FLUORIDE ACTION NETWORK

http://fluoridealert.org/

May 28, 2008

A critique of CDC's William Bailey's comments to the Fairbanks, Alaska, City Council, on March 6, 2008

INTRODUCTION: This is Part 1 of a 3-part critique of the testimony given by Dr. William Bailey, of the Centers for Disease Control and Prevention (CDC), to the City Council of Fairbanks, Alaska, on March 6, 2008. After citizens in Juneau, Alaska, overwhelmingly voted to stop fluoridation in October 2007, citizens raised the issue in Fairbanks, Alaska. Four days after hearing from Dr. Bailey, the Fairbanks City Council voted 3 to 2 to continue their fluoridation program. Dr. Bailey's full title is William Bailey, DDS, MPH, Dental Officer for the Oral Health Division's Program Service Team, CDC.

Because the authority of the CDC is so influential around the world, the Fluoride Action Network has gone to some length to critique Dr. Bailey's information and arguments. If ever a situation demanded the admonition "Question Authority," this is it.

A local Fairbanks citizen, Peggy DeSpain, kindly forwarded to FAN an audiotape of Dr. Bailey's telephone presentation. We thank her and also the City Council of Fairbanks for allowing Dr. Bailey's testimony to be shared with the public.

This critique has been forwarded to Dr. Bailey for his response, which FAN will make available when it occurs.

The responders:

Carole Clinch, BA, BPHE, lives in Waterloo, Ontario, Canada. She is a former hypothyroid patient. By eliminating fluoride sources as much as possible and by using iodine supplementation, she was able to eliminate the need for thyroid hormone supplementation. Her hypothyroid symptoms have disappeared and her laboratory results are now in "optimal" range. Fluoride is an "endocrine disruptor" (NRC 2006 p 266)

Paul Connett, PhD, Emeritus Professor of Chemistry, St. Lawrence University, Canton, NY. Executive Director of the American Environmental Health Studies Project (Fluoride Action Network is a project of AEHSP).

Carol Kopf, BS, MA, volunteers for both the New York State Coalition Opposed to Fluoridation, Inc. and the Fluoride Action Network. She spearheaded a campaign, which stopped fluoridation in her hometown in 1983 after she extensively queried government, health and dental officials for the valid science showing fluoridation is safe and effective for all. She's still waiting.

Hardy Limeback, DDS, PHD, Associate Professor and Head of Preventive Dentistry at the University of Toronto. Committee member and co-author of the 2006 report Fluoride in drinking water: a scientific review of EPA's standards, published by the National Research Council of the National Academies. Former President of the Canadian Association of Dental Research.

Chris Neurath, Director of Research, American Environmental Health Studies Project and the Fluoride Action Network.

Bill Osmunson, DDS, MPH, Director, the Institute for Comprehensive Dental Studies. Dental practitioner and educator for 30 years with active practices in Bellevue, WA and Lake Oswego, OR. Host of the Cable TV Series, "The Doctor's Corner," Portland, OR.

Bruce Spittle, MB ChB DPM (Otago), FRANZCP, worked as a Senior Lecturer, Department of Psychological Medicine, Dunedin School of Medicine, New Zealand 1978-2004. He is the author of Fluoride Fatigue. Fluoride Poisoning: is fluoride from your drinking water--and from other sources-- making you sick? Revised 3rd printing. Dunedin, New Zealand: Paua Press; 2008. It is available from him at spittle@es.co.nz for US$9.99 including postage.

DR. WILLIAM BAILEY (CDC): This is your meeting so I won't presume… what I am here for. . CDC doesn't normally get involved with local decisions. I am here to help you make the decision not to try to influence your decision. When there are fluoridation campaigns going on across the country we don't get involved. When state legislatures ask us to come in and testify on the science we will do that. So that's my role from CDC – I am here to assist you - help you make your decision.

As far as CDC goes – the CDC as an agency – one of our main roles is to prevent disease and promote healthy behavior and that's why we promote community water fluoridation, as it is one of the two interventions for communities that was recommended by the community guide. The other was community based sealant programs. So those two interventions are what the community guide recommend as the two most effective programs for preventing tooth decay. So the CDC believes that community water fluoridation is safe, healthy and effective and we promote it and that is our role.

> **PAUL CONNETT:** The key operative word in this paragraph is "believes." It is clear that Dr. Bailey and the Oral Health Division (OHD) of the CDC "believes" that "community water fluoridation is safe, healthy and effective." The trouble is that, as Dr. Bailey's testimony and our critique below amply illustrates, neither he, nor the OHD nor the CDC parent agency, can establish this scientifically. The OHD is CDC's division in charge of the fluoridation of drinking water in America. The public needs clarification on its role: is it there simply to promote and defend fluoridation, or is it also charged with protection of the public health? (We need clarification from Dr. Bailey on this.) Unfortunately, the OHD's promotional activities, and lack of scientists with the appropriate qualifications to make judgments on safety, get in the way of its being able to make an objective and comprehensive assessment of the risks involved. The CDC appears to exercise no independent scientific judgment over pronouncements made by the OHD and staff members like Dr. Bailey. Thus it is being left largely to people without qualifications in biochemistry, toxicology, medicine or health risk assessment to defend and promote this practice.

DR. WILLIAM BAILEY (CDC): I assume you will have questions on different areas.

Community water fluoridation started in 1945 and so it has been around for more than 60 years. Sometimes people will ask us to do some science on community water fluoridation - well there has been 60 years of science. In fact the science began on the natural levels of fluoride in the water before they ever implemented community water fluoridation. They didn't just say let's adjust the water to this level. They did lots of interventions and investigations on water systems with naturally occurring fluoride in the water.

PAUL CONNETT: The one thing that we have not had on fluoridation is 60 years of science – the very opposite. What we have had for over 60 years is politics overwhelming the science. This began most noticeably in 1950 when the US Public Health Service (PHS) endorsed fluoridation without a single fluoridation trial completed and without any significant health studies conducted. The only extensive investigation on adverse effects in the period leading up to the first trials in the 1940s was fluoride's action on the teeth – one single tissue in the body. Even when adverse effects were observed in the Newburgh-Kingston trial (1945-55), such as earlier menstruation in young girls and cortical bone defects in boys, they were ignored (Schlesinger et al., 1956). The gamble taken in 1950 by the US PHS was that ingested fluoride could have a systemic effect on the growing tooth (dental fluorosis) without having an impact on any other developing tissue. Neither the US nor any other fluoridating country has gone out of its way to check to see if this is the case. The most basic health studies of fluoridated populations simply have not been done. We will discuss this further below.

DR. WILLIAM BAILEY (CDC): That's something we should say too, fluoride is a naturally occurring substance. It is the 13th most abundant element on the earth. There is fluoride in almost all water supplies. The oceans of the earth have fluoride in them at, or levels greater than, the levels we fluoridate our water.

PAUL CONNETT: The fact that fluoride is naturally occurring does not make it safe. Arsenic also occurs naturally in some water supplies, but that doesn't make it safe to drink. The levels of fluoride in surface waters and the sea is not as relevant as the level of fluoride in mothers milk: baby's first meal. This is incredibly low – 0.004 ppm (NRC, 2006, p; 33, 36) which means a bottle fed baby in a fluoridated area (at 1 ppm) will get some 250 times more fluoride than a breast fed baby. If ingested fluoride has any significant benefit for the baby then it simply means that nature is wrong on baby's first meal – a highly unlikely proposition.

CAROLE CLINCH: The CDC is well aware that manufacturers do not supply a naturally occurring fluoride compound to the water companies. They provide hydrofluorosilicic acid. This is an artificial "anthropogenic" fluoride additive not a "natural" fluoride compound like calcium fluoride. Moreover, the industrial produced hydrofluorosilicic acid contains trace amounts of arsenic, lead, and other contaminants.

Increased lead levels in drinking water and blood levels are partially due to fluorosiliciates added to drinking water:

Direct additive: Lead is the second most common contaminant found in the silicofluoride products.

Indirect additive: Lead is now known to leach from lead pipes, lead solder and leaded brass because of the chemical action of fluorosilicates. (See Maas 2007)

For example, Tacoma Washington had to shut down the fluoridation equipment because HFSA had dissolved the pipes. The municipal water had 32 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. After discontinuing use of HFSA, lead level continued to drop, and today it is about 5 ppb. (IAOMT Position Paper on Water Fluoridation p24-25)

DR. WILLIAM BAILEY (CDC): Now the amount that people put in their water is dependent on their climate, so the colder you are the more you put in because it's based on the theory that people drink less in the colder areas. If you are outside in a warm climate like Southern Florida

we put 0.7 ppm – or mg per liter – in the water. If you are up around Fairbanks (Alaska) we put 1 to 1.2 ppm in the water. The amount that we adjust the fluoride to which is optimum for oral health depends on the climate.

> **PAUL CONNETT:** This commentary underlines one of the most unscientific aspects of fluoridation. Simply because you can control how much fluoride goes into the water does not mean you can control how much fluoride people get. When exposed to a toxic substance like fluoride, what hurts you is the dose measured in milligrams per day, which depends on how much water you drink (and how much fluoride you get from other sources).
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> Illustration: someone drinking 1 liter of water per day at 0.7 ppm would get a dose of 0.7 mg/day; someone drinking one liter of water at 1.2 ppm would get a dose of 1.2 mg/day. That is a difference of 0.5 mg/day. Compare that difference with the case of two people drinking different quantities of water.
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> Illustration: compare one person drinking 1 liter of water per day at 1 ppm (dose = 1 mg/day) and someone drinking 4 liters of water at 1 ppm (dose = 4 mg/day). That would be a difference of 3 mg per day. In other words the variation in dose based on how much water people drink far outweighs the difference in the small adjustment of concentration to take into account climate. The preoccupation with relating concentrations used to climate is a simplistic way of implying that operators have control over dose when they do not!
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> Even more importantly, especially when we are considering infants and children, is the "dosage" measured in mg/kg bodyweight/day which is the critical measure. This calculation corrects for bodyweight, by dividing mg/day by the bodyweight of the person concerned or the average bodyweight for the age range considered. Thus if an adult were to get 4 mg/day the relevant index for toxicological purposes would be 4 divided by 70 kg bodyweight or 0.057 mg/kg/day (you could think of this as a measure of tissue concentration). Compare this "dosage" with a 7 kg infant receiving 4 mg/day. The infant would get 0.57 mg/kg/day – or an effective "tissue concentration" 10 times higher than the adult.
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> Most people instinctively understand this bodyweight adjustment when they recognize that a safe dose of a drug like aspirin for a 70 kg adult would not be safe for a 7 kg infant.
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> Simply put, being unable to control the dose in mg/day or dosage in mg/kg/day makes fluoridation a very bad medicinal practice. According to Dr. Arvid Carlsson (he received the Nobel in 2000, and made the following comments in 1978):
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> > "... Water fluoridation also 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. Not only in that the dose cannot be adapted to individual requirements. It is, in addition, based on a completely irrelevant factor, namely consumption of drinking water, which varies greatly between individuals and is, moreover, very poorly surveyed."
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> **CAROLE CLINCH:** According to the US National Research Council report on Fluoride in Drinking Water (NRC, 2006) high water consumers (athletes, lactating mothers, soldiers, outdoor workers in hot climates, diabetic patients) consume up to 12 liters of water per day.

Any discussion of fluoride in drinking water must also acknowledge the global increase of fluoride exposure from other sources. Fluorides are present in the air, water, foods (pesticides, fertilizers and post-harvest fumigants contribute to the fluoride content in our food chain), consumer products and drugs. Increased uses of fluoridated drinking water in the processing of foods and beverages has a certain multiplier effect in the food chain, as discussed in the report prepared for the Quebec Minister of the Environment in 1979 and the book "La fluoration: autopsie d'une erreur scientifique" by Morin et al. 2005 and other sources.

DR. WILLIAM BAILEY (CDC): As far as why CDC believes that community water fluoridation is a good thing, we base our science on the weight of the evidence. So we base our science on the 60 years of research but also – and possibly even more importantly – the reviews which are done by expert committees and the systematic reviews which are done. You know initially there were only individual studies but after so long you get enough studies that you can do systematic reviews and you can look at the weight of the evidence and the quality of the evidence. There are a number of systematic reviews that are done all the time. The last one came out in the Fall of 2007 from Australia by the National Health and Medical Research Council. These are happening very often throughout the world - systematic reviews on fluoride. So that's where we take our belief in why fluoridation is safe and effective. It is from the expert committees and the systematic reviews.

PAUL CONNETT: Again notice the use of the word "believe." One of the disturbing aspects about this paragraph is that the reviews on which the CDC largely relies for the safety of the fluoridation program were not carried out by the CDC themselves. Dr. Bailey cites the review by NHMRC, 2007 here, but later he cites others: the York Review (2000), Irish Fluoridation Forum (2002), and NRC (2006). Later, he also cites the report by the Agency for Toxic Substances and Disease Registry (ATSDR, 2003). ATSDR is part of the Public Health Service and does reports on fluoride in connection with the superfund program. While these ATSDR reports contain some useful material, especially the 1993 edition, they do not focus on water fluoridation per se, and they are only updated every 10 years (by outside contractors). Thus they are far too infrequent to be useful in monitoring the safety of the water fluoridation program. In my view, the CDC should be on top of every study published in every country within weeks of publication. For example, last year alone there were three papers from China, India, and Mexico (Wang SX et al., Trevedi et al. and Rocha-Amador et al.) which reported a lowering of IQ in children drinking fluoride in water (admittedly at higher levels than 1 ppm), but Dr. Bailey never mentions this. Nor did the NHMRC (2007) report.

Bearing in mind the obvious conflict of interest that the Oral Health Division (OHD) has in this matter - a preoccupation with the benefits of fluoridation - it is surprising that the CDC has not established another division or group within the CDC to oversee the literature on health risks. Even if there was no conflict with the OHD in this matter the current personnel lack the appropriate scientific qualifications to track the literature on safety. Most of the staff has dental degrees. The highest qualified people are two individuals with a PhD and one is an economist (See Appendix 1 on page 50 for a list of OHD's staff).

The problem of lack of independent oversight of the OHD's pronouncements and lack of appropriate expertise within the OHD itself became apparent when the OHD claimed within six days of the publication of the NRC (2006) report that the findings of this prestigious panel were consistent with their promotion of fluoridation at 1 ppm. Here are three excerpts from what the OHD placed on its web page on March 28, 2006. This remains their position as of May 26, 2008:

> A recent report, Fluoride in Drinking Water: A Scientific Review of EPA's Standards from the National Research Council (NRC), released on March 22, 2006, addresses safe maximum fluoride levels. The report addresses the safety of high levels of fluoride in water that occur naturally, and does not question the use of lower levels of fluoride to prevent tooth decay...
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> The National Research Council (NRC) Committee found that the current EPA maximum contaminant level goal (MCLG) of 4 milligrams of fluoride per Liter (mg/L) of drinking water should be lowered to better protect people from health risks associated with high natural fluoride levels. The report recommended that the EPA update its risk assessment in order to determine the appropriate level for the MCLG...
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> The findings of the NRC report are consistent with CDC's assessment that water is safe and healthy at the levels used for water fluoridation (0.7–1.2 mg/L). (CDC, 2006)

I cannot believe that well qualified toxicologists and other specialists at the CDC (outside the OHD) would have made such a rash statement. Moreover, six days was an inadequate time even for qualified staff to have studied this 507-page report and its over 1000 references, let alone perform a new health risk assessment to see what a new "safe" MCLG would be. Nor have they produced a written analysis to support their dubious claims.

As far as the 2007 review by the Australian National Health and Medical Research Council (NHMRC) is concerned, this was far from a comprehensive review. Most important health concerns were completely ignored. Like the CDC this Australian panel dismissed the NRC findings as not being relevant for communities drinking water at 1 ppm. The contents of the NRC's 507-page, three and half year review, were handled in the following two sentences (also quoted by Dr. Spittle below):

> "The reader is also referred to recent comprehensive reports regarding water fluoridation published by the World Health Organization (WHO, 2006) and the National Research Council of the National Academies (NAS, 2006). The NAS report refers to the adverse health effects from fluoride at 2-4 mg/L, the reader is alerted to the fact that fluoridation of Australia's drinking water occurs in the range of 0.6 to 1.1 mg/L"

This cavalier dismissal of the NRC's work certainly shortened the time this Australian panel devoted to this topic but their doing so can hardly be considered scientific or responsible.

DR. WILLIAM BAILEY (CDC): Now sometimes people will point to just one study or another and say this study found this and that's true. They may find something about anything- but if its good science then that study should be able to be replicated- if someone follows the same methodology they should find the same thing and that's why we look to the weight of the evidence.

PAUL CONNETT: If Dr. Bailey or the CDC was serious about "good science" and the "weight of evidence" why have they not examined in any detail the issue of fluoride's impact on the brain. There have now been over 40 animal studies that indicate that fluoride can damage the brain and 18 (out of 20) studies that indicate that fluoride lowers the IQ in children. That's not "just one study;" the lowering of IQ has been replicated 18 times in four different countries. (NOTE: FAN paid for the translation of nine of the eighteen IQ studies from China. They are cited in the References in Part 3

under IQ Studies. Forty-two animal studies are listed under Brain Studies in the References. FAN paid for the translation of seven of these 42 studies.)

In my view, in the context of protecting public health, the true meaning of the words "weight of evidence" is that regulatory agencies consider and balance every line of evidence that may give clues as to possible dangers. This means including human epidemiological studies, clinical trials, animal studies, biochemical studies and model calculations. The NRC (2006) did this: the other reviews cited by Dr. Bailey did not. Why limit what you look at when your mission is protecting the public?

DR. WILLIAM BAILEY (CDC): Of all the expert committees and all the systematic reviews that have been done, they have all said that water fluoridation is safe and effective and healthy. So that's the basis of our decision to promote it.

PAUL CONNETT: This is incorrect. The NRC (2006) did not say this. The NRC (2006) report found that the Maximum Contaminant Level Goal of 4 ppm was not protective of human health (also see National Academies 2006 press release). The report recommended that US EPA's Office of Drinking Water perform a risk assessment to determine a MCLG that is protective. Specifically, the report found that the MCLG is not protective for the following three effects:

1. Clinical Stage 2 skeletal fluorosis: "associated with chronic joint pain, arthritic symptoms, calcification of ligaments, and osteosclerosis of cancellous bones ... the committee judges that stage II is more appropriately characterized as the first stage at which the condition is adverse to health. Thus, this stage of the affliction should also be considered in evaluating any proposed changes in drinking-water standards for fluoride." (Pages 170-171)

NOTE: Up until this report, EPA's Office of Drinking Water listed only one adverse effect, crippling skeletal fluorosis (Stage 3), and the MCLG at 4 ppm was to reflect this. The change from Stage 3 to Stage 2 is a significant and correct change.

2. Bone fractures: "... the majority of the committee concluded that the MCLG is not likely to be protective against bone fractures." (Page 3)

3. Severe Dental Fluorosis: "After reviewing the collective evidence, including studies conducted since the early 1990s, the committee concluded unanimously that the present MCLG of 4 mg/L for fluoride should be lowered. Exposure at the MCLG clearly puts children at risk of developing severe enamel fluorosis..." (Page 2)

In addition to these definitive findings, there were many other health concerns reviewed, some of which are discussed by Dr. Limeback below, and numerous red flags waved. The following is from an article in the January 2008 Scientific American (Fagin, 2008):

"The NRC committee concluded that fluoride can subtly alter endocrine function, especially in the thyroid—the gland that produces hormones regulating growth and metabolism. Although researchers do not know how fluoride consumption can influence the thyroid, the effects appear to be strongly influenced by diet and genetics. Says John Doull, professor emeritus of pharmacology and toxicology at the University of Kansas Medical Center, who chaired the NRC committee: 'The thyroid changes do worry me. There are some things there that need to be explored'…

> "What the committee found is that we've gone with the status quo regarding fluoride for many years—for too long, really—and now we need to take a fresh look," Doull says. "In the scientific community, people tend to think this is settled. I mean, when the U.S. surgeon general comes out and says this is one of the 10 greatest achievements of the 20th century, that's a hard hurdle to get over. But when we looked at the studies that have been done, we found that many of these questions are unsettled and we have much less information than we should, considering how long this [fluoridation] has been going on. I think that's why fluoridation is still being challenged so many years after it began. In the face of ignorance, controversy is rampant."

Also, the York Review (McDonagh et al., 2000) did not say this. In fact this is what two of the advisory members of the York Review said about the issue in a recent article in the British Medical Journal:

> "Water fluoridation has not been proved to reduce tooth decay" and "No drug would be licensed for effectiveness or safety on the present evidence." (Cheng et al., 2007)

These York advisors also expressed their concern about the poor quality evidence supporting water fluoridation and the misinterpretations of this evidence by the UK government:

> "Department of Health's objectivity is questionable—it funded the British Fluoridation Society and, along with many other supporters of fluoridation, it used the York review's findings selectively to give an overoptimistic assessment of the evidence in favour of fluoridation." (Cheng et al., 2007)

For many of the other reviews cited by Dr. Bailey, it comes as little surprise that a number of these reviews support fluoridation because they have been commissioned by governments (Australia and Ireland for example) avidly supporting and promoting fluoridation.

By and large these reports are only as good as the panels that are appointed to review the subject. This was particularly true of the "Fluoridation Forum" which was commissioned by the Irish government.

Ireland has had mandatory fluoridation since 1963. The panel that reviewed the practice consisted largely of government employees and pro-fluoridation dental researchers. Their findings were a self-fulfilling prophecy.

Out of a 300-page report, the Irish Fluoridation Forum devoted only 17 pages to health effects. Of these 17 pages only 2 dealt with original studies. They even managed to ignore a key study on bone I had presented to them in my personal testimony!

In contrast to the Irish review, the NRC (2006) was a very thorough piece of work. The NRC (2006) panel was one of the first truly balanced ever selected to look at fluoride's toxicity. It took the panel three and half years to summarize the literature and reach their conclusions. The fact that the review has either been downplayed, dismissed or ignored in fluoridating countries speaks volumes. More about other reviews later.

FAIRBANKS COUNCILOR: "Sir, you said that in Fairbanks we do 1 to 1.2 ppm. Could you clarify that? I thought it was more than that."

DR. WILLIAM BAILEY (CDC): No, I think that should be about the amount but of course your local water authority would be the best source of what they put in but based on what we recommend. And realize that water fluoridation is not a national program at all as you know. It's your decision. But the safety of water is an EPA function. So the EPA looks at the maximum level contaminant goals and secondary maximum contaminant level goals and so on. They set some of those and those are regulatory in nature. If you exceed those you have to notify the public.

FAIRBANKS COUNCILOR: "The fact that we have 5 ppm naturally occurring, how does that dovetail?"

DR. WILLIAM BAILEY (CDC): I think you have 0.5 ppm.

FAIRBANKS COUNCILOR: "Oh I see. So it's 0.5 ppm. OK I got it now."

DR. WILLIAM BAILEY (CDC): You should be fluoridating about double that amount at about 1ppm.

FAIRBANKS COUNCILOR: "I have a question. What is the overall value (total dose, PC)? I mean 60 years ago…when did toothpaste with fluoride come into play?"

DR. WILLIAM BAILEY (CDC): It was approved by the American Dental Association - the seal of approval in 1964. With fluoride. By about 1980 about 90% of the population were using fluoridated toothpaste.

FAIRBANKS COUNCILOR: "Sir, how do you account for studies that have shown that in communities – these are 8 countries which have fluoride and others that don't – have tracked tooth decay in these countries and they have come together with a tight range - non-fluoridated and non-fluoridated are seeing approximately the same amount of tooth decay?"

DR. WILLIAM BAILEY (CDC): Well some of those countries – all those studies are based on tooth decay in 12-year olds – they don't look at the whole spectrum of tooth decay. They just look at 12-year olds. And they only look at permanent teeth – you begin your permanent teeth when you are six. Your second molar comes in about the age of 12. That's not a lot of time for children to get cavities. We know for example that fluoride toothpaste does decrease decay but we also know that with community water fluoridation and toothpaste together decreases tooth decay even more.

> **PAUL CONNETT:** It was the authors of the CDC report published in 1999, which purportedly supported the claim that fluoridation was "one of the top ten public health achievements of the Twentieth Century," who choose to use tooth decay in 12 year-olds as their metric. As the councilor pointed out a comparison with other industrialized countries *using the same metric* showed that tooth decay was coming down as fast in non-fluoridated countries as in the US or other fluoridated countries. One can compare these results graphically at http://www.FluorideAlert.org/who-dmft.htm.

DR. WILLIAM BAILEY (CDC): There is always a question whether it is just topical – do you just get the benefit from having the fluoride touch the surface of your tooth or do you get any benefit from ingesting the fluoride, especially as your teeth are developing? We believe that there is both a systemic and a topical effect. There is even – research out of Australia as recently as last year that is still showing a systemic and a topical effect. So fluoride benefits you in two ways: one as your teeth are forming and secondly, getting that topical effect.

> **CAROLE CLINCH:** Dr. Bailey appears to be backtracking from CDC's conclusions about the relative contribution from topical and systemic exposure. In 1999 the CDC stated that:

> "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.

DR. WILLIAM BAILEY (CDC): I should get into a little on how fluoride works. What happens is that your tooth starts getting decay at a very microscopic level and that's called demineralization and that demineralization can be re-mineralized. What happens when you get demineralized is your the tooth starts getting eaten up by the acid in the bacteria in the plague. So it releases phosphorous, and it releases calcium. The fluoride attacks that and grabs the phosphate and the calcium and brings it back cause it is electronegative and brings it back into the tooth surface and re-mineralizes the surface.

FAIRBANKS COUNCILOR: "Is that systemically or is that topical?"

DR. WILLIAM BAILEY (CDC): That's topical. The reason fluoride works so well is that the fluoride is held in the plague. The plague serves as a reservoir which is right against your tooth. If you are drinking water throughout the day it helps replenish that reservoir of fluoride in your plague as opposed to brushing your teeth twice a day then you don't get that replenishment. Systemic fluoride also increases the fluoride in your saliva a bit, but we don't think that that has a great effect on prevention of tooth decay.

> **PAUL CONNETT:** This last sentence: "Systemic fluoride also increases the fluoride in your saliva a bit, but we don't think that that has a great effect on prevention of tooth decay" is astounding.
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> When the CDC admitted in 1999 that the predominant benefits of fluoride were topical not systemic, many critics of this practice believed that that was the beginning of the end of fluoridation. After all if the risks were systemic and the benefits were topical, common sense would suggest that one should minimize the risks and maximize the benefits by brushing fluoridated toothpaste on your teeth and then spitting it out. However promoters have performed somersaults to try to cut their cake and keep it. They argued that you needed to ingest fluoride to build up the fluoride levels in the saliva in order to deliver the topical benefit all day. Now the CDC is saying that the levels in saliva are not enough to have much effect. What mechanism is left which necessitates ingesting fluoride? Above Dr. Bailey argues that fluoride builds up in the plague (and yet we are told to brush our teeth to get rid of the plague; is the plague a good thing or a bad thing?) but how does it build up in the plague? When you swallow fluoridated water it is not long enough in the mouth to touch many of the teeth or build up in the plague.

FAIRBANKS COUNCILOR: " I have another question. You said that you go to professional committees for something I am not familiar with - systematic review - what scientific groups have you gone to that have conducted peer reviewed studies – double blind studies – controlled studies – to evaluate fluoride's safety?"

DR. WILLIAM BAILEY (CDC): The systematic reviews which I am talking about – the National Health and Medical Research Council – the National Research Council in 2006 – the Agency for Toxic Substance and Disease Registry in 2003 – the Forum on Fluoridation in 2002 in Ireland – the University of York in 2000 and so forth. There's been many of these throughout the years.

PAUL CONNETT: This is hardly an impressive list as far as establishing the efficacy and safety of fluoridation is concerned. I have already commented on several of these reports above.

First, as far as systematic reviews by the York team (McDonagh, et al., 2000) and the NHMRC report of 2007 are concerned, only epidemiological studies were considered and for communities drinking water at, or close to, 1 ppm. Neither of these reviews considered clinical trials, animal studies, biochemical studies or model systems. Nor did they consider epidemiological studies not published in English, thus excluding several important studies from Russia and China on endocrine and neurodevelopmental effects. As mentioned above the NHMRC (2007) report brushed off the findings in the NRC (2006) report, in just two sentences, erroneously claiming that the authors only looked at studies at 4 ppm.

But the largest problem with this systematic approach is that it puts a straightjacket on the situation when those countries that artificially fluoridate their water have conducted very few (if any) health studies on communities drinking artificially fluoridated water on any tissue other than the teeth.

In the US and Canada no study has attempted to examine a possible relationship between consumption of fluoridated water and various ailments, including: arthritic symptoms in adults, under-active thyroid, lowered IQ in children, increased bone fractures in children, earlier onset of puberty, Alzheimer's disease in adults, accumulation of fluoride in the pineal gland and lowered melatonin production. Nor has there been any formal investigation of the many anecdotal reports and case studies that some individuals are highly sensitive to fluoride. Dr. Bruce Spittle goes into this issue in more detail below.

Ireland has done NO health studies on fluoride, even though it has had mandatory fluoridation since 1963 and currently 73% of its population is drinking fluoridated water. Thus, I find it extraordinary that Dr. Bailey should cite the Irish Fluoridation Forum report as offering "scientific" support for fluoridation. As I explained above this report was a hatchet job supporting government policy.

Australian health authorities have not undertaken or commissioned any health study of fluoridated communities, apart from one small cancer study. Instead, every few years they get the Australian National Health and Medical Research Council (NHMRC) to produce a review of the literature from other countries (1991, 1999, 2007). This organization faithfully endorses the practice as being "safe and effective" but in the process has ignored many key studies in the literature.

Interestingly, in 1991, the NHMRC recommended that Australian health authorities do two things. 1) Track the levels of fluoride in the bones of the Australian people so that a data base could be developed to support meaningful epidemiological studies on such concerns as arthritis, osteoporosis and bone fractures. This was never done. 2) Investigate the numerous anecdotal reports that some citizens were supersensitive to fluoride, so that this issue could be put on a scientific level. This was never done. Subsequent NHMRC reports have never referred back to this failure of the Australian health authorities to follow up on these important and basic suggestions.

BRUCE SPITTLE: Dr. William Bailey states, on the basis of the Australian National Health and Medical Research Council review and several systemic reviews, that fluoridation is safe. However the 2006 NRC review expressed concerns about safety, particularly with respect to arthritis, neurological development, and thyroid function as well as chronic toxicity symptoms such as those involving gastrointestinal function and skin reactions.

Several recent systematic reviews such as the Australian NHMRC report have reached the conclusion that the practice is safe but did not consider the papers where harm was reported such as those by Dr G Waldbott. When the evidence for harm is not reviewed, no evidence of harm is found.

The publications by Dr Waldbott on fluoride number 142.(1) The University of York systematic review has 294 references in the bibliography but not one is by Dr Waldbott. A reference is included to a paper by me on "Allergy and hypersensitivity to fluoride" in which I referred to seven papers by Waldbott, but the reference to my paper in the systematic review was only to reject it because it did not meet the inclusion criteria.(2,3)

> "Although some authors (Spittle 1993) have reported cases of hypersensitivity to fluoridated water, no studies meeting the inclusion criteria were found."

Thus, rather than the University of York systematic review having carefully considered the work of Dr Waldbott, they set inclusion criteria for their review that were such as to exclude his work from consideration. The view that the University of York systematic review found insufficient evidence to reach a conclusion that other adverse health conditions were associated with fluoride in water cloaks the reality that the review did not in fact examine any of Waldbott's publications. In contrast to the 2000 University of York systematic review, with 243 pages and 294 references, the 2006 NRC report with 507 pages and 1077 references considered Waldbott's work and was not dismissive of it. The 2006 NRC report stated that the primary symptoms of gastrointestinal injury are nausea, vomiting, and abdominal pain and that these had been reported in well documented case studies by Waldbott and Petraborg as well as in a double-blind clinical study by Grimbergen involving the research group of doctors in the Netherlands with Dr Hans Moolenburgh and that these authors could have been examining a group of patients whose gastrointestinal (GI) tracts were particularly hypersensitive.(4-7) Similarly the work by these doctors on skin reactions was noted:

> "In the studies by physicians treating patients who reported problems after fluoridation was initiated, there were several reports of skin irritation (Waldbott 1956; Grimbergen 1974; Petraborg 1977)." (8-10)

The Australian National Health Medical Research Council (NHMRC, 1999) report has been updated by a 203-page 2007 report, A systematic review of the efficacy and safety of fluoridation, with 113 references, but does not include any publications by Dr Waldbott.(11-12) Similarly the World Health Organization report (2002) has been updated by a 144-page 2006 report, Fluoride in drinking-water, with 248 references, but none of Dr Waldbott's publications.(13-14) The Australian NHMRC report dismisses the relevance to water fluoridation of the 2006 NRC report, Fluoride in drinking water: a scientific review of EPA's standards, which includes Dr Waldbott's work on people affected by fluoridated water, in two sentences:

> "The reader is also referred to recent comprehensive reports regarding water fluoridation published by the World Health Organization (WHO, 2006) and the National Research Council of the National Academies (NAS, 2006). The NAS report refers to the adverse health effects from fluoride at 2-4 mg/L, the reader is alerted to the fact that fluoridation of Australia's drinking water occurs in the range of 0.6 to 1.1 mg/L."

The NHMRC report does not alert the reader to the fact that it is the dose (and for young children the dosage) rather than the concentration in the water that is important so that someone drinking 3 L with 1 ppm of fluoride would receive the same amount, 3

mg, as is contained in 1.5 L of water with 2 ppm of fluoride. Those with above average water intakes include some athletes, persons doing heavy manual labor, persons with diabetes, and those with renal failure. The 2006 NRC report is of clear relevance to water fluoridation and, in addition to referring to two of Waldbott's publications, reviewed animal studies showing adverse changes occurred in the brains of rats with water containing 0.34 ppm and 1 ppm of fluoride.(15) Similarly the report included data on fluoride and fractures involving fluoridated water, and the relevant animal work studying fluoride and the pineal gland. The NHMRC report repeats uncorrected mistakes present in the York report, e.g. in Table 62 on page 122 of the NHMRC report the I.Q. difference reported by Zhao (1996) is given as -7.7 when the correct figure from the original study is -7.5, and on page 123 it is stated:

> "Lin (1991) found a significant negative association of combined low iodine and high fluoride with goitre and mental retardation." (16-18)

Whereas Lin FF et al. found that the average I.Q. of children in high fluoride and low iodine areas was 19-25% lower than the average I.Q. of children in control areas.(19) A positive association was present between the water fluoride level and mental retardation. As the fluoride level increased, so too did the incidence of mental retardation. The NHMRC report does not make it easier for the reader to check the Lin quotation by omitting the paper from the references. The York report noted an inverse association between the water fluoride level and I.Q. had been reported by Zhao (1996) and Lin (1991). As the fluoride level increased, the I.Q. decreased. No mention is found in the discussion in the NHMRC report of the inverse association between the water fluoride level and intelligence.

Thus the systematic reviews referred to by Dr Bailey are not entirely independent of one another with the NHMRC report repeating mistakes present in the York report and the recent reviews with the exception of the 2006 NRC report omit consideration of papers describing adverse effects such as those by Dr Waldbott. Dr Bailey's claim that fluoridation is safe is not supported when the relevant studies, such as those by Dr Waldbott, are properly considered.

DR. WILLIAM BAILEY (CDC): When you ask about blinded studies – where do we go to look for blinded studies? This is also something that comes up a lot. What blinded studies means is that you pick two groups – let's say that you are in the medical trial – a clinical trial – and so you give somebody a new medicine, and somebody else a placebo. So some people are getting the intervention and some others are not. But nobody knows if they are getting the intervention or if they are getting the placebo. Then when they look at the results then the examiners are blinded as well. That means that they don't know who got the intervention and who didn't. They can be completely objective and say well that this is a better result – I don't know if they got this or not but this turned out better than this. So that is called blinded studies. The reason that you cannot do blinded studies in fluoridation is that it is impossible. To put fluoride in the public water supply you have to do a public announcement – you just can't put any in without the public knowing. You can't do blinded fluoridation on anyone. Also you can't randomly give fluoride to one house and not to the next – it's just not possible with the way our water systems work. Third, the way that studies work anymore, we know there is a benefit to water fluoridation so to give it to one group and withhold known benefits from another group - that's unethical. So they would never allow that kind of research trial to go forward.

CHRIS NEURATH: Dr. Bailey has given deceptive excuses for the failure to conduct any clinically controlled, randomized-assignment, double blind, trial (CRT) of water fluoridation. This type of trial is the only methodology that the FDA will accept for approving the use of medicines and medical devices. It is the gold standard. The FDA has simply ignored their mandate to require a CRT for fluoridation and prescription

fluoride supplements (tablets and drops). The FDA has never approved either and has abrogated their duty by not taking action to halt fluoridation or fluoride supplements.

The CDC and the other fluoridation promoters are probably very sensitive to their vulnerability on this lack of high quality evidence of effectiveness. Bailey has come up with two excuses to avoid having to meet this gold standard.

In his first excuse, he says that it would be impossible to blind the subjects of a water fluoridation trial because the only way it could be conducted is through municipal water systems. This ignores the much better method of testing whether fluoridated water provides a benefit, which is in a clinically controlled setting. The gold standard CRT requires such a methodology.

Instead of dosing people with the fluoride in their tap water, you would supply people with special bottled water with coded labels. Half the people would be randomly assigned to get bottled water with fluoride, and the other half would be supplied bottled water with no fluoride. The labels would be coded so everyone would be blind to which was the real treated water and which was the placebo. This is exactly how all-standard drug trials are conducted. Half the people get the real drug to take and the others get an identical looking placebo "sugar pill" to take. Obviously, to determine whether fluoride in water is effective, you would conduct such a study in a region that had low levels of fluoride in the municipal water so that the bottled water was the main source of ingested fluoride.

Choosing an appropriate location in which to conduct the study will also solve the second false issue raised by Dr. Bailey. He says it is unethical to conduct a CRT with a placebo if it has already been proven that the treatment is effective. Supposedly you are dooming the half who are randomly assigned the placebo to more cavities. However, there are many places in the world that have not accepted the contention that fluoridation has been proven to be safe and effective. Most European countries, for example, have specifically ruled that it is not proven and have outlawed its use in their country. A CRT with fluoridated bottled water could be ethically conducted in any of these countries. A further advantage of performing the study in such a region is that there is a much lower chance that the study subjects would be ingesting fluoride from beverages or foods made in a nearby fluoridated region. Bailey exaggerates the use of fluoridated salt in Europe, which would be another fluoride exposure to avoid in a CRT. Most European countries do not have fluoridated salt and would be excellent places to conduct a CRT.

One can make an additional, philosophical, response to Bailey's contention that a CRT of fluoridation would be unethical in the USA. Today, only about 2/3rds of Americans with municipal water get fluoridated water. That means about 100 million Americans are already part of the "placebo group" of an ongoing but uncontrolled trial of fluoridation. How can it be ethical to perform what is essentially a huge uncontrolled medical experiment on 100 million people but unethical to do the exact same trial in a controlled setting on maybe 1000 people?

An issue that Bailey avoided altogether was the fact that prescription fluoride supplements have also never been the subject of a proper CRT that would meet FDA's standards. These are sold and prescribed just like any other prescription medicine, yet have never been approved by FDA because no proper CRT has ever been done for them. Fluoride supplements are claimed to work in exactly the same manner as fluoridated water. Both are ingested and then raise the fluoride level in the blood, other fluids, and especially the calcified tissues of the body.

> It is also important to understand that CRT studies are designed to not only determine whether a medicine is effective, but to also assess how safe it is so that a risk/benefit judgment can be made as to whether it should be approved. In CRT studies, the subjects are carefully monitored for any adverse side effects. This type of controlled monitoring has never been carried out in any existing fluoridation trials. Amazingly, the only fluoridation trial that even attempted a crude form of overall health monitoring was the 1945 Newburgh-Kingston Trial (Schlessinger et al, 1956). But this trial would not meet modern standards. The majority of the treated people were never monitored for anything. These unexamined subjects were all the residents older than 18.

DR. WILLIAM BAILEY (CDC): So we really can't do blinded studies, so what we do instead – there are a couple of ways you can do studies on fluoridation. One is to compare people that have grown up in one community that was fluoridated with a group of people who grew up in a community which wasn't fluoridated. There are some limitations to that and even though that's the way to look at it. There are limitations in that people move in and out of communities – they may or may not drink the water – they may or may not have other things which influence their tooth decay and so forth. Then there is the other way to do it, (which) is to take a group of people and then follow them prospectively through time and see what happens. That's a real expensive way to do research but that can be done as well.

> **CHRIS NEURATH:** All existing studies of the effectiveness of fluoridation have used much lower quality methods than CRT. That is why the York Review concluded with surprise that they found not a single high quality study among hundreds that have been conducted over the past 60 years. Even the few best studies, which were good enough to meet their screening criteria, did not provide strong convincing evidence that fluoridation is effective. The benefit they found averaged only a 15% reduction in cavities, rather than the 25, 40, 60, and even 70% reductions that are often claimed. Such a small apparent benefit might even be simply an artifact of the weak study methods. For example, most studies took only a cursory consideration of socioeconomic level (SES) as a confounding variable. It is well known that dental health is often greatly affected by SES. Even slight differences in SES between two populations compared in a study can lead to confounding errors in the final results.
>
> Inadequate double-blinding is another common weakness of almost all existing studies. Double-blinding means both the subjects and the researchers are blinded to who gets fluoridated water and who gets non-fluoridated. Virtually all studies use dental examiner researchers to score the dental health of subjects. Whenever the study uses subjects from two different cities, one fluoridated, and one non-fluoridated, it is almost impossible to guarantee blinding of dental examiners. Most studies didn't even try to blind examiners.
>
> These are just some of the most obvious weaknesses of existing studies. Books have been written detailing the numerous other weaknesses and outright errors in many of the leading studies (Sutton, 1996). One can understand why this topic in dental medicine is based on so many problematic studies when one realizes that the government agencies that almost always fund these studies are the biggest promoters of fluoridation. The dental researchers who perform the studies are usually also promoters of fluoridation. This has led to a serious situation where many scientific papers may suffer author bias. Recent examination of a comparable situation with both drug company funded science and cigarette company funded science, have shown that the results are heavily influenced by the funding source. For example, it was found that there was an almost 90-fold greater chance that a scientific review paper funded by the tobacco industry would find no adverse effect from passive smoking than papers funded by independent groups (Barnes et al., 1998).

> Scientific studies and reviews of fluoridation may suffer from a similar strong bias. One of the only ways to try to overcome such bias is through gold standard CRT studies. Such studies are much harder to manipulate, either purposely or unconsciously. It appears self-serving for Dr. Bailey to tell the city council of Fairbanks Alaska that such studies are impossible or unethical. Neither is true.

FAIRBANKS COUNCILOR: "They are recommending now that nursing mothers not drink fluoridated water and that young children not receive fluoridated water. Later in early childhood to have one glass a day. How did we come with these new standards? How did those recommendations come about?"

DR. WILLIAM BAILEY (CDC): What you are talking about is the interim guidance on infant formula which was put out by the American Dental Association. We also have content on this on our web site. And the recommendation isn't that infants avoid all fluoridated water. What this came from is the fact that the American Dental Association read the NRC report …

FAIRBANKS COUNCILOR: "And the NRC is who?"

DR. WILLIAM BAILEY (CDC): The National Research Council.

FAIRBANKS COUNCILOR: "And they are actually a scientific body? Does scientific studies?"

DR. WILLIAM BAILEY (CDC): They were the group that was hired by the – there the group that works for the National Academies of Science – that gave a report to the Environmental Protection Agency on whether the MCLG was protective. So they were looking at naturally high levels of fluoride in water. This report was in 2006. They were looking to see if levels of fluoride in water at 4 ppm - or four times what we normally fluoridate the water at – was protective against health effects. So that was what that group was about."

> **PAUL CONNETT:** Again we see the self-serving confusion between concentration and dose. Dr. Hardy Limeback comments on Dr. Bailey's limited characterization of the NRC's work below.

FAIRBANKS COUNCILOR: "But they were a scientific group? They are scientists?'

DR. WILLIAM BAILEY (CDC): Yes.

FAIRBANKS COUNCILOR: " OK. Thank you."

DR. WILLIAM BAILEY (CDC): So that was a scientific review. It wasn't a systematic review in that they did not set rules as to what would be entered in and allowed to go forward in the report or not. So they could cite any studies they could find in their report. But it was a scientific investigation and an expert panel. So anyway in the NRC report they noted that some infants may be exceeding the upper tolerable intake set by the Institute of Medicine.

So they (ADA, PC) said that for people concerned about the risk for developing enamel fluorosis, parents can mix infant formula with low fluoride water or no-fluoride water. Or they can just use the premixed formula and so forth. But…we also have content on this. The fact is people have been mixing infant formula - what's interesting as well, but a little off subject – but around the same time Australia issued their recommendations on fluoride and they recommended that parents do mix infant formula with fluoridated water. I guess the thing to say about this from our side is that for decades people have been mixing infant formula with fluoridated water and children are at no greater risk then they ever have been but that all of a sudden there's a new scientific report out of the University of Iowa which says that for the first time that the first year might be important for the development for fluorosis. See the permanent teeth don't start developing until 18-22 months so we always thought that first 9 months of life when people have

infant formula wasn't a risk for enamel fluorosis. Since that report came out now from the University of Iowa, so we said well maybe parents are concerned should do something. But no the children are at no greater risk than they have ever been.

> **PAUL CONNETT:** This is not true based on the CDC's own reports. They reported in 2005 that dental fluorosis rates have increased 9% over the last 10 years (CDC, 2005). Now approximately 32% of all American children have dental fluorosis (and that average includes children living in non-fluoridated communities. The rate in fluoridated communities is higher.)

DR. WILLIAM BAILEY (CDC): I think water fluoridation has been around in Fairbanks for decades – right?

FAIRBANKS COUNCILOR: Yes

DR. WILLIAM BAILEY (CDC): So you can see what happens to the children or the people you know that have grown up with infant formula that was done with fluoridated water. I mean there is no greater risk than there ever has been and – children – there is no risk at all for the objectionable – both moderate and severe forms of fluorosis. We do know that – the CDC did a study 1999-2004 a national study – NHANES – and the amount of fluorosis was about 32% for adolescents. But that said – you know – many times the opponents will put things out showing teeth that are disfigured, saying that 32% of children have fluorosis like this. Well, you know, most everybody has a very mild form of fluorosis. Most people, who have fluorosis, don't even know that they have it and it takes a trained dentist to find it and you have to dry the teeth to find it and so forth. So I mean the common sense is go to an eighth grade and look at their eighth grade picture and have them all smile and look and see how many kids have brown or disfigured teeth. They have all been drinking fluoridated water so – you know, it isn't that 32% of children across America have this disfigured – you know – severe form of fluorosis. 32% have some very mild or mild, and occasionally severe fluorosis, but we don't believe that is from drinking the water, but we do believe it is from total fluoride intake. That's why we have recommendations on supervision of toothpaste – and trying to help kids not swallow toothpaste and not to have two year olds use it unless it is recommended by a dentist of a physician. You know – I think on the one hand you have to look at the science and the way that the science is done and on the other hand you have to use your common sense.

When people come and say this horrible disfigurement appearing on teeth comes from enamel fluorosis, look around and look at the kids and see. For the most part they have – I come from a generation and I can look back to my parents oral health and I am in my late fifties – I can look at the oral health of my parents and I can look at the oral health of my kids and see a vast difference and I am somewhere in the middle. A lot of that was due to fluoridation. Yes you can look at science and you can look at scientific studies and you look at the weight of the science but also use your common sense.

> **PAUL CONNETT:** You can get a more accurate assessment of this situation by looking at the accepted definitions of these various levels of dental fluorosis and the percentage of children currently affected in each category instead of relying on Dr. Bailey's homely but simplistic analysis.
>
> According to Dean's classification:
>
> - Very mild dental fluorosis affects up to 25% of the enamel surface.
> - Mild dental fluorosis affects between 25 and 50% of the enamel surface.
> - Moderate dental fluorosis affects 100% of the dental surface.
> - Severe dental fluorosis affects 100% of the dental surface with indentation and chipping of the tooth.

Based on the data collected in the largest survey ever conducted in the US (carried out by the NIDR in the period 1986-87) in which 39,000 children in 84 communities were examined, Heller et al. (1997) reported the following in communities with fluoride levels between 0.7 and 1.2 ppm:

- 22.6% of children had very mild dental fluorosis
- 5.8 % of children had mild dental fluorosis
- 1.5 % of children had moderate dental fluorosis

That means that over 1 in 100 children living in a fluoridated community has 100% of the enamel on at least two tooth teeth impacted. This condition costs approximately $1000 a tooth to correct.

The dental fluorosis figures reported in 2005 by the CDC for children aged 12-15 years.

- Questionable…….....11.96%
- Very Mild……..... 25.33%
- Mild……..7.68%
- Moderate/Severe.....3.58%

Contrary to Dr. Bailey's dismissal this is a serious issue in its own right. However, the greater concern is the question of what damage fluoride might be doing to the other developing tissues in the child while it is causing this problem. Remember dental fluorosis is a systemic (not a topical) effect of fluoride.

FAIRBANKS COUNCILOR: "This mayor Searle. Is there a pill to take fluoride out of the water?"

DR. WILLIAM BAILEY (CDC): There is a way to take out of the water but it is very, very expensive. I mean because nearly all the water contains some natural fluoride. You can do reverse osmosis and take nearly everything out of that water. The problem is that water purified like that it is very aggressive. Water is the universal solvent - you wouldn't want that in your pipes because it is going to want to take everything it can find and would probably corrode the pipes. And something that doesn't have minerals in – water like that is very aggressive. Yes there is a way to do it but it is very, very expensive. If you want to go absolutely no fluoride in your water you would have to go to reverse osmosis.

FAIRBANKS COUNCILOR: "I have just one more question – I am sorry –go ahead Tanya."

FAIRBANKS COUNCILOR: "OK you said that – this is councilman Brown –you said can see a vast difference between your parents oral health, yours and then your kids?"

DR. WILLIAM BAILEY (CDC): Yes.

FAIRBANKS COUNCILOR: "What comes to my mind the difference in lifestyles changes, dietary habits, and I am taking that into account because – I mean – I am older generation thinking back to oral health of my grandparents and parents who were eating relatively healthy OK and their dental condition was good. There wasn't a lot of cavities and that and then our generation had more cavities but there was some major dietary changes with the introduction of fast foods, more sugar and other ingredients such as artificial flavors and that. So I am wondering how much these studies took this into account. Especially, western dietary habits which is bad for a number of reasons, but also with tooth decay and other problems. How much did the studies take into account lifestyle changes?"

CAROL KOPF: I think the councilor has hit the nail on the head here and before Dr. Bailey responds let me insert this story that comes from a broadcast from Anchorage,

Alaska. It talks about the teeth of Native Alaskans before the advent of high sugar diets.

> "If you came to fish camp a hundred years ago, you wouldn't see children brushing their teeth. Yet they had good teeth."
>
> "Sugar: the smoking gun for tooth decay in rural Alaska. When it was first introduced in the Bush, people had no idea that it would take only a few generations to turn the healthiest teeth in the world into some of the worst"
>
> "In a 1930 newspaper article he [a dentist, Waugh] is quoted as saying, "Of all races, the teeth of the Eskimo are most excellent. Where they eat Native foods, their teeth are less likely to decay of any known race. But when they eat our sweets and starches, their misery begins."
>
> "Waugh's research shows he was ahead of his time. He sent out surveys to villages all across Alaska asking missionaries and school teachers to answer questions about what people were eating and the condition of their teeth."
>
> "When general stores appeared in villages, the teeth deteriorated." (1a)

DR. WILLIAM BAILEY (CDC): Well there are studies which look at tooth decay and dietary habits and studies which look at tooth decay and other types of hygiene habit and things like that – there are lots of those. It is hard to put it all together in one picture. And you are right. Living conditions have improved, health in general has improved and so forth. So you can't just say that there is just one thing has accounted for this. But for the most part from my parents' generation – and as you say your parents and grandparents – you may have lived in a fairly remote place where there was very little in the way of processed food- but in many parts of the country it was true that a lot of people were dentureless when they got to their late 50's or 60's. It was almost the norm that you would wear dentures. Now it is becoming much less frequent occurrence and I think it is down around 29% now for the whole nation. So there has been an improvement but you are right, you have to factor in all the other health – you know –living conditions, health styles and so forth. That's exactly right, you can't just say that it is due to one thing.

FAIRBANKS COUNCILOR: "OK – taking into consideration my background – I grew up in Detroit but had access to different geographic areas – my dad was from the south, they ate primarily from the land – my mother was from the East coast – Long Island and we ate primarily from gardens and that – we even had a garden in our back yard. So we ate fairly healthy and then you brought up - wait a minute we ate fairly healthy until the lifestyle change came when my mother started working – she was home until my brother went to school – So then we cut back on the home cooked meals – so then we started eating out more and we noticed the change in our health within a few years, OK? Then the other thing with the dentures. Was there the knowledge of the implants and other technologies and other procedures which exist now, which didn't exist then? So were dentures prominent because they didn't have those procedures in place back then and not because teeth were rotting out?"

DR. WILLIAM BAILEY (CDC): Well they didn't have – you're right they didn't those procedures in place back then but the reality is that people are keeping their teeth longer. We know now that for example older adults are keeping their teeth, they are not losing their teeth like they used to. But that also creates the issue of tooth decay in older adults. We know for example that older adults have the same amount of new decay as children and we know that adults have more untreated decay than children. So that is one of the great things about fluoridation is that it helps people of all ages. Your older adults are having as much decay as children now. So that's one way that fluoridation really helps.

BILL OSMUNSON: Dr. Bailey apparently made a simple mistake of mixing up the topical and systemic effects of fluoride. Topical fluoride (varnish) has fair evidence of efficacy in the case of rampant decay (NIH, 2001). However, the CDC has repeatedly stated that ingestion of fluoride is not likely to reduce tooth decay (CDC, 1999, 2001) and mother's milk has almost no fluoride (NRC, 2006). At best, water fluoridation would benefit less than 10% of those treated (CDC, 1999).

Dr. Bailey is partly correct in that people in developed countries are keeping their teeth longer; however, fluoridation is not the reason. Comparing non-fluoridated with fluoridated developed countries (WHO data online), or states or even counties within states, finds no improved dental health or lower dental expenses in fluoridated areas.

Remember, supporters of fluoridation claim a huge 15 to 40% reduction in dental decay with fluoridation; however, dental expenses are not lower in fluoridated areas. The effectiveness of a public health intervention should be able to be seen in the community. For example, we would not continue to use the polio vaccine if vaccinated areas had just as much polio.

Arranging the 50 USA states according to the percentage of their population fluoridated and the confounding factor of socioeconomic status (see Figure at http://www.fluorideresearch.org/404/files/FJ2007_v40_n4_p214-221.pdf) one finds that about 82% of the wealthy and 55% of the poor are reporting very good to excellent teeth regardless of percentage of the population of each state drinking fluoridated water. The relationship between tooth decay and income levels is very strong, but the evidence for effectiveness of fluoridation is clearly lacking from this US national comparison (Osmunson, 2007).

FAIRBANKS COUNCILOR: "What cumulative effect does fluoride have on adults other than fluorosis? Osteoporosis, thyroid conditions – things like that?"

DR. WILLIAM BAILEY (CDC): The CDC doesn't investigate that we rely on the expert panels and other people who look at that. And a lot of people have looked at that.

PAUL CONNETT: In Part 1, I asked why an agency as large as the CDC, with so many scientists available to them, rely on others to track both the safety and effectiveness of the fluoridation program and also rely on unqualified personnel in the Oral Health Division to pass judgment on critical reviews on fluoride's dangers like the one done by the NRC in 2006. After all the CDC is the lead agency promoting fluoridation in the US and artificially fluoridated water is going to 170 million Americans every day. If there are dangers associated with this program shouldn't the CDC be the first to know, not the last? Why when the CDC released their infamous statement in 1999 that fluoridation was 'one of the top ten achievements of the Twentieth Century' (CDC, 1999) was the CDC relying on a review of health effects that was already six years out of date (NRC, 1993) in 1999? Ironically, the body that told them in 1993 that everything was OK, the National Research Council, was the very same agency whose report in 2006 revealed many serious problems. The CDC used the first report (NRC, 1993) to assure the world that fluoridation was safe for over 6 years, and yet dismissed the dangers presented in the second (NRC, 2006) they dismissed in 6 days!

Not only is the CDC not tracking the relationship between fluoridation and osteoporosis and thyroid function, no other fluoridating country is! Moreover, as discussed above (see Part 1) there are many other health issues that fluoridating countries are not investigating in relation to fluoridation, including: arthritic symptoms in adults (and children), lowered IQ in children, increased bone fractures in children using dental fluorosis as a biomarker, earlier onset of puberty in girls, Alzheimer's

> disease, accumulation of fluoride in the bone and in the pineal gland and lowered melatonin production. Practically no work has been done on these concerns. Nor has there been any formal investigation of the many anecdotal reports that some individuals are highly sensitive to fluoride (see comments by Dr. Spittle in Part 1). Even the areas that have been investigated like hip fractures in the elderly and osteosarcoma in young males the work has been very limited and needs more investigation in other fluoridated countries.

DR. WILLIAM BAILEY (CDC): That's why I really wanted you to have this report in brief because that was what the National Research Council was looking at – from the National Academies. They were looking at – and you are right the fluoride does accumulate throughout your lifetime, especially in your skeletal system – and so what this committee was looking at was people who drank excessive amounts of high natural fluoride – they were looking at people who drank 4 ppm or greater over a lifetime.

> **HARDY LIMEBACK:** We looked at toxicity of fluoride in every aspect of intake (except from respiration of fluoride-contaminated air). We looked at all the studies we could find in the literature that examined the effects of fluoride intake, whether in the form of liquid, food, oral care product, even drugs such as anesthetics. The total intake is important since someone drinking fluoridated water could be pushed over the edge in terms of maximum tolerable dose.

DR. WILLIAM BAILEY (CDC): So what they came out with was three recommendations that could have an affect on – for sure it would have an effect on fluorosis – severe fluorosis for people who drank 4 ppm over a lifetime 10% would be expected to have severe fluorosis – they said that it was likely to cause an increase in bone fractures – they weren't unanimous on that – they found mottling rather than observations

> **HARDY LIMEBACK:** I don't understand that last comment.

DR. WILLIAM BAILEY (CDC): – but that it could result in an increase in bone fractures and it could also result in skeletal fluorosis. Now in the US over the last decade the most we have seen as far as skeletal fluorosis is about six cases that have been diagnosed,

> **PAUL CONNETT:** this does not include cases of the earlier symptoms of fluorosis which are identical to arthritic symptoms which affect 1 in 3 American adults ((CDC, 2002).

DR. WILLIAM BAILEY (CDC): most of them from other things, for example from a person drinking a lot of concentrated iced tea. So they looked at a lot of other things, but they only came up with these three things.

> **HARDY LIMEBACK:** There were many more serious health outcomes examined. We looked at 1.0 ppm fluoride for adverse health RISKS, such as:
>
> - excessive intake in infants (neurotoxicity, dental fluorosis, osteosarcoma), especially using fluoridated tap water for infant formula
> - contaminants (lead intake in children exposed to H2SiF6)
> - excessive intake in growing children (bone effects, hypothyroid)
> - excessive intake in diabetics, athletes
> - hypersensitivity in a subpopulation that cannot tolerate even low daily doses of fluoride
> - excessive retention kidney patients (and bone problems)
> - potential for genetic damage (Down Syndrome)
> - osteosarcoma in young boys (the Bassin study)

> The committee could not agree that the science was solid enough to include all of these as definitive outcomes on which to base a recommendation to lower the fluoride in drinking water. This, however, does not negate that fact that there are many really well done studies pointing to an increased risk for other adverse health effects from fluoride intake.

DR. WILLIAM BAILEY (CDC): They studied the science for three and half years. They made recommendations that other things needed study, but even drinking 4 times the amount of fluoride in your water over a lifetime. The only thing was a sure thing was enamel fluorosis. The things that could be was bone fractures and skeletal fluorosis. But they compared the bone fractures with people who drank water and 1 ppm not zero. Not very low. Some studies –some really good studies –well they followed people over time – prospective studies – which have shown that there may be a protective effect at 1 ppm for bone fractures.

> **PAUL CONNETT:** I believe the study that Dr. Bailey is referring to here is the study by Li et al. (2001). While it is true that they reported a protective effect for all bone fractures combined (in the elderly) they found no protective effect for the all-important issue of hip fractures in the elderly, and in fact found an approximate linear increase in hip fracture rates as the level of fluoride in water rose from 1 ppm to 4 ppm plus (while these results only became statistically significant above 4 ppm, the linear trend is clear and thus suggests that the increase between 1 ppm and 1.7 ppm was real).

DR. WILLIAM BAILEY (CDC): So if you have very low fluoride concentrations the bone fractures may be higher but as you come down to 1 ppm – about what we fluoridate the water – there may be a protective effect

> **PAUL CONNETT:** for all bone fractures combined but not for hip fractures.

DR. WILLIAM BAILEY (CDC): and then as you go up to 4 ppm or greater your bone fractures go up. That's because fluoride is attracted to the bone, especially for the long bone, it accumulates in the outside of the long bones which makes them strong on the outside but easier to break if you have very high concentrations of fluoride. They are thicker but they break easier.

> **HARDY LIMEBACK:** There is no margin of safety for people who drink excess water or who cannot eliminate it efficiently (kidney patients). Kidney patients have never been included in bone studies. Fluoride is harmful to them. It contributes to osteodystrophy. Reducing fluoride in the water even down to levels of water fluoridation will still not protect the entire population and it is the moral duty of the EPA to work with the CDC to find the lowest, safest level of fluoride in the drinking water.

FAIRBANKS COUNCILOR: "The mayor asked you a question on is there a pill to remove fluoride from water. And my question is there any sort of filtering system which average households might be able to use to remove the fluoride or reduce the amount of fluoride?"

DR. WILLIAM BAILEY (CDC): There are point of use systems that you can put into your home. If you put in an activated charcoal filter or something like that on your faucet it won't take out any fluoride. But there are point of use systems that actually work on a reverse osmosis or membrane type system that will take fluoride out – to some extent any way.

FAIRBANKS COUNCILOR: "And are those systems that are practical to use say in a single household in terms of cost – can you comment on that?"

DR. WILLIAM BAILEY (CDC): You know I am not an expert on that. I have heard that a number around $500 for those systems, but I am not an authority on that. That's just something I have heard.

FAIRBANKS COUNCILOR: "I have two other questions. Those of us who are always taught to brush your teeth after every meal and floss every night and use controlled Rx from time to time, are probably fine. I wonder if you would comment on people in Fairbanks who – through their upbringing or perhaps through socioeconomic reasons – don't have the same knowledge and practices in terms of dental care – how the fluoride might impact these different groups?"

DR. WILLIAM BAILEY (CDC): Fluoride helps all groups but the higher the potential for caries the better the help.

> **BILL OSMUNSON:** Potential is not reality. In reality the poor have more decay, but fluoridation does not change that reality (Osmunson, 2007).
>
> **CAROLE CLINCH:** As far as helping those in greatest need is concerned, it is important to point out that it is well established that, 1) Fluoridation has no effect in reducing cavities in pits and fissures where 80-90% of tooth decay occurs today and 2) Fluoridation cannot counteract the ravages caused by baby bottle tooth decay. Here are some quotes supporting these conclusions:
>
> 1. Fluoridation has no effect in reducing cavities in pits and fissures
>
> > "The type of caries now seen in British Columbia's children of 13 years of age, is mostly the pit and fissure type. Knudsen in 1940, suggested that 70 percent of the caries in children was in pits and fissures. Recent reports indicate that today, 83 percent of all caries in North American children is of this type. **Pit and fissure cavities aren't considered to be preventable by fluorides**, they are prevented by sealants." (Gray, 1987; my emphasis)
> >
> > "Because the surface-specific analysis was used, we learned that almost 90% of the remaining [tooth] decay is found in the pits and fissures (chewing surfaces) of children's teeth: **those surfaces that are not as affected by the protective benefit of fluoride**." (Koplan, 2000; my emphasis)
> >
> > **"Nearly 90 percent of cavities in school children occur in the surfaces of teeth with vulnerable pits and grooves, where fluoride is least effective."** (NIDR, 1992; my emphasis)
> >
> > "It is estimated that 84% of the caries experience in the 5- to 17- year-old population involves tooth surfaces with pits and fissures. **Although fluorides cannot be expected appreciably to reduce our incidence of caries on these surfaces**, sealants can." (JADA, 1984; my emphasis)
>
> 2. Fluoride is ineffective at preventing baby bottle tooth decay.
>
> In circumstances of high acid challenge to the enamel of children's teeth due to pooling of sugary fluids in the mouth for prolonged periods, called Baby Bottle Tooth Decay (BBTD), all surfaces of the tooth are vulnerable and water fluoridation is not effective according to the CDC and others.
>
> > "The prevalence of BBTD in the 18 communities of Head Start children ranged from 17 to 85 percent with a mean of 53%. The surveyed communities had a mixture of fluoridated and non-fluoridated drinking water sources. **Regardless of water fluoridation, the prevalence of BBTD remained high at all of the sites surveyed**." (Kelly, 1987; my emphasis)

> "By either of the two criterion i.e., two of the four maxillary incisors or three of the four maxillary incisors, the rate for 5-year-olds was significantly higher than for 3-year-olds. **Children attending centers showed no significant differences based on fluoride status for the total sample or other variables**." (Barnes, 1992; my emphasis)
>
> "Data from Head Start surveys show the prevalence of baby bottle tooth decay is about three times the national average among poor urban children, even in communities with a fluoridated water supply." (Von Burg, 1995).

DR. WILLIAM BAILEY (CDC): You know I guess that is the beauty about water fluoridation you don't have to remember to do anything, you don't have to be compliant in any way, in a way it is the perfect public health measure. All you have to do is drink water or use it for cooking and so forth, and you will get some benefit of fluoride. So certainly those people who will benefit from water fluoridation – they wouldn't benefit much as if they brushed their teeth twice a day and also had community water fluoridation, but they would benefit from the fluoride in the water.

> **BILL OSMUNSON:** Dr. Bailey's use of words like "beauty" and "compliant" is inappropriate. Fluoride for ingestion is a prescription drug. Fluoridation is forced medication of a drug without a doctor's prescription. A substance for the treatment or mitigation of disease is a drug. Go to your pharmacy and ask for fluoride to ingest. Every state in the US has laws that regulate controlled and legend (prescription) drugs, poisons and toxins. Fluoridation is in violation of these laws. Your doctor is the legal intermediary between industry/governments and you the patient. You hire the doctor to legally protect and ensure the drug is appropriate. Ask your city, water district or state, under who's prescription drug license is the fluoride drug being dispensed? None. In effect, fluoridation is the dispensing of a prescription drug without a license and without the patient's consent. Forced medication is no less a crime than forced sex.

FAIRBANKS COUNCILOR: "From some of the information that's been brought to our attention, I am under the impression that in Europe for example there is very little fluoridation and yet – if my impression is correct – when you look at dental decay and all that the statistics are the same as the United States. Can you comment on that?"

DR. WILLIAM BAILEY (CDC): Sure. Europe uses a lot of salt fluoridation, so they have just had their fiftieth anniversary of salt fluoridation in 2005.

> **PAUL CONNETT:** It is true that some countries in Europe fluoridate their salt but they are in a minority. This explanation by Dr. Bailey cannot be used to explain away the fact that tooth decay has been coming down as fast in non-fluoridated countries as fluoridated ones. Some of the best figures for low tooth decay come from countries which neither fluoridate their water nor their salt, e.g. Belgium, Denmark, Finland, Iceland, Netherlands, Norway and Sweden. See http://www.fluoridealert.org/who-dmft.htm

FAIRBANKS COUNCILOR: "Are you talking about table salt? You are talking about a container of table salt which you purchase at will. Is that correct?"

DR. WILLIAM BAILEY (CDC): Yes. A container of table salt like most salt has iodine in it. A lot of the salt in the Caribbean and South America. There are 27 countries in South America and the Caribbean which have salt fluoridation. And then Austria, Czech Republic, France, Germany, Hungary, Slovak Republic, Spain and Switzerland have fluoridated salt. So fluoridated salt works to reduce tooth decay as well. Normally they fluoridate salt at about 250 ppm. The problem with fluoridated salt is that with water fluoridation you look at the natural amount of fluoride in the water and you adjust it up to a level which is optimal for health in the region. With salt fluoridation

there is going to be some parts – different water sources –which have differing amounts of fluoride in them which people are drinking but the salt remains consistent throughout the region. Sometimes you will read from the opponents that Europe is totally against all (fluoridation) so forth but in fact the European Union passed a resolution in 2006 - I believe - that talked about the use of fluoride – in fact it was 16th May 2006 - the European parliament voted 526 in favor and 126 against this resolution that says 'that the addition of fluoride to food practice or the addition of fluoride to drinking water or salt or milk is now authorized in the countries of the European Union.' So that's something which is very recent from 2006 and was voted on by the parliament there.

> **PAUL CONNETT:** For a list of reasons why most European countries have rejected water fluoridation go to http://www.fluoridealert.org/govt-statements.htm

FAIRBANKS COUNCILOR: "I just have three more questions. I would like to ask you if you don't mind Dr. Bailey if I could have time to prepare them and email them to you and have the answers for Monday's meeting. Would you amicable for that?"

DR. WILLIAM BAILEY (CDC): Well, I will be glad to help. But I would rather that you work through your State dental director. Normally the CDC doesn't hold ourselves out…

FAIRBANKS COUNCILOR: "That's Brad. I'll send it to Brad. The questions I have: Are you aware that in Canada the maximum contaminant level for the fluoride was 4 ppm but they reduced it? And reduced it all the way down to 0.6 ppm and since we have it naturally occurring at 0.5 ppm and that is an incremental difference and I understand from brad that fluoridation only provides an incremental benefit to begin with. Do we have to supplement it with everything on the market, everything with fluoride in there and is it really when we have such naturally occurring fluoride?"

> **PAUL CONNETT:** The councilor is confusing the maximum contaminant level - 4 ppm in the US, and 1.5 ppm in Canada - with the level recommended for fluoridation. Carol Clinch below discusses these levels.

DR. WILLIAM BAILEY (CDC): Well, I believe that Canada's maximum level is 1.5 ppm and is also the World Health Organization's maximum level.

FAIRBANKS COUNCILOR: "I have some documentation that indeed have lowered it for Canada. That might be a new revelation."

DR. WILLIAM BAILEY (CDC): Maybe you could share that with me. I would be interested in the source to see whether it came from the Canadian government or rather from some sort of group that opposes fluoridation.

> **CAROLE CLINCH:** US PHS recommended guidelines for artificial water fluoridation is 0.7-1.2 mg/L. Health Canada recommended guidelines are 0.8-1.0 mg/L as of 1999 – decreased from 1.0.-1.2 mg/L. Ontario Ministry of Environment recommended guidelines are 0.5-0.8 mg/L as of 2000 – decreased from 1.0-1.2 mg/L.
>
> These guidelines were reduced because of the 1999 Ontario Ministry of Health and Long Term Care Report on Water Fluoridation which stated (Locker 1999):
>
> 1) "The magnitude of [fluoridation's] effect is not large in absolute terms, is often not statistically significant, and may not be of clinical significance... Canadian studies do not provide systematic evidence that water fluoridation is effective in reducing decay in contemporary child populations. The few studies of communities where fluoridation has been withdrawn do not suggest significant increases in dental caries as a result."

> 2) "Current studies support the view that dental fluorosis has increased in both fluoridated and non-fluoridated communities. North American studies suggest rates of 20 to 75% in the former and 12 to 45% in the latter."
>
> 3) "In Canada, actual intakes are larger than recommended intakes for formula-fed infants and those living in fluoridated communities. Efforts are required to reduce intakes among the most vulnerable age group, children aged 7 months to 4 years."

Two years later the same author (Dr. David Locker) stated:

> "In the absence of comprehensive, high-quality evidence with respect to the benefits and risks of water fluoridation, the moral status of advocacy for this practice is, at best, indeterminate, and could perhaps be considered immoral" (Cohen & Locker, 2001).

Currently, the Ontario Ministry of Environment and Health Canada are both reviewing all policies and guidelines regarding water fluoridation.

FAIRBANKS COUNCILOR: "OK. The other thing I wanted to ask and I think we all have hit on it. I want to do so again. Washington, DC, is fluoridated but they are having a dental decay crisis."

DR. WILLIAM BAILEY (CDC): Yes.

FAIRBANKS COUNCILOR: "So are we back to the argument that the number one thing for good oral health is diet- and I think we can all agree that the direct application of fluoride is most beneficial?"

DR. WILLIAM BAILEY (CDC): Well, actually any body who has better economic status usually has better dental health in all areas. And so if we look at poor areas – especially pockets of poor areas – we know that for children 80% of the tooth decay for children is in 25% of the population but that subgroup is always the poorest segment of the population. So having community water fluoridation won't eliminate tooth decay, it will help reduce tooth decay but it doesn't overwhelm all the other things that can happen.

FAIRBANKS COUNCILOR: "Yes but this is an increase. They are having a crisis even with it in the water."

DR. WILLIAM BAILEY (CDC): Sure. Because they don't have access to dental care – because they – you know – they have a very low social economic status. You know any kind of disease – especially oral health – is multi factorial disease – you just can't say because of what you eat, you can't just say its because say the carie you get, that's its because your other health, but there's a lot of things which enter into oral health. So community water fluoridation helps to reduce tooth decay and that's in children in study after study

> **CAROLE CLINCH:** Dr. Bailey should read the studies more carefully. For example, the Brampton-Caledon Study, Ontario, Canada. This study observed tooth decay in 1,047 7-year old children in 25 schools over the 2001-2 period. (Ito, 2007).
>
> The authors found that 50% of children from non-fluoridated Caledon had cavities. 37% of children from the fluoridated Brampton had cavities. Does this prove that water fluoridation CAUSED the difference in cavity rates? NO. Statistical analysis of the data showed: Factors that did affect cavities were: Good Dental Hygiene, Good Nutrition, Dental sealants, Breast Feeding vs. Infant formulas. Water fluoridation did not influence the rate of cavities. The authors clearly state:

"The effect of fluoridation on caries in these communities was not evident"

Many Public Health Officials are using raw data and using it as "proof" that water fluoridation is CAUSING the EFFECT (difference in cavities). This study demonstrates that you cannot use raw data to prove anything.

Without a statistical analysis of raw survey data, no conclusions can be drawn as to which factors may be causal. A recent review of the literature on fluoridation's effectiveness ("The York review," McDonagh et al., 2000) could find no grade A research on the matter.

A recent (2007) Italian review of fluoridation concluded that:

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

2) "Several studies conducted in fluoridated and nonfluoridated communities suggested that this method of delivering fluoride may be unnecessary for caries prevention, particularly in the industrialized countries where the caries level has become low. Although water fluoridation may still be a relevant public health measure in poor and disadvantaged populations, the use of topical fluoride offers an optimal opportunity to prevent caries among people living in both industrialized and developing countries."

3) "In the past decades, a number of authors focused their attention on caries trend of the communities that interrupted water fluoridation in comparison to communities without water fluoridation (Kuopio and Jyvaskyla, Finland; Chemnitz and Plauen, Germany; Tiel and Culemborg, Holland; La Salud, Cuba). In these communities, during the years of water fluoridation, a caries reduction had been observed, but after the cessation, caries prevalence did not rise, remained almost the same or even decreased further. These findings do indicate that the interruption of CWF had no negative effects on caries prevalence."

4) "to date, there is limited evidence to support the view that fluoridation reduced the [social] disparities in caries." (Pizzo et al.)

CAROL KOPF: Poverty is often associated with poor diet. Fluoride is neither a nutrient nor essential for healthy teeth (1-3). However, the evidence is solid that lack of essential nutrients makes teeth more decay susceptible.

Good dental health begins in the womb (4). Specifically, calcium, protein, phosphorus, vitamins A, C and D help construct babies' primary teeth, according to the American Dental Association.

Additionally, protein-calorie malnutrition, iodine deficiency and excessive fluoride increase susceptibility to dental caries, according to the U.S. Surgeon General (5).

Americans are deficient in calcium (6), magnesium (7), vitamins C (8) and D (9). No evidence indicates any American is fluoride-deficient. In fact, American children are fluoride overexposed (10).

In the past fluoride was credited with the substantial cavity decline. However, "No clear reasons for the caries decline have been identified," according to the 1999 Dental Textbook, Dentistry, Dental Practice and the Community, by Burt and Eklund .

However, fluoridation and the explosion of fluoridated dental products coincided with many health-preserving trends. For instance, milk was vitamin D fortified to prevent bone and teeth damaging rickets; cereals and breads were vitamin and mineral enriched; dental care and insurance was encouraged and affordable; and Americans became more nutritionally aware. No valid science proves fluoridation was the cavity-killing culprit.

According to a large federal study

> (NHANES III) children without deciduous caries experience had significantly higher fruit, grain, sodium, and total Healthy Eating Index's than children with deciduous caries experience while children without permanent caries experience had significantly higher dairy, cholesterol, fruit, grain, sodium, variety, and total Healthy Eating Index's than children with permanent caries experience (11).

In fact, American kids who don't eat the recommended five servings of vegetables and fruits -- every day -- up their risk of cavities more than threefold (12).

Burdened with the worst oral health, U.S. children in poverty are also the least healthy, most food insecure, least likely to ingest recommended levels of vital nutrients, least likely to have dental insurance or care, and most likely to have unfilled cavities.

Is fluoridation going to help these children? Common sense and science says, no. But the American Dental Association (ADA) and the U.S. Centers for Disease Control (CDC) say yes, using claims and endorsements not backed with valid science (13).

Weston Price in *Nutrition and Physical Degeneration* reported long ago what dentistry needs to re-learn. Children with the best diets have the best teeth without fluoride. Children with the worst diets have the worst teeth even with fluoride.

There's a constant movement of minerals into and out of teeth. Fluoride is said to enhance the re-mineralization process. Without essential minerals available, fluoride is useless. Many low-income children are deficient in required tooth building and repairing nutrients, such as calcium, that also moderate fluoride's toxic effects.

Fruits and vegetables offer a substantial amount of essential nutrients which may be why vegetarians have less tooth decay (14). Only 23% of Americans comply with recommendations to eat 5 – 9 servings of fruits and vegetables, daily (15).

Maybe produce should be government subsidized to repair nutritionally starved kids instead of wasting multi-millions of dollars on fluoride and fluoridation programs each year at the local, state and federal levels. Unlike fluoridation, fruits and vegetables deliver essential nutrients that teeth and bodies require.

Well-meaning but misguided dentists thought fluoride was their magic bullet to prevent tooth decay at a time when nutrients were discovered to prevent diseases, such as vitamin C preventing scurvy. The bad news is that there's no magic bullet to cure or prevent tooth decay. The good news is that tooth decay is highly and easily preventable - with a nutritious diet and regular dental care.

DR. WILLIAM BAILEY (CDC): but that does not mean that it is going to overwhelm other factors. For example, I have worked with the Indian Health Service for 14 years. We did community water fluoridation and sealant programs and still we were overwhelmed in certain ways and a lot of it comes from poverty.

FAIRBANKS COUNCILOR: "I have checked here in the clinic here and the other facility we have. They have a sliding scale – they have dental available – they have fluoride tablets available to folks at the lower end of the socioeconomic scale."

DR. WILLIAM BAILEY (CDC): Well they shouldn't because if you have fluoridated water they shouldn't be giving out fluoridated tablets because that's what causes dental fluorosis.

> **CAROLE CLINCH:** Overexposure to fluoride (from any source) causes dental fluorosis. Since fluoridated water is the single largest source of fluoride (NRC 2006), fluoridated water is the single largest cause of dental fluorosis.
>
> > "for typical individuals, the single most important contributor to fluoride exposures (approaching 50% or more) is fluoridated water and other beverages and foods prepared or manufactured with fluoridated water" (NRC 2006, p 87)
> >
> > "In 1997, the EPA estimated that Americans were ingesting nearly five times more fluoride than in 1971 - from food and drinks alone." (Smith, 2001)

FAIRBANKS COUNCILOR: "That leads into the next question. You said that in Northern climates you recommend higher levels. Well in the winter we have lots of tea here made with hot water. Heating water causes the greater concentration of fluoride. Fluoride comes through to us in fruits and products, backed goods from other parts of the US, which use fluoride. So we are getting such a multitude area of fluoride that like you said it is hard to pin down and having been told that it provides an incremental benefit taken systemically do you have any thoughts on how if are at 0.5 ppm natural occurring fluoride, what would it take to make up the incremental difference of the bottom of the scale that is recommended – even at the 2.2 ppm. Would that be using the mouth wash?"

DR. WILLIAM BAILEY (CDC): I am not sure that I totally understand your question.

FAIRBANKS COUNCILOR: "If you are going to replace the value of fluoride that is taken systemically which was told to me to be of incremental value – if I understand incremental value it means small…"

DR. WILLIAM BAILEY (CDC): Progressively greater. You are going to get more value at fluoridating at 1 ppm than you are at 0.5 ppm. In other words, the higher the fluoride goes up you get an incrementally greater benefit the higher the fluoride goes up.

FAIRBANKS COUNCILOR: "Do we know what that incremental benefit is across the board when you are looking at fluoridated toothpaste, mouth wash and diet? What role does that value make systemically? Is that 10% of it, is it 5% of the whole value that you need from fluoride?"

DR. WILLIAM BAILEY (CDC): I don't know. I haven't seen any studies on that. But you know that you are getting from fluoride (fluoridated water) is 1 ppm; toothpaste has 1000 ppm, the amount that rinses have is over 1500 ppm, so you are looking 1 thousandth of what's in the water right now. I am not diminishing that you are getting a lot of your intake from drinking water and other beverages but you have to also keep in mind that some of these other things that you are talking about – for example tooth paste, which have concentrations 1000 times the concentration that's in water.

> **PAUL CONNETT:** Yet again we see a confusion between concentration and dose. The concern is how many milligrams of fluoride you ingest. To ingest 1 mg of fluoride from water you would need to consume 1 liter of water at 1 ppm. To consume 1 mg of fluoride from toothpaste at 1000 ppm, you would need to swallow 1 gram of toothpaste.

FAIRBANKS COUNCILOR: "And they are directly applied? So you want me to send these questions onto Brad - the remaining questions that I have? – There is one thing I want to be clear about – Dr. Bailey - I am talking about the Fairbanks community not sweepingly across the world – I am saying that this community has it naturally. I don't want you to think I am just spreading it."

FAIRBANKS COUNCILOR: "The impact on bones – I am not talking about the naturally occurring fluoride – makes the bones hard on the outside but weaker on the inside. Are you talking about the added fluoride?"

DR. WILLIAM BAILEY (CDC): Any fluoride actually. The York study looked at this in 2000 and said that they could find no difference between natural fluoride and fluoride that is added to the water. There's been studies- the latest by Finney, in 2006 - they're water chemists- and they looked at the dissociation of the various fluoride additives and they said that in the end it is all just the fluoride ion that is working in the water but so it doesn't matter where it comes from. The fluoride ion is the fluoride ion and is the same whether it is naturally occurring or put in using an additive.

> **CAROLE CLINCH:** There is far more to this discussion than Dr. Bailey implies. Scientific evidence does not support the contention by the CDC that by the time the hexafluorosilicate ion (silicon ion with 6 fluoride ions attached in H2SiF6 or Na2SiF6) reaches the tap it will have been completely converted into silica and the free fluoride ion and that they will never re-associate.
>
> The ability of silicofluorides to separate/dissociate into their component parts (silicon, fluoride) is dependent on several known factors: pH, presence of other substances (metal cations), water hardness and temperature. In low pH environments such as are found in acidic beverages (e.g. fruit juices, tea, coffee) which use fluoridated water, acidic foods and more importantly, in our gut where low pH levels occur, re-association of fluoride and silicon ions is likely to occur.
>
> Although the reports are sparse, historically authors have found that "natural fluoride" (i.e. calcium fluoride), sodium fluoride and the silicofluorides have not behaved the same in mammals. See the following table from (Kick et al., 1935).

FLUORIDE VS FLUOROSILICATE: RELATIVE TOXICITY

TABLE 1: Availability of Fluorine in Various Forms (Table 39, Kick et al. 1935)

Fluorine Supp	Time on Ration	Fluorine Ingested	Fluorine in Feces	Fluorine Absorbed	Fluorine in Urine	Fluorine Balance	Fluorine Retained
	Days	Mg.	Mg.	Mg.	Mg.	Mg.	Pct.
Rock phosphate (untreated)	11	217.2	128.7	88.5	31.5	+57.0	26.2
Rock phosphate (untreated)	10	213.6	131.5	82.1	20.5	+61.6	28.8
Sodium fluosilicate	23	269.9	94.3	175.6	93.6	+82.0	30.4
Sodium fluosilicate	22	259.9	94.4	175.5	90.2	+85.3	31.6
Sodium fluoride	18	211.2	116.5	94.7	25.8	+68.9	32.6
Calcium fluoride	11	229.6	225.5	4.1	4.2	-00.1	0.0

The results from Zipkin's study in 1956 imply that soft tissue of young male mammals suffer more exposure to fluoride from H2SiF6 and Na2SiF6 than from sodium fluoride (Zipkin, 1956).

Two recent papers on the toxicology and behavior of the silicofluorides have been published in Neurotoxicology (Maas et al., 2007 and Coplan et al., 2007). These authors demonstrate that the silicofluoride ions:

1. are associated with increased lead levels in drinking water
2. are associated with increased blood lead levels in young children, and
3. do not behave the same as "free fluoride ions" in biological systems

Coplan et al. (2007) review the research which demonstrates that silicofluorides interfere with neurotransmission. Specifically, silicofluorides inhibit acetylcholinesterase, an enzyme responsible for dismantling the neurotransmitter acetylycholine after it has delivered its message (such interference is how nerve gases work). They explain that the mechanisms of silicofluoride and fluoride inhibition of this key enzyme are different. Thus it is not enough to rely on studies of sodium fluoride and the brain, additional studies need to be done with silicofluorides.

Coplan et al. also review the work of Machalinski et al. (2003), who reported that the four different human leukemic cell lines were more susceptible to the effects of silcofluorides (the compounds used in water fluoridation) than to sodium fluoride (NaF). According to these authors:

> "Silicofluoride complex (SiF) has biological effects that are even more potent than those of simple fluoride released by sodium fluoride."
>
> "The early response effect of Na2SiF6 was greater, and in several cases significantly greater, than NaF on clonogenic growth and the induction of apoptosis in all four cell lines."
>
> "In conclusion, our findings revealed that human leukemic cells can be influenced and damaged by different forms of fluorine compounds. A substantially more evident effect was caused by silicofluoride complex (SiF) compared to simple fluoride ion released by sodium fluoride."

Based upon the above, and other studies cited by Coplan et al., it is clear that sodium fluoride and silicofluorides do not behave in identical ways in biological systems. To protect the public it is essential that full toxicity studies (as opposed to theoretical calculations and hand waving exercises) are required for the silicofluorides - the actual products put into our drinking water. In the absence of toxicity studies demonstrating safety, the practice of water fluoridation using these chemicals should not be permissible.

FAIRBANKS COUNCILOR: "So Dr. Bailey all water has natural fluoride in it or is that correct?"

DR. WILLIAM BAILEY (CDC): Yes it is in everything.

FAIRBANKS COUNCILOR: "Is our naturally occurring fluoride in water more than any where else in the country? Different levels?

DR. WILLIAM BAILEY (CDC): There are different levels. In 2006 the National Research Council report says that there is about 1.6 million people in the US that have over 2 ppm naturally

occurring in their water. So it is not – you know – when you look at 1.6 million people out of 300 million that's not a great amount percentage wise but 1.6 million is still a lot of people. So we would like to see those people with 2 ppm or greater try to find alternative water sources for their children before their teeth are developing.

> **PAUL CONNETT:** Again, we see the confusion between concentration and dose.† The difference between 1 ppm and 2 ppm may seem large to some, but that would only be the case if you could control how much water people drank. Someone in a 1 ppm community could easily get a larger dose of fluoride than someone in a 2 ppm community, e.g. if they drank more than twice as much water.

FAIRBANKS COUNCILOR: " I too would like to forward a few questions. Here there is not time – so Brad is that the gentleman to email them to?"

DR. WILLIAM BAILEY (CDC): Yes

FAIRBANKS COUNCILOR: "Will Brad be able to respond within a day or two – if the questions are not too difficult?

DR. WILLIAM BAILEY (CDC): Brad : "If you can get me questions, I will try to respond to them by tomorrow. Etc

FAIRBANKS COUNCILOR: " Dr. Bailey you mentioned that there were two types of studies – scientific studies - one in where you follow people through time and the other is you compare one city against another city or one area against another area. One having had fluoride the other not. The first one you said you follow people through time and I didn't hear a follow up statement by you as to what study might have done that. I assume that has probably been done that people have been followed through time or questionnaires have been delivered to people on a broad enough scale to make it somewhat reliable. Do you know of any studies like that?"

DR. WILLIAM BAILEY (CDC): Yes for example a study done by Kathy Phipps in the Northwestern part of the United States. She followed over 9000 post-menopausal women because at the time there was some concern that fluoride was related to fractures, especially hip fractures. And so she followed these 9000 women and recorded there fractures and what she found was that there was that there was not an increased risk for hip fractures.

> **PAUL CONNETT:** There are some serious limitations with this paper. To get this relationship Phipps had to control for 12 variables. Moreover, she found an increase in wrist fractures in the fluoridated population, which in the draft of her paper she indicated was statistically significant but in the final version stated that it was not (Connett, 2001).

FAIRBANKS COUNCILOR: "In that study was there a finding on the benefit of fluoride to teeth?"

DR. WILLIAM BAILEY (CDC): No she just looked at bones.

FAIRBANKS COUNCILOR: "So, I am looking for that one. Were there any where people were followed through time where the benefit to teeth was examined?"

DR. WILLIAM BAILEY (CDC): Normally – there probably are studies like that but I don't know of any of the top of my head – normally what they do is they look at – they almost always used children because – at the beginning they thought fluoride was only good for children. Also it is an easy group that is in a school. Normally they look at 12 year old children – then they look at 12-year old children – 5 years later but they would be different groups.

FAIRBANKS COUNCILOR: "The second issue one was one city or area versus another. You mentioned that those were difficult because you know whose drinking who isn't, whose taking artificial and who isn't – regressional analysis could… (side 1 of tape ended)… any of that you might know of?"

DR. WILLIAM BAILEY (CDC): Sure. We can go all the way back to when they started water fluoridation. What they did there they used pairs of cities one of which was fluoridated and the other that wasn't…

FAIRBANKS COUNCILOR: "if you would just tell us the one… (Bailey continues to talk about the early trials)… I am looking for one that is recent, because in the old days we didn't have fluoridated toothpaste. Could you give me the best study that you can come up with that's recent that shows pretty clearly that an area without fluoridation where they used fluoridated toothpaste versus an area that doesn't. Do you know of a recent study like that?"

DR. WILLIAM BAILEY (CDC): There was a school children in the late 80's - Brunelle and Carlos's paper from 1989 – where they reported – it was a national study – that was when toothpaste was in full use – just about – and they reported – this was a national study - and they reported about a 25% reduction in the difference between the fluoridated and non-fluoridated areas when you adjusted for other …

FAIRBANKS COUNCILOR: "I can find that if I look up national schoolchildren in 1989 I can find that?"

DR. WILLIAM BAILEY (CDC): I can send you a copy of the Brunelle and Carlos report.

FAIRBANKS COUNCILOR: "Thanks I appreciate that. OK thank you."

> **PAUL CONNETT:** It is worth adding a few words about the important study by Brunelle and Carlos (1990). If it had worked out differently, this might well have become the bible of the pro-fluoridation forces – as it is, it contributes greatly to their undoing - at least, for those who actually read the literature.
>
> The study resulted from a huge multi-million dollar survey conducted by the NIDR (I have already alluded to this study when discussing dental fluorosis) in which the teeth of 39,000 children in 84 communities were examined. The study came on the heels of several prominent reports that researchers were finding little difference in tooth decay when comparing fluoridated and non-fluoridated communities and countries (Leverett, 1982; Colquhoun, 1985 and Diesendorf, 1986).
>
> The motivation behind this study may well have been to demonstrate once and for all that fluoridation worked. If that was the motivation behind the exercise it failed. When John Yiamouyiannis obtained the raw data from this study under the Freedom of Information Act (FOIA) he found that there was no statistical difference in tooth decay in the permanent teeth as measured by DMFT (Decayed, Missing and Filled Teeth) for children aged 5-17 whether they had lived their whole lives in fluoridated, or non-fluoridated communities or part of their lives in fluoridated communities (Yiamouyiannis, 1990).
>
> When Brunelle and Carlos published their analysis they used a more stringent and sensitive metric – they used DMFS (decayed missing and filled surfaces on the permanent teeth). As there are five surfaces to most of the teeth (the ones without a cutting edge) this measure is up to five times more sensitive than the DMFT measure.
>
> However, Brunelle and Carlos were only able to report an average saving of 0.6 of one tooth surface (see Table 6), when comparing children who had lived all their lives

in a fluoridated (Average =2.6 DMFS) versus non-fluoridated (average 3.2 DMFS) community. However, what Brunelle and Carlos reported in the abstract to their paper was an 18% saving. 18% is considerably less impressive than the rates that were being claimed at the time by promoters (40-60%). It is even less impressive when one finds out that the absolute saving amounted to just 0.6 of one tooth surface. This amounts to about one cavity or filling.

One wonders what health risks most people would take to secure an overall average saving of 0.6 of one tooth surface? But it gets worse.

Subsequent studies have found even less absolute savings in tooth decay. Spencer et al. (1996) in a study of two Australian states found an average saving of 0.12-0.3 DMFS and Armfield and Spencer (2004) in a study of 10,000 children in South Australia found NO significant difference in the permanent teeth between children who had lived all their lives drinking fluoridated tap water and those who had drunk rain water or bottled water. Despite these meager findings Spencer and Armfield still aggressively promote fluoridation, even advocating the addition of fluoride to bottled water!

FAIRBANKS COUNCILOR: "I have my last question. You had made the comment that the fluoride which was natural is the same as the added fluoride. Where does added fluoride come from? Where is that product derived from that we put into our water supply?"

DR. WILLIAM BAILEY (CDC): It mostly comes from the fertilizer industry. Phosphorous fertilizer industry. It's a by-product. They do this with a lot of industrial things they take – gypsum is also another thing that comes from that phosphorous fertilizer industry but – that's where the majority comes from – that's the fluorosilicic acid. You'll see things about they scrub it out of the smokestacks- well they don't scrub it out of smokestacks – they use a reclaiming process and they get the fluorosilicic acid that way. (Discusses other source for the computer industry). But almost of it comes from the Phosphorous fertilizer industry.

PAUL CONNETT: Let me cut through Dr. Bailey's attempt at semantic detoxification here. The chemicals used in over 90% of fluoridated public water supplies in the US are the silicon fluorides: hexafluorosilicic acid (H_2SiF_6) or its sodium salt (Na_2SiF_6). These substances are generated in the wet scrubbing systems of the phosphate fertilizer industry, which in the US is largely located in Polk and Hillsborough Counties, Florida. Phosphate rock is mined from the earth and then heated with concentrated sulfuric acid to produce phosphoric acid which in turn is used to make "superphosphate" a soluble form of phosphate used in agriculture. The phosphate rock contains between 2 and 4% fluorine (as the fluoride ion, F-), and when it is heated with sulfuric acid, the fluoride generates hydrogen fluoride gas, which in turn reacts with silica in the rock to produce silicon tetrafluoride.

Until about the mid-20th century, the production of these two highly toxic gases caused significant damage to vegetation, cattle and human health in the vicinity of the phosphate manufacturing plants. With the advent of new environmental regulations, wet scrubbing systems were utilized to lower these emissions. So strictly speaking Dr. Bailey is correct: the industry does not scrape this substance from the smokestacks, they trap the toxic gases in a spray of water before they enter the smokestacks. The resultant liquor generated in the scrubbing process is a 20-25% solution of hexafluorosilicic acid.

This solution is a toxic waste. It cannot be dumped into the sea by international law and it cannot be dumped into local waterways because it is far too concentrated. Officially it is classified as a hazardous waste but it is one of the vagaries of

hazardous waste laws in the US that if someone is willing to buy this stuff it drops the hazardous waste label and becomes a "product."

Thus, unpurified hexafluorosilicic acid (with many toxic contaminants) is the primary chemical now used to fluoridate public water supplies in the US. For some regulatory officials, the use of this scrubbing liquor for fluoridation is considered a positive development. In 1983, Rebecca Hammer, the Deputy Assistant Administrator for Water at the US Environmental Protection Agency (EPA), described the practice as:

> "…an ideal solution to a long standing problem. By recovering by-product fluosilicic acid from fertilizer manufacturing, water and air pollution are minimized, and water authorities have a low-cost source of fluoride available to them" (Hammer, 1983).

However, Dr. William Hirzy, an EPA scientist, argues that the public water supply should not be used as a means of getting rid of hazardous waste and in recent testimony before the US Senate, described Hammer's views as "linguistic detoxification" (Hirzy, 2004).

Clearly, being able to convert a hazardous waste material into a saleable product is very attractive for the phosphate industry. It would be extremely expensive to send this material to hazardous waste sites. It would also be cost prohibitive for communities to use pharmaceutical grade fluoride compounds in fluoridation programs. Others have suggested that a better way to deal with the waste fluoride would be to convert it into calcium fluoride, which could then be used as feedstock for the many industries that use this material (Moriber, 1974). However, it has proved difficult for the phosphate industry to remove the silica from the product and an alternative proposal is to use the fluoride waste in cement production (Lavanga). But as long as communities are prepared to pay for this material and put it into their water supply there is relatively little incentive for the phosphate industry to find more sensible and responsible solutions to their waste problem.

FAIRBANKS COUNCILOR: "If as a community we took the fluoride out of our water how long would it be – a generation, 20 years – before we would see an impact from it. Statistically?"

DR. WILLIAM BAILEY (CDC): I can't give you an answer on that. Some of the studies that did that – I don't have any recent ones. These were all years ago – decades ago. Antigo, Wisconsin, in 1949 fluoridated and they fluoridated till 1960 and they discontinued. Five and half years later – and now this was before (fluoridated) toothpaste – five and half years later they saw a 70% increase in caries.

> **PAUL CONNETT:** I am surprised that Dr. Bailey singled out this very old Antigo, Wisconsin study to support this claim, because it was a particularly poor study from a scientific point of view. More recent and well conducted studies have shown that where fluoridation has been discontinued in communities in 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; Seppa 2000).

DR. WILLIAM BAILEY (CDC): The community guide (2002) talked about discontinuation of fluoride as well. This study came out in 2002 and this was a systematic review and they looked at the studies and they said stopping water fluoridation resulted in a median 17.9% relative increase in caries – tooth decay. But they don't say how many years.

FAIRBANKS COUNCILOR: "I would like to know - you said that the non-natural fluoride comes from fertilizer – which companies and what's in it and where can I get that information?"

DR. WILLIAM BAILEY (CDC): If you go to our website – I can send the link to that as well – we have a whole section on additives – questions and answers about additives and so forth. The other thing that it explains there is the fluoride additive – it isn't just something that somebody is collecting and dumping in your water. There are regulations which relate to the additive too – they have to be of a certain purity. The American Water Works Association has standards that are national standards for the additives – for any additives which go into our water – and NSF international has standards and those are all talked about there as well - on our website - as well. I can send you this link if you like on the additives.

> **PAUL CONNETT:** NSF International (National Sanitation Foundation International) is a private corporation with fluoridating chemical industry representatives on their board. Getting information from them is like getting gold out of Fort Knox. The incredible thing is that when one pursues the ultimate question of who can vouch for the safety of water fluoridation and the fluoridating chemicals used, one is eventually led to NSF International. The EPA does not regulate water fluoridation as such (the EPA regulates fluoride as a contaminant); the FDA does not take responsibility for regulating fluoride for ingestion and, as we saw above, when it comes to the safety of fluoridation the CDC refers questioners largely to reviews by other bodies. Thus the issue of safety has been outsourced to this private entity. One of the things that the law requires NSF International to do is to provide the toxicological studies, which demonstrate the safety of the chemicals added to water. When recently asked to provide this information for the silicofluorides by officials in Southern California, the NSF refused, claiming that they didn't have to because they were a private corporation! Another serious question is how frequently these chemicals are tested by the NSF for their contaminant levels and whether or not an adequate statistical analysis has been applied if each batch is not tested.

FAIRBANKS COUNCILOR: "So what else is in water besides fluoride?"

DR. WILLIAM BAILEY (CDC): I am not an industry person but of course chlorine is in the water. They add things to reduce iron in water, because iron can stain fixtures – I wish our fluoridation engineer was here because he knows all of that. If you have specific questions about engineering questions I can forward…

FAIRBANKS COUNCILOR: "That's OK, I just know that if we were to remove fluoride they would add something else to maintain the pH balance. So take out one additive and get another it seems like."

FAIRBANKS COUNCILOR: " I think certain additives are for the purity of the water but this (fluoride) is actually an additive for medication for a physical aspect rather than for safety of the water."

DR. WILLIAM BAILEY (CDC): It's not considered a medication it's er…

> **PAUL CONNETT:** It is a pity that Dr. Bailey was cut off here because it would have been interesting to hear how he classified fluoride if it was not considered a medication. There is no scientific evidence that demonstrates that it is a nutrient. To do this you have to deprive an animal or a human of the suspected nutrient from the diet. If a disease results then the substance is declared an essential nutrient. This has not been done for fluoride. Furthermore, it would be a huge surprise if fluoride were a nutrient because that would mean that nature was wrong on baby's first meal where the level of fluoride in mothers' milk is remarkably low (0.004 ppm, NRC, 2006). Nor am I aware of any other nutrient whose main action is topical not systemic.

FAIRBANKS COUNCILOR: "It's curious when we speak about it and we talked about doses or suggested amounts that people should drink – pregnant, young etc – I am a large woman so I drink one glass so I am under-dosing and I have a skinny friend who exercises all the time and they are drinking 20 glasses a day so. To be in the system you get doses for people of different sizes, weights and activities – so it is a curious thing that we are trying to decide what is healthy and we have got that stated. Then habit. Then personal choice comes into play. So…"

DR. WILLIAM BAILEY (CDC): Yes it does. But for over 60 years there have been people of all kinds of medical conditions and of all kinds of different sizes and different intakes and so forth and for over 60 years we have not seen an adverse effect. Other than fluorosis that's related to intake of all levels – so….

PAUL CONNETT: And this is the hub of the matter and I will use this opportunity to summarize some of the arguments we have made above. The countries that fluoridate their water have not done the critical health studies of the communities they have fluoridated. This allows proponents like Dr. Bailey to assert they do not see any effects, while opponents are left complaining that governments promoting fluoridation have seriously neglected their job of investigating the matter. Absence of study does not mean absence of harm.

This is what Dr. John Doull, the chairman of the NRC (2006) review said about the matter in a January 2008 article in Scientific American:

> "What the committee found is that we've gone with the status quo regarding fluoride for many years-for too long, really-and now we need to take a fresh look," Doull says. "In the scientific community, people tend to think this is settled. I mean, when the U.S. surgeon general comes out and says this is one of the 10 greatest achievements of the 20th century, that's a hard hurdle to get over. But when we looked at the studies that have been done, we found that many of these questions are unsettled and we have much less information than we should, considering how long this [fluoridation] has been going on. I think that's why fluoridation is still being challenged so many years after it began. In the face of ignorance, controversy is rampant." (Fagin, 2008)

It is important to note that to complete their comprehensive review of the subject the NRC (2006) panel had to reach out to the scientific literature from countries that do not fluoridate their water, and particularly those like India and China which have high natural levels in the water causing undeniable health problems.

We have a Catch-22 situation here. Those countries that practice fluoridation have not done the most basic and obvious studies to check to see if fluoridation is harming their populations. If you don't look, you don't find! So when this weak database is used to do a "systematic review" it is little wonder that "panels of experts" cannot find much evidence of harm (York Review, 2000 and NHMRC, 2007). What the NRC (2006) panel did – which few panels have done before – was to scour the studies done in countries, like India and China, with relatively high background levels of fluoride in the water. These studies are available because the countries do not have an interest in protecting an artificial water fluoridation programs – far from it, their interest is to remove fluoride down to a level that they consider safe. Thus there is a government willingness and money available to do the studies. Moreover, there is no pressure on researchers not to find "embarrassing" results. Promoters of fluoridation in the US and elsewhere were not happy when Mullenix and Bassin published their seminal findings on the brain and osteosarcoma respectively (Mullenix et al., 1995 and Bassin et al., 2006) and reacted accordingly: Mullenix was fired and Bassin's work was hidden from the public and scientific community for three years (Bryson, 2004). There are many other earlier examples of politics trumping science on this issue.

To complete the Catch-22 argument. In India and China, most of the population studies are drinking water above 1 ppm, which enables promoters to maintain the "illusion" of safety for fluoridation, by claiming that results at higher levels are not relevant to populations' drinking water at 1 ppm. This is what the ADA and the CDC did, and this is what health authorities in Australia, Canada, New Zealand, Ireland, Israel and the UK have done. However this is a rather silly argument because, as any toxicologist will confirm, we are often forced to make judgments about dangers to human health based upon high dose animal experiments. In the case of fluoride we have the "luxury" of human observations at doses equal to or very close to the doses experienced by some, if not all people, living in fluoridated populations.

The NRC (2006) report has demonstrated emphatically that fluoride can damage health – not just the teeth and bone – but many other tissues as well. What is required now is the determination to see if there is an adequate margin of safety between the doses that have caused harm in these studies and the full range of doses that people are getting in fluoridated communities.

Most importantly, in going from small population studies to extrapolating to whole populations we have to introduce a "margin of safety" (or safety factor) to allow for the full range of sensitivity towards a toxic substance in any human population. In the case of fluoridation we have to protect the very young, the very old, those with poor kidney function, those with diabetes, and those with poor nutrition, particularly those with borderline iodine deficiency. For this purpose regulators usually use a safety of factor of ten and sometimes an extra safety factor to account for the extra sensitivity of infants and young children.

The NRC (2006) report found that the current MCLG of 4 ppm is not protective of human health and recommended that EPA's Office of Drinking Water perform a new health risk assessment to determine a safe MCLG. This determination will require the EPA to examine all the health effects reviewed by the NRC and determine at what doses these effects occurred and then apply an appropriate margin of safety which will protect the whole population. After two years the US EPA has not begun the health risk assessment. For the record: at a 2007 meeting convened by Jonathan Fleuchaus, General Counsel for US EPA's Pesticides Division, with the Fluoride Action Network, Environmental Working Group and Beyond Pesticides, EPA put forward the recommendation that they would expedite the fluoride health risk assessment if the groups would drop their formal Objections against EPA's approval of sulfuryl fluoride as a fumigant on post-harvest food. EPA told the groups that if they didn't agree, the health risk assessment could be put off for as long as 10 years. The groups responded that they would not drop their case against sulfuryl fluoride, which EPA has estimated will be the second largest exposure source to fluoride after fluoridated drinking water.

Meanwhile, as far as the dangers posed to those who appear to be particularly sensitive to fluoride, even when independent researchers like Dr. George Waldbott do studies, they are ignored. Excuses are made but the simple fact is that no fluoridating country has ever attempted to put the issue of some people being sensitive to fluoride to rest by conducting scientific studies on the matter. This is just part of the politics overruling science on this issue. For over 60 years bad science has been used to support a bad policy. For a fuller discussion for the history of this issue see The Fluoride Deception by Christopher Bryson. A 28 minute interview with Bryson can be viewed at http://video.google.com/videoplay?docid=-3949434744498031545&hl=en

MAYOR: "We thank you Dr. Bailey very much."

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APPENDIX 1

Centers for Disease Control and Prevention
Coordinating Center for Health Promotion (CoCHP)
National Center for Chronic Disease Prevention and Health Promotion

Division of Oral Health

Atlanta GA

(Information as of March 2008)	Name	Degree
Office of the Director		
Director	William Maas	DDS, MPH
Deputy Director	Steven Cahill	MPH
Assoc. Director for Science	William Kohn	DDS
Health Economist	Susan Griffin	**PhD**
Management & Prog Analyst	Stephanie Arrindell	
Health Communications Spec.	Linda Orgain	MPH
Health Scientist	Christopher Callahan	MS
Budget Analyst	Sam Oyerinde	BA, MBA
Admin Operations Assistant	Tanya Turner-Brown	
Lead Secretary	Angel Key	
Office Automation Assistant	Norman Williams	
Surveillance, Investigations, and Research Team		
Team Leader	Eugenio Beltran	DMD, MPH
Statistician	Laurie Barker	MSPH
Dental Officer	Jennifer Cleveland	DDS, MPH
Epidemiologist	Amy Colins	BS, BSN, MPH
Epidemiologist	Paul Eke	**PhD**, MPH
Dental Officer	Barbara Gooch	DMD, MPH
Health Scientist	Freder Jaramillo	DDS, MPH, MHA
Dental Officer	Gina Thornton-Evans	DDS, MPH
Program Services Team		
Team Leader	Scott Presson	DDS, MPH
Dental Officer	William Bailey	DDS, MPH
Nat'l Fluoridation Engineer	Kip Duchon	PE, MSEnvE
Public Health Educator	Elizabeth Hines	RDH, MPH
Evaluation Scientist	Rene Lavinghouze	MA
Public Health Educator	Karen Sicard	RDH, MPH
Public Health Analyst	Bridgette Smith	
Dental Public Health Resident	Ella Oong	DMD, MPH
Public Health Educator	Sherry Williams	MPH, CHES
Evaluation Contractor	Kisha Smith	BS, MPH, CHES
Secretary	Angela Fisher	