Bill as Introduced

SB 312 - AS INTRODUCED

2000 SESSION

00-2641
08/01

SENATE BILL ***312***

AN ACT relative to fluoride.

SPONSORS: Sen. Wheeler, Dist 21; Sen. Squires, Dist 12; Rep. Emerton, Hills 7; Rep. Copenhaver, Graf 10

COMMITTEE: Public Affairs

ANALYSIS

This bill changes to 5 percent the percentage of town, city, or village water district voters needed to put an article or question relative to fluoridation of the municipality's water supply on the warrant or ballot for an annual meeting or election.

Explanation: Matter added to current law appears in ***bold italics.***
Matter removed from current law appears [~~in brackets and struckthrough.~~]
Matter which is either (a) all new or (b) repealed and reenacted appears in regular type.

SB 312 - AS INTRODUCED

00-2641
08/01

STATE OF NEW HAMPSHIRE

In the Year of Our Lord Two Thousand

AN ACT relative to fluoride.

Be it Enacted by the Senate and House of Representatives in General Court convened:

1 Public Water Supplies; Town Referendum on Fluorides in Water; Percentage Required. Amend RSA 31:17-a to read as follows:

31:17-a Referendum. Upon the written application of [~~10~~] *5* percent of the voters in a town, presented to the selectmen or one of them at least 15 days before the day prescribed for an annual town meeting, the selectmen shall insert in their warrant for such meeting an article relative to the use of fluorides in the public water system for said town. If the town has an official ballot, the town clerk shall insert on such ballot the following question: "Shall permission be granted to introduce fluorides into the public water system?" Beside this question shall be printed the word "yes" and the word "no" with the proper boxes for the voter to indicate his choice. If a majority of the voters do not approve the use of fluorides in the public water system, no fluorides shall be introduced into the public water system for said town; or if fluorides have prior to said vote been introduced, such use shall be discontinued until such time as the voters of the town shall, by majority vote, approve the use of fluorides. After such popular referendum, the selectmen shall not insert an article relative to the use of fluorides in the public water system in the warrant nor shall such question be inserted on the official ballot for a minimum period of 3 years from the date of the last popular referendum and only upon written application at that time of not less than [~~10~~] *5* percent of the registered voters of said town.

2 Public Water Supplies; City Referendum on Fluorides in Water; Percentage Required. Amend RSA 44:16 to read as follows:

44:16 Public Water Supplies. Upon the written application of [~~10~~] *5* percent of the voters in any city, presented to the city clerk prior to the municipal election, the city clerk shall insert on the ballot to be used at said election the following question: "Shall permission be granted to introduce fluorides into the public water system?" Beside this question shall be printed the word "yes" and the word "no" with the proper boxes for the voter to indicate his choice. If a majority of the voters at said election do not approve the use of fluorides in the public water system for said city, no fluorides shall be introduced into the public water system. If fluorides have, prior to said vote, been so introduced, such use shall be discontinued until such time as the voters of the city shall, by majority vote, approve the use of such fluorides. After such popular referendum, the city clerk shall not insert the aforementioned question relative to the use of fluorides in the public water system on the ballot to be

used at the municipal election for a minimum period of 3 years from the date of the last popular referendum, and only upon written application at that time of not less than [~~10~~] *5* percent of the registered voters of said city.

3 Public Water Supplies; Village Water District Referendum on Fluorides in Water; Percentage Required. Amend RSA 52:23 to read as follows:

52:23 Public Water. Upon the written application of [~~10~~] *5* percent of the voters in any village water district, presented to the commissioners or one of them at least 15 days before the day prescribed for an annual meeting of the district, the commissioners shall insert in their warrant for such meeting an article relative to the use of fluorides in the water system for said district, and the district clerk shall prepare a ballot for said meeting with the following question: "Shall permission be granted to introduce fluorides into the district water system?" Beside the question shall be printed the word "yes" and the word "no" with the proper boxes for the voter to indicate his choice. If a majority of the voters do not approve the use of fluorides in the district water system, no fluorides shall be introduced into the district water system; or if fluorides have, prior to said vote, been so introduced, such use shall be discontinued until such time as the voters of the district shall, by majority vote, approve of the use of fluorides. After such popular referendum, the commissioners shall not insert an article relative to the use of fluorides in the district water system in the warrant nor shall the district clerk prepare such a ballot for a minimum period of 3 years from the date of the last popular referendum of the district and only upon written application at that time of not less than [~~10~~] *5* percent of the registered voters of said district.

4 Effective Date. This act shall take effect 60 days after its passage.

Committee Minutes

Extra copies

Date: **February 23, 2000**
Time: **1:50 PM**
Room: **104 - LOB**

The Senate Committee on Public Affairs held a hearing on the following:

SB 312 relative to fluoride

Members of Committee present: Senator Trombly
Senator Disnard
Senator Eaton
Senator Krueger
Senator McCarley
Senator Roberge

The Chair, Senator Rick A. Trombly, opened the hearing by calling on Senator Wheeler for the introduction of Senate Bill 312.

Senator Katherine W. Wheeler, D. 21: Thank you Mr. Chair and members of the committee. I am Senator Katie Wheeler from District 21 (Dover, Durham, Lee, Madbury, and Rollingsford), and I'm very pleased to bring Senate Bill 312 to you today.

I've been quite active since I've been in the legislature in all health issues and, in the past number of years, specifically with the issue of public health. As you all know, I've worked a great deal on oral healthcare issues and have sponsored various pieces of legislation to try to expand access to oral healthcare to our children and to our adults in our state because I think it's a serious lack. In the course of these legislative efforts, I've had a lot of testimony, a lot of photographs, gone to clinics, and I've seen evidence of really terrible tooth decay in very young children and what it can do to their overall health as well as to the health of their mouths. . . .and it is incredibly depressing. If I had a million dollars extra I'd endow dental clinics. . . .I'd do something for oral healthcare. . . .But, not having that. . . . .One of the most cost-effective ways we know of in our country to help children have strong healthy teeth is to have fluoridated water.

Throughout decades of research and more than 50 years of practical experience, fluoridation of public water supplies has been responsible for dramatically improving the public's oral health. Along with the eradication

of polio, community water fluoridation is seen as one of the ten most successful public health measures of the century. In a 1995 policy statement, the U. S. Public Health Service reaffirmed that water fluoridation is the most cost effective, practical, and safe means for reducing the amount of tooth decay in a community. Simply by drinking optimally fluoridated water, the entire community benefits regardless of age, socioeconomic status, educational level, or other variables.

Fluoridation's benefits do not require individual behavior change and are available to those without access to dental care.

Senate Bill 312 is not mandated fluoridated water . . . . It's not even putting fluoridated water in one community. It's just making it more possible for a community to put the question of water fluoridation before the voters. We haven't changed the law – the community still is being asked if they want water fluoridation. They can still vote it down; but we have an almost impossible barrier right now to getting this before the voters.

Right now, New Hampshire law requires that 10% of voters need to sign a petition to put the fluoridation referendum on the ballot. That's a lot of people. Last year in Manchester 6,000 petition signatures were required before the voters could even vote on the idea of fluoridating the public water supply. It wasn't 6,000 votes to get fluoridation; it was 6,000 votes to be allowed to address the question.

Senate Bill 312 would change the requirement so that 5 percent of the voters are needed to sign a petition to put the question of fluoridation on the ballot. Legal research shows that to add a referendum question to the ballot that provides for liquor sales in a community or for the sales of sweepstakes tickets in a community, only 5 percent of the voters are required to petition the selectmen to put these questions before the voters.

Senate Bill 312 asks to make the requirements the same for fluoridation as for the sale of liquor or sweepstakes tickets. I don't know why we have a barrier that's twice as high for a public health matter than we do for selling liquor or sweepstakes tickets, and I think it's time we rectified it.

I thank you for your kind attention to this matter.

Senator Rick A. Trombly, D. 7: Thank you.

Senator Disnard?

Senator George F. Disnard, D. 8: Senator, I notice in several sections, particularly on Line 11, **"if fluorides have prior to said vote been introduced, such use shall be discontinued"**. . . . If a community is already introducing fluoride into the water, why would they have to discontinue?

Senator Katherine W. Wheeler, D. 21: Senator Disnard, I'm assuming that this is saying that if you have a referendum which you hadn't had before but you have fluoridated water and the people don't want the fluoridation, then you stop using it until they can actually vote on it. . . .I presume that's what it means.

Senator George F. Disnard, D. 8: I don't understand the rationale if they already have it.

Senator Katherine W. Wheeler, D. 21: I think it's to make communities feel that there's going to be a sufficient amount of local control.

Senator George F. Disnard, D. 8: They already have a handle of control.

Senator Katherine W. Wheeler, D. 21: Perhaps they haven't . . . . . Senator Disnard, I don't know what the history of it is.

Senator Rick A. Trombly, D. 7: I think, Senator Wheeler, that your change though does not affect that part of law. Correct? This is not new language introduced?

Senator Katherine W. Wheeler, D. 21: No. Thank you for pointing that out, Senator Trombly. All this does is change the 10 percent to 5 percent. It's one of those questions where I have a hard time trying to defend the entire statute but it all got reprinted. That's really a separate issue although an important one.

Senator Rick A. Trombly, D. 7: It is a good question.

Senator Katherine W. Wheeler, D. 21: It's a very good question.

Senator Caroline McCarley, D. 6: Just a quick question to Senator Wheeler.

Do you know how many communities currently. . . . . I don't know which way to ask the question because I don't have any idea what's the bigger number. How many communities don't have fluoride in their water systems?

Senator Katherine W. Wheeler, D. 21: I think the people testifying after me will give you a more accurate answer to that. I have been disturbed by the fact that in our state our major cities (in the past) have not had . . . .our major population sources have not had fluoridated water. It seemed to be a big lack.

Senator Caroline McCarley, D. 6: Thank you.

Senator Rick A. Trombly, D. 7: Good question. Thank you, Senator Wheeler.

Senator Squires?

Senator James W. Squires, D. 12: Thank you very much, Mr. Chairman and members of the committee.

This bill is not about the merits or hazards of fluoridation. I want to make that clear. That is a contentious subject as everyone is aware. Nashua does not have fluoridated water. What the bill is about is the process by which that question is put to the voters, and that's it. **The only changes in the existing statute you will see are changing the number 10 to 5.** So, the public policy question being addressed. . . . .Is it the public policy in the state of New Hampshire to require 10 percent of the voters in order to place a referendum on the ballot or 5? It is to that point that I wish to speak. The number is arbitrary, most numbers are. It is interesting that you can put a liquor store and gambling operations in a town with less of a hurdle than fluoridation. So, in the interest of consistency, one might make the argument that 5 percent is reasonable. But, that's what this bill is about. . . . it changes nothing else except the percentage required. I support that change. . . .I think the voters should have an opportunity whenever possible to address this issue. It's, obviously, an issue only for those communities with a municipal water supply. The town that I live in has none nor do any of the neighbor towns. . . .so, it only applies to those communities which, as you heard, are by and large of greater size. So, that's the extent of this bill. . . . . that's the question that ought to put, I believe. . . . .Is it the policy of New Hampshire to have 5 or 10? Ten is existing, five is what's before us. Thank you.

Senator Rick A. Trombly, D. 7: Thank you. Any questions?

Senator Krueger?

Senator Patricia Krueger, D. 16: Senator Squires, there are some towns where some people (like New London) are on municipal water and the rest of

the population have wells. You don't see any problem with that kind of situation. . .a vote affecting people?

Senator James W. Squires, D. 12: I don't, Senator Krueger. I, as you know, grew up in New London, and we had public water and were glad of it. There are areas of the town for which you have well water, but given the fact that it's a community and everybody, presumably, has an opportunity to vote. . . . .those that lived on wells could make some decision as to what's in their interest both near and long term.

Senator Patricia Krueger, D. 16: Thank you.

Senator Rick A. Trombly, D. 7: Christos Giotopoulos?

Christos Giotopoulos, D.D.S. – N. H. Dental Society: Thank you. My name is Dr. Christos Giotopoulos from Bedford, NH. I am currently serving as president of New Hampshire Dental Society and, also, I might add a really kind of a lifelong resident of Manchester. . . . .born and raised there. So, I can pretty much attest to what's been going on in the state of dental health in terms of the city of Manchester, and as you well know, we got the referendum passed this year. But, on to this particular issue . . . . . .

What we found in terms of getting the 10 percent was that. . . . . .In today's society (as you well are aware) young families – and these are the people who are going to probably benefit most from fluoride – are extremely busy. They're out on the soccer fields, they're in the hockey rinks, they're all over the place, and it's extremely difficult to get 10 percent of the registered voters of any area to sign these types of petitions. This is a health issue. . . . The New Hampshire Dental Society, as you well know, is firmly in favor of fluoridation. . . . .We make no bones about that. However, we feel very strongly that it is up to each locality; it is up to the members of the voting electorate in those areas to make those decisions; however, we feel that 5 percent is a much more realistic attainable number to get it on to the ballot, and then let the voters decide.

Senator Rick A. Trombly, D. 7: Thank you. Questions? Thank you, Doctor.

For the people who have signed to speak in favor or opposed, I would ask you if you would keep your remarks limited to the content of the legislation, which is the change from 10 percent to 5 percent. That's the only thing that this committee is going to deal with whether or not we agree with that change or not. So, if you have a particular feeling in favor of fluoride or

against fluoride, this bill doesn't address that. . . .It deals with just that number.

Gerhard Bedding – N. H. Pure Water Coalition: My name is Gerhard Bedding. I am a science writer and a teacher. I worked for four years as a full-time science writer for the Xerox Corporation. I have two Master's degrees, one as a science major. I am Director of the N. H. Pure Water Coalition, which was formed recently to educate the New Hampshire public about the growing scientific controversy surrounding fluoridation.

On behalf of this coalition, I am speaking against SB 312 as it now stands. However, if this bill were to be combined with HB 1598, we could accept it. Let me explain that a little bit later.

I'm not going to talk about my feelings about fluoridation, but I do believe it is totally relevant that we establish controversy here which is why SB 312 is coming up at all and why HB 1598 appeared two weeks ago in the house.

In your envelope are two reports **(Written Testimony - See Attachment #1 – See File For Reports)** without which a discussion is really not possible nowadays because they are the most recent materials available. May 1, 1999 – This is an EPA scientist, not just one "whistle-blowing" scientist. . . . .and if we have one "whistle-blower" for a nuclear power plant it's on the front page of the paper. There're are hundreds of "whistle-blowing" scientists who beg to differ on the basis of their study with what the health establishment says about fluoridation. . . . and this is the conclusion they come to. They are asking for an immediate halt to fluoridation in the United States. They explain that their conclusion is based on the scientific literature. . . . . .

Senator George F. Disnard, D. 8: Mr. Chairman, we're not sticking to the subject.

Senator Rick A. Trombly, D. 7: Mr. Bedding, ...

Gerhard Bedding – N. H. Pure Water Coalition: Okay, I'll leave that there. I hope you will look at it. . . .It establishes the controversy very clearly.

Senator Rick A. Trombly, D. 7: The committee is very well aware of it. the issue of fluoridation is hotly debated in the communities. . . . . .

Gerhard Bedding – N. H. Pure Water Coalition: There's one thing I wanted to say though. Remarks have been made that there's no credible opposition to fluoridation. I believe that remark by just what I said as we

race twelve Nobel Prize winners who have taken a position against that. I just want to make that clear.

Back to SB 312 and its relation to HB 1598. . . . . .HB 1598 is gentle and eminently reasonable bill. It simple asks that the serious scientific controversy over fluoridation be recognized by requiring a two-third majority rather than the simple majority. If, in deed, fluoridation is a good idea, then the medical establishment, which has all the power of its reputation and of federal money (our taxes), ought to be able to persuade a sizeable majority to vote for it. The New Hampshire Legislature has had the wisdom to recognize in other areas that more than a simple majority vote can be needed. For example, in Keene, we just passed a school bond issue. We had to reach 60 percent on that. We are simply saying this is serious. . . .it's even more serious than reaching into your pocketbook. This is reaching into your body. My doctor would advise me not to have fluoridation. This says my doctor is more important than your doctor; you have got to have it.

So, if the two bills were able somehow to be combined, we believe that the barrier to get it on the ballot doesn't have to be high. We have to recognize where the barrier should be high. . . . .that's in the decision. This is not a basketball game where with one point in overtime "winner takes all." This influences what you are taking into your body. It forces people who do not want it one way or another to take it. Even if they don't drink it. . . . .they go to a restaurant. . . . it's used in the preparation of food. They can't avoid it. So, if this is such a great idea, to get 60 or 66 percent of the vote should be a very simple matter; and if that were to be recognized, we would have no problem with this bill. Thank you very much.

Senator Rick A. Trombly, D. 7: Any questions? Thank you.

Shelley Nellkens?

Shelley Nellkens, Antrim, NH: I'd like to give you just a little bit of my background. I have a Bachelor's in biology with a minor in chemistry from CCNY; I have a Master's from NYU; I've studied medical physiology at Columbia Presbyterian College of Physicians and Surgeons; and I was a research assistant-Pediatric Genetics at Johns Hopkins.

I'm a little bit dismayed at your saying that we can't talk about basically the health impacts. When Senator Wheeler introduced it, it was glorified (the whole idea of fluoridation) by public health. . . .and this is the greatest thing since peanuts and . . . . . .but then, when the opposition wants to put some balance to it, we're told, no-no, we have to stick to the issue. Well, all right, I'll stick to the issue.

Drinking water is not the same as needing 5 percent as to whether somebody can go and buy alcohol. . . . .We're not pouring alcohol into the water. If we need 5 percent for alcohol and sweepstakes tickets, that's one thing. You're not making my kids buy sweepstakes tickets; you're not making my kids drink alcohol. This bill is totally different. This is a sweeping bill that would make it easier for the powers that be to push a product (industry waste product) into our water and that everybody would have to drink. So, I don't see making a correlation between alcohol and sweepstakes tickets and fluoride is, to my mind, absolutely ridiculous.

I have everything set here. I brought the toxicological profile which was put out by ATSCR which is a . . .. .public health, and on Page 4 of this there is a statement, "The average daily fluoride intake for food and water is estimated to be about one milligram if you have water that is not artificially fluoridated and about 2.7 milligrams if you have fluoridated water." This was done in 1991; that's gone up. These are the kind of things. . . . .I mean, how many people are going to have the toxicological profiles on hand? I have them for every single toxic element because that's my field. Once it goes on the ballot, the amount of money that public health can send the way of brainwashing people, and literally it's brainwashing. . . .it's giving misinformation. When I went to the hearing in the house, I heard a gentleman say (a reputable gentleman) that there is not one study that wasn't even qualified. . . . .there is not one study that shows adverse health affects of fluoride. Well, I'm sorry, but that's an out and out fabrication.

There are a lot of fabrications going on, and I'm really sorry that we can't address this. . . . .that we can't go into more detail because there's a lot of really interesting information. For instance, I have some information from both Kieser Aluminum and Chemtech Products, and these are suppliers of fluoride. Now, the fluoride that's put in Concord's water goes out to bid in June, and it will go to the lowest bidder; and it will be an industry waste product – and it will be approved in this state by the National Sanitation Workers Federation. It's not a pharmaceutically approved product; it's not a FDA approved product. It is approved by the National Sanitation Workers Federation. I sorry, I just find it. . . .I hope you read the material that's in these envelopes because I think it will be quite elucidating, and I hope you will be as strict with the other speakers who are pro fluoride as you are with those of us who would like to spend a little bit more time talking about the realities of fluoridation. Thank you.

<u>Senator Rick A. Trombly, D. 7</u>: Thank you.

Senator Krueger?

Senator Patricia Krueger, D. 16: I just have a quick question. I would think that if fluoride is as damaging as your information would lead one to believe, then you would really want it out there for discussion. . . .that you would want it on the ballot. I've never been one. . . .look at races that are after political races. . . . money doesn't drive everything, and I would think that you would like the opportunity if you look at, for example, what happened in Manchester. People became informed because the debate was out at the people. Wouldn't you agree with that?

Shelley Nellkens, Antrim, NH: No. I don't know if . . .(inaudible). . . . . you have to understand where I'm coming from. I'm running a writing campaign for a certain person (Leonard Peltier), we don't have money. . . . .

Senator Patricia Krueger, D. 16: I know who he is.

Shelley Nellkens, Antrim, NH: Yes, but my vote wasn't counted. . . . . It was all over the papers. . . . The Union Leader had an article. . . .it went out over AP. . . .my vote was just thrown away. We have a wonderful platform – We can't get it out. – Why? We don't have money. You have to have a lot of money in order to educate people or to put out this information; and we all know about the disinformation that goes out. Snake oil salesmen advertise constantly on TV, on the radio, in the newspapers. . . . .It's very difficult to counter that. No, we don't have the same funds. No, I don't want to go into a popular vote; it's too easy to manipulate the popular vote.

Senator Rick A. Trombly, D. 7: I just want to tell you that the legislation deals with the 5 percent issue. There's not a senator on this committee that would argue with this thing that there are two sides to this issue. . . one scientific and the other scientific. We're talking about the policy how does this reach the voters – 10 percent vs. 5 percent. . . .and I will be as strict. Any of you that have any information, we'll read it. We're not going to exec on this today. Thank you, very much.

Karen Wynn Herrin?

Karen Wynn Herrin – N. H. Dental Hygienist Assoc: **See Attachment #2)** I'll just take a brief moment to say that I am in support of this bill. I'm a dental hygienist and I work at the Technical Institute in Concord where many of the clients that we see are lower income. I also work in the public school systems with some of the elementary school children; and I can verify to what Senator Wheeler was saying about the need being so overwhelming. I feel that it's by requiring 10 percent of the voters to petition to get it on the ballot just puts such a barrier up. I don't think that that's

necessary.. I think we could let be at the local level for the decisions to be made by each community without obstruction and interference.

Senator Rick A. Trombly, D. 7: Thank you. Any questions? Thank you very much.

Coleen Smead?

Coleen Smead – N. H. Dental Hygienist Association: I have lots of information for you , too. **(See Attachment #3 – See File For Articles of Information)** Unfortunately, I just have one copy of each because it's about 100 pages.

My name is Coleen Smead. I am currently the president of the N. H. Dental Hygienist Association. I've been a hygienist for 20 years. Previously, I was an assistant for 8 years. I've worked in offices in Massachusetts, New Hampshire, and Vermont. I've worked in non-fluoridated communities and fluoridated communities, and I've seen the affects on both ends. I just speak strongly in favor of this bill. I think it should be easier to get on the ballot. This bill does not mandate fluoride anywhere; it just gives the public the chance to vote on it.

Senator Rick A. Trombly, D. 7: If you would address something. . . .I think that the people that have spoken in opposition to this bill talk about how fluoridation of water once it passes, if you don't want to have it, it's not voluntary that you have to drink it. Could you speak to me over their objections which is because it's so invasive and non-voluntary, and does affect some people and those it doesn't? Why should there not be a higher standard than for sale of sweepstakes and something that's always voluntary?

Coleen Smead – N. H. Dental Hygienist Association: The information that I gave her has a lot of. . . . .there's like 55 percent of the population in the United States is fluoridated; and there's lots of information there. . . . . scientific data from many many groups stating that there is no real adverse affects from the immunology people, from dentists, physicians, the Cancer Institute. . . . .and the reason I really support this is the people that least have access to dental care. . . . .

Senator Rick A. Trombly, D. 7: Their concern is that the bulk of this is consumption of a chemical to which they object, and they want a higher threshold because of that. How does that. . . . is that not a fair request of them? Is it because it's a chemical they don't want to ingest; therefore, there should be a higher standard before it . . . . .

Coleen Smead – N. H. Dental Hygienist Association: All this does is get it on the ballot though, and they could still get out a vote against it if that's the way they feel.

Senator Rick A. Trombly, D. 7: Thank you.

Lloyd G. Basinow – Citizens Against Fluoride Exposure: Mr. Chairman, members of the committee, my name is Lloyd Basinow, and I'm the director of public information for a Manchester group called Citizens Against Fluoride Exposure. I have a prepared statement. I'm going to try to pin it down a little bit closer but there are some remarks that I do want to make from it.

(Reads from written testimony – See Attachment #4)

I will conclude by pointing out to this committee that attached to the copies of my statement is a pink copy with a lot of documented evidence to back up the statements I've said. There's been some comments here as to how wonderful fluoride is. . . . . .

Senator Rick A. Trombly, D. 7: I've given you a fair amount of . . . . . .

Lloyd G. Basinow – Citizens Against Fluoride Exposure: Okay. Please note the back of this, it's so wonderful that thousands of people are being killed with fluoride every year in this country and in Europe. This is the documentation. Thank you, Mr. Chairman.

Senator Rick A. Trombly, D. 7: Any questions? I have a couple of questions for you.

The first is. . . . .Was I drawing the correct conclusion when you said there are people who use the Manchester water that's now fluoridated. . . .

Lloyd G. Basinow – Citizens Against Fluoride Exposure: It's not fluoridated, yet.

Senator Rick A. Trombly, D. 7: Okay. Well, if it were, that there are consumers of the water outside the municipality where the vote was held who do not have the ability to vote on whether or not . . . . . .

Lloyd G. Basinow – Citizens Against Fluoride Exposure:
40,000 to 50,000 people in the towns of Goffstown, Grassmere, Bedford, Hooksett, Londonderry, Auburn and Derry. . . . . .Derry alone has 14,000

people on the Manchester water supply plus others, of course, are on well water.

Senator Rick A. Trombly, D. 7: Would you do me a favor and give that list to the committee?

Lloyd G. Basinow – Citizens Against Fluoride Exposure: I'd be very happy to.

Senator Rick A. Trombly, D. 7: My other question is. . . . .We had a bill earlier dealing with issues put on the town warrant, and my question is – If the selectmen in the town that I live in (the town of Boscawen) have to put a warrant article on the warrant and they can be forced to do that with only 25 signatures, which I assure you is much less than 5 percent of the population of the town. . . . . How is requiring 5 percent of this larger number less fair than only 25 people being able to do it in a small town on other issues.

Lloyd G. Basinow – Citizens Against Fluoride Exposure: I think you have to look at the particular issue that you want to put onto your town warrant versus a city like Manchester where we have over 100,000 people. Not all of those are registered voters, but taking into consideration that whatever is done. . . .relative to fluoride. . . .whatever is done in regards to fluoride according to an interpretation of the laws by the Attorney General's office, the outlying towns do not have a say on what Manchester does with the water supply. The odd part of this thing is, when I researched the state laws on the creation of the Manchester Water works, it specifically said that the Manchester Water Works was being allowed to be created by the state legislature to also supply water to the surrounding districts. Yet, the surrounding districts have to put up with whatever they receive from the Manchester Water Works – but they have no say in what would go into that water.

Senator Rick A. Trombly, D. 7: Thank you. Any questions?

Is it Paul Harrington?

Paul Harrington, Nashua, NH: Yes.
. . . . . .(background interference). . . . .here before me.

Senator Rick A. Trombly, D. 7: Well, Paul, I have you and one other speaker signed up to speak – that's all I have. So, if somebody wants to sign up and wants to speak, they'll go in the next go around. We're not going to shut anyone down, I just want to tell you why I called on you. If you want to

refer to someone, just give me that person's name and I'll be glad to write it in.

Paul Harrington, Nashua, NH: Dr. Mancuso.

Senator Rick A. Trombly, D. 7: Dr. Mancuso.

Dr. Norman Mancuso, Natick, MA:

Written testimony – (See Attachment #5)

I would like to speak to the issue of restricting the testimony to this, because the question is whether lowering the barrier to a controversial program is in the best interest of the people. You'll also hear from the same proponents that there is not controversy about fluoridation. Let me only say with regard to that - If, before you leave the house in the morning, your spouse slaps you, and if you come back at night and your spouse slaps you again – then you can maintain that you don't have any marital discord in your home, but that's not the truth.

The bill that's before you which proposes lowering the number of signers from 10 percent to 5 percent should also include provision for those communities which choose to not continue fluoridation in the light of present testimony and present evidence. There are numerous circumstances of this type of thing; and anyone who chooses to look through the references I've provided will find that there is, in deed, a controversy and it's of massive proportions. I'd be happy to answer any questions.

Senator Rick A. Trombly, D. 7: Thank you, Doctor.

Mr. Harrington, did you wish to be recognized?

Paul Harrington – Nashua, NH: We mentioned earlier, Mr. Chairman, about the people not being represented. Well, I'm in Nashua and there're many people who receive Pennichuck water that would never be able to vote on this, and I believe that's an outrage.

(Reads from written testimony – See Attachment #6)

Mr. Chairman, I notice there's a soda there. Recently, there was an article that came out internationally that, when you drink two sodas now you're over your intake of fluoride for the day. I hope these people understand this that are trying to promote this.

Resumes Reading from written testimony.

Senator Rick A. Trombly, D. 7: I know everyone's anxiety to explore the benefits and the detriments of fluoride. . . . .Mr. Harrington, I say to you, again. . . .We on the committee are very well aware of that. . . .don't mean to cut you off. . . .We're here to determine whether 5 percent, 10 percent, and I'm trying to give some leeway because I do understand this is a very important issue to both sides. Even if people who disagree with you in this room say there's no controversy, believe you me, we know there's one. Okay?

Paul Harrington, Nashua, NH: I just strongly oppose it, because being in Nashua, I know one of the reasons. . . .We fought hard to stop this, and now they're trying to just cut it in half so they can get their signatures and bring all the money in to get it – what they did in Manchester to Nashua. There're are many people upset, Mr. Chairman. Thank you very much for your time.

Senator Rick A. Trombly, D. 7: Thank you very much. Questions?

Stacie Plourde?

Stacie Plourde, Hooksett, NH: My name is Stacie Plourde. I'm a hygienist. I live in Hooksett, and representing myself. I just want to address. . . .I think it was a question that you asked. . . .you just happen to be my senator, but. . . . .Well water versus public.

I think you had asked a question of well water versus public water supply in certain towns, and Hooksett is a community that does have public water as well as well water. I think for putting this on the ballot that the target people we're trying to reach, whether they be low income or the children; most of those people. . . .if they're of low income and they're not getting fluoride from their pediatrician and that sort of thing. . . .are going to live where there's public water. . . .so I would see that as a benefit.

Also, living in Hooksett, half of our town has public water from Manchester and half of it is from our own public water supply. I personally feel that, if we were to lower this down to 5 percent, that would enable the rest of our town to put this issue on the ballot, put it before the town of Hooksett so that most of the town could be fluoridated that has public water supplies.

Senator Rick A. Trombly, D. 7: Since you're representing yourself. . . . .

Stacie Plourde, Hooksett, NH: Yes.

Senator Rick A. Trombly, D. 7: . . . . .The people who've come here today said, "Look, there's a large segment of the population that is not even going to have a voice in this.". . .and I know this goes astray from where we are legislatively, but it intrigues me that people who are going to be consuming this don't have any say in whether or not it be in their water. Could you just give me your thoughts on that?

Stacie Plourde, Hooksett, NH: Well, I'd like to compare it to. . . Students in our town attend Manchester High Schools. We do not have a say on their education in Manchester. . . .that is always a hot topic. So, whether or not you have a say of where you live, that's ultimately just where you live. There's a lot of things we don't have control over as voters, and we, as a town, cannot vote on Manchester's school issues and the same with half of the people of the town Hooksett could not vote on this issue. I don't know if that's something that could be changed down the road, but that's just part of where you live.

Senator Rick A. Trombly, D. 7: Do you have a question for your constituent?

Senator Patricia Krueger, D. 16: My question is. . . . .There are other things that are added to public water for the good which we don't have control over as well; certainly the public water in Manchester smells. . . .but would you agree that those are put in and there could be controversy attached to them?

Stacie Plourde, Hooksett, NH: Oh, absolutely, and I don't know how much study goes into it before they decide how much they're going to chlorinate the Manchester water; but I don't see that all over the paper as a hot issue, and I think that could be a problem as well.

Senator Rick A. Trombly, D. 7: I have William Kassler. . .did you want to speak now?

William Kassler – Department of Health & Human Services: I have prepared testimony **(See Attachment #7)** which I won't read. Good afternoon. For the record my name is William Kassler. I'm a practicing physician; I'm also the parent of three children under the age of seven, all of whom are taking oral fluoride supplementation because we're not fortunate enough to live in a community that fluoridates its water supply. I'm here representing the Department of Health and Human Services as the State's Medical Director. The department supports this bill because it would eliminate unreasonable barriers on our communities choosing to improve the oral health of its citizens.

I would like to cite that there have been many public opinion polls that indicate that, when put to the voters, there's overwhelming majority of them that can support this. I would also be available for any questions that you might have about the health affects or the health hazards of fluoride. I would also like to remind you that it is the Department's policy to actively promote and support community water fluoridation.

Senator Rick A. Trombly, D. 7: Thank you. Any questions?

Also in favor of the bill, but has not checked off, Nancy Martin. Nancy?

Nancy Martin, Warner, NH: I don't choose to speak, but I come from the Bureau of Oral Health and we support this bill.

Senator Rick A. Trombly, D. 7: Thank you very much.

Carolyn Hartnett?

Carolyn Harnett: I'm not choosing to speak, but I'm also in favor of it. Our department has the dental auxiliaries programs at New Hampshire Tech.

Senator Rick A. Trombly, D. 7: Bernard Lucey is in favor and did not wish to speak. Bernard do you want to speak now?

Bernard Lucey – Department of Environment Services: Yes, please.

Good afternoon. My name is Bernie Lucey. I am an engineer with the Department of Environment Services, and I am going to remember the Chair's advice relative to keeping on target with the 5 percent and 10 percent issue.

. . . .**(Tape change)**. . . .or it was Senator Disnard. What's the purpose of a clause that was further down in the statute relative to ceasing fluoridation? I think this bill with a 5 percent figure would give those people that are opposed to fluoridation the same benefit as the people that are advocating fluoridation to bring a fluoridation repeal to the voters for a vote. That. . . . in Berlin (I assume that it was done in accordance with the law.), back in, roughly, 1990 the city did away with fluoridation that had previously been in place.

The city of Concord has gone in different directions on the fluoridation issue since 1950. I think it initially took it on, then set it aside for 10 or 15 years

(and these numbers are very approximate), then brought it back on board again, and, currently, the city of Concord fluoridates. So, this bill may provide as much to those that are opposed to fluoridation as to the advocates.

Number two, I have some informational documents here **(See Attachment #8)**. Those documents. . . .and I'll pass them to whichever is the right side of the house here. . . .Senator McCarley, you had asked how many systems in the state of New Hampshire fluoridate. There are ten that do this purposefully out of approximately 100 municipal systems, and those are listed on one of those documents. The other document states the approximate levels where they're either regulatory or educational aspects of the Safe Drinking Water Act being to the fluoridation issue.

Item number 3, in terms of outlying communities having a say or not having a say in the fluoridation area. . . . .this is a difficult issue for regional water systems such as Manchester. That the city of Manchester uses many chemicals in their water treatment. . . . .those are not individually asked of all the consumers as to whether the consumer wants that particular chemical used at the water treatment plant. I think it would be certainly difficult to actually achieve that kind of – that's basically a prerogative of management in accordance with other engineering factors mandated by our agency. . . that you could easily have towns (a), (b), and (c) vote in favor of fluoridation, towns (d), (e), and (f) vote opposed to it, and potentially then overrule the preference of the core town that is hosting the community water system or the regional water system to begin with.

The number 50,000 people served by Manchester. . . .Manchester serves approximately 110,000 people, and I think more than half of those are within the city of Manchester. The Attorney General did provide commentary about a year ago relative to the issue of what would be the role of the outlying communities in terms of a popular referendum, and that letter from the Attorney General's office is on file and available to the committee if they ask.

Senator Rick A. Trombly, D. 7: Would you get us a copy of that, please?

Bernard Lucey – Department of Environmental Services: Yes.

In terms of the Department of Environmental Services, we are here speaking in favor of the bill, and, finally, I'm available to answer any questions that you may have.

Senator Rick A. Trombly, D. 7: Thank you.

Myron Coplan, Natick, MA: Thank you, Mr. Chairman.

My name is Myron Coplan. I'm a resident of Natick, Massachusetts. I appreciate the courtesy of your office of having invited somebody from out of state to address you. I will try to confine my remarks to the purpose of your meeting, and perhaps I didn't adequately designate my own qualifications. I should have forgotten about being a chemist/chemical engineer and commented on the fact that I am a citizen and I vote, and I fancy the somewhat naïve view that a vote should not be wasted idly - you should vote from a basis of information. Therefore, I'm going to skip to the last page **(See Attachment #9)** of what consists of a lot of stuff.

The conclusion is as follows: It would seem that any legislation promulgated in 2000 which intends the public to have an intelligent basis for considering the merits of water fluoridation should provide that public with contemporary relevant facts on which to base that choice. **It is therefore suggested that the following language would be appropriate for New Hampshire to consider at this time, but I would say any legislature.** I hold no brief for 5 percent or 10 percent or 45 percent. I hold the following to be of greatest concern – **"I'm suggesting legislation."**

"Prior to the call of any referendum on the question of fluoridating a public water supply, the health authority of a municipality or county recommending the start or continuation of such practice shall conduct and publish the results of a survey of the current rate of children's tooth decay in said municipality or county, as determined according to recognized protocols for such surveys, and said survey shall include a statistically representative sample according to age, gender, socioeconomic status, and race/ethnicity criteria."

Final remark on this subject – Such an approach. . . .(a) would provide a realistic basis for forming an opinion, in contrast to a "faith-based" assumption that "experts" know the facts and tell the truth, and (b) is intellectually more honest than manipulating the numbers of individuals required to sign a petition or support an issue placed in referendum.

I would like to comment that I would feel quite well informed to decide whether a new liquor store should be opened up in my town or whether some restaurant should be given a liquor license. I would feel adequately confident to judge whether we need a new high school or not by just consulting various obvious facts in my community. I feel most voters have no knowledge of what the impact of fluorides may be on their child, on themselves, on their grandparents. . . . .they have to rely on technical information very difficult sometimes to pin down. . . . And, I would submit. . . . this document will be circulated for each of you. It will show that contemporary facts regarding

Bell Weather Communities that have often been cited by the proponents of fluoridation. Newburg-Kingston in New York, for example; which, in 1945, was one of two Bell Weather comparisons. One of them was Grand Rapids and Muskegon; the other one is Newburg and Kingston. Today, in the non-fluoridated community of Kingston, tooth decay is less than it is in fluoridated Newburg. You will not hear that. . . . .you will be told about the 40 or 50 percent benefit that Newburg enjoyed in 1945. . . . .but, what are the facts today? The facts are today from not anti-fluoridation people but people who work for the National Institute of Dental Research. . . . various qualified organizations. All the documentation that I have here, that you will, hopefully, read, is not on a sheet from anti-fluoridationists. I've spent a fair amount of time, a considerable amount of time since I was elected to the Natick Board of Health in 1981 following this issue. I served in many capacities in my community, so I'm very sensitive to the issue of what it means to get a vote, either in town meeting or some other vote, and when you go in that ballot. . . .close the curtain behind you. . . whatever. . . .make a mark on the ballot. . . . .you have to ask which way I want to go on this issue, and if you only have the information provided to you by those in your community who are extensively authorities on the subject and you have no reason to doubt that they're up to date on their facts, you're going to go along with them.

I'm sensitive to this issue. This suggested amendment requires those people to go out there. Now, I'm totally in sympathy with one of your fellow senators, Ms. Wheeler, with the fact that there are children with terrible teeth. The question is, why do they have terrible teeth?. . .and. . . .Will fluoride do them any good? If you read the documentation that I'm providing you from the research literature of the dental research community; in 1999 there was no evidence that fluoride would do a thing for that 2-year old child lying in a crib with decayed teeth. Thank you.

Senator Rick A. Trombly, D. 7: Thank you for coming down from Massachusetts.

Senator Krueger?

Senator Patricia Krueger, D. 16: I just have a quick question, Mr. Chairman. I was wondering, Mr. Coplan, if you had the same feelings about fluoride in toothpaste and if, in fact, that was given consideration in the dental health improvement in Newburg, New York. . . . .if, in fact, parents thought they weren't getting fluoride in their water, if they then encouraged their children to use fluoride toothpaste.

Myron Coplan, Natick, MA: Senator, I'll try to keep it as brief as I can.

I gave my own children fluoride tablets because there was none in the water and probably nothing in the toothpaste in those days (I'm a great-grandfather). As far as today's toothpastes are concerned, the substance used to deliver fluoride is not the same as being used to fluoridate water. There's a big problem there, but I won't get into the technology of that. My feeling is, if you do have adequate dental care (including brushing teeth and the right kind of diet) you don't need to supplement anything, because you're going to get all the fluoride you need from topical contact. The consensus of the day is ingested fluoride is a waste of time. If you are going to get any benefits out of the fluoride, it will be because the fluoride deals with the plaque, the streptococcus mutants which generates the acids that corrode the enamel, and to a limited extent, free fluoride iron in your mouth changes the chemical nature of the surface of the tooth. It doesn't happen by getting into your gut, into your blood, and through the inside of the dentin of your tooth. It doesn't happen. **(See Attachment #9)**

Senator Patricia Krueger, D. 16: Thank you.

Senator Rick A. Trombly, D. 7: Thank you very much. That's all the people I have to testify, so, I will close the hearing. It's probably my intent, if you have any submissions for us (I've asked some people to do that), I will probably get back on this next week. We have to get these bills out, so we'll probably vote on it next Wednesday. . . . .in two weeks. So you have two weeks to get that to us. . .two weeks from today. Get 8 copies so that one has a copy. Thank you everybody for your patience and consideration.

Hearing closed at 2:50 p.m.

Respectfully submitted,
Carolyn Carey, Senate Secretary

File copy

Date: **February 23, 2000**
Time: **1:50 PM**
Room: **104 - LOB**

The Senate Committee on Public Affairs held a hearing on the following:

SB 312 relative to fluoride

Members of Committee present: Senator Trombly
Senator Disnard
Senator Eaton
Senator Krueger
Senator McCarley
Senator Roberge

The Chair, Senator Rick A. Trombly, opened the hearing by calling on Senator Wheeler for the introduction of Senate Bill 312.

Senator Katherine W. Wheeler, D. 21: Thank you Mr. Chair and members of the committee. I am Senator Katie Wheeler from District 21 (Dover, Durham, Lee, Madbury, and Rollingsford), and I'm very pleased to bring Senate Bill 312 to you today.

I've been quite active since I've been in the legislature in all health issues and, in the past number of years, specifically with the issue of public health. As you all know, I've worked a great deal on oral healthcare issues and have sponsored various pieces of legislation to try to expand access to oral healthcare to our children and to our adults in our state because I think it's a serious lack. In the course of these legislative efforts, I've had a lot of testimony, a lot of photographs, gone to clinics, and I've seen evidence of really terrible tooth decay in very young children and what it can do to their overall health as well as to the health of their mouths. . . .and it is incredibly depressing. If I had a million dollars extra I'd endow dental clinics. . . .I'd do something for oral healthcare. . . .But, not having that. . . . .One of the most cost-effective ways we know of in our country to help children have strong healthy teeth is to have fluoridated water.

Throughout decades of research and more than 50 years of practical experience, fluoridation of public water supplies has been responsible for dramatically improving the public's oral health. Along with the eradication

of polio, community water fluoridation is seen as one of the ten most successful public health measures of the century. In a 1995 policy statement, the U. S. Public Health Service reaffirmed that water fluoridation is the most cost effective, practical, and safe means for reducing the amount of tooth decay in a community. Simply by drinking optimally fluoridated water, the entire community benefits regardless of age, socioeconomic status, educational level, or other variables.

Fluoridation's benefits do not require individual behavior change and are available to those without access to dental care.

Senate Bill 312 is not mandated fluoridated water . . . . It's not even putting fluoridated water in one community. It's just making it more possible for a community to put the question of water fluoridation before the voters. We haven't changed the law – the community still is being asked if they want water fluoridation. They can still vote it down; but we have an almost impossible barrier right now to getting this before the voters.

Right now, New Hampshire law requires that 10% of voters need to sign a petition to put the fluoridation referendum on the ballot. That's a lot of people. Last year in Manchester 6,000 petition signatures were required before the voters could even vote on the idea of fluoridating the public water supply. It wasn't 6,000 votes to get fluoridation; it was 6,000 votes to be allowed to address the question.

Senate Bill 312 would change the requirement so that 5 percent of the voters are needed to sign a petition to put the question of fluoridation on the ballot. Legal research shows that to add a referendum question to the ballot that provides for liquor sales in a community or for the sales of sweepstakes tickets in a community, only 5 percent of the voters are required to petition the selectmen to put these questions before the voters.

Senate Bill 312 asks to make the requirements the same for fluoridation as for the sale of liquor or sweepstakes tickets. I don't know why we have a barrier that's twice as high for a public health matter than we do for selling liquor or sweepstakes tickets, and I think it's time we rectified it.

I thank you for your kind attention to this matter.

Senator Rick A. Trombly, D. 7: Thank you.

Senator Disnard?

Senator George F. Disnard, D. 8: Senator, I notice in several sections, particularly on **Line 11, "if fluorides have prior to said vote been introduced, such use shall be discontinued"**. . . . If a community is already introducing fluoride into the water, why would they have to discontinue?

Senator Katherine W. Wheeler, D. 21: Senator Disnard, I'm assuming that this is saying that if you have a referendum which you hadn't had before but you have fluoridated water and the people don't want the fluoridation, then you stop using it until they can actually vote on it. . . .I presume that's what it means.

Senator George F. Disnard, D. 8: I don't understand the rationale if they already have it.

Senator Katherine W. Wheeler, D. 21: I think it's to make communities feel that there's going to be a sufficient amount of local control.

Senator George F. Disnard, D. 8: They already have a handle of control.

Senator Katherine W. Wheeler, D. 21: Perhaps they haven't . . . . . Senator Disnard, I don't know what the history of it is.

Senator Rick A. Trombly, D. 7: I think, Senator Wheeler, that your change though does not affect that part of law. Correct? This is not new language introduced?

Senator Katherine W. Wheeler, D. 21: No. Thank you for pointing that out, Senator Trombly. All this does is change the 10 percent to 5 percent. It's one of those questions where I have a hard time trying to defend the entire statute but it all got reprinted. That's really a separate issue although an important one.

Senator Rick A. Trombly, D. 7: It is a good question.

Senator Katherine W. Wheeler, D. 21: It's a very good question.

Senator Caroline McCarley, D. 6: Just a quick question to Senator Wheeler.

Do you know how many communities currently. . . . . I don't know which way to ask the question because I don't have any idea what's the bigger number. How many communities don't have fluoride in their water systems?

Senator Katherine W. Wheeler, D. 21: I think the people testifying after me will give you a more accurate answer to that. I have been disturbed by the fact that in our state our major cities (in the past) have not had . . . .our major population sources have not had fluoridated water. It seemed to be a big lack.

Senator Caroline McCarley, D. 6: Thank you.

Senator Rick A. Trombly, D. 7: Good question. Thank you, Senator Wheeler.

Senator Squires?

Senator James W. Squires, D. 12: Thank you very much, Mr. Chairman and members of the committee.

This bill is not about the merits or hazards of fluoridation. I want to make that clear. That is a contentious subject as everyone is aware. Nashua does not have fluoridated water. What the bill is about is the process by which that question is put to the voters, and that's it. **The only changes in the existing statute you will see are changing the number 10 to 5.** So, the public policy question being addressed. . . . .Is it the public policy in the state of New Hampshire to require 10 percent of the voters in order to place a referendum on the ballot or 5? It is to that point that I wish to speak. The number is arbitrary, most numbers are. It is interesting that you can put a liquor store and gambling operations in a town with less of a hurdle than fluoridation. So, in the interest of consistency, one might make the argument that 5 percent is reasonable. But, that's what this bill is about. . . . it changes nothing else except the percentage required. I support that change. . . .I think the voters should have an opportunity whenever possible to address this issue. It's, obviously, an issue only for those communities with a municipal water supply. The town that I live in has none nor do any of the neighbor towns. . . .so, it only applies to those communities which, as you heard, are by and large of greater size. So, that's the extent of this bill. . . . . that's the question that ought to put, I believe. . . . .Is it the policy of New Hampshire to have 5 or 10? Ten is existing, five is what's before us. Thank you.

Senator Rick A. Trombly, D. 7: Thank you. Any questions?

Senator Krueger?

Senator Patricia Krueger, D. 16: Senator Squires, there are some towns where some people (like New London) are on municipal water and the rest of

the population have wells. You don't see any problem with that kind of situation. . .a vote affecting people?

Senator James W. Squires, D. 12: I don't, Senator Krueger. I, as you know, grew up in New London, and we had public water and were glad of it. There are areas of the town for which you have well water, but given the fact that it's a community and everybody, presumably, has an opportunity to vote. . . . .those that lived on wells could make some decision as to what's in their interest both near and long term.

Senator Patricia Krueger, D. 16: Thank you.

Senator Rick A. Trombly, D. 7: Christos Giotopoulos?

Christos Giotopoulos, D.D.S. – N. H. Dental Society: Thank you. My name is Dr. Christos Giotopoulos from Bedford, NH. I am currently serving as president of New Hampshire Dental Society and, also, I might add a really kind of a lifelong resident of Manchester. . . . .born and raised there. So, I can pretty much attest to what's been going on in the state of dental health in terms of the city of Manchester, and as you well know, we got the referendum passed this year. But, on to this particular issue . . . . . .

What we found in terms of getting the 10 percent was that. . . . . .In today's society (as you well are aware) young families – and these are the people who are going to probably benefit most from fluoride – are extremely busy. They're out on the soccer fields, they're in the hockey rinks, they're all over the place, and it's extremely difficult to get 10 percent of the registered voters of any area to sign these types of petitions. This is a health issue. . . . The New Hampshire Dental Society, as you well know, is firmly in favor of fluoridation. . . . .We make no bones about that. However, we feel very strongly that it is up to each locality; it is up to the members of the voting electorate in those areas to make those decisions; however, we feel that 5 percent is a much more realistic attainable number to get it on to the ballot, and then let the voters decide.

Senator Rick A. Trombly, D. 7: Thank you. Questions? Thank you, Doctor.

For the people who have signed to speak in favor or opposed, I would ask you if you would keep your remarks limited to the content of the legislation, which is the change from 10 percent to 5 percent. That's the only thing that this committee is going to deal with whether or not we agree with that change or not. So, if you have a particular feeling in favor of fluoride or

against fluoride, this bill doesn't address that. . . .It deals with just that number.

Gerhard Bedding – N. H. Pure Water Coalition: My name is Gerhard Bedding. I am a science writer and a teacher. I worked for four years as a full-time science writer for the Xerox Corporation. I have two Master's degrees, one as a science major. I am Director of the N. H. Pure Water Coalition, which was formed recently to educate the New Hampshire public about the growing scientific controversy surrounding fluoridation.

On behalf of this coalition, I am speaking against SB 312 as it now stands. However, if this bill were to be combined with HB 1598, we could accept it. Let me explain that a little bit later.

I'm not going to talk about my feelings about fluoridation, but I do believe it is totally relevant that we establish controversy here which is why SB 312 is coming up at all and why HB 1598 appeared two weeks ago in the house.

In your envelope are two reports **(Written Testimony - See Attachment #1 – See File For Reports)** without which a discussion is really not possible nowadays because they are the most recent materials available. May 1, 1999 – This is an EPA scientist, not just one "whistle-blowing" scientist. . . . .and if we have one "whistle-blower" for a nuclear power plant it's on the front page of the paper. There're are hundreds of "whistle-blowing" scientists who beg to differ on the basis of their study with what the health establishment says about fluoridation. . . . and this is the conclusion they come to. They are asking for an immediate halt to fluoridation in the United States. They explain that their conclusion is based on the scientific literature. . . . . .

Senator George F. Disnard, D. 8: Mr. Chairman, we're not sticking to the subject.

Senator Rick A. Trombly, D. 7: Mr. Bedding, ...

Gerhard Bedding – N. H. Pure Water Coalition: Okay, I'll leave that there. I hope you will look at it. . . .It establishes the controversy very clearly.

Senator Rick A. Trombly, D. 7: The committee is very well aware of it. the issue of fluoridation is hotly debated in the communities. . . . . .

Gerhard Bedding – N. H. Pure Water Coalition: There's one thing I wanted to say though. Remarks have been made that there's no credible opposition to fluoridation. I believe that remark by just what I said as we

race twelve Nobel Prize winners who have taken a position against that. I just want to make that clear.

Back to SB 312 and its relation to HB 1598. . . . . .HB 1598 is gentle and eminently reasonable bill. It simple asks that the serious scientific controversy over fluoridation be recognized by requiring a two-third majority rather than the simple majority. If, in deed, fluoridation is a good idea, then the medical establishment, which has all the power of its reputation and of federal money (our taxes), ought to be able to persuade a sizeable majority to vote for it. The New Hampshire Legislature has had the wisdom to recognize in other areas that more than a simple majority vote can be needed. For example, in Keene, we just passed a school bond issue. We had to reach 60 percent on that. We are simply saying this is serious. . . .it's even more serious than reaching into your pocketbook. This is reaching into your body. My doctor would advise me not to have fluoridation. This says my doctor is more important than your doctor; you have got to have it.

So, if the two bills were able somehow to be combined, we believe that the barrier to get it on the ballot doesn't have to be high. We have to recognize where the barrier should be high. . . . .that's in the decision. This is not a basketball game where with one point in overtime "winner takes all." This influences what you are taking into your body. It forces people who do not want it one way or another to take it. Even if they don't drink it. . . . .they go to a restaurant. . . . it's used in the preparation of food. They can't avoid it. So, if this is such a great idea, to get 60 or 66 percent of the vote should be a very simple matter; and if that were to be recognized, we would have no problem with this bill. Thank you very much.

Senator Rick A. Trombly, D. 7: Any questions? Thank you.

Shelley Nellkens?

Shelley Nellkens, Antrim, NH: I'd like to give you just a little bit of my background. I have a Bachelor's in biology with a minor in chemistry from CCNY; I have a Master's from NYU; I've studied medical physiology at Columbia Presbyterian College of Physicians and Surgeons; and I was a research assistant-Pediatric Genetics at Johns Hopkins.

I'm a little bit dismayed at your saying that we can't talk about basically the health impacts. When Senator Wheeler introduced it, it was glorified (the whole idea of fluoridation) by public health. . . .and this is the greatest thing since peanuts and . . . . . .but then, when the opposition wants to put some balance to it, we're told, no-no, we have to stick to the issue. Well, all right, I'll stick to the issue.

Drinking water is not the same as needing 5 percent as to whether somebody can go and buy alcohol. . . . .We're not pouring alcohol into the water. If we need 5 percent for alcohol and sweepstakes tickets, that's one thing. You're not making my kids buy sweepstakes tickets; you're not making my kids drink alcohol. This bill is totally different. This is a sweeping bill that would make it easier for the powers that be to push a product (industry waste product) into our water and that everybody would have to drink. So, I don't see making a correlation between alcohol and sweepstakes tickets and fluoride is, to my mind, absolutely ridiculous.

I have everything set here. I brought the toxicological profile which was put out by ATSCR which is a . . .. .public health, and on Page 4 of this there is a statement, "The average daily fluoride intake for food and water is estimated to be about one milligram if you have water that is not artificially fluoridated and about 2.7 milligrams if you have fluoridated water." This was done in 1991; that's gone up. These are the kind of things. . . . .I mean, how many people are going to have the toxicological profiles on hand? I have them for every single toxic element because that's my field. Once it goes on the ballot, the amount of money that public health can send the way of brainwashing people, and literally it's brainwashing. . . .it's giving misinformation. When I went to the hearing in the house, I heard a gentleman say (a reputable gentleman) that there is not one study that wasn't even qualified. . . . .there is not one study that shows adverse health affects of fluoride. Well, I'm sorry, but that's an out and out fabrication.

File Note
No documents given from Shelley Nellkins at hearing

There are a lot of fabrications going on, and I'm really sorry that we can't address this. . . . .that we can't go into more detail because there's a lot of really interesting information. For instance, I have some information from both Kieser Aluminum and Chemtech Products, and these are suppliers of fluoride. Now, the fluoride that's put in Concord's water goes out to bid in June, and it will go to the lowest bidder; and it will be an industry waste product – and it will be approved in this state by the National Sanitation Workers Federation. It's not a pharmaceutically approved product; it's not a FDA approved product. It is approved by the National Sanitation Workers Federation. I sorry, I just find it. . . .I hope you read the material that's in these envelopes because I think it will be quite elucidating, and I hope you will be as strict with the other speakers who are pro fluoride as you are with those of us who would like to spend a little bit more time talking about the realities of fluoridation. Thank you.

Senator Rick A. Trombly, D. 7: Thank you.

Senator Krueger?

Senator Patricia Krueger, D. 16: I just have a quick question. I would think that if fluoride is as damaging as your information would lead one to believe, then you would really want it out there for discussion. . . .that you would want it on the ballot. I've never been one. . . .look at races that are after political races. . . . money doesn't drive everything, and I would think that you would like the opportunity if you look at, for example, what happened in Manchester. People became informed because the debate was out at the people. Wouldn't you agree with that?

Shelley Nellkens, Antrim, NH: No. I don't know if . . .(inaudible). . . . . you have to understand where I'm coming from. I'm running a writing campaign for a certain person (Leonard Peltier), we don't have money. . . . .

Senator Patricia Krueger, D. 16: I know who he is.

Shelley Nellkens, Antrim, NH: Yes, but my vote wasn't counted. . . . . It was all over the papers. . . . The Union Leader had an article. . . .it went out over AP. . . .my vote was just thrown away. We have a wonderful platform – We can't get it out. – Why? We don't have money. You have to have a lot of money in order to educate people or to put out this information; and we all know about the disinformation that goes out. Snake oil salesmen advertise constantly on TV, on the radio, in the newspapers. . . . .It's very difficult to counter that. No, we don't have the same funds. No, I don't want to go into a popular vote; it's too easy to manipulate the popular vote.

Senator Rick A. Trombly, D. 7: I just want to tell you that the legislation deals with the 5 percent issue. There's not a senator on this committee that would argue with this thing that there are two sides to this issue. . . one scientific and the other scientific. We're talking about the policy how does this reach the voters – 10 percent vs. 5 percent. . . .and I will be as strict. Any of you that have any information, we'll read it. We're not going to exec on this today. Thank you, very much.

Karen Wynn Herrin?

Karen Wynn Herrin – N. H. Dental Hygienist Assoc: **See Attachment #2)** I'll just take a brief moment to say that I am in support of this bill. I'm a dental hygienist and I work at the Technical Institute in Concord where many of the clients that we see are lower income. I also work in the public school systems with some of the elementary school children; and I can verify to what Senator Wheeler was saying about the need being so overwhelming. I feel that it's by requiring 10 percent of the voters to petition to get it on the ballot just puts such a barrier up. I don't think that that's

necessary. I think we could let be at the local level for the decisions to be made by each community without obstruction and interference.

Senator Rick A. Trombly, D. 7: Thank you. Any questions? Thank you very much.

Coleen Smead?

Coleen Smead – N. H. Dental Hygienist Association: I have lots of information for you , too. **(See Attachment #3 – See File For Articles of Information)** Unfortunately, I just have one copy of each because it's about 100 pages.

My name is Coleen Smead. I am currently the president of the N. H. Dental Hygienist Association. I've been a hygienist for 20 years. Previously, I was an assistant for 8 years. I've worked in offices in Massachusetts, New Hampshire, and Vermont. I've worked in non-fluoridated communities and fluoridated communities, and I've seen the affects on both ends. I just speak strongly in favor of this bill. I think it should be easier to get on the ballot. This bill does not mandate fluoride anywhere; it just gives the public the chance to vote on it.

Senator Rick A. Trombly, D. 7: If you would address something. . . .I think that the people that have spoken in opposition to this bill talk about how fluoridation of water once it passes, if you don't want to have it, it's not voluntary that you have to drink it. Could you speak to me over their objections which is because it's so invasive and non-voluntary, and does affect some people and those it doesn't? Why should there not be a higher standard than for sale of sweepstakes and something that's always voluntary?

Coleen Smead – N. H. Dental Hygienist Association: The information that I gave her has a lot of. . . . .there's like 55 percent of the population in the United States is fluoridated; and there's lots of information there. . . . . scientific data from many many groups stating that there is no real adverse affects from the immunology people, from dentists, physicians, the Cancer Institute. . . . .and the reason I really support this is the people that least have access to dental care. . . . .

Senator Rick A. Trombly, D. 7: Their concern is that the bulk of this is consumption of a chemical to which they object, and they want a higher threshold because of that. How does that. . . . is that not a fair request of them? Is it because it's a chemical they don't want to ingest; therefore, there should be a higher standard before it . . . . .

Coleen Smead – N. H. Dental Hygienist Association: All this does is get it on the ballot though, and they could still get out a vote against it if that's the way they feel.

Senator Rick A. Trombly, D. 7: Thank you.

Lloyd G. Basinow – Citizens Against Fluoride Exposure: Mr. Chairman, members of the committee, my name is Lloyd Basinow, and I'm the director of public information for a Manchester group called Citizens Against Fluoride Exposure. I have a prepared statement. I'm going to try to pin it down a little bit closer but there are some remarks that I do want to make from it.

(Reads from written testimony – See Attachment #4)

I will conclude by pointing out to this committee that attached to the copies of my statement is a pink copy with a lot of documented evidence to back up the statements I've said. There's been some comments here as to how wonderful fluoride is. . . . . .

Senator Rick A. Trombly, D. 7: I've given you a fair amount of . . . . . .

Lloyd G. Basinow – Citizens Against Fluoride Exposure: Okay. Please note the back of this, it's so wonderful that thousands of people are being killed with fluoride every year in this country and in Europe. This is the documentation. Thank you, Mr. Chairman.

Senator Rick A. Trombly, D. 7: Any questions? I have a couple of questions for you.

The first is. . . . .Was I drawing the correct conclusion when you said there are people who use the Manchester water that's now fluoridated. . . .

Lloyd G. Basinow – Citizens Against Fluoride Exposure: It's not fluoridated, yet.

Senator Rick A. Trombly, D. 7: Okay. Well, if it were, that there are consumers of the water outside the municipality where the vote was held who do not have the ability to vote on whether or not . . . . . .

Lloyd G. Basinow – Citizens Against Fluoride Exposure:
40,000 to 50,000 people in the towns of Goffstown, Grassmere, Bedford, Hooksett, Londonderry, Auburn and Derry. . . . . .Derry alone has 14,000

people on the Manchester water supply plus others, of course, are on well water.

Senator Rick A. Trombly, D. 7: Would you do me a favor and give that list to the committee?

Lloyd G. Basinow – Citizens Against Fluoride Exposure: I'd be very happy to.

Senator Rick A. Trombly, D. 7: My other question is. . . . .We had a bill earlier dealing with issues put on the town warrant, and my question is – If the selectmen in the town that I live in (the town of Boscawen) have to put a warrant article on the warrant and they can be forced to do that with only 25 signatures, which I assure you is much less than 5 percent of the population of the town. . . . . How is requiring 5 percent of this larger number less fair than only 25 people being able to do it in a small town on other issues.

Lloyd G. Basinow – Citizens Against Fluoride Exposure: I think you have to look at the particular issue that you want to put onto your town warrant versus a city like Manchester where we have over 100,000 people. Not all of those are registered voters, but taking into consideration that whatever is done. . . .relative to fluoride. . . .whatever is done in regards to fluoride according to an interpretation of the laws by the Attorney General's office, the outlying towns do not have a say on what Manchester does with the water supply. The odd part of this thing is, when I researched the state laws on the creation of the Manchester Water works, it specifically said that the Manchester Water Works was being allowed to be created by the state legislature to also supply water to the surrounding districts. Yet, the surrounding districts have to put up with whatever they receive from the Manchester Water Works – but they have no say in what would go into that water.

List attached ↖ to committee Transcripts

Senator Rick A. Trombly, D. 7: Thank you. Any questions?

Is it Paul Harrington?

Paul Harrington, Nashua, NH: Yes.
. . . . . .(background interference). . . . .here before me.

Senator Rick A. Trombly, D. 7: Well, Paul, I have you and one other speaker signed up to speak – that's all I have. So, if somebody wants to sign up and wants to speak, they'll go in the next go around. We're not going to shut anyone down, I just want to tell you why I called on you. If you want to

refer to someone, just give me that person's name and I'll be glad to write it in.

Paul Harrington, Nashua, NH: Dr. Mancuso.

Senator Rick A. Trombly, D. 7: Dr. Mancuso.

Dr. Norman Mancuso, Natick, MA:

Written testimony – (See Attachment #5)

I would like to speak to the issue of restricting the testimony to this, because the question is whether lowering the barrier to a controversial program is in the best interest of the people. You'll also hear from the same proponents that there is not controversy about fluoridation. Let me only say with regard to that - If, before you leave the house in the morning, your spouse slaps you, and if you come back at night and your spouse slaps you again – then you can maintain that you don't have any marital discord in your home, but that's not the truth.

The bill that's before you which proposes lowering the number of signers from 10 percent to 5 percent should also include provision for those communities which choose to not continue fluoridation in the light of present testimony and present evidence. There are numerous circumstances of this type of thing; and anyone who chooses to look through the references I've provided will find that there is, in deed, a controversy and it's of massive proportions. I'd be happy to answer any questions.

Senator Rick A. Trombly, D. 7: Thank you, Doctor.

Mr. Harrington, did you wish to be recognized?

Paul Harrington – Nashua, NH: We mentioned earlier, Mr. Chairman, about the people not being represented. Well, I'm in Nashua and there're many people who receive Pennichuck water that would never be able to vote on this, and I believe that's an outrage.

(Reads from written testimony – See Attachment #6)

Mr. Chairman, I notice there's a soda there. Recently, there was an article that came out internationally that, when you drink two sodas now you're over your intake of fluoride for the day. I hope these people understand this that are trying to promote this.

Resumes Reading from written testimony.

Senator Rick A. Trombly, D. 7: I know everyone's anxiety to explore the benefits and the detriments of fluoride. . . . .Mr. Harrington, I say to you, again. . . .We on the committee are very well aware of that. . . .don't mean to cut you off. . . .We're here to determine whether 5 percent, 10 percent, and I'm trying to give some leeway because I do understand this is a very important issue to both sides. Even if people who disagree with you in this room say there's no controversy, believe you me, we know there's one. Okay?

Paul Harrington, Nashua, NH: I just strongly oppose it, because being in Nashua, I know one of the reasons. . . .We fought hard to stop this, and now they're trying to just cut it in half so they can get their signatures and bring all the money in to get it – what they did in Manchester to Nashua. There're are many people upset, Mr. Chairman. Thank you very much for your time.

Senator Rick A. Trombly, D. 7: Thank you very much. Questions?

Stacie Plourde?

Stacie Plourde, Hooksett, NH: My name is Stacie Plourde. I'm a hygienist. I live in Hooksett, and representing myself. I just want to address. . . .I think it was a question that you asked. . . .you just happen to be my senator, but. . . . .Well water versus public.

I think you had asked a question of well water versus public water supply in certain towns, and Hooksett is a community that does have public water as well as well water. I think for putting this on the ballot that the target people we're trying to reach, whether they be low income or the children; most of those people. . . .if they're of low income and they're not getting fluoride from their pediatrician and that sort of thing. . . .are going to live where there's public water. . . .so I would see that as a benefit.

Also, living in Hooksett, half of our town has public water from Manchester and half of it is from our own public water supply. I personally feel that, if we were to lower this down to 5 percent, that would enable the rest of our town to put this issue on the ballot, put it before the town of Hooksett so that most of the town could be fluoridated that has public water supplies.

Senator Rick A. Trombly, D. 7: Since you're representing yourself. . . . . .

Stacie Plourde, Hooksett, NH: Yes.

Senator Rick A. Trombly, D. 7: . . . . .The people who've come here today said, "Look, there's a large segment of the population that is not even going to have a voice in this.". . .and I know this goes astray from where we are legislatively, but it intrigues me that people who are going to be consuming this don't have any say in whether or not it be in their water. Could you just give me your thoughts on that?

Stacie Plourde, Hooksett, NH: Well, I'd like to compare it to. . . Students in our town attend Manchester High Schools. We do not have a say on their education in Manchester. . . .that is always a hot topic. So, whether or not you have a say of where you live, that's ultimately just where you live. There's a lot of things we don't have control over as voters, and we, as a town, cannot vote on Manchester's school issues and the same with half of the people of the town Hooksett could not vote on this issue. I don't know if that's something that could be changed down the road, but that's just part of where you live.

Senator Rick A. Trombly, D. 7: Do you have a question for your constituent?

Senator Patricia Krueger, D. 16: My question is. . . . .There are other things that are added to public water for the good which we don't have control over as well; certainly the public water in Manchester smells. . . .but would you agree that those are put in and there could be controversy attached to them?

Stacie Plourde, Hooksett, NH: Oh, absolutely, and I don't know how much study goes into it before they decide how much they're going to chlorinate the Manchester water; but I don't see that all over the paper as a hot issue, and I think that could be a problem as well.

Senator Rick A. Trombly, D. 7: I have William Kassler. . .did you want to speak now?

William Kassler – Department of Health & Human Services: I have prepared testimony **(See Attachment #7)** which I won't read. Good afternoon. For the record my name is William Kassler. I'm a practicing physician; I'm also the parent of three children under the age of seven, all of whom are taking oral fluoride supplementation because we're not fortunate enough to live in a community that fluoridates its water supply. I'm here representing the Department of Health and Human Services as the State's Medical Director. The department supports this bill because it would eliminate unreasonable barriers on our communities choosing to improve the oral health of its citizens.

I would like to cite that there have been many public opinion polls that indicate that, when put to the voters, there's overwhelming majority of them that can support this. I would also be available for any questions that you might have about the health affects or the health hazards of fluoride. I would also like to remind you that it is the Department's policy to actively promote and support community water fluoridation.

Senator Rick A. Trombly, D. 7: Thank you. Any questions?

Also in favor of the bill, but has not checked off, Nancy Martin. Nancy?

Nancy Martin, Warner, NH: I don't choose to speak, but I come from the Bureau of Oral Health and we support this bill.

Senator Rick A. Trombly, D. 7: Thank you very much.

Carolyn Hartnett?

Carolyn Harnett: I'm not choosing to speak, but I'm also in favor of it. Our department has the dental auxiliaries programs at New Hampshire Tech.

Senator Rick A. Trombly, D. 7: Bernard Lucey is in favor and did not wish to speak. Bernard do you want to speak now?

Bernard Lucey – Department of Environment Services: Yes, please.

Good afternoon. My name is Bernie Lucey. I am an engineer with the Department of Environment Services, and I am going to remember the Chair's advice relative to keeping on target with the 5 percent and 10 percent issue.

. . . .**(Tape change)**. . . .or it was Senator Disnard. What's the purpose of a clause that was further down in the statute relative to ceasing fluoridation? I think this bill with a 5 percent figure would give those people that are opposed to fluoridation the same benefit as the people that are advocating fluoridation to bring a fluoridation repeal to the voters for a vote. That. . . . in Berlin (I assume that it was done in accordance with the law.), back in, roughly, 1990 the city did away with fluoridation that had previously been in place.

The city of Concord has gone in different directions on the fluoridation issue since 1950. I think it initially took it on, then set it aside for 10 or 15 years

(and these numbers are very approximate), then brought it back on board again, and, currently, the city of Concord fluoridates. So, this bill may provide as much to those that are opposed to fluoridation as to the advocates.

Number two, I have some informational documents here **(See Attachment #8)**. Those documents. . . .and I'll pass them to whichever is the right side of the house here. . . .Senator McCarley, you had asked how many systems in the state of New Hampshire fluoridate. There are ten that do this purposefully out of approximately 100 municipal systems, and those are listed on one of those documents. The other document states the approximate levels where they're either regulatory or educational aspects of the Safe Drinking Water Act being to the fluoridation issue.

Item number 3, in terms of outlying communities having a say or not having a say in the fluoridation area. . . . .this is a difficult issue for regional water systems such as Manchester. That the city of Manchester uses many chemicals in their water treatment. . . . .those are not individually asked of all the consumers as to whether the consumer wants that particular chemical used at the water treatment plant. I think it would be certainly difficult to actually achieve that kind of – that's basically a prerogative of management in accordance with other engineering factors mandated by our agency. . . that you could easily have towns (a), (b), and (c) vote in favor of fluoridation, towns (d), (e), and (f) vote opposed to it, and potentially then overrule the preference of the core town that is hosting the community water system or the regional water system to begin with.

The number 50,000 people served by Manchester. . . .Manchester serves approximately 110,000 people, and I think more than half of those are within the city of Manchester. The Attorney General did provide commentary about a year ago relative to the issue of what would be the role of the outlying communities in terms of a popular referendum, and that letter from the Attorney General's office is on file and available to the committee if they ask.

Senator Rick A. Trombly, D. 7: Would you get us a copy of that, please?

Bernard Lucey – Department of Environmental Services: Yes.

In terms of the Department of Environmental Services, we are here speaking in favor of the bill, and, finally, I'm available to answer any questions that you may have.

Senator Rick A. Trombly, D. 7: Thank you.

Myron Coplan, Natick, MA: Thank you, Mr. Chairman.

Copy of letter from AG's office not received at completion of transcript pg 17

My name is Myron Coplan. I'm a resident of Natick, Massachusetts. I appreciate the courtesy of your office of having invited somebody from out of state to address you. I will try to confine my remarks to the purpose of your meeting, and perhaps I didn't adequately designate my own qualifications. I should have forgotten about being a chemist/chemical engineer and commented on the fact that I am a citizen and I vote, and I fancy the somewhat naïve view that a vote should not be wasted idly - you should vote from a basis of information. Therefore, I'm going to skip to the last page **(See Attachment #9)** of what consists of a lot of stuff.

The conclusion is as follows: It would seem that any legislation promulgated in 2000 which intends the public to have an intelligent basis for considering the merits of water fluoridation should provide that public with contemporary relevant facts on which to base that choice. **It is therefore suggested that the following language would be appropriate for New Hampshire to consider at this time, but I would say any legislature.** I hold no brief for 5 percent or 10 percent or 45 percent. I hold the following to be of greatest concern – **"I'm suggesting legislation."**

"Prior to the call of any referendum on the question of fluoridating a public water supply, the health authority of a municipality or county recommending the start or continuation of such practice shall conduct and publish the results of a survey of the current rate of children's tooth decay in said municipality or county, as determined according to recognized protocols for such surveys, and said survey shall include a statistically representative sample according to age, gender, socioeconomic status, and race/ethnicity criteria."

Final remark on this subject – Such an approach. . . .(a) would provide a realistic basis for forming an opinion, in contrast to a "faith-based" assumption that "experts" know the facts and tell the truth, and (b) is intellectually more honest than manipulating the numbers of individuals required to sign a petition or support an issue placed in referendum.

I would like to comment that I would feel quite well informed to decide whether a new liquor store should be opened up in my town or whether some restaurant should be given a liquor license. I would feel adequately confident to judge whether we need a new high school or not by just consulting various obvious facts in my community. I feel most voters have no knowledge of what the impact of fluorides may be on their child, on themselves, on their grandparents. . . . .they have to rely on technical information very difficult sometimes to pin down. . . . And, I would submit. . . . this document will be circulated for each of you. It will show that contemporary facts regarding

Bell Weather Communities that have often been cited by the proponents of fluoridation. Newburg-Kingston in New York, for example; which, in 1945, was one of two Bell Weather comparisons. One of them was Grand Rapids and Muskegon; the other one is Newburg and Kingston. Today, in the non-fluoridated community of Kingston, tooth decay is less than it is in fluoridated Newburg. You will not hear that. . . . .you will be told about the 40 or 50 percent benefit that Newburg enjoyed in 1945. . . . .but, what are the facts today? The facts are today from not anti-fluoridation people but people who work for the National Institute of Dental Research. . . . various qualified organizations. All the documentation that I have here, that you will, hopefully, read, is not on a sheet from anti-fluoridationists. I've spent a fair amount of time, a considerable amount of time since I was elected to the Natick Board of Health in 1981 following this issue. I served in many capacities in my community, so I'm very sensitive to the issue of what it means to get a vote, either in town meeting or some other vote, and when you go in that ballot. . . .close the curtain behind you. . . whatever. . . .make a mark on the ballot. . . . .you have to ask which way I want to go on this issue, and if you only have the information provided to you by those in your community who are extensively authorities on the subject and you have no reason to doubt that they're up to date on their facts, you're going to go along with them.

I'm sensitive to this issue. This suggested amendment requires those people to go out there. Now, I'm totally in sympathy with one of your fellow senators, Ms. Wheeler, with the fact that there are children with terrible teeth. The question is, why do they have terrible teeth?. . .and. . . .Will fluoride do them any good? If you read the documentation that I'm providing you from the research literature of the dental research community; in 1999 there was no evidence that fluoride would do a thing for that 2-year old child lying in a crib with decayed teeth. Thank you.

Senator Rick A. Trombly, D. 7: Thank you for coming down from Massachusetts.

Senator Krueger?

Senator Patricia Krueger, D. 16: I just have a quick question, Mr. Chairman. I was wondering, Mr. Coplan, if you had the same feelings about fluoride in toothpaste and if, in fact, that was given consideration in the dental health improvement in Newburg, New York. . . . .if, in fact, parents thought they weren't getting fluoride in their water, if they then encouraged their children to use fluoride toothpaste.

Myron Coplan, Natick, MA: Senator, I'll try to keep it as brief as I can.

I gave my own children fluoride tablets because there was none in the water and probably nothing in the toothpaste in those days (I'm a great-grandfather). As far as today's toothpastes are concerned, the substance used to deliver fluoride is not the same as being used to fluoridate water. There's a big problem there, but I won't get into the technology of that. My feeling is, if you do have adequate dental care (including brushing teeth and the right kind of diet) you don't need to supplement anything, because you're going to get all the fluoride you need from topical contact. The consensus of the day is ingested fluoride is a waste of time. If you are going to get any benefits out of the fluoride, it will be because the fluoride deals with the plaque, the streptococcus mutants which generates the acids that corrode the enamel, and to a limited extent, free fluoride iron in your mouth changes the chemical nature of the surface of the tooth. It doesn't happen by getting into your gut, into your blood, and through the inside of the dentin of your tooth. It doesn't happen. **(See Attachment #9)**

Senator Patricia Krueger, D. 16: Thank you.

Senator Rick A. Trombly, D. 7: Thank you very much. That's all the people I have to testify, so, I will close the hearing. It's probably my intent, if you have any submissions for us (I've asked some people to do that), I will probably get back on this next week. We have to get these bills out, so we'll probably vote on it next Wednesday. . . . .in two weeks. So you have two weeks to get that to us. . .two weeks from today. Get 8 copies so that one has a copy. Thank you everybody for your patience and consideration.

Hearing closed at 2:50 p.m.

Respectfully submitted,
Carolyn Carey, Senate Secretary

SB312 2/23/00 1:50 p.m Fluoride

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Attachment #1

N.H. PURE WATER COALITION

Director: Gerhard Bedding, 8 Green Acres Rd., Keene, NH 03431. Tel. and fax 603-355-2202

Partial list of organizations, professionals, and businesses endorsing the N.H. Pure Water Coalition: American Preventive Medical Assn, New Hampshire Greens, New Hampshire Citizens for Health Freedom, Citizens for a Future New Hampshire, Earth Island Institute, Aurum Foundation, Namaste Permaculture, N.H. Coalition for Alternatives to Herbicides, Albert Schatz, Ph. D. (discoverer of streptomycin), A. Konopka, M.D., Gail Rockwell Minton, Ph.D., Gerald Karnow, M.D., Caroline Snyder, Ph.D., Philip Incao, M.D., Paul W. Scharff, M.D., L.J. Aventuro, M.D., Kent Hesse, M.D., Phyllis Mullenix, Ph.D., Daisy Goodman, R.N., Thomas Cowan, M.D., Pamela Herring, N.D., Leon Hecht, N.D., H. Crayé, N.D., Louis J. Ronsivalli, M.Sc, Kelly Sutton, M.D., Gary L. Walsemann, D.C., John R. Lee, M.D., D. Kennedy, DDS, Libby DeMartelly, M.A., Elaine A. Brown, D.M.D., Paul Connett, Ph.D.,A-Market Natural Foods, Blueberry Fields.

To Rick Trombly and Members of the
Public Affairs Committee, N.H. Senate

February 22, 2000

Re: SB 312

My name is Gerhard Bedding. I am a science writer and a teacher. I worked for four years as a full-time science writer for the Xerox Corporation. I have two Master's degrees, one with a science major. I am Director of the N.H. Pure Water Coalition which was formed recently to educate the N.H. public about the growing scientific controversy surrounding fluoridation.

On behalf of the NH Pure Water Coalition, I am speaking against SB 312 as it now stands. Asking for 10% of all voter signatures to put fluoridation on the ballot seems quite reasonable in the light of the raging controversy. However, if SB 312 were to be combined with House Bill 1598, we could probably live with it. Let me explain that a bit later.

No serious discussion of fluoridation is possible without taking into account two recent reports: "Fluoridation and the Environment" and "Why EPA's Headquarters Union of Scientists Oppose Fluoridation" of May 1, 1999, which represents the view of hundreds of "whistle-blowing" EPA scientists. Their report asks for an immediate halt to fluoridation in the U.S. They explain that their conclusion is based on the scientific literature, "documenting the increasingly out-of-control exposure to fluoride, the lack of benefit to dental health from ingestion of fluoride, and the hazard to human health from such ingestion. These hazards include acute toxic hazards, such as to people with impaired kidney function, as well as chronic toxic hazards of gene mutations, cancer, reproductive effects, neurotoxicity, bone pathology, and dental fluorosis." Six pages of peer-reviewed references follow the report.

Here is a statement from hundreds of EPA whistleblower-scientists, not just one or two, all experts hired to guard the quality of our water and air, and sworn to tell the American public the truth as they find it. They have not sworn allegiance to the health establishment but to the public.

Their report should have been big news but the media ignored it.

It is clear that there is a huge scientific controversy over the benefits and risks of fluoridation. The ADA's comment that "there is no credible opposition to fluoridation" sounds hollow when one considers that 12 Nobel Prize winning scientists are either outright opposed to fluoridation or are very critical of the practice. (See Paul Connett, Ph.D., Waste Not # 359,, January 2000)

Why are the ADA, the CDC, the Public Health Service still promoting fluoridation? One might call it institutional inertia, or fear of loss of face: Their hasty and premature endorsement of fluoridation 50 years ago now makes it hard for them to re-evaluate fluoridation in the light of current scientific research. Medical authorities outside the U.S., who did not make premature endorsements on fluoridation, have generally abandoned it, after testing and studying it for many years. Outside the U.S. only 2.5% of the world population drinks fluoridated water. 98% of Europe is not fluoridated.

Now back to SB 312 and its relation to HB 1598. HB 1598 is a gentle and eminently reasonable bill. It simply asks that the serious scientific controversy over fluoridation be recognized by requiring a 2/3majority, rather than a simple majority, to start fluoridation. If indeed fluoridation is a good idea, then the medical establishment which has all the power of its reputation and of Federal money, ought to be able to persuade a sizeable majority to vote for it.

For example, a narrow majority of 51.5% - Manchester's vote on 11/ 2, 1999 - should not have had the right to force the other 48.5% to swallow something they object to. This is not a basketball game where one or two points leads to "Winner takes all".

The NH Legislature has had the wisdom to recognize areas where more than a simple majority vote is needed to reach a decision. For example, New Hampshire requires a 60% majority vote to pass a school bond issue. I suggest that being forced to consume something you don't want, something your own doctor may advise against, is even more serious than having to make tax payments on a school bond you might have objected to.

HB 1598 also addresses the outrageous injustice done to NH citizens in outlying towns who receive their water from a city where they cannot vote. I understand that 40,000 NH citizens outside Manchester are in this position. Their demand should be "No fluoridation without representation".

So, if SB 312 can be combined with HB 1598, we could probably live with it.

Gerhard Bedding

PURE WATER COALITION
8 GREEN ACRES RD
KEENE NH 03431

SB 312

Attachment #1

ARTHUR D. HERSHEY, MEMBER
HOUSE POST OFFICE BOX 202020
ROOM 214, CAPITOL ANNEX
HARRISBURG, PA 17120-2020
PHONE (717) 783-6435
FAX (717) 705-1868

3157 LIMESTONE ROAD
P O BOX 69
COCHRANVILLE, PA 19330
PHONE (610) 593-6565
FAX (610) 593-7041

House of Representatives
COMMONWEALTH OF PENNSYLVANIA
HARRISBURG

COMMITTEES

MAJORITY CHAIRMAN, ENVIRONMENTAL RESOURCES AND ENERGY
AGRICULTURAL AND RURAL AFFAIRS,

RURAL CAUCUS
TIMBER CAUCUS
FIREMEN'S CAUCUS

APPOINTMENTS

CHESAPEAKE BAY COMMISSION, CHAIRMAN

June 16, 1999

Ellie Rudolph, Director
Pennsylvania Chapter Health Alliance International
645 Ninth Street
Oakmont, Pa 15139

Dear Mrs. Rudolph:

I received your recent note, along with the attachments, expressing your interest and concern over the issue of fluoridation of drinking water. I appreciate your providing the enclosures to your note and I realize they represent quite a bit of work on your part. I appreciate receiving information such as yours from my constituents since it makes it much easier for me to understand the issues involved from a broad perspective.

As you are aware, the Environmental Resources and Energy Committee, which I am Chairman, has had referred to committee, House Bill 939, which, if enacted, would, in simple terms, establish minimum fluoridation levels for public drinking water.

As you are probably also aware, the fluoridation issue has been on and off the public agenda in Pennsylvania Legislature for many years now. When I learned that this bill was referred to my committee, I asked my staff to research the subject and their report to me was that there is no solid scientific or medical evidence to show that fluoridation is of any beneficial help to public health, safety or welfare. As chairman of this committee, it is my policy not to move any legislation from committee that would not result in a positive benefit to public health, safety or welfare.

Accordingly, please be advised that I have no intention now, or in the near future, to have the committee consider House Bill 939 or any other legislation dealing with fluoridation of public drinking water.

I appreciate your taking the time to write and advising me of your interest in this issue. Should you have any additional information that you might feel helpful to myself or my staff, please contact Fred Taylor, Esq., of my staff counsel at (717) 783-3972.

Thank you again.

Sincerely,

Art

Arthur D. Hershey, Majority Chairman
Environmental Resources & Energy Committee

ADH/sel

N.H. PURE WATER COALITION

Director: Gerhard Bedding, 8 Green Acres Rd., Keene, NH 03431. Tel. and fax 603-355-2202

Partial list of organizations, professionals, and businesses endorsing the N.H. Pure Water Coalition:

American Preventive Medical Association
New Hampshire Greens
New Hampshire Citizens for Health Freedom
Citizens for a Future New Hampshire
Earth Island Institute
Aurum Foundation
Namaste Permaculture
N.H. Coalition for Alternatives to Herbicides
Albert Schatz, Ph. D. (discoverer of streptomycin, which is considered to be one of the ten major medical discoveries of the 20th century)
A. Konopka, M.D.
Gail Rockwell Minton, Ph.D.
Gerald Karnow, M.D.
Caroline Snyder, Ph.D.
Philip Incao, M.D.
Paul W. Scharff, M.D.
L.J. Aventuro, M.D.
Kent Hesse, M.D.
Phyllis Mullenix, Ph.D.
Daisy Goodman, R.N.
Thomas Cowan, M.D.
Pamela Herring, N.D.
Leon Hecht, N.D.
H. Crayé, N.D.
Louis J. Ronsivalli, M.Sc.
Kelly Sutton, M.D.
Gary L. Walsemann, D.C.
David Ridge, D.C.
John R. Lee, M.D.
D. Kennedy, DDS
Libby DeMartelly, M.A.
Elaine A. Brown, D.M.D.
Paul Connett, Ph.D.
A-Market Natural Foods
Blueberry Fields.

ESTEEMED VOICES WARN AGAINST FLUORIDATION:

* "Fluoride is an enzyme poison, in the same class as cyanide, oxalate, or azide, which means that it is capable of a very wide variety of harmful effects, **even at low doses.** This characteristic of fluoride has long been known and accounts for the opposition to fluoridation by such eminent scientists, all Ph.D's, as Sumner and Myrback (authors of *The Enzymes*), Laubengayer (Cornell, leading authority on all aspects of fluoride chemistry), Theorell and von Euler (both were Swedes and both *Nobel Prize winners* for work in enzymology) and a number of others.
John B. Patrick, Ph. D. Chemistry, before a Joint Congressional Committee (8/ 4/82). Dr. Patrick at that time was Senior Professor and Chairman, Dept. of Chemistry, Mary Baldwin College."

* "I am appalled at the prospect of using water as a vehicle for drugs. Fluoride is a corrosive poison that will produce serious effects on a long-range basis. Any attempt to use the water this way is deplorable." **Dr. Charles Heyd, Past President of the American Medical Association.**

* "I am certainly not a proponent of fluoridation of public water supplies. I think it exposes adults to possible risks. It may increase the total fluoride load that people are getting on top of other sources and it doesn't give people a choice"

Andrew Weil. M.D., *Natural Health,* magazine, March-April 1998

William Marcus, Ph.D., D.A.B.T., (Toxicology), former U.S. EPA Senior Science Advisor *
Albert W. Burgstahler, Ph.D. (Organic Chemistry, Env. Fluoride)
Robert J Carton, Ph. D. (Env. Sciences & Risk Assessment)
Paul Connett, Ph.D. (Toxicology and Environmental Chemistry)
Richard Foulkes, M.D., Fmr. Consultant to Health Minstr, BC, Canada
Richard A. Kunin, M.D., Pres. Soc.for Orthomolecular Health Medicine.
M.A. Krikker, M.D., Hemochromatosis Foundation, Albany, N.Y.
D. Skinner, M.D., B.Sc, C.A.F.C.
Roy E. Hanford, M.D. (Phys.&Surgeon)
John R. Lee, M.D.
Gerson Jacobs, M.D.
Harvey Petraborg, M.D.
E.R. Cooper, M.D.
Edward A. McLaughlin, M.D.
Philip E. Zanfagna, M.D.
Jonathan Forman, M.D.
L.A. Alesen, M.D.
William J. Filante, M.D.
Sheila M. Gibson, M.D., B.Sc., M.F. Hom (Research Physician)
George L. Waldbott, M.D. (founder Int.Soc. for Fl. Research)
Simon Beisler, M.D. (Chief of Urology, Roosevelt Hospital, N.Y.)
Fred Squier, M.D. (Head of Oral Surg, Lenox Hill Hospital, N.Y.)
John Garlock, M.D. (Consulting Surgeon, Mt.Sinai Hosp., N.Y.)

This is only a partial list

Edgar A. Lawrence, M.D. (Dir. of Medicine, Lenox Hill, N.Y.)
Girard F. Obenender, M.D.,
Frederick B. Exner, M.D. (Fellow of the Am. Coll. of Radiology)
Charles C. Bass, M.D. (Dean Emeritus, Tulane Un. Medical School)
Alton Ochsner, M.D. (Chief Dept. of Surgery, Tulane Un. Med. School)
Julian Whitaker, M.D.
Robert Atkins, M.D.
Bruce West, M.D.
Philip Incao, M.D.
Leslie A. Russell, D.M.D.
Kirk Youngman, D.M.D.
Paul W. Sheeran, D.M.D.
Ellsworth D. Foreman, D.M.D.
David Kennedy D.D.S. (Inter. Acad. Oral Med. and Toxicology)
+ 24 other dentists with a D.D.S.
Benedict J. Gallo, Ph.D. (Botany, Research Microbiologist)
Norman R. Mancuso, Ph.D. (Chemistry, Apollo Project Scientist)
Andrew Berns-Hicks (Hazardous Substance Engineer, CA-EPA)
John P. Flaherty, (Chief Justice, Supreme Court of Pennsylvania)

*** Above affiliations are listed for identification purposes and do not imply institution endorsement or support.**

N.H.Pure Water Coalition
8 Green Acres Rd., Keene, N.H. 03431
Tel. & Fax 603-355-2202

73 Mirror Street
Manchester, NH 03104
February 23, 2000

Rick Trombly Chairman
Members of the Public Affairs Committee

Re: Senate Bill 312 - An Act Relative to Fluoride

Dear Chairman Trombly and Members of the Committee:

Please consider killing Senate Bill 312 requiring a 5% vote of the population in order to add fluoride to our water supplies in New Hampshire. There are very serious issues and concerns regarding the toxicity of ingesting this poisonous substance amongst the scientific community and our citizens. A few of them are mentioned below.

During October 1999, I had a telephone conversation with Dr. William Hirzey, Vice President of the EPA Union of Scientists in Washington, DC. The Union's members consist of 1500 *cream-of-the-crop"* scientists, engineers and lawyers who *strongly oppose* adding fluoride to drinking water. Dr. Hirzey said, **" Fluoride is a poison and should not be added to our drinking water. If anyone wants fluoride they can get it by prescription from their doctor or their dentist".**

Dr. Phyllis Mullinex, Ph.D., toxicologist, Boston Children's Hospital was hired by the Forsyth Dental School at Harvard University to research fluoride. Dr. Mullinex was appalled at her findings – **fluoride breaks through the blood/brain barrier, causing ADD, ADHD and learning disabilities in children, which are increasing in epidemic proportions**. Dr. Mullinex said the amount of fluoride which is considered "safe" is 1 PPM per day, which is equivalent to the size of a pea of toothpaste on your toothbrush. She added that children under 6 should ***never,*** use fluoridated toothpaste or drink fluoridated water. At a young age, children have not developed their reflex to spit out, they swallow their toothpaste , which poses an imminent danger to their health.

David Hess, Chairman
Members of the Municipal and County Government Committee
Re: Senate Bill 312

February 23, 2000
Page 2 of 2

Fluoride is a toxic waste product of aluminum and phosphate fertilizer companies and is classified as "hazardous waste". Their disposal fee is $1.40 per gallon as hazardous waste, or they can sell it for 35 cents per gallon to the unsuspecting public. It's purely economics - $1.75 profit to market a gallon of their poison.

Let's not let their profit motive override our "freedom of choice" in the very personal area of what we may or may not want to consume. I choose not to be medicated with a poison more toxic than lead through my drinking water.

Public drinking water was never intended to be a vehicle for delivering poisonous substances to the citizens of any community. If a percentage of our citizens have backaches, migraines or arthritis, should we drug our citizens through their drinking water with medications which address those ailments?

Manchester lost to fluoridation by a very narrow margin of only 680 votes. Should the rest of us be held hostage by being denied our freedom of choice regarding the integrity of the water we drink, cook with, and bathe?

Your consideration to kill this bill would be appreciated..

Respectfully submitted,

Katherine E. Bantis

Katherine E. Bantis
73 Mirror Street
Manchester, NH 03104

P. S. For your reference -- website:
www.cadvision.com/fluoride/index.htm

ALBERT SCHATZ, Ph.D.
6907 Sherman Street, Philadelphia, PA 19119
215-842-0265 FAX 215-842-2388
aschatz@unix.temple.edu

October 15, 1999

The Citizens of Manchester
Manchester
New Hampshire

Dear People:

I am writing about the dangers of fluoridation.

I have been doing scientific research for more than half a century. **I have been involved in the fluoridation controversy since the early 1950's.** During this time, I have done considerable research on fluoridation, and published many reports in several countries.

I am opposed to fluoridation because of the overwhelming evidence that fluoridation is not only potentially harmful but has already caused considerable well-documented harm. So, it is definitely not safe.

Albert Schatz, Ph.D., received his doctoral degree in Soil Microbiology and Biochemistry from Rutgers University. He discovered the antibiotic Streptomycin which was the first effective means of treating tuberculosis. In his book The Forgotten Plague, Frank Ryan, M.D., commented on this discovery: "So, calmly and methodically, Albert Schatz, barely 23 years old, now performed an experiment that would utltimately prove **one of the most important in the history of medicine.** He tested streptomycin against tuberculosis."

Streptomycin was also the first effective treatment for pneumonic plague, also known as "the Black Death", and for tularemia, brucellosis, and other serious infectious diseases.

Dr. Schatz was awarded honorary degrees and medals, and was named an honorary member of scientific, medical, and dental societies in Europe, Latin America, and the United States. One of the Gold Medals awarded was the Grand Prix Humanitaire de France. He also received the Rutgers University Medal for the discovery of streptomycin. The citation accompanying the medal stated that "The worldwide impact of this discovery is now part of medical history."

Dr. Schatz initiated research that led to the discovery of another antibiotic, Nystatin. He has also done research with other infectious diseases, cancer, multiple sclerosis, fluoridation, the role of chelation in the formation and fertility of soils, etc. He has published three books and more than 700 articles. He is a member of Phi Beta Kappa and Sigma Xi.

In November 1965, the University of Chile awarded Dr. Schatz an Honorary Degree for his contributions to that country. He has honorary degrees from four other American universities. Dr. Schatz has been invited to lecture in the U.S. and in 19 other countries.

ALBERT SCHATZ, Ph.D.
6907 Sherman Street, Philadelphia, PA 19119
215-842-0265 FAX 215-842-2388
aschatz@unix.temple.edu

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I am opposed to fluoridation because of the overwhelming evidence that fluoridation is not only potentially harmful but has already caused considerable well-documented harm. So, it is definitely not safe.

Fluoridation also does not prevent dental caries. What it does is delay the appearance of tooth decay. This delay occurs because tooth eruption is delayed in adolescents who are fluoridated. Teeth, whose eruption is delayed, are exposed to cariogenic conditions in the mouth for a shorter period of time than teeth which erupt without delay. This is why there is less decay in fluoridated children compared to children of the same age who are not fluoridated. The so-called "beneficial" effect of fluoride is therefore a statistical illusion. My report entitled **The Failure of Fluoridation in England** discusses this statistical illusion in data published by the **British Department of Public Health and Social Security in London**.

I also refer my report **Low-level Fluoridation and Low-Level Radiation. Two Case Histories of Misconduct in Science**.

Sincerely yours,

Albert Schatz

NEW YORK STATE COALITION OPPOSED TO FLUORIDATION, INC.
Participating Member of International Network for Safe Drinking Water
P. O. Box 263, Old Bethpage, New York 11804-0263 e-mail: NYSCOF@aol.com
Contact Paul S. Beeber, Esq. - 516-433-8882; 516-378-7309

President and General Counsel
Paul Stephen Beeber, Esq.

Honorary Chairman
Hon. Owen H.Johnson
N.Y.S. Senator

NEWS RELEASE FOR IMMEDIATE RELEASE

SAFETY CONCERNS LEADS PROMINENT FLUORIDATION SPOKESPERSON TO CALL FOR END TO FLUORIDATION

Dr. Hardy Limeback, D.D.S., Ph.D., Head of Preventive Dentistry at University of Toronto, fluoride biochemistry expert, a spokesperson for the Canadian Dental Association for over 12 years, recently made a public announcement that **he no longer supports fluoridation.** Dr. Limeback's opposition to fluoridation came about after he reviewed the scientific literature and found that there is very little, if any, dental benefit from swallowing fluoride. In addition, fluoride can cause adverse effects to bones and teeth.

Dr. Limeback's conclusions against fluoridation are joined by a growing number of professional critics of fluoridation in the fields of medicine, dentistry, and science. A major concern of Dr. Limeback and most opponents of fluoridation is that total fluoride intake is out of control. **Excessive** fluoride intake is easily reached because of fluoride in water, foods, beverages, supplements, medications, toothpastes, rinses, fertilizers, and more.

Proponents of fluoridation report that dental fluorosis is increasing (white stains, yellow or brown discolorations or actual pitting of teeth of youngsters) but label it only "cosmetic". Dr. Limeback counters, "Since when is a cosmetic problem not a problem when the patient must seek dental treatment to fix it."..."More money is spent treating dental fluorosis than would have been saved even if fluoridation did reduce decay in children," says Limeback.

Dr. Limeback says, "The anti-fluoridationists did everyone a favor. They have challenged us to prove to them that the benefits of fluoride outweigh the risks. In my opinion, there is no question that the risks now far outweigh the benefits...Fluoride accumulates in the bones... There hasn't been a single study to show that exposure over a lifetime is safe.."

Attorney Paul Beeber, President of the New York State Coalition Opposed to Fluoridation, stated, "Dr. Limeback has done the public a great service by raising a Red Warning Flag. Those who promote fluoridation are placing people at risk of hip fractures and other harmful effects. Risk groups include those with kidney impairment, high water consumers, and others."

In an interview with the Coalition, Dr. Limeback stated, "The message has to go out: "Fluoride is a drug...Fluoridated toothpastes in the United States are now required by the FDA to have warning labels..."We should all turn to what the Europeans are doing and ban fluoride from the water supplies."

-30- (6/23/99)

Dr. Limeback may be reached at: Tel. 416-979-4929, Ext. 4461; Fax: 416-979-4936;
e-mail: hardy.limeback@utoronto.ca

http://www.fluoride-journal.com
http://www.SaveTeeth.org
http://www.cadvision.com/fluoride
http://www.sonic.net/~kryptox/fluoride.htm

DECLINE IN TOOTH DECAY NOT ATTRIBUTABLE TO WATER FLUORIDATION

The decline in tooth decay in 12 year old children over periods of up to 20 years is greater in four non-fluoridated European countries than in the Republic of Ireland, where two thirds of the country is fluoridated.

Also there are fewer decayed teeth in these non-fluoridated countries in the 1990s than in the fluoridated Republic of Ireland.

Data from the World Health Organisation, Non Communicable Disease Division, shows that the Republic of Ireland, by far the most fluoridated country at 66% runs sixth place behind four countries with no fluoridation and one with 10% fluoridation.

The Table clearly demonstrates that the decline in tooth decay is NOT attributable to water fluoridation.

Comparison of Decayed, Missing and Filled Teeth (DMFT) in 12-year-olds in European Countries compared with the Republic of Ireland.

(Source: World Health Organisation, Non-Communicable Disease Division)

	Country	DMFT	Year	DMFT	Year	Decline in DMFT %	Comment
1	Finland	7.5	1975	1.2	1991	84	No Fluoridation
2	Denmark	6.4	1978	1.3	1992	80	No Fluoridation
3	UK (GB&NI)	4.7	1973	1.4	1993	70	10% Fluoridation
4	Sweden	6.3	1977	1.5	1994	76	No Fluoridation
5	Netherlands	6.5-8.2	1974	1.7	1991		No Fluoridation
6	Rep. of Ireland	5.4	1972	1.9	1992	65	66% Fluoridation
7	Switzerland	2.3-9.9	1963-75	2.0	1987-89		One city Fluoridated
8	France	3.5	1975	2.1	1993	40	No Fluoridation
9	Norway	8.4	1973	2.3	1991	70	No Fluoridation
10	Spain	1.9	1968-69	2.3	1993	+21	1% Fluoridation
11	Germany	6.0	1973	2.5(GDR*)	1994	58	No Fluoridation *(*Formerly)*
				2.6(FDR*)	1994	57	No Fluoridation *(*Formerly)*
12	Belgium	3.1	1972	2.7	1991	13	No Fluoridation
13	Austria	1.0-3.5	1973	3.0	1993		No Fluoridation
14	Italy	4.0-6.9	1978-79	3.0	1985		No Fluoridation
15	Portugal	4.6	1979	3.2	1989	30	No Fluoridation

From data compiled by T.J. Moore, BSc., 1996 and published by the National Pure Water Association, U.K.

Note: As a range of DMFT is shown in Netherlands, Switzerland, Austria and Italy, the percentage decline in DMFT is not shown in the Table. However, the decline in DMFT in Netherlands is at least 74%.

DMFT = Decayed, Missing + Filled Teeth

TUCSON FINDS NO RELATION BETWEEN FLUORIDE LEVELS AND TOOTH DECAY

A study of the dental health of 26,000 elementary school children in Tucson, Arizona, concluded that there is no obvious relationship between fluoride levels in drinking water and tooth decay. (1) This startling conclusion was made in a study commissioned by the mayor and town council, who were considering switching from groundwater to Colorado River water to supply the city of 600,000. A new treatment plant would have to be built and the health department wanted the water fluoridated.

The mayor and council appointed a citizens' advisory committee to hold hearings to examine the risks and benefits of fluoridation. The committee conducted hearings, and also did their own study of the tooth decay rates in 23 schools that are now on well water. (2) Fluoride concentrations in the groundwater varied from about 0.1 ppm to over 0.8 ppm. (the so-called "optimal level" to prevent tooth decay).

The study showed how overly simplistic it is to look at fluoride levels and tooth decay, but not at other variables affecting dental health. When fluoride levels were compared with rates of tooth decay, the committee found that tooth decay increased significantly with increasing concentration of fluoride (Figure 2). About 10% of children in the school with 0.1 ppm fluoride in the water had tooth decay. Over 45% of the children in some schools with 0.8 ppm had tooth decay.

The study, however, also found a significant inverse relationship between income and tooth decay: the higher the family income, the lower the rate of tooth decay in children (Figure 3). Families with incomes of $60,000 per year had decay rates of 10% while families with the lowest incomes ($22,000 per year) had decay rates of over 45%.

(1) Letter to the editor, Cornelius Steelink, Chemical & Engineering News, July 27, 1992.
(2) Citizen's Water Advisory Committee Report, Findings and Recommendations on Fluoridation, C. Steelink, et al., June 12, 1992.

Figure 2.

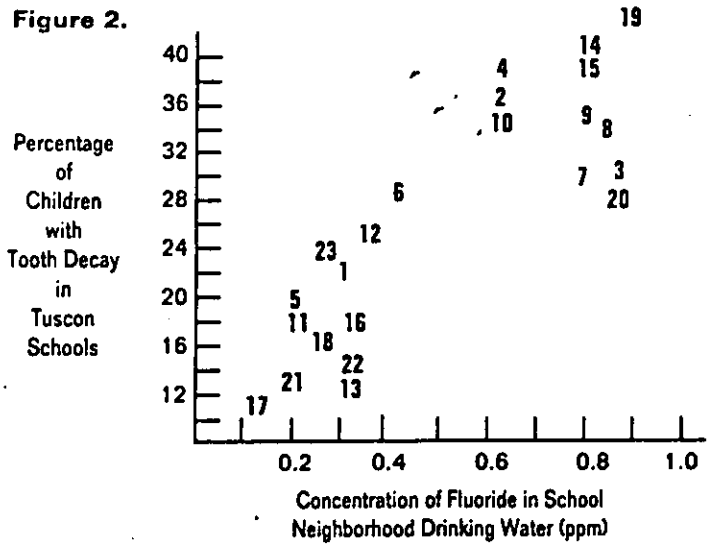
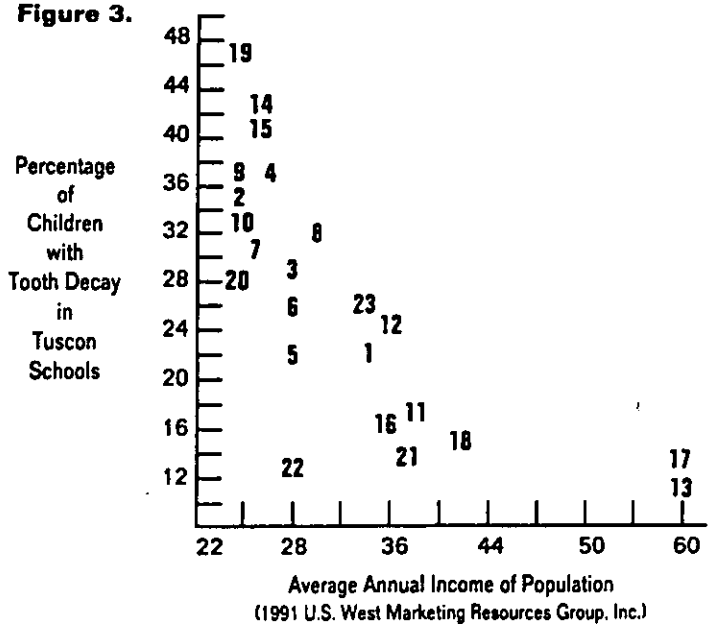


Figure 3.



KEY

1	Bnchta	9	Roskruge	17	Van Horne
2	Davis	10	Rose	18	Schumacher
3	Gnjalva	11	Steele	19	Drachman
4	Hollinger	12	Tully	20	Van Buskirk
5	Jefferson	13	Wrightston	21	Sewell1
6	Miles	14	Ochoa	22	Hughes
7	Pueblo Gardens	15	Mission View	23	Enckson
8	Robison	16	Dully		

The FLUORIDE REPORT

c/o Truth About Fluoride, Inc.
P.O. Box 219
Buckeystown, MD 21717-0219
Phone/FAX 301-874-2948

Fluoridation and its Effects

It is more toxic than lead, Alar, red dye #3, and only slightly less toxic than arsenic – and it's probably in your drinking water. However, this well-known toxin isn't in the water by accident. In 1945, American municipalities began treating public water supplies with fluoride compounds in a process called fluoridation.

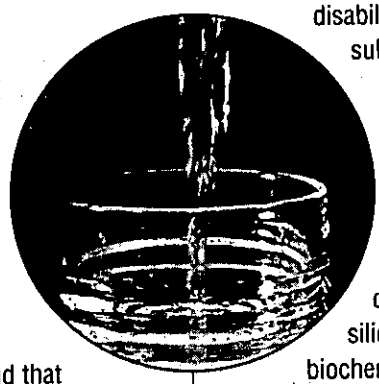
Proponents of fluoridation claim that it is a low-cost way to improve dental health. At the end of 1992, the Centers For Disease Control (CDC) estimated that 62% of the U.S. population connected to public water supplies received fluoridated water. Efforts to fluoridate water in new communities continue – but so does the debate.

Researchers have warned that intake of too much fluoride can cause skeletal and dental fluorosis (severe weakening of the bones, muscles, joints, and tooth enamel), bone fractures, and lethal poisoning. Proponents of fluoridation argue that the amount of fluoride in drinking water supplies is kept well below harmful levels. However, fluoride accumulates in human tissues – and humans ingest fluoride from many other sources. Critics contend the combined amount of fluoride from toothpaste, pesticide residues, foods and beverages, and fluoridated water may be exposing millions of Americans to potentially toxic levels of fluoride.

The Environmental Protection Agency (EPA) union, that represents about 1500 scientists, lawyers, engineers and other employees at EPA headquarters, filed a grievance in May 1999 asking that EPA provide un-fluoridated drinking water to its employees. The EPA union, known as the National Treasury Employees Union, expressed that "our opposition to drinking water fluoridation has grown, based on the scientific literature documenting the increasingly out-of-control exposures to fluoride, the lack of benefit to dental health from ingestion of fluoride and the hazards to human health from such ingestion." For governmental and other organizations to continue endorsing fluoridation and pushing for more exposure to fluoride "is irrational and irresponsible at best," according to the union's statement.

The Natural Activist (Citizens for Health)

THE NATURAL ACTIVIST



Currently, nearly all fluoridated water supplies are treated with less expensive compounds of fluosilicic acid and sodium silicofluoride. A study published in the August 1999 issue of The International Journal of Environmental Studies found that children in communities using silicofluoride compounds had significantly higher levels of lead in their blood compared with their counterparts in communities that used sodium fluoride or no fluoridation at all. Lead poisoning has been linked with higher rates of learning disabilities, hyperactivity, substance abuse and crime.

Data for the study was collected from more than 280,000 children in 30 Massachusetts communities. These results support critics' concerns that silicofluorides trigger biochemical reactions inside the body that cause increased uptake of toxic heavy metals.

The fluoridation debate continues in state and local governments. **To learn more, visit *Citizens For Health* on the web, at www.citizens.org, or call 1-800-357-2211.★**

NTEU
The National Treasury Employees Union

CHAPTER 280
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May1,1999

WHY EPA'S HEADQUARTERS UNION OF SCIENTISTS OPPOSES FLUORIDATION

The following documents why our union, formerly National Federation of Federal Employees Local 2050 and since April 1998 Chapter 280 of the National Treasury Employees Union, took the stand it did opposing fluoridation of drinking water supplies. Our union is comprised of and represents the approximately 1500 scientists, lawyers, engineers and other professional employees at EPA Headquarters here in Washington, D.C.

The union first became interested in this issue rather by accident. Like most Americans, including many physicians and dentists, most of our members had thought that fluoride's only effects were beneficial - reductions in tooth decay, etc. We too believed assurances of safety and effectiveness of water fluoridation[1].

Then, as EPA was engaged in revising its drinking water standard for fluoride in 1985, an employee came to the union with a complaint: he said he was being forced to write into the regulation a statement to the effect that EPA thought it was alright for children to have "funky" teeth. It was OK, EPA said, because it considered that condition to be only a *cosmetic* effect, not an adverse *health* effect. The reason for this EPA position was that it was under political pressure to set its health-based standard for fluoride at 4 mg/liter. At that level, EPA knew that a significant number of children develop moderate to severe dental fluorosis, but since it had deemed the effect as only cosmetic, EPA didn't have to set its health-based standard at a lower level to prevent it.

We tried to settle this ethics issue quietly, within the family, but EPA was unable or unwilling to resist external political pressure, and we took the fight public with a union *amicus curiae* brief in a lawsuit filed against EPA by a public interest group. The union has published

[1]For a history of how drinking water fluoridation began, see "Fluoride, Teeth and the Atomic Bomb", by investigative reporters Joel Griffiths and Chris Bryson, available on-line at http://www.rvi.net/~fluoride

on this initial involvement period in detail.\1

Since then our opposition to drinking water fluoridation has grown, based on the scientific literature documenting the increasingly out-of-control exposures to fluoride, the lack of benefit to dental health from ingestion of fluoride and the hazards to human health from such ingestion. These hazards include acute toxic hazard, such as to people with impaired kidney function, as well as chronic toxic hazards of gene mutations, cancer, reproductive effects, neurotoxicity, bone pathology and dental fluorosis. First, a review of recent neurotoxicity research results.

In 1995, Mullenix and co-workers \2 showed that rats given fluoride in drinking water at levels that give rise to plasma fluoride concentrations in the range seen in humans suffer neurotoxic effects that vary according to when the rats were given the fluoride - as adult animals, as young animals, or through the placenta before birth. Those exposed before birth were born hyperactive and remained so throughout their lives. Those exposed as young or adult animals displayed depressed activity. Then in 1998, Guan and co-workers \3 gave doses similar to those used by the Mullenix research group to try to understand the mechanism(s) underlying the effects seen by the Mullenix group. Guan's group found that several key chemicals in the brain - those that form the membrane of brain cells - were substantially depleted in rats given fluoride, as compared to those who did not get fluoride.

Another 1998 publication by Varner, Jensen and others \4 reported on the brain- and kidney damaging effects in rats that were given fluoride in drinking water at the same level deemed "optimal" by pro-fluoridation groups, namely 1 part per million (1 ppm). Even more pronounced damage was seen in animals that got the fluoride in conjunction with aluminum. These results are especially disturbing because of the low dose level of fluoride that shows the toxic effect in rats - rats are more resistant to fluoride than humans. This latter statement is based on Mullenix's finding that it takes substantially more fluoride in the drinking water of rats than of humans to reach the same fluoride level in plasma. It is the level in plasma that determines how much fluoride is "seen" by particular tissues in the body. So when rats get 1 ppm in drinking water, their brains and

kidneys are exposed to much less fluoride than humans getting 1 ppm, yet they are experiencing toxic effects. Thus we are compelled to consider the likelihood that humans are experiencing damage to their brains and kidneys at the "optimal" level of 1 ppm.

In support of this concern are results from two epidemiology studies from China\5,\6 that show decreases in I.Q. in children who get more fluoride than the control groups of children in each study. These decreases are about 5 to 10 I.Q. points in children aged 8 to 13 years.

Another troubling brain effect has recently surfaced: fluoride's interference with the function of the brain's pineal gland. The pineal gland produces melatonin which, among other roles, mediates the body's internal clock, doing such things as governing the onset of puberty. Jennifer Luke\7 has shown that fluoride accumulates in the pineal gland and inhibits its production of melatonin. She showed in test animals that this inhibition causes an earlier onset of sexual maturity, an effect reported in humans as well in 1956, as part of the Kingston/Newburgh study, which is discussed below. In fluoridated Newburgh, young girls experienced earlier onset of menstruation (on average, by six months) than girls in non-fluoridated Kingston \8.

From a risk assessment perspective, all these brain effect data are particularly compelling and disturbing because they are convergent.

We looked at the cancer data with alarm as well. There are epidemiology studies that are convergent with whole-animal and single-cell studies (dealing with the cancer hazard), just as the neurotoxicity research just mentioned all points in the same direction. EPA fired the Office of Drinking Water's chief toxicologist, Dr. William Marcus, who also was our local union's treasurer at the time, for refusing to remain silent on the cancer risk issue\9 . The judge who heard the lawsuit he brought against EPA over the firing made that finding - that EPA fired him over his fluoride work and not for the phony reason put forward by EPA management at his dismissal. Dr. Marcus won his lawsuit and is again at work at EPA. Documentation is available on request.

The type of cancer of particular concern with fluoride, although not the only type, is osteosarcoma, especially in males. The National Toxicology Program conducted a two-year study \10 in which rats and mice were given sodium fluoride in drinking water. The positive result of that study (in which malignancies in tissues other than bone were also observed), particularly in male rats, is convergent with a host of data from tests showing fluoride's ability to cause mutations (a principal "trigger" mechanism for inducing a cell to become cancerous) e.g.\11a, b, c, d and data showing increases in osteosarcomas in young men in New Jersey \12 , Washington and Iowa \13 based on their drinking fluoridated water. It was his analysis, repeated statements about all these and other incriminating cancer data, and his requests for an independent, unbiased evaluation of them that got Dr. Marcus fired.

Bone pathology other than cancer is a concern as well. An excellent review of this issue was published by Diesendorf et al. in 1997 \14. Five epidemiology studies have shown a higher rate of hip fractures in fluoridated vs. non-fluoridated communities. \15a, b, c, d, e. Crippling skeletal fluorosis was the endpoint used by EPA to set its primary drinking water standard in 1986, and the ethical deficiencies in that standard setting process prompted our union to join the Natural Resources Defense Council in opposing the standard in court, as mentioned above.

Regarding the effectiveness of fluoride in reducing dental cavities, there has not been any double-blind study of fluoride's effectiveness as a caries preventative. There have been many, many small scale, selective publications on this issue that proponents cite to justify fluoridation, but the largest and most comprehensive study, one done by dentists trained by the National Institute of Dental Research, on over 39,000 school children aged 5-17 years, shows no significant differences (in terms of decayed, missing and filled teeth) among caries incidences in fluoridated, non-fluoridated and partially fluoridated communities.\16. The latest publication \17 on the fifty-year fluoridation experiment in two New York cities, Newburgh and Kingston, shows the same thing. The only significant difference in dental health between the two communities as a whole is that fluoridated Newburgh, N.Y. shows about twice the incidence of dental fluorosis (the first, visible sign of fluoride chronic toxicity) as seen in

non-fluoridated Kingston.

John Colquhoun's publication on this point of efficacy is especially important\18. Dr. Colquhoun was Principal Dental Officer for Auckland, the largest city in New Zealand, and a staunch supporter of fluoridation - until he was given the task of looking at the world-wide data on fluoridation's effectiveness in preventing cavities. The paper is titled, "Why I changed My Mind About Water Fluoridation." In it Colquhoun provides details on how data were manipulated to support fluoridation in English speaking countries, especially the U.S. and New Zealand. This paper explains why an ethical public health professional was compelled to do a 180 degree turn on fluoridation.

Further on the point of the tide turning against drinking water fluoridation, statements are now coming from other dentists in the pro-fluoride camp who are starting to warn that topical fluoride (e.g. fluoride in tooth paste) is the only significantly beneficial way in which that substance affects dental health \19, \20, \21. However, if the concentrations of fluoride in the oral cavity are sufficient to inhibit bacterial enzymes and cause other bacteriostatic effects, then those concentrations are also capable of producing adverse effects in mammalian tissue, which likewise relies on enzyme systems. This statement is based not only on common sense, but also on results of mutation studies which show that fluoride can cause gene mutations in mammalian and lower order tissues at fluoride concentrations estimated to be present in the mouth from fluoridated tooth paste\22. Further, there were tumors of the oral cavity seen in the NTP cancer study mentioned above, further strengthening concern over the toxicity of topically applied fluoride.

In any event, a person can choose whether to use fluoridated tooth paste or not (although finding non-fluoridated kinds is getting harder and harder), but one cannot avoid fluoride when it is put into the public water supplies.

So, in addition to our concern over the toxicity of fluoride, we note the uncontrolled - and apparently uncontrollable - exposures to fluoride that are occurring nationwide via drinking water, processed

foods, fluoride pesticide residues and dental care products. A recent report in the lay media\23, that, according to the Centers for Disease Control, at least 22 percent of America's children now have dental fluorosis, is just one indication of this uncontrolled, excess exposure. The finding of nearly 12 percent incidence of dental fluorosis among children in un-fluoridated Kingston New York\17 is another. For governmental and other organizations to continue to push for *more* exposure in the face of current levels of over-exposure coupled with an increasing crescendo of adverse toxicity findings is irrational and irresponsible at best.

Thus, we took the stand that a policy which makes the public water supply a vehicle for disseminating this toxic and prophylactically useless (via ingestion, at any rate) substance is wrong.

We have also taken a direct step to protect the employees we represent from the risks of drinking fluoridated water. We applied EPA's risk control methodology, the Reference Dose, to the recent neurotoxicity data. The Reference Dose is the daily dose, expressed in milligrams of chemical per kilogram of body weight, that a person can receive over the long term with reasonable assurance of safety from adverse effects. Application of this methodology to the Varner et al.\4 data leads to a Reference Dose for fluoride of 0.000007 mg/kg-day. Persons who drink about one quart of fluoridated water from the public drinking water supply of the District of Columbia while at work receive about 0.001 mg/kg-day from that source alone. This amount of fluoride is more than 100 times the Reference Dose. On the basis of these results the union filed a grievance, asking that EPA provide un-fluoridated drinking water to its employees.

The implication for the general public of these calculations is clear. Recent, peer-reviewed toxicity data, when applied to EPA's standard method for controlling risks from toxic chemicals, require an immediate halt to the use of the nation's drinking water reservoirs as disposal sites for the toxic waste of the phosphate fertilizer industry\24.

This document was prepared on behalf of the National Treasury Employees Union Chapter 280 by Chapter Senior Vice-President J. William Hirzy, Ph.D. For more information please call Dr. Hirzy at 202-260-4683. His E-mail address is <hirzy.john@epa.gov>

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Special 16-page Report

Fluorides and the Environment

Contents

Editorial: Why Fluoride Is An Environmental Issue.....1
Gar Smith, editor, Earth Island Journal

Clear and Present Danger.....3
Bob Woffinden, London Guardian

Fluoridation and Hip Fractures.....7
John R. Lee, MD

The Impact of Fluoridation on Salmon in the Northwest US and British Columbia.....8
Richard G. Foulkes, MD & Anne C. Anderson, RPN

EPA Whistleblowers on Fluoride.....11
- *William L. Marcus, Ph.D*
- *Robert Carton, Ph.D*

Fluoride: The Phosphate Connection...12
George C. Glasser

The Effects of Fluorides on Plants.....14
Alan Davison and Leonard Weinstein

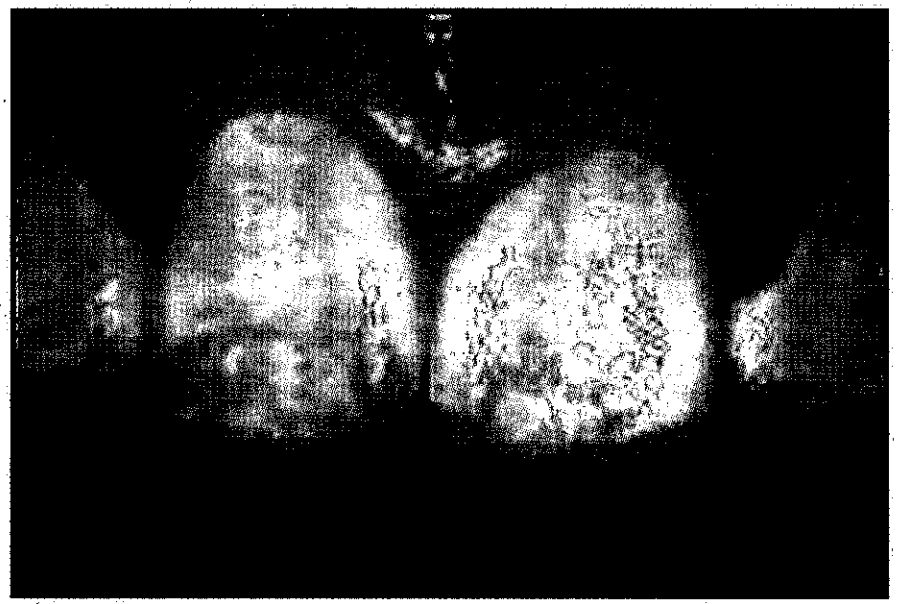
Resources..... 16
- *Organizations* - *Websites*
- *Books* - *Fluoride-free Toothpaste*

This special section of *Earth Island Journal* was prepared to coincide with the 22nd meeting of the **International Society for Fluoride Research** on August 24-27 in Bellingham, Washington. For information on the conferencce, contact Prof. Ming-Ho Yu. Center for Environmental Science, Western Washington University, Bellingham, WA 98225-9181, (360) 650-3676, fax: 650-7284.

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An example of dental fluorosis. Dental fluorosis is found in persons who were exposed to fluoride during the formation of their permanent teeth. It is the first visible sign of fluorosis.

Why Fluoride Is an Environmental Issue

by Gar Smith

While fluoride compounds occur naturally in some water supplies, the past 50 years have seen a dramatic – and troubling – increase in the volume of man-made industrial fluoride compounds expelled into our water and air.

Pouring fluorides into water supplies has generated controversy and opposition for five contentious decades. Meanwhile, little attention has been paid to the fluoride pollution that pours into the atmosphere from thousands of industrial plants around the world.

Fluoride pollution is not a new problem. As the two reports cited below show, concerns about the dangers of fluoride contamination were well known 25 years ago.

Fluoride Pollution: In Our Water, Our Air and Our Food

"Fluorides are pollutants with considerable potential for producing ecological damage," Edward Groth III warned in an article in the April/May 1975 issue of *Environment.* By the end of the 1960s, the EPA estimated that 155,000 tons of fluoride (calculated as hydrogen fluoride) was pouring into the atmosphere each year from aluminum smelters, phosphate processing, coal combustion and the manufacturing of steel, bricks and glass products.

Several types of coniferous forests are vulnerable to fluoride damage at one part per billion (ppb) or less. Because fluoride does not break-down, it slowly accumulates in the environment. As early as 1971, the National Research Council warned that fluoride pollution from US industry (in concentrations as low as 1 ppb) had caused serious damage to plants and posed a threat to livestock as far as 20 miles downwind of the emission points. Some grasses consumed by livestock have been found to contain 200,000 times more fluoride than in the ambient air.

A 1971 National Park Service study of the area downwind of an Anaconda aluminum company smelter and a phosphate plant found excessive elevations of fluoride in pines, firs, grasses, shrubs, herbs and hay. Honey bees had the highest fluoride levels among insects. Wildlife, from birds and ground squirrels to larger mammal predators, had fluoride levels that reached as high as 13,333 parts per million (ppm).

{CONTINUED ON NEXT PAGE}

Fluorides and the Environment

To date..., the USDA has manifested no official concern about the influence of fluoric air pollution on any part of the nation's produce."

– Jerard and Patrick, 1973

Foraging on grasses containing 30 to 40 ppm of fluoride can be toxic to cattle. Mussels, oysters, crabs, shrimp and prawns have been killed by aquatic fluoride pollution.

Groth noted that some plants can synthesize organic fluoride compounds like fluoroacetates which *Fluoride Quarterly Reports* identified as "among the most poisonous substances known." Fluoro-organic residues have turned up in soybeans, lettuce, tea and oatmeal.

Airborne pollution dusts food crops with sodium fluoroacetate (which is sold commercially as Compound 1080, a deadly rodenticide). Groth observed that "a general buildup of fluoro-organic compounds in natural food webs" risks severe ecological damage.

Groth also noted that "fluoride may interact synergistically with other environmental pollutants to produce greater effects than either pollutant could cause were it acting alone." This synergistic "boost" has been demonstrated between fluoride and copper and between airborne hydrogen fluoride and sulfur dioxide.

Fluoridating the water for 100 million people requires dumping approximately 20,000 tons of fluoride into municipal reservoirs each year. About half of the ingested fluoride winds up stored in human teeth and bones. The rest returns to the environment via the household toilet.

A 1964 scientific study of fluoride levels in sewage in 56 California cities "demonstrated that domestic sewage already contained fluoride over and above that naturally present in water or added for dental health," Groth reported.

The study discovered that even residents in cities without fluoridated water were consuming so much excess fluoride in their foods and beverages that they were flushing "significant fluoride into receiving streams in their sewage."

The "Unpublicized Pollutant"

In a 1973 report in the *International Journal of Environmental Studies*, researchers Elise Jerard and J.B. Patrick identified fluoride as "a highly unpublicized pollutant" that the President's Science Advisory Committee once classified as a "highest priority" contaminant.

"During the past three decades, fluoride discharges from fossil fuel combustion – and more than 50 types of major industries – have steadily increased the burden of airborne contamination," Jerard and Patrick wrote. "Invisible but potent, these emissions in both gaseous and particulate form, with their repertoire of ecological effects, pollute rain, soil, plant life and animals, surface waters [and]... both directly and through interactions of this cycle – man."

Jerard and Patrick reported that "airborne fluoride accumulates in plants and can concentrate in the leafy portions by a factor of 2- to 260-fold without any visible sign of the contamination."

Jerard and Patrick reported that in some regions of Florida, "25,000 acres of citrus trees have been destroyed" within 50 miles of the phosphate processing plants and apparently "normal" specimens of orange juice were found to contain 3-12 ppm of fluoride.

In 1966, Professor of Atmospheric Sanitation Morris Katz noted that, while most air pollutants are measured in parts per million, atmospheric fluoride must be monitored in parts per *billion*. Katz warned that prolonged exposure to airborne fluoride concentrations of less than 1 ppb "may create a hazard [since].... fluorides are more than 100 times more toxic than sulfur dioxide."

In 1969, a massive fish kill that turned Placentia Bay, Newfoundland into "a biological desert" was traced to fluoride effluent from a plant that produced elemental phosphorus for metal finishing and consumer goods. Some 22,800 pounds of fluoride effluent poured into the bay each day, primarily in the form of hydrofluosilicic acid – the same substance used to fluoridate city water supplies.

According to US *Department of Agriculture Handbook No. 380*: "Airborne fluorides have caused more worldwide damage to domestic animals than any other air pollutant." The handbook's list of fluorosis symptoms included: "dental mottling, respiratory distress, stiffness in knees or elbows or both" and concluded with the observation that "Man is much more sensitive than domestic animals to F [fluoride] intoxication."

In a 1970 report on "The Effects of Fluorides on Man," Harold C. Hodge (*See* Earth Island Journal, *Winter, Spring* '98) listed some of the symptoms of fluoride poisoning found in industrial workers: osteosclerosis, ossifications of ligamentous attachments, sinus trouble, perforation of the nasal septum, chest pains, coughs, thyroid disorders, anemia, dizziness, weakness and nausea.

Fluoride in the Food Chain

Twenty-five years ago, Jerard and Patrick issued an alarm about the growing presence of fluorides in the food chain. The researchers listed numerous examples of severe fluoride pollution on foods ranging from spinach, lettuce and tubers to the milk and meat of cows. In addition to contamination from atmospheric fluorides, Jerard and Patrick discovered that farm produce also picks up fluoride pollution from phosphate fertilizers and fluoride-bearing pesticides applied to apples, pears, celery and raspberries.

Coal-burning electric powerplants and the petroleum industry are major sources of urban fluoride pollution. Jerard and Patrick also noted a "considerable fluoride content, up to 16% or more, in a number of important drugs, including tranquilizers, corticosteroids, some preparations used in cancer therapy and anesthetics."

"Fluoride-emitting factories, once scattered with wide exclusion zones, have proliferated and become more closely concentrated," Jerard and Patrick observed in 1973. "Foods grown in fluoride-polluted regions are distributed over great distances... Foods and beverages processed with fluoridated water are mass-distributed."

Each liter of fluoridated water, at 1 ppm concentration, contains a one milligram dose of fluoride — the so-called "recommended" daily amount. Water, however, is only one source of ingested fluoride. In 1991, the US Public Health Service estimated that the total daily intake for a 110-pound adult from all sources in an "optimally" fluoridated city, ranged as high as 6.6 milligrams. In 1997, the EPA estimated that Americans were ingesting nearly five times more fluoride than in 1971 — from food and drinks alone.

Children are more at risk of over-exposure than adults. A 1991 study by the *Journal of Clinical Pediatric Dentistry* found that every sample of bottled fruit beverages tested contained fluoride. One sample of Gerber's grape juice contained 6.8 ppm – 70% higher that the EPA's Maximum Contaminant Level of 4 ppm for fluoride in drinking water and 240% higher than the EPA's 2 ppm standard set to protect against dental fluorosis.

Currently there is no federal program to detect or label the fluoride content in US foods or drinks. We hope that this special report will help to encourage a fundamental review of the health and ecological impacts of fluorides in the environment.

"To date..., fluoride has received relatively little attention as a contaminant of the ecosystem."

– Edward Groth III, 1975

A Clear and Present Danger

by Bob Woffinden
The London Guardian

Since childhood we have been told that fluoride is good for our teeth. It is added to the water supply of many regions for just that reason. Our children brush regularly with great quantities of it. But fluoride toxicity has been linked to bone disease, infant mortality and brain damage. And the line between safety and danger, purity and poison is a thin one.

Fluoride first entered the public consciousness as part of a post-war new dawn, when science would unerringly lead the way to a better life for all. It came to assume almost magical properties as a wholly salutary chemical. Today, every science textbook and encyclopaedia refers to its capacity for inhibiting dental decay, especially among children.

The experts told us that fluoride both helped the remineralisation of enamel (the outer layer of the teeth) and also prevented the bacteria in dental plaque from producing the acid that causes decay. As the dental authorities became ever more zealous in the promotion of fluoride, it was delivered to the population, either through the fluoridation of the public water supply, or by fluoride in toothpaste and other dental supplements.

Fluoridation was essentially a socialist health policy. In the phrase often cited by dental professionals, it gave poor kids rich teeth.

There were those who counselled caution, on the grounds that fluoride is a cumulative poison; and that, in any case, rates of dental decay were also falling dramatically in countries that did not espouse its use. But in Britain, the concept of fluoride as a supremely benign aid was instilled in generations of dental students.

The idea was an American import. As a whole, Europe has never been persuaded. Only about 2 percent of Europe has artificially fluoridated water supplies, and virtually all of that is accounted for by Britain (10 percent of the country) and Ireland (66 percent). In England, Birmingham fluoridated in 1964; Britain's second city was desperate to be first at something.

Yet, on one obvious level, the fluoridation of the public water supply is an absurd concept. We all know what happens to the nation's water: about one-third is lost in leakages before it ever gets anywhere; seven-eighths of the rest is used by industry, and much of the remainder literally goes straight down the toilet. The proportion that reaches our teeth is tiny indeed.

Some industries — notably those dealing with photographic or X-Ray equipment — need first to remove the fluoride. People on dialysis cannot receive fluoridated water. Mothers with newly-born babies are best advised not to make up baby formula with fluoridated tap-water.

Assuming, for the moment, that fluoride actually achieves



Gar Smith

If children are not supposed to swallow fluoride toothpastes, why are they flavored to taste like strawberry and watermelon? Wouldn't the kids be safer if toothpastes tasted like broccoli?

everything that is claimed for it with respect to teeth, how do those fluoride ions know that, when they come cascading into the body, they must strengthen the resistance of teeth to decay, but do nothing else at all. Isn't it common sense to assume that if teeth are being affected, then so are other parts of the body?

Of all the fluoride taken into the body, about 50 percent is excreted. The rest remains. In its major 1993 report, "Health Effects of Ingested Fluoride," the US National Research Council (NRC) pointed out that, "Half the fluoride [taken in by the body] becomes associated with teeth and bones within 24 hours of ingestion. In growing children, even more of the fluoride is retained." For many years, dental authorities have confidently asserted that whereas fluoride's impact on the teeth is striking and wonderfully beneficial, its impact on bones, even over a lifetime, is non-existent. There is now increasing evidence that this is exactly what it seems: an illogical proposition.

Bad to the Bone

During the Nineties, a steady trickle of scientific reports has found a "statistically significant" association between water fluoridation and increased risk of hip fracture. The suggestion is that the hip needs tensile strength, but that this is destroyed by fluoride. One study monitored the hip fracture rates of white women across 3,000 counties in the US. Another compared the incidence of hip fracture among mainly Mormon communities in Utah. This was of particular interest because it could exclude confounding factors such as smoking and alcohol consumption. The study found a "small but significant" additional risk of hip fracture among both men and women exposed to artificial fluoridation at one part per million (ppm) — precisely the level at which water is fluoridated in the UK.

The urgent need for further investigation was made even plainer by the publication of an alarming study by the University of Bordeaux, published in the *Journal of The American Medical Association*. This measured rates of hip fracture among elderly citizens in 75 parishes of southwestern France, and compared the concentrations of fluoride in the water (which, in this case, was naturally fluoridated). The study found that people living in fluoridated areas suffered 86 percent more fractures than people in non-fluoridated parts.

One irony of this research is that those who lobby in favor of fluoridation always refer to the savings to the National Health Service in costs of dental care — however, if fluoridation does indeed lead to an increased incidence of hip fracture, then the overall costs to the NHS would be far greater than these projected savings. Hip fracture, a serious and some-

Adapted from an article originally published in The Guardian Weekend *[119 Farringdon Road, London EC1R 3ER England], June 7 1997. This article was a winner of the 1997 Project Censored Award. It shared the honor with the* Australian and New Zealand Journal of Public Health *and the Worcester, Massachusetts* Telegram & Gazette. *Reprinted with permission.* The Guardian © *1997.*

1997 Project Censored Award Winner

times life-threatening condition, is one of the most expensive items on the NHS budget.

Cases of crippling skeletal fluorosis, a condition directly caused by fluoride, are exceptionally rare, except in countries of naturally high fluoride levels such as India; but the early stages of the condition could perhaps be triggered by artificially-fluoridated water supplies. Fluoride, which is deposited in mineralising new bone more easily than existing bone, distorts the natural regeneration of the bone. As fluoride accumulates, the bones become thickened and develop outgrowths. Tendons and ligaments may then be affected and nerves may become trapped and damaged.

The result could be a mounting toll of skeletal problems — from occasional stiffness or pain in the joints, to backache and osteoarthritis. These problems collectively form one of the major causes of absence from work in Britain; so their impact on the economy — even aside from the well-being of the individual — is considerable.

Bone Cancer & Down's Syndrome

Research undertaken in the US for the National Toxicology Program (NTP) in 1990 and 1991 showed "a possible increase in osteosarcomas in male rats" exposed to fluoride. Osteosarcoma is rare, but it is one of the principal cancers of childhood. As a result of the NTP report, the Department of Health in New Jersey commissioned work to assess the incidence of osteosarcoma in the state in relation to water fluoridation. The results were astonishing: they indicated that in male children (under the age of 20), the risk of osteosarcoma was between two and seven times greater in fluoridated water areas.

Dr Sheila Gibson, of the Glasgow Homoeopathic Hospital, reported further serious findings in a paper in *Complementary Medical Research*. By adding sodium fluoride to blood samples, she demonstrated that fluoride impaired the functioning of the immune system.

There also is concern about the genotoxicity of fluoride and its possible role in the cause of increased levels of infant mortality and Down's Syndrome births. The West Midlands Perinatal Audit reported that the city had "significantly higher" rates of stillbirth and neonatal mortality than the average for England and Wales.

Could this be attributable to fluoride? In an as-yet unpublished paper, Ian Packington, a toxicologist on the advisory panel of the National Pure Water Association (an anti-fluoride campaign group), records that in the years 1990-92 perinatal deaths in the fluoridated parts of the West Midlands were 15 percent higher than in neighboring unexposed areas such as Shropshire and Herefordshire. From an analysis of Department of Health statistics, he concluded that in the period 1983-86 cases of Down's Syndrome were 30 percent higher in fluoridated than non-fluoridated areas.

These were not isolated findings. In the 1970s, Dr. Albert Schatz reported that the artificial fluoridation of drinking water in Latin American countries was associated with increased rates of infant mortality and deaths due to congenital malformation. As long ago as the 1950s, Dr. Ionel Rapaport published studies showing links between Down's Syndrome and natural fluoridation.

Brushing Your Brain with Fluoride

Unlike fluorine — which is one of nature's most reactive elements — the fluoride ion is very stable. It was unclear how it could potentially cause prenatal damage of this kind until, in 1981, the *Journal of The American Chemical Society* reported that fluoride could form strong hydrogen bonds.

This could indeed have serious repercussions for biological systems, with the consequences of affecting proteins, other molecules and DNA. Dr John Emsley, the scientist conducting the research, wrote that, "We believe we have found an explanation of how this reputedly inert ion could disrupt key sites in biological systems." Even so, worse was still to come.

The NRC report on the effects of fluoride clearly conceded that there were "inconsistencies" in the data about fluoride toxicity. One area it did not examine at all was the effect of fluoride on the brain and central nervous system — even though the results of relevant Russian studies in the 1970s were by then widely known. These demonstrated that workers suffering from exposure to fluoride in the workplace exhibited signs of impaired mental functioning.

The NCR's omission was put into sharp perspective with the publication in 1995 of work by the neurotoxicist, Dr. Phyllis Mullinex. In the 1980s, she developed a sensitive test using animal models to ascertain the effects of neurotoxins on the central nervous system. As a result, she was recruited to head the department of toxicology at the Forsyth Dental Institute in Boston. Everything went well until she stepped into politically-sensitive territory by using her system to test the effects of fluoride.

"Are you telling us that we're reducing children's IQs by putting fluoride in toothpaste?" She replied, "Well, basically, yes." She did not receive further funding.

She noted disruption to the behavior patterns of rats, and concluded that fluoride adversely affected the brain. She went on to show that fluoride accumulated in brain tissue, and that its effects depended on the age of exposure (young rats were more vulnerable). She also determined that these effects were measurable at a lower level of exposure to fluoride than was necessary to produce damage to the bones.

In order to receive her next round of funding, she presented her interim findings to representatives of the major toothpaste manufacturers. She was asked, "Are you telling us that we're reducing children's IQs by putting fluoride in toothpaste?" She replied, "Well, basically, yes." She did not receive further funding.

Although her paper was peer-reviewed and published in *Neurotoxicology And Teratology*, she was told that her work was "not relevant to dentistry" and sacked from her post at the Forsyth. (She retained a second post at Harvard Medical School.) She sued the Forsyth for wrongful dismissal and won what is believed to be a substantial out-of-court settlement.

The disturbing conclusions of her work have been buttressed by new studies from China, published in the journal *Fluoride*. Researchers compared the IQs of children in areas of low and high natural fluoridation and discovered that children in the low-fluoride area had higher IQs. There was some criticism that this work had not taken sufficient account of possible confounding factors. So a small-scale study was initiated, comparing two villages — Sima, with a high level of natural fluoride, and Xinhua. The results were the same as before. The children exposed to higher levels of fluoride had lower IQs.

Fluoridation: What's in It for Us?

In October 1990, a document labeled "For Reference *Only* — *Do Not* Send Out" was prepared by Lucier Chemical Industries, Ltd. and sent to the city of St. Petersburg, Florida. LCI purchases fluorosilicic acid (aka hydrofluosilicic acid) from Cargill Fertilizer, Inc. which it sells to St. Petersburg, which pours it into the municipal water supplies.

The confidential memo described the fluoridation agent as a "highly corrosive" solution, "white to straw yellow in color" and containing the following ingredients:

	Percent (by wt.)
H_2SiF_6 (hydrofluosilicic acid)	24%
Fluorine	18.5%
Heavy metals, as lead, Pb	0.0002%
Phosphorus	0.200%
HF (hydrogen fluoride)	1.000%
Arsenic	0.0035%
Barium	0.0002%
Cadmium	0.0004%
Chromium	0.0003%
Iron	0.100
Iodine	0.0015%
Lead	0.00005%
Mercury	0.0000001%
Selenium	0.000003%
Silver	0.0004%

Damn the Studies: Full Speed Ahead!

Paul Connett is a professor of chemistry at St. Lawrence University in New York state and an international authority on environmental toxins. "I now realize that, because the pro-fluoride lobby has successfully portrayed the anti-fluoridationists as a bunch of crackpots, people have been kept away from this issue. In fact, once I looked into the literature and was, quite frankly, appalled by the poor science underpinning fluoridation, I had grave concerns about the wisdom of putting this toxic substance into our drinking water."

In the US, at the same time that the first fluoridation scheme was being introduced, scientists were admitting (in documents hitherto secret, but now disclosed under the Freedom of Information Act) that they had no idea what the effects of low-level exposure would be.

The first such scheme was introduced in Grand Rapids, Michigan, in 1945 as a long-term pilot study. Over a 15-year period, it was to be compared with an unfluoridated control city, Muskegon, to determine whether fluoride actually did benefit dental health. The Americans couldn't wait 15 years, however; or even two. The following year, six cities opted to fluoridate. In 1947, 87 did, including Muskegon. In a prime example of bureaucrats pre-empting science, the authorities decreed that it was unfair to deprive its citizens of the "benefits" of fluoridation. The 15-year study had run for just 18 months.

There has never been a single long-term, scientifically inviolable study of fluoridation. The most remarkable aspect of the conduct of the dental lobby has been... its cowardice in not confronting the huge commercial sugar interests.

Thus there has never been a single long-term, scientifically inviolable study of fluoridation. And this is against a background of steady improvements in dental health, with the widespread, indeed ubiquitous, availability of fluoride toothpaste. But since cleaning one's teeth is always beneficial, how much real additional advantage does the fluoride confer? There are, of course, those who argue that the Grand Rapids study was not allowed to run its full course precisely because the results would have capsized the pro-fluoride arguments.

Fluorosis: The Price We Pay

Why has there been such unrelenting administrative pressure to fluoridate? Conspiracy theorists would point to the confluence of interests of the sugar industry, keen to identify any method of improving dental health which did not involve consuming less sugar, and huge industrial concerns, such as aluminium manufacturers, petro-chemical and fertiliser industries, for all of whom fluoride was a waste product and a dangerous pollutant. Accordingly, they welcomed the opportunity both to launder the image of fluoride and (in some instances) to sell to water companies something they would otherwise have had to pay to get rid of.

The dental profession itself tells a very different story. In 1945, a physician noticed something different about the teeth of children living in high fluoride areas: they were mottled and discolored. The condition — fluorosis — was caused by fluoride attacking the enamel of the permanent teeth while they were being formed in the gums. When the teeth erupted, they had unsightly stains on them.

However, the physician also believed that the children with fluorosis had fewer dental caries. Thus, the link was made, and the aim was formulated of trying to fluoridate to a uniform level for the benefit of dental health. The optimal level, at which benefits to teeth could be reconciled with an acceptable level of fluorosis, was determined as 1 ppm of fluoride in water.

From the outset, the danger of fluorosis was inherent in the dental lobby's advocacy of fluoride — it was recognized that some children would need to sacrifice their appearance for what was deemed to be the greater good. In recent years, however, dental fluorosis (the majority of cases are only mild) has been increasing. In the US, the NRC expects fluorosis to occur, albeit in a mild form, in 10 percent of the population. Statistics showed that in one unnamed city with a fluoride concentration of twice the recommended level, the prevalence of dental fluorosis in children was 53 percent.

Fluorosis strikes when the child is at a psychologically vulnerable age. At an international conference on fluoridation in Birmingham in 1995, evidence was presented that, in Australia, "even mild [fluorosis] was associated with psycho-behavioural impacts." Worse yet, dental fluorosis is merely the *visible* sign of fluoride's effects. Are there other kinds of damage that cannot be seen?

The worldwide increase in fluorosis is hardly surprising, as exposure to fluoride from sources other than the water supply has increased immeasurably over the past 25 years. Even

Fluorides and the Environment

for those of us not living in fluoridated areas, there is constant exposure from toothpaste, from other dental products, from fruits and vegetables (which retain fluroide from pesticide residues) and from drinks such as tea. Tea leaves have naturally high fluoride levels since tea grows best in a fluoride soil.

In 1945, the dental authorities set the optimal level for fluoridation at 1 ppm; and the optimal level today is still 1 ppm, despite the fact that overall exposure to fluoride has increased significantly since 1945. The absolute level of fluoride exposure is of critical importance because the whole debate is so finely balanced.

As Professor Connett explained: "From a toxicological point of view, the gap between the therapeutic dose — the level at which fluoride is supposed to benefit teeth — and the toxic dose, at which it begins to do serious harm, is very small. Usually, you want a factor of a hundred between the two. In this case, it's tiny. The optimal level in drinking water is one ppm. The maximum contaminant level, as prescribed by the US Environmental Protection Agency, is 4 ppm. That gap is far too small for public safety." [*Note: In 1986, the EPA raised the maximum exposure level from 2.4 ppm to 4 ppm.* *See story on page 11.*]

Faced with accumulating information of this kind, the dental administrators and pharmaceutical companies have been quietly moving the goalposts.

No one should be taking fluoride supplements, especially if they live in a fluoridated area. The problem here is that many millions of people probably have no idea whether they're living in a fluoridated area or not, because no one has ever had the courtesy to tell them. To quote the leading textbook, *Essentials Of Dental Caries*: "topical fluoride preparations [toothpaste et al] should be applied carefully because of their potential toxic effects." Children should be supervised by parents when brushing their teeth! They should use only a pea-sized amount of fluoride toothpaste (though no one would ever suppose as much from watching the television commercials) and should on no account swallow it. The chairman of the British Fluoridation Society, Professor Mike Lennon, blames the increased incidence of dental fluorosis on children "abusing" (that is, swallowing) toothpaste.

Since it is difficult not to swallow toothpaste, and since fluoride is in any case absorbed through the gums, parents may instead like to purchase non-fluoride toothpaste — were it not that this is almost impossible in many parts of the country, as the supermarkets and pharmaceutical retailers have severely restricted consumer choice.

So, the real route to lasting dental health remains, as ever, regular dental hygiene and a nutritious diet. In fact, the most remarkable aspect of the conduct of the dental lobby has been not its unquestioning espousal of fluoride but its cowardice in not confronting the huge commercial sugar interests. After all, dental caries were unknown before refined sugars.

The possible subtle effects of long-term exposure to low levels of fluoride can no longer be ignored. Those who wish to extend fluoridation schemes throughout the country tell us that there's "no evidence" that it causes harm. We must bear in mind how carefully the authorities have avoided gathering the evidence.

The final irony is that fluoridation, having been introduced to bridge the socio-economic gulf in society, probably benefits the poor least of all. It is precisely those suffering poor nutrition, and hence vitamin and mineral deficiencies, who will be most vulnerable to fluoride's toxic effects.

Fluoride in the News

"Aluminum-induced neural degeneration in rats is greatly enhanced when the animals were fed low doses of fluoride. The presence of fluoride enhanced the bioavailability of aluminum (Al) and caused more Al to cross the blood-brain barrier and be deposited in the brain. The pathological changes found in the brain tissue of animals given fluoride and aluminum-fluoride were similar to the alterations found in the brains of people with Alzheimer's disease and other forms of dementia."
— ***Brain Research*** *(vol. 784:1998)*

"Roger Masters, a Dartmouth professor of government, and Myron Coplan, a retired chemical engineer, have gathered statistical evidence [*in an EPA-funded study*] indicating that children who live in areas where the drinking water has been treated with silicofluorides have elevated levels of lead in their blood and higher rates of violent crime, which may be attributable to the lead."
– ***The Valley News***, *Vermont, June 22, 1998*

"In October 1944, the *Journal of the American Medical Association* published an editorial stating that 'the use of drinking water containing as little as 1.2 to 3 parts per million of fluoride will cause... osteosclerosis, spondylosis and osteopetrosis.' In 1990, the American National Toxicology Program announced that it had established a clear link between fluoride and a type of bone cancer called osteosarcoma. However, it was in the interest of many powerful bodies that fluoride be added to our drinking water supplies. This included the sugar industry and the aluminium industry, which was desperate to get rid of the vast amount of fluoride waste that its activities had generated."
— ***The Ecologist***, *March/April 1998*

"New research suggests young children may be getting more fluoride than they need through baby foods. The researchers analyzed the fluoride concentration of 238 commercially available infant foods. The results reveal ready-to-eat foods with chicken had the highest fluoride concentrations. The researchers also found that dry infant cereals that are reconstituted with fluoridated water may noticeably increase the levels of fluoride in a child's daily intake."
— ***Journal of the American Dental Association***, *August 23, 1997*

"[Fluoride is a poison]. That's the message of the new warning labels required by the Food and Drug Administration on all fluoride toothpastes and dental care products shipped as of April 7. In areas where the drinking water contains fluoride, children who swallow even [a] pea-sized amount of toothpaste are getting too much fluoride and are at risk for fluorosis."
— ***The Washington Post***, *June 16, 1997*

"An analysis of survey data collected by the National Institute of Dental Research concludes that children who live in areas of the US where the water supplies are fluoridated have tooth decay rates nearly identical with those who live in nonfluoridated areas."
— ***Chemical & Engineering News***, *May 8, 1989*

"When people open their next town water bills, they will notice a new warning about the potential side effects of fluoridation. The warning will say the town recommends pregnant women, parents of children under 3 and people sensitive to fluoride consult their doctors."
— ***The Middlesex News***, *Massachusetts, March 10, 1998*

Fluoridation and Hip Fractures

by John R. Lee, M.D.

The costs and health effects of osteoporotic fractures in the US are enormous. The total cost of fracture care is now about $9 billion/year. It is estimated that about 350,000 hip fractures occur per year and the incidence is rising.

A study by the University of Iowa's Department of Preventive Medicine and Environmental Health, calculated that the lifetime risk of a fracture of the hip, spine or distal forearm is almost 40% in white women and 13% in men from age 50 years onward. Hip fractures account for 87-100% of fracture-related nursing home placements and 87-96% of short-term fracture costs.

In an effort to treat osteoporosis and prevent hip fracture, some doctors administer "therapeutic" doses of fluoride. Four US studies have examined the effect of these "therapeutic" doses and all of them found that, even though bone density appeared to increase, hip fracture rates increased within three years of treatment. In addition, all reported significant periarticular joint pain and gastrointestinal side effects in the treated subjects.

Dr. L. V. Avioli, Shoenberg Professor of Medicine at the Washington University School of Medicine, concluded that "sodium fluoride is accompanied by so many medical complications and side effects that it is hardly worth exploring in depth as a therapeutic mode for post-menopausal osteoporosis." Dr. Saul Genuth, chairman of the FDA advisory committee that analyzed the fluoride/fracture findings, was quoted in the *Medical World News* as saying the FDA "should quietly forget about fluoride."

More recently, attention has shifted to lower dosages of fluoride, such as found in fluoridated water. There are now at least eight studies that showed an increase of hip fracture incidence in fluoridated communities. They are summarized here:

■ In 1986, M.R. Sowers *et al*, in a retrospective study, found an increased fracture rate in both pre- and postmenopausal women relative to their water fluoride exposure.

■ In 1991, M.R. Sowers *et al* completed a prospective study again showing that water fluoride was correlated with more than double the unfluoridated fracture rates.

■ In 1991, Jacobsen *et al* showed a very strong positive correlation of hip fracture to fluoridation.

■ In 1991, C. Cooper *et al* showed a statistically significant increase of hip fracture incidence in England relative to fluoride content of drinking water ranging from 0 to 1 mg/L [ppm].

■ Also in 1991, C. Keller compared hip fracture rates in 216 US counties with natural fluoride concentrations in drinking water and found significantly higher fracture rates in counties with fluoride levels of >1.2 ppm.

■ D.S. May and M.G. Wilson reported finding that, as the percentage of persons exposed to fluoride in water increased, the hip fracture rate generally increased.

■ In 1992, C. Danielson *et al* reported that the risk of hip fracture was approximately 30% higher for women and 40% higher for men in fluoridated communities. Among women at age 75, the risk was about twice as high in fluoridated communities.

■ In 1995, H. Jaqmin-Gedda *et al*, scientists from the University of Bordeaux, France, studied hip fracture rates in 75 civil parishes in southwestern France and found (after adjustment for multiple alternative variables) an increased risk [odds ratio] for hip fracture of 1.86, i.e., 86% more likely, in parishes with water fluoride levels higher than 0.11 ppm.

In addition, a number of studies suggest fluoride induces pathologically mineralized bone and a deterioration in the overall strength of bone. A 1994 report by P. Fratzl *et al* in the *Journal of Bone & Mineral Research* described abnormal bone mineralization after fluoride treatments. In that same year, C.H. Sogaard *et al* reported a marked decrease in trabecular bone quality after just five years of sodium fluoride therapy. Pediatric orthopedists are finding that, here in the US, sports injuries to the young are rising sharply — ranging from stress fractures of the lower spine in young gymnasts to tendonitis in swimmers.

In 1992, orthopedic surgeon Carl L. Stanitski observed: "We are seeing more and more stress fractures in children and more and more injuries caused by repetitive use." Some might argue that overuse and too much training are the cause, but others are concerned that something is causing defective bone and connective tissue of US kids, and that something might well be fluoridation.

Conclusion: All studies of fracture rates relative to long-term fluoridation exposure indicate a significant increase in fracture risk from fluoridation. The increased fracture risk due to fluoridation appears to range from 40-100%, depending on the age of the subjects studied. For women in their seventh decade who have been exposed to life-long fluoridation, the risk of hip fracture is approximately doubled. The risk increases with fluoride concentration at all levels over 0.11 ppm. Increased bone and connective tissue injuries of US youngsters should alert us to the probability that our high fluoride environment is adversely affecting our youngsters as well as our elderly.

{CITATIONS AVAILABLE ON REQUEST}

John R Lee, MD, is the former director of the Marin Medical Society in California and the author of Optimal Health Guidelines, Optimal Fluoridation *and* Gilbert's Disease and Fluoride Toxicity. *The full text of this article was published in the research journal,* Fluoride *(Vol. 26 No. 4, pages 274-277, 1993).*

JAMA on Fluoride and Hip Fractures

"Hip Fractures and Fluoridation in Utah's Elderly Population,' a study by C. Danielson *et al* [*Journal of the American Medical Association*, August 12, 1992, 268:746-8], compared the incidence of femoral neck fractures in a community with long-standing water fluoridation (to 1 ppm) with the incidence in two communities without water fluoridation (less than 0.3 ppm).

"The findings of this report support other epidemiologic studies suggesting that fluoride increases the risk of hip fracture."

– Journal of the American Medical Association

"A review of recent scientific literature reveals a consistent pattern of evidence – hip fractures, skeletal fluorosis, the effect of fluoride on bone structure, fluoride levels in bones and osteosarcomas – pointing to the existence of causal mechanisms by which fluoride damages bones.... [Fluoridation] proponents must come to grips with a serious ethical question: is it right to put fluoride in *drinking* water and to mislead the community that fluoride must be ingested, when any small benefit is due to the *topical* action of fluoride on teeth."

– Australian and New Zealand Journal of Public Health, 1997

Impact of Artificial Fluoridation on Salmon In the Northwest US and British Columbia

by Richard G Foulkes, MD and Anne C. Anderson, RPN

In the US Northwest, species of salmon using the Snake-Columbia River system, are listed as "endangered." On the North Thompson River of British Columbia, Canada, sperm banks are being employed to preserve salmon species. Proposed water diversion on the Nechako River, in British Columbia, may threaten the internationally important Fraser River fishery.

Writing in the quarterly magazine, *The New Pacific*, in January 1994, Joseph Cone reported that the annual migration of salmon in the Snake-Columbia River system had declined over the past century from an estimated 10-16 million to 2 million in 1991. He pointed out that "the problem is enormously complex — biologically, administratively and economically." His article and reports in the media have stressed problems with harvesting; loss of habitat through poor forestry practices, livestock and human settlement; and dams built for power and irrigation. Little emphasis is placed on the effects of pollution of water by toxic substances such as fluoride.

The aluminum industry is the chief beneficiary of power dams on the Columbia River System, and it is the fluoride wastes from smelters that first come to mind as sources of fluoride pollution. However, there is another potential source of contamination — the artificial fluoridation of community water supplies for the avowed purpose of improving dental health.

Fluoride and "Critical Habitat"

In discussions of "critical habitat" for endangered salmon species, all of the possible components must be evaluated. This study examines the possibility that artificial fluoridation of drinking water in communities along the course of salmon rivers is a factor to be included.

The US Environmental Protection Agency (EPA)[1] and the Province of British Columbia[2] adhere to a "permissible level" of 1.5 ppm (1.5 mg/L) for fluoride discharged into fresh water. BC's "recommended guideline" is currently 0.2 ppm fluoride; but this does not have the force of legislation. Neither the Minister of the Environment nor the Washington State Department of Ecology requires fluoride estimations for sewer effluent permits as it is considered fluoride is not significantly toxic to aquatic life in concentrations expected in discharges.[3,4]

A review of the literature and other documents, including as court transcripts, reveals that levels below 1.5 ppm have been shown to have both lethal and other adverse effects on salmon. Evidence presented by the EPA and other government bodies responsible for the environment suggests that harm can come to aquatic life only at concentrations that far exceed those in discharges from fluoridated cities. Both Groth[5] and Warrington[6] point out that many factors influence susceptibility of fish to fluoride: temperature; water hardness; pH; chloride concentration; and, the strain, age and physiological and reproductive condition of the fish.

Groth points out that there are serious problems with laboratory experiments as opposed to field studies. In lab tests, "... many of the organisms tested for fluoride toxicity did not experience effects until levels of fluoride higher than those which might realistically be encountered in the environment were attained." Groth concluded that the finding can be misleading: the techniques of measurement may be inadequate to detect effects, and these may be at the population rather than individual level.[5]

There are studies showing the effect of water temperature and hardness. Angelovic and others[7] showed lethal effects on rainbow trout related to temperature. Using sodium fluoride at the same degree of hardness (estimated at 44 by Warrington[6]), at 7.2 degrees C over an exposure period of 240 hours, Angelovic determined that the LC50 (the lethal concentration required to kill 50% of the tests subjects) was 5.9-7.5 ppm. At 12.8 degrees C, half the trout died at concentrations of 2.6-6.0 ppm. Neuhold[8] reported the same result for 12.8 degrees C and the same degree of hardness. Pimental and Bulkley,[9] using a constant temperature of 12 degrees C, monitored the mortality of rainbow trout over a 96-hour period in waters with hardness levels of 17, 49, 182 and 185 ppm. The LC50 was associated with fluoride levels of 51, 128, 140 and 193 ppm respectively.

In British Columbia, where the softness of major salmonid water courses is the rule, Warrington combined the findings of Angelovic, Pimental and Bulkley to calculate that the chronic threshold for rainbow trout at 12 degrees and water hardness of 10 mg/L (calcium carbonate) is 0.2 ppm.

Smelters vs. Salmon

In a field study, Damkaer and Dey[10] (*See sidebar, page 10*) demonstrated that high salmon loss at John Day Dam on the Columbia River, 1982-1986, was caused by the inhibition of migration by fluoride contamination from an aluminum smelter located 1.6 km [one mile] above the dam. In 1982, the average daily discharge of fluoride was 384 kg and the salmon loss was 55%. In 1985, discharge averaged 49 kg and was accompanied by a concentration of 0.2 ppm and a salmonid loss of 5%.

Damkaer and Dey confirmed the cause-and-effect relationship by means of a two-choice flume for fluoride gradient salmon behaviour tests. These determined that the "critical level" was 0.2 ppm.

There are other studies that indicate that fluoride at levels below 1.5 ppm have lethal and other adverse effects on fish. Delayed hatching of rainbow trout have occurred at 1.5 ppm;[11] brown mussels have died at 1.4 ppm[12]; an alga (*Porphyria tenera*) was killed by a four-hour fumigation with fluoride with a critical concentration of 0.9 ppm[13]; and, levels below 0.1 ppm were shown to be lethal to the water flea, *Daphnia magna*.[14] These latter two studies suggest that salmon species also may be af-

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fected by fluoride-induced reduction of food supply.

Documents used in a 1961 court case involving Meader's Trout farm in Pocatello, Idaho,[15] contain evidence that between 1949 and 1950 trout damage and loss was related to fluoride contamination due to rain washing airborne particles from leaves into hatchery water at levels as low as 0.5 ppm. This evidence suggests that the "safe level" of fluoride in the fresh water habitat of salmon species is not 1.5 ppm but, 0.2 ppm.

Is City Water Deadly to Salmon?

In fluoridated areas, drinking water obtained from surface water with an average fluoride concentration of 0.1-0.2 ppm[16] is raised to the "optimal" level of 0.7-1.2 ppm by the addition of sodium fluoride, hydrofluosilicic acid, or sodium silicofluoride. [*Note: In 1985, the EPA raised the Maximum Contaminant Level to 4 ppm.*]

Fluoride, in community drinking water, enters the fresh water ecosystem in various ways. Surface run-off from fire-fighting, washing cars, and watering gardens may enter streams directly or through storm sewers at optimal concentration, 0.7-1.2 ppm. Most enters during waste water treatment.

Masuda[17] studied a large number of cities and calculated the concentrations in waste water that were in excess of the concentration present in the cities' water supplies. In raw sewage, this was 1.30 ppm; primary treatment reduced this slightly to 1.28 ppm; secondary treatment to 0.39 ppm. Singer and Armstrong[18] found 0.38 ppm in unfluoridated sewage and 1.16-1.25 ppm in fluoridated sewage.

It is clear that, in the case of artificially fluoridated communities, the concentration of fluoride in both surface run-off and sewer effluent exceeds 0.2 ppm.

Studies show that elevated concentrations in fresh water receiving fluoridated effluent may persist for some distance. Bahls[19] showed that effluent containing 0.6-2.0 ppm discharged into the East Galletin River from the city of Bozeman, Montana, did not return to the background level of 0.33 ppm for 5.3 km [3.3 mi.]. Singer and Armstrong[18] reported that a distance of 16 km [9.9 mi.] was required to return the Mississippi River to its background level of 0.2 ppm after receiving the effluent of 1.21 ppm from Minneapolis-St Paul.

Although dilution reduces concentration over distance, the amount of fluoride in effluent is either deposited in sediment locally or is carried to estuaries where it may persist for 1-2 million years.[16] Fluoride residues may re-contaminate the water anew if dredging were to take place.

Sewage sludge, a product of secondary treatment systems must contain high concentrations of fluoride. However, this is seldom measured in the jurisdictions contacted for this study.

When spread on agricultural land or forests, sewage sludge becomes a hazard in the "critical habitat" of salmon species. During application, aerosols are created that may be ingested by animals and may contaminate surface water. The sludge adds toxic substances to the soil. Fluoride can move into ground water and the run-off of soil particulates may enter streams that play a role in the life-cycle of salmon.



Illustration by Lil Kingerly, Riverdale School, Oregon

Effluent from fluoridated cities is also discharged into tidal waters. While sea water has been shown to have a higher concentration of fluoride than unpolluted surface water,[16] contaminated rivers flowing into an estuary (as well as direct discharge of effluent) can elevate the amount of fluoride.

From information that is available, 0.2 ppm in the fresh water ecosystem in the US Northwest and British Columbia appears to be the appropriate safe level for salmon species rather than the 1.5 ppm non accepted. Decreases in water volume and/or flow velocity have the potential to increase fluoride concentration. Increased water temperature will enhance fluoride toxicity. Fluoridation deserves to be looked at as a component of "critical habitat" along with the more publicized factors.

A review of the US Department of Health and Human Services publicaton, *Fluoridation Census 1985*,[21] shows that along the course of the Snake River from the Idaho-Wyoming border to its junction with the Columbia River in Washington State, there are three water systems fluoridated at 1.0 ppm. Eight artificially fluoridated water systems are located on the banks of the Columbia from the Canadian border to the mouth. That is, a total of 11 artificially fluoridated communities are located along the Columbia-Snake River system. Has this played a role in the catastrophic decline in salmonid stocks in this once highly productive ecosystem?

The declining salmon returns to the North Thompson, especially of Chinook and Coho, is threatening the existence of species. The City of Kamloops, which contributes run-off and sewage effluent to the North Thompson, is artificially fluoridated. Could this fluoride contribute to migration delay as occurred at the John Day Dam? Could the decline be related to loss of basic feed or hatching abnormalities associated with toxic levels of fluoride?

Effluent levels in Kamloops have been measured at 0.6-1.2 ppm by city employees (personal communication) but no field studies on the effect on salmon species have been carried out.

The Fraser River of British Columbia begins in the Rocky Mountains and travels west to the city of Prince George, where it is joined by the Nechako River carrying water from the western portion of the Province. From there, it flows south to enter the Strait of Georgia after it is joined by numerous tributaries, the largest of which is the Thompson River.

Prince George, like Kamloops, is artificially fluoridated. Has fluoride effluent from Prince George contributed to reported declines in Chinook and Coho stocks in the Nechako? If the diversion of water from the Nechako River (as proposed in the "Kemano II" hydroelectric project) takes place and lowers the water level, slows the flow and raises the temperature of the Nechako Fraser River system, will the toxic effect of fluoride from Prince George and Kamloops be enhanced, putting at risk not only on Chinook and Coho but the Sockeye upon which fishers of both the US and Canada depend?

The decline in salmon stocks, especially Chinook and Coho, is a major economic problem for both commercial and sport

fisheries. "Critical habitat restrictions" are currently being formulated. In the US, the Chinook salmon is being considered for listing under the Endangered Species Act. In BC, the Kemano II hydroelectric project is currently "on hold" and severe restrictions have been placed on the harvesting of both Cinook and Coho salmon. There has been no change in the "permissible level" of 1.5 ppm fluoride in either the US or Canada.

There are many questions, but until evidence to the contrary is available, based on impartial field studies, in order to protect salmon species in the US Northwest and British Columbia, the "critical level" of fluoride in fresh water should be 0.2 mgF/L.

The strategy for eliminating unacceptable levels of fluoride from the "critical habitat" of Northwest Pacific salmon consists in the immediate banning of artificial fluoridation and the rapid sunsetting of the current disposal practices of fluoride-producing industries.

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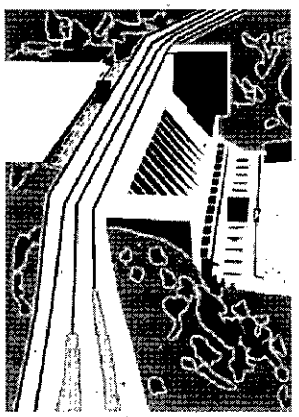
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Fluoride Effects on Salmon at John Day Dam, Columbia River, 1982-1986



by Douglas B Dey and DM Damkaer

The upstream migration of adult spring chinook salmon in the Columbia River has been subject to unusually long delays at John Day Dam. During the spring migration period, average passage times for radio-tagged salmonids at John Day Dam were 158 and 156 hours in 1979 and 1980, respectively. In contrast, average passage time at Bonneville Dam was less than 48 hours and at The Dalles Dam it was less than 24 hours. In addition, passage times for salmonids in the fall of 1982 were twice as long at John Day Dam as they were at The Dalles and McNary Dams. The delay of nearly one week at John Day Dam appeared to contribute to increased mortality and may have affected the spawning success of migrating adult salmonids.

Migratory delays at John Day Dam were not decreased appreciably by changes in fishway entrance locations, water discharge volumes or configurations, or turbine operating conditions. The lack of response by migrating salmonids to flow alterations below the dam focused attention on the possibility that something in the water might be causing fish to avoid the fishways and delay their passage.

In 1982, preliminary studies conducted by CZES Division personnel suggested that the fish-passage delays might be related to contaminants discharged at an aluminum smelter outfall located on the Washington shore upstream from John Day Dam. In particular, high concentrations of fluoride in the vicinity of John Day Dam (0.3-0.5 mg/L in 1982) prompted investigators to focus sampling and research efforts on this contaminant.

In 1983 and 1984, behavior tests were conducted in which over 600 returning salmonids (chinook, coho, and chum salmon) were captured and tested with different concentrations of fluoride in a two-choice flume located in the spawning channel of Big Beef Creek, Washington. The conclusion from these experiments was that the behavior of upstream-migrating adult salmon would be adversely affected by fluoride concentrations of about 0.5 mg/L and that concentrations of 0.2 mg F/L were at or below the threshold for fluoride sensitivity of chinook and coho salmon.

Beginning in 1983 and continuing through 1986, fluoride discharges from the aluminum plant were greatly reduced. With the reduction in fluoride discharged from the aluminum plant, there was a corresponding drop in fluoride concentrations in the river near the outfall and John Day Dam. Concurrently, fish passage delays and interdam losses of adult salmon decreased to acceptable levels.

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From the North American Journal of Fisheries Management, *9 (1989), 154-162, National Marine Fisheries Service, Northwest Fisheries Science Center, April 1993.*

EPA Whistleblowers on Fluoride

Facts for Fluoridationists

by William L. Marcus, Ph.D

I would like to pass along a few tips that have gotten some responses from people who were previously pro-fluoridators. I like to use the approach that first states what everybody has agreed upon in the US, and progress to the more controversial.

- First, it is agreed by all people who think themselves knowledgeable about fluorides that the effect on teeth is limited to children three years or younger. Anyone else is exposed unnecessarily.
- When using the measures of filled, partially filled and missing teeth — comparing fluoridated and non-fluoridated water supplies the world over, including the US, there is either no difference or, more often, people using fluoridated water have more caries. Even very small amounts of fluoride cause brittle, hard-to-repair teeth.
- Studies demonstrate that the rate of hip fracture is at least double among people 65 years or older in fluoridated areas, and people who imbibe fluoridated water are also twice as likely to be hard-of-hearing.
- Fluoridating water increases lead exposure, especially to children, because the fluoride added to drinking water often has up to 400 mcg of lead per liter and the corrosive action of fluoride extracts lead from pipes and solder joints, increasing lead exposure of the young. Babies up to 3 months old absorb 16 times as much lead per unit of body weight than adults.
- Two large [fluoride-related epidemiological studies] in New Jersey and New York State determined the incidence of osteosarcoma (almost always fatal) in men under 18 years of age increased by 6- to 8-fold. An increase of this magnitude is *prima facie* evidence of a real ongoing effect.
- I find that people are simply not willing to believe that our government would condone the addition of a compound to the water supply that was not efficacious. This is why, in my opinion, it has not been possible to convince enough people of conscience to review the fluoride story.
- People remember that the National Academy of Science (NAS) released a report that sort of said fluoride was OK. They do not know that members hand-picked for the NAS panel were known to be pro-fluoride. They were not present when the NAS board calculated that the amount of fluoride ingested daily was far higher than previously believed.
- The [NAS panel] discovered that soft drinks, including Coke, Pepsi and Seven-Up were made by diluting concentrate with fluoridated water, that Kool-Aid, baby formula, etc., also have fluorides added. These exposures were not considered by the EPA when setting the current standard.
- The NAS did not allow me to explain that the levels of fluoride found in the bones of rodents who had osteosarcoma was lower than the level found in human adults exposed to allowable levels of fluoride.... No other compounds (including radioactive compounds) have been able to produce osteosarcomas in rodents.

William Marcus is a Senior Science Advisor with the EPA's Office of Science and Technology. In 1990, as a senior EPA toxicologist, Marcus questioned the safety of fluoride and was subsequently fired. He sued the EPA and won reinstatement – a major victory for whistleblowers.

The EPA's Fluoride Fraud

by Robert J. Carton, Ph.D

The fluoride in drinking water standard, or Recommended Maximum Contaminant Level (RMCL), published by EPA in the Federal Register on November 14, 1985, is a classic case of political interference with science.

The regulation is a fraudulent statement by the Federal Government that 4 milligrams per liter (mg/l) of fluoride in drinking water is safe with an adequate margin of safety. There is evidence that critical information in the scientific and technical support documents used to develop the standard was falsified by the Department of Health and Human Serivces and the EPA to protect a long-standing public health policy.

EPA professionals were never asked to conduct a thorough, independent analysis of the fluoride literature. Instead, their credentials were used to give the appearance of scientific credibility. They were used to support the predetermined conclusion that 4 mg/l of fluoride in drinking water is safe.

Ethical misconduct by EPA management included the following: EPA managers ignored the requirements of the law to protect sensitive individuals such as children, diabetics or people with kidney impairment. Contrary to law, they made the criteria for considering health data so stringent that reasonable concerns for safety were eliminated. Data showing positive correlations between fluoride exposure and genetic effects in almost all laboratory tests were discounted.

By selective use of data, they fit science to the desired outcome. They reported to the Administrator data demonstrating that dental fluorosis was an adverse health effect, but then hid this information from the public when the Administrator decided to call dental fluorosis a "cosmetic" effect.

EPA management based its standard on only one health effect: crippling skeletal fluorosis (CSF). They ignored data showing that healthy individuals were at risk of developing CSF if they happened to drink large quantities of water at the "safe" level of 4 mg/l. EPA's own data showed that some people drink as much as 5.5 liters a day. These people would receive a daily dose of 22 mg, which exceeds the dose necessary to cause CSF.

Management also relied on an April 1983 report from the Surgeon General that they knew was false. The concerns of an expert panel about the effects of fluoride on the bones of children, on the heart, for dental fluorosis and for the overall lack of scientific data on the effects of fluoride in US drinking water were deleted from the EPA's report.

The report was submitted for public comment but was never altered to incorporate the information sent in by world-class experts. Any opnions contrary to the report were dismissed. What we have is actually a draft stamped "Final."

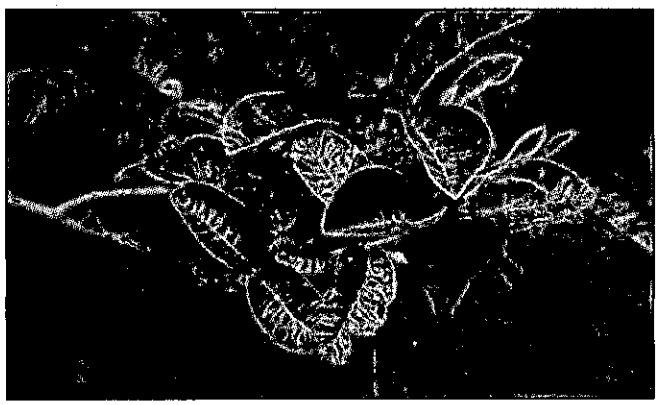
Objective scientific methods of data collection and analysis were avoided in favor of presenting information in a way that agreed with current policy.

Fluoridation is the greatest case of scientific fraud of this century, if not of all time.

In 1991, when this was written, Robert Carton was an EPA scientists and Vice-President of Local 2050 of the National Federation of Federal Employees, representing 1200 EPA professionals.

The Effects of Fluorides on Plants

by Alan Davison and Leonard Weinstein



Guava (Psidium guajava) in Brazil. Older leaves curled and dying. Note: The photos on these pages represent extreme examples of fluoride injury on the sensitive "indicator" plants.

Fluoride-induced symptoms have been described in many reviews (Weinstein and McCune 1970; Weinstein and McCune, 1971; Thomas and Alther 1966; Brandt and Heck 1977; Treshow and Pack 1970; Guderian et al. 1969; Hindawi 1970; Thomas 1961). The basis for the following description is Weinstein and McCune (1971) plus our own experience in the field in several countries.

Gaseous fluoride enters the leaf through the stomata (=pores) then it dissolves in the water permeating the cell walls. The natural flow of water in a leaf is towards the sites of greatest evaporation, which are the margins and tip. Carried by the water, the fluoride concentrates in the margins and tip, so it is these areas that generally are the first to show visible injury. Clearly, this concentration mechanism is one reason why fluoride can be so toxic to plants but there is an important corollary: Most of the leaf may have very little fluoride present and may function normally in terms of assimilation.

Generally, leaves are most sensitive when they are young and still expanding. Once fully developed, they may be many times more resistant. Therefore symptoms are more often seen in young, expanding leaves. Where fumigation is periodic, symptoms may reflect this as only those leaves that are at the sensitive stage of development when the fumigation occurs will develop injury. The rate at which symptoms appear depends on the weather. There can be a considerable lag between the time of exposure to the fluoride and the development of the symptoms.

Exposure to a high concentration causes necrosis of part or even the whole of the leaf. The term necrosis comes form the Greek *nekros* meaning a dead body. The tissues die.

The initial stages vary with species and both the speed of development of the symptoms and their appearance depend on the weather. In most monocotyledonous (narrow-leaved species including grasses and lilies) plants, the initial symptom is the development of chlorosis (= yellowing) at the tips and margins of elongating leaves.

In some species, the tissues take on a "water-soaked" appearance that looks very like early frost injury, then the tissues desiccate and change color. In some species the dead, necrotic areas are pale white to tan, in others they are brown and they may be black (eg in Populus spp.) or have reddish tinges.

Characteristically, there is a dark brown margin along the basal part of the necrotic area. This line of demarcation is very useful in identifying multiple exposures. The necrotic area is sharply delineated from the healthy portion of the leaf blade by a narrow band of chlorotic tissue sometimes streaked with red as in some varieties of Sorghum.



Apricot tree with affected bark.

Dead, dry pieces of leaf may become brittle and fall off, giving the leaf a tattered appearance. This is common in Chinese apricot and many *Populus* varieties. When very young leaves are injured in this way, the resulting leaf may only be a fraction of the normal size and completely mis-shaped.

Pine species vary greatly in sensitivity. For example, young ponderosa pine (*Pinus ponderosa*) needles first exhibit a lightening in color which turns light brown to reddish-brown at the tip and progresses basipetally along the needle. The discoloration is often accompanied by narrow, dark banded zones, which may be the result of intermittent exposures to fluoride spaced at different periods. Dark bands may also occur at the interface of necrotic and healthy tissues. Needles are born in groups (2, 3, 5 depending on species). They tend to be marked to the same extent.

Although necrosis is the symptom most frequently referred to in texts, often being called tip-burn, other symptoms are at least as common or, in some areas, more common.

In dicotyledonous (two seed-leaved) species, the initial symptom of fluoride effects on leaves is usually chlorosis of the tip, which later extends downward along the margins and inward toward the midrib. This chlorosis becomes more intense and extensive with prolonged exposure until the midrib and some veins appear as a green arborescent pattern on a chlorotic background. Continued exposure may lead to the tip becoming necrotic and falling off, leaving the leaf notched.

The symptoms produced in corn, sorghum, and some other grasses begin as scattered chlorotic flecks at the tips and upper margins of middle-aged leaves. As the symptoms progress, the flecking becomes more intense and extends downward, especially along the margins. The amount of chlorosis diminishes from the tip downward and from the margins toward the midrib. A greater degree of chlorosis is usually present at the arch of the leaf and wavy areas of the margin. At high fluoride concentrations, there is less chlorotic flecking and

a greater tendency for tip, marginal, and interveinal necrosis, or a transverse necrotic band at the arch of the leaf.

In young, developing leaves of broad-leaved species, and occasionally in petals, the translocation of fluoride to the margins and tips leads to a distorted shape. This may be accompanied by chlorosis at the margins and/or necrosis. The occurs because cells in the mid-parts of the leaf have low fluoride and expand normally but those on the margins are slower-growing, so the leaf buckles and distorts, becoming cupped and concave or convoluted like a savoy cabbage.

There is little information about the effects of fluoride on fruits but there are two important examples. Bonte and Garrec described fluoride-induced distortion of strawberry fruits. It was caused by lack of fertilization of the some of the seeds, which are responsible for hormonal-induced swelling of the fruit.

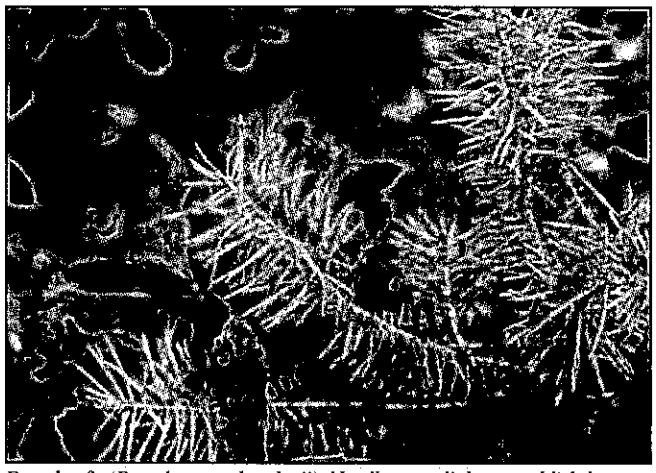
Peach also shows an unusual disorder induced by fluoride called "suture red spot" or "soft suture" of the fruit. It is characterized by premature ripening of the flesh on one or both sides of the suture toward the stylar (blossom) end of the fruit (Benson 1959; MacLean et al. 1984). The ripening of this tissue considerably precedes that of the normal fruit and is often accompanied by splitting of the flesh along the suture. At harvest, the affected areas are soft and often decomposing.

Finally, although the economic value of injury to a peach crop can be calculated, it is almost impossible to calculate or predict the effects of injury on other plants. If fluoride kills all of the leaves on a tree, then there will, of course, be an effect on subsequent growth. However, apart from this very rare occurrence, there is little or no relationship between visible injury and either growth or longevity. A plant that is visibly injured is not necessarily dying and there have been some cases of spectacular recovery of trees after severe injury. Many that show a significant degree of injury (such as *Populus*) continue to grow at normal rates. Conversely, just because a plant does not show visible injury does not mean that there is no effect of fluoride on assimilation or growth. Predicting the effects of fluoride is not a job to be undertaken lightly.

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Sweet corn (Zea mays) with flecking on leaves.



Douglas fir (Pseudotsuga douglasii). Needles turn light- to reddish-brown.

ADA Warns: Fluoride Risk in Baby Food

CHICAGO (ADA) — New research suggests young children may be getting more fluoride than they need through baby foods, according to a study published in the July 1997 issue of the *Journal of the American Dental Association* (JADA).

"Our main concern is that these young children could be at increased risk for mild to moderate dental fluorosis by ingesting too much fluoride," says Steven M. Levy, DDS, one of the authors of the JADA study from the College of Dentistry at the University of Iowa.

"It's important for parents to know how much fluoride their children are getting, whether it's through the water supply, fluoride supplements, fluoridated toothpaste or baby food," Dr. Levy stated.

Fluorosis is a cosmetic defect that occurs when more than an optimal amount of fluoride is ingested. The result of mild fluorosis is light spots on permanent teeth that develop while the teeth are still forming.

The researchers analyzed the fluoride concentration of 238 commercially available infant foods. They took samples for analysis from 206 ready-to-eat infant foods and 32 dry infant cereals, which they prepared with water according to the manufacturer's directions.

The results of the analysis reveal ready-to-eat foods with chicken had the highest fluoride concentrations.

One of the reasons for the high fluoride concentrations in infant foods with chicken may be because of the processing method, according to the study. The mechanical deboning process may leave skin and residual bone particles in the food. Much of fluoride is stored in bone; therefore, the higher concentrations in the chicken-containing products.

The researchers also found that dry infant cereals that are reconstituted with fluoridated water may noticeably increase the levels of fluoride in a child's daily intake.

"What we found in this study is fluoride concentrations for the majority of all the products tested varied widely because of the different water sources used to process the foods," Dr. Levy explains. "The differences can be traced to the manufacturing sites that use a fluoridated municipal water supply as compared to a non-fluoridated city or well water."

The American Dental Association reminds consumers that drinking water fluoridated at the recommended level or eating foods prepared or processed with fluoridated water is safe and effective.

Fluoride and the Phosphate Connection

by George C. Glasser

Cities all over the US purchase hundreds of thousands of gallons of fresh pollution concentrate from Florida – fluorosilicic acid (H_2SiF_6) – to fluoridate water.

Fluorosilicic acid is composed of tetrafluorosiliciate gas and other species of fluorine gases captured in pollution scrubbers and concentrated into a 23% solution during wet process phosphate fertilizer manufacture. Generally, the acid is stored in outdoor cooling ponds before being shipped to US cities to artificially fluoridate drinking water.

Fluoridating drinking water with recovered pollution is a cost-effective means of disposing of toxic waste. The fluorosilicic acid would otherwise be classified as a hazardous toxic waste on the Superfund Priorities List of toxic substances that pose the most significant risk to human health and the greatest potential liability for manufacturers.

Phosphate fertilizer suppliers have more than $10 billion invested in production and mining facilities in Florida. Phosphate fertilizer production accounts for $800 million in wages per year. Florida's mines produce 30% of the world supply and 75% of the US supply of phosphate fertilizers. Much of the country's supply of fluoro-silicic acid for water fluoridation is also produced in Florida.

Phosphate fertilizer manufacturing and mining are not environment friendly operations. Fluorides and radionuclides are the primary toxic pollutants from the manufacture of phosphate fertilizer in Central Florida. People living near the fertilizer plants and mines, experience lung cancer and leukemia rates that are double the state average. Much of West Central Florida has become a toxic waste dump for phosphate fertilizer manufacturers. Federal and state pollution regulations have been modified to accommodate phosphate fertilizer production and use: These regulations have included using recovered pollution for water fluoridation.

Radium wastes from filtration systems at phosphate fertilizer facilities are among the most radioactive types of naturally occurring radioactive material (NORM) wastes. The radium wastes are so concentrated, they cannot be disposed of at the one US landfill licensed to accept NORM wastes, so manufacturers dump the radioactive wastes in acidic ponds atop 200-foot-high gypsum stacks. The federal government has no rules for its disposal.

During the late 1960's, fluorine emissions were damaging crops, killing fish and causing crippling skeletal fluorosis in livestock. The EPA became concerned and enforced regulations requiring manufacturers to install pollution scrubbers. At that time, the facilities were dumping the concentrated pollution directly into waterways leading into Tampa Bay.

George Glasser is a Florida-based writer whose work has appeared in Newlife, Whole Life Times, *the* Sarasota ECO Report *and the* Tampa Tribune.

A Phosphate Worse than Death

In the late 1960's, EPA chemist Ervin Bellack worked out the ideal solution to a monumental pollution problem. Because recovered phosphate fertilizer manufacturing waste contain about 19% fluorine, Bellack concluded that the concentrated "scrubber liquor" could be a perfect water fluoridation agent. It was a liquid and easily soluble in water, unlike sodium fluoride – a waste product from aluminum manufacturing. It was also inexpensive.

Fate also intervened. The aluminum industry, which previously supplied sodium fluoride for water fluoridation, was facing a shortage of fluorspar used in smelting aluminum. Consequently, there was a shortage of sodium fluoride to fluoridate drinking water.

For the phosphate fertilizer industry, the shortage of sodium fluoride was the key to turning red ink into black and an environmental liability into a perceived asset. With the help of the EPA, fluorosilicic acid was transformed from a concentrated toxic waste and a liability into a "proven cavity fighter."

The EPA and the US Public Health Service waived all testing procedures and — with the help of the American Dental Association (ADA) — encouraged cities to add the radioactive concentrate into America's drinking water as an "improved" form of fluoride.

In promoting the use of pollution concentrate as a fluoridation agent, the ADA, Federal agencies and manufacturers failed to mention that it was radioactive.

The product is not "fluorine" or "fluoride" as proponents state: It is a pollution concentrate. Fluorine is only one captured pollutant comprising about 19% of the total product.

By 1983, the official EPA policy was expressed by EPA Office of Water Deputy Administrator Rebecca Hanmer as follows: *"In regard to the use of fluosilicic (fluorosilicic) acid as a source of fluoride for fluoridation, this agency regards such use as an ideal environmental solution to a long-standing problem. By recovering by-product fluosilicic acid from fertilizer manufacturing, water and air pollution are minimized, and water utilities have a low-cost source of fluoride available to them."*

A Hot New Property

In promoting the use of the pollution concentrate as a fluoridation agent, the ADA, Federal agencies and manufacturers failed to mention that it was radioactive. Whenever uranium is found in nature as a component of a mineral, a host of other radionuclides are always found in the mineral in various stages of decay. Uranium and all of its decay-rate products are found in phosphate rock, fluorosilicic acid and phosphate fertilizer.

During wet-process manufacturing, trace amounts of radium and uranium are captured in the pollution scrubber. This process was the subject of an article by H.F. Denzinger, H. J. König and G.E. Krüger in the fertilizer industry journal, *Phosphorus & Potassium* (No. 103, Sept./Oct. 1979) discussed how radionuclides are carried into the fluorosilicic acid.

While the uranium and radium in fluorosilicic acid are known carcinogens, two decay products of uranium are even more carcinogenic: radon-222 and polonium-210.

During the acidulation process that creates phosphoric acid, radon gas contained in the phosphate pebble can be released in greater proportions than other decay-rate products (radionuclides) and carried over into the fluorosilicic acid. Polonium may also be captured in greater quantities during scrubbing operations because, like radon, it can readily combine with fluoride.

In written communications to the author, EPA Office of Drinking Water official Joseph A. Cotruvo and Public Health Service fluoridation engineer Thomas Reeves have acknowledged the presence of radionuclides in fluorosilicic acid.

Radon-222 is not an immediate threat because it stops emitting alpha radiation and decays into lead-214 in 3.86 days. Lead-214 appears to be harmless but it eventually decays into bismuth-214 and then into polonium-214. Unless someone knew to look for specific isotopes, no one would know that a transmutation into the polonium isotope had occurred.

Polonium-210, a decay product of bismuth-210, has a half-life of 138 days and gives off intense alpha radiation as it decays into regular lead and becomes stable. Any polonium-210 that might be present in the phosphate concentrate could pose a significant health threat. A very small amount of polonium-210 can be very dangerous, giving off 5,000 times more alpha radiation than the same amount of radium. As little as 0.03 microcuries (6.8 trillionths of a gram) of polonium-210 can be carcinogenic to humans.

"By recovering by-product fluosilicic acid from fertilizer manufacturing... water utilities have a low-cost source of fluoride available to them."
Rebecca Hammer, Office of Water, EPA, 1983

The lead isotope behaves like calcium in the body. It may be stored in the bones for years before turning into polonium-210 and triggering a carcinogenic release of alpha radiation.

Drinking water fluoridated with fluorosilicic acid contains radon at every sequence of its decay to polonium. The fresher the pollution concentrate, the more polonium it will contain.

As long as the amount of contaminants added to the drinking water (including radionuclides in fluorosilicic acid) do not exceed the limits set forth in the Safe Drinking Water Act, the EPA has no regulatory problem with the use of any contaminated products for drinking water treatment.

Big Risks: No Tests.

Despite the increased cancer risk from using phosphate waste to fluoridate drinking water, the EPA nor the Centers for Disease Control have never commissioned or required any clinical studies with the pollution concentrate – specifically, the hexafluorsilicate radical whose toxicokinetic properties are different than the lone, fluoride ion.

Section 104 (I) (5) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) directs the Toxic Substances and Disease Registry, the EPA, the Public Health Service and the National Toxicology Program to initiate a program of research on fluoride safety. However, after almost 30 years of using fluorosilicic acid and sodium fluorosilicate to fluoridate the drinking water, not one study has been commissioned.

The fluoride ion only hypothetically exists as an entity in an ideal solution of purified water – and tap water is far from pure H_2O. All clinical research with animal models is done using 99.97% pure sodium fluoride and double distilled or deionized water. Among the thousands of clinical studies about fluoride, not one has been done with the pollution concentrate or typical tap water containing fluorides.

Synergy Soup

The fluorosilicic acid is also contaminated with small traces of arsenic, cadmium, mercury, lead, sulfates, iron and phosphorous, not to mention radionuclides. Some contaminants have the potential to react with the hexafluorosilicate radical and may act as complex ionic compounds. The biological fates and toxicokinetic properties of these complex ions are unknown.

The reality of artificial water fluoridation is so complex that determining the safety of the practice may be impossible. Tap water is chemically treated with chlorine, soluble silicates, phosphate polymers and many other chemicals. In addition, the source water itself may contain a variety of contaminants.

The addition of a fluoridation agent can create synergized toxicants in a water supply that have unique toxico-kinetic properties found only in that particular water supply. Consequently, any maladies resulting from chronic ingestion of the product likely would be dismissed as a local or regional anomaly unrelated to water fluoridation.

Technically, artificially fluoridating drinking water is a violation of the Safe Drinking Water Act (SDWA). Under statutes of the SDWA, federal agencies are forbidden from endorsing, supporting, requiring or funding the practice of adding any chemicals to the water supply other than for purposes of water purification. However, the Public Health Service (PHS) applies semantics to circumvent Federal law in order to promote and fund the practice.

PHS states that they only recommend levels of fluorides in the drinking water, and it is the sole decision of a state or community to fluoridate drinking water.

Federal agencies are forbidden from directly funding or implementing water fluoridation but Federal Block Grants are given to States to use as they see fit. Through second and third parties (such as the American Dental Association, state health departments and state fluoridation coordinators), PHS encourages communities to apply for Federal Block Grant funds to implement fluoridation.

The legality of using of Federal Block Grant funds to fund water fluoridation, a practice prohibited by Federal law, has never been addressed in the courts.

Vendors selling the pollution concentrate as a fluoridation agent use a broad disclaimer found on the Material Data Safety Sheet that states: "no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices, or from *any hazards inherent to the product.*" [*Emphasis added.*]

The next time you turn on the tap and water gushes out into a glass, reflect on the following disclaimer from the EPA's 1997 Fluoride: Regulatory Fact Sheet:

"In the United States, there are no Federal safety standards which are applicable to additives, including those for use in fluoridating drinking water."

{CITATIONS AVAILABLE ON REQUEST}

Resources

Organizations

Center for Health Action
PO Box 80270, Forest Park Station
Springfield, MA 01138

Citizens for Safe Drinking Water
3243 Madrid Street
San Diego, CA 92110

Concerned Citizens for Pure Water
164 Heatherly Heights Road
Saluda, NC 28773

Fluoride Alert
192 Locha Trail
Jupiter, FL 33458

Global Alliance Against Fluoridation
Park West Station, PO Box 20832
New York, NY 10025-1516

Health Alliance International
645 Ninth Street
Oakmont, PA 15139

New Jersey Citizens Opposing Forced Fluoridation, Inc.
PO Box 4315
River Edge, NJ 07661

New York State Coalition Opposed to Fluoridation, Inc.
PO Box 263
Old Bethpage, NY 11804-0263

Our Rights Our Water
1102 Pleasant Street, #818
Worcester, MA 01602

Pure Water Committee of Western Maryland
2245 Pocahontas Road
Frostburg, MD 21532

Safe Water Association, Inc.
PO Box 502
Fond du Lac, WI 54936

Safe Water Coalition, Inc.
PO Box 6134
Albany, CA 94706

Safe Water Coalition, Inc.
PO Box 773
Orinda, CA 94563-0768

Safe Water Coalition of Washington State
5615 West Lyons Court
Spokane, WA 99208

Safe Water Committee
PO Box 1242
Old Chelsea Station
New York, NY 10113

Safe Water Foundation of Texas
11419 Shadow Way
Houston, TX 77024

Tacoma Fluoride Alert
1507 North Fife Street
Tacoma, WA 98406

Waste Not
82 Judson Street
Canton, NY 13617

Books

Continuing Evaluation of the Use of Fluorides, ed. Erling Johansen, Donald Taves and Thor Olsen. (Westview Press for the American Association for the Advancement of Science, 1979)

Fluoridation: The Great Dilemma by Albert W. Burgstahler, H. Lewis McKinney and George L. Walbott (Coronado Press Inc., 1978)

Fluoride, the Aging Factor: How to Recognize and Avoid the Devastating Effects of Fluoride by Dr. John Yiamouyiannis (1993)

Fluoride Emissions: Their Monitoring and Effects on Vegetation and Ecosystems by Frank Murray (1982)

Review of Fluoride: Benefits and Risks. Report of the Ad Hoc Subcommittee on Fluoride, US Department of Health and Human Services (February 1991)

The Fluoride Question: Panacea or Poison by Anne-Lise Gotzsche (Stein and Day, 1975)

Publications

"Fluoride's Revenge," by Daniel Grossman (*The Progressive*, December 1990)

Environmental Fluoride 1977, National Ressearch Council of Canada

"Fluoridation of Public Water Systems: Valid Exercise of State Police Power or Constitutional Violation?" by Douglas A. Balog. *Pace Environmental Law Review*, 1997

"Fluoride: Industry's Toxic Coup," by Joel Griffiths (*Covert Action Quarterly*, Fall 1992; *Earth Island Journal*, Fall 1998)

"Fluoride Pollution," by Edward Groth III (*Environment*, April/May 1975)

Fluorides and Oral Health, World Heath Organization, Technical Series No. 846 (1994)

Fluorides. Committee on Biologic Effects of Atmospheric Pollutants, National Research Council, National Academy of Sciences (1971)

Fluoride, the quarterly journal of the International Society for Fluoride Research, 81A Landscape Road, Mt. Eden, Auckland 4, New Zealand, phone/fax: 011-11-64-9-630-7114.

Health Effects of Ingested Fluoride, National Academy of Sciences/National Research Council, 1993

"Special Investigative Report on Fluoridation," *Chemical & Engineering News*, August 1, 1988.

"The Fluoride Connection," by Richard G. Foulkes, MD, *Townsend Letter* (April 1998)

Websites

American Dental Association Fluoridation Facts
(Source for pro-fluoride information)
http://www.ada.org/consumer/fluoride/facts

Academy of General Dentistry
http://www.agd.org

American Dietetic Association
http://www.dentnet.nl/ntvt

Canadian Pediatric Society
http://www.cps.ca

Dental Fluorosis Prevention Program
http://www.inter-view.net/~sherrell

Fluoride Issues
http://www.sonic.net/~kryptox

Health Action Network Society, Alberta, Canada
http://www.cadvision.com/fluoride

Holistic Dental Association, Holistic/Alternative Dentistry
http://www.simwell.com/hda

Leading Edge International Research Group
http://www.trufax.org

Preventative Dental Health Association
http://emporium.turnpike.net/P/PDHA/

The Fluoride Stop
http://bruha.com/fluoride

Stop Fluoridation USA
http://home.cdsnet.net/~fluoride

Zero Waste America
http://www.zerowasteamerica.com/BanFluoride.htm

Fluoride-free Toothpaste

Baby Orageł Tooth & Gum Cleanser, Del Pharmaceuticals

First Teeth Toothpaste for Babies & Toddlers, Nu-Tec Health Products, Inc. Carlsbad, CA 92008

Homoedent (France), Distributed by Boiron-Borneman, Inc., Newton Square, PA 19073

Nature's Gate, Levlad, Inc., Chatsworth, California 91311

Natural Tea Tree Oil, Desert Essence, Chatsworth, CA 91311

Optifresh; Tea Tree, Distributed by Natural Organics, Inc., 548 Broadhollow Rd., Melville, NY 11747

Peelu Toothpaste, Distributed by The Peelu Co., Box 2672, Fargo, ND 58108, 1 (800) 457-3358

The Natural Dentist, Woodstock Natural Products, Inc., 2337 Lemoine Ave., Fort Lee, NJ 07024, (800) 615-6895

Tru-Dent, Schiff Products, Inc., Salt Lake City, UT 84194

Vademecum Toothpaste, The Swedish Whitener
Distributed in the US by Dermatone Lab, Connecticut

Weleda Toothpaste, Weleda, Inc., PO Box 249, Congers, NY 10920, (800) 289-1969

"Our members' review of the body of evidence over the last 11 years, including animal and human epidemiology studies, indicates a causal link between fluoride/fluoridation and cancer, genetic damage, neurological impairment and bone pathology... the health and welfare of the public is not served by the addition of this substance (fluoride) to the public water supply... for which there is virtually no evidence of significant benefits... and substantial evidence of harm." — *National Federation of Federal Employees Union (Local 2050), Washington, DC, July 1997*

NEWS RELEASE

April 16, 1998

Email: jgreen@abac.com
Email: davidkennedy-dds@home.com

Contact: Jeff Green
Citizens For Safe Drinking Water
3243 Madrid Street
San Diego, CA 92110
(800) 728-3833

Research Links Low Levels of Fluoride and Aluminum to Alzheimer's and Kidney Damage

In a study just published in the peer-reviewed journal *Brain Research* the presence of low levels of fluoride in the drinking water of test animals, equal to the amount of elemental fluorine found in fluoridated water, caused damage to the tissue of the brain that the authors identified as similar to the pathological changes found in humans with Alzheimer's and other forms of dementia.

While the purpose of this study was to assess the factors that enhance or inhibit the bioavailability of aluminum and its effects on the nervous system, the study looked at the effects of aluminum-fluoride and sodium-fluoride separately.

The authors report, "Histological evidence of glomerular distortion and other signs of kidney disorder were found in animals in both the aluminum-fluoride and sodium fluoride groups..."

"While the small amount of aluminum-fluoride in the drinking water of rats required for neurotoxic effects is surprising, perhaps even more surprising are the neurological results of the sodium-fluoride at the dose given in the present study (2.1 ppm). {the amount used to achieve 1 ppm of elemental fluorine used in fluoridation}.

"Fluoride has diverse actions on a variety of cellular and physiological functions, including the inhibition of a variety of enzymes, a corrosive action in acid mediums, hypocalcemia, hyperkalemia, and possibly cerebral impairment."

The authors summarize, "Chronic administration of aluminum-fluoride and sodium-fluoride in the drinking water of rats resulted in distinct morphological alterations of the brain, including the effects on neurons and cerebrovasculature."

While there are numerous studies linking fluoride to increased risk of hip fracture, cancer, genetic damage, bone pathology, and dental fluorosis, as identified in July 1997 by the union which consists of all of the scientists and other professionals at the Environmental Protection Agency, Washington, D.C., this study adds further definition to a series of recent studies that have illuminated fluoride's adverse neurological impact and have anticipated the results from this research that focuses on the hippocampus region of the brain, and interaction with other neurotoxins.

A previous study by Mullenix, et al. in *Neurotoxicology and Teratology*, 1995, documents abnormal behavioral responses by animals exposed to fluoride at various stages of gestation, which resulted in the exposed animals exhibiting either permanent hyperactivity if exposed prenatally, or what layman refer to as "the rat version of couch potato" if exposed after birth.

In "Psychopharmacology of Fluoride: A Review", 1994, the author A. Spittle concludes, "There would appear to be some evidence that chronic exposure to fluoride may be associated with cerebral impairment affecting particularly the concentration and memory of some individuals. These symptoms are reminiscent of those seen in the chronic fatigue syndrome."

In the "Effect of Fluoride on the Physiology of the Pineal Gland", 1994, the author, J. A. Luke suggests that fluoride also effects the gland in the brain that produces melatonin, which has been established as critical to those people suffering from sleep disorders.

The follow-up question should be obvious: In light of this scientific evidence, is it in the best interest of our nation to continue a public policy __ a public policy that has already been rejected by 98% of Europe __ that forces each man, woman, and child to ingest a known cumulative neurotoxin, which is added to our water supply with no control over total intake from all sources, or variances in susceptibility?

The 1996 Safe Drinking Water Act requires that each chemical that appears in our drinking water be re-assessed with a new criteria for assuring the safety of drinking water for the most susceptible segments of our population. The coming days will reveal whether the agencies that have been established to protect our health will act.

30-30-30

References

Chronic administration of aluminum-fluoride or sodium-fluoride to rats in the drinking water: alterations in neuronal and cerebrovascular integrity, Julie A. Verner, Karl F. Jensen, William Horvath, Robert L. Isaacson, *Brain Research*, vol. 784, pp. 284-298, 1998.

Neurotoxicity of Sodium Fluoride in Rats, Mullenix et al., *Neurotoxicology and Teratology, Vol. 17, no. 2, pp. 169-177, 1995*

Effect of Fluoride on the Physiology of the Pineal Gland, J. A Luke, Caries *Research*, Vol. 28, p204, 1994.

Psychopharmacology of Fluoride: A Review, A. Spittle, *International Clinical Psychopharmacology*, Vol. 9, 1994.

http://www.sonic.net/~kryptox/fluoride.htm
http://www.cadvision.com/fluoride/index.htm

AMERICA:OVER-DOSED ON FLUORIDE

Compiled by Lynn Landes and Maria Bechis, Chair & Vice Chair, Fluoride Committee , PA Sierra Club, March 14, 1997

The widespread and uncontrolled use of fluoride in our water, food, juices, soft drinks, beverages, and dental products is causing pervasive over-exposure to fluoride in the U.S. population. Most developed countries have banned fluoride in water. Today, over 60% of the United States population drink fluoridated water. In general, Americans are not warned of the risks of fluoride. Food and beverage labels do not include fluoride concentrations.

Fluoride is the only chemical added to U.S. municipal water that is used to mass medicate, rather than to render water safe to drink. It is not an essential nutrient. It has never received "FDA Approval"(U.S. Food and Drug Administration) as safe or effective. It is listed as an "unapproved new drug." Although fluoride can occur naturally in some water supplies, the type of fluoride added to water is a hazardous waste of the aluminum, uranium, and phosphate fertilizer industries .

For two consecutive years, 1995 & 1996, **The Journal of the American Dental Association (JADA)** has published studies reporting on pervasive over-exposure to fluoride due to ***"the widespread use of fluoridated water, fluoride dentifrice, dietary fluoride supplements and other forms of fluoride...[There is] an increased prevalence of dental fluorosis, ranging from about 15% to 65% in fluoridated areas and 5% to 40% in non-fluoridated areas in North America."*** The 1996 study warned parents to limit their children's intake of juices due to excessive fluoride content.

***Fluorosis* is symptomatic of an over-exposure to fluoride throughout the body.** Its visible characteristics are the discoloration or pitting of the teeth. White flecks in the teeth may also occur. *Fluorosis* can lead to tooth decay. FDA's claim that *fluorosis* is only a "cosmetic" effect is unsubstantiated. **Fluoride accumulates throughout the body, over an individual's lifetime.** It effects all age groups with both long and short-term harmful health consequences.

In 1993, U.S. Dept. of Health and Human Services (HHS) stated in its Toxicological Profile on fluoride (TP 91/17), ***"Existing data indicate that subsets of the population may be unusually susceptible to the toxic effects of fluoride and its compounds. These populations include the elderly, people with deficiencies of calcium, magnesium and/or vitamin C, and people with cardiovascular and kidney problems ...Postmenopausal women and elderly men in fluoridated communities may also be at increased risk of fractures."***

Is there a margin of safety for exposure to fluoride? In the 1940's, when *fluoridation* of municipal water began, the ***"optimal"*** level of exposure to fluoride for *dental benefit* was determined to be 1 milligram/day. Even at the 1 mg/day exposure level, 10% of the population was expected to *suffer* ***dental fluorosis.*** It was estimated that individuals drank 1 liter of water per day. At that time, other sources of fluoride were scarce.

In 1986, the EPA set new ***"maximum contaminant levels (MCLs)"*** for fluoride. Above 2 mg/liter "children are likely to develop objectionable ***dental fluorosis"*** and parents must be officially notified. Above 4 mg/liter, individuals are at risk of developing ***"crippling skeletal fluorosis".*** It is against federal law to fluoridate water above 4 mg/liter.

Below is a summary and analysis of a HHS table that estimates ***fluoride exposure levels from food, beverages, toothpaste, and mouthwash*** (U.S. Dept. of Health and Human Services, *Review of Fluoride Benefits and Risks*, 1991).

Fluoride Concentration in Drinking Water		Fluoride Intake	% Over 1 mg "Optimal" Dose
Unfluoridated Communities	< 0.3 mg/L	0.88 - 2.20 mg/day	**as much as 120%**
"Optimally" Fluoridated	0.7-1.2 mg/L	*1.58* - 6.60 mg/day	**as much as 560%**
Fluoridated communities	> 2.0 mg/L	2.10- > 7.05 mg/day	**possible > 605%**

(Table does not include Fluoride supplements, pharmaceuticals, emissions, and workplace exposures to fluoride)

RECOMMENDATION: The FDA should be required to put fluoride through the rigorous "controlled studies" necessary for "FDA Approval." If fluoride gains FDA approval, then it should be treated as a *prescribed medication* in order to protect individuals from over-exposure.

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David Kennedy, DDS Initiative author

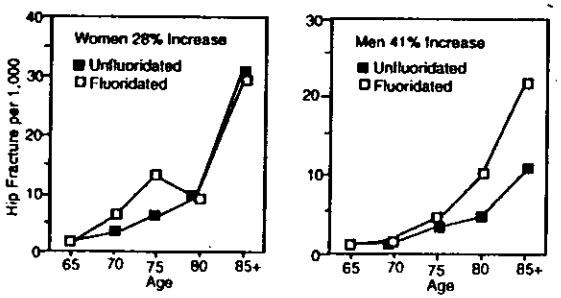
Important Fluoride Facts

Fluoride is cancer-causing in rats, mice and humans.

1) *Carcinogenesis*, volume 9, pages 2279-2284 (1988)
2) *Sodium Fluoride: individual animal tumor pathology table [rats]*, Battelle Memorial Institute, Feb. 23, 1989
3) *Sodium Fluoride: individual animal tumor pathology table [mice]*, Battelle Memorial Institute, April 11, 1989
4) Lancet 36, page 737 (1990)
5) *Review of Fluoride: Benefits and Risks*, U. S. Public Health Service, pages F1-F7 (1991)
6) *Fluoride* volume 26, pages 83-96 (1992)
7) *A Brief Report on the Association of Drinking Water Fluoridation and the Incidence of Osteosarcoma among Young Males*, New Jersey Department of Health, November 1992
8) *Fluoride, the Aging Factor*, Health Action Press, pages 72-90 (1993)

Hip fracture rates are much higher in people residing in fluoridated communities.

Graph from reference 3 below Daineilson et al.



1) *Journal of the American Medical Association* volume 264, pages 500-502 (1990)
2) *Journal of the American Medical Association* volume 266, pages 513-514 (1991)
3) *Journal of the American Medical Association* volume 268, pages 746-748 (1992)
4) *Journal of the American Medical Association* volume 273, pages 775-776 (1995)

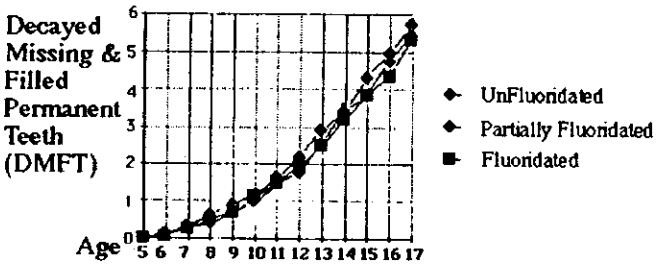
The U.S. National Research Council admits that dental fluorosis (fluoride poisoning of the teeth) affects from 8% to 51% of the children drinking fluoridated water.

1) *Science* volume 217, pages 26-30 (1982)
2) *Journal of the American Dental Association* volume 108, pages 56-59 (1984)
3) *Journal of Public Health Dentistry* volume 46, pages 184-187(1986)
4) *Health Effects of Ingested Fluoride*, National Research Council, page 37 (1993)

Recent large-scale studies show no difference in decay rates of permanent teeth in fluoridated and non fluoridated areas.

1) *Community Health Studies* volume 11, pages 85-90 (1987)
2) *Journal of the Canadian Dental Association* volume 53, pages 763-765 (1987)
3) *Fluoride* volume 23, pages 55-67 (1990)

United States 1987 Fluoridation Survey found NO DIFFERENCE in Tooth Decay



Fluoride tablets and drops are not approved by the U.S. Food and Drug Administration as safe or effective.

1) Letter from Frank R. Fazzari, Chief, Prescription Drug Compliance, Food and Drug Administration to New Jersey Assemblyman John Kelly (June 8, 1993)
2) *Preventing Tooth Decay: Results from a Four-Year National Study*, Robert Wood-Johnson Foundation, Special Report number 2/1983, 18p
.3) *Community Dentistry and Oral Epidemiology*, volume 19, pages 88-92 (1991)

Fluoride is more toxic than lead, and even in minute doses, accumulates in and is damaging to brain/mind development of children; i.e. produces abnormal behavior in animals and reduces IQ in humans.

1) Mullenix, Phyllis et. al Neurotoxicity of Sodium Fluoride in Rats, *Neurotoxicology and Teratology*, Vol. 17, No. 2, pp. 169-177, 1995
2) Li, XS; Zhi, JL; Gao, RO Effects of fluoride exposure on intelligence in children, *Fluoride* 28:4, pp. 189-192 (1995)
3) Zhao, LB; Liang, D; W Wu Lu-Liang Effects of a high fluoride water supply on children's intelligence. *Fluoride* vol. 29:4 pp. 190-192 1996

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House of Representatives
COMMONWEALTH OF PENNSYLVANIA
HARRISBURG

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MAJORITY CHAIRMAN, ENVIRONMENTAL RESOURCES AND ENERGY
AGRICULTURAL AND RURAL AFFAIRS.

RURAL CAUCUS
TIMBER CAUCUS
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APPOINTMENTS

CHESAPEAKE BAY COMMISSION, CHAIRMAN

June 16, 1999

Ellie Rudolph, Director
Pennsylvania Chapter Health Alliance International
645 Ninth Street
Oakmont, Pa 15139

Dear Mrs. Rudolph:

I received your recent note, along with the attachments, expressing your interest and concern over the issue of fluoridation of drinking water. I appreciate your providing the enclosures to your note and I realize they represent quite a bit of work on your part. I appreciate receiving information such as yours from my constituents since it makes it much easier for me to understand the issues involved from a broad perspective.

As you are aware, the Environmental Resources and Energy Committee, which I am Chairman, has had referred to committee, House Bill 939, which, if enacted, would, in simple terms, establish minimum fluoridation levels for public drinking water.

As you are probably also aware, the fluoridation issue has been on and off the public agenda in Pennsylvania Legislature for many years now. When I learned that this bill was referred to my committee, I asked my staff to research the subject and their report to me was that there is no solid scientific or medical evidence to show that fluoridation is of any beneficial help to public health, safety or welfare. As chairman of this committee; it is my policy not to move any legislation from committee that would not result in a positive benefit to public health, safety or welfare.

Accordingly, please be advised that I have no intention now, or in the near future, to have the committee consider House Bill 939 or any other legislation dealing with fluoridation of public drinking water.

I appreciate your taking the time to write and advising me of your interest in this issue. Should you have any additional information that you might feel helpful to myself or my staff, please contact Fred Taylor, Esq., of my staff counsel at (717) 783-3972.

Thank you again.

Sincerely,

Art

Arthur D. Hershey, Majority Chairman
Environmental Resources & Energy Committee

ADH/sel

N.H. PURE WATER COALITION

Director: Gerhard Bedding, 8 Green Acres Rd., Keene, NH 03431. Tel. and fax 603-355-2202

Partial list of organizations, professionals, and businesses endorsing the N.H. Pure Water Coalition: American Preventive Medical Assn, New Hampshire Greens, New Hampshire Citizens for Health Freedom, Citizens for a Future New Hampshire, Earth Island Institute, Aurum Foundation, Namaste Permaculture, N.H. Coalition for Alternatives to Herbicides, Albert Schatz, Ph. D. (discoverer of streptomycin), A. Konopka, M.D., Gail Rockwell Minton, Ph.D., Gerald Karnow, M.D., Caroline Snyder, Ph.D., Philip Incao, M.D., Paul W. Scharff, M.D., L.J. Aventuro, M.D., Kent Hesse, M.D., Phyllis Mullenix, Ph.D., Daisy Goodman, R.N., Thomas Cowan, M.D., Pamela Herring, N.D., Leon Hecht, N.D., H. Crayé, N.D., Louis J. Ronsivalli, M.Sc, Kelly Sutton, M.D., Gary L. Walsemann, D.C., John R. Lee, M.D., D. Kennedy, DDS, Libby DeMartelly, M.A., Elaine A. Brown, D.M.D., Paul Connett, Ph.D.,A-Market Natural Foods, Blueberry Fields.

To Rick Trombly and Members of the
Public Affairs Committee, N.H. Senate February 22, 2000

Re: SB 312

My name is Gerhard Bedding. I am a science writer and a teacher. I worked for four years as a full-time science writer for the Xerox Corporation. I have two Master's degrees, one with a science major. I am Director of the N.H. Pure Water Coalition which was formed recently to educate the N.H. public about the growing scientific controversy surrounding fluoridation.

On behalf of the NH Pure Water Coalition, I am speaking against SB 312 as it now stands. Asking for 10% of all voter signatures to put fluoridation on the ballot seems quite reasonable in the light of the raging controversy. However, if SB 312 were to be combined with House Bill 1598, we could probably live with it. Let me explain that a bit later.

No serious discussion of fluoridation is possible without taking into account two recent reports: "Fluoridation and the Environment" and "Why EPA's Headquarters Union of Scientists Oppose Fluoridation" of May 1, 1999, which represents the view of hundreds of "whistle-blowing" EPA scientists. Their report asks for an immediate halt to fluoridation in the U.S. They explain that their conclusion is based on the scientific literature, "documenting the increasingly out-of-control exposure to fluoride, the lack of benefit to dental health from ingestion of fluoride, and the hazard to human health from such ingestion. These hazards include acute toxic hazards, such as to people with impaired kidney function, as well as chronic toxic hazards of gene mutations, cancer, reproductive effects, neurotoxicity, bone pathology, and dental fluorosis." Six pages of peer-reviewed references follow the report.

Here is a statement from hundreds of EPA whistleblower-scientists, not just one or two, all experts hired to guard the quality of our water and air, and sworn to tell the American public the truth as they find it. They have not sworn allegiance to the health establishment but to the public.

Their report should have been big news but the media ignored it.

It is clear that there is a huge scientific controversy over the benefits and risks of fluoridation. The ADA's comment that "there is no credible opposition to fluoridation" sounds hollow when one considers that 12 Nobel Prize winning scientists are either outright opposed to fluoridation or are very critical of the practice. (See Paul Connett, Ph.D., Waste Not # 359,, January 2000)

Why are the ADA, the CDC, the Public Health Service still promoting fluoridation? One might call it institutional inertia, or fear of loss of face: Their hasty and premature endorsement of fluoridation 50 years ago now makes it hard for them to re-evaluate fluoridation in the light of current scientific research. Medical authorities outside the U.S., who did not make premature endorsements on fluoridation, have generally abandoned it, after testing and studying it for many years. Outside the U.S. only 2.5% of the world population drinks fluoridated water. 98% of Europe is not fluoridated.

Now back to SB 312 and its relation to HB 1598. HB 1598 is a gentle and eminently reasonable bill. It simply asks that the serious scientific controversy over fluoridation be recognized by requiring a 2/3majority, rather than a simple majority, to start fluoridation. If indeed fluoridation is a good idea, then the medical establishment which has all the power of its reputation and of Federal money, ought to be able to persuade a sizeable majority to vote for it.

For example, a narrow majority of 51.5% - Manchester's vote on 11/ 2, 1999 - should not have had the right to force the other 48.5% to swallow something they object to. This is not a basketball game where one or two points leads to "Winner takes all".

The NH Legislature has had the wisdom to recognize areas where more than a simple majority vote is needed to reach a decision. For example, New Hampshire requires a 60% majority vote to pass a school bond issue. I suggest that being forced to consume something you don't want, something your own doctor may advise against, is even more serious than having to make tax payments on a school bond you might have objected to.

HB 1598 also addresses the outrageous injustice done to NH citizens in outlying towns who receive their water from a city where they cannot vote. I understand that 40,000 NH citizens outside Manchester are in this position. Their demand should be "No fluoridation without representation".

So, if SB 312 can be combined with HB 1598, we could probably live with it.

Gerhard Bedding

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American Preventive Medical Association
New Hampshire Greens
New Hampshire Citizens for Health Freedom
Citizens for a Future New Hampshire
Earth Island Institute
Aurum Foundation
Namaste Permaculture
N.H. Coalition for Alternatives to Herbicides
Albert Schatz, Ph. D. (discoverer of streptomycin, which is considered to be one of the ten major medical discoveries of the 20th century)
A. Konopka, M.D.
Gail Rockwell Minton, Ph.D.
Gerald Karnow, M.D.
Caroline Snyder, Ph.D.
Philip Incao, M.D.
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A-Market Natural Foods
Blueberry Fields.

ESTEEMED VOICES WARN AGAINST FLUORIDATION:

* "Fluoride is an enzyme poison, in the same class as cyanide, oxalate, or azide, which means that it is capable of a very wide variety of harmful effects, **even at low doses.** This characteristic of fluoride has long been known and accounts for the opposition to fluoridation by such eminent scientists, all Ph.D's, as Sumner and Myrback (authors of *The Enzymes*), Laubengayer (Cornell, leading authority on all aspects of fluoride chemistry), Theorell and von Euler (both were Swedes and both *Nobel Prize winners* for work in enzymology) and a number of others.
John B. Patrick, Ph. D. Chemistry, before a Joint Congressional Committee (8/ 4/82). Dr. Patrick at that time was Senior Professor and Chairman, Dept. of Chemistry, Mary Baldwin College."

* "I am appalled at the prospect of using water as a vehicle for drugs. Fluoride is a corrosive poison that will produce serious effects on a long-range basis. Any attempt to use the water this way is deplorable." **Dr. Charles Heyd, Past President of the American Medical Association.**

* "I am certainly not a proponent of fluoridation of public water supplies. I think it exposes adults to possible risks. It may increase the total fluoride load that people are getting on top of other sources and it doesn't give people a choice"

Andrew Weil. M.D., *Natural Health,* magazine, March-April 1998

William Marcus, Ph.D.,
D.A.B.T., (Toxicology), former U.S. EPA Senior Science Advisor *
Albert W. Burgstahler, Ph.D.
(Organic Chemistry, Env. Fluoride)
Robert J Carton, Ph. D.
(Env. Sciences & Risk Assessment)
Paul Connett, Ph.D. (Toxicology and Environmental Chemistry)
Richard Foulkes, M.D., Fmr. Consultant to Health Minstr, BC, Canada
Richard A. Kunin, M.D., Pres. Soc.for Orthomolecular Health Medicine.
M.A. Krikker, M.D., Hemochromatosis Foundation, Albany, N.Y.
D. Skinner, M.D., B.Sc, C.A.F.C.
Roy E. Hanford, M.D. (Phys.&Surgeon)
John R. Lee, M.D.
Gerson Jacobs, M.D.
Harvey Petraborg, M.D.
E.R. Cooper, M.D.
Edward A. McLaughlin, M.D.
Philip E. Zanfagna, M.D.
Jonathan Forman, M.D.
L.A. Alesen, M.D.
William J. Filante, M.D.
Sheila M. Gibson, M.D., B.Sc., M.F. Hom (Research Physician)
George L. Waldbott, M.D. (founder Int.Soc. for Fl. Research)
Simon Beisler, M.D. (Chief of Urology, Roosevelt Hospital, N.Y.)
Fred Squier, M.D. (Head of Oral Surg, Lenox Hill Hospital, N.Y.)
John Garlock, M.D. (Consulting Surgeon, Mt.Sinai Hosp., N.Y.)

This is only a partial list

Edgar A. Lawrence, M.D. (Dir. of Medicine, Lenox Hill, N.Y.)
Girard F. Obenender, M.D.,
Frederick B. Exner, M.D. (Fellow of the Am. Coll. of Radiology)
Charles C. Bass, M.D. (Dean Emeritus, Tulane Un. Medical School)
Alton Ochsner, M.D. (Chief Dept. of Surgery, Tulane Un. Med. School)
Julian Whitaker, M.D.
Robert Atkins, M.D.
Bruce West, M.D.
Philip Incao, M.D.
Leslie A. Russell, D.M.D.
Kirk Youngman, D.M.D.
Paul W. Sheeran, D.M.D.
Ellsworth D. Foreman, D.M.D.
David Kennedy D.D.S. (Inter. Acad. Oral Med. and Toxicology)
+ 24 other dentists with a D.D.S.
Benedict J. Gallo, Ph.D. (Botany, Research Microbiologist)
Norman R. Mancuso, Ph.D. (Chemistry, Apollo Project Scientist)
Andrew Berns-Hicks (Hazardous Substance Engineer, CA-EPA)
John P. Flaherty, (Chief Justice, Supreme Court of Pennsylvania)

*** Above affiliations are listed for identification purposes and do not imply institution endorsement or support.**

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ALBERT SCHATZ, Ph.D.
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aschatz@unix.temple.edu

October 15, 1999

The Citizens of Manchester
Manchester
New Hampshire

Dear People:

I am writing about the dangers of fluoridation.

I have been doing scientific research for more than half a century. **I have been involved in the fluoridation controversy since the early 1950's.** During this time, I have done considerable research on fluoridation, and published many reports in several countries.

I am opposed to fluoridation because of the overwhelming evidence that fluoridation is not only potentially harmful but has already caused considerable

Albert Schatz, Ph.D., received his doctoral degree in Soil Microbiology and Biochemistry from Rutgers University. He discovered the antibiotic Streptomycin which was the first effective means of treating tuberculosis. In his book The Forgotten Plague, Frank Ryan, M.D., commented on this discovery: "So, calmly and methodically, Albert Schatz, barely 23 years old, now performed an experiment that would utltimately prove **one of the most important in the history of medicine.** He tested streptomycin against tuberculosis."

Streptomycin was also the first effective treatment for pneumonic plague, also known as "the Black Death", and for tularemia, brucellosis, and other serious infectious diseases.

Dr. Schatz was awarded honorary degrees and medals, and was named an honorary member of scientific, medical, and dental societies in Europe, Latin America, and the United States. One of the Gold Medals awarded was the Grand Prix Humanitaire de France. He also received the Rutgers University Medal for the discovery of streptomycin. The citation accompanying the medal stated that "The worldwide impact of this discovery is now part of medical history."

Dr. Schatz initiated research that led to the discovery of another antibiotic, Nystatin. He has also done research with other infectious diseases, cancer, multiple sclerosis, fluoridation, the role of chelation in the formation and fertility of soils, etc. He has published three books and more than 700 articles. He is a member of Phi Beta Kappa and Sigma Xi.

In November 1965, the University of Chile awarded Dr. Schatz an Honorary Degree for his contributions to that country. He has honorary degrees from four other American universities. Dr. Schatz has been invited to lecture in the U.S. and in 19 other countries.

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I am opposed to fluoridation because of the overwhelming evidence that fluoridation is not only potentially harmful but has already caused considerable well-documented harm. So, it is definitely not safe.

Fluoridation also does not prevent dental caries. What it does is delay the appearance of tooth decay. This delay occurs because tooth eruption is delayed in adolescents who are fluoridated. Teeth, whose eruption is delayed, are exposed to cariogenic conditions in the mouth for a shorter period of time than teeth which erupt without delay. This is why there is less decay in fluoridated children compared to children of the same age who are not fluoridated. The so-called "beneficial" effect of fluoride is therefore a statistical illusion. My report entitled **The Failure of Fluoridation in England** discusses this statistical illusion in data published by the **British Department of Public Health and Social Security in London.**

I also refer my report **Low-level Fluoridation and Low-Level Radiation. Two Case Histories of Misconduct in Science.**

Sincerely yours,

Albert Schatz

NEW YORK STATE COALITION OPPOSED TO FLUORIDATION, INC.
Participating Member of International Network for Safe Drinking Water
P. O. Box 263, Old Bethpage, New York 11804-0263 e-mail: NYSCOF@aol.com
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President and General Counsel
Paul Stephen Beeber, Esq.

Honorary Chairman
Hon. Owen H.Johnson
N.Y.S. Senator

NEWS RELEASE FOR IMMEDIATE RELEASE

SAFETY CONCERNS LEADS PROMINENT FLUORIDATION SPOKESPERSON TO CALL FOR END TO FLUORIDATION

Dr. Hardy Limeback, D.D.S., Ph.D., Head of Preventive Dentistry at University of Toronto, fluoride biochemistry expert, a spokesperson for the Canadian Dental Association for over 12 years, recently made a public announcement that **he no longer supports fluoridation.** Dr. Limeback's opposition to fluoridation came about after he reviewed the scientific literature and found that there is very little, if any, dental benefit from swallowing fluoride. In addition, fluoride can cause adverse effects to bones and teeth.

Dr. Limeback's conclusions against fluoridation are joined by a growing number of professional critics of fluoridation in the fields of medicine, dentistry, and science. A major concern of Dr. Limeback and most opponents of fluoridation is that total fluoride intake is out of control. **Excessive** fluoride intake is easily reached because of fluoride in water, foods, beverages, supplements, medications, toothpastes, rinses, fertilizers, and more.

Proponents of fluoridation report that dental fluorosis is increasing (white stains, yellow or brown discolorations or actual pitting of teeth of youngsters) but label it only "cosmetic". Dr. Limeback counters, "Since when is a cosmetic problem not a problem when the patient must seek dental treatment to fix it."..."More money is spent treating dental fluorosis than would have been saved even if fluoridation did reduce decay in children," says Limeback.

Dr. Limeback says, "The anti-fluoridationists did everyone a favor. They have challenged us to prove to them that the benefits of fluoride outweigh the risks. In my opinion, there is no question that the risks now far outweigh the benefits...Fluoride accumulates in the bones... There hasn't been a single study to show that exposure over a lifetime is safe.."

Attorney Paul Beeber, President of the New York State Coalition Opposed to Fluoridation, stated, "Dr. Limeback has done the public a great service by raising a Red Warning Flag. Those who promote fluoridation are placing people at risk of hip fractures and other harmful effects. Risk groups include those with kidney impairment, high water consumers, and others."

In an interview with the Coalition, Dr. Limeback stated, "The message has to go out: "Fluoride is a drug...Fluoridated toothpastes in the United States are now required by the FDA to have warning labels..."We should all turn to what the Europeans are doing and ban fluoride from the water supplies."

-30- (6/23/99)

Dr. Limeback may be reached at: Tel. 416-979-4929, Ext. 4461; Fax: 416-979-4936;
e-mail: hardy.limeback@utoronto.ca

http://www.fluoride-journal.com
http://www.SaveTeeth.org
http://www.cadvision.com/fluoride
http://www.sonic.net/~kryptox/fluoride.htm

DECLINE IN TOOTH DECAY NOT ATTRIBUTABLE TO WATER FLUORIDATION

The decline in tooth decay in 12 year old children over periods of up to 20 years is greater in four non-fluoridated European countries than in the Republic of Ireland, where two thirds of the country is fluoridated.

Also there are fewer decayed teeth in these non-fluoridated countries in the 1990s than in the fluoridated Republic of Ireland.

Data from the World Health Organisation, Non Communicable Disease Division, shows that the Republic of Ireland, by far the most fluoridated country at 66% runs sixth place behind four countries with no fluoridation and one with 10% fluoridation.

The Table clearly demonstrates that the decline in tooth decay is NOT attributable to water fluoridation.

Comparison of Decayed, Missing and Filled Teeth (DMFT) in 12-year-olds in European Countries compared with the Republic of Ireland.

(Source: World Health Organisation, Non-Communicable Disease Division)

	Country	DMFT	Year	DMFT	Year	Decline in DMFT %	Comment
1	Finland	7.5	1975	1.2	1991	84	No Fluoridation
2	Denmark	6.4	1978	1.3	1992	80	No Fluoridation
3	UK (GB&NI)	4.7	1973	1.4	1993	70	10% Fluoridation
4	Sweden	6.3	1977	1.5	1994	76	No Fluoridation
5	Netherlands	6.5-8.2	1974	1.7	1991		No Fluoridation
6	Rep. of Ireland	5.4	1972	1.9	1992	65	66% Fluoridation
7	Switzerland	2.3-9.9	1963-75	2.0	1987-89		One city Fluoridated
8	France	3.5	1975	2.1	1993	40	No Fluoridation
9	Norway	8.4	1973	2.3	1991	70	No Fluoridation
10	Spain	1.9	1968-69	2.3	1993	+21	1% Fluoridation
11	Germany	6.0	1973	2.5(GDR*)	1994	58	No Fluoridation *(*Formerly)*
				2.6(FDR*)	1994	57	No Fluoridation *(*Formerly)*
12	Belgium	3.1	1972	2.7	1991	13	No Fluoridation
13	Austria	1.0-3.5	1973	3.0	1993		No Fluoridation
14	Italy	4.0-6.9	1978-79	3.0	1985		No Fluoridation
15	Portugal	4.6	1979	3.2	1989	30	No Fluoridation

From data compiled by T.J. Moore, BSc., 1996 and published by the National Pure Water Association, U.K.

Note: As a range of DMFT is shown in Netherlands, Switzerland, Austria and Italy, the percentage decline in DMFT is not shown in the Table. However, the decline in DMFT in Netherlands is at least 74%.

DMFT = Decayed, Missing + Filled Teeth

TUCSON FINDS NO RELATION BETWEEN FLUORIDE LEVELS AND TOOTH DECAY

A study of the dental health of 26,000 elementary school children in Tucson, Arizona, concluded that there is no obvious relationship between fluoride levels in drinking water and tooth decay. (1) This startling conclusion was made in a study commissioned by the mayor and town council, who were considering switching from groundwater to Colorado River water to supply the city of 600,000. A new treatment plant would have to be built and the health department wanted the water fluoridated.

The mayor and council appointed a citizens' advisory committee to hold hearings to examine the risks and benefits of fluoridation. The committee conducted hearings, and also did their own study of the tooth decay rates in 23 schools that are now on well water. (2) Fluoride concentrations in the groundwater varied from about 0.1 ppm to over 0.8 ppm. (the so-called "optimal level" to prevent tooth decay).

The study showed how overly simplistic it is to look at fluoride levels and tooth decay, but not at other variables affecting dental health. When fluoride levels were compared with rates of tooth decay, the committee found that tooth decay increased significantly with increasing concentration of fluoride (Figure 2). About 10% of children in the school with 0.1 ppm fluoride in the water had tooth decay. Over 45% of the children in some schools with 0.8 ppm had tooth decay.

The study, however, also found a significant inverse relationship between income and tooth decay: the higher the family income, the lower the rate of tooth decay in children (Figure 3). Families with incomes of $60,000 per year had decay rates of 10% while families with the lowest incomes ($22,000 per year) had decay rates of over 45%.

(1) Letter to the editor, Cornelius Steelink, Chemical & Engineering News, July 27, 1992.
(2) Citizen's Water Advisory Committee Report, Findings and Recommendations on Fluoridation, C. Steelink, et al., June 12, 1992.

Figure 2.

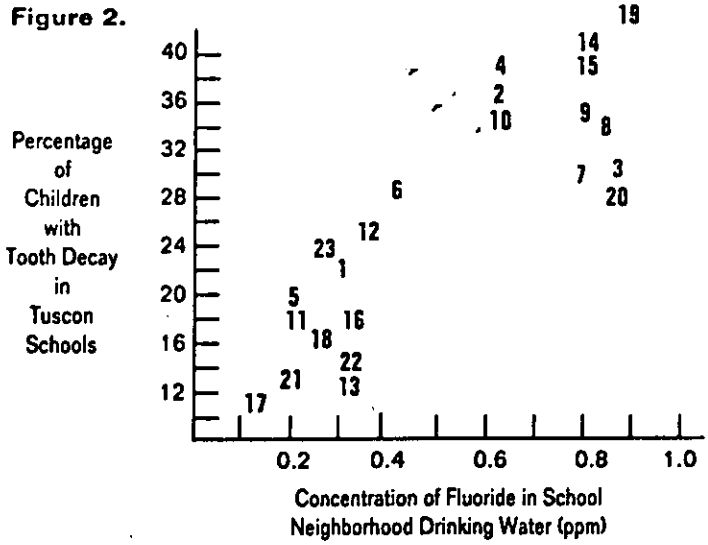
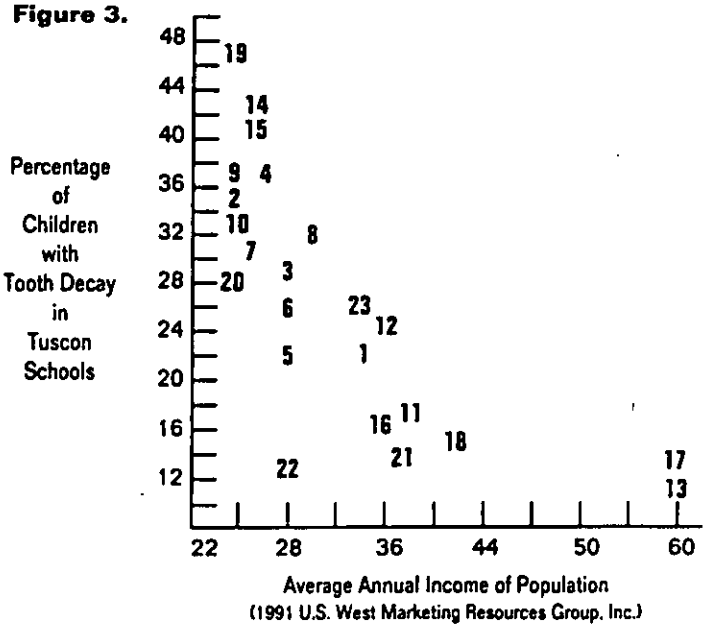


Figure 3.



KEY					
1	Bnchta	9	Roskruge	17	Van Horne
2	Davis	10	Rose	18	Schumacher
3	Grijalva	11	Steele	19	Drachman
4	Hollinger	12	Tully	20	Van Buskirk
5	Jefferson	13	Wrightston	21	Sewell
6	Miles	14	Ochoa	22	Hughes
7	Pueblo Gardens	15	Mission View	23	Erickson
8	Robison	16	Dully		

The FLUORIDE REPORT

c/o Truth About Fluoride, Inc.
P.O. Box 219
Buckeystown, MD 21717-0219
Phone/FAX 301-874-2948

Fluoridation and its Effects

It is more toxic than lead, Alar, red dye #3, and only slightly less toxic than arsenic – and it's probably in your drinking water. However, this well-known toxin isn't in the water by accident. In 1945, American municipalities began treating public water supplies with fluoride compounds in a process called fluoridation.

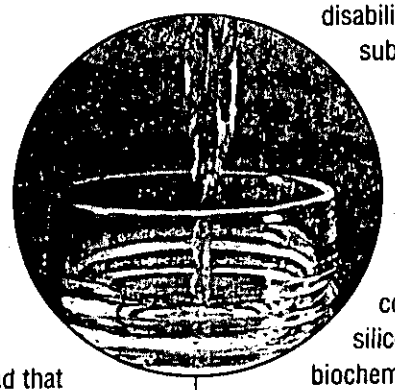
Proponents of fluoridation claim that it is a low-cost way to improve dental health. At the end of 1992, the Centers For Disease Control (CDC) estimated that 62% of the U.S. population connected to public water supplies received fluoridated water. Efforts to fluoridate water in new communities continue – but so does the debate.

Researchers have warned that intake of too much fluoride can cause skeletal and dental fluorosis (severe weakening of the bones, muscles, joints, and tooth enamel), bone fractures, and lethal poisoning. Proponents of fluoridation argue that the amount of fluoride in drinking water supplies is kept well below harmful levels. However, fluoride accumulates in human tissues – and humans ingest fluoride from many other sources. Critics contend the combined amount of fluoride from toothpaste, pesticide residues, foods and beverages, and fluoridated water may be exposing millions of Americans to potentially toxic levels of fluoride.

The Environmental Protection Agency (EPA) union, that represents about 1500 scientists, lawyers, engineers and other employees at EPA headquarters, filed a grievance in May 1999 asking that EPA provide un-fluoridated drinking water to its employees. The EPA union, known as the National Treasury Employees Union, expressed that "our opposition to drinking water fluoridation has grown, based on the scientific literature documenting the increasingly out-of-control exposures to fluoride, the lack of benefit to dental health from ingestion of fluoride and the hazards to human health from such ingestion." For governmental and other organizations to continue endorsing fluoridation and pushing for more exposure to fluoride "is irrational and irresponsible at best," according to the union's statement.

The Natural Activist (Citizens for Health)

THE NATURAL ACTIVIST



Currently, nearly all fluoridated water supplies are treated with less expensive compounds of fluosilicic acid and sodium silicofluoride. A study published in the August 1999 issue of The International Journal of Environmental Studies found that children in communities using silicofluoride compounds had significantly higher levels of lead in their blood compared with their counterparts in communities that used sodium fluoride or no fluoridation at all. Lead poisoning has been linked with higher rates of learning disabilities, hyperactivity, substance abuse and crime.

Data for the study was collected from more than 280,000 children in 30 Massachusetts communities. These results support critics' concerns that silicofluorides trigger biochemical reactions inside the body that cause increased uptake of toxic heavy metals.

The fluoridation debate continues in state and local governments. **To learn more, visit *Citizens For Health* on the web, at www.citizens.org, or call 1-800-357-2211.★**

NTEU
The National Treasury Employees Union

CHAPTER 280
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May1,1999

WHY EPA'S HEADQUARTERS UNION OF SCIENTISTS OPPOSES FLUORIDATION

The following documents why our union, formerly National Federation of Federal Employees Local 2050 and since April 1998 Chapter 280 of the National Treasury Employees Union, took the stand it did opposing fluoridation of drinking water supplies. Our union is comprised of and represents the approximately 1500 scientists, lawyers, engineers and other professional employees at EPA Headquarters here in Washington, D.C.

The union first became interested in this issue rather by accident. Like most Americans, including many physicians and dentists, most of our members had thought that fluoride's only effects were beneficial - reductions in tooth decay, etc. We too believed assurances of safety and effectiveness of water fluoridation[1].

Then, as EPA was engaged in revising its drinking water standard for fluoride in 1985, an employee came to the union with a complaint: he said he was being forced to write into the regulation a statement to the effect that EPA thought it was alright for children to have "funky" teeth. It was OK, EPA said, because it considered that condition to be only a *cosmetic* effect, not an adverse *health* effect. The reason for this EPA position was that it was under political pressure to set its health-based standard for fluoride at 4 mg/liter. At that level, EPA knew that a significant number of children develop moderate to severe dental fluorosis, but since it had deemed the effect as only cosmetic, EPA didn't have to set its health-based standard at a lower level to prevent it.

We tried to settle this ethics issue quietly, within the family, but EPA was unable or unwilling to resist external political pressure, and we took the fight public with a union *amicus curiae* brief in a lawsuit filed against EPA by a public interest group. The union has published

[1]For a history of how drinking water fluoridation began, see "Fluoride, Teeth and the Atomic Bomb", by investigative reporters Joel Griffiths and Chris Bryson, available on-line at http://www.rvi.net/~fluoride

on this initial involvement period in detail.\1

Since then our opposition to drinking water fluoridation has grown, based on the scientific literature documenting the increasingly out-of-control exposures to fluoride, the lack of benefit to dental health from ingestion of fluoride and the hazards to human health from such ingestion. These hazards include acute toxic hazard, such as to people with impaired kidney function, as well as chronic toxic hazards of gene mutations, cancer, reproductive effects, neurotoxicity, bone pathology and dental fluorosis. First, a review of recent neurotoxicity research results.

In 1995, Mullenix and co-workers \2 showed that rats given fluoride in drinking water at levels that give rise to plasma fluoride concentrations in the range seen in humans suffer neurotoxic effects that vary according to when the rats were given the fluoride - as adult animals, as young animals, or through the placenta before birth. Those exposed before birth were born hyperactive and remained so throughout their lives. Those exposed as young or adult animals displayed depressed activity. Then in 1998, Guan and co-workers \3 gave doses similar to those used by the Mullenix research group to try to understand the mechanism(s) underlying the effects seen by the Mullenix group. Guan's group found that several key chemicals in the brain - those that form the membrane of brain cells - were substantially depleted in rats given fluoride, as compared to those who did not get fluoride.

Another 1998 publication by Varner, Jensen and others \4 reported on the brain- and kidney damaging effects in rats that were given fluoride in drinking water at the same level deemed "optimal" by pro-fluoridation groups, namely 1 part per million (1 ppm). Even more pronounced damage was seen in animals that got the fluoride in conjunction with aluminum. These results are especially disturbing because of the low dose level of fluoride that shows the toxic effect in rats - rats are more resistant to fluoride than humans. This latter statement is based on Mullenix's finding that it takes substantially more fluoride in the drinking water of rats than of humans to reach the same fluoride level in plasma. It is the level in plasma that determines how much fluoride is "seen" by particular tissues in the body. So when rats get 1 ppm in drinking water, their brains and

kidneys are exposed to much less fluoride than humans getting 1 ppm, yet they are experiencing toxic effects. Thus we are compelled to consider the likelihood that humans are experiencing damage to their brains and kidneys at the "optimal" level of 1 ppm.

In support of this concern are results from two epidemiology studies from China\5,\6 that show decreases in I.Q. in children who get more fluoride than the control groups of children in each study. These decreases are about 5 to 10 I.Q. points in children aged 8 to 13 years.

Another troubling brain effect has recently surfaced: fluoride's interference with the function of the brain's pineal gland. The pineal gland produces melatonin which, among other roles, mediates the body's internal clock, doing such things as governing the onset of puberty. Jennifer Luke\7 has shown that fluoride accumulates in the pineal gland and inhibits its production of melatonin. She showed in test animals that this inhibition causes an earlier onset of sexual maturity, an effect reported in humans as well in 1956, as part of the Kingston/Newburgh study, which is discussed below. In fluoridated Newburgh, young girls experienced earlier onset of menstruation (on average, by six months) than girls in non-fluoridated Kingston \8.

From a risk assessment perspective, all these brain effect data are particularly compelling and disturbing because they are convergent.

We looked at the cancer data with alarm as well. There are epidemiology studies that are convergent with whole-animal and single-cell studies (dealing with the cancer hazard), just as the neurotoxicity research just mentioned all points in the same direction. EPA fired the Office of Drinking Water's chief toxicologist, Dr. William Marcus, who also was our local union's treasurer at the time, for refusing to remain silent on the cancer risk issue\9 . The judge who heard the lawsuit he brought against EPA over the firing made that finding - that EPA fired him over his fluoride work and not for the phony reason put forward by EPA management at his dismissal. Dr. Marcus won his lawsuit and is again at work at EPA. Documentation is available on request.

The type of cancer of particular concern with fluoride, although not the only type, is osteosarcoma, especially in males. The National Toxicology Program conducted a two-year study \10 in which rats and mice were given sodium fluoride in drinking water. The positive result of that study (in which malignancies in tissues other than bone were also observed), particularly in male rats, is convergent with a host of data from tests showing fluoride's ability to cause mutations (a principal "trigger" mechanism for inducing a cell to become cancerous) e.g.\11a, b, c, d and data showing increases in osteosarcomas in young men in New Jersey \12 , Washington and Iowa \13 based on their drinking fluoridated water. It was his analysis, repeated statements about all these and other incriminating cancer data, and his requests for an independent, unbiased evaluation of them that got Dr. Marcus fired.

Bone pathology other than cancer is a concern as well. An excellent review of this issue was published by Diesendorf et al. in 1997 \14. Five epidemiology studies have shown a higher rate of hip fractures in fluoridated vs. non-fluoridated communities. \15a, b, c, d, e. Crippling skeletal fluorosis was the endpoint used by EPA to set its primary drinking water standard in 1986, and the ethical deficiencies in that standard setting process prompted our union to join the Natural Resources Defense Council in opposing the standard in court, as mentioned above.

Regarding the effectiveness of fluoride in reducing dental cavities, there has not been any double-blind study of fluoride's effectiveness as a caries preventative. There have been many, many small scale, selective publications on this issue that proponents cite to justify fluoridation, but the largest and most comprehensive study, one done by dentists trained by the National Institute of Dental Research, on over 39,000 school children aged 5-17 years, shows no significant differences (in terms of decayed, missing and filled teeth) among caries incidences in fluoridated, non-fluoridated and partially fluoridated communities.\16. The latest publication \17 on the fifty-year fluoridation experiment in two New York cities, Newburgh and Kingston, shows the same thing. The only significant difference in dental health between the two communities as a whole is that fluoridated Newburgh, N.Y. shows about twice the incidence of dental fluorosis (the first, visible sign of fluoride chronic toxicity) as seen in

non-fluoridated Kingston.

John Colquhoun's publication on this point of efficacy is especially important\18. Dr. Colquhoun was Principal Dental Officer for Auckland, the largest city in New Zealand, and a staunch supporter of fluoridation - until he was given the task of looking at the world-wide data on fluoridation's effectiveness in preventing cavities. The paper is titled, "Why I changed My Mind About Water Fluoridation." In it Colquhoun provides details on how data were manipulated to support fluoridation in English speaking countries, especially the U.S. and New Zealand. This paper explains why an ethical public health professional was compelled to do a 180 degree turn on fluoridation.

Further on the point of the tide turning against drinking water fluoridation, statements are now coming from other dentists in the pro-fluoride camp who are starting to warn that topical fluoride (e.g. fluoride in tooth paste) is the only significantly beneficial way in which that substance affects dental health \19, \20, \21. However, if the concentrations of fluoride in the oral cavity are sufficient to inhibit bacterial enzymes and cause other bacteriostatic effects, then those concentrations are also capable of producing adverse effects in mammalian tissue, which likewise relies on enzyme systems. This statement is based not only on common sense, but also on results of mutation studies which show that fluoride can cause gene mutations in mammalian and lower order tissues at fluoride concentrations estimated to be present in the mouth from fluoridated tooth paste\22. Further, there were tumors of the oral cavity seen in the NTP cancer study mentioned above, further strengthening concern over the toxicity of topically applied fluoride.

In any event, a person can choose whether to use fluoridated tooth paste or not (although finding non-fluoridated kinds is getting harder and harder), but one cannot avoid fluoride when it is put into the public water supplies.

So, in addition to our concern over the toxicity of fluoride, we note the uncontrolled - and apparently uncontrollable - exposures to fluoride that are occurring nationwide via drinking water, processed

foods, fluoride pesticide residues and dental care products. A recent report in the lay media\23, that, according to the Centers for Disease Control, at least 22 percent of America's children now have dental fluorosis, is just one indication of this uncontrolled, excess exposure. The finding of nearly 12 percent incidence of dental fluorosis among children in un-fluoridated Kingston New York\17 is another. For governmental and other organizations to continue to push for *more* exposure in the face of current levels of over-exposure coupled with an increasing crescendo of adverse toxicity findings is irrational and irresponsible at best.

Thus, we took the stand that a policy which makes the public water supply a vehicle for disseminating this toxic and prophylactically useless (via ingestion, at any rate) substance is wrong.

We have also taken a direct step to protect the employees we represent from the risks of drinking fluoridated water. We applied EPA's risk control methodology, the Reference Dose, to the recent neurotoxicity data. The Reference Dose is the daily dose, expressed in milligrams of chemical per kilogram of body weight, that a person can receive over the long term with reasonable assurance of safety from adverse effects. Application of this methodology to the Varner et al.\4 data leads to a Reference Dose for fluoride of 0.000007 mg/kg-day. Persons who drink about one quart of fluoridated water from the public drinking water supply of the District of Columbia while at work receive about 0.001mg/kg-day from that source alone. This amount of fluoride is more than 100 times the Reference Dose. On the basis of these results the union filed a grievance, asking that EPA provide un-fluoridated drinking water to its employees.

The implication for the general public of these calculations is clear. Recent, peer-reviewed toxicity data, when applied to EPA's standard method for controlling risks from toxic chemicals, require an immediate halt to the use of the nation's drinking water reservoirs as disposal sites for the toxic waste of the phosphate fertilizer industry\24.

This document was prepared on behalf of the National Treasury Employees Union Chapter 280 by Chapter Senior Vice-President J. William Hirzy, Ph.D. For more information please call Dr. Hirzy at 202-260-4683. His E-mail address is <hirzy.john@epa.gov>

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NEWS RELEASE

April 16, 1998

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Research Links Low Levels of Fluoride and Aluminum to Alzheimer's and Kidney Damage

In a study just published in the peer-reviewed journal *Brain Research* the presence of low levels of fluoride in the drinking water of test animals, equal to the amount of elemental fluorine found in fluoridated water, caused damage to the tissue of the brain that the authors identified as similar to the pathological changes found in humans with Alzheimer's and other forms of dementia.

While the purpose of this study was to assess the factors that enhance or inhibit the bioavailability of aluminum and its effects on the nervous system, the study looked at the effects of aluminum-fluoride and sodium-fluoride separately.

The authors report, "Histological evidence of glomerular distortion and other signs of kidney disorder were found in animals in both the aluminum-fluoride and sodium fluoride groups..."

"While the small amount of aluminum-fluoride in the drinking water of rats required for neurotoxic effects is surprising, perhaps even more surprising are the neurological results of the sodium-fluoride at the dose given in the present study (2.1 ppm). {the amount used to achieve 1 ppm of elemental fluorine used in fluoridation}.

"Fluoride has diverse actions on a variety of cellular and physiological functions, including the inhibition of a variety of enzymes, a corrosive action in acid mediums, hypocalcemia, hyperkalemia, and possibly cerebral impairment."

The authors summarize, "Chronic administration of aluminum-fluoride and sodium-fluoride in the drinking water of rats resulted in distinct morphological alterations of the brain, including the effects on neurons and cerebrovasculature."

While there are numerous studies linking fluoride to increased risk of hip fracture, cancer, genetic damage, bone pathology, and dental fluorosis, as identified in July 1997 by the union which consists of all of the scientists and other professionals at the Environmental Protection Agency, Washington, D.C., this study adds further definition to a series of recent studies that have illuminated fluoride's adverse neurological impact and have anticipated the results from this research that focuses on the hippocampus region of the brain, and interaction with other neurotoxins.

A previous study by Mullenix, et al. in *Neurotoxicology and Teratology*, 1995, documents abnormal behavioral responses by animals exposed to fluoride at various stages of gestation, which resulted in the exposed animals exhibiting either permanent hyperactivity if exposed prenatally, or what layman refer to as "the rat version of couch potato" if exposed after birth.

In "Psychopharmacology of Fluoride: A Review", 1994, the author A. Spittle concludes, "There would appear to be some evidence that chronic exposure to fluoride may be associated with cerebral impairment affecting particularly the concentration and memory of some individuals. These symptoms are reminiscent of those seen in the chronic fatigue syndrome."

In the "Effect of Fluoride on the Physiology of the Pineal Gland", 1994, the author, J. A. Luke suggests that fluoride also effects the gland in the brain that produces melatonin, which has been established as critical to those people suffering from sleep disorders.

The follow-up question should be obvious: In light of this scientific evidence, is it in the best interest of our nation to continue a public policy __ a public policy that has already been rejected by 98% of Europe __ that forces each man, woman, and child to ingest a known cumulative neurotoxin, which is added to our water supply with no control over total intake from all sources, or variances in susceptibility?

The 1996 Safe Drinking Water Act requires that each chemical that appears in our drinking water be re-assessed with a new criteria for assuring the safety of drinking water for the most susceptible segments of our population. The coming days will reveal whether the agencies that have been established to protect our health will act.

30-30-30

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AMERICA:OVER-DOSED ON FLUORIDE

Compiled by Lynn Landes and Maria Bechis, Chair & Vice Chair, Fluoride Committee , PA Sierra Club, March 14, 1997

The widespread and uncontrolled use of fluoride in our water, food, juices, soft drinks, beverages, and dental products is causing pervasive over-exposure to fluoride in the U.S. population. Most developed countries have banned fluoride in water. Today, over 60% of the United States population drink fluoridated water. In general, Americans are not warned of the risks of fluoride. Food and beverage labels do not include fluoride concentrations.

Fluoride is the only chemical added to U.S. municipal water that is used to mass medicate, rather than to render water safe to drink. It is not an essential nutrient. It has never received "FDA Approval"(U.S. Food and Drug Administration) as safe or effective. It is listed as an "unapproved new drug." Although fluoride can occur naturally in some water supplies, the type of fluoride added to water is a hazardous waste of the aluminum, uranium, and phosphate fertilizer industries .

For two consecutive years, 1995 & 1996, **The Journal of the American Dental Association (JADA)** has published studies reporting on pervasive over-exposure to fluoride due to ***"the widespread use of fluoridated water, fluoride dentifrice, dietary fluoride supplements and other forms of fluoride...[There is] an increased prevalence of dental fluorosis, ranging from about 15% to 65% in fluoridated areas and 5% to 40% in non-fluoridated areas in North America."*** The 1996 study warned parents to limit their children's intake of juices due to excessive fluoride content.

***Fluorosis* is symptomatic of an over-exposure to fluoride throughout the body.** Its visible characteristics are the discoloration or pitting of the teeth. White flecks in the teeth may also occur. *Fluorosis* can lead to tooth decay. FDA's claim that *fluorosis* is only a "cosmetic" effect is unsubstantiated. **Fluoride accumulates throughout the body, over an individual's lifetime.** It effects all age groups with both long and short-term harmful health consequences.

In 1993, U.S. Dept. of Health and Human Services (HHS) stated in its Toxicological Profile on fluoride (TP 91/17), ***"Existing data indicate that subsets of the population may be unusually susceptible to the toxic effects of fluoride and its compounds. These populations include the elderly, people with deficiencies of calcium, magnesium and/or vitamin C, and people with cardiovascular and kidney problems ...Postmenopausal women and elderly men in fluoridated communities may also be at increased risk of fractures."***

Is there a margin of safety for exposure to fluoride? In the 1940's, when *fluoridation* of municipal water began, the ***"optimal"*** level of exposure to fluoride for *dental benefit* was determined to be 1 milligram/day. Even at the 1 mg/day exposure level, 10% of the population was expected to *suffer* ***dental fluorosis.*** It was estimated that individuals drank 1 liter of water per day. At that time, other sources of fluoride were scarce.

In 1986, the EPA set new ***"maximum contaminant levels (MCLs)"*** for fluoride. Above 2 mg/liter "children are likely to develop objectionable ***dental fluorosis"*** and parents must be officially notified. Above 4 mg/liter, individuals are at risk of developing ***"crippling skeletal fluorosis".*** It is against federal law to fluoridate water above 4 mg/liter.

Below is a summary and analysis of a HHS table that estimates ***fluoride exposure levels from food, beverages, toothpaste, and mouthwash*** (U.S. Dept. of Health and Human Services, *Review of Fluoride Benefits and Risks*, 1991).

Fluoride Concentration in Drinking Water		Fluoride Intake	% Over 1 mg "Optimal" Dose
Unfluoridated Communities	< 0.3 mg/L	0.88 - 2.20 mg/day	**as much as 120%**
"Optimally" Fluoridated	0.7-1.2 mg/L	*1.58* - 6.60 mg/day	**as much as 560%**
Fluoridated communities	> 2.0 mg/L	2.10- > 7.05 mg/day	**possible > 605%**

(Table does not include Fluoride supplements, pharmaceuticals, emissions, and workplace exposures to fluoride)

RECOMMENDATION: The FDA should be required to put fluoride through the rigorous "controlled studies" necessary for "FDA Approval." If fluoride gains FDA approval, then it should be treated as a *prescribed medication* in order to protect individuals from over-exposure.

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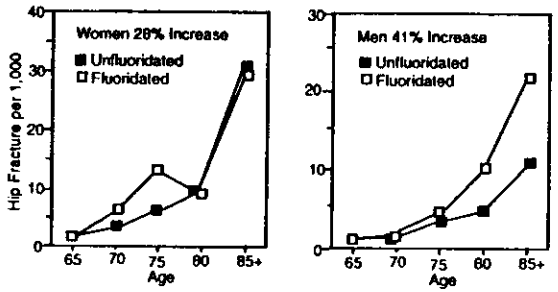
Important Fluoride Facts

Fluoride is cancer-causing in rats, mice and humans.

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2) *Sodium Fluoride: individual animal tumor pathology table [rats]*, Battelle Memorial Institute, Feb. 23, 1989
3) *Sodium Fluoride: individual animal tumor pathology table [mice]*, Battelle Memorial Institute, April 11, 1989
4) Lancet 36, page 737 (1990)
5) *Review of Fluoride: Benefits and Risks*, U. S. Public Health Service, pages F1-F7 (1991)
6) *Fluoride* volume 26, pages 83-96 (1992)
7) *A Brief Report on the Association of Drinking Water Fluoridation and the Incidence of Osteosarcoma among Young Males*, New Jersey Department of Health, November 1992
8) *Fluoride, the Aging Factor*, Health Action Press, pages 72-90 (1993)

Hip fracture rates are much higher in people residing in fluoridated communities.

Graph from reference 3 below Daineilson et al.



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2) *Journal of the American Medical Association* volume 266, pages 513-514 (1991)
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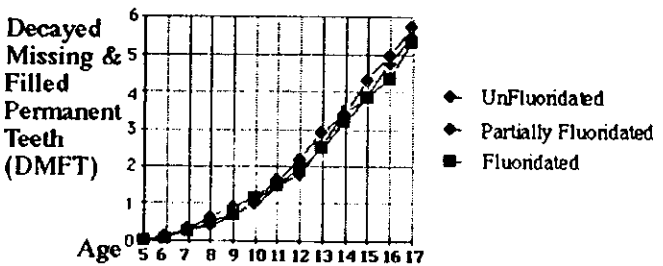
The U.S. National Research Council admits that dental fluorosis (fluoride poisoning of the teeth) affects from 8% to 51% of the children drinking fluoridated water.

1) *Science* volume 217, pages 26-30 (1982)
2) *Journal of the American Dental Association* volume 108, pages 56-59 (1984)
3) *Journal of Public Health Dentistry* volume 46, pages 184-187(1986)
4) *Health Effects of Ingested Fluoride*, National Research Council, page 37 (1993)

Recent large-scale studies show no difference in decay rates of permanent teeth in fluoridated and non fluoridated areas.

1) *Community Health Studies* volume 11, pages 85-90 (1987)
2) *Journal of the Canadian Dental Association* volume 53, pages 763-765 (1987)
3) *Fluoride* volume 23, pages 55-67 (1990)

United States 1987 Fluoridation Survey found NO DIFFERENCE in Tooth Decay



Fluoride tablets and drops are not approved by the U.S. Food and Drug Administration as safe or effective.

1) Letter from Frank R. Fazzari, Chief, Prescription Drug Compliance, Food and Drug Administration to New Jersey Assemblyman John Kelly (June 8, 1993)
2) *Preventing Tooth Decay: Results from a Four-Year National Study*, Robert Wood-Johnson Foundation, Special Report number 2/1983, 18p
.3) *Community Dentistry and Oral Epidemiology*, volume 19, pages 88-92 (1991)

Fluoride is more toxic than lead, and even in minute doses, accumulates in and is damaging to brain/mind development of children; i.e. produces abnormal behavior in animals and reduces IQ in humans.

1) Mullenix, Phyllis et. al Neurotoxicity of Sodium Fluoride in Rats, *Neurotoxicology and Teratology*, Vol. 17, No. 2, pp. 169-177, 1995
2) Li, XS; Zhi, JL; Gao, RO Effects of fluoride exposure on intelligence in children, *Fluoride* 28:4, pp. 189-192 (1995)
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FLUORIDE ISSUES
http://www.sonic.net/~monty/fluoride.htm

73 Mirror Street
Manchester, NH 03104
February 23, 2000

Rick Trombly Chairman
Members of the Public Affairs Committee

Re: Senate Bill 312 - An Act Relative to Fluoride

Dear Chairman Trombly and Members of the Committee:

Please consider killing Senate Bill 312 requiring a 5% vote of the population in order to add fluoride to our water supplies in New Hampshire. There are very serious issues and concerns regarding the toxicity of ingesting this poisonous substance amongst the scientific community and our citizens. A few of them are mentioned below.

During October 1999, I had a telephone conversation with Dr. William Hirzey, Vice President of the EPA Union of Scientists in Washington, DC. The Union's members consist of 1500 *cream-of-the-crop"* scientists, engineers and lawyers who *strongly oppose* adding fluoride to drinking water. Dr. Hirzey said, **" Fluoride is a poison and should not be added to our drinking water. If anyone wants fluoride they can get it by prescription from their doctor or their dentist".**

Dr. Phyllis Mullinex, Ph.D., toxicologist, Boston Children's Hospital was hired by the Forsyth Dental School at Harvard University to research fluoride. Dr. Mullinex was appalled at her findings – **fluoride breaks through the blood/brain barrier, causing ADD, ADHD and learning disabilities in children, which are increasing in epidemic proportions**. Dr. Mullinex said the amount of fluoride which is considered "safe" is 1 PPM per day, which is equivalent to the size of a pea of toothpaste on your toothbrush. She added that children under 6 should ***never,*** use fluoridated toothpaste or drink fluoridated water. At a young age, children have not developed their reflex to spit out, they swallow their toothpaste , which poses an imminent danger to their health.

David Hess, Chairman
Members of the Municipal and County Government Committee
Re: Senate Bill 312

February 23, 2000
Page 2 of 2

Fluoride is a toxic waste product of aluminum and phosphate fertilizer companies and is classified as "hazardous waste". Their disposal fee is $1.40 per gallon as hazardous waste, or they can sell it for 35 cents per gallon to the unsuspecting public. It's purely economics - $1.75 profit to market a gallon of their poison.

Let's not let their profit motive override our "freedom of choice" in the very personal area of what we may or may not want to consume. I choose not to be medicated with a poison more toxic than lead through my drinking water.

Public drinking water was never intended to be a vehicle for delivering poisonous substances to the citizens of any community. If a percentage of our citizens have backaches, migraines or arthritis, should we drug our citizens through their drinking water with medications which address those ailments?

Manchester lost to fluoridation by a very narrow margin of only 680 votes. Should the rest of us be held hostage by being denied our freedom of choice regarding the integrity of the water we drink, cook with, and bathe?

Your consideration to kill this bill would be appreciated..

Respectfully submitted,

Katherine E. Bantis

Katherine E. Bantis
73 Mirror Street
Manchester, NH 03104

P. S. For your reference -- website:
www.cadvision.com/fluoride/index.htm

Special 16-page Report

Fluorides and the Environment

Contents

Editorial: Why Fluoride Is An Environmental Issue.....1
Gar Smith, editor, Earth Island Journal

Clear and Present Danger.....3
Bob Woffinden, London Guardian

Fluoridation and Hip Fractures.....7
John R. Lee, MD

The Impact of Fluoridation on Salmon in the Northwest US and British Columbia.....8
Richard G. Foulkes, MD & Anne C. Anderson, RPN

EPA Whistleblowers on Fluoride.....11
- *William L. Marcus, Ph.D*
- *Robert Carton, Ph.D*

Fluoride: The Phosphate Connection...12
George C. Glasser

The Effects of Fluorides on Plants.....14
Alan Davison and Leonard Weinstein

Resources..... 16
- *Organizations* - *Websites*
- *Books* - *Fluoride-free Toothpaste*

This special section of *Earth Island Journal* was prepared to coincide with the 22nd meeting of the **International Society for Fluoride Research** on August 24-27 in Bellingham, Washington. For information on the conferencce, contact Prof. Ming-Ho Yu. Center for Environmental Science, Western Washington University, Bellingham, WA 98225-9181, (360) 650-3676, fax: 650-7284.

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An example of dental fluorosis. Dental fluorosis is found in persons who were exposed to fluoride during the formation of their permanent teeth. It is the first visible sign of fluorosis.

Why Fluoride Is an Environmental Issue

by Gar Smith

While fluoride compounds occur naturally in some water supplies, the past 50 years have seen a dramatic – and troubling – increase in the volume of man-made industrial fluoride compounds expelled into our water and air.

Pouring fluorides into water supplies has generated controversy and opposition for five contentious decades. Meanwhile, little attention has been paid to the fluoride pollution that pours into the atmosphere from thousands of industrial plants around the world.

Fluoride pollution is not a new problem. As the two reports cited below show, concerns about the dangers of fluoride contamination were well known 25 years ago.

Fluoride Pollution: In Our Water, Our Air and Our Food

"Fluorides are pollutants with considerable potential for producing ecological damage," Edward Groth III warned in an article in the April/May 1975 issue of *Environment*. By the end of the 1960s, the EPA estimated that 155,000 tons of fluoride (calculated as hydrogen fluoride) was pouring into the atmosphere each year from aluminum smelters, phosphate processing, coal combustion and the manufacturing of steel, bricks and glass products.

Several types of coniferous forests are vulnerable to fluoride damage at one part per billion (ppb) or less. Because fluoride does not break-down, it slowly accumulates in the environment. As early as 1971, the National Research Council warned that fluoride pollution from US industry (in concentrations as low as 1 ppb) had caused serious damage to plants and posed a threat to livestock as far as 20 miles downwind of the emission points. Some grasses consumed by livestock have been found to contain 200,000 times more fluoride than in the ambient air.

A 1971 National Park Service study of the area downwind of an Anaconda aluminum company smelter and a phosphate plant found excessive elevations of fluoride in pines, firs, grasses, shrubs, herbs and hay. Honey bees had the highest fluoride levels among insects. Wildlife, from birds and ground squirrels to larger mammal predators, had fluoride levels that reached as high as 13,333 parts per million (ppm).

{CONTINUED ON NEXT PAGE}

Fluorides and the Environment

To date..., the USDA has manifested no official concern about the influence of fluoric air pollution on any part of the nation's produce."

– Jerard and Patrick, 1973

Foraging on grasses containing 30 to 40 ppm of fluoride can be toxic to cattle. Mussels, oysters, crabs, shrimp and prawns have been killed by aquatic fluoride pollution.

Groth noted that some plants can synthesize organic fluoride compounds like fluoroacetates which *Fluoride Quarterly Reports* identified as "among the most poisonous substances known." Fluoro-organic residues have turned up in soybeans, lettuce, tea and oatmeal.

Airborne pollution dusts food crops with sodium fluoroacetate (which is sold commercially as Compound 1080, a deadly rodenticide). Groth observed that "a general buildup of fluoro-organic compounds in natural food webs" risks severe ecological damage.

Groth also noted that "fluoride may interact synergistically with other environmental pollutants to produce greater effects than either pollutant could cause were it acting alone." This synergistic "boost" has been demonstrated between fluoride and copper and between airborne hydrogen fluoride and sulfur dioxide.

Fluoridating the water for 100 million people requires dumping approximately 20,000 tons of fluoride into municipal reservoirs each year. About half of the ingested fluoride winds up stored in human teeth and bones. The rest returns to the environment via the household toilet.

A 1964 scientific study of fluoride levels in sewage in 56 California cities "demonstrated that domestic sewage already contained fluoride over and above that naturally present in water or added for dental health," Groth reported.

The study discovered that even residents in cities without fluoridated water were consuming so much excess fluoride in their foods and beverages that they were flushing "significant fluoride into receiving streams in their sewage."

The "Unpublicized Pollutant"

In a 1973 report in the *International Journal of Environmental Studies*, researchers Elise Jerard and J.B. Patrick identified fluoride as "a highly unpublicized pollutant" that the President's Science Advisory Committee once classified as a "highest priority" contaminant.

"During the past three decades, fluoride discharges from fossil fuel combustion – and more than 50 types of major industries – have steadily increased the burden of airborne contamination," Jerard and Patrick wrote. "Invisible but potent, these emissions in both gaseous and particulate form, with their repertoire of ecological effects, pollute rain, soil, plant life and animals, surface waters [and]... both directly and through interactions of this cycle – man."

Jerard and Patrick reported that "airborne fluoride accumulates in plants and can concentrate in the leafy portions by a factor of 2- to 260-fold without any visible sign of the contamination."

Jerard and Patrick reported that in some regions of Florida, "25,000 acres of citrus trees have been destroyed" within 50 miles of the phosphate processing plants and apparently "normal" specimens of orange juice were found to contain 3-12 ppm of fluoride.

In 1966, Professor of Atmospheric Sanitation Morris Katz noted that, while most air pollutants are measured in parts per million, atmospheric fluoride must be monitored in parts per *billion*. Katz warned that prolonged exposure to airborne fluoride concentrations of less than 1 ppb "may create a hazard [since].... fluorides are more than 100 times more toxic than sulfur dioxide."

In 1969, a massive fish kill that turned Placentia Bay, Newfoundland into "a biological desert" was traced to fluoride effluent from a plant that produced elemental phosphorus for metal finishing and consumer goods. Some 22,800 pounds of fluoride effluent poured into the bay each day, primarily in the form of hydrofluosilicic acid – the same substance used to fluoridate city water supplies.

According to US *Department of Agriculture Handbook No. 380*: "Airborne fluorides have caused more worldwide damage to domestic animals than any other air pollutant." The handbook's list of fluorosis symptoms included: "dental mottling, respiratory distress, stiffness in knees or elbows or both" and concluded with the observation that "Man is much more sensitive than domestic animals to F [fluoride] intoxication."

In a 1970 report on "The Effects of Fluorides on Man," Harold C. Hodge (*See* Earth Island Journal, *Winter, Spring '98*) listed some of the symptoms of fluoride poisoning found in industrial workers: osteosclerosis, ossifications of ligamentous attachments, sinus trouble, perforation of the nasal septum, chest pains, coughs, thyroid disorders, anemia, dizziness, weakness and nausea.

Fluoride in the Food Chain

Twenty-five years ago, Jerard and Patrick issued an alarm about the growing presence of fluorides in the food chain. The researchers listed numerous examples of severe fluoride pollution on foods ranging from spinach, lettuce and tubers to the milk and meat of cows. In addition to contamination from atmospheric fluorides, Jerard and Patrick discovered that farm produce also picks up fluoride pollution from phosphate fertilizers and fluoride-bearing pesticides applied to apples, pears, celery and raspberries.

Coal-burning electric powerplants and the petroleum industry are major sources of urban fluoride pollution. Jerard and Patrick also noted a "considerable fluoride content, up to 16% or more, in a number of important drugs, including tranquilizers, corticosteroids, some preparations used in cancer therapy and anesthetics."

"Fluoride-emitting factories, once scattered with wide exclusion zones, have proliferated and become more closely concentrated," Jerard and Patrick observed in 1973. "Foods grown in fluoride-polluted regions are distributed over great distances... Foods and beverages processed with fluoridated water are mass-distributed."

Each liter of fluoridated water, at 1 ppm concentration, contains a one milligram dose of fluoride — the so-called "recommended" daily amount. Water, however, is only one source of ingested fluoride. In 1991, the US Public Health Service estimated that the total daily intake for a 110-pound adult from all sources in an "optimally" fluoridated city, ranged as high as 6.6 milligrams. In 1997, the EPA estimated that Americans were ingesting nearly five times more fluoride than in 1971 — from food and drinks alone.

Children are more at risk of over-exposure than adults. A 1991 study by the *Journal of Clinical Pediatric Dentistry* found that every sample of bottled fruit beverages tested contained fluoride. One sample of Gerber's grape juice contained 6.8 ppm – 70% higher that the EPA's Maximum Contaminant Level of 4 ppm for fluoride in drinking water and 240% higher than the EPA's 2 ppm standard set to protect against dental fluorosis.

Currently there is no federal program to detect or label the fluoride content in US foods or drinks. We hope that this special report will help to encourage a fundamental review of the health and ecological impacts of fluorides in the environment.

"To date..., fluoride has received relatively little attention as a contaminant of the ecosystem."

– Edward Groth III, 1975

A Clear and Present Danger

by Bob Woffinden
The London Guardian

Since childhood we have been told that fluoride is good for our teeth. It is added to the water supply of many regions for just that reason. Our children brush regularly with great quantities of it. But fluoride toxicity has been linked to bone disease, infant mortality and brain damage. And the line between safety and danger, purity and poison is a thin one.

Fluoride first entered the public consciousness as part of a post-war new dawn, when science would unerringly lead the way to a better life for all. It came to assume almost magical properties as a wholly salutary chemical. Today, every science textbook and encyclopaedia refers to its capacity for inhibiting dental decay, especially among children.

The experts told us that fluoride both helped the remineralisation of enamel (the outer layer of the teeth) and also prevented the bacteria in dental plaque from producing the acid that causes decay. As the dental authorities became ever more zealous in the promotion of fluoride, it was delivered to the population, either through the fluoridation of the public water supply, or by fluoride in toothpaste and other dental supplements.

Fluoridation was essentially a socialist health policy. In the phrase often cited by dental professionals, it gave poor kids rich teeth.

There were those who counselled caution, on the grounds that fluoride is a cumulative poison; and that, in any case, rates of dental decay were also falling dramatically in countries that did not espouse its use. But in Britain, the concept of fluoride as a supremely benign aid was instilled in generations of dental students.

The idea was an American import. As a whole, Europe has never been persuaded. Only about 2 percent of Europe has artificially fluoridated water supplies, and virtually all of that is accounted for by Britain (10 percent of the country) and Ireland (66 percent). In England, Birmingham fluoridated in 1964; Britain's second city was desperate to be first at something.

Yet, on one obvious level, the fluoridation of the public water supply is an absurd concept. We all know what happens to the nation's water: about one-third is lost in leakages before it ever gets anywhere; seven-eighths of the rest is used by industry, and much of the remainder literally goes straight down the toilet. The proportion that reaches our teeth is tiny indeed.

Some industries — notably those dealing with photographic or X-Ray equipment — need first to remove the fluoride. People on dialysis cannot receive fluoridated water. Mothers with newly-born babies are best advised not to make up baby formula with fluoridated tap-water.

Assuming, for the moment, that fluoride actually achieves everything that is claimed for it with respect to teeth, how do those fluoride ions know that, when they come cascading into the body, they must strengthen the resistance of teeth to decay, but do nothing else at all. Isn't it common sense to assume that if teeth are being affected, then so are other parts of the body?



Gar Smith

If children are not supposed to swallow fluoride toothpastes, why are they flavored to taste like strawberry and watermelon? Wouldn't the kids be safer if toothpastes tasted like broccoli?

Of all the fluoride taken into the body, about 50 percent is excreted. The rest remains. In its major 1993 report, "Health Effects of Ingested Fluoride," the US National Research Council (NRC) pointed out that, "Half the fluoride [taken in by the body] becomes associated with teeth and bones within 24 hours of ingestion. In growing children, even more of the fluoride is retained." For many years, dental authorities have confidently asserted that whereas fluoride's impact on the teeth is striking and wonderfully beneficial, its impact on bones, even over a lifetime, is non-existent. There is now increasing evidence that this is exactly what it seems: an illogical proposition.

Bad to the Bone

During the Nineties, a steady trickle of scientific reports has found a "statistically significant" association between water fluoridation and increased risk of hip fracture. The suggestion is that the hip needs tensile strength, but that this is destroyed by fluoride. One study monitored the hip fracture rates of white women across 3,000 counties in the US. Another compared the incidence of hip fracture among mainly Mormon communities in Utah. This was of particular interest because it could exclude confounding factors such as smoking and alcohol consumption. The study found a "small but significant" additional risk of hip fracture among both men and women exposed to artificial fluoridation at one part per million (ppm) — precisely the level at which water is fluoridated in the UK.

The urgent need for further investigation was made even plainer by the publication of an alarming study by the University of Bordeaux, published in the *Journal of The American Medical Association*. This measured rates of hip fracture among elderly citizens in 75 parishes of southwestern France, and compared the concentrations of fluoride in the water (which, in this case, was naturally fluoridated). The study found that people living in fluoridated areas suffered 86 percent more fractures than people in non-fluoridated parts.

One irony of this research is that those who lobby in favor of fluoridation always refer to the savings to the National Health Service in costs of dental care — however, if fluoridation does indeed lead to an increased incidence of hip fracture, then the overall costs to the NHS would be far greater than these projected savings. Hip fracture, a serious and some-

Adapted from an article originally published in The Guardian Weekend *[119 Farringdon Road, London EC1R 3ER England], June 7 1997. This article was a winner of the 1997 Project Censored Award. It shared the honor with the* Australian and New Zealand Journal of Public Health *and the Worcester, Massachusetts* Telegram & Gazette. *Reprinted with permission.* The Guardian © *1997.*

1997 Project Censored Award Winner

times life-threatening condition, is one of the most expensive items on the NHS budget.

Cases of crippling skeletal fluorosis, a condition directly caused by fluoride, are exceptionally rare, except in countries of naturally high fluoride levels such as India; but the early stages of the condition could perhaps be triggered by artificially-fluoridated water supplies. Fluoride, which is deposited in mineralising new bone more easily than existing bone, distorts the natural regeneration of the bone. As fluoride accumulates, the bones become thickened and develop outgrowths. Tendons and ligaments may then be affected and nerves may become trapped and damaged.

The result could be a mounting toll of skeletal problems — from occasional stiffness or pain in the joints, to backache and osteoarthritis. These problems collectively form one of the major causes of absence from work in Britain, so their impact on the economy — even aside from the well-being of the individual — is considerable.

Bone Cancer & Down's Syndrome

Research undertaken in the US for the National Toxicology Program (NTP) in 1990 and 1991 showed "a possible increase in osteosarcomas in male rats" exposed to fluoride. Osteosarcoma is rare; but it is one of the principal cancers of childhood. As a result of the NTP report, the Department of Health in New Jersey commissioned work to assess the incidence of osteosarcoma in the state in relation to water fluoridation. The results were astonishing: they indicated that in male children (under the age of 20), the risk of osteosarcoma was between two and seven times greater in fluoridated water areas.

"Are you telling us that we're reducing children's IQs by putting fluoride in toothpaste?" She replied, "Well, basically, yes." She did not receive further funding.

Dr Sheila Gibson, of the Glasgow Homoeopathic Hospital, reported further serious findings in a paper in *Complementary Medical Research*. By adding sodium fluoride to blood samples, she demonstrated that fluoride impaired the functioning of the immune system.

There also is concern about the genotoxicity of fluoride and its possible role in the cause of increased levels of infant mortality and Down's Syndrome births. The West Midlands Perinatal Audit reported that the city had "significantly higher" rates of stillbirth and neonatal mortality than the average for England and Wales.

Could this be attributable to fluoride? In an as-yet unpublished paper, Ian Packington, a toxicologist on the advisory panel of the National Pure Water Association (an anti-fluoride campaign group), records that in the years 1990-92 perinatal deaths in the fluoridated parts of the West Midlands were 15 percent higher than in neighboring unexposed areas such as Shropshire and Herefordshire. From an analysis of Department of Health statistics, he concluded that in the period 1983-86 cases of Down's Syndrome were 30 percent higher in fluoridated than non-fluoridated areas.

These were not isolated findings. In the 1970s, Dr. Albert Schatz reported that the artificial fluoridation of drinking water in Latin American countries was associated with increased rates of infant mortality and deaths due to congenital malformation. As long ago as the 1950s, Dr. Ionel Rapaport published studies showing links between Down's Syndrome and natural fluoridation.

Brushing Your Brain with Fluoride

Unlike fluorine — which is one of nature's most reactive elements — the fluoride ion is very stable. It was unclear how it could potentially cause prenatal damage of this kind until, in 1981, the *Journal of The American Chemical Society* reported that fluoride could form strong hydrogen bonds.

This could indeed have serious repercussions for biological systems, with the consequences of affecting proteins, other molecules and DNA. Dr John Emsley, the scientist conducting the research, wrote that, "We believe we have found an explanation of how this reputedly inert ion could disrupt key sites in biological systems." Even so, worse was still to come.

The NRC report on the effects of fluoride clearly conceded that there were "inconsistencies" in the data about fluoride toxicity. One area it did not examine at all was the effect of fluoride on the brain and central nervous system — even though the results of relevant Russian studies in the 1970s were by then widely known. These demonstrated that workers suffering from exposure to fluoride in the workplace exhibited signs of impaired mental functioning.

The NCR's omission was put into sharp perspective with the publication in 1995 of work by the neurotoxicist, Dr. Phyllis Mullinex. In the 1980s, she developed a sensitive test using animal models to ascertain the effects of neurotoxins on the central nervous system. As a result, she was recruited to head the department of toxicology at the Forsyth Dental Institute in Boston. Everything went well until she stepped into politically-sensitive territory by using her system to test the effects of fluoride.

She noted disruption to the behavior patterns of rats, and concluded that fluoride adversely affected the brain. She went on to show that fluoride accumulated in brain tissue, and that its effects depended on the age of exposure (young rats were more vulnerable). She also determined that these effects were measurable at a lower level of exposure to fluoride than was necessary to produce damage to the bones.

In order to receive her next round of funding, she presented her interim findings to representatives of the major toothpaste manufacturers. She was asked, "Are you telling us that we're reducing children's IQs by putting fluoride in toothpaste?" She replied, "Well, basically, yes." She did not receive further funding.

Although her paper was peer-reviewed and published in *Neurotoxicology And Teratology*, she was told that her work was "not relevant to dentistry" and sacked from her post at the Forsyth. (She retained a second post at Harvard Medical School.) She sued the Forsyth for wrongful dismissal and won what is believed to be a substantial out-of-court settlement.

The disturbing conclusions of her work have been buttressed by new studies from China, published in the journal *Fluoride*. Researchers compared the IQs of children in areas of low and high natural fluoridation and discovered that children in the low-fluoride area had higher IQs. There was some criticism that this work had not taken sufficient account of possible confounding factors. So a small-scale study was initiated, comparing two villages — Sima, with a high level of natural fluoride, and Xinhua. The results were the same as before. The children exposed to higher levels of fluoride had lower IQs.

Fluoridation. What's in It for Us?

In October 1990, a document labeled "For Reference *Only* — *Do Not* Send Out" was prepared by Lucier Chemical Industries, Ltd. and sent to the city of St. Petersburg, Florida. LCI purchases fluorosilicic acid (aka hydrofluosilicic acid) from Cargill Fertilizer, Inc. which it sells to St. Petersburg, which pours it into the municipal water supplies.

The confidential memo described the fluoridation agent as a "highly corrosive" solution, "white to straw yellow in color" and containing the following ingredients:

	Percent (by wt.)
H_2SiF_6 (hydrofluosilicic acid)	24%
Fluorine	18.5%
Heavy metals, as lead, Pb	0.0002%
Phosphorus	0.200%
HF (hydrogen fluoride)	1.000%
Arsenic	0.0035%
Barium	0.0002%
Cadmium	0.0004%
Chromium	0.0003%
Iron	0.100
Iodine	0.0015%
Lead	0.00005%
Mercury	0.0000001%
Selenium	0.000003%
Silver	0.0004%

Damn the Studies: Full Speed Ahead!

Paul Connett is a professor of chemistry at St. Lawrence University in New York state and an international authority on environmental toxins. "I now realize that, because the pro-fluoride lobby has successfully portrayed the anti-fluoridationists as a bunch of crackpots, people have been kept away from this issue. In fact, once I looked into the literature and was, quite frankly, appalled by the poor science underpinning fluoridation, I had grave concerns about the wisdom of putting this toxic substance into our drinking water."

In the US, at the same time that the first fluoridation scheme was being introduced, scientists were admitting (in documents hitherto secret, but now disclosed under the Freedom of Information Act) that they had no idea what the effects of low-level exposure would be.

The first such scheme was introduced in Grand Rapids, Michigan, in 1945 as a long-term pilot study. Over a 15-year period, it was to be compared with an unfluoridated control city, Muskegon, to determine whether fluoride actually did benefit dental health. The Americans couldn't wait 15 years, however; or even two. The following year, six cities opted to fluoridate. In 1947, 87 did, including Muskegon. In a prime example of bureaucrats pre-empting science, the authorities decreed that it was unfair to deprive its citizens of the "benefits" of fluoridation. The 15-year study had run for just 18 months.

There has never been a single long-term, scientifically inviolable study of fluoridation. The most remarkable aspect of the conduct of the dental lobby has been... its cowardice in not confronting the huge commercial sugar interests.

Thus there has never been a single long-term, scientifically inviolable study of fluoridation. And this is against a background of steady improvements in dental health, with the widespread, indeed ubiquitous, availability of fluoride toothpaste. But since cleaning one's teeth is always beneficial, how much real additional advantage does the fluoride confer? There are, of course, those who argue that the Grand Rapids study was not allowed to run its full course precisely because the results would have capsized the pro-fluoride arguments.

Fluorosis: The Price We Pay

Why has there been such unrelenting administrative pressure to fluoridate? Conspiracy theorists would point to the confluence of interests of the sugar industry, keen to identify any method of improving dental health which did not involve consuming less sugar, and huge industrial concerns, such as aluminium manufacturers, petro-chemical and fertiliser industries, for all of whom fluoride was a waste product and a dangerous pollutant. Accordingly, they welcomed the opportunity both to launder the image of fluoride and (in some instances) to sell to water companies something they would otherwise have had to pay to get rid of.

The dental profession itself tells a very different story. In 1945, a physician noticed something different about the teeth of children living in high fluoride areas: they were mottled and discolored. The condition — fluorosis — was caused by fluoride attacking the enamel of the permanent teeth while they were being formed in the gums. When the teeth erupted, they had unsightly stains on them.

However, the physician also believed that the children with fluorosis had fewer dental caries. Thus, the link was made, and the aim was formulated of trying to fluoridate to a uniform level for the benefit of dental health. The optimal level, at which benefits to teeth could be reconciled with an acceptable level of fluorosis, was determined as 1 ppm of fluoride in water.

From the outset, the danger of fluorosis was inherent in the dental lobby's advocacy of fluoride — it was recognized that some children would need to sacrifice their appearance for what was deemed to be the greater good. In recent years, however, dental fluorosis (the majority of cases are only mild) has been increasing. In the US, the NRC expects fluorosis to occur, albeit in a mild form, in 10 percent of the population. Statistics showed that in one unnamed city with a fluoride concentration of twice the recommended level, the prevalence of dental fluorosis in children was 53 percent.

Fluorosis strikes when the child is at a psychologically vulnerable age. At an international conference on fluoridation in Birmingham in 1995, evidence was presented that, in Australia, "even mild [fluorosis] was associated with psycho-behavioural impacts." Worse yet, dental fluorosis is merely the *visible* sign of fluoride's effects. Are there other kinds of damage that cannot be seen?

The worldwide increase in fluorosis is hardly surprising, as exposure to fluoride from sources other than the water supply has increased immeasurably over the past 25 years. Even

for those of us not living in fluoridated areas, there is constant exposure from toothpaste, from other dental products, from fruits and vegetables (which retain fluroide from pesticide residues) and from drinks such as tea. Tea leaves have naturally high fluoride levels since tea grows best in a fluoride soil.

In 1945, the dental authorities set the optimal level for fluoridation at 1 ppm; and the optimal level today is still 1 ppm, despite the fact that overall exposure to fluoride has increased significantly since 1945. The absolute level of fluoride exposure is of critical importance because the whole debate is so finely balanced.

As Professor Connett explained: "From a toxicological point of view, the gap between the therapeutic dose — the level at which fluoride is supposed to benefit teeth — and the toxic dose, at which it begins to do serious harm, is very small. Usually, you want a factor of a hundred between the two. In this case, it's tiny. The optimal level in drinking water is one ppm. The maximum contaminant level, as prescribed by the US Environmental Protection Agency, is 4 ppm. That gap is far too small for public safety." [*Note: In 1986, the EPA raised the maximum exposure level from 2.4 ppm to 4 ppm. See story on page 11.*]

Faced with accumulating information of this kind, the dental administrators and pharmaceutical companies have been quietly moving the goalposts.

No one should be taking fluoride supplements, especially if they live in a fluoridated area. The problem here is that many millions of people probably have no idea whether they're living in a fluoridated area or not, because no one has ever had the courtesy to tell them. To quote the leading textbook, *Essentials Of Dental Caries*: "topical fluoride preparations [toothpaste et al] should be applied carefully because of their potential toxic effects." Children should be supervised by parents when brushing their teeth. They should use only a pea-sized amount of fluoride toothpaste (though no one would ever suppose as much from watching the television commercials) and should on no account swallow it. The chairman of the British Fluoridation Society, Professor Mike Lennon, blames the increased incidence of dental fluorosis on children "abusing" (that is, swallowing) toothpaste.

Since it is difficult not to swallow toothpaste, and since fluoride is in any case absorbed through the gums, parents may instead like to purchase non-fluoride toothpaste — were it not that this is almost impossible in many parts of the country, as the supermarkets and pharmaceutical retailers have severely restricted consumer choice.

So, the real route to lasting dental health remains, as ever, regular dental hygiene and a nutritious diet. In fact, the most remarkable aspect of the conduct of the dental lobby has been not its unquestioning espousal of fluoride but its cowardice in not confronting the huge commercial sugar interests. After all, dental caries were unknown before refined sugars.

The possible subtle effects of long-term exposure to low levels of fluoride can no longer be ignored. Those who wish to extend fluoridation schemes throughout the country tell us that there's "no evidence" that it causes harm. We must bear in mind how carefully the authorities have avoided gathering the evidence.

The final irony is that fluoridation, having been introduced to bridge the socio-economic gulf in society, probably benefits the poor least of all. It is precisely those suffering poor nutrition, and hence vitamin and mineral deficiencies, who will be most vulnerable to fluoride's toxic effects.

Fluoride in the News

"Aluminum-induced neural degeneration in rats is greatly enhanced when the animals were fed low doses of fluoride. The presence of fluoride enhanced the bioavailability of aluminum (Al) and caused more Al to cross the blood-brain barrier and be deposited in the brain. The pathological changes found in the brain tissue of animals given fluoride and aluminum-fluoride were similar to the alterations found in the brains of people with Alzheimer's disease and other forms of dementia."
— ***Brain Research*** *(vol. 784:1998)*

"Roger Masters, a Dartmouth professor of government, and Myron Coplan, a retired chemical engineer, have gathered statistical evidence [*in an EPA-funded study*] indicating that children who live in areas where the drinking water has been treated with silicofluorides have elevated levels of lead in their blood and higher rates of violent crime, which may be attributable to the lead."
– ***The Valley News,*** *Vermont, June 22, 1998*

"In October 1944, the *Journal of the American Medical Association* published an editorial stating that 'the use of drinking water containing as little as 1.2 to 3 parts per million of fluoride will cause... osteosclerosis, spondylosis and osteopetrosis.' In 1990, the American National Toxicology Program announced that it had established a clear link between fluoride and a type of bone cancer called osteosarcoma. However, it was in the interest of many powerful bodies that fluoride be added to our drinking water supplies. This included the sugar industry and the aluminium industry, which was desperate to get rid of the vast amount of fluoride waste that its activities had generated."
— ***The Ecologist,*** *March/April 1998*

"New research suggests young children may be getting more fluoride than they need through baby foods. The researchers analyzed the fluoride concentration of 238 commercially available infant foods. The results reveal ready-to-eat foods with chicken had the highest fluoride concentrations. The researchers also found that dry infant cereals that are reconstituted with fluoridated water may noticeably increase the levels of fluoride in a child's daily intake."
— ***Journal of the American Dental Association,*** *August 23, 1997*

"[Fluoride is a poison]. That's the message of the new warning labels required by the Food and Drug Administration on all fluoride toothpastes and dental care products shipped as of April 7. In areas where the drinking water contains fluoride, children who swallow even [a] pea-sized amount of toothpaste are getting too much fluoride and are at risk for fluorosis."
— ***The Washington Post,*** *June 16, 1997*

"An analysis of survey data collected by the National Institute of Dental Research concludes that children who live in areas of the US where the water supplies are fluoridated have tooth decay rates nearly identical with those who live in nonfluoridated areas."
— ***Chemical & Engineering News,*** *May 8, 1989*

"When people open their next town water bills, they will notice a new warning about the potential side effects of fluoridation. The warning will say the town recommends pregnant women, parents of children under 3 and people sensitive to fluoride consult their doctors."
— ***The Middlesex News,*** *Massachusetts, March 10, 1998*

Fluoridation and Hip Fractures

by John R. Lee, M.D.

The costs and health effects of osteoporotic fractures in the US are enormous. The total cost of fracture care is now about $9 billion/year. It is estimated that about 350,000 hip fractures occur per year and the incidence is rising.

A study by the University of Iowa's Department of Preventive Medicine and Environmental Health, calculated that the lifetime risk of a fracture of the hip, spine or distal forearm is almost 40% in white women and 13% in men from age 50 years onward. Hip fractures account for 87-100% of fracture-related nursing home placements and 87-96% of short-term fracture costs.

In an effort to treat osteoporosis and prevent hip fracture, some doctors administer "therapeutic" doses of fluoride. Four US studies have examined the effect of these "therapeutic" doses and all of them found that, even though bone density appeared to increase, hip fracture rates increased within three years of treatment. In addition, all reported significant periarticular joint pain and gastrointestinal side effects in the treated subjects.

Dr. L. V. Avioli, Shoenberg Professor of Medicine at the Washington University School of Medicine, concluded that "sodium fluoride is accompanied by so many medical complications and side effects that it is hardly worth exploring in depth as a therapeutic mode for post-menopausal osteoporosis." Dr. Saul Genuth, chairman of the FDA advisory committee that analyzed the fluoride/fracture findings, was quoted in the *Medical World News* as saying the FDA "should quietly forget about fluoride."

More recently, attention has shifted to lower dosages of fluoride, such as found in fluoridated water. There are now at least eight studies that showed an increase of hip fracture incidence in fluoridated communities. They are summarized here:

■ In 1986, M.R. Sowers *et al*, in a retrospective study, found an increased fracture rate in both pre- and postmenopausal women relative to their water fluoride exposure.

■ In 1991, M.R. Sowers *et al* completed a prospective study again showing that water fluoride was correlated with more than double the unfluoridated fracture rates.

■ In 1991, Jacobsen *et al* showed a very strong positive correlation of hip fracture to fluoridation.

■ In 1991, C. Cooper *et al* showed a statistically significant increase of hip fracture incidence in England relative to fluoride content of drinking water ranging from 0 to 1 mg/L [ppm].

■ Also in 1991, C. Keller compared hip fracture rates in 216 US counties with natural fluoride concentrations in drinking water and found significantly higher fracture rates in counties with fluoride levels of >1.2 ppm.

■ D.S. May and M.G. Wilson reported finding that, as the percentage of persons exposed to fluoride in water increased, the hip fracture rate generally increased.

■ In 1992, C. Danielson *et al* reported that the risk of hip fracture was approximately 30% higher for women and 40% higher for men in fluoridated communities. Among women at age 75, the risk was about twice as high in fluoridated communities.

■ In 1995, H. Jaqmin-Gedda *et al*, scientists from the University of Bordeaux, France, studied hip fracture rates in 75 civil parishes in southwestern France and found (after adjustment for multiple alternative variables) an increased risk [odds ratio] for hip fracture of 1.86, i.e., 86% more likely, in parishes with water fluoride levels higher than 0.11 ppm.

In addition, a number of studies suggest fluoride induces pathologically mineralized bone and a deterioration in the overall strength of bone. A 1994 report by P. Fratzl *et al* in the *Journal of Bone & Mineral Research* described abnormal bone mineralization after fluoride treatments. In that same year, C.H. Sogaard *et al* reported a marked decrease in trabecular bone quality after just five years of sodium fluoride therapy. Pediatric orthopedists are finding that, here in the US, sports injuries to the young are rising sharply — ranging from stress fractures of the lower spine in young gymnasts to tendonitis in swimmers.

In 1992, orthopedic surgeon Carl L. Stanitski observed: "We are seeing more and more stress fractures in children and more and more injuries caused by repetitive use." Some might argue that overuse and too much training are the cause, but others are concerned that something is causing defective bone and connective tissue of US kids, and that something might well be fluoridation.

Conclusion: All studies of fracture rates relative to long-term fluoridation exposure indicate a significant increase in fracture risk from fluoridation. The increased fracture risk due to fluoridation appears to range from 40-100%, depending on the age of the subjects studied. For women in their seventh decade who have been exposed to life-long fluoridation, the risk of hip fracture is approximately doubled. The risk increases with fluoride concentration at all levels over 0.11 ppm. Increased bone and connective tissue injuries of US youngsters should alert us to the probability that our high fluoride environment is adversely affecting our youngsters as well as our elderly.

{CITATIONS AVAILABLE ON REQUEST}

John R Lee, MD, is the former director of the Marin Medical Society in California and the author of Optimal Health Guidelines, Optimal Fluoridation *and* Gilbert's Disease and Fluoride Toxicity. *The full text of this article was published in the research journal,* Fluoride *(Vol. 26 No. 4, pages 274-277, 1993).*

JAMA on Fluoride and Hip Fractures

"Hip Fractures and Fluoridation in Utah's Elderly Population," a study by C. Danielson *et al* [*Journal of the American Medical Association*, August 12, 1992, 268:746-8], compared the incidence of femoral neck fractures in a community with long-standing water fluoridation (to 1 ppm) with the incidence in two communities without water fluoridation (less than 0.3 ppm).

"The findings of this report support other epidemiologic studies suggesting that fluoride increases the risk of hip fracture."

— *Journal of the American Medical Association*

"A review of recent scientific literature reveals a consistent pattern of evidence – hip fractures, skeletal fluorosis, the effect of fluoride on bone structure, fluoride levels in bones and osteosarcomas – pointing to the existence of causal mechanisms by which fluoride damages bones.... [Fluoridation] proponents must come to grips with a serious ethical question: Is it right to put fluoride in *drinking* water and to mislead the community that fluoride must be ingested, when any small benefit is due to the *topical* action of fluoride on teeth."

— *Australian and New Zealand Journal of Public Health*, 1997

Impact of Artificial Fluoridation on Salmon In the Northwest US and British Columbia

by Richard G Foulkes, MD and Anne C. Anderson, RPN

In the US Northwest, species of salmon using the Snake-Columbia River system, are listed as "endangered." On the North Thompson River of British Columbia, Canada, sperm banks are being employed to preserve salmon species. Proposed water diversion on the Nechako River, in British Columbia, may threaten the internationally important Fraser River fishery.

Writing in the quarterly magazine, *The New Pacific*, in January 1994, Joseph Cone reported that the annual migration of salmon in the Snake-Columbia River system had declined over the past century from an estimated 10-16 million to 2 million in 1991. He pointed out that "the problem is enormously complex — biologically, administratively and economically." His article and reports in the media have stressed problems with harvesting; loss of habitat through poor forestry practices, livestock and human settlement; and dams built for power and irrigation. Little emphasis is placed on the effects of pollution of water by toxic substances such as fluoride.

The aluminum industry is the chief beneficiary of power dams on the Columbia River System, and it is the fluoride wastes from smelters that first come to mind as sources of fluoride pollution. However, there is another potential source of contamination — the artificial fluoridation of community water supplies for the avowed purpose of improving dental health.

Fluoride and "Critical Habitat"

In discussions of "critical habitat" for endangered salmon species, all of the possible components must be evaluated. This study examines the possibility that artificial fluoridation of drinking water in communities along the course of salmon rivers is a factor to be included.

The US Environmental Protection Agency (EPA)[1] and the Province of British Columbia[2] adhere to a "permissible level" of 1.5 ppm (1.5 mg/L) for fluoride discharged into fresh water. BC's "recommended guideline" is currently 0.2 ppm fluoride; but this does not have the force of legislation. Neither the Minister of the Environment nor the Washington State Department of Ecology requires fluoride estimations for sewer effluent permits as it is considered fluoride is not significantly toxic to aquatic life in concentrations expected in discharges.[3,4]

A review of the literature and other documents, including as court transcripts, reveals that levels below 1.5 ppm have been shown to have both lethal and other adverse effects on salmon. Evidence presented by the EPA and other government bodies responsible for the environment suggests that harm can come to aquatic life only at concentrations that far exceed those in discharges from fluoridated cities. Both Groth[5] and Warrington[6] point out that many factors influence susceptibility of fish to fluoride: temperature; water hardness; pH; chloride concentration; and, the strain, age and physiological and reproductive condition of the fish.

Groth points out that there are serious problems with laboratory experiments as opposed to field studies. In lab tests, "... many of the organisms tested for fluoride toxicity did not experience effects until levels of fluoride higher than those which might realistically be encountered in the environment were attained." Groth concluded that the finding can be misleading: the techniques of measurement may be inadequate to detect effects, and these may be at the population rather than individual level.[5]

There are studies showing the effect of water temperature and hardness. Angelovic and others[7] showed lethal effects on rainbow trout related to temperature. Using sodium fluoride at the same degree of hardness (estimated at 44 by Warrington[6]), at 7.2 degrees C over an exposure period of 240 hours, Angelovic determined that the LC50 (the lethal concentration required to kill 50% of the tests subjects) was 5.9-7.5 ppm. At 12.8 degrees C, half the trout died at concentrations of 2.6-6.0 ppm. Neuhold[8] reported the same result for 12.8 degrees C and the same degree of hardness. Pimental and Bulkley,[9] using a constant temperature of 12 degrees C, monitored the mortality of rainbow trout over a 96-hour period in waters with hardness levels of 17, 49, 182 and 185 ppm. The LC50 was associated with fluoride levels of 51, 128, 140 and 193 ppm respectively.

In British Columbia, where the softness of major salmonid water courses is the rule, Warrington combined the findings of Angelovic, Pimental and Bulkley to calculate that the chronic threshold for rainbow trout at 12 degrees and water hardness of 10 mg/L (calcium carbonate) is 0.2 ppm.

Smelters vs. Salmon

In a field study, Damkaer and Dey[10] (*See sidebar, page 10*) demonstrated that high salmon loss at John Day Dam on the Columbia River, 1982-1986, was caused by the inhibition of migration by fluoride contamination from an aluminum smelter located 1.6 km [one mile] above the dam. In 1982, the average daily discharge of fluoride was 384 kg and the salmon loss was 55%. In 1985, discharge averaged 49 kg and was accompanied by a concentration of 0.2 ppm and a salmonid loss of 5%.

Damkaer and Dey confirmed the cause-and-effect relationship by means of a two-choice flume for fluoride gradient salmon behaviour tests. These determined that the "critical level" was 0.2 ppm.

There are other studies that indicate that fluoride at levels below 1.5 ppm have lethal and other adverse effects on fish. Delayed hatching of rainbow trout have occurred at 1.5 ppm;[11] brown mussels have died at 1.4 ppm[12]; an alga (*Porphyria tenera*) was killed by a four-hour fumigation with fluoride with a critical concentration of 0.9 ppm[13]; and, levels below 0.1 ppm were shown to be lethal to the water flea, *Daphnia magna*.[14] These latter two studies suggest that salmon species also may be af-

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fected by fluoride-induced reduction of food supply.

Documents used in a 1961 court case involving Meader's Trout farm in Pocatello, Idaho,[15] contain evidence that between 1949 and 1950 trout damage and loss was related to fluoride contamination due to rain washing airborne particles from leaves into hatchery water at levels as low as 0.5 ppm. This evidence suggests that the "safe level" of fluoride in the fresh water habitat of salmon species is not 1.5 ppm but, 0.2 ppm.

Is City Water Deadly to Salmon?

In fluoridated areas, drinking water obtained from surface water with an average fluoride concentration of 0.1-0.2 ppm[16] is raised to the "optimal" level of 0.7-1.2 ppm by the addition of sodium fluoride, hydrofluosilicic acid, or sodium silicofluoride. [*Note: In 1985, the EPA raised the Maximum Contaminant Level to 4 ppm.*]

Fluoride, in community drinking water, enters the fresh water ecosystem in various ways. Surface run-off from fire-fighting, washing cars, and watering gardens may enter streams directly or through storm sewers at optimal concentration, 0.7-1.2 ppm. Most enters during waste water treatment.

Masuda[17] studied a large number of cities and calculated the concentrations in waste water that were in excess of the concentration present in the cities' water supplies. In raw sewage, this was 1.30 ppm; primary treatment reduced this slightly to 1.28 ppm; secondary treatment to 0.39 ppm. Singer and Armstrong[18] found 0.38 ppm in unfluoridated sewage and 1.16-1.25 ppm in fluoridated sewage.

It is clear that, in the case of artificially fluoridated communities, the concentration of fluoride in both surface run-off and sewer effluent exceeds 0.2 ppm.

Studies show that elevated concentrations in fresh water receiving fluoridated effluent may persist for some distance. Bahls[19] showed that effluent containing 0.6-2.0 ppm discharged into the East Galletin River from the city of Bozeman, Montana, did not return to the background level of 0.33 ppm for 5.3 km [3.3 mi.]. Singer and Armstrong[18] reported that a distance of 16 km [9.9 mi.] was required to return the Mississippi River to its background level of 0.2 ppm after receiving the effluent of 1.21 ppm from Minneapolis-St Paul.



Illustration by Lil Kingerly, Riverdale School, Oregon

Although dilution reduces concentration over distance, the amount of fluoride in effluent is either deposited in sediment locally or is carried to estuaries where it may persist for 1-2 million years.[16] Fluoride residues may re-contaminate the water anew if dredging were to take place.

Sewage sludge, a product of secondary treatment systems must contain high concentrations of fluoride. However, this is seldom measured in the jurisdictions contacted for this study.

When spread on agricultural land or forests, sewage sludge becomes a hazard in the "critical habitat" of salmon species. During application, aerosols are created that may be ingested by animals and may contaminate surface water. The sludge adds toxic substances to the soil. Fluoride can move into ground water and the run-off of soil particulates may enter streams that play a role in the life-cycle of salmon.

Effluent from fluoridated cities is also discharged into tidal waters. While sea water has been shown to have a higher concentration of fluoride than unpolluted surface water,[16] contaminated rivers flowing into an estuary (as well as direct discharge of effluent) can elevate the amount of fluoride.

From information that is available, 0.2 ppm in the fresh water ecosystem in the US Northwest and British Columbia appears to be the appropriate safe level for salmon species rather than the 1.5 ppm non accepted. Decreases in water volume and/or flow velocity have the potential to increase fluoride concentration. Increased water temperature will enhance fluoride toxicity. Fluoridation deserves to be looked at as a component of "critical habitat" along with the more publicized factors.

A review of the US Department of Health and Human Services publicaton, *Fluoridation Census 1985*,[21] shows that along the course of the Snake River from the Idaho-Wyoming border to its junction with the Columbia River in Washington State, there are three water systems fluoridated at 1.0 ppm. Eight artificially fluoridated water systems are located on the banks of the Columbia from the Canadian border to the mouth. That is, a total of 11 artificially fluoridated communities are located along the Columbia-Snake River system. Has this played a role in the catastrophic decline in salmonid stocks in this once highly productive ecosystem?

The declining salmon returns to the North Thompson, especially of Chinook and Coho, is threatening the existence of species. The City of Kamloops, which contributes run-off and sewage effluent to the North Thompson, is artificially fluoridated. Could this fluoride contribute to migration delay as occurred at the John Day Dam? Could the decline be related to loss of basic feed or hatching abnormalities associated with toxic levels of fluoride?

Effluent levels in Kamloops have been measured at 0.6-1.2 ppm by city employees (personal communication) but no field studies on the effect on salmon species have been carried out.

The Fraser River of British Columbia begins in the Rocky Mountains and travels west to the city of Prince George, where it is joined by the Nechako River carrying water from the western portion of the Province. From there, it flows south to enter the Strait of Georgia after it is joined by numerous tributaries, the largest of which is the Thompson River.

Prince George, like Kamloops, is artificially fluoridated. Has fluoride effluent from Prince George contributed to reported declines in Chinook and Coho stocks in the Nechako? If the diversion of water from the Nechako River (as proposed in the "Kemano II" hydroelectric project) takes place and lowers the water level, slows the flow and raises the temperature of the Nechako Fraser River system, will the toxic effect of fluoride from Prince George and Kamloops be enhanced, putting at risk not only on Chinook and Coho but the Sockeye upon which fishers of both the US and Canada depend?

The decline in salmon stocks, especially Chinook and Coho, is a major economic problem for both commercial and sport

fisheries. "Critical habitat restrictions" are currently being formulated. In the US, the Chinook salmon is being considered for listing under the Endangered Species Act. In BC, the Kemano II hydroelectric project is currently "on hold" and severe restrictions have been placed on the harvesting of both Cinook and Coho salmon. There has been no change in the "permissible level" of 1.5 ppm fluoride in either the US or Canada.

There are many questions, but until evidence to the contrary is available, based on impartial field studies, in order to protect salmon species in the US Northwest and British Columbia, the "critical level" of fluoride in fresh water should be 0.2 mgF/L.

The strategy for eliminating unacceptable levels of fluoride from the "critical habitat" of Northwest Pacific salmon consists in the immediate banning of artificial fluoridation and the rapid sunsetting of the current disposal practices of fluoride-producing industries.

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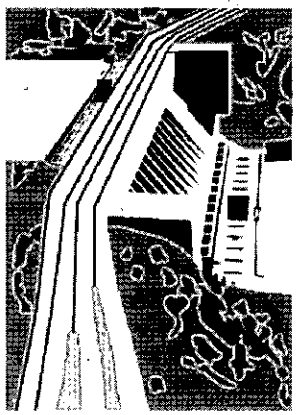
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Fluoride Effects on Salmon at John Day Dam, Columbia River, 1982-1986



by Douglas B Dey and DM Damkaer

The upstream migration of adult spring chinook salmon in the Columbia River has been subject to unusually long delays at John Day Dam. During the spring migration period, average passage times for radio-tagged salmonids at John Day Dam were 158 and 156 hours in 1979 and 1980, respectively. In contrast, average passage time at Bonneville Dam was less than 48 hours and at The Dalles Dam it was less than 24 hours. In addition, passage times for salmonids in the fall of 1982 were twice as long at John Day Dam as they were at The Dalles and McNary Dams. The delay of nearly one week at John Day Dam appeared to contribute to increased mortality and may have affected the spawning success of migrating adult salmonids.

Migratory delays at John Day Dam were not decreased appreciably by changes in fishway entrance locations, water discharge volumes or configurations, or turbine operating conditions. The lack of response by migrating salmonids to flow alterations below the dam focused attention on the possibility that something in the water might be causing fish to avoid the fishways and delay their passage.

In 1982, preliminary studies conducted by CZES Division personnel suggested that the fish-passage delays might be related to contaminants discharged at an aluminum smelter outfall located on the Washington shore upstream from John Day Dam. In particular, high concentrations of fluoride in the vicinity of John Day Dam (0.3-0.5 mg/L in 1982) prompted investigators to focus sampling and research efforts on this contaminant.

In 1983 and 1984, behavior tests were conducted in which over 600 returning salmonids (chinook, coho, and chum salmon) were captured and tested with different concentrations of fluoride in a two-choice flume located in the spawning channel of Big Beef Creek, Washington. The conclusion from these experiments was that the behavior of upstream-migrating adult salmon would be adversely affected by fluoride concentrations of about 0.5 mg/L and that concentrations of 0.2 mg F/L were at or below the threshold for fluoride sensitivity of chinook and coho salmon.

Beginning in 1983 and continuing through 1986, fluoride discharges from the aluminum plant were greatly reduced. With the reduction in fluoride discharged from the aluminum plant, there was a corresponding drop in fluoride concentrations in the river near the outfall and John Day Dam. Concurrently, fish passage delays and interdam losses of adult salmon decreased to acceptable levels.

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From the North American Journal of Fisheries Management, *9 (1989), 154-162, National Marine Fisheries Service, Northwest Fisheries Science Center, April 1993.*

Facts for Fluoridationists

by William L. Marcus, Ph.D

I would like to pass along a few tips that have gotten some responses from people who were previously pro-fluoridators. I like to use the approach that first states what everybody has agreed upon in the US, and progress to the more controversial.

■ First, it is agreed by all people who think themselves knowledgeable about fluorides that the effect on teeth is limited to children three years or younger. Anyone else is exposed unnecessarily.

■ When using the measures of filled, partially filled and missing teeth — comparing fluoridated and non-fluoridated water supplies the world over, including the US, there is either no difference or, more often, people using fluoridated water have more caries. Even very small amounts of fluoride cause brittle, hard-to-repair teeth.

■ Studies demonstrate that the rate of hip fracture is at least double among people 65 years or older in fluoridated areas, and people who imbibe fluoridated water are also twice as likely to be hard-of-hearing.

■ Fluoridating water increases lead exposure, especially to children, because the fluoride added to drinking water often has up to 400 mcg of lead per liter and the corrosive action of fluoride extracts lead from pipes and solder joints, increasing lead exposure of the young. Babies up to 3 months old absorb 16 times as much lead per unit of body weight than adults.

■ Two large [fluoride-related epidemiological studies] in New Jersey and New York State determined the incidence of osteosarcoma (almost always fatal) in men under 18 years of age increased by 6- to 8-fold. An increase of this magnitude is *prima facie* evidence of a real ongoing effect.

■ I find that people are simply not willing to believe that our government would condone the addition of a compound to the water supply that was not efficacious. This is why, in my opinion, it has not been possible to convince enough people of conscience to review the fluoride story.

■ People remember that the National Academy of Science (NAS) released a report that sort of said fluoride was OK. They do not know that members hand-picked for the NAS panel were known to be pro-fluoride. They were not present when the NAS board calculated that the amount of fluoride ingested daily was far higher than previously believed.

■ The [NAS panel] discovered that soft drinks, including Coke, Pepsi and Seven-Up were made by diluting concentrate with fluoridated water, that Kool-Aid, baby formula, etc., also have fluorides added. These exposures were not considered by the EPA when setting the current standard.

■ The NAS did not allow me to explain that the levels of fluoride found in the bones of rodents who had osteosarcoma was lower than the level found in human adults exposed to allowable levels of fluoride.... No other compounds (including radioactive compounds) have been able to produce osteosarcomas in rodents.

William Marcus is a Senior Science Advisor with the EPA's Office of Science and Technology. In 1990, as a senior EPA toxicologist, Marcus questioned the safety of fluoride and was subsequently fired. He sued the EPA and won reinstatement – a major victory for whistleblowers.

EPA Whistleblowers on Fluoride

The EPA's Fluoride Fraud

by Robert J. Carton, Ph.D

The fluoride in drinking water standard, or Recommended Maximum Contaminant Level (RMCL), published by EPA in the Federal Register on November 14, 1985, is a classic case of political interference with science.

The regulation is a fraudulent statement by the Federal Government that 4 milligrams per liter (mg/l) of fluoride in drinking water is safe with an adequate margin of safety. There is evidence that critical information in the scientific and technical support documents used to develop the standard was falsified by the Department of Health and Human Serivces and the EPA to protect a long-standing public health policy.

EPA professionals were never asked to conduct a thorough, independent analysis of the fluoride literature. Instead, their credentials were used to give the appearance of scientific credibility. They were used to support the predetermined conclusion that 4 mg/l of fluoride in drinking water is safe.

Ethical misconduct by EPA management included the following: EPA managers ignored the requirements of the law to protect sensitive individuals such as children, diabetics or people with kidney impairment. Contrary to law, they made the criteria for considering health data so stringent that reasonable concerns for safety were eliminated. Data showing positive correlations between fluoride exposure and genetic effects in almost all laboratory tests were discounted.

By selective use of data, they fit science to the desired outcome. They reported to the Administrator data demonstrating that dental fluorosis was an adverse health effect, but then hid this information from the public when the Administrator decided to call dental fluorosis a "cosmetic" effect.

EPA management based its standard on only one health effect: crippling skeletal fluorosis (CSF). They ignored data showing that healthy individuals were at risk of developing CSF if they happened to drink large quantities of water at the "safe" level of 4 mg/l. EPA's own data showed that some people drink as much as 5.5 liters a day. These people would receive a daily dose of 22 mg, which exceeds the dose necessary to cause CSF.

Management also relied on an April 1983 report from the Surgeon General that they knew was false. The concerns of an expert panel about the effects of fluoride on the bones of children, on the heart, for dental fluorosis and for the overall lack of scientific data on the effects of fluoride in US drinking, water were deleted from the EPA's report.

The report was submitted for public comment but was never altered to incorporate the information sent in by world-class experts. Any opnions contrary to the report were dismissed. What we have is actually a draft stamped "Final."

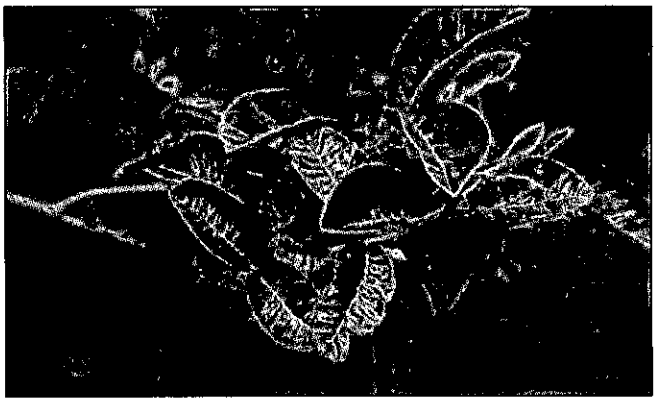
Objective scientific methods of data collection and analysis were avoided in favor of presenting information in a way that agreed with current policy.

Fluoridation is the greatest case of scientific fraud of this century, if not of all time.

In 1991, when this was written, Robert Carton was an EPA scientists and Vice-President of Local 2050 of the National Federation of Federal Employees, representing 1200 EPA professionals.

The Effects of Fluorides on Plants

by Alan Davison and Leonard Weinstein



Guava (Psidium guajava) in Brazil. Older leaves curled and dying. Note: The photos on these pages represent extreme examples of fluoride injury on the sensitive "indicator" plants.

Fluoride-induced symptoms have been described in many reviews (Weinstein and McCune 1970; Weinstein and McCune, 1971; Thomas and Alther 1966; Brandt and Heck 1977; Treshow and Pack 1970; Guderian et al. 1969; Hindawi 1970; Thomas 1961). The basis for the following description is Weinstein and McCune (1971) plus our own experience in the field in several countries.

Gaseous fluoride enters the leaf through the stomata (=pores) then it dissolves in the water permeating the cell walls. The natural flow of water in a leaf is towards the sites of greatest evaporation, which are the margins and tip. Carried by the water, the fluoride concentrates in the margins and tip, so it is these areas that generally are the first to show visible injury. Clearly, this concentration mechanism is one reason why fluoride can be so toxic to plants but there is an important corollary: Most of the leaf may have very little fluoride present and may function normally in terms of assimilation.

Generally, leaves are most sensitive when they are young and still expanding. Once fully developed, they may be many times more resistant. Therefore symptoms are more often seen in young, expanding leaves. Where fumigation is periodic, symptoms may reflect this as only those leaves that are at the sensitive stage of development when the fumigation occurs will develop injury. The rate at which symptoms appear depends on the weather. There can be a considerable lag between the time of exposure to the fluoride and the development of the symptoms.

Exposure to a high concentration causes necrosis of part or even the whole of the leaf. The term necrosis comes form the Greek *nekros* meaning a dead body. The tissues die.

The initial stages vary with species and both the speed of development of the symptoms and their appearance depend on the weather. In most monocotyledonous (narrow-leaved species including grasses and lilies) plants, the initial symptom is the development of chlorosis (= yellowing) at the tips and margins of elongating leaves.

In some species, the tissues take on a "water-soaked" appearance that looks very like early frost injury, then the tissues desiccate and change color. In some species the dead, necrotic areas are pale white to tan, in others they are brown and they may be black (eg in Populus spp.) or have reddish tinges.

Characteristically, there is a dark brown margin along the basal part of the necrotic area. This line of demarcation is very useful in identifying multiple exposures. The necrotic area is sharply delineated from the healthy portion of the leaf blade by a narrow band of chlorotic tissue sometimes streaked with red as in some varieties of Sorghum.



Apricot tree with affected bark.

Dead, dry pieces of leaf may become brittle and fall off, giving the leaf a tattered appearance. This is common in Chinese apricot and many *Populus* varieties. When very young leaves are injured in this way, the resulting leaf may only be a fraction of the normal size and completely mis-shaped.

Pine species vary greatly in sensitivity. For example, young ponderosa pine (*Pinus ponderosa*) needles first exhibit a lightening in color which turns light brown to reddish-brown at the tip and progresses basipetally along the needle. The discoloration is often accompanied by narrow, dark banded zones, which may be the result of intermittent exposures to fluoride spaced at different periods. Dark bands may also occur at the interface of necrotic and healthy tissues. Needles are born in groups (2, 3, 5 depending on species). They tend to be marked to the same extent.

Although necrosis is the symptom most frequently referred to in texts, often being called tip-burn, other symptoms are at least as common or, in some areas, more common.

In dicotyledonous (two seed-leaved) species, the initial symptom of fluoride effects on leaves is usually chlorosis of the tip, which later extends downward along the margins and inward toward the midrib. This chlorosis becomes more intense and extensive with prolonged exposure until the midrib and some veins appear as a green arborescent pattern on a chlorotic background. Continued exposure may lead to the tip becoming necrotic and falling off, leaving the leaf notched.

The symptoms produced in corn, sorghum, and some other grasses begin as scattered chlorotic flecks at the tips and upper margins of middle-aged leaves. As the symptoms progress, the flecking becomes more intense and extends downward, especially along the margins. The amount of chlorosis diminishes from the tip downward and from the margins toward the midrib. A greater degree of chlorosis is usually present at the arch of the leaf and wavy areas of the margin. At high fluoride concentrations, there is less chlorotic flecking and

a greater tendency for tip, marginal, and interveinal necrosis, or a transverse necrotic band at the arch of the leaf.

In young, developing leaves of broad-leaved species, and occasionally in petals, the translocation of fluoride to the margins and tips leads to a distorted shape. This may be accompanied by chlorosis at the margins and/or necrosis. The occurs because cells in the mid-parts of the leaf have low fluoride and expand normally but those on the margins are slower-growing, so the leaf buckles and distorts, becoming cupped and concave or convoluted like a savoy cabbage.

There is little information about the effects of fluoride on fruits but there are two important examples. Bonte and Garrec described fluoride-induced distortion of strawberry fruits. It was caused by lack of fertilization of the some of the seeds, which are responsible for hormonal-induced swelling of the fruit.

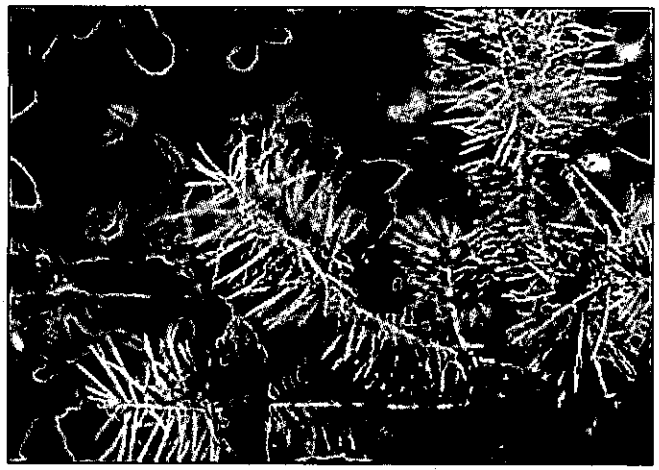
Peach also shows an unusual disorder induced by fluoride called "suture red spot" or "soft suture" of the fruit. It is characterized by premature ripening of the flesh on one or both sides of the suture toward the stylar (blossom) end of the fruit (Benson 1959; MacLean et al. 1984). The ripening of this tissue considerably precedes that of the normal fruit and is often accompanied by splitting of the flesh along the suture. At harvest, the affected areas are soft and often decomposing.

Finally, although the economic value of injury to a peach crop can be calculated, it is almost impossible to calculate or predict the effects of injury on other plants. If fluoride kills all of the leaves on a tree, then there will, of course, be an effect on subsequent growth. However, apart from this very rare occurrence, there is little or no relationship between visible injury and either growth or longevity. A plant that is visibly injured is not necessarily dying and there have been some cases of spectacular recovery of trees after severe injury. Many that show a significant degree of injury (such as *Populus*) continue to grow at normal rates. Conversely, just because a plant does not show visible injury does not mean that there is no effect of fluoride on assimilation or growth. Predicting the effects of fluoride is not a job to be undertaken lightly.

Alan Davison, The Air Pollution Group, Department of Agricultural and Environmental Science, University of Newcastle upon Tyne, Newcastle upon Tyne, UK. Leonard Weinsteind, Environmental Biology, Boyce Thompson Institute, Cornell University, Ithaca, NY. Website: www.ncl.ac.uk/airweb/



Sweet corn (Zea mays) with flecking on leaves.



Douglas fir (Pseudotsuga douglasii). Needles turn light- to reddish-brown.

ADA Warns: Fluoride Risk in Baby Food

CHICAGO (ADA) — New research suggests young children may be getting more fluoride than they need through baby foods, according to a study published in the July 1997 issue of the *Journal of the American Dental Association* (JADA).

"Our main concern is that these young children could be at increased risk for mild to moderate dental fluorosis by ingesting too much fluoride," says Steven M. Levy, DDS, one of the authors of the JADA study from the College of Dentistry at the University of Iowa.

"It's important for parents to know how much fluoride their children are getting, whether it's through the water supply, fluoride supplements, fluoridated toothpaste or baby food," Dr. Levy stated.

Fluorosis is a cosmetic defect that occurs when more than an optimal amount of fluoride is ingested. The result of mild fluorosis is light spots on permanent teeth that develop while the teeth are still forming.

The researchers analyzed the fluoride concentration of 238 commercially available infant foods. They took samples for analysis from 206 ready-to-eat infant foods and 32 dry infant cereals, which they prepared with water according to the manufacturer's directions.

The results of the analysis reveal ready-to-eat foods with chicken had the highest fluoride concentrations.

One of the reasons for the high fluoride concentrations in infant foods with chicken may be because of the processing method, according to the study. The mechanical deboning process may leave skin and residual bone particles in the food. Much of fluoride is stored in bone; therefore, the higher concentrations in the chicken-containing products.

The researchers also found that dry infant cereals that are reconstituted with fluoridated water may noticeably increase the levels of fluoride in a child's daily intake.

"What we found in this study is fluoride concentrations for the majority of all the products tested varied widely because of the different water sources used to process the foods," Dr. Levy explains. "The differences can be traced to the manufacturing sites that use a fluoridated municipal water supply as compared to a non-fluoridated city or well water."

The American Dental Association reminds consumers that drinking water fluoridated at the recommended level or eating foods prepared or processed with fluoridated water is safe and effective.

Fluoride and the Phosphate Connection

by George C. Glasser

Cities all over the US purchase hundreds of thousands of gallons of fresh pollution concentrate from Florida – fluorosilicic acid (H_2SiF_6) – to fluoridate water.

Fluorosilicic acid is composed of tetrafluorosiliciate gas and other species of fluorine gases captured in pollution scrubbers and concentrated into a 23% solution during wet process phosphate fertilizer manufacture. Generally, the acid is stored in outdoor cooling ponds before being shipped to US cities to artificially fluoridate drinking water.

Fluoridating drinking water with recovered pollution is a cost-effective means of disposing of toxic waste. The fluorosilicic acid would otherwise be classified as a hazardous toxic waste on the Superfund Priorities List of toxic substances that pose the most significant risk to human health and the greatest potential liability for manufacturers.

Phosphate fertilizer suppliers have more than $10 billion invested in production and mining facilities in Florida. Phosphate fertilizer production accounts for $800 million in wages per year. Florida's mines produce 30% of the world supply and 75% of the US supply of phosphate fertilizers. Much of the country's supply of fluoro-silicic acid for water fluoridation is also produced in Florida.

Phosphate fertilizer manufacturing and mining are not environment friendly operations. Fluorides and radionuclides are the primary toxic pollutants from the manufacture of phosphate fertilizer in Central Florida. People living near the fertilizer plants and mines, experience lung cancer and leukemia rates that are double the state average. Much of West Central Florida has become a toxic waste dump for phosphate fertilizer manufacturers. Federal and state pollution regulations have been modified to accommodate phosphate fertilizer production and use: These regulations have included using recovered pollution for water fluoridation.

Radium wastes from filtration systems at phosphate fertilizer facilities are among the most radioactive types of naturally occurring radioactive material (NORM) wastes. The radium wastes are so concentrated, they cannot be disposed of at the one US landfill licensed to accept NORM wastes, so manufacturers dump the radioactive wastes in acidic ponds atop 200-foot-high gypsum stacks. The federal government has no rules for its disposal.

During the late 1960's, fluorine emissions were damaging crops, killing fish and causing crippling skeletal fluorosis in livestock. The EPA became concerned and enforced regulations requiring manufacturers to install pollution scrubbers. At that time, the facilities were dumping the concentrated pollution directly into waterways leading into Tampa Bay.

George Glasser is a Florida-based writer whose work has appeared in Newlife, Whole Life Times, *the* Sarasota ECO Report *and the* Tampa Tribune.

A Phosphate Worse than Death

In the late 1960's, EPA chemist Ervin Bellack worked out the ideal solution to a monumental pollution problem. Because recovered phosphate fertilizer manufacturing waste contain about 19% fluorine, Bellack concluded that the concentrated "scrubber liquor" could be a perfect water fluoridation agent. It was a liquid and easily soluble in water, unlike sodium fluoride – a waste product from aluminum manufacturing. It was also inexpensive.

Fate also intervened. The aluminum industry, which previously supplied sodium fluoride for water fluoridation, was facing a shortage of fluorspar used in smelting aluminum. Consequently, there was a shortage of sodium fluoride to fluoridate drinking water.

For the phosphate fertilizer industry, the shortage of sodium fluoride was the key to turning red ink into black and an environmental liability into a perceived asset. With the help of the EPA, fluorosilicic acid was transformed from a concentrated toxic waste and a liability into a "proven cavity fighter."

The EPA and the US Public Health Service waived all testing procedures and — with the help of the American Dental Association (ADA) — encouraged cities to add the radioactive concentrate into America's drinking water as an "improved" form of fluoride.

In promoting the use of pollution concentrate as a fluoridation agent, the ADA, Federal agencies and manufacturers failed to mention that it was radioactive.

The product is not "fluorine" or "fluoride" as proponents state: It is a pollution concentrate. Fluorine is only one captured pollutant comprising about 19% of the total product.

By 1983, the official EPA policy was expressed by EPA Office of Water Deputy Administrator Rebecca Hanmer as follows: *"In regard to the use of fluosilicic (fluorosilicic) acid as a source of fluoride for fluoridation, this agency regards such use as an ideal environmental solution to a long-standing problem. By recovering by-product fluosilicic acid from fertilizer manufacturing, water and air pollution are minimized, and water utilities have a low-cost source of fluoride available to them."*

A Hot New Property

In promoting the use of the pollution concentrate as a fluoridation agent, the ADA, Federal agencies and manufacturers failed to mention that it was radioactive. Whenever uranium is found in nature as a component of a mineral, a host of other radionuclides are always found in the mineral in various stages of decay. Uranium and all of its decay-rate products are found in phosphate rock, fluorosilicic acid and phosphate fertilizer.

During wet-process manufacturing, trace amounts of radium and uranium are captured in the pollution scrubber. This process was the subject of an article by H.F. Denzinger, H. J. König and G.E. Krüger in the fertilizer industry journal, *Phosphorus & Potassium* (No. 103, Sept./Oct. 1979) discussed how radionuclides are carried into the fluorosilicic acid.

While the uranium and radium in fluorosilicic acid are known carcinogens, two decay products of uranium are even more carcinogenic: radon-222 and polonium-210.

During the acidulation process that creates phosphoric acid, radon gas contained in the phosphate pebble can be released in greater proportions than other decay-rate products (radionuclides) and carried over into the fluorosilicic acid. Polonium may also be captured in greater quantities during scrubbing operations because, like radon, it can readily combine with fluoride.

In written communications to the author, EPA Office of Drinking Water official Joseph A. Cotruvo and Public Health Service fluoridation engineer Thomas Reeves have acknowledged the presence of radionuclides in fluorosilicic acid.

Radon-222 is not an immediate threat because it stops emitting alpha radiation and decays into lead-214 in 3.86 days. Lead-214 appears to be harmless but it eventually decays into bismuth-214 and then into polonium-214. Unless someone knew to look for specific isotopes, no one would know that a transmutation into the polonium isotope had occurred.

Polonium-210, a decay product of bismuth-210, has a half-life of 138 days and gives off intense alpha radiation as it decays into regular lead and becomes stable. Any polonium-210 that might be present in the phosphate concentrate could pose a significant health threat. A very small amount of polonium-210 can be very dangerous, giving off 5,000 times more alpha radiation than the same amount of radium. As little as 0.03 microcuries (6.8 trillionths of a gram) of polonium-210 can be carcinogenic to humans.

"By recovering by-product fluosilicic acid from fertilizer manufacturing... water utilities have a low-cost source of fluoride available to them."
Rebecca Hammer, Office of Water, EPA, 1983

The lead isotope behaves like calcium in the body. It may be stored in the bones for years before turning into polonium-210 and triggering a carcinogenic release of alpha radiation.

Drinking water fluoridated with fluorosilicic acid contains radon at every sequence of its decay to polonium. The fresher the pollution concentrate, the more polonium it will contain.

As long as the amount of contaminants added to the drinking water (including radionuclides in fluorosilicic acid) do not exceed the limits set forth in the Safe Drinking Water Act, the EPA has no regulatory problem with the use of any contaminated products for drinking water treatment.

Big Risks: No Tests.

Despite the increased cancer risk from using phosphate waste to fluoridate drinking water, the EPA nor the Centers for Disease Control have never commissioned or required any clinical studies with the pollution concentrate – specifically, the hexafluorsilicate radical whose toxicokinetic properties are different than the lone, fluoride ion.

Section 104 (I) (5) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) directs the Toxic Substances and Disease Registry, the EPA, the Public Health Service and the National Toxicology Program to initiate a program of research on fluoride safety. However, after almost 30 years of using fluorosilicic acid and sodium fluorosilicate to fluoridate the drinking water, not one study has been commissioned.

The fluoride ion only hypothetically exists as an entity in an ideal solution of purified water – and tap water is far from pure H_2O. All clinical research with animal models is done using 99.97% pure sodium fluoride and double distilled or deionized water. Among the thousands of clinical studies about fluoride, not one has been done with the pollution concentrate or typical tap water containing fluorides.

Synergy Soup

The fluorosilicic acid is also contaminated with small traces of arsenic, cadmium, mercury, lead, sulfates, iron and phosphorous, not to mention radionuclides. Some contaminants have the potential to react with the hexafluorosilicate radical and may act as complex ionic compounds. The biological fates and toxicokinetic properties of these complex ions are unknown.

The reality of artificial water fluoridation is so complex that determining the safety of the practice may be impossible. Tap water is chemically treated with chlorine, soluble silicates, phosphate polymers and many other chemicals. In addition, the source water itself may contain a variety of contaminants.

The addition of a fluoridation agent can create synergized toxicants in a water supply that have unique toxico-kinetic properties found only in that particular water supply. Consequently, any maladies resulting from chronic ingestion of the product likely would be dismissed as a local or regional anomaly unrelated to water fluoridation.

Technically, artificially fluoridating drinking water is a violation of the Safe Drinking Water Act (SDWA). Under statutes of the SDWA, federal agencies are forbidden from endorsing, supporting, requiring or funding the practice of adding any chemicals to the water supply other than for purposes of water purification. However, the Public Health Service (PHS) applies semantics to circumvent Federal law in order to promote and fund the practice.

PHS states that they only recommend levels of fluorides in the drinking water, and it is the sole decision of a state or community to fluoridate drinking water.

Federal agencies are forbidden from directly funding or implementing water fluoridation but Federal Block Grants are given to States to use as they see fit. Through second and third parties (such as the American Dental Association, state health departments and state fluoridation coordinators), PHS encourages communities to apply for Federal Block Grant funds to implement fluoridation.

The legality of using of Federal Block Grant funds to fund water fluoridation, a practice prohibited by Federal law, has never been addressed in the courts.

Vendors selling the pollution concentrate as a fluoridation agent use a broad disclaimer found on the Material Data Safety Sheet that states: "no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices, or from *any hazards inherent to the product.*" [*Emphasis added.*]

The next time you turn on the tap and water gushes out into a glass, reflect on the following disclaimer from the EPA's 1997 Fluoride: Regulatory Fact Sheet:

"In the United States, there are no Federal safety standards which are applicable to additives, including those for use in fluoridating drinking water."

{CITATIONS AVAILABLE ON REQUEST}

Resources

Organizations

Center for Health Action
PO Box 80270, Forest Park Station
Springfield, MA 01138

Citizens for Safe Drinking Water
3243 Madrid Street
San Diego, CA 92110

Concerned Citizens for Pure Water
164 Heatherly Heights Road
Saluda, NC 28773

Fluoride Alert
192 Locha Trail
Jupiter, FL 33458

Global Alliance Against Fluoridation
Park West Station, PO Box 20832
New York, NY 10025-1516

Health Alliance International
645 Ninth Street
Oakmont, PA 15139

New Jersey Citizens Opposing Forced Fluoridation, Inc:
PO Box 4315
River Edge, NJ 07661

New York State Coalition Opposed to Fluoridation, Inc.
PO Box 263
Old Bethpage, NY 11804-0263

Our Rights Our Water
1102 Pleasant Street, #818
Worcester, MA 01602

Pure Water Committee of Western Maryland
2245 Pocahontas Road
Frostburg, MD 21532

Safe Water Association, Inc.
PO Box 502
Fond du Lac, WI 54936

Safe Water Coalition, Inc.
PO Box 6134
Albany, CA 94706

Safe Water Coalition, Inc.
PO Box 773
Orinda, CA 94563-0768

Safe Water Coalition of Washington State
5615 West Lyons Court
Spokane, WA 99208

Safe Water Committee
PO Box 1242
Old Chelsea Station
New York, NY 10113

Safe Water Foundation of Texas
11419 Shadow Way
Houston, TX 77024

Tacoma Fluoride Alert
1507 North Fife Street
Tacoma, WA 98406

Waste Not
82 Judson Street
Canton, NY 13617

Books

Continuing Evaluation of the Use of Fluorides, ed. Erling Johansen, Donald Taves and Thor Olsen. (Westview Press for the American Association for the Advancement of Science, 1979)

Fluoridation:The Great Dilemma by Albert W. Burgstahler, H. Lewis McKinney and George L. Walbott (Coronado Press Inc., 1978)

Fluoride, the Aging Factor: How to Recognize and Avoid the Devastating Effects of Fluoride by Dr. John Yiamouyiannis (1993)

Fluoride Emissions:Their Monitoring and Effects on Vegetation and Ecosystems by Frank Murray (1982)

Review of Fluoride: Benefits and Risks. Report of the Ad Hoc Subcommittee on Fluoride, US Department of Health and Human Services (February 1991)

The Fluoride Question: Panacea or Poison by Anne-Lise Gotzsche (Stein and Day, 1975)

Publications

"Fluoride's Revenge," by Daniel Grossman (*The Progressive*, December 1990)

Environmental Fluoride 1977, National Ressearch Council of Canada

"Fluoridation of Public Water Systems: Valid Exercise of State Police Power or Constitutional Violation?" by Douglas A. Balog, *Pace Environmental Law Review*, 1997

"Fluoride: Industry's Toxic Coup," by Joel Griffiths (*Covert Action Quarterly*, Fall 1992; *Earth Island Journal*, Fall 1998)

"Fluoride Pollution," by Edward Groth III (*Environment*, April/May 1975)

Fluorides and Oral Health, World Heath Organization, Technical Series No. 846 (1994)

Fluorides. Committee on Biologic Effects of Atmospheric Pollutants, National Research Council, National Academy of Sciences (1971)

Fluoride, the quarterly journal of the International Society for Fluoride Research, 81A Landscape Road, Mt. Eden, Auckland 4, New Zealand, phone/fax: 011-11-64-9-630-7114.

Health Effects of Ingested Fluoride, National Academy of Sciences/National Research Council, 1993

"Special Investigative Report on Fluoridation," *Chemical & Engineering News*, August 1, 1988.

"The Fluoride Connection," by Richard G. Foulkes, MD, *Townsend Letter* (April 1998)

Websites

American Dental Association Fluoridation Facts
(Source for pro-fluoride information)
http://www.ada.org/consumer/fluoride/facts

Academy of General Dentistry
http://www.agd.org

American Dietetic Association
http://www.dentnet.nl/ntvt

Canadian Pediatric Society
http://www.cps.ca

Dental Fluorosis Prevention Program
http://www.inter-view.net/~sherrell

Fluoride Issues
http://www.sonic.net/~kryptox

Health Action Network Society, Alberta, Canada
http://www.cadvision.com/fluoride

Holistic Dental Association, Holistic/Alternative Dentistry
http://www.simwell.com/hda

Leading Edge International Research Group
http://www.trufax.org

Preventative Dental Health Association
http://emporium.turnpike.net/P/PDHA/

The Fluoride Stop
http://bruha.com/fluoride

Stop Fluoridation USA
http://home.cdsnet.net/~fluoride

Zero Waste America
http://www.zerowasteamerica.com/BanFluoride.htm

Fluoride-free Toothpaste

Baby Orajel Tooth & Gum Cleanser, Del Pharmaceuticals

First Teeth Toothpaste for Babies & Toddlers, Nu-Tec Health Products, Inc. Carlsbad, CA 92008

Homoedent (France), Distributed by Boiron-Borneman, Inc., Newton Square, PA 19073

Nature's Gate, Levlad, Inc., Chatsworth, California 91311

Natural Tea Tree Oil, Desert Essence, Chatsworth, CA 91311

Optifresh; Tea Tree, Distributed by Natural Organics, Inc., 548 Broadhollow Rd., Melville, NY 11747

Peelu Toothpaste, Distributed by The Peelu Co., Box 2672, Fargo, ND 58108, 1 (800) 457-3358

The Natural Dentist, Woodstock Natural Products, Inc., 2337 Lemoine Ave., Fort Lee, NJ 07024, (800) 615-6895

Tru-Dent, Schiff Products, Inc., Salt Lake City, UT 84194

Yademecum Toothpaste, The Swedish Whitener
Distributed in the US by Dermatone Lab, Connecticut

Weleda Toothpaste, Weleda, Inc., PO Box 249, Congers, NY 10920, (800) 289-1969

"Our members' review of the body of evidence over the last 11 years, including animal and human epidemiology studies, indicates a causal link between fluoride/fluoridation and cancer, genetic damage, neurological impairment and bone pathology... the health and welfare of the public is not served by the addition of this substance (fluoride) to the public water supply... for which there is virtually no evidence of significant benefits... and substantial evidence of harm." — *National Federation of Federal Employees Union (Local 2050), Washington, DC, July 1997*

Attachment "2"

Re: Senate Bill 312

Date: February 23, 2000

Karen Wynn Herrin, RDH, MEd

I would like to take this opportunity to voice my support for Senate bill 312.

Based on over 50 years of experience, controlled water fluoridation continues to be the safest and most economical method to prevent dental decay for all socioeconomic groups. Numerous studies have shown an average 20-40% reduction in the incidence of dental decay in communities with water fluoridation. Another illustration of the effectiveness of fluoride is that children living in fluoridated areas are 6 times as likely to be free from decay as children living in nonfluoridated areas.

Water fluoridation is especially beneficial for those members in a community of lower socioeconomic status. When access to commercial fluoride products, such as mouthrinses and toothpastes, are minimal, as with many of the poor and elderly, water fluoridation still provides the single most important source of fluoride. For the more prosperous, the fluoride that is ingested from public water supplies constitutes but one of several sources. It has been estimated that water fluoridation may result in a 40% benefit for the poor, whereas the more affluent with better access to dental products and professional services may realize less than a 20% benefit.

Most of the early studies on water fluoridation focused solely on the benefits derived for children. With adults now retaining their teeth longer, the effect of fluoride on the adult teeth cannot be overlooked. It has been shown that decay on the exposed root surfaces of teeth begins to occur with significant frequency in the 35-44 age group, doubles in the 45-54 age group, and doubles yet again in the 55-66 age group. Thus, the maximum attainable benefit derived from water fluoridation alone now appears to be a 40% reduction in the incidence of adult decay.

Water fluoridation is also economical, costing on average 51 cents per person per year. For every dollar spent on water fluoridation, $80 is saved in costs that would have been used to restore the effects of tooth decay. This savings is equally magnified by the realization that for every decayed tooth prevented, the need is reduced for repeatedly restoring defective fillings several times over a lifetime. This savings is important considering that the replacement rates for an amalgam or silver filling because of secondary decay varies from between 38-50%.

The last issue related to water fluoridation is a question of safety. Fluoride is perhaps one of the most thoroughly studied community health measures now in use. A report published by the World Health Organization addressed numerous questions raised about the possible effects of fluoride on different organs and its alleged association to various diseases. The study found no reliable evidence that any ill effects or symptoms resulted from drinking water fluoridated at the recommended levels. In 1991, the Department of Health and Human Services released a report on fluoride outlining the benefits and risks. This report also concluded that there is no indication that chronic low-level fluoride exposure presents a problem in any organ system.

On a personal note, in my work as a dental hygienist at The New Hampshire Technical Institute and in the public school systems, I see several children, many of whom are from lower income families. This experience has proven to me that the need for water fluoridation in many communities in this state is overwhelming. Given the safety and effectiveness of this public health measure, there is clearly no need for the state to legislate an unnecessary and obstructive exception to placing water fluoridation on local ballots. A petition from 5% of the registered voters should be all that is required to place this issue before the community.

LOT OF INFORMATION ON AMERICAN DENTAL ASSOCIATION SITE,
E.g. :
Fluorides & Fluoridation
Fluoridation Facts
Fluoridation Links

BUT DID NOT SEND FOR COPY IN TIME AND IS COPYRIGHTED
SO HERE IS THE WEB SITE

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See Terms & Conditions of Use for further legal information.

August 17, 1999
Document address: **http://www.ada.org/consumer/fluoride/sites.html**

"Family Physician Workforce Reform: Recommendations of the American Academy of Family Physicians"

FLUORIDATION OF PUBLIC WATER SUPPLIES
Fluoridation of public water supplies is a safe, economical, and effective measure to prevent dental caries. Family physicians should know the fluoride content of local drinking water supplies, should educate patients to prevent excessive fluoride intake, and be knowledgeable about the health risks and benefits associated with fluoride. Dietary fluoride supplements should be considered for children from ages six months through 16 years when drinking water levels are suboptimal. (1993)(1996)

AWWA Government Affairs (American Water Works Association.)
Fluoridation of Public Water Supplies

Adopted by the Board of Directors Jan. 25, 1976 and reaffirmed Jan. 31, 1982

In view of the endorsement and resolutions of the American Dental Association, the Canadian Dental Association, the American Medical Association, the Canadian Medical Association, and the Health League of Canada, the American Water Works Association (AWWA) supports the practice of fluoridation of public water supplies in conformance with the standards set by the appropriate regulatory agencies.

Attachment #3
(See File for Articles of information)

Hello my name is Coleen Smead
(I am currently the President of the NH Dental Hygiene Association,)
I have been a hygienist for 20 years and was a dental assistant for 8 years before that. I worked in communities that were fluoridated and ones that were not in MA, ME and NH. I personally have seen the difference Public Water Fluoridation can make.

Fluoride supplements have been around for a long time and are an alterative to water supply fluoridation but compliance is a factor and not all who need it get it. Also Fluoride is beneficial to all ages not just to children.

In reading many articles from many health and other organizations this is well supported and scientifically backed.

The American Dental Association has a wealth of information on its web site. I did not print that as it is copywrited but have the web site here for you.
http://www.ada.org/consumer/fluoride/sites.html
(or go to: http://www.ada.org
and click on "Research and Clinical Issues"
then click on "Fluorides and Fluoridation")

I have here for you many articles from organizations like:

The American Dietetic Association
The Joint Public Information Committee of the American Society for Nutritional Sciences
The American Society for Clinical Nutrition
The International Food Information Council
The American Academy of Family Physicians
The American Water Works
The Surgeon General
The British Fluoridation Society

The National Cancer Institute
Consumer Reports
The CDC: Morbidity and Mortality Weekly Report

This bill just makes it easier to get the issue of Public Water Fluoridation on the Ballot so the public can vote on it. It does not actually allow Water Fluoridation to take place.

I have brought this information for you so you may understand as I do, that Fluoride helps people keep their teeth without serious consequences when used as recommended. It is not a poison unless used in excessive quantities; it does not cause cancer, birth defects, heart disease, allergic reactions or any other serious disease when used in amounts recommended, as is the same for substances like iron, vitamins A & D. At the level in fluoridated water (1 ppm) you would have to drink at least several hundred gallons at **one** sitting to get a lethal dose!!

Fluoridated Water Helps those people who have the least access to Dental care and have the least ability to prevent debilitating dental disease, while incurring the least cost to the community. Although this bill does not permit actual fluoridation it is a step in the right direction, so the public can make that choice.

I urge you to pass this bill and will leave this information for you.

Thank you,

Coleen M. Smead, RDH
President New Hampshire Dental Hygienists' Association

Fluoridation 2/2000

Attachment #3

Joan Jewell RDH
Dental Hygiene Consultant
Oral Health Bureau
Public Health Division
New Mexico Department of Health

Dawn H.
Nancy

Consumer Reports

Editor's note: Soon after these reports were published, John Yiamouyiannis instituted an $8-million libel suit against Consumers Union, charging that he had been defamed by CU's report. According to people who called us, the existence of the libel action was mentioned by opponents of fluoridation whenever our report was quoted or introduced at local hearings or public debates.

In May 1979, Yiamouyiannis's suit was dismissed by Judge Richard Owen of the U.S. District Court for the Southern District, who said: "...the suggestion is strong that the plaintiff's object in bringing this action is to use this court to discourage the publication of opposing views."

Yiamouyiannis appealed that decision, but in March 1980, the U.S. Court of Appeals for the Second Circuit unanimously upheld Judge Owen's decision, and added: "It is clear that [CU] made a thorough investigation of the facts.... The unquestioned methodology of the preparation of the article exemplifies the very highest order of responsible journalism..."

A TWO-PART REPORT ON FLUORIDATION

"There are three kinds of lies," remarked 19th-century British statesman Benjamin Disraeli, "Lies, damned lies, and statistics." Probably every type of misrepresentation known to Disraeli, and some he may have overlooked, have been used to attack fluoridation. Misleading information about it appears regularly in a paper called the National Fluoridation News, and the entire gamut of hokum has been published in a 176-page issue of the Cancer Control Journal, a pro-Laetrile magazine based in Los Angeles. This two-part report, reprinted from the July and August, 1978, issues of CONSUMER REPORTS, responds to the lies and false claims that have been made in the attack on fluoridation.

PART I: THE CANCER SCARE

On the evening of February 10, 1976, millions of Dutch television viewers were watching their sets with more than customary attention. News of a bribery scandal in the United States had just reached Europe, along with rumors that Prince Bernard of Holland was implicated. Those who tuned in were unaware, however, that an unrelated interview later in the newscast would soon affect many of them more directly than the scandal.

The interview involved Dean Burk, Ph.D., an American biochemist formerly with the National Cancer Institute, the Federal agency that conducts or sponsors much of the cancer research in the U.S. Dr. Burk's message was a troubling one. Adding fluoride to drinking water as a dental health measure, he asserted, was causing thousands of cancer deaths annually in the U.S. He claimed that statistical studies done by himself and another biochemist, John Yiamouyiannis, Ph.D., showed a link between fluoridation and cancer. Dr. Burk expressed no reservations about his conclusion. "Fluoridation," he told the audience, "is a form of public mass murder."

Copies of the Burk-Yiamouyiannis report had been circulated to members of the Dutch Parliament before the TV appearance. Soon after, a proposal by the Minister of Health to fluoridate all drinking-water supplies in Holland died in Parliament. By September 1976, a Royal Decree ended fluoridation in Rotterdam and other Dutch cities that had been treating their water for years.

A GROWING SENSE OF ALARM

What happened in Holland is not an isolated incident. Despite widespread endorsement of fluoridation by medical, dental, and public health officials, the practice has come under increasing attack both in the United States and abroad as a potential cause of cancer and other diseases. Three years ago, after a publicity campaign linking fluoride to cancer, Los Angeles voters defeated an ordinance to fluoridate the city's water supply. Since 1973, voters in hundreds of smaller U.S. cities and towns have taken similar action, often out of fear of cancer or other disorders attributed to fluoridation.

How valid are those fears? Is there a genuine scientific controversy surrounding the safety of fluoridation? According to Representative James J. Delaney (D., N.Y.), chairman of the powerful House Rules Committee, the answer is an emphatic "yes." A long-time opponent of fluoridation, Delaney has urged Congress to halt the practice, pending

R029

...er investigation of its safety. Last fall, a subcommittee ...the House's Committee on Government Operations held ...earings on the issue. Drs. Burk and Yiamouyiannis testified, as did representatives of the American Dental Association, the National Cancer Institute, and authorities on fluoride research. An extensive array of scientific studies and expert commentaries on fluoridation was also presented.

What emerged from the testimony, in CU's opinion, was an unmistakable sense that millions of Americans are being grossly misled about an issue important to both their health and the cost of their dental bills. Water fluoridation is the only public-health measure that many Americans vote on directly. Yet last fall's hearings received only scant coverage by the press, except in publications that commonly run anti-fluoridation stories. Accordingly, in this two-part report we will tell you the facts about fluoridation—what it is, how it developed, and what it does. This month we will also examine the claims about fluoridation and cancer and consider the people behind those claims. Next month we'll take a look at other charges frequently leveled at fluoridation, including claims about allergies, birth defects, and heart disease.

ON THE TRAIL OF COLORADO STAIN

Fluorides are compounds containing the element fluorine. In its various forms, fluoride is found in practically all soils, plants, and animals, as well as in human blood, bones, and teeth. It's also present in at least trace amounts in all natural water supplies. The concentration in water varies widely, however. In the U.S., natural fluoride levels range from a high of about 8 parts per million (ppm) in areas of the Southwest to as little as 0.05 ppm in the Northeast.

Fluoridation is simply an adjustment of the natural fluoride content to about 1 ppm—a level of intake that strengthens tooth enamel and sharply reduces dental decay, especially among those exposed to fluoridated water from early childhood. The nominal 1-ppm level (actually 0.7 to 1.2 ppm, according to local conditions) isn't an arbitrary one. Its selection involved a scientific detective story complete with a twist ending.

Water fluoridation is the only public-health measure that many Americans vote on directly. And since 1973, hundreds of towns and cities have voted against fluoridating the water supply.

The initial clue was uncovered early in the century by two scientists investigating a cosmetic defect. F.S. McKay and G.V. Black were trying to find out what caused a mottling of the tooth enamel, a discoloration variously known as "Colorado brown stain" and "Texas teeth." By 1916 they had narrowed the search to something in domestic water supplies. The next step was to identify the substance and get it out of the water. It took until 1931, however, before the substance was identified as fluoride.

Meanwhile, McKay had noticed something else. A practicing dentist, he observed that patients with mottled teeth also had remarkable resistance to tooth decay. The concern of public health officials at the time was still how to get fluoride out of the water. But McKay's observation also spurred further research by the Public Health Service to learn more about fluoride's effect on teeth.

Over the next ten years, research teams led by Dr. H.T. Dean of the Public Health Service studied the dental status of 7257 children in 21 cities having various levels of natural fluoride in their water. The results were unequivocal. The more fluoride in the water, the fewer dental cavities the children experienced. When the water contained approximately 1 ppm or more of fluoride, the children developed about 60 percent fewer cavities than did those who drank water with negligible fluoride content. Furthermore, at the 1-ppm level, the unattractive mottling did not occur. It was associated with levels above 2 ppm. Thus, 1 ppm of fluoride became the benchmark level.

Tooth decay was no minor health problem. During the war year of 1942 some 2,000,000 men were examined as potential members of the armed forces. Almost 10 percent of them were rejected because they didn't have 12 sound teeth in proper position out of a possible 32.

Although the potential dental advantages of fluoridation were obvious, there was a natural reluctance to add a chemical to community water supplies. In the early 1940's, there was no background of scientific data about possible side effects. There were some practical reassurances, though. People had been ingesting fluoride in food and water since the dawn of the human race. Many Southwesterners had been drinking water containing several times the 1-ppm level of fluoride for a lifetime without any discernible side effects except mottled teeth. Eventually, a few cities decided to take the chance.

THE NEWBURGH-KINGSTON EXPERIMENT

Among the pioneers was the New York State Department of Health. Before attempting any widespread introduction of fluoridation, the department proposed a long-term, controlled study of a limited group of children who would be carefully monitored by physicians. After considering various communities, the department chose the cities of Newburgh and Kingston as ideal candidates for the study.

Located some 35 miles apart near the Hudson River, both cities had populations of about 30,000 and were similar in racial, economic, and other demographic characteristics. Each also used reservoirs with water deficient in fluoride.

One city's water supply was to be fluoridated, the other not. Meanwhile, matched groups of children from the two cities were to be followed from infancy onward by means of comprehensive pediatric checkups to detect any side effects from fluoride. Special attention was to be given to growth rates, bone development, blood chemistry, the skin, the thyroid gland, vision, and hearing. Each child would also receive meticulous, regular dental exams.

In March 1944, the City Council of Newburgh agreed to participate in the study and approved the fluoridation of its water to 1 ppm. Kingston agreed to serve as the con-

y and use its fluoride-deficient water without change. al of 817 children were enrolled in the Newburgh group d 711 in Kingston. Although most entered at the start of the study, several infants were added during each of the first three years to ensure having some children whose mothers were exposed to fluoridated water throughout pregnancy.

The study went on for 10 years, and a majority of the children in both groups participated through the final examination. The findings can be summarized briefly: The examinations disclosed no differences of medical significance between the two groups that could even remotely be attributed to fluoride. There was one difference of dental significance, however. The Newburgh children experienced nearly 60 percent fewer cavities than the Kingston children.

Numerous studies have since confirmed the benefits of fluoridation. "Fewer cavities" means fewer costly fillings, fewer lost teeth, and, eventually, fewer dentures or partial dentures. The cost of fluoridation to a community, according to a report last year in the New England Journal of Medicine, is only about 10 to 40 cents a year per capita.

THE EVIDENCE FOR SAFETY

Since the early days of the Newburgh-Kingston project, literally thousands of scientific studies have examined the effectiveness and safety of fluoride. Virtually every doubt or question that has been raised, however scanty the evidence, has been studied in depth by one or more groups of researchers. As a dentist representing the American Dental Association noted in the House subcommittee hearings last fall, "Fluoridation may well be the most thoroughly studied community health measure of recent history."

In the late 1960's, the World Health Organization accomplished the Herculean task of pulling much of the known information together. The objective was to provide an impartial review of the scientific literature on fluoridation—a vast international aggregation of population studies, experimental research, animal studies, and clinical investigations, including human autopsy studies, clinical trials, and X-ray research.

The report, "Fluorides and Human Health," came out in 1970. It addressed numerous questions raised up to that time about the possible effects of fluoride on different organs and its alleged association to various diseases. Again, the conclusions can be summarized briefly: The study found no reliable evidence that any ill effects or symptoms resulted from drinking water fluoridated at recommended levels.

Since the report's publication, the World Health Organization has uncovered no evidence to alter its judgment. In a statement issued in 1975, the organization noted: "The only sign of physiological or pathological change in life-long users of optimally fluoridated water supplies . . . is that they suffer less from tooth decay."

THE LOYAL OPPOSITION

No amount of study, however, has managed to quiet the criticism of fluoride that has been present from the beginning. Writing in the Journal of the American Dental Association in March 1956, the commissioner of New York State's Department of Health, Dr. Herman E. Hilleboe, told of some of the troubles his agency had encountered in the early days of the Newburgh-Kingston project. Soon after the project's approval in March 1944, the local health officer in Newburgh began receiving complaints from some of the town's citizens.

Some protested that the fluoridated water was discoloring their saucepans. Others complained that it was giving them digestive troubles. One woman complained to her dentist that the "fluoride water" had caused her denture to crack. "These incidents all occurred before fluoride was added to the water supply," notes Dr. Hilleboe. The complaints stopped abruptly after a Newburgh newspaper criticized the town's imaginary ills.

"The only sign of physiological or pathological change in life-long users of optimally fluoridated water supplies . . . is that they suffer less from tooth decay." [from a World Health Organization report]

Despite fluoridation's success in Newburgh, protests against it elsewhere weren't collapsing so readily a decade later. The rise of "a vociferous minority," said Dr. Hilleboe, had succeeded in delaying, or even reversing, the start-up of fluoridation in several areas. The opposition, he reported, came chiefly from food faddists, cultists, chiropractors, and people who misunderstood what fluoridation was. But the efforts of antifluoridationists have also been aided by the caution of various physicians, dentists, and scientists of good standing who initially questioned the safety of fluoridation. Opposition has also come from other professionals and lay people who view fluoridation as a government infringement of individual freedom.

Various groups have been formed for the sole purpose of fighting fluoridation, but none has had much impact outside of its local community. Generally, the real steam behind the antifluoridation movement has come from well-funded, national, multi-issue organizations that have been able to disseminate large amounts of scare propaganda around the country. One such group is the John Birch Society. Another, up until the early 1970's, was the Rodale Press, publisher of Prevention magazine and a frequent proponent of unproved nutrition concepts. The most active and effective group today, however, is the National Health Federation, whose roots run deep into the soil of medical quackery. Those roots are worth a brief examination.

WHEN ROOSTERS HAD BAD TEETH

In the early 1950's, an organization called the Electronic Medical Foundation ran a lucrative diagnosis-by-mail service and also sold electronic treatment devices for "curing" numerous disorders. An estimated 3000 practitioners, mainly

ctors, would send dried blood specimens from their s to the foundation. There, the blood spot would be ed by an electronic gadget and a "diagnosis" mailed by postcard.

This eventually aroused a certain skepticism at the U.S. Food and Drug Administration. Accordingly, the FDA arranged to send a few blood spots of its own.

The first, from a man who had lost his right leg, elicited a diagnosis of arthritis in the right foot and ankle. The blood of a dead man brought back a diagnosis of colitis, and that of a rooster resulted in a report of sinus infection and bad teeth.

The FDA inspectors also investigated the treatment devices. They found that the gadgets simply contained circuits resembling those of an electric doorbell or a small radio transmitter. None could cure anything, reports FDA historian Wallace Janssen.

In 1954 a U.S. District Court ordered the president of the firm, Fred J. Hart, to stop distributing the treatment devices. Shortly thereafter, Hart founded the National Health Federation. Hart continued to distribute the devices, however, and was subsequently prosecuted for criminal contempt and fined $500 in 1962. Between 1957 and 1963, several other officials of the NHF were convicted of misbranding dietary products with false medical claims and received fines or prison sentences. In 1963, the FDA released a report on the NHF that said in part:

> The stated purpose of the federation is to promote "freedom of choice" in health matters. The record shows that what this frequently means is freedom to promote medical nostrums and devices which violate the law. From its inception, the federation has been a front for promoters of unproved remedies, eccentric theories and quackery.

In an updated report on the NHF issued in 1973, the FDA reiterated virtually the same judgment. Throughout its history, the NHF has crusaded against any Government interference with unproven remedies or treatments. At the same time, it has also opposed proven public-health measures--smallpox vaccination, pasteurization of milk, polio vaccination, and fluoridation of drinking-water supplies.

For the most part, the NHF's opposition to public-health measures has been a losing cause. Until recent years, even fluoridation was slowly gaining acceptance in more communities. About 105 million Americans now have fluoridated water. But in 1974 the NHF decided to mount a new national campaign to "break the back" of fluoridation efforts. It hired Dr. Yiamouyiannis to do the job.

RAISING THE SPECTER OF CANCER

The first big target was Los Angeles, whose City Council had voted in September 1974 to fluoridate the water supply. The NHF's ammunition was a study by Dr. Yiamouyiannis that purported to link fluoridation to an increase in cancer deaths. The study and a couple of publicity handouts that accompanied it were eventually reviewed by various public-health officials, including Thomas Mack, M.D., of Los Angeles, an associate professor of community medicine and an expert in cancer epidemiology. (Epidemiology is a branch of medicine that studies the incidence, causes, and control of a disease in specific populations.) The nature of the Yiamouyiannis study is apparent in an excerpt from Dr. Mack's review:

"I cannot begin without commenting on the form of the documents you sent me," Dr. Mack stated. "Despite the gravity of the question addressed, the form of these sheets is that of a propaganda flyer rather than a serious scientific effort. Specifically, there is no indication that any of the material was ever prepared for submission to a reputable scientific journal. . . . All over the documents one finds . . . conclusions emblazoned essentially in the form of slogans, without cautious interpretation or restrictions. For these reasons, the reader must immediately presume that objectivity has never been considered. . . . At the same time this bias is so pervasive and obvious, the mistaken logic so gross and naive, that the reader assumes the author to be, however competent in his Ph.D. field, totally unaware of the principles of epidemiology."

Most people are unfamiliar with the principles of epidemiology, however, and a Ph.D. degree can sometimes lend credibility even to claptrap. In Los Angeles it evidently did. The scare tactics of the NHF and other antifluoridationists scored a stunning victory over dental health.

"There is no evidence that fluoride increases the incidence or mortality of cancer in any organ." [from a study by the Royal College of Physicians]

Around the beginning of 1975, Dr. Yiamouyiannis also joined forces with Dr. Burk. Like the National Health Federation, Dr. Burk is a leading advocate of the worthless cancer drug Laetrile (CONSUMER REPORTS, August 1977), and he shares the NHF's aversion to fluoridation.

The collaboration produced a study claiming that 25,000 or more excess cancer deaths occur annually in U.S. cities that fluoridate their water. The assertion was based on a comparison of death rates for specific cancers in some counties that were fluoridated compared with some that were not. In July 1975, Representative Delaney entered the study into the Congressional Record and called for "an immediate suspension of all artificial fluoridation."

The National Cancer Institute reviewed the study and was unimpressed. Unlike a proper epidemiological study, it had failed to take into account widely recognized risk factors known to affect the death rate from specific types of cancers. Using the same data, the NCI reanalyzed the study, taking into account such influences as ethnic composition of the population, geographic location, socioeconomic status, and other fundamental risk factors. The purported differences in the cancer death rates promptly disappeared.

Undaunted, Drs. Burk and Yiamouyiannis bounced back with another study. This time they compared overall cancer death rates for 10 large cities that were fluoridated versus 10 large cities that were not. Again, the fluoridated cities came

cond best. Over the 20-year period studied, cancer rates in the fluoridated cities purportedly increased ercent more than in the unfluoridated ones. In Decem- 1975, Representative Delaney entered the study into the ongressional Record and demanded that all fluoridation be stopped.

If anything, the new study was even more amateurish than the July entry. In the judgment of one NCI official at the House subcommittee hearings, it represented "the worst piece of work that has been done to date on fluoride." Drs. Burk and Yiamouyiannis had somehow managed to ignore the most fundamental factors involved in cancer mortality rates—age, sex, and race. Old people die from cancer more often than young people; men have a higher cancer death rate than women; and blacks a higher one than whites. Unless those factors are taken into consideration, the results of a cancer-mortality comparison would be meaningless.

When NCI scientists reanalyzed the Burk-Yiamouyiannis data, they found that the difference in the cancer death rate was due entirely to the age and racial makeup of the respective populations. Fluoridation was irrelevant.

ONWARD TO EUROPE

Rebuffed by NCI scientists, Dr. Burk took the National Health Federation studies to Holland and England. As noted earlier, the Dutch trip was a smashing success. But the British refused to panic. Both the Royal College of Physicians and Oxford University had recently completed studies of fluoridation and cancer. The Royal College of Physicians in January 1976 concluded: "There is no evidence that fluoride increases the incidence or mortality of cancer in any organ." The Oxford study reached a similar conclusion.

Moreover, British scientists had learned of the NCI's refutation of the Burk-Yiamouyiannis studies. They also were aware that an independent study conducted for the National Academy of Sciences at the University of Rochester, N.Y., had confirmed the NCI's findings.

"In the normal course of events," reported an Oxford research group, "that would have been the end of the matter. Unfortunately, however, it has not been." What the British scientists hadn't realized was that the facts were incidental.

The real goal of antifluoridation groups, explains an American Dental Association official, "is to create the illusion of a scientific controversy." The "studies" are merely the ploy. The accuracy of that judgment was evidenced by what happened next. According to an account in The Lancet, a British medical journal, Drs. Burk and Yiamouyiannis began publicizing their cancer claims in Britain. Through the assistance of the National Anti-Fluoridation Campaign, their misleading data were circulated to members of Parliament, health authorities, and water boards as evidence that fluoridation was causing many cancer deaths.

Meanwhile, the National Health Federation began claiming in the U.S. that NCI officials were concealing data, a charge that eventually had an impact in Britain. In Parliament, one member accused British health officials of misleading the public about fluoridation and of denying people the truth "because of the Official Secrets Act."

THE NCI 'COVER-UP'

According to testmony at the House subcommittee hearings, the NCI refused to disclose certain information to the National Health Federation. That refusal, however, was far less sinister than some members of the British Parliament were later led to believe.

The NCI initially gave Dr. Burk a copy of the publication "U.S. Cancer Mortality by County: 1950-1969," which he later used in preparing the first Burk-Yiamouyiannis report. After the NCI reviewed that report, Dr. Yiamouyiannis asked for a copy of the NCI's analyses. Those were also dispatched. Then, according to NCI testimony, Dr. Yiamouyiannis used that information to attack the NCI's review. Consequently, when he requested their analyses of his subsequent study, NCI officials denied the request. They pointed out that the basic sources were routine publications of the Bureau of the Census and the National Center for Health Statistics, and they told him, in effect, to do the calculations himself. "The data," said NCI's Dr. Robert N. Hoover at the hearings, "are generally available to anyone with a public library card."

To check that claim, a CU staff member visited the local public library. All but two of the volumes needed, both from 1950, were on the shelves of a suburban library within walking distance of our offices. A phone call by one of the librarians located the two remaining volumes at another nearby branch.

As a result of the charges and the wide publicity the National Health Federation gained in Britain, Drs. Richard Doll and Leo Kinlen of the Department of Regius Professor of Medicine at Oxford decided to undertake still another study. Their reason, they explained, was "to be sure about the truth of the matter, and because we feared that Burk and Yiamouyiannis's abuse of statistics might be detrimental to the future health of British children." At the same time, the Royal College of Physicians requested a formal opinion of the cancer data from the Council of the Royal Statistical Society in Britain.

The resulting studies appeared respectively in The Lancet and in the Journal of Applied Statistics in 1977. In The Lancet, Drs. Doll and Kinlen reported that none of the evidence "provides any reason to suppose that fluoridation is associated with an increase in cancer mortality, let alone causes it." The study conducted for the Royal Statistical Society, which undertook an even more comprehensive statistical analysis than the NCI or Oxford, came to the same conclusion.

Furthermore, additional studies by the NCI in 1976, the U.S. Center for Disease Control in 1977, and the National Heart, Lung, and Blood Institute in 1977 each found no evidence linking fluoridation and cancer. In short, independent investigations by seven of the leading medical and scientific organizations in the English-speaking world have unanimously refuted the National Health Federation's cancer claims.

Meanwhile, other allegations against fluoride are in wide circulation. Fluoride is said to cause allergic reactions, birth defects, mutations, heart disease, and cancer in animals. We'll examine those allegations in the second part of this report.

PART II: THE MISLEADING CLAIMS

In addition to frightening the public with a baseless claim that fluoridation of the public water supply causes cancer, the opponents of fluoridation have issued many other misleading charges accusing fluorides of causing ills that range from brittle nails to birth defects. Since such claims are resurrected whenever fluoridation comes up for a vote, we'll discuss the most persistent ones and examine the evidence behind them.

CLAIM: FLUORIDE IS A POISON

Like iron, zinc, and several other minerals, fluorine (in the form of fluoride) is classified by the National Academy of Sciences as an essential trace element in human nutrition. And like many substances essential to life or good health—iron, vitamins A and D, oxygen, and even water itself—fluoride can be toxic in excessive quantities. At high concentrations, fluoride has been used as a poison for insects and rodents. However, at the level in fluoridated water—one part per million (ppm)—you'd have to drink at least several hundred gallons at one sitting to get a lethal dose. The water alone would kill you first.

But what about the possibility of slow poisoning—a little bit at a time over long periods? According to the National Academy of Sciences, the daily intake required to produce symptoms of chronic toxicity after years of consumption is 20 to 80 milligrams or more—far in excess of the average intake in the U.S. Such heavy doses are associated with water supplies that contain at least 10 ppm of natural fluoride, as in some parts of India. There is absolutely no danger of poisoning from imbibing water fluoridated to prevent dental cavities.

An occasional tactic in antifluoridation tracts is to run pictures of cattle or other animals harmed by fluoride poisoning. The photographs are authentic, but the impression conveyed is false. Years ago, steel mills and clay factories in England and Wales sometimes polluted nearby vegetation with tons of fluoride emissions. Similar incidents have also occurred in the U.S. Cattle and other animals that grazed on the vegetation would ingest enormous amounts of fluoride and develop bone fractures and lameness. Their pictures are the ones antifluoridationists use.

In contrast, a controlled experiment with cattle produced far different results. The cattle were fed various amounts of fluoride in their diets for nearly 7½ years. Even at fluoride levels as high as 27 ppm, the cattle did not experience fractures, lameness, or any adverse effects on soft tissues, fertility, or milk production. Nor were there any abnormal effects on their offspring through successive generations.

CLAIM: FLUORIDE CAUSES BIRTH DEFECTS

In the late 1950's, a French physician named Rapaport reported that mongolism occurred more frequently in some cities with fluoridated water than in some cities with little or no fluoride in their water. Experts who reviewed the study found it seriously flawed, however, especially in its method of locating cases. According to Dr. Rapaport's figures, the incidence of mongoloid births in both the fluoridated and unfluoridated cities was less than half the usual rate—a highly questionable finding in itself. Thus, there was a strong likelihood that Dr. Rapaport had failed to uncover the majority of mongoloid births in the cities he chose to study.

That conclusion was soon confirmed by a more carefully controlled study in England. Using more exacting methods of case-finding, the British researchers reported no difference in the incidence of mongolism whether the water was high or low in fluoride.

Since then, two extensive studies have substantiated the British findings. One surveyed virtually all mongoloid births in Massachusetts from 1950 through 1966. The results, published in the New England Journal of Medicine in 1974, showed no link between fluoridation and mongolism. An

even larger study published in 1976 covered approximately 1.4 million births in six major U.S. cities. Researchers at the Center for Disease Control investigated not only mongolism, but also cleft palate, heart abnormalities, clubfoot, and other common birth defects. Again, there was no association between fluoride and any of the defects. In short, the antifluoridationists' claim is based solely on the discredited Rapaport study.

CLAIM: FLUORIDE IS MUTAGENIC

A variation on the birth-defects theme is the charge that fluoride is a genetic hazard. Until recently, this claim was based on irrelevant or questionable experiments with fruit flies and plants. Then, in 1976, two researchers in Kansas City, Mo., reported that various levels of fluoride damaged chromosomes in the bone-marrow cells and sperm cells of mice. Although experts who reviewed the experiment noted several inconsistencies in the results, the question it raised was judged important enough to warrant further research.

Accordingly, joint studies were undertaken by the Laboratory of Developmental Biology and Anomalies at the National Institute of Dental Research, the Department of Biochemistry at the University of Minnesota, and the Laboratory of Cellular and Comparative Physiology at the National Institute on Aging. The scientists conducted four separate experiments, including tests on mice receiving acute doses of fluoride and mice raised for several generations on water containing 50 ppm of fluoride. None of the studies produced any evidence that fluoride damages chromosomes, even at levels 100 times that in fluoridated water supplies.

In Germany, meanwhile, an independent group of researchers reported similar results with human white blood cells, which are especially sensitive to mutagenic agents. Not only did fluoride fail to produce damage, it also evidenced an antimutagenic effect by *protecting* chromosomes against a known mutagen.

CLAIM: FLUORIDE CAUSES ALLERGIC REACTIONS

The charge that people can suffer allergic reactions or "intolerance" to fluoride gained prominence from anecdotal accounts by George L. Waldbott, M.D., an early opponent of fluoridation who founded the National Fluoridation News. Between 1955 and 1965, Dr. Waldbott reported numerous instances of patients experiencing nausea, headaches, "spastic colitis," or various other symptoms that he attributed to fluoride ingestion.

In the World Health Organization study described last month, a review of the Waldbott reports found no reliable evidence to support his contentions. The cases were judged to represent "a variety of unrelated conditions." Following the WHO study, the Public Health Service asked the American Academy of Allergy to evaluate the issue. After a review of the existing clinical reports, the executive committee of the academy concluded unanimously: "There is no evidence of allergy or intolerance to fluorides as used in the fluoridation of community water supplies."

CLAIM: FLUORIDE CAUSES CANCER IN ANIMALS

Possibly the most absurd evidence marshalled against fluoridation is material purporting to show that fluoride induces cancer in animals. One series of studies frequently quoted by antifluoridationists was conducted by researchers in Texas in the 1950's. The first study involved a strain of mice that ordinarily gets cancer. Supposedly, the mice given fluoridated water developed tumors slightly earlier than similar mice on fluoride-free water. There were a few minor hitches in the experiment, however. All the mice were also fed a dog chow that, unknown to the investigator, contained 42 ppm of fluoride—or 10 to 100 times the amount any of the mice got in their water, thus making any comparison between the two groups invalid. A further botching occurred when the investigator miscalculated the amounts of fluoride in the water. Two scientists from the National Institutes of Health reviewed the study in 1951 and dismissed it. Other experiments by the same investigator and a co-worker have long been discredited by subsequent research. Nevertheless, opponents of fluoridation still cite the Texas experiments as significant evidence that fluoride is carcinogenic.

Another study currently getting star billing in antifluoridation tracts is an experiment conducted with fruit flies in 1963. This time, legitimate findings are being substantially distorted. In that study, two strains of fruit flies exposed to 20 to 50 ppm of fluoride in their food experienced an increased incidence of melanotic tumors. Opponents of fluoridation interpret that to mean that fluoride can cause cancer. That's not so, according to scientists working at the National

Institute. While humans may be physiological cousins of mouse and other mammals, their kinship to the fruit fly is somewhat more distant.

Specifically, a *melanotic* tumor in a fruit fly is not the same as a cancerous tumor in a human or mammal. It is more akin to scar tissue, and, unlike a cancerous tumor, it's not malignant or harmful. It can be induced by a wide range of substances, including some vitamins and even lysine and tryptophan, two amino acids essential for human growth and health. Fruit flies can also get malignant tumors, but there's no evidence that fluoride has ever caused any. Indeed, fluoride has never proved to be carcinogenic in tests on a variety of animals, including rats, mice, guinea pigs, rabbits, hamsters, dogs, and sheep.

CLAIM: FLUORIDE CONTRIBUTES TO HEART DISEASE

In Wisconsin, opponents of fluoridation have often charged that it increases the number of deaths from heart disease. They base their claim on statistics that show a rise in heart deaths in the town of Antigo, Wis., since the introduction of fluoridation there.

The National Heart and Lung Institute has called the data a "misrepresentation of statistics." As one scientist points out, "The well-known fact that deaths from heart disease become more frequent as people grow older was overlooked." Since fluoridation was introduced in Antigo in 1949, the percentage of elderly people there has doubled. Between 1950 and 1970, for example, the segment of the population 75 years old or older increased 106 percent. When that factor is taken into account, the alleged effect of fluoride vanishes.

According to a 1972 study by the National Heart and Lung Institute, comparisons of fluoridated and unfluoridated communities reveal no difference in the rate of heart deaths. Furthermore, reported the institute, evidence from autopsy studies, from examinations of people exposed to acute doses of fluoride in industrial accidents, and from medical data on people who have drunk water naturally high in fluoride for a lifetime "all consistently indicate no adverse effect on cardiovascular health."

THE FACTS: ANTIGO LEARNED THEM THE HARD WAY

Of all the numerous ills that have been attributed to fluoridation—from cancer in humans to constipation in dogs—none has ever been shown to be valid. In fact, the only known hazard of fluoridated water has nothing to do with drinking it. Patients undergoing kidney dialysis can be exposed to about 50 to 100 times the amount of fluid consumed by the average person. Accordingly, the National Institute of Arthritis and Metabolic Disease recommends that fluoride—as well as calcium, magnesium, and copper—be removed from the tap water *before it is used in an artificial kidney machine*. Aside from that precaution, there is no genuine reason to worry about fluoridation.

In 1960, however, the residents of Antigo, Wis., didn't realize that scare stories being circulated by local opponents of fluoridation were false. Antigo voted to discontinue its 11-year practice of fluoridating the water supply. The decision eventually led to a study by public health officials, who wanted to learn what effects the end of fluoridation would have on the dental health of Antigo youngsters.

During 1960, dental personnel from the Wisconsin Division of Health examined nearly all children in the kindergarten, second, fourth, and sixth grades of Antigo's schools. The examiners recorded the number of decayed, missing, or filled teeth for each child. Four years later, they repeated the examination among children in all of the same grades except the sixth.

The kindergarteners in 1964 had a rate of dental problems 92 percent higher than their counterparts four years earlier. Among second-graders, the decay rate in permanent teeth was up 183 percent. Among fourth-graders, it was up 41 percent. A subsequent examination of sixth-graders showed a 91 percent increase in decay rates. In 1965, Antigo voted to reinstate fluoridation.

Despite persisting claims about heart deaths by local antifluoridationists, the people of Antigo today still drink fluoridated water. Meanwhile, about 100 million Americans do not, largely because of the fears raised by opponents of fluoridation. The simple truth is that there's no "scientific controversy" over the safety of fluoridation. The practice is safe, economical, and beneficial. The survival of this fake controversy represents, in CU's opinion, one of the major triumphs of quackery over science in our generation.

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Water Fluoridation

Surgeon General's Statement on Community Water Fluoridation
General Information
Frequently Asked Questions
Fluoridation Fact Sheet

Surgeon General's Statement on Community Water Fluoridation

Since the 1940s, each Public Health Service, U.S. Surgeon General has committed his or her support for community water fluoridation. Printed below, is the most recent endorsement supporting community water fluoridation from Acting Surgeon General, Audrey F. Manley, M.D., M.P.H.

December 14, 1995

Ninteen ninety-five marks the 50th anniversary of the initiation of community water fluoridation in the United States. Data consistently have indicated that water fluoridation is the most cost-effective, practical, and safe means for reducing the occurrence of tooth decay in a community. Water fluoridation continues to be the cornerstone of community oral disease prevention.

The benefits of fluoridation are available, on average, for little more than $0.50 per person per year, and even less, in large communities. Today, 62 percent of the population served by public water supplies have access to adequate levels of fluoride in their drinking water. It has been demonstrated that the action of fluoride in preventing tooth decay provides a benefit to children and adults throughout their lives. The health benefits of fluoridation include a reduction in the frequency and severity of dental decay, a decrease in the need for tooth extractions and fillings, a reduction in pain and suffering associated with tooth decay, and the obvious elevation of self-esteem that goes with improved functioning and appearance.

As we look ahead to the next century, we can be thankful for the progress that has been made in improving the nation's oral health, but we can not be complacent. Although the ravages of dental decay have decreased in recent years, there still remains a large segment of the population afflicted by this disease. Ongoing efforts to reduce the burden of dental decay in our population are required, particularly for those groups demonstrated to be at higher risk of dental decay or with inadequate access to professional dental care. Continuing attention to assuring the quality of fluoridation activities by water suppliers and state and local health authorities is essential. Ultimately, optimizing the public's oral health through community water fluoridation will require a concerted effort by public officials, health professionals, and the public.

/s/

Audrey F. Manley, M.D., M.P.H.
Acting Surgeon General



General Information

Tooth decay, also known as dental caries, is a health problem that has plagued humankind for centuries. Until as recently as 50 years ago, the damage caused by caries was an inevitable fact of life for most people. The disease often meant many visits to the dentist to have damage and painful teeth repaired or removed. Today, primarily as a result of fluoride, damage caused by this problem can be reduced and, in many instances, prevented.

Fluoride's benefits for teeth were discovered in the 1930s. Dental scientists observed remarkably low decay rates among people whose water supplies contained significant amounts of natural fluoride. Several studies conducted during the 1940s and 1950s confirmed that when a small amount of fluoride is added to the community water supply, decay rates among residents of that community decrease. Although these studies focused primarily on the benefits of water fluoridation for children, more recent studies demonstrate that decay rates in adults are also reduced as a result ot fluoride in the drinking water.

Fluoride prevents tooth decay two ways: through direct contact with teeth and when people drink it in the water supply during the tooth forming years and later. The most inexpensive way to deliver the benefits of fluoride to all residents of a community is through water fluoridation. All water contains some fluoride naturally. When a community fluoridates its water, it adjusts the level of fluoride in the water to prevent dental decay. Currently, over 144 million people in the United States are supplied with water containing enough fluoride to protect teeth.

One of the health objectives contained in Healthy People 2000, the plan that sets health goals for the nation for the year 2000, calls for at least 75 percent of the nation's people to be served by community water systems providing optimal levels of fluoride. The current level is 62 percent. To reach this goal, appoximately 30 million more people must gain access to fluoridated water through public water systems.

Other sources of fluoride are also available. Children whose home water supplies contain low amounts of fluoride can take dietary fluoride supplements to reduce tooth decay. This daily supplement, which can be prescribed by a dentist or a physician, should only be taken by children if the home water supply has been verified to contain a low concentration of fluoride.

Forms of fluoride that can be applied directly to teeth include toothpastes, mouthrinses, and professionally applied fluoride treatments available in the dental office. These methods of delivering fluoride are more expensive than water fluoridation and require a conscious decision to use them. However, the widespread availability of fluorides, via water fluoridation and other sources, has resulted in the steady decline of dental caries throughout the United States.



Frequently Asked Questions

Questions and Answers About... Water Fluoridation

Q. Is community water fluoridation safe?

A. Yes. Extensive research conducted over the past 50 years has shown time and time again that fluoridation of public water supplies is a safe and effective way to reduce the incidence of dental caries for all community residents. A recent comprehensive review of the benefits and potential risks of fluoridation confirmed its safety and value.

Q. How much does it cost to fluoridate the water?

A. Nationally, the average cost of providing fluoridated water to residents within a community is $0.51 a year. This cost varies depending on the size of the community.

Q. Is community water fluoridation a cost-effective method for disease prevention?

A. Yes. In 1992, an estimated $38.7 billion was spent on dental services, representing about 5.3 percent of all expenditures for personal health care in the United States. The national average cost to restore one cavity with dental amalgam is approximately $42--the approximate cost of providing fluoridation to an individual for a lifetime.

Q. Is tooth decay still a serious problem?

A. Yes. Over 84 percent of U.S. children, 96 percent of U.S. adults, and 99.5 percent of Americans 65 years of age and older have experienced tooth decay.

Q. Has the incidence of dental caries decreased since water fluoridation began?

A. Yes. Independent studies initiated in 1945 and 1946 followed four communities and assessed the value of water fluoridation. After 15 years, tooth decay rates in these communities declined, on average, 56 percent more than in demographically similar communities whose water supplies were not fluoridated. More recent studies show that water fluoridation will reduce dental caries in permanent teeth by approximately 17 to 40 percent. Although this reduction in decay is not as dramatic as it was 45 years ago, it continues to be significant when comparisons are made with nonfluoridated communities.

Top of Page

Position of The American Dietetic Association:
The impact of fluoride on dental health
J Am Diet Assoc 1994;94:1428.

The appropriate use of fluorides through water fluoridation, fluoride supplements, or topical application, has been shown to be an important factor in the prevention of dental caries and remineralization of teeth. This is true for persons of all ages. The use of fluorides and fluoridation is endorsed by almost all professional health organizations as the most effective dental public health measure in existence.

Fluoride is a natural element found at varying concentrations in all drinking water and in soil. It is considered a beneficial nutrient (1) and is present in trace amounts in the body. When consumed in optimal amounts in water and food and used topically in toothpastes, rinses, and office treatments, fluoride reduces the risk and prevalence of dental caries (decay) and helps promote enamel remineralization throughout life.

Position

The American Dietetic Association reaffirms that appropriate fluoride supplementation, through its beneficial effects on dental health, has an important, positive impact on health and nutritional status.

History of Fluoride Discovery

The relationship between fluoride and dental caries was first noted in the early part of the 20th century when it was observed that residents of certain areas of the country developed brown stains on their teeth. These stained teeth, although unsightly, were highly resistant to decay. In the 1930s, researchers discovered that the prevalence and severity of this type of mottled enamel (dental fluorosis) was directly associated with the amount of fluoride in the water. Subsequently, it was recognized that fluoride consumption, at optimal concentrations (0.7 to 1.2 parts per million [ppm]) in the water supply, imparted protection against development of dental caries, without staining teeth. The results of numerous long-term community trials in which fluoride has been added to water supplies at an optimal level verify the effectiveness, safety, and economy of this public health measure in reducing the prevalence of dental caries (2).

Mechanisms of Fluoride Action

Scientists have proposed that fluoride has several functions (2):

- Promotes remineralization of incipient lesions;
- Increases resistance to acid demineralization;
- Interferes in the formation and functioning of dental plaque microorganisms;
- Increases the rate of posteruptive maturation; and Improves tooth morphology.

Pre-eruptive Systemic Effects

Fluoride is absorbed through the gastrointestinal system. The rate and degree of absorption depend on the solubility of the source and the amount ingested at a given time. Once absorbed into the bloodstream, fluoride is either deposited into bones and developing teeth or excreted in the urine (3). The major sources of systemic fluoride are water fluoridation and dietary supplements; food sources are a lesser but potentially important source. During tooth development, fluoride is incorporated into the developing tooth's mineralized structure. Although this is no longer believed to be the most important reason for the effect of fluoride in dental caries, the presence of fluoride in the dental enamel probably increases resistance to demineralization when the tooth surface is exposed to organic acids.

Posteruptive Systemic Effects

After tooth eruption, fluoride is no longer involved systemically in tooth formation. However, **consumed fluoride is excreted through the saliva and can aid in tooth protection throughout the lifetime (4).**

Posteruptive Topical Effects

Providing fluoride only before tooth eruption does not afford maximum protection against caries. In fact, topical mechanisms are now considered the primary means by which fluoride imparts protection to teeth (4). Thus, topical fluorides are now considered important in caries prevention independent of the provision of systemic fluorides.

The posteruptive beneficial effect of fluoride likely occurs primarily from the presence of fluoride in the fluid phase at the tooth surface. Fluoride is responsible for decreasing demineralization when the tooth is exposed to organic acids and for increasing the rate of remineralization.

The frequency of fluoride exposure to the tooth surface is of prime importance to maintain the high fluoride concentration that is necessary in the fluid phase of enamel surfaces to prevent caries and enhance the remineralization of early carious lesions (4). Topical fluoride may be particularly important in the prevention of root caries, coronal caries, and tooth loss in adults and the elderly.

In addition to its direct mineralizing effect on enamel, fluoride may affect oral plaque bacteria. These bacteria secrete acids onto tooth surfaces (the by-products of carbohydrate fermentation), which initiates tooth demineralization. The entry of fluoride into the bacterial cell interferes with acid production, thus reducing potential enamel destruction (5). This, however, is not considered to be an important determinant of fluoride's beneficial effect in reducing caries.

Fluoride can be provided topically to teeth via rinses, dentifrices, or gels at home, at school, or in the dental office.

Fluoridated water and chewable dietary fluoride supplements are also thought to provide notable topical benefit. Thus, people of all ages benefit from the topical effects of fluoride, whether or not they consumed fluoridated water or fluoride supplements as children.

Indications, Sources, and Efficacy

Water Fluoridation

Fluoridation, by definition, is the adjustment of fluoride in a water supply to an optimal concentration between 0.7 and 1.2 ppm. The value of water fluoridation for the prevention of dental caries has been unquestionably demonstrated. A 40% to 60% reduction in the prevalence of caries in the permanent dentition was observed from 1946 through 1979 in persons who consumed fluoridated water from birth through adolescence compared with a population living in a nonfluoridated area (5). From 1979 through 1989, the effects of water fluoridation alone resulted in only about a 30% decrease in caries (5). This decline in efficacy is thought to be attributable to the presence of fluoride in many other vehicles besides water, which dilute the effect of the water alone (5).

In nonfluoridated areas, adding fluoride to school water supplies (at slightly higher than optimal levels), results in significant caries reduction (6). However, only 319 schools in the United States have water fluoridation programs (6). Authors of the National Preventive Dentistry Demonstration Project compared the effectiveness of various school-based caries prevention programs and **reaffirmed fluoridation of public water supplies as the most cost-effective dental public health measure** (7). Even so, a notable segment of the United States does not benefit from this practice. In 1992, the Centers for Disease Control and Prevention estimated that about 135 million people in the United States, or about 62% of the population, had access to fluoridated drinking water (6). The US Public Health Service goal that by 1990 at least 95% of the population served by piped water supplies would have optimally fluoridated water was not met. The revised goal for the year 2000, as stated in the Healthy People 2000 guidelines, sets a target of 75% (8).

The direct annual cost of fluoridation in the United States averages 54 cents per person. Cost depends to a large extent on community size (9). Fluoridation is the most cost-effective method of providing protection and has the benefit of reaching all segments of a population, regardless of socioeconomic status or age. In addition, there are notable savings in dental care or restoration costs and lost work hours because of dental disease (9).

Dietary Fluoride Supplements

Because not all persons have access to a fluoridated public water supply, other methods of providing optimal amounts of fluoride have been explored. The use of fluoride supplements is indicated for children in nonfluoridated areas. However, dietary fluoridation is contraindicated if the water is already optimally fluoridated, because dental fluorosis may result in children who consume excessive fluoride during the early stages of tooth development. Fluorosis is the mottling of tooth enamel that results from excessive systemic fluoride during enamel development before tooth eruption. In cases of mild fluorosis, teeth are highly resistant to caries

but may have chalky white patches. This mild fluorosis, for the most part, is only detectable during dental examinations, and is not cosmetically objectionable. Severe fluorosis imparts a dark-brown stain to teeth and can interfere with proper tooth mineralization.

In recent years, with the broader availability of systemic fluoride from various sources, there has been an increase in the prevalence of mild fluorosis, which has been attributed to several factors (2):

Improper use of dietary fluoride supplements;
Ingestion of other topical modalities (which should not be swallowed but sometimes are); and
"Diffusion" (or "halo" effect) of fluoride from foods and beverages processed in fluoridated areas and consumed by people in fluoridated as well as nonfluoridated areas.

The prescription of dietary fluoride supplements for children living in nonfluoridated areas has long been recognized as an effective (*but less reliable*) alternative to water fluoridation. However, the recent increase in cases of mild fluorosis and increased knowledge of fluoride's function and efficacy has led to recent changes in the guidelines for dietary fluoride supplements recommended by the Council on Scientific Affairs of the American Dental Association.

The Figure shows new recommendations for fluoride supplementation.

The new guidelines acknowledge the more important topical effects of systemic fluoride by recommending that supplementation begin at the age of 6 months and that the upper age limit for supplementation be extended from the age of 13 years to the age of 16 years (10,11). Also, because fluoride is prevalent in a variety of sources other than fluoridated water, the level of water fluoride content above which systemic fluorides should not be given was reduced from 0.7 ppm to 0.6 ppm. Note that in the guidelines the recommended dosages are stated as fluoride ion. Supplements should be provided as sodium fluoride. One milligram sodium is attained from 2.2 mg sodium fluoride.

There is little indication that the use of fluorides prenatally will confer meaningful systemic benefits to the developing fetus. Thus, the Council on Dental Therapeutics of the American Dental Association and the American Academy of Pediatrics Committee on Nutrition believe there is little justification for recommending prenatal use of systemic fluoride above amounts normally obtained through water and food (12). The question of prenatal efficacy can be adequately answered only by further research.

Because the concentration of fluoride in breast milk is very low, some have suggested that breast-fed infants in fluoridated communities should be given fluoride supplements. However, because many mothers combine breast-feeding with formula use and may give infants drinking water between feedings, this practice should be viewed with caution. Fluoride supplements, therefore, are not generally recommended for breast-fed infants residing in fluoridated communities. Supplementation should be done under the supervision of a pediatrician or a dentist.

Topical Application Sources

Fluoride mouth rinses, dentifrices, and gels are important adjunctive topical fluoride sources that are effective and can be easily administered in the school or home setting and in the dental office. School-based fluoride rinse programs are second only to water fluoridation in their efficacy as a public health measure. Such programs have reported up to a 20% reduction in caries (13).

Fluoride products carrying the American Dental Association seal on the product label have undergone extensive clinical trials to demonstrate their effectiveness (3). Children should be cautioned that products meant for topical use should not be swallowed, because fluorosis in developing permanent teeth is of some concern (14).

Food Sources

Although most foods contain some fluoride, the primary dietary source is fluoridated water. Beverages (e.g., bottled water, brewed tea, infant formulas) and commercially prepared foods (e.g., poultry products, seafood, powdered cereals) also supply fluoride to the diet (15,16). Because foods processed with fluoridated water can add notably to total fluoride consumption (particularly in infants), potential sources of high fluoride intake in children's diets should be identified before any supplementation is recommended (17).

Current Issues

Safety of Fluoride

Chronic low level ingestion Resistance to water fluoridation began in l950 and continues to raise controversy in some segments of the population today. A 1984 survey of state dental directors revealed that about 39% perceived the antifluoridation groups to have increased in strength over the previous 5 years, and indicated 255 legal challenges to existing fluoride programs during that period. Public referenda, city council hearings, newspaper campaigns, and even litigation continue to be common tactics used to oppose the measure (18).

The charges raised by opponents today tend to be more sophisticated variations on themes used since the inception of fluoridation, namely, *alleged* adverse health consequences (eg, cancer, acquired immunodeficiency syndrome) and infringement on freedom of choice. Their emotional appeals and scare messages, coupled with elaborate theories, often have a powerful influence on an unsophisticated public (19,20).

Although antifluoridationists have gained much publicity in their attempt to create the illusion of scientific controversy about fluoridation, claims of a health hazard from water fluoridation are unfounded. Fluoridation has probably been the most thoroughly studied community health measure in recent history. The American Dental Association cites extensive research demonstrating that fluoridation does not increase the incidence or mortality rate of any chronic condition, including cancer, heart disease, intra-cranial lesions, nephritis,

cirrhosis, and Down syndrome (2). **Results of recent studies failed to find any correlation between fluoride in the water supply and cancer in human beings (21).**

As noted in the 1988 US Surgeon General's Report on Nutrition and Health, "Conclusive evidence shows that such levels of fluoride (as recommended in drinking water) are safe" (22). The 1989 report Diet and Health (23), issued by **the National Research Council, also stresses that fluoridation of drinking water supplies at a level of 1 ppm protects against dental caries and in such concentrations is not associated with any known adverse health effects.** *Fluoride toxicity from water sources would be improbable because of the large quantities of water that would need to be consumed at any one time.*

Acute high levels of ingestion
Caution should be exercised in the administration of more concentrated fluoride products to young children to prevent acute poisoning episodes. To avoid possible excessive intakes of fluoride supplements by unsupervised children, the American Dental Association has recommended that no more than 264 mg sodium fluoride (120 mg fluoride) be dispensed at one time (3). The recommended limit has produced an excellent safety record for more than 20 years.

Fluoride dentifrices have been on the market for more than 30 years; about 90% of dentifrices currently sold in the United States contain fluoride (24). No cases of acute toxicity due to dentifrice ingestion have been reported. However, the amount of fluoride on the toothbrush should be no more than pea sized, and the toothpaste (or rinse or gel) should be expectorated rather than swallowed to avoid the risk of fluorosis (14).

Conclusion

When fluoride is provided in optimal amounts, it potentially conveys major dental health benefits to *all* age groups. Fluoridation of public water supplies has been endorsed by most professional health organizations (e.g., the American Dental Association [25], the American Medical Association [26], and The American Dietetic Association), as the most effective dental public health measure in existence. Still, a notable proportion of the US population fails to receive maximum benefits possible from community water fluoridation and use of fluoride products.

Dietetics professionals should consider it part of their patient care to routinely consider and monitor the use of systemic and topical fluorides, especially in children. Toward this end, alliances and referral systems among dietetics professionals, dental hygienists, and dentists need to be strengthened in the pursuit of optimal dental care. **The American Dietetic Association strongly reaffirms its endorsement of the use of systemic**

and topical fluorides, including water fluoridation, as an important health promotion measure.

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ADA Position adopted by the House of Delegates on April 23, 1989, and reaffirmed on September 11, 1993. This position is in effect until December 1999.

The American Dietetic Association authorizes republication of the position, in its entirety, provided full and proper credit is given.

Recognition is given to the following for their contributions:
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Resolution on Fluoridation of Drinking Water

By:
The Joint Public Information Committee Of The American Society For Nutritional Sciences
And The American Society For Clinical Nutrition

KIRVIN L. KNOX (Chair), KRISTEN W. MCNUTT, ELAINE R. MONSEN, RICHARD S. RIVLIN, A. CATHARINE ROSS AND HAROLD H. SANDSTEAD

The Committee has considered the issue of the health aspects of the fluoridation of public water supplies. The following resolution, drafted by the Committee, was approved by the Council of the American Society for Nutritional Sciences on April 22, 1985, and by the Council of the American Society for Clinical Nutrition on May 2, 1985.

RESOLUTION

Tooth decay is one of the Nation's most ubiquitous health problems in numbers of people affected and its persistence. Appropriate fluoridation of public water is a safe, economical and effective measure to prevent dental caries. The most favorable and persistent benefits accrue to those who have had continuous exposure to optimum fluoride levels in drinking water. This public health measure is supported by the U.S. Public Health Service and more than 60 health professional and technical associations including the American Medical Association and the American Dental Association. Therefore, the Joint Public Information Committee of the American Society for Nutritional Sciences and the American Society for Clinical Nutrition agrees that fluoridation of community water supplies to an optimum level wherever the natural level is less than optimum is a safe, economical and effective measure to improve dental health by improving nutrition.

The International Food Information Council
Fluoride: The Wonder Nutrient

Despite hopes to the contrary, magic bullets are few in the world of medical science. The exception may be fluoride. It is credited with being the primary factor in a dramatic reduction in dental caries in the last twenty years.

Fluoride is a natural component of minerals in rocks and soils. All water contains fluoride, but it is sometimes necessary to add it to some public supplies to attain the optimal amount for dental health.

The story of how fluoride came to have an essential role in the effort to achieve a cavity-free generation is not one of laboratory science. Rather it is one of careful scientific observation of a naturally occurring phenomenon, followed by wide experimentation. First noticed in the early part of this century when researchers observed that persons with "mottled teeth" experienced fewer dental caries than those without the discoloration. The phenomenon was traced to high amounts of naturally occurring fluoride in their drinking water. "Mottled teeth" is also known as fluorosis, a cosmetic defect characterized by white flecks, or in some severe cases, stained teeth.

Fluoride was first introduced into the drinking water of Grand Rapids, Michigan as part of a two-city community trial in 1945. The Grand Rapids undertaking was so successful that the control city of Muskegon soon insisted on fluoridating its water.

Since then, literally thousands of studies on fluorides and fluoridation have been completed, and more than 3,700 studies have been conducted since 1970 alone. The most recent national study on children conducted from 1986-1987 by the National Institute of Dental Research found "a clear and continuing benefit of community water fluoridation in preventing tooth decay."

The fluoridation of drinking water has expanded steadily, as has the use of fluorides in other ways. **"Originally viewed as beneficial primarily for children, fluoride agents are now recognized as effective for all ages and of increasing importance in an aging population,"** according to Irwin Mandel, D.D.S., professor emeritus, Columbia University School of Dental and Oral Surgery. Virtually all toothpaste used in the United States contains fluoride. Fluoride mouthwashes and tablets are used in schools and homes, and topical fluorides are applied in dental offices. Around the world, where fluoridation of water supplies may not be realistic, fluoride-containing toothpaste is used. Unfortunately, those who consume high amounts of bottled water in place of fluoridated tap water may not be receiving its oral health benefits.

Fluoride has not achieved its fame nor results without its share of critics. It has been accused of being illegal, a communist plot, immoral and unconstitutional. It has been blamed for everything from cancer and birth defects to premature aging and, more recently, Alzheimer's disease and AIDS.

However, according to the American Dental Association, **"The simple fact remains that there has never been a single valid, peer-reviewed laboratory, clinical or epidemiological study that showed that drinking water with fluoride at optimal levels caused cancer, heart disease or any other multitude of diseases of which it has been accused."**

Based on the findings from hundreds of studies, both the National Institute of Dental Research and the U.S. Public Health Service support fluoridation as a safe, effective, equitable means of controlling dental caries.

BRITAIN RECOGNIZES THE NEED TO FLUORIDATE WATER:

British Fluoridation Society

The principal aim of the British Fluoridation Society is to promote the improvement of dental health by securing the optimum fluoride content of water supplies (one part per million).

ORGANIZATIONS SUPPORTING THE CAMPAIGN CALL FOR ACTION:

Recognizing the link between poor dental health, social deprivation and the lack of a fluoridated water supply, we jointly call upon the Government, local authorities and the water industry to take action to ensure that fluoridation is introduced wherever it is practicable to do so and wherever there is a demonstrable health need.

British Dental Association
British Medical Association
British Fluoridation Society
NHS Confederation
Action and Information on Sugars
Association of Directors of Public Health Medicine
Association for Public Health
British Association for the Study of Community Dentistry
British Association for Community Child Health
British Dental Health Foundation
British Dental Hygienists Association
British Dietetic Association
British Society of Dentistry for the Handicapped
British Society of Gerodontology
British Society for Paediatric Dentistry
Faculty of Dental Surgery of the Royal College of Surgeons of England
Faculty of General Dental Practitioners (UK) of the Royal College of Surgeons of England
Faculty of Public Health Medicine of the Royal College of Physicians of the United Kingdom
FDI World Dental Federation
Health Education Authority
Health Promotion Wales
Help The Aged
Institute of Health Education
MENCAP
National Dental Health Education Group
NHS Consultants Association
Oral Health Promotion Research Group
Public Health Alliance
Scottish Association for Community Child Health
Socialist Health Association
The Patients Association
The Royal Society of Health
Unison Health Care

NATIONAL CANCER INSTITUTE

Cancer Facts Risk Factors

Fluoridated Water

Virtually all water contains fluoride. In the 1940s, scientists discovered that the higher the level of natural fluoride in the community water supply, the fewer the dental caries (cavities) among the residents. Currently, more than half of all Americans live in areas where fluoride is added to the water supply to bring it up to the level considered best for dental health.

The possible relationship between fluoridated water and cancer has been debated at length. Although earlier animal studies revealed no evidence that fluoride is carcinogenic, a National Toxicology Program study completed in April 1990 generated considerable interest in this subject. In this study, a small number of male rats (4 of 130) developed bone cancer after drinking water containing fluoride in amounts that were 25 to 100 times greater than the levels found in municipal fluoridated water. No cancers were seen in the female rats or in the male or female mice that were also tested. According to the scientists who conducted the study, the fact that a few male rats developed tumors could not be used as firm evidence to link fluoride ingestion with cancer.

In February 1991, the Public Health Service reported the results of a year- long survey that showed no evidence of an association between fluoride and cancer in humans. The survey, which involved a review of more than 50 human epidemiology studies produced over the past 40 years, led the investigators to conclude that optimal fluoridation of drinking water "does not pose a detectable risk of cancer to humans."

In one recent study, scientists at the National Cancer Institute evaluated the relationship between fluoridation of drinking water and the cancer mortality (deaths) in the United States during a 36-year period and the relationship between fluoridation and the cancer incidence (rate) during a 15-year period. After examining more than 2.2 million cancer death records and 125,000 cancer case records in counties using fluoridated water, the researchers saw no indication of a cancer risk associated with fluoridated drinking water.

National Cancer Institute Information Resources

You may want more information for yourself, your family, and your doctor. The following National Cancer Institute (NCI) services are available to help you.

Telephone...

Cancer Information Service (CIS) Provides accurate, up-to-date information on cancer to patients and their families, health professionals, and the general public. Information specialists translate the latest scientific information into understandable language and respond in English, Spanish, or on TTY equipment.

Toll-free: 1-800-4-CANCER (1-800-422-6237)
TTY: 1-800-332-8615

Internet...

These web sites may be useful:
http://www.nci.nih.gov - NCI's primary web site; contains information about the Institute and its programs. Also includes news, upcoming events, educational materials, and publications for patients, the public, and the mass media on http://rex.nci.nih.gov.

http://cancernet.nci.nih.gov - CancerNet; contains material for health professionals, patients, and the public, including information from PDQ about cancer treatment, screening, prevention, supportive care, and clinical trials, and CANCERLIT, a bibliographic database.

http://cancertrials.nci.nih.gov - cancerTrials; NCI's comprehensive clinical trials information center for patients, health professionals, and the public. Includes information on understanding trials, deciding whether to participate in trials, finding specific trials, plus research news and other resources.

E-mail...

CancerMail
Includes NCI information about cancer treatment, screening, prevention, and supportive care. To obtain a contents list, send e-mail to cancermail@icicc.nci.nih.gov with the word "help" in the body of the message.

Fax...

CancerFax
Includes NCI information about cancer treatment, screening, prevention, and supportive care. To obtain a contents list, dial 301-402-5874 from a fax machine hand set and follow the recorded instructions.

Date Last Modified: 12/1992

AAFP (American Academy of Allergy, Asthma and Immunology)

Reference Manual -- Clinical Policies

Fluoridation of Public Water Supplies

February 1996

POLICY STATEMENT

Fluoridation of public water supplies is a safe, economical, and effective measure to prevent dental caries. Family physicians should know the fluoride content of local drinking water supplies, educate patients to prevent excessive fluoride intake, and be knowledgeable about the health risks and benefits associated with fluoride. Dietary fluoride supplements should be considered for children from ages 6 months through 16 years when drinking water levels are sub optimal. (1995, Revised 1996)

Introduction

Since the addition of fluoride to public water supplies was initiated in 1945, exposure to fluoridation continues as a persistent public health issue. It is estimated that 62% of the United States population in 1989 resided in areas served by fluoridated drinking water supplies.[1] Fluoride is a ubiquitous element found at varying levels in all diets. In addition to fluoridated water, other sources of fluoride include foods and beverages produced in areas with fluoridated water, dentifrices, fluoride-containing mouth rinses, dental treatment products and dietary supplements. Efforts to quantify fluoride intake have proven difficult due to variable fluoride content within products as well as variation in amounts consumed.[2]

Observational studies by Dean and colleagues during the 1930's identified reductions in dental caries at a naturally occurring fluoride concentration of 1 mg per liter.[3,4] This level of fluoride resulted in decreased caries prevalence without objectionable levels of dental fluorosis, prompting the adoption of this concentration as an optimal level. In 1993, the National Research Council [5] concluded that there was not sufficient evidence to support changing the upper limit of 1.2 part per million (ppm) of fluoride in drinking water. More recently, the U.S. Public Health Service reviewed this drinking water standard and reaffirmed optimal levels of 0.7 to 1.2 ppm fluoride (dependent on annual average of maximum daily air temperatures) to yield an average of 1 mg per day of consumed fluoride.[6] Where the fluoride content of drinking water is naturally increased, the Environmental Protection Agency recommends reductions to a level of 2.0 ppm. Water sources with fluoride levels of 0.0 to 0.3 ppm fluoride are considered to be non-fluoridated.

The Healthy People 2000 document [1] contains reference to the issue of fluoride as it relates to health of the American public. Specific objectives relevant to fluoridation include:

objective 13.9 Increase to at least 75 percent the proportion of people served by community water systems providing optimal levels of fluoride. (baseline: 62 percent in 1989)
objective 13.10 fluorides to at least 85 percent of people not receiving optimally fluoridated public water. (baseline: 50 percent in 1989)

The reported benefits and risks associated with exposure to fluoride are highlighted in the following sections.

Benefits

Dental Health: Numerous reports documenting that exposure to fluoridated water supplies during adolescence results in reduced dental caries prevalence have appeared in a variety of sources. [7] These studies, comparing fluoridated and non-fluoridated communities, have reported decreases in the overall prevalence of dental caries and for summary scores of dental decay identified as the "DMF" for permanent teeth and the "df" for primary teeth. These summary scores represent the cumulative caries experience based on the number of decay (D or d), missing (M) or filled (F or f) tooth surfaces. Additional studies have documented increased caries prevalence following withdrawal of fluoride supplementation of drinking water.[8,9]

Comparable decreases in caries prevalence have also been observed in communities in non-fluoridated areas. Suggested reasons for this include greater use of fluoride containing dental care products, reductions in the consumption of refined sugar, better access to and utilization of dental health services, improvements in oral hygiene and increase awareness of dental health.[10,11,12]

While the majority of published studies have examined dental health among adolescents, dental decay is also common during the later years of life in the form of root surface caries. Fewer carious lesions have been identified among older persons residing in communities with optimal fluoride levels. [13,14]

Several factors may be operative in observed temporal declines in caries prevalence including improved access to dental care, enhanced knowledge of dental hygiene, expanded use of fluoride-containing dental care products and increased exposures to fluoride through foods and beverages. Overall, the preponderance of evidence indicates that fluoride is beneficial to dental health.

The action of fluoride on teeth involves both topical and systemic mechanisms. Fluoride acts to stabilize the hydroxyapatite matrix on internal and external tooth surfaces.[15,16] Topical application of fluoride has been shown to decrease levels of dental plaque bacteria.[17] Systemic fluoride is provided by fluoridated public water supplies, dietary

supplements, foods and beverages. Sources of topical fluorides include fluoride-containing dentifrices, mouth rinses and gels.

Dental caries is a health problem which impacts on the medical, functional, nutritional and psychological status of patients in all age groups. The prevalence of dental caries is 42% at five years of age, increasing to more than 84% by age 17.[18,19,20,21] The Health Care Financing Administration estimates that 5% of the total health care expenditures (or $34 billion dollars) is spent on dental services of which 13.2% (or $4.5 billion) is used for amalgam restoration.[20]

Other Potential Benefits: While fluoride is known to stimulate osteoblastic activity this newly formed bone is histologically abnormal. No consensus exists with respect to the duration or dose of fluoride as a possible therapy for osteoporosis. [22]

Risks

Acute Toxicity: Acute toxic effects from fluoride occur at doses of 1-5 mg/kg. Symptoms of toxicity include nausea, vomiting, diarrhea, sialorrhea and abdominal pain, often accompanied by seizures, cardiac arrhythmias and coma.[23,24,25]

Fluorosis: Chronic exposures to fluoride may result in dental fluorosis or skeletal fluorosis. Dental fluorosis, which is variable in clinical presentation, occurs from exposure to increased levels of fluoride during tooth formation. While various presentations of dental fluorosis are seen throughout the United States, it is generally considered more of a cosmetic problem since it rarely compromises dental or oral function. The prevalence of fluorosis is dependent on the criteria used to define the problem.

While excessive chronic fluoride exposure may result in skeletal fluorosis, this manifestation is *extremely rare with only a handful of cases reported during the past 30 years*. A study of persons exposed to drinking water sources with >4 mg/liter (e.g., >4 ppm) of fluoride showed no evidence of radiographic change.[26]

Cancer: Interest in the potential carcinogenicity of fluoride resurfaced when a National Toxicology Program study of rodents with life-long fluoride exposures reported an increased incidence of osteosarcomas among male rats ingesting a high fluoride diet.[27] However, this same study failed to demonstrate differences in cancer occurrence among female rats or among male or female mice. This report prompted an examination of incidence rates for osteosarcomas, and all bone cancers combined, in fluoridated and non-fluoridated communities, *which revealed no significant differences.* [28] In addition, total lifetime fluoride exposure was not found to be associated with risk of developing osteosarcoma.[29]

Previous reports which compared cancer mortality [30,31,32,33,34,35) in fluoridated and non-fluoridated areas *revealed no association with fluoride levels in drinking water.* Similarly, *studies of cancer incidence in fluoridated and non-fluoridated communities*

identified no significant differences.[30,36] An additional study of persons occupationally exposed to fluoride reported elevated incidence for cancers of the respiratory tract,[37] most likely resultant from smoking habits rather than fluoride exposure.

Bone Fractures: Studies of hip fracture rates and fluoridated drinking water supplies have yielded no consistent results.[38,39,40,41] Further studies are needed to resolve these inconsistencies.

Other Potential Risks: Knowledge regarding the reproductive and genotoxic effects of fluoride is limited. Available evidence does not support an association between fluoridated drinking water supplies and congenital malformations. Data on the genotoxic effects of fluoride in human populations are unavailable.

Further information on the reported risk and benefits of fluoride exposure are available in primary sources as well as comprehensive review papers on this topic. [42,43]

Dietary Supplementation

A comprehensive history taking is essential before fluoride is prescribed as a dietary supplement. The history should include a review of previous residences and fluoride status of drinking water supplies, travel history, sources of drinking water, method of infant feeding, the use of dietary supplements containing fluoride and the use of fluoride containing products for dental care. Physicians should also be alert to possible sources of regional environmental fluoride contamination (e.g., industrial emissions). Taken together, this information is utilized to determine an estimate of the current fluoride intake of an individual, recognizing inherent limitations in knowing the precise fluoride content of processed foods and beverages. This provides the basis on which a health professional can prevent unnecessary and inappropriate fluoride intake. Local public health officials are able to provide information on the fluoride content of water that is supplied from public sources. Where drinking water is obtained from underground sources and private wells, chemical analyses is needed to determine the fluoride content.

The American Academy of Pediatrics (AAP) has issued a schedule for fluoride supplementation [44] (see Table 1). These recommendations take account of the levels of fluoride contained in the primary drinking water supply as well as the age of the pediatric patient. Changes in the current AAP schedule include the elimination of fluoride supplementation during the first six months, decreased doses of supplemental fluoride from age six months to six years, and decreasing the level at which no supplementation is needed from 0.7 ppm to 0.6 ppm. Dietary supplementation among children in fluoride-deficient communities is also supported by the U.S. Preventive Services Task Force.[45]

The magnitude of scale which exists between typical exposures and exposures likely to result in untoward health effects refers to the term "margin of safety." It is important to recognize that a relatively narrow margin of safety may exist for development of dental fluorosis among children consuming fluoridated drinking water or consuming fluoride supplements. Patients should be cautioned about the toxicity of fluoride when it is

prescribed in tablet or liquid form. Parents should monitor their children's use of dentifrices and other dental products that may represent sources of excessive fluoride ingestion. Physicians should be aware of the fluoride levels in water supplies, as well as possible sources of regional environmental fluoride contamination, so as to appropriately prescribe supplements.

To minimize the risk of systemic ingestion of topical fluoride agents children should be supervised when using products containing fluoride. Toothpaste contains fluoride at a level of 1 mg /gram, thus unsupervised children can ingest excessive fluoride. For example, a two-year old, brushing their teeth twice a day, could ingest as much as 0.5 mg a day.

Dental caries represents a health problem which impacts on the medical, functional, nutritional and psychological status of patients. Fluoridation of public water supplies is a safe, economical and effective measure to prevent dental caries. When drinking water levels of fluoride are suboptimal, dietary supplementation should be considered.

Table 1. Schedule for Fluoride Supplementation.

Child's Age	Fluoride content of drinking water (in parts per million [ppm])		
	<0.3 ppm	0.3-0.6 ppm	>0.6 ppm
birth to six months	0 mg	0 mg	0 mg
six months - 3 years	0.25 mg	0 mg	0 mg
3 - 6 years	0.50 mg	0.25 mg	0 mg
6 - 16 years	1.00 mg	0.50 mg	0 mg

*fluoride doses presented in milligrams.

source: American Academy of Pediatrics, Committee on Nutrition. Fluoride supplementation for children: interim policy recommendations. Pediatrics 1995; 95: 777.[44]

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These recommendations are provided only as an assistance for physicians making clinical decisions regarding the care of their patients. As such, they cannot substitute for the individual judgment brought to each clinical situation by the patient's family physician. As with all clinical reference resources, they reflect the best understanding of the science of medicine at the time of publication, but they should be used with the clear understanding that continued research may result in new knowledge and recommendations.

CDC

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MORBIDITY AND MORTALITY
WEEKLY REPORT

933 Fluoridation of Drinking Water to Prevent Dental Caries
941 Progress Toward Poliomyelitis Eradication — Nepal, 1996–1999
944 Update: West Nile Virus Encephalitis — New York, 1999
955 Notice to Readers

Achievements in Public Health, 1900–1999

Fluoridation of Drinking Water to Prevent Dental Caries

Fluoridation of community drinking water is a major factor responsible for the decline in dental caries (tooth decay) during the second half of the 20th century. The history of water fluoridation is a classic example of clinical observation leading to epidemiologic investigation and community-based public health intervention. Although other fluoride-containing products are available, water fluoridation remains the most equitable and cost-effective method of delivering fluoride to all members of most communities, regardless of age, educational attainment, or income level.

Dental Caries

Dental caries is an infectious, communicable, multifactorial disease in which bacteria dissolve the enamel surface of a tooth (*1*). Unchecked, the bacteria then may penetrate the underlying dentin and progress into the soft pulp tissue. Dental caries can result in loss of tooth structure and discomfort. Untreated caries can lead to incapacitating pain, a bacterial infection that leads to pulpal necrosis, tooth extraction and loss of dental function, and may progress to an acute systemic infection. The major etiologic factors for this disease are specific bacteria in dental plaque (particularly *Streptococcus mutans* and lactobacilli) on susceptible tooth surfaces and the availability of fermentable carbohydrates.

At the beginning of the 20th century, extensive dental caries was common in the United States and in most developed countries (*2*). No effective measures existed for preventing this disease, and the most frequent treatment was tooth extraction. Failure to meet the minimum standard of having six opposing teeth was a leading cause of rejection from military service in both world wars (*3,4*). Pioneering oral epidemiologists developed an index to measure the prevalence of dental caries using the number of decayed, missing, or filled teeth (DMFT) or decayed, missing, or filled tooth surfaces (DMFS) (*5*) rather than merely presence of dental caries, in part because nearly all persons in most age groups in the United States had evidence of the disease. Application of the DMFT index in epidemiologic surveys throughout the United States in the 1930s and 1940s allowed quantitative distinctions in dental caries experience among communities—an innovation that proved critical in identifying a preventive agent and evaluating its effects.

Fluoridation — Continued

History of Water Fluoridation

Soon after establishing his dental practice in Colorado Springs, Colorado, in 1901, Dr. Frederick S. McKay noted an unusual permanent stain or "mottled enamel" (termed "Colorado brown stain" by area residents) on the teeth of many of his patients (*6*). After years of personal field investigations, McKay concluded that an agent in the public water supply probably was responsible for mottled enamel. McKay also observed that teeth affected by this condition seemed less susceptible to dental caries (*7*).

Dr. F. L. Robertson, a dentist in Bauxite, Arkansas, noted the presence of mottled enamel among children after a deep well was dug in 1909 to provide a local water supply. A hypothesis that something in the water was responsible for mottled enamel led local officials to abandon the well in 1927. In 1930, H. V. Churchill, a chemist with Aluminum Company of America, an aluminum manufacturing company that had bauxite mines in the town, used a newly available method of spectrographic analysis that identified high concentrations of fluoride (13.7 parts per million [ppm]) in the water of the abandoned well (*8*). Fluoride, the ion of the element fluorine, almost universally is found in soil and water but generally in very low concentrations (<1.0 ppm). On hearing of the new analytic method, McKay sent water samples to Churchill from areas where mottled enamel was endemic; these samples contained high levels of fluoride (2.0–12.0 ppm).

The identification of a possible etiologic agent for mottled enamel led to the establishment in 1931 of the Dental Hygiene Unit at the National Institute of Health headed by Dr. H. Trendley Dean. Dean's primary responsibility was to investigate the association between fluoride and mottled enamel (see box). Adopting the term "fluorosis" to replace "mottled enamel," Dean conducted extensive observational epidemiologic surveys and by 1942 had documented the prevalence of dental fluorosis for much of the United States (*9*). Dean developed the ordinally scaled Fluorosis Index to classify this condition. Very mild fluorosis was characterized by small, opaque "paper white" areas affecting ≤25% of the tooth surface; in mild fluorosis, 26%–50% of the tooth surface was affected. In moderate dental fluorosis, all enamel surfaces were involved and susceptible to frequent brown staining. Severe fluorosis was characterized by pitting of the enamel, widespread brown stains, and a "corroded" appearance (*9*).

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*). Caries among children was lower in cities with more fluoride in their community water supplies; at concentrations >1.0 ppm, this association began to level off. At 1.0 ppm, the prevalence of dental fluorosis was low and mostly very mild.

The hypothesis that dental caries could be prevented by adjusting the fluoride level of community water supplies from negligible levels to 1.0–1.2 ppm was tested in a prospective field study conducted in four pairs of cities (intervention and control) starting in 1945: Grand Rapids and Muskegon, Michigan; Newburgh and Kingston, New York; Evanston and Oak Park, Illinois; and Brantford and Sarnia, Ontario, Canada. After conducting sequential cross-sectional surveys in these communities over 13–15 years, caries was reduced 50%–70% among children in the communities with fluoridated water (*12*). The prevalence of dental fluorosis in the intervention

Fluoridation — Continued

H. Trendley Dean, D.D.S.



In 1931, dental surgeon and epidemiologist H. Trendley Dean (August 25, 1893–May 13, 1962) set out to study the harm that too much fluoride could do; however, his work demonstrated the good that a little fluoride could do.

Henry Trendley Dean grew up in East St. Louis, and received his D.D.S. from the St. Louis University School of Dentistry in 1916. After 1 year in private practice, Dean joined the Army, serving in a number of military camps stateside before going to France. In 1919, Captain Dean returned to private practice, but 2 years later joined the Public Health Service as acting assistant dental surgeon. During the next 10 years he served in Marine hospitals around the country, studied for a year at Boston University, and developed a reputation as both a skilled dental surgeon and researcher. In 1931, Dean became the first dental scientist at the National Institute of Health, advancing to director of the dental research section in 1945. After World War II, he directed epidemiologic studies for the Army in Germany. When Congress established the National Institute of Dental Research (NIDR) in 1948, Dean was appointed its director, a position he held until retiring in 1953.

The National Institute of Health (NIH) had hired Dean in 1931 to conduct a major study of mottled enamel. The team that Dean assembled reflected an interdisciplinary approach. The study required accurate assays of fluoride in water, so he enlisted Dr. Elias Elvove, senior chemist at NIH, who developed a technique for measuring the presence of fluoride in water to an accuracy of 0.1 ppm. He also hired experts in animal dentistry, dental pathology, and water chemistry. As accurate data on the incidence of fluorosis emerged, the apparent correlation between mottled teeth and lower caries rates grew more compelling. As early as 1932, Dean observed that individuals in an area where mottled teeth was endemic demonstrated "a lower incidence of caries than individuals in some nearby non-endemic area." By 1938, determining the prophylactic properties of fluoride became the study's primary focus.

Dean's legacy comes almost entirely from his association with the introduction of fluoridation, yet fluoride constituted only a small part of his professional activities. He also studied the effects of radium poisoning on alveolar bone; developed a program to study the prevention and cure of Vincent's angina (trench mouth); and undertook various studies of the causes, prevention, and cure of dental caries. More important, he played a major role in shaping federal participation in basic dental science research at the NIDR, integrating investigations of dental health into mainstream medical research. As he stated in a national radio address in 1950: "We can't divorce the mouth from the rest of the body."

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Fluoridation — Continued

communities was comparable with what had been observed in cities where drinking water contained natural fluoride at 1.0 ppm. Epidemiologic investigations of patterns of water consumption and caries experience across different climates and geographic regions in the United States led in 1962 to the development of a recommended optimum range of fluoride concentration of 0.7–1.2 ppm, with the lower concentration recommended for warmer climates (where water consumption was higher) and the higher concentration for colder climates (*13*).

The effectiveness of community water fluoridation in preventing dental caries prompted rapid adoption of this public health measure in cities throughout the United States. As a result, dental caries declined precipitously during the second half of the 20th century. For example, the mean DMFT among persons aged 12 years in the United States declined 68%, from 4.0 in 1966–1970 (*14*) to 1.3 in 1988–1994 (CDC, unpublished data, 1999) (Figure 1). The American Dental Association, the American Medical Association, the World Health Organization, and other professional and scientific organizations quickly endorsed water fluoridation. Knowledge about the benefits of water fluoridation led to the development of other modalities for delivery of fluoride, such as toothpastes, gels, mouth rinses, tablets, and drops. Several countries in Europe and Latin America have added fluoride to table salt.

Effectiveness of Water Fluoridation

Early studies reported that caries reduction attributable to fluoridation ranged from 50% to 70%, but by the mid-1980s the mean DMFS scores in the permanent dentition of children who lived in communities with fluoridated water were only 18% lower than among those living in communities without fluoridated water (*15*). A review of studies on the effectiveness of water fluoridation conducted in the United States during 1979–1989 found that caries reduction was 8%–37% among adolescents (mean: 26.5%) (*16*).

Since the early days of community water fluoridation, the prevalence of dental caries has declined in both communities with and communities without fluoridated water in the United States. This trend has been attributed largely to the diffusion of fluoridated water to areas without fluoridated water through bottling and processing of foods and beverages in areas with fluoridated water and widespread use of fluoride toothpaste (*17*). Fluoride toothpaste is efficacious in preventing dental caries, but its effectiveness depends on frequency of use by persons or their caregivers. In contrast, water fluoridation reaches all residents of communities and generally is not dependent on individual behavior.

Although early studies focused mostly on children, water fluoridation also is effective in preventing dental caries among adults. Fluoridation reduces enamel caries in adults by 20%–40% (*16*) and prevents caries on the exposed root surfaces of teeth, a condition that particularly affects older adults.

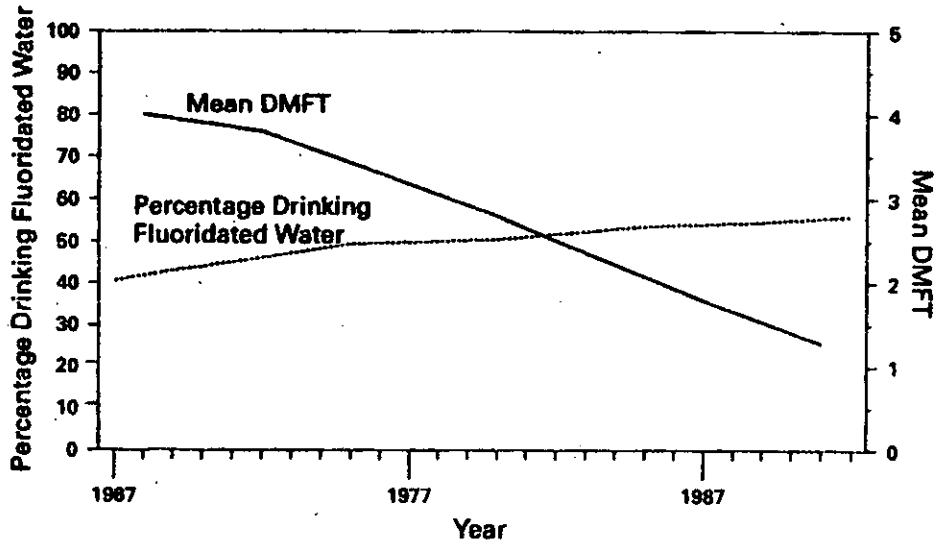
Water fluoridation is especially beneficial for communities of low socioeconomic status (*18*). These communities have a disproportionate burden of dental caries and have less access than higher income communities to dental-care services and other sources of fluoride. Water fluoridation may help reduce such dental health disparities.

Biologic Mechanism

Fluoride's caries-preventive properties initially were attributed to changes in enamel during tooth development because of the association between fluoride and

Fluoridation — Continued

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



Sources:

1. CDC. Fluoridation census 1992. Atlanta, Georgia: US Department of Health and Human Services, Public Health Service, CDC, National Center for Prevention Services, Division of Oral Health, 1993.
2. National Center for Health Statistics. Decayed, missing, and filled teeth among youth 12–17 years—United States. Rockville, Maryland: US Department of Health, Education, and Welfare, Public Health Service, Health Resources Administration, 1974. Vital and health statistics, vol 11, no. 144. DHEW publication no. (HRA)75-1626.
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5. CDC, unpublished data, third National Health and Nutrition Examination Survey, 1988–1994.

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 (*1*). These mechanisms include 1) inhibition of demineralization, 2) enhancement of remineralization, and 3) inhibition of bacterial activity in dental plaque (*1*).

Enamel and dentin are composed of mineral crystals (primarily calcium and phosphate) embedded in an organic protein/lipid matrix. Dental mineral is dissolved readily by acid produced by cariogenic bacteria when they metabolize fermentable

Fluoridation — Continued

carbohydrates. Fluoride present in solution at low levels, which becomes concentrated in dental plaque, can substantially inhibit dissolution of tooth mineral by acid.

Fluoride enhances remineralization by adsorbing to the tooth surface and attracting calcium ions present in saliva. Fluoride also acts to bring the calcium and phosphate ions together and is included in the chemical reaction that takes place, producing a crystal surface that is much less soluble in acid than the original tooth mineral (*1*).

Fluoride from topical sources such as fluoridated drinking water is taken up by cariogenic bacteria when they produce acid. Once inside the cells, fluoride interferes with enzyme activity of the bacteria and the control of intracellular pH. This reduces bacterial acid production, which directly reduces the dissolution rate of tooth mineral (*19*).

Population Served by Water Fluoridation

By the end of 1992, 10,567 public water systems serving 135 million persons in 8573 U.S. communities had instituted water fluoridation (*20*). Approximately 70% of all U.S. cities with populations of >100,000 used fluoridated water. In addition, 3784 public water systems serving 10 million persons in 1924 communities had natural fluoride levels ≥0.7 ppm. In total, 144 million persons in the United States (56% of the population) were receiving fluoridated water in 1992, including 62% of those served by public water systems. However, approximately 42,000 public water systems and 153 U.S. cities with populations ≥50,000 have not instituted fluoridation.

Cost Effectiveness and Cost Savings of Fluoridation

Water fluoridation costs range from a mean of 31 cents per person per year in U.S. communities of >50,000 persons to a mean of $2.12 per person in communities of <10,000 (1988 dollars) (*21*). Compared with other methods of community-based dental caries prevention, water fluoridation is the most cost effective for most areas of the United States in terms of cost per saved tooth surface (*22*).

Water fluoridation reduces direct health-care expenditures through primary prevention of dental caries and avoidance of restorative care. Per capita cost savings from 1 year of fluoridation may range from negligible amounts among very small communities with very low incidence of caries to $53 among large communities with a high incidence of disease (CDC, unpublished data, 1999). One economic analysis estimated that prevention of dental caries, largely attributed to fluoridation and fluoride-containing products, saved $39 billion (1990 dollars) in dental-care expenditures in the United States during 1979–1989 (*23*).

Safety of Water Fluoridation

Early investigations into the physiologic effects of fluoride in drinking water predated the first community field trials. Since 1950, opponents of water fluoridation have claimed it increased the risk for cancer, Down syndrome, heart disease, osteoporosis and bone fracture, acquired immunodeficiency syndrome, low intelligence, Alzheimer disease, allergic reactions, and other health conditions (*24*). The safety and effectiveness of water fluoridation have been re-evaluated frequently, and no credible evidence supports an association between fluoridation and any of these conditions (*25*).

Fluoridation — Continued

21st Century Challenges

Despite the substantial decline in the prevalence and severity of dental caries in the United States during the 20th century, this largely preventable disease is still common. National data indicate that 67% of persons aged 12–17 years (*26*) and 94% of persons aged ≥18 years (*27*) have experienced caries in their permanent teeth.

Among the most striking results of water fluoridation is the change in public attitudes and expectations regarding dental health. Tooth loss is no longer considered inevitable, and increasingly adults in the United States are retaining most of their teeth for a lifetime (*12*). For example, the percentage of persons aged 45–54 years who had lost all their permanent teeth decreased from 20.0% in 1960–1962 (*28*) to 9.1% in 1988–1994 (CDC, unpublished data, 1999). The oldest post-World War II "baby boomers" will reach age 60 years in the first decade of the 21st century, and more of that birth cohort will have a relatively intact dentition at that age than any generation in history. Thus, more teeth than ever will be at risk for caries among persons aged ≥60 years. In the next century, water fluoridation will continue to help prevent caries among these older persons in the United States.

Most persons in the United States support community water fluoridation (*29*). Although the proportion of the U.S. population drinking fluoridated water increased fairly quickly from 1945 into the 1970s, the rate of increase has been much lower in recent years. This slowing in the expansion of fluoridation is attributable to several factors: 1) the public, some scientists, and policymakers may perceive that dental caries is no longer a public health problem or that fluoridation is no longer necessary or effective; 2) adoption of water fluoridation can require political processes that make institution of this public health measure difficult; 3) opponents of water fluoridation often make unsubstantiated claims about adverse health effects of fluoridation in attempts to influence public opinion (*24*); and 4) many of the U.S. public water systems that are not fluoridated tend to serve small populations, which increases the per capita cost of fluoridation. These barriers present serious challenges to expanding fluoridation in the United States in the 21st century. To overcome the challenges facing this preventive measure, public health professionals at the national, state, and local level will need to enhance their promotion of fluoridation and commit the necessary resources for equipment, personnel, and training.

Reported by Div of Oral Health, National Center for Chronic Disease Prevention and Health Promotion, CDC.

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NO FLUORIDE VOTE ON MANCHESTER WATER WORKS

40 TO 50,000 WATER USERS IN OUTLYING AREAS

DERRY
LONDONDERRY
BEDFORD
GRASSMERE
HOOKSET
AUBURN
· GOFFS TOWN

SB 312
L. Bastian

Attachment #4

CITIZENS AGAINST FLUORIDE EXPOSURE

503 Amherst Street, Manchester, NH 03104 (603) 624-4063
Lloyd G. Basinow, Director of Public Information

FEBRUARY 23,2000 PUBLIC HEARING - SENATE BILL 312 - FLUORIDE

New Hampshire is fast becoming the fluoride toxic waste disposal dumping ground for the fertilizer and aluminum industries with the naive help of our state legislature. That which is illegal to dump directly into the Merrimack River is allowed to be filtered through the bodies of our citizens regardless of the risks involved. Senate Bill 312 is probably one of the worse pieces of proposed legislation I have ever seen. The proposed change does nothing to correct the fact that R.S.A.s 31:17A, 44:16, 52:23 and 485:14 are blatantly unconstitutional on their face. I am happy to tell you that these statutes and any changes to them will shortly, for the first time, be challenged in our State and Federal courts.

(First) The present statutes allow the indiscriminate use of a public utility (municipal water supply) to MASS MEDICATE subsets of the population without their consent and regardless of the effect. The statutes make no provisions and completely ignores chemical reaction to subsets of the population taking prescription and non-prescription medications. The statutes ignore the chemical reaction to subsets of the population's intolerance to added amounts of Fluoride and of those individuals who suffer from medical problems which would be exasperated by the introduction of this toxic chemical waste including the reduction of life expectancy. The effect on the animal population can not even be calculated. Additionally, these statutes contain no provisions mandating any form of **RISK ASSESSMENT** or **IMPACT INFORMATION (STUDIES)** prior to the injection of Fluoride.

As an example of the injustice, 10,938 voters in Manchester voted against Fluoridation while between 40,000 and 50,000 water users in outlying areas surrounding Manchester who depend on the Manchester Water Works for their only supply of public water were given no opportunity to have a vote in the issue of putting poison into their water. For all of the foregoing reasons and more, the present state statutes

~~violate the EQUAL PROTECTION CLAUSE~~ of the United States Constitution.

(Second) The addition of Fluoride in no way adds to the purity or safety of a water supply and Fluoride is not necessary for the health, safety or wellbeing of the general population....yet....the statutes do not require that a **"NEED"** be demonstrated prior to Fluoridation. While the statutes may well attempt to circumvent **DUE PROCESS OF THE LAW** and the rights of citizens to challenge **forced medication** upon them, there is no doubt that the people's right to **REDRESS UNDER THE LAW** is denied to them. These statutes contain the clause that once the question appears on the ballot or town warrant it can not be resubmitted "for a minimum period of 3 years from the date of the last popular referendum" in the district, city or town. Anotherwords, people could be sick and dying from Fluoride in their water and they could do nothing for three years. Surely this alone is a denial of **REDRESS OF GRIEVANCE**.

(Third) It should be noted that the required wording of the referendum question is so vague as to be non-informative and misleading. The question states no reason for Fluoridation, does not state any adversities, does not state an amount of the proposed Fluoridation and does not tell the voter the type of Fluoride to be administered. It is not necessary to enumerate all the possible constitutional violations created by the present wording of the referendum question.

These statutes must be removed from the law books immediately for surely, the courts will strike them down in the near future. As an initial step of this Senate Committee, we strongly urge that a STUDY COMMITTEE be formed to examine the entire issue of Fluoridation and recommend appropriate action to the General Court before making any changes to the present statutes.

I would remind this committee that important referendum questions initiated by petition, when allowed by statute, have always required at least 15 or 20 percent of the registered voters to get the question onto the ballot. The existing 10% required for a fluoridation question is already extremely to low. To change the requirement down to five percent is ridiculous. If any thing, the existing 10% needs to be raised....not lowered.

Lloyd G. Basinow

Lloyd G. Basinow

ONE ADDITIONAL COMMENT

NOT INCLUDED ON MY WRITTEN STATEMENT

This bill is an obvious ruse to eventually eliminate entirely the petition requirement to get a fluoridation question onto the ballot and then, at a later time, to deprive the people the right to even vote on whether the poison fluoride should go into their public water supply.

CITIZENS AGAINST FLUORIDE EXPOSURE

(C.A.F.E.)

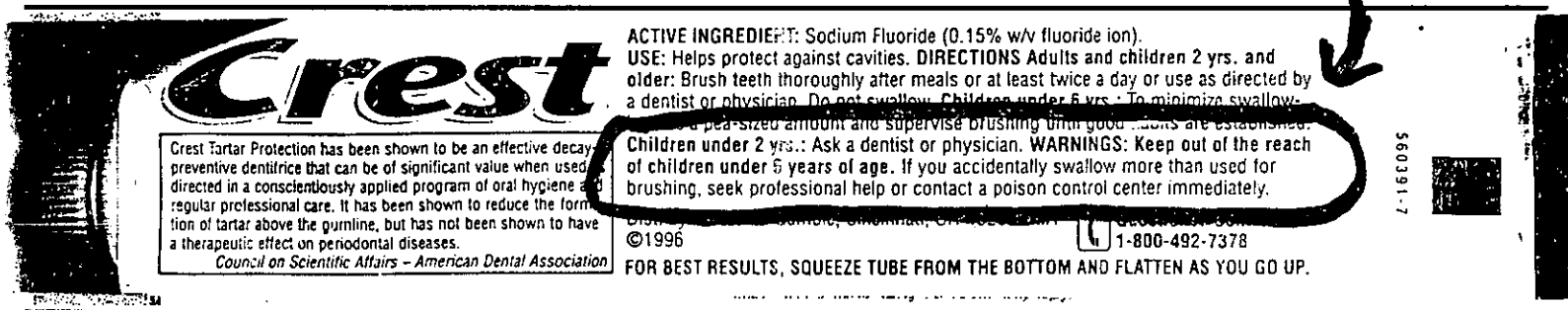
LLOYD G. BASINOW, Spokesman
503 Amherst Street
Manchester, NH 03104
(603) 624-4063

ON NOVEMBER 2ND - VOTE "NO"

TO PUTTING THE POISON FLUORIDE INTO MANCHESTER'S DRINKING WATER

LOOK AT THE WARNING LABEL

On the back of every fluoridated tooth paste is printed, "Keep out of the reach of children ... **if swallowed contact a poison control center immediately."**



WHY WOULD YOU AND YOUR FAMILY WANT TO DRINK POISON?

THE EXPERTS GIVE WARNING!

1500 SCIENTISTS AND PROFESSIONALS AT HEADQUARTERS OF THE ENVIRONMENTAL PROTECTION AGENCY **UNANIMOUSLY VOTED TO OPPOSE FLUORIDATION** ON THE BASIS OF MANY YEARS OF CAREFUL STUDIES SAYING, *"OUR (UNION) MEMBERS' REVIEW OF THE BODY OF EVIDENCE OVER THE LAST ELEVEN YEARS, INCLUDING ANIMAL AND HUMAN EPIDEMIOLOGY STUDIES, INDICATE A CAUSUAL LINK (DIRECT CAUSE) BETWEEN FLUORIDE/FLUORIDATION AND **CANCER, GENETIC DAMAGE, NEUROLOGICAL IMPAIRMENT, AND BONE PATHOLOGY (BONE DAMAGE).** OF PARTICULAR CONCERN ARE RECENT EPIDEMIOLOGY STUDIES LINKING FLUORIDE EXPOSURE TO **LOWER IQ IN CHILDREN."***



WHY DRINK POISON?

VOTE "NO"

ON NOVEMBER 2nd



Manchester Water Works
Water Quality Roundup for 1997

Inorganic Chemicals

Inorganic chemicals are generally found in all water supplies. They may be either man made or of natural origin. The chemicals listed below are those inorganics which EPA has regulated due to their adverse health effects. The MCL listed is the maximum allowable by EPA standards.

Contaminant

Arsenic ←
Antimony
Asbestos
Barium
Beryllium
Cadmium
Chromium
Cyanide ↙
Fluoride ←
Mercury
Nickel
Nitrate
Nitrite
Selenium
Sulfate
Thallium

SIXTEEN MOST DANGEROUS TOXIC CHEMICALS ACCORDING TO THE MANCHESTER WATER WORKS AND ENVIRONMENTAL PROTECTION AGENCY, WHICH ***"due to their adverse health effects"*** SHOULD BE KEPT OUT OF DRINKING WATER SUPPLIES.

"SAVE YOUR TEETH - POISON YOUR STOMACH"

UNION LEADER "PROOF" for October 29, 1999

FLUORI2N01A RAP 2x8 ZALLCALL 26 14:39:53 10/22/99

PUBLIC NOTICE
MANCHESTER VOTERS

Fluoridation advocates, dentists, ADA, AMA and Manchester Health Department are attempting to trick you into poisoning Manchester's drinking water. They say fluoridation is healthy, safe and no one is in danger. Now the Health Department wants to **"GAMBLE"** with our lives!

WHO'S LYING?

The following is a sample of individual and mass fluoride poisonings reported in the news media:

Annapolis Evening Capital 50,000 poisoned, 10,000 acute cases, 65% neurologic symptoms Health officer kept it a secret for two weeks saying "We did not want to jeopardize the fluoridation program." ★ N.Y. Times (headline) "$750,000 GIVEN IN CHILD DEATH IN FLUORIDE CASE - BOY, 3, WAS IN CITY CLINIC FOR ROUTINE CLEANING" ★ Glen Cove, Long Island child dies in dentist's chair ★ Melbourne Truth of Australia (headline) "FLUORIDE TABLES KILL BABY JASEN" ★ Rocky Mountain Poison Center reported 87 cases of fluoride poisoning in children younger than 12 years old - 2 involved fluoride treatments by dentists - 1 dead. ★ Spencer County, Indiana 18,000 poisoned - 79 dead ★ **Belgian,** Meuse Valley - 60 dead ★ Donora, Pennsylvania - 20 dead ★ Alaska 296 acute - 1 dead ★ Mississippi - 123 acute poisonings ★ Norway - 370 cases ★ Russia 378 cases ★ Mass fluoride poison cases reported in Maryland, Florida, Quebec, Ohio, Oregon, Washington and British Columbia.

Why would any intelligent person want to ingest poison into their body so they could go to the grave earlier with good teeth? Substitution of one cavity for another makes no sense!

Keep Your Health In Your Own Hands!

VOTE "NO" ON FLUORIDATION
REFERENDUM QUESTION, November 2nd

New Hampshire Pure Water Coalition
Citizens Against Fluoride Exposure
503 Amherst St. Manchester, N.H. 03104 603-624-4063

PLEASE HELP
DONATIONS NEEDED
IF YOU BELIEVE IN THE CAUSE

Attachment #3

Norman R. Mancuso Associates

Engineering, Information & Computer Services, Systems & Software

24 Terrane Avenue Natick, MA 01760-1732 (508) 647-4999 VOICE/FAX nrmancuso@mediaone.net

Institute of Electrical & Electronic Engineers
Committee of Concerned Engineers
American Chemical Society

Testimony on NH Senate Bill 312 before the Public Affairs Committee
New Hampshire State Senate
Feb. 23, 2000

Good Afternoon. My name is Norman R. Mancuso. I hold a Ph. D. in Chemistry from SUNY/Buffalo. During the period 1961-1965, I held the positions of Du Pont Teaching Fellow and Petroleum Research Fund Fellow during my pre-doctoral studies. During 1966-67 I served as a National Institutes of Health Post-Doctoral Fellow at the department of Chemistry at MIT. From 1967 through 1979, I was a member of the Division of Sponsored Research in that department. During this time period, I developed analytical instrumentation and software for the purpose of determining the structures of Organic Compounds using High Resolution Mass Spectrometry. I also served as Apollo Project Scientist from 1967 through 1970 and was actively involved in the design of the equipment at the Lunar Receiving Laboratory and in the analysis of Lunar Material from the various Apollo missions. I was Sr. Systems Engineer at Inforex Corp and was later Group Leader. at Dennison Mfg. Co. and Avery-Dennison Imaging Systems Division. In 1991, I engaged in consulting, d.b.a. Norman R. Mancuso Associates. During 1997, I served as Chairman of the Fluoridation Study Committee for the town of Natick, co-producing a 93-page report entitled "Should Natick Fluoridate" which recommended to the Board of Selectmen that Fluoridation NOT take place in the Town of Natick.

You will no doubt hear today, from proponents of water fluoridation, that the vast majority of the public stands solidly beyond this practice. It is therefore exceedingly curious that these same proponents should suggest that the citizens of NH will benefit in any way from the proposed legislation. I therefore testify in opposition to the proposed bill as it currently stands. No doubt you are also aware of House Bill 1598, which requires a two-thirds majority in order to make the decision to fluoridate a community. If SB 312 were to be combined with legislation similar to HB 1598 it may be more acceptable. dth Comments

The question of community water fluoridation continues to provoke much discussion. This is largely the result of the growing body of literature, which concludes that continued water fluoridation is responsible for a growing number of maladies of various significance and ought not to be continued. Because of the nature of these recent findings, it appears foolhardy to facilitate the implementation of fluoridation.

For example, numerous studies have indicated that water fluoridation results in a significantly increased (8-40% more; 95% confidence level) incidence of bone fractures in older men and women in fluoridated communities compared to unfluoridated communities. This appears to be particularly true of those already suffering from osteoporosis. Even if all of the so-called cariostatic benefits of fluoride could be achieved, these pale into insignificance when compared to the potential morbidity of large bone fractures in the elderly. In fact, as you will hear from others today, the prevailing evidence is that these claimed cariostatic benefits are largely unachievable.

Recent work by Masters and Coplan leads to the conclusion that fluoridation with Fluorosilicic Acid and its derivatives is strongly correlated with increased venous blood lead levels in children living in communities which use the above chemicals in the process of fluoridation of their public water supplies. The danger of ingested lead is widely understood to result in medical conditions such as ADD and ADHD and may well be responsible for a significant portion of socially pathological behavior.

Fluoride has become a common and largely inescapable component in the normal food chain of humans. In fact, it routinely supplies, in the daily diet of most people, more than is recommended as the so-called "optimum" dose to be ingested by the daily intake of up to two liters of fluoridated water. It is important to note that this is the case for people who DO NOT live in a community whose public water supply is fluoridated. Clearly, those who do will often intake up to four or more milligrams per day. In other words, they may ingest a daily dose LARGER than the MCL for fluoride as set by the EPA!

In spite of the posturing of the pro-fluoridation community, water fluoridation is the **only controllable source** of fluoride in the average diet. It is literally impossible for the average person to limit fluoride intake in any of the other components of the normal diet. In spite of this, the pro-fluoridation community continues to suggest that people must control the uncontrollable sources and that water fluoridation must be implemented or must continue.

Notwithstanding the fact that over fifty years have passed since fluoridation began, little or no research has been carried out to determine the long-term effects of the program on the public. This is especially true in the case of the use of fluorosilicates, which are used in 90% of the fluoridated water systems in the USA today. Moreover, even the original research carried out with Sodium Fluoride was flawed from the start. Today, no scientist or health professional worth his salt would even consider the job complete without having performed double blinded experiments. In the light of the foregoing information, it seems clear that SB 312 as it currently stands is inadvisable. I urge you to vote to **withhold approval** of this bill.

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e. On decreased fertility in humans:
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Masters, RJ, Coplan, MJ, Intern. J. Environmental Studies, 56:435, 1999, Water Treatment with Silicofluorides and Lead Toxicity

SB312

2/23/00

Testimony of Norman Mancuso

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Institute of Electrical & Electronic Engineers
Committee of Concerned Engineers
American Chemical Society

Testimony on NH Senate Bill 312 before the Public Affairs Committee
New Hampshire State Senate
Feb. 23, 2000

Good Afternoon. My name is Norman R. Mancuso. I hold a Ph. D. in Chemistry from SUNY/Buffalo. During the period 1961-1965, I held the positions of Du Pont Teaching Fellow and Petroleum Research Fund Fellow during my pre-doctoral studies. During 1966-67 I served as a National Institutes of Health Post-Doctoral Fellow at the department of Chemistry at MIT. From 1967 through 1979, I was a member of the Division of Sponsored Research in that department. During this time period, I developed analytical instrumentation and software for the purpose of determining the structures of Organic Compounds using High Resolution Mass Spectrometry. I also served as Apollo Project Scientist from 1967 through 1970 and was actively involved in the design of the equipment at the Lunar Receiving Laboratory and in the analysis of Lunar Material from the various Apollo missions. I was Sr. Systems Engineer at Inforex Corp and was later Group Leader. at Dennison Mfg. Co. and Avery-Dennison Imaging Systems Division. In 1991, I engaged in consulting, d.b.a. Norman R. Mancuso Associates. During 1997, I served as Chairman of the Fluoridation Study Committee for the town of Natick, co-producing a 93-page report entitled "Should Natick Fluoridate" which recommended to the Board of Selectmen that Fluoridation NOT take place in the Town of Natick.

You will no doubt hear today, from proponents of water fluoridation, that the vast majority of the public stands solidly beyond this practice. It is therefore exceedingly curious that these same proponents should suggest that the citizens of NH will benefit in any way from the proposed legislation. I therefore testify in opposition to the proposed bill as it currently stands. No doubt you are also aware of House Bill 1598, which requires a two-thirds majority in order to make the decision to fluoridate a community. If SB 312 were to be combined with legislation similar to HB 1598 it may be more acceptable.

The question of community water fluoridation continues to provoke much discussion. This is largely the result of the growing body of literature, which concludes that continued water fluoridation is responsible for a growing number of maladies of various significance and ought not to be continued. Because of the nature of these recent findings, it appears foolhardy to facilitate the implementation of fluoridation.

For example, numerous studies have indicated that water fluoridation results in a significantly increased (8-40% more; 95% confidence level) incidence of bone fractures in older men and women in fluoridated communities compared to unfluoridated communities. This appears to be particularly true of those already suffering from osteoporosis. Even if all of the so-called cariostatic benefits of fluoride could be achieved, these pale into insignificance when compared to the potential morbidity of large bone fractures in the elderly. In fact, as you will hear from others today, the prevailing evidence is that these claimed cariostatic benefits are largely unachievable.

Recent work by Masters and Coplan leads to the conclusion that fluoridation with Fluorosilicic Acid and its derivatives is strongly correlated with increased venous blood lead levels in children living in communities which use the above chemicals in the process of fluoridation of their public water supplies. The danger of ingested lead is widely understood to result in medical conditions such as ADD and ADHD and may well be responsible for a significant portion of socially pathological behavior.

Fluoride has become a common and largely inescapable component in the normal food chain of humans. In fact, it routinely supplies, in the daily diet of most people, more than is recommended as the so-called "optimum" dose to be ingested by the daily intake of up to two liters of fluoridated water. It is important to note that this is the case for people who DO NOT live in a community whose public water supply is fluoridated. Clearly, those who do will often intake up to four or more milligrams per day. In other words, they may ingest a daily dose LARGER than the MCL for fluoride as set by the EPA!

In spite of the posturing of the pro-fluoridation community, water fluoridation is the **only controllable source** of fluoride in the average diet. It is literally impossible for the average person to limit fluoride intake in any of the other components of the normal diet. In spite of this, the pro-fluoridation community continues to suggest that people must control the uncontrollable sources and that water fluoridation must be implemented or must continue.

Notwithstanding the fact that over fifty years have passed since fluoridation began, little or no research has been carried out to determine the long-term effects of the program on the public. This is especially true in the case of the use of fluorosilicates, which are used in 90% of the fluoridated water systems in the USA today. Moreover, even the original research carried out with Sodium Fluoride was flawed from the start. Today, no scientist or health professional worth his salt would even consider the job complete without having performed double blinded experiments. In the light of the foregoing information, it seems clear that SB 312 as it currently stands is inadvisable. I urge you to vote to **withhold approval** of this bill.

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Joint Testimony for Hearing on New Hampshire Senate Bill # SB 312
New Hampshire Senate Public Affairs Committee, February 23, 2000

(Presented by Myron J. Coplan for himself and Dartmouth College Professor Roger D. Masters)

My name is Myron J. Coplan. I am a resident of Natick, Massachusetts and appear here today as spokesman for myself as well as for Professor (Emeritus) Roger D. Masters, who is unable to attend this hearing due to illness. Dr. Masters' credentials and written testimony have previously been presented at a hearing held by the NH House of Representatives Committee on Municipal and County Government. Our written testimony here today is expanded from the versions presented to that referenced Committee Hearing.

I am a professional chemist/chemical engineer (MA Reg # 621478), former Senior Scientist and retired V. President of a major multi-national company, now consulting as "Intellequity".I am listed in American Men of Science, Member (Emeritus) of the American Chemical Society, American Association for the Advancement of Science, The New York Academy of Science and others. My field of specialization is membrane systems for water purification, an area in which I hold 32 patents.

I directed professionals engaged in hands-on research on treatment of by-product wastes from phosphate fertilizer production. These include the principal agents (silicofluorides) used to treat potable water. I am familiar with the chemistry of silicofluorides and their toxicity hazards. In addition, my avocation activities include service on my town (Natick, MA) board of health in which capacity I became a "student" of water fluoridation at the practical level.

Masters is currently Research Professor and Nelson A. Rockefeller Professor of Government, Emeritus at Dartmouth and President of the Foundation for Neuroscience and Society. In 1967 he received a Guggenheim Fellowship to study political implications of the revolutionary advances in modern biology. He is a recognized specialist in this field, serving as Vice Chair of the Association for Politics and the Life Sciences, (international association of scholars) and is currently on its Council. From 1993 to 1998 Dr. Masters also chaired the Executive Committee of the Gruter Institute for Law and Behavioral Research

At the request of John Gorzyck Vermont Commissioner of Corrections, Masters undertook a study of biological factors in violent crime including brain function and the influence of environmental neurotoxins. This study revealed that violent youth offenders have higher levels of lead in their hair than non-violent youth offenders. His studies of heavy metal intoxication as a correlate of dysfunctional behavior appear in authoritative journals.

Since 1997, Masters and Coplan have collaborated in studies of the association of a particular class of fluoridating agents used to treat public water systems with elevated blood lead in children, ADD/ADHD, prevalence of violent crime, and other health and behavioral disorders in communities served by such water systems. The testimony below is organized to address three issues: (I) Objective current facts about tooth decay and the effect of water fluoridation. (II) Objective facts about health effects from drinking silicofluoride treated water. (III) Appropriate legislation relative to water fluoridation at this time.

ISSUE (I): Objective Facts re Fluoridated Water and Tooth Decay

Although proponents of water fluoridation rarely concede the fact, it is now well known among the professional research community that the benefits of fluoride to teeth are due to contacting the enamel outer surface via topical applications, tooth-paste etc. (See Abstracts, appended). Fluoride in the digestive tract from food, beverages and swallowed toothpaste, which then crosses into the bloodstream, does not inhibit tooth decay. Rather, it is the cause of a tooth defect called "fluorosis", a disturbance of the fine structure of the enamel of a nascent pre-emergent tooth. This occurs because flouride modifies the natural tooth bud formation process which then shows up as a "mottling" or opacities in emerged tooth enamel.

In 1945 the prevalence of only mild fluorosis was about 10-12% in communities that had drinking water with the optimum 1 ppm of fluoride. Fluorosis was unknown in communities without fluoride in their water. Today, fluoridated communities are experiencing fluorosis at around 30-50 % and occasionally as high as 80 %, some of it moderate to severe. Non-fluoridated communities are experiencing fluorosis in the 10-15 % prevalence range from fluoride in sources other than the local water. ("Health Effects of Ingested Fluoride"; National Research Council; National Academy Press; Washington, DC; 1993)

Regarding tooth decay, a community "average" condition is a specious measure of the real problem of childhood caries. Today, about 80% of tooth decay teeth is found among 20% of children.(Kaste LM et al; "Cooronal Caries in the Primary and Permanent Dentition of Children and Adolescents 1-17 years of Age"; J. Dent Res V 75 Spec Iss; pp 631-641; Feb 1996) More than half of most sampled groups are caries free. However, there is a small minority of children whose teeth are a problem due to a condition which starts early in their life as "Baby Bottle Tooth Decay".

This is described in several abstracts appended hereto. Simply stated, the consensus of experts is that improperly attended infants are susceptible to "rampant" decay due to prolonged tooth exposure to bacterial nutrients in nipple-bottled fluids. Their deciduous teeth suffer serious attack from acids produced by streptococcus mutans (and other micro-organisms). When their permanent teeth erupt into the infected oral cavity, these are immediately at risk of attack, even though their "baby teeth" have started to fall out.

Their problem arises from cultural, social, and educational attributes of their environment. None of the dozen or so abstracts on BBTD appended hereto offers any evidence to support the premise that adding fluoride to the water ingested by these children will do them any good. Another group of appended abstracts illustrates the fact that the consensus view of the benefits of fluoride for any child of any age: to wit, only topical contact with the tooth enamel offers any protection. Ingested fluoride does only harm, when it exceeds a very small, defined threshold for the onset of fluorosis.

Meanwhile, with excessive uptake of fluoride from all sources unequivocally evidenced by increased prevalence of fluorosis, the original claimed benefit of 50-60 % lower tooth decay, (incorrectly attributed to "optimally" fluoridated water), has virtually completely vanished (see Figure 1, the data points for which are from reports in recognized dental research journals listed on the page following the figure).

In 1986-87 a national Oral Health survey by the US Public Health Service was conducted on 39,000 children 5-17 years of age. (NIH Pub. No. 89-2247, Sept 1989). As published, this document did not present information on the effects of fluoridated water. However, under outside pressure, the National Institute of Dental Research analyzed tooth decay rates as a function of local water fluoridation status and published same in 1990. (Brunelle, JA and Carlos JP; "Recent Trends in Dental Caries in US Children and Effect of Water Fluoridation"; J. Dent. Res 69 Spec Iss; Feb 1990; pp 723-27). These data are shown in Table I as tooth decay rate, expressed as mean number of decayed, missing and filled tooth surfaces per child, (DMFS).

They indicate that *national average* DMFS rate in fluoridated areas was 18 % less than in non-fluoridated. Major regional differences exist, however. In Region VII, (California, Hawaii, Washington, Oregon) DMFS in fluoridated areas was 61 % less than in non-fluoridated. Aside from the fact this strongly biased the national average upward, there are problems with Region VII rates, both statistically and substantively. Without dwelling on details: (a) ethnic/racial, diet, health habits, and SES significantly affect caries and (b) many Region VII residents are notably susceptible to these factors.

On the other hand, in Region I (New England), the nominal benefit of fluoridation was only 10%. But, this was 15 years ago when decay rates were dropping rapidly in both fluoridated and non-fluoridated communities and differences between them dwindling. The trends suggest that by 1995, the benefit of fluoridation in most places had probably dropped to nil as illustrated in Figures 1-3. *At least as important, however, is that in the Midwest (Region III), a population of over 40 million, where fluoridation had started early and has been practiced most widely, the tooth decay rate in 1986-87 was* ***HIGHER*** *in fluoridated areas than non-fluoridated areas,* ***according to NIDR data.***.

A smaller early 1990s study compared tooth decay of young adults who had consumed non-fluoridated water from birth to 5-8 yr of age with subjects who had fluoridated water controlled at the optimum level of 1 ppm F in six water supply systems under the management of the US government on military bases. The report (Kobayashi S et al; "Caries Experience in subjects 18-22 years of age after 13 years' discontinued water fluoridation in Okinawa"; Community Dent Oral Epidemiol 1992 Apr;20(2):81-3) concludes: "Overall differences in favor of the fluoridated subjects were small and non-significant", in complete accord with the trends shown in Figures 1-3 and Table I.

Even the apparent adverse effect of water fluoridation shown for Region III in Table I, is replicated in a 1998 study by the NY State Board of Health which compared trends in Newburgh and Kingston, NY, (see Figure 2). Fluoridation proponents invariably cite the 1945-55 experiment in which fluoridated Newburgh was seen to have experienced a 50-60 % drop in decay rate while non-fluoridated Kingston had not. It is clear from Figure 2 that the ostensible benefit of fluoridation in Newburgh from 1945 to 1955 no longer exists. In fact, the reverse is the case: non-fluoridated Kingston now seems to be slightly better off than fluoridated Newburgh. In fact, well before this revelation, work at the Forsyth Dental Center had shown that non-fluoridated Norwood and Dedham MA, had been experiencing similar decay decline from about the late 50s onward. (Glass RL; "Secular Changes in Caries Prevalaence in Two Massachusetts Towns": Caries Res V 15; pp 445050; 1981)

Finally, a major national survey completed in 1998 (NHANES III, Phases I and 2) provides data on child tooth decay and other health matters. While the NHANES III data base does not include information on fluoridation status of the residence communities of the children surveyed, this problem was relatively easily overcomeusing the CDC 1992 Fluoridation Census. It was possible to assign the children of 35 counties according their likelihood of receiving fluoridated water using this census according to:

Group (A) living in counties (3 million people in all) where over 95% of residents received fluoridated water;

Group (B) living in counties (1.9 million people in all) where less than 5 % of residents received fluoridated water;

Group (C) living in counties which on average had 52% of all residents (1.1 million people) receiving fluoridated water.

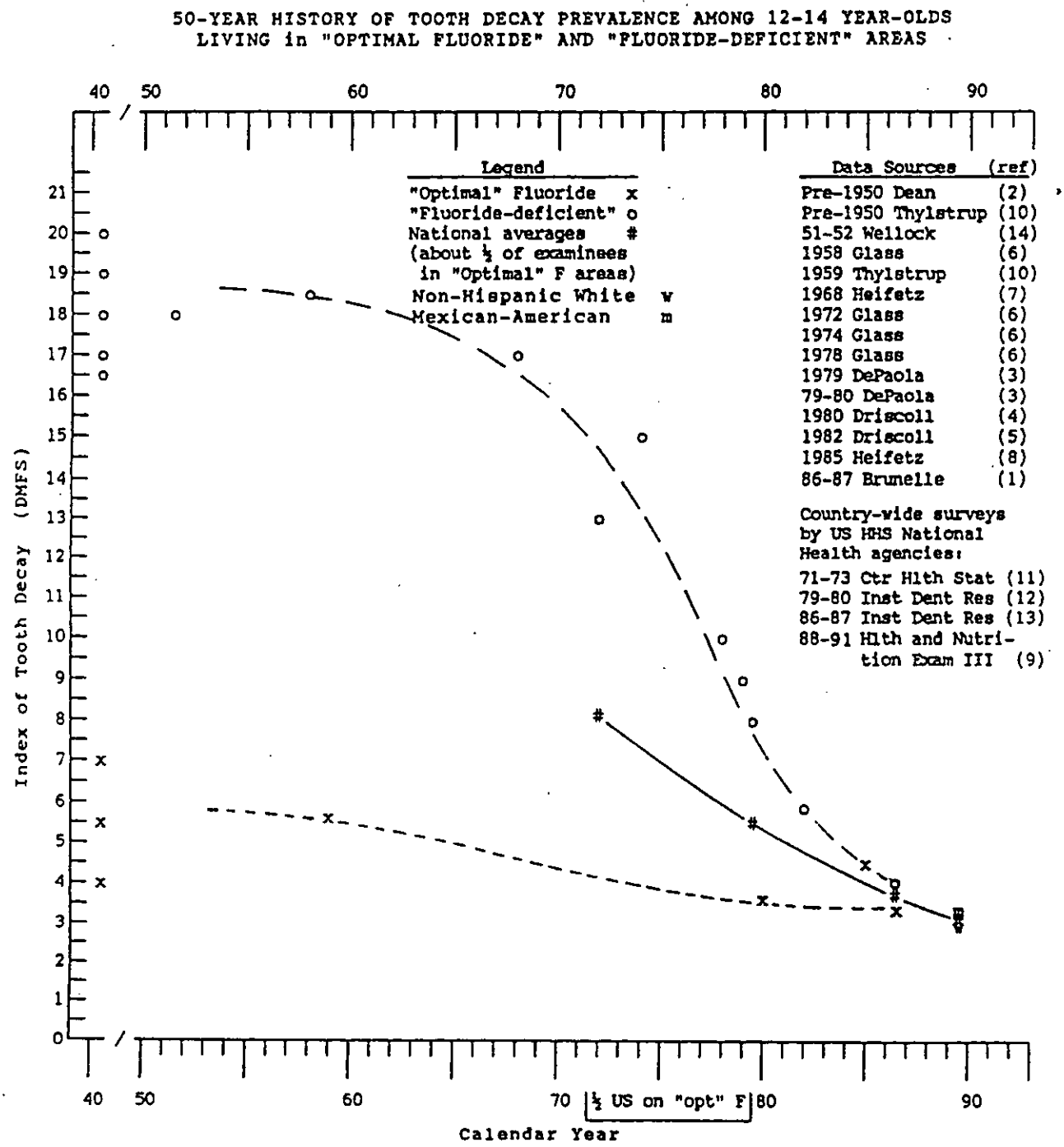
Since any Group (C) child would have had a "50/50" chance of receiving fluoridated water, the association of his/her tooth decay rate with exposure to fluoridated water would have been entirely speculative. We focused, therefore on the other two groups, in which each child would have either a 95% or 5% chance of receiving fluoridated water so a comparison of decay rates could be made with reasonable confidence. The results, plotted by age, are shown in Figure 3. The graph comparing decay as a function of age for the children in Group (A) with the children in Group (B) speaks for itself.

(In addition to the tooth decay analysis we analyzed NHANES III data for child blood lead, which reported here in the following section pertaining to adverse health effects. All of this is to be submitted to a prominent journal for publication.)

Conclusion regarding Issue (I) The weight of objective evidence at the present time is that community water fluoridation has no beneficial effect on mean rate of caries for children and represents an added burden of fluoride contributing to fluorosis.

Issue (I) Figure 1

Decline in DMFS Index in 12-14 Year Olds (12)



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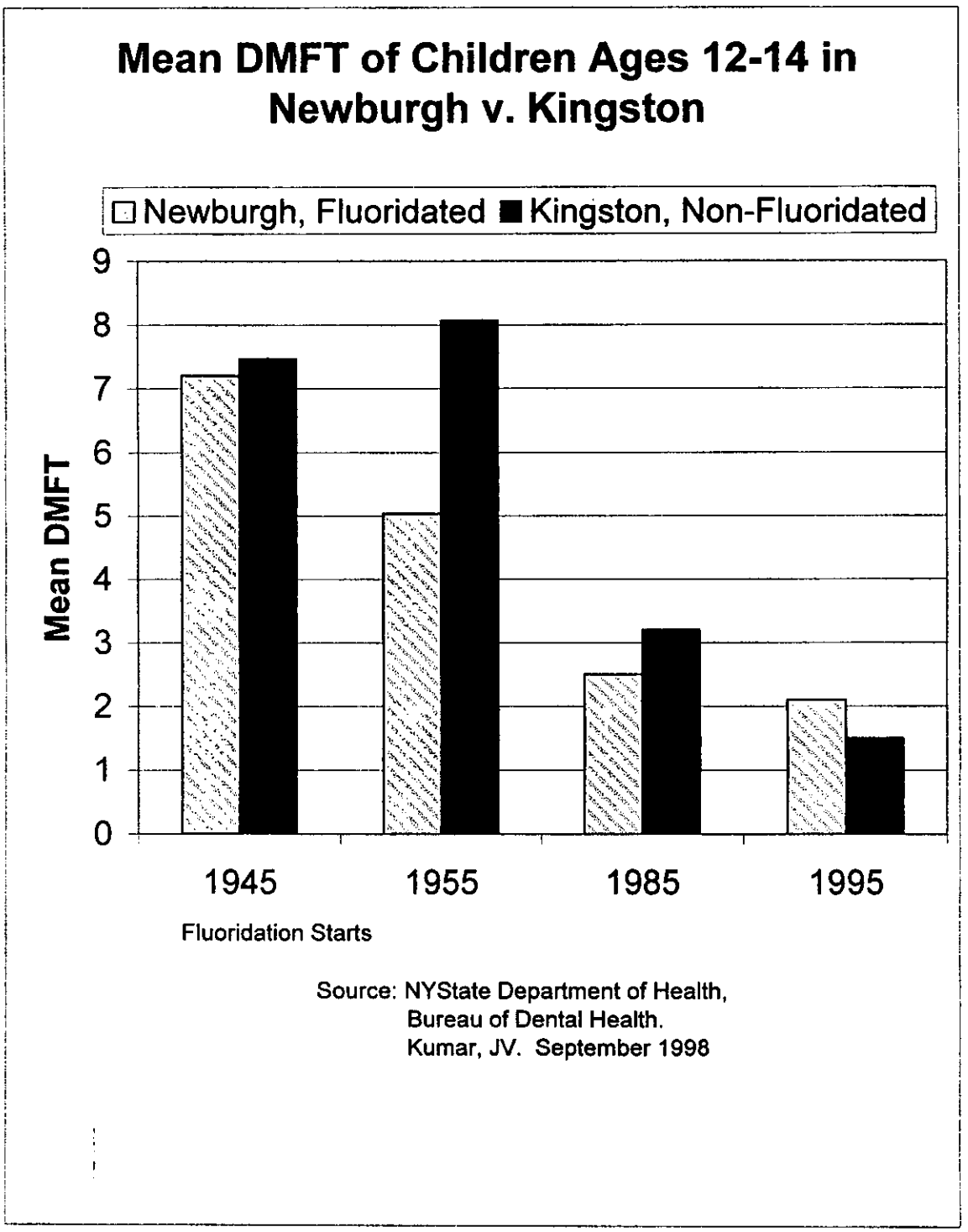
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Issue (I) Figure 2



Issue (I) Figure 3

Effect of Fluoridated Water on Tooth Decay Rates
Of Children of All Races in The NHANES III Study
(Phases 1 and 2, 1988-95)

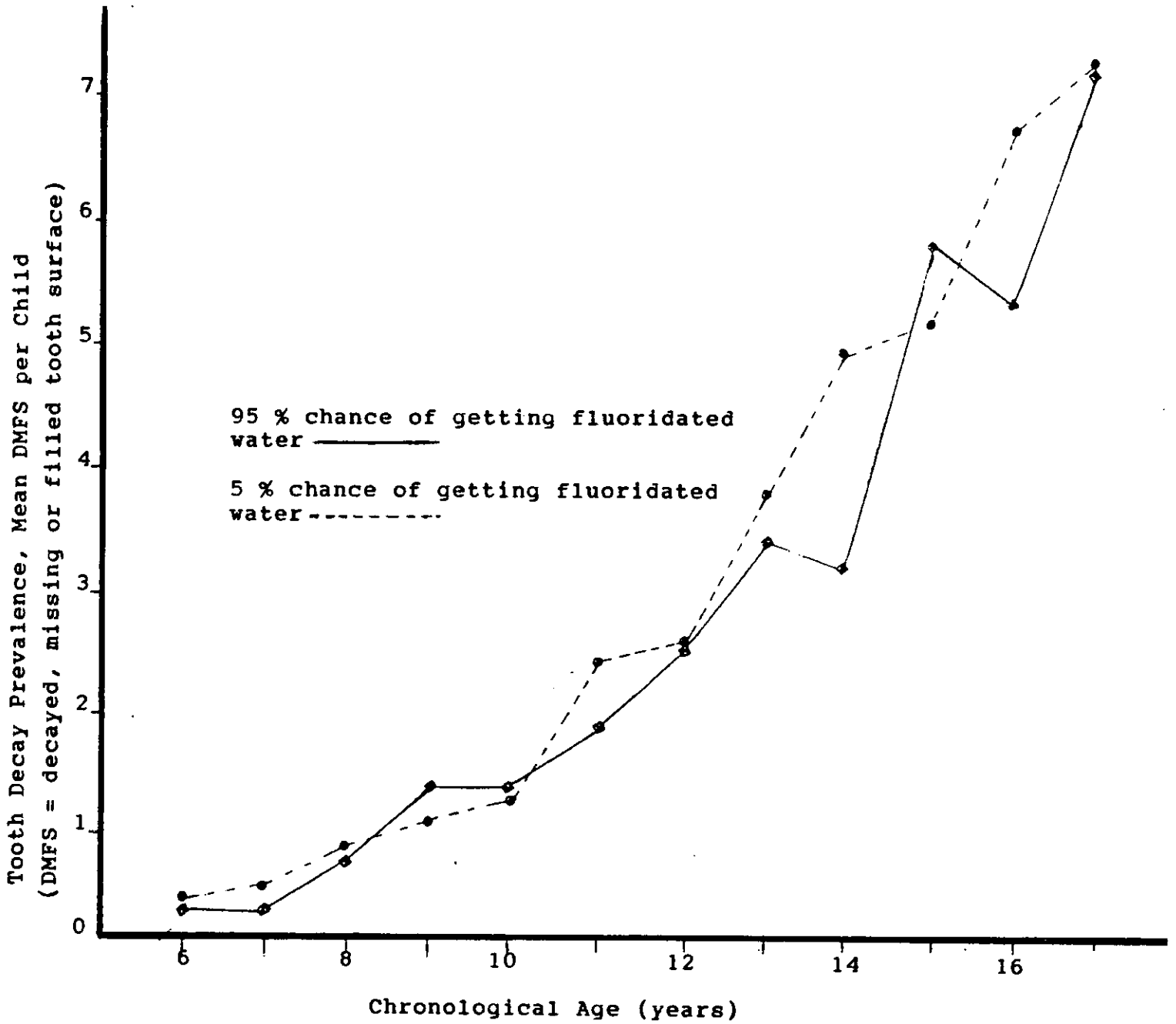


Table I.

ANALYSIS OF NIDR 1986-87 SURVEY OF DENTAL CARIES
AS A FUNCTION OF COMMUNITY FLUORIDE STATUS

Region	Reference (16) 5-17 yr-olds* (thous)	%	DMFS	Std. Error	Reference (21) % Area F'ed	DMFS F	DMFS Non-F	F vs NF % diff
(a) US	41,310	100.0	3.07	0.071	53	2.79	3.39	18 less
(b) I	2,042	4.9	3.60	0.192	55	3.11	3.45	10 less
(c) II	5,989	14.5	3.43	0.119	49	3.08	3.42	10 less
(d) III	9,233	22.4	2.91	0.216	74	2.86	2.69	6 more
(e) IV	11,048	26.7	3.08	0.169	54	2.75	3.60	24 less
(f) V	4,448	10.8	2.39	0.117	59	2.49	2.71	8 less
(g) VI	2,499	6.1	2.75	0.153	34	2.36	3.07	23 less
(h) VII	6,042	14.6	3.37	0.052	19	1.42	3.61	61 less
(i) I-III comb'd.	17,264	41.8	3.17		63	2.95	3.15	6 less

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* According to (16) the US 5-17 year census was 43,280,974. The number of subjects initially examined were 39,206 but only those with at least one permanent tooth were retained in the calculation of DMFS statistics. Hence the population represented by recorded data is 41,310,000 and the % by Region is in accord with that number.

Abstracts

Current Views of The Role of Fluoride

Margolis HC, Moreno EC (Forsyth Dental Center, Boston, Massachusetts 02115.); "Physicochemical perspectives on the cariostatic mechanisms of systemic and topical fluorides"; J Dent Res 1990 Feb;69 Spec No:606-13; discussion 634-6

The cariostatic mechanisms of systemic and topical fluoride agents are considered in light of a previously proposed model for the caries process. It is noted that fluoride, in principle, can induce a cariostatic effect: by (1) reducing enamel solubility when incorporated into the mineral structure; (2) by fostering the remineralization of incipient enamel lesions and the deposition of fluoridated phases (within dental plaque) which provide a source of mineral ions (Ca, P, F) under acidic conditions; and (3) by reducing the net rate of transport of matter out of the enamel surface, under acidic conditions, by inducing the reprecipitation of fluoridated hydroxyapatite phases within enamel. It is also noted that relatively high (approximately 12,000 ppm) concentrations of professionally applied topical fluorides significantly reduce the rate of acid production of cariogenic organisms (e.g., S. mutans). Based on an analysis of available clinical and laboratory data, it is concluded that the benefits provided by water fluoridation result, to a large degree, from a topical effect. It is suggested that clinical procedures be developed to establish and maintain low levels of free fluoride in plaque fluid. It appears that this will require frequent exposure to topical fluorides.

Martens LC, Verbeeck RM (Unites de medecine dentaire pediatrique, Hopital universitaire, Gand.); "Mechanism of action of fluorides in local/topical application"; Rev Belge Med Dent 1998;53(1):295-308

The marked caries reduction in many countries over the last two decades is thought to be mainly the result of the widespread and frequent use of low concentrations of fluorides mainly via toothpastes. This article gives a review on fluoride sources in the oral cavity and discusses the physiochemical mechanisms by which fluoride interacts with enamel during the caries process and its reversal. From this review it becomes clear that fluoride incorporated into the enamel mineral during tooth development has little effect on the caries process. It is the fluoride incorporated posteruptively and in the aqueous phase during the caries challenge that is of primary importance. The most effective caries preventive fluoride regimen, both from a theoretical perspective and as proved clinically, is the frequent (daily) low concentration application of fluoride from toothpastes and/or mouthrinses. High concentrations, however, used at intervals of months or years and administered by the dentist, work initially not only on both de- and remineralisation, but also by providing fluoride as calcium-fluoride or absorbed in early lesions which is subsequently available over prolonged periods.

Shellis RP, Duckworth RM; (MRC Dental Group, Dental Hospital and School, Bristol, UK.) "Studies on the cariostatic mechanisms of fluoride"; Int Dent J 1994 Jun;44(3 Suppl 1):263-73

This paper reviews mechanisms underlying the caries-preventive effects of fluoride, with special reference to factors which govern the efficacy of topical treatments. Fluoride reduces demineralisation in several ways: by reducing bacterial acid production and acidurance; by reducing the equilibrium solubility of apatite; and by the fluoridation of apatite crystal surfaces, reducing the dissolution rate, whether or not there is reduced solubility of the bulk mineral. On available evidence, the last seems to be the most important effect. The effect depends upon the presence of sufficiently high, dissolved fluoride concentrations to maintain the surface fluoridation. The provision of dissolved fluoride is the key to successful therapy, especially topical treatments. Fluoride also promotes remineralisation even at low concentrations, thus slowing or preventing overall mineral loss. The formation of intra-oral fluoride reservoirs capable of supplying ions for a prolonged period is crucial to the success of topical treatments..

Fischer C, Lussi A, Hotz P (Klinik fur Zahnerhaltung, Universitat Bern Schweiz); "The cariostatic mechanisms of action of fluorides. A review"; Monatsschr Zahnmed 1995;105(3):311-7

In the past the inhibition of caries by fluorides was ascribed to the reduced solubility of enamel due to the incorporation of F- into the enamel mineral. During the last years the understanding of the cariostatic mechanism has changed fundamentally. Based on these new findings the loosely bound fluorides, which are present in the surroundings of the teeth after application of topicals, are regarded as decisive for the caries preventing effect by causing an inhibition of demineralization, enhancing the remineralization process and supporting the precipitation of CaF2. The formation of CaF2 is induced after application of topicals, and the material stays relatively stable in the mouth, due to adsorbed HPO4(2-) ions at the surface of CaF2. During the cariogenic challenge, CaF2 releases F- ions due to the reduced concentration of HPO4(2-) ions at acidic pH values. The CaF2 therefore functions as a pH-controlled F(-)-reservoir and is the most important supplier of free F- ions during the cariogenic challenge.

Ogaard B (University of Oslo Dental Faculty, Department of Orthodontics, Norway.); "Effects of fluoride on caries development and progression in vivo"; J Dent Res 1990 Feb;69 Spec No:813-9; discussion 820-3

The dissolution rate of calcium-fluoride-like material from the enamel surface in vivo appears to be much slower than previously thought. This could be due to adsorption of phosphate ions and/or protein molecules to the surface of the calcium-fluoride-like particles. During cariogenic challenges, the phosphate/protein coating is released, resulting in increased solubility rate of the calcium-fluoride-like material. Due to this mechanism, calcium-fluoride-like material may be a major aspect of the cariostatic mechanism of topically applied fluoride. Topically applied neutral fluoride agents are able to inhibit caries development in enamel but not completely stop lesion development. A fluoride solution at low pH has been found to be more effective in caries model studies than neutral fluoride agents, which might be due to the formation of a larger depot of calcium fluoride. Data from fluoridated areas indicate that the fluoride ion as such has a limited effect on lesion development, and a major mechanism of the cariostatic effect may be reformation of apatite (remineralization). The product of lesion consolidation (a fluoridated apatite) may have a limited effect, since intra-oral caries model studies show that even pure fluorapatite, in the form of shark enamel, demineralizes. In fissures and around orthodontic appliances, conventional fluoride agents appear to have only a small effect.

Ten Cate JM (Department of Cariology & Endodontology, Academic Center for Dentistry Amsterdam, (ACTA), The Netherlands.); "In vitro studies on the effects of fluoride on de- and remineralization."; J Dent Res 1990 Feb;69 Spec No:614-9; discussion 634-6

The recent literature extensively describes the role of ambient fluoride in the de- and remineralization of dental enamel. Fluoride in sub-ppm concentrations is effective in promoting mineral deposition and inhibiting mineral dissolution. The latter phenomenon is most likely attributable to the concomitant precipitation of a fluoride-rich mineral phase which inhibits further dissolution. These fundamental processes result in an inhibition of enamel demineralization and an enhancement of enamel lesion remineralization. Alternatively, fluoride may also induce the 'arrestment' of enamel lesions. For the in vivo patterns and the effects of caries-preventive substances to be studied, de- and remineralization can best be examined with a pH-cycling system in which the pH depressions occurring in the oral environment are mimicked in a laboratory model. Such an approach has proved useful in developing optimal fluoride schemes which can be tested in animal, intraoral, and clinical studies.

ten Cate JM and Featherstone JD (Department of Cariology and Endodontology, Academic Centre for Dentistry, Amsterdam, The Netherlands): "Mechanistic aspects of the interactions between fluoride and dental enamel"; Crit Rev Oral Biol Med 1991;2(3):283-96

For many years after the discovery of its caries preventive effect, fluoride was thought to be primarily active by lowering the solubility of the apatitic mineral phase of the dental hard tissues. Recent findings have shed new light on the mechanisms by which fluoride inhibits or delays dental caries. Fluoride present in the oral fluids alters the rate of the naturally occurring dissolution and reprecipitation processes at the tooth-oral fluid interface. Demineralization of enamel is inhibited by concentrations of fluoride in the sub-ppm range. Likewise, remineralization of incipient caries lesions (the earliest stage of enamel caries) is accelerated by trace amounts of fluoride. As these two processes comprise dental caries the physiological balance between hard tissue breakdown and repair is favorably shifted by fluoride. The driving force for both phenomena is thermodynamic, that is, fluorapatite or a fluoridated hydroxyapatite may form when fluoride is supplied at low concentrations. This article critically reviews the current information about tooth-fluoride interactions, both from laboratory and clinical studies.

Fejerskov O, Thylstrup A, Larsen MJ; "Rational use of fluorides in caries prevention. A concept based on possible cariostatic mechanisms."; Acta Odontol Scand 1981;39(4):241-9

The aim of this review has been to suggest that future fluoride preventive programs should be based on what is at present known about the possible cariostatic mechanisms of fluoride. The relative role of enamel fluoride in caries prevention has become increasingly questioned during the last two decades. No significant relationship has been demonstrated between caries experience of the individual and fluoride content of the enamel. Furthermore, the fluoride content in surface enamel between teeth developed in low and "optimal" fluoride areas is too small to explain any significant effect on dissolution rate of the enamel. As the major explanation for the cariostatic effect of fluoride must therefore be sought in its local effect on the oral environment, the possible effects on plaque colonization, composition and metabolic activities are discussed. The effect of even low concentrations of fluoride in the liquid phase on enamel dissolution is described, and it is concluded that the major cariostatic effect of water fluoridation, fluoride tooth paste and mouth rinses can probably be ascribed to regular increases in fluoride ion activity in the oral fluids. The effect of high concentrations of topical fluoride solutions is thought to be a result of a slow dissolution of calcium fluoride deposited in initial caries lesions, whereby an increased fluoride ion concentration is maintained locally for longer periods of time. Finally, the clinical consequences of these considerations are described.

Baby Bottle Tooth Decay

Bruerd B, Jones C (IHS Dental Services Branch, Albuquerque, NM 87100, USA); "Preventing baby bottle tooth decay: eight-year results"; Public Health Rep 1996 Jan-Feb;111(1):63-5

Baby bottle tooth decay (BBTD) is a preventable dental disease that affects more than 50% of American Indian/Alaska Native (AI/AN) children. A community-oriented program to prevent BBTD was implemented in 12 AI/AN communities in 1986. In 1989, the overall prevalence of BBTD for the 12 sites combined decreased from 57% to 43% which represented a 25% reduction (P<.001). Funding for the formal program was discontinued in 1990. In 1994, the Indian Health Service Dental and Head Start funded an assessment of the current prevalence of BBTD and the level of program implementation at the 12 original sites. This paper describes the findings. At the five sites where both one-to- one counseling and community-based educational activities had continued, BBTD prevalence was reduced by 38%(P<.001) over the eight-year period.

Weinstein P et al; "Epidemiologic study of 19-month-old Edmonton, Alberta children: caries rates and risk factors"; ASDC J Dent Child 1996 Nov-Dec;63(6):426-33

A random sample of 938 19-month-old Edmonton children and their parents/caretakers were studied. Parents were interviewed and children were examined. Specimens for a caries activity test were collected at the examination. Results indicated 25 percent of the children had moderate to high caries activity, as shown by the Cariostat, with 4.6 percent showing decalcification lesions and frank caries. Early caries (BBTD) were found to be related to bottle feeding practices, discomfort with allowing the child to cry, and with mother being foreign-born. Foreign-born status was associated with the above parenting practices. Preferences for preventive recommendations and other descriptive results were reported.

Smith PJ, Moffatt ME (Department of Community Health Sciences, Winnipeg, Manitoba, Canada.): "Baby-bottle tooth decay: are we on the right track?";Int J Circumpolar Health 1998;57 Suppl 1:155-62

The baby-bottle tooth decay (BBTD) risk factor literature was critically assessed for strength of evidence, and the prevention literature for the identification of which risk factors are being addressed. "Inappropriate" feeding practices (non-nutritive sucking, prolonged bottle/breast feeding, nap-time feeding) are believed to cause BBTD. The association of these practices with BBTD is inconsistent and the strength of association varies greatly. These practices increase exposure to lactose, a cariogenic carbohydrate, but the current causation model fails to explain why the majority of children with these risk factors do not develop BBTD. The association of BBTD with low socioeconomic status is stronger and more consistent. Prevention has focused almost exclusively on education directed at changing the postnatal feeding practices despite the fact that teeth begin formation in utero. Prenatal deficiencies of calcium and vitamin D can lead to enamel defects, and enamel defects in turn predispose teeth to caries. Baby-bottle tooth decay is especially prevalent in Aboriginal people, for whom studies have consistently reported diets deficient in vitamin D and calcium. BBTD may be a consequence of the poor socioeconomic conditions and malnutrition. Perhaps more attention should be given to primary prevention.

Erickson PR, et al; "Estimation of the caries-related risk associated with infant formulas"; J Pediatr Dent 1998 Nov-Dec;20(7):395-403

PURPOSE: Baby bottle tooth decay (BBTD) affects 6% of children under three years of age and is associated with inappropriate bottle use. The objective of this study was to estimate the caries-related risk associated with 26 infant formulas and whole milk. METHODS: First, the plaque pH of adult volunteers was monitored before and after an oral rinse with infant formula to determine the minimum pH obtained in response to each formula. Second, Streptococcus sobrinus 6715 was cultured in each infant formula, and the increase in the number of colony forming units was measured. Third, each infant formula was incubated with powdered enamel and the solubility of enamel mineral was calculated in the absence of bacteria. Fourth, each formula was mixed with standardized concentrations of acid to determine the buffering capabilities. Finally, enamel windows were created on extracted permanent molars and exfoliated primary incisor crowns that were then colonized with mutans streptococci and incubated with infant formula. Caries was assessed visually and radiographically for 18 weeks. The length of time required for the development of enamel caries, dentinal caries and pulpal involvement was recorded. RESULTS: One-way or two-way ANOVA of these five assays demonstrated that 1. Plaque pH varied in response to oral rinsing with infant formula and most formulas did have the ability to reduce the pH significantly below the pH obtained after rinsing with water 2. Some infant formulas supported significant bacterial growth 3. Enamel mineral was dissolved by incubation with certain infant formula 4. The buffer capacity varied among the infant formulas tested 5. The length of time required for caries to reach dentin or pulp differed for the formulas, with some formulas causing dentinal caries by 3.4 weeks and pulpal involvement by 7.2 weeks.

Peretz B, Kafka I (Department of Pediatric Dentistry, Hebrew University-Hadassah Faculty of Dental Medicine, Jerusalem, Israel); "Baby bottle tooth decay and complications during pregnancy and delivery"; Pediatr Dent 1997 Jan-Feb;19(1):34-6

The purpose of the study was to investigate an association between maternal and/or fetal complications during pregnancy and/or delivery and the occurrence of baby bottle tooth decay (BBTD) in the infant. The study population comprised 50 mothers of infants with BBTD (BBTD+ mothers): 50 mothers of aged-matched children with similar eating and bottle-use habits but without BBTD (BBTD-) served as comparisons. Interviews with the mothers focused on pregnancy complications (vaginal bleeding, premature uterine contractions, viral or bacterial infections, hospitalization, diabetes, or other causes of high-risk pregnancy), mode of delivery (normal or instrumental), fetal distress, gestational age, birth weight, and mother's age at delivery. Chi-square analysis and the Student's t-test were used to analyze the data. Pregnancy complications and instrument delivery/cesarean section were significantly higher in the BBTD+ group than in the controls ($P = 0.0001$ and $P = 0.0004$, respectively). In the BBTD+ group, vaginal bleeding/premature uterine contractions were most frequent (50%), while in the BBTD- group high-risk pregnancy dominated (20%). Normal deliveries were more frequent in the BBTD+ mothers (68%) than in the comparisons (40%). Gestational age and baby's birth weight did not differ between the two groups. The mean age of the BBTD+ mothers was significantly lower than that of the controls ($P = 0.013$). The results suggest that babies born after maternal complications during pregnancy or babies who experience a traumatic birth must be considered to be at risk of developing BBTD when exposed to excessive bottle nursing.

Febres C et al (Department of Growth and Development, University of Texas-Houston 77225-0068, USA.); "Parental awareness, habits, and social factors and their relationship to baby bottle tooth decay."; Pediatr Dent 1997 Jan-Feb;19(1):22-7

The general objective of this study was to investigate the relationship between parental awareness, habits, and social factors in a particular parent population and the occurrence of baby bottle tooth decay (BBTD) in their children. The sample consisted of Hispanic, Black, and White families and included 100 parents with 100 children from the Pediatric Clinic and the Pediatric Dentistry Clinic at Houston Medical Center, University of Texas, Houston. Questionnaires including information related to demographic data, educational level, marital status, baby care, and knowledge and beliefs about BBTD were completed by the parents. Each child was examined with mouth mirror and tongue blade to determine the presence of BBTD. Overall, 19 of the children were found to have BBTD. The racial distribution of the children with and without BBTD was statistically significant ($P = 0.03$) with the Hispanic population being over-represented in the BBTD group (72.2% versus 37.0%) and Blacks under-represented (16.2% versus 50.6%). The ages at which babies with BBTD were weaned from the bottle were significantly ($P < 0.001$) higher than those with no BBTD, and those weaned after 14 months of age were more likely to have BBTD. The percentage of babies with BBTD weaned from the bottle after 14 months old was higher (36.8%) than babies without the condition (26.5%). Awareness of BBTD was generally lower among parents of the BBTD children than parents of children without BBTD, as reflected by the feeding patterns of their children and their responses to questions dealing with their knowledge of BBTD.

Von Burg MM et al; "Baby bottle tooth decay: a concern for all mothers"; Pediatr Nurs 1995 Nov-Dec;21(6):515-9, quiz 520-1

Health care professionals often inappropriately separate dental health from other health functions. Baby bottle tooth decay (BBTD) should be a concern for all professionals who work with expectant or new mothers and very young children. Research indicates that even though many mothers are aware of the etiology of the condition, they continue to allow prolonged nursing with milk or liquids other than water. Nurses can help promote good oral health for children by educating and training expectant and new mothers, children, and others who work with mothers and children in preventing BBTD.

Barnes GP et al; (Department of Community Health and Preventive Dentistry, Baylor College of Dentistry, Dallas, TX 75246) "Ethnicity, location, age, and fluoridation factors in baby bottle tooth decay and caries prevalence of Head Start children."; Public Health Rep 1992 Mar-Apr;107(2):167-73

Baby bottle tooth decay (BBTD) is a term applied to a specific form of rampant decay associated with inappropriate bottle or breast feeding of infants and young children. Although the prevalence of BBTD has been studied in individual ethnic groups, comparison studies are rare. Head Start children have frequently served as study subjects for assessing the prevalence of BBTD. The purpose of this study was to compare BBTD and caries prevalence among Head Start children who are members of four ethnic groups in five southwestern States. Age, residence, and fluoridation status were also compared for the total sample and ethnic categories. The sampling process was a stratified random site selection; it was used to obtain data on 1,230 children. This number constituted 3 percent of the children enrolled in Head Start in Public Health Service Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas) where the study was conducted. The criterion for determining the presence of BBTD was based on the number of carious deciduous maxillary incisors observed. The severity of the condition was reported as two of four and three of four of the target teeth affected. Thus, two levels of severity are reported. BBTD was prevalent in approximately 24 percent and 15 percent of the total sample, depending on the severity criterion used. Native American children had a significantly higher (P less than 0.05) prevalence than Hispanic, white, and black subjects. Rural children had significantly higher (P less than 0.05) prevalence of BBTD than nonrural children for all ethnic groups except whites.

ISSUE (II): Objective Facts re Health Effects of Silicofluoride Agents

There are really two issues here:
(a) Studies, if any, of health effects in humans from long-term exposure to the fluoridating agents most widely used in the US today.
(b) Any other evidence which implicates these fluoridating in adverse health effects.

Discussion of Issue (II) a:

Although experimental fluoridation of water supplies of whole communities began in 1945 using sodium fluoride (NaF) as the fluoridating agent, within two years a major shift was made to the use of fluosilicic acid and sodium fluosilicate (herein the "silicofluorides" or "SiFs"). Today, over 90 % of fluoridated water in the US is treated with SiFs, less than 10 % with NaF. A major report issued in 1957 justified this shift this way:

> "The widespread use of sodium silicofluoride in fluoridating drinking water has made it important to determine the state of the fluoride in such water, specifically, how much is fluoride ion, how much, if any, is unchanged silico-fluoride, how much is fluoride bound to other ions. If all or nearly all of the fluoride is the ion F-, the great body of information about the biologic effects of fluorides can be brought forward as a guarantee of safety. If considerable amounts of silicofluoride remain, a question can legitimately be raised since comparatively little work has been done on the biologic effects of silicofluorides. This paper presents some experimental results permitting the conclusion that no silicofluoride exists in drinking water."

The report from which that preamble is quoted (Feldman I et al; "The State of Fluoride in Drinking Water"; J. Dent Res. Vol 36 (2); pp192-202; April 1957) is an impressive but entirely theoretical dissertation on the mechanisms of silicofluoride dissociation leading to the release of the simple fluoride ion from complex silicofluoride ion. It predicts "virtually" 100 % dissociation at a concentration of 16 parts per million of fluoride.

In 1969, however, an empirical study (Crosby NT; "Equilibria of Fluosilicate Solutions with Special Reference to The Fluoridation of Public Water Supplies"; J Appl Chem; v19; April 1969; pp 100-102) found by experiment that at 15 parts per million as much as 40 % of silicofluoride was still in the non-dissociated form. One, therefore, cannot rely on Feldman et al for its "guarantee of safety" for the use of silicofluorides as water treating agents.

Moreover, in response to questions asked in May 1999 by the Chairman of the US House of Representatives sub-committee on the Environment: "What chronic toxicity test data are there on sodium fluosilicate? On hydrofluorosilicic acid?" in June 1999, the Assistant Administrator EPA acknowledged: "EPA was not able to identify chronic studies for these chemicals."

Conclusion Regarding Issue (II) a: There are no known experiments demonstrating health safety of chronic low-level ingestion of the most commonly used fluoridating agents in the US.

Discussion of Issue (II) b

In 1950, the US PHS essentially announced and endorsed the switch from the use of NaF to SiFs for water fluoridation (McClure FJ: "Availability of Fluorine in Sodium Fluoride vs, Sodium Fluosilicate"; Public Health Reports vol 65 No 37; September 15, 1950, pp 1175-11860). The reason given for that change was economic. Sodium fluosilicate was enough cheaper than NaF that a saving of as much as a dollar per year per community resident could be achieved.

The only health-based data offered for the switch was the equivalence of tooth decay protection in rats from equivalent amounts of ingested fluoride. However, McClure himself was willing to caution: "There were some differences, however, in the paths of excretion, [of non-retained F], i.e., in the urine or feces." The differences reported were as shown below:

Effect of One "Rat-Day" of Exposure to Fluoridated water

	Fluoride Source		
	Na2SiF6	NaF	Ratio
(a) F- Ingested	4.00 mgm	3.91 mgm	1.02
(b) F- Retained	1.22 mgm	1.28 mgm	0.95
(c) F- Excess F (a-b)	2.78 mgm	2.63 mgm	1.06
(d) F- eliminated in feces	1.40 mgm	2.16 mgm	0.63
(e) F- eliminated in urine	1.38 mgm	0.48 mgm	2.67
(f) F- into blood (b+e)	2.60 mgm	1.76 mgm	1.48

With almost three times as much fluoride excreted via urine there would have to be as much as three times higher blood burden of fluoride and three times as much soft tissue exposure. No one today would consider this to be trivial. Moreover, the length of time of the rat exposure was too short to approximate effects in humans to 10-20 years of exposure. Notwithstanding differing views by fluoridation proponents, there are good reasons to believe that SiF treated water (which is supplied in over 90% of water systems) is not "just like" NaF treated water (which is supplied in less than 10 % of water systems).

Early on, there was in fact one experiment on humans which did demonstrate, albeit in a cursory way, that human metabolism of SiFs and NaFs was not the same. (Zipkin I et al; "Urinary Fluoride Levels Associated with Use of Fluoridated Water"; Pub Hlth Rpts 71 pp767-772; 1956). Children took longer than adults to reach an equilibrium between uptake of fluoride in their water and excretion of fluoride in their urine. In addition, the delayed equilibrium effect was greater from an SiF agent than from NaF in their drinking water.

We have postulated a number of hypotheses to account for these disparities. In principle, several pertain to the unique properties of SiF itself. However, one cannot discount the possibility that the presence of SiF in commercial agents may simply mark the presence of other substances in the supplied material with their own biochemical effect since the

silicofluorides are highly toxic chemicals produced from the waste ponds of phosphate fertilizer plants. To understand whether these facts might merit further study, we focused explicitly on differences between populations exposed to silicofluorides, to sodium fluoride, or to non-fluoridated water.

Under grants from the Office of Criminal Enforcement, Forensics and Training of the EPA and the Earhart Foundation, we have focused on three large-scale surveys of children's blood lead: over 250,000 children in Massachusetts, over 150,000 children in New York State communities of 15,000 to 75,000, and almost 3,000 children sampled in the National Health and Nutrition Survey (NHANES III). In all three of these samples, we find exposure to silicofluorides is significantly associated with higher levels of blood lead (controlling for other risk-factors for lead absorption). Repeatedly, we find that these results would occur by chance less than once in 10,000 times.

More important, we find some individuals and groups are especially at risk. Where silicofluorides are in use, the bodily uptake of lead from environmental sources such as old housing with lead paint, high lead levels in water or soil, or industrial pollution, is significantly increased (Figure 1). Individuals with diets deficient in calcium and other key vitamins and minerals are especially vulnerable. As a result, our data show that the effects of silicofluoride are especially great among poor and minority citizens, who are more likely to live in environments where lead is present (Figures 2 and 3).

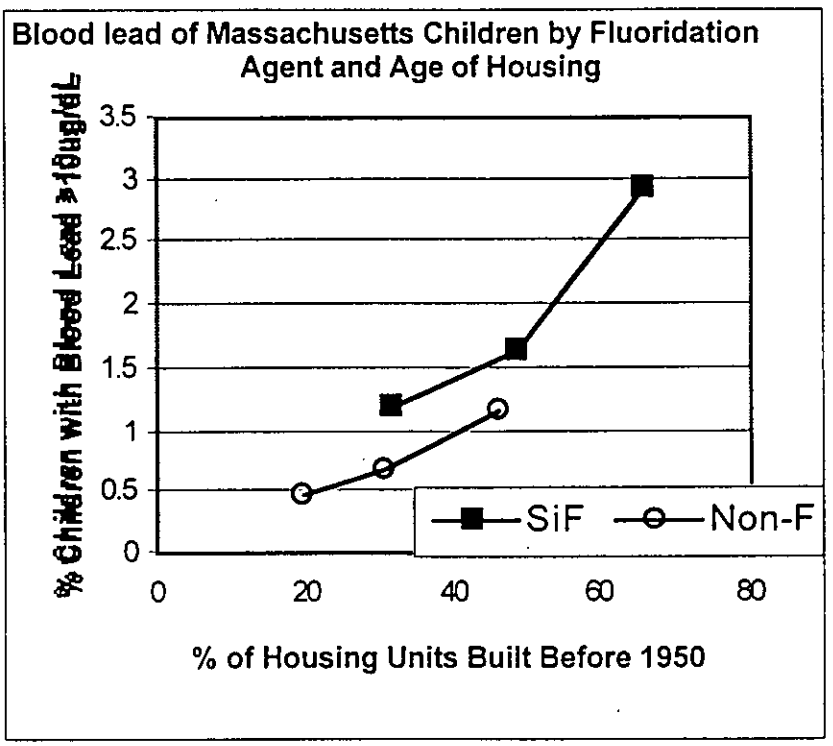
We have also looked at data on other health and behavioral outcomes that have been linked to lead toxicity. In 1992, a New Jersey Department of Health study found a pattern of increased rates of a rare children's bone cancer (osteosarcoma) in fluoridated communities; we found that the chemicals used were typically silicofluorides, and confirmed that the pattern was NOT due to other confounding factors. We also analyzed data from the drugs used at the time of arrest in a National Institute of Justice sample of over 30,000 criminals. We studied this because cocaine increases the activity of dopamine, and lead absorption lowers levels of this neurotransmitter (in a sense, one can think of cocaine use as a crude self-medication, much as depressed people take Prozac to increase serotonin function). As predicted, rates of cocaine use were significantly higher where silicofluorides are used in water treatment, with no comparable increase in the use of other psychotropic drugs.

In addition, we have considered the geography of ADD/ADHD in a small sample of New York communities (total population about 40,000). Rates of diagnosis with these learning deficits and of ritalin therapy are about 38% higher where silicofluorides are in the water. Finally, preliminary analysis of national crime statistics shows that, across the 3141 counties in the continental US., rates of both violent crime and property crime are significantly higher where over 80% of the population receives silicofluoride treated water. All of these results are statistically significant ($p < .05$ or less).

Conclusion regarding Issue (II) b: there is ample reason to consider the use of SiF in water treatment to be a health hazard. Biological effects known to exist in the 1950s and the associations of SiFs with adverse health effects found in the recent past should be addressed and dispelled.

Issue (II)

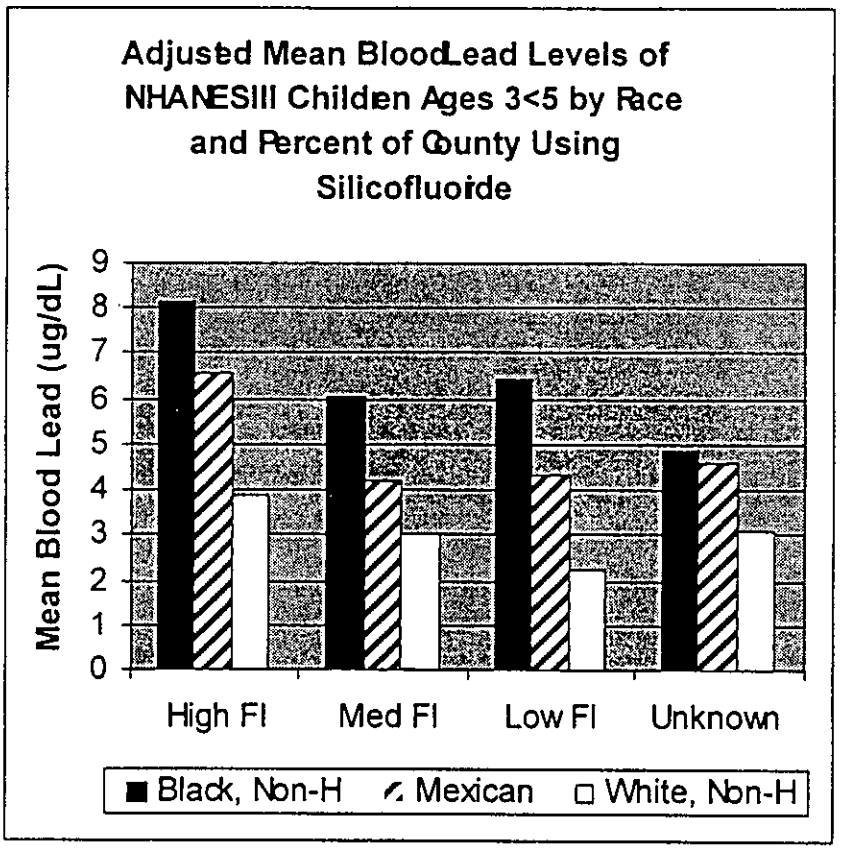
Figure 1. The Effect of Silicofluorides in Increasing Lead Uptake of Children Living in Old Housing



Source: Poster presentation, 17th International Neurotoxicology Conference (Note: for a full report on Massachusetts data, see Masters and Coplan, 1999). N > 250,000.

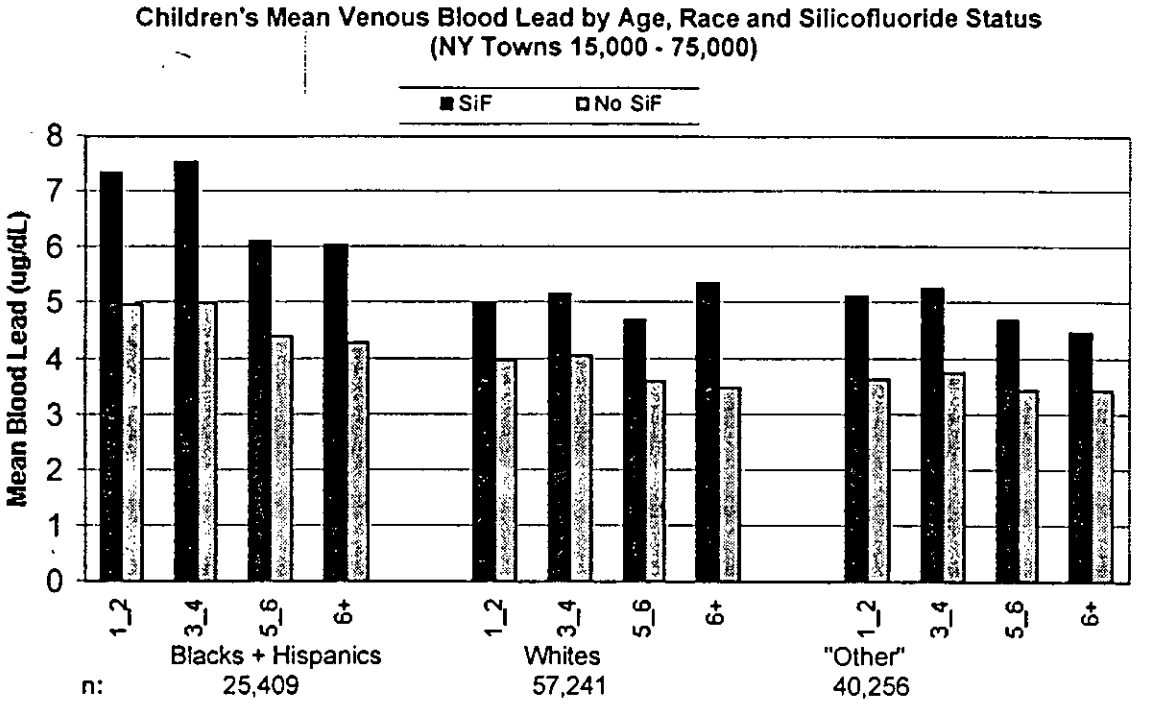
Issue (II)

Figure 2. Differential Vulnerability of Minority Children to Higher Lead Uptake in Counties with "High Fluoridation" (over 80% exposed to Silicofluorides) – National Health and Nutrition Evaluation Survey (NHANES III)



Source: Poster presentation, 17th International Neurotoxicology Conference (Note: manuscript analyzing this data is in final stage of preparation). n = 3990

Children's Blood Lead in New York - Preliminary Results.



Source: NYS Dept. of Health, Childhood Lead Poisoning Prevention Program

Data Source: New York State Department of Health Survey of blood lead levels for over 1.5 million children made available for analysis by Dr. Robert Wilson, N. Y. State Department of Health. Individual records contain child's age, sex, race, type of test (venous or capillary blood sampling), highest level of blood lead (in µg/dL), and lowest level of blood lead.

Method: For all children in New York communities of 15,000 to 75,000 population, highest venous blood lead level reported for children in towns using silicofluorides (fluosilicic acid or sodium silicofluoride) was compared to lead levels of children in comparable size communities without fluoridation. The sample was divided by age (1-2 years, 3-4 years, 5-6 years, and over 6 years) and by race (Black, Hispanic; White; Asian, Indian, Other, and Unknown).

Results: For children of each race in each age group, average blood lead levels were significantly higher for residents of communities using silicofluorides Analysis of variance indicates, for each age group, a highly significant interaction between silicofluoride exposure (SiF) and race:

ANOVA Results

Age	*DF*	*F*	*Probability*
1-2	1, 6	299.03	SiF: p = 0.0001; Race: p = 0.0001 Silicofluoride by Race: p = 0.0001
3-4	1,6	184.08	SiF: p = 0.0001, Race: p = 0.0001 Silicofluoride by Race: p = 0.0001
5-6	1,6	76.31	SiF: p = 0.0001, Race: p = 0.0001 Silicofluoride by Race: p = 0.0025
Over 6	1,6	19.76	SiF: p = 0.0045, Race: p = 0.0001 Silicofluoride by Race: p = .0158

ISSUE (III): Appropriate Legislative Action

Evidence concerning the efficacy and safety of ingesting fluoridated water as a preventive of tooth decay has been questioned by members of the dental research community from the outset of the US national program and for 40 more years: ([a] Bibby BG; "Topical Application of Fluorides as a Method of Combatting Dental Caries"; Am Ass for the Adv of Sci Symposium "Dental Caries and Fluorine", Moulton FR, editor; 1946. [b] Glass RL; "Secular Changes in Caries Prevalence in Two Massachusetts Towns": Caries Research; V 15 pp 445-450; 1981. [c] Thylstrup A; "Clinical Evidence of the Role of Pre-eruptive Fluoride in Caries Prevention": J Dent Res V 69 Sp Is; 742-750; Feb 1990)

Despite legitimate scientific questions of fact, proponents of fluoridation erroneously insist that only "quacks" raise questions. On the other hand, proponents of fluoridation insist they have the only science on the subject while behaving in a manner consistent with the lowest form of politicized discourse. They invariably:

a) level ad hominem attacks on the qualifications of anyone who raises questions;
b) fail to address the substance of issues in question;
c) invent "straw man" issues to refute;
d) demonstrably mis-state facts based on self-styled expertise.

Even officials of the principal professional organization supporting water fluoridation, in trying to come to grips with the central issue, have openly attacked science-based views of their own senior colleagues when they have veered from the "party line". In 1991 the American Association for Public Health Dentistry (AAPHD) held a symposium titled "Appropriate Uses of Fluoride for the "90s". (Horowitz S; J Pub Hlth Dent; 51 (1); Winter '99'; pp 56-59). During a major debate over what to do about the acknowledged evidence of a substantial increase in prevalence of "fluorosis" due to excess fluoride ingestion, the chief of the National Institute of Dental Research (NIDR) made the following statement":

> "Consideration of the attributes of *equity and ubiquity* of use of community water fluoridation causes me to react to one of the two recommendations made by Leverett in his conclusions. I totally agree with Rozier that *we should not conduct studies to evaluate the effects of reducing the concentrations of fluoride used for community water fluoridation or suggest that present concentrations may be too high, as Leverett states we need to do."* [Emphasis added]

Dr. Dennis Leverett was head of the Eastman Dental Center in Rochester, NY. He was not an opponent of fluoridation by any means. He had, nevertheless, gone on record well before the 1991 debate (Leverett DH; "Fluorides and the Changing Prevalence of Dental Caries": Science; Vol 217, July 1982, 26-30) with a warning about over-exposure of children to fluoride from their food, bottled drinks, tooth-paste and drinking water.

When he repeated that warning at the 1991 symposium, his science-based views were dismissed by the head of the NIDR in favor of a political argument for undiminished dissemination of fluoridated water based on "the attributes of equity and ubiquity." That is, if poor kids needed it, whether other kids needed it or not, everyone had to drink fluoridated water.

The irony of that thesis was sharply brought home at the 1995 Symposium of the same AAPHD entitled: "Fluoride---Too Much of a Good Thing?" when a report (Levy ML; "Sources of Fluoride Intake of Children"; J Pb Hlth Dent; vol 55 (1); Winter 1995; pp39-52) noted that the American Academy of Pediatric Dentistry had just revised their standards to recommend that infants under the age of 6 months should not be fed formula made with water exceeding 0.3 ppm of fluoride (Anon; "New Fluoride Schedule Adopted"; ADA News; 25 (10); 1994; pp 12-14).

The problem of feeding new-borns living in communities with water "adjusted" to 1.0 ppm F (the so-called "optimum") came up. The suggestion was offered that this could be dealt with if parents bought low-fluoride bottled water, distilled water or installed reverse osmosis equipment to remove fluoride; public water had to be fluoridated to 1 ppm F (p 50 of cited Levy article).

If there is any doubt about who has politicized water fluoridation and disdains scientific facts, one need only study the Oct 22, 1999 CDC Morbidity and Mortality Weekly Report. While extolling the virtues of water fluoridation by citing the favorable experience of fluoridating the water in Newburgh New York in 1945, the CDC fails to mention the 1998 NY Dept of Health report (our Issue I, Figure 2) showing that the tooth decay rate comparison between fluoridated Newburgh and non-fluoridated Kingston had reversed the nominal benefit.

Conclusion regarding Issue (III): It would seem that any legislation promulgated in 2000 which intends the public to have an intelligent basis for considering the merits of water fluoridation should provide that public with contemporary relevant facts on which to base that choice. It is therefore suggested that the following language would be appropriate for New Hampshire to consider at this time.

> "Prior to the call of any referendum on the question of fluoridating a public water supply, the health authority of a municipality or county recommending the start or continuation of such practice shall conduct and publish the results of a survey of the current rate of children's tooth decay in said municipality or county, as determined according to recognized protocols for such surveys, and said survey shall include a statistically representative sample according to age, gender, SES, and race/ethnicity criteria."

Such an approach (a) would provide a realistic basis for forming an opinion, in contrast to a faith-based assumption that "experts" know the facts and tell the truth, and (b) is intellectually more honest than manipulating the numbers of individuals required to sign a petition or support an issue placed in referendum.

"Fluorides are general protoplasmic poisons"

Dr. Hardy Limeback, biochemist and Professor of Dentistry, University of Toronto, former consultant to the Canadian Dental Association.
"Children under three should never use fluoridated toothpaste. Or drink fluoridated water. And baby formula must never be made up using Toronto tap water. Never. In fluoridated areas, people should never use fluoride supplements. We tried to get them banned for children but (the dentists) wouldn't even look at the evidence we presented" (See news.htm for full text).

Professor A.K. Susheela (author of over 100 published scientific papers)
"What is the matter with your scientists that they allow your government to be so stupid?", October 4, 1998, commenting on the UK government's support for fluoridation.

Dr. Robert Carton, Ph.D, former Environmental Protection Agency Scientist (20 years), *Food & Water Journal*, Summer 1998
"The level of fluoride the government allows the public is based on scientifically fraudulent information and altered reports. People can be harmed simply by drinking water."

Dr. William Marcus, Ph.D, Environmental Protection Agency Scientist, *Food & Water Journal*, Summer 1998
"Fluoride is a carcinogen by any standard we use. i believe EPA should act immediately to protect the public, not just on the cancer data, but on the evidence of bone fractures, arthritis, mutagenicity, and other effects."

Dr. Geoffrey Smith, Dental Surgeon, *New Scientist*, May 5, 1983
"Dental Fluorosis, no matter how slight is an irreversible pathological condition recognised by authorities around the world as the first readily detectable clinical symptom of previous chronic fluoride poisoning. To suggest we should ignore such a sign is as irrational as saying that the blue-black line which appears on the gums due to chronic lead poisoning is of no significance because it doesn't cause any pain or discomfort.‰

Frederick B. Exner, M.D., May 11, 1960
"Resolved to its simplest terms, the issue before you is this: Suppose I, as an individual, want to do something to one of you for the sole purpose of helping you and you don't want it done. You are a sane adult. There is no acute emergency. No one else is involved. I have no other ulterior motive. The question then is: 'Which one of us has the right to decide whether I should be permitted to do something to you 'for your own good' but against your will? Do You? Or do I"

Journal of the American Medical Association, Sept 18, 1943, Editorial.

"Fluorides are general protoplasmic poisons, probably because of their capacity to modify the metabolism of cells by changing the permeability of the cell membrane and by inhibiting certain enzyme systems. The exact mechanism of such actions is obscure. The sources of fluorine intoxication are drinking water containing 1 part per million or more of fluorine, fluoride compounds used as insecticidal spays for fruits and vegetables (cryolite and barium fluosilicate) and the mining and conversion of phosphate rock to superphosphate, which is used as fertilizer."

Journal American Dental Association, October 1944, Editorial
We do know that the use of drinking water containing as little as 1.2 - 3.0 parts per million of fluorine will cause such developmental disturbances in bones as osteosclerosis, spondylosis and osteopetrosis, as well as goiter, and we cannot afford to run the risk of producing such serious systemic disturbances in applying what is at present a doubtful procedure intended to prevent development of dental disfigurements....

Dr. P. Mullenix, Ph.D., research scientist, 1997 letter to Calgary Councillors.
"As a toxicologist involved in fluoride research for over ten years, I was stunned by the Calgary Regional Health Authority's glib comments proclaiming water fluoridation safe. The 'fifty years' of studies about fluoride safety, do not exist. The "ongoing intensive research on fluorides and fluoridation', does not exist, certainly none investigating safety.‰

Dr. A. Schatz, Ph.D., co-discoverer, at age 23, of the first effective treatment against tuberculosis ~ streptomycin ~ 1997 letter to Calgary Councillors
"Many individuals with impeccable credentials in science, dentistry, and medicine have published incontrovertible evidence that fluoridation is harmful and does not reduce the incidence of dental caries".

Dr. Conrad Sonntag, Alberta Dentist, 1992
„[fluoridation] amounts to mass medication to contest a disease which is neither life threatening nor grossly debilitating. I'd rather not see any more chemicals in the water. We're trying to treat this problem [decay] much like trying to kill a fly with a shotgun.‰

Alhava E.M., et al., The Effect of Drinking Water Fluoridation on the Fluoride Content, Strength and Mineral Density of Human Bone, *Acta Orthop. Scand.*, 51, 1980
"The highest fluoride content in bone ash was observed in women with severe osteoporosis"

U.S. Agency for Toxic Substances and Disease Registry, 1993
„...subsets of the population may be unusually susceptible to the toxic effects of fluoride and its compounds. These populations include the elderly, people with deficiencies of calcium, magnesium, and/or vitamin C, and people with cardiovascular and kidney problems.‰

Dr. P.H. Phillips, biochemist, University of Wisconsin
"Fluoride is an accumulative poison which accumulates in the skeletal structures, including the teeth, when the body is exposed to small daily intakes of this element. ...it is like lead accumulation in the bone until saturation occurs and then lead poisoning sets in.‰

Supreme Court Justice J.P. Flaherty - former Chairman of the Pennsylvania Academy of Sciences - in a 1979 letter to the Mayor of Auckland, N.Z.
„...the evidence is quite convincing that the addition of sodium fluoride to the public water supply at one part per million is extremely deleterious to the human body.... Prior to my hearing this case, I gave the matter of fluoridation little if any, thought but I received quite an education, and noted that the proponents of fluoridation do nothing more than try to impugn the objectivity of those who oppose fluoridation.‰

Dr. C.G. Heyd, former President of the American Medical Association
"I am appalled at the prospect of using water as a vehicle for drugs....‰

The late Dr. George L. Waldbott, author of "Fluoridation, the Great Dilemma"
„...When medical practitioners everywhere also recognize the severity of the problems of chronic fluoride toxicosis, and laws mandating truly safe drinking water are sincerely enforced, the health of millions will dramatically improve....‰

Carl Sagan C., from *Broca's Brain*
The character or beliefs of the scientist are irrelevant; all that matters is whether the evidence supports his contention. Arguments from authority simply do not count; too many authorities have been mistaken too often.

Yearbook of Agriculture, 1939
Fluorine interferes with the normal calcification of the teeth during the process of their formation so that affected teeth, in addition to being usually discolored and ugly in appearance, are structurally weak and deteriorate early in life. For this reason, it is especially important that fluorine be avoided during the period of tooth formation, that is, from birth to the age of 12 years.

Dyson Rose, John Marier, Environmental Fluoride 1977, National Research Council of Canada (NRCC No. 16081).
Fluoride is a persistent bioaccumulator, and is entering into human food-and-beverage chains in increasing amounts. Careful consideration of all available data indicates that the amount of fluoride ingested daily in foods and beverages by adult humans living in fluoridated communities currently ranges between 3.5 and 5.5 mg. ... Long-term ingestion, with accumulation of fluoride in animals and man, induces metabolic and biochemical changes ... There is no doubt that inadequate nutrition increases the severity of fluoride toxicosis.

AND, „...chronic intake of fluoride increases the long-term metabolic requirement for both calcium and magnesium.‰

DeEds F, Fluorine in Relation to Bone and Tooth Development, *JADA*, 23, 1936, p 574
Fluorine is a general protoplasmic poison, but the most important symptoms of chronic fluorine poisoning known at present are mottling of the teeth and interference with bone formation.

Chief Dental Officer, British Ministry of Health and Social Security, December 11, 1980.
...no laboratory test has ever shown that 1 part per million fluoride in the drinking water reduces tooth decay.

Bette Hileman, Fluoridation of Water, Chemical & Engineering News, August 1, 1988.
Although skeletal fluorosis has been studied intensely in other countries for more than 40 years, virtually no research has been done in the U.S. to determine how many people are afflicted with the earlier stages of the disease, particularly the preclinical stages. Because some of the clinical symptoms mimic arthritis, the first two clinical phases of skeletal fluorosis could be easily misdiagnosed. Skeletal fluorosis is not even discussed in most medical texts under the effects of fluoride; indeed, a number of texts say the condition is almost nonexistent in the U.S. Even if a doctor is aware of the disease, the early stages are difficult to diagnose.

Johnston DW, Current status of professionally applied topical fluorides, *Com Dent Oral Epidem* 1994, 22
"Professionally applied topical fluoride procedures should not be provided on a routine basis but should be limited, particularly in Canada where caries incidence is relatively low, to high caries risk groups served by dental public health programs and high risk patients in private dental practice. For those selected for these procedures, the maximum benefits must be assured at the least biological and financial costs." [emphasis added]

Does your dentist still recommend twice-yearly fluoride treatments?

—Proponents of fluoridation claim that fluoridating public water supplies is a simple, safe procedure, yet this Water Fluoridation Manual for Engineers and Technicians contains 119 pages of Dos, Don'ts, cautions, admissions, overfeeds, etc. On the one hand, the Manual tries to convey the impression that fluoridation is safe and no reason for concern - making invalid claims as well as vital omissions. On the other hand, this Manual reveals many hazards due to fluoridation. The fact that fluoridation is an occupational hazard for the water plant operators is made very clear. The fact that the information contained in this Manual actual strengthens, not weakens, the position of the opponents of fluoridation, is also very clear.—

(See Excerpts on Reverse Side)

WATER FLUORIDATION

A MANUAL FOR ENGINEERS AND TECHNICIANS



OCTOBER 1985

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL
DENTAL DISEASE PREVENTION ACTIVITY
CENTER FOR PREVENTION SERVICES
ATLANTA, GEORGIA 30333

Written By

Thomas G. Reeves
National Fluoridation Engineer

(119 pages)

(OVER)

Hydrofluosilicic acid (H_2SiF_6)	solution
	1.2

Fluoride chemicals, like chlorine, caustic soda, and many other chemicals used in water treatment can constitute a safety hazard for the water plant operator unless proper precautions in handling are observed. It is essential that the operator be aware of the hazards associated with each individual chemical prior to its use.

2.6 Hydrofluosilicic Acid

Hydrofluosilicic acid (pronounced Hy-dro-FLEW-oh-suh-lys-ik), also known as hexafluosilicic, silicofluoric, or fluosilicic acid (H_2SiF_6), is a 20 to 35 percent aqueous solution with a formula weight of 144.08. It is a straw-colored, transparent, fuming, corrosive liquid having a pungent odor and an irritating action on the skin. Solutions of 20 to 35 percent hydrofluosilicic acid exhibit a low pH (1.2).

The largest production of the acid is a by-product of phosphate fertilizer manufacture.

Like all other fluoride compounds, hydrofluosilicic acid has a number of industrial uses, including the sterilization of equipment; in the brewery and bottling industries; electroplating; tanning of animal hides; etching of glass; refining of lead; hardening of cement; and preservation of wood.

Even supposedly well-rinsed drums should never be used where traces of fluoride could present a hazard. If possible, the storage area should be kept locked and not be used for any other purpose. Workers should particularly be warned against eating in a fluoride storage area.

Hydrofluosilicic acid presents particular storage problems, for the vapors are corrosive and will even etch glass. Containers must be kept tightly closed and vented to the outdoors.

Always wear protective safety gear when handling fluoride chemicals. The following is a list of protective clothing and equipment which is the minimum recommended for each fluoride chemical:

2.11.2 Chronic Toxic Exposure

The only toxic effect of low levels of fluoride over a prolonged period (2 to 8 times that of the optimal level) is mottled enamel of the teeth. At higher levels of fluoride intake, osteosclerosis, calcification of ligaments and tendons, and/or vertebrae consolidation can occur. With chronic toxic exposure from fluoride chemical dusts, there may be a general lack of appetite, slight nausea, some shortness of breath, constipation, pain in the liver region, and anemia.

Care should be taken to avoid greatly oversized feed pumps which could seriously overfeed if accidentally set too high.

7. The fluoridation equipment must be placed in an area which is secure from tampering and vandalism.

8.1 General

The Centers for Disease Control (CDC) has been charged with the responsibility for the implementation of a Public Health Service initiative for the promotion of oral health, including water fluoridation. One objective of this initiative is that by 1990, nearly all of the citizens in the United States who are served by community public water supply systems shall obtain the benefits of water fluoridation.

The lack of good monitoring and surveillance programs in States with fluoridated communities has been a concern of State dental directors and CDC for some time.

8.3 Fluoride Overfeed Incidents

8.3.1 General

When a community is fluoridating its drinking water, there is always a potential for overfeeding.

Second, all of the effects resulting from the overdose of fluoride have been mild and short-lived. Third, it is very difficult to swallow fluoride in large enough quantities to make a person critically ill. One of the symptoms of fluoride poisoning is severe nausea; thus, in effect, people cure themselves by vomiting.

4.3.4 Chemical Storage Costs

Fluoride compounds should be stored in dry, well ventilated areas, inaccessible to unauthorized personnel. For some installations, additional storage space may be required. Costs for storage installations range from a low of about $2 per square foot for unheated metal buildings, up to about $10 per square foot (1985 reference) for conventional brick masonry structures.

(OVER)

WATER FLUORIDATION

A Manual of Standard Practice

WORKERS' COMPENSATION BOARD OF BRITISH COLUMBIA

Properties of Fluoridation Agents

Chemical Supply

There are three chemicals commonly used for water fluoridation:

- fluosilicic acid (H_2SiF_6) (also known as hydrofluosilicic acid or fluorosilicic acid), available in 30-gallon and 45-gallon drums or by tank truck delivery
- sodium fluoride (NaF), available in 50 kg bags
- sodium silicofluoride (Na_2SiF_6), available in 50 kg bags.

1. Fluosilicic Acid

- straw-coloured, clear when pure
- liquid, usually 24-30% in water
- non-flammable
- evaporates readily
- vapour decomposes immediately to hydrogen fluoride and silicon tetrafluoride
- pungent, nauseating odour
- very corrosive to metals
- will corrode glass
- will react with alkalies (bleach, lye), combustible material (solvents), oxidizing/reducing agents (chlorine)
- may react violently with water (poured into the storage tank or sprayed on a spill) to release hydrogen fluoride
- may decompose rapidly above 80°C (keep cool)

2. Sodium Fluoride

- white, granular powder
- odourless
- decomposes at very high temperatures to hydrogen fluoride
- will react with oxidizers, combustible materials, and flammable liquids

- will react with acids to form hydrogen fluoride
- solubility (maximum) is 4% in water
- solubility varies only slightly with temperature

3. Sodium Silicofluoride

- white crystalline powder
- odourless
- not flammable
- in the presence of water, sodium silicofluoride will react with metals (e.g. aluminum or magnesium) to release hydrogen — a very flammable gas
- will react with acids
- may decompose to hydrogen fluoride and silicon tetrafluoride
- solubility in water varies with temperature (see Table 1)

Table 1 — Solubility of Sodium Silicofluoride

Temperature (°C)	Solubility (g/l)
0°	4.4
25°	7.6
38°	9.8
100°	24.5

4. Other Associated Compounds

a) Hydrogen Fluoride

- colourless gas
- very corrosive
- odour threshold ranges between 0.04 ppm and 0.2 ppm
- can dissolve glass or ceramic materials

b) Silicon Tetrafluoride

- colourless gas
- suffocating odour
- reacts rapidly with moisture to form hydrogen fluoride and fluosilicic acid
- can react dangerously with alcohols or acetone

Health Effects of Workplace Exposure

Acute Health Effects

1. Hydrogen Fluoride

- the vapour is extremely irritating to all moist body surfaces (external or internal)
- inhalation of the vapour can cause extreme irritation of the respiratory tract at airborne concentrations as low as 3 ppm, causing pulmonary edema (fluid in the lung)
- inhalation of 50 ppm for over 30 minutes may be fatal

Note: **Hydrogen fluoride vapour is formed by spontaneous decomposition of fluosilicic acid in the air and by agitation of concentrated solutions of sodium fluoride or sodium silicofluoride.**

- solutions of hydrogen fluoride, sodium fluoride or sodium silicofluoride can cause very severe skin burns which continue to corrode tissue even after washing with water
- absorption of the solution into the body can lead to weakening of the bone structure and heart failure — both due to severe calcium imbalance

2. Fluosilicic Acid

- extremely corrosive to eyes, skin and all mucous membranes (e.g. lung passages)
- has similar effects to hydrogen fluoride
- can cause coughing, headaches, ulceration of nose and throat, nausea, pulmonary edema, coma and death
- in addition, ingestion can cause destruction of digestive tract tissue, great abdominal pain and intense thirst

3. Sodium Fluoride

- very poisonous; ingestion of less than 1 g has caused nausea and vomiting, abdominal pain, painful spasm of the limbs and stupor; ingestion of 5 g has proven fatal.
- dust will irritate eyes, nose and respiratory system
- permanent eye damage may occur after short exposure
- dust will cause severe irritation of moist skin
- exposure to saturated solutions of sodium fluoride can cause severe skin and eye burns which require specialized first aid treatment

4. Sodium Silicofluoride

- as for sodium fluoride

5. Silicon Tetrafluoride

- formed by decomposition of fluosilicic acid in air
- inhalation causes severe irritation of the lungs and respiratory tract; causing coughing, choking, pulmonary edema
- can cause severe burns of eyes and skin
- permanent eye damage may result from short exposure

Chronic Health Effects

Workers having chronic toxic exposure to fluoride dusts or vapour may experience lack of appetite, constipation, liver pain and anemia. Workers breathing fluoride dust or vapour in excess of 20 mg/day over several years may develop fluorosis. As a result, bones can become brittle due to loss of calcium, and the spine joints can stiffen as the ligaments become calcified.

Note: **Due to the ingestion hazard, eating, drinking or smoking should not be permitted in work areas.**

Table

Flu
0.001
1 ppi
>2 pj
5 pp
8 pp
>20 Fluc
>12!
ca 5

> = !
ppn
ca =
g = !
(Ne

with a feeder mechanism that will allow control of the weight of sodium silicofluoride being fed. The feed rate is monitored by a remote sensor which monitors the flow of water in the distribution system. This sensor automatically adjusts the quantity of fluoride fed into the solution tank which in turn produces a variable concentration to be fed into the system.

The drawbacks to this process are the lag time involved between the time the signal is sent to the feeder to increase or decrease the fluoride powder feed, and the time it takes to dissolve and ultimately enter the water supply. The dissolving process can take several minutes. This process, therefore, may result in a wide variation of fluoride in the water supply both above and below the set point.

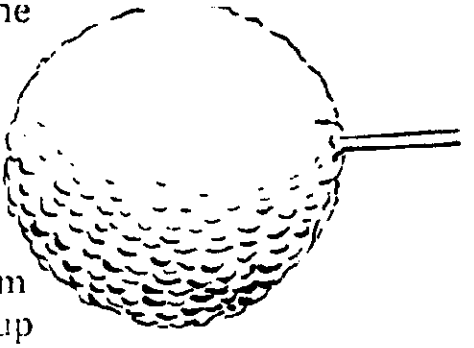
A volumetric system uses a fixed concentration (strength) with a variable injection pumping rate. The injection pumping rate is controlled automatically from a signal generated by the rate of pumping of the main water supply.

Common Problems For All Systems

Corrosion

Two of the most common problems associated with the delivery of fluorides are:

- the corrosion of feed-line piping and equipment
- build-up of insoluble deposits in the feeding equipment.



These deposits (calcium and magnesium fluorides) may be encountered when hard water (hardness >50 ppm) is used as the solution make-up water. This problem can be avoided by passing the make-up water through an ion exchange type softener to remove the calcium and magnesium before adding the fluoride.

Overfeeding

Positive prevention of overfeeding of fluoride solution is essential in all installations. From a hydraulic point of view, in proportioning pump installations there is little or no possibility of overfeeding when injecting against pressure or elevating the discharge to a higher point of application. However, when pumping to a lower elevation or into a suction line, an air gap or other positive break must be provided in the solution line.

To ensure against overfeeding, a continuous fluoride ion analyser should be installed to measure the fluoride concentration after addition to the distribution system. The analyzer should shut down the fluoride pump when the level reaches 5 ppm. A visual or audible alarm may be a part of this system.

The fluoride metering pump must only operate when the main water supply is flowing. A flow switch, installed in series, between the well pump and the fluoride metering pump eliminates the possibility of feeding fluoride into the static main supply. Developing a high concentration "slug" of fluoride in the supply is then impossible.

Maintenance

Proper maintenance of all parts of the fluoridation system plays an important part in ensuring accurate operation of the system. The operator must follow all maintenance instructions provided by the equipment manufacturer. This will include periodic calibration of gauges and metering pumps. The following maintenance items relate only to the fluoridation supply. All pumps, meters, ventilation equipment, etc., must also be checked regularly and repaired when faults are found.

Fluosilicic Acid

Acid feeders generally require little maintenance as the design is simple. The main considerations are:

- check the feeder pump for defects or leaks
- check the pump intake and discharge lines for cracks, kinks and leaks
- check cleanliness of the strainer and foot valve.

Saturator (Upflow Type)

- Keep the area around the fluoride installation free of clutter.
- Check plumbing connections for leaks.
- If the equipment is located in an area subject to freezing, the infra-red lamp or radiant panel and thermostat that controls them must be checked for proper functioning during cold weather.
- Inspect the saturator tank supply line and the flow meter for leaks and proper operation.
- Inspect the saturator tank for leaks around the drain outlet or defects in the tank.
- Check the feeder pump head for cracks or leaks.
- Lubricate the feeder pump (if required).

- Check lines to and from the feeder pump head for leaks or cracks.
- Inspect the electrical connections and plug of the feeder pump.
- Check to see that the water pressure to the saturator is between 20 psi and 125 psi and the water flow is 2 gpm.
- Check the solenoid water valve and liquid level switch for proper operation.
- Remove the distribution tubes and check for accumulation of debris. Clean slits in the tubes if necessary.
- Check and clean the strainer and foot valve on the suction line.
- Keep the fluoride powder above the recommended minimal level in the saturator at all times.

Sodium Silicofluoride

Since this is the most complex system, maintenance is also a more detailed process. A planned maintenance programme for the hopper and its ventilation, the feed mechanism, scales, solution tank and mixers, feed lines and feed pump and all associated equipment must be developed.

A daily inspection for leaks (including lubricants, powder, make-up water and fluoride solution) or unusual noise or vibration will help to catch small problems before they develop into major ones.

Building Design

Any room that contains a part of the fluoride delivery system will be designated as the "Fluoride Room". Typically all the equipment is contained in one room. This fluoride room must be clearly identified by signs or other similar means. A bulk storage tank for fluosilicic acid can be located in a separate building or underground. There must be clear vehicular access for delivery of chemical supplies.

A spill containment area must be provided to isolate the "day tank" (for fluosilicic acid) or the solution tank (for sodium fluoride or sodium silicofluoride) sufficient to hold 110% of the contents of the full tank. In the event of a tank failure, the automatic low fluid level indicator that activates refilling the tank must be over-ridden. There must be no drain in the spill containment area. Spilled solution (or powder) must be collected and disposal arranged according to local requirements.

There should be adequate head-room (or the room must be designated as a hard hat area) and there should be clear access to all equipment so that maintenance work is not impeded.

Failure of a ventilation system to move the design air flows must be indicated by an audible or visual alarm.

Fluosilicic Acid

- If bulk storage tanks are to be located underground, contact the B.C. Ministry of Environment, Lands and Parks regarding current regulations governing such installations.
- The B.C. Electrical Code requires that electrical equipment is protected from corrosion. Electrical panels, switches, and other fittings, which must be located in the tank room, can be protected by the use of an epoxy coating or grease

tape. This effectively isolates the fitting from the corrosive atmosphere.

- Windows and meter faces should not be made of glass, as this will be etched by the corrosive vapour and become impossible to see through.
- Where windows are considered necessary in the door or walls of the fluoride room for visual observations from the outside, they must be made of a plastic that is resistant to fluoride corrosion (e.g. PMP [Polyethylene Methylpentene], also known as TPX).
- General exhaust ventilation providing 10 air changes per hour (but not less than 300 cfm) must be provided. A ventilation system of greater capacity may be run intermittently. Should the system be run intermittently, workers must be able to turn it on before entering the room.
- Adequate, tempered make-up air may also be required; the opening of windows or doors is not acceptable for this purpose.
- A switch to activate the exhaust ventilation must be located outside the fluoride room.

Sodium Fluoride or Sodium Silicofluoride

- Bags of chemical must be kept off the ground — on shelving or on pallets — to avoid getting wet.
- General exhaust ventilation of 2-3 air changes per hour to control heat and humidity.
- A local exhaust system (see slot hood design diagram on page 14) at the loading point of an SSF hopper sufficient to provide air movement of 100 ft/min. from behind the operator across the powder feed opening.

Note: Regular inspections of each ventilation system are required due to the corrosive nature of the contaminated air.

Personal Protective Equipment

In concentrated form all the fluoridation chemicals are severe skin and eye irritants. Effective eye and skin protection must be worn by workers in areas where these chemicals are handled.

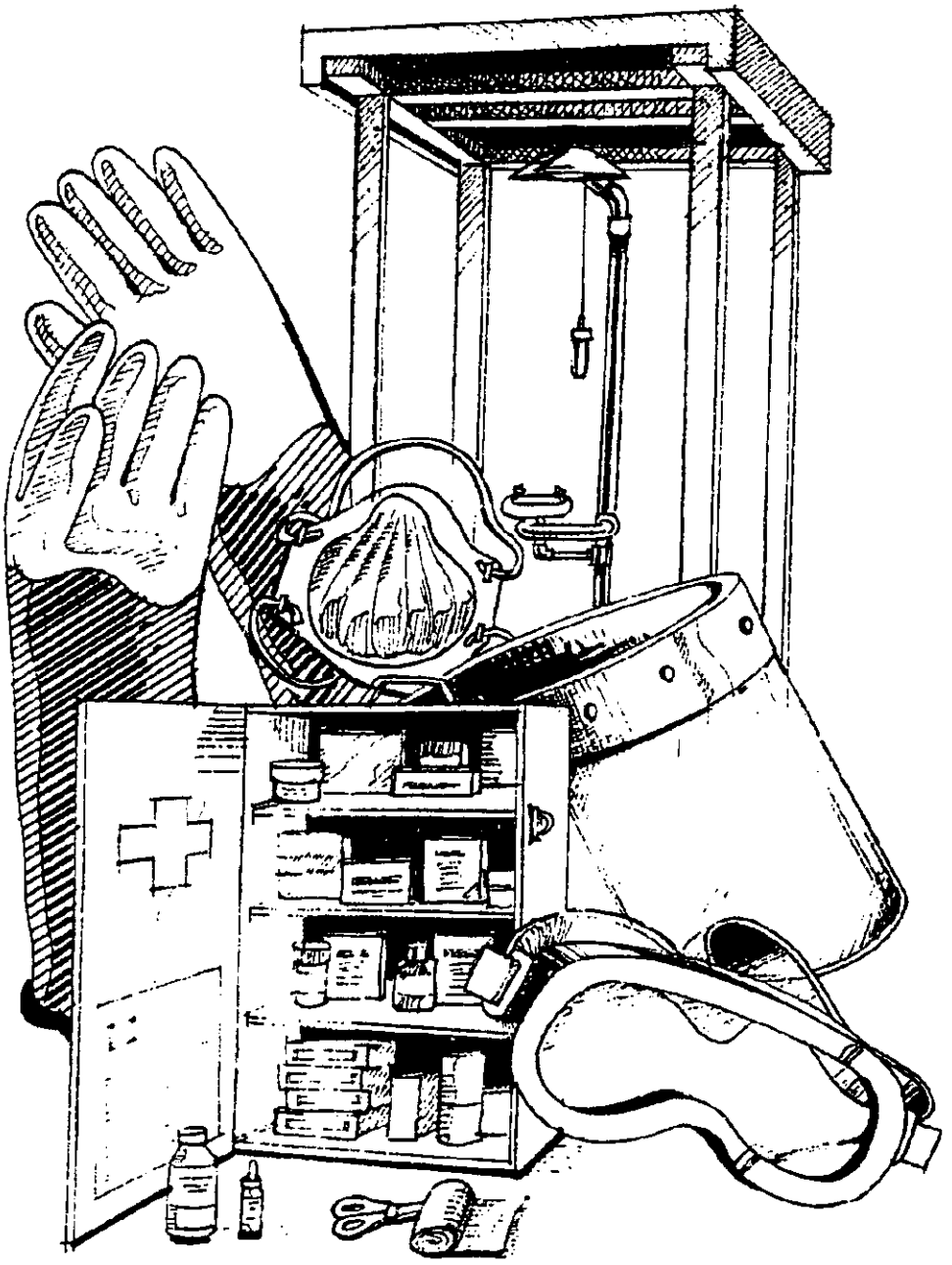
Eye Protection

Eye protection, such as safety goggles and face shield must be worn in rooms where sodium fluoride or sodium silicofluoride are handled. Fluosilicic acid mist gives rise to hydrogen fluoride and silicon tetrafluoride vapours. Non-vented, chemical splash goggles will be required in the event of an overexposure to the vapours. Alternatively, a full-facepiece respirator can be worn.

Eye Wash and Shower

An emergency eye-wash/shower facility must be immediately available to employees. While the permanent location must not be inside the fluoride storage room nor in an outdoors location (where it may freeze), the facility must be so located that an injured employee can reach it within a few seconds of the accident occurring. In many instances, a portable eye-wash bottle may be kept in the employee's vehicle or a nearby building and carried with the employee to the fluoride building. This serves as an initial "flush" until the permanent installation can be reached.

Eye wash and shower equipment must be tested on a regular basis (e.g. monthly) to ensure that it is working properly.



Emergency Procedures

Emergencies do occur and each employee must be trained to respond to such a situation. The most likely emergency situations in a fluoridation station are:

- chemical spill or leak
- chemical injury to an employee
- incorrect chemical feed into water system
- ventilation failure

An emergency response plan must be developed for each potential situation. Once a detailed plan has been written, it is important to hold drills to determine whether the plan works in practice and to make employees thoroughly familiar with their role. Records of these drills should be kept, in order that efficiency can be monitored.

In addition to controlling and correcting the immediate problem, the emergency plan must address the following general concerns with specific details:

- recognition that an emergency situation exists
- notification of appropriate employees, including first aid attendants
- evacuation procedure (if necessary), including "manicheck"
- search and rescue
- notification of other authorities, as necessary (medical health officer, hospital, police, fire department, or other emergency response units)
- emergency personal protective equipment and rescue equipment and their location
- control of other material on site (e.g. chlorine) which may become dangerous during the emergency
- emergency lighting
- notification of adjacent worksites and private homes, if necessary, that an emergency situation exists

The material safety data sheet for the chemical(s) in use may provide information (e.g. First Aid or spill response) useful in developing emergency procedures.

Immediately after the procedures have been developed, the following must be done:

- give each worker a copy of the emergency plan
- train workers to ensure that the procedures are clearly understood
- post the procedures and other relevant information (e.g. telephone numbers) in appropriate conspicuous locations
- regularly test the procedures including simulated emergency exercises
- ensure that the fire department and other emergency response units are given specialized information, such as specific health hazards, electrical hazard or emergency controls

In addition to the general emergency procedures, there must also be procedures more specific to fluoride systems. They include:

- leak detection, control, and repair
- spill control and neutralization
- first aid response
- accident investigation

LETTER TO EDITOR, TACOMA MORNING NEWS TRIBUNE

April 17, 1989

Tacoma is again facing the fluoridation issue. My wife and I hope, through this letter, that our personal experience with fluoride in Seattle's water supply, will make Tacoma homeowners aware of some of the intensive problems they will definitely face should fluoridation be implemented.

Many are already aware that people with certain health problems cannot safely tolerate fluoridated water. But most are unaware of the devastating and costly effect fluoride has on plumbing equipment. My wife has worked in the dry cleaning business for over twenty years. I have forty years experience with dry cleaning and laundromats, and carry a 4th grade unlimited boiler license, so am familiar with boilers and all dry cleaning equipment. I have seen with my own eyes the problem fluoride has produced.

Fluoride causes severe corrosion, a deterioration in boilers, piping and valves. Also in tumblers and presses. Homeowners had similar problems with household plumbing, particularly with hot water systems. Galvanized hot water systems, heaters failed and had to be replaced with glass-lined steel tanks. In the apartment building where we live, three hot water tanks went out as a result of fluoride induced corrosion.

Unusual corrosion occurred after fluoride was added to Seattle water in 1970. Samples of drinking water were found to contain material from cement-asbestos pipelines that had deteriorated. Also, quantities of iron, lead, copper, zinc, cadmimum and manganese far exceeded recommended drinking water standards.

Seattle hired Kennedy Engineers of Tacoma to ascertain the problem. Their revealing report on fluoride corrosion, February 1978, may be obtained in brief through the Freedom of Information Act, and will verify facts in this letter.

The August 1, 1988 issue of Chemical and Engineering News presents a very comprehensive scientific review on fluoride. Study them. Don't make the costly mistake Seattle has.

Sincerely

Robert and Billie Blasjo

- Seattle

Mr. & Mrs. Robert Blasjo
9301 57th S. #5
Seattle, WA 98118
Phone: 725- 6652

Attachment #6

February 23, 2000

To: Public Affairs Committee re: Senate Bill 312

With all due respect to my friend Dr. Mancuso I want to show the members of this committee you do not have to be a rocket scientist to see the dangers of artificial fluoridation. As President and volunteer member of N.H. Citizens for Health Freedom like others I have volunteered many hours of my time to research this subject. Like others I have reached these common sense conclusions:

1. The half-a-century old safety studies pro-fluoridationists always talk about are research done with sodium fluoride. Surprisingly, the health effects of silicofluorides have hardly been studied. The FDA has not approved silicofluorides. It should be noted that these materials are waste products of the fertilizer industry, which would have to pay very high costs for the disposal of these highly toxic materials. Today, 90% of the fluoridated communities in the U.S. are fluoridated with hexafluorosilicate (silicofluorides).*

2. Since 62 percent of the U.S. is artificially fluoridated, most foods and beverages we consume contain fluoride, resulting in an average intake for most of us that is already more than is recommended, even without drinking fluoridated water.

3. The other complication that is seldom mentioned with artificial fluoridation is the corrosion: Two of the most common problems associated with the delivery of fluorides are:

- The corrosion of feed-line piping and equipment
- Build-up of insoluble deposits in the feeding equipment.

Fluoridation proponents say that the safety of fluoridation has been proven long ago by numerous studies. Have they forgotten that science never stands still? I oppose SB 312.

Paul Harrington
President of New Hampshire Citizens for Health Freedom
Nashua, New Hampshire

* Recent Study by Masters and Coplan

Attachment #7

Department of Health and Human Services
Testimony on SB 312
February 23, 2000

Good afternoon. For the record my name is William Kassler. I am a practicing physician, a parent of three children under the age of 7, all of who are taking oral fluoride supplementation because we are not fortunate to live in a community that fluoridates its water supply, and I'm here representing the Department of Health and Human Services as the State Medical Director. I will be speaking in favor of this bill. As you know, the bill would change to 5%, the percentage of voters needed to put an article relative to community water fluoridation on the ballot.

It is the New Hampshire Department of Health and Human Services' policy to actively promote and support community water supply fluoridation. This policy is based on sound scientific evidence that fluoridation of community water supplies is the single most effective public health measure to prevent tooth decay and improve oral health. We join the American Dental Association, the U.S. Public Health Service, the American Medical Association, and the World Health Organization in supporting community water fluoridation. In fact, CDC has stated that fluoridation of community drinking water to prevent dental carries and tooth decay is one of the 10 most important public health achievements of the 20th Century.

Fluoride is nature's cavity fighter. Fluoride is abundant in the earth's surface and is found in minerals that are in rocks and soil everywhere. Small amounts of fluoride occur naturally in all water sources, and varying amounts of fluoride are found in all foods and beverages. The benefits of fluoride were discovered when communities that had high levels of natural fluoride

were observed to have very low levels of tooth decay. Community water fluoridation is the adjustment, in areas with low natural fluoride concentration in water, up to the level recommended for optimal dental health: a concentration of 1 part per million. Studies show that water fluoridation at this level reduces the amount of cavities children get by as much as 60%, and the amount of decay in adults by nearly 35%. Furthermore, it benefits individuals of all ages and socioeconomic groups, especially those without access to regular dental care.

Fluoride reduces tooth decay in many ways. It is incorporated into the enamel of developing teeth, making them more resistant to decay. After teeth develop, fluoride strengthens the tooth structure to further prevent decay by actually reversing the early stages of tooth decay. In older persons, decay that commonly forms along the gum line is markedly reduced with fluoride use.

One recent study compared fluoridated and non-fluoridated communities in Louisiana and found that Medicaid eligible children in communities without fluoridation were three times as likely than similar children in fluoridated communities to receive their dental care in a hospital; indicating far more severe dental disease. Furthermore, the cost of treatment was approximately twice as high in non-fluoridated communities.

Studies over the last 50 years have repeatedly confirmed the safety of water fluoridation at optimal levels and its effectiveness in preventing decay. Over 144 million residents in more than 10,000 communities nation-wide are now served by fluoridated water supplies adjusted to the optimal level.

From time to time, the safety of fluoridation has been questioned. Like many other nutrients that we routinely add as supplements such as iron, calcium, iodine, and vitamins, fluoride can be

toxic in excessive quantities. However, at concentrations found in fluoridated water, fluoride is non-toxic and extremely safe. As with other nutrients, fluoride is safe and effective when consumed properly at the recommended levels.

In spite of its safety record, concerns are sometimes raised about low levels of fluoride being ingested over a lifetime. For generations, millions of people have lived in areas where the natural level of fluoride in drinking water is higher than that recommended for community fluoridation; sometimes at 10-100 times the recommended level. The only risk associated with this high level of fluoride is dental fluorosis: a change in appearance in the teeth caused by ingestion of high amounts of fluoride when the teeth are developing. Dentists regard this as a cosmetic affect only, older children and adults are not at risk for fluorosis. Furthermore, the recommended level of fluoride at 1 part per million in the water is set to minimize dental fluorosis, which is extremely rare.

Concerns are sometimes raised of fluoride being associated with increased risk for cancer, Down syndrome, heart disease, osteoporosis, AIDS, low intelligence, Alzheimer disease, allergic reactions, lead poisoning, kidney failure, and other health problems. Because of these concerns, since the 1950s the safety of water fluoridation has been re-evaluated frequently. Most recently, in the 1990s extensive scientific reviews by the National Academy of Sciences, the US Public Health service, and the Centers for Disease Control and Prevention have concluded that there is no substantive or credible scientific evidence that there is any danger from drinking water fluoridated at the recommended levels. Let me repeat, there is no credible scientific evidence that supports an association between fluoridation and any of those conditions.

In conclusion, the Department supports community water fluoridation and supports this bill because it would eliminate an unreasonable barrier on communities desiring to improve the oral health of its citizens. According to CDC, dental disease remains among the most prevalent and preventable chronic health problems in the United States. Dental disease can become severely painful and debilitating, and can profoundly reduce overall health, and productivity. It has been reported nationally, that per year, over 20 million days were lost from work, and over 51 million hours were lost from school as a result of dental conditions. In children, dental cavities are 6 times more common than asthma. Fluoridation has been shown to make a difference. To summarize:

- Fluoridation is a public health measure that benefits all people, children and adults, regardless of income or education, but is particularly beneficial to those who do not have access to preventive dental care.
- The overwhelming majority of the health and scientific community considers fluoridation beneficial.
- After 50 years of extensive scientific research, the overwhelming weight of scientific evidence indicated fluoride is safe.
- Fluoride protects over 360 million people worldwide in approximately 60 countries, with over 100,000 communities and 145 million people in the United States.
- Just 50 cents per person per year covers the cost of fluoridation. Over a lifetime, that's the approximate price of one dental filling, making fluoridation very cost effective.
- Time and time again, public opinion polls indicate that the overwhelming majority of Americans support water fluoridation.

I would be happy to answer any questions you may have.

Attachment #8

ENVIRONMENTAL Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

6 Hazen Drive, Concord, New Hampshire 03301 · (603) 271-3503 · www.state.nh.us/des

WD-WSEB-5-1 1998

New Hampshire
Public Water Systems That Add Fluoride

The public water systems listed below add fluoride to their water supply. The purpose is to reduce the incidences of tooth decay in younger users. The target dosage as recommended by the US Public Health Service, Centers for Disease Control, is 1.1 part per million (ppm) which also can be expressed as one 1.1 milligram per liter (mg/L).

Fluoride occurs naturally in bedrock (a.k.a. artesian) wells in New Hampshire. In southern New Hampshire, the occurrence of elevated fluoride is irregular. In the northern portions, fluoride is much more common, particularly in wells in the Mt. Washington Valley and in the area from northern Wolfeboro through Franconia Notch. Public water systems with elevated naturally occurring fluoride are listed fact sheet WD-WSEB-5-2 entitled "Small Public Water Systems in New Hampshire with Naturally Occurring Fluoride".

System	Senior Operator	Population	Chemical Used / Start Date
Concord Water Works 16 Penacook St Concord, NH 03301	Bill Dailey 225-8696	36,000	Fluosilicic acid 1978
Fryeburg Water Co. 8A Portland St Fryeburg, ME. 04037	John Hastings 207-935-2010	100 (in NH)	Sodium Fluoride (Maine)
Dover Water Works River Street Dover, NH 03820	Rick Fowler 742-8600	25,000	Fluosilicic Acid 1990

Over

Durham Water Works University of NH Water Tr. Plant Durham, NH 03824	Joe Winking 862-1390	8,000	Sodium Fluoride 1955
Hanover Water Co. 68 N. Main St. Hanover, NH 03755	Peter Kilbacki 643-3439	7,000	Sodium Fluoride 1958
Laconia Water Works 988 Union Ave. Lakeport, NH 03246	Phil Pineau 524-1096	12,000	Sodium Fluoride 1989
Lancaster Water Wks City Hall Lancaster, NH 03584	Tim Bilideau 788-3391	2,500	Sodium Fluoride 1964
Lebanon Water Works City Hall Lebanon, NH 03766	Kevin Kingston 448-2514	9,000	Sodium Fluoride
Portsmouth Water W. 700 Islington St. Portsmouth, NH 03801	Al Leathers 431-6007	37,000	Fluosilicic Acid 1971
Rochester Water W. City Hall Rochester, NH 03867	Dave Ford 335-4291	20,000	Fluosilicic Acid 1981

FOR MORE INFORMATION

For more information please call the DES's Water Supply Engineering Bureau at (603) 271-3139. We would appreciate your suggestions concerning this Fact Sheet. For a complete list of water supply fact sheets, please request WD-WSEB-15-2. We would appreciate your comments concerning this fact sheet and your experiences in purchasing water conditioning equipment. Drinking water fact sheets are available through the DES web site at: http://www.state.nh.us/des then select: publications, fact sheets, water division, water supply.

Attachment #9

Joint Testimony for Hearing on New Hampshire Senate Bill # SB 312
New Hampshire Senate Public Affairs Committee, February 23, 2000
(Presented by Myron J. Coplan for himself and Dartmouth College Professor Roger D. Masters)

My name is Myron J. Coplan. I am a resident of Natick, Massachusetts and appear here today as spokesman for myself as well as for Professor (Emeritus) Roger D. Masters, who is unable to attend this hearing due to illness. Dr. Masters' credentials and written testimony have previously been presented at a hearing held by the NH House of Representatives Committee on Municipal and County Government. Our written testimony here today is expanded from the versions presented to that referenced Committee Hearing.

I am a professional chemist/chemical engineer (MA Reg # 621478), former Senior Scientist and retired V. President of a major multi-national company, now consulting as "Intellequity".I am listed in American Men of Science, Member (Emeritus) of the American Chemical Society, American Association for the Advancement of Science, The New York Academy of Science and others. My field of specialization is membrane systems for water purification, an area in which I hold 32 patents.

I directed professionals engaged in hands-on research on treatment of by-product wastes from phosphate fertilizer production. These include the principal agents (silicofluorides) used to treat potable water. I am familiar with the chemistry of silicofluorides and their toxicity hazards. In addition, my avocation activities include service on my town (Natick, MA) board of health in which capacity I became a "student" of water fluoridation at the practical level.

Masters is currently Research Professor and Nelson A. Rockefeller Professor of Government, Emeritus at Dartmouth and President of the Foundation for Neuroscience and Society. In 1967 he received a Guggenheim Fellowship to study political implications of the revolutionary advances in modern biology. He is a recognized specialist in this field, serving as Vice Chair of the Association for Politics and the Life Sciences, (international association of scholars) and is currently on its Council. From 1993 to 1998 Dr. Masters also chaired the Executive Committee of the Gruter Institute for Law and Behavioral Research

At the request of John Gorzyck Vermont Commissioner of Corrections, Masters undertook a study of biological factors in violent crime including brain function and the influence of environmental neurotoxins. This study revealed that violent youth offenders have higher levels of lead in their hair than non-violent youth offenders. His studies of heavy metal intoxication as a correlate of dysfunctional behavior appear in authoritative journals.

Since 1997, Masters and Coplan have collaborated in studies of the association of a particular class of fluoridating agents used to treat public water systems with elevated blood lead in children, ADD/ADHD, prevalence of violent crime, and other health and behavioral disorders in communities served by such water systems. The testimony below is organized to address three issues: (I) Objective current facts about tooth decay and the effect of water fluoridation. (II) Objective facts about health effects from drinking silicofluoride treated water. (III) Appropriate legislation relative to water fluoridation at this time.

ISSUE (I): Objective Facts re Fluoridated Water and Tooth Decay

Although proponents of water fluoridation rarely concede the fact, it is now well known among the professional research community that the benefits of fluoride to teeth are due to contacting the enamel outer surface via topical applications, tooth-paste etc. (See Abstracts, appended). Fluoride in the digestive tract from food, beverages and swallowed toothpaste, which then crosses into the bloodstream, does not inhibit tooth decay. Rather, it is the cause of a tooth defect called "fluorosis", a disturbance of the fine structure of the enamel of a nascent pre-emergent tooth. This occurs because flouride modifies the natural tooth bud formation process which then shows up as a "mottling" or opacities in emerged tooth enamel.

In 1945 the prevalence of only mild fluorosis was about 10-12% in communities that had drinking water with the optimum 1 ppm of fluoride. Fluorosis was unknown in communities without fluoride in their water. Today, fluoridated communities are experiencing fluorosis at around 30-50 % and occasionally as high as 80 %, some of it moderate to severe. Non-fluoridated communities are experiencing fluorosis in the 10-15 % prevalence range from fluoride in sources other than the local water. ("Health Effects of Ingested Fluoride"; National Research Council; National Academy Press; Washington, DC; 1993)

Regarding tooth decay, a community "average" condition is a specious measure of the real problem of childhood caries. Today, about 80% of tooth decay teeth is found among 20% of children.(Kaste LM et al; "Cooronal Caries in the Primary and Permanent Dentition of Children and Adolescents 1-17 years of Age"; J. Dent Res V 75 Spec Iss; pp 631-641; Feb 1996) More than half of most sampled groups are caries free. However, there is a small minority of children whose teeth are a problem due to a condition which starts early in their life as "Baby Bottle Tooth Decay".

This is described in several abstracts appended hereto. Simply stated, the consensus of experts is that improperly attended infants are susceptible to "rampant" decay due to prolonged tooth exposure to bacterial nutrients in nipple-bottled fluids. Their deciduous teeth suffer serious attack from acids produced by streptococcus mutans (and other micro-organisms). When their permanent teeth erupt into the infected oral cavity, these are immediately at risk of attack, even though their "baby teeth" have started to fall out.

Their problem arises from cultural, social, and educational attributes of their environment. None of the dozen or so abstracts on BBTD appended hereto offers any evidence to support the premise that adding fluoride to the water ingested by these children will do them any good. Another group of appended abstracts illustrates the fact that the consensus view of the benefits of fluoride for any child of any age: to wit, only topical contact with the tooth enamel offers any protection. Ingested fluoride does only harm, when it exceeds a very small, defined threshold for the onset of fluorosis.

Meanwhile, with excessive uptake of fluoride from all sources unequivocally evidenced by increased prevalence of fluorosis, the original claimed benefit of 50-60 % lower tooth decay, (incorrectly attributed to "optimally" fluoridated water), has virtually completely vanished (see Figure 1, the data points for which are from reports in recognized dental research journals listed on the page following the figure).

In 1986-87 a national Oral Health survey by the US Public Health Service was conducted on 39,000 children 5-17 years of age. (NIH Pub. No. 89-2247, Sept 1989). As published, this document did not present information on the effects of fluoridated water. However, under outside pressure, the National Institute of Dental Research analyzed tooth decay rates as a function of local water fluoridation status and published same in 1990. (Brunelle, JA and Carlos JP; "Recent Trends in Dental Caries in US Children and Effect of Water Fluoridation"; J. Dent. Res 69 Spec Iss; Feb 1990; pp 723-27). These data are shown in Table I as tooth decay rate, expressed as mean number of decayed, missing and filled tooth surfaces per child, (DMFS).

They indicate that *national average* DMFS rate in fluoridated areas was 18 % less than in non-fluoridated. Major regional differences exist, however. In Region VII, (California, Hawaii, Washington, Oregon) DMFS in fluoridated areas was 61 % less than in non-fluoridated. Aside from the fact this strongly biased the national average upward, there are problems with Region VII rates, both statistically and substantively. Without dwelling on details: (a) ethnic/racial, diet, health habits, and SES significantly affect caries and (b) many Region VII residents are notably susceptible to these factors.

On the other hand, in Region I (New England), the nominal benefit of fluoridation was only 10%. But, this was 15 years ago when decay rates were dropping rapidly in both fluoridated and non-fluoridated communities and differences between them dwindling. The trends suggest that by 1995, the benefit of fluoridation in most places had probably dropped to nil as illustrated in Figures 1-3. *At least as important, however, is that in the Midwest (Region III), a population of over 40 million, where fluoridation had started early and has been practiced most widely, the tooth decay rate in 1986-87 was* ***HIGHER*** *in fluoridated areas than non-fluoridated areas,* ***according to NIDR data.***

A smaller early 1990s study compared tooth decay of young adults who had consumed non-fluoridated water from birth to 5-8 yr of age with subjects who had fluoridated water controlled at the optimum level of 1 ppm F in six water supply systems under the management of the US government on military bases. The report (Kobayashi S et al; "Caries Experience in subjects 18-22 years of age after 13 years' discontinued water fluoridation in Okinawa"; Community Dent Oral Epidemiol 1992 Apr;20(2):81-3) concludes: "Overall differences in favor of the fluoridated subjects were small and non-significant", in complete accord with the trends shown in Figures 1-3 and Table I.

Even the apparent adverse effect of water fluoridation shown for Region III in Table I, is replicated in a 1998 study by the NY State Board of Health which compared trends in Newburgh and Kingston, NY, (see Figure 2). Fluoridation proponents invariably cite the 1945-55 experiment in which fluoridated Newburgh was seen to have experienced a 50-60 % drop in decay rate while non-fluoridated Kingston had not. It is clear from Figure 2 that the ostensible benefit of fluoridation in Newburgh from 1945 to 1955 no longer exists. In fact, the reverse is the case: non-fluoridated Kingston now seems to be slightly better off than fluoridated Newburgh. In fact, well before this revelation, work at the Forsyth Dental Center had shown that non-fluoridated Norwood and Dedham MA, had been experiencing similar decay decline from about the late 50s onward. (Glass RL; "Secular Changes in Caries Prevalaence in Two Massachusetts Towns": Caries Res V 15; pp 445050; 1981)

Finally, a major national survey completed in 1998 (NHANES III, Phases I and 2) provides data on child tooth decay and other health matters. While the NHANES III data base does not include information on fluoridation status of the residence communities of the children surveyed, this problem was relatively easily overcomeusing the CDC 1992 Fluoridation Census. It was possible to assign the children of 35 counties according their likelihood of receiving fluoridated water using this census according to:

Group (A) living in counties (3 million people in all) where over 95% of residents received fluoridated water;

Group (B) living in counties (1.9 million people in all) where less than 5 % of residents received fluoridated water;

Group (C) living in counties which on average had 52% of all residents (1.1 million people) receiving fluoridated water.

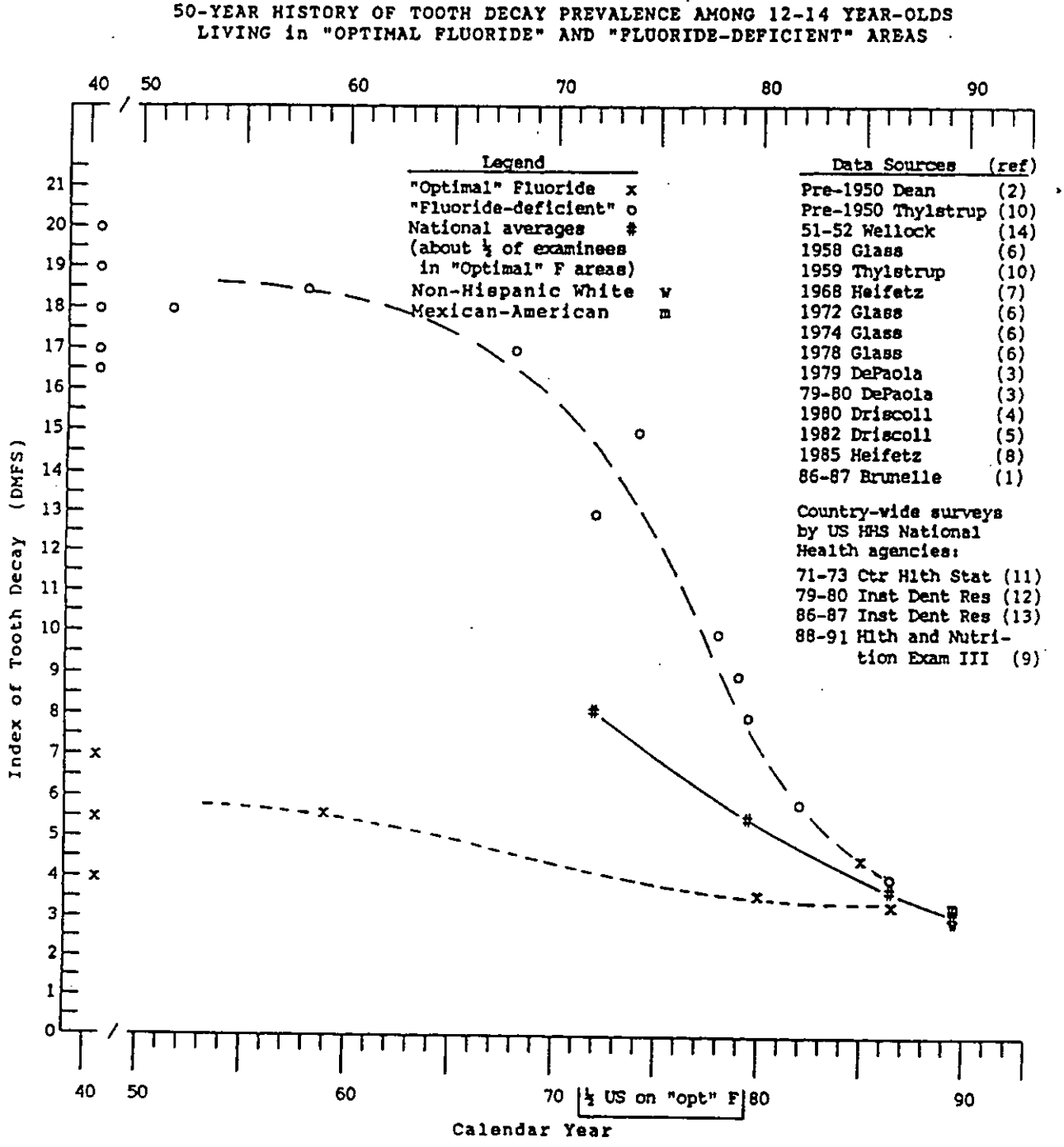
Since any Group (C) child would have had a "50/50" chance of receiving fluoridated water, the association of his/her tooth decay rate with exposure to fluoridated water would have been entirely speculative. We focused, therefore on the other two groups, in which each child would have either a 95% or 5% chance of receiving fluoridated water so a comparison of decay rates could be made with reasonable confidence. The results, plotted by age, are shown in Figure 3. The graph comparing decay as a function of age for the children in Group (A) with the children in Group (B) speaks for itself.

(In addition to the tooth decay analysis we analyzed NHANES III data for child blood lead, which reported here in the following section pertaining to adverse health effects. All of this is to be submitted to a prominent journal for publication.)

Conclusion regarding Issue (I) The weight of objective evidence at the present time is that community water fluoridation has no beneficial effect on mean rate of caries for children and represents an added burden of fluoride contributing to fluorosis.

Issue (I) Figure 1

Decline in DMFS Index in 12-14 Year Olds (12)



References Cited in Figure I

(1) Brunelle, J. A. and Carlos, J. P.; "Recent Trends in Dental Caries in U. S. Children and the Effect of Water Fluoridation; Journal of Dental Research; (69 Special Issues); pp 723-727; Feb 1990;

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(3) DePaola, P. F. et al; PA Dental Survey of Massachusetts Schoolchildren"; Journal of Dental Research; (61 Special Issue); pp 1356-1360; Nov 1982.

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(5) Driscoll, W. S. et al; "Prevalence of Dental Caries and Dental Fluorosis in Areas with Negligible, Optimal, and Above-Optimal Fluoride Concentrations in Drinking Water;" Journal of the American Dental Association; (113) pp 29-33; July 1986.

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(7) Heifetz, S. B. et al; "Effect of School Water Fluoridation on Dental Caries: Results in Seagrove, NC after 12 Years"; Journal of the American Dental Association; (106) pp 334-336; March 1983.

(8) Heifetz, S. B. et al; "Prevalence of Dental Caries and Dental Fluorosis in Areas with Optimal and Above-Optimal Fluoride Concentrations: A 5-Year Follow-Up Surveys; Journal of the American Dental Association; (116) pp 490-495; April 1988.

(9) Kaste, L. M. et al; "Coronal Caries in the Primary and Permanent Dentition of Children and Adolescents 1-17 Years of Age: United States, 1988-91"; Journal of Dental Research; (75 Special Issue); pp 631-641; Feb 1996. (Source for 1988-91 NHANES data).

(10) Thylstrup, A; "Clinical Evidence of The Role of Pre-eruptive Fluoride in Caries Prevention"; Journal of Dental Research; (69 Special Issue); pp 742-750; Feb 1990.

(11) US PHS; Special dental tape (unpublished) from 1971-73 National Health Survey HANES I conducted by National Center for Health Statistics via NIH Pub. No. 82-2245: Dec 1981.

(12) US PHS; 'The Prevalence of Dental Caries in United States Children"; NIDR National Survey 1979-80; NIH Pub. 82-2245; Dec 1981.
(13) US PHS; "Oral Health of United States Children"; NIDR National Survey 1986-87; NIH Pub. No. 89-2247.

(14) Wellock, W.; "Report of the Special Commission on Dental Health and of Measures to Eliminate Dental Decay Including Fluoridation of Community Water Supplies"; Commonwealth of Massachusetts, House No. 3902; December 1967 (via Ref. 3).

(A) US PHS; "Review of Fluoride BENEFITS and RISKS"; Report of the Ad Hoc Subcommittee on Fluoride; Unnumbered publication of the Department of Health and Human Services, September 1991.

(B) US PHS; "Water Fluoridation A Manual for Water Plant Operators"; Center for Disease Control and Prevention, Division of Oral Health; Atlanta, April 1994.

(C) Hilderbolt CF, Elvin-Lewis S, Molnar S, McKee JK, Perkins MD, Young KL; "Caries Prevalences Among Geochemical Regions of Missouri"; American Journal of Physical Anthropology 78; pp 79-92; 1989.

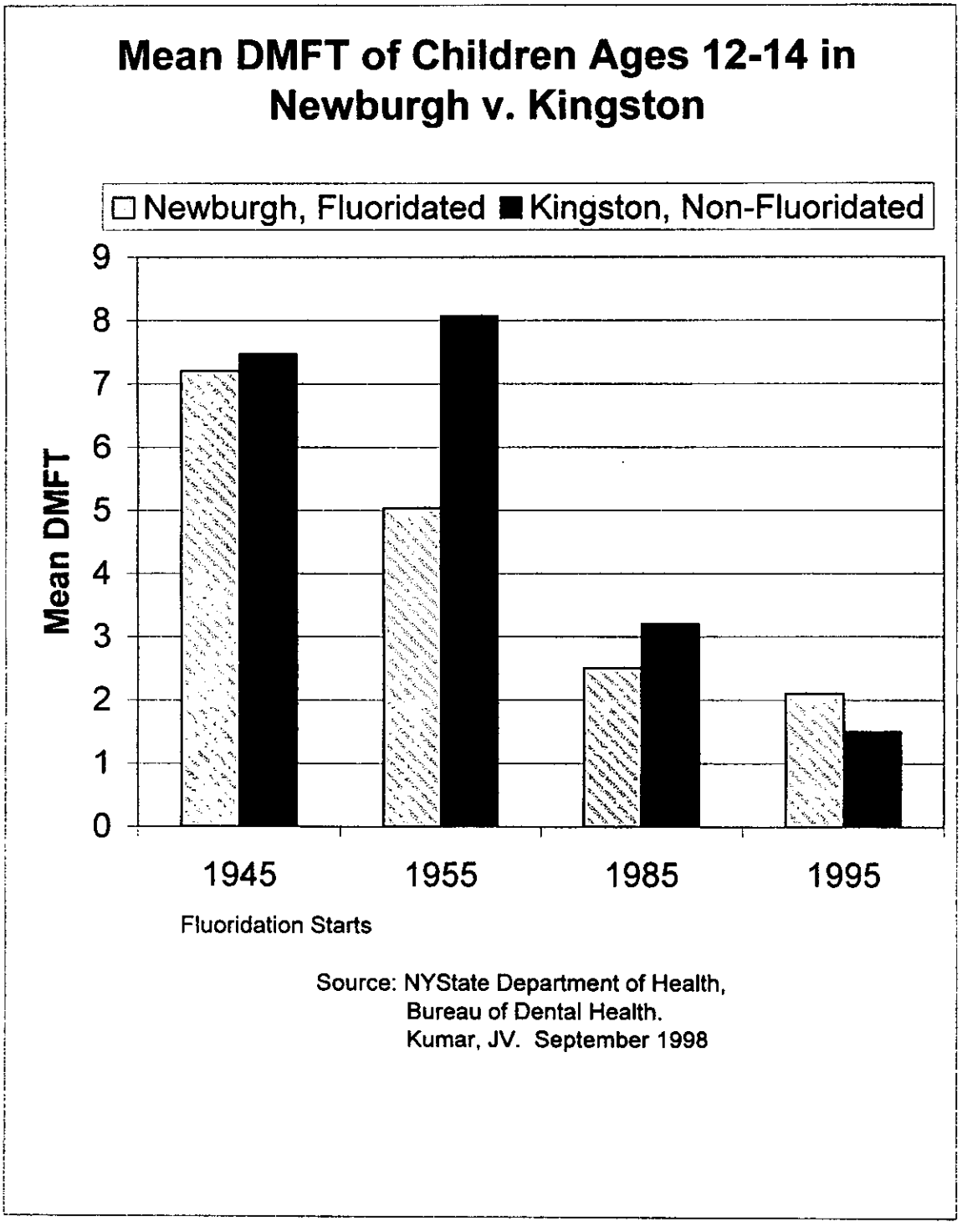
(D) Leroux BG, Maynard RJ, Domoto P, Zhu C, Milgrom P; "The Estimation of Caries in Small Areas"; Journal of Public Health Dentistry 75 12; pp 1947-56; December 1996.

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(F) Pendrys DG, Stamm JW; "Relationship of Total Fluoride Intake to Beneficial Effects and Enamel Fluorosis"; Journal of Dental Research 69; pp 529-538; Special Issue February 1990.

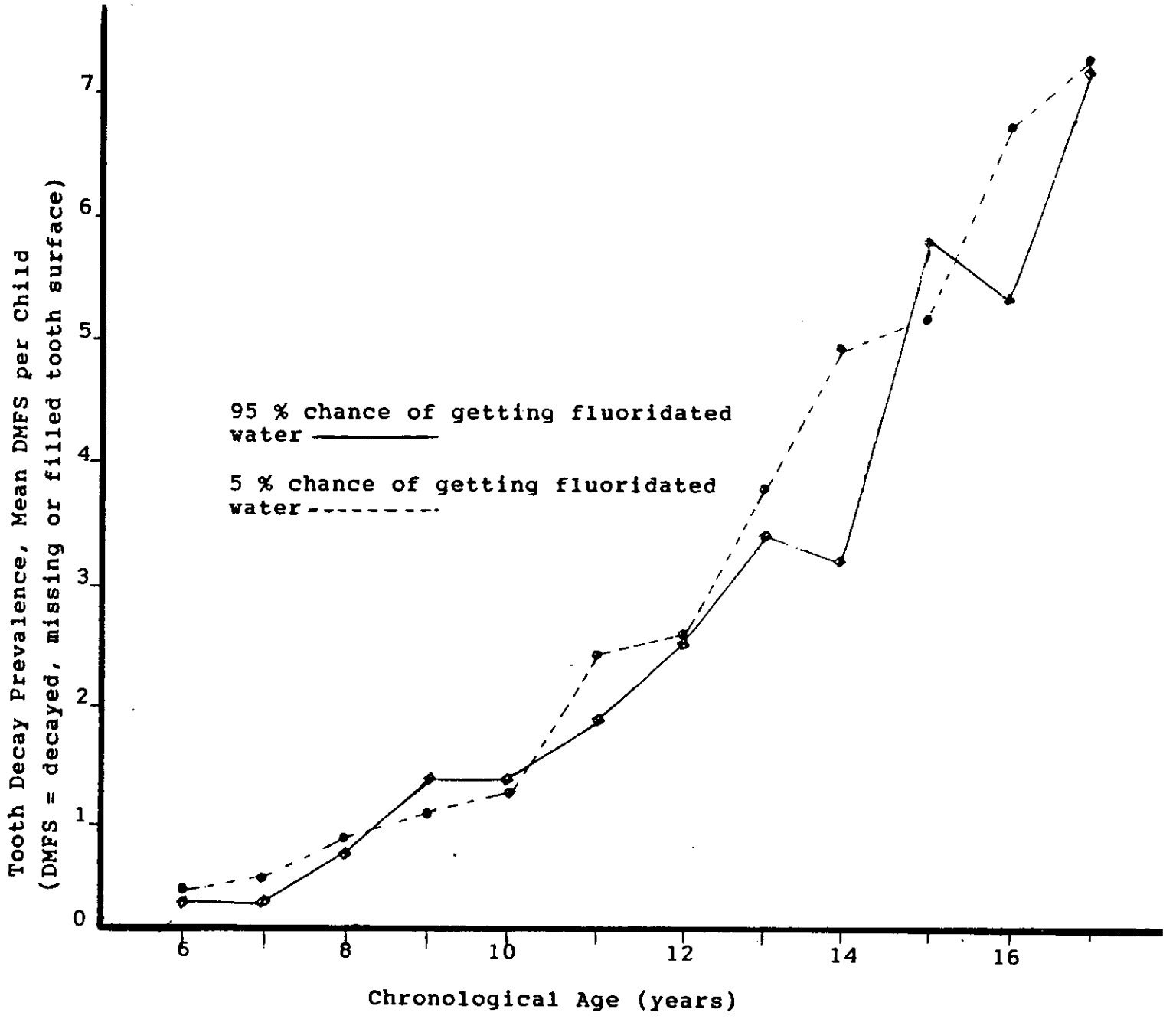
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Issue (I) Figure 2

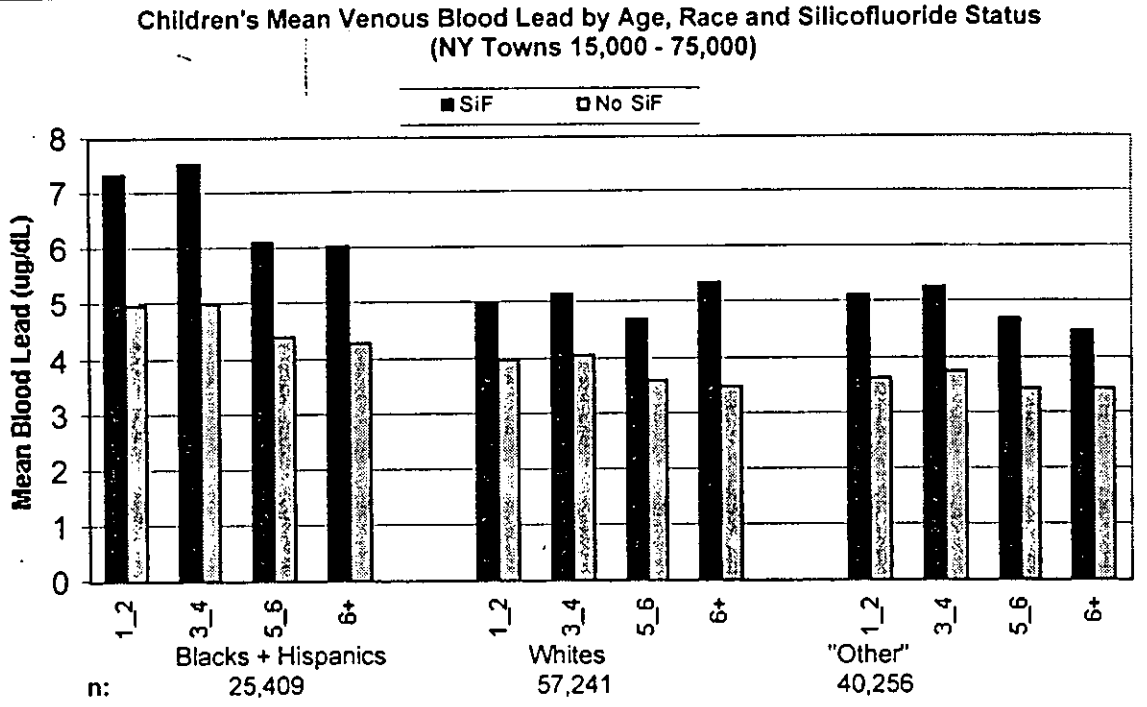


Issue (I) Figure 3

Effect of Fluoridated Water on Tooth Decay Rates
Of Children of All Races in The NHANES III Study
(Phases 1 and 2, 1988-95)



Children's Blood Lead in New York - Preliminary Results.



Source: NYS Dept. of Health, Childhood Lead Poisoning Prevention Program

Data Source: New York State Department of Health Survey of blood lead levels for over 1.5 million children made available for analysis by Dr. Robert Wilson, N. Y. State Department of Health. Individual records contain child's age, sex, race, type of test (venous or capillary blood sampling), highest level of blood lead (in µg/dL), and lowest level of blood lead.

Method: For all children in New York communities of 15,000 to 75,000 population, highest venous blood lead level reported for children in towns using silicofluorides (fluosilicic acid or sodium silicofluoride) was compared to lead levels of children in comparable size communities without fluoridation. The sample was divided by age (1-2 years, 3-4 years, 5-6 years, and over 6 years) and by race (Black, Hispanic; White; Asian, Indian, Other, and Unknown).

Results: For children of each race in each age group, average blood lead levels were significantly higher for residents of communities using silicofluorides Analysis of variance indicates, for each age group, a highly significant interaction between silicofluoride exposure (SiF) and race:

ANOVA Results

Age	*DF*	*F*	*Probability*
1-2	1, 6	299.03	SiF: p = 0.0001; Race: p = 0.0001 Silicofluoride by Race: p = 0.0001
3-4	1,6	184.08	SiF: p = 0.0001, Race: p = 0.0001 Silicofluoride by Race: p = 0.0001
5-6	1,6	76.31	SiF: p = 0.0001, Race: p = 0.0001 Silicofluoride by Race: p = 0.0025
Over 6	1,6	19.76	SiF: p = 0.0045, Race: p = 0.0001 Silicofluoride by Race: p = .0158

ISSUE (II): Objective Facts re Health Effects of Silicofluoride Agents

There are really two issues here:
(a) Studies, if any, of health effects in humans from long-term exposure to the fluoridating agents most widely used in the US today.
(b) Any other evidence which implicates these fluoridating in adverse health effects.

Discussion of Issue (II) a:

Although experimental fluoridation of water supplies of whole communities began in 1945 using sodium fluoride (NaF) as the fluoridating agent, within two years a major shift was made to the use of fluosilicic acid and sodium fluosilicate (herein the "silicofluorides" or "SiFs"). Today, over 90 % of fluoridated water in the US is treated with SiFs, less than 10 % with NaF. A major report issued in 1957 justified this shift this way:

> "The widespread use of sodium silicofluoride in fluoridating drinking water has made it important to determine the state of the fluoride in such water, specifically, how much is fluoride ion, how much, if any, is unchanged silico-fluoride, how much is fluoride bound to other ions. If all or nearly all of the fluoride is the ion F-, the great body of information about the biologic effects of fluorides can be brought forward as a guarantee of safety. If considerable amounts of silicofluoride remain, a question can legitimately be raised since comparatively little work has been done on the biologic effects of silicofluorides. This paper presents some experimental results permitting the conclusion that no silicofluoride exists in drinking water."

The report from which that preamble is quoted (Feldman I et al; "The State of Fluoride in Drinking Water"; J. Dent Res. Vol 36 (2); pp192-202; April 1957) is an impressive but entirely theoretical dissertation on the mechanisms of silicofluoride dissociation leading to the release of the simple fluoride ion from complex silicofluoride ion. It predicts "virtually" 100 % dissociation at a concentration of 16 parts per million of fluoride.

In 1969, however, an empirical study (Crosby NT; "Equilibria of Fluosilicate Solutions with Special Reference to The Fluoridation of Public Water Supplies"; J Appl Chem; v19; April 1969; pp 100-102) found by experiment that at 15 parts per million as much as 40 % of silicofluoride was still in the non-dissociated form. One, therefore, cannot rely on Feldman et al for its "guarantee of safety" for the use of silicofluorides as water treating agents.

Moreover, in response to questions asked in May 1999 by the Chairman of the US House of Representatives sub-committee on the Environment: "What chronic toxicity test data are there on sodium fluosilicate? On hydrofluorosilicic acid?" in June 1999, the Assistant Administrator EPA acknowledged: "EPA was not able to identify chronic studies for these chemicals."

Conclusion Regarding Issue (II) a: There are no known experiments demonstrating health safety of chronic low-level ingestion of the most commonly used fluoridating agents in the US.

Discussion of Issue (II) b

In 1950, the US PHS essentially announced and endorsed the switch from the use of NaF to SiFs for water fluoridation (McClure FJ: "Availability of Fluorine in Sodium Fluoride vs, Sodium Fluosilicate"; Public Health Reports vol 65 No 37; September 15, 1950, pp 1175-11860). The reason given for that change was economic. Sodium fluosilicate was enough cheaper than NaF that a saving of as much as a dollar per year per community resident could be achieved.

The only health-based data offered for the switch was the equivalence of tooth decay protection in rats from equivalent amounts of ingested fluoride. However, McClure himself was willing to caution: "There were some differences, however, in the paths of excretion, [of non-retained F], i.e., in the urine or feces." The differences reported were as shown below:

Effect of One "Rat-Day" of Exposure to Fluoridated water

	Fluoride Source		
	Na2SiF6	NaF	Ratio
(a) F- Ingested	4.00 mgm	3.91 mgm	1.02
(b) F- Retained	1.22 mgm	1.28 mgm	0.95
(c) F- Excess F (a-b)	2.78 mgm	2.63 mgm	1.06
(d) F- eliminated in feces	1.40 mgm	2.16 mgm	0.63
(e) F- eliminated in urine	1.38 mgm	0.48 mgm	2.67
(f) F- into blood (b+e)	2.60 mgm	1.76 mgm	1.48

With almost three times as much fluoride excreted via urine there would have to be as much as three times higher blood burden of fluoride and three times as much soft tissue exposure. No one today would consider this to be trivial. Moreover, the length of time of the rat exposure was too short to approximate effects in humans to 10-20 years of exposure. Notwithstanding differing views by fluoridation proponents, there are good reasons to believe that SiF treated water (which is supplied in over 90% of water systems) is not "just like" NaF treated water (which is supplied in less than 10 % of water systems).

Early on, there was in fact one experiment on humans which did demonstrate, albeit in a cursory way, that human metabolism of SiFs and NaFs was not the same. (Zipkin I et al; "Urinary Fluoride Levels Associated with Use of Fluoridated Water"; Pub Hlth Rpts 71 pp767-772; 1956). Children took longer than adults to reach an equilibrium between uptake of fluoride in their water and excretion of fluoride in their urine. In addition, the delayed equilibrium effect was greater from an SiF agent than from NaF in their drinking water.

We have postulated a number of hypotheses to account for these disparities. In principle, several pertain to the unique properties of SiF itself. However, one cannot discount the possibility that the presence of SiF in commercial agents may simply mark the presence of other substances in the supplied material with their own biochemical effect since the

silicofluorides are highly toxic chemicals produced from the waste ponds of phosphate fertilizer plants. To understand whether these facts might merit further study, we focused explicitly on differences between populations exposed to silicofluorides, to sodium fluoride, or to non-fluoridated water.

Under grants from the Office of Criminal Enforcement, Forensics and Training of the EPA and the Earhart Foundation, we have focused on three large-scale surveys of children's blood lead: over 250,000 children in Massachusetts, over 150,000 children in New York State communities of 15,000 to 75,000, and almost 3,000 children sampled in the National Health and Nutrition Survey (NHANES III). In all three of these samples, we find exposure to silicofluorides is significantly associated with higher levels of blood lead (controlling for other risk-factors for lead absorption). Repeatedly, we find that these results would occur by chance less than once in 10,000 times.

More important, we find some individuals and groups are especially at risk. Where silicofluorides are in use, the bodily uptake of lead from environmental sources such as old housing with lead paint, high lead levels in water or soil, or industrial pollution, is significantly increased (Figure 1). Individuals with diets deficient in calcium and other key vitamins and minerals are especially vulnerable. As a result, our data show that the effects of silicofluoride are especially great among poor and minority citizens, who are more likely to live in environments where lead is present (Figures 2 and 3).

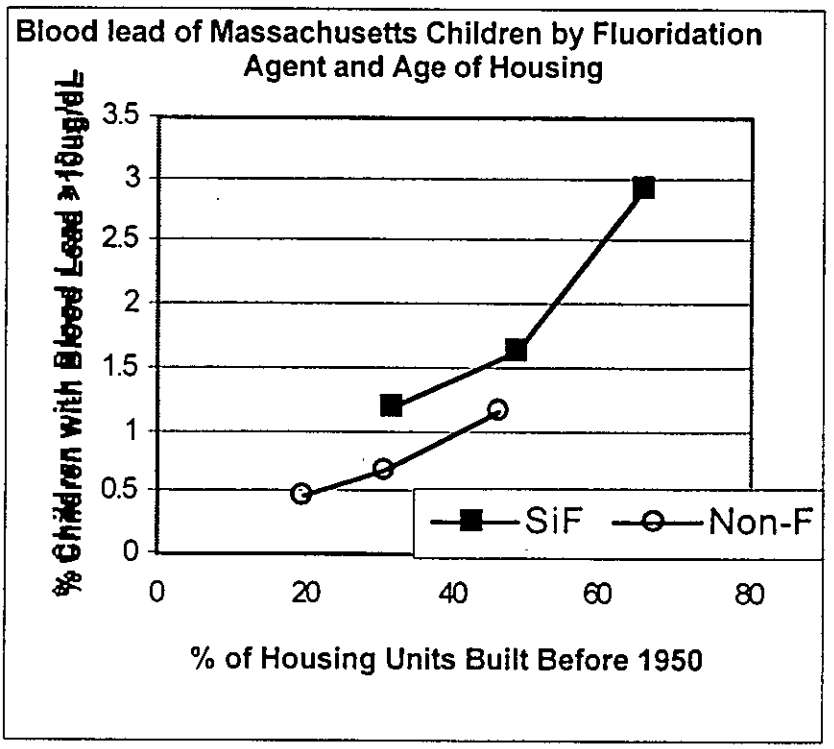
We have also looked at data on other health and behavioral outcomes that have been linked to lead toxicity. In 1992, a New Jersey Department of Health study found a pattern of increased rates of a rare children's bone cancer (osteosarcoma) in fluoridated communities; we found that the chemicals used were typically silicofluorides, and confirmed that the pattern was NOT due to other confounding factors. We also analyzed data from the drugs used at the time of arrest in a National Institute of Justice sample of over 30,000 criminals. We studied this because cocaine increases the activity of dopamine, and lead absorption lowers levels of this neurotransmitter (in a sense, one can think of cocaine use as a crude self-medication, much as depressed people take Prozac to increase serotonin function). As predicted, rates of cocaine use were significantly higher where silicofluorides are used in water treatment, with no comparable increase in the use of other psychotropic drugs.

In addition, we have considered the geography of ADD/ADHD in a small sample of New York communities (total population about 40,000). Rates of diagnosis with these learning deficits and of ritalin therapy are about 38% higher where silicofluorides are in the water. Finally, preliminary analysis of national crime statistics shows that, across the 3141 counties in the continental US., rates of both violent crime and property crime are significantly higher where over 80% of the population receives silicofluoride treated water. All of these results are statistically significant ($p < .05$ or less).

Conclusion regarding Issue (II) b: there is ample reason to consider the use of SiF in water treatment to be a health hazard. Biological effects known to exist in the 1950s and the associations of SiFs with adverse health effects found in the recent past should be addressed and dispelled.

Issue (II)

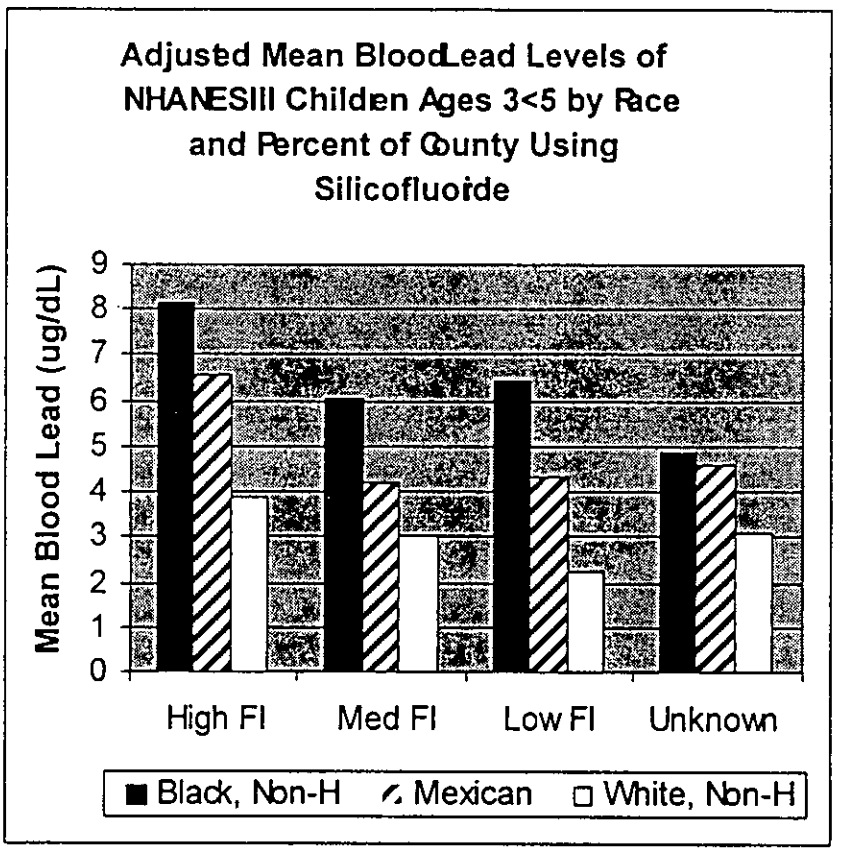
Figure 1. The Effect of Silicofluorides in Increasing Lead Uptake of Children Living in Old Housing



Source: Poster presentation, 17th International Neurotoxicology Conference (Note: for a full report on Massachusetts data, see Masters and Coplan, 1999). N > 250,000.

Issue (II)

Figure 2. Differential Vulnerability of Minority Children to Higher Lead Uptake in Counties with "High Fluoridation" (over 80% exposed to Silicofluorides) – National Health and Nutrition Evaluation Survey (NHANES III)



Source: Poster presentation, 17th International Neurotoxicology Conference (Note: manuscript analyzing this data is in final stage of preparation). n = 3990

ISSUE (III): Appropriate Legislative Action

Evidence concerning the efficacy and safety of ingesting fluoridated water as a preventive of tooth decay has been questioned by members of the dental research community from the outset of the US national program and for 40 more years: ([a] Bibby BG; "Topical Application of Fluorides as a Method of Combatting Dental Caries"; Am Ass for the Adv of Sci Symposium "Dental Caries and Fluorine", Moulton FR, editor; 1946. [b] Glass RL; "Secular Changes in Caries Prevalence in Two Massachusetts Towns": Caries Research; V 15 pp 445-450; 1981. [c] Thylstrup A; "Clinical Evidence of the Role of Pre-eruptive Fluoride in Caries Prevention": J Dent Res V 69 Sp Is; 742-750; Feb 1990)

Despite legitimate scientific questions of fact, proponents of fluoridation erroneously insist that only "quacks" raise questions. On the other hand, proponents of fluoridation insist they have the only science on the subject while behaving in a manner consistent with the lowest form of politicized discourse. They invariably:

a) level ad hominem attacks on the qualifications of anyone who raises questions;
b) fail to address the substance of issues in question;
c) invent "straw man" issues to refute;
d) demonstrably mis-state facts based on self-styled expertise.

Even officials of the principal professional organization supporting water fluoridation, in trying to come to grips with the central issue, have openly attacked science-based views of their own senior colleagues when they have veered from the "party line". In 1991 the American Association for Public Health Dentistry (AAPHD) held a symposium titled "Appropriate Uses of Fluoride for the "90s". (Horowitz S; J Pub Hlth Dent; 51 (1); Winter '99'; pp 56-59). During a major debate over what to do about the acknowledged evidence of a substantial increase in prevalence of "fluorosis" due to excess fluoride ingestion, the chief of the National Institute of Dental Research (NIDR) made the following statement":

> "Consideration of the attributes of *equity and ubiquity* of use of community water fluoridation causes me to react to one of the two recommendations made by Leverett in his conclusions. I totally agree with Rozier that *we should not conduct studies to evaluate the effects of reducing the concentrations of fluoride used for community water fluoridation or suggest that present concentrations may be too high, as Leverett states we need to do."* [Emphasis added]

Dr. Dennis Leverett was head of the Eastman Dental Center in Rochester, NY. He was not an opponent of fluoridation by any means. He had, nevertheless, gone on record well before the 1991 debate (Leverett DH; "Fluorides and the Changing Prevalence of Dental Caries": Science; Vol 217, July 1982, 26-30) with a warning about over-exposure of children to fluoride from their food, bottled drinks, tooth-paste and drinking water.

When he repeated that warning at the 1991 symposium, his science-based views were dismissed by the head of the NIDR in favor of a political argument for undiminished dissemination of fluoridated water based on "the attributes of equity and ubiquity." That is, if poor kids needed it, whether other kids needed it or not, everyone had to drink fluoridated water.

The irony of that thesis was sharply brought home at the 1995 Symposium of the same AAPHD entitled: "Fluoride---Too Much of a Good Thing?" when a report (Levy ML; "Sources of Fluoride Intake of Children"; J Pb Hlth Dent; vol 55 (1); Winter 1995; pp39-52) noted that the American Academy of Pediatric Dentistry had just revised their standards to recommend that infants under the age of 6 months should not be fed formula made with water exceeding 0.3 ppm of fluoride (Anon; "New Fluoride Schedule Adopted"; ADA News; 25 (10); 1994; pp 12-14).

The problem of feeding new-borns living in communities with water "adjusted" to 1.0 ppm F (the so-called "optimum") came up. The suggestion was offered that this could be dealt with if parents bought low-fluoride bottled water, distilled water or installed reverse osmosis equipment to remove fluoride; public water had to be fluoridated to 1 ppm F (p 50 of cited Levy article).

If there is any doubt about who has politicized water fluoridation and disdains scientific facts, one need only study the Oct 22, 1999 CDC Morbidity and Mortality Weekly Report. While extolling the virtues of water fluoridation by citing the favorable experience of fluoridating the water in Newburgh New York in 1945, the CDC fails to mention the 1998 NY Dept of Health report (our Issue I, Figure 2) showing that the tooth decay rate comparison between fluoridated Newburgh and non-fluoridated Kingston had reversed the nominal benefit.

Conclusion regarding Issue (III): It would seem that any legislation promulgated in 2000 which intends the public to have an intelligent basis for considering the merits of water fluoridation should provide that public with contemporary relevant facts on which to base that choice. It is therefore suggested that the following language would be appropriate for New Hampshire to consider at this time.

> "Prior to the call of any referendum on the question of fluoridating a public water supply, the health authority of a municipality or county recommending the start or continuation of such practice shall conduct and publish the results of a survey of the current rate of children's tooth decay in said municipality or county, as determined according to recognized protocols for such surveys, and said survey shall include a statistically representative sample according to age, gender, SES, and race/ethnicity criteria."

Such an approach (a) would provide a realistic basis for forming an opinion, in contrast to a faith-based assumption that "experts" know the facts and tell the truth, and (b) is intellectually more honest than manipulating the numbers of individuals required to sign a petition or support an issue placed in referendum.

Table I.

ANALYSIS OF NIDR 1986-87 SURVEY OF DENTAL CARIES
AS A FUNCTION OF COMMUNITY FLUORIDE STATUS

	Reference (16)				Reference (21)			
Region	5-17 yr-olds* (thous)	%	DMFS	Std. Error	% Area F'ed	DMFS F	DMFS Non-F	F vs NF % diff
(a) US	41,310	100.0	3.07	0.071	53	2.79	3.39	18 less
(b) I	2,042	4.9	3.60	0.192	55	3.11	3.45	10 less
(c) II	5,989	14.5	3.43	0.119	49	3.08	3.42	10 less
(d) III	9,233	22.4	2.91	0.216	74	2.86	2.69	6 more
(e) IV	11,048	26.7	3.08	0.169	54	2.75	3.60	24 less
(f) V	4,448	10.8	2.39	0.117	59	2.49	2.71	8 less
(g) VI	2,499	6.1	2.75	0.153	34	2.36	3.07	23 less
(h) VII	6,042	14.6	3.37	0.052	19	1.42	3.61	61 less
(i) I-III comb'd.	17,264	41.8	3.17		63	2.95	3.15	6 less

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* According to (16) the US 5-17 year census was 43,280,974. The number of subjects initially examined were 39,206 but only those with at least one permanent tooth were retained in the calculation of DMFS statistics. Hence the population represented by recorded data is 41,310,000 and the % by Region is in accord with that number.

Abstracts

Current Views of The Role of Fluoride

Margolis HC, Moreno EC (Forsyth Dental Center, Boston, Massachusetts 02115.); "Physicochemical perspectives on the cariostatic mechanisms of systemic and topical fluorides"; J Dent Res 1990 Feb;69 Spec No:606-13; discussion 634-6

The cariostatic mechanisms of systemic and topical fluoride agents are considered in light of a previously proposed model for the caries process. It is noted that fluoride, in principle, can induce a cariostatic effect: by (1) reducing enamel solubility when incorporated into the mineral structure; (2) by fostering the remineralization of incipient enamel lesions and the deposition of fluoridated phases (within dental plaque) which provide a source of mineral ions (Ca, P, F) under acidic conditions; and (3) by reducing the net rate of transport of matter out of the enamel surface, under acidic conditions, by inducing the reprecipitation of fluoridated hydroxyapatite phases within enamel. It is also noted that relatively high (approximately 12,000 ppm) concentrations of professionally applied topical fluorides significantly reduce the rate of acid production of cariogenic organisms (e.g., S. mutans). Based on an analysis of available clinical and laboratory data, it is concluded that the benefits provided by water fluoridation result, to a large degree, from a topical effect. It is suggested that clinical procedures be developed to establish and maintain low levels of free fluoride in plaque fluid. It appears that this will require frequent exposure to topical fluorides.

Martens LC, Verbeeck RM (Unites de medecine dentaire pediatrique, Hopital universitaire, Gand.); "Mechanism of action of fluorides in local/topical application"; Rev Belge Med Dent 1998;53(1):295-308

The marked caries reduction in many countries over the last two decades is thought to be mainly the result of the widespread and frequent use of low concentrations of fluorides mainly via toothpastes. This article gives a review on fluoride sources in the oral cavity and discusses the physiochemical mechanisms by which fluoride interacts with enamel during the caries process and its reversal. From this review it becomes clear that fluoride incorporated into the enamel mineral during tooth development has little effect on the caries process. It is the fluoride incorporated posteruptively and in the aqueous phase during the caries challenge that is of primary importance. The most effective caries preventive fluoride regimen, both from a theoretical perspective and as proved clinically, is the frequent (daily) low concentration application of fluoride from toothpastes and/or mouthrinses. High concentrations, however, used at intervals of months or years and administered by the dentist, work initially not only on both de- and remineralisation, but also by providing fluoride as calcium-fluoride or absorbed in early lesions which is subsequently available over prolonged periods.

Shellis RP, Duckworth RM; (MRC Dental Group, Dental Hospital and School, Bristol, UK.) "Studies on the cariostatic mechanisms of fluoride"; Int Dent J 1994 Jun;44(3 Suppl 1):263-73

This paper reviews mechanisms underlying the caries-preventive effects of fluoride, with special reference to factors which govern the efficacy of topical treatments. Fluoride reduces demineralisation in several ways: by reducing bacterial acid production and acidurance; by reducing the equilibrium solubility of apatite; and by the fluoridation of apatite crystal surfaces, reducing the dissolution rate, whether or not there is reduced solubility of the bulk mineral. On available evidence, the last seems to be the most important effect. The effect depends upon the presence of sufficiently high, dissolved fluoride concentrations to maintain the surface fluoridation. The provision of dissolved fluoride is the key to successful therapy, especially topical treatments. Fluoride also promotes remineralisation even at low concentrations, thus slowing or preventing overall mineral loss. The formation of intra-oral fluoride reservoirs capable of supplying ions for a prolonged period is crucial to the success of topical treatments..

Fischer C, Lussi A, Hotz P (Klinik fur Zahnerhaltung, Universitat Bern Schweiz); "The cariostatic mechanisms of action of fluorides. A review"; Monatsschr Zahnmed 1995;105(3):311-7

In the past the inhibition of caries by fluorides was ascribed to the reduced solubility of enamel due to the incorporation of F- into the enamel mineral. During the last years the understanding of the cariostatic mechanism has changed fundamentally. Based on these new findings the loosely bound fluorides, which are present in the surroundings of the teeth after application of topicals, are regarded as decisive for the caries preventing effect by causing an inhibition of demineralization, enhancing the remineralization process and supporting the precipitation of CaF2. The formation of CaF2 is induced after application of topicals, and the material stays relatively stable in the mouth, due to adsorbed HPO4(2-) ions at the surface of CaF2. During the cariogenic challenge, CaF2 releases F- ions due to the reduced concentration of HPO4(2-) ions at acidic pH values. The CaF2 therefore functions as a pH-controlled F(-)-reservoir and is the most important supplier of free F- ions during the cariogenic challenge.

Ogaard B (University of Oslo Dental Faculty, Department of Orthodontics, Norway.); "Effects of fluoride on caries development and progression in vivo"; J Dent Res 1990 Feb;69 Spec No:813-9; discussion 820-3

The dissolution rate of calcium-fluoride-like material from the enamel surface in vivo appears to be much slower than previously thought. This could be due to adsorption of phosphate ions and/or protein molecules to the surface of the calcium-fluoride-like particles. During cariogenic challenges, the phosphate/protein coating is released, resulting in increased solubility rate of the calcium-fluoride-like material. Due to this mechanism, calcium-fluoride-like material may be a major aspect of the cariostatic mechanism of topically applied fluoride. Topically applied neutral fluoride agents are able to inhibit caries development in enamel but not completely stop lesion development. A fluoride solution at low pH has been found to be more effective in caries model studies than neutral fluoride agents, which might be due to the formation of a larger depot of calcium fluoride. Data from fluoridated areas indicate that the fluoride ion as such has a limited effect on lesion development, and a major mechanism of the cariostatic effect may be reformation of apatite (remineralization). The product of lesion consolidation (a fluoridated apatite) may have a limited effect, since intra-oral caries model studies show that even pure fluorapatite, in the form of shark enamel, demineralizes. In fissures and around orthodontic appliances, conventional fluoride agents appear to have only a small effect.

Ten Cate JM (Department of Cariology & Endodontology, Academic Center for Dentistry Amsterdam, (ACTA), The Netherlands.); "In vitro studies on the effects of fluoride on de- and remineralization."; J Dent Res 1990 Feb;69 Spec No:614-9; discussion 634-6

The recent literature extensively describes the role of ambient fluoride in the de- and remineralization of dental enamel. Fluoride in sub-ppm concentrations is effective in promoting mineral deposition and inhibiting mineral dissolution. The latter phenomenon is most likely attributable to the concomitant precipitation of a fluoride-rich mineral phase which inhibits further dissolution. These fundamental processes result in an inhibition of enamel demineralization and an enhancement of enamel lesion remineralization. Alternatively, fluoride may also induce the 'arrestment' of enamel lesions. For the in vivo patterns and the effects of caries-preventive substances to be studied, de- and remineralization can best be examined with a pH-cycling system in which the pH depressions occurring in the oral environment are mimicked in a laboratory model. Such an approach has proved useful in developing optimal fluoride schemes which can be tested in animal, intraoral, and clinical studies.

ten Cate JM and Featherstone JD (Department of Cariology and Endodontology, Academic Centre for Dentistry, Amsterdam, The Netherlands): "Mechanistic aspects of the interactions between fluoride and dental enamel"; Crit Rev Oral Biol Med 1991;2(3):283-96

For many years after the discovery of its caries preventive effect, fluoride was thought to be primarily active by lowering the solubility of the apatitic mineral phase of the dental hard tissues. Recent findings have shed new light on the mechanisms by which fluoride inhibits or delays dental caries. Fluoride present in the oral fluids alters the rate of the naturally occurring dissolution and reprecipitation processes at the tooth-oral fluid interface. Demineralization of enamel is inhibited by concentrations of fluoride in the sub-ppm range. Likewise, remineralization of incipient caries lesions (the earliest stage of enamel caries) is accelerated by trace amounts of fluoride. As these two processes comprise dental caries the physiological balance between hard tissue breakdown and repair is favorably shifted by fluoride. The driving force for both phenomena is thermodynamic, that is, fluorapatite or a fluoridated hydroxyapatite may form when fluoride is supplied at low concentrations. This article critically reviews the current information about tooth-fluoride interactions, both from laboratory and clinical studies.

Fejerskov O, Thylstrup A, Larsen MJ; "Rational use of fluorides in caries prevention. A concept based on possible cariostatic mechanisms."; Acta Odontol Scand 1981;39(4):241-9

The aim of this review has been to suggest that future fluoride preventive programs should be based on what is at present known about the possible cariostatic mechanisms of fluoride. The relative role of enamel fluoride in caries prevention has become increasingly questioned during the last two decades. No significant relationship has been demonstrated between caries experience of the individual and fluoride content of the enamel. Furthermore, the fluoride content in surface enamel between teeth developed in low and "optimal" fluoride areas is too small to explain any significant effect on dissolution rate of the enamel. As the major explanation for the cariostatic effect of fluoride must therefore be sought in its local effect on the oral environment, the possible effects on plaque colonization, composition and metabolic activities are discussed. The effect of even low concentrations of fluoride in the liquid phase on enamel dissolution is described, and it is concluded that the major cariostatic effect of water fluoridation, fluoride tooth paste and mouth rinses can probably be ascribed to regular increases in fluoride ion activity in the oral fluids. The effect of high concentrations of topical fluoride solutions is thought to be a result of a slow dissolution of calcium fluoride deposited in initial caries lesions, whereby an increased fluoride ion concentration is maintained locally for longer periods of time. Finally, the clinical consequences of these considerations are described.

Baby Bottle Tooth Decay

Bruerd B, Jones C (IHS Dental Services Branch, Albuquerque, NM 87100, USA); "Preventing baby bottle tooth decay: eight-year results"; Public Health Rep 1996 Jan-Feb;111(1):63-5

Baby bottle tooth decay (BBTD) is a preventable dental disease that affects more than 50% of American Indian/Alaska Native (AI/AN) children. A community-oriented program to prevent BBTD was implemented in 12 AI/AN communities in 1986. In 1989, the overall prevalence of BBTD for the 12 sites combined decreased from 57% to 43% which represented a 25% reduction (P<.001). Funding for the formal program was discontinued in 1990. In 1994, the Indian Health Service Dental and Head Start funded an assessment of the current prevalence of BBTD and the level of program implementation at the 12 original sites. This paper describes the findings. At the five sites where both one-to- one counseling and community-based educational activities had continued, BBTD prevalence was reduced by 38%(P<.001) over the eight-year period.

Weinstein P et al; "Epidemiologic study of 19-month-old Edmonton, Alberta children: caries rates and risk factors"; ASDC J Dent Child 1996 Nov-Dec;63(6):426-33

A random sample of 938 19-month-old Edmonton children and their parents/caretakers were studied. Parents were interviewed and children were examined. Specimens for a caries activity test were collected at the examination. Results indicated 25 percent of the children had moderate to high caries activity, as shown by the Cariostat, with 4.6 percent showing decalcification lesions and frank caries. Early caries (BBTD) were found to be related to bottle feeding practices, discomfort with allowing the child to cry, and with mother being foreign-born. Foreign-born status was associated with the above parenting practices. Preferences for preventive recommendations and other descriptive results were reported.

Smith PJ, Moffatt ME (Department of Community Health Sciences, Winnipeg, Manitoba, Canada.): "Baby-bottle tooth decay: are we on the right track?";Int J Circumpolar Health 1998;57 Suppl 1:155-62

The baby-bottle tooth decay (BBTD) risk factor literature was critically assessed for strength of evidence, and the prevention literature for the identification of which risk factors are being addressed. "Inappropriate" feeding practices (non-nutritive sucking, prolonged bottle/breast feeding, nap-time feeding) are believed to cause BBTD. The association of these practices with BBTD is inconsistent and the strength of association varies greatly. These practices increase exposure to lactose, a cariogenic carbohydrate, but the current causation model fails to explain why the majority of children with these risk factors do not develop BBTD. The association of BBTD with low socioeconomic status is stronger and more consistent. Prevention has focused almost exclusively on education directed at changing the postnatal feeding practices despite the fact that teeth begin formation in utero. Prenatal deficiencies of calcium and vitamin D can lead to enamel defects, and enamel defects in turn predispose teeth to caries. Baby-bottle tooth decay is especially prevalent in Aboriginal people, for whom studies have consistently reported diets deficient in vitamin D and calcium. BBTD may be a consequence of the poor socioeconomic conditions and malnutrition. Perhaps more attention should be given to primary prevention.

Erickson PR, et al; "Estimation of the caries-related risk associated with infant formulas"; J Pediatr Dent 1998 Nov-Dec;20(7):395-403

PURPOSE: Baby bottle tooth decay (BBTD) affects 6% of children under three years of age and is associated with inappropriate bottle use. The objective of this study was to estimate the caries-related risk associated with 26 infant formulas and whole milk. METHODS: First, the plaque pH of adult volunteers was monitored before and after an oral rinse with infant formula to determine the minimum pH obtained in response to each formula. Second, Streptococcus sobrinus 6715 was cultured in each infant formula, and the increase in the number of colony forming units was measured. Third, each infant formula was incubated with powdered enamel and the solubility of enamel mineral was calculated in the absence of bacteria. Fourth, each formula was mixed with standardized concentrations of acid to determine the buffering capabilities. Finally, enamel windows were created on extracted permanent molars and exfoliated primary incisor crowns that were then colonized with mutans streptococci and incubated with infant formula. Caries was assessed visually and radiographically for 18 weeks. The length of time required for the development of enamel caries, dentinal caries and pulpal involvement was recorded. RESULTS: One-way or two-way ANOVA of these five assays demonstrated that 1. Plaque pH varied in response to oral rinsing with infant formula and most formulas did have the ability to reduce the pH significantly below the pH obtained after rinsing with water 2. Some infant formulas supported significant bacterial growth 3. Enamel mineral was dissolved by incubation with certain infant formula 4. The buffer capacity varied among the infant formulas tested 5. The length of time required for caries to reach dentin or pulp differed for the formulas, with some formulas causing dentinal caries by 3.4 weeks and pulpal involvement by 7.2 weeks.

Peretz B, Kafka I (Department of Pediatric Dentistry, Hebrew University-Hadassah Faculty of Dental Medicine, Jerusalem, Israel); "Baby bottle tooth decay and complications during pregnancy and delivery"; Pediatr Dent 1997 Jan-Feb;19(1):34-6

The purpose of the study was to investigate an association between maternal and/or fetal complications during pregnancy and/or delivery and the occurrence of baby bottle tooth decay (BBTD) in the infant. The study population comprised 50 mothers of infants with BBTD (BBTD+ mothers): 50 mothers of aged-matched children with similar eating and bottle-use habits but without BBTD (BBTD-) served as comparisons. Interviews with the mothers focused on pregnancy complications (vaginal bleeding, premature uterine contractions, viral or bacterial infections, hospitalization, diabetes, or other causes of high-risk pregnancy), mode of delivery (normal or instrumental), fetal distress, gestational age, birth weight, and mother's age at delivery. Chi-square analysis and the Student's t-test were used to analyze the data. Pregnancy complications and instrument delivery/cesarean section were significantly higher in the BBTD+ group than in the controls ($P = 0.0001$ and $P = 0.0004$, respectively). In the BBTD+ group, vaginal bleeding/premature uterine contractions were most frequent (50%), while in the BBTD- group high-risk pregnancy dominated (20%). Normal deliveries were more frequent in the BBTD+ mothers (68%) than in the comparisons (40%). Gestational age and baby's birth weight did not differ between the two groups. The mean age of the BBTD+ mothers was significantly lower than that of the controls ($P = 0.013$). The results suggest that babies born after maternal complications during pregnancy or babies who experience a traumatic birth must be considered to be at risk of developing BBTD when exposed to excessive bottle nursing.

Febres C et al (Department of Growth and Development, University of Texas-Houston 77225-0068, USA.); "Parental awareness, habits, and social factors and their relationship to baby bottle tooth decay."; Pediatr Dent 1997 Jan-Feb;19(1):22-7

The general objective of this study was to investigate the relationship between parental awareness, habits, and social factors in a particular parent population and the occurrence of baby bottle tooth decay (BBTD) in their children. The sample consisted of Hispanic, Black, and White families and included 100 parents with 100 children from the Pediatric Clinic and the Pediatric Dentistry Clinic at Houston Medical Center, University of Texas, Houston. Questionnaires including information related to demographic data, educational level, marital status, baby care, and knowledge and beliefs about BBTD were completed by the parents. Each child was examined with mouth mirror and tongue blade to determine the presence of BBTD. Overall, 19 of the children were found to have BBTD. The racial distribution of the children with and without BBTD was statistically significant ($P = 0.03$) with the Hispanic population being over-represented in the BBTD group (72.2% versus 37.0%) and Blacks under-represented (16.2% versus 50.6%). The ages at which babies with BBTD were weaned from the bottle were significantly ($P < 0.001$) higher than those with no BBTD, and those weaned after 14 months of age were more likely to have BBTD. The percentage of babies with BBTD weaned from the bottle after 14 months old was higher (36.8%) than babies without the condition (26.5%). Awareness of BBTD was generally lower among parents of the BBTD children than parents of children without BBTD, as reflected by the feeding patterns of their children and their responses to questions dealing with their knowledge of BBTD.

Von Burg MM et al; "Baby bottle tooth decay: a concern for all mothers"; Pediatr Nurs 1995 Nov-Dec;21(6):515-9, quiz 520-1

Health care professionals often inappropriately separate dental health from other health functions. Baby bottle tooth decay (BBTD) should be a concern for all professionals who work with expectant or new mothers and very young children. Research indicates that even though many mothers are aware of the etiology of the condition, they continue to allow prolonged nursing with milk or liquids other than water. Nurses can help promote good oral health for children by educating and training expectant and new mothers, children, and others who work with mothers and children in preventing BBTD.

Barnes GP et al; (Department of Community Health and Preventive Dentistry, Baylor College of Dentistry, Dallas, TX 75246) "Ethnicity, location, age, and fluoridation factors in baby bottle tooth decay and caries prevalence of Head Start children."; Public Health Rep 1992 Mar-Apr;107(2):167-73

Baby bottle tooth decay (BBTD) is a term applied to a specific form of rampant decay associated with inappropriate bottle or breast feeding of infants and young children. Although the prevalence of BBTD has been studied in individual ethnic groups, comparison studies are rare. Head Start children have frequently served as study subjects for assessing the prevalence of BBTD. The purpose of this study was to compare BBTD and caries prevalence among Head Start children who are members of four ethnic groups in five southwestern States. Age, residence, and fluoridation status were also compared for the total sample and ethnic categories. The sampling process was a stratified random site selection; it was used to obtain data on 1,230 children. This number constituted 3 percent of the children enrolled in Head Start in Public Health Service Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas) where the study was conducted. The criterion for determining the presence of BBTD was based on the number of carious deciduous maxillary incisors observed. The severity of the condition was reported as two of four and three of four of the target teeth affected. Thus, two levels of severity are reported. BBTD was prevalent in approximately 24 percent and 15 percent of the total sample, depending on the severity criterion used. Native American children had a significantly higher (P less than 0.05) prevalence than Hispanic, white, and black subjects. Rural children had significantly higher (P less than 0.05) prevalence of BBTD than nonrural children for all ethnic groups except whites.

Fluoridation Fact Sheet
Refer: FL-141 December 1993

Status of Water Fluoridation in the United States

As of 12/31/92

1.Total U.S. Population - 1992 Estimate..... 258,544,000
U.S. Population on Public Water Supply Systems
(per 1992 EPA data) 232,438,000
U.S. Population Not Served by Public Water Supply
Systems..... 26,106,000

2.Total No. of Public Water Supply Systems
(per 1992 EPA data) 59,158
No. of Systems with population less than 100 18,273
No. of Systems with population between 101-500 18,238
No. of Systems with population between 501-1000 6,307
No. of Systems with population over 1,000 15,487

3.Total No. of Public Water Supply Systems that
are Fluoridating (1992 Fluoridation Census) 14,351
Adjusted 10,567
Natural 3,784

4.Total No. of Fluoridated Communities
(1992 Fluoridation Census)..... 10,496
Adjusted 8,572
Natural 1,924

5.Total U.S. Population on Fluoridated Drinking Water Systems
(1992 Fluoridation Census) ..... 144.6 million
Adjusted ..... 134.6 million
Natural ..... 10.0 million

6.Percentage of U.S. Population Receiving Fluoridated Water:
(134.6 M + 10.0 M) divided by 258.5 = 55.9%

7.Percentage of Total U.S. Population on Public Water Supply Systems
Receiving Fluoridated Water:
(134.6 M + 10.0 M) divided by 232.4 = 62.2%

8.Percentage - Small Systems
Small water systems (<500 population) comprise 62.2% of U.S. community water systems, but serve 2.3% of the population on public water supply systems.

9.Percentage - Large Systems
Large water systems (>100,000 population) comprise 0.6% of community water systems, but serve 44.8% of the population on public water supply systems.

Division of Oral Health
National Center for Chronic Disease Prevention and Health Promotion
Centers for Disease Control and Prevention
United States Department of Health and Human Services

IMPORTANT MESSAGE

FOR Carolyn

DATE 3/02/00 TIME 1:15 A.M. P.M.

M. Jay Seavey

OF

PHONE 622-6070
AREA CODE NUMBER EXTENSION

☐ FAX

☐ MOBILE
AREA CODE NUMBER TIME TO CALL

TELEPHONED	✓	PLEASE CALL	✓
CAME TO SEE YOU		WILL CALL AGAIN	
WANTS TO SEE YOU		RUSH	
RETURNED YOUR CALL		WILL FAX TO YOU	

MESSAGE

Re: SB312

Wants to know if Barney Lucci's testimony supports plain idea tion

See pg 9 ea 16 + 17

SIGNED

Returned call on 3/10/00. Left message

TOPS FORM 74600 MADE IN U.S.A. 100% RECYCLED

Speakers

Fill in *ONLY* if *SPEAKING* on Bill

Bill # S.B. 312 Date 2/23/00

Committee Public affairs

I support the bill ____

I oppose the bill X

I have written testimony ____

(Number of copies) ____

Time needed to speak: 3 MIN.

Name Lloyd G. BASINOW

Address 503 AMHERST ST.
MANCHESTER 03104

Phone 624-4063

Representing C.A.F.E.
Citizens Against Fluoride Exposure

SENATE Public Affairs COMMITTEE

Date 2/23/00 Time 1:45 PM Public Hearing on SB312

Appearing in FAVOR (Please print) — Please check box at left to speak

Speaking?	Name	Address	Representing
☒			
☑	Sen. James Squires	Sen. Dist. 12	Co-Sponsor
☑	William Kassler	Bedford	DHHS
☑	Sen Katrina Wheeler		
☑	Christos Giotopoulos DDS	Bedford	NH Dental Society
☑	Karen Wynn Herrin RDH	Bedford	NH Dent Hyg. Assoc
☑	Coleen M Smead RDH	Barrington	NH Dent Hyg assoc
☑	Stacy Clarke RDH	Hooksett	Myself + NHDHA
●	Nancy Martin	Warner	RDH myself
☐	Carolyn Hartnett	Concord NH	RDH myself
☑	Bernard Lucey	6 Hazen Dr.	Dept of Env. Ser.

Appearing in OPPOSITION (Please Print) — Please check box at left to speak

☑	Gerhard Bedding,	8 Green Acres, Keene, NH 03431	NH Pure Water Coalition
☑	Shelley Nellkens,	Antrim 03440 · PO Box 263	
☒	Lloyd G. BASINOW C.A.F.E.	MANCHESTER	
☑	Norman R. Mancuso	Natick MA	
☑		Natick Mass.	
☑	Paul Harrington	Nashua, NH	
☐			
☑	Dr. Norman Mancuso		
☐			
☐			

Voting Sheets

Senate Public Affairs Committee
EXECUTIVE SESSION

Bill# SB312

Hearing date: 3/08/00 Room: Rm 104- LOB
Motion of: OTP

Made by Senator:			*Seconded by Senator:*		
	Trombly	☐		Trombly	☐
	Disnard	☑		Disnard	☐
	Eaton	☐		Eaton	☐
	Krueger	☐		Krueger	☐
	McCarley	☐		McCarley	☐
	Roberge	☐		Roberge	☑

5-0

Committee Member	*Present*	*Vote*	*Reported out by*
Senator Rick Trombly, Chairman	☑		
Senator George Disnard, Vice-Chair	☑		
Senator Thomas Eaton	☑		
Senator Pat Krueger	☐		
Senator Caroline McCarley	☑		
Senator Sheila Roberge	☑		Sen. Roberge

*Amendments:

NOTES:

Committee Report

Date: February 23, 2000 Time: 1:50 pm

The Senate Committee on Public Affairs held its hearing in Room 104 LOB, Concord, New Hampshire.

BILL NO.: SB 312 TITLE: relative to fluoride.

Members of the Committee present:

Senator Trombly
Senator Disnard
Senator Eaton
Senator Krueger
Senator McCarley
Senator Roberge

Those appearing in favor:

Name and Address	Representing
See Attached.	

Those appearing in opposition:

Name and Address	Representing
See Attached.	

REPORT OF THE COMMITTEE:

- ☒ Ought to Pass
- ☐ Ought to Pass w/ Amendment
- ☐ Inexpedient to Legislate
- ☐ Rereferred
- ☐ Interim Study
- ☐ Continued Hearing
- ☐ Postponed Hearing

File

STATE OF NEW HAMPSHIRE

SENATE

REPORT OF THE COMMITTEE

Date:

THE COMMITTEE ON Public Affairs

to which was referred Senate Bill SB 312

AN ACT relative to fluoride.

VOTE: 5-0

Having considered the same, report the same without amendment and recommend that the bill: **OUGHT TO PASS.**

Senator Sheila Roberge
For the Committee