50 Reasons to Oppose Fluoridation
Updated April 12, 2004

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1) Fluoride is not an essential nutrient (NRC 1993 and IOM 1997). No disease has ever been linked to a fluoride deficiency. Humans can have perfectly good teeth without fluoride.

2) Fluoridation is not necessary. Most Western European countries are not fluoridated and have experienced the same decline in dental decay as the US (See data from World Health Organization in Appendix 1, and the time trends presented graphically at http://www.fluoridealert.org/who-dmft.htm). The reasons given by countries for not fluoridating are presented in Appendix 2.)

3) Fluoridation's role in the decline of tooth decay is in serious doubt. The largest survey ever conducted in the US (over 39,000 children from 84 communities) by the National Institute of Dental Research showed little difference in tooth decay among children in fluoridated and non-fluoridated communities (Hileman 1989). According to NIDR researchers, the study found an average difference of only 0.6 DMFS (Decayed Missing and Filled Surfaces) in the permanent teeth of children aged 5-17 residing in either fluoridated or unfluoridated areas (Brunelle and Carlos, 1990). This difference is less than one tooth surface! There are 128 tooth surfaces in a child's mouth. This result was not shown to be statistically significant. In a review commissioned by the Ontario government, Dr. David Locker concluded:

> "The magnitude of [fluoridation's] effect is not large in absolute terms, is often not statistically significant and may not be of clinical significance" (Locker 1999).

4) Where fluoridation has been discontinued in communities from Canada, the former East Germany, Cuba and Finland, dental decay has not increased but has actually decreased (Maupome 2001; Kunzel and Fischer,1997,2000; Kunzel 2000 and Seppa 2000).

5) There have been numerous recent reports of dental crises in US cities (e.g. Boston, Cincinnati, New York City) which have been fluoridated for over 20 years. There appears to be a far greater (inverse) relationship between tooth decay and income level than with water fluoride levels.

6) Modern research (e.g. Diesendorf 1986; Colquhoun 1997, and De Liefde, 1998) shows that decay rates were coming down before fluoridation was introduced and have continued to decline even after its benefits would have been maximized. Many other factors influence tooth decay. Some recent studies have found that tooth decay actually increases as the fluoride concentration in the water increases (Olsson 1979; Retief 1979; Mann 1987, 1990; Steelink 1992; Teotia 1994; Grobleri 2001; Awadia 2002 and Ekanayake 2002).

7) The Centers for Disease Control and Prevention (CDC 1999, 2001) has now acknowledged the findings of many leading dental researchers, that the mechanism of fluoride's benefits are mainly TOPICAL not SYSTEMIC. Thus, you don't have to swallow fluoride to protect teeth. As the benefits of fluoride (if any exist) are topical, and the risks are systemic, it makes more sense, for those who want to take the risks, to deliver the fluoride directly to the tooth in the form of toothpaste. Since swallowing fluoride is unnecessary, there is no reason to force people (against their will) to drink fluoride in their water supply. This position was recently shared by Dr. Douglas Carnall, the associate editor of the British Medical Journal. His editorial appears in Appendix 3.

8) Despite being prescribed by doctors for over 50 years, the US Food and Drug Administration (FDA) has

never approved any fluoride product designed for ingestion as safe or effective. Fluoride supplements are designed to deliver the same amount of fluoride as ingested daily from fluoridated water (Kelly 2000).

9) The US fluoridation program has massively failed to achieve one of its key objectives, i.e. to lower dental decay rates while holding down dental fluorosis (mottled and discolored enamel), a condition known to be caused by fluoride. The goal of the early promoters of fluoridation was to limit dental fluorosis (in its mildest form) to 10% of children (NRC 1993, pp. 6-7). A major US survey has found 30% of children in optimally fluoridated areas had dental fluorosis on at least two teeth (Heller 1997), while smaller studies have found up to 80% of children impacted (Williams 1990; Lalumandier 1995 and Morgan 1998). The York Review estimates that up to 48% of children in optimally fluoridated areas worldwide have dental fluorosis in all forms and 12.5% with symptoms of aesthetic concern (McDonagh, 2000).

10) Dental fluorosis means that a child has been overdosed on fluoride. While the mechanism by which the enamel is damaged is not definitively known, it appears fluorosis may be a result of either inhibited enzymes in the growing teeth (Dan Besten 1999), or through fluoride's interference with G-protein signaling mechanisms (Matsuo 1996). In a study in Mexico, Alarcon-Herrera (2001) has shown a linear correlation between the severity of dental fluorosis and the frequency of bone fractures in children.

11) The level of fluoride put into water (1 ppm) is up to 200 times higher than normally found in mothers' milk (0.005 – 0.01 ppm) (Ekstrand 1981; Institute of Medicine 1997). There are no benefits, only risks, for infants ingesting this heightened level of fluoride at such an early age (this is an age where susceptibility to environmental toxins is particularly high).

12) Fluoride is a cumulative poison. On average, only 50% of the fluoride we ingest each day is excreted through the kidneys. The remainder accumulates in our bones, pineal gland, and other tissues. If the kidney is damaged, fluoride accumulation will increase, and with it, the likelihood of harm.

13) Fluoride is very biologically active even at low concentrations. It interferes with hydrogen bonding (Emsley 1981) and inhibits numerous enzymes (Waldbott 1978).

14) When complexed with aluminum, fluoride interferes with G-proteins (Bigay 1985, 1987). Such interactions give aluminum-fluoride complexes the potential to interfere with many hormonal and some neurochemical signals (Strunecka & Patocka 1999, Li 2003).

15) Fluoride has been shown to be mutagenic, cause chromosome damage and interfere with the enzymes involved with DNA repair in a variety of cell and tissue studies (Tsutsui 1984; Caspary 1987; Kishi 1993 and Mihashi 1996). Recent studies have also found a correlation between fluoride exposure and chromosome damage in humans (Sheth 1994; Wu 1995; Meng 1997 and Joseph 2000).

16) Fluoride forms complexes with a large number of metal ions, which include metals which are needed in the body (like calcium and magnesium) and metals (like lead and aluminum) which are toxic to the body. This can cause a variety of problems. For example, fluoride interferes with enzymes where magnesium is an important co-factor, and it can help facilitate the uptake of aluminum and lead into tissues where these metals wouldn't otherwise go (Mahaffey 1976; Allain 1996; Varner 1998).

17) Rats fed for one year with 1 ppm fluoride in their water, using either sodium fluoride or aluminum fluoride, had morphological changes to their kidneys and brains, an increased uptake of aluminum in the brain, and the formation of beta amyloid deposits which are characteristic of Alzheimers disease (Varner 1998).

18) Aluminum fluoride was recently nominated by the Environmental Protection Agency and National Institute of Environmental Health Sciences for testing by the National Toxicology Program. According to EPA and NIEHS, aluminum fluoride currently has a "high health research priority" due to its "known neurotoxicity"

(BNA, 2000). If fluoride is added to water which contains aluminum, than aluminum fluoride complexes will form.

19) Animal experiments show that fluoride accumulates in the brain and exposure alters mental behavior in a manner consistent with a neurotoxic agent (Mullenix 1995). Rats dosed prenatally demonstrated hyperactive behavior. Those dosed postnatally demonstrated hypoactivity (i.e. under activity or "couch potato" syndrome). More recent animal experiments have reported that fluoride can damage the brain (Wang 1997; Guan 1998; Varner 1998; Zhao 1998; Zhang 1999; Lu 2000; Shao 2000; Sun 2000; Bhatnagar 2002; Chen 2002, 2003; Long 2002; Shivarajashankara 2002a, b; Shashi 2003 and Zhai 2003) and impact learning and behavior (Paul 1998; Zhang 1999, 2001; Sun 2000; Ekambaram 2001; Bhatnagar 2002).

20) Five studies from China show a lowering of IQ in children associated with fluoride exposure (Lin Fa-Fu 1991; Li 1995; Zhao 1996; Lu 2000; and Xiang 2003a, b). One of these studies (Lin Fa-Fu 1991) indicates that even just moderate levels of fluoride exposure (e.g. 0.9 ppm in the water) can exacerbate the neurological defects of iodine deficiency.

21) Studies by Jennifer Luke (2001) showed that fluoride accumulates in the human pineal gland to very high levels. In her Ph.D. thesis Luke has also shown in animal studies that fluoride reduces melatonin production and leads to an earlier onset of puberty (Luke 1997).

22) In the first half of the 20th century, fluoride was prescribed by a number of European doctors to reduce the activity of the thyroid gland for those suffering from hyperthyroidism (over active thyroid) (Stecher 1960; Waldbott 1978). With water fluoridation, we are forcing people to drink a thyroid-depressing medication which could, in turn, serve to promote higher levels of hypothyroidism (underactive thyroid) in the population, and all the subsequent problems related to this disorder. Such problems include depression, fatigue, weight gain, muscle and joint pains, increased cholesterol levels, and heart disease.

It bears noting that according to the Department of Health and Human Services (1991) fluoride exposure in fluoridated communities is estimated to range from 1.6 to 6.6 mg/day, which is a range that actually overlaps the dose (2.3 - 4.5 mg/day) shown to decrease the functioning of the human thyroid (Galletti & Joyet 1958). This is a remarkable fact, particularly considering the rampant and increasing problem of hypothyroidism in the United States (in 1999, the second most prescribed drug of the year was Synthroid, which is a hormone replacement drug used to treat an underactive thyroid). In Russia, Bachinskii (1985) found a lowering of thyroid function, among otherwise healthy people, at 2.3 ppm fluoride in water.

23) Some of the early symptoms of skeletal fluorosis, a fluoride-induced bone and joint disease that impacts millions of people in India, China, and Africa , mimic the symptoms of arthritis (Singh 1963; Franke 1975; Teotia 1976; Carnow 1981; Czerwinski 1988; DHHS 1991). According to a review on fluoridation by Chemical & Engineering News, "Because some of the clinical symptoms mimic arthritis, the first two clinical phases of skeletal fluorosis could be easily misdiagnosed" (Hileman 1988). Few if any studies have been done to determine the extent of this misdiagnosis, and whether the high prevalence of arthritis in America (1 in 3 Americans have some form of arthritis - CDC, 2002) is related to our growing fluoride exposure, which is highly plausible. The causes of most forms of arthritis (e.g. osteoarthritis) are unknown.

24) In some studies, when high doses of fluoride (average 26 mg per day) were used in trials to treat patients with osteoporosis in an effort to harden their bones and reduce fracture rates, it actually led to a HIGHER number of fractures, particularly hip fractures (Inkovaara 1975; Gerster 1983; Dambacher 1986; O'Duffy 1986; Hedlund 1989; Bayley 1990; Gutteridge 1990. 2002; Orcel 1990; Riggs 1990 and Schnitzler 1990). The cumulative doses used in these trials are exceeded by the lifetime cumulative doses being experienced by many people living in fluoridated communities.

25) Nineteen studies (three unpublished, including one abstract) since 1990 have examined the possible

relationship of fluoride in water and hip fracture among the elderly. Eleven of these studies found an association, eight did not. One study found a dose-related increase in hip fracture as the concentration of fluoride rose from 1 ppm to 8 ppm (Li 2001). Hip fracture is a very serious issue for the elderly, as a quarter of those who have a hip fracture die within a year of the operation, while 50 percent never regain an independent existence (All 19 of these studies are referenced as a group in the reference section).

26) The only government-sanctioned animal study to investigate if fluoride causes cancer, found a dose-dependent increase in cancer in the target organ (bone) of the fluoride-treated (male) rats (NTP 1990). The initial review of this study also reported an increase in liver and oral cancers, however, all non-bone cancers were later downgraded – with a questionable rationale - by a government-review panel (Marcus 1990). In light of the importance of this study, EPA Professional Headquarters Union has requested that Congress establish an independent review to examine the study's results (Hirzy 2000).

27) A review of national cancer data in the US by the National Cancer Institute (NCI) revealed a significantly higher rate of bone cancer in young men in fluoridated versus unfluoridated areas (Hoover 1991). While the NCI concluded that fluoridation was not the cause, no explanation was provided to explain the higher rates in the fluoridated areas. A smaller study from New Jersey (Cohn 1992) found bone cancer rates to be up to 6 times higher in young men living in fluoridated versus unfluoridated areas. Other epidemiological studies have failed to find this relationship (Mahoney 1991; Freni 1992).

28) Fluoride administered to animals at high doses wreaks havoc on the male reproductive system - it damages sperm and increases the rate of infertility in a number of different species (Kour 1980; Chinoy 1989; Chinoy 1991; Susheela 1991; Chinoy 1994; Kumar 1994; Narayana 1994a, b; Zhao 1995; Elbetieha 2000; Ghosh 2002 and Zakrzewska 2002). While studies conducted at the FDA have failed to find reproductive effects in rats (Sprando 1996, 1997, 1998), an epidemiological study from the US has found increased rates of infertility among couples living in areas with 3 or more ppm fluoride in the water (Freni 1994), and 2 studies have found a reduced level of circulating testosterone in males living in high fluoride areas (Susheela 1996 and Barot 1998).

29) The fluoridation program has been very poorly monitored. There has never been a comprehensive analysis of the fluoride levels in the bones, blood, or urine of the American people or the citizens of other fluoridated countries. Based on the sparse data that has become available, however, it is increasingly evident that some people in the population – particularly people with kidney disease - are accumulating fluoride levels that have been associated with harm to both animals and humans, particularly harm to bone (see Connett 2004).

30) Once fluoride is put in the water it is impossible to control the dose each individual receives. This is because 1) some people (e.g. manual laborers, athletes, diabetics, and people with kidney disease) drink more water than others, and 2) we receive fluoride from sources other than the water supply. Other sources of fluoride include food and beverages processed with fluoridated water (Kiritsy 1996 and Heilman 1999), fluoridated dental products (Bentley 1999 and Levy 1999), mechanically deboned meat (Fein 2001), teas (Levy 1999), and pesticide residues on food (Stannard 1991 and Burgstahler 1997).

31) Fluoridation is unethical because individuals are not being asked for their informed consent prior to medication. This is standard practice for all medication, and one of the key reasons why most of western Europe has ruled against fluoridation (see appendix 2).

As one doctor aptly stated, "No physician in his right senses would prescribe for a person he has never met, whose medical history he does not know, a substance which is intended to create bodily change, with the advice: 'Take as much as you like, but you will take it for the rest of your life because some children suffer from tooth decay.' It is a preposterous notion."

32) While referenda are preferential to imposed policies from central government, it still leaves the problem of individual rights versus majority rule. Put another way -- does a voter have the right to require that their

neighbor ingest a certain medication (even if it's against that neighbor's will)?

33) Some individuals appear to be highly sensitive to fluoride as shown by case studies and double blind studies (Shea 1967, Waldbott 1978 and Moolenburg 1987). In one study, which lasted 13 years, Feltman and Kosel (1961) showed that about 1% of patients given 1 mg of fluoride each day developed negative reactions. Can we as a society force these people to ingest fluoride?

34) According to the Agency for Toxic Substances and Disease Registry (ATSDR 1993), and other researchers (Juncos & Donadio 1972; Marier & Rose 1977 and Johnson 1979), certain subsets of the population may be particularly vulnerable to fluoride's toxic effects; these include: the elderly, diabetics and people with poor kidney function. Again, can we in good conscience force these people to ingest fluoride on a daily basis for their entire lives?

35) Also vulnerable are those who suffer from malnutrition (e.g. calcium, magnesium, vitamin C, vitamin D and iodide deficiencies and protein poor diets) (Massler & Schour 1952; Marier & Rose 1977; Lin Fa-Fu 1991; Chen 1997; Teotia 1998). Those most likely to suffer from poor nutrition are the poor, who are precisely the people being targeted by new fluoridation programs. While being at heightened risk, poor families are less able to afford avoidance measures (e.g. bottled water or removal equipment).

36) Since dental decay is most concentrated in poor communities, we should be spending our efforts trying to increase the access to dental care for poor families. The real "Oral Health Crisis" that exists today in the United States, is not a lack of fluoride but poverty and lack of dental insurance. The Surgeon General has estimated that 80% of dentists in the US do not treat children on Medicaid.

37) Fluoridation has been found to be ineffective at preventing one of the most serious oral health problems facing poor children, namely, baby bottle tooth decay, otherwise known as early childhood caries (Barnes 1992 and Shiboski 2003).

38) The early studies conducted in 1945 -1955 in the US, which helped to launch fluoridation, have been heavily criticized for their poor methodology and poor choice of control communities (De Stefano 1954; Sutton 1959, 1960 and 1996; Ziegelbecker 1970). According to Dr. Hubert Arnold, a statistician from the University of California at Davis, the early fluoridation trials "are especially rich in fallacies, improper design, invalid use of statistical methods, omissions of contrary data, and just plain muddleheadedness and hebetude." In 2000, the British Government's "York Review" could give no fluoridation trial a grade A classification – despite 50 years of research (McDonagh 2000, see Appendix 3 for commentary).

39) The US Public Health Service first endorsed fluoridation in 1950, before one single trial had been completed (McClure 1970)!

40) Since 1950, it has been found that fluorides do little to prevent pit and fissure tooth decay, a fact that even the dental community has acknowledged (Seholle 1984; Gray 1987; PHS 1993; and Pinkham 1999). This is significant because pit and fissure tooth decay represents up to 85% of the tooth decay experienced by children today (Seholle 1984 and Gray 1987).

41) Despite the fact that we are exposed to far more fluoride today than we were in 1945 (when fluoridation began), the "optimal" fluoridation level is still 1 part per million, the same level deemed optimal in 1945! (Marier & Rose 1977; Levy 1999; Rozier 1999 and Fomon 2000).

42) The chemicals used to fluoridate water in the US are not pharmaceutical grade. Instead, they come from the wet scrubbing systems of the superphosphate fertilizer industry. These chemicals (90% of which are sodium fluorosilicate and fluorosilicic acid), are classified hazardous wastes contaminated with various impurities. Recent testing by the National Sanitation Foundation suggest that the levels of arsenic in these chemicals are

relatively high (up to 1.6 ppb after dilution into public water) and of potential concern (NSF 2000 and Wang 2000).

43) These hazardous wastes have not been tested comprehensively. The chemical usually tested in animal studies is pharmaceutical grade sodium fluoride, not industrial grade fluorosilicic acid. The assumption being made is that by the time this waste product has been diluted, all the fluorosilicic acid will have been converted into free fluoride ion, and the other toxics and radioactive isotopes will be so dilute that they will not cause any harm, even with lifetime exposure. These assumptions have not been examined carefully by scientists, independent of the fluoridation program.

44) Studies by Masters and Coplan (1999, 2000) show an association between the use of fluorosilicic acid (and its sodium salt) to fluoridate water and an increased uptake of lead into children's blood. Because of lead's acknowledged ability to damage the child's developing brain, this is a very serious finding yet it is being largely ignored by fluoridating countries.

45) Sodium fluoride is an extremely toxic substance -- just 200 mg of fluoride ion is enough to kill a young child, and just 3-5 grams (e.g. a teaspoon) is enough to kill an adult. Both children (swallowing tablets/gels) and adults (accidents involving fluoridation equipment and filters on dialysis machines) have died from excess exposure.

46) Some of the earliest opponents of fluoridation were biochemists and at least 14 Nobel Prize winners are among numerous scientists who have expressed their reservations about the practice of fluoridation (see appendix 4).

47) The recent Nobel Laureate in Medicine and Physiology, Dr. Arvid Carlsson (2000), was one of the leading opponents of fluoridation in Sweden, and part of the panel that recommended that the Swedish government reject the practice, which they did in 1971. According to Carlsson:

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

48) While pro-fluoridation officials continue to promote fluoridation with undiminished fervor, they cannot defend the practice in open public debate – even when challenged to do so by organizations such as the Association for Science in the Public Interest, the American College of Toxicology, or the US Environmental Protection Agency (Bryson 2004). According to Dr. Michael Easley, a prominent lobbyist for fluoridation in the US, "Debates give the illusion that a scientific controversy exists when no credible people support the fluorophobics' view" (See appendix 5).

In light of proponents' refusal to debate this issue, Dr. Edward Groth, a Senior Scientist at Consumers Union, observed that "the political profluoridation stance has evolved into a dogmatic, authoritarian, essentially antiscientific posture, one that discourages open debate of scientific issues" (Martin 1991).

49) Many scientists, doctors and dentists who have spoken out publicly on this issue have been subjected to censorship and intimidation (Martin 1991). Most recently, Dr. Phyllis Mullenix was fired from her position as Chair of Toxicology at Forsythe Dental Center for publishing her findings on fluoride and the brain; and Dr. William Marcus was fired from the EPA for questioning the government's handling of the NTP's fluoride-cancer study (Bryson 2004). Tactics like this would not be necessary if those promoting fluoridation were on secure scientific ground.

50) The Union representing the scientists at US EPA headquarters in Washington DC is now on record as

opposing water fluoridation (Hirzy 1999). According to the Union's Senior Vice President, Dr. William Hirzy:

> "In summary, we hold that fluoridation is an unreasonable risk. That is, the toxicity of fluoride is so great and the purported benefits associated with it are so small - if there are any at all - that requiring every man, woman and child in America to ingest it borders on criminal behavior on the part of governments."

Conclusion

When it comes to controversies surrounding toxic chemicals, invested interests traditionally do their very best to discount animal studies and quibble with epidemiological findings. In the past, political pressures have led government agencies to drag their feet on regulating asbestos, benzene, DDT, PCBs, tetraethyl lead, tobacco and dioxins. With fluoridation we have had a fifty year delay. Unfortunately, because government officials have put so much of their credibility on the line defending fluoridation, and because of the huge liabilities waiting in the wings if they admit that fluoridation has caused an increase in hip fracture, arthritis, bone cancer, brain disorders or thyroid problems, it will be very difficult for them to speak honestly and openly about the issue. But they must, not only to protect millions of people from unnecessary harm, but to protect the notion that, at its core, public health policy must be based on sound science not political expediency. They have a tool with which to do this: it's called the Precautionary Principle. Simply put, this says: if in doubt leave it out. This is what most European countries have done and their children's teeth have not suffered, while their public's trust has been strengthened.

It is like a question from a Kafka play. Just how much doubt is needed on just one of the health concerns identified above, to override a benefit, which when quantified in the largest survey ever conducted in the US, amounts to less than one tooth surface (out of 128) in a child's mouth?

For those who would call for further studies, I say fine. Take the fluoride out of the water first and then conduct all the studies you want. This folly must end without further delay.

Postscript

Further arguments against fluoridation, can be viewed at http://www.fluoridealert.org. Arguments for fluoridation can be found at http://www.ada.org and a more systematic presentation of fluoride's toxic effects can be found at http://www.Slweb.org/bibliography.html

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Acknowledgements

I would like to acknowledge the help given to me in the research for this statement to my son Michael Connett and to Naomi Flack for the proofreading of the text. Any remaining mistakes are my own.

APPENDIX 1. World Health Organization Data

DMFT (Decayed, Missing & Filled teeth) Status for 12 year olds by Country

	DMFTs	Year	Status*
Australia	0.8	1998	More than 50% of water is fluoridated
Zurich, Switzerland	0.84	1998	Water is unfluoridated, but salt is fluoridated

Netherlands	0.9	1992-93	No water fluoridation or salt fluoridation
Sweden	0.9	1999	No water fluoridation or salt fluoridation
Denmark	0.9	2001	No water fluoridation or salt fluoridation
UK *(England & Wales)*	0.9	1996-97	11% of water supplies are fluoridated
Ireland	1.1	1997	More than 50% of water is fluoridated
Finland	1.1	1997	No water fluoridation or salt fluoridation
Germany	1.2	2000	No water fluoridation, but salt fluoridation is common
US	1.4	1988-91	More than 50% of water is fluoridated
Norway	1.5	1998	No water fluoridation or salt fluoridation
Iceland	1.5	1996	No water fluoridation or salt fluoridation
New Zealand	1.5	1993	More than 50% of water is fluoridated
Belgium	1.6	1998	No water fluoridation, but salt fluoridation is common
Austria	1.7	1997	No water fluoridation, but salt fluoridation is common
France	1.9	1998	No water fluoridation, but salt fluoridation is common

Data from WHO Oral Health Country/Area Profile Programme Department of Noncommunicable Diseases Surveillance/Oral Health WHO Collaborating Centre, Malmö University, Sweden http://www.whocollab.od.mah.se/euro.html

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APPENDIX 2. Statements on fluoridation by governmental officials from several countries

Germany: "Generally, in Germany fluoridation of drinking water is forbidden. The relevant German law allows exceptions to the fluoridation ban on application. The argumentation of the Federal Ministry of Health against a general permission of fluoridation of drinking water is the problematic nature of compuls[ory] medication." (*Gerda Hankel-Khan, Embassy of Federal Republic of Germany, September 16, 1999*). www.fluoridealert.org/germany.jpeg

France: "Fluoride chemicals are not included in the list [of 'chemicals for drinking water treatment']. This is due to ethical as well as medical considerations." (*Louis Sanchez, Directeur de la Protection de l'Environment, August 25, 2000*). www.fluoridealert.org/france.jpeg

Belgium: "This water treatment has never been of use in Belgium and will never be (we hope so) into the future. The main reason for that is the fundamental position of the drinking water sector that it is not its task to deliver medicinal treatment to people. This is the sole responsibility of health services." (*Chr. Legros, Directeur, Belgaqua, Brussels, Belgium, February 28, 2000*). www.fluoridation.com/c-belgium.htm

Luxembourg: "Fluoride has never been added to the public water supplies in Luxembourg. In our views, the drinking water isn't the suitable way for medicinal treatment and that people needing an addition of fluoride can decide by their own to use the most appropriate way, like the intake of fluoride tablets, to cover their [daily] needs." (*Jean-Marie RIES, Head, Water Department, Administration De L'Environment, May 3, 2000*). www.fluoridealert.org/luxembourg.jpeg

Finland: "We do not favor or recommend fluoridation of drinking water. There are better ways of providing the fluoride our teeth need." (*Paavo Poteri, Acting Managing Director, Helsinki Water, Finland, February 7, 2000*). www.fluoridation.com/c-finland.htm

"Artificial fluoridation of drinking water supplies has been practiced in Finland only in one town, Kuopio, situated in eastern Finland and with a population of about 80,000 people (1.6% of the Finnish population). Fluoridation started in 1959 and finished in 1992 as a result of the resistance of local population. The most usual grounds for the resistance presented in this context were an individual's right to drinking water without additional chemicals used for the medication of limited population groups. A concept of "force-feeding" was also mentioned.

Drinking water fluoridation is not prohibited in Finland but no municipalities have turned out to be willing to practice it. Water suppliers, naturally, have always been against dosing of fluoride chemicals into water." (*Leena Hiisvirta, M.Sc., Chief Engineer, Ministry of Social Affairs and Health, Finland, January 12, 1996*.) www.fluoridealert.org/finland.jpeg

Denmark: "We are pleased to inform you that according to the Danish Ministry of Environment and Energy, toxic fluorides have never been added to the public water supplies. Consequently, no Danish city has ever been fluoridated." (*Klaus Werner, Royal Danish Embassy, Washington DC, December 22, 1999*). www.fluoridation.com/c-denmark.htm

Norway: "In Norway we had a rather intense discussion on this subject some 20 years ago, and the conclusion was that drinking water should not be fluoridated." (*Truls Krogh & Toril Hofshagen, Folkehelsa Statens institutt for folkeheise (National Institute of Public Health) Oslo, Norway, March 1, 2000*). www.fluoridation.com/c-norway.htm

Sweden: "Drinking water fluoridation is not allowed in Sweden...New scientific documentation or changes in dental health situation that could alter the conclusions of the Commission have not been shown." (*Gunnar Guzikowski, Chief Government Inspector, Livsmedels Verket -- National Food Administration Drinking Water Division, Sweden, February 28, 2000*). www.fluoridation.com/c-sweden.htm

Netherlands: "From the end of the 1960s until the beginning of the 1970s drinking water in various places in the Netherlands was fluoridated to prevent caries. However, in its judgement of 22 June 1973 in case No. 10683 (Budding and co. versus the City of Amsterdam) the Supreme Court (Hoge Road) ruled there was no legal basis for fluoridation. After that judgement, amendment to the Water Supply Act was prepared to provide a legal basis for fluoridation. During the process it became clear that there was not enough support from Parlement [sic] for this amendment and the proposal was withdrawn." (*Wilfred Reinhold, Legal Advisor, Directorate Drinking Water, Netherlands, January 15, 2000*). www.fluoridation.com/c-netherlands.htm

Northern Ireland: "The water supply in Northern Ireland has never been artificially fluoridated except in 2 small localities where fluoride was added to the water for about 30 years up to last year. Fluoridation ceased at these locations for operational reasons. At this time, there are no plans to commence fluoridation of water supplies in Northern Ireland." (*C.J. Grimes, Department for Regional Development, Belfast, November 6, 2000*). www.fluoridealert.org/Northern-Ireland.jpeg

Austria: "Toxic fluorides have never been added to the public water supplies in Austria." (*M. Eisenhut, Head of Water Department, Osterreichische Yereinigung fur das Gas-und Wasserfach Schubertring 14, A-1015 Wien, Austria, February 17, 2000*). www.fluoridation.com/c-austria.htm

Czech Republic:"Since 1993, drinking water has not been treated with fluoride in public water supplies throughout the Czech Republic. Although fluoridation of drinking water has not actually been proscribed it is not under consideration because this form of supplementation is considered as follows:

(a) uneconomical (only 0.54% of water suitable for drinking is used as such; the remainder is employed for hygiene etc. Furthermore, an increasing amount of consumers (particularly children) are using bottled water for drinking (underground water usually with fluor)

(b) unecological (environmental load by a foreign substance)

(c) unethical ("forced medication")

(d) toxicologically and phyiologically debateable (fluoridation represents an untargeted form of supplementation which disregards actual individual intake and requirements and may lead to excessive health-threatening intake in certain population groups; [and] complexation of fluor in water into non biological active forms of fluor." (*Dr. B. Havlik, Ministerstvo Zdravotnictvi Ceske Republiky, October 14, 1999*). www.fluoridealert.org/czech.jpeg

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APPENDIX 3. Statement of Douglas Carnall, Associate Editor of the British Medical Journal, published on the BMJ website (http://www.bmj.com) on the day that they published the York Review on Fluoridation.

See this review on the web at http://bmj.bmjjournals.com/cgi/content/full/321/7265/904/a

British Medical Journal, October 7, 2000, Reviews, Website of the week: Water fluoridation

Fluoridation was a controversial topic even before Kubrick's Base Commander Ripper railed against "the international communist conspiracy to sap and impurify all of our precious bodily fluids" in the 1964 film Dr Strangelove. This week's BMJ shouldn't precipitate a global holocaust, but it does seem that Base Commander Ripper may have had a point. The systematic review published this week (p 855) shows that much of the evidence for fluoridation was derived from low quality studies, that its benefits may have been overstated, and that the risk to benefit ratio for the development of the commonest side effect (dental fluorosis, or mottling of the teeth) is rather high.

Supplementary materials are available on the BMJ 's website and on that of the review's authors, enhancing the validity of the conclusions through transparency of process. For example, the "frequently asked questions" page of the site explains who comprised the advisory panel and how they were chosen ("balanced to include those for and against, as well as those who are neutral"), and the site includes the minutes of their meetings. You can also pick up all 279 references in Word97 format, and tables of data in PDF. Such transparency is admirable and can only encourage rationality of debate.

Professionals who propose compulsory preventive measures for a whole population have a different weight of responsibility on their shoulders than those who respond to the requests of individuals for help. Previously neutral on the issue, I am now persuaded by the arguments that those who wish to take fluoride (like me) had better get it from toothpaste rather than the water supply (see www.derweb.co.uk/bfs/index.html and www.npwa.freeserve.co.uk/index.html for the two viewpoints).

Douglas Carnall
Associate Editor

APPENDIX 4. List of 14 Noble Prize winners who have opposed or expressed reservations about fluoridation.

1) Adolf Butenandt (Chemistry, 1939)
2) Arvid Carlsson (Medicine, 2000)
3) Hans von Euler-Chelpin (Chemistry, 1929).
4) Walter Rudolf Hess (Medicine, 1949)
5) Corneille Jean-François Heymans (Medicine, 1938)
6) Sir Cyril Norman Hinshelwood (Chemistry, 1956)
7) Joshua Lederberg (Medicine, 1958)
8) William P. Murphy (Medicine, 1934)
8) Giulio Natta (1963 Nobel Prize in Chemistry)
10) Sir Robert Robinson (Chemistry, 1947)
11) Nikolai Semenov (Chemistry, 1956)
12) James B. Sumner (Chemistry, 1946)
13) Hugo Theorell (Medicine, 1955)
14) Artturi Virtanen (Chemistry, 1945)

APPENDIX 5. Quotes on debating fluoridation from Dr. Michael Easley, Director of the National Center for Fluoridation Policy and Research, and one of the most active proponents of fluoridation in the US (Easley 1999). Easley's quotes typify the historic contempt that proponents have had to scientific debate.

> "A favorite tactic of the fluorophobics is to argue for a debate so that 'the people can decide who is right.' Proponents of fluoride are often trapped into consenting to public debates."
>
> "Debates give the illusion that a scientific controversy exists when no credible people support the fluorophobics' view."
>
> "Like parasites, opponents steal undeserved credibility just by sharing the stage with respected scientists who are there to defend fluoridation"; and,
>
> "Unfortunately, a most flagrant abuse of the public trust occasionally occurs when a physician or a dentist, for whatever personal reason, uses their professional standing in the community to argue against fluoridation, a clear violation of professional ethics, the principles of science and community standards of practice."

References

Agency for Toxic Substances and Disease Registry (ATSDR) (1993). Toxicological Profile for Fluorides, Hydrogen Fluoride, and Fluorine (F). U.S. Department of Health & Human Services, Public Health Service. ATSDR/TP-91/17.

Allain P, et al. (1996). Enhancement of aluminum digestive absorption by fluoride in rats. *Research Communications in Molecular Pathology and Pharmacology* 91: 225-31.

Arnold HA. (1980). Letter to Dr. Ernest Newbrun. May 28, 1980. http://www.fluoridealert.org/uc-davis.htm

Awadia AK, et al. (2002). Caries experience and caries predictors - a study of Tanzanian children consuming drinking water with different fluoride concentrations. *Clinical Oral Investigations* (2002) 6:98-103.

Bachinskii PP, et al. (1985) Action of the body fluorine of healthy persons and thyroidopathy patients on the function of hypophyseal-thyroid the system. *Probl Endokrinol* (Mosk) 31: 25-9. http://www.fluoridealert.org /epa-sf/appendix-e.pdf

Barnes GP, et al. (1992). Ethnicity, location, age, and fluoridation factors in baby bottle tooth decay and caries prevalence of Head Start children. *Public Health Reports* 107: 167-73.

Barot VV. (1998). Occurrence of endemic fluorosis in human population of North Gujarat, India: human health risk. *Bulletin of Environmental Contamination and Toxicology* 61: 303-10.

Bayley TA, et al. (1990). Fluoride-induced fractures: relation to osteogenic effect. *Journal of Bone and Mineral Research* 5(Suppl 1):S217-22.

Bentley EM, et al. (1999). Fluoride ingestion from toothpaste by young children. *British Dental Journal* 186: 460-2.

Bhatnagar M, et al. (2002). Neurotoxicity of fluoride: neurodegeneration in hippocampus of female mice. *Indian Journal of Experimental Biology* 40: 546-54.

Bigay J, et al. (1987). Fluoride complexes of aluminium or beryllium act on G-proteins as reversibly bound analogues of the gamma phosphate of GTP. *EMBO Journal* 6: 2907-2913.

Bigay J, et al. (1985). Fluoroaluminates activate transducin-GDP by mimicking the gamma-phosphate of GTP in its binding site. *FEBS Letters* 191: 181-185.

Brunelle JA, Carlos JP. (1990). Recent trends in dental caries in U.S. children and the effect of water fluoridation. *Journal of Dental Research* 69(Special edition): 723-727.

Bryson C. (2004). The Fluoride Deception. Seven Stories Press, New York.

Burgstahler AW, et al. (1997). Fluoride in California wines and raisins. *Fluoride* 30: 142-146.

Carlsson A. (1978). Current problems relating to the pharmacology and toxicology of fluorides. *Journal of the Swedish Medical Association* 14: 1388-1392.

Carnow BW, Conibear SA. (1981). Industrial fluorosis. *Fluoride* 14: 172-181.

Caspary WJ, et al (1987). Mutagenic activity of fluorides in mouse lymphoma cells. *Mutation Research* 187:165-80.

Centers for Disease Control and Prevention (CDC). (2002). Prevalence of Self-Reported Arthritis or Chronic Joint Symptoms Among Adults --- United States, 2001. *Mortality and Morbidity Weekly Review* 51: 948-950.

Centers for Disease Control and Prevention (CDC). (2001). Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States. *Morbidity and Mortality Weekly Report* 50(RR14): 1-42.

Centers for Disease Control and Prevention (CDC). (1999). Achievements in Public Health, 1900-1999: Fluoridation of Drinking Water to Prevent Dental Caries. *Mortality and Morbidity Weekly Review* 48: 933-940.

Chen J, et al. (2003). Selective decreases of nicotinic acetylcholine receptors in PC12 cells exposed to fluoride. *Toxicology* 183: 235-42.

Chen J, et al. (2002). [Studies on DNA damage and apoptosis in rat brain induced by fluoride] *Zhonghua Yu*

Fang Yi Xue Za Zhi 36 :222-224.

Chen YC, et al. (1997). Nutrition survey in dental fluorosis-afflicted areas. *Fluoride* 30(2):77-80.

Chinoy NJ, Narayana MV. (1994). In vitro fluoride toxicity in human spermatozoa. *Reproductive Toxicology* 8:155-9.

Chinoy NJ, et al. (1991). Microdose vasal injection of sodium fluoride in the rat. *Reproductive Toxicology* 5: 505-12.

Chinoy NJ, Sequeira E. (1989). Effects of fluoride on the histoarchitecture of reproductive organs of the male mouse. *Reproductive Toxicology* 3: 261-7.

Cohn PD. (1992). A Brief Report On The Association Of Drinking Water Fluoridation And The Incidence of Osteosarcoma Among Young Males. New Jersey Department of Health Environ. Health Service: 1- 17.

Colquhoun J. (1997) Why I changed my mind about Fluoridation. *Perspectives in Biology and Medicine* 41: 29-44. http://www.fluoride-journal.com/98-31-2/312103.htm

Connett M. (2004). Fluoride & Bone Damage: Published Data. Submission to National Research Council (NRC). http://www.fluoridealert.org/bone-data.pdf

Connett, P. (2000). Fluoride: A Statement of Concern. *Waste Not* #459. January 2000. Waste Not, 82 Judson Street, Canton, NY 13617. http://www.fluoridealert.org/fluoride-statement.htm

Czerwinski E, et al. (1988). Bone and joint pathology in fluoride-exposed workers. Archives of Environmental Health 43: 340-343.

Dambacher MA, et al. (1986). Long-term fluoride therapy of postmenopausal osteoporosis. *Bone* 7: 199-205.

De Liefde B. (1998). The decline of caries in New Zealand over the past 40 Years. *New Zealand Dental Journal* 94: 109-113.

Department of Health & Human Services. (U.S. DHHS) (1991). Review of Fluoride: Benefits and Risks. Report of the Ad Hoc Committee on Fluoride, Committee to Coordinate Environmental Health and Related Programs. Department of Health and Human Services, USA.

DenBesten, P (1999). Biological mechanism of dental fluorosis relevant to the use of fluoride supplements. *Community Dentistry and Oral Epidemiology* 27: 41-7.

De Stefano TM. (1954). The fluoridation research studies and the general practitioner. *Bulletin of Hudson County Dental Society* February.

Diesendorf M.(1986). The mystery of declining tooth decay. *Nature* 322: 125-129. http://www.fluoridealert.org/diesendorf.htm

Ditkoff BA, Lo Gerfo P. (2000). The Thyroid Guide. Harper-Collins. New York.

Easley, M. (1999). Community fluoridation in America: the unprincipled opposition. Unpublished.

Ekambaram P, Paul V. (2001). Calcium preventing locomotor behavioral and dental toxicities of fluoride by decreasing serum fluoride level in rats. *Environmental Toxicology and Pharmacology* 9: 141-146.

Ekanayake L, Van Der Hoek W. (2002). Dental caries and developmental defects of enamel in relation to

fluoride levels in drinking water in an arid area of sri lanka. *Caries Research* 36: 398-404.

Ekstrand J, et al. (1981). No evidence of transfer of fluoride from plasma to breast milk. *British Medical Journal* (Clin Res Ed). 283: 761-2.

Elbetieha A, et al. (2000). Fertility effects of sodium fluoride in male mice. *Fluoride* 33: 128-134.

Emsley J, et al (1981). An unexpectedly strong hydrogen bond: ab initio calculations and spectroscopic studies of amide-fluoride systems. *Journal of the American Chemical Society* 103: 24-28.

Fein NJ, Cerklewski FL. (2001). Fluoride content of foods made with mechanically separated chicken. *Journal of Agricultural Food Chemistry* 49: 4284-6.

Feltman R, Kosel G. (1961). Prenatal and postnatal ingestion of fluorides - Fourteen years of investigation - Final report. *Journal of Dental Medicine* 16: 190-99.

Fomon SJ, et al. (2000). Fluoride intake and prevalence of dental fluorosis: trends in fluoride intake with special attention to infants. *Journal of Public Health Dentistry* 60: 131-9.

Franke J, et al. (1975). Industrial fluorosis. *Fluoride* 8: 61-83.

Freni SC. (1994). Exposure to high fluoride concentrations in drinking water is associated with decreased birth rates. *Journal of Toxicology and Environmental Health* 42: 109-121.

Freni SC, Gaylor DW. (1992). International trends in the incidence of bone cancer are not related to drinking water fluoridation. *Cancer* 70: 611-8.

Galletti P, Joyet G. (1958). Effect of fluorine on thyroidal iodine metabolism in hyperthyroidism. *Journal of Clinical Endocrinology* 18: 1102-1110. http://www. fluoridealert.org/galletti.htm

Gerster JC, et al. (1983). Bilateral fractures of femoral neck in patients with moderate renal failure receiving fluoride for spinal osteoporosis. *British Medical Journal* (Clin Res Ed) 287(6394):723-5.

Ghosh D, et al. (2002). Testicular toxicity in sodium fluoride treated rats: association with oxidative stress. *Reproductive Toxicolology* 16(4):385.

Gray, AS. (1987). Fluoridation: time for a new base line? *Journal of the Canadian Dental Association* 53: 763-5.

Grobleri SR, et al. (2001). Dental fluorosis and caries experience in relation to three different drinking water fluoride levels in South Africa. *International Journal of Paediatric Dentistry* 11(5):372-9.

Guan ZZ, et al (1998). Influence of chronic fluorosis on membrane lipids in rat brain. *Neurotoxicology and Teratology* 20: 537-542.

Gutteridge DH, et al. (2002). A randomized trial of sodium fluoride (60 mg) +/- estrogen in postmenopausal osteoporotic vertebral fractures: increased vertebral fractures and peripheral bone loss with sodium fluoride; concurrent estrogen prevents peripheral loss, but not vertebral fractures. *Osteoporosis International* 13(2):158-70.

Gutteridge DH, et al. (1990). Spontaneous hip fractures in fluoride-treated patients: potential causative factors. *Journal of Bone and Mineral Research* 5 Suppl 1:S205-15.

Hanmer R. (1983). Letter to Leslie A. Russell, D.M.D, from Rebecca Hanmer, Deputy Assistant Administrator

for Water, US EPA. March 30, 1983.

Hedlund LR, Gallagher JC. (1989). Increased incidence of hip fracture in osteoporotic women treated with sodium fluoride. *Journal of Bone and Mineral Research* 4: 223-5.

Heller KE, et al (1997). Dental caries and dental fluorosis at varying water fluoride concentrations. *Journal of Public Health Dentistry* 57: 136-143.

Hileman B. (1989). New studies cast doubt on fluoridation benefits. *Chemical and Engineering News* May 8. http://www.fluoridealert .org/NIDR.htm

Hileman B. (1988). Fluoridation of water: Questions about health risks and benefits remain after more than 40 years. *Chemical and Engineering News*. August 1: 26-42. http://www.fluoridealert.org/hileman.htm

Hirzy JW. (1999). Why the EPA's Headquarters Union of Scientists Opposes Fluoridation. Press release from National Treasury Employees Union. May 1. http://www.fluoridealert.org/hp-epa.htm

Hoover RN, et al. (1991). Time trends for bone and joint cancers and osteosarcomas in the Surveillance, Epidemiology and End Results (SEER) Program. National Cancer Institute In: Review of Fluoride: Benefits and Risks Report of the Ad Hoc Committee on Fluoride of the Committee to Coordinate Environmental Health and Related Programs US Public Health Service. pp F1 -F7.

Inkovaara J, et al. (1975). Prophylactic fluoride treatment and aged bones. *British Medical Journal* 3: 73-4.

Institute of Medicine. (1997). Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride. Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board. National Academy Press.

Johnson W, et al. (1979). Fluoridation and bone disease in renal patients. In: Johansen E, Taves DR, Olsen TO, Eds. Continuing Evaluation of the Use of Fluorides. AAAS Selected Symposium. Westview Press, Boulder, Colorado. pp. 275-293.

Joseph S, Gadhia PK. (2000). Sister chromatid exchange frequency and chromosome aberrations in residents of fluoride endemic regions of South Gujarat. *Fluoride* 33: 154-158.

Juncos LI, Donadio JV. (1972). Renal failure and fluorosis. *Journal of the American Medical Association* 222: 783-5.

Kelly JV. (2000). Letter to Senator Robert Smith, Chairman of Environment and Public Works Committee, U.S. Senate, August 14, 2000. http://www.fluoridealert .org/fda.htm

Kilborn LG, et al. (1950). Fluorosis with report of an advanced case. *Canadian Medical Association Journal* 62: 135-141.

Kiritsy MC, et al. (1996). Assessing fluoride concentrations of juices and juice-flavored drinks. *Journal of the American Dental Association* 127: 895-902.

Kishi K, Ishida T. (1993). Clastogenic activity of sodium fluoride in great ape cells. *Mutation Research* 301:183-8.

Kour K, Singh J. (1980). Histological finding of mice testes following fluoride ingestion. *Fluoride* 13: 160-162.

Kumar A, Susheela AK. (1994). Ultrastructural studies of spermiogenesis in rabbit exposed to chronic fluoride

toxicity. *International Journal of Fertility and Menopausal Studies* 39:164-71.

Kumar JV, Green EL. (1998). Recommendations for fluoride use in children. *NY State Dental Journal* 64: 40-7.

Kunzel W, Fischer T. (2000). Caries prevalence after cessation of water fluoridation in La Salud, Cuba. *Caries Research* 34: 20-5.

Kunzel W, et al. (2000). Decline in caries prevalence after the cessation of water fluoridation in former East Germany. *Community Dentistry and Oral Epidemiology* 28: 382-389.

Kunzel W, Fischer T. (1997). Rise and fall of caries prevalence in German towns with different F concentrations in drinking water. *Caries Research* 31: 166-73.

Lalumandier JA, et al. (1995). The prevalence and risk factors of fluorosis among patients in a pediatric dental practice. *Pediatric Dentistry* 17: 19-25.

Levy SM, Guha-Chowdhury N. (1999). Total fluoride intake and implications for dietary fluoride supplementation. *Journal of Public Health Dentistry* 59: 211-23.

Li L. (2003). The biochemistry and physiology of metallic fluoride: action, mechanism, and implications. *Critical Reviews of Oral Biology and Medicine* 14: 100-14.

Li XS. (1995). Effect of fluoride exposure on intelligence in children. *Fluoride* 28: 189-192.

Lin FF, et al. (1991). The relationship of a low-iodine and high-fluoride environment to subclinical cretinism in Xinjiang. *Iodine Deficiency Disorder Newsletter* Vol. 7. No. 3. http://www.fluoridealert.org/IDD.htm

Locker D. (1999). Benefits and Risks of Water Fluoridation. An Update of the 1996 Federal-Provincial Sub-committee Report. Prepared for Ontario Ministry of Health and Long Term Care.

Long YG, et al. (2002). Chronic fluoride toxicity decreases the number of nicotinic acetylcholine receptors in rat brain. *Neurotoxicology and Teratology* 24: 751-7.

Lu XH, et al. (2000). Study of the mechanism of neurone apoptosis in rats from the chronic fluorosis. *Chinese Journal of Epidemiology* 19: 96-98.

Luke J. (2001). Fluoride deposition in the aged human pineal gland. *Caries Research* 35: 125-128.

Luke J. (1997). The Effect of Fluoride on the Physiology of the Pineal Gland. Ph.D. Thesis. University of Surrey, Guildord.

Mahaffey KR, Stone CL. (1976). Effect of High Fluorine (F) Intake on Tissue Lead (Pb) Concentrations. *Federation Proceedings* 35: 256.

Mahoney MC, et al. (1991). Bone cancer incidence rates in New York State: time trends and fluoridated drinking water. *American Journal of Public Health* 81: 475-9.

Mann J,et al. (1990). Fluorosis and dental caries in 6-8-year-old children in a 5 ppm fluoride area. *Community Dentistry and Oral Epidemiology* 18: 77-9.

Mann J, et al. (1987). Fluorosis and caries prevalence in a community drinking above-optimal fluoridated water. *Community Dentistry and Oral Epidemiology* 15: 293-5.

Marcus W. (1990). Memorandum from Dr. William Marcus, to Alan B. Hais, Acting Director Criteria &

Standards Division ODW, US EPA. May 1, 1990. http:// www.fluoridealert.org/marcus.htm

Martin B. (1991). Scientific Knowledge in Controversy: The Social Dynamics of the Fluoridation Debate. SUNY Press, Albany NY.

Massler M, Schour I. (1952). Relation of endemic dental fluorosis to malnutrition. *Journal of the American Dental Association* 44: 156-165.

Masters R, et al. (2000). Association of silicofluoride treated water with elevated blood lead. *Neurotoxicology* 21: 1091-1099.

Masters RD, Coplan M. (1999). Water treatment with silicofluorides and lead toxicity. *International Journal of Environmental Studies* 56: 435-449.

Matsuo S, et al. (1998). Mechanism of toxic action of fluoride in dental fluorosis: whether trimeric G proteins participate in the disturbance of intracellular transport of secretory ameloblast exposed to fluoride. *Archives of Toxicology* 72: 798-806.

Maupome G, et al. (2001). Patterns of dental caries following the cessation of water fluoridation. *Community Dentistry and Oral Epidemiology* 29: 37-47.

McClure F. (1970). Water fluoridation, the search and the victory. US Department of Health, Education, and Welfare, Washington DC.

McDonagh M, et al. (2000). A Systematic Review of Public Water Fluoridation. NHS Center for Reviews and Dissemination,. University of York, September 2000.

Meng Z, Zhang B. (1997). Chromosomal aberrations and micronuclei in lymphocytes of workers at a phosphate fertilizer factory. *Mutation Research* 393: 283-288.

Mihashi,M. and Tsutsui,T.(1996). Clastogenic activity of sodium fluoride to rat vertebral body-derived cells in culture. *Mutation Research* 368: 7-13.

Moolenburgh H. (1987). Fluoride: The Freedom Fight. Mainstream Publishing, Edinburgh.

Morgan L, et al. (1998). Investigation of the possible associations between fluorosis, fluoride exposure, and childhood behavior problems. *Pediatric Dentistry* 20: 244-252.

Mullenix P, et al. (1995). Neurotoxicity of sodium fluoride in rats. *Neurotoxicology and Teratology* 17: 169-177.

Narayana MV, et al. (1994). Reversible effects of sodium fluoride ingestion on spermatozoa of the rat. *International Journal of Fertility and Menopausal Studies* 39: 337-46.

Narayana MV, Chinoy NJ. (1994). Effect of fluoride on rat testicular steroidogenesis. *Fluoride* 27: 7-12.

National Research Council. (1993). Health Effects of Ingested Fluoride. National Academy Press, Washington DC.

National Sanitation Foundation International (NSF). (2000) Letter from Stan Hazan, General Manager, NSF Drinking Water Additives Certification Program, to Ken Calvert, Chairman, Subcommittee on Energy and the Environment, Committee on Science, US House of Representatives. July 7. http://www.keepersofthewell.org /product_pdfs/NSF_response.pdf

National Toxicology Program [NTP] (1990). Toxicology and Carcinogenesis Studies of Sodium Fluoride in F344/N Rats and B6C3f1 Mice. Technical report Series No. 393. NIH Publ. No 91-2848. National Institute of Environmental Health Sciences, Research Triangle Park, N.C. The results of this study are summarized in the Department of Health and Human Services report (DHHS,1991) op cit.

O'Duffy JD, et al. (1986). Mechanism of acute lower extremity pain syndrome in fluoride-treated osteoporotic patients. *American Journal of Medicine* 80: 561-6.

Olsson B. (1979). Dental findings in high-fluoride areas in Ethiopia. *Community Dentistry and Oral Epidemiology* 7: 51-6.

Orcel P, et al. (1990). Stress fractures of the lower limbs in osteoporotic patients treated with fluoride. *Journal of Bone and Mineral Research* 5(Suppl 1): S191-4.

Paul V, et al. (1998). Effects of sodium fluoride on locomotor behavior and a few biochemical parameters in rats. *Environmental Toxicology and Pharmacology* 6: 187–191.

Pinkham, JR, ed. (1999). Pediatric Dentistry Infancy Through Adolescence. 3rd Edition. WB Saunders Co, Philadelphia.

Public Health Service (PHS). (1993). Toward improving the oral health of Americans: an overview of oral health status, resources, and care delivery. *Public Health Reports* 108: 657-72.

Retief DH, et al. (1979). Relationships among fluoride concentration in enamel, degree of fluorosis and caries incidence in a community residing in a high fluoride area. *Journal of Oral Pathology* 8: 224-36.

Riggs BL, et al. (1990). Effect of Fluoride treatment on the Fracture Rates in Postmenopausal Women with Osteoporosis. *New England Journal of Medicine* 322: 802-809.

Rozier RG. (1999). The prevalence and severity of enamel fluorosis in North American children. *Journal of Public Health Dentistry* 59: 239-46.

Schnitzler CM, et al. (1990). Bone fragility of the peripheral skeleton during fluoride therapy for osteoporosis. *Clinical Orthopaedics* (261): 268-75.

Seholle RH. (1984). Preserving the perfect tooth (editorial). *Journal of the American Dental Association* 108: 448.

Seppa L, et al. (2000). Caries trends 1992-98 in two low-fluoride Finnish towns formerly with and without fluoride. *Caries Research* 34: 462-8.

Shao Q, et al. (2000). [Influence of free radical inducer on the level of oxidative stress in brain of rats with fluorosis]. *Zhonghua Yu Fang Yi Xue Za Zhi* 34(6):330-2.

Shashi A. (2003). Histopathological investigation of fluoride-induced neurotoxicity in rabbits. *Fluoride* 36: 95-105.

Shea JJ, et al. (1967). Allergy to fluoride. *Annals of Allergy* 25:388-91.

Sheth FJ, et al. (1994). Sister chromatid exchanges: A study in fluorotic individuals of North Gujurat. *Fluoride* 27: 215-219.

Shiboski CH, et al. (2003). The association of early childhood caries and race/ethnicity among California

preschool children. *Journal of Public Health Dentistry* 63:38-46.

Shivarajashankara YM , et al. (2002). Brain lipid peroxidation and antioxidant systems of young rats in chronic fluoride intoxication. *Fluoride* 35: 197-203.

Shivarajashankara YM , et al. (2002). Histological changes in the brain of young fluoride-intoxicated rats. *Fluoride* 35: 12-21.

Singh A, Jolly SS. (1970). Fluorides and Human Health. World Health Organization. pp 239-240.

Singh A, et al. (1963). Endemic fluorosis: epidemiological, clinical and biochemical study of chronic fluoride intoxication in Punjab. *Medicine* 42: 229-246.

Sprando RL, et al. (1998). Testing the potential of sodium fluoride to affect spermatogenesis: a morphometric study. *Food and Chemical Toxicology* 36: 1117-24.

Sprando RL, et al. (1997). Testing the potential of sodium fluoride to affect spermatogenesis in the rat. *Food and Chemical Toxicology* 35: 881-90.

Sprando RL, et al. (1996). Effect of intratesticular injection of sodium fluoride on spermatogenesis. *Food and Chemical Toxicology* 34: 377-84.

Stannard JG, et al. (1991). Fluoride Levels and Fluoride Contamination of Fruit Juices. *Journal of Clinical Pediatric Dentistry* 16: 38-40.

Stecher P, et al. (1960). The Merck Index of Chemicals and Drugs. Merck & Co., Inc, Rathway NJ. p. 952.

Steelink C. (1992). Fluoridation controversy. *Chemical & Engineering News* (Letter). July 27: 2-3.

Strunecka A, Patocka J. (1999). Pharmacological and toxicological effects of aluminofluoride complexes. *Fluoride* 32: 230-242.

Sun ZR, et al. (2000). Effects of high fluoride drinking water on the cerebral functions of mice. *Chinese Journal of Epidemiology* 19: 262-263.

Susheela AK. (1993). Prevalence of endemic fluorosis with gastrointestinal manifestations in people living in some North-Indian villages. *Fluoride* 26: 97-104.

Susheela AK, Kumar A. (1991). A study of the effect of high concentrations of fluoride on the reproductive organs of male rabbits, using light and scanning electron microscopy. *Journal of Reproductive Fertility* 92: 353-60.

Sutton P. (1996). The Greatest Fraud: Fluoridation. Lorne, Australia: Kurunda Pty, Ltd.

Sutton P. (1960) Fluoridation: Errors and Omissions in Experimental Trials. Melbourne University Press. Second Edition.

Sutton, P. (1959). Fluoridation: Errors and Omissions in Experimental Trials. Melbourne University Press. First Edition.

Teotia M, et al. (1998). Endemic chronic fluoride toxicity and dietary calcium deficiency interaction syndromes of metabolic bone disease and deformities in India: year 2000. *Indian Journal of Pediatrics* 65: 371-81.

Teotia SPS, Teotia M. (1994). Dental caries: a disorder of high fluoride and low dietary calcium interactions (30

years of personal research). *Fluoride* 27: 59-66.

Teotia SPS, et al. (1976). Symposium on the non-skeletal phase of chronic fluorosis: The Joints. *Fluoride* 9: 19-24.

Tsutsui T, Suzuki N, Ohmori M, Maizumi H. (1984). Cytotoxicity, chromosome aberrations and unscheduled DNA synthesis in cultured human diploid fibroblasts induced by sodium fluoride. *Mutation Research* 139:193-8.

Waldbott GL, et al. (1978). Fluoridation: The Great Dilemma. Coronado Press, Inc., Lawrence, Kansas.

Waldbott GL. (1965). A Battle with Titans. Carlton Press, NY.

Wang C, et al. (2000). Treatment Chemicals contribute to Arsenic Levels. *Opflow* (a journal of the American Water Works Association). October 2000.

Wang Y, et al. (1997). [Changes of coenzyme Q content in brain tissues of rats with fluorosis]. *Zhonghua Yu Fang Yi Xue Za Zhi* 31: 330-3.

WHO (Online). WHO Oral Health Country/Area Profile Programme. Department of Noncommunicable Diseases Surveillance/Oral Health. WHO Collaborating Centre, Malmö University, Sweden. http://www.whocollab. od.mah.se/euro.html

Williams JE, et al. (1990). Community water fluoride levels, preschool dietary patterns, and the occurrence of fluoride enamel opacities. *Journal of Public Health Dentistry* 50: 276-81.

Wu DQ, Wu Y. (1995). Micronucleus and sister chromatid exchange frequency in endemic fluorosis. *Fluoride* 28: 125-127.

Xiang Q, et al. (2003a). Effect of fluoride in drinking water on children's intelligence. *Fluoride* 36: 84-94.

Xiang Q. (2003b). Blood lead of children in Wamiao-Xinhuai intelligence study. *Fluoride* 36: 138.

Zakrzewska H, et al. (2002). In vitro influence of sodium fluoride on ram semen quality and enzyme activities. *Fluoride* 35: 153-160.

Zhai JX, et al. (2003). [Studies on fluoride concentration and cholinesterase activity in rat hippocampus]. *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi* 21: 102-4.

Zhang Z, et al. (2001). [Effects of selenium on the damage of learning-memory ability of mice induced by fluoride]. *Wei Sheng Yan Jiu* 30: 144-6.

Zhang Z, et al. (1999). [Effect of fluoride exposure on synaptic structure of brain areas related to learning-memory in mice] [Article in Chinese]. *Wei Sheng Yan Jiu* 28:210-2.

Zhao XL, Wu JH. (1998). Actions of sodium fluoride on acetylcholinesterase activities in rats. *Biomedical and Environmental Sciences* 11: 1-6.

Zhao LB, et al (1996). Effect of high-fluoride water supply on children's intelligence. *Fluoride* 29: 190-192.

Zhao ZL, et al. (1995). The influence of fluoride on the content of testosterone and cholesterol in rat. *Fluoride* 28: 128-130.

Ziegelbecker R. (1970). A critical review on the fluorine caries problem. *Fluoride* 3: 71-79.

The 19 studies on the possible association of hip fracture and fluoridated-water.

a) Studies Reporting an Association between fluoridated water (1 ppm fluoride) & hip fracture.

1 a) Cooper C, et al. (1990). Water fluoride concentration and fracture of the proximal femur. *Journal of Epidemiology and Community Health* 44: 17-19.

1 b) Cooper C, et al. (1991). Water fluoridation and hip fracture. *JAMA* 266: 513-514 (letter, a reanalysis of data presented in 1990 paper).

2) Danielson C, et al. (1992). Hip fractures and fluoridation in Utah's elderly population. *Journal of the American Medical Association* 268: 746-748.

3) Hegmann KT, et al. (2000). The Effects of Fluoridation on Degenerative Joint Disease (DJD) and Hip Fractures. Abstract #71, of the 33rd Annual Meeting of the Society For Epidemiological research, June 15-17, 2000. Published in a Supplement of *American Journal of Epidemiology* P. S18.

4) Jacobsen SJ, et al. (1992). The association between water fluoridation and hip fracture among white women and men aged 65 years and older; a national ecologic study." Annals of Epidemiology 2: 617-626.

5) Jacobsen SJ, et al. (1990). Regional variation in the incidence of hip fracture: US white women aged 65 years and olders. *JAMA* 264(4): 500-2.

6 a) Jacqmin-Gadda H, et al. (1995). Fluorine concentration in drinking water and fractures in the elderly. *JAMA* 273: 775-776 (letter).

6 b) Jacqmin-Gadda H, et al. (1998). Risk factors for fractures in the elderly. Epidemiology 9(4): 417-423. (An elaboration of the 1995 study referred to in the JAMA letter).

7) Keller C. (1991) Fluorides in drinking water. Unpublished results. Discussed in Gordon, S.L. and Corbin, S.B,(1992) Summary of Workshop on Drinking Water Fluoride Influence on Hip Fracture on Bone Health. *Osteoporosis International* 2: 109-117.

8) Kurttio PN, et al. (1999). Exposure to natural fluoride in well water and hip fracture: A cohort analysis in Finland. *American Journal of Epidemiology* 150(8): 817-824.

9) May DS, Wilson MG. (1992). Hip fractures in relation to water fluoridation: an ecologic analysis. Unpublished data, discussed in Gordon SL, and Corbin SB. (1992). Summary of Workshop on Drinking Water Fluoride Influence on Hip Fracture on Bone Health. *Osteoporosis International* 2:109-117.

b) Studies reporting an association between water-fluoride levels higher than fluoridated water (4 ppm+) & hip fracture.

Li Y, et al. (2001). Effect of long-term exposure to fluoride in drinking water on risks of bone fractures. *Journal of Bone and Mineral Research* 16: 932-9.

Sowers M, et al. (1991). A prospective study of bone mineral content and fracture in communities with differential fluoride exposure. *American Journal of Epidemiology* 133: 649-660.

c) Studies Reporting No Association between water fluoride & hip fracture:

(Note that in 4 of these 8 studies, an association was actually found between fluoride and some form of fracture – e.g. wrist and hip. See notes and quotes below.)

Cauley J. et al. (1995). Effects of fluoridated drinking water on bone mass and fractures: the study of osteoporotic fractures. *Journal of Bone and Mineral Research* 10: 1076-86.

Feskanich D, et al. (1998). Use of toenail fluoride levels as an indicator for the risk of hip and forearm fractures in women. *Epidemiology* 9: 412-6.

> While this study didn't find an association between water fluoride and hip fracture, it did find an association - albeit non-significant 1.6 (0.8-3.1) - between fluoride exposure and elevated rates of forearm fracture.

Hillier S, et al. (2000). Fluoride in drinking water and risk of hip fracture in the UK: a case control study. *The Lancet* 335: 265-2690.

Jacobsen SJ, et al. (1993). Hip Fracture Incidence Before and After the Fluoridation of the Public Water Supply, Rochester, Minnesota. *American Journal of Public Health* 83: 743-745.

Karagas MR, et al. (1996). Patterns of Fracture among the United States Elderly: Geographic and Fluoride Effects. *Annals of Epidemiology* 6: 209-216.

> As with Feskanich (1998) this study didn't find an association between fluoridation & hip fracture, but it did find an association between fluoridation and distal forearm fracture, as well as proximal humerus fracture. "Independent of geographic effects, men in fluoridated areas had modestly higher rates of fractures of the distal forearm and proximal humerus than did men in nonfluoridated areas."

Lehmann R, et al. (1998). Drinking Water Fluoridation: Bone Mineral Density and Hip Fracture Incidence. *Bone* 22: 273-278.

Phipps KR, et al. (2000). Community water fluoridation, bone mineral density and fractures: prospective study of effects in older women. *British Medical Journal* 321: 860-4.

> As with Feskanich (1998) and Karagas (1996), this study didn't find an association between water fluoride & hip fracture, but it did find an association between water fluoride and other types of fracture - in this case, wrist fracture. "There was a non-significant trend toward an increased risk of wrist fracture."

Suarez-Almazor M, et al. (1993). The fluoridation of drinking water and hip fracture hospitalization rates in two Canadian communities. *American Journal of Public Health* 83: 689-693.

> While the authors of this study conclude there is no association between fluoridation and hip fracture, their own data reveals a statistically significant increase in hip fracture for men living in the fluoridated area. According to the authors, "although a statistically significant increase in the risk of hip fracture was observed among Edmonton men, this increase was relatively small (RR=1.12)."