EPA is going to be responsible for the end of the water fluoridation program. EPA knows that there will be enormous political flak for doing that." (6)

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http://apha.confex.com/apha/137am/webprogram/Paper197468.html

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posted by: Kerry Lauerman


Me on Open Salon
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By 2012, Water Fluoridation Will Be Banned
posted by: uprightnetizen

(2) Fluoride Action Network – Health Effects Database
http://www.fluoridealert.org/health/sitemap.html

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http://www.nichd.nih.gov/health/topics/Preterm_Labor_and_Birth.cfm

(4) Fluoride Action Network - HEALTH EFFECTS: Fluoride & the Reproductive System http://www.fluoridealert.org/health/repro/index.html

(5) Why EPA Headquarters Union of Scientists Opposes Fluoridation
http://nteu280.org/Issues/Fluoride/NTEU280-Fluoride.htm

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http://www.theeagleonline.com/news/story/hirzy-epa-drags-feet-on-flouride

AUTHOR TAGS: tooth decay, teeth, babies, infants, birth, preterm, fluoridation, premature, fluoride

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Study Links Fluoride To Pre-term Birth And Anemia In Pregnancy

03 Sep 2010 Click to Print

Fluoride avoidance reduced anemia in pregnant women, decreased pre-term births and enhanced babies' birth-weight, concludes leading fluoride expert, AK Susheela and colleagues, in a study published in *Current Science* (May 2010).

Susheela's team explains that anemia in pregnancy, which can lead to maternal and infant mortality, continues to plague many countries despite nutritional counseling and maternal iron and folic acid supplementation. This is the first examination of fluoride as an additional risk factor for anemia and low-birth-weight babies.

Anemic pregnant women living in India, whose urine contained 1 mg/L fluoride or more, were separated into two groups. The experimental group avoided fluoride in water, food and other sources and ate a nutritious diet per instruction. The control group received no instructions. Both groups supplemented with iron and folic acid.

Results reveal that anemia was reduced and pre-term and low-birth-weight babies were considerably fewer in the fluoride-avoidance group as compared to the control. Two stillbirths occurred in the control group, none in the experimental group.

Susheela et al. writes, "Maternal and child under-nutrition and anemia is not necessarily due to insufficient food intake but because of the derangement of nutrient absorption due to damage caused to GI (gastrointestinal) mucosa by ingestion of undesired chemical substances, viz. fluoride through food, water and other sources."

Fluoride avoidance regenerated the intestinal lining which enhanced the absorption of nutrients as evidenced by the reduction in urinary fluoride followed by rise in hemoglobin levels, they report.

Could the same thing be happening in the United States? State University of New York researchers found more premature births in fluoridated than non-fluoridated upstate New York communities, according to a presentation made at the 2009 American Public Health Association's annual meeting.

Current Science reports that adverse reactions of fluoride consumption are known to occur including reducing red blood cells, reducing blood folic acid activity, inhibiting vitamin B12 production and the nonabsorption of nutrients for hemoglobin biosynthesis.

"Citizens must demand that water fluoridation be stopped," says attorney Paul Beeber, President, New York State Coalition Opposed to Fluoridation, Inc. "It's disturbing that public-health officials and organized dentistry continue to ignore the overwhelming evidence revealing fluoride to be non-nutritive, unnecessary and unsafe," says Beeber.

Source: NYS Coalition Opposed to Fluoridation, Inc.

Article URL: http://www.medicalnewstoday.com/releases/199829.php

Overview: Infant Formula and Fluorosis

The proper amount of fluoride from infancy through old age helps prevent and control tooth decay. **Community water fluoridation** is a widely accepted practice for preventing and controlling tooth decay by adjusting the concentration of fluoride in the public water supply.

Fluoride intake from water and other fluoride sources, such as toothpaste and mouthrinses, during the ages when teeth are forming (from birth through age 8) also can result in changes in the appearance of the tooth's surface called dental fluorosis. In the United States, the majority of **dental fluorosis** is mild and appears as white spots that are barely noticeable and difficult for anyone except a dental health care professional to see.

Recent evidence suggests that mixing powdered or liquid infant formula concentrate with fluoridated water on a regular basis may increase the chance of a child developing the faint, white markings of very mild or mild enamel fluorosis.

You can use fluoridated water for preparing infant formula. However, if your child is exclusively consuming infant formula reconstituted with fluoridated water, there may be an increased chance for mild dental fluorosis. To lessen this chance, parents can use low-fluoride bottled water some of the time to mix infant formula; these bottled waters are labeled as de-ionized, purified, demineralized, or distilled.

What is the best source of nutrition for infants?

Breastfeeding is ideal for infants. CDC is committed to increasing breastfeeding throughout the United States and promoting optimal breastfeeding practices. Both babies and mothers gain many benefits from breastfeeding. Breast milk is easy to digest and contains antibodies that can protect infants from bacterial and viral infections. More can be learned about this subject at **http://www.cdc.gov/breastfeeding/**.

If breastfeeding is not possible, several types of formula are available for infant feeding. Parents and caregivers are encouraged to speak with their pediatrician about what type of infant formula is best suited for their child.

Why is there a focus on infant formula as a source of fluoride?

Infant formula manufacturers take steps to assure that infant formula contains low fluoride levels—the products themselves are not the issue. Although formula itself has low amounts of fluoride, if your child is exclusively consuming infant formula reconstituted with fluoridated water, there may be an increased chance for mild dental fluorosis.

Infants consume little other than breast milk or formula during the first 4 to 6 months of life, and continue to have a high intake of liquids during the entire first year. Therefore, proportional to body weight, fluoride intake may be higher for younger or smaller children than for older children, adolescents, or adults.

What types of infant formula may increase the chance of dental fluorosis?

There are three types of formula available in the United States for infant feeding. These are powdered formula, which comes in bulk or single-serve packets, concentrated liquid, and ready-to-feed formula. Ready-to-feed formula contains little fluoride and does not contribute to development of dental fluorosis. Those types of formula that require mixing with water—powdered or liquid concentrates—can be a child's main source of fluoride intake (depending upon the fluoride content of the water source used) and may increase the chance of dental fluorosis.

Can I use optimally fluoridated tap water to mix infant formula?

Yes, you can use fluoridated water for preparing infant formula. However, if your child is exclusively consuming infant formula reconstituted with fluoridated water, there may be an increased chance for mild dental fluorosis. To lessen this chance, parents can use low-fluoride bottled water some of the time to mix infant formula; these bottled waters are labeled as de-ionized, purified, demineralized, or distilled.

How can I find out the level (concentration) of fluoride in my tap water?

The best source of information on fluoride levels in your water system is your local water utility. Other knowledgeable sources may be a local public health authority, dentist, dental hygienist, or physician. CDC's Web site **My Water's Fluoride** allows consumers in some states to learn the fluoridation status of their water system. Nearly all tap water contains some natural fluoride, but, depending on the water system, the concentration can range from very low (0.2 mg/L fluoride or less) to very high (2.0 mg/L fluoride or higher). Approximately 72% of all public water systems serving about 195 million people adjust the fluoride in their water to the level recommended to prevent tooth decay.

Will using only low fluoride water to mix formula eliminate my child's risk for dental fluorosis?

Using only water with low fluoride levels to mix formula will reduce, but will not eliminate, the risk for dental fluorosis. Children can take in fluoride from other sources during the time that teeth are developing (birth through age 8). These sources include drinking water, foods and beverages processed with fluoridated water, and dental products, such as fluoride toothpaste, that can be swallowed by young children whose swallowing reflex is not fully developed.

Additional Resource

Dental Fluorosis – Learn more about simple steps to reduce your child's risk for dental fluorosis.

Back to Top

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Page Located on the Web at http://www.cdc.gov/fluoridation/safety/infant_formula.htm

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Affidavit of Gerard F. Judd, Ph.D.

Dr. Gerard Judd's book "Good Teeth, Birth to Death " is available at Amazon.

In Support of Motion for Summary Judgment

State of Wisconsin Circuit Court Fond Du Lac County

SAFE WATER ASSOCIATION, INC.,

Plaintiff,
vs.
Case No. 92 CV 579
CITY OF FOND DU LAC,

Defendant.

AFFIDAVIT OF GERARD F. JUDD, Ph.D.

IN SUPPORT OF MOTION FOR SUMMARY JUDGMENT

State of Arizona

County of Maricopa

Gerard F. Judd, Ph.D., being first duly sworn on oath and with personal knowledge of the information contained herein, respectfully states to the Court as follows:

BACKGROUND

1. I have been a professor of Chemistry at Phoenix College, Phoenix Arizona, since 1965.

2. I received my B.A. in chemistry from the University of Utah in 1943. I received my M.S. from the University of Portland in 1948. I received my Ph.D. in physical and organic chemistry from Purdue University in 1953. I did Postdoctoral research at Purdue University, on fluorinated organometallic reactions in 1954.

3. A few of my more recent research, academic and service honors include:

- a. Elected to Emeritus Member of American Chemical Society, 11/92.
- b. "20 Year Outstanding Teaching Award and Pin" from Maricopa County Community College District, Dr.

Paul A. Elsner, Chancellor, 2/92.
- c. Reviewed two fundamental chemistry textbooks for publishers, 5/91.
- d. Received "Speaker's Gold Plated Champion's Award for Research, Communication and Education," regarding better teeth, health and government. Arizona Breakfast Club, Harry E. Everingham, President, 11/24/90.
- e. "Faculty Appreciation Gift for Outstanding Contributions to Teaching," Maricopa County Community College District, Phoenix, Arizona, Dr. Paul A. Elsner, Chancellor, 3/4/85.

4. I have devoted thousands of hours during my career to studying the chemistry of fluoride. In addition, in preparing this affidavit, I have specifically researched and summarized the following professional and technical literature on the epidemiological effects of fluoride:

- a. Journal of Fluoride, August 1992 - January 1983.
- b. Chemical Abstracts, August 1992 - January 1989.
- c. Index Medicus, May, June and July 1992.
- d. Fluoridation The Great Dilemma, a 421-page book by
- George L. Waldbott, M.D. in collaboration with Albert W. Burgstahler, Ph.D. and H. Lewis McKinney, Ph.D.
- e. A Struggle With Titans, Forces Behind Fluoridation, a 383-page book by George L. Waldbott, M.D. (a scientist's look at fluoridation).
- f. Fluoridation, the Aging Factor, a 203-page book by John Yiamouyannis, Ph.D. in Biochemistry, and world-leading authority on the biological effects of fluoride.
- g. Fluoride, The Freedom Fight, a 207-page book by Dr. Hans Moolenburgh, M.D. (The Netherlands).
- h. Fluoridation, a 264-page book by Isabel Jansen, R.N.
- i. The Fluoride Question, Panacea or Poison?, a 176-page book by Anne-Lise Gotzsche, medical journalist (England).
- j. Hello, Test Animals . . . Chinchillas or You and Your Grandchildren, a 180-page book by W. R. Cox, chinchilla breeder and researcher.
- k. The Grim Truth About Fluoridation, a 128-page book by Robert M. Buck, journalist.
- l. Fluoridation, Poison on Tap, a 460-page book by Glen S. R. Walker, consultant in strategic metals, munitions, and chemical industry, registered by the National Association of Testing Authorities in Australia.
- m. Fluoride in Australia, a Case to Answer, a 159-page book by Wendy Varney, journalist.

5. During the past two years I have personally discussed the effects of artificial fluoridation of drinking water with many individuals possessing outstanding background on the subject of fluoridation, including the following:

- a. Dr. Albert Burgstahler, Ph.D., University of Kansas;
- b. Dr. Mel Ruber, Ph.D., Columbia, Maryland;
- c. Dr. Robert Carton, Ph.D., former head of EPA Employees Union, Environmental Protection Agency, Washington, D.C.;
- d. Dr. William Marcus, Ph.D., epidemiologist, Environmental Protection Agency, Washington, D.C.;
- e. Dr. William Foulkes, M.D., Vancouver, Washington, former head of Ministry of Health in British Columbia;
- f. Dr. John Colquhoun, Ph.D., Titi Rangi, New Zealand;
- g. Dr. Albert Schatz, Ph.D., chemistry researcher, retired, Temple University, Philadelphia, Pennsylvania;
- h. Dr. Cornelius Steelink, Ph.D., Chemistry Professor, University of Arizona;
- i. Dr. John Yiamouyiannis, Ph.D., Delaware, Ohio;
- j. Dr. John R. Lee, M.D., Sebastopol, California.

EVIDENCE AGAINST THE SAFETY OF FLUORIDATION

6. My research, communication and discovery concerning the epidemiological effects of fluoridation has provided me with solid scientific evidence on which to base the following conclusions.

7. Fluoride has never been established as, and is not, essential in nutrition for soft tissues, bones or teeth.

8. There are no experiments or data which establish that fluoride in any form or in any concentration is harmless when put into drinking water for human consumption or usage.

9. Fluoride at low levels has been shown to unsnap hydrogen bonds in the enzyme cytochrome oxidase, and thus

ruin its ability to handle oxygen in humans, animals or plants. (Exhibit____).

10. It is well-established in academic and industrial chemical industry that the hydrogen-fluoride hydrogen bond is stronger than the hydrogen-nitrogen or hydrogen-oxygen hydrogen bonds characteristic of human enzymes. Therefore, human enzyme systems (thousands of enzymes) are subject to destruction when water containing fluoride is consumed. After a few weeks for some, and a lifetime for others, a large enough reservoir of fluoride is built up to cause serious ailments.

11. At least 63 human, animal and plant enzymes are for the most part destroyed or modified by fluoride.

12. A summary of important epidemiological effects of fluoride from Chemical Abstracts, 1992-1989 (53 pages); Journal of Fluoride, August 1992-January 1993 (42 pages); and Index Medicus, May, June and July 1992 (3 pages) failed to produce even one article proving fluoride to be harmless.

13. Contrariwise, hundreds of experiments on test animals, humans, plants, and their cells, have invariably demonstrated harmful effects.

14. A large number of epidemiological effects in the way of ailments and allergies caused by fluoride have been clinically established by competent authorities, including those below.

15. Forty-nine or more serious allergenic conditions were established by George Waldbott, M.D. These were proven by removing patients from drinking water with fluoride in it, in which case they were cured. This was followed up with single- or double-blind tests with fluoride tablets.

16. Eight of Dr. Waldbott's side effects were confirmed through double-blind tests organized by Dr. H. Moolenburgh, with 12 other physicians, one pharmacist, and one attorney. (Exhibit____). Only one of these side effects presented in court was sufficient to cause the Holland Ministry of Health to discontinue fluoridation of water in that country. These side effects are listed in Waldbott's book, pp. 123-125.

17. Genetic changes in bone cells and sperm cells of mice were thoroughly studied, re-studied and established by Dr. Albert Taylor. This work has been confirmed by numerous other researchers.

18. Fluoride as a factor in cataracts has been established by statistical studies of Dr. Ionel F. Rapaport and confirmed by the research of Dr. Burgstahler. This has also been confirmed by analysis of cataracted and un-cataracted eye lenses. The older the person, the more the fluoride in the lens. (Exhibit____).

19. SIDS (crib or cot death) has been related to fluoride poisoning by Dr. J. Colquhoun (exhibit____), Dr. Bruce Spittle, and others.

20. Chronic fatigue syndrome (CFS), and chronic fluoride toxicity (CFT) have been found to be very closely related in their symptoms (Exhibit____).

21. RSI (repetitive stress injury, or carpal tunnel syndrome) has been linked to the accumulation of fluoride in the bone by Dr. Geoffrey E. Smith. Additional work supporting this link was found by Dr. Sutton. (Exhibit____).

22. Dental fluorosis has been shown recently to occur at fluoride levels as low as .3 ppm, as opposed to earlier studies of Dr. H. Trendly Dean, who set 1.0 as a tolerable limit, allowing 24 percent fluorosis. The degree of fluorosis depends on the nutritional status of the person.

23. Dr. Waldbott had over 400 cases of pre-skeletal bone fluorosis in patients, which he established was caused by their drinking fluoridated water. (Exhibit____) This has been further confirmed by many other studies. The degree of bone fluorosis is strictly related to bone fluoride content.

24. Embrittled bones are caused by drinking fluoridated water, as well as by administration of tablets to "harden bones." (Riggs study, Exhibit____; Utah study, Exhibit____; Jacobson's study, Exhibit____; Cooper's study, Exhibit____; and Sower's study, Exhibit____.

25. Increased infant mortality and birth defects (two to three times increase) was established by Dr. Albert Schatz

to be present in Chilean children administered fluoridated water in an experimental study in Curico, Chili, with San Fernando and La Serena as a control towns. (Exhibit____). Dr. Schatz found fluoridation did no good for teeth, and caused enormous increase in miscarriages. The malformations and infant mortality dropped dramatically upon cessation of the fluoridation. Similar malformations and infant mortalities are now occurring in U.S.

26. C. R. Cox, working with the University of Oregon, found that 17 ppm fluoride in feed caused constipation, great mature and baby chinchilla death, small litters and over four generations a smaller, inferior rabbit.

27. Down's Syndrome was established to be linked to consumption of fluoride through statistical studies and re-studies by Dr. Ionel F. Rapaport, M.D. and Waldbott, Fluoridation the Great Dilemma, pp. 212-219. Dr. Rapaport also found that 70% of Down's Syndrome babies were born with cataracted eyes.

28. Genu valgum (knock knees) has been reported as having been caused by fluoride in drinking water..

29. Gilbert's Disease (hemorrhagic yellow jaundice) has been cured by taking the patient off fluoridated drinking water. (Exhibit____).

30. Collagen synthesis has been shown to be impeded by fluoride by the work of B. Uslu, Andola School of Medicine, Eskisehir, Turkey.

31. Immunosuppression, according to Sutton and Gibson, may be caused by consumption of fluoride. (See Exhibits_____).

32. Decreased immunodiffusion has been established as due to fluoride ion, making it a negative chemitaxic agent (this means it impedes the "taxiing" or motion effect). (Exhibit____).

33. Between 1953 and 1968, there were approximately 572,810 (44,062 per year average) more deaths due to all types of cancer in 10 major fluoridated cities compared to non-fluoridated cities. Sex, race and age changes in these populations were insignificant during this period, so that nothing else could be established as causal. (Exhibit____).

34. In Antigo, Wisconsin, heart attacks were shown to dramatically increase both in the general population and the people under 65 and over 65 when fluoridation was instituted and continued over 35 years.

35. A tremendous increase in caiman (alligator) deaths was experienced once Kansas City, Kansas water was fluoridated at the Parrot Hill farms under the care of Patricia Jacobs, naturalist.

EVIDENCE AGAINST THE EFFECTIVENESS OF FLUORIDATION

36. In contrast to the claims of the Human Health Services and the American Dental Association that fluoride reduces DMF (decayed, missing, filled teeth) 65 percent, it has now been established through a very large number of reliable studies that fluoride may actually cause a slight amount of DMF. (A large amount of DMF is actually related to nutrition.)

37. Dr. Yiamouyiannis found that of 39,200 students, ages 5-19, from 89 fluoridated and non-fluoridated areas, the teeth of those living in non-fluoridated areas had slightly less DMF. (Exhibit___/___).

38. A survey of 1,500 fifth grade students in Missouri gave slightly lower DMF for those who lived in a non-fluoridated area. This was also true in a survey of 1500 6th graders.(Exhibit____).

39. A study of school children in Tucson, Arizona by Dr. Cornelius Steelink (Chemistry Department, University of Arizona), established that there was an increase in DMF with an increase in fluoride in the water. (Exhibit____).

40. A thorough study of the entire population of Japan (included 20,000 school children, 1972) established that when the fluoride in the drinking water was above .4 ppm there was more decay. (Exhibit____).

41. A study of Auckland, New Zealand, found that DMF decreases depended heavily on dental education in the schools and the salary of people from various areas, and insignificantly on the amount of fluoride in the water.

(Exhibit____).

42. In Garis, Africa a high proportion of 14 to 15-year-olds had first permanent molars which were extensively carious or missing despite 1.06 ppm fluoride in drinking water. High sugar intake was a possible factor.

43. Earlier "studies" justifying fluoridation of drinking water have been unmasked and debunked by competent authorities (Dr. Waldbott, Dr. Colquhoun, Dr. Foulkes, Dr. Mark Diesendorf, Dr. Sutton, Dr. Exner and Dr. Rudolf Ziegelbecker) on the basis of neglecting variables, cheating and group selection, not completing the studies, etc. (Exhibits_____).

44. As one example, phosphate, calcium and strontium were not accounted for in the Newburgh-Kingston study, or any other study, to the best of my knowledge. Dr. Waldbott established that the Kingston water had deficiencies of these elements.

CONCLUSION

45. My research has made it clear that the American Dental Association and U. S. Human Health Services have made a wrong turn in their attempt to improve the teeth of the American public.

46. Fluoride in drinking water should be limited to .1 ppm where possible, since reverse osmosis can easily reduce fluoride below this value.

47. It is my best judgment, reached with a high degree of scientific certainty, that fluoridation is invalid in theory and ineffective in practice as a preventive of dental caries. It is also dangerous to the health of consumers.

48. I make this Affidavit in support of the Plaintiff's Motion for Summary Judgment.

Dated this _____ day of _____, 1993.

_____
Gerard F. Judd, Ph.D.

Subscribed and sworn to before me

this ___ day of _____, 1993.

_____

Notary Public, State of _____

My Commission:_____

Dr. Gerard Judd's book "Good Teeth, Birth to Death " is available at Amazon.

Back

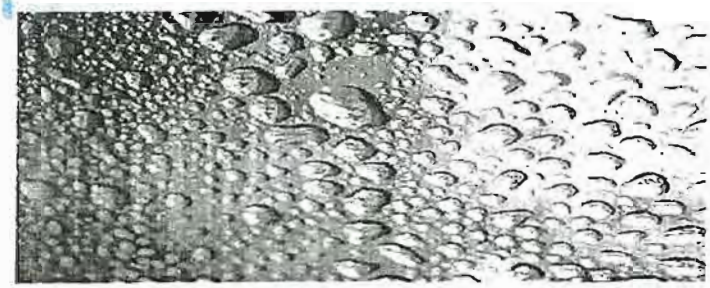
LEAD – FLUORIDE LINK

Chloramine + Lead Pipes + Fluoride = Contaminated tap water

JULY 13, 2009

By Olga Naidenko, EWG Senior Scientist

The lead pollution crisis of the Washington, D.C. water supply - and the culprit that caused it, the water disinfection chemical chloramine - is a powerful example of how things can go terribly wrong when water quality problems are considered and tackled in isolation.



Earlier this year, Virginia Polytechnic Institute and State University (Virginia Tech) scientists reported the shockingly high lead levels in the blood of young Washington, D.C. children tested between 2001 and 2004, when the District of Columbia's drinking water was being contaminated with lead from aging pipes.

Unfortunately, this situation is not unique: similar results have been reported in Greenville, North Carolina, according to studies by the Duke University researchers.

Chloramines and lead pipes: Not so good together

American water utilities are increasingly switching to chloramines, a mixture of chlorine and ammonia, for final disinfection of drinking water. Chloramine was supposed to be a "safer" water disinfectant than chlorine because it reduces formation of toxic chlorination byproducts. A 2005 survey by the American Water Works Association found that approximately a third of all utilities now use chloramines.

Water disinfection byproducts are associated with increased risk of cancer and possibly adverse effects on the development of the fetus, so minimizing their levels in drinking water is a good thing. Yet, chloramines drastically increase the leaching of lead from pipes. And here is a real challenge: there are tens of thousands of lead service lines in the water system administered by the DC Water and Sewer Authority. Add to these lines the lead based solder used to join copper pipe, brass and chrome plated faucets, and water fixtures, and the opportunities for lead to leach into the drinking water multiply.

We all accept that water disinfection is a public health necessity. However, we need to thoroughly consider the full impact of any chemical added to drinking water *given the current water distribution infrastructure in place*, not in some theoretical vacuum. As described by Duke researchers, chloramine-induced lead leaching might be lessened by the addition of anticorrosivity agents during the water treatment process. Is that sufficient for protection of public health? We really don't know! Chloramine itself has been associated with severe respiratory toxicity and skin sensitivity. Overall, despite ongoing research, water treatment chemistry is still insufficiently understood by scientists and specific water quality outcomes depend on the particular chemical interactions found in each water treatment and distribution system.

And now add fluoride

In addition to disinfection chemicals, other additives are commonly mixed with the finished drinking water before it leaves the water treatment plant. Of them, fluoride is possibly the most known. Two thirds of the U.S. municipal water supply is artificially fluoridated *in an effort to prevent* tooth decay. But fluoridation additives in tap water are not the same form of fluoride as found in toothpaste. Typically, water is fluoridated with fluorosilicic acid (FSA) or its salt, sodium fluosilicate, collectively referred to as fluorosilicates. In contrast, fluoride in toothpaste is usually in form of simple sodium fluoride salt, NaF.

Here comes a second unpleasant "surprise" for those in lead-piped locations: fluorosilicates have a unique affinity for lead. In fact, lead fluorosilicate is one of the most water-soluble forms of lead. In fact, fluorosilicic acid has been used *as a solvent* for lead and other heavy metals in metallurgy. In industrial applications, chemical engineers rely on this acid to remove surface lead from leaded-brass machine parts.

Research shows what happens when we mix it all up

What happens when fluorosilicates in water pass through lead-containing pipes and metal fixtures? Not surprisingly, the

fluorosilicates extract high levels of soluble lead from leaded-brass metal parts (researchers from the Environmental Quality Institute of the University of North Carolina-Asheville performed this actual experiment).

In research published in the scientific journal *Neurotoxicology*, researchers found that the mixture of the two chemicals: disinfectant (whether chlorine or chloramine) with fluorosilicic acid has a drastically increased potency, leaching amazingly high quantities of lead.

Where does this lead go? Into our drinking water and right on into our bodies, where they wreak havoc by poisoning our heart, kidneys and blood, causing irreversible neurological damage and impairing reproductive function.

North Carolina researchers concluded that the supposedly innocuous - and purportedly beneficial - quantities of fluoride added to drinking water may, in fact, precipitate a cascade of serious health problems, especially when chloramines and lead pipes are added into the mix.

Do we even need fluoride in tap water?
The mixture of chloramine and fluorosilicates in drinking water causes extensive leaching of lead. We cannot dispense with water disinfection - everybody acknowledges this. Thus, chlorine and chloramine are probably here to stay for some time. On the other hand, fluoride, or, specifically, water fluoridation with fluorosilicates, is quite dispensable.

But wait - isn't fluoride the miracle chemical that improves dental health?

Well, yes and no. Much of what is publicized today in caries prevention programs worldwide is derived from the theories generated in the 1950s and '60s, when water fluoridation was actively promoted. As we now know, the main benefits of fluoride for dental health are derived from *surface* application on the teeth, not from ingestion.

In fact, ingestion of fluoride causes dental fluorosis, a range of adverse health effects that includes mottling, pitting, and weakening of the teeth. These risks are especially significant for infants and young children. In the U.S. and worldwide, about 30 percent of children who drink fluoridated water experience dental fluorosis. In 2006, the American Dental Association (ADA) issued an "Interim Guidance on Fluoride Intake for Infants and Young Children." ADA recommended that in areas where fluoride is added to tap water, parents should consider using fluoride-free bottled water to reconstitute concentrated or powdered infant formula to avoid excess fluoride.

According to the latest research, the anti-caries activity of fluoride is due to topical effects, which supports the value of fluoride-containing toothpaste to dental health. There is clear evidence that fluoride dental products significantly reduce the incidence of cavities. In contrast, a substantial and growing body of peer-reviewed science suggests that ingesting fluoride in tap water does not provide any additional dental benefits other than those offered by fluoride toothpaste and may present serious health risks.

To learn more about fluoride health effects, read the recent report by EWG.

The message: Don't assess chemicals in isolation
The lesson here is straightforward: it is completely unscientific to simply toss any chemical into the drinking water on the premises that this chemical might provide some benefits. **The real question is:** what would be the effect of this chemical given what else is going on with the water system? In case of fluoridation and chloramines, what emerges at the end of the pipe (our faucets!) is a potentially highly hazardous mixture of fluorosilicates, lead, and residual levels of disinfectants.

To protect the health of my family today, I can buy a water filter to remove heavy metals and disinfection byproducts from my drinking water with a simple pitcher filter. But **to protect the health of the entire nation,** we really need to consider if our current methods of water treatment can withstand scientific scrutiny, or whether they should be re-assessed so as to provide safe, healthy tap water to all Americans.

« EWG heads to Congress: Thanks for your help |

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Water treatment with silicofluorides and lead toxicity

DOI:
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Roger D. Masters[a] & Myron J. Coplan[b]

pages 435-449

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Toxic metals like lead, manganese, copper and cadmium damage neurons and deregulate neurotransmitters like serotonin and dopamine (which are essential to normal impulse control and learning). Earlier studies show that — controlling for socio-economic and demographic factors — environmental pollution with lead is a highly significant risk factor in predicting higher rates of crime, attention deficit disorder or hyperactivity, and learning disabilities. Exposure and uptake of lead has been associated with industrial pollution, leaded paint and plumbing systems in old housing, lead residues in soil, dietary habits (such as shortages of calcium and iron), and demographic factors (such as poverty, stress, and minority ethnicity). We report here on an additional "risk co-factor" making lead and other toxic metals in the environment more dangerous to local residents: the use of silicofluorides as agents in water treatment. The two chemicals in question — fluosilicic acid and sodium silicofluoride — are toxins that, despite claims to the contrary, do not dissociate completely and change water chemistry when used under normal water treatment practices. As a result, water treatment with siliconfluorides apparently functions to increase the cellular uptake of lead. Data from lead screening of over 280,000 children in Massachusetts indicates that silicofluoride usage is associated with significant increases in average lead in children's blood as well as percentage of children with blood lead in excess of 10μg/dL. Consistent with the hypothesized role of silicofluorides as enhancing uptake of lead whatever the source of exposure, children are especially at risk for higher blood lead in those communities with more old housing or lead in excess of 15 ppb in first draw water samples where silicofluorides are also in use. Preliminary findings from county-level data in Georgia confirm that silicofluoride usage is associated with higher levels of lead in children's blood. In both Massachusetts and Georgia, moreover, behaviors associated with lead nurotoxicity are more frequent in communities using silicofluorides than in comparable localities that do not use these chemicals. Because there has been insufficient animal or human testing of silicofluoride treated water, further study of the effect of silicofluorides is needed to clarify the extent to which these chemicals are risk co-factors for lead uptake and the hazardous effects it produces.

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Keywords

- lead,
- toxicity,
- pollution,
- children's health,
- public water supplies

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ELSEVIER FULL-TEXT ARTICLE

Toxicology. 2010 Apr 30;271(1-2):21-6. Epub 2010 Feb 25.

Fluoride increases lead concentrations in whole blood and in calcified tissues from lead-exposed rats.

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Abstract

Higher blood lead (BPb) levels have been reported in children living in communities that receive fluoride-treated water. Here, we examined whether fluoride co-administered with lead increases BPb and lead concentrations in calcified tissues in Wistar rats exposed to this metal from the beginning of gestation. We exposed female rats and their offspring to control water (Control Group), 100mg/L of fluoride (F Group), 30mg/L of lead (Pb Group), or 100mg/L of fluoride and 30mg/L of lead (F+Pb Group) from 1 week prior to mating until offspring was 81 days old. Blood and calcified tissues (enamel, dentine, and bone) were harvested at day 81 for lead and fluoride analyses. Higher BPb concentrations were found in the F+Pb Group compared with the Pb Group (76.7+/-11.0microg/dL vs. 22.6+/-8.5microg/dL, respectively; $p<0.001$). Two- to threefold higher lead concentrations were found in the calcified tissues in the F+Pb Group compared with the Pb Group (all $p<0.001$). Fluoride concentrations were similar in the F and in the F+Pb Groups. These findings show that fluoride consistently increases BPb and calcified tissues Pb concentrations in animals exposed to low levels of lead and suggest that a biological effect not yet recognized may underlie the epidemiological association between increased BPb lead levels in children living in water-fluoridated communities.

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NeuroToxicology

Effects of fluoridation and disinfection agent combinations on lead leaching from leaded-brass parts

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Available online 30 June 2007

Abstract

This study concerns effects on water-borne lead from combinations of chlorine (CL) or chloramines (CA) with fluosilicic acid (FSA) or sodium fluoride (NaF). CL is known to corrode brass, releasing lead from plumbing devices. It is known that CA and CL in different ratios with ammonia (NH_3) mobilize copper from brass, which we have found also enhances elution of lead from leaded brass alloys. Phase I involved leaded-brass 1/4 in. elbows pre-conditioned in DI water and soaked in static solutions containing various combinations of CL, CA, FSA, NaF, and ammonium fluosilicate. In Phase II 20 leaded-brass alloy water meters were installed in pipe loops. After pre-conditioning the meters with 200 flushings with 1.0 ppm CL water, seven different solutions were pumped for a period of 6 weeks. Water samples were taken for lead analysis three times per week after a 16-h stagnation period. In the static testing with brass elbows, exposure to the waters with CA + 50% excess NH_3 + FSA, with CA and ammonium fluosilicate, and with CA + FSA resulted in the highest estimated lead concentrations. In the flow-through brass meter tests, waters with CL + FSA, with CL + NaF, and with CL alone produced the highest average lead concentration for the first 3-week period. Over the last 3 weeks the highest lead concentrations were produced by CL + NaF, followed by CL alone and CA + NH_3 + FSA. Over the first test week (after CL flushing concentrations were increased from 1.0 to 2.0 ppm) lead concentrations nearly doubled (from about 100 to nearly 200 ppb), but when FSA was also included, lead concentrations spiked to over 900 ppb. Lead concentrations from the CL-based waters appeared to be decreasing over the study period, while for the CA + NH_3 + FSA combination, lead concentrations seemed to be increasing with time.

Keywords: Water disinfection; Chlorine; Chloramines; Fluoridation; Lead leaching

1. Introduction

1.1. Motivation for this study

The continuing problem of ingested lead from lead-bearing water was highlighted at a US House of Representatives sub-committee hearing convened in March 2004 to investigate issues concerning "First Draw" water lead levels as high as 1000 ppb in Washington DC water circa 2001–2004. An expert witness (Edwards, 2004) testified that this was found in homes without lead service lines or lead soldered copper piping. The only possible lead source had to be leaded-brass plumbing and/or brass faucets. The expert also suggested that a recent switch in disinfectant from chlorine to chloramine caused the problem. The study reported here, conducted by the Environmental Quality Institute of the University of North Carolina (EQI), focused on brass corrosion by combinations of disinfectant and fluoridating agents in two laboratory phases. In the first, small leaded-brass plumbing elbows (2% lead) were exposed under static conditions to DI water with chlorine and chloramines, either alone or in combination with municipal water fluoridating agents. Stagnant water lead data from that phase guided selection of combinations of disinfectant and fluoridating agent for a second phase in which brass water meters (8% lead) were exposed to seven water formulations under flow-through conditions. It was expected that Phase II results would be used to guide field tests under "real world" conditions in cooperating water plants, but the untimely demise of EQI Director Richard P. Maas prevented that follow-on step. Nevertheless, Phase I and Phase II results presented here provide at least heuristic insight

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into the "DC experience" and, more generally, shed new light on lead elution from brass by combinations of chlorine-based disinfectants and fluoridation chemicals.

1.2. Applicable terminology

Herein "CL" means a chlorine species used for potable water disinfection that may be injected as chlorine gas (Cl_2), or hypochlorite solutions carrying chloride ion, hypochlorous acid (HOCl), and/or hypochlorite ion (OCl^-) that may exist together in equilibrium. CL concentration may be expressed in parts per million (ppm) of "free chlorine" where 1 ppm is the stoichiometric equivalent of 29×10^{-6} mol of free chloride ion.

"NH" means ammonia added to CL treated water to produce mono-chloramine. NH may be injected as ammonia gas (NH_3), ammonium hydroxide solution, or as an ammonium salt solution. The desired proportion of CL/NH is 1:1 on a molar basis which is little less than 5:1 in ppm units.

"CA" means "chloramine" produced by adding NH to CL treated water; the desired mono-chloramine is actually part of a mixture with small amounts of di- and tri-chloramine. Actual amounts of NH and CL vary from time to time, yielding either undesired di- or tri-chloramine or excess NH. Chlorine in CA is also known as "combined chlorine," a term also applied to products created when CL reacts with water contaminants (USEPA, 2004).

"SiF" applies to the silicon/fluorine complex (fluosilicate), a class of water fluoridating agents (aka fluorosilicates, silicofluoride, silicofluoric, hexafluorosilicate, and other names) from which fluoride ion (F^-) is released upon dissociation of $[SiF_6]^{2-}$ when diluted in water. The principal SiF agents are fluosilicic acid (H_2SiF_6), herein "FSA", and its sodium salt (Na_2SiF_6). Concentrated (20–30%) FSA is injected as such into water plant water. Sodium fluosilicate (NaFSA) is added as a saturated solution. The term SiF covers $[SiF_6]^{2-}$ and its dissociation derivatives.

2. Relevant background

2.1. Continuing problem of drinking water lead

Lead contaminated drinking water remains a significant public health issue in the United States, even though water-borne lead has steadily declined along with other lead sources such as lead-based paint, roadside soils, food, and other products. In 1991, the EPA estimated that drinking water was responsible for 14–20% of total lead uptake of all ages in the U.S. (USEPA, 1991). EPA's Lead and Copper Rule (LCR) for potable water was expected to reduce drinking water lead levels by 50%. That did occur (Maas et al., 2005) after leaded-solders were banned under the Safe Drinking Water Act Amendments of 1986 (USEPA, 1986); water suppliers were required to reduce corrosivity of their finished waters (Maas et al., 1994; Ramaley, 1993; USEPA, 1991); with better control of alkalinity, pH, and additives (Cardew, 2003; Edwards et al., 1996; Lytle and Schock, 2000). On its own initiative, the California legislature set limits on lead content of leaded-brass plumbing devices and faucets (Patch et al., 1998; State of California, 1995). Much research focused on preventing lead extraction from installed lead service lines by treating water with phosphatic agents (phosphoric acid, combinations of orthophosphoric acid and zinc orthophosphate, polyphosphates, or blends of orthophosphoric acid with polyphosphate) that produce inert barrier coatings inside lead pipes. Along with successes in this area there have also been conflicting results. Orthophosphate treatments can reduce soluble lead levels by 70%, but polyphosphate can actually increase lead and copper in drinking water (Edwards and McNeill, 2002), often manifested as particulates (McNeill and Edwards, 2004).

2.2. Complicating factors

2.2.1. Switch to chloramines for disinfection

Water lead problems have been exacerbated by EPA's Stage I Disinfection By-products Rule (USEPA, 2002) requiring reduction of disinfection by-products (DBPs) such as trihalomethanes (THM's) and haloacetic acids (HAA's) created by CL disinfection (ChemScan, 1997). A switch from CL to CA was recommended and adopted in some systems since it was less expensive than other disinfection methods and easy to add NH to already-chlorinated water. One explanation for the DC experience was that the switch from CL lowered the oxidizing potential of DC water, destroying the normally protective lead dioxide (PbO_2) scale inside lead pipes (Renner, 2004).

Although CA corrosivity has received a lot of attention, no studies have included fluoridating agents (Edwards and Dudi, 2004; Eisnor and Gagnon, 2004; Lin et al., 1997; Reiber, 1993; Sung et al., 2005). A microscopy study revealed how CA alone is a good solvent for lead (Switzer et al., 2006). Whatever these studies may have found under laboratory conditions, it should be noted that CA in the water plant is not added as a commercial product with consistent properties. It is formed by adding NH to CL treated water. Ideally, mono-chloramine is the principal product formed at pH 8 and the proper 1:1 NH/CL molar ratio. Maintaining exactly the ideal NH/CL proportion at all times is not very likely.

2.2.2. The role of fluoridating agents

Fluoridating agents can only complicate matters. Sodium fluoride (NaF), used to treat less than 10% of US fluoridated water, raises pH a little with negligible effect, but the same cannot be said for possible interference by the fluoride ion in the reaction of NH with CL. The effect of SiFs is another matter. The fluosilicate anion $[SiF_6]^{2-}$ of FSA and NaFSA provides the fluoride ion (F^-) in over 90% of fluoridated water. $[SiF_6]^{2-}$ releases F^- in a complicated, poorly understood, sequence of time-, temperature- and pH-dependent steps. Under water plant operating conditions, incompletely dissociated $[SiF_6]^{2-}$ residues may survive and react with other chemicals in the water. Under some conditions, NH and FSA, as such, react to produce silica and ammonium fluoride (Mollere, 1990). How that affects corrosion is not known, but whatever its reaction with NH may be, FSA does not leach lead simply because it is an acid.

The fluosilicate anion $[SiF_6]^{2-}$ and/or partially dissociated derivatives have a unique affinity for lead. Lead fluosilicate is

one of the most water soluble lead species known, a property recognized and exploited for many years (Stauter, 1976). FSA has been used as a solvent for lead and other heavy metals in extractive metallurgy (Cole et al., 1981; Kerby, 1979) and to remove surface lead from leaded-brass brass machined parts (Bonomi et al., 2001; Giusti, 2001, 2002). With or without CA, FSA would extract lead from brass. Besides, in the water plant situation it is reasonable to expect FSA to combine with NH as ammonium fluosilicate, an excellent solvent for copper alloys (Hara et al., 2002) and other metals (Silva et al., 1995).

It has been argued that FSA dissociates almost completely at the levels typically added to drinking water, and therefore cannot be more corrosive than sodium fluoride (NaF) (Urbansky and Schock, 2000). However, in a comprehensive follow-up review of the literature, Urbansky states that FSA may not dissociate completely in drinking water (Urbansky, 2002). Evidence for that is not new (Colton, 1958; Kolthoff and Stenger, 1947; Lenfesty et al., 1952; Munter et al., 1947; Thomsen, 1951). Titration of FSA to a pH 7 end-point only neutralizes the two hydronium ions produced by ordinary hydrolysis of H_2SiF_6, leaving the fluosilicate anion $[SiF_6]^{2-}$ intact. In addition to that, $[SiF_6]^{2-}$ dissociation in cold water could take 20 min to reach 90% completion (Hudleston and Bassett, 1921; Rees and Hudleston, 1936) and may never get to that condition below pH 9 (AWWA, 1994).

Consequently, incompletely dissociated $[SiF_6]^{2-}$ residues may remain in water plant water that is not above pH 8 or some commonly occurring low temperature. Apart from problems with incompletely dissociated $[SiF_6]^{2-}$ residues, injection of concentrated of FSA simultaneously and in close proximity with NH almost guarantees unanticipated side reactions.

2.2.3. *Distribution of lead in brass*

The varied, occasionally conflicting, reports on elution of lead from brass may have a common explanation. Lead alloyed with copper is not molecularly distributed, as in a solid solution. Discrete lead nodules are embedded in a copper matrix. Agents that attack copper are likely to foster lead mobility, adding significantly to lead (probably particulate) in drinking water. CL, CA, or excess NH are all capable of doing that, either by copper stress cracking (Flom, 2002) or mobilization in an ammonia/copper complex (Clark, 2003), thereby exposing lead nodules in brass for easier transport into water.

This may help to explain the DC experience that homes with only brass as a possible source of lead, not only had high water lead, but were also experiencing serious pitting of copper pipe. In many cases, particulate lead may predominate over soluble lead eluted from brass, as well as other lead sources (McNeill and Edwards, 2004).

3. Materials/methods and statistical analyses

3.1. *Phase I (static tests of 2% leaded-brass elbows)*

Sixty 2% leaded-brass 1/2 in. barb 90° elbows were purchased locally. Three elbows were assayed for lead in a small piece sliced from one end. Measured lead concentrations ranged from 1.70 to 1.82%. Elbows were labeled, thoroughly rinsed, and placed in a tray of deionized (DI) water for conditioning. The water was changed twice and agitated three times a day for 18 days. After conditioning, two sets of static bottle tests were conducted as follows: individual elbows were removed from the trays of DI water, rinsed with DI water and placed in their own labeled bottle. Exactly 100 mL of the appropriate test water was added to each bottle which was capped and set aside to sit undisturbed overnight. After 16-h stagnation exposure, each elbow was removed from its bottle of test water with plastic tongs, rinsed with DI water, and placed back into its tray of DI water. Test waters were analyzed for lead using the EPA 200.8 method for graphite furnace atomic absorption spectrophotometry.

In the first set of bottle tests, elbows were exposed to waters at pH 7 and pH 8, comprising 2 ppm each of: (1) CL only; (2) FSA only; (3) CA only; (4) CA + FSA. CL was adjusted by adding the appropriate amount of dilute sodium hypochlorite (NaOCl) solution. For the FSA waters, enough FSA was added to produce 2.0 ppm F^- which represents above average, but not unusual conditions within the highest permissible level (MCL) for drinking water fluoride. FSA was added as pre-diluted 26% FSA.

Although the CDC nominal "optimum" adjusted F^- concentration is 1.0 ppm, it is only a mid-range figure (CDC, 2001). The CDC recommends adjusting F^- according to mean annual local temperature. In colder areas (50–54 °F annual mean) such as Great Lakes States, the optimum is 1.1–1.7 ppm and in warmer areas (71–79 °F) it is 0.7–1.3 ppm. An allowance is also made for deviation from these boundaries by 0.1 ppm on the low side and 0.5 ppm on the high side (CDC, 1999). Hence, a water plant taking water in December through April from Lake Ontario or the Northern reaches of the Mississippi River could comply with CDC's optimum F^- at 2.0 ppm. Also, the recommended optimum F^- for school water systems is 4.1–5.0 ppm for the middle temperature range (CDC, 1999). Therefore, the 2.0 ppm F^- concentrations in this study were in the range experienced by much of the U.S. public.

CA was prepared as a stock solution comprising ammonium hydroxide and sodium hypochlorite in stoichiometric equivalent concentrations. For test water exposure, appropriate amounts of stock solution were pH adjusted upward by adding sodium bicarbonate ($NaHCO_3$) or downward using hydrochloric acid (HCl). Elbows were randomly assigned to test waters so that each water composition had five elbows assigned to it.

The conditionings using pH 8 were dropped in the second set of bottle tests to allow testing of more types of water additives. The same procedures used in the first set of bottle tests were carried out in the second set at pH 7 and 2.0 ppm of each constituent: (1) DI water only; (2) CL only; (3) CA only; (4) CA + 50% excess NH; (5) CA + FSA; (6) CA + 50% excess NH + FSA; (7) CA solution into which 26% FSA was added to produce 2 ppm of fluoride without pre-dilution; (8) FSA + NH; (9) CA + ammonium fluosilicate.

CL, CA, FSA, and pH were adjusted the same way as the first bottle tests. NH was adjusted by adding ammonium hydroxide

in appropriate 1:1 molarity with CL alone as well as with 50% excess NH to represent water plant control deviations described above regarding excess ammonia. The 50% excess NH is consistent with 50% greater than nominal 1 ppm F^- optimum, therefore a reasonable condition to occur in a water plant with the risk of side reaction between SiF and NH. The difference between conditions 5 and 7 was based on that premise. In condition 5, FSA was diluted before adding it to the mixture, as was done for other treatments using FSA. In condition 7, it was added at 26% concentration and the resulting mixture diluted to 2 ppm F^-.

For reasons described earlier, mixing concentrated FSA with NH with ample time to react should approximate water plant conditions, producing a species with corrosion potential differing from that when pre-diluted dissociated FSA meets ammonia. It should be noted here that concentrated FSA and NH are frequently injected into water plant water in close proximity to each other (District of Columbia Water and Sewer Authority, 2002). The rationale for including conditions 8 and 9 was that NH is known to react with copper, forming the soluble copper/ammonia complex, thus possibly exposing additional lead surface in the brass.

3.2. Phase I statistical analyses

For both sets of bottle tests, ANOVA analyses conducted on the natural-log-transformed lead concentrations found no evidence of significant non-normality (Kolmogorov–Smirnov p-values = 0.124 and 0.100) or heterogeneity of variances (Levene p-values = 0.191 and 0.979). Tukey's least significant difference (LSD) procedure was used to perform a multiple comparison of log lead concentrations between each combination of water and pH. Confidence intervals for the median lead concentrations of all elbows that might be exposed to those conditions were calculated for each water-pH combination under the assumptions that the log lead concentrations were approximately normally distributed with common variance. Least square means and corresponding individual confidence intervals were calculated from the ANOVA analysis for these log lead concentrations for each combination, and then the inverse transform was conducted on the least square means of the logged data to obtain the estimated medians and 95% confidence intervals for the median lead concentrations.

3.3. Phase II (flow-through tests 8% leaded-brass meters)

Twenty leaded-brass Hersey Model 430 water meters were purchased locally in Asheville, NC. Three meters were selected randomly and assayed for lead on a small slice from the meter exterior with results ranging from 7.59 to 8.44% lead. Meters were randomly assigned to one of seven types of water and hooked up to a plumbing manifold consisting of three meters for each of six waters and two meters for one water. Connected plumbing included a Flojet Model 2100-953-115 plastic vacuum pump and a 100 L Nalgene laboratory carboy (see Fig. 1).

Each manifold system was conditioned by flushing 350 mL of a 1.0 ppm CL/DI water solution through all the meters about

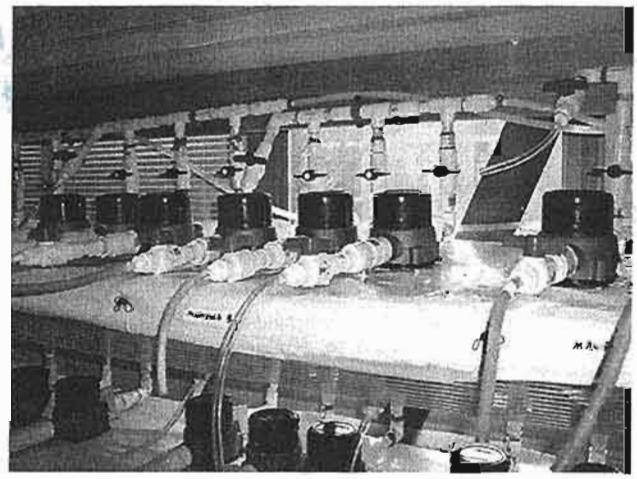

Fig. 1. Picture of Phase II setup.

15 times each weekday for 2.5 weeks for a total of approximately 190 times. One additional week of conditioning was completed by flushing 350 mL of the CL/DI water through the meters another 63 times. For this final week, samples were taken on Wednesday, Thursday, and Friday mornings at approximately 8:30 a.m. The late afternoon before each sample was taken a 2-L flush was completed at 4:30 p.m. and the meters sat undisturbed overnight 16 h until the morning sample at 8:30 a.m. Conditioning provided stagnation water lead data for 1 ppm CL prior to switching to test waters. After conditioning, the following waters with 2.0 ppm of each constituent were studied: (1) CA + FSA; (2) CA + 100% excess NH + FSA; (3) CA + 100% excess NH; (4) CA + 100% excess NH + NaF; (5) CL + FSA; (6) CL + NaF; and (7) CL alone. The target pH for all waters was 7.5 with an acceptable range of 7.3–7.7. The 100% excess NH was used as a potential worst-case scenario simulating a situation that might reasonably occur from time to time in a water plant. The CL, CA, FSA, NH, and pH were adjusted using the same methodology as that of Phase I.

Three meters were tested for each water composition, except the CA + FSA combination which was tested with two meters. For 6 weeks the plumbing manifold systems were flushed four times each weekday. Each meter had 1 L of its respective test water flushed through it three times, and the final flush of each day was 2 L. Sampling occurred each week for the 6-week sampling period on Tuesday, Wednesday, and Thursday mornings following a 16-h stagnation period.

3.4. Phase II statistical analyses

To assure that no meter was used that might be particularly susceptible to corrosion, an ANOVA analysis was performed on the log-transformed lead concentrations for the samples taken during conditioning. Median values of stagnation water lead concentration were found for each set of meters and combination of day and water composition. As with the elbow data, the natural logarithm was taken for each lead concentration. Lead concentrations for each meter were averaged over

the first 3 and last 3 weeks of the study. These arithmetic means were log transformed to give a single value to each meter for each of the two periods.

ANOVA analyses were performed on these log-transformed means and individual 95% confidence intervals for the log-transformed means calculated. An inverse transform was applied to these values to estimate the typical mean stagnation water lead concentration produced by the given water over the given time periods. ANOVA data for each of the pre-treatment period, first 3 treatment weeks, and last 3 weeks provided no evidence of significant non-normality (Kolmogorov–Smirnov p-values = 0.079, >0.15, >0.15, respectively) or heterogeneity of variances (Levene p-values = 0.962, 0.475, 0.218, respectively).

4. Results

4.1. Phase 1 results (2% lead elbows)

For the first set of bottle tests pH, water treatment, and their interactive effect were all significantly related to log lead concentration (p-values = <0.001, <0.001, 0.006, respectively). Fig. 2 displays the 95% confidence intervals for medians of the first set of static bottle tests. As seen from the results of the Tukey's LSD (Table 1) and individual confidence intervals (Fig. 2), lead concentrations are significantly higher at pH 7 for the CL and the CA waters, but not for the other two. The highest lead concentration was produced by CA + FSA under both pHs. CA at pH 7 produced the next highest lead concentration, but not significantly less than the highest. Absent a factorial design it was not possible to test formally for an interactive effect of CA + FSA. FSA alone gave results very similar to CL. Although CA + FSA produced the highest lead concentrations at both pHs, the combination was significantly higher than CA alone only at pH 8. Thus, bottle test 1 provides evidence, albeit not compelling, for a positive interactive effect of CA + FSA on leaded-brass corrosion.

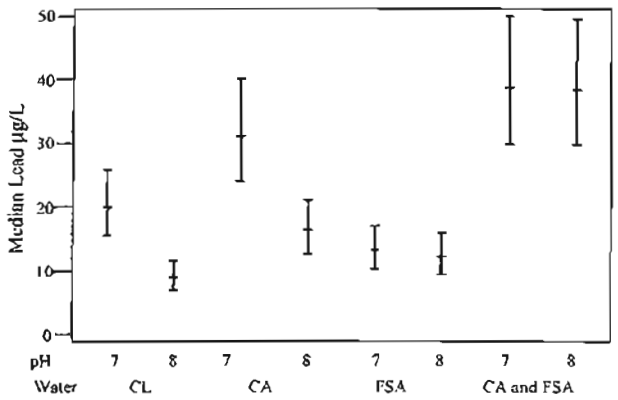

Fig. 2. Median 95% confidence intervals for bottle test 1 at pH 7 and pH 8.

Table 1
Estimated median lead concentrations for bottle test 1

	Water							
	Cl	FSA	FSA	CA	Cl	CA	CA + FSA	CA + FSA
PH	8	8	7	8	7	7	8	7
Estimated median	9.0	12.3	13.3	16.3	20.0	31.1	38.4	38.7

Combinations covered by the same line are not significantly different using Tukey's LSD statistic with a significance level of $\alpha = 0.05$.

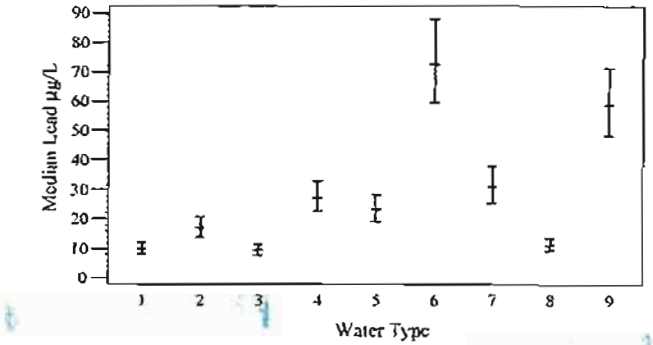

Fig. 3. Median 95% confidence intervals for bottle test 2. 1, Deionized Water; 2, CL Only; 3, CA Only; 4, CA and 50% excess NH; 5, CA and FSA 6, CA,50% excess NH, and FSA; 7, CA with 26% FSA Added; 8, FSA NH; 9, CA with concentrated ammonium fluorosilicate.

For the second set of bottle tests, water composition was the only factor having a significant effect on log lead concentrations ($p = 0.000$). Estimated median and confidence intervals for the median lead concentration of each water is displayed in Fig. 3. From the individual confidence intervals (Fig. 3) and Tukey's LSD results (Table 2) it can be seen that CA + 50% excess NH + FSA (#6) and CA + ammonium fluosilicate (#9) produced the two highest lead concentrations. CA + 50% excess NH; CA + FSA; CA + concentrated FSA produced intermediate concentrations. CL alone, CA alone, DI water alone, and the combination of NH + FSA produced the lowest concentrations. Unlike the first set of bottle tests at pH 7, CA alone produced significantly lower lead concentration than CL alone. CA + concentrated FSA produced a higher concentration than CA + pre-diluted FSA but the difference was not statistically significant.

Table 2
Estimated median lead concentrations for bottle test 2

Water code	Estimated median
3	9.4
1	9.9
8	11.1
2	17.0
5	23.3
4	27.2
7	30.8
9	58.8
6	72.3

Combinations covered by the same line are not significantly different using Tukey's LSD statistic with a significance level of $\alpha = 0.05$.
1, deionized water; 2, CL only; 3, CA only; 4, CA and 50% excess NH; 5, CA and FSA; 6, CA + 50% excess NH + FSA; 7, CA with 26% FSA added; 8, FSA + NH; 9, CA + concentrated ammonium fluosilicate.

The interactive effects of CA and FSA on lead leaching cannot be directly examined from the set of waters in the second set of bottle tests. However, effects of excess NH, FSA and their interactive effect can be evaluated for the CA waters. The four conditions: (3) CA only; (4) CA + 50% excess NH; (5) CA + FSA; and (6) CA + 50% excess NH + FSA make up a two-way full factorial experimental design. ANOVA analysis on just those four conditions found that in the presence of CA, both 50% excess NH ($p = 0.000$) and FSA ($p = 0.000$) were positively related to log lead concentration, but their interactive effect ($p = 0.662$) was not significant. Thus, in the presence of CA, 50% excess NH and FSA had positive additive effects on log lead concentrations in the second bottle study.

Median lead concentration for CA + 50% excess NH + FSA was greater than for CA + ammonium fluosilicate, but not significantly so. Thus, it seems reasonable to believe that CA + 50% excess NH + FSA leaches lead through a mechanism similar to that for CA with ammonium fluosilicate as such.

4.2. Phase II results (8% leaded-brass meters)

ANOVA analysis of the log-transformed lead concentrations during exposure to conditioning water (1.0 ppm CL/DI water solution) found no significant differences in the median lead concentrations between the groups of meters selected for the seven different water treatments (p-value = 0.771). The estimated median lead concentration for meters exposed only to the conditioning regime was 84.0 μg/L.

On Day 13 after treatment began, a meter receiving CL + FSA was reported to have a stagnation water lead concentration of 2.9 ppb, while the other two meters had values of 49.5 and 62.4. The 2.9 outlier was not included in any analyses. The median ($n = 3$, except for CA + FSA where $n = 2$) lead concentrations for each day were obtained for each water chemistry. Fig. 4 displays the median lead concentrations for the CA-type waters over the 28 days of testing. Fig. 5 displays the median lead concentration for the CL-type waters over the 28 days.

The median range in lead concentrations for the three (or, in one case two) meters subjected to the same waters for the entire study period (not displayed on the figure) was 9.0 μg/L over all days and waters. Some day-water sets had much higher meter-to-meter ranges. For example, days 1–3 for CL + FSA water had ranges of 115.5, 217.3, and 136.4 μg/L, respectively, but these were measured for water lead data in the 1000 ppb regime. As expected for data that is approximately log-normally distributed, day-water combinations with larger medians tended to also have larger ranges.

Figs. 6 and 7 illustrate the variability of the stagnation water lead concentrations produced over the entire test period by meters receiving, respectively, CA + 100% extra NH and meters

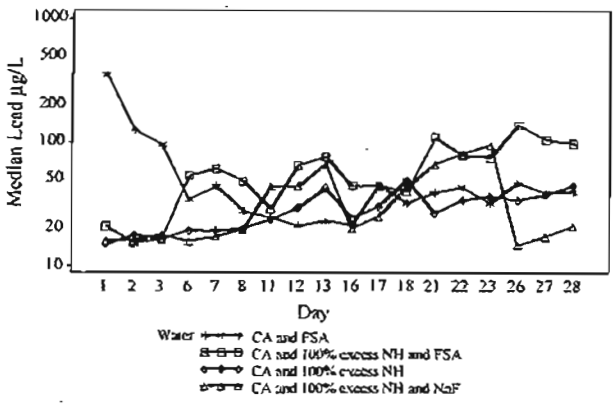

Fig. 4. Mean lead concentrations for the CA-based waters.

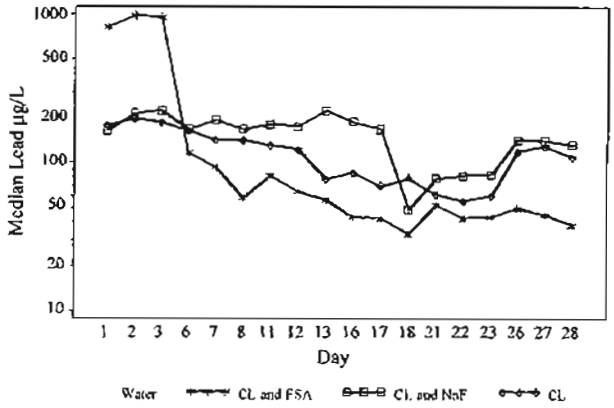

Fig. 5. Mean lead concentrations for CL waters by day.

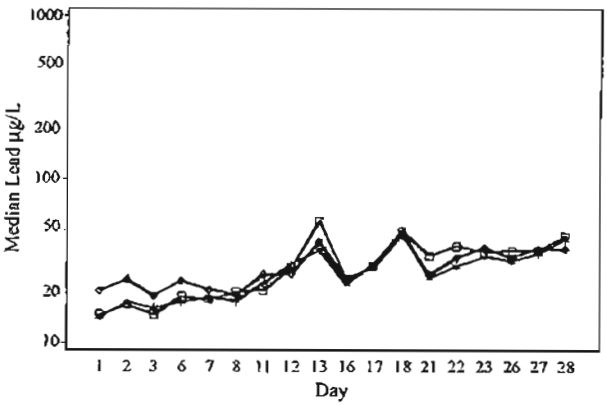

Fig. 6. Lead concentrations for meters using CA + 100% excess NH.

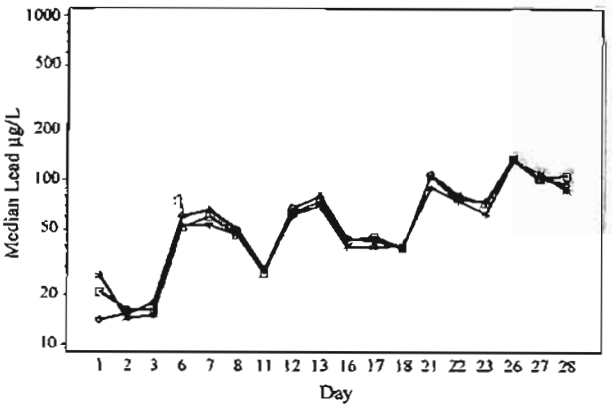

Fig. 7. Lead concentrations for meters using CA + 100% excess NH + FSA.

Table 3
Estimated median lead concentrations of meters by type of water averaged over day for the first 3 weeks of the study

Water	N meters	Estimated median (95% confidence interval)
CA and 100% extra NH	3	23.3 (21.0–25.9)
CA, 100% extra NH and NaF	3	28.1 (25.3–31.2)
CA, 100% extra NH and FSA	3	42.6 (38.4–47.3)
CA and FSA	2	83.1 (73.1–94.5)
CL	3	145.9 (131.4–162.0)
CL and NaF	3	185.3 (166.6–205.7)
CL and FSA	3	362.8 (326.7–402.9)

Water types that are covered by the same line are not significantly different from each other using Tukey's LSD with a significance level of $\alpha = 0.05$.

receiving CA + 100% extra NH + FSA. Clearly, for both treatment waters there is very little meter-to-meter variation in eluted lead on any one day. Such consistency is reasonable assurance that all the data reflect real effects, not merely random "chemical noise." Based on the premise that observed differences in stagnation water lead are not statistical aberrations, but due to explicable causes, day-to-day and week-to-week variability requires comment, which will be provided in the following section.

In the analyses shown in Figs. 4–7 a "week" is 5 days, since flushing occurred only on weekdays, and thus essentially no aging was considered to be occurring over weekends. Thus, Days 1–28 as shown in these figures represent 6 weeks of sampling on 3 successive days. Table 3 shows the median lead concentrations for all seven water chemistries averaged over the first 3 (5-day) weeks and Table 4 shows the corresponding results for the last 3 weeks of the study.

Fig. 4 and Tables 3 and 4 provide insights into corrosivity of CA-based test waters. The most corrosive of the CA-based test waters for the first 3 weeks was CA + FSA, while CA + excess NH + FSA was the most corrosive for the last 3 weeks and the only water showing a strong trend of increasing corrosivity over the whole experiment. Water with CA + excess NH and water with CA + excess NH + NaF were similar to one another in corrosivity which was significantly lower than the other waters. CA + excess NH + NaF displayed more variability over time than the other CA-based waters.

Fig. 4 and Tables 3 and 4 indicate that the water with CL + FSA was most corrosive for the first 3 weeks and CL + NaF was most corrosive for the last 3 weeks and second most corrosive for the first three weeks. Water with CL only was third most corrosive for the first 3 weeks and second most corrosive for the last 3. Water with CL + FSA showed a decreasing trend over the course of the experiment, while the other two CL-based waters displayed irregular, slightly decreasing trends.

Table 4
Estimated median lead concentrations of meters by type of water averaged over day for the last 3 weeks of the study

Water	N meters	Estimated median (95% confidence interval)
CA and 100% extra NH	3	34.8 (31.9–37.9)
CA and FSA	2	36.8 (33.1–40.9)
CA, 100% extra NH and NaF	3	43.2 (39.6–47.1)
CL and FSA	3	43.3 (39.7–47.2)
CA, 100% extra NH and FSA	3	79.2 (72.6–86.3)
CL	3	84.0 (77.0–91.6)
CL and NaF	3	115.2 (106.1–126.1)

Water types that are covered by the same line are not significantly different from each other using Tukey's LSD with a significance level of $\alpha = 0.05$.

Comparing the CL-based waters to CA-based waters, CL-based waters were most corrosive over the first 3 weeks of the study and three of the four most corrosive over the last three. This is in contrast to the results of Phase I in which the CA-based waters tended to be associated with greater stagnation water concentrations. However, it should be borne in mind that Phase I elbows were only 2% lead while Phase II meters were 8% lead. The possible effect of this difference on water lead will be discussed below along with comments about why in Phase II the highest lead level was a spike to over 1000 ppb extracted by FSA + 2 ppm CL water after initial meter conditioning with 1 ppm CL water.

5. Discussion of findings

5.1. Consistency of test results

Meter-to-meter difference in stagnation water lead values was very low on any one day and for virtually all test waters. The few instances where above median meter-to-meter variation was found, the median lead values were also on the high side. In other words, meter-to-meter differences in water lead values were about the same percent of median water lead values for most days and water formulas.

Day-to-day lead values within any week were often consistent or with a trend up or down. Such trends might be explained by loss of volatiles from a given batch of water without make-up under laboratory conditions that would not occur in a water plant where composition is in constant make-up mode. For example, excess NH alone might gradually decline, with one effect on lead extraction and excess CL alone might decline with the same or another effect. Given the fact that CL and NH combine to form chloramine, neither NH nor CL would be lost, which would have its own effect.

On the other hand, notable shifts in lead extraction occurred when a fresh batch of treatment water was prepared, typically between weeks. The most extreme shift in the entire experiment occurred when meters were first exposed to CL + FSA after having been conditioned to 1% CL/DI water. Along with the 17 other meters, the lead released by this group of 3 during the conditioning process had reached around 100 ppb. The first day these meters were exposed to CL + FSA following meter conditioning, lead concentration leaped to 800 ppb and increased to over 1000 ppb by the third day.

The second week batch of FSA + CL water was made up with the same FSA composition as the first batch, but the CL charge was different, in that sodium hypochlorite solution had been adjusted to compensate for change in the CL stock solution over time. The first day of the second week, water lead was down to 100 ppb, the same level as that at the end of the conditioning period. Thereafter, lead levels dropped in the

next 2 weeks and settled into a consistent 50 ppb day-to-day and week-to-week.

A crucial fact about the make-ups of the first and second FSA + CL batches is that the first had a pH of 7.56 with 1 g sodium bicarbonate added while the second had a pH of 7.30 with 6 g of sodium bicarbonate added. It is doubtful that this pH difference accounts for first week lead starting on day 1 at 800 ppb, increasing to over 1000 by the third day. The fact that one sixth the amount of base in batch 1 than in batch 2 produced a higher pH in batch 1 than that of batch 2 suggests fluosilicate dissociation status was not the same for both batches.

There also could have been serious error in batch preparation or analytical technique. But these explanations are at odds with the consistency of lead extraction measured during conditioning and very low meter-to-meter variation illustrated in Figs. 6 and 7. Neither human error in batch preparation, nor flaws in instrument performance can account for the high first day lead and upward trend that followed. A better explanation is that the combined action of CL and FSA in the first water batch started out very efficient and improved in the next 2 days. This would be consistent with release of particulate lead from the brass alloy in the first week leaving the remaining potentially mobilizable lead shielded from corrosive attack.

A similar, but less dramatic, effect was observed when FSA was added to CA with excess NH. After settling at the 100 ppb level during conditioning, the first day of exposure the test water produced a stagnation lead level of 350 ppb. Then, in this case, without any change in batch formula, after the first-day 350 ppb spike, the second day lead was 120 ppb, and the third day 100 ppb. Thereafter, for 5 successive weeks, with new batches each week, stagnation lead settled down to a very consistent 40–50 ppb.

On an obviously different scale, the same sensitivity of leaded-brass to corrosion by FSA + CL or FSA + CA can be expected in a water plant. It may not be observed when very tight controls are kept on treatment chemical compositions, but the results reported here are very much like what was found in the DC experience.

Considering the several different additives used in the plant, it is a forgone conclusion that deviations from an ideal dosage of any one additive are inevitable. The important data in this report should, therefore, be treated as providing reasonable confidence, not absolute proof of what would actually occur in a water plant.

6. Conclusions

In the "fluoridation debate" proponents frequently argue that the 1 or 2 ppm of fluoride in drinking water is so trivial that it cannot be a health danger. When one translates the ppm involved into molar concentrations, 2 ppm of fluoride is about twice the concentration of 2 ppm of chloride.

Ironically, the switch from CL to CA for disinfection that was made for health reasons, may have created a high water lead health problem. Published evidence has shown that chloramine used instead of chlorine for water disinfection enhances lead extraction from leaded-brass plumbing devices and faucets. Prior to the present study, no one had looked at brass corrosion by combinations of either chlorine or chloramine with water fluoridating agents. Several factors applicable to such combinations can produce more corrosion than either of the disinfectants or fluoridating agents alone.

One such factor is that fluosilicic acid, the most widely used fluoridating agent, is a good solvent for lead. Another is that chlorine, ammonia, and chloramine are all hostile to copper in that they induce copper stress cracking and/or can dissolve it. A third factor is that ammonia added to chlorine to produce chloramine will also react with fluosilicic acid to produce ammonium fluosilicate, an established solvent for copper alloys.

Besides these chemical factors, the lead in brass is present as nodules, so that any attack on the copper matrix of brass would render particulate lead readily accessible for mobilization. Whatever the exact mechanism may be for the combined effect of CA and fluoridating agents on increased levels of waterborne lead, the fact is that SiFs (FSA and NaFSA), commonly used to fluoridate water, have been associated with elevated blood lead levels in children (Coplan et al., in press; Masters et al., 2000). In a related sense, it was recently found that the North Carolina water systems that use FSA and chloramine are associated with elevated blood lead levels in children (Allegood, 2005; Clabby, 2006; Miranda et al., 2006). EPA has claimed a year-long evaluation they conducted did not find a national problem comparable to that in DC, but EPA also acknowledged the need to update specific areas of the LCR and guidance materials (USEPA, 2006). That ought to include lead from brass (Dudi et al., 2005; Renner, 2006) (see Coplan et al., in press).

Acknowledgment

This paper is dedicated to Dr. Richard P. Maas 1952–2005.

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Impact of fluorosilicate compounds on lead levels in drinking water and on water distribution infrastructure

Petition: No. 245

Issue(s): Environmental assessment, fisheries, human health/environmental health, toxic substances, and water

Petitioner(s): Environmental Training Institute

Date Received: 2 May 2008

Status: Completed

Summary: The petitioner seeks responses from several departments on potential health concerns related to increased levels of lead in drinking water due to fluoridation. In addition, the petitioner alleges that fluorosilicates have a detrimental effect on water distribution infrastructure and asks whether the government has carried out related cost assessments.

Federal Departments Responsible for Reply: Environment Canada, Department of Finance Canada, Fisheries and Oceans Canada, Health Canada, Public Health Agency of Canada, Public Works and Government Services Canada, Treasury Board of Canada Secretariat

Petition

Petition under Section 22 of the *Auditor General Act* for the discontinuation of the addition of toxic substances to our drinking water (inorganic fluorides, inorganic arsenic, lead)
In violation of the *Fisheries Act*, section 34(1), which describe the provisions to conserve and protect fish habitat that sustain Canada's fisheries resources, the harmful alteration, section 35(1), which prohibits the harmful alteration, disruption or destruction (HADD) of fish habitat, and sections 36-42 which control the deposition of any deleterious substance to water frequented by fish

Fluorosilicate Compounds Increase Drinking Water Lead Levels, Hence Source Water Contamination.

[Original signed by Peter L.D. Van Caulart]

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Commissioner of the Environment and Sustainable Development
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Telephone: 613-995-3708
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Email: petitions@oag-bvg.gc.ca

Introduction

Background levels of fluoride for Lake Ontario and the St. Lawrence River are up to 0.25mg/L that is double the 0.12mg/L Canadian Water Quality Guideline (CWQG). DWSP http://www.ene.gov.on.ca/envision/water/dwsp/0002/eastern/eastern.htm

Evidence from the study by Daemker and Dey 1989 indicates that some species of fish (salmon) are harmed at levels of about 0.25mg/L.[10] Other studies that indicate that fluoride at levels below 1.5 ppm have lethal and other adverse effects on fish. Delayed hatching of rainbow trout have occurred at 1.5 ppm; [11] brown mussels have died at 1.4 ppm[12]; an alga (Porphyria tenera) was killed by a four-hour fumigation with fluoride with a critical concentration of 0.9 ppm[13]; and, levels below 0.1 ppm were shown to be lethal to the water flea, Daphnia magna.[14] These latter two studies suggest that salmon species also may be affected by fluoride-induced reduction of food supply.

Documents used in a 1961 court case involving Meader's Trout farm in Pocatello, Idaho,[15] contain evidence that between 1949 and 1950 trout damage and loss was related to fluoride contamination due to rain washing airborne particles from leaves into hatchery water at levels as low as 0.5 ppm.

Because, in soft waters with low ionic content, a fluoride concentration as low as 0.5mg/L can adversely affect invertebrates and fishes, safe levels below this fluoride concentration are recommended in order to protect freshwater animals from fluoride pollution.[16]

Such demonstrated harm of aquatic species is in violation of the Fisheries Act. The addition of toxic substances (Na_2SiF_6 and H_2SiF_6 and co-contaminants arsenic, lead, mercury etc.) into our drinking water, hence source water is harmful and not sustainable.

Fluorosilicates Increase Blood Lead Levels

The actual products used in 90% of artificial water fluoridation sites are fluorosilicates that are derived from the phosphate mining industry. These products (Na_2SiF_6, H_2SiF_6) contain trace amounts of arsenic, lead and other contaminants. The **direct and indirect contribution of the drinking water contaminant lead** from fluorosilicates and their contribution to independent health effects are assessed below.

Direct additive: Lead is the second most common co-contaminant with the silicofluorides used in water fluoridation; "The second most common contaminant found..." (NSF Fluoride Fact Sheet on Fluoridation Chemicals)

Chlorine → Chloramine

A switch from chlorine to chloramine [ammonia + chlorine] was recently recommended and adopted in some water systems for several reasons:[1]

- Chloramine is cheaper than other disinfection methods
- Easy to add ammonium to already-chlorinated water
- Chloramine produced fewer disinfection by-products [DBPs] than chlorine

Fluorosilicates &/or Chloramine + Lead or Leaded Brass = Increased Blood Levels

Two new studies[1-3] demonstrate that fluoride in various combinations with chlorinating chemicals (e.g. chlorine or chloramine) increases the release of lead from leaded brass fittings used in water pipes. There are several chemical reasons[3];

1. fluosilicic acid, the most widely used fluoridating agent, is a good solvent for lead.
2. chlorine, ammonia, and chloramine are all hostile to copper in that they induce copper stress cracking and/or can dissolve it.
3. ammonia added to chlorine to produce chloramine will also react with fluosilicic acid to produce ammonium fluosilicate, an established solvent for copper alloys/brass.

Besides these chemical factors, the lead in brass is present as nodules, so that any attack on the copper matrix of brass would make lead particles readily accessible for mobilization[3].

Drinking Water is an important source of increased lead. Increased blood levels were found in homes without lead service lines or lead soldered copper piping. The only possible lead source had to be leaded-brass plumbing and/or brass faucets.

Silicofluoride use is associated with 2 neurotoxic effects[1]:

1. Prevalence of children with elevated blood lead (PbB>10µg/dL) is about double that in non-fluoridated communities;
2. Voluntary and involuntary muscle action is stimulated by **acetylcholine** (ACh) that is cleaved by the enzyme **acetylcholinesterase** (AChE) to end the stimulation. Without AChE, muscle excitation would persist as spasm with potentially lethal effect, as caused by a nerve gas. Acetylcholine modulated by acetylcholinesterase also induces saliva flow. Intense salivation is a symptom of fluoride poisoning. Silicofluorides inhibit AChE.

"It is proposed here that SiFW [silicofluorides in water] induces protein mis-folding via a mechanism that would affect polypeptides in general, and explain dental fluorosis, a tooth enamel defect that is not merely "cosmetic" but a "canary in the mine" foretelling other adverse, albeit subtle, health and behavioral effects."

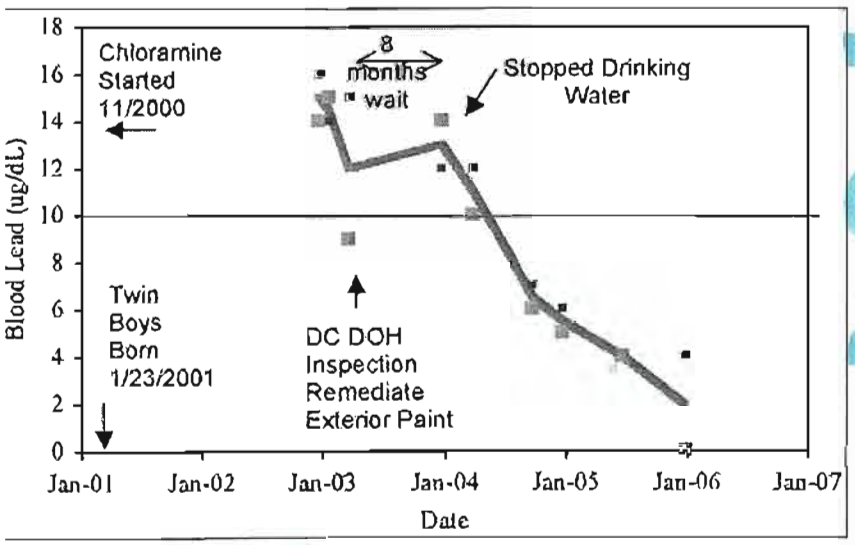
Indirect additive: "A contaminant that is extracted into drinking water through contact with surfaces of materials or products used for drinking water treatment, storage, transmission, or distribution." (NSF/ANSI Standard 60 2.10, P 3)

A growing body of research suggests that the practice of fluoridation may double the exposure of lead in our children from drinking water in two important ways:

1. **Direct additive**: Lead is the second most common contaminant found in the silicofluoride products used in >95% of water fluoridation facilities in the US.
2. **Indirect additive**: Lead is now known to leach from lead pipes, lead solder and leaded brass by mechanical and chemical interactions of fluorosilicates and/or chloramine (see below).

The University of North Carolina Environmental Quality Institute (EQI) has found that lead-bearing brass plumbing in the absence of any other source such as lead pipes is corroded by SiF treated water to such an extent that it should be considered as a serious source of ingested lead. (Contact Myron Coplan P.E., Intellequity Technology Services; Telephone: 508 653-6147)

A statistically significant association between the use of silicofluorides as water fluoridation agents (in both Massachusetts and New York State) and an increased uptake of lead into children's blood[4,5] was previously demonstrated.



Blood lead data for twin boys born in 2000.

"After the levels were found to be higher than CDC's [Centers for Disease Control] level of concern, DOH [department of health] inspected their home for lead paint and found only a remote exterior door as an admittedly unlikely source. However, painting the door failed to bring down the boys' blood lead levels. But when they stopped drinking tap water and it was no longer used in cooking their meals, the boys' blood lead levels declined rapidly."[8]

Sodium Fluoride → Silicofluorides

Silicofluorides were substituted for sodium fluoride in 1947 and endorsed in 1950 by the US Public Health Service without prior animal testing because rats teeth got as much fluoride as from sodium fluoride, and a community could save 4 cents per year per resident (McClure, 1950).[1]

Fluorosilicates shortens lifetime of water distribution infrastructure. Fluoride is the most corrosive of all known elements. (Merck Index) Fluorosilicates cause the following problems:

1. **leach lead from brass/copper fittings** (Coplan 2007, Maas 2007, Masters 1999, 2000, NRC 2006 Report on Fluorides in Drinking Water)
2. **leach lead from lead pipes and lead solder - cast iron (CI), ductile iron (DI)** piping
3. **antagonistic to the Asbestos Cement pipe matrix** used in transmission watermains, hastening decay of this important infrastructure. (IAOMT p24)
4. **corrodes stainless steel, nickel, ceramic and glass.**
5. **acidifies water, creating a need for neutralizing agents** such as lime to increase pH and restore lost alkalinity.

Quicklime is calcium oxide (CaO) and is made by heating limestone. It's the cheapest form of lime. To use quicklime it must be **slaked by adding water and allowing the insolubles to precipitate, leaving the limewater to be used for water treatment coagulation, softening or raising pH.** The slaking process is labour intensive and dirty. Quicklime must be stored in sealed silo hoppers, onsite. It's a cheap ingredient that requires a high capital cost for storage and slaking equipment, plus an ongoing operational labour cost to run the system. http://www.carmeusena.com/Markets/faqs.asp?indid=4#3

Liquid Sodium hydroxide NaOH may also be used to raise pH. It is simple to use, feed directly to pump, easier to store, but it is 5x higher price. It is used in small communities because they do not have the human resources to deal with lime sludge/limewater separation.

In **San Diego a new stainless steel HFSA vat** was destroyed within weeks of installation "After waiting four years to complete billions of dollars of improvements at five water treatment plants, the Metropolitan Water District had expected to start fluoridating in October."..."Metropolitan spokesman Bob Muir said Wednesday the latest delay came after the agency's staff discovered the galvanized steel it planned to use could corrode if it came in contact with the fluorosilicic acid that will fluoridate supplies." (Conaughton 2007)

1992 Tacoma, Washington had to shut down the fluoridation equipment due to the fact that **fluoride had eaten the pipes**. The municipal water had approximately 32 parts per billion (ppb) lead at the time of the breakdown. After the breakdown, the lead level dropped to 17 ppb. When the equipment was fixed, the lead level shot back up to 32 ppb. The city fathers decided to discontinue the use of fluoride, and the lead level again dropped. Over the next several years the lead level continued to drop, and today it is about 5 ppb. IAOMT p24-25

Thurmont, Maryland had an identical experience with fluoride raising lead levels in their municipal water system. IAOMT p25

One new study reports:[3] "Over the first test week with chlorine flushing, lead concentrations nearly doubled [from 100ppb to nearly 200ppb]. When fluorosilicic acid was added, lead concentrations spiked from 100ppb to over 900ppb. Lead concentrations from the chlorine-based waters appeared to be decreasing over the study period. Lead concentrations seemed to be increasing with the chlorine + ammonia + fluorosilicic acid combination."

Moss et al 1999[6] indicate that elevated blood lead levels may lead to increased cavities.

The quote below is from the following document:
Silicofluorides Should Not Be Added to Municipal Water Without Safety Testing Adequate to Protect Children and Other Vulnerable Populations *Resolution Submitted to American Public Health Association by Myron Coplan, P.E. & Dr. Robert Carton, Ph.D. 2001*

"Considering that data on 400,000 children in New York, Massachusetts, and in the NHANES III (National Health and Nutrition Examination Survey III) study, found that where local water is fluoridated with SiF's the prevalence of children with venous blood lead exceeding 10mcg/dL was significantly higher than in non-fluoridated areas with risk ratios of between 2.0 and 4.0 ($p<0.001$) controlling for race, housing age, poverty, congestion, and parental education);[40, 41] and

Recognizing that blood lead is believed responsible for adverse effects inflicted *in utero* such as impaired immune capacity,[42] brain damage and developmental problems,[43, 44, 45] as well as in early childhood,[46, 47, 48, 49, 50, 51] and into puberty/adolescence as impaired cognition and impulse control,[52, 53] and adulthood as nephropathy and hypertension,[54, 55] and into geriatric life;[56]"

"The atomic weight of lead being about ten times that of fluorine, for each ppm of silicon bound fluorine, 10 ppm of lead would be mobilized."[1]

Enzyme inhibition by SiF was also the subject of a German PhD thesis that focused on inhibiting acetylcholinesterase (AChE). AChE plays a vital role in proper functioning of cholinergic neural systems responsible for both voluntary and involuntary muscular processes. For instance, AChE quenches acetylcholine (ACh) activity after it has transmitted excitatory signals across a synaptic gap to a muscle end-plate. Without that quenching, muscle excitation would be prolonged, a spasm would occur that can be fatal...a shorthand description of how nerve gas works.[17]

Apart from direct adverse health problem from ingested SiF's, it should be noted that SiF treated water is a potential source of low-level internal radiation from contaminating radionuclides as a possible cause of osteosarcoma.

COSTS OF FLUOROSILICATES TO WATER DISTRIBUTION INFRASTRUCTURE

The Centers for Disease Control now states clearly that fluorides are ineffective at the levels currently used in Canada. ***"Fluoride's predominant effect is posteruptive and topical."*** *MMWR Weekly Report.* Vol. 50, No. RR-14, August 17, 2001, p. 4.

"Fluoride's caries-preventive properties initially were attributed to changes in enamel during tooth development because of the association between fluoride and cosmetic changes in enamel and a belief that fluoride incorporated into enamel during tooth development would result in a more acid-resistant mineral. However, laboratory and epidemiologic research suggests that fluoride prevents dental caries predominately after eruption of the tooth into the mouth, and its ***actions primarily are topical for both adults and children.*** *" MMWR Weekly Report.* 1999;48:933-940.

The CDC also states that the concentration of fluoride in drinking water is too low to have a topical effect. *"Studies have shown that* ***even a drop of 0.2 mg/L below the optimum (fluoride) level can reduce dental benefits significantly.*** *"* CDC Fluoridation Course 3017-G, pg. 8, Para. 3 According to the estimates by CDC, fluoride level for Ontario should be at least 1.2mg/L. According to CDC's own calculations, the concentrations (0.5-0.8mg/L) recommended by the Ontario MOE are ineffective.

Conclusions

The direct or indirect addition of lead from fluorosilicates is shown to cause measurable health harm. Lead is a known neurotoxicant. Lead has synergistic effects with chlorine/chloramine.

This evidence suggests that the "safe level" of fluoride in the fresh water habitat of susceptible species is 0.2 ppm (mg/L). The evidence suggests that artificial water fluoridation is harmful to humans and should be discontinued.

Questions

1. In legal circles when one product is advertised for use and then another product is used in its place, it is called "bait and switch". Please provide evidence that Health Canada or Public Health have informed the public that we are putting H_2SiF_6 or Na_2SiF_6 into drinking water and not "fluoride"? Provide evidence of such notices.
2. Does Environment Canada consider that removing fluoride compounds from air emissions (HF) to minimize pollution and adding them through drinking water, hence source water is a valid environmental solution to pollution? If so, explain how?
3. How has Health Canada or Environmental Canada communicated concern about increasing lead levels in drinking water, hence source water? If so, which federal agency will conduct research to determine the relative contributions of the mixtures of free chlorine or chloramine and fluorosilicates to our lead in drinking water?

4. What is Health Canada's current position with respect to the American Dental Association's explanation that fluoride works topically, not by swallowing (JADA Cover Story July 2000)? Agree or not?
5. Has Public Works or the Treasury Board made a cost assessment of how much the use of H_2SiF6 and Na_2SiF_6 are costing taxpayers in terms of infrastructure? Please provide estimates and the source of these estimates.
6. Australia and US governments are being sued for health harm caused by water fluoridation. What type of risk assessment has Health Canada or any other government agency done to assess potential liability on this issue for the government of Canada?
7. The CDC states: *"Studies have shown that even a drop of 0.2 mg/L below the optimum (fluoride) level can reduce dental benefits significantly."* CDC Fluoridation Course 3017-G, pg. 8, para. 3 According to the estimates by CDC, "optimal" fluoride levels for Ontario should be 1.2mg/L or higher. According to CDC's own calculations, the concentrations (0.5-0.8mg/L) recommended by Ont. MOE are ineffective. Why does Health Canada continue to promote this ineffective method of delivering this unregulated drug when even the Centers for Disease Control optimal dosage formula demonstrate that it is ineffective?
8. Does Health Canada still use the Galagan-Vermillion formula and the assumptions on which it was based (e.g. Galagan and Vermillion assumed that, on average, 44% of the American children's fluid intake was milk, which has negligible fluoride levels) to determine water fluoridation concentration guidelines? If so, please provide rationale and research evidence. If not, why? Galagan DJ, Vermillion JR, Nevitt GA, Stadt AM, Dart RE. Climate and fluid intake. Public Health Rep 1957;72:484–90.
9. Does Health Canada believe that 44% of Canadian children's fluid intake is milk? If so, why? Please provide rationale and research evidence. If not, why?
10. Does Health Canada contend that drinking water providers may compel the ingestion of, and dermal exposures to, fluoride through our addition of a direct water additive?
11. Which government agency is responsible for disclosing all sources of, and quantifying, potential and historically based exposures to fluoride?
12. Is the Department of Fisheries and Oceans aware that fluoridating communities adding the toxic compounds of hydrofluorosilicic acid, arsenic and lead to our fresh water and salt water systems are pushing background levels of fluoride above the CWQG? If so, what do they plan to do about it? If not, why?
13. Does the Department of Fisheries and Oceans believe that the discharge of municipal fluoridated effluents is a sustainable activity for fisheries? If so, why? If not, what are the Department's plans to halt it?
14. H_2SiF_6, Na_2SiF_6 are the primary agents used in >95% of water fluoridation schemes in the USA and assumably in Canada. These products are incorporated into the food chain through reconstituted beverages (fruit beverages, sodas) and food processing (cooking, washing). Does Health

Canada have any responsibility to prevent the sale of toxic substances, as defined by CEPA (inorganic fluorides such as H_2SiF_6, Na_2SiF_6 which are anthropogenic) for consumption? Does any other federal government agency (Environment Canada?) have a responsibility to prevent the sale of toxic substances in our food chain?

15. The Safe Drinking Water Act of Ontario, section 20, does not permit the addition of drinking water health hazards to our drinking water; dilution of drinking water health hazards is no defence. What proof Can Environment Canada or Health Canada or any other relevant government agency show that the toxic substances used in water fluoridation (H_2SiF_6, Na_2SiF_6) their complex silicate by-products and co-contaminants arsenic, lead (see Urbansky 2002, Coplan 2007, Smith, 1999) are not drinking water health hazards? (Urbansky concluded that hydroxo-fluoro SiF derivatives exist in drinking water. Coplan et al 2007 also demonstrates that many fluorosiliciates exist in drinking water H_2SiF_6, $H_2SiF_6 \cdot SiF_4$, Na_2SiF_6). Please provide references.
16. Does Health Canada, Environment Canada or any other relevant government agency disagree with the above evidence that fluorosilicates do not completely dissociate and may re-associate? If so, please provide rationale and complete references.
17. Can Health Canada, Environment Canada or any other relevant government agency prove that complete dissociation occurs despite the above evidence? If so, please provide references.
18. Which SINGLE peer-reviewed publication in an established scientific journal that establishes the SAFETY of either fluorosilicic acid or sodium silicofluoride (H_2SiF_6, Na_2SiF_6) for all individuals, over a lifetime of ingestion, using conventional animal studies of toxicology (and neurotoxicology) can Health Canada or any other relevant government agency provide as evidence of such?
19. Knowing that approximately 50% of the fluoride humans and animals ingest each day accumulates in their bones, what systematic and comprehensive attempts to measure fluoride in the bones of the Canadian population or fish species to see how close some individuals or fish species are getting to levels associated with pre-clinical, phase 1, phase II or phase III skeletal fluorosis <http://salsa.democracyinaction.org/dia/track.jsp?v=2&c=d7MRwdlM6uD1oIrwfLMfOElUQHKaz7Xd> , as well as levels associated with increased susceptibility to bone fractures <http://salsa.democracyinaction.org/dia/track.jsp?v=2&c=H1PPFrMCu0Jw2jIMpmf%2BK0lUQHKaz7Xd> in animal studies <http://salsa.democracyinaction.org/dia/track.jsp?v=2&c=88KRz7vDYWGIjuURme452klUQHKaz7Xd> and clinical trials <http://salsa.democracyinaction.org/dia/track.jsp?v=2&c=2kKMD1zB%2BTHq1ASGjcrjeUlUQHKaz7Xd> ?
20. What published studies have satisfied you that when a child has developed dental fluorosis that fluoride has caused no other damage <http://salsa.democracyinaction.org/dia/track.jsp?

v=2&c=1lvtZ6CYQhmMqAt8rVhVBUlUQHKaz7Xd> to the child's developing tissues?

Recommendations

Will Fisheries and Oceans recommend the discontinuation of this practice which is no longer considered effective in the treatment of cavities, but which is influencing the migration patterns and the destruction of some marine species such as Pacific Salmon, in violation of the Fisheries Act?

Will Public Works and Government Services Canada or Finance Canada recommend that a cost estimate of damage done to water infrastructures in cities that currently fluoridate?

Because litigation is now occurring in Australia and the USA regarding water fluoridation, will Public Works and Government Services Canada or Finance Canada recommend that a cost estimate of possible litigation on this issue be made?

Will Health Canada recommend that this practice of adding hydrofluorosilicic acid or sodium silicofluoride and associated contaminants to drinking water, hence source water, stop immediately? If not, why?

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FLUORIDE CLASS ACTION

by James Robert Deal, Attorney

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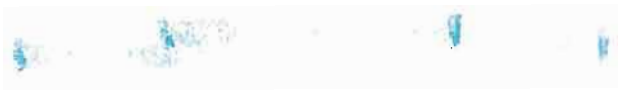

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Comments Re Lead

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COMMENTS TO HHS AND EPA
REGARDING LEAD, ARSENIC, AND WATER FLUORIDATION
Submitted April 19, 2011, Revised May 19, 2011

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Dear Ms. Sebelius and Ms. Jackson,

I am writing to give comments to HHS and EPA regarding their recent requests for comment on fluoridation.

To make it easier to follow links, read a web version of this letter at http://fluoride-class-action.com/hhs. Click on http://fluoride-class-action.com/hhs/comments-re-lead.

This letter is a supplement to my Fluoride Report Card for HHS and EPA. To read that letter click on http://fluoride-class-action.com/hhs/comments-re-lead.

I conclude that the research done by HHS and EPA on fluoridation is inadequate and that neither presented sufficient evidence to come to the conclusion that fluoridation should be continued but at a reduced level, that is at .7 ppm or that a new reference does of .08 mg of fluoride per kg of body weight should be set. I also conclude that HHS and EPA have been ignoring evidence that would force the conclusion that no fluoridation at any level should continue.

One of the most important lines of evidence that has been ignored is that which connects silicofluorides with increased lead in water.

Both requests for comment look back to the 2006 NRC Report, which suggested many topics which EPA should study in connection with drinking water fluoridation. The long list of topics included the following: caries, fluorosis, and bone fractures, fertility, thyroid function, increased calcitonin activity, increased parathyroid hormone activity, secondary hyperparathyroidism, impaired glucose tolerance, and possible effects on timing of sexual maturity, endocrine effects and brain function, osteosarcoma. See 2006 NRC Report, "Research Needs", pages 11-12, which mentions "brain function" as a needed area of research, and which points to lead which causes serious neurological harm. NRC also suggested on page 52-53 under "Fluorosilicates" that EPA do further research on the connection between silicofluorides and lead uptake:

> Most fluoride in drinking water is added in the form of fluosilicic acid (fluorosilicic acid, H2SiF6) or the sodium salt (sodium fluosilicate, Na2SiF6), collectively referred to as fluorosilicates (CDC 1993). Of approximately 10,000 fluoridated water systems included in the CDC's 1992 fluoridation census, 75% of them (accounting for 90% of the people served) used fluorosilicates. This widespread use of silicofluorides has raised concerns on at least two levels. First, some authors have reported an association between the use of silicofluorides in community water and elevated blood concentrations of lead in children (Masters and Coplan 1999; Masters et al. 2000); this association is attributed to increased uptake of lead (from whatever source) due to incompletely dissociated silicofluorides remaining in the drinking water (Masters and Coplan 1999; Masters et al. 2000) or to increased leaching of lead into drinking water in systems that use chloramines (instead of chlorine as a disinfectant) and silicofluorides (Allegood 2005; Clabby 2005; Maas et al. 2005).12,13
>
> Use of more sophisticated analytical techniques such as nuclear magnetic resonance has failed to detect any silicon- and fluorine-containing species other than hexafluorosilicate ion ($SiF6^{2-}$) (Urbansky 2002; Morris 2004). In drinking water at approximately neutral pH and typical fluoride concentrations, all the silicofluoride appears to be dissociated entirely to silicic acid (Si(OH)4), fluoride ion, and HF (Urbansky 2002; Morris 2004); any intermediate species either exist at extremely low concentrations or are highly transient. $SiF6^{2-}$ would be present only under conditions of low pH (pH < 5; Urbansky 2002; Morris 2004) and high fluoride concentration (above 16 mg/L according to Urbansky [2002]; at least 1 g/L to reach detectable levels of $SiF6^{2-}$, according to Morris [2004]). Urbansky (2002) also stated that the silica contribution from the fluoridating agent is usually trivial compared with native silica in the water; therefore, addition of any fluoridating agent (or the presence of natural fluoride) could result in the presence of $SiF6^{2-}$ in any water if other conditions (low pH and high total fluoride concentration) are met. 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. 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 AlF2+ and AlF3). Calculations were not reported for pH <6.
>
> Further research should include analysis of the concentrations of fluoride and various fluoride species or complexes present in tap water, using a range of water samples (e.g., of different hardness and mineral content). In addition, given the expected presence of fluoride ion (from any fluoridation source) and silica (native to the water) in any fluoridated tap water, it would be useful to examine what happens when that tap water is used to make acidic beverages or products (commercially or in homes), especially fruit juice from concentrate, tea, and soft drinks. 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 are high for many people, and therefore the possibility of biological effects of $SiF6^{2-}$, as opposed to free fluoride ion, should be examined.

HHS and EPA avoided the silicofluoride and lead issue. They chose to do research only on caries, fluorosis, and brittle bones

NRC suggested that further research be done on the silicofluoride-lead issue, however, neither HHS nor EPA did such further research. They only addressed caries, fluorosis, and bone fractures. Nevertheless, HHS and EPA had the audacity to recommend that fluoridation be continued. HHS and EPA should immediately retract any

recommendation that fluoridation be continued.

Why have HHS and EPA avoided doing broad research on all topics pertaining to fluoridation? I can only speculate. The best hypothesis I can come up with is that they do not want to find what they would find if they did broad research. Their primary commitment is not to our health or pure water but to please the chemical industry which buys seats on the boards of our regulatory agencies through political donations to our representatives and senators.

A FOCUS ON LEAD IN PAINT—LEAD IN WATER IGNORED

Federal law mandates that water districts give lead notices. A water district, as

> owner or operator of a public water system .. shall identify and provide notice to persons that may be affected by lead contamination of their drinking water where such contamination results from . . lead content in the construction materials of the public water distribution system [or] corrosivity of the water supply sufficient to cause leaching of lead. . Notice under this paragraph shall be provided notwithstanding the absence of a violation of any national drinking water standard.[1] [emphasis added]

State boards of health have the responsibility under federal law to make rules pertaining to protecting state citizens, particularly children, from lead.

When the Washington Board of Health, for example, works on the lead issue, it focuses on avoiding lead in old paint [2] The Board of Health in its literature also mentions lead in brass plumbing fixtures, solder, and batteries, but goes nowhere with this aspect of lead avoidance. The "Lead Warning" card[3] distributed by the Washington Department of Health focuses almost entirely on lead in paint The section of "A Healthy Home" brochure[4] published by the Department of Health and which deals with lead focuses entirely on lead paint. Washington is typical of other states when it comes to lead disclosure requirements. Likewise, EPA efforts[5] to reduce exposure to lead focus on lead in paint. The EPA has failed to do its duty to see to it that states disclose the danger. I pointed out to the Washington Department of Health that it was failing to disclose lead problems related to water fluoridation

On both the state and federal levels the lead that enters our bodies through drinking water is ignored. I learned this when I went to a Washington Department of Health meeting on lead. The focus was on lead in paint and not on lead in water.

SDWA § 300j–24, entitled Lead contamination in school drinking water requires as follows:

> Within 9 months after October 31, 1988, each State shall establish a program, consistent with this section, to assist local educational agencies in testing for, and remedying, lead contamination in drinking water from coolers and from other sources of lead contamination at schools under the jurisdiction of such agencies.

This is another law which the EPA enforces only half heartedly.

The health issue is this: There is sometimes a small amount of lead in raw fluoridated drinking water. Fluorosilicates are being added to drinking water which contain lead at up to .6 ppb.[6] Fluorosilicates added to drinking water break down into ions, one of which is HF, which dissolves lead in pipes. Lead goes directly into the blood stream and passes all the bodies barriers, brain barrier, placental barrier, and perhaps the mammary barrier.

Like other states, Washington is failing to notify citizens of these lead issues. It fails even to look at lead in drinking water. The Washington Department of Health – like EPA, like CDC, like FDA – ignores the issue of lead in water.

Why do they ignore the lead issue? Because to look honestly at the lead issue would mean looking at the fluoridation materials that contain lead and leaches lead from brass plumbing. Because fluoridation is a sacred cow.

LEAD IN PLUMBING

Lead has long been added to almost all brass water pipes and pipe fittings[7] and to the solder used to solder brass and copper pipe. Lead has long been added to brass to soften it and lower its melting point.

The Wikipedia article on Tap Water contains this discussion under Lead Leaching:

Generally, copper tubes are soldered directly into copper or brass fittings, although compression, crimp, or flare fittings are also used. Formerly, concerns with copper supply tubes included the lead used in the solder at joints (50% tin and 50% lead). Some studies have shown significant "leaching" of the lead into the potable water stream, particularly after long periods of low usage, followed by peak demand periods. In hard water applications, shortly after installation, the interior of the pipes will be coated with the deposited minerals that had been dissolved in the water, and therefore the vast majority of exposed lead is prevented from entering the potable water. Building codes now require lead-free solder. Building Codes throughout the U.S. require the use of virtually "lead-free" (<.2% lead) solder or filler metals in plumbing fittings and appliances as well [8]

In 1977 we made lead based paint illegal.[9] In 1986 we made lead based inks illegal [10] Between 1976 and 1986 we phased out tetraethyl lead.[11] California has banned lead bullets[12] in areas where condors forage.

Newer water mains are lead free However, many older water mains are cast iron[13] and are generally soldered together with lead solder poured molten into forms set up around the joins Old cast iron water mains are common in many cities.[14] Concrete-asbestos water pipes[15] are used extensively, not only as sewer pipes but as drinking water mains[16] NaF and SiF dissolve concrete[17].

Even if there is no lead in water mains, things change when water gets to homes and businesses, where water encounters brass plumbing and fittings which contain lead, and copper pipe which is soldered with lead solder. Until recently, it was standard procedure to solder copper pipes together with solder containing 50 percent lead.[18]

In 1986 as part of the Safe Drinking Water Act.[19] the EPA required that all pipes and fittings that carry water be "lead free". However, the term "lead free" allowed water pipes and fittings to contain up to 8.0% lead and allowed solder[20] for use in plumbing to contain up to 0.2% lead, a standard which Washington follows.[21] Before 1986 water pipes were sometimes up to 30% lead. This means that we should carefully check lead levels[22] in water in old buildings, including old schools.

In 2010 California limited lead content[23] in brass pipes and fittings to a maximum of 0.25%, and in solder to 0.2%.[24] It is unfortunate that the EPA did not do the same back on a nationwide basis in 1986. The 8.0% lead level provides insufficient protection; HF – released as SiFs ionize in acid conditions – leaches the lead from pipes into our drinking water.

Many thousands have been harmed by lead[25] since 1986. We would hope that the EPA would follow California's lead and reduce lead levels in water pipes. Note, however, that limiting lead in new construction will not remove the already existing lead in plumbing in millions of homes, schools, apartment buildings, and businesses Something should be done to reduce the amount of lead consumed by children through their drinking water. The way to do that is to halt fluoridation using silicofluorides.

In 2004 the Seattle Post-Intelligencer reported that lead was showing up in water fountains in old Seattle schools, at levels up to 1,600 ppb[26], far above EPA's legally enforceable maximum contaminant level[27] (MCL) in effect at that time, which was 20 ppb. The MCL was recently reduced to 15 ppb.[28]

Two studies were done that I know of which discuss this incident, both written by Karr, Sathyanarayana, and others. The authors concluded in both their 2004[29] and 2006 [30] articles that the high lead levels were not a concern because children's blood lead levels were not higher than average, that the highest lead levels by far occurred in first draw water and dropped dramatically in running water, and the fact that the children only drank part of their water at school.

More important is the recommended maximum contaminant level goal[31] (MCLG) for lead, which is zero. Lead is a probable human carcinogen, so we should not do anything that adds lead to our water, causes lead to leach out of plumbing, or increases lead uptake or retention by the body.

Lead in pipes will often stay put relatively well and not dissolve into drinking water, particularly if the water is hard and contains a lot of calcium carbonate, which binds with lead and coats the inside of pipes and thus insulates the lead from the water. Ancient Rome declined in part because Romans were lead poisoned. Most presume that this was because their water pipes were lead. Yes, in areas outside of Rome where water came from melted snow and was soft. No, in Rome where water came from springs and was hard. It was not their pipes that poisoned the Romans; it was the lead acetate they used in copious amounts as a sweetener, which was produced by cooking grapes in lead pots to produce a must.

A problem arises when silicofluorides (SiFs) are added to water. SiFs ionize in such a way that they dissolve lead[32], as I will discuss below. Blood lead levels are higher in cities which fluoridate using SiFs.

This problem is most serious in cities such as Seattle which have soft water, snow melt water that is low in dissolved calcium and other minerals. Even the CDC admits that soft water is more prone[33] to be acidic and leach more lead because there is so little dissolved minerals in soft water to bind with the fluoride and reduce acidity. Thus, fluoride is freer to bind with lead in soft water. Seattle's snow melt water is considered very soft.

Elemental fluorine is the most electronegative of all elements, although it does not exist naturally. Elemental fluorine does not exist in nature because it reacts immediately with other substances to become fluoride, a negatively charged elemental anion

Fluoride aggressively seeks out other elements in the body and bonds with them strongly, especially with positive charged calcium and aluminum. It interacts with positively

charged lead ions. At acidic pH, hydrogen fluoride – an ionization breakdown product of SiF – dissolves lead.

Fluorine is the most powerful oxidizer, a more powerful oxidizer even than oxygen. Oxygen does not oxidize fluorine, fluorine oxidizes oxygen and forms OF_2, oxygen difluoride.

Fluoride is the most hydrogen bond disrupting of all the charged elements. Even a small amount will do damage. Fluoride can denature protein, and the extent to which it denatures protein depends on the concentration of the fluoride and on the sensitivity of the particular protein.

In people who drink water fluoridated at 1.0 ppm, blood fluoride level is around .2 ppm. Even at this low level fluoride affects the activity of many sensitive enzymes.[34] All protein, DNA, and cells need to be turned over or repaired or in some cases replicated, and they do this with the assistance of enzymes. Fluoride interferes with enzymatic activity in general and can disrupt protein, DNA, and cellular turnover, repair, and replication.

Proteins have H atoms sticking off their sides. Fluoride affects the hydrogen bonds of the protein H atoms with water, thus changing the shape of proteins or at high enough concentrations denaturing them.

It is not acceptable to say that 2 ppm fluoride is only a "small amount of fluoride" because that small amount will find hydrogen bonds in proteins to disrupt. F does not disappear when it is only present at 2 ppm. It is still there doing its mischief. It can alter the 3-dimensional shape of some proteins at even the smallest dose. Those who consume synthetic fluorides are taking a chance as to which proteins will be denatured and to what extent and how much abuse from fluoride the body can take.

Fluoride "loves" to bond with calcium. It is this bonding that prevents calcium fluoride from being labeled a poison -- although it is definitely sickening and can cause serious health problems over time.

Fluoride builds up in bone, which is where most of the calcium is. A person who has been drinking fluoridated water for a year may have around 2,500 ppm fluoride in his bones. After 20 years he may have from 4,000 ppm to 6,000 ppm, which will cause bone weakness or pain, or up to 10,000 ppm, which can render one an invalid. The fluoride level in bone will not much exceed 12,000 to 14,000 ppm, because at that level of fluoride, the bones are no longer able to release the normal surges of calcium necessary to supply the heart with the blood calcium ion which must be available to rush into heart cells each time the heart beats. Death by heart failure is likely to occur.

In a person quits drinking fluoridated water, the fluoride in blood and in soft tissues can be eliminated, but fluoride in bone is essentially permanent (NRC, 2006).

When lead is available, such as when fluoridated water sits in brass pipe overnight or through the weekend, and especially when calcium is not available to bind with and seal in the lead, fluoride dissolves and joins with lead, especially when the water is soft and acidic, and especially when the form of the fluoride is HF, hydrogen fluoride, which is formed when SiFs dissolve in water and ionize, as I will discuss below.

Fluoride is the supreme flux. The word "flux" itself derives from an old version of the name for fluoride. Fluxes such as fluoride make metals in general melt at lower temperatures.[35] Lead like fluoride lowers the melting point of the metals it is mixed with. Fluxes are also used in solder on the surface of metals being worked or welded to prevent surface oxidation and remove impurities.

In the past water pipes were used for electrical grounding. This accelerates lead corrosion and increases lead in drinking water.[36]

Further, silicofluorides attack PVC pipe,[37] causing the release of ammonia, which combines with chlorine to form chloramine, which is more aggressive than chlorine in dissolving lead in brass pipes, fittings, and solder. Fortunately Seattle, for example uses chlorine instead of chloramine, and we hope it will not follow the current trend of switching from chlorine to chloramine as a disinfectant.

SILICOFLUORIDES AS ACETYLCHOLINESTERASE INHIBITORS

There are many theories about how silicofluorides do us harm, and all of them may be true. HHS and EPA should explore all these theories; currently they explore none of them. This is an act of bad faith.

There is substantial evidence to support the theory that silicofluorides are acetylcholinesterase inhibitors. I paraphrase from an email sent to me by Dr. Roger D. Masters, who has done much work on silicofluorides, working as part of a team with Myron Coplan and others:

The fundamental problem with silicofluoride water treatment is that these compounds do NOT "dissociate" completely into component elements, as was assumed when the use of silicofluorides in place of sodium fluoride began around 1950. Hydrofluosilicic acid, H_2SiF_6, does not dissociate neatly into H+ Si + F. Westendorf (4th ed.) showed that a "residual species" of chemical remains which is biologically active. The residual is an acetylcholinesterase inhibitor, a fact which has mostly been ignored or unnoticed by mainstream fluoride scientists.

There are two effects of silicofluorides on brain chemistry. First, the action of acetylcholinesterase, the enzyme that breaks down acetylcholine, is blocked. Acetylcholine is a neurotransmitter which stimulates cellular activity. With acetylcholinesterase unable to do its work, activity once stimulated is hard deactivate, as in the case of ADHD. Second, silicofluoride residue has effects on the neurotransmitter dopamine (which is a central regulator of impulsiveness). Where silicofluorides are used, the combination of more activation and weaker inhibition results in statistically significant increases in behaviors where impulse control is essential: learning deficits, more substance abuse, and more violent crime.[38]

We have solid findings, in peer reviewed journals, that show lower scores on nine standardized tests in Massachusetts towns where drinking water is fluoridated with silicofluorides. Findings show higher rates of violent crime. The latter has been assessed using multivariate statistical analyses of up to twelve risk factors to predict county level violent crime rates for all 3141 US counties and then replicated for violent crime. These effects are related to the neurotoxicity of silicofluoride residues as well as lead. That is, where silicofluorides are used, the neurotransmitter dopamine does not function normally. The resulting behavioral problems cost American taxpayers billions of dollars. The National Toxicology Program[39] nominated silicofluorides for testing in 2003 on the ground [that] their toxicology wasn't known, and a decade of published data on harmful effects has never been contradicted. The EPA should immediately ban use of silicofluorides until such time as their safety has been demonstrated convincingly and contrary data explained.

In 2000 Masters, Coplan, and others published an article in NeuroToxicology,[40] a peer reviewed journal.[41] This article was expanded on in a 2001 article[42] and summarized in Dartmouth News.[43] The authors of the Dartmouth News article conclude that there is

evidence that public drinking water treated with sodium silicofluoride or fluosilicic acid, known as silicofluorides (SiFs), is linked to higher uptake of lead in children.

Sodium fluoride, first added to public drinking water in 1945, is now used in less than 10% of fluoridation systems nationwide.... Instead, [silicofluorides] are now used to treat drinking water delivered to 140 million people [including Seattle, Everett, and most Washington water systems].

Masters and . Coplan . studied the blood lead levels in over 400,000 children in three different samples. In each case, they found a significant link between [silicofluoride]-treated water and elevated blood lead levels. [Masters said:] 'We should stop using silicofluorides in our public water supply until we know what they do.' . The researchers found that the greatest likelihood of children having elevated blood lead levels occurs when they are exposed both to known risk factors, such as old house paint and lead in soil or water, and to [silicofluoride]-treated drinking water. [Masters said.] '[O]ur preliminary findings show correlations between SiF use and more behavior problems due to known effects of lead on brain chemistry.' Also requiring further examination is German research that shows [silicofluorides] inhibit cholinesterase, an enzyme that plays an important role in regulating neurotransmitters [Masters said.] 'If [silicofluorides] are cholinesterase inhibitors, this means that [silicofluorides] have effects like the chemical agents linked to Gulf War Syndrome, chronic fatigue syndrome and other puzzling conditions that plague millions of Americans... ' [Masters said:] '[T]his may well be the worst environmental poison since leaded gasoline.'

Masters added more detail in a letter he wrote June 17, 2001.[44]

In 2007 Masters, Coplan, and others published another article in NeuroToxicology,[45] in which they concluded:[46]

Silicofluorides ... are used to fluoridate over 90% of US fluoridated municipal water supplies [including Seattle's]. Living in communities with silicofluoride treated water... is associated with two neurotoxic effects.

(1) Prevalence of children with elevated blood lead ... is about double that in non-fluoridated communities .... [silicofluoride treated water] is associated with serious corrosion of lead-bearing brass plumbing, producing elevated water lead ... at the faucet. New data refute the long-prevailing belief that [lead in water] contributes little to children's blood lead.... [I]t it is likely to contribute 50% or more.

(2) [Silicofluoride treated water] has been shown to interfere with cholinergic function. . [Silicofluoride treated water] is a more powerful inhibitor of acetylcholinesterase than [water fluoridated with sodium fluoride, which was used when fluoridation first began in the 1950s].

Authors of another study published in NeuroToxicology reported:

This study concerns effects on water-borne lead from combinations of chlorine (CL) or chloramines (CA) with fluosilicic acid (FSA) or sodium fluoride (NaF). ... Water samples were taken for lead analysis three times per week after a 16-h stagnation period. . . [W]hen FSA was also included, lead concentrations spiked to over 900 ppb. Lead concentrations from the CL-based waters appeared to be decreasing over the study period, while for the CA+NH3+FSA combination, lead concentrations seemed to be increasing with time.[47]

THE SILICOFLUORIDE / HYDROGEN FLUORIDE LINK

Another convincing theory is that silicofluorides go through a chemical process that ends up increasing the amount of hydrogen fluoride, which in turn is especially good at dissolving lead in pipes.

Sodium fluoride, NaF, is a salt that forms alkaline or basic water. Silicofluorides such as H_2SiF_6, hexafluorosilicic acid, abbreviated here as SiF, are acids with low pH.

When SiF is used to fluoridate tap water, it breaks down into H^+, SiF_6^{2-} hexafluorosilicate anion, F-, and HF. The pH level is very low. To balance the acidity, the water company adds sodium hydroxide, NaOH, a strong base, aka Drano®. NaOH ionizes and forms Na+ and OH-. Na+ is a spectator ion and does not interact with other elements as long as it is in water. OH- combines with H+ to form water, thus reducing the H+ and neutralizing the pH. Without sodium hydroxide added, hydrogen fluoride HF will quickly dissolve water system equipment.

When a municipality fluoridates with tanker loads of silicofluorides, it must bring in tanker loads of NaOH to neutralize the low pH of the fluoride. More NaOH is needed in cities with soft, more acidic water – such as Seattle.

Workmen who handle these chemicals must wear hazardous materials suits for self-protection.

NaOH ionizes into Na+ and OH-, and the OH- can combine with metals in pipes such as iron and copper. It can also combine with aluminum, which the water district adds to precipitate dirt. As a result, there may not be sufficient OH- remaining to raise the pH of SiF fluoridated water at the time the water arrives at the point of use. Out in the street main pipe, the water pH may be neutral and low in HF. However, once the water is in the building plumbing, especially when the water sits in the pipes overnight or through the weekend, the water pH drops as OH- combines with iron, copper, and aluminum, and the HF dissolves lead and other metals. This negative pH plunge is more pronounced in soft, more acidic water because it has less calcium to bind with and neutralize fluoride. This is how lead levels in water in old Seattle schools got up to 1,600 ppb[48].

If you remember anything from this chemistry lesson, remember that fluoride loves calcium. It will make a bee line for wherever calcium is found in the body and be locked there permanently, in teeth, bones, pineal, and other areas.

When NaF ionizes in water, little HF is produced. But when SiF ionizes, HF is produced along with H^+, F- and $(SiF_6)^{2-}$. The lower the pH, the more HF is produced, which is especially effective at dissolving the lead out of brass plumbing.

NaOH is the line of defense. It's job is to keep pH neutral. NaOH is an unreliable defender. NaOH levels can drop if there is an NaOH underfeed. If there is a SiF overfeed, SiF will overwhelm the NaOH. Or NaOH can be lost when water reaches pipes and the OH- combines with iron in pipes to produce $Fe(OH)3$. It can combine with aluminum to make $Al(OH)3$. Aluminum is often added to water to precipitate dirt so it can be filtered out. It can combine with copper to form $CuOH_2$. With less OH- ion available to combine with H+ and form water and thus raise pH, there is more H+ available to join with F- to make HF.

As stated above, it is the HF which does the mischief in the pipes, dissolving the lead. Likewise, when SiF fluoridated water or SiF fluoridated soda pop or orange juice reconstituted with SiF fluoridated water or bread made with SiF fluoridated water reaches the stomach where the pH is low, more H+ binds to F- to form more HF, which is hard on stomach lining, especially for a person with a thin stomach lining.

HF is a small molecule which will burrow into and easily dissolve lead and other metals in pipes and easily burrow into and attack stomach lining. Some theorize that through this mechanism SiF causes stomach ulcers and stomach cancer.

At one atmosphere pressure HF has a boiling point of 19.5°C (67.1° F). As such, it is very tissue penetrating and causes severe, deep "burns" on contact with the skin or respiratory system. In water it is hydrofluoric acid, which is very corrosive and is able to etch glass.[49]

SiF dissociates almost completely in water at a pH of 7.4 or above. It forms silicic acid $Si(OH)4$ or its silicate anions after dissociation of H^+. The lower the pH, the less that SiF dissociates. While pH may be neutral out in the water main, in the old school or apartment building, with pipes that are 30% lead, the water may have a more acidic pH, depending on injected levels of NaOH with the SiF and depending on metals such iron, aluminum, and copper that can precipitate OH^- to varying degrees. In the stomach the pH is 3.0 to 5.0. In the small intestine the pH of stomach contents gradually increases along its initial length until it becomes basic as a result of the pancreatic release of bicarbonate. In the blood stream pH is 7.4, with the pH of arterial blood slightly lower than the pH of venous blood. In the gaps between synapses the pH is 7.4. Inside the cell the pH is 6.9. As the SiF travels about the body, pH changes and so SiF forms vary.

SiF scrubber liquor is composed of dozens of different constantly changing ions and compounds, depending on pH. Read what Wikipedia has to say about hexafluorosilicic acid:

Like several related compounds, hexafluorosilicic acid does not exist as a discrete species, that is, a material with the formula H_2SiF_6 has not been isolated. Hexafluorosilicic acid refers to an equilibrium mixture with hexafluorosilicate anion (SiF_6^{2-}) in an aqueous solution or other solvents that contain strong proton donors at low pH (acids described similarly include chloroplatinic acid, fluoroboric acid, and hexafluorophosphoric acid, and, more commonly, carbonic acid) Distillation of hexafluorosilicic acid solutions produces no molecules of H_2SiF_6, instead the vapor consists of HF, SiF_4, and water. Aqueous solutions of H_2SiF_6 contain the hexafluorosilicate anion, SiF_6^{2-} and protonated water.[50]

Workmen who handle these chemicals must wear hazardous materials suits for self protection. Spills are inevitable.

Water fluoridation plants take up acres. They are surrounded by tall electrified fences with guards who watch your every move when you approach them. They are like armed outposts Not even local policemen are allowed inside

But the worst part of fluoridation is the steady trickle of toxic waste into pretty much every river in the Lower 48 States.

The slurry liquor is dilute but there is a lot of it and it contains the most toxic wastes imaginable, including lead, arsenic, uranium, radium, polonium 210, and other radionuclides [51]

HYPERSENSITIVES, THE FLUORIDE ALLERGIC

Being an attorney, people confess all kinds of things to me. They know I cannot tell anyone what they confess People call me who are fluoride hypersensitives. Many of the hypersensitives went through an episode in which they were hypersensitized to fluoride. They confess these episodes to me.

The most common story is about the hypersensitive adult who as a child discovered the wonderful taste of Ipana toothpaste and would sneak into the bathroom at night and eat toothpaste. They tell how they did it for months Or my friend who was part of the first test of sodium fluoride in Grand Rapids Michigan in 1945 and was seriously overdosed and sickened as a child, and who now has reactions when she consumes even a small amount of fluoride.

Parents of mentally disabled children tell me how fluoridated water worsens their symptoms:

People tell me how they had to move away from their fluoridated town to one not yet fluoridated. They tell me how they get sick when they return and how they get better again when they leave. They tell of the rashes they develop when they shower in fluoridated water

Many tell how they were sensitized as children and how they can react strongly to fluoride Perhaps their body is panicking and trying to communicate to the conscious mind that the person must stop drinking the fluoridated water.

Could the effect be psychosomatic? Not according to Dr. Bruce Spittle, co-editor of the journal Fluoride Dr. Bruce Spittle has written about the hypersensitives, and he reports objective, double blind tests which confirm the fact that around one percent of us are very sensitive to fluoride.

In his free eBook, Spittle discusses fluoride studies done on animals, starting on page 50. Fluoride affects different species in different ways. Some species are more sensitive to fluoride. For example, rats are less sensitive. It takes more fluoride to poison a rat than to poison a human. Perhaps this is the result of selective evolutionary pressures; they are descended from the few rats that survived the NaF rat and roach poison we formerly spread around. Some species are more sensitive to it. Horses are very sensitive to fluoride. Horses drink a lot of water. A horse that always drinks from his trough will start drinking from muddy ruts in the road and eating snow Horses get sick from fluoride and die if they are not given fluoride free water All species are sensitive to fluoride, and different amounts of fluoride will kill all of them.

The NRC asked the EPA to study: endocrine effects of fluoride, decreased thyroid function, increased calcitonin activity, increased parathyroid hormone activity, secondary hyperparathyroidism, impaired glucose tolerance – these being possible mechanisms through which the hypersensitives are made to react. However, HHS and EPA have not done any research into these important areas. They have only studied caries, fluorosis, and bone fractures.

My sharpest criticism of those who run HHS and the EPA, is for their insensitivity to those who are fluoride allergic.

SILICOFLUORIDES CONTAIN LEAD

Silicofluorides not only produce HF which dissolves lead. Silicofluorides contain lead. NSF, the National Sanitation Foundation, puts out its analysis of silicofluorides, and admits that the liquid flurosilicic acid scrubber liquor (26% SiF and other toxins) after being diluted down to the point where the SiF level is 1 ppm, contains sometimes as much as .6 ppb lead.[52]

Lead is so nasty that we should not knowingly be adding any amount of lead to drinking water. The MCLG, maximum contaminant level goal for lead is zero. Bear in mind that flurosilicic acid is a mixture of hundreds of elements and lead is just one of them.

Silicofluorides come from super-phosphate fertilizer plants in Florida, Louisiana, and increasingly from China. To make super-phosphate fertilizer, processors cook rock phosphate with sulfuric acid. Sulfuric acid contains lead because the sulfuric acid is produced in gigantic lead pots, and part of the lead remains in the sulfuric acid, as NSF International[53] admits

Lead is a probable human carcinogen[54]. With both known and probable carcinogens the MCLG.[55] is always zero. That means none at all should be added to drinking water.

The fact that there is an MCL for lead of 15 ppb does not mean that a water district can therefore add any amount of lead it wants to add up to 15 ppb

There is an MCL, maximum contaminant level, which is the level at which the federal or state governments will file suit. This 15 ppb limit is the legally enforceable limit. If the MCL for lead is exceeded, then the water district must pay the cost of filtering out the lead.

The 2006 NRC Report at page 13 says the following about fluoride, and the same would apply to lead:

EPA's drinking-water guidelines are not recommendations about adding fluoride to drinking water to protect the public from dental caries. .. Instead, EPA's guidelines are maximum allowable concentrations in drinking water intended to prevent toxic or other adverse effects that could result from exposure to fluoride.

Nevertheless, we are knowingly adding lead to our drinking water. This is one more example of laws which are being broken just so we can preserve the chemical, fertilizer, and fluoride business

HHS & EPA POLICY: DILUTION IS THE SOLUTION

We quote[56] from Fluoride and Lead by Frances Frech:

> Let us tell you a tale of two cities–Tacoma, Washington, and Thurmont, Maryland. Both of them saw significant decline in [blood] lead levels only six months after fluoridation was stopped. (In Tacoma, that was due to equipment problems; in Thurmont, it was a temporary ban by the city council.) Tacoma registered a drop of nearly 50% ... ; in Thurmont it was 78%. To the best of our knowledge, no other explanations were offered. In Thurmont the ban is now permanent."

Unfortunately, Tacoma returned to fluoridating its drinking water and a battle continues over whether to reverse this policy.

Super-phosphate fertilizer is used to grow corn, soybeans, wheat, and other industrial food crops as rapidly as possible. To make super-phosphate fertilizer sulfuric acid is mixed with rock phosphate. Clouds of fluoride-rich[57] vapor go up the stacks. Before EPA intervention in the 1970s, the toxic smoke poisoned plants, animals, and people for miles around

The EPA required fertilizer plants to begin using wet scrubbers to filter out the fluoride along with the lead, arsenic, and many other contaminants from the smoke. The silicofluorides are the unfiltered and unprocessed scrubber liquor from the fertilizer production process. Silicofluoride scrubber liquor goes directly into tanker trucks and is delivered to the headwaters of the Tolt and Cedar Rivers, where it is poured into Seattle drinking water. The scrubber liquor is the most filthy substance imaginable. The idea that we dilute it and drink it is amazing.

The greatest irony of all this is that the toxic smoke that was illegal to go up the smoke stacks as air pollution and was illegal to dump as a liquid into rivers and oceans, was grandfathered in as a de facto legal medical additive to drinking water. It still gets dumped into rivers and oceans but only after passing through city water systems.

LEAD NOTICE

The EPA grants primacy on a state-by-state basis to each state which qualifies to carry out the role of implementing the SDWA, and Washington has been granted primacy. See 40 CFR 42.10. In each state there is a lead agency which is empowered to administer the SDWA, and in Washington that agency is the Department of Health. RCW 70.119A.080, RCW 43.21A.445. In RCW 43.21A.445 several Washington agencies led by the Department of Health are "... authorized to participate fully in and are empowered to administer ... " the SDWA.

Because the SDWA requires that state ". . drinking water regulations" be "no less stringent than the national primary drinking water regulations,"[58] state regulations likewise must be so limited. Therefore, the Department of Health must see to it that water districts disseminate notice regarding lead which the Safe Drinking Water Act

requires water districts to give.[59]

This is what the SDWA says regarding lead notice:

Public notice requirements

(A) In general

Each owner or operator of a public water system shall identify and provide notice to persons that may be affected by lead contamination of their drinking water where such contamination results from either or both of the following:

(i) The lead content in the construction materials of the public water distribution system.

(ii) Corrosivity of the water supply sufficient to cause leaching of lead

The notice shall be provided in such manner and form as may be reasonably required by the Administrator. Notice under this paragraph shall be provided notwithstanding the absence of a violation of any national drinking water standard.

(B) Contents of notice

Notice under this paragraph shall provide a clear and readily understandable explanation of—

(i) the potential sources of lead in the drinking water,

(ii) potential adverse health effects,

(iii) reasonably available methods of mitigating known or potential lead content in drinking water,

(iv) any steps the system is taking to mitigate lead content in drinking water, and

(v) the necessity for seeking alternative water supplies, if any.

The law is very clear on this point: The SDWA requires the EPA to write lead disclosures and see to it that states disseminate them. Water systems must give an honest notice to water drinkers regarding lead, and the Department of Health as the lead agency in enforcement of the SDWA[60] as set forth in RCW 70.119A.080 must pass and enforce a regulation requiring that water districts give such notice.

EPA is failing to enforce this part of the SDWA and failing to insist that municipalities send out truthful lead notices.

Silicofluorides contain more lead than does sodium fluoride. Compared with NaF, SiFs cause more lead to be leached from brass pipe and fittings and from the lead solder used to solder copper pipe and cast iron water mains. For all these reasons SiFs should be disallowed as fluoridation materials.

The lead notice section of the SDWA requires every municipality to disclose in writing to water drinkers

the lead content in the construction materials of the public water distribution system [and] the corrosivity of the water supply sufficient to cause leaching of lead.

The EPA has not required municipalities to issue such reports, nor has it properly informed them as to how to measure their waters' corrosivity.

The EPA is falling down on its job when it comes to honestly doing what needs to be done to get lead out of peoples' diets: Get all the fluorosilicates out of the drinking water, immediately and in all municipalities throughout the country. There is sufficient evidence for the EPA right now to issue an order to take effect immediately. Hearings would be held but they should be held after and not before the order goes into effect

LEAD – PROBABLE HUMAN CARCINOGEN

The EPA classifies lead[61] as a "probable human carcinogen" and adds.

Health effects associated with exposure to inorganic lead and compounds include, but are not limited to, neurotoxicity, developmental delays, hypertension, impaired hearing acuity, impaired hemoglobin synthesis, and male reproductive impairment. Importantly, many of lead's health effects may occur without overt signs of toxicity. Lead has particularly significant effects in children, well before the usual term of chronic exposure can take place. Children under 6 years old have a high risk of exposure because of their more frequent hand-to-mouth behavior.

Once lead is consumed it pervades the entire body, passing through brain, placental, and mammary barriers.

The need to add no lead to drinking water is especially true because there are other vectors of lead exposure which are hard to eliminate such as lead paint, batteries, bullets, and many industrial uses. However, the most serious source of lead is brass plumbing, as I discuss above on page 8, at levels up to 1,600 ppb.

EPA defines MCLG[62] as "the level of a contaminant in drinking water below which there is no known or expected risk to health." The MCLG for lead is zero. This means that any level of lead added to water may cause or increase risk to health. Therefore, no lead may be added to water and therefore fluoridation, which adds lead to drinking water, must cease.

The authors of the 2006 NRC Report at page 285 say:

> The EPA Office of Drinking Water establishes MCLGs of zero for contaminants that are known or probable human carcinogens. Chemicals for which cancer hazard is judged to be absent are regulated via the reference dose (RfD) method (see Chapter 11).

The Wikipedia article[63] on "lead poisoning" says:

> No safe threshold for lead exposure has been discovered—that is, there is no known amount of lead that is too small to cause the body harm . The US Centers for Disease Control and Prevention and the World Health Organization state that a blood lead level of 10 µg/dL or above is a cause for concern; however, lead may impair development and have harmful health effects even at lower levels, and there is no known safe exposure level.

EPA and HHS have acted in bad faith by ignoring the fact that the fluoridation materials they endorse routinely contain lead and dissolve lead from plumbing. No amount of lead should routinely be added to water, and no amount of fluoride should be added to water of the type which contains lead or dissolves the lead out of plumbing. For this reason alone EPA and FDA have grounds to terminate fluoridation with silicofluorides immediately, and they should do so

ARSENIC – CONFIRMED CLASS A HUMAN CARCINOGEN

NSF reports that 43 percent of tanker truck loads of silicofluoride contain arsenic, and that those loads can contain levels, which after the scrubber liquor is diluted to the point where fluoride concentration goes from 26.0% to 1.0 ppm, arsenic will be present at levels of up to .6 ppb.[64]

Arsenic is a poison and a known human carcinogen.[65] The smallest amount can kill in many ways. Regarding arsenic, CDC's ATSDR[66] has this to say:

> Prolonged arsenic exposure causes skin and lung cancer and may cause other internal cancers as well. (page 2)

> A small molecule [sic, actually arsenic is an atom] that can easily get into cells, arsenic can cause cell injury and death by multiple mechanisms. Interference with cellular respiration explains the potent toxicity of arsenic. In addition, arsine gas may interact directly with red cell membranes. Arsenic is a known human carcinogen, but the specific mechanisms by which it causes cancer are less well understood. (page 46)

> A scientific consensus has not yet been reached on the many suggested modes of arsenic carcinogenesis that exist in the literature. These include modes that are predominately genotoxic (i.e., chromosomal abnormalities, oxidative stress, and gene amplification) vs. more nongenotoxic (i.e., altered growth factors, enhanced cell proliferation and promotion of carcinogenesis, and altered DNA repair). Likewise, the dose-response relationship at low arsenic concentrations for any of these suggested modes is not known [Kitchin 2001]. (page 48)

> Arsenic can cause serious effects of the neurologic, respiratory, hematologic, cardiovascular, gastrointestinal, and other systems. Arsenic is a carcinogen in multiple organ systems. Interindividual and population differences in arsenic methylation and nutritional status may be factors in susceptibility to arsenic toxicity. (page 68)

Arsenic can be excreted through hair, skin, feces, or urine, but primarily through kidneys. Kidneys do not excrete all arsenic consumed, especially for those who have weak kidneys. Arsenic, whether eaten, drunk, or inhaled may be deposited throughout the body. It may wind up in the lungs where it may cause lung cancer or in the skin where it may cause skin cancer.[67]

The MCL for arsenic in water is 10 ppb. This does not mean it is acceptable for water districts to add arsenic knowingly at any level up to 10 ppb. The MCLG for arsenic is zero,[68] as it is for lead.[69] When the MCLG for an element or compound is zero,[70] none should be added at all.

The need to add no arsenic to drinking water is especially true because there are other vectors of exposure which are hard to eliminate. Until recently arsenic was used as a wood preservative. Lead arsenate was used for example, in Wisconsin in agriculture until the 1950s.[71] Once there is arsenic in the soil it does not disappear. Homes and schools are built on old farmland, and it is easy for children and gardeners to be exposed to arsenic. Arsenic occurs naturally in some water sources. It is used in making lead batteries and in various industrial applications. Amazingly, it is legal in the United States to feed arsenic to non-organic chickens.[72] The body is poor at excreting arsenic, as noted above

EPA defines MCLG[73] as "the level of a contaminant in drinking water below which there is no known or expected risk to health." The MCLG for arsenic is zero (as it is for lead). This means that any level of arsenic added to water may cause or increase risk to health. Therefore, no arsenic should be added to water and therefore fluoridation, which adds arsenic to drinking water, must cease.

EPA and HHS have acted in bad faith by ignoring the fact that the fluoridation materials they endorse routinely contain arsenic (as well as lead). No amount of arsenic should routinely be added to water. For this reason alone EPA and FDA have grounds to terminate fluoridation with silicofluorides.

FLUORIDE, LEAD, ARSENIC, ALUMINUM TOGETHER – SYNERGISTIC EFFECT

It is entirely possible that fluoride, lead, arsenic, aluminum, and several other heavy metals and strange chemicals, all of them present together in SiF, act more powerfully together than they do individually. We know of one example of a synergy involving these elements: Fluoride interferes with the body's ability to process and eliminate arsenic. So arsenic and fluoride together are more toxic than either acting alone.

When you add up the MCLGs for F, Pb, As, Al, U, and other metals and compounds found in SiF, the sum of the MCLG equivalents becomes a large number.

A WAY OUT

Today there are more contaminants in the source waters used to make drinking water, so it is time for EPA to respond to this change in the environment by drawing the logical conclusion: With all the competing heavy metals joining the fluoride, water fluoridation is no longer the safe way to deliver fluoride. EPA could advise people that if they want fluoride they can get it easily by brushing their teeth more frequently with fluoridated toothpaste and even swallowing some of it.

Fluoridation is dying out – just like tetraethyl lead, asbestos, cigarettes, and mercury amalgam. In most cities and towns where the issue is voted on, a majority votes to end fluoridation. Former Georgia Governor Andrew Young is pressing for a Fluoride-Gate investigation. Minorities and those who eat a less nutritious diet are more subject to being harmed by fluoride, lead, and arsenic.

The possibility that people and corporations are going to be sued is becoming clearer. I discuss mass toxic tort actions with fellow attorneys. There are tens of thousands of people now dead who would still be alive if National Kidney Foundation, EPA, and state boards of health had disclosed what they knew, that those with weak kidneys especially should not drink fluoridated water. The suits will come, so those who are pushing fluoridation had better switch sides and try to mitigate the damages caused.

The administrators at HHS and EPA who support fluoridation – in conflict with the scientists who oppose it – should get off the sinking fluoride ship while the getting is good. If losing face is a concern, there is a way to change positions on fluoridation without losing face or admitting liability. That is to rely on a reason which has just become clear: the synergistic effects of many contaminants acting together.

There is not only more artificial fluoride in water, there is also more artificial fluoride in foods and beverages. There is also more lead and arsenic in the environment. Arsenic was spread in tens of thousands of agricultural sites around the country over the last century, and arsenic never goes away. F-Pb-Al-As – all work together synergistically and constitute a new group of troublesome chemicals. EPA should create an MCL and an MCLG for F-Pb-Al-As combined.

If HHS and EPA rely on the synergistic effect to change their position on fluoridation, they will be able to take credit for deciding that fluoridation has to stop without ever admitting they were wrong about fluoride in the first place.

HHS and EPA could declare that drinking water is no longer a safe vehicle for delivering fluoride. They can say that the chemical ecology of water has changed and so HHS and EPA is having to change. People will not have to give up their fluoride: They can just brush more frequently and swallow a little toothpaste if they want to

There's your open door. Go through it while you can

NOTICES WHICH WATER DISTRICTS SHOULD GIVE

If the EPA were to allow the continued use of silicofluorides, it should require that municipalities give notices which include the following warnings:

> Those who drink tap water and eat food made with tap water should be aware of the following: Tap water in this water district is fluoridated with silicofluorides Silicofluorides contain lead and arsenic. Silicofluorides leach lead from brass pipe, from brass fittings, and from the lead based solder used to solder together brass and copper pipe Silicofluorides leach lead from the lead solder used to solder cast iron water main pipes. The lead content of your drinking water may vary from zero to .6 ppb from the silicofluoride added, and the level may be more as a result of lead leached from pipes as a result of silicofluorides added. The federal MCL, maximum contaminant level for lead, is 15 ppb. The federal MCLG, maximum contaminant level goal, is zero, meaning that any and all amounts of fluoride intake should be avoided where ever possible.
>
> Homes, apartments, schools, and other buildings built before 1986 generally utilize brass pipes containing up to 30.0% lead, and lead levels in such buildings, have been known to be as high as 1,600 ppb, especially when water sits in lines for long periods of time. Brass pipes in buildings built after 1986 generally use brass containing up to 8.0% lead (except in California where limits are lower).
>
> Those who wish to avoid consuming lead and who wish to avoid having their children consume lead should not drink tap water or use it to cook food and instead should use a source of water known not to contain lead such as spring water, distilled water, or water filtered with a reverse osmosis filter. Lead is known to cause brain damage

A better solution than requiring disclosure would be for EPA to ban the use of silicofluorides as fluoridation materials, a power which the EPA has, given the harm that silicofluorides are causing, particularly in connection with lead poisoning, under SDFA § 300 g-1 (b)(1)(d):

> Urgent threats to public health — The Administrator may promulgate an interim national primary drinking water regulation for a contaminant without making a determination for the contaminant under paragraph (4)(C), or completing the analysis under paragraph (3)(C), to address an urgent threat to public health as determined by the Administrator after consultation with and written response to any comments provided by the Secretary of Health and Human Services, acting through the director of the Centers for Disease Control and Prevention or the director of the National Institutes of Health.

CONCLUSION: BAD FAITH

HHS and EPA are not monolithic entities There are people of all different persuasions in those agencies. Some therein – such as the EPA union – even agree with me. So when I hurl accusations of bad faith against HHS and EPA, try not to take it personally because I am only addressing the stubborn defenders of fluoride among you.

HHS and EPA have acted in bad faith by failing to study all the research areas listed in the 1993 and 2006 NRC Reports, including the connection between silicofluorides, lead, and arsenic.

Given the fact that HHS and EPA have recommended continued fluoridation at .7 ppm and have done so without studying all the issues NRC identified, including issues pertaining to the connection between silicofluorides, lead, and arsenic, HHS and EPA have acted in bad faith

HHS and EPA have acted in bad faith by implying that they have done sufficient research to be confident that all may drink all the tap water they want at .7 ppm and not suffer any harm, particularly in light of the increase in lead uptake resulting from silicofluorides.

HHS and EPA have acted in bad faith by failing to give clear and correct notice to those who would have benefitted most from receiving it: infants and children, those with kidney disease (who drink large quantities of water), diabetics (who drink large quantities of water), to the effect that they should avoid drinking fluoridated water

Fluoridation is a fraud. It should be stopped

ACTION PROPOSED

HHS (including the CDC) and the EPA should retract their endorsement of water fluoridation.

The EPA should commission the NRC to write a report dealing with artificial water fluoridation of drinking water. The new report should ask whether it is safe to fluoridate and if so how water fluoridation should be conducted and at what level and with which type of fluoride. The report should be due in one year.

The EPA should exercise its authority under the Safe Drinking Water Act to order an immediate ban on artificial water fluoridation throughout the United States. This ban should remain in place until the new report has been received from the NRC.

HHS and EPA should commit themselves to airing all sides of the fluoridation debate, particularly as it applies to the link between SiFs and lead poisoning. They should post the debate on their web sites. They should correct all the many errors on their websites pertaining to fluoridation, including those relating to the link between SiFs and lead. This policy of openness should apply to all health and environmental issues.

CDC should deal forthrightly with the serious ethics charges laid against it.

The EPA should retract its support of the NSF, including its financial support and its "imprimatur" on NSF publications. The EPA should instruct the NSF to cease making any statements which would imply that the EPA agrees with NSF's certification of SiFs as acceptable fluoridation materials.

The EPA should obtain rights to the NSF 60 book, which says almost nothing and sells for only $325, and make it available on its website so that water districts and everyone else can see what a fraud the NSF 60 certification is.

The EPA should declare in plain and simple English that an MCL is not an authorization to add any level of a particular contaminant, including fluoride, but is to the contrary a requirement to remove that contaminant if its level exceeds the MCL.

The EPA should declare in plain and simple English that an MCLG is a rule against adding any amount of a particular contaminant above the MCLG level. Thus, if the MCLG for lead and arsenic are zero, a water district may not add any lead or arsenic to drinking water whatsoever, including the tiny amount of mercury and lead found in SiF fluoridation materials.

The FDA should ban fluoridation if the EPA does not do it first.

The FDA should require that all bottled water containing fluoride be labeled to disclose the fluoride level and the type of fluoride in the water. It should be presumed that bottled water which says nothing on the label about fluoride contain no NaF or SiF or a minimal amount of CaF_2.

Likewise, all reconstituted juices, all beer, all bread, all foods made using fluoridated water should disclose the fluoride level of the water used to make the product. It shall be presumed that all reconstituted juices, all beer, all bread whose label says nothing about fluoride contains no fluoride.

The FDA should ban fluoridated toothpaste. The risk of children eating it is too great for such a product – one which does nothing to protect teeth against decay – to be found in millions of bathrooms in easy reach of children.

If the FDA should allow continued sale of fluoridated toothpaste, it should require big print warnings that fluoridated toothpaste be kept out of the hands of and not used by children under eight years of age.

If the FDA should allow continued sale of fluoridated toothpaste, the FDA should require that fluoridated toothpaste have a taste that children dislike in order to discourage children from eating it.

EPA, HHS, CDC, and FDA should recommend to the Attorney General of the United States that he appoint special counsel to investigate "Fluoride-Gate".

CLOSING

This letter is also intended to be read by all those who are forced to drink highly dilute toxic waste and want to see this crude practice ended. For that reason I have gone into detail explaining the relevant legal and scientific issues. Fluoridation should be a political issue in the 2012 campaign and if Andrew Young of Atlanta has his way, it will be.

I want to express appreciation to Dr. Richard Sauerheber for tutoring me in basic chemistry.

Sincerely,

James Robert Deal, Attorney

WSBA Number 8103

President, http://Fluoride-Class-Action.com

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1. Jim
September 1st, 2011 at 07:02 | #1
Reply | Quote

This is a great letter. Marc Edwards of Virginia Tech is one of the top corrosion experts for water. He warned agencies of the lead leaching risks of the chloramine H2SiF6 combination when the EPA started advising cities to switch from straight chlorine. They ignored him and his many warnings. Then the Washinton DC changeover was on Nov 1 2000. DC had been double dosing with chlorine and created lots of lead blisters. Much of the system was even lead pipes. They were at the end of their three year lead survey as required and noticed the jump but never reported it to anyone. They allowed lead levels to remain toxic unmentioned to the public. They did get Marc Edwards to come up with proof with three grad students testing water for lead for like six months. They told Marc he had the contract. He never got paid a dime and was warned he would never work again if he was not silent on this problem.
A 300 million program to change out lead lateral lines started and done incorrectly which caused higher lead levels and halted after 100 million was wasted. Bottled water and fliulters were given to 25,000 homes that had lead supply pipes. They never mentioned another 100,000 also had the high lead levels. This was front page "Washington Post for 30 days running. DC Watch had the hearings to read. Hearings are still being held as who to blame. CDC did a small study of 201 kids who were receiving the bottled water on lead blood levels. They tested fine as this was many months and up to a year later on safe water. Lead levels in blood fall 50% per month after toxic intake ends. This was designed to be fraud.
Edwards years later won the Mac Arthur engineering award and 500,000 no strings cash. He used some cash to prove other data showed many hundreds if not thousands of kids were lead toxic because of this government caused lead screw up.
He also helped discover lead contamination problems in new pipes in a school building. It was traced to low lead 8% brass shut offs. It was proven the castings had much higher lead levels on the surface, thus more lead leaching.
Old schools often have sky high lead levels in water. As do lots of other buildings but the older are usually the worst. But exceptions do exist ignored and untested. The engineering department at Virginia Tech does have a contact number for him I think. He consults worldwide of water corrosion. He is tops on Potomic water. Cities only test samples every three years. Maas 2007 tested over 150,000 homes in North Carolina for the EPA. Coplan 2007 also shows bench testing for lead levels from fluoridation and chlorine, chloramine.

2. Jeanette Bajorek
April 20th, 2011 at 12:29 | #2
Reply | Quote

James,
Since making clear to the reader just what point you are making when you reference certain pages in the NRC report is difficult if the actual word "lead" does not appear in the NRC reference, and not having researched all your references for myself,(to see if you used your own paper as reference at all), I am thinking that your own paper on lead is so good and thorough and has so many references – why don't you just reference your own paper? or at least use the references you provided in your paper rather than using any more NRC page numbers. Or isn't that done? Everything you have presented thus far is so logical and thorough and am impressed.

That's the best I can think to do, outside of re-reading the NRC book to find something that would fit, and I don't want to take the time to do that.
Best,
Jeanette

3. Tim
April 17th, 2011 at 20:31 | #3
Reply | Quote

The best information I've come across on fluoride and fluoridated water is at the website http://www.MacBrussell.com. Just go to the bottom of the homepage. Dr. John Lee, Dr. John Yiamouyannis, Dr. Phyllis Mullenix, and Joanie Greggains explain the history, origin, and the health hazards of this toxic waste. The audio is 75 minutes long. Hopefully people will burn cds of the audio and pass them around.

4. Audrey Adams
April 17th, 2011 at 18:41 | #4
Reply | Quote

Excellent, James! Have you thought about sending a copy to a Seattle Public Utilities? Perhapas Everett, too?

5. Jeanette Bajorek
April 17th, 2011 at 15:07 | #5
Reply | Quote

dear James,

I am a great admirer of your work on LEAD. Just one little comment here: I tried to follow up your page number links in the NRC 06 book on recommendations to research the lead problem in drinking water, but the pages indicated 6-9and 43-44 made no mention at all of lead.

Just wonder what I may be missing ?
These letters to the HHS and EPA are wonderful in my opinion. With these issues all out in the open this way, I don't see how they can keep stonewalling .
Jeanette

anette Bajorek

1. June 3rd, 2011 at 22:53 | #1
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2. June 3rd, 2011 at 22:55 | #2
   WASHINGTON ACTION FOR SAFE WATER » Involving Students
3. June 5th, 2011 at 03:47 | #3
   FLUORIDE CLASS ACTION » Washington Board Of Health Put On Notice
4. June 5th, 2011 at 05:35 | #4
   WASHINGTON ACTION FOR SAFE WATER » Washington Board of Health Put on Notice
5. August 20th, 2011 at 06:44 | #5
   FLUORIDE CLASS ACTION » Hempfest Flier
6. August 27th, 2011 at 02:46 | #6
   FLUORIDE CLASS ACTION » Questions Regarding Lead in Seattle Water
7. October 10th, 2011 at 05:15 | #7
   FLUORIDE CLASS ACTION » Occupy Seattle Flier 10-10-11
8. October 11th, 2011 at 15:00 | #8
   Reasons to Oppose Flouridation : gohealthynext com
9. October 13th, 2011 at 09:45 | #9
   FLUORIDE CLASS ACTION » FOIA to Everett Water District 10-13-11
10. October 15th, 2011 at 11:04 | #10
    FLUORIDE CLASS ACTION » Questionaire To Candidates
11. October 16th, 2011 at 13:27 | #11
    FLUORIDE CLASS ACTION » Research Should Be Done In Now Non-Fluoridated Calgary
12. October 22nd, 2011 at 04:57 | #12
    WASHINGTON ACTION FOR SAFE WATER » Occupy-Seattle-Flier-10-21-11
13. October 22nd, 2011 at 05:12 | #13
    FLUORIDE CLASS ACTION » Occupy Seattle Flier 10-21-11
14. October 30th, 2011 at 03:17 | #14
    WASHINGTON ACTION FOR SAFE WATER » Press Release – WASW to Occupy Seattle City Hall Monday at Noon to Protest Lead, Arsenic, Silicofluoride Added to Water
15. October 30th, 2011 at 17:37 | #15
    FLUORIDE CLASS ACTION » Press Release - Showdown At City Hall – Monday 10-31-11 – Please come

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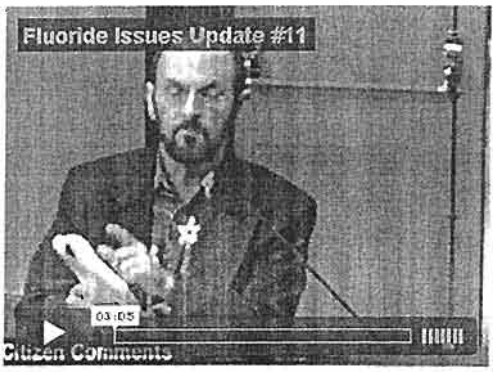

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- Citizens for Safe Drinking Water Sue
- Demands to De-Fluoridate Issaquah
- Hereford Texas - The Town Without A Toothache
- NSC 1997 Report: Fluoride As Nutrient
- ADA – FI Does Not Cause Bone Cancer – FAN Disagrees
- Golda Starr Addresses Everett City Council
- Everett Blog is Covering City Council Fluoride Debate
- Notice to Everett of Liability 7-20-2011
- Fluoride And Hypothyroidism
- ADA and HHS Conspire to Squelch Fluoridegate
- Cuba stopped fluoridation in 1997, and cavities did not rise
- Dr. Hirzy of EPA Union
- Most Dentists Have Not Studied Fluoridation
- Alveda King & Andrew Young Against Fluoride
- Fairbanks Ends Fluoridation
- ADA, CDA $200,000 to remove fluoride from Cal list
- Bill Gates' Vaccines
- Dr. Sauerheber on Salt and Fluoridation
- Washington Board Of Health Put On Notice
- Involving Students
- Fluoride-Gate–CDC-Ethics-Complaint
- Fluoride-Gate–US-and-NZ
- Sauerheber on Fluoride
- Sauerheber to FDA 11-17-10
- Sauerheber to EPA 4-9-2011
- Sauerheber to EPA-HHS
- HHS Warns That Infant Formulas Contain Fluoride
- Health & Human Services
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- JRD Presentation at FAN Conference
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- Nuclear Power is Not Green
- IAOMT Amici wanted to reply to fluoridation supporters
- Fluoride in the New York Times
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- Dr. Bruce Spittle on Fluoride Fatigue
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Thanks, Wikipedia.

Fluoride Is Poison, Says Dartmouth Doctor

New evidence seems to confirm that by fluoridating our water, we are poisoning our children.

By Tom Valentine

More than two years ago, the court-killed *Spotlight* wrote about George Glasser, a citizen researcher who blew the whistle on the use of highly-toxic fluorosilicic acid from rock fertilizer processing as the primary source of community water fluoridation.

Now, a massive study of young children who have been subjected to fluorosilicic acid fluoridation in their New York communities shows that the water additive does not improve kids' teeth and could even be poisoning them.

Until that time, most people were under the impression that water fluoridation used sodium fluoride, rat poison, a by-product of aluminum manufacturing.

Glasser, however, pointed out that more than 75 percent of the U.S. water fluoridation communities have been using the even more toxic fluorosilicic acid since the late 1970s.

Glasser was the first to stress the excessive toxicity inherent in using the hydrofluorosilicic acid residue that is removed from the industrial pollution control "scrubbers" in the manufacture of phosphate fertilizers.

The chemists refer to this material as silicofluorides and have now conclusively shown that the fluoridation material is linked to other heavy metal toxins that are found in drinking water—lead, arsenic, aluminum and cadmium for example.

In the March 2001 issue of the journal *Neuro Toxicology*, a team of researchers led by Dr. Roger Masters of Dartmouth College reported evidence that public drinking water fluoridated with fluorosilicic acid is linked to higher levels of lead in children.

After pointing out that since 1992 only about 10 percent of America's fluoridated communities use sodium fluoride and 90 percent use fluorosilicic acid, the researchers stated that about 140 million Americans have this chemical placed in their water.

They also pointed out that sodium fluoride was tested on animals and approved for human consumption, but fluorosilicic acid had not been so tested and approved.

The research team studied the blood-lead levels in more than 400,000 children in three different samplings. In each case they found a significant link between fluorosilicic acid-treated water and elevated blood levels of lead.

In the latest study, the blood levels of about 150,000 children ranging in ages from infant to 6 were analyzed.

The samples were collected by the New York State Department of Children's Health from 1994 through 1998.

Researchers concluded that the fluorosilicic acid-treated water was equal to or worse a contributor of blood-lead levels as old house paint.

Dr. Masters said these preliminary findings correlate the fluorosilicic acid water treatment and behavior problems that are due to known effects of lead on brain chemistry.

Additionally, a study in Germany showed the fluorosilicic acid water (SiFs) may inhibit the enzyme cholinesterase which plays a key role in regulating neurotransmitters.

"If SiFs are cholinesterase inhibitors, this means that SiFs have effects like the chemical agents linked to Gulf War Syndrome, chronic fatigue syndrome and other puzzling conditions that plague millions of Americans," Masters said. "We need a better understanding of how SiFs behave chemically and physiologically."

Last March, Dr. Masters testified before New Hampshire legislators in favor of the Fluoride Product Quality Control Act. The bill would put the SiFs to a series of tests, and perhaps further research on neurotoxicity and behavior.

"If further research confirms our findings," Masters said, "this may well be the worst environmental poison since leaded gasoline."

The EPA admits it has no data on the health and behavioral effects of SiFs.

Dr. Masters asked: "Shouldn't we stop intentionally exposing 140 million Americans to an untested chemical until the risks are extensively and objectively evaluated by independent researchers?"

And, the final insult: There is no conclusive evidence that fluoridation of drinking water significantly improves the teeth of children at all. ™

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Display Settings: Abstract

Neurotoxicology. 2000 Dec;21(6):1091-100

Association of silicofluoride treated water with elevated blood lead.

Masters RD, Coplan MJ, Hone BT, Dykes JE.

Foundation for Neuroscience and Society, Dartmouth College, Hanover, NH 03755-3547, USA. roger.d.masters@dartmouth.edu

Abstract

Previous epidemiological studies have associated silicofluoride-treated community water with enhanced child blood lead parameters. Chronic, low-level dosage of silicofluoride (SiF) has never been adequately tested for health effects in humans. We report here on a statistical study of 151,225 venous blood lead (VBL) tests taken from children ages 0-6 inclusive, living in 105 communities of populations from 15,000 to 75,000. The tests are part of a sample collected by the New York State Department of Children's Health, mostly from 1994-1998. Community fluoridation status was determined from the CDC 1992 Fluoridation Census. Covariates were assigned to each community using the 1990 U.S. Census. Blood lead measures were divided into groups based on race and age. Logistic regressions were carried out for each race/age group, as well as above and below the median of 7 covariates to test the relationship between known risk factors for lead uptake, exposure to SiF-treated water, and VBL >10 microg/dL. RESULTS: For every age/race group, there was a consistently significant association of SiF treated community water and elevated blood lead. Logistic regressions above and below the median value of seven covariates show an effect of silicofluoride on blood lead independent of those covariates. The highest likelihood of children having VBL> 10 microg/dL occurs when they are both exposed to SiF treated water and likely to be subject to another risk factor known to be associated with high blood lead (e.g., old housing). Results are consistent with prior analyses of surveys of children's blood lead in Massachusetts and NHANES III. These data contradict the null hypothesis that there is no difference between the toxic effects of SiF and sodium fluoride, pointing to the need for chemical studies and comprehensive animal testing of water treated with commercial grade silicofluorides.

PMID: 11233755[PubMed - indexed for MEDLINE]

Publication Types, MeSH Terms, Substances

Fluoride chemicals may increase lead accumulation, say researchers

Published on March 16, 2010 at 3:11 AM

Fluoride chemicals added to public water supplies, boosts lead absorption in lab animals' bones, teeth and blood, report Sawan, et al. (*Toxicology* 2/2010). Earlier studies already show children's blood-lead-levels are higher in fluoridated communities, reports Sawan's research team.

"...exposure to increased amounts of lead and fluoride occurs at about the same age (1-3 years)... Therefore, this is a critical time when systemic exposure to fluoride should be minimized since fluoride may increase lead accumulation," the researchers caution.

Low-level lead exposure is associated with lower IQ, ADHD and many health and behavior ailments.

Fluosilicic acid (fluoride) is added to water supplies ostensibly to reduce tooth decay.

Sawan's team put fluosilicic acid, with and without lead, into lab animals' drinking water. They found more lead in tooth enamel, surface bone, whole bone, and tooth dentine in rats co-exposed to fluoride and lead.

Possibly anticipating criticism that rats were fed higher fluoride-concentrated water than people drink, the authors write, "This concentration was chosen because it produces plasma fluoride levels that are comparable with those commonly found in humans..."

Increased prevalence and severity of fluoride-discolored teeth (fluorosis) proves U.S. children are already fluoride-overexposed, "which may cause their blood-lead levels to increase and produce more lead toxicity," they write.

"These findings suggest that a biological effect, not recognized so far, may underlie the epidemiological association between increased blood-lead levels in children and water fluoridation," concludes Sawan's research team.

"[O]ur findings may have serious implications for populations exposed to increased amounts of both lead and fluoride, particularly young children," the research team writes.

Fluoridation chemicals often contain lead (NSF International).

Attorney Paul Beeber, President, New York State Coalition Opposed to Fluoridation (NYSCOF), says, "People need to lobby and petition their legislators to stop fluoridation in their towns, cities and states. Legislators are ignoring the science proving fluoridation is endangering our health, our water supplies and wasting tax dollars while denying freedom of choice." (see: http://www.fluoridealert.org/health/sitemap.html)

Masters and Coplan's landmark studies show higher blood-lead-levels in children living in silico-fluoridated communities (*Neurotoxicology* 2000, 2007). Macek's research shows children's higher blood-lead-levels are associated with water fluoridation when lead is already in the environment (*Environmental Health Perspectives*, 2006).

Some fluoridation chemicals originate in China, Mexico and Japan, reports the CDC.

SOURCE New York State Coalition Opposed to Fluoridation, Inc.

Costs of Fluoridation

In a typical city, people consume less that 1% of all water that passes through the public water system. The rest of the water is used for washing, toilet flushing, industry, gardening, and so on. Even when many found it reasonable to believe that fluorides reduced tooth decay, fluoridation of public water supplies was an extremely costly way to deliver 1.0 milligram fluoride per day to the target population of children from birth to age 12.

For example, the annual projected cost for water fluoridation chemicals alone for the city of Tacoma, Washington in 1992 was $125,000. (C.R. Myrick, Water Quality Coordinator, City of Tacoma, telephone conversation with Wini Silko, citizen of Tacoma, November 15, 1991.) By contrast, the cost of fluoride tablets and drops for all children aged 12 and under in Tacoma would have been less than $25,000 (based on a cost of $1.20 per thousand 1.0 milligram tablets).

This comparison does not take into account the capital and labor costs of fluoridation or the substantial hidden costs, which include corrosion of water mains and plumbing, environmental pollution and degradation of the health of the general population.

Fluorides are so highly corrosive that they cannot be contained in metal or glass. Even at dilutions of 1.0 ppm, fluorides increase corrosion rates and cause leaching of lead and other metals from plumbing. In the first half of 1992 Tacoma, Washington failed to meet EPA standards for lead contamination in its water. When equipment failure forced a halt to fluoridation of Tacoma's water supply, tests showed a nearly 50% drop in lead contamination. (Letter to Michael Heath, Washington State Department of Health, from C.R. Myrick, Water Quality Coordinator, City of Tacoma, December 2, 1992.) In February 1994, Thurmont, Maryland reported a similar drop in lead levels when fluoridation was halted there. ("Lead levels in Thurmont water drop" by Julia Robb in The Frederick (MD) Post, February 3, 1994.)

When a claimed 20% decrease in tooth decay is compared to a 600% increase in bone cancer or a 41% increase in hip fractures, when the cost of a tooth filling is compared to the cost of a hip fracture or cancer treatment, it is obvious that the human and economic costs of fluoridation are staggering.

FLUORIDE CIVIL RIGHTS ISSUES

NOTE: Yellow highlights below in the copy of the text from Ambassador Young's March 29, 2011 letter have been added by The Lillie Center Inc. Condensed to display on one page.

ANDREW YOUNG

Chip Rogers, Senate Majority Leader, Rm. 236
Georgia State Capitol
Atlanta GA 30334

Subject: Withdrawal of Law Requiring Water Fluoridation in Georgia

Dear Senators and Representatives:

I am writing to convey my interest in seeing that Georgia's law mandating water fluoridation for Georgia communities be repealed.

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. We originally thought people needed to swallow it, so the fluoride would be incorporated into teeth before they erupted from the gums. Our belief in the need for systemic absorption was why we began adding fluoride to drinking water. But now we know that the primary, limited cavity fighting effects of fluoride are topical, when fluorides touch teeth in the mouth. We know that fluorides do little to stop cavities where they occur most often, in the pits and fissures of the back molars where food packs down into the grooves. This is why there is a big push today to use teeth sealants in the molars of children. We also have a cavity epidemic today in our inner cities that have been fluoridated for decades.

So now we know that fluoride's impacts are primarily topical and are very limited where needed most in the teeth. And on top of this we are learning that fluorides do not simply affect teeth, but can also harm other tissues and systems in the body. So we must weigh the risks to kidney patients, to diabetics, and to babies against the small amount of cavities prevented by swallowed fluorides. The National Research Council has acknowledged that kidney patients, diabetics, seniors, and infants are susceptible groups that are especially vulnerable to harm from fluorides. There are millions of these persons who have these health conditions or who meet the criteria for concern.

The National Center for Health Statistics says that 41% of 12-15 year old adolescents now have the teeth staining called "dental fluorosis" that shows overexposure to fluorides as a child, and that 3.6% have the very visible moderate and severe forms of the condition. This translates into millions of persons with disfiguring impacts from fluorides. How many of these persons can afford the tens of thousands of dollars to have veneers or other cosmetic dental work performed?

There is growing bipartisan support across the country for halting water fluoridation. And eleven unions of EPA workers, representing 7,000 EPA lab workers, scientists, and others have called for a halt to fluoridation. The recent suggested lowering of fluoride levels in water does not address the fact that we still cannot control the amount of fluorides that sensitive individuals ingest. People are calling for investigative Fluoridegate hearings, and one can understand why, given the fact that the story about fluorides keeps changing.

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.

Peace and Blessings,

Andrew Young

PROVIDENCE
BAPTIST CHURCH
"Winning the Lost...Developing the Saved"

Dr. Gerald L. Durley
Pastor

March 9, 2011

Senator Chip Rogers
Senate Majority Leader
Georgia State Capitol – Room 236
Atlanta, Georgia 30334

RE: Repeal of Georgia's Mandatory Fluoridation Law

Dear Senator Rogers:

As a citizen, a minister, and a community leader, I am writing to state my opposition to the practice of water fluoridation, and to ask that the current Georgia law mandating water fluoridation throughout our state be repealed.

First and foremost, water fluoridation takes away people's choice. We have a God-given right to not have fluoride forced into our bodies or the bodies of our children. Fluoridation supporters attempt to say that people are not forced to drink fluoridated water, but that is a disingenuous statement that ignores reality. Many families do not have funds to buy an expensive home water fluoride removal system, or to buy unfluoridated bottled water for making their babies' milk formula, so in truth they are forced to drink fluoride in their water simply because of their economic status or household income.

Second, fluoridation disproportionately harms members of the black community. The Centers for Disease Control's own information acknowledges that blacks have significantly more "dental fluorosis" teeth staining than whites. For many, the stains are not simply "barely visible" or "faint" in color, or "just a cosmetic issue" as fluoridation promoters call it. Common sense tells us that if fluorides affect the teeth, which are the hardest surfaces of the body to cause permanent staining, certainly other soft tissue organs in the body are affected. Also, the National Research Council of the National Academy of Sciences has designated kidney patients, diabetics, seniors, and babies as "susceptible subpopulations" that are especially vulnerable to harm from ingested fluorides. Black citizens are disproportionately affected by kidney disease and diabetes, and are therefore more impacted by fluorides.

Third, we cannot control the dose of fluoride people ingest if we put fluoride in drinking water. Layered on top of this, we do not know what each person's medical history or nutritional status is. Therefore, the "one size fits all" approach to fluoridation makes no sense.

We need to focus on helping people get access to dentists. Lack of fluoride does not cause cavities. Too many sugars on the teeth, lack of access to dental care, and lack of dental health education–these cause cavities.

We also need to know why the full story about harm from fluorides is only just now coming out. I support the holding of Fluoridegate hearings at the state and national level so we can learn why we haven't been openly told that fluorides build up in the body over time, why our government agencies haven't told the black community openly that fluorides disproportionately harm black Americans, and why we've been told that decades of extensive research show fluoridation to be safe, when the National Research Council in 2006 listed volumes of basic research that has never been done. This is a serious issue for all Americans, of every race and in every location.

Sincerely,

Servant/ Leader Gerald L. Durley

2295 Benjamin E. Mays Drive, SW • Atlanta, Georgia 30311
Phone: *404-752-6869* • FAX: *404-752-5284*
www.pmbcatlanta.org

Civil Rights Violation Regarding Forced Medication

LEAGUE of UNITED LATIN AMERICAN CITIZENS

WHEREAS, the League of United Latin American Citizens is this nation's oldest and largest Latino organization, founded in Corpus Christi, Texas on February 17, 1929; and

WHEREAS, LULAC throughout its history has committed itself to the principles that Latinos have equal access to opportunities in employment, education, housing and healthcare; and

WHEREAS, LULAC advocates for the well-being of, but not exclusively of, Hispanics throughout our country; and

WHEREAS, safe drinking water is a necessity for life; and

WHEREAS, the purpose of a public water supply is to supply water to the entire community which is composed of people with varying health conditions, in varying stages of life, and of varying economic status; not to forcibly mass medicate the population which is a civil rights violation; and

WHEREAS, fluoridation is mass medication of the public through the public water supply; and

WHEREAS, current science shows that fluoridation chemicals pose increased risk to sensitive subpopulations, including infants, the elderly, diabetics, kidney patients, and people with poor nutritional status; and

WHEREAS, minority communities are more highly impacted by fluorides as they historically experience more diabetes and kidney disease; and

WHEREAS, minorities are disproportionately harmed by fluorides as documented by increased rates of dental fluorosis (disfiguration and discoloration of the teeth); and

WHEREAS, the National Research Council in 2006 established that there are large gaps in the research on fluoride's effects on the whole body; a fact that contradicts previous assurances made by public health officials and by elected officials, that fluorides and fluoridation have been exhaustively researched; and

WHEREAS, a growing number of cities and health professionals have rejected fluoridation based on current science and the recognition of a person's right to choose what goes into his/her body; and

WHEREAS, the CDC now recommends that non-fluoridated water be used for infant formula (if parents want to avoid dental fluorosis – a permanent mottling and staining of teeth), which creates an economic hardship for large numbers of families, minority and otherwise; and

WHEREAS, the League of United Latin American Citizens (LULAC), founded in 1929, has historically been a champion of the disenfranchised and a leader in the fight for social and environmental justice; and

WHEREAS, City Council Districts I-6 of San Antonio (predominantly minority districts) voted overwhelmingly that the public water supply should not be contaminated with fluoridation chemicals; and

WHEREAS, the election to fluoridate the water, essentially disenfranchised the right of these minority Districts to safe drinking water for all; and

WHEREAS, the U.S. Health and Human Services and the EPA (January 2011) have recently affirmed the NRC Study results that citizens may be ingesting too much fluoride and that the exposure is primarily from drinking water; and

WHEREAS, the proponents of fluoridation promised a safe and effective dental health additive, but the San Antonio Water System's

(SAWS) contract for fluoridation chemicals proves a "bait and switch"; as SAWS is adding the toxic waste by-product of the phosphate fertilizer industry, that has no warranty for its safety and effectiveness for any purpose from the supplier (PENCCO, Inc.) or the source (Mosaic Chemical); and

THEREFORE, BE IT RESOLVED, that LULAC commends efforts by organizations that oppose forced mass medication of the public drinking supplies using fluorides that are industrial grade, toxic waste by-products which contain contaminants (arsenic, lead, mercury) which further endanger life; and

BE IT FURTHER RESOLVED, that LULAC supports efforts by all citizens working to stop forced medication through the public water system because it violates civil rights; and

BE IT FURTHER RESOLVED, that LULAC opposes the public policy of fluoridation because it fails to meet legislative intent; and

BE IT FURTHER RESOLVED, that LULAC demands to know why government agencies entrusted with protecting the public health are more protective of the policy of fluoridation than they are of public health.

Approved this 1st day of July 2011.

Margaret Moran
LULAC National President

New Evidence Confirms Dentists Controlled Statements by CDC On Fluoridation Toxicity Concerns

Planned Parenthood, founded by Margaret Sanger, once advocated "Birth Control" water. Some scientific studies show that flouride can be harmful to the human reproductive process – Alveda King

FOR IMMEDIATE RELEASE
June 22, 2011

CONTACT: Daniel G. Stockin, MPH The Lillie Center, Inc. P.O. Box 839 Ellijay GA 30540
Ph: 706-669-0786 email: stockin2@yahoo.com web: www.SpotsOnMyTeeth.com

Another King Family Member Speaks Out as Fluoridegate Scandal Builds in Atlanta

Ellijay, GA – Swirling questions about conflicts of interest and improper influence grew rapidly today as Freedom of Information Act documents showed that since the 1970s, dental health professionals alone in the Centers for Disease Control (CDC) have controlled the agency's stance supporting water fluoridation.

A response to a request for the names and job descriptions of all persons in CDC that have had input into CDC's decision to support fluoridation listed no CDC toxicologists, minority health professionals, experts in diabetes, or others outside the Oral Health Division.

CDC says its administrative structure is set up to address what the agency calls "cross cutting issues." Yet only CDC's directors of oral health were listed over several decades as being responsible for the agency's fluoridation stance, a disquieting disclosure for water, health, and political leaders that believed CDC utilized its broad array of internal expertise in assessing research on whole-body, outside-the-mouth harm from fluoridation.

The documentation intensifies focus on the motivations behind CDC's and EPA's fluoride safety statements that appear at odds with current scientific knowledge.

After a 2006 report from the National Research Council documented extensive amounts of basic research never conducted on whole-body fluoride impacts, CDC continued promoting fluoridation while stating on its website, "Extensive research conducted over the past 60 years has shown that fluoridation of public water supplies is safe and effective for all community residents."

The disclosures come as yet another prominent member of the Atlanta black community is calling for a halt to water fluoridation and highlighting concerns about the CDC's role in promoting it.

Alveda King, nationally known minister and niece of civil rights leader Martin Luther King Jr., joins the civil rights leader's daughter, Bernice King, former Atlanta mayor and U.N. ambassador Andrew Young, and civil rights leader and minister Dr. Gerald Durley in drawing attention to risks from fluoridation.

Alveda King posted information on her blog today. "The Centers for Disease Control has clearly been trying to preserve fluoridation at all costs, but the facts about fluoride harm are coming out anyway," she says.

"This is a civil rights issue," she continues. "No one should be subjected to drinking fluoride in their water, especially sensitive groups like kidney patients and diabetics, babies in their milk formula, or poor families that cannot afford to purchase unfluoridated water. Black and Latino families are being disproportionately harmed."

A growing body of published research shows that minorities, kidney patients, diabetics, babies and seniors are particularly at risk for harm from ingested fluorides.

Law firms are now reviewing old and new documents believed to highlight a pattern of attempts to curtail discussions on fluoride toxicity and downplay the importance of professionals personally reviewing scientific reports about fluorides.

One such document is an explosive transcript of a 1951 meeting of state dental directors on file at the Library of Congress.

State dental leaders at the meeting were encouraged to promote fluoridation were told, "The question of toxicity is on the same order. Lay off it altogether. Just pass it over. 'We know there is absolutely no effect other than reducing tooth decay,' you say, and go on. If it becomes an issue, then you will have to take it over, but don't bring it up yourself."

A white paper issued by the American Dental Association in 1979 stated that, "Individual dentists must be convinced that they need not be familiar with scientific reports of laboratory and field investigations on fluoridation to be effective participants in the promotion program and that nonparticipation is an overt neglect of professional responsibility."

"I think it's pretty clear that the public, the media, and health providers were given soothing talking points about fluoridation, and in many cases dissuaded from personally looking at toxicity data," says Daniel G. Stockin, a career public health professional who is opposed to fluoridation.

"How can CDC oral health professionals in a department that has promoted fluoridation for decades be objective, let alone competent to assess research and draw conclusions about the toxicity of fluorides on thyroid glands, kidneys, and the pineal gland?" he asks.

"There is a reason we're seeing calls for Fluoridegate investigations," Stockin continues. "The legal community and the media are waking up to this. I believe jurors will see a clear pattern of disinformation, half-truths, misdirection, and omission of critical material facts concerning harm from fluoridated drinking water."

###

Reference Links / Sources:

* Freedom of Info. Act Request & Response
* CDC statement on structure set up to address cross cutting issues
* CDC's "60 years of extensive research" statement (see "Safety and Fluoridation")
* Alveda King's blog: see June 22, 2011 post
* National Research Council report on fluorides: see "Susceptible Subpopulations" pp. 350-51, Harm to minorities – see Table 23 from CDC MMWR publication and other research references
* Transcript of 1951 meeting of state dental directors (see p. 23), Original document on file at Library of Congress: call number RK21.C55 LC, control no.: 59062243. LCCN permalink Meeting name: Conference of the State and Territorial Dental Directors with the Public Health Service and the Children's Bureau. Main title: Proceedings. Published/Created: [Washington] U. S. Dept. of Health, Education, and Welfare.
* ADA White Paper on Fluoridation: see bottom p. 10
* Atlanta leaders on fluoridation: Bernice King Facebook page, see May 10, 2011 post; Rev. Durley & Ambassador Young
* Fluoridation Litigation Article in American Association for Justice newsletter

Related posts:

1. SpotsOnMyTeeth.com Reveals Controversial Fluoride Issue
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Website

DECEMBER 21, 2011

Black Pastors Speak Out Against Fluoride In Water

MEMPHIS - Rev. William Owens, President of the Coalition of African American Pastors, is joining a growing chorus of leaders calling for federal and state hearings and investigations into new revelations about risks from drinking fluoridated water.

Owens wants to know why important fluoride information wasn't shared with African American leaders and citizens, and is especially concerned about fluoride impacts on poor and inner city families.

"There are so many issues that need to be addressed in Fluoridegate investigations," he states. "This is very disturbing."

"Why wasn't the black community told that blacks are disproportionately impacted by harm from fluorides and fluoridated water? Nobody told me until I learned about this a year ago. African Americans have more kidney disease and more diabetes, but nobody elected to tell us that kidney patients and diabetics are more susceptible to harm from ingested fluorides."

In 2006 the National Research Council published a report that listed diabetics, kidney patients, babies and children, seniors, and outdoor workers as "susceptible subpopulations" that are especially vulnerable to harm from fluorides.

Owens also wants to know why the Centers for Disease Control didn't issue a press release when it changed its stance about mixing baby formula with fluoridated water after the NRC report was issued.

Shortly after the NRC report was published the CDC posted deep inside its website a statement about children potentially developing permanent staining of teeth called "dental fluorosis" if fluoridated water is used to mix baby formula.

"Do you know how many millions of moms and dads are going to their kitchen sink every day to get water for baby formula? This affects a lot of people. Why no press release?" he asks.

"What are poor families to do if they can't afford unfluoridated water? How are they to learn the information about fluorosis? How are they to pay to repair the stains on their teeth?"

"What about the kidney risks and concerns about IQ impacts?" he continues. "Does the Center for Disease Control really think that fluorides miraculously only affect teeth in the mouth and don't impact the rest of the body?"

Owens is an outspoken advocate for assisting children in their education and is concerned about reports of IQ impacts from children ingesting fluorides.
A recent study published in Environmental Health Perspectives, a publication of the National Institute for Environmental Health Sciences, documented diminished IQ in children from fluorides in water.

In 2009 a study in the Journal of Public Health Dentistry noted that black children ingest significantly more fluorides than white children.
The 2006 NRC report included a statement that, "More research is needed to clarify fluoride's biochemical effects on the brain."

CDC's Morbidity and Mortality Weekly Report published data in 2005 showing that blacks have significantly more of the worst forms of dental fluorosis than whites. Owens wants to know why African Americans leaders weren't openly given this and other important information.

The U.S. Department of Health and Human Services proposed somewhat reducing the level of fluoride in water in a statement on January 7, 2011.
The HHS actions don't go far enough, according to Rev. Owens, citing the issue that some people drink dramatically more water than others, have medical susceptibilities to fluorides, and have numerous other uncontrolled sources of fluoride in their diet.

"We need to investigate this Fluoridegate mess. This is a civil rights and environmental justice issue. We don't need just a little less fluoride in water. Fluoridation needs to end," he says firmly.

STORY TAGS: BLACK NEWS, AFRICAN AMERICAN NEWS, MINORITY NEWS, CIVIL RIGHTS NEWS, DISCRIMINATION, RACISM, RACIAL EQUALITY, BIAS, EQUALITY, AFRO AMERICAN NEWS

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Civil Rights Leaders Call End To Water Fluoridation

CANTON, NY - Because fluoride can disproportionately harm poor citizens and black families, Atlanta civil rights leaders, Andrew Young and Dr. Gerald Durley, have asked Georgia legislators to repeal the state's mandatory water fluoridation law.

Andrew Young, former U.N. Ambassador and former Atlanta Mayor, along with Reverend Dr. Gerald Durley, Pastor of Providence Baptist Church in Atlanta, both inductees in the International Civil Rights Walk of Fame, expressed concerns about the fairness, safety, and full disclosure regarding fluoridation in letters to the state's minority and majority legislative leaders.

Fluoride chemicals, added to 96% of Georgia's public drinking water supplies are meant to prevent tooth decay, especially in the poor. Yet, 61% of low-income Georgia third-graders have tooth decay compared to 51% from higher income families - and 33% and 20%, respectively, have untreated cavities showing a dire need for dental care.

"We also have a cavity epidemic today in our inner cities that have been fluoridated for decades," wrote Ambassador Young.

Studies show that despite fluoridation, tooth decay is higher in blacks (4) along with fluoride overexposure symptoms - dental fluorosis or discolored teeth.(5)

Dr. Durley wrote, "The National Research Council (NRC) of the National Academy of Sciences has designated kidney patients, diabetics, seniors, and babies as 'susceptible subpopulations' that are especially vulnerable to harm from ingested fluorides. Black citizens are disproportionately affected by kidney disease and diabetes, and are therefore more impacted by fluorides."

Ambassador Young wrote, "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."

Dr. Durley's letter to the legislators also says, "I support the holding of Fluoridegate hearings at the state and national level so we can learn why we haven't been openly told that fluorides build up in the body over time (and) why our government agencies haven't told the black community openly that fluorides disproportionately harm black Americans..."

An American Association for Justice Newsletter for trial lawyers describes potential fluoride legal actions based on personal injury, consumer fraud, and civil rights harm.

In a letter to their state's Health Commissioner, a bipartisan group of Tennessee legislators expressed their concern about fluoridation's undesirable impact on babies and other groups.

A bipartisan group of New York City Council Members has also introduced legislation to stop fluoridation in NYC.

Daniel G. Stockin of The Lillie Center Inc., a Georgia-based firm working to end the practice of fluoridation says, "You can look for even more leaders and persons harmed by fluoridation to speak out now."

The Department of Health and Human Services (HHS) proposes to lower water fluoride levels to alleviate the growing dental fluorosis epidemic. The Fluoride Action Network (FAN) submitted scientific evidence to HHS indicating that fluoridation must stop completely to preserve health, documenting that:

- HHS has failed to consider fluoride's impact on the brain. Fluoride has been linked to lowered IQ in 24 human studies, and over 100 animal studies have reported damage to the brain.
- Infants who are fed formula made with fluoridated tap water will receive up to 175 times more fluoride than breast-fed infants. Infants 0-6 months old, the smallest and most vulnerable in our population, were completely excluded from risk calculations in HHS's proposal.
- African-American children and low-income children suffer from the highest rates of dental fluorosis, including the most severe forms of the condition. The HHS has failed to take any steps to redress this inequity, thereby making fluoridation an Environmental Justice issue.

Young stated, "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."

Paul Connett, PhD, Director of FAN says "Fluoridation is unnecessary, unethical, the benefits wildly exaggerated and the risks minimized."

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Fluoride - Not FDA Approved for Ingestion
By Sally Stride
June 25, 2004

Amazingly enough, children's sodium fluoride anti-cavity drug products have never been found safe or effective by the Food and Drug Administration (FDA). They were never even tested. The reason will astound you.

As you already know, sodium-fluoride drug products are routinely given to children to prevent tooth decay. They are drugs requiring a dentist's or physician's prescription.

Earlier this year, I wrote the FDA in order to find out why these drugs are not listed on the FDA's approved drug list. My exchange of e-mail correspondence with the FDA (see below) shows that fluoride supplements were "grandfathered in" before the 1938 law requiring drug testing was enacted.

Drug products on the market prior to 1938 were presumed safe by the FDA and were allowed to be sold without any testing. As long as they meet certain conditions, these pre-1938 drugs can continue to be sold without the post-1938 testing requirement. However, once a drug is on the market for any reason, doctors can use that drug to treat any disease or condition.

But in the case of sodium fluoride, its continued, post-1938 use defies logic. Sodium fluoride was on the market prior to 1938, but it was not used at that time to stop cavities, nor was it used for any medical reason. Sodium fluoride was sold as a rat poison. So, in effect, the FDA says that since sodium fluoride was used to kill rats safely and effectively before 1938, the FDA considers it is safe to give to children to prevent tooth decay.

Over 91% of U.S. fluoridating communities now use cheaper silicofluorides , another chemical which was never approved by the FDA. This chemical, too, was never safety tested in animals nor in humans, but it was recently found to increase children's blood lead levels.

And how times change! The following statement is from a 1951 American Dental Association brochure: "There is no proof that commercial preparations such as tablets, dentifrices, mouthwashes or chewing gum containing fluorides are effective in preventing dental decay. Unfortunately such preparations are being offered to the public without adequate scientific evidence of their value."

So, it was in this context and with this knowledge that I wrote the FDA on March 5, 2004, by e-mail:

"Comments: I don't see fluoride supplements, which require a prescription, listed on your approved drugs list. They are prescribed to children to prevent tooth decay. Why aren't they approved? They aren't nutritional supplements, so they can't be excluded. Is it safe to give children drugs that haven't been FDA approved?

Fairly quickly, four days later, the FDA responded to my e-mail as follows:

"Subject: RE: DrugInfo Comment Form FDA/CDER Site

Date: 3/9/2004 3:56:03 PM

From: DRUGINFO@cder.fda.gov

Sodium fluoride has been marketed in the United States since before 1938, when the Food, Drug, and Cosmetic Act (the Act) was enacted. The Act is the basic food and drug law of the United States and is intended to assure the consumer that foods are pure and wholesome, safe to eat, and produced under sanitary conditions; that drugs and devices are safe and effective for their intended uses; that cosmetics are safe and made from appropriate ingredients; and that all labeling and packaging is truthful, informative, and not deceptive.

With the passage of the Act, an approved New Drug Application (NDA) was required for marketing any new drug product (drug products introduced after 1938), as the regulatory mechanism for ensuring that all new drugs were cleared for safety prior to distribution. An amendment to the Act in 1962 required that, before marketing a drug, a manufacturer also had to provide substantial evidence of effectiveness for the product's intended uses. Drugs on the market prior to enactment of the 1938 law were exempted, or "grandfathered," and manufacturers were not required to file an NDA. The premise was that all pre-1938 drugs were considered safe, and if the manufacturer did not change the product formulation or indication, then an NDA was not required. However, once a manufacturer made any change to a pre-1938 drug, that drug was considered by the FDA to be a "new drug" and the manufacturer was required to prove that the drug was safe for its intended use.

The FDA is aware of sodium fluoride-containing products in various dosage forms that are currently marketed. At the present time, the FDA is deferring any regulatory action on sodium fluoride products that were marketed prior to 1962 as long as the currently marketed product is identical to the pre-1962 product.

Any prescription sodium fluoride-containing product coming into the marketplace after 1962 that is not identical to the pre-1962 labeling and that has drug claims, is subject to the FDA drug review process prior to marketing. Drug sponsors, generally manufacturers, develop new drugs, from the earliest laboratory discoveries through various phases of animal and human safety testing as well as clinical testing for effectiveness and appropriate dosing.

The FDA reviews data collected during drug testing at two key points: first, at the time the sponsor believes that the drug is ready for human testing and submits an Investigational New Drug Application (IND); and second, at the time the sponsor submits an NDA for approval to market the drug product. Before the FDA will permit testing of a drug in humans (clinical trials), the sponsor must provide us information in an IND demonstrating that the drug is reasonably safe to administer to humans. The sponsor must also provide manufacturing and control data, a detailed plan for clinical trials, and the names and qualifications of the investigators who will be performing the clinical trials.

Not all oral vitamins are prescription drugs. If the preparation contains 1mg or more of folic acid, then it is prescription. They are indicated for a variety of reasons but mainly to maintain normal blood levels and, therefore, prevent a variety of clinical conditions associated with vitamin deficiencies. If a patient is already deficient, then they will need more than the RDA to replete body stores of the deficient vitamin(s). Certain inborn errors of metabolism require treatment with specific vitamins.

Thank you Bd100 CDER Drug Information."

The next day, I e-mailed the FDA back:

"Wednesday, March 10, 2004 8:29 AM

To: DRUGINFO@cder.fda.gov

Subject: Re: DrugInfo Comment Form FDA/CDER Site

Thank you for your very detailed answer . Sodium fluoride supplements weren't tested as a decay preventative until the 1950's or 1960's. The sodium fluoride on the market before 1938 was sold as a rat poison. Were there any other medicinal reasons for using sodium fluoride before 1938? Thank you. Sally"

The FDA's final response to me was as follows:

"Subject: RE: DrugInfo Comment Form FDA/ CDER Site

Date: 3/18/2004 1:17:15 PM Eastern Standard Time

From: DRUGINFO@cder.fda.gov

Reply To: To: Suite1oh1@aol.com

We don't have information on the medical uses of fluoride before 1938.

Thank you bd100 CDER Drug Information"

The campaign to fluoridate the nation is in full swing by fluoridation promoters. They are continuing to downplay or ignore the mounting evidence against fluoridation. If they succeed, then it would be a disaster for the nation, both from the standpoint of health and that of health freedoms. It is very important for all of you to send letters to the editor as well as letters to their legislators on all levels: federal, state, and local. It is best if you express your concerns in a polite, sincere way but with conviction, and ask your legislators to take action, to curb and stop the implementation of fluoride programs, implementation and funding of fluoridation, fluoride programs, and at least declare a moratorium on fluoridation and ultimately halt fluoridation wherever it exists. One person can and does make a difference, sometimes THE difference.

"It is not the function of our Government to keep the citizen from falling into error, It is the function of the citizen to keep the Government from falling into error."
– Robert Houghwout Jackson,
Chief Judge at the War-Crimes Tribunal in Nuremberg

CDC Water Fluoridation Stand Long Influenced By Dentists

By Dr.Mercola
Mercola.com, July 23, 2011
Straight to the Source

For related articles and more information, please visit OCA's Health Issues page and our Appetite For a Change page.

Documents released under the Freedom of Information Act show that since the 1970's, the dental health professionals in the Centers for Disease Control (CDC) have completely controlled the agency's stance supporting water fluoridation. No CDC toxicologists, minority health professionals, experts in diabetes, or others outside the Oral Health Division had any input into the agency's position.

The documents have drawn attention once again to the CDC's and EPA's fluoride safety statements, which appear at odds with current scientific knowledge.

According to the Fluoride Action Network:

"Law firms are now reviewing old and new documents believed to highlight a pattern of attempts to curtail discussions on fluoride toxicity and downplay the importance of professionals personally reviewing scientific reports about fluorides."

Sources: Fluoride Action Network June 22, 2011

Dr. Mercola's Comments:
The Centers for Disease Control and Prevention (CDC) is part of a larger administrative structure that provides intra-agency support and resource sharing for health issues that require the input from more than one area of expertise. Other offices that share information and expertise with the CDC include the National Center for Chronic Disease Prevention and Health Promotion, Office of Minority Health and Health Equity, and the Agency for Toxic Substances.

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Proposed HHS Recommendation for Fluoride Concentration in Drinking Water for Prevention of Dental Caries

DISCLAIMER: The Secretary of Health and Human Services (HHS) signed the following notice on January 7, 2011, and HHS is submitting it for publication in the Federal Register. Steps have been taken to ensure the accuracy of the pre-publication version, however, it is not the official version. Please refer to the official version in a forthcoming Federal Register publication, or the U.S. Government Printing Office (GPO) website at http://www.gpoaccess.gov/fr/index.html.

Department of Health and Human Services

Proposed HHS Recommendation for Fluoride Concentration in Drinking Water for Prevention of Dental Caries

AGENCY: Department of Health and Human Services, Office of the Secretary.

ACTION: Notice.

SUMMARY: The Department of Health and Human Services (HHS) seeks public comment on proposed new guidance which will update and replace the 1962 U.S. Public Health Service Drinking Water Standards related to recommendations for fluoride concentrations in drinking water. The U.S. Public Health Service recommendations for optimal fluoride concentrations were based on ambient air temperature of geographic areas and ranged from 0.7 – 1.2 mg/L.

HHS proposes that community water systems adjust the amount of fluoride to 0.7 mg/L to achieve an optimal fluoride level. For the purpose of this guidance, the optimal concentration of fluoride in drinking water is that concentration that provides the best balance of protection from dental caries while limiting the risk of dental fluorosis. Community water fluoridation is the adjusting and monitoring of fluoride in drinking water to reach the optimal concentration (Truman BI, et al, 2002).

This updated guidance is intended to apply to community water systems that are currently fluoridating or will initiate fluoridation.[1] This guidance is based on several considerations that include:

- Scientific evidence related to effectiveness of water fluoridation on caries prevention and control across all age groups
- Fluoride in drinking water as one of several available fluoride sources
- Trends in the prevalence and severity of dental fluorosis
- Current evidence on fluid intake in children across various ambient air temperatures.

DATES: To receive consideration, comments on the proposed recommendations for fluoride concentration in drinking water for the prevention of dental caries should be received no later than **[INSERT DATE 30 DAYS FROM DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Comments are preferred electronically and may be addressed to CWFcomments@cdc.gov. Written responses should be addressed to the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, CWF Comments, Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), 4770 Buford Highway, NE, MS F-10, Atlanta, GA 30341-3717.

FOR FURTHER INFORMATION CONTACT: Barbara F. Gooch, Associate Director for Science (Acting), 770-488-6054, CWFcomments@cdc.gov, Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), Centers for Disease Control and Prevention, 4770 Buford Highway, NE, MS F-10, Atlanta, GA 30341-3717.

SUPPLEMENTARY INFORMATION:

The U.S. Public Health Service has provided recommendations regarding optimal fluoride concentrations in drinking water from community water systems (CWS)[2] for the prevention of dental caries (US DHEW, 1962). HHS proposes to update and replace these recommendations because of new data that address changes in the prevalence of dental fluorosis, fluid intake among children, and the contribution of fluoride in drinking water to total fluoride exposure in the United States. As of December 31, 2008, the Centers for Disease Control and Prevention (CDC) estimated that 16,977 community water systems provided fluoridated water to 196 million people. 95% of the population receiving fluoridated water was served by community water systems that added fluoride to water, or purchased water with added fluoride from other systems. The remaining 5% were served by systems with naturally occurring fluoride at or above the recommended level. More statistics about water fluoridation in the United States are available at http://www.cdc.gov/fluoridation/statistics/2008stats.htm. Guidance for systems with naturally occurring fluoride levels above the recommended level are beyond the scope of this document. Systems that have fluoride levels greater than the national primary (4.0 mg/L) or secondary (2.0 mg/L) drinking water standards established by EPA can find more information at the following EPA web site:
http://water.epa.gov/drink/contaminants/basicinformation/fluoride.cfm. CDC's Recommendations for Fluoride Use (CDC, 2001b), available at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm, provides guidance on community water fluoridation and use of other fluoride-containing products.

Recommendation

HHS proposes that community water systems adjust their fluoride content to 0.7 mg/L [parts per million (ppm)].

Rationale

Importance of community water fluoridation:

Community water fluoridation is a major factor responsible for the decline of the prevalence and severity of dental caries (tooth decay) during the second half of the 20th century. From the early 1970's to the present, the prevalence of dental caries in at least one permanent tooth (excluding third molars) among adolescents, aged 12 – 17 years, [3] has decreased from 90% to 60% and the average number of teeth affected by dental caries (i.e., decayed, missing and filled) from 6.2 to 2.6 (Kelly JE, 1975, Dye B, et al, 2007). Adults have also benefited from community water fluoridation. Among adults, aged 35 – 44 years,[4] the average number of affected teeth decreased from 18 in the early 1960's to 10 among adults, aged 35 – 49 years, in 1999-2004 (Kelly JE, et al, 1967; Dye B, et al, 2007). Although there have been notable declines in tooth decay, it remains one of the most common chronic diseases of childhood (USDHHS, 2000; Newacheck PW et al, 2000). Effective population-based interventions to prevent and control dental caries, such as community water fluoridation, are still needed (CDC, 2001a).

Systematic reviews of the scientific evidence related to fluoride have concluded that community water fluoridation is effective in decreasing dental caries prevalence and severity (McDonagh MS, et al, 2000a, McDonagh MS, et al, 2000b, Truman BI, et al, 2002, Griffin SO, et al, 2007). Effects included significant increases in the proportion of children who were caries-free and significant reductions in the number of teeth or tooth surfaces with caries in both children and adults (McDonagh MS, et al, 2000b, Griffin SO, et al, 2007). When analyses were limited to studies conducted after the introduction of other sources of fluoride, especially fluoride toothpaste, beneficial effects across the lifespan from community water fluoridation were still apparent (McDonagh MS, et al, 2000b; Griffin SO, et al, 2007).

Fluoride works primarily to prevent dental caries through topical remineralization of tooth surfaces when small amounts of fluoride, specifically in saliva and accumulated plaque, are present frequently in the mouth (Featherstone JDB, 1999). Consuming fluoridated water and beverages and foods prepared or processed with fluoridated water routinely introduces a low concentration of fluoride into the mouth. Although other fluoride-containing products are available and contribute to the prevention and control of dental caries, community water fluoridation has been identified as the most cost-effective method of delivering fluoride to all members of the community regardless of age, educational attainment, or income level (CDC, 1999, Burt BA, 1989). Studies continue to find that community water fluoridation is cost-saving (Truman B, et al, 2002).

Trends in availability of fluoride sources:

Community water fluoridation and fluoride toothpaste are the most common sources of non-dietary fluoride in the United States (CDC, 2001b). Community water fluoridation began in 1945, reaching almost 50% of the U.S. population by 1975 and 64% by 2008, http://www.cdc.gov/fluoridation/statistics/2008stats.htm; http://www.cdc.gov/fluoridation/pdf/statistics/1975.pdf. Toothpaste containing fluoride was first marketed in the United States in 1955 (USDHEW, 1980) and by the 1990's accounted for more than 90 percent of the toothpaste market (Burt BA and Eklund SA, 2005). Other products that provide fluoride now include mouthrinses, fluoride supplements, and professionally applied

fluoride compounds. More detailed explanations of these products are published elsewhere (CDC, 2001b) (ADA, 2006) (USDHHS, 2010). More information on all sources of fluoride and their relative contribution to total fluoride exposure in the United States is presented in a report by EPA (US EPA 2010a).

Dental fluorosis:

Fluoride ingestion while teeth are developing can result in a range of visually detectable changes in the tooth enamel (Aoba T and Fejerskov O, 2002). Changes range from barely visible lacy white markings in milder cases to pitting of the teeth in the rare, severe form. The period of possible risk for fluorosis in the permanent teeth, excluding the third molars,[5] extends from about birth through 8 years of age when the preeruptive maturation of tooth enamel is complete (CDC, 2001b; Massler M and Schour I, 1958). When communities first began adding fluoride to their public water systems in 1945, drinking water and foods and beverages prepared with fluoridated water were the primary sources of fluoride for most children (McClure FJ, 1943). Since the 1940's, other sources of ingested fluoride, such as fluoride toothpaste (if swallowed) and fluoride supplements, have become available. Fluoride intake from these products, in addition to water and other beverages and infant formula prepared with fluoridated water, have been associated with increased risk of dental fluorosis (Levy SL, et al, 2010, Wong MCM, et al, 2010, Osuji OO et al, 1988, Pendrys DG et al, 1994, Pendrys DG and Katz RV 1989, Pendrys DG, 1995). Both the 1962 USPHS recommendations and the current proposal for fluoride concentrations in community drinking water were set to achieve a reduction in dental caries while minimizing the risk of dental fluorosis.

Results of two national surveys indicate that the prevalence of dental fluorosis has increased since the 1980's, but mostly in the very mild or mild forms. The most recent data on prevalence of dental fluorosis come from the National Health and Nutrition Examination Survey (NHANES), 1999-2004. NHANES assessed the prevalence and severity of dental fluorosis among persons, aged 6 to 49 years. Twenty-three percent had dental fluorosis of which the vast majority was very mild or mild. Approximately 2% of persons had moderate dental fluorosis, and less than 1% had severe. Prevalence was higher among younger persons and ranged from 41% among adolescents aged 12 – 15 years to 9% among adults, aged 40 – 49 years. The higher prevalence of dental fluorosis in the younger persons probably reflects the increase in fluoride exposures across the U.S. population through community water fluoridation and increased use of fluoride toothpaste.

The prevalence and severity of dental fluorosis among 12 – 15 year olds in 1999-2004 were compared to estimates from the Oral Health of United States Children Survey, 1986-87, which was the first national survey to include measures of dental fluorosis. Although these two national surveys differed in sampling and representation (schoolchildren versus household), findings support the hypothesis that there has been an increase in dental fluorosis that was very mild or greater between the two surveys. In 1986-87 and 1999-2004 the prevalence of dental fluorosis was 23% and 41%, respectively, among adolescents aged 12 to 15. (Beltrán-Aguilar ED, et al, 2010a). Similarly, the prevalence of very mild fluorosis (17.2% and 28.5%), mild fluorosis (4.1% and 8.6%) and moderate and severe fluorosis combined (1.3% and 3.6%) have increased.

The estimates for severe fluorosis for adolescents in both surveys were statistically unreliable because of too few cases in the samples.

More information on fluoride concentrations in drinking water and the impact of severe dental fluorosis in children is presented in a report by EPA (US EPA 2010 b).

Relationship between dental caries and fluorosis at varying water fluoridation concentrations:

The 1986-87 Oral Health of United States Children Survey is the only national survey that measured the child's water fluoride exposure and can link that exposure to measures of caries and fluorosis (US DHHS, 1989). An additional analysis of data from this survey examined the relationship between dental caries and fluorosis at varying water fluoride concentrations for children aged 6 to 17 years (Heller KE, et al, 1997). Findings indicate that there was a gradual decline in dental caries as fluoride content in water increased from negligible to 0.7 mg/L. Reductions plateaued at concentrations from 0.7 to 1.2 mg/L. In contrast, the percentage of children with at least very mild dental fluorosis increased with increasing fluoride concentrations in water. The published report did not report standard errors.

In Hong Kong a small change of about 0.2 mg/L[6] in the mean fluoride concentration in drinking water in 1978 was associated with a detectable reduction in fluorosis prevalence by the mid 1980's[7] (Evans R.W, Stamm JW., 1991). Across all age groups more than 90% of fluorosis cases were very mild or mild. (Evans R.W, Stamm JW., 1991). The study did not include measures of fluoride intake. Concurrently, dental caries prevalence did not increase. (Lo ECM et al, 1990). Although not fully generalizable to the current U.S. context, these findings, along with those from the 1986-87 survey of U.S. schoolchildren, suggest that risk of fluorosis can be reduced and caries prevention maintained toward the lower end (i.e., 0.7 mg/L) of the 1962 USPHS recommendations for fluoride concentrations for community water systems.

Relationship of fluid intake and ambient temperature among children and adolescents in the United States:

The 1962 USPHS recommendations stated that community drinking water should contain 0.7-1.2 mg/L [ppm] fluoride, depending on the ambient air temperature of the area. These temperature-related guidelines were based on studies conducted in two communities in California in the early 1950's. Findings indicated that a lower fluoride concentration was appropriate for communities in warmer climates because children drank more tap water on warm days (Galagan DJ, 1953; Galagan DJ and Vermillion JR, 1957; Galagan DJ et al, 1957). Social and environmental changes, including increased use of air conditioning and more sedentary lifestyles, have occurred since the 1950's, and thus, the assumption that children living in warmer regions drink more tap water than children in cooler regions may no longer be valid.

Studies conducted since 2001 suggest that fluid intake in children does not increase with increases in ambient air temperature (Sohn W, et al, 2001; Beltrán-Aguilar ED, et al, 2010b). One study conducted among children using nationally representative data from 1988 to 1994 did not find an association between fluid intake and ambient air temperature (Sohn W, et al, 2001).

A similar study using nationally representative data from 1999 to 2004 also found no association between fluid intake and ambient temperature among children or adolescents (Beltrán-Aguilar ED, et al, 2010b). These recent findings demonstrating a lack of an association between fluid intake among children and adolescents and ambient temperature support use of a single target concentration for community water fluoridation in all temperature zones of the United States.

Conclusions:

HHS recommends an optimal fluoride concentration of 0.7 mg/L for community water systems based on the following information:

- Community water fluoridation is the most cost-effective method of delivering fluoride for the prevention of tooth decay;
- In addition to drinking water, other sources of fluoride exposure have contributed to the prevention of dental caries and an increase in dental fluorosis prevalence;
- Significant caries preventive benefits can be achieved and risk of fluorosis reduced at 0.7 mg/L, the lowest concentration in the range of the USPHS recommendation.
- Recent data do not show a convincing relationship between fluid intake and ambient air temperature. Thus, there is no need for different recommendations for water fluoride concentrations in different temperature zones.

Surveillance activities:

CDC and the National Institute of Dental and Craniofacial Research (NIDCR), in coordination with other federal agencies, will enhance surveillance of dental caries, dental fluorosis, and fluoride intake with a focus on younger populations at higher risk of fluorosis to obtain the best available and most current information to support effective efforts to improve oral health.

Process:

The U.S. Department of Health and Human Services (HHS) convened a federal inter-departmental, inter-agency panel of scientists (Appendix A) to review scientific evidence related to the 1962 USPHS Drinking Water Standards related to recommendations for fluoride concentrations in drinking water in the United States and to update these proposed recommendations. Panelists included representatives from the Centers for Disease Control and Prevention, the National Institutes of Health, the Food and Drug Administration, the Agency for Healthcare Research and Quality, the Office of the Assistant Secretary for Health, the U.S. Environmental Protection Agency, and the U.S. Department of Agriculture. The panelists evaluated existing recommendations for fluoride in drinking water, systematic reviews of the risks and benefits from fluoride in drinking water, the epidemiology of dental caries and fluorosis in the U.S., and current data on fluid intake in children, aged 0 to 10 years, across temperature gradients in the U.S. Conclusions were reached and are summarized along with their rationale in this proposed guidance document. This guidance will be advisory, not regulatory, in nature. Guidance will be submitted to the Federal Register and will undergo public and stakeholder comment for 30 days, after which HHS will review comments and consider changes.

DATED:

_____

Kathleen Sebelius

Secretary

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Comments regarding the document, Fluoride: Exposure and Relative Source

Contribution Analysis, should be sent to EPA at FluorideScience@epa.gov.

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EPA SCIENTISTS OPPOSING FLUORIDE

Organic Consumers Association
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EPA Scientists & Workers Call for an End to Water Fluoridation Because of Cancer Risk

From: Environment News Service <www.ens-newswire.com

FOR IMMEDIATE RELEASE

EPA UNIONS CALL FOR NATIONWIDE MORATORIUM ON FLUORIDATION, CONGRESSIONAL HEARING ON ADVERSE EFFECTS, YOUTH CANCER COVER UP

WASHINGTON, DC, August 30, 2005 --/WORLD-WIRE/-- Eleven EPA employee unions representing over 7000 environmental and public health professionals of the Civil Service have called for a moratorium on drinking water fluoridation programs across the country, and have asked EPA management to recognize fluoride as posing a serious risk of causing cancer in people. The unions acted following revelations of an apparent cover-up of evidence from Harvard School of Dental Medicine linking fluoridation with elevated risk of a fatal bone cancer in young boys.

The unions sent letters to key Congressional committees asking Congress to legislate a moratorium pending a review of all the science on the risks and benefits of fluoridation. The letters cited the weight of evidence supporting a classification of fluoride as a likely human carcinogen, which includes other epidemiology results similar to those in the Harvard study, animal studies, and biological reasons why fluoride can reasonably be expected to cause the bone cancer - osteosarcoma - seen in young boys and test animals.

The unions also pointed out recent work by Richard Maas of the Environmental Quality Institute, University of North Carolina that links increases in lead levels in drinking water systems to use of silicofluoride fluoridating agents with chloramines disinfectant.

The letter to EPA Administrator Stephen Johnson asked him to issue a public warning in the form of an advanced notice of proposed rulemaking setting the health-based drinking water standard for fluoride at zero, as it is for all known or probable human carcinogens, pending a recommendation from a National Academy of Sciences' National Research Council committee. That committee's work is not expected to be done before 2006.

The unions also asked Congress and EPA's enforcement office, or the Department of Justice, to look into reasons why the Harvard study director, Chester Douglass, failed to report the seven-fold increased risk seen in the work he oversaw, and instead wrote to the National Institute of Environmental Health Sciences, the federal agency that funded the Harvard study, saying there was no link between fluoridation and osteosarcoma. Douglass sent the same negative report to the National Research Council committee studying possible changes in EPA's drinking water standards for fluoride.

The unions who signed the letters represent EPA employees from across the nation, including laboratory scientists in Ohio, Oklahoma and Michigan, regulatory support scientists and other workers at EPA headquarters in Washington, D.C. and science and regulatory workers in Boston, New York, Philadelphia, Atlanta, and San Francisco.

They are affiliated with the National Treasury Employees Union, the American Federation of Government Employees, Engineers and Scientists of California/International Federation of Professional and Technical Engineers, and the National Association of Government Employee/Service Employees International Union.

The unions' letter is online at:
http://nteu280.org/Issues/Fluoride/fluoridesummary.htm

FOR INFORMATION CONTACT:

Dr. William Hirzy Vice-President, NTEU Chapter 280
Phone (cell) 202-285-0498 This is complete notice.

USA Citizens can easily back-up the 7,000 EPA 'career employees.' Consider, you and your family need CLEAN & SAFE Drinking Water, every day. This is your opportunity to back those 7000+ EPA union members that care about scientific integrity and exposing the truth about 'corporate hazardous waste fluorosilicates' being metered into our drinking waters. Their common sense demand for a 'moratorium on fluoridation' along with Congressional Investigation incl. 'under oath' hearings is critical!

We, the undersigned, join with members of eleven EPA unions in their call for an immediate Congressional act placing a national moratorium on water fluoridation pending a full Congressional investigation into this public policy, which affects - directly and indirectly - every resident of the United States.

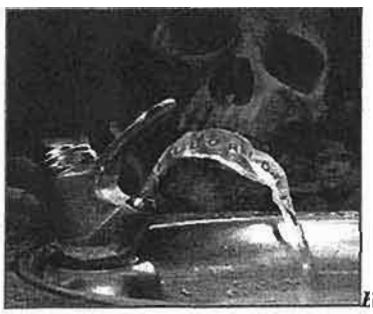
Read & Sign Citizens PETITION at:
http://petition.powalliance.org/index.html

Sunday, October 16, 2011

THE STATESMAN SENTINEL

EPA Scientist: Water Fluoridation Greatest Scientific Fraud of Century

July 21, 2010StatesmanSentinel.com · Comments (5)



By Rebecca Noel

Our Interesting World

The dangers of fluoride have been well known in the alternative health arena for decades but unfortunately the general public en masse has been basically indoctrinated into believing fluoride prevents cavities and is something good for them…

It's been hard for anyone to oppose the propaganda given about fluoride. Many people who speak out against fluoride are losing their jobs and being ostracized by their colleagues. With this in mind, it is no wonder that more people aren't speaking out. Currently, any doctor or dentist who opposes fluoridation would run the risk of losing their license to practice medicine or dentistry.

But more and more people are starting to speak out regardless of job security including the EPA's own scientists! Bravo to these brave men who have listened to their conscience and can no longer participate in the great lie that is poisoning so many innocent people!

For over 60 years the subject of fluoride has been a big controversy. How fluoride got approved started back in the 1940's with an aluminum company called ALCOA (aluminum company of America). This company was facing problems with toxic waste. One of the byproducts of aluminum manufacture is sodium fluoride.

Because of its toxicity, it must be disposed of in the highest rated waste disposal facility. This would be at a tremendous cost. In 1944, a long time ALCOA lawyer named Oscar Ewing was named the company's chief counsel with fees in the then astronomical range of $750,000 a year. In 1947, Ewing was made Federal Security Agency Administrator, with the announcement that he was taking a big cut in salary.

The US Public Health Service, then a division of FSA, came under command of Ewing, and he began to vigorously promote fluoridation nationwide. Ewing's public relations strategist for the fluoride campaign was the nephew of Sigmund Freud, Edward L. Bernays. This was the man who literally wrote the book on propaganda....and I don't mean figuratively. In 1928 Bernays published a book entitled: "Propaganda", in which he describes how the human mind can be manipulated.

This book was recently republished in 2004. It is interesting to note that Bernays was also involved in the promotion of cigarettes. To this day it is not exactly clear how ALCOA garnered the support of the American Medical and Dental Association; however, there may have been other factors involved.

These factors may have involved the fact that mass quantities of fluoride were produced in the production of the atomic bomb. In fact the first litigation over the atomic bomb had nothing to do with radiation....it was fluoride poisoning that caused ill health. It was these factors that may have led to the need to put a friendlier face on fluoride.

It is also noteworthy that fluoridation began at the time of World War II. This was a time when aluminum production was being increased to provide for the production of airplanes and other military needs. It is theorized that this increased need for aluminum production may have paved the way for fluoride's acceptance.

It is also interesting to note that prior to 1940 fluoride was considered a toxic element. In fact in 1939 the U.S. Public Health Service regulations state "the presence of fluorides in excess of 1ppm shall constitute rejection of the water supply"....yet when water fluoridation is instituted these days the levels are set at a minimum of 1ppm.

In fact, an article appearing in the Journal of American Medical Association on September 18, 1943 states, "fluorides are general protoplasmic poisons, changing the permeability of the cell membrane by inhibiting certain enzymes".

In fact, before 1940, fluoride's only approved use was as a rat and cockroach poison. In smaller doses, it was approved for use as a treatment for an overactive thyroid gland but this use was abandoned after many patients suffered destruction of their thyroid gland.

Continue reading

The Frederick Post

Frederick, Maryland Saturday, February 13, 1994

EPA ordered to reinstate Montgomery scientist

Secretary of Labor Robert Reich has ordered the reinstatement of a Montgomery County Scientist who was fired by the Environmental Protection Agency after he opposed the use of fluoride in drinking water.

Dr. William Marcus was awarded back pay for his $87,000 per year job as a senior toxicologist, $50,000 for hardship and other compensation under Mr. Reich's order, issued Monday.

Mr. Reich ratified a Dec. 3, 1992, ruling by administrative law judge, David Clarke that the EPA "retaliated" against Dr. Marcus by firing him in May 1992 for his scientific reports which recommended removing fluoride from drinking water.

Fluoride, Dr. Marcus said in an interview Friday, is "a poison" found to cause liver cancer and other health problems. It also causes lead to leach from plumbing into water supplies, he said.

Dr. Marcus, an EPA scientist for 18 years until he was fired, was protected under federal "whistleblower" laws designed to safeguard employees who report damaging facts about their employer, Mr. Reich said.

The EPA is an independent federal agency, but the Labor Department has jurisdiction in disputes involving its employees.

Before Dr. Marcus was fired, EPA Inspector General John Martin issued a report on him "which contained slanderous, false and derogatory information," said Mr. Reich.

The report's charges were "unsubstantiated," and that "the true reason for the discharge was retaliation", Mr. Reich said.

Dr. Marcus said the report was an attempt to discredit him because he had testified in 38 court cases about the harmful effects of chemical produced by national and international companies.

Dr. Marcus said EPA officials sent out memos calling him "a threat," claiming that he had

carried a gun to work to possibly kill his superior.

Upon learning that Dr. Marcus had filed a lawsuit, EPA officials broke a federal law by shredding documents that would have exonerated him, said Mr. Reich,.

Dr. Marcus was accused of "stealing time" from the government by working as a consultant while on the EPA payroll. His attorneys found that time cards were falsified in the investigation process. Government officials attempted to file charges against him using the fake documents. Dr. Marcus said.

"Fighting the federal government is by no means an easy task," he said describing a two year legal battle with his employer. "Since (EPA Lawyers) have jobs and their job depends not upon doing what is right but on fighting, they will fight forever...It is a vicious circle in which the costs to the taxpayer are never considered."

"There are independent, hard working EPA scientists who are afraid to publish the truth because they're afraid of losing their jobs." Dr. Marcus said. "It has a chilling effect."

EPA officials would not comment on the matter, spokeswoman Denise Graveline said Friday.

Since then our opposition to drinking water fluoridation has grown, based on the scientific literature documenting the increasingly out-of-control exposures to fluoride, the lack of benefit to dental health from ingestion of fluoride and the hazards to human health from such ingestion. These hazards include acute toxic hazard, such as to people with impaired kidney function, as well as chronic toxic hazards of gene mutations, cancer, reproductive effects, neurotoxicity, bone pathology and dental fluorosis. First, a review of recent neurotoxicity research results.

In 1995, Mullenix and co-workers[2] showed that rats given fluoride in drinking water at levels that give rise to plasma fluoride concentrations in the range seen in humans suffer neurotoxic effects that vary according to when the rats were given the fluoride - as adult animals, as young animals, or through the placenta before birth. Those exposed before birth were born hyperactive and remained so throughout their lives. Those exposed as young or adult animals displayed depressed activity. Then in 1998, Guan and co-workers[3] gave doses similar to those used by the Mullenix research group to try to understand the mechanism(s) underlying the effects seen by the Mullenix group. Guan's group found that several key chemicals in the brain - those that form the membrane of brain cells - were substantially depleted in rats given fluoride, as compared to those who did not get fluoride.

Another 1998 publication by Varner, Jensen and others[4] reported on the brain- and kidney damaging effects in rats that were given fluoride in drinking water at the same level deemed "optimal" by pro-fluoridation groups, namely 1 part per million (1 ppm). Even more pronounced damage was seen in animals that got the fluoride in conjunction with aluminum. These results are especially disturbing because of the low dose level of fluoride that shows the toxic effect in rats - rats are more resistant to fluoride than humans. This latter statement is based on Mullenix's finding that it takes substantially more fluoride in the drinking water of rats than of humans to reach the same fluoride level in plasma. It is the level in plasma that determines how much fluoride is "seen" by particular tissues in the body. So when rats get 1 ppm in drinking water, their brains and kidneys are exposed to much less fluoride than humans getting 1 ppm, yet they are experiencing toxic effects. Thus we are compelled to consider the likelihood that humans are experiencing damage to their brains and kidneys at the "optimal" level of 1 ppm.

In support of this concern are results from two epidemiology studies from China[5, 6] that show decreases in I.Q. in children who get more fluoride than the control groups of children in each study. These decreases are about 5 to 10 I.Q. points in children aged 8 to 13 years.

Another troubling brain effect has recently surfaced: fluoride's interference with the function of the brain's pineal gland. The pineal gland produces melatonin which, among other roles, mediates the body's internal clock, doing such things as governing the onset of puberty. Jennifer Luke[7] has shown that fluoride accumulates in the pineal gland and inhibits its production of melatonin. She showed in test animals that this inhibition causes an earlier onset of sexual maturity, an effect reported in humans as well in 1956, as part of the Kingston/Newburgh study, which is discussed below. In fluoridated Newburgh, young girls experienced earlier onset of menstruation (on average, by six months) than girls in non-fluoridated Kingston.[8]

From a risk assessment perspective, all these brain effect data are particularly compelli
because they are convergent.

We looked at the cancer data with alarm as well. There are epidemiology studies that a
whole-animal and single-cell studies (dealing with the cancer hazard), just as the neuro
just mentioned all points in the same direction. EPA fired the Office of Drinking Water
toxicologist, Dr. William Marcus, who also was our local union's treasurer at the time,
remain silent on the cancer risk issue.[9] The judge who heard the lawsuit he brought aga

Dr. William Marcus

see also:

- Statement of Dr. J. William Hirzy, National Treasury Employees Union Chapter 280, before The Subcommittee on Wildlife, Fisheries and Drinking Water, United States Senate, June 29, 2000
- EPA scientists take action against EPA for failing to protect public health -- Important scientific and technical considerations were ignored when the Recommended Maximum Contaminant Level (RMCL) for fluoride was set (1986 Amicus Brief).
- The need for a Code of Ethics at the EPA became critical. Without an enforceable code of ethics with sanctions, the distortion of truth caused by the pressures of politics would continue.
- Environmental Protection Agency Union fights back

CHAPTER 280
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May 1, 1999

WHY EPA'S HEADQUARTERS UNION OF SCIENTISTS OPPOSES FLUORIDATION

The following documents why our union, formerly National Federation of Federal Employees Local 2050 and since April 1998 Chapter 280 of the National Treasury Employees Union, took the stand it did opposing fluoridation of drinking water supplies. Our union is comprised of and represents the approximately 1500 scientists, lawyers, engineers and other professional employees at EPA Headquarters here in Washington, D.C.

The union first became interested in this issue rather by accident. Like most Americans, including many physicians and dentists, most of our members had thought that fluoride's only effects were beneficial - reductions in tooth decay, etc. We too believed assurances of safety and effectiveness of water fluoridation.

Then, as EPA was engaged in revising its drinking water standard for fluoride in 1985, an employee came to the union with a complaint: he said he was being forced to write into the regulation a statement to the effect that EPA thought it was alright for children to have "funky" teeth. It was OK, EPA said, because it considered that condition to be only a *cosmetic* effect, not an adverse *health* effect. The reason for this EPA position was that it was under political pressure to set its health-based standard for fluoride at 4 mg/liter. At that level, EPA knew that a significant number of children develop moderate to severe dental fluorosis, but since it had deemed the effect as only cosmetic, EPA didn't have to set its health-based standard at a lower level to prevent it.

We tried to settle this ethics issue quietly, within the family, but EPA was unable or unwilling to resist external political pressure, and we took the fight public with a union *amicus curiae* brief in a lawsuit filed against EPA by a public interest group. The union has published on this initial involvement period in detail.[1]

firing made that finding - that EPA fired him over his fluoride work and not for the phony reason put forward by EPA management at his dismissal. Dr. Marcus won his lawsuit and is again at work at EPA. Documentation is available on request.

The type of cancer of particular concern with fluoride, although not the only type, is osteosarcoma, especially in males. The National Toxicology Program conducted a two-year study[10] in which rats and mice were given sodium fluoride in drinking water. The positive result of that study (in which malignancies in tissues other than bone were also observed), particularly in male rats, is convergent with a host of data from tests showing fluoride's ability to cause mutations (a principal "trigger" mechanism for inducing a cell to become cancerous) e.g.[11a, b, c, d] and data showing increases in osteosarcomas in young men in New Jersey[12], Washington and Iowa[13] based on their drinking fluoridated water. It was his analysis, repeated statements about all these and other incriminating cancer data, and his requests for an independent, unbiased evaluation of them that got Dr. Marcus fired.

Bone pathology other than cancer is a concern as well. An excellent review of this issue was published by Diesendorf et al. in 1997.[14] Five epidemiology studies have shown a higher rate of hip fractures in fluoridated vs. non-fluoridated communities.[15a, b, c, d, e] Crippling skeletal fluorosis was the endpoint used by EPA to set its primary drinking water standard in 1986, and the ethical deficiencies in that standard setting process prompted our union to join the Natural Resources Defense Council in opposing the standard in court, as mentioned above.

Regarding the effectiveness of fluoride in reducing dental cavities, there has not been any double-blind study of fluoride's effectiveness as a caries preventative. There have been many, many small scale, selective publications on this issue that proponents cite to justify fluoridation, but the largest and most comprehensive study, one done by dentists trained by the National Institute of Dental Research, on over 39,000 school children aged 5-17 years, shows no significant differences (in terms of decayed, missing and filled teeth) among caries incidences in fluoridated, non-fluoridated and partially fluoridated communities.[16] The latest publication[17] on the fifty-year fluoridation experiment in two New York cities, Newburgh and Kingston, shows the same thing. The only significant difference in dental health between the two communities as a whole is that fluoridated Newburgh, N.Y. shows about twice the incidence of dental fluorosis (the first, visible sign of fluoride chronic toxicity) as seen in non-fluoridated Kingston.

John Colquhoun's publication on this point of efficacy is especially important.[18] Dr. Colquhoun was Principal Dental Officer for Auckland, the largest city in New Zealand, and a staunch supporter of fluoridation - until he was given the task of looking at the world-wide data on fluoridation's effectiveness in preventing cavities. The paper is titled, "Why I changed My Mind About Water Fluoridation." In it Colquhoun provides details on how data were manipulated to support fluoridation in English speaking countries, especially the U.S. and New Zealand. This paper explains why an ethical public health professional was compelled to do a 180 degree turn on fluoridation.

Further on the point of the tide turning against drinking water fluoridation, statements are now coming from other dentists in the pro-fluoride camp who are starting to warn that topical fluoride (e.g. fluoride in tooth paste) is the only significantly beneficial way in which that substance affects dental health.[19, 20, 21] However, if the concentrations of fluoride in the oral cavity are sufficient to inhibit bacterial enzymes and cause other bacteriostatic effects, then those concentrations are also capable of producing adverse effects in mammalian tissue, which likewise relies on enzyme systems. This statement is based not only on common sense, but also on results of mutation studies which show that fluoride can cause gene mutations in mammalian and lower order tissues at fluoride concentrations estimated to be present in the mouth from fluoridated tooth paste.[22] Further, there were tumors of the oral cavity seen in the NTP cancer study

mentioned above, further strengthening concern over the toxicity of topically applied fluoride.

In any event, a person can choose whether to use fluoridated tooth paste or not (although finding non-fluoridated kinds is getting harder and harder), but one cannot avoid fluoride when it is put into the public water supplies.

So, in addition to our concern over the toxicity of fluoride, we note the uncontrolled - and apparently uncontrollable - exposures to fluoride that are occurring nationwide via drinking water, processed foods, fluoride pesticide residues and dental care products. A recent report in the lay media[23] that, according to the Centers for Disease Control, at least 22 percent of America's children now have dental fluorosis, is just one indication of this uncontrolled, excess exposure. The finding of nearly 12 percent incidence of dental fluorosis among children in un-fluoridated Kingston New York[17] is another. For governmental and other organizations to continue to push for *more* exposure in the face of current levels of over-exposure coupled with an increasing crescendo of adverse toxicity findings is irrational and irresponsible at best.

Thus, we took the stand that a policy which makes the public water supply a vehicle for disseminating this toxic and prophylactically useless (via ingestion, at any rate) substance is wrong.

We have also taken a direct step to protect the employees we represent from the risks of drinking fluoridated water. We applied EPA's risk control methodology, the Reference Dose, to the recent neurotoxicity data. The Reference Dose is the daily dose, expressed in milligrams of chemical per kilogram of body weight, that a person can receive over the long term with reasonable assurance of safety from adverse effects. Application of this methodology to the Varner et al.[4] data leads to a Reference Dose for fluoride of 0.000007 mg/kg-day. Persons who drink about one quart of fluoridated water from the public drinking water supply of the District of Columbia while at work receive about 0.01mg/kg-day from that source alone. This amount of fluoride is more than 100 times the Reference Dose. On the basis of these results the union filed a grievance, asking that EPA provide un-fluoridated drinking water to its employees.

The implication for the general public of these calculations is clear. Recent, peer-reviewed toxicity data, when applied to EPA's standard method for controlling risks from toxic chemicals, require an immediate halt to the use of the nation's drinking water reservoirs as disposal sites for the toxic waste of the phosphate fertilizer industry.[24]

This document was prepared on behalf of the National Treasury Employees Union Chapter 280 by Chapter Senior Vice-President J. William Hirzy, Ph.D. For more information please call Dr. Hirzy at 202-260-4683. His E-mail address is hirzy.john@epa.gov

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Fluoride: Protected Pollutant or Panacea?
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Vice President of EPA's Scientist Union Testifies Against Fluoridation

STATEMENT OF

Dr. J. WILLIAM HIRZY
NATIONAL TREASURY EMPLOYEES UNION CHAPTER 280

BEFORE THE SUBCOMMITTEE ON WILDLIFE, FISHERIES AND DRINKING WATER UNITED STATES SENATE

JUNE 29, 2000

(Click here for printer-friendly format)

Good morning Mr. Chairman and Members of the Subcommittee. I appreciate the opportunity to appear before this Subcommittee to present the views of the union, of which I am a Vice-President, on the subject of fluoridation of public water supplies.

Our union is comprised of and represents the professional employees at the headquarters location of the U.S. Environmental Protection Agency in Washington D.C. Our members include toxicologists, biologists, chemists, engineers, lawyers and others defined by law as "professionals." The work we do includes evaluation of toxicity, exposure and economic information for managements use in formulating public health and environmental protection policy.

I am not here as a representative of EPA, but rather as a representative of EPA headquarters professional employees, through their duly elected labor union. The union first got involved in this issue in 1985 as a matter of professional ethics. In 1997 we most recently voted to oppose fluoridation. Our opposition has strengthened since then.

Summary of Recommendations

1) We ask that you order an independent review of a cancer bioassay previously mandated by Congressional committee and subsequently performed by Battelle Memorial Institute with appropriate blinding and instructions that all reviewers independent determinations be reported to this Committee.

2) We ask that you order that the two waste products of the fertilizer industry that are now used in 90% of fluoridation programs, for which EPA states they are not able to identify any chronic studies, be used in any future toxicity studies, rather than a substitute chemical. Further, since federal agencies are actively advocating that each man woman and child drink, eat and bathe in these chemicals, silicofluorides should be placed at the head of the list for establishing a MCL that complies with the Safe Drinking Water Act. This means that the MCL be protective of the most sensitive of our population, including infants, with an appropriate margin of safety for ingestion over an entire lifetime.

3) We ask that you order an epidemiology study comparing children with dental fluorosis to those not displaying overdose during growth and development years for behavioral and other disorders.

4) We ask that you convene a joint Congressional Committee to give the only substance that is being mandated for ingestion throughout this country the full hearing that it deserves.

National Review of Fluoridation

The Subcommittees hearing today can only begin to get at the issues surrounding the policy of water fluoridation in the United States, a massive experiment that has been run on the American public, without informed consent, for over fifty years. The last Congressional hearings on this subject were held in 1977. Much knowledge has been gained in the intervening years. It is high time for a national review of this policy by a Joint Select Committee of Congress. New hearings should explore, at minimum, these points:

1) excessive and un-controlled fluoride exposures;

2) altered findings of a cancer bioassay;

3) the results and implications of recent brain effects research;

4) the "protected pollutant" status of fluoride within EPA;

5) the altered recommendations to EPA of a 1983 Surgeon Generals Panel on fluoride;

6) the results of a fifty-year experiment on fluoridation in two New York communities;

7) the findings of fact in three landmark lawsuits since 1978;

8) the findings and implications of recent research linking the predominant fluoridation chemical with elevated blood-lead levels in children and anti-social behavior; and

9) changing views among dental researchers on the efficacy of water fluoridation

Fluoride Exposures Are Excessive and Un-controlled

According to a study by the National Institute of Dental Research, 66 percent of Americas children in fluoridated communities show the visible sign of over-exposure and fluoride toxicity, dental fluorosis (1). That result is from a survey done in the mid-1980's and the figure today is undoubtedly much higher.

Centers for Disease Control and EPA claim that dental fluorosis is only a "cosmetic" effect. God did not create humans with fluorosed teeth. That effect occurs when children ingest more fluoride than their bodies can handle with the metabolic processes we were born with, and their teeth are damaged as a result. And not only their teeth. Childrens bones and other tissues, as well as their developing teeth are accumulating too much fluoride. We can see the effect on teeth. Few researchers, if any, are looking for the effects of excessive fluoride exposure on bone and other tissues in American children. What has been reported so far in this connection is disturbing. One example is epidemiological evidence (2a, 2b) showing elevated bone cancer in young men related to consumption of fluoridated drinking water.

Without trying to ascribe a cause and effect relationship beforehand, we do know that American children in large numbers are afflicted with hyperactivity-attention deficit disorder, that autism seems to be on the rise, that bone fractures in young athletes and military personnel are on the rise, that earlier onset of puberty in young women is occurring. There are biologically plausible mechanisms described in peer-reviewed research on fluoride that can link some of these effects to fluoride exposures (e.g. 3,4,5,6). Considering the economic and human costs of these conditions, we believe that Congress should order epidemiology studies that use dental fluorosis as an index of exposure to determine if there are links between such effects and fluoride over-exposure.

In the interim, while this epidemiology is conducted, we believe that a national moratorium on water fluoridation should be instituted. There will be a hue and cry from some quarters, predicting increased dental caries, but Europe has about the same rate of dental caries as the U.S. (7) and most European countries do not fluoridate (8). I am submitting letters from European and Asian authorities on this point. There are studies in the U.S. of localities that have interrupted fluoridation with no discernable increase in dental caries rates (e.g., 9). And people who want the freedom of choice to continue to ingest fluoride can do so by other means.

Cancer Bioassay Findings

In 1990, the results of the National Toxicology Program cancer bioassay on sodium fluoride were published (10), the initial findings of which would have ended fluoridation. But a special commission was hastily convened to review the findings, resulting in the salvation of fluoridation through systematic down-grading of the evidence of carcinogenicity. The final, published version of the NTP report says that there is, "equivocal evidence of carcinogenicity in male rats," changed from "clear evidence of carcinogenicity in male rats."

The change prompted Dr. William Marcus, who was then Senior Science Adviser and Toxicologist in the Office of Drinking Water, to blow the whistle about the issue (22), which led to his firing by EPA. Dr. Marcus sued EPA, won his case and was reinstated with back pay, benefits and compensatory damages. I am submitting material from Dr. Marcus to the Subcommittee dealing with the cancer and neurotoxicity risks posed by fluoridation.

We believe the Subcommittee should call for an independent review of the tumor slides from the bioassay, as was called for by Dr. Marcus (22), with the results to be presented in a hearing before a Select Committee of the Congress. The scientists who conducted the original study, the original reviewers of the study, and the "review commission" members should be called, and an explanation given for the changed findings.

Brain Effects Research

Since 1994 there have been six publications that link fluoride exposure to direct adverse effects on the brain. Two epidemiology studies from China indicate depression of I.Q. in children (11,12). Another paper (3) shows a link between prenatal exposure of animals to fluoride and subsequent birth of off-spring which are hyperactive throughout life. A 1998 paper shows brain and kidney damage in animals given the "optimal" dosage of fluoride, viz. one part per million (13). And another (14) shows decreased levels of a key substance in the brain that may explain the results in the other paper from that journal. Another publication (5) links fluoride dosing to adverse effects on the brains pineal gland and pre-mature onset of sexual maturity in animals. Earlier onset of menstruation of girls in fluoridated Newburg, New York has also been reported (6).

Given the national concern over incidence of attention deficit-hyperactivity disorder and autism in our children, we believe that the authors of these studies should be called before a Select Committee, along with those who have critiqued their studies, so the American public and the Congress can understand the implications of this work.

Fluoride as a Protected Pollutant

The classic example of EPAs protective treatment of this substance, recognized the world over and in the U S before the linguistic de-toxification campaign of the 1940's and 1950's as a major environmental pollutant, is the 1983 statement by EPAs then Deputy Assistant Administrator for Water, Rebecca Hanmer (15), that EPA views the use of hydrofluosilicic acid recovered from the waste stream of phosphate fertilizer manufacture as,

> "...an ideal solution to a long standing problem. By recovering by-product fluosilicic acid (sic) from fertilizer manufacturing, water and air pollution are minimized, and water authorities have a low-cost source of fluoride..."

In other words, the solution to pollution is dilution, as long as the pollutant is dumped straight into drinking water systems and not into rivers or the atmosphere. I am submitting a copy of her letter.

Other Federal entities are also protective of fluoride. Congressman Calvert of the House Science Committee has sent letters of inquiry to EPA and other Federal entities on the matter of fluoride, answers to which have not yet been received.

We believe that EPA and other Federal officials should be called to testify on the manner in which fluoride has been protected. The union will be happy to assist the Congress in identifying targets for an inquiry. For instance, hydrofluosilicic acid does not appear on the Toxic Release Inventory list of chemicals, and there is a remarkable discrepancy among the Maximum Contaminant Levels for fluoride, arsenic and lead, given the relative toxicities of these substances.

Surgeon Generals Panel on Fluoride

We believe that EPA staff and managers should be called to testify, along with members of the 1983 Surgeon Generals panel and officials of the Department of Human Services, to explain how the original recommendations of the Surgeon Generals panel (16) were altered to allow EPA to set otherwise unjustifiable drinking water standards for fluoride.

Kingston and Newburg, New York Results

In 1998, the results of a fifty-year fluoridation experiment involving Kingston, New York (un-fluoridated) and Newburg, New York (fluoridated) were published (17). In summary, there is no overall significant difference in rates of dental decay in children in the two cities, but children in the fluoridated city show significantly higher rates of dental fluorosis than children in the un-fluoridated city.

We believe that the authors of this study and representatives of the Centers For Disease Control and EPA should be called before a Select Committee to explain the increase in dental fluorosis among American children and the implications of that increase for skeletal and other effects as the children mature, including bone cancer, stress fractures and arthritis.

Findings of Fact by Judges

In three landmark cases adjudicated since 1978 in Pennsylvania, Illinois and Texas (18), judges with no interest except finding fact and administering justice heard prolonged testimony from proponents and opponents of fluoridation and made dispassionate findings of fact. I cite one such instance here.

In November, 1978, Judge John Flaherty, now Chief Justice of the Supreme Court of Pennsylvania, issued findings in the case, Aitkenhead v. Borough of West View, tried before him in the Allegheny Court of Common Pleas. Testimony in the case filled 2800 transcript pages and fully elucidated the benefits and risks of water fluoridation as understood in 1978. Judge Flaherty issued an injunction against fluoridation in the case, but the injunction was overturned on jurisdictional grounds. His findings of fact were not disturbed by appellate action. Judge Flaherty, in a July, 1979 letter to the Mayor of Aukland New Zealand wrote the following about the case:

"In my view, the evidence is quite convincing that the addition of sodium fluoride to the public water supply at one part per million is extremely deleterious to the human body, and, a review of the evidence will disclose that there was no convincing evidence to the contrary...

"Prior to hearing this case, I gave the matter of fluoridation little, if any, thought, but I received quite an education, and noted that the proponents of fluoridation do nothing more than try to impune (sic) the objectivity of those who oppose fluoridation."

In the Illinois decision, Judge Ronald Niemann concludes: "This record is barren of any credible and reputable scientific epidemiological studies and or analysis of statistical data which would support the Illinois Legislatures determination that fluoridation of the water supplies is both a safe and effective means of promoting public health."

Judge Anthony Farris in Texas found: "[That] the artificial fluoridation of public water supplies, such as contemplated by {Houston} City ordinance No. 80-2530 may cause or contribute to the cause of cancer, genetic damage, intolerant reactions, and chronic toxicity, including dental mottling, in man; that the said artificial fluoridation may aggravate malnutrition and existing illness in man; and that the value of said artificial fluoridation is in some doubt as to reduction of tooth decay in man."

The significance of Judge Flahertys statement and his and the other two judges findings of fact is this: proponents of fluoridation are fond of reciting endorsement statements by authorities, such as those by CDC and the American Dental Association, both of which have long-standing commitments that are hard if not impossible to recant, on the safety and efficacy of fluoridation. Now come three truly independent servants of justice, the judges in these three cases, and they find that fluoridation of water supplies is not justified.

Proponents of fluoridation are absolutely right about one thing: there is no real controversy about fluoridation when the facts are heard by an open mind.

I am submitting a copy of the excerpted letter from Judge Flaherty and another letter referenced in it that was sent to Judge Flaherty by Dr. Peter Sammartino, then Chancellor of Fairleigh Dickenson University. I am also submitting a reprint copy of an article in the Spring 1999 issue of the Florida State University Journal of Land Use and Environmental Law by Jack Graham and Dr. Pierre Morin, titled "Highlights in North American Litigation During the Twentieth Century on Artificial Fluoridation of Public Water. Mr. Graham was

chief litigator in the case before Judge Flaherty and in the other two cases (in Illinois and Texas).

We believe that Mr. Graham should be called before a Select Committee along with, if appropriate, the judges in these three cases who could relate their experience as trial judges in these cases.

Hydrofluosilicic Acid

There are no chronic toxicity data on the predominant chemical, hydrofluosilicic acid and its sodium salt, used to fluoridate American communities. Newly published studies (19) indicate a link between use of these chemicals and elevated level of lead in childrens blood and anti-social behavior. Material from the authors of these studies has been submitted by them independently.

We believe the authors of these papers and their critics should be called before a Select Committee to explain to you and the American people what these papers mean for continuation of the policy of fluoridation.

Changing Views on Efficacy and Risk

In recent years, two prominent dental researchers who were leaders of the pro-fluoridation movement announced reversals of their former positions because they concluded that water fluoridation is not an effective means of reducing dental caries and that it poses serious risks to human health. The late Dr. John Colquhoun was Principal Dental Officer of Aukland, New Zealand, and he published his reasons for changing sides in 1997 (20). In 1999, Dr Hardy Limeback, Head of Preventive Dentistry, University of Toronto, announced his change of views, then published a statement (21) dated April 2000. I am submitting a copy of Dr. Limebacks publications.

We believe that Dr. Limeback, along with fluoridation proponents who have not changed their minds, such as Drs. Ernest Newbrun and Herschel Horowitz, should be called before a Select Committee to testify on the reasons for their respective positions.

Thank you for your consideration, and I will be happy to take questions.

Read EPA Union's 1986 Amicus Brief against EPA Management for the agency's issuance of a new, elevated, Maximum Contaminant Level for fluoride

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LEGALITY OF WATER FLUORIDATION

American Association for Justice
formerly the Association of Trial Lawyers of America

Newsletter | Vol. 18, No. 2, Winter/Spring 2011 Endowed by David S. Shrager

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Fluoridegate and Fluoride Litigation: What Law Firms Need to Know About Fluoride Toxic Tort Actions

By Chris Nidel, Rockville, MD & Daniel G. Stockin, Ellijay, GA

Chris Nidel, Nidel Law PC, 1011 Pleasant Dr., Rockville, MD 20850; T: 202-730-5926; chris@nidellaw.com; www.nidellaw.com. Daniel G. Stockin, The Life Center Inc., PO Box 639, Ellijay, GA 30540; T: 706-669-0786; stockin2@yahoo.com; www.thelifecenter.com. The next edition of the STEP newsletter will provide an overview and analysis of recent science developments, potential defendants, causes of action, and the rapidly accelerating interest in legal actions by harmed parties.

You have probably heard the recent news in the media about fluoride risks: a growing "Fluoridegate" scandal; cities dropping their longstanding policy of water fluoridation; and concerns about fluoride harm to kidneys, bones, thyroid glands, and teeth. For decades, Americans have heard of a long-simmering controversy over the whole-body safety of ingested fluorides. Now government agencies and private sector groups are admitting concerns about the impact to the body from fluorides in numerous consumer products, including water, beverages, foods made with fluoridated water or containing fluoride fumigant residues, and oral care products.

Of particular interest is news that infants, diabetics, kidney patients, and seniors are "susceptible subpopulations" that are particularly vulnerable to harm from fluorides. The number of potential plaintiffs in these and other groups foreshadows decades of fluoride-related court cases and investigations. As a result, scientists, health care professionals, businesses, and influential leaders are voicing concerns about fluorides. The Gerber baby products company is now selling an unfluoridated water to be used for making milk formula so that parents and others caring for infants will not use fluoridated water when mixing formula for babies.

A signature condition of excessive fluoride intake is "dental fluorosis," a permanent and often disfiguring staining of teeth. A staggering number of Americans have the white, yellow, or brown staining or pitting of teeth caused by fluorides. Most never know what caused the staining. According to the National Center for Health Statistics, approximately 23 percent of people ages 6– 49 have fluorosis, as do 41 percent of adolescents agres 12–15 years old.

Public and private sector groups as well as individuals are potentially responsible for the financial and health impacts of fluorides provided to consumers without full disclosure of the risks. A partial list of defendants includes manufacturers of fluoridation chemicals, oral care product manufacturers, retailers, water utilities, medical and dental practitioners, and professional associations. Given the complexity of potential litigation, plaintiffs may choose to utilize market-share and other legal theories providing liability to a group of defendants for a single, indivisible injury.

Causes of action may include personal injury, failure to warn, negligent misrepresentation, medical or dental malpractice, and consumer fraud. Because African-Americans and other minority groups are disproportionately harmed by fluorides, there may be civil rights and environmental justice avenues for legal cases.

The curtain is lifting, exposing the degree of deception at the root of the Fluoridegate scandal and highlighting the liability of both municipal water providers and private companies.

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Pace Environmental Law Review
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Fluoridation of Public Water Systems: Valid Exercise of State Police Power or Constitutional Violation?

*Douglas A. Balog, Esq.**

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References

I. Introduction

The United States Supreme Court has never decided whether a state, in the proper exercise of its police power, can mandate prophylactic medication for a noncontagious disease when such disease is treatable by reasonable, less intrusive means. More specifically, the Supreme Court has never decided whether fluoridation of public water systems is a valid exercise of state police power or a constitutional violation. It is the scope of state police power and governmental involvement with the noncontagious disease of dental caries that will be explored in this Comment. Police power is the implied constitutional authority allowing states to make laws concerning the health, safety, welfare and morals of its citizens.[1] States exercise their police power when they require that students be medicated against contagious diseases, such as measles, mumps and rubella, by way of inoculations prior to attending public schools. This immunization requirement is virtually uncontested by the public because the risk of spreading communicable diseases to other students is widely recognized.[2]

However, states also medicate the public water systems[3] with fluoride in an attempt to retard tooth decay -- a non-contagious disease,[4] also known as dental caries.[5] This state action has been rigorously contested by members of the public because the addition of fluoride to the public water system by municipal providers[6] may have adverse consequences on the health of the general public which outweigh the benefits allegedly prodded in reducing tooth decay in children.[7]

Fears concerning the purity of public water sources have increased dramatically in recent years, due in part to reports of leaking landfills, corroding pipes and crumbling gasoline storage tanks tainting water supplies.[8] These

fears pertain not only to contaminants such as lead, nitrates, pesticides, radon and other organic chemicals that inadvertently find their way into public drinking water, but also to chlorine and fluorine, which are purposely added to public water systems.[9] A public survey conducted in the late 1980s indicated that "[n]early 70 percent of Americans are worried about the quality of their drinking water . . . [with] their concern center[ing] on how water looks, tastes or smells.[10]

In 1992, "Americans spent more than $700 million on inhome filters" and more than $2 billion on bottled water in efforts to avoid drinking contaminated water.[11] In spite of this, a common misconception is that fluoridated tap water provided by a public water system is completely safe to drink. This assumption is unwarranted because fluoridated tap water has the potential to cause adverse health consequences, including death.[12]

While the general public supports chlorination[13] to ensure that tap water is safer to drink, there is both adamant support and unrelenting opposition to the artificial fluoridation of drinking water.[14] Public debate on the issue of fluoridation began in the 1950s and continues to date, resulting in an abundance of lawsuits opposing fluoridation of public water systems.

The public support for fluoridation exists mainly because of the misconception that fluoride in drinking water and toothpaste benefits the development and overall health of the teeth of both children and adults. However, even proponents of fluoridation admit that fluoride does not provide any health benefits when ingested by an adult, while the potential exists for causing adverse health problems, such as crippling skeletal fluorosis.[15] Other adverse health problems linked to fluoride include a 690% increase in bone cancer in of young males,[16] a doubling of hip fractures for both older men and women,[17] and infertility in women.[18]

Some opponents of fluoridation are of the opinion that there is no correlation between the level of fluoride in water and dental caries.[19] As a matter of fact, the federal government has conceded that the purported benefit of fluoridation is limited, as it applies only to developing enamel in the teeth of children up to the age of nine.[20] The problem with health laws specifically targeted at children is that children constitute only a minority of the general public because "[t]he most recent year in which a majority of families included at least one child among their members was 1982.... [C]hildren are defined as the householder's own children who are under the age of 18, have never been married, and are still living at home.[21] It logically follows that persons under the age of eighteen comprise less than 50% of the U.S. population.

Therefore, state laws authorizing municipal fluoridation of water do not benefit the majority of the public, and thus do not promote the health, safety, and welfare of Americans, the majority of whom are adults.

Fluoridation of public water systems has been attacked in the courts on various constitutional grounds, but has always been upheld as a valid exercise of state police power.[22] This result stems from the application of the "rational basis" test of judicial review to fluoridation laws by all of the appellate courts. The rational basis test is the least demanding form of judicial review, providing broad deference to the legislature. It merely requires that the goals sought be legitimate, and that the means chosen by the legislature be rationally related to the achievement of those goals, so as not to violate the Due Process Clause.[23] To pass constitutional muster under the rational basis test, legislation cannot be arbitrary and must have a reasonable purpose which "bears a rational relationship to a [permissible] state objective."[24]

There is a rebuttable presumption that all legislation is constitutional, and "those challenging a statute must prove unconstitutionality beyond a reasonable doubt."[25] Because of this presumption of validity, courts will generally apply the easily-satisfied rational basis test to a challenged law, unless given a reason to justify a higher standard of review. A constitutional challenge to legislation is one such reason for performing a more demanding judicial review, because the rational basis test does not apply if the statute "interferers with the free exercise of some fundamental personal right or liberty."[26]

The rational basis test is properly applied to legislation dealing with public health protection, such as the prevention or spread of contagious or communicable diseases.[27] However, fluoridation of public water systems cannot logically rise to the level of a public health protection measure, as it is merely an attempt to prevent the disease of tooth decay, which is neither contagious nor communicable. Thus, adding prophylactic medication (fluoride) to drinking water exceeds the scope of state police power, and courts should apply the highest standard of judicial review, called "strict scrutiny" to the legislation authorizing fluoridation.

Strict scrutiny is the highest standard of judicial review that courts use to determine if a law deprived, infringed, or interfered with a fundamental constitutional right or liberty.[28] To pass this test, the legislation must be narrowly tailored and necessary to achieve a legitimate, compelling state interest.[29] It is first necessary to understand what constitutes a "fundamental constitutional right" in order to know when a strict scrutiny review is required. The United States Supreme Court has recently held that "[t]he forcible injection of medication into a nonconsenting person's body represents a substantial interference with that person's liberty," [30] which involves a fundamental constitutional right.

This Comment shows why, under strict scrutiny review, state laws authorizing fluoridation of public water systems should be struck down as unconstitutional since they impinge a fundamental constitutional right, the means of accomplishing fluoridation is not narrowly tailored, and there is no compelling government interest involved.[31] To fully understand the detrimental effects of fluoride on the human body, one must be familiar with its chemical properties and how it has become regulated by the federal government. To accomplish this goal, Part I of this Comment examines the adverse health effects caused by fluoride ingestion and how fluoride has come to be labeled as a contaminant, poison, and most importantly, as a drug for treating a noncontagious disease.

Part II traces the regulatory attempts aimed at ensuring the provision of safe drinking water by municipalities, and explains the role of the Environmental Protection Agency in establishing contaminant levels for fluoride under the Safe Drinking Water Act. Part III examines the legal challenges to fluoridation of public water systems, noting that courts have upheld that it is a valid exercise of state police power. Part IV addresses the exercise of state police power as a basis for enacting fluoridation laws.

Further, Part IV analyzes the constitutional protection afforded to an individual in the context of fluoridation laws. Finally, Part V concludes that courts have used the wrong standard in their judicial review of statutes authorizing fluoridation, and that fluoridation laws will not pass constitutional muster under a strict scrutiny standard of review. This is because fluoridation statutes violate the constitutionally protected liberty interest to be free from unwanted medical treatment recognized by the U.S. Supreme Court in the 1990 cases, Cruzan v. Director, Missouri Dept of Health[32] and Washington v. Harper.[33] These two decisions have not yet been relied upon by a lower court in the constitutional analysis of fluoridation laws.

Fluoridating public water in an attempt to target children whose permanent teeth are still developing is like using a shotgun to shoot an apple off someone's head; sure, you hit the apple, but the side effects are undesirable.

I. Health Effects on the Human Body From Fluoride Ingestion

To understand why most, if not all, states have laws providing for the addition of fluoride to the public water systems and why the public opinion is split as to the benefits and harms of fluoridation, some background information on fluoride is useful. Fluoride is a binary compound,[34] consisting of the element fluorine[35] combined with another element, such as copper, magnesium, iron, sodium, or zinc.[36] Fluorine has been estimated to be the thirteenth most abundant element in the earth's crust and is usually found only in combination with other elements, producing compounds called fluorides.[37]

It is crucial to note that fluorine is not an essential nutrient needed by the human body.[38] Virtually all foods contain trace amounts of fluoride, but the quantity is negligible and not considered for purposes of regulating maximum fluoride levels in drinking water.[39] The use of fluoride for medicinal purposes originated because it was discovered in communities where the water supply naturally contained a small percentage of dissolved fluorides that the tendency toward tooth decay in children was notably reduced.[40] Accordingly, the United States Public Health Service endorsed the artificial fluoridation of public drinking water in 1950.[41] Because the government is now actively involved in preventing tooth decay (a periodontal disease), it is actually practicing medicine, which is defined as "the science and art of . . . preventing disease," and fluoride may be considered a 'medicine' which is defined as "any drug or other substance used in treating disease ...."[42]

The decision to add fluoride to public water systems sparked controversy because "the fluoride encountered in 'natural' drinking water is calcium fluoride,"[43] but artificial fluoridation is accomplished by using either sodium fluoride,[44] sodium fluorosilicate,[45] or hydrofluorosilicic acid.[46] Sodium fluoride was the first compound used in public water systems to artificially fluoridate public water, which caused an uproar because sodium fluoride is a known poison used commercially as an insecticide, rodenticide, wood preservative and fungicide, in ceramics production, and in light metal production.[47] The federal government recognizes the toxicity of sodium fluoride because it is regulated as an active ingredient in pesticides under the Federal Insecticide, Fungicide, and Rodenticide

Act (FIFRA).[48] Pesticides with highly toxic quantities of sodium fluoride in them must have the skull and crossbones symbol as well as the word poison prominently displayed on the container.[49]

The government promoters seeking to add fluoride to the public water systems back in the 1950s held a conference and tried to diffuse this issue by instructing those in attendance not to use the word "artificial" in conjunction with fluoridation and not to tell the public that sodium fluoride is being used because "that is rat poison."[50] Instead, the public should only be told that "fluorides" are added to the water.[51]

This is hardly comforting because in a table of water-borne contaminants, the Environmental Protection Agency (EPA) lists fluoride between cyanide and mercury, two toxic substances that the public would certainly never tolerate to be purposely added to their water supply.[52]

The scientific community is sharply divided as to the detrimental effects of fluoride on the human body.[53] The EPA solicited and received over 400 written public comments and held two full days of public hearings in Washington, D.C. pertaining to the issue of whether fluoride in public drinking water posed adverse health effects.[54] Many professional health organizations and state officials believed that fluoride in drinking water causes no adverse health effects, but other commentators believed that it can cause serious adverse health effects, such as crippling skeletal fluorosis,[55] mutagenicity,[56] and oncogenicity.[57] Dr. John Yiamouyiannis, an expert biochemist witness who has testified in several lawsuits challenging fluoridation statutes, authored a book entitled Fluoride - The Aging Factor.[58] In this book, Dr. Yiamouyiannis describes, among other adverse health effects, how fluoride damages enzymes and interferes with collagen formation in the human body, resulting in premature aging.[59] This book, along with eighty-eight other technical reports and studies, were considered by the EPA in its determination of the Recommended Maximum Contaminant Level (RMCL) for fluoride to be published in the Code of Federal Regulations (CFR).[60] The EPA concluded that there was an inadequate basis to say that fluoride is oncogenic, mutagenic, or results in allergic or idiosyncratic sensitivity.[61] However, the EPA acknowledged that the conclusions of the studies conflicted and that there are ongoing chronic rat and mouse bioassays designed to measure the oncogenic[62] potential of fluoride, which they will reconsider when the results become available.[63]

The EPA did acknowledge that dental fluorosis, a condition manifested by staining and/or pitting of the teeth, can result from ingesting fluoride, but labeled it as a cosmetic effect rather than an adverse health effect within the meaning of the Safe Drinking Water Act.[64] The EPA also concluded that crippling skeletal fluorosis has been thoroughly documented to be associated with the consumption of fluoridated drinking water in the U.S., and accordingly set the RMCL to protect against this adverse health effect.[65] In response to public comments opposing fluoridation, the EPA emphasized that the Safe Drinking Water Act "prohibits [the] EPA from requiring the addition of any substance for preventative health care purposes unrelated to [the] contamination of drinking water," and that just because it issued final regulations does not mean that it endorses the fluoridation of public water systems.[66] The federal government also regulates the ingestion of fluoride by humans in the Food, Drug, and Cosmetic Act, chapter 1, subchapter D, part 355 Anticaries Drug Products for Over-the-Counter Human Use,[67] and also in chapter 1, subchapter B. part 165 Beverages.[68] Fluoride used in a toothpaste, dentifrice, mouthwash, gel, or rinse is considered to be an anticaries drug, which is "[a] drug that aids in the prevention and prophylactic treatment of dental cavities (decay, caries)."[69] Three sources of fluoride are used for topical application in the mouth: sodium fluoride, [70] sodium monofluorophosphate,[71] and stannous fluoride.[72] While the maximum permissible fluoride concentration in water is 4mg/ L, it is much higher in topical applications, depending on its form. For example, dentifrices[73] contain a theoretical total fluorine concentration of 850 to 1150 parts per million (ppm)[74] in a paste dosage form.[75] This concentration is aimed at obtaining at least 650 ppm[76] of fluoride ions,[77] whereas treatment rinses[78] target a fluoride ion concentration of 0.01 0.05 percent in an aqueous solution.[79]

The government has recognized the adverse health effects that may result from swallowing either fluoridated toothpaste or mouth rinse, and requires that warning labels be affixed to the anticaries drug products. [80] All fluoride dentifrices (tooth pastes and tooth powders) must be labeled "Warning: Keep out of the reach of children under 6 years of age. [81] The labels for rinse and gel products emphasize the importance of spitting out the solution and not swallowing it.[82] This is because fluoride is very toxic, and at least one child has been killed from swallowing a fluoride jell applied by a dental hygienist.[83] In summary, fluoride is neither a vitamin nor a mineral necessary for human health.[84] Rather, fluorine is a highly reactive element[85] used as a prophylactic drug to help prevent tooth decay in developing permanent teeth.[86] Fluoride provides no benefits to adults, and ingestion of it will only result in the health problems previously mentioned.[87]

II. Legislative History of Safe Drinking Water

One of the first published cases attempting to ensure the safety of drinking water was Commonwealth v. Towanda Water-Works.[88] In Towanda, the Pennsylvania Attorney General alleged that the public water in the borough of Towanda was impure, unwholesome, polluted, unfit for use by the public, and dangerous to their lives and health.[89] The evidence as to the purity of the water was conflicting, but the jury found that the water was wholesome, [90] even though it was not pure.[91] The court took judicial notice that the only possible way to obtain pure water was by distillation.[92] Thus, the court held that the statute requiring "pure" water to be furnished for public consumption was to be construed to mean wholesome water, not pure in the abstract or chemical sense.[93] This case laid the foundation for the first drinking water standard set by the U.S. Public Health Service.

Promulgated in 1914, this standard was designed to protect the public from acute bacterial diseases,[94] and eventually led to the enactment of federal legislation in 1974 known as the Safe Drinking Water Act (SDWA).[95] The Safe Drinking Water Act requires the EPA Administrator to identify waterborne contaminants and publish maximum contaminant levels (enforceable standards) and recommended maximum contaminant levels (nonenforceable health goals) for municipal providers.[96] The SDWA was amended in 1986, changing the Recommended Maximum Contaminant Level (RMCL) terminology to Maximum Contaminant Level Goals (MCLG).[97] The EPA Administrator must promulgate national primary drinking water regulations for contaminants which may have an adverse effect on the health of persons and which are "known or anticipated to occur in public water systems."[98] The EPA issued national primary drinking water regulations for fluoride because it concluded that crippling skeletal fluorosis[99] is an adverse health effect, and has been thoroughly documented to be associated with consumption of fluoridated drinking water.[100]

The EPA promulgated a Maximum Contaminant Level[101] (MCL) for fluoride in the 1985 National Interim Primary Drinking Water Regulations, pursuant to section 1412 of the Safe Drinking Water Act.[102] This interim MCL varied from 1.4 milligrams per liter (mg/L) to 2.4 mg/L, depending upon the annual average ambient air temperatures.[103] This interim amount was twice the optimum fluoride concentration, and was determined to strike an appropriate balance between the occurrence of dental fluorosis[104] and the prevention of dental caries.[105]

In response to this proposed MCL, the EPA received over 400 written public comments and held two full days of public hearings as to whether fluoride in drinking water posed adverse health consequences.[106] Based upon all the information it received, the EPA set the Recommended Maximum Contaminant Level (RMCL) of fluoride at 4 mg/L,[107] and subsequently set the Maximum Contaminant Level (MCL) at 4 mg/L also.[108] The EPA promulgated an RMCL for fluoride because it agreed with Surgeon Generals Shapiro and Koop that adverse health effects stemming from the ingestion of fluoride include "death, gastrointestinal hemorrhage or irritation, arthralgias, and crippling fluorosis." [109] RMCLs are non-enforceable health goals which are set at levels for which there are "no known or anticipated adverse health effects" and which leave a margin of safety to protect against crippling skeletal fluorosis.[110] The difference between an MCL and an RMCL is that the RMCL is supposed "to be based only on health and safety considerations while an MCL takes feasibility and cost into consideration.[111]

The Administrator must also promulgate the national secondary drinking water regulations, which are designed to protect the public health by controlling contaminants that "may adversely affect the odor or appearance of [drinking] water.[112] These secondary regulations specify the Secondary Maximum Contaminant Levels (SMCLs) which limit those contaminants that "may adversely affect the aesthetic quality of drinking water such as taste, odor, color and appearance ...."[113] Fluoride was not included in the original list of contaminants, but in 1985 the EPA Administrator proposed a SMCL of 2.0 mg/L for fluoride.[114] This limit was eventually approved and incorporated into the Code of Federal Regulations (CFR).[115]

If the EPA's SMCL for fluoride is exceeded, but the MCL is not, the CFRs require that the municipal water provider send the following notice to all paying users, as well as to the state public health officer:

> Public Notice
>
> Dear User:
>
> The U.S. Environmental Protection Agency requires that we send you this notice on the level of fluoride in your drinking water. The drinking water in your community has a fluoride concentration of [fill in amount] milligrams per liter (mg/L).

Federal regulations require that fluoride, which occurs naturally in your water supply, not exceed a concentration of 4.0 mg/L in drinking water. This is an enforceable standard called a Maximum Contaminant Level (MCL), and it has been established to protect the public health. Exposure to drinking water levels above 4.0 mg/L for many years may result in some cases of crippling skeletal fluorosis, which is a serious bone disorder.

Federal law also requires that we notify you when monitoring indicates that the fluoride in your drinking water exceeds 2.0 mg/L. This is intended to alert families about dental problems that might affect children under nine years of age. The fluoride concentration of your water exceeds this federal guideline.

Fluoride in children's drinking water at levels of approximately 1 mg/L reduces the number of dental cavities. However, some children exposed to levels of fluoride greater than about 2.0 mg/1 may develop dental fluorosis. Dental fluorosis, in its moderate and severe forms, is a brown staining and/or pitting of the permanent teeth.

Because dental fluorosis occurs only when developing teeth (before they erupt from the gums) are exposed to elevated fluoride levels, households without children are not expected to be affected by this level of fluoride. Families with children under the age of nine are encouraged to seek other sources of drinking water for their children to avoid the possibility of staining and pitting.

Your water supplier can lower the concentration of fluoride in your water so that you will still receive the benefits of cavity prevention while the possibility of stained and pitted teeth is minimized. Removal of fluoride may increase your water costs. Treatment systems are also commercially available for home use. Information on such systems is available at the address given below. Low fluoride bottled drinking water that would meet all standards is also commercially available.

For further information, contact [Public Water System employee's name, address, and phone number] at your water system[116]

The EPA has published a disclaimer in the national primary drinking water regulation for fluoride stating that: (1) they do not endorse fluoridation, even though they established an RMCL, (2) public water systems are not required to meet the RMCL, (3) states are not required to adopt the RMCL, and (4) fluoridation is a matter for state and local authorities.[117]

The RMCL for fluoride promulgated by the EPA is based upon the presumption that a child will drink 1.4 liters of tap water a day and that an adult will drink 2.0 liters a day.1[118] However, the EPA does not admit that suppliers of water[119] frequently violate the RMCL as well as the MCL for fluoride. In fiscal year 1986, 740 Public Water Systems (PWS) were in violation of fluoride levels.[120] Moreover, fluoride was the second most frequently violated contaminant by Significant Non-Compliers (SNCs).[121]

III. Legal Challenges Against Public Water System Fluoridation

The United States Supreme Court has never decided whether a state can compel individuals to ingest fluoride through public drinking water, when fluoride can be administered by other reasonable, less intrusive means. Accordingly, some state courts have limited their constitutional analysis of fluoridation statutes, based on reasoning that since the United States Supreme Court has declined to hear any fluoridation cases, there must not be any substantial constitutional issues.[122] The trial court in Paduano v. City of New York[123] held that "[w]hile denials of certiorari do not constitute decisions on the merits, it is clear that the Supreme Court has repeatedly held that no substantial Federal questions are presented by objections to fluoridation."[124] The court assumed, however, that the United States Supreme Court is, in effect, affirming the lower court when it dismisses the appeal.[125] However, this is

not true, and courts should be compelled to analyze all constitutional issues in light of the most recent Supreme Court decisions.[126]

A. Challenges Based on States' Lack of Authority to Fluoridate Public Water Systems

The first reported challenge to the addition of fluoride to a public water supply by a state was in De Aryan v. Butler.[127] In De Aryan, a taxpayer brought suit seeking to enjoin the addition of fluoride to water furnished to San Diego.[128] The basis for the challenge was that the city council exceeded its authority in enacting the fluoridation resolution.[129] The De Aryan court found that the State Board of Public Health was part of the Department of Public Health and thus had the "power to formulate policies affecting public health, and to adopt, promulgate, repeal, and amend rules and regulations consistent with law for the protection of the public health.[130] The State Legislature had "delegated to the State Board of Public Health the duty and powers necessary to control and regulate the purity, potability, and wholesomeness of public waters in this state."[131]

The De Aryan court further found that the entire police power of the state is vested in the legislature, and is only limited by the State Constitution and other applicable statutes.[132] Furthermore, even though the enforcement of police power may seem harsh at times, it is an indispensable part of state sovereignty and may not be legally limited unless its use is unreasonable and arbitrarily invoked.[133] Accordingly, applying the rational basis test, the De Aryan court concluded that the addition of fluoride to the public water system was a valid exercise of police power as long as it was not unreasonable or an abuse of discretion.[134] Although the petitioner taxpayer proffered exhibits, reports, and expert witnesses at the trial, there was no allegation in the petition that the City Council abused its discretion or made an unreasonable decision to endorse fluoridation.[135] Therefore, the District Court of Appeal could not consider the evidence.[136]

A somewhat different challenge against the authority of a city to fluoridate the public water system was made in Wilson v. City of Mountlake Terrace.[137] In Wilson, the appellants, representing a class of 300 persons in an unincorporated area adjacent to Mountlake Terrace, objected to the introduction of fluoride into their water by the Alderwood Water District.[138] Alderwood was under contract to provide fluoridated water to Mountlake Terrace, and also provided water to the appellants through a common distribution line.[139] The appellants argued that a city cannot exercise its police power outside its boundaries, and, therefore, Mountlake Terrace was without authority to impose fluoridation on persons living outside the city.[140] The appellants, however, did not claim to be harmed by the fluoridation, and stipulated that fluoridation did not render the water unfit for human consumption according to health department standards.[141] The Supreme Court of Washington agreed with the trial court's finding that "the fluoridation of appellant's water is the incidental, although inevitable, result of the city's exercise of its police power ...."[142] Applying the rational basis test, the court affirmed the judgment for Mountlake Terrace allowing continued fluoridation because of the finding that appellants were not harmed.[143]

B. Scope of Police Power Exceeded by the States

In 1954, one year after the De Aryan challenge, residents of Tulsa sought to enjoin enforcement of an ordinance authorizing fluoridation of the city water supply, alleging that it constituted an unwarranted exercise of state police power.[144] These plaintiffs, in Dowell v. City of Tulsa, argued that Oklahoma had "never . . . attempt[ed] to regulate or control any disease except those that are 'contagious, infectious, or dangerous'".[145] The Dowell court, however, did not believe that the Oklahoma Legislature "intended to restrict its enactment of measures designed to promote the public health and welfare to those designed to prevent the spread of [such] diseases."[146] The court found support for its position by noting the many statutes regulating food, lodging, and other subjects "that have no direct connection with or relation to [such] diseases."[147] Thus, using the rational basis test, the court upheld the fluoridation statute as a valid exercise of state police power "relating to eugenics and the maintenance of a healthy, normal, and socially sound populace."[148]

That same year, the appellant in McGurren v. City of Fargo[149] challenged the police power of the state, alleging that an implied contract exists between the public water system supplier and the consumer.[150] The rationale was that the city furnished and sold water in a proprietary capacity, and since the appellant had performed his contractual requirements by making the necessary service arrangements and paying the city for the water, then the city was mutually obliged to furnish water that was as reasonably pure and wholesome as possible.[151] The appellant further argued that the city breached the implied contract by adding fluoride to the water because the water was no longer free from any contamination, rendering the water "unfit for domestic use and unsafe and dangerous to individuals."[152] The appellant then argued that this breach endangered the health of the community, thereby exceeding the police power, which is intended to protect the public's health.[153] Accordingly, the McGurren court felt

that an injunction preventing the addition of fluoride to the public water supply was proper and overruled the appellee's demurrer,[154] remanding the case to the district court to allow the City of Fargo answer the complaint.[155]

C. Constitutional Challenges

The constitutional challenges brought against the fluoridation of public water systems have covered the entire spectrum of colorable arguments. These arguments include First Amendment freedom of religion, Fourteenth Amendment denial of liberty, abridgement of privileges and immunities, and denial of equal protection, and finally, Ninth Amendment invasion of personal privacy.

1. Fourteenth Amendment Challenges

The Fourteenth Amendment to the United States Constitution provides, in pertinent part, that

> no State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws.[156]

Challenges to public water system fluoridation statutes typically include allegations of: (1) deprivation of personal liberty; (2) abridgement of one's privileges and immunities; or (3) denial of equal protection of the law.

(a) Deprivation of Personal Liberty

Two years after a federal court in California rendered the decision in De Aryan,[157] the seminal case of Kraus v. City of Cleveland[158] was decided in Ohio Supreme Court. The plaintiff in Kraus attacked legislation authorizing fluoridation of the public water supply as an infringement of fundamental liberties.[159] Urging that every individual has a personal liberty right "to protect his health as he deems best to insure a long and happy life," the plaintiff argued that fluoridation of the city water supply deprives him of this right in violation of the Fourteenth Amendment.[160] The Kraus court recognized this personal liberty right, but noted that it is not absolute because it is subject to limits stemming from the police powers of the state.[161] The plaintiff argued, however, that individual rights are subordinate to state police powers only when there is an overriding public purpose, such as a present danger, necessity, or emergency, and suggested that no such purpose existed to justify fluoridation of the water supply.[162] The Kraus court then examined the scope of the police power under Ohio law and found that if it satisfied the following four prongs, it was a valid exercise of police power: (1) it must be reasonable and necessary to achieve the legislature's objectives; (2) it must not violate the U.S. Constitution; (3) it must not be in direct conflict with any provision of the State Constitution; and (4) it must not be used in an arbitrary and oppressive manner.[163]
The public health measure at issue in Kraus pertained to the prevention of dental caries by increasing resistance in children to tooth decay, which the court felt was a "serious and widespread disease."[164] Accordingly, the Kraus court found that "any reasonable measure designed to decrease or retard the incidence of dental caries is in the interest and welfare of the public," and that this exercise of police power was not arbitrary or oppressive.[165] Thus, although the Kraus court did not disagree that fluoridation is an invasion of a person's constitutional right to protect his health as he deems best, it applied the rational basis test and held that this right must yield to police power exercised to prevent caries in Children.[166]

(b) Abridgment of Privileges and Immunities

In Teeter v. Municipal City of La Porte,[167] an action was brought to enjoin fluoridation of the municipal water supply, based on allegations that the local ordinance abridged the Privileges and Immunities Clause[168] of the Fourteenth Amendment.[169] The appellants argued that fluoridation of the public water system was "an enforced method of taking drugs and giving [the] same to their children . . . [and that] each individual should have the right to determine what to drink and eat without dictation from others ...." [170] The court determined, however, that it was "not necessary to decide the constitutional issues at this stage of the proceeding" and merely indicated that it was not "in a position to hold conclusively as a matter of law [that] fluoridation will not have cumulative toxic effects."[171] Thus, the Teeter decision did not advance the legal analysis of constitutional issues raised by forced fluoridation.
Almost ten years after Teeter, plaintiffs in Paduano v. City of New York[172] sought to enjoin the proposed fluoridation of the public water system arguing that, among other things, it violated the Privileges and Immunities Clause of the Fourteenth Amendment to the U.S. Constitution as well as Article I, Section 1 of the New York State Constitution.[173] The Paduano court held that fluoridation of the water supply "may be the only practical method of insuring the administration of this drug to the very young," and is probably the most efficient and cheapest method of doing so.[174] The court also held that "[i]t is not shocking to realize that the State, acting in the interest of children, too young to be sui juris,[175] may intervene in the parental area."[176] The plaintiffs' motion for an injunction was

denied because the Paduano court felt bound by the principles of stare decisis[177] to follow other cases, where the Supreme Court has denied certiorari to all fluoridation challenges.[178]

(c) Denial of Equal Protection of the Laws

It is undisputed even by the proponents of fluoridation that any benefit provided by fluoridation affects only tooth enamel that is still developing in children. Therefore, challenges have been made alleging that fluoridation of public water systems violates the Equal Protection Clause of the Fourteenth Amendment[179] because it affects only a limited class, namely, children.[180] These challenges have been dismissed because the United States Supreme Court has held that police power may be applied to a reasonable classification, and that just because the class is not all-embracing does not mean the legislation violates the Equal Protection Clause.[181] Several courts have held that fluoridation does not affect only a limited class because "[c]hildren of today are adult citizens of tomorrow"[182] and "it is apparent that children become adults."[183] Thus, the characterization of fluoridation laws as "class legislation" has passed the rational basis test applied by the courts.

2. First Amendment Right to Freedom of Religion

Another constitutional challenge asserted against fluoridation is based upon religious beliefs held by many citizens which forbid them to take medication for the prevention or treatment of any disease. The First Amendment to the United States Constitution provides, in pertinent part, that "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof."[184] Thus, many cases have been brought, based on the theory that fluoridation violates the First Amendment right to freedom of religion.[185]

A First Amendment challenge was raised in Kraus v. City of Cleveland,[186] where the plaintiff contended that fluoridation of the public water system "compels people to take a form of medication contrary to their religious beliefs" in violation of the First Amendment.[187] The Kraus court noted that the United States Supreme Court has held that "freedom of religion has a dual aspect, freedom to believe, and freedom to act exercising such beliefs. The first is an absolute right, [but] the second is not," and therefore may be regulated in order to protect society.[188] Accordingly, the Kraus court held that the constitutional guaranty to freedom of religion must yield to regulations imposed "in the interests of the public welfare."[189]

3. Ninth Amendment Implied Right of Personal Privacy

In addition to the explicit constitutional rights protected by the First and Fourteenth Amendments, the Ninth Amendment provides that "[t]he enumeration in the Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people."[190] This amendment was enacted so as to ensure that the government cannot violate fundamental rights of the public merely because those rights were not explicitly protected by the Constitution. Under the auspices of the Ninth Amendment, the City of Brainerd, Minnesota alleged that people have a prerogative to refuse fluoridation which is derived from the implicit constitutional right of privacy.[191] While there is no explicit mention of the right of privacy in the Constitution, the United States Supreme Court has held that "the right of privacy protects an individual's right 'to be free from unwarranted governmental intrusion into matters so fundamentally affecting a person,'" such as the decision whether or not to terminate pregnancy.[192]

The Brainerd court recognized that while the United States Supreme Court has never ruled on the issue, "the right of personal privacy could also extend to protect an individual's decision regarding what he will or will not ingest into his body."[193] The Supreme Court, however, has held that "the constitution does not protect an individual 'against all intrusions' but only 'against intrusions which are not justified in the circumstances, or which are made in an improper manner'."[194] The Brainerd court found that while forced fluoridation does infringe upon an individual's freedom, such infringement cannot be given substantial weight if there are no significant adverse consequences to the individual.[195] If any weight were given to this infringement, the court felt that people could interfere with governmental enactment of similar public health measures, such as chlorinating the water.[196] Accordingly, the Brainerd court held "that fluoridation is a justified intrusion into an individual's bodily integrity."[197]

The most recent reported challenge to fluoridation is the 1994 case Safe Water Association, Inc. v. City of Fond Du Lac.[198] In Safe Water, the appellant asserted, inter alia, that the city's adoption of an fluoridation ordinance violated the constitutional right to privacy.[199] Plaintiffs had to first overcome the hurdle presented by Froncek v. City of Milwaukee, [200] a 1955 Wisconsin Supreme Court decision upholding fluoridation. In order to dispose of its adverse impact, Safe Water pointed out that the precedential weight of this decision was sufficiently limited by the more recent decisions of the United States Supreme Court in Griswold v. Connecticut[201] and Roe v. Wade,[202] which drastically enlarged the scope of the right to privacy.[203] The Safe Water Court noted that the U.S. Supreme Court recognized the implicit guarantee of "zones of privacy" in Carey v. Population Services, Int'l.,[204] but that this right

of privacy is narrow and is subject to some limitations.[205] The court then granted summary judgment against Safe Water Association, reasoning that it failed to see any relationship between cases concerning the freedom to make reproductive choices and the issue of the right to be free from fluoridated water.[206]

IV. Analysis

A proper analysis of the statutes authorizing the fluoridation of public water systems must begin with a review of the limitations on state police power. Laws relating to "minimum wages for women and minors, maximum hours for women and minors, . . . control of venereal disease, blood tests for marriage licenses, sterilization, pasteurization of milk, chlorination of water, and vaccination have all been held valid as based on police power exercised in regard to public health."[207] However, the United States Supreme Court has never decided whether fluoridation of public water involves constitutional issues, and thus the lower courts must make their own determination if fluoridation is a valid exercise of state police power or a constitutional violation.[208]

A. Lack of Authority Challenges

The first category of challenges to fluoridation of public water systems involves the lack of authority for states to require fluoridation of public water systems.[209] The first reported challenge to fluoridation was De Aryan v. Butler,[210] where the issue was whether the city council of San Diego and the State Board of Health had the authority to require that fluorides be added to the public water supply.[211] The District Court of Appeal held that the State Board of Health was delegated the police power "necessary to control and regulate the purity, potability and wholesomeness of public waters in the state."[212] Because there was no allegation that the city council of San Diego abused its discretion or acted unreasonably in enacting the fluoridation statute, the De Aryan court correctly concluded that the statute was a valid exercise of police power.[213]

In the case Wilson v. City of Mountlake Terrace,[214] plaintiffs challenged the authority of the city to fluoridate their water, arguing that they lived outside the city limits and, therefore, are not citizens, residents, nor taxpayers of the city.[215] The Supreme Court of Washington correctly concluded that the valid exercise of police power may not be challenged by someone experiencing an incidental effect, if such individual does not allege that any harm resulted therefrom.[216] The challenges to fluoridation in these two cases did not involve constitutional issues, and, therefore, the rational basis test was properly employed as the basis for judicial review.

B. Scope of Police Power Exceeded Challenges

The second category of legal challenges to fluoridation of public water systems involves allegations that the state exceeded the scope of their police powers.[217] The appellant in Dowell v. City of Tulsa[218] contended that police power was limited to the regulation of contagious, infectious, or dangerous diseases, but the court felt this distinction was immaterial, ridiculous, and of no consequence to the promotion of public health.[219] In the case McGurren v. City of Fargo, [220] the appellant convinced the court that he had a breach of contract issue, which was then remanded to the lower court for resolution.[221] The Dowell court properly used the rational basis test to find that the state did not exceed the scope of its police power, because the appellant failed to sufficiently identify a fundamental constitutional right which was infringed. The McGurren court never reached the constitutional issues raised, and thus did not further the constitutional analysis of fluoridation laws.

C. Constitutional Challenges

The third category of legal challenges to fluoridation of public water systems involves allegations that the state deprived an individual of their personal liberty, abridged their privileges and immunities, or denied them equal protection of the law in contravention of the Fourteenth Amendment to the United States Constitution.[222]

1. Deprivation of Personal Liberty Challenges

The problem in making a challenge that fluoridation of public water systems deprives a person of personal liberty is that this constitutional right is not absolute; the Constitution provides that no state may deprive a person of liberty without due process of law.[223] "Liberty" may be subdivided "into three headings involving governmental restraints on (1) physical freedom, (2) the exercise of fundamental constitutional rights, and (3) other forms of freedom of choice or action."[224] The liberty guaranteed and protected by the Fourteenth Amendment includes the freedom to marry, establish a home, bring up children, live and work where one chooses, get a job, acquire useful knowledge, use and enjoy one's faculties, freedom from unauthorized physical restraint, and those privileges "essential to the orderly pursuit of happiness by free people."[225]

A state may enact legislation and deprive citizens of that state of any of these rights, but the citizens must first be afforded due process of law.[226] Due process is a course of legal proceedings according to the rules and principles

which have been established in our legal system for the protection and enforcement of private rights.[227] "Substantive" due process provides protection from arbitrary and unreasonable actions, while "procedural" due process requires that a party whose rights are to be affected be given notice and an opportunity to be heard before a court or other appropriate decision-making body.[228]

The appellant in Kraus v. City of Cleveland[229] alleged that he was deprived of his liberty to protect his health as he deems best, but did not claim that he was denied due process.[230] The Kraus trial court had applied the rational basis test to the fluoridation statute and found it to be a valid exercise of police power, which was affirmed by the Supreme Court of Ohio.[231] The problem in this and every other case is that the rational basis test does not apply if the statute being analyzed interferes with a fundamental right.[232] This is where the ambiguity arises, because the "law" is constantly changing, and what is unconstitutional today may be legal tomorrow.[233] Therefore, modern courts should reanalyze the limitations on personal liberty in light of recent Supreme Court cases. When it is finally decided that fluoridation of the public water systems impinges on a fundamental right, the rational basis test will be inappropriate, and strict judicial scrutiny by the courts will be required.

2. Abridgement of Privileges and Immunities Challenges

The problem in making a challenge that fluoridation of public water systems abridges a person's privileges and immunities is that the purpose of this clause is to protect "those rights peculiar to being a citizen of the federal government; it does not protect those rights which relate only to state citizenship."[234] The privileges and immunities challenges made in Teeter v. Municipal City of La Porte[235] and Paduano v. City of New York[236] have nothing to do with citizenship privileges in different states and thus are unfounded in the Constitution.[237] Accordingly, these cases were properly decided using the rational basis test of judicial review.

3. Denial of Equal Protection of the Laws Challenges

The last Fourteenth Amendment challenge to statutes authorizing the fluoridation of public water systems is that they violate equal protection of the laws.[238] In Chapman v. City of Shreveport,[239] the appellees argued that it was unreasonable to fluoridate the water when it affected only a limited class.[240] This argument, however, goes towards proving that fluoridation statutes are not narrowly tailored, not that they have been denied equal protection of the laws. Equal protection of the laws requires that individuals be treated in a similar manner.[241] No claim was made in Chapman that the appellee was not receiving the same protection being provided to other persons in similar circumstances; instead, he was trying to remove himself from the prophylactic medication being provided to children through fluoridated water.[242]

The Supreme Court of Louisiana stated that the exercise of police power is not objectionable solely because it does not apply to all classes, and held that the legislature is allowed to subject adults to fluoridation because the statute was not arbitrary, oppressive, or unreasonable.[243] This holding unduly expands the purpose of police power, which is supposed to promote the general welfare of the majority of the public. American households are composed mainly of adults, not children, and thus, fluoridating public water systems is an overbroad use of police power which can cause adverse health effects for the majority of the public.[244]

There are many reasonable alternatives available to parents who want their children to receive fluoride treatment, such as topical gels, mouth rinses, children's toothpaste, fluoride tablets, and drops.[245] A study found that "fluoride administered in tablet form or in vitamin preparations was more than twice as effective as fluoridated water in preventing cavities."[246] Children ages 7 to 12 had no tooth decay in 54% of those who took fluoride tablets or drops since infancy, while only 23.9% of adults with lifetime exposure to fluoridated water were cavity-free.[247] An additional argument supporting fluoride supplementation from sources other than public water systems is that fluoride tablets or drops can be administered in exact doses, but the amount of fluoride ingested from drinking tap water cannot be controlled.[248] These tablets or drops can then be discontinued after the permanent teeth have finished developing around age 10-12, or even sooner if deleterious side effects occur.[249]

4. Freedom of Religion Challenges

In addition to the Fourteenth Amendment challenges, many plaintiffs alleged that the state had violated their First Amendment right to freedom of religion.[250] The appellant in Kraus v. City of Cleveland[251] claimed that fluoridation of the water supply compels people to take a form of medication contrary to their religious beliefs in contravention of the First Amendment to the U.S. Constitution and the State Constitution.[252] The United States Supreme Court has ruled on similar challenges, and has held that the freedom to believe is absolute and is a fundamental right, but the freedom to act according to such beliefs is not fundamental and may be regulated under police powers.[253]

The Kraus court then tried to distinguish fluoridation from other infringements on freedom of religion.[254] The court recognized that although the City of Cleveland is the sole supplier of public drinking water within that city, there is no absolute duty on the part of the city to supply water.[255] Furthermore, courts have held that citizens opposed to drinking fluoridated water are free to buy non-fluoridated water because there is no direct compulsion to drink tap water.[256] The Kraus court recognized that obtaining non-fluoridated water may pose a problem of inconvenience for some and possibly of economics for others, but felt it was not a wholly impossible situation.[257]

The argument that there is no compulsion to drink fluoridated water is without merit. Public water systems were established to serve the public.[258] Since the majority of the public are adults, then fluoridating tap water to provide a drug to a minority of the public (children) defeats the whole purpose of the public water system. Besides the inconvenience and expense of having to buy bottled water, it is virtually impossible to escape eating processed foods that have been prepared using fluoridated water. Therefore, there is a compulsion to ingest fluoridated water, whether it comes from the faucet or from the foods we eat. Although the Kraus court felt there was no compulsion to drink fluoridated tap water, the ease at which it reached that conclusion suggests the worthlessness of the achievement. Despite the erroneous conclusion by the Kraus court, it correctly applied the rational basis test to the infringement of religion challenge, because the Supreme Court has not recognized the exercise of religion as an absolute constitutional right.[259]

5. Right of Privacy Challenges

The very last category of legal challenges to fluoridation of public water systems involves allegations that the state deprived someone of their implied Ninth Amendment constitutional right of personal privacy to be free from unwanted government intrusions.[260] The Minnesota Supreme Court recognized this implicit constitutional right in Minnesota State Board of Health v. City of Brainerd,[261] but felt that it only protected against intrusions that were unjustified or made improperly.[262] The Brainerd court felt that if much weight was given to the right of privacy argument, then people could start refusing to let the government make similar intrusions.[263] Other courts have acknowledged the "zone of privacy" espoused by the U.S. Supreme Court in Carey v. Population Services, Int'l.,[264] but have held that this zone is narrow and subject to limitations.[265]

Some states, however, have determined that fluoridation of public water systems falls within this zone of privacy. The trial court in Chapman v. City of Shreveport[266] concluded that fluoridation of the city water supply was not reasonably related to the public health, and that tooth decay is not a matter of public health.[267] Furthermore, it held that the choice to ingest fluoride is strictly "within the realm of private dental health and hygiene," and that every person should be free to choose his medical treatment for himself and his family.[268]

Along these same lines, the dissent in Minnesota State Board of Health v. City of Brainerd[269] realized that although the majority had used a balancing test to weigh the state's intrusion into the citizen's right of privacy, they failed to look at other alternative means that minimized intrusion.[270] Given that Minnesota's purpose was to make publicly-funded fluoride treatment readily available, the dissent felt that the city could have been compelled to provide fluorine tablets or dental applications to whomever wanted treatment, without infringing on the right of privacy of the majority.[271] Justice Yetka concluded by noting that there was not a compelling state interest to fluoridate the water, especially since it could possibly be carcinogenic, and that reasonable alternatives existed, which tipped the balance in favor of an individual's rights.[272]

The dissent in Kaul v. City of Chehalis[273] recognized that measures directly affecting the bodily integrity of a person represent the most penetrating exercise of police power.[274] Only the emergency of a present danger justifies quarantine, isolation, or compulsory treatment, and it is doubtful whether compulsory vaccination can be made without such danger.[275] Justice Hill, in his dissent, pointed out that any proposed health regulation must not impair essential rights and principles, and anyone who wants or needs fluorine can get a prescription for topical application, or ingest it by other ways.[276] Additionally, he noted that the United States Supreme Court has held that health regulations must not restrain personal liberty "under conditions essential to the equal enjoyment of the same right by others" or unless there is "pressure of great dangers" to the public's safety.[277]

Justice Hill reiterated the well known fact that "[w]hile dental caries may be termed a 'disease' which is prevalent in the teeth of almost everyone, it is not contagious or communicable in any way."[278] In addition, "[d]ental caries in no way endangers the public health in the sense that its existence in the teeth of one individual might adversely affect the personal health of any other individual."[279] Furthermore, Justice Hill felt that allowing the state to fluoridate public water systems would open the door to compulsory mass medication or preventative treatment for any disease without regard to a person's right to decide such matters for himself.[280] Justice Hill concluded that the "prevention of

dental caries by compulsory treatment of the teeth does not fall within the scope of protection of the public dental health for which the police power may be invoked."[281] He believed that education and persuasion, not compulsion, should be the government's goal if fluorine is actually the key to dental health.[282]

D. Supreme Court Stance on Unwanted Medical Treatment

In Cruzan v. Director, Missouri Department of Health,[283] the United States Supreme Court stated that although many state courts have analyzed the right to refuse medical treatment under the implied constitutional right of privacy, it "is more properly analyzed in terms of a Fourteenth Amendment liberty interest."[284] In Cruzan, the Supreme Court acknowledged that "[t]he principle that a competent person has a constitutionally protected liberty interest in refusing unwanted medical treatment may be inferred from our prior decisions."[285] Additionally, the Supreme Court assumed that the Constitution would grant a person "a constitutionally protected right to refuse lifesaving hydration and nutrition."[286] In a prior case, the Supreme Court held that "[t]he forcible injection of medication into a nonconsenting person's body represents a substantial interference with that person's liberty."[287] However, the court also recognized that while a person has a liberty interest under the Fourteenth Amendment Due Process Clause, whether the person's "constitutional rights have been violated must be determined by balancing his liberty interests against the relevant state interests."[288] This "relevant" state interest, also referred to as a "compelling" state interest,[289] is one which the state is forced or obliged to protect.[290] While all states have a compelling interest to prevent contagious diseases, such as the spread of smallpox in Jacobson v. Massachusetts, [291] tooth decay is not contagious, poses no risk of an outbreak, and thus is not a compelling interest such as would require state intervention. Accordingly, courts should apply a strict scrutiny standard of review when balancing a substantial liberty interest against fluoridation, which is, in effect, merely a state-mandated prophylactic measure for a noncontagious disease. A strict scrutiny standard requires that a state have a compelling interest to enact legislation, and that such legislation be narrowly tailored to achieve its purpose so as not to infringe on personal liberty interests protected by the Constitution.[292]

There is clearly no right or compelling interest for the federal government to mandate fluoridation of drinking water because it is known that fluoride is a contaminant which may have an adverse affect on the health of persons.[293] If states were bound by the Safe Water Drinking Act, then they would be prohibited from requiring fluoridation of the public water systems, despite their police power. This state police power is supposed to be used to promote the general health and welfare of the public, and should not be used as authority to purposely add contaminants into public drinking water. While reasonable minds may differ about whether the state's interest in health encompasses non-contagious diseases and whether this interest is compelling, fluoridation of public water systems does not pass constitutional muster because it fails the second prong of the strict scrutiny test: it is not narrowly tailored to achieve the legislature's purpose, and reasonable alternatives exist.

V. Conclusion

It is incumbent upon the United States Supreme Court to grant certiorari to the next fluoridation challenge brought based upon a due process violation of an individual's liberty interest. Whereas the Supreme Court has yet to resolve the issue of whether fluoridation invades a constitutionally protected interest when the state mandates the ingestion of a prophylactic drug to prevent a noncontagious disease, the Court has held, however, that a state may exercise its police power to protect the public from the spread of contagious disease. This distinction between contagious and noncontagious disease is critical because it determines the extent of the state interest when balancing the right of an individual to be free from compulsory medication against the state interest in attempting to prevent tooth decay by fluoridating public water systems.

The holding in Washington v. Harper[294] reflects the modern Supreme Court position, whereby "[t]he forcible injection of medication into a nonconsenting person's body represents a substantial interference with that person's liberty."[295] However, this holding is qualified by the caveat that whether this constitutionally protected liberty interest has been violated "must be determined by balancing that liberty interest against the relevant state interests."[296] The balancing is accomplished by subjecting fluoridation statutes to a strict scrutiny review in order to determine if they pass constitutional muster.

Because there is no compelling state interest to mandate prophylactic drugs for a noncontagious disease, the means of accomplishing the legislature's goals is not narrowly tailored, and reasonable alternatives exist, fluoridation statutes will fail the strict scrutiny test. Pursuant to the holdings in Harper and Cruzan, it is reasonably certain that fluoridation of public water systems will eventually be deemed a substantial invasion of personal liberty in violation of the Constitution of the United States of America.

Fluoridating public water in an attempt to target children whose permanent teeth are still developing is like using a shotgun to shoot an apple off someone's head; sure, you hit the apple, but the side effects are undesirable.

References

1. The Tenth Amendment, considered to be the source of state police power, provides that "[t]he powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." U.S. CONST. amend. X. See infra note 22.back 1back 1
2. See generally Michael S. Morgenstern, The Role of the Federal Government in Protecting Citizens from Communicable Diseases, 47 U. CIN. L. REV. 537 (1978).
3. "The term 'public water system' means a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves at least twenty-five individuals." Public Health Service (Safe Drinking Water) Act § 1401(4), 42 U.S.C. § 300f(4) (1994), as amended by Act of Aug. 6, 1996, Pub. L. No. 104-128, 1996 U.S.C.C.A.N. (110 Stat.) 1613, 1616 (1996) [hereinafter Safe Drinking Water Act].
4. A disease is a "destructive process in the body, with a specific cause and characteristic symptoms. WEBSTER's NEW UNIVERSAL UNABRIDGED DICTIONARY 523 (2d ed. 1983). Furthermore, tooth decay, technically called dental caries, is the destruction or necrosis of teeth. See DORLAND's ILLUSTRATED MEDICAL DICTIONARY 250 (27th ed. 1988). Therefore, since tooth decay is a destructive process in the body, it is a disease. See also infra note 5.
5. Dental caries is "[a] disease of calcified tissues of teeth characterized by demineralization of the inorganic portion and destruction of the organic matrix." 21 C.F.R. § 355.3(d) (1996).back 5back 5
6. Municipal providers include "a city, town, or other public body created by or pursuant to State law, or an Indian Tribe." Safe Drinking Water Act § 1401(10), 42 U.S.C. § 300f(10) (defining "municipality").
7. Fluoridation is an issue which has caused great controversy since the 1950s. Abundant opposition still exists today, as can be evidenced by surfing the Internet. See, e.g., Preventative Dental Health Association, The Dangers of Fluoridation (last modified Dec. 15, 1995) ; Gerard F. Judd, Ph.D & Chemist, Keep Your Teeth, We Now Know How!! Fluoridation Not the Answer (visited May 10, 1997) ; Michael Schachter, M.D., P.A., The Dangers of Fluoride and Fluoridation (visited May 10, 1997) ; Health Action Network Society, Is Fluoride Good For You? (visited May 10, 1997); Fluoride Issues (visited May 10, 1997).
8. See BUREAU OF CONSUMER PROTECTION - OFFICE OF CONSUMER/BUSINESS EDUCATION, FEDERAL TRADE COMMISSION, FACTS FOR CONSUMERS: WATER TESTING SCAMS. See also Exclusive Interview with Carol Browner, Administrator of the U.S. Environmental Protection Agency, POPULAR SCIENCE (visited May 10, 1997); Mark D. Uehling, How Safe is Your Water?, POPULAR SCIENCE, Oct. 1996, at 63.
9. See Fit to Drink?, CONSUMER REPORTS, Jan. 1990, at 30 (pertaining to chlorine, lead, nitrates, pesticides, radon, and other organic chemicals). See also National Primary Drinking Water Regulations, Fluoride, 50 Fed. Reg. 47,142, 47,146 (1985) (codified at 40 C.F.R. § 141.51) (pertaining to fluoride).
10. Fit to Drink?, CONSUMER REPORTS, Jan. 1990, at 30. See also Is Your Water Safe?, POPULAR SCIENCE (visited May 10, 1997) .back 10back 10
11. Fran Donegan, Water Treatment Basics, POPULAR MECHANICS, May 1993, at 61.
12. See, e.g., Smith v. State, 921 P.2d 632 (Alaska 1996). In Smith, excessive fluoride in the public water system caused widespread illness in the town of Hooper Bay, Alaska, and even resulted in the death of one resident. *See id.* at 633.
13. Only one case has challenged chlorination of the public water supply. See Commonwealth v. Town of Hudson, 52 N.E.2d 566 (Mass. 1943). The town of Hudson, Massachusetts rejected an order by the State Department of Public Health to chlorinate its water supply because they believed it would adulterate their otherwise pure water. *See id.* at 569, 572. The state had ordered chlorination of the water supply during the war to guard against sabotage by enemy agents or sympathizers.

See id. at 570. The town objected on grounds that its water supply was naturally pure. *See id.* at 572. The Supreme Judicial Court of Massachusetts upheld the order to chlorinate as a valid exercise of state police power to protect against disease-producing organisms. *See id.* at 571, 572.

14. See, e.g., De Aryan v. Butler, 260 P.2d 98 (Cal. 1953), cert. denied, 347 U.S. 1012 (1954) (earliest reported court challenge against fluoridation); Safe Water Association, Inc. v. City of Fond Du Lac, 516 N.W.2d 13 (Wis. Ct. App. 1994), review dismissed, 520 N.W.2d 91 (Wis. 1994) (most recently reported court challenge against fluoridation) and other cases cited infra. In addition to private citizen suits opposing fluoridation, many organizations are also fighting fluoridation. Some of these include: Global Alliance Against Fluoridation [New York, NY], The Anti-Fluoridation Association of Victoria [Melbourne, Australia], Citizens for Safe Drinking Water [San Diego, CA], Safe Water Coalition, Inc. [Orinda, CA], New York State Coalition Opposed to Fluoridation, Inc. [Old Bethpage, NY], New Zealand Pure Water Association Inc. [Bay of Plenty, New Zealand], Support Coalition [Eugene, OR], PA Mandatory Fluoridation Alert [Oakmont, PA], Safe Water Coalition of Washington State [Spokane, WA], and the National Pure Water Association [Wakefield, United Kingdom]. See Organizations Which Oppose Fluoridation (visited May 10, 1997) . Also, both the Environmental Defense Fund, Inc. and the Natural Resources Defense Council, Inc. (NRDC) have challenged the maximum fluoride levels in water set by the Environmental Protection Agency. See Environmental Defense Fund, Inc. v. Costle, 578 F.2d 337 (D.C. Cir. 1978); Natural Resources Defense Council, Inc. v. Environmental Protection Agency, 812 F.2d 721 (D.C. Cir. 1987).
15. See generally National Primary Drinking Water Regulations; Fluoride, 50 Fed. Reg. 47,142 - 47,155 (codified at 40 C.F.R. § 141.51).back 15back 15
16. See Preventative Dental Health Association, Adverse Health Effects Linked To Fluoride (last modified Jan. 11, 1996) (citing Perry D. Cohn, Ph.D., An Epidemiological Report on Drinking Water Fluoridation and Osteosarcoma in Young Males, New Jersey Department of Health, Environmental Health Service (Nov. 8, 1992).
17. *See id.* (citing Hip Fracture Rates Related to Fluoridated Water, Journal of the American Medical Association Vol. 264(4), 500-02 (1990), J.C. Robins & J.L. Ambrus, Studies on Osteoporosis IX. Effect of Fluoride on Steroid Induced Osteoporosis, Research Communications in Chemical Pathology and Pharmacology, Vol. 37, No. 3, 453-61 (1982).
18. *See id.* (citing S.C. Freni, Journal of Toxicology and Environmental Health, Vol. 42, 109-21 (1994).
19. *See id.* (citing M. Diesendorf, Tooth Decay Not Related to Fluoride Intake From Water, NATURE, Vol. 322, July 10, 1986; J. Colquhoun, Tooth Decay Related to Economics of Family, AMERICAN LABORATORY, Vol. 17, 1985, at 98-109; J. Colquhoun, COMMUNITY DENTISTRY AND ORAL EPIDEMIOLOGY, Vol. 13, 1985 at 37-41; JOHN YIAMOUYIANNIS, PH.D., FLUORIDE - THE AGING FACTOR (2d ed. 1986); D. Ziegelbecker, FLUORIDE, Vol. 14, 1981, at 123-28).
20. See National Primary Drinking Water Regulations; Fluoride, 50 Fed. Reg. 47,156, 47,171 (Appendix A - proposal for a new warning notice to the public, which reads: "Fluoride, at the appropriate levels in the drinking water of children up to the age of nine, reduces cavities."). See also AM. JUR. 3D Proof of Facts Taber's Cyclopedic Medical Dictionary 682 (16th ed. 1989), which states that "fluoride taken after the age of 8 to 10 will have little effect on the prevention of dental caries." back 20back 20
21. U.S. DEPARTMENT OF COMMERCE - BUREAU OF THE CENSUS, HOUSEHOLD AND FAMILY CHARACTERISTICS: MAR. 1994 viii (Sept.1995).
22. Police power is not explicitly provided for in the Constitution. It is recognized as a power inherent in state sovereignty to protect the health, safety, general welfare, and morals of the public, secured by the Tenth Amendment. See Lochner v. New York, 198 U.S. 45, 53 (1905). "Police power" is a general term containing many ramifications and has never been pinpointed as to its exact meaning." City Comm'n of the City of Fort Pierce v. State ex rel. Altenhoff, 143 So. 2d 879, 889 (Fla. 1962).

23. See Weinberger v. Salfi, 422 U.S. 749, 769 (1975) (citing Richardson v. Belcher, 404 U.S. 78, 84 (1971).
24. Village of Belle Terre v. Boraas, 416 U.S. 1, 8 (1974) (citing Reed v. Reed, 404 U.S. 71, 76 (1971).
25. Safe Water Ass'n Inc. v. City of Fond Du Lac, 516 N.W.2d 13, 17 (Wis. Ct. App. 1994), review dismissed, 520 N.W.2d 91 (Wis. 1994).back 25back 25
26. See San Antonio Independent School District v. Rodriguez, 411 U.S. 1, 38 (1973). See also BLACK'S LAW DICTIONARY 872 (6th ed. 1991) (defining rational basis test).
27. See Doe v. Bolton, 410 U.S. 179, 215 (1973) (Douglas, J., concurring) (citing Jacobson v. Commonwealth of Massachusetts, 197 U.S. 11 (1905), which upheld state imposed vaccinations to prevent epidemics).
28. See San Antonio Independent School District v. Rodriguez, 411 U.S. 1, 37-38 (1973). See also Doe v. Bolton, 410 U.S. at 216 (Douglas, J., concurring) (stating that "[u]nless regulatory measures are so confined and are addressed to the specific areas of compelling legislative concern, the police power would become the great leveler of constitutional rights and liberties").
29. See Roe v. Wade, 410 U.S. 113, 155 (1973).
30. Washington v. Harper, 494 U.S. 210, 229 (1990).back 30back 30
31. There is no compelling state interest to impose regulations for noncontagious or nonhazardous health concerns. See, e.g. Carey v. Population Services International, 431 U.S. 678, 690 (1977) (holding that a statute controlling the distribution of nonhazardous contraceptives "bears no relation to the State's interest in protecting [public] health"). See also Michael S. Morgenstern, The Role of the Federal Government in Protecting Citizens from Communicable Diseases, 47 U. CIN. L. REV. 537, 538 n.2 (1978), which recognizes the governmental interest only in communicable diseases, which are "disease[s] the causative agent of which may pass or be carried from one person to another directly or indirectly." (citing DORLAND's ILLUSTRATED MEDICAL DICTIONARY 455 (25th ed. 1974).
32. 497 U.S. 261 (1990).
33. 494 U.S. 210 (1990).
34. A binary compound is composed of two elements. See WEBSTER'S NEW UNIVERSAL UNABRIDGED DICTIONARY 183 (2d ed. 1983).
35. See DORLAND'S ILLUSTRATED MEDICAL DICTIONARY 643 (27th ed. 1988).back 35back 35
36. See John J. Miller, Ph.D., The Fluoride Ion, PREVENTION, July 1964, at 56.
37. See GEORGE L. WALDBOTT, M.D., FLUORIDATION: THE GREAT DILEMMA 20 (1978).
38. See Jonathan Forman, M.D., What Looks Like a Neurosis May Be a Fluorosis, PREVENTION, June 1964, at 92. See also John J. Miller, Ph.D., The Fluoride Ion, PREVENTION, July 1964, at 57-58.
39. See National Primary Drinking Water Regulations; Fluoride, 50 Fed. Reg. 47,142, 47,145 (Table 1) (codified at 40 C.F.R. § 141.51). See also Kraus v. City of Cleveland, 116 N.E.2d 779, 792 (Ohio 1953).
40. See 10 COLLIER'S ENCYCLOPEDIA 109 (1992). This observation was limited to only those children whose teeth were still developing when they drank the fluoridated water. See id.back 40back 40
41. See Michael Wollan, Controlling the Potential Hazards of Government-Sponsored Technology, 36 GEO. WASH. L. REV. 1105, 1128 (1968).
42. WEBSTER's NEW UNIVERSAL UNABRIDGED DICTIONARY 1118 (2d ed. 1983) (defining "medicine").
43. ANNE-LISE GOTZSCHE, THE FLUORIDE QUESTION 68 (1975).
44. For the Material Safety Data Sheet (MSDS) detailing the characteristics and health hazards of sodium fluoride, see (visited May 10, 1997).
45. The chemical symbol of sodium fluorosilicate, a salt of hydrofluorosilicic acid, is Na2SiF6. See GEORGE L. WALDBOTT, M.D., FLUORIDATION: THE GREAT DILEMMA 24 (1978).back 45back 45
46. Also called hydrofluosilicic acid, its chemical symbol is H2SiF6. *See id.* Hydrofluorosilicic acid and sodium fluorosilicate are used commercially for electroplating, water fluoridation, wood preservation, concrete hardening, a flux for metal casting, production of synthetic mica, extraction of zirconium, and for making acid resistant cements. *See id.* at 24, 25.
47. *See id.* at 25.

48. FIFRA requires all new pesticides to be registered, as well as the reregistration of pesticides first registered before November 1, 1984. See Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. §§ 136a, 136a-1 (exceptions omitted). The Special Review and Reregistration Division in EPA's Office of Pesticide Programs publishes a document called the "Rainbow Report" (Status of Pesticides in Reregistration and Special Review) which lists sodium fluoride as an active ingredient in pesticides. See Environmental Protection Agency, Pesticide Active Ingredients Index, (visited May 10, 1997). Sodium Fluoride was originally labeled as an "economic poison" under FIFRA. See 7 U.S.C. § 135a(a)(4) (1981) (omitted). "The term 'economic poison' means (1) any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, nematodes, fungi, weeds, and other forms of plant or animal life or viruses, except viruses on or in living man or other animals, which the Administrator shall declare to be a pest ...." 7 U.S.C. § 135(a) (omitted).
49. See 7 U.S.C. § 136(q)(2)(D) (1991) (emphasis added).
50. Promotion and Application of Water Fluoridation: Hearings Before the Dept. of Labor and Health, Education and Welfare Appropriations, 89th Cong., Vol. 5, (1967) (statement of Dr. John W. Knutson, Chief, Division of Dental Public Health, Public Health Service, at the proceedings of the Fourth Annual Conference of State Dental Directors with the Public Health Service and the Children's Bureau, held at the Federal Security Building in Washington, D.C., on June 6-8, 1951).back 50back 50
51. *See id.*
52. See 40 C.F.R. § 141.23(k)(3)(ii) (1994). See also 40 C.F.R. § 141.51 (1996) (contaminant table listing fluoride between cyanide and lead). Additionally, "[f]rom today's perspective, health professionals were reckless to promote mass fluoridation as early as 1951" because fluoride is an acute poison and only crude risk data was available then. Allan Mazur, Why Do We Worry About Trace Poisons?, RISK: HEALTH, SAFETY AND ENVIRONMENT 35, 41 (Winter 1996). Mr. Mazur believes that in 1951 health professionals were not as concerned about chronic exposure to trace poisons as we are today, and that if fluoridation of public water systems were proposed today, supported only by the risk data available in 1951, it would not be approved. *See id.* at 41-42.
53. See generally National Primary Drinking Water Regulations, Fluoride, 50 Fed. Reg. 47,142 - 47,155 (codified at 40 C.F.R. § 141.51).
54. *See id.* at 47,145.
55. Fluorosis is "a condition due to exposure to excessive amounts of fluorine or its compounds," resulting in combined osteosclerosis and osteomalacia (alternating brittle and soft areas of bone). DORLAND's ILLUSTRATED MEDICAL DICTIONARY 643 (27th ed. 1988).back 55back 55
56. A mutation is "a sudden variation in some inheritable characteristic . . . as distinguished from a variation resulting from generations of gradual change." WEBSTER's NEW UNIVERSAL UNABRIDGED DICTIONARY 1186 (2d ed. 1983).
57. See National Primary Drinking Water Regulations, Fluoride, 50 Fed. Reg. 47,142, 47,145 (codified at 40 C.F.R. § 141.51).
58. See JOHN YIAMOUYIANNIS, PH.D., FLUORIDE - THE AGING FACTOR (1983).
59. *See id.* passim.
60. See National Primary Drinking Water Regulations, Fluoride, 50 Fed. Reg. 47,142, 47,153 (codified at 40 C.F.R. § 141.51).back 60back 60
61. *See id.* at 47,151.
62. Oncogenicity is a factor that causes the development of cancer. See CONCISE SCIENCE DICTIONARY 484 (2d ed. 1991).
63. See National Primary Drinking Water Regulations Fluoride, 50 Fed. Reg. 47,142, 47,147 (codified at 40 C.F.R. § 141.51). In 1993, the EPA announced that it would not revise the maximum contaminant level goal (MCLG) for fluoride after it had considered recent reports concerning the health effects from ingesting fluoride. See Drinking Water Maximum Contaminant Level Goal; Fluoride, 58 Fed. Reg. 68,826 (1993). The decision was based on the results of a study performed by the National Academy of Sciences (NAS), which saw no immediate need to change the MCLG, but felt that further research was needed in the areas of dental fluorosis, bone strength and fractures, and carcinogenicity. *See id.* at 68,827. Accordingly, the EPA

announced that it will continue to solicit public comments on this issue, and hopes to issue a final decision after the NAS research is concluded, which it anticipates will be around the year 2001. *See id.*

64. See National Primary Drinking Water Regulations; Fluoride, 50 Fed. Reg. 47,142 (summary) (codified at 40 C.F.R. § 141.51).

65. *See id.* back 65back 65

66. *Id.* at 47,153.

67. Codified at 21 C.F.R. Part 355 (1996).

68. The Food and Drug Administration (FDA) is now allowing bottled water to have fluoride added, but requires that it have a label listing fluoride as an ingredient. See 60 Fed. Reg. 57,076, 57,079 (1995) (codified at 21 C.F.R. § 165.110(b)(4)(ii) (1997).

69. 21 C.F.R. § 355.3(c) (1996).

70. 70. See 21 C.F.R. § 355.10(a) (1996).back 70 back 70

71. *See id.* § 355.10(b) (1996).

72. *See id.* § 355.10(c) (1996).

73. A dentifrice is "[a]n abrasive-containing dosage form for delivering an anticaries drug to the teeth." 21 C.F.R. § 355.3(e) (1996).

74. One part per million is the same concentration as one milligram per liter (mg/L). See I. TAXEL, CONVERSION FACTORS (1964).

75. See 21 C.F.R. § 355.10(a)(1) (1996).

76. *See id.* But see § 355.10(c)(i) (1996) (requiring stannous fluoride dentifrices to have a fluoride ion concentration of at least 700 ppm). Stannous fluoride is a compound of fluorine and tin. See WEBSTER's NEW UNIVERSAL UNABRIDGED DICTIONARY 1773 (2D ed. 1983) Stannous fluoride has a chemical symbol of SnF2. See GEORGE L. WALDBOTT, M.D., FLUORIDATION: THE GREAT DILEMMA 25 (1978).

77. A fluoride ion is "[t]he negatively charged atom of the chemical element fluorine." 21 C.F.R. § 355.3(g) (1996).

78. A treatment rinse is "[a] liquid dosage form for delivering an anticaries drug to the teeth." *Id.* § 355.3(j).

79. *See id.* § 355.10(a)(3).

80. *See generally id.* § 355.50 (1996) (Labeling of anticaries drug products).back 80back 80

81. *Id.* § 355.50(c)(1).

82. *See id.* § 355.50(d)(2), (d)(4). In fact, many toothpastes contain a warning stating that children under 6 years old should use only a pea-sized amount and should be supervised to prevent swallowing. Such a warning is needed because swallowing too much fluoride can be fatal. See infra note 83.

83. See Robert D. McFadden, $750,000 Given in Child's Death in Fluoride Case, N.Y. TIMES, Jan. 20, 1979, at 23 (a 3 year old boy died after receiving an overdose of fluoride at a New York City Dental Clinic).

84. See supra note 38 and accompanying text.

85. See GEORGE L. WALDBOTT, M.D., FLUORIDATION: THE GREAT DILEMMA 20 (1978).back 85back 85

86. See supra note 69 and accompanying text.

87. See generally National Primary Drinking Water Regulations; Fluoride, 50 Fed. Reg. 47,142 - 47,155 (codified at 40 C.F.R. § 141.51).

88. 15 A. 440 (Pa. 1888).

89. *See id.* at 441.

90. Wholesome water must "not be injurious to the health of those using it." *Id.* at 442.back 90 back 90

91. *See id.*

92. See id at 443.

93. See 15 A. at 443.

94. See EDWARD J. CALABRESE ET AL., SAFE DRINKING WATER ACT 1 (1989).

95. Originally promulgated as the Public Health Service Act, ch. 373, title XIV (1944). The Safe Drinking Water Act is now codified at 42 U.S.C. §§ 300f to 300j-26, as amended by Act of Aug. 6, 1996, Pub. L. No. 104-128, 1996 U.S.C.C.A.N. (110 Stat.) 1613-93 (1996).

96. See National Primary Drinking Water Regulations; Fluoride, 50 Fed. Reg. 47,142 (summary) (codified at 40 C.F.R. § 141.51). See also EDWARD J. CALABRESE ET AL., SAFE DRINKING WATER ACT 17-18.

97. See Safe Drinking Water Act § 1412(a)(2), 42 U.S.C. § 300g-l(a)(2). See also EDWARD J. CALALBRESE ET AL., SAFE DRINKING WATER ACT 19.

98. Safe Drinking Water Act § 1412(b)(3)(A), 42 U.S.C. § 300g-l(b)(3)(A).

99. "The most clearly established fluoride-induced bone complaint is crippling skeletal fluorosis, also called chronic fluoride toxicity ...." ANNE-LISE GOTZSCHE, THE FLUORIDE QUESTION 86 (1975).

100. See National Primary Drinking Water Regulations; Fluoride, 50 Fed. Reg. 47,142 (summary) (codified at 40 C.F.R. § 141.51).back 100back 100

101. The maximum contaminant level is the maximum permissible level of a contaminant in the public water system which may adversely affect the public welfare. See Safe Drinking Water Act § 1401(2), (3), 42 U.S.C. § 300f(2), (3).
102. See National Primary Drinking Water Regulations, Fluoride, 50 Fed. Reg. 47,142, 47,143 (codified at 40 C.F.R. § 141.51).
103. *See id.*
104. Fluorosis is "[a] condition caused by an excessive intake of fluorides (2 or more p.p.m. in drinking water), characterized mainly by mottling, staining, or hypoplasia of the enamel of the teeth, although skeletal bones are also affected. STEDMAN's MEDICAL DICTIONARY 599 (25th ed. 1990).
105. See National Primary Drinking Water Regulations, Fluoride, 50 Fed. Reg. 47,142, 47,143 (codified at 40 C.F.R. § 141.51).
106. See id at 47,145.
107. *See id.* at 47,143.
108. See 40 C.F.R. § 141.62 (1996).
109. National Primary Drinking Water Regulations; Fluoride, 50 Fed. Reg. 47,142, 47,143 (codified at 40 C.F.R. § 141.51)

(emphasis added).
110. *Id.* at 47,142. back 110back 110
111. *Id.* at 47,155.
112. See Safe Drinking Water Act §§ 1401(2), 1412(c), 42 U.S.C. §§ 300f(2) 300g-l(c).
113. National Secondary Drinking Water Regulations, 44 Fed. Reg. 42,195 (1979) (codified at 40 C.F.R. § 143.3).
114. See National Primary Drinking Water Regulations, Fluoride, 50 Fed. Reg. 47,156 (1985).
115. See 40 C.F.R. §143.3 (1996).
116. *Id.* § 143.5. Despite the requirement for this notice, the EPA "has been criticized for failure to enforce required water quality standards and for not reporting to the public the failure of municipal water companies to meet standards." A. DAN TARL0CK ET AL., WATER RESOURCE MANAGEMENT 16 (4th ed. 1993).
117. See National Primary Drinking Water Regulations; Fluoride, 50 Fed. Reg. 47,142, 47,153 (codified at 40 C.F.R. § 141.51).
118. *See id.* at 47,145. If an adult drinks more than two liters of water per day, it logically follows that they are ingesting more fluoride than is calculated to be safe by the EPA.
119. "The term 'supplier of water' means any person who owns or operates a public water system." Safe Drinking Water Act § 1401(5), 42 U.S.C. § 300f(5).
120. See EDWARD J. CALABRESE ET AL., SAFE DRINKING WATER ACT 112 tbl. 5.back 120back 120
121. *See id.* at 108. SNCs "are those systems which have the most serious and more frequent violations." *Id.* at 106.
122. Cases that the Supreme Court has declined to hear include: Birnel v. Town of Fircrest, 335 P.2d 819 (Wash. 1959), appeal dismissed, 361 U.S. 10 (1959), reh'g. denied, 361 U.S. 904 (1959); Chapman v. City of Shreveport, 74 So. 2d 142 (La. 1954), appeal dismissed, 348 U.S. 892 (1954), City of Canton v. Whitman, 337 N.E.2d 766 (Ohio 1975), appeal dismissed, 425 U.S. 956 (1976); De Aryan v. Butler, 260 P.2d 98 (D. Cal. 1953), cert. denied, 347 U.S. 1012 (1954); Dowell v. City of Tulsa, 273 P.2d 859 (Okla. 1954), cert. denied, 348 U.S. 912 (1955); Kraus v. City of Cleveland, 116 N.E.2d 779 (Ohio Com. Pl. 1953), aff'd, 127 N.E.2d 609 (Ohio 1955), appeal dismissed, 351 U.S. 935 (1956); Minnesota State Bd. of Health v. City of Brainerd, 241 N.W.2d 624 (Minn. 1976), appeal dismissed, 429 U.S. 803 (1976); Paduano v. City of New York, 257 N.Y.S.2d 531 (Sup. Ct. 1965), aff'd, 24 A.D.2d 437 (N.Y.A.D. 1965), aff'd, 218 N.E.2d 339 (N.Y. 1966), cert. denied, 385 U.S. 1026 (1967); Readey v. St. Louis County Water Co., 352 S.W.2d 622 (Mo. 1961), appeal dismissed and cert. denied, 371 U.S. 8 (1962), reh'g denied, 371 U.S. 906 (1962); Safe Water Foundation of Texas v. City of Houston, 661 S.W.2d 190 (Tex. Ct. App. 1983), appeal dismissed, 469 U.S. 801 (1984); Schuringa v. City of Chicago, 198 N.E.2d 326 (Ill. 1964), cert. denied, 379 U.S. 964 (1965).
123. 257 N.Y.S.2d 531 (Sup. Ct. 1965).
124. Id at 542. The Paduano court recognized that the judiciary did not have power to impose fluoridation on anyone, but if some proof was proffered that fluoridation has harmful side effects and is not in the interests of the community, they might be able to overrule the

legislation authorizing it. *See id.*
125. *See id.* at 538 n.*.back 125back 125
126. The Supreme Court has noted "that all a denial of a petition for a writ of certiorari

means is that fewer than four members of the Court thought it should be granted." Maryland v. Baltimore Radio Show, 338 U.S. 912, 919 (1950). The Court also stated that they have "rigorously insisted that such a denial carries with it no implication whatever regarding the Court's views on the merits of a case which it has declined to review." *Id.* This has been said again and again, and the Court repeatedly has to reiterate this admonition. *See id.* Therefore, all courts that declined to rule on the constitutional challenges to fluoridation because they interpreted a denial of certiorari as the equivalent to an affirmation of the lower court's decision were wrong! For a detailed analysis of what certiorari denial constitutes, see Peter Linzer, The Meaning of Certiorari Denials, 79 COLUM. L. REV. 1227 (1979).

127. 260 P.2d 98 (D. Cal. 1953).
128. *See id.* at 99.
129. *See id.* at 101. See also Young v. Board of Health of Borough of Somerville, 293 A.2d 164 (N.J. 1972); Rogowski v. City of Detroit, 132 N.W.2d 16 (Mich. 1965). An act performed without any authority to do so is known as "ultra vires." An "[u]ltra vires act of [a] municipality is one which is beyond powers conferred upon it by law. BLACK'S LAW DICTIONARY 1057 (6th ed. 1991).
130. 260 P.2d at 101.back 130back 130
131. *Id.*
132. See id
133. *See id.* at 101,102.
134. *See id.* at 102.
135. See De Aryan v. Butler, 260 P.2d at 99, 103.
136. *See id.* at 102.
137. 417 P.2d 632 (1966).
138. *See id.* at 632,633.
139. *See id.*
140. *See id.* at 634.back 140back 140
141. *See id.* at 635.
142. 417 P.2d at 635.
143. Wilson v. City of Mountlake Terrace, 417 P.2d 632 635 (Wash. 1966).
144. See Dowell v. City of Tulsa, 273 P.2d 859, 860 (Okla. 1954).
145. *Id.* at 861.
146. *Id.*
147. *Id.*
148. *Id.* at 862 (quoting 11 AM. JUR. Constitutional Law § 271, 1023).
149. 66 N.W.2d 207 (N.D. 1954).
150. *See id.* at 209.back 150back 150
151. *See id.*
152. *Id.* at 211 (citing 56 AM. JUR. Waterworks § 75 at 76, § 79 at 983).
153. *See id.* at 209, 212.
154. A "demurrer" is "[a]n assertion that the complaint does not set forth a cause of action upon which relief can be granted." BLACK'S LAW DICTIONARY 298 (6th ed. 1991).
155. See 66 N.W.2d at 212. The decision of the district court on remand is unreported.
156. U.S. CONST. amend. XIV, § 1.
157. 260 P.2d 98 (D. Cal. 1953).
158. 127 N.E.2d 609 (Ohio 1955), appeal dismissed, 351 U.S. 935 (1956).
159. See id at 610.
160. *Id.* See also Readey v. St. Louis County Water Co., 352 S.W.2d 622 628-32 (Mo. 1961), cert. denied, 371 U.S. 8 (1962).back 160back 160
161. See 116 N.E.2d at 794.
162. *See id.* at 794-95.
163. *See id.* at 795.
164. *Id.*
165. *Id.* at 795-96.
166. See 116 N.E.2d at 794-95.
167. 139 N.E.2d 158 (Inc. 1956).
168. The Privileges and Immunities Clause provides that "[n]o State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States." U.S. CONST. amend XIV, § 1.
169. See 139 N.E.2d at 160.
170. *Id.* at n.2.back 170back 170
171. *Id.* at 161.
172. 257 N.Y.S.2d 531 (Sup. Ct. 1965).
173. *See id.* at 538.
174. *Id.* at 539.
175. "Sui juris" means "possessing full social and civil rights; not under any legal disability, or the power of another, or guardianship." BLACK'S LAW DICTIONARY 1000 (6th ed. 1991).
176. 257 N.Y.S.2d at 541.
177. Stare decisis is a policy of courts to abide by decided cases and not disturb a settled principle of law. See BLACK'S LAW DICTIONARY 978 (6th ed. 1991).
178. See 257 N.Y.S.2d at 542.
179. The Equal Protection Clause provides that [n]o State shall . . . deny to any person within its jurisdiction the equal protection of the laws." U.S. CONST. amend. XIV, § 1.
180. See, e.g. Chapman v. City of Shreveport, 74 So. 2d 142, 146 (La. 1954) appeal dismissed,

348 U.S. 892 (1954). See also Hall v. Bates, 148 S.E.2d 345 (S.C. 1966), Kraus v. City of Cleveland, 116 N.E.2d 779 (Ohio Com. Pl. 1953) aff'd, 127 N.E.2d 609 (Ohio 1955), appeal dismissed, 351 U.S. 935 (1956). For a classification involving age, see City Comm'n of Fort Pierce v. State ex ref. Altenhoff, 143 So. 2d 879 (D.C. Fla. 1962). In this case, plaintiffs alleged that fluoridation of the water system "is violative of the constitutional guarantee against Class Legislation in that its proponents only claim it is beneficial to children of the age group of one to fourteen years." *Id.* at 881.back 180back 180

181. See Zucht v. King, 260 U.S. 174, 177 (1922). See also West Coast Hotel Co. v. Parrish, 300 U.S. 379, 400 (1937); Sturges & Burn Mfg. Co. v. Beauchamp, 231 U.S. 320, 326 (1913).
182. Chapman v. City of Shreveport, 74 So. 2d 142, 145 (La. 1954).
183. Readey v. St. Louis County Water Co., 352 S.W.2d 622, 632 (Mo. 1961).
184. U.S. CONST. amend. I.
185. See, e.g., Teeter v. Municipal City of La Porte, 139 N.E.2d 158 (Inc. 1956) (challenging a municipal ordinance on the grounds that it violated the rights of those whose religious beliefs were opposed to medication).
186. 116 N.E.2d 779 (Ohio Com. Pl. 1953).
187. *Id.* at 805.
188. Id at 805, 806, (citing Cantwell v. State of Connecticut, 310 U.S. 296 (1940).

189. *Id.* at 808.
190. U.S. CONST. amend. IX.back 190back 190
191. See Minnesota State Bd. of Health v. City of Brainerd, 241 N.W.2d 624, 630 (Minn. 1976), appeal dismissed, 429 U.S. 803 (1976).
192. *Id.* at 631 (quoting Eisenstadt v. Baird, 405 U.S. 438, 453 (1972).
193. *Id.*
194. *Id.* (quoting Schmerber v. California, 384 U.S. 757 (1966).
195. See id at 632.
196. See 241 N.W.2d at 632.
197. *Id.* at 633.
198. 516 N.W.2d 13 (Wis. Ct. App. 1994), review dismissed, 520 N.W.2d 91 (Wis. 1994).
199. *See id.* at 17.

200. 69 N.W.2d 242 (Wis. 1955).back 200back 200
201. 381 U.S. 479 (1965).
202. 410 U.S. 113 (1973).
203. See 516 N.W.2d at 17, 18.
204. 431 U.S. 678 (1977).
205. See 516 N.W.2d at 18.
206. *See id.*
207. Kraus v. City of Cleveland, 127 N.E.2d 609, 611 (Ohio 1955).
208. See supra note 126 and accompanying text.
209. See supra Part III.A.

210. 260 P.2d 98 (D. Cal. 1953).back 210back 210
211. *See id.* at 101.
212. *Id.*
213. *See id.* at 102.
214. 417 P.2d 632 (Wash. 1966).
215. *See id.* at 633.
216. *See id.* at 635.
217. See supra Part III.B.
218. 273 P.2d 859 (Okla.1954).
219. *See id.* at 861,863.

220. 66 N.W.2d 207 (N.D. 1954).back 220back 220
221. See id at 212.
222. See supra Part III.C.1.
223. See U.S. CONST. amend. XIV, § 1 (emphasis added).
224. JOHN E. NOWAK & RONALD D. ROTUNDA, CONSTITUTIONAL LAW, § 13.4, at 519 (5th ed. 1995). See also BLACK'S LAW DICTIONARY 633 (6th ed. 1991) (liberty amounts to freedom from all restraints except those justly imposed by law which are not arbitrary and are "reasonable regulations and prohibitions imposed in the interests of the community.")

225. BLACK'S LAW DICTIONARY 633 (6th ed. 1991).back 225back 225
226. See U.S. CONST. amend. XIV, § 1.
227. See JOHN E. NOWAK & RONALD D. ROTUNDA, CONSTITUTIONAL LAW, § 13.8, at 548 (noting that "[t]he adversary process is best designed to safeguard individual rights against arbitrary action by the government."). See also BLACK'S LAW DICTIONARY 346 (6th ed. 1991) (defining due process of law).
228. See, e.g., Washington v. Harper, 494 U.S. 210 (1990) cited in JOHN E. NOWAK & RONALD D. ROTUNDA, CONSTITUTIONAL LAW, § 10.6, at 358. The Supreme Court's analysis of the substantive due process issue found that the state interest in protecting persons from a psychotic prisoner with whom he might come in contact with was Reasonably related to a legitimate penological interest. JOHN E. NOWAK & RONALD D. ROTUNDA,

CONSTITUTIONAL LAW, § 10.6, at 358 (quoting Turner v. Safley, 428 U.S. 78 (1987). There was a separate procedural due process issue in Washington, which was whether twenty-four hour notice prior to a hearing before a medical board complied with due process principles. *See id.* at 358-59. See also BLACK'S LAW DICTIONARY 836, 977 (6th ed. 1991) (defining procedural due process and substntive due process, respectively).

229. 127 N.E.2d 609 (Ohio 1955).

230. *See id.* at 610.back 230back 230

231. *See id.* at 613-14.

232. See supra note 28 and accompanying text.

233. See, e.g., Roe v. Wade, 410 U.S. 113 (1973).

234. JOHN E. NOWAK & RONALD D. ROTUNDA, CONSTITUTIONAL LAW, § 10.3, at 343 (citing the Slaughter-House Cases, 83 U.S. (16 Wall.) 36 (1873). This case held that "the clause only refers to uniquely federal rights such as the right to petition Congress, the right to vote in federal elections, the right to interstate travel or commerce, the right to enter federal lands, or the rights of a citizen while in custody of federal officers." *Id.* (citing Slaughter-House Cases at 79- 81).

235. 139 N.E.2d 158 (Inc. 1956).

236. 257 N.Y.S.2d 531 (Sup. Ct. 1965).

237. See supra Part III.C.1.(b).

238. See supra Part III.C.1.(c).

239. 74 So. 2d 142 (La. 1954).

240. *See id.* at 146.back 240back 240

241. Fluoridation opponents raise the equal protection issue because fluoridation is purported to benefit only children under the age of nine, thus creating a special class. However "[t]he Supreme Court has not found that any form of heightened judicial scrutiny should be used when reviewing classifications that are based on age." JOHN E. NOWAK & RONALD D. ROTUNDA, CONSTITUTIONAL LAW, § 14.3, at 609 n.38. The Supreme Court uses the rational basis test when the classification does not relate to a fundamental right. *See id.*

242. See 74 So. 2d at 146.

243. *See id.* at 146, 147.

244. See supra Part I.

245. See generally 21 C.F.R. Part 355, Anticaries Drug Products for Over- the-Counter Human Use. There are also many fluoridated products available by prescription.back 245back 245

246. GEORGE L. WALDBOTT, M.D., FLUORIDATION: THE GREAT DILEMMA 307 (1978).

247. *See id.*

248. *See id.* A further argument against fluoridated water can be made in that many children do not drink tap water at all. We are a society of processed food and beverages. Infants drink canned formula, and children drink bottled milk, juice, and soft drinks. Rare is the child who will reach for a glass of tap water when thirsty. However, some childrens' drinks, such as Kool-Aid®, do require tap water to make. But even these "mix it yourself" drinks will not contain artificial fluoridation if the water is drawn from a private well. Thus, the entire purpose of fluoridation is being unintentionally circumvented by the advent of ready-to-drink beverages, unless of course, the beverage manufacturer uses fluoridated water.

249. *See id.*

250. See supra Part III.C.2.back 250back 250

251. 116 N.E.2d 779 (Ohio 1953), aff'd, 127 N.E.2d 609 (Ohio 1955), appeal dismissed, 351 U.S. 935 (1956).

252. *See id.* at 805.

253. See Cantwell v. State of Connecticut, 310 U.S. 296 (1940).

254. See 116 N.E.2d at 806-08.

255. *See id.* at 807.

256. See Chapman v. City of Shreveport, 74 So. 2d 142, 146 (La. 1954).

257. See 116 N.E.2d at 807.

258. The public does not have a choice of providers from whom it may receive tap water, however. One of the leading experts in water law has correctly categorized those receiving water from a public water system as "captive consumers." See A. Dan Tarlock, Safe Drinking Water: A Federalism Perspective, 21 WM & MARY L. REV. 233, 239 (1997). The argument has been made that since water is an article of commerce under Sporhase v. Nebraska ex rel. Douglas, 458 U.S. 941 (1982), then consumers have a "freedom of choice" to seek an alternate source for this "product," such as bottled spring water. The problem with this argument is that it fails to recognize that the municipality has a monopoly over the public water system; consumers cannot switch to a different provider, as is possible with telephone service.

The United States Supreme Court has held that police power measures which impose an

undue cost and inconvenience on commerce are an unconstitutional burden. See, e.g., Bibb v. Navajo Freight Lines, Inc., 359 U.S. 520 (1959). Purchasing bottled water to avoid drinking fluoridated tap water is both expensive and inconveient, and thus is an impermissible burden to be placed on the public. Further, the highly touted charcoal filters, such as the Brita® water pitcher, are not able to filter out fluoride. Expensive reverse osmosis systems or distillation is required to extract fluoride out of the water. Besides this undue burden, it would be virtually impossible to exercise your "freedom of choice" if you are at a restaurant, school, library, shopping mall, the movies, or anywhere away from your supply of bottled water. Therefore, the "freedom of choice" argument is untenable and merely an exercise in obfuscation.back 258back 258

259.*See id.* at 808.

260.See supra Part III.C.3.back 260back 260

261.241 N.W.2d 624 (Minn. 1976).

262.*See id.* at 631.

263.*See id.* at 632.

264.431 U.S. 678 (1977).

265.See Safe Water Association, Inc. v. City of Fond Du Lac, 516 N.W.2d 13, 18 (Wis. Ct. App. 1994).

266.74 So. 2d 142.

267.*See id.* at 143.

268.*Id.*

269.241 N.W.2d 624 (Minn. 1976).

270.*See id.* at 634 (Yetka, J., dissenting).back 270 back 270

271.See id

272.*See id.* at 634-35.

273.277 P.2d 352 (Wash. 1954)(en banc).

274.*See id.* at 359 (Hill, J., dissenting, citing Freund on Police Power 116, § 123).

275.*See id.*

276.*See id.*

277.Id (citing Jacobson v. Massachusetts, 197 U.S. 11 (1905).

278.277 P.2d at 359.

279.*Id.* at 359-60.

280.*See id.* at 360.back 280back 280

281.*Id.* at 361.

282.*See id.* (emphasis added).

283.497 U.S. 261 (1990).

284.*Id.* at 279 n.7.

285.*Id.* at 278.

286.*Id.* at 279.

287.*Id.* at 278 (citing Washington v. Harper, 494 U.S. 210, 229 (1990).

288.497 U.S. at 279, (citing Youngberg v. Romeo, 457 U.S. 307 (1982).

289.See Roe v. Wade, 410 U.S. at 155.

290.See, e.g. Carey v. Population Services International, 431 U.S. 678, 690 (1977) (holding that a statute restricting access to nonhazardous contraceptives had no relation to any compelling state interest in protecting public health).back 290back 290

291.197 U.S. 11 (1905).

292.See supra note 29 and accompanying text.

293.See generally National Primary Drinking Water Regulations; Fluoride, 50 Fed. Reg. 47,142 - 47,155 (codified at 40 C.F.R. § 141.51).

294.494 U.S. 210 (1990).

295.*Id.* at 229.

296.Cruzan v. Director, Missouri Dep't of Health, 497 U.S. at 279.back 296back 296

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*This Comment is dedicated to my dad, Ralph F. Balog, who has opposed fluoridation of public water systems since the early 1960s. The author received a B.S. from Parks College of St. Louis University in 1985, an M.S. from Embry- Riddle Aeronautical University in 1990, and a J.D. from Pace University School of Law in 1997. Thanks to Andrea Herbst and her group for their excellent editing job.

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