



82 Judson Street
Canton NY 13617
315-379-9200
www.FluorideAction.net

March 30, 2009

Via Email Sanco-Sc8-Secretariat@ec.europa.eu

To: Scientific Committee on Health and Environmental Risks (SCHER)
The European Commission

Re: Public Consultation on Fluoridation 'Working Mandate'

Dear Committee Members,

You have asked for comments on your "Working Mandate on fluoridation"

My name is Dr. Paul Connett, I am professor emeritus of environmental chemistry at St. Lawrence University, Canton, NY 13617 where I taught for 23 years. My specialty was environmental chemistry and toxicology. For the past 13 years I have researched the issue of fluoride's toxicity and carefully studied and followed the fluoridation debate. I currently serve as the Executive Director of the Fluoride Action Network.

I am pleased that your body has seen fit to get up-to-date information on fluoride's toxicity, (including the largely untested silicon fluorides, most frequently used to fluoridate drinking water) and will be sending you a great deal of material prior to the April 26 deadline.

I hope your effort is genuine – I am afraid so many "blue ribbon" reviews are fixed. The dental lobby wields mighty power in certain governmental circles, especially in English speaking countries, as well as the WHO. Thus I was very disturbed when I saw the phrase "no one doubts the beneficial effects of fluoride" in your "working mandate" document. This looks like the dental lobby has already poisoned the waters.

You say, "no one doubts the beneficial effects of fluoride". That is incorrect. I do not believe that, nor do the vast majority of the scientists who have taken the time to read the literature on this. Please see the evidence below that demonstrates that the evidence that SWALLOWING fluoride reduces tooth decay is very, very weak. After having read this summary I trust you will remove this inaccurate phrase.

If you are to gain any public trust in your deliberations then also please remove those individuals who have been involved in writing past EU decisions involving fluoride, and are known to be pro-fluoridationists, from any further involvement in this process. We specifically ask that dentists be removed, a) because they are extremely biased in favor of fluoridation and b) they do not have the qualifications to make judgments on fluoride's ability to impact other parts of the body. Instead, on behalf of the public, we request that a balanced panel of toxicologists, neurologists, physiologists, and biologists review the new information and the Working Mandate.

I have circulated your mandate to the membership of FAN around the world and you are likely to get many other requests along similar lines. I would also like to make you aware that over 2200 professionals worldwide are calling for an end to the practice of water fluoridation – the deliberate addition of a known toxic substance to the drinking water at levels 250 times higher than the level in mothers' milk. See <http://www.Fluoridealert.org/professionals.statement.html>

Yours sincerely

Paul Connett, PhD
paul@fluoridealert.org

Why the Fluoride Action Network doubts the benefits of swallowing fluoride.

Introduction

One of the surprises waiting for someone who decides to review the literature on the issue of water fluoridation is the discovery that, despite the impression conveyed by the promoters, the evidence that swallowing fluoride actually reduces tooth decay is very weak. In this bulletin we will begin to review the evidence that the benefits of swallowing have been wildly exaggerated and no grade A study has ever been published to support the claims of "massive" benefit.

1. Fluoride is not an essential nutrient

Fluoride is not an essential nutrient (NRC 1993 and IOM 1997). No disease has ever been linked to a fluoride deficiency. Humans can have perfectly good teeth without fluoride. This is not surprising when one notes the level of fluoride in mothers' milk. This is only 0.004 ppm (NRC, 2006, [p. 36](#) and [Table 2-6, p. 40](#)). If the infant needed fluoride to develop strong health teeth then clearly evolution messed up on this requirement.

2. No "Randomized Controlled Trials" demonstrating effectiveness

In the 60 years (plus) of this practice there has never been a study of the quality required by the FDA and other national regulatory bodies when approving new drugs for efficacy. Such trials require random selection of the individuals tested (exposed and unexposed) and examinations should be "double blind." Double blind means that neither the person examining the subject nor the person being tested should know whether the substance given is the drug or a placebo. The modern terminology for this testing is "Randomized Controlled Trial."

The York Review (McDonagh et al. 2000) after an exhaustive review of the literature could identify NO "Randomized Controlled Trials" of either fluoridation's effectiveness, or safety.

3. No controls for delayed eruption of teeth

Not one single study purporting to demonstrate fluoridation's effectiveness has ever controlled for a possible delayed eruption of teeth caused by fluoride, for which there is some evidence (Feltman and Kosel 1961; Komarek et al. 2005).

4. Primary versus secondary dentition

Those promoting fluoridation usually do so using the data on primary dentition (deciduous teeth) rather than secondary dentition (permanent teeth). However, it is the latter which are more important since these are the teeth we hope to have for the rest of our lives.

5. Cross-sectional versus Longitudinal studies

The York Review (McDonagh et al. 2000) only looked at longitudinal studies (these compare the same community over a period of time). Cross-sectional studies (these compare 2 or more communities at the same point in time) are much larger and more convincing in indicating no or little benefit from ingesting fluoride. Some of these studies are discussed below.

6. Baby bottle tooth decay

Even promoters of fluoridation have conceded that fluoridation cannot prevent baby bottle tooth decay (BBTD) and this is the cause of the most distressing examples of tooth decay in infants

often leading to extractions under anesthesia. BBTD is caused by babies sucking on sugared water, fruit juice (and even coca cola) for hours on end (Kelly et al. 1987; Barnes et al. 1992; Weinstein et al. 1992; Von Burg et al. 1995; Febres et al. 1997; Tang et al. 1997; Blen et al. 1999 and Kong 1999).

Promoters are being intellectually dishonest when they use pictures of BBTD to promote fluoridation. But this has become a standard ploy of many promoting fluoridation.

7. Pit and fissure decay

Since 1950, it has been found that fluorides do little to prevent pit and fissure tooth decay, a fact that even the dental community has acknowledged (Seholle 1984; Gray 1987; PHS 1993; and Pinkham 1999).

This is significant because pit and fissure tooth decay represents up to 85% of the tooth decay experienced by children today (Seholle 1984 and Gray 1987). Pit and fissure decay is best prevented with sealants.

8. Decay rates have been coming down before fluoridation began and after the" benefits" would have been maximized

Modern research (e.g. Diesendorf 1986; Colquhoun 1997, and de Liefde 1998) shows that decay rates were coming down before fluoridation was introduced and have continued to decline even after its benefits would have been maximized (see discussion on Diesendorf's 1986 paper below).

Many other factors influence tooth decay. Some recent studies have found that tooth decay actually increases as the fluoride concentration in the water increases (Olsson 1979; Retief 1979; Mann 1987, 1990; Steelink 1992; Teotia 1994; Grobleri 2001; Awadia 2002; and Ekanayake 2002).

9. Little difference between fluoridated and non-fluoridated communities

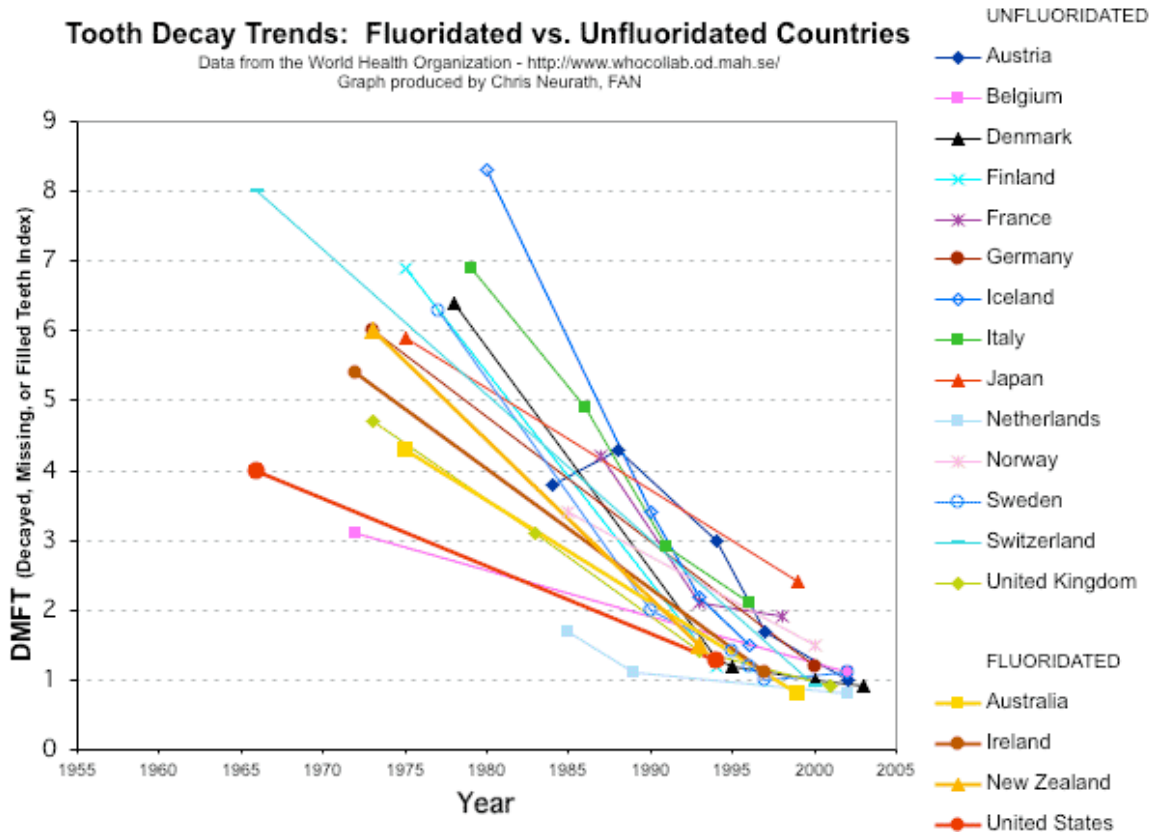
There is very little evidence that demonstrates a significant difference in the permanent teeth when comparing children living in fluoridated and non-fluoridated communities (Leverett 1982; Diesendorf 1986; Gray 1987; Yiamouyiannis 1990; Brunelle and Carlos 1990; Spencer et al. 1996; de Liefde 1997; Locker 1999; Armfield & Spencer 2004; and Pizzo et al. 2007).

10. Benefits topical not systemic.

Even ardent supporters and promoters of fluoridation like the Centers for Disease Control and Prevention (CDC), now admit that the benefits of fluoride are largely topical not systemic (CDC 1999, 2001). In other words fluoride works on the outside of the tooth not from inside the body. The fact that fluoridated toothpaste is universally available today, coupled with an increasing standard of living, are more likely explanations for declines in tooth decay in industrialized societies than the availability of fluoridated drinking water.

11. World Health organization (WHO) data

According to WHO data there is no significant difference in the rates of decline in decay in the teeth of 12-year olds between fluoridated and non-fluoridated countries, over the period from the 1960s to the present. The same set of data shows no significant difference today. See the figure below, which presents this data graphically.

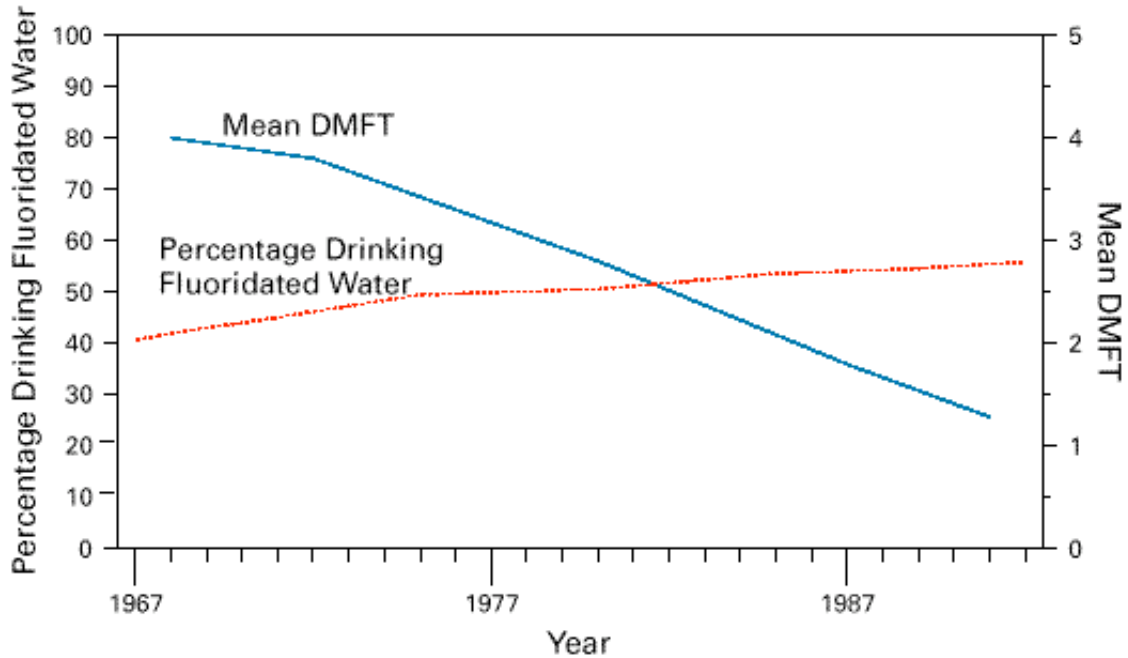


See also a similar graph presented in the article by Cheng et al. 2007, in the *British Medical Journal*.

12. Comparing WHO data with CDC claims.

It is interesting to compare the figure based on the WHO data and the figure used by the CDC in 1999:

FIGURE 1. Percentage of population residing in areas with fluoridated community water systems and mean number of decayed, missing (because of caries), or filled permanent teeth (DMFT) among children aged 12 years — United States, 1967–1992



The CDC used this figure in 1999 to "demonstrate" the effectiveness of fluoridation. They inferred that tooth decay was coming down over the period 1960 to the 1990's in the US because the percentage of the American population drinking fluoridated water had gone up over this same period (CDC, 1999).

It is disturbing that the CDC authors appear to have been unaware of the WHO data, which clearly refutes the claim for such a simplistic causal relationship.

This CDC graph was used in the report, which was supposed to substantiate their claim that fluoridation is "One of the top ten public health achievements of the 20th Century" (CDC, 1999).

This famous statement is quoted nearly every day somewhere in the world by some unsuspecting editor, journalist or public health official as the final word on fluoridation's safety and effectiveness. As far as an attempt to demonstrate effectiveness is concerned this graph remains a total embarrassment to any genuine scientist at the CDC - or it should be.

13. US Department of Human Health Services (DHHS) survey

Dr. Bill Osmunson has showed that according to the results of a questionnaire administered to parents in all 50 states in the US by the DHHS, there is absolutely no relationship in the percentage of parents who responded "my child has very good or excellent teeth" and the percentage of the population in the state drinking fluoridated water (Osmunson, 2007). However, there is a very strong relation in all 50 states between the percentage of parents giving that answer and their income levels.

Across the board 80% of high income parents gave that answer, but only about 60% of low income parents did so (Osmunson, 2007).

Linear regression lines plotted for these answers versus the percentage of the population in each state fluoridated were quite flat for both high income and low-income families. This indicates no correlation between the answers and the fluoridation status of each state.

14. New York State survey.

In 2002- 2004 a survey of tooth decay in third graders in NY State was conducted by the pro-fluoridation NY Department of Health (NYDOH). When the tooth decay in third graders (average by county), was plotted (by Michael Connett) against the percentage of each county drinking fluoridated water, linear regression shows there is no relationship. There was however a clear relationship with average county income levels.

15. Tooth decay and income levels.

What the findings in the DHHS and NY surveys show is that there is a much stronger relationship between tooth decay and parent's income level than community fluoridation status.

16. The weakness of comparing two towns (or regions).

Frequently promoters will produce surveys comparing the tooth decay between two towns: one fluoridated the other not. However, you can get any result you want comparing two towns (or regions) unless confounding variables are controlled very carefully (i.e. income levels, delayed eruption, diet, genetic, ethnic, cultural and educational differences, parental oversight, as well as the dental services available).

Often, these comparisons look more like a self-serving and self-fulfilling prophesy on behalf of fluoridation promoters, than a genuine comparison of the effects of ingesting fluoride between two towns. That is why the surveys should be part of a bona fide externally peer-reviewed published study. This way it can be ascertained if controls were attempted for these confounding variables. Most importantly it is necessary to compare how much money was spent on dental services in each community as well as the number of interventions administered. There is some evidence in the US and the UK that commensurate with the introduction of fluoridation in some cities (e.g. San Antonio, Texas; Wolverhampton, UK) the measure has been accompanied with other measures to fight tooth decay. This can create or inflate whatever benefit of fluoridation is being claimed.

17. When fluoridation is discontinued

Contrary to claims from proponents that when fluoridation is discontinued tooth decay goes up, several modern studies indicate the very opposite. Where fluoridation has been discontinued in communities from Canada, the former East Germany, Cuba and Finland, dental decay has not increased but in some cases actually decreased (Maupome 2001; Kunzel and Fischer, 1997, 2000; Kunzel 2000 and Seppa 2000).

It is possible that other preventive measures were stepped up when fluoridation was ceased in these communities, but that gives weight to the notion that there are ways of fighting tooth decay other than forcing fluoride on people in their water supply.

18. A dental crisis has been reported in many fluoridated cities in the US

There have been numerous press reports over the last few years of dental crises in US cities and states (e.g. Boston, Cincinnati, Concord, NH, New York City, Pittsburg, Connecticut, South Bronx, Detroit) which have been fluoridated for over 20 years. The fact that these crises are occurring in the low-income areas of the cities again reflects the fact that there is a far greater (inverse) relationship between tooth decay and family income levels than with water fluoride levels. It also

demonstrates that the disparities in tooth decay caused by income levels are not being corrected by fluoridation programs. Here is a sampling of these newspaper reports:

Cincinnati - Fluoridated since 1979

"City and regional medical officials say tooth decay is the city's No. 1 unmet health-care need. 'We cannot meet the demand,' says Dr. Larry Hill, Cincinnati Health Department dental director. 'It's absolutely heartbreaking and a travesty. We have kids in this community with severe untreated dental infections. We have kids with self-esteem problems, and we have kids in severe pain and we have no place to send them in Cincinnati. People would be shocked to learn how bad the problem has become.'" (Solvig, 2002)

Concord, NH - Fluoridated since 1978

"It's overwhelming," said Deb Bergschneider, dental clinic coordinator at the Concord center. "Because we serve the uninsured, we see the lower level of the community and the need is just astronomical. ... By the time they get to us, their mouths are bombed out. They are all emergency situations. It's a severe, severe, problem. It's sad." (Gerth, 2005).

Boston - Fluoridated since 1978

"With a study estimating that the number of untreated cavities among Boston students greatly exceeds the national average, public health officials are about to launch an offensive against what they say is a growing dental crisis in the city... According to statistics cited in the city's latest annual health report, "The Health of Boston 1999": Eighteen percent of children 4 years old and younger who were seen in the pediatric program at Tufts University School of Dental Medicine in 1995 had baby-bottle tooth decay, a painful condition that arises when a baby is given a bottle of juice or milk at bedtime. Treatment can cost up to \$4,000 per child. About 90 percent of 107 Boston high school students were found to need dental treatment, according to a 1996 unpublished study. That report also estimated that the city's students had four times more untreated cavities than the national average..." (Kong, 1999)

Connecticut - Statewide mandatory fluoridation since 1960s

"Dental decay remains the most common chronic disease among Connecticut's children. Poor oral health causes Connecticut children to lose hundreds of thousands of school days each year. One in four Connecticut children is on Medicaid, but two of three Connecticut children receive no dental care. And DSS continues to exploit the seriously stretched public health providers and the few remaining private providers. There is an oral health crisis in Connecticut." (Slate, 2005)

South Bronx - Fluoridated since 1965

"Bleeding gums, impacted teeth and rotting teeth are routine matters for the children I have interviewed in the South Bronx. Children get used to feeling constant pain. They go to sleep with it. They go to school with it. Sometimes their teachers are alarmed and try to get them to a clinic. But it's all so slow and heavily encumbered with red tape and waiting lists and missing, lost or canceled welfare cards, that dental care is often long delayed. Children live for months with pain that grown-ups would find unendurable. The gradual attrition of accepted pain erodes their energy and aspiration. I have seen children in New York with

teeth that look like brownish, broken sticks. I have also seen teen-agers who were missing half their teeth. But, to me, most shocking is to see a child with an abscess that has been inflamed for weeks and that he has simply lived with and accepts as part of the routine of life. Many teachers in the urban schools have seen this. It is almost commonplace." (Kozol, 1991)

Northern Manhattan – Fluoridated since 1965

"The study was conducted to determine the prevalence of early childhood caries (ECC), untreated caries, and the ratio of posterior to anterior caries in a disadvantaged predominantly Hispanic or African-American urban population...The children in this population have higher caries prevalence and a higher level of untreated caries than the national means as reported in NHANES III..." (Albert et al, 2002).

Pittsburgh, PA - Fluoridated since 1953

"Nearly half of children in Pittsburgh between 6 and 8 have had cavities, according to a 2002 state Department of Health report. More than 70 percent of 15-year-olds in the city have had cavities, the highest percentage in the state. Close to 30 percent of the city's children have untreated cavities. That's more than double the state average of 14 percent." (Law, 2005)

Washington DC - Fluoridated since 1952

"Washington DC has "one of the highest decay rates in children in the country." The "typical new patient, age 6, has five or six teeth with cavities -- a 'staggering' number" at the Children's National Medical Center." (Morse, 2002)

19. Early trials and Dean's 21-city study.

A great deal of the conviction that fluoridation works has been derived from two sources: Dean's famous 21-city study (Dean, 1942) and the early fluoridation trials in the US, Canada and New Zealand. However, both the legitimacy and the quality of the methodologies used in these have been questioned.

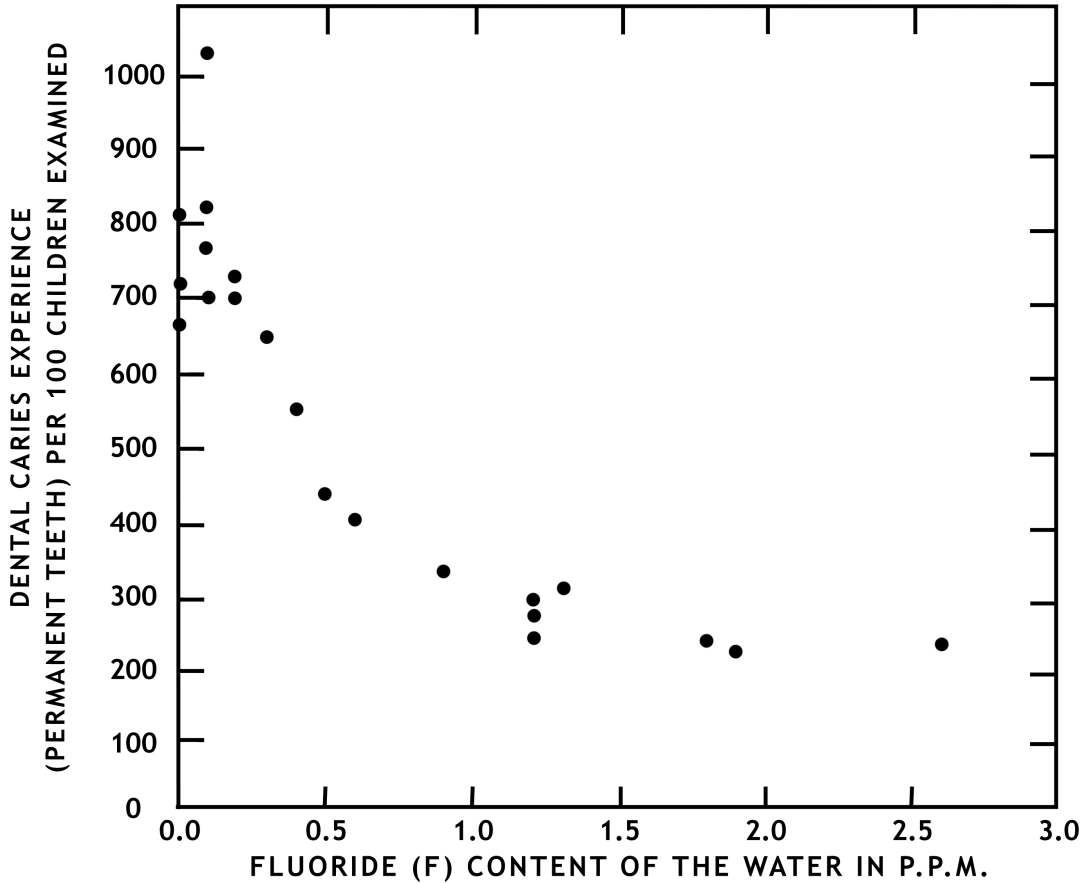
20. Dean's study has been questioned.

In describing Dean's early work the CDC states that:

"Dean compared the prevalence of fluorosis with data collected by others on dental caries prevalence among children in 26 states (as measured by DMFT) and noted a strong inverse relation (10). This cross-sectional relation was confirmed in a study of 21 cities in Colorado, Illinois, Indiana, and Ohio (11)." (CDC, 1999).

This raises the question: if Dean had access to data from 26 states, why did he end up using data from ONLY 21 cities?

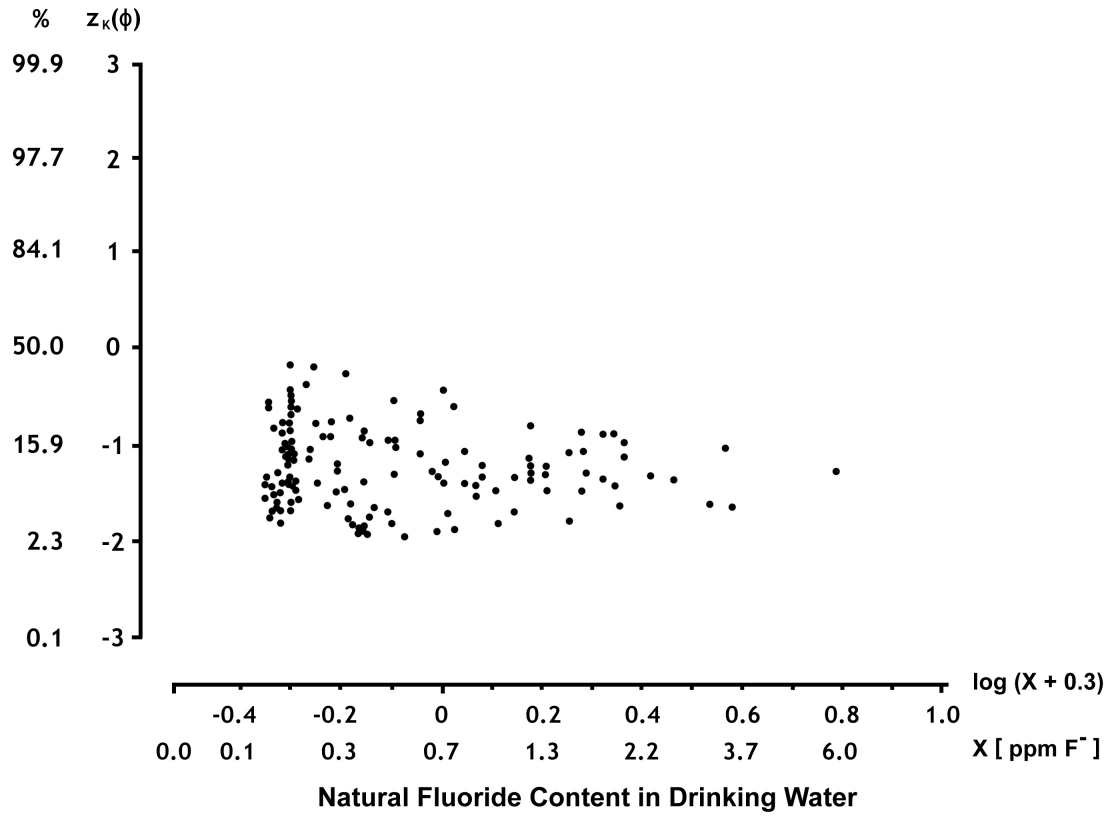
RELATION BETWEEN THE AMOUNT OF DENTAL CARIES (PERMANENT TEETH) OBSERVED IN 7257 SELECTED 12 - 14 YEAR OLD WHITE SCHOOL CHILDREN OF 21 CITIES OF 4 STATES AND THE FLUORIDE (F) CONTENT OF PUBLIC WATER SUPPLY



Rudolf Ziegelbecker, an Austrian statistician, who sadly passed away a few weeks ago, pursued this issue. When he added in all the data he could find from the US and Europe, which related tooth decay with fluoride levels in the water, the inverse relationship reported by Dean disappeared. However, when he examined the same data for dental fluorosis he found a very robust relationship. (Ziegelbecker, 1981). Thus one relationship (between fluoride levels and dental fluorosis) holds up over the "background noise", the other (fluoride levels and dental decay) does not.

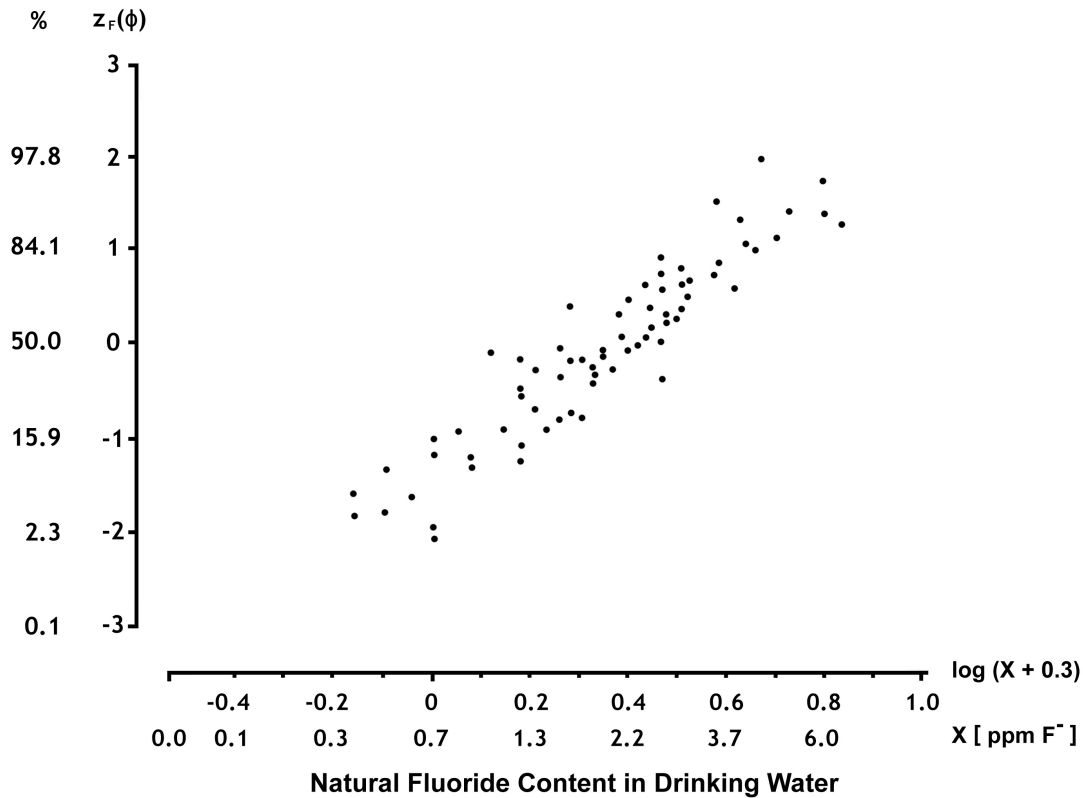
Dental Caries
Prevalence
(% DMFT per child)

Ziegelbecker (1981)



% Children with
Dental Fluorosis

Ziegelbecker (1981)



21. The early trials.

The trials conducted in 1945 -1955 in the US, and Canada, which helped to launch fluoridation, have been heavily criticized for their poor methodology and poor choice of control communities (De Stefano 1954; Sutton 1959, 1960 and 1996; Ziegelbecker 1970). According to Dr. Hubert Arnold, a statistician from the University of California at Davis, the early fluoridation trials:

"are especially rich in fallacies, improper design, invalid use of statistical methods, omissions of contrary data, and just plain muddleheadedness and hebetude (hebetude is mental lethargy or dullness, PC)." (Arnold, 1980)

Some examples of poor methodology in the early trials.

In two trials the control communities were fluoridated before the trial had been completed.

Furthermore, when the Grand Rapids trial began in 1945, children from all 79 schools in Grand Rapids were examined. By 1949, however, examiners observed children from only 25 of these 79 schools. Meanwhile in Muskegon, children from ALL the schools were still being examined.

Such problematic changes and inconsistencies in sampling size is further illustrated by the fact that when the Grand Rapids study commenced, the number of 12 to 16 year olds being examined was 7,661, but by the final year of the study, the number of 12 to 16 year olds being studied had dropped to just 1,031 (Sutton 1996).

Along with these arbitrary changes in the study's sampling methods, the study employed multiple examiners to assess the children's teeth. But as was known at the time, studies from the American Journal of Public Health (Boyd et al., 1951) as well as the Journal of the American Dental Association (Radusch, 1934), there is a considerable variability between each dentists' assessment of a person's teeth.

Despite these enormous weaknesses, these early studies are cited again and again to support the success of fluoridation. As Benjamin Nesin, Director of the New York State Water Laboratories, stated at the time,

"It must be emphasized that the fluoridation hypothesis in its entirety rests on a very narrow base of selected experimental information. It is this very base which is vulnerable to scientific criticism. And it is upon this very narrow base that the impressive array of endorsement rests like an inverted pyramid (Nesin, 1956)."

Sutton's monographs on this matter (Sutton, 1959, 1960) have never been successfully refuted by proponents, even though they have tried. Sutton's work was re-published in book form shortly before he died in 1996. The book also contains some of the letters and articles that attempted to rebut Sutton's work and his responses.

22. The Hastings-Napier trial a fraud.

The Hastings-Napier trial was conducted in the 1950s and was used to successfully promote fluoridation throughout New Zealand. However, it has now been shown to be fraudulent (Colquhoun and Mann, 1986; Colquhoun PhD thesis, 1987). The control community (Napier) was dropped two years after the trial began and the huge drop in tooth decay found in Hastings was found to be due to an artifact involving a change in methodology used to characterize tooth decay before and after the trial (i.e. diagnosing tooth decay was less stringent at the end of the trial than at the beginning). The fact that the methodology had been changed was NOT acknowledged by the authors when they published their report – which in our book constitutes fraud (Ludwig, 1958, 1959, 1962, 1963, 1965, 1971; Colquhoun, 1987).

23. Modern Studies.

If we shift to more modern times, a major development occurred in 1980. This was when Dr. John Colquhoun was sent by his superiors in New Zealand on a four-month world tour to investigate tooth decay in several different continents, including Australia, Asia, North America and Europe. He was expected to bring back with him evidence that would prove once and for all that fluoridation worked. He failed to do so.

24. Colquhoun's work (1980- 1997)

In 1980 Colquhoun was the principal dental officer for Auckland, NZ's largest city. Both as a dental officer and as a city councilor he had avidly and successfully promoted fluoridation throughout the country.

When Colquhoun went on his world tour, to his dismay, researchers reported to him – behind the scenes - that they were not finding the difference in tooth decay between fluoridated and non-fluoridated communities that they had expected – in fact they were finding very little difference at all.

When Colquhoun returned to NZ he was given a summary of tooth decay for the whole of the country. NZ is a little unusual in this respect since under their national health service they monitor tooth decay for ALL children at the ages of 5 and 12. So this was not a *sample* survey but a

complete record.

When Colquhoun looked at the complete record of tooth decay in NZ, he found no difference in tooth decay between the fluoridated and non-fluoridated cities. If anything, the teeth were slightly better in the non-fluoridated communities.

When Colquhoun's assistants reported to him the extensive amount of dental fluorosis occurring in fluoridated Auckland, he risked his pension by deciding to make the lack of fluoridation's effectiveness public. To his enormous credit he spent the rest of his life trying to undo the damage he had done by reversing his position on fluoridation, and opposing it in any scientific way he could.

Paul Connett interviewed Colquhoun on videotape in Auckland in 1997 shortly before he died (see Colquhoun videotape, Connett, 1997).

Colquhoun wrote up his findings in several published papers (Colquhoun 1984, 1985, 1987, 1990, 1992 and 1995) and after he retired he obtained a PhD (1987). His research thesis examined the history of fluoridation in New Zealand. He offered Thomas Kuhn's famous analysis: "The Structure of Scientific Revolutions" to explain the reluctance of the dental community to change its paradigm on fluoridation's safety and effectiveness in NZ. In his thesis Colquhoun also exposed the rigged nature of the Hastings-Napier fluoridation trial (discussed above).

Colquhoun summarized his evolution from being an ardent supporter of fluoridation to one of its most articulate critics in, "Why I changed My Mind on Fluoridation," a paper published in 1997.

25. Leverett, 1982

In the 1980's articles began to appear pointing out that tooth decay was falling in non-fluoridated communities. Dennis Leverett reviewed many of these studies in the prestigious journal *Science* in 1982. Leverett noted:

"Within the past 2 or 3 years there has been increasing evidence from several developed nations of a drop in the prevalence of dental caries which cannot be attributed directly to intentional fluoride use. The data are becoming available as epidemiologists and clinical researchers review the patterns of dental caries prevalence in communities that do not have fluoridated water. The data cover children from the ages of 5 to 17 for various periods of up to 30 years; caries reductions as high as 60 per cent have been observed" (Leverett, 1982, p.27)

"The decline in caries prevalence in communities without fluoridated water in various countries is well documented (Hunter, 1979; McEniery and Davies, 1979; Zacheri and Long, 1979; Mitropoulos and Worthington, 1981; Mainwaring and Naylor, 1981; Leverett, unpublished data; DePaola et al, 1981; Glass, 1981, 1982; NIDR, 1981). The cause or causes are, at this time, a matter of speculation" (Leverett, 1982, p. 29).

Leverett speculated that the reductions in non-fluoridated areas were due to

"an increase in fluoride in the food chain, especially from the use of fluoridated water in food processing, increased use of infant formulas with measurable fluoride content, and even unintentional ingestion of fluoride dentifrices."

26. Diesendorf, 1986

The next significant paper came from Mark Diesendorf who published, "The Mystery of Declining

Tooth Decay" in Nature in 1986. In this article Diesendorf showed that tooth decay was coming down before fluoridation was introduced in Tamworth, Australia, and continued to decline for each age long after any benefits would have been maximized.

It is important to comment on this latter finding because it remains relevant – but often overlooked - today. We will use tooth decay in 12 year olds to explain. 12 years after fluoridation has begun in a city, all 12 year olds will have been exposed to fluoridated water for 12 years (i.e. their whole lives). For all subsequent years – ALL 12 year olds will also have been exposed to fluoridated water their whole lives. Thus after 12 years any further drop in tooth decay cannot be ascribed to fluoridation. That has been maximized for all 12 year olds after 12 years of the program. Today, careless observers are using current data in fluoridating communities without referring back to the numbers ascertained at the year when maximized benefit would have been achieved for the age in question.

Diesendorf rejected Leverett's hypothesis (as cited above) that the drop in tooth decay in non-fluoridated areas was due to ingestion of fluoride from other sources, because as he stated:

"this hypothesis cannot explain the reductions in prefluoridation Sydney, or those in unfluoridated parts of Gloucestershire which started in the late 1960s." (p.129)

Diesendorf added,

"The food processing pathway is unlikely to be significant in Western Europe where there is hardly any fluoridation" (p. 129)

Diesendorf offered his own suggestions for these declines in tooth decay in non-fluoridated communities:

"(T)he main causes of the observed reductions in caries are changes in dietary patterns, possible changes in the immune status of populations and, under some circumstances the use of topical fluorides." (p. 129)

After discussing the issue of diet, Diesendorf included his article with this comment:

"Perhaps the real mystery of declining tooth decay is why so much effort has gone into poor quality research on fluoridation, instead of on more fundamental questions of diet and immunity." (p.129)

It is worth noting that Diesendorf's background was not dentistry but in theoretical physics. Indeed, he had already published in Nature on this subject. Today he is better known in Australia for his work on alternative energy sources (Saddler & Diesendorf, 2004).

For Diesendorf it is quite likely that the reason he was able to break through the dental community's almost sacrosanct paradigm of fluoridation's effectiveness, was precisely because he was not trained at dental school. It has taken rare integrity and courage for dentally trained professionals, like John Colquhoun (NZ), Philip Sutton (Australia), David Kennedy (US), and Hardy Limeback, to challenge the fundamentals of this practice.

27. Gray, 1987

Another dental professional who attempted to question the paradigm was A.S. Gray, but doing so did not enhance his career. Gray reviewed the tooth decay figures largely in British Columbia. He stated that these indicate that:

"DMF rates in children are falling drastically in non-fluoridated areas as well as fluoridated areas. The current statements of our profession in support of fluoridation do not appear to take these changes into account. It is timely for the profession to take the lead in deciding what is scientifically appropriate to tell communities that may consider installing fluoridation equipment and holding fluoridation referendums in the late 1980's."

Gray cited these figures to support this conclusion:

"[S]urvey results in British Columbia with only 11 per cent of the population using fluoridated water, show lower average DMFT rates than provinces with 40-70 percent of the population drinking fluoridated water. How does one explain this?... [S]chool districts recently reporting the highest caries free rates were totally unfluoridated."

28. NIDR, 1986-87

In 1986 the National Institute of Dental Research (NIDR) stepped in and organized – at great expense to the US taxpayer - the largest survey of tooth decay ever undertaken in the US. They examined the teeth of nearly 40,000 children in 84 communities.

29. Yiammouyiannis, 1990.

When Dr. John Yiammouyiannis (a well-known opponent of fluoridation and author of the book "The Aging Factor") obtained the raw data from the NIDR he found that there was no statistical difference between the DMFTs (decayed missing and filled permanent teeth) of children between those who lived all their lives in a fluoridated community (F) and those who lived their whole lives in a non-fluoridated community (NF), and those who had lived their lives part of the time in a fluoridated community and part of the time in a non-fluoridated community (PF). In a figure in his paper he showed that the three curves for DMFT across the age range from 5 to 17 years are plotted for the F, NF and PF children and the lines essentially overlap.

30. Brunelle and Carlos, 1990.

Subsequently, two authors from the NIDR (Brunelle and Carlos) published their own analysis of the data. However, they decided to increase the sensitivity of the study by analyzing tooth decay using DMFS (decayed missing filled permanent surfaces) as a measure of decay. All except the cutting teeth have 5 surfaces per tooth so this increased the sensitivity by nearly a factor of five. Even so they found very little difference between children who lived all their lives in a fluoridated community or a non-fluoridated community.

In the abstract of their paper the authors reported the average difference for 5-17 year olds as 18%. However, if one goes to Table 6 in their paper one finds that this average saving amounts to just 0.6 of one tooth surface, and that is out of approximately 100 tooth surfaces in a child's mouth. Nor did the authors subject this to any analysis to see if the result was statistically significant. What we are looking at here are the arithmetical vagaries of comparing two small numbers. Reporting that small difference as a percentage can be very misleading. For a fluoridation promoter an 18% reduction in tooth decay sounds a lot better than the saving of 0.6 of one tooth surface. Even so, 18% is still a lot smaller than the figure of 60% that was being used by promoters of fluoridation at that time.

Despite this very unimpressive difference in tooth decay, this is what the authors stated in their abstract:

"The results suggest that water fluoridation has played a dominant role in the

decline in caries and must continue to be a major prevention methodology."

For most people a saving of just 0.6 of one tooth surface would hardly seem to justify the time, money and angst involved in imposing this practice on reluctant individuals and communities. However, it is not unusual for dental research papers which report either meager or no savings to claim in the abstract that the paper supports water fluoridation. Cynics might suggest that this is the price that has to be paid to ensure future funding. Whatever the motivation for the hyperbole it has often proved effective for those decision makers who never read the abstract or read the fine details in the results section.

31. Spencer et al., 1996

Subsequently a large survey conducted in two states in Australia found an even smaller difference (than the NIDR in the US) in average tooth decay in the permanent teeth - again measured as DMFS - between children who had lived all their lives in fluoridated versus non-fluoridated communities (Spencer et al., 1996). They found an average difference of between 0.12 and 0.3 tooth surfaces per child compared with the 0.6 DMFS found by Brunelle and Carlos (1990). Even if these differences are real they represent a very small fraction of the tooth surfaces in a child's mouth. 0.3 of one tooth surface out of 128 tooth surfaces represents an absolute saving of just 0.23%.

However, this is what the authors said about the context of their finding in the abstract of their paper:

"In the press and scientific literature there has been questioning of fluoridation, although the most recent Australian review reasserted its safety and effectiveness...lifetime exposure to fluoridation is associated with average reductions of 2.0 dmfs and between 0.12 and 0.3 DMFS per child, (Spencer et al., 1996, abstract).

Please note the significance of the lower and upper case letters here: dmfs, denotes decayed missing and filled PRIMARY teeth and DMFS denotes decayed missing and filled SECONDARY teeth.

32. de Liefde, 1998.

In 1998, de Liefde in a survey of tooth decay in New Zealand described the difference in permanent tooth decay between fluoridated and non-fluoridated communities as "clinically meaningless" (de Liefde, 1998)

33. Locker, 1999.

In a report prepared for the Ontario Ministry of Health & Long Term Care, Dr. David Locker, of the University of Toronto, reported:

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

34. Armfield and Spencer, 2004

In 2004, Armfield and Spencer published a study, which investigated tooth decay in 10,000 children in South Australia. While they found a small difference in the primary teeth they found no statistically significant difference between tooth decay in the permanent teeth between those children who had drunk tank water (rain water) or bottled water and those who drank fluoridated

water. Spencer claims that fluoridation opponents are misusing their study (Spencer, 2006), however in their abstract the authors clearly state:

"The effect of consumption of nonpublic water on permanent caries experience was not significant." (Armfield and Spencer, 2004).

See Diesendorf's response to Spencer's claim (Spencer, 2006) that he and others have misused his paper (Diesendorf, 2006).

35. Pizzo, 2007

In 2007, a team of Italian researchers from the University of Palermo, concluded from their review of the literature:

"...it is now accepted that systemic fluoride plays a limited role in caries prevention. Several epidemiological studies conducted in fluoridated and non-fluoridated communities clearly indicate that CWF [community water fluoridation, PC] may be unnecessary for caries prevention, particularly in the industrialized countries where the caries level has become low." (Pizzo et al, 2007)

References:

Albert DA, Findley S, Mitchell DA, Park K, McManus JM. 2002. Dental caries among disadvantaged 3- to 4-year old children in northern Manhattan. *Pediatr Dent.* 24(3):229-33. May-June.

Armfield JM, Spencer AJ. 2004. Consumption of nonpublic water: implications for children's caries experience. *Community Dent Oral Epidemiol* 32:283-296.

Arnold HA. 1980. Letter to Dr. Ernest Newbrun. May 28, 1980. Available at <http://www.fluoridealert.org/uc-davis.htm>

Awadia AK, Birkeland JM, Haugejorden O, Bjorvatn K. 2002. Caries experience and caries predictors - a study of Tanzanian children consuming drinking water with different fluoride concentrations. *Clin Oral Invest* (2002) 6:98-103.

Barnes GP, Parker WA, Lyon TC, Drum MA, Coleman GC. 1992. Ethnicity, location, age, and fluoridation factors in baby bottle tooth decay and caries prevalence of Head Start children. *Public Health Reports* 107:167-73.

Blen M, Narendran S, Jones K. 1999. Dental caries in children under age three attending a university clinic. *Pediatr Dent.* 21(4):261-4. July-August.

Boyd JC, Wessels NE. 1951. Epidemiological studies in dental caries. III. The interpretation of clinical data relating to caries advance. *J. Am. Public Health*, 51: 967-986.

Brunelle JA, Carlos JP. 1990. Recent trends in dental caries in U.S. children and the effect of water fluoridation. *J. Dent. Res* 69, (Special edition), 723-727. Available at <http://www.fluoridealert.org/health/teeth/caries/nidr-dmfs.html>

Centers for Disease Control and Prevention (CDC). 1999. Achievements in public health, 1900-1999: Fluoridation of drinking water to prevent dental caries. *Mortality and Morbidity Weekly Review.* (MMWR). 48(41): 933-940 October 22, 1999. Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4841a1.htm>

Centers for Disease Control and Prevention (CDC). 2001. Recommendations for using fluoride to prevent and control dental caries in the United States. *Mortality and Morbidity Weekly Review* (MMWR). August 17. 50(RR14):1-42. Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm>

Cheng KK, Chalmers I, Sheldon TA. 2007. Adding fluoride to water supplies. *British Medical Journal* 335(7622):699-702.

Colquhoun J. 1984. New evidence on fluoridation. *Social Science & Medicine* 19:1239-46.

Colquhoun J. 1985. Influence of social class and fluoridation on child dental health. *Community Dentistry and Oral Epidemiology* 13:37-41.

Colquhoun J. 1987. Education and fluoridation in New Zealand: an historical study. PhD thesis. University of Auckland, NZ.

Colquhoun J. 1987. Child dental health differences in New Zealand. *Community Health Studies* 11:87-104.

Colquhoun J. 1990. Flawed foundation: a re-examination of the scientific basis for a dental benefit from fluoridation. *Community Health Studies* 14:288-96.

Colquhoun J. 1992. Possible explanations for decline in tooth decay in New Zealand. *Community Dentistry and Oral Epidemiology* 1992 20:161-6.

Colquhoun J. 1995. Dental caries among children in New Zealand. *Community Dentistry and Oral Epidemiology* 23:381.

Colquhoun J. 1997. Why I changed my mind about fluoridation. *Perspectives in Biology and Medicine* 41: 29-44.

Available at <http://www.fluoride-journal.com/98-31-2/312103.htm>

Dean HT, Arnold FA Jr, Elvove E. 1942. Domestic water and dental caries. *Pub. Health Rep.* 57:1155-1179, August 7.

de Liefde B. 1998. The decline of caries in New Zealand over the past 40 years. *New Zealand Dental Journal.* 94: 109-113

De Paola PF, Soparkar P, Allukian M, De Velis R, Resker M. 1981. Changes in caries prevalence of Massachusetts children over thirty years. *J Dental Res*; 60:360.

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

Diesendorf M. 1986. The mystery of declining tooth decay. *Nature.* 322:125-129. Available at <http://www.fluoridealert.org/health/teeth/caries/diesendorf.html>

Diesendorf M. 2006. Response to John Spencer's obfuscation of the results of his own paper. *Fluoride* 39(4):327-330. http://www.fluorideresearch.org/394/files/FJ2006_v39_n4_p326-330.pdf

Ekanayake L, van der Hoek W. 2002. Dental caries and developmental defects of enamel in relation to fluoride levels in drinking water in an arid area of Sri Lanka. *Caries Research* 36: 398-404.

Febres C, Echeverri EA, Keene HJ. 1997. Parental awareness, habits, and social factors and their relationship to baby bottle tooth decay. *Pediatric Dentistry* 19:22-27. (Of 100 children in this study, 19 had BBTD on at least two maxillary incisors: Hispanic 13, Black 3, White 1. -note: Houston was fluoridated in 1982.)

Feltman R, Kosel G. 1961 Prenatal and postnatal ingestion of fluorides - Fourteen years of investigation - final report. *J Dent Med* 16:190-99.

Gerth U. 2005. Nothing to smile about. *Fosters Daily Democrat* (Connecticut). May 22. Available at <http://www2.fluoridealert.org/Alert/United-States/New-Hampshire/Nothing-to-smile-about>

Glass RL. 1981. Secular changes in caries prevalence in two Massachusetts towns. *Caries Res.* 15: 445-450.

Glass RL. 1982. The first international conference of the declining prevalence of dental caries. *J Dent Res* 61:1301-1383.

Gray AS. 1987. Fluoridation: time for a new base line? *Journal of the Canadian Dental Association.* 53(10): 763-5.

- Grobleri SR, Louw AJ, van Kotze TJ. 2001. Dental fluorosis and caries experience in relation to three different drinking water fluoride levels in South Africa. *Int J Paediatr Dent.* 11(5):372-9.
- Hunter PB. 1979. The prevalence of dental caries in 5-year-old New Zealand children. 1979. *New Zealand Dental Journal* 75(341):154-7.
- Institute of Medicine (IOM). 1997. Dietary reference intakes for calcium, phosphorus, magnesium, vitamin D, and fluoride. Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board. National Academy Press. Available at <http://www.nap.edu/openbook.php?isbn=0309063507>
- Kelly M, Bruerd B. 1987. The prevalence of baby bottle tooth decay among two native American populations. *Journal of Public Health Dentistry* 47:94-97.
- Komárek A, Lesaffre E, Härkänen T, Declerck D, Virtanen JI. 2005. A Bayesian analysis of multivariate doubly-interval-censored dental data. *Biostatistics* 6:145-55.
- Kong D. 1999. City to launch battle against dental 'crisis'. *Boston Globe* (Massachusetts). November 27. Available at <http://www.fluoridealert.org/f-boston.htm>
- Kozol J. 1991. *Savage inequalities. Children in America's schools.* Crown Publishers, Inc. (New York). Harper Perennial / Harper Collins (New York).
- Künzel W, Fischer T. 1997. Rise and fall of caries prevalence in German towns with different F concentrations in drinking water. *Caries Res* 31(3):166-73.
- Künzel W, Fischer T. 2000. Caries prevalence after cessation of water fluoridation in La Salud, Cuba. *Caries Res* 34(1):20-5.
- Künzel W, Fischer T, Lorenz R, Brühmann S. 2000. Decline in caries prevalence after the cessation of water fluoridation in former East Germany. *Community Dent. Oral Epidemiol.* 28(5):382-389.
- Law V. 2005. Sink your teeth into health care. *Pittsburgh Tribune-Review* (Pennsylvania). February 13. Available at http://www.pittsburghlive.com/x/pittsburghtrib/s_303168.html
- Leverett DH. 1982. Fluorides and the changing prevalence of dental caries. *Science.* 217(4554):26-30.
- Locker D. 1999. Benefits and risks of water fluoridation. An Update of the 1996 Federal-Provincial Sub-committee Report. Prepared for Ontario Ministry of Health and Long Term Care. Available at http://www.health.gov.on.ca/english/public/pub/ministry_reports/fluoridation/fluor.pdf
- Ludwig TG. 1958. The Hastings fluoridation project I. Dental effects between 1954 and 1957. *NZ Dent J.* 54:165-72.
- Ludwig TG. 1959. The Hastings fluoridation project II. Dental effects between 1954 and 1959. *NZ Dent J.* 55:176-79.
- Ludwig TG. 1962. The Hastings fluoridation project III. Dental effects between 1954 and 1961. *NZ Dent J.* 58:22-4.
- Ludwig TG. 1963. The Hastings fluoridation project IV. Dental effects between 1954 and 1964. *NZ Dent J.* 59:175-9.

- Ludwig TG. 1965. The Hastings fluoridation project V. Dental effects between 1954 and 1963. *NZ Dent J.* 59:298-301.
- Ludwig TG. 1971. The Hastings fluoridation project VI. Dental effects between 1954 and 1970. *NZ Dent J.* 67:155-60.
- Mainwaring PJ, Naylor NM. 1981. The secular changes in caries experience in 11- to 12-year-old children over one decade. *J. Dent. Res.* 60:1140.
- Mann J, Tibi M, Sgan-Cohen HD. 1987. Fluorosis and caries prevalence in a community drinking above-optimal fluoridated water. *Community Dentistry and Oral Epidemiology* 15:293-5.
- Mann J, Mahmoud W, Ernest M, Sgan-Cohen H, Shoshan N, Gedalia I. 1990. Fluorosis and dental caries in 6-8-year-old children in a 5 ppm fluoride area. *Community Dent Oral Epidemiol.* 18(2):77-9.
- Maupomé G, Clark DC, Levy SM, Berkowitz J. 2001. Patterns of dental caries following the cessation of water fluoridation. *Community Dent Oral Epidemiol.* 29(1):37-47.
- McDonagh M, Whiting PF, Wilson PM, Sutton AJ, Chestnutt I, Cooper J, Misso K, Bradley M, Treasure E, Kleijnen J. 2000. A systematic review of public water fluoridation. NHS Center for Reviews and Dissemination, University of York, September 2000.
<http://www.bmj.com/cgi/content/full/321/7265/855>
- McEniery TM, Davies GN. 1979. Brisbane dental survey, 1977. A comparative study of caries experience of children in Brisbane, Australia over a 20-year period. *Commun. Dent. Oral Epidemiol.*, 7: 42-50.
- Mitropoulos CM, Worthington HV. 1981. Statistical aspects of caries prevalence data over a 12-year period in English school children. *J Dent Res.* 60:1154. Sp. Iss. B.
- Morse S. 2002. Dentists push for fluoride in bottled water. *Washington Post (DC)*. March 5. Available at <http://www2.fluoridealert.org/Alert/United-States/National/Dentists-Push-for-Fluoride-in-Bottled-Water>
- Nesin BC. 1956. A water supply perspective of the fluoridation discussion. *J Maine Water Utilities Association.*
- National Institute of Dental Research (NIDR). 1981. The prevalence of dental caries in United States children, 1979-80: National Dental Caries Prevalence Survey. Bethesda, Maryland: US Department of Health and Human Services, Public Health Service, 1981; NIH publication No. 82-2245.
- National Research Council (NRC). 1993. Health effects of ingested fluoride. National Academy Press, Washington DC. Available at <http://www.nap.edu/openbook.php?isbn=030904975X>
- National Research Council (NRC). 2006. Fluoride in drinking water: a scientific review of EPA's standards. National Academies Press, Washington D.C. Available at http://www.nap.edu/catalog.php?record_id=11571

Nesin BC. 1956. A water supply perspective of the fluoridation discussion. J Maine Water Utilities Association.

Olsson B. 1979. Dental findings in high-fluoride areas in Ethiopia. Community Dentistry and Oral Epidemiology 7(1):51-6.

Osmunson B. 2007. Water fluoridation intervention: dentistry's crown jewel or dark hour? Fluoride 40(4):214-221. October-December. Available at http://www.fluorideresearch.org/404/files/FJ2007_v40_n4_p214-221.pdf

Pinkham JR, ed. 1999. Pediatric dentistry: infancy through adolescence. 3rd Edition. WB Saunders Co.

Pizzo G, Piscopo MR, Pizzo I, Giuliana G. 2007. Community water fluoridation and caries prevention: a critical review. Clinical Oral Investigations 11(3):189-93.

Radusch DF. 1934. Variability of diagnosis of incidence of dental caries. J. Am. Dent. Assoc., 28: 1959-1961, 1941.

Retief DH, Bradley EL, Barbakow FH, Friedman M, van der Merwe EH, Bischoff JI. 1979. Relationships among fluoride concentration in enamel, degree of fluorosis and caries incidence in a community residing in a high fluoride area. Journal of Oral Pathology 8:224-36.

Saddler H, Diesendorf M, Denniss R. 2004. A clean energy future for Australia, Clean Energy Future Group, Sydney, Australia.

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

Seppä L, Kärkkäinen S, Hausen H. 2000. Caries trends 1992-98 in two low-fluoride Finnish towns formerly with and without fluoride. Caries Res. 34(6):462-8.

Slate R. 2005. State must fund plan to provide oral health care for the poor. New Haven Register (Connecticut). May 5. Available at <http://www2.fluoridealert.org/Alert/United-States/Connecticut/Fluoridated-Connecticut-experiencing-Oral-Health-Crisis>

Solvig E. 2002. Special report: Cincinnati's dental crisis, Cincinnati Enquirer (Ohio). October 6. Available at <http://www.fluoridealert.org/media/2002d.html>

Spencer AJ, Slade GD, Davies M. 1996. Water fluoridation in Australia. Community Dent Health. 13 Suppl 2:27-37. September.

Spencer AJ. 2006. The use of fluorides in Australia: Guidelines. Aust Dent J 51(2):195-199.

Spencer J. 2006. Dental research on fluoridation misused. Fluoride 39(4):326-327. http://www.fluorideresearch.org/394/files/FJ2006_v39_n4_p326-330.pdf

Steelink C. 1992. Fluoridation controversy. Letter. Chemical & Engineering News. pp 2-3. July 27.

Sutton P. 1959. Fluoridation: errors and omissions in experimental trials. Melbourne University Press. First Edition.

Sutton P. 1960. Fluoridation: Errors and omissions in experimental trials. Melbourne University Press. Second Edition.

Sutton P. 1996. The greatest fraud: fluoridation. Lorne, Australia: Kurunda Pty, Ltd.

Tang JM, Altman DS, Robertson DC, O'Sullivan DM, Douglass JM, Tinanoff N. 1997. Dental caries prevalence and treatment levels in Arizona preschool children. Public Health Reports; 112:319-29. Available at <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1381972>

Teotia SPS, Teotia M. 1994. Dental caries: a disorder of high fluoride and low dietary calcium interactions (30 years of personal research). Fluoride. 27(2):59-66.

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

Von Burg MM, Sanders BJ, Weddell JA. 1995. Baby bottle tooth decay: a concern for all mothers. Pediatric Nursing. 21:515-519.

Weinstein P, Domoto P, Wohlers K, Koday M. 1992. Mexican-America parents with children at risk for baby bottle tooth decay. Pilot study at migrant farmworkers clinic. ASDC J Dent Chil 59:376-383.

Yiamouyiannis JA. 1990. Water fluoridation and tooth decay: results from the 1986-87 national survey of U.S. schoolchildren. Fluoride. 23:55-67.

Zacherl WA, Long DM. 1979. Reduction in caries attack rate – non-fluoridated community. J. Dent. Res. (Sp. Iss. A.) 58:227.

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

Ziegelbecker R. 1981. Fluoridated water and teeth. Fluoride 14:123-128.