Public Health
100 Years of Service * 1913-2013

Municipal Water Fluoridation: Recommendation for Durham City Council

June 2013

Developed by
Durham County Board of Health

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Durham County Board of Health 2013

Member	Statutory Position	Term Expires
F. Vincent Allison, III, DDS	Dentist	January 2014
Stacy Jill Bryant, OD, F.A.A.C.	Optometrist	January 2014
Heidi Carter, MSPH	Public Member in Engineer Position	January 2015
Michael Case	Public Member	January 2016
John T. Daniel, Jr., MD	Physician	January 2016
Stephen Dedrick, RPh., MS	Pharmacist	January 2015
Brenda Howerton	County Commissioner	December 2013
Teme Levbarg, PhD, MSW	Public Member (Vice Chair)	January 2016
James M. Miller, DVM	Veterinarian (Chair)	January 2014
Nancy Short, DrPH, MBA, BSN	Nurse	January 2014
Bergen Watterson, MSCP, BA	Public Member	January 2016

Acknowledgements

This report, Municipal Water Fluoridation: Recommendation for Durham City Council, documents the deliberations of the Durham County Board of Health to arrive at a recommendation on fluoridation of Durham's municipal water supply. The Board of Health appointed a subcommittee that organized and guided the process. The Board of Health received, reviewed, discussed and considered research, literature, presentations, input, assistance and feedback on fluoridation of drinking water. Board of Health meetings also included public comments and presentations from local citizens and professionals in the fields of medicine, dentistry, hydrogeology and water management, including UNC School of Pediatric Dentistry; NCDENR Division of Water Quality, Aquifer Protection Section; Department of Water Management, City of Durham; Oral Health Section, NC Division of Public Health; and Office of State Health Director, NC Division of Public Health.

Members of the Board of Health fluoridation subcommittee were James Miller, DVM; Vincent Allison, III, DDS; Nancy Short, DrPH, MBA, BSN; Teme Levbarg, PhD, MSW. Durham County Department of Public Health staff to the subcommittee were Gayle Harris, MPH, Public Health Director; Rebecca Freeman, MPH, RD, LDN, Assistant Public Health Director; Miriam McIntosh, DDS, MPH, Dental Practice Director; James Harris, PhD, Dental Division Director.

Executive Summary

On March 14, 2013, the Durham County Department of Public Health (DCoDPH) hosted a discussion on fluoride and fluoridation of the municipal water in Durham by a panel that consisted of the Assistant Director for the City of Durham Department of Water Management; a Hydrogeologist with the North Carolina Department of Environment and Natural Resources (NCDENR), Division of Water Quality, Aquifer Protection Section; Chief of the Oral Health Section in the Division of Public Health; and Chair of the UNC-CH School of Dentistry Department of Pediatric Dentistry. This panel discussion was coordinated by an ad hoc committee set up by the DCoDPH Board of Health to gather information regarding the pros and cons of fluoridation of drinking water. This information would be utilized by the Durham County Board of Health in formulating a recommendation to be considered by the Durham City Council at their request. The Durham City Council is seeking to address complaints made by a citizen of Durham that fluoride is harmful to our health and therefore fluoridation of drinking water should be discontinued.

Members of the panel and literature reviewing sound scientific research about fluoride , standards for fluoride in drinking water and the importance of fluoridating community water state that community water fluoridation is one of ten great public health achievements of the 20th century and the single most effective public health measure to prevent dental decay.[1,2,3,4,5] Furthermore, research has been reported in the literature for more than 65 years that shows community fluoridation within the proper range is safe for our health and effective in reducing tooth decay. Although fluoride is considered safe, there is the chance of one risk that has been documented in research and that is dental fluorosis, a condition that causes staining and sometimes pitting of the enamel of teeth.[6,7] Dental fluorosis is observed to occur in some children in areas where there is a higher level of naturally occurring fluoride in well water (from the geological composition of soils and bedrock) than the maximum level needed to reduce tooth decay (4 parts per million) during their developing years (younger than 8 years of age). Unusually high levels of fluoride may also result from ingestion of fluoride from a combination of sources.[7] Fluorosis may occur with any combination of natural or community fluoridated water, plus the ingestion of fluoride tablets, and/or the ingestion of large amounts of fluoridated toothpaste that commonly happens when children are not supervised closely to limit the amount of fluoride products they use.[3, 4] Dental fluorosis ranges in appearance from white spots on the enamel of teeth to pitting and brown stains on the enamel.[3,4] Researchers see this as a cosmetic effect – not an adverse effect on health, such as pain and/or infection.

In addition to fluorosis observed in dental enamel when high levels of fluoride are ingested, opponents to fluoridation of municipal water claim fluoride causes damage to the brain (lowering

the IQ of children), skeletal, endocrine, and immune systems, as well as contributing to bone and liver cancer. [4,5] Opponents also contend that community water fluoridation violates the principle of informed consent or is involuntary medication. The Environmental Protection Agency (EPA) monitors fluoride levels in drinking water (as it does other additives or elements naturally occurring in drinking water) and not the Federal Drug Administration, because fluoride is an element, not a food or drug.[4] Scientific evidence over the past 60 years has shown the allegations made by opponents of community water fluoridation to be misinterpretations that have taken sound scientific findings out of context and/or they are reports of research not supported by valid scientific institutions or review processes.[3,4] The EPA and the National Health and Medical Research Council (NHMRC) reviews confirm that reports of cases showing adverse effects of drinking water containing fluoride, like the Harvard study,[8] occur in areas where there are very high levels of fluoride in the drinking water. [5,6] Both reviews report that the research the opposition states to support their claims were often conducted in areas such as China, the African Rift system (from Jordan in northern Africa to Kenya and Tanzania in east Africa), some tracts of the Middle East, and the Indian sub-continent where inhabitants were exposed to extremely high levels of naturally occurring fluoride.[5] In many of these areas, 8 mg/L of fluoride were detected and as much as 2800 mg/L has been found at Lake Nakuru in Kenya.

In a report by the World Health Organization on naturally occurring hazards,[9] natural elements found in water are reviewed and include, in addition to fluoride, calcium, magnesium, copper, aluminum, sodium salts, uranium, radon, and arsenic. The report states that water gathers these elements from the rocks and ground through which it permeates. Furthermore, the reports states that at high levels, all of these elements pose a potential health hazard. Water treatment by water management companies can reduce the levels to beneficial or levels that do not pose a health hazard. Material Safety Data Sheets for supplements including fluoride added to foods, show all of them can pose health hazards at doses higher than those recommended.

All ground and surface water in the United States contains some naturally occurring fluoride. There are areas in the United States where the ground water contains higher than optimal levels of naturally occurring fluoride. Under the Safe Drinking Water Act, the EPA has established drinking water standards for a number of substances, including fluoride, in order to protect the public's health. [6,10] In cases where the naturally occurring level of fluoride in drinking water exceeds that level, the water supplier is required to lower the level to the appropriate range. (Common methods to remove fluoride are distillation or reverse osmosis). [4] Fluoride is added only to water that has naturally occurring levels lower than what is considered the optimum amount. Nearly all supplies that are put into drinking water (more than 40 items are typically used) must undergo various water treatment processes to be safe and suitable for human consumption .[6,7,9] Under the Safe Drinking Water Act (SDWA) the EPA must periodically review the existing National Primary Water Regulations at least every 6 years, which is a routine part of the EPA's operations dictated by SDWA to keep the regulations in line with current

changes in fluoride exposure (products used by citizens that contain fluoride such as toothpaste, mouth rinses, food, and beverages).

In 2003, fluoride was one of the chemicals reviewed by the EPA. [11] The EPA determined that a revision of fluoride usage levels was not appropriate at that time. In view of the additional exposure Americans now have to orally ingested fluoride by consuming products containing fluoride such as foods, toothpaste, mouth rinses, etc., the National Research Council's Subcommittee on Fluoride in Drinking Water conducted a review in 2010. The US Department of Health and Human Services (US-DHHS) recommended in 2011, on the basis of this assessment, that the optimal dose of fluoride added to water for the prevention of tooth decay be 0.7 mg/L.[6] This recommendation was made to promote public health benefits of fluoride for preventing tooth decay while minimizing the chance for dental fluorosis. Durham City Department of Water Management currently maintains the dosage of fluoride at 0.7 mg/L (0.7 parts/million) with daily testing. In addition, information about the water treatment process in Durham is made available to the citizens in Durham on their website and annually by mail (panelist).

The American Dental Association, the US Department of Health and Human Services-Center for Disease Control and Prevention (CDC), the US Public Health Service, the American Medical Association, the World Health Organization, the Institute of Medicine-Food and Nutrition Board, the National Research Council, the American Academy of Pediatrics, as well as several other nationally recognized organizations, support community water fluoridation. Community water fluoridation has been found to be the most effective public health measure to prevent dental decay for children and adults, reduce oral health disparities and improve oral health. In addition, it is the most cost effective measure to reduce tooth decay; the cost of community water fluoridation is $1 for every $38 spent on dental treatment.[12] Fluoridating water is similar to fortifying salt with iodine, milk with vitamin D, orange juice with calcium and bread with folic acid to improve health outcomes of all citizens in the community.

Via a letter to the April 2013 National Oral Health Conference, US Surgeon General Dr. Regina Benjamin stated, "One of water fluoridation's biggest advantages is that it benefits all residents of a community…". "Fluoridation's effectiveness in preventing tooth decay is not limited to children, but extends throughout life, resulting in fewer and less severe cavities." [13] In her letter, she also referenced comments by Surgeon General Dr. David Satcher in his *Oral Health in America: A Report of the Surgeon General* (2000) where Dr. Satcher stated "community water fluoridation continues to be the most cost-effective and practical way to provide protection from tooth decay in a community." Other former Surgeon Generals have supported community fluoridation as well.[4] Former Surgeon General Dr. Luther Terry is reported to have called fluoridation as vital a public health measure as immunization against disease, pasteurization of milk and purification of water. Former Surgeon General Dr. C. Everett Koop stated, "Fluoridation is the single most important commitment that a community can make to the oral health of citizens." Additionally, in the *2003 National Call to Action to Promote Oral Health*,

then US Surgeon General Carmona called on policymakers, community leaders, private industry, health professionals, the media, and the public to affirm that oral health is essential to general health and well-being.

In a letter to the DCoDPH Board of Health, Dr. Laura Gerald, North Carolina's State Health Director, stated, "for more than 65 years the safety of community water fluoridation has been studied and confirmed as being safe and the most cost effective preventative measure that can be taken to reduce tooth decay in people of all ages." She stated further, "North Carolina has supported the fluoridation of drinking water for over 65 years. Charlotte fluoridated its water supply in 1949 and at that time, was the largest water system in the world to adjust its fluoride level to the recommended optimal level." Dr. Gerald is a pediatrician with a Masters in Public Health from Harvard University and has learned first-hand about the number of children who suffer with tooth decay during the time she worked in a rural low-income county.

Fluoridated community water is considered by its supporters to be the most effective strategy because all residents in the community benefit from it, and the benefit is not dependent upon human behavior (individual frequency of use).[14] Also fluoridated water benefits low socioeconomic populations, where health disparities exist, since people in those populations cannot afford oral hygiene products to benefit from the fluoride in them nor do they have access (or have less access) to dental services. Communities benefit from fluoridated drinking water in that less money is spent on dental services in public health facilities which are funded by the general public. Currently, public health dental services are stretched beyond their limits, due to the lack of resources needed to provide dental services to all individuals with dental problems that stem from tooth decay.

In addition to fluoride being reported to be non-toxic at low levels, it has also been reported to have a beneficial effect in reducing the amount of tooth decay.[15,6] Several reports on literature reviews and monitoring by the EPA show that 4 mg/L of fluoride is the maximum level that should be added to drinking water to greatly reduce the amount of tooth decay in a community without adverse effects on the health of individuals consuming the water, and that 0.7 to 1.2 mg/L is the minimum. The US-DHHS is recommending 0.7 mg/L as the optimum dose needed to prevent tooth decay and have the least adverse effect, if any, on health.[6]

Just as vitamin intake is recommended daily to maintain an optimum level of various vitamins continuously in our bodies, so must exposure to the optimum level of fluoride occur to prevent tooth decay and maintain good oral health. Sporadic/occasional intake is not effective. Forgetting or not having time to brush, toddlers who refuse to have their teeth brushed, and children who do not like to brush their teeth (just like they don't care to bathe) cross all socioeconomic levels in communities. Fluoridating community water is the most effective way to assure all citizens are exposed to the recommended or optimum level of fluoride to reduce the occurrence of tooth decay, yet will have no adverse effect on the health of individuals and greatly reduce the cost of dental services needed to individuals as well as the healthcare system.

RECOMMENDATION FROM THE AD HOC COMMITTEE

The Board of Health fluoridation subcommittee met on May 24, 2013 to consider all information, research, presentations, and public comments gathered on fluoridation of municipal water supplies. Based on research evidence and literature review as well as testimony from reputable panelists contained on this report, and considering public comments, the DCoDPH Ad Hoc Committee recommends to the Durham County Board of Health that fluoridation of Durham's municipal water supply be continued at the current levels, as deemed effective for prevention of tooth decay and for promotion of good oral health by the US-DHHS, Centers for Disease Control and Prevention.

RECOMMENDATION FROM THE DURHAM COUNTY BOARD OF HEALTH

A regular session of the Durham County Board of Health was held on June 13, 2013. During the Committee Reports section of the agenda, Dr. F. Vincent Allison III read the above recommendation from the committee. The Board of Health voted unanimously to approve the committee's recommendation.

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[1] http://www.fluoridescience.org
[2] http://www.cdc.gov/fluoridation
[3] http://www.apha.org/advocacy/policy/policysearch
[4] http://www.ada.org/sections/news/andevents/pdfs/fluoridation_facts
[5] http://www.nhmrc.gov.au/_files_nhmrc/publications
[6] http://yosemite.epa.gov/opa/admpress
[7] National Research Council of the National Academies, A Scientific Review of EPA's Standards: Fluoride in Drinking Water. 2006. The Academic Press, Washington. DC.
[8] Choi AL, Sun G, Zhang Y, and Grandjean 2012. Developmental Fluoride Neurotoxicity: A Systematic Review and Meta Analysis. Environmental Health Perspectives 120(10):1362-1368.
[9] http://www.who.int/water_sanitation_health/naturalhazards/
[10] http://water.epa.gov/drink/standards/hascience
[11] http://water.epa.gov/drink/contaminants/basicinformation/fluoride.
[12] Griffin, SO., Jones, K., Tomar, S.L., 2001. An Economic Evaluation of Community Water Fluoridation. J Public Health Dent, 61 (2):78-86.
[13] http://www.ada.org/news
[14] ADA Fluoridation Facts Compendium. Available at ADA.org
[15] http://water.epa.gov/action/advisories/drinking/upload/dwstandards2012

Background

On October 1, 2011, Corey Sturmer submitted a request to appear before the City Council during a Council Work Session on December 21, [2011] indicating the subject would be "Water Supply and Fluoride." His message was stated as "I wish to present evidence that sodium fluoride, a chemical regularly added to our water supply, causes neurological damage, cancer, poor bone health, and possible death among other ailments. I [want] to convince the city council to take action to eliminate the addition of this additive to our water."

On February 28, 2012, Corey Sturmer submitted a request to appear before the City Council on March 8, 2012, to talk about fluoride. His documented summary of his presentation stated "I wish to restate my concern for the addition of Fluoride to Durham's drinking water. I have produced conclusive proof of [its] detrimental nature to our bone density, IQ and dental health and would like to ask the city council to take immediate action to remove this additive to our water."

On March 15, 2012, Mr. Sturmer submitted a request to appear before the City Council during a regular meeting session to provide comments regarding the addition of fluoride to Durham's drinking water.

On July 12, 2012, Mr. Sturmer sent an e-mail to Vicki Westbrook and copied Don Greeley, Assistant Director and Director of Water Management Department, City of Durham. The subject of the message was "Durham Guinea Pig Reports; Duke University study links fluoridation with dental damage." He commented in the e-mail message "...Ironically, the city of Durham's own Duke University in conjunction with Professor Brian A Burt conducted a study when this writer was living in Durham at the age of 4-5 years. The study involved the city turning off public water fluoridation for a period of 11 months during 1990-1991, whilst observing the incisor changes in over 1800 K-5 aged children in Durham, NC." (See Attachment 23, 24)

On July 25, 2012, Mr. Sturmer e-mailed Councilman Steve Schewel and copied the Mayor and other Council members to share news article titled "Harvard Study Finds Fluoride Lowers IQ" published online July 20, 2012 in Environmental Health Perspectives.

On August 15, 2012, Mr. Sturmer sent an e-mail to Mayor Bell and copied to all members of the City Council and "Water Management Employees"– Don Greeley and Vicki Westbrook with a subject of "NOTIFICATION: WTVD Channel 11 interested in public water fluoridation dangers." (See Attachment 2) The body of the message began with the following wording and format:

"Durham City Council Members & City Water Department Employees,

You are being put on *notice* that the unhealthy and unethical practice of fluoridating our public drinking water now has the attention of local media. Public awareness of this has shifted greatly since the July 24 Harvard Study was released which showed Fluoride reduces intelligence quotient for children and adults.

Steve Daniels of WTVD Channel 11 Eyewitness news is now in detailed talks with myself, educators, parents, and dentists who are staunchly AGAINST the practice of fluoridating our public drinking water."

This e-mail message also contains several e-mail exchanges between Mr. Sturmer and Steve Daniels, Evening News Anchor ABC11 News Department from July 13, 2012 and August 15, 2012.

On August 17' 2012, Mayor Bell responded to Mr. Sturmer's message will the following reply: "Thanks for your email and sharing your information and concerns with me/the city council/etc. I am requesting my staff to refer your email to Ms. Gayle Harris (Durham County Health Director) and the Chair of the Board of Health." That same day, the e-mail was sent to Gayle Harris by Evelyn Wright-Corbett, Administrative Coordinator Mayor's Office. A follow-up telephone call with Ms. Wright-Corbett clarified that the Mayor would like for the Board of Health to make a recommendation to him and the City Council regarding fluoride in Durham's municipal water supply.

Mr. Sturmer contacted Ms. Harris to schedule a meeting to discuss his concerns. He met with the Ms. Harris and Ms. Sue McLaurin, Board of Health Chair on August 23, 2012. During that meeting, he was advised that he could provide public comments to the Board of Health at the September 13, 2012 meeting. After hearing from him, the Board of Health would determine a process for addressing his concerns.

On September 13, 2012, Mr. Sturmer, Charlee Eades, Kelly McMullen, Scott Boggs and Rachel Godfrey signed up to speak during the Public Comment period of the Board of Health meeting. Each speaker provided written information that included their comments and/or additional materials for the Board of Health to consider. [See Attachments 4a-4e(v)]

Evaluation of Public Comments, Concerns, and Opposition

ASSERTION 1: FLUORIDE HAS DAMAGING AFFECTS ON OUR PHYSIOLOGY

Public comments made asserted that studies exist which indicate fluoride damages the brain, causes gastrointestinal disorders, and cancer. Comments were made that fluoride in the water may not benefit teeth, and that it causes dental fluorosis – a visible sign of damage to the internal structure of the tooth.

EVALUATION

Dr. Rebecca King, North Carolina State Public Health Dental Director, Chief of the Oral Health Section provided her professional opinion that, "more than 3,000 studies or research papers have been published on the subject of fluoridation," meaning few topics have been as thoroughly researched as fluoride. CDC (Centers for Disease Control and Prevention) states that: 'the weight of the peer-reviewed scientific evidence does not support an association between water fluoridation and any adverse health effect or systemic disorder.' Leading health and medical organizations agree that there is "strong evidence that water fluoridation is both safe and effective."

Dr. Timothy Wright, Professor and Chair at UNC-CH Department of Pediatric Dentistry stated that "If you go back in fluoride history, when it was discovered 100 years ago, it has been looked at as a great health benefactor. So what does the data suggest? It has accused fluoride and its derivatives, compounds of everything from down-syndrome to retardation, to osteosarcoma. So what are the facts?"

"Osteosarcoma was a condition where they looked at different communities with different water levels (of fluoride). It is one of the only preventive health measures tested at the community level. The initial trials in Grand Rapids Michigan, in 1945, involved a comparison of one community that was fluoridated and one that was not. This has been going on for over 65 years of water fluoridation in the United States. Concerns about osteosarcoma were big. There was a rat study, in RTP, that leaked some of the early information, before they had completed the trial data, that said there was evidence of high levels of osteosarcoma. They went back and analyzed all the data and it didn't pan out. The most recent scare of that was in Dr. Douglas's data from Harvard, where he was accused of hiding data. It appeared males were having a higher level of osteosarcoma, based on the epidemiological studies of humans. They went back and analyzed the data fully with other groups and it didn't pan out. Osteosarcoma is extremely rare, and it

had an effect you would expect to see a massive population base with these kinds of fluoride effects."

Concerning fluorosis, Dr. Wright explained, "Dental fluorosis occurs at the time of tooth development. So, we are looking at the young ages as being the most sensitive, especially for the anterior teeth, up to 8-9 years old. For the front teeth, it would be 1-3 years old. So, dental fluorosis can occur if you get too much, like from eating toothpaste, in our society, or on a well with too much, or inappropriately prescribed. So whatever the exposure was during that window (1-3 years old), depending on the dosage, the higher the dosage the worst the defect is. Basically the enamel is mineralizing as well as it should. Fluoride has a variety of activities on cells and cell systems and physiology at those higher levels…People with minimal fluorosis have lower levels of caries."

Dr. King stated "So it's like anything you want the proper levels, as far as discussion of fluorosis, there are some studies that say that changes in the fluoridation levels probably wouldn't do much for fluorosis anyhow. As Dr. Wright mentioned, fluorosis comes from inappropriate use of toothpaste, little kids not being supervised and eating too much or kids getting a fluoride supplement when they are already on a community water system. So they are getting double the dosage of fluoride. We would expect there to be problems. It really is not so much related to the .7 part per million that is in water." "I have had kids come see me and their teeth were dirty and we are talking about brushing their teeth and they would say 'I couldn't brush my teeth, because my brother ate the whole tub."

The Centers for Disease and Prevention August 17, 2001, report, *Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States*, states "Even in its severe form, enamel fluorosis is considered a cosmetic effect, not an adverse functional effect."

CONCLUSION

Based on extensive research that has been conducted on the impact of fluoride, there is strong evidence that water fluoridation is both safe and effective and does not cause brain damage, gastrointestinal disorders, and cancer. Dental fluorosis occurs during tooth development. Young children up to 8 to 9 years old are most susceptible to fluorosis, which is related more to inappropriate use of toothpaste (children not being supervised with toothpaste use) or getting a fluoride supplement when they are already on a fluoridated water supply. Severe enamel fluorosis is considered a cosmetic effect, not an adverse functional effect.

Evaluation of Public Comments, Concerns, and Opposition

ASSERTION 2: FLUORIDE IS A DANGEROUS CHEMICAL

During public comments, it was stated that the fluoride chemical used in Durham's municipal water supply is a HAZMAT Class 8 Corrosive Substance (which means it will burn a hole through all layers of your skin and beyond). It was also asserted that fluoride does not magically disappear at small doses in our water: it interferes with basic chemical processes in our cells and causes disease in our organ systems.

EVALUATION

Amy Keyworth, Hydrogeologist, North Carolina Department of Environment and Natural Resources, Division of Water Quality, Aquifer Protection Section, explained that, "Fluoride is a naturally occurring ion of the element fluorine. It combines with many cations to form a variety of naturally occurring minerals such as calcium fluoride, sodium fluoride, aluminum fluoride, etc. Fluoride is found in groundwater in varying concentrations, depending on the local geology. Fluoride-bearing minerals are found in both igneous and sedimentary rocks."

"In Durham County, there are two primary geologic types – the Carolina Terrane to the north and west, and the Triassic Basin to the south and east. The Carolina Terrane is made up of rocks resulting from ancient, extinct volcanic activity. The Triassic Basin rocks are sedimentary rocks formed from the weathering and erosion of Carolina Terrane rocks. Both Carolina Terrane and Triassic Basin rocks contain some fluoride-bearing minerals."

Dr. Wright said that, "Fluoride is the 13th most common element in the earth's crust. It is a chemical, we are all chemicals."

"Why is it a fertilizer? The phosphate, when they dig for fertilizer to add the phosphate. When they mine the phosphate, one of the by-products of that is different fluoride rich, because it is the earth's crust. They are digging it up and getting the phosphates, so it is a by-product of that industry. It is only one of the things that is used in municipalities. When they say they are measuring fluoride ion, that is true, because when you put it into the water it dissolves. So you have the elements; the components of that. You will have sodium, silicate, and fluoride; and the fluoride is an ion. So you don't have fluorosilicic acid, but some actually use liquid feeders that are hydrofluoric acid… So yes, that is a true statement. It is a by-product of that."

"We have lots of by-products, such as penicillin. It's mold on bread, but how many lives have been saved by that. So you have to tease out what is the reality versus the emotional. It is very emotional to say it is a by-product and it sounds like a chemical name with acid in it and sounds terrible, but it disassociates the fluoride ion so what they are measuring is the disassociated ion. It is true that it is toxic, like most things if you have too much of it. It causes not only tooth problems, but systemic problems and if you take enough of it, it will kill you. Those are the truths as I see it, but at 0.7 parts per million, again these were studies done on humans from municipalities, with thousands of people drinking at these different levels. As you got close to part per million, you got the best bang for your buck with no deleterious effects of any kind, systemic or anything else."

CONCLUSION

Effects of fluoride are related to the dosage consumed; if too much is ingested, it can be toxic. However, in maintaining the 0.7 parts per million standard in the water supply as currently practiced in Durham, fluoride provides a good benefit without harmful effects.

Evaluation of Public Comments, Concerns, and Opposition

ASSERTION 3: RESEARCHERS AT HARVARD AND DUKE HAVE HIGHLIGHTED NEGATIVE IMPACT OF FLUORIDE IN WATER

During public comments, it was asserted that Harvard released a study in 2012 with the quote, "Children in high fluoride areas had significantly lower IQ scores than those who lived in low fluoride areas. The results suggest that fluoride may be a developmental neurotoxicant that affects brain development at exposures much below those that can cause toxicity in adults."

It was also noted that Duke conducted a study in the early 1990s related to the cessation of fluoridation in Durham's municipal water source between September 1990 and August 1991. It was concluded that, "while the break had little effect on caries, dental fluorosis is sensitive to even small changes in fluoride exposure from drinking water, and this sensitivity is greater at 1-3 years of age than at 4 or 5 years."

EVALUATION

Dr. Timothy Wright stated that, "recent IQ data (from the Harvard Study) shows that they sampled communities in China and two communities in Iran. What they are comparing is called high fluoride levels, which are anywhere from 4-to-20 times above .7 mg/L levels that the United States would consider to be optimally fluoridated. In most of those communities—not all of them, but most of them—there is not a problem of lower IQ scores. So, the data overwhelmingly shows, in thousands of studies, that at the right level, fluoride is beneficial and safe."

Dr. Wright continued, "Groups arguing against water fluoridation site information regarding the risks of fluoride, such as recent publications on children exposed to fluoride having lower IQ levels. In all of these study populations, the children studied were exposed to many times greater the optimal level of fluoride (sometimes as much as 20 times) and the normal comparison group was typically children with fluoride exposure levels similar to or even greater than those drinking Durham Country water. Providing water fluoridation in fluoride deficient communities has been present in the United States for over 60 years. It has been evaluated for safety on millions of people, and there remain no validated and scientifically supported harmful effects."

In addition to Dr. Wrights comments on fluorosis (refer to assertion 1), Dr. King added that, "there are some studies that say that changes in the fluoridation levels probably wouldn't do much for fluorosis anyhow. Fluorosis can come from inappropriate use of toothpaste, little kids

not being supervised and eating too much or kids getting a fluoride supplement when they are already on a community water system. So, they are getting double the dosage of fluoride. We would expect there to be problems. It really is not so much related to the .7 part per million that is in water."

Jean Spratt, DDS, Oral Health Section, NC Division of Public Health commented in an email to Health Director Gayle Harris (Attachment 2) that the Harvard study (Attachment 2) is "not relevant to community water fluoridation as practiced in the U.S., which provides very small, carefully controlled adjustments to the amount of fluoride in the water." Furthermore, the study "Dealt with areas in China and Iran, with very high levels of naturally occurring fluoride (much higher than used in community water fluoridation in the U.S.). Most anything in excess can harm someone's health." Additionally, the Harvard study, "Did not consider presence of other risks in the water, such as lead, arsenic. Community water fluoridation has been studied extensively for over 60 years and determined to be safe and effective."

Regarding the cessation of water fluoridation in Durham between September 1990 and August 1991, Martha Ann Keels, PhD, DDS, Duke faculty, in an email to Health Director Gayle Harris, stated that "Durham had a 'Break' in the container that help fluoride at one of the plants (Williams I think) and the policy at the time was to turn OFF fluoride at the Brown Plant until the Williams Plant container could be fixed—which took almost a year." Dr. Keels and Dr. Brian Burt were funded by NIH to study the effects of turning off fluoride in the water for almost a year. (Attachment 23) When asked if her findings suggest that fluoride should be removed from drinking water, Dr. Keels replied "No".

CONCLUSION

The study by Harvard was conducted in communities in China and Iran where fluoride levels were 4 – 20 times higher than the .7 parts per million in Durham's municipal water supply. In addition, it is noted that not all subjects experienced lower IQ scores. The research serves to confirm that taken at the right levels, fluoride provides a good benefit.

As for the second part of this assertion focusing on dental fluorosis after an 11-month cessation of water fluoridation, one of the authors of the study, Dr. Keels, noted that there seemed to be a "'HALO EFFECT OF FLUORIDE' in the diet protecting the teeth despite the fact the city water was not fluoridated." Furthermore, Dr. Keels recommends that water fluoridation should continue.

Dr. King noted that "changes in the fluoridation levels probably wouldn't do much for fluorosis anyhow." The panelists noted that fluorosis may result from inappropriate use of toothpaste,

children not being supervised and eating too much, or youth ingesting a fluoride supplement when they are already on a community water system. Dr. Wright also stated that, "Dental fluorosis occurs at the time of tooth development." Therefore, it appears that the .07 parts per million in Durham's water would not contribute to dental fluorosis, regardless of age.

Evaluation of Public Comments, Concerns, and Opposition

ASSERTION 4: SCIENTIFIC STUDIES SHOW FLUORIDE IN WATER POSES RISK OF SERIOUS HARM

In addition to assertions made on the physiological impacts of fluoride, public comments made note of the EPA's Headquarters Professionals' Union opposes water fluoridation based on scientific literature documenting the increasingly out-of-control exposure to fluoride, the lack of benefit to dental health from ingestion of fluoride, and the hazards to human health.

Comments also suggested the Centers for Disease Control and Prevention (CDC) National Health and Nutrition Examination Survey shows that in 25 of the 28 largest cities in the US, fluoride levels in tap water alone will put 8 – 36 percent of all babies up to 6 months of age over the safe dose of fluoride on any given day.

EVALUATION

Per the Safe Drinking Water Act (1974), the EPA is required to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur. These non-enforceable health goals, based solely on possible health risks and exposure over a lifetime with an adequate margin of safety, are called maximum contaminant level goals (MCLG). Contaminants are any physical, chemical, biological or radiological substances or matter in water. Referring to the January 7, 2011, EPA *News Releases – Water,* "HHS' proposed recommendation of 0.7 milligrams of fluoride per liter of water replaces the current recommended range of 0.7 to 1.2 milligrams. This updated recommendation is based on recent EPA and HHS scientific assessments to balance the benefits of preventing tooth decay while limiting any unwanted health effects." (Attachment 22)

Regarding the CDC, William Bailey, D.D.S., M.P.H., Acting Director, Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion: Centers for Disease Control and Prevention, provided a letter to the Durham County Department of Public Health on March 14, 2013, stating, "community water fluoridation has been shown to be effective in reducing the number and severity of cavities and is a major reason that Americans today have better overall dental health. Currently, more than 200 million people, or 73.9 percent of the U.S. population served by public water supplies, drink water with optimal fluoride levels to prevent tooth decay.

Water fluoridation is beneficial for reducing and controlling tooth decay and promoting oral health in children as well as adults. A review of the effectiveness of community water fluoridation conducted by the Task Force on Community Preventive Services found that when tooth decay rates were measured before and after water fluoridation, decay rates decreased by a median 29.1% among children ages 4 to 17 compared with control groups. Fluoridation was found to help decrease tooth decay both in communities with varying decay rates and among children of varying socioeconomic status."

CONCLUSION

The EPA Headquarters Professionals' Union article is twelve years old and is not an endorsement of the Environmental Protection Agency itself. The recommendation of 0.7 mg/L of fluoride in water is based on EPA and HHS scientific assessments. Additionally, the Centers for Disease Control and Prevention (CDC) named community water fluoridation one of 10 great public health achievements of the 20th century.

Evaluation of Public Comments, Concerns, and Opposition

ASSERTION 5: WATER FLUORIDATION VIOLATES THE PRINCIPLE OF INFORMED CONSENT

Public comments made asserted that by adding fluoride to the public water supply Durham is denying all individuals the right to review the relevant scientific studies, consider their own physiological factors, and make informed decisions to accept or reject treatment of fluoridation. It was also stated that Durham is requiring citizens to spend approximately $173,000 to purchase a product (hydrofluorosilicic acid) from a private industry.

EVALUATION

Dr. King stated that, "Fluoride is not a medication. It is in there to prevent tooth decay. It's like vitamins. It is a preventive measure not a medicine".

Dr. Wright added that, "Fluoride is not only the 13th most common element in the crust, it is the most active element in the periodic table. It doesn't hang out, it bonds up with stuff, it's made in the earth's crust. It is the most reactive element in the earth's crust. Fluoride is not a drug. If you look up the definition of a drug or medication, it (fluoride) is not; it is an ion; it is an element. You are not medicating people when you chlorinate the water...This is another prevention measure that is accepted."

Gayle Harris, Health Director: Durham County Department of Public Health explained that, "The request for the Department to look into the issue of water fluoridation "came from Mayor Bell after he had several appearances from residents before the City Council about water fluoridation. In August, Mayor Bell asked that you (the Board) make a recommendation to the City Council about this issue.

Vicki Westbrook, Assistant Director, City of Durham, Department of Water Management, stated that "The total budget for 2012 for chemicals at the water treatment facilities was $2.3 million; fluoride purchases (in the form of hydrofluorosilicic acid) comprise about 3% of the chemical budget or just under $70,000."

CONCLUSION

Durham has not denied individuals the right to review the relevant scientific studies, consider their own physiological factors, and make informed decisions to accept or reject treatment of fluoridation. Board of Health meetings are open to the public and each meeting offers a "Public Comments" opportunity. The Board of Health was asked to make a recommendation on the fluoridation of Durham's municipal water supply, not the cost.

Attachments

Attachment 1

Email Received from Mayor Bell's Office in Format Received

From: Wright-Corbett, Evelyn [mailto:Evelyn.Wright-Corbett@durhamnc.gov]
Sent: Friday, August 17, 2012 11:56 AM
To: Harris, Gayle
Subject: FW: NOTIFICATION: WTVD Channel 11 interested in public water fluoridation dangers

I am forwarding this e-mail for your perusal as requested by Mayor Bell. If you have any questions, please feel free to contact me.

Evelyn Wright-Corbett
Administrative Coordinator
Mayor's Office
(919) 560-4333

From: Corey Sturmer [mailto:csturmer@gmail.com]
Sent: Friday, August 17, 2012 11:15 AM
To: Bell, William
Cc: Schewel, Steve; Cole-McFadden, Cora; Catotti, Diane; Clement, Howard; Woodard, Mike; Westbrook, Vicki; Greeley, Don; Wright-Corbett, Evelyn; Johnson, Hattie
Subject: Re: NOTIFICATION: WTVD Channel 11 interested in public water fluoridation dangers

Thank you Bill for reaching out.

I would be happy to meet with Gayle Harris and anyone else who is interested.

Please also share my personal cell phone number with Gayle - 919 880 7883

Kindly so,

Corey

On Fri, Aug 17, 2012 at 11:07 AM, Bell, William <Bill.Bell@durhamnc.gov> wrote:

Thanks for your email and sharing your information and concerns with me/the city council/etc. I am requesting my staff to refer your email to Ms. Gayle Harris (Durham County Health Director) and the Chair of the Board of Health.

Thanks again for your email.
Bill

Friday 8/17/2012 @ 11:06am
Sent from my iPad

On Aug 15, 2012, at 9:56 AM, "Corey Sturmer" <csturmer@gmail.com> wrote:

Durham City Council Members & City Water Department Employees,

You are being put on *notice* that the unhealthy and unethical practice of fluoridating our public drinking water now has the attention of local media. Public awareness of this has shifted greatly since the July 24 Harvard Study was released which showed Fluoride reduces intelligence quotient for children and adults.

Steve Daniels of WTVD Channel 11 Eyewitness news is now in detailed talks with myself, educators, parents, and dentists who are staunchly AGAINST the practice of fluoridating our public drinking water.

Currently there are debates being planned in Arizona and other states which will possibly be televised. This issue has State and NATIONAL implications and may be an important issue for your political career in the future. I hope you will take this opportunity to be a positive member of our community and take the initiative to change this policy, before the city has an egg on their face from perpetuating a dangerous practice.

---------- Forwarded message ----------
From: **Corey Sturmer** <csturmer@gmail.com>
Date: Wed, Aug 15, 2012 at 9:42 AM
Subject: URGENT UPDATE! - Fluoridation of the Triangle's public drinking water
To: "Daniels, Steve" <Steve.Daniels@abc.com>

Hi Steve,

Not sure if your producer Lori told you but I stopped by the EyeWitness news station here in Raleigh last week to see if you were there. She told me you were in Durham, but would notify you that I dropped in to talk about the Fluoride story.

Just wanted to update you -

- **A Harvard study was released July 24 showing Fluoride reduces children's IQ. Click here to see**
- I met with Michael Somers, current Principal at Parkwood Elementary school (the school I went to as a kid when this study was conducted by Duke University) - he said he is interested in getting the school involved if Steve Daniels and WTVD channel 11 does a story.

- I also spoke with Dr. Michael Fleming, the practicing Durham dentist who is adamantly against Fluoridation of the public water supply - he said he would be willing to do an interview.
- There is going to be a public debate in Arizona concerning the fluoridation of the public water supply - this MIGHT be televised! - This story has State and NATIONAL implications!

Please feel free to call me to discuss more detail - 919 880 7883

Kindly,

Corey

On Mon, Jul 30, 2012 at 9:22 PM, Daniels, Steve <Steve.Daniels@abc.com> wrote:

Hi Corey –
Thanks for checking in.

My team and I will be sitting down soon to discuss our big investigative projects for the fall. I think this is all very interesting and would be good to revisit.

We will be in touch.

-Steve

Steve Daniels | Evening News Anchor
ABC11 News Department
919.687.2338 | steve.daniels@abc.com
WTVD-An ABC Owned Station | abc11.com

<image001.png>

From: Corey Sturmer [mailto:csturmer@gmail.com]
Sent: Friday, July 27, 2012 11:25 AM
To: Daniels, Steve

Subject: Re: Fluoridation of the Triangle's public drinking water

Hi Steve,

It's been a little more than a week since I spoke with your intern Jessica.

I was wondering what your plans are (if any) for this fluoride story? I have a brief update with some developments:

Harvard Study published in the Federal Government Journal reveals Fluoride lowers IQ.

Dr. Michael Fleming, who you met before has agreed to do an interview with me on the subject of public water fluoridation

Kelly Smoke is running for Durham County soil and water conservation supervisor. She has officially thrown her support behind this movement and made it one of the planks of her bid for the seat.

Kindly,

Corey

On Mon, Jul 16, 2012 at 11:40 PM, Daniels, Steve <Steve.Daniels@abc.com> wrote:
Hi Corey –

Thanks for getting in touch.

I am looking forward to reading your website.

This is a very busy week for me.

I will try to take a look and may have a researcher follow-up with you.

Thanks.
-Steve

Steve Daniels | Evening News Anchor
ABC11 News Department
919.687.2338 | steve.daniels@abc.com
WTVD-An ABC Owned Station abc11.com

<image001.png>

From: Corey Sturmer [mailto:csturmer@gmail.com]
Sent: Monday, July 16, 2012 2:43 PM
To: steve.daniels@abc11mail.com
Subject: Re: Fluoridation of the Triangle's public drinking water

Hi Steve,
I wanted to follow up on this. Do you have some time to chat this week?
best,

Corey

On Fri, Jul 13, 2012 at 10:11 AM, Corey Sturmer <csturmer@gmail.com> wrote:

Steve,

I am mailing you because I found your 2007 article with Dr. Michael Fleming on the fluoridation of our public drinking water.

I am intimately involved with this struggle, and was wondering if you would like to know more. I have contacted Dr. Fleming and am in touch with people all around the world (and locally) who are helping to make this happen. Being a journalist - your assistance would be greatly appreciated.

Please find my website below, which should tell you everything else you need to know about me and where I'd like to take this!

http://www.durhamagainstfluoride.com

I look forward to hearing from you,

Corey Sturmer

919 880 7883

Freeman, Rebecca S.

From: Freeman, Rebecca S.
Sent: Thursday, June 13, 2013 9:38 AM
To: Freeman, Rebecca S.
Subject: FW: Dr. Spratt's Email
Attachments: Aug 2012 Responses to Harvard study and IQ cjs.docx; Harvard High FluorideandLow IQAugust 2012.pdf

From: Spratt, Jean [mailto:jean.spratt@dhhs.nc.gov]
Sent: Wednesday, August 15, 2012 2:18 PM
To: Harris, Gayle; McIntosh, Miriam
Cc: Harris, James R.; Freeman, Rebecca S.; Westbrook, Vicki (Vicki.Westbrook@durhamnc.gov); DHHS.Dental.SMT
Subject: FW: NOTIFICATION: WTVD Channel 11 interested in public water fluoridation dangers

Hello Gayle and Miriam,

Remember the young man, Corey Sturmer, who spoke about community water fluoridation to the City Council in March 2012? I'm forwarding an email we got from Vickie Westbrook at the Durham water plant, asking for our help with Mr. Sturmer, who has seen a recently published article and has brought in Channel 11. As I shared with you both back in March, the Oral Health Section is happy to help, but a local response will be better received and more successful. We've done some brainstorming here, and here is what we have come up with so far to help you get the ball rolling.

The article in question, attached, reports on studies claiming that community water fluoridation reduces IQ. There are flaws in the studies evaluated in this article, which the authors themselves acknowledge. I am also attaching our preliminary talking points about the article.

I conference called today with Dr. Kevin Buchholtz on our staff (who spoke at the Durham City Council meeting in March). Because Mr. Sturmer is bringing in TV11, we included Lisa Ward at the NC Dental Society in our call. Lisa does media training for the NCDS and also was involved in fighting anti-fluoridation in Kansas in the past. We came up with the following:

- We are trying to slow this down some, to give us all some time to prepare a response plan.
- This will be best as a local response, with Durham resident/dentist input to Channel 11.
- Lisa knows Dr. Martha Ann Keels and has called and emailed her to ask if she will be the contact given to Channel 11. Martha Ann is out of town until Monday, and Lisa will call her then.
- Lisa will call Steve Daniels and ask that they produce a balanced story. She will say:
    - Martha Ann as local contact, if she agrees.
    - The NCDS is available to make comments.
    - Kevin will be available, to give general information and a state level perspective.
    - Information is available from the ADA.

- The OHS will contact Citizens for Public Health members, such as Howard Fitts and Becky Bowden, for their support.
- Kevin will get back with Vickie Westbrook at the water plant in the next day or so to let her know about this response plan (and she is copied on this email).
- I told the group I would bring you two up to speed on all this.

Next steps???
For now, I suggest that y'all go ahead and get information out to the dental community and let them know they may be contacted to speak to this (by patients as well as the media):

- Dental member of BOH
- Dr. Ted Brooks
- Durham/Orange County Dental Society president, and ask him/her to share with the membership by email
- The UNC School of Dentistry dentists who work at the DCHD dental clinic
- You may want to touch bases with the City Council and Mr. Bell as well, since Mr. Sturmer copied them on his email.

I'll let you know how Lisa's contact with Steve Daniels goes, once that happens, and we'll see how this plays out.

FYI, Steve Daniels did a report on community water fluoridation in 2007, which can be found at http://abclocal.go.com/wtvd/story?section=news&id=5750692

Please call me if you want to talk, 919-707-5491.
Best regards,
Jean

C. Jean Spratt, DDS, MPH
Public Health Regional Dentist Supervisor
North Carolina Oral Health Section
MSC 1910
Raleigh, North Carolina 27699-1910
Phone: 919-707-5491
Fax: 919-870-4805
Jean.Spratt@dhhs.nc.gov
http://www.ncdhhs.gov/dph/oralhealth/

From: Buchholtz, Kevin
Sent: Wednesday, August 15, 2012 11:35 AM
To: Lisa Ward; Spratt, Jean
Cc: DHHS.Dental.SMT
Subject: RE: Martha Ann Keels

SMT and Lisa,
The first attachment contains a couple of bullet points about the recent Harvard Study and comments from Matt Jacob from the Pew Foundation on the study. The second is the Harvard study.
Thanks,
Kevin

Kevin J. Buchholtz, DDS
Public Health Dentist Supervisor
Oral Health Section of the NC Division of Public Health
Department of Health and Human Services
1306 Clarendon Drive, Greensboro, NC 27410
Telephone: (336) 294-4591
Fax: (336) 294-4420
Email: Kevin.Buchholtz@dhhs.nc.gov

From: Lisa Ward [mailto:LWard@ncdental.org]
Sent: Wednesday, August 15, 2012 11:08 AM
To: Spratt, Jean; Buchholtz, Kevin
Subject: Martha Ann Keels

Hi – Dr. Keels is out of town until Monday. I will email her about the issue and give her a heads' up and then will call her Monday. I'll be back in touch with you as soon as I have confirmation from Martha Ann that she will act as a local dentist spokesperson.

Lisa

Lisa Ward
Director of Communications and Government Affairs
North Carolina Dental Society
1600 Evans Road
Cary, NC 27513
919-234-4024 (direct line)
www.ncdental.org

From: Spratt, Jean [mailto:jean.spratt@dhhs.nc.gov]
Sent: Wednesday, August 15, 2012 11:03 AM
To: Lisa Ward
Subject: FW: [Dental.smt] FW: NOTIFICATION: WTVD Channel 11 interested in public water fluoridation dangers

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From: Buchholtz, Kevin [mailto:kevin.buchholtz@dhhs.nc.gov]
Sent: Wednesday, August 15, 2012 10:29 AM
To: DHHS.Dental.SMT
Subject: [Dental.smt] FW: NOTIFICATION: WTVD Channel 11 interested in public water fluoridation dangers

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From: Westbrook, Vicki [mailto:Vicki.Westbrook@durhamnc.gov]
Sent: Wednesday, August 15, 2012 10:06 AM
To: Buchholtz, Kevin
Cc: gharris@durhamcountync.gov
Subject: FW: NOTIFICATION: WTVD Channel 11 interested in public water fluoridation dangers

Good morning,

You will see below that this young man is continuing to pursue his mission.

I would like to suggest to the reporter that they contact you as well. Would you be comfortable with that?

Best regards,

Vicki Westbrook
Assistant Director
Department of Water Management
City of Durham
101 City Hall Plaza
Durham, NC 27701
919-560-4381, ext. 35266

From: Corey Sturmer [mailto:csturmer@gmail.com]
Sent: Wednesday, August 15, 2012 9:57 AM
To: Bell, William
Cc: Schewel, Steve; Cole-McFadden, Cora; Catotti, Diane; Clement, Howard; Woodard, Mike; Westbrook, Vicki; Greeley, Don
Subject: NOTIFICATION: WTVD Channel 11 interested in public water fluoridation dangers

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Kindly,

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We will be in touch.

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This is a very busy week for me.

I will try to take a look and may have a researcher follow-up with you.

Thanks.

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Steve Daniels | Evening News Anchor
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Please find my website below, which should tell you everything else you need to know about me and where I'd like to take this!

http://www.durhamagainstfluoride.com

I look forward to hearing from you,

Corey Sturmer

919 880 7883

Email correspondence to and from this address is subject to the North Carolina Public Records Law and may be disclosed to third parties by an authorized State official. Unauthorized disclosure of juvenile, health, legally privileged, or otherwise confidential information, including confidential information relating to an ongoing State procurement effort, is prohibited by law. If you have received this e-mail in error, please notify the sender immediately and delete all records of this e-mail.

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Email attachment/comments from Dr. Spratt to Gayle Harris, Miriam McIntosh, August 15,2012

Comments on the Harvard Study:

- Not relevant to community water fluoridation as practiced in the U.S., which provides very small, carefully controlled adjustments to the amount of fluoride in the water.
- Dealt with areas in China and Iran, with very high levels of naturally occurring fluoride (much higher than used in community water fluoridation in the U. S.). Most anything in excess can harm someone's health.
- Authors admit that each of the studies had flaws.
- Not a large difference in the average standardized mean IQ scores between the high and low fluoride groups (0.45), which according to the authors," may be within the measurement error of IQ testing." OR The difference in IQ was very small between high and low fluoride groups (0.45). That is so small, the authors said it "may be within the measurement error of IQ testing."
- Did not consider presence of other risks in the water, such as lead, arsenic.

Community water fluoridation has been studied extensively for over 60 years and determined to be safe and effective.

Matt Jacob - Pew Foundation –Fri 8/3/2012 3:21 PM

Based on Pew's analysis, the article in *Environmental Health Perspectives* (EHP) does not raise valid concerns about water fluoridation, as practiced in the U.S. The article reviewed studies of IQ scores for children living in areas of China, Mongolia and Iran where the water supplies have unusually high, natural fluoride levels. In many cases, the high-fluoride areas were significantly higher than the levels used to fluoridate public water systems in the U.S. In fact, the high-fluoride areas in these foreign countries reached levels as high as 11.5 mg/L, which is more than 10 times higher than the optimal level used in the U.S.

The EHP offers a meta-analysis, and its credibility hinges on whether good-quality studies are reviewed. Yet the article's co-authors admit that "each of the [studies] reviewed had deficiencies, in some cases rather serious, which limit the conclusions that can be drawn." Although the studies compared high-fluoride with low-fluoride areas, the authors acknowledge that "the actual exposures of the individual children are not known."

It's worth noting that a 2009 animal study found that even at fluoride levels that were up to 230 times higher than the typical human consumes, there was "no evidence of learning deficits in any of the fluoride-exposed groups."

In addition, the authors acknowledge that the average standardized mean difference (0.45) in IQ scores between the high- and low-fluoride groups "may be within the measurement error of IQ testing."

Finally, the co-authors recognized that these foreign studies did not rule out a variety of confounding factors that could have influenced these IQ scores. Given the small difference in IQ scores, it's possible that arsenic levels, school quality, nutrition, parents' educational levels and other factors could have shaped the results. The authors also added that "reports of lead concentrations in the study villages in China were not available"— another factor that could not be discounted. A British research team reviewed similar Chinese data and reported that "water supplies may be contaminated with other chemicals such as arsenic, which may affect IQ."

Attachment 2 (b)

ENVIRONMENTAL HEALTH PERSPECTIVES

ehp.niehs.nih.gov

Developmental Fluoride Neurotoxicity: A Systematic Review and Meta-Analysis

Anna L. Choi, Guifan Sun, Ying Zhang, Philippe Grandjean

http://dx.doi.org/10.1289/ehp.1104912

Online 20 July 2012

NIEHS
National Institute of
Environmental Health Sciences

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Developmental Fluoride Neurotoxicity: A Systematic Review and Meta-Analysis

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List of Abbreviations:

CI, confidence interval

CNKI, China National Knowledge Infrastructure

SE, standard error

SMD, Standardized mean difference

TOXNET, Toxicology Data Network

Abstract

Background: Although fluoride may cause neurotoxicity in animal models and acute fluoride poisoning causes neurotoxicity in adults, very little is known of its effects on children's neurodevelopment.

Objective: We performed a systematic review and meta-analysis of published studies to investigate the effects of increased fluoride exposure and delayed neurobehavioral development.

Methods: We searched the MEDLINE, EMBASE, Water Resources Abstracts, and TOXNET databases through 2011 for eligible studies. We also searched the China National Knowledge Infrastructure (CNKI) database, as many studies on fluoride neurotoxicity have been published in Chinese journals only. In total, we identified 27 eligible epidemiological studies with high and reference exposures, endpoints of IQ scores or related cognitive function measures with means and variances for the two exposure groups. We estimated the standardized mean difference (SMD) between exposed and reference groups across all studies using random effects models. We conducted sensitivity analyses restricted to studies using the same outcome assessment and having drinking water fluoride as the only exposure. Cochran test for heterogeneity between studies, Begg's funnel plot and Egger test to assess publication bias were performed. Meta-regressions to explore sources of variation in mean differences among the studies were conducted.

Results: The standardized weighted mean difference in IQ score between exposed and reference populations was -0.45 (95% CI -0.56 to -0.35) using a random-effects model. Thus, children in high fluoride areas had significantly lower IQ scores than those who lived in low fluoride areas. Subgroup and sensitivity analyses also indicated inverse associations, although the substantial heterogeneity did not appear to decrease.

Conclusions: The results support the possibility of an adverse effect of high fluoride exposure on children's neurodevelopment. Future research should include detailed individual-level information on prenatal exposure, neurobehavioral performance, and covariates for adjustment.

Introduction

A recent report from the US National Research Council (NRC 2006) concluded that adverse effects of high fluoride concentrations in drinking-water may be of concern and that additional research is warranted. Fluoride may cause neurotoxicity in laboratory animals, including effects on learning and memory (Chioca et al. 2008; Mullenix et al. 1995). A recent experimental study where the rat hippocampal neurons were incubated with various concentrations (20 mg/L, 40 mg/L, and 80 mg/L) of sodium fluoride *in vitro* showed that fluoride neurotoxicity may target hippocampal neurons (Zhang et al. 2008). Although acute fluoride poisoning may be neurotoxic to adults, most of the epidemiological information available on associations with children's neurodevelopment is from China, where fluoride generally occurs in drinking water as a natural contaminant, and the concentration depends on local geological conditions. In many rural communities in China, populations with high exposure to fluoride in local drinking water sources may reside in close proximity to populations without high exposure (NRC 2006).

Opportunities for epidemiological studies depend on the existence of comparable population groups exposed to different levels of fluoride from drinking water. Such circumstances are difficult to find in many industrialized countries, as fluoride concentrations in community water are usually no higher than 1 mg/L, even when fluoride is added to water supplies as a public health measure to reduce tooth decay. Multiple epidemiological studies of developmental fluoride neurotoxicity were conducted in China due to the high fluoride concentrations that are substantially above 1 mg/L in well-water in many rural communities, although microbiologically safe water has been accessible to many rural households as a result of the recent five-year plan (2001-2005) by the Chinese government. It is projected that all rural

residents will have access to safe public drinking water by 2020 (World Bank 2006). However, results of the published studies have not been widely disseminated. Four studies published in English (Li et al. 1995; Lu et al. 2000; Xiang et al. 2003; Zhao et al. 1996) were cited in a recent report from the National Research Council (NRC 2006), while the World Health Organization has considered only two (Li et al. 1995; Zhao et al. 1996) in its most recent monograph on fluoride (WHO 2002).

Fluoride readily crosses the placenta (ATSDR 2003). Fluoride exposure to the developing brain, which is much more susceptible to injury caused by toxicants than is the mature brain, may possibly lead to damage of a permanent nature (US EPA 2011). Based on the considerations of health risks, and in response to the recommendation of the National Research Council (NRC 2006), the U.S. Department of Health and Human Services (HHS) and the U.S. Environmental Protection Agency (EPA) recently announced that HHS is proposing to change the recommended level of fluoride in drinking water to 0.7 mg/L from the currently recommended range of 0.7 to 1.2 mg/L, and EPA is reviewing the maximum amount of fluoride allowed in drinking water, which currently is set at 4.0 mg/L (US EPA 2011).

To summarize the available literature, we performed a systematic review and meta-analysis of published studies on increased fluoride exposure in drinking water and neurodevelopmental delays. We specifically targeted studies carried out in rural China that have not been widely disseminated, thus complementing the studies that have been included in previous reviews and risk assessment reports.

Methods

Search Strategy

We searched MEDLINE (National Library of Medicine, Bethesda, MD; http://www.ncbi.nlm.nih.gov/pubmed), EMBASE (Elsevier B.V., Amsterdam, the Netherlands; http://www.embase.com), Water Resources Abstracts (Proquest, Ann Arbor, MI; http://www.csa.com/factsheets/water-resources-set-c.php), and TOXNET (National Library of Medicine, Bethesda, MD; http://toxnet.nlm.nih.gov) databases to identify studies of drinking water fluoride and neurodevelopmental outcomes in children. In addition, we searched the China National Knowledge Infrastructure (CNKI; http://www.cnki.net) database to identify studies published in Chinese journals only. Keywords included combinations of "fluoride" or "drinking water fluoride", "children", "neurodevelopment" or "neurologic" or "intelligence" or "IQ". We also used references cited in articles identified. Records were searched from 1980 to 2011. Our literature search identified 39 studies, among which 36 (95%) were studies with high and reference exposure groups, and 3 (7.7%) studies were based on individual-level measure of exposures. The latter showed dose-related deficits were found but were excluded because our meta-analysis focused on studies with the high and low exposure groups only. In addition, 2 studies were published twice, and the duplicates were excluded.

Inclusion criteria and Data Extraction

The criteria for inclusion of studies included studies with high and reference fluoride exposures, endpoints of IQ scores or other related cognitive function measures, presentation of a mean outcome measure and associated measure of variance [95% confidence intervals (CI) or standard errors (SEs) and numbers of participants]. Interpretations of statistical significance are based on

an alpha level of 0.05. Information included for each study also included the first author, location of the study, year of publication, and numbers of participants in high-fluoride and low-fluoride areas. We noted and recorded the information on age and gender of children, and parental education and income if available.

Statistical Analysis

STATA (version 11.0; StataCorp, College Station, TX) and available commands (Stern 2009) were used for the meta-analyses. A standardized weighted mean difference (SMD) was computed using both fixed-effects and random-effects models. The fixed-effects model uses the Mantel-Haenszel method assuming homogeneity among the studies, while the random-effects model uses the DerSimonian and Laird method, incorporating both a within-study and an additive between-studies component of variance when there is between-study heterogeneity (Egger et al. 2001). The estimate of the between-study variation is incorporated into both the standard error of the estimate of the common effect and the weight of individual studies, which was calculated as the inverse sum of the within and between study variance. Heterogeneity among studies was evaluated using the I^2 statistic, which represents the percentage of total variation across all studies due to between-study heterogeneity (Higgins and Thompson 2002). The potential for publication bias was evaluated using Begg and Egger tests and visual inspection of a Begg funnel plot (Begg and Mazumdar 1994; Egger et al. 1997). We also conducted independent meta-regressions to estimate the contribution of study characteristics (mean age in years from the age range and year of publication in each study) to heterogeneity among the studies. The scoring standard for the Combined Raven's Test – The Rural edition in China (CRT-RC) test classifies a score of ≤69 and 70-79 as low and marginal intelligence,

respectively (Wang et al. 1989). We also used the random effects models to estimate risk ratios for the association between fluoride exposure and a low/marginal versus normal Raven's test score among children in studies that used the Combined Raven's Test –Rural in China (CRT-RC) test (Wang et al. 1989). Scores indicating low and marginal intelligence (≤69 and 70-79, respectively) were combined as a single outcome due to small numbers of children in each outcome subgroup.

Results

Six of the 34 studies identified were excluded due to missing information on the number of subjects or the mean and variance of the outcome (see Figure 1 for a study selection flow chart and Supplemental Material, Table S1 for additional information on studies that were excluded from the analysis). Another study (Trivedi et al. 2007) was excluded because SDs reported for the outcome parameter were questionably small (1.13 for high fluoride group, and 1.23 for low fluoride group) and the SMD (-10.8, 95% CI -11.9, -9.6) was more than 10-times lower than the second smallest SMD (-0.95, 95% CI -1.16, -0.75) and 150-times lower than the largest SMD (0.07, 95% CI -0.083, 0.22) reported for the other studies, which had relatively consistent SMD estimates. Inclusion of this study in the meta-analysis resulted with a much smaller pooled random-effects SMD estimate and a much larger I^2 (-0.63 (95% CI -0.83, -0.44), I^2 94.1%) compared to the estimates that excluded this study (-0.45, 95% CI -0.56, -0.34), I^2 80%) (see Supplemental Material, Figure S1). Characteristics of the 27 studies included are shown in Table 1(An et al. 1992; Chen et al. 1991; Fan et al. 2007; Guo et al. 1991; Hong et al. 2001; Li et al. 2003; Li et al. 2009; Li et al. 2010; Lin et al. 1991; Lin et al. 1994; Lin et al. 1995; Lu et al. 2000; Poureslami et al. 2011; Ren et al. 1989; Seraj et al. 2006; Sun et al. 1991; Wang et al.

1996; Wang et al. 2001; Wang et al. 2006; Wang et al. 2007; Xiang et al. 2003; Xu et al. 1994; Yang et al. 1994; Yao et al. 1996; Yao et al. 1997; Zhang et al. 1998; Zhao et al. 1996). Two of the studies included in the analysis were conducted in Iran (Poureslami et al. 2011; Seraj et al. 2006), otherwise the study cohorts were populations from China. Two cohorts were exposed to fluoride from coal burning (Guo et al. 1991; Li et al. 2010), otherwise populations were exposed to fluoride through drinking water. The CRT-RC was used to measure the children's intelligence in 16 studies. Other intelligence measures included the Weschler Intelligence tests (3 studies), Binet IQ test (2 studies), Raven's test (2 studies), Japan IQ test (2 studies), Chinese comparative intelligence test (1 study), and the mental work capacity index (1 study). As each of the intelligence tests used are designed to measure general intelligence, we used data from all eligible studies to estimate the possible effects of fluoride exposure on general intelligence. In addition, we conducted a sensitivity analysis restricted to studies that used similar tests to measure the outcome (specifically, the CRT-RC, Weschler Intelligence test, Binet IQ test, or Raven's test), and an analysis restricted to studies that used the CRT-RC. We also performed an analysis that excluded studies with co-exposures including iodine and arsenic, or with non-drinking water fluoride exposure from coal burning.

Pooled SMD estimates

Among the 27 studies, all but one study showed random-effect SMD estimates that indicated an inverse association, ranging from -0.95 (95% CI: -1.16, -0.75) to -0.10 (95% CI: -0.25, 0.04) (Figure 2). The study with a positive association reported a SMD estimate of 0.07 (95% CI: -0.8, 0.22). Similar results were found with the fixed-effect SMD estimates. The fixed-effects pooled SMD estimate and corresponding 95% CI were -0.40 (-0.44, -0.35), with a p-value <0.001 for

the test for homogeneity. The random-effects SMD estimate and 95% CI were -0.45 (95% CI:-0.56, -0.34) with an I^2 of 80% and homogeneity test p-value <0.001 (Figure 2). Because of heterogeneity (excess variability) between study results, we primarily used the random-effects model for subsequent sensitivity analyses, which is generally considered to be the more conservative method (Egger et al. 2001). Among the restricted sets of intelligence tests, the SMD for the model with only CRT-RC tests and drinking-water exposure (and to a lesser extent the model with only CRT-RC tests) was lower than that for all studies combined, although the difference did not appear to be significant. Heterogeneity, however, remained at a similar magnitude when the analyses were restricted (Table 2).

Sources of heterogeneity

We performed meta-regression models to assess study characteristics as potential predictors of effect. Information on the child's gender and parental education were not reported in more than 80% of the studies, and only 7% of the studies reported household income. These variables were therefore not included in the models. Among the two covariates, year of publication (0.02; 95% CI: 0.006, 0.03), but not mean age of the study children (-0.02; 95% CI: -0.094, 0.04), was a significant predictor in the model with all 27 studies included. I^2 residual 68.7%, represented the proportion of residual between-study variation due to heterogeneity. From the adjusted R^2, 39.8% of between-study variance was explained by the two covariates. The overall test of the covariates was significant (p=0.004).

When the model was restricted to the 16 studies that used the CRT-RC, the child's age (but not year of publication) was a significant predictor of the SMD. The R^2 of 65.6% of between-study variance was explained by the two covariates, and only 47.3% of the residual variation was due

to heterogeneity. The overall test of both covariates in the model remained significant ($p = 0.0053$). On further restriction of the model to exclude the 7 studies with arsenic and iodine as co-exposures and fluoride originating from coal-burning, thus including only the 9 with fluoride exposure from drinking water, neither age nor year of publication was a significant predictor, and the overall test of covariates was less important ($p = 0.062$), in accordance with the similarity of intelligence test outcomes and the source of exposure in the studies included. Although official reports of lead concentrations in the study villages in China were not available, some studies reported high percentage (95 to 100%) of low lead exposure (less than the standard of 0.01 mg/L) in drinking water samples in villages from several study provinces (Bi et al. 2010; Peng et al. 2008; Sun 2010).

Publication bias

A Begg's funnel plot with the SE of SMD from each study plotted against its corresponding SMD did not show clear evidence of asymmetry, though two studies with a large SE also reported relatively large effect estimates, which may be consistent with publication bias or heterogeneity (Figure 3). The plot appears symmetrical for studies with larger SE, but with substantial variation in SMD among the more precise studies, consistent with the heterogeneity observed among the studies included in the analysis. Begg ($p = 0.22$) and Egger ($p = 0.11$) tests did not indicate significant ($p < 0.05$) departures from symmetry.

Pooled risk ratios

The relative risk of a low/marginal score on the CRT-RC test (<80) among children with high fluoride exposure compared to those with low exposure (16 studies total) was 1.93 (95% CI:

1.46, 2.55; I^2 58.5%). When the model was restricted to 9 studies that used the CRT-RC and included only drinking water fluoride exposure (Chen et al. 1991; Fan et al. 2007; Li et al. 1995; Li et al. 2003; Li et al. 2010; Lu et al.2000; Wang et al. 2006; Yao et al. 1996, 1997), the estimate was similar (RR 1.75; 95% CI: 1.16, 2.65; I^2 70.6%). Although fluoride exposure showed inverse associations with test scores, the available exposure information did not allow a formal dose-response analysis. However, dose-related differences in test scores occurred at a wide range of water-fluoride concentrations.

Discussion

Findings from our meta-analyses of 27 studies published over 22 years suggest an inverse association between high fluoride exposure and children's intelligence. Children who lived in areas with high fluoride exposure had lower IQ scores than those who lived in low exposure or control areas. Our findings are consistent with an earlier review (Tang et al. 2008), although ours more systematically addressed study selection and exclusion information, and more comprehensive in 1) including nine additional studies, 2) performing meta-regression to estimate the contribution of study characteristics as sources of heterogeneity, and 3) estimating pooled risk ratios for the association between fluoride exposure and a low/marginal Raven's test score.

As noted by the NRC committee (NRC 2006), assessments of fluoride safety have relied on incomplete information on potential risks. In regard to developmental neurotoxicity, much information has in fact been published, although mainly as short reports in Chinese that have not been available to most expert committees. We carried out an extensive review that includes epidemiological studies carried out in China. While most reports were fairly brief and complete information on covariates was not available, the results tended to support the potential for

fluoride-mediated developmental neurotoxicity at relatively high levels of exposure in some studies. We did not find conclusive evidence of publication bias, though there was substantial heterogeneity among studies. Drinking-water may contain other neurotoxicants, such as arsenic, but exclusion of studies including arsenic and iodine as co-exposures in a sensitivity analysis resulted in a lower estimate, although the difference was not significant. The exposed groups had access to drinking-water with fluoride concentrations up to 11.5 mg/L (Wang et al. 2007), thus in many cases concentrations were above the levels of 0.7-1.2 mg/L (HHS) and 4.0 mg/L (US EPA) considered acceptable in the US. A recent cross-sectional study based on individual-level measure of exposures suggested that low levels of water fluoride (range 0.24 to 2.84 mg/L) had significant negative associations with child's intelligence (Ding et al. 2011). This study was not included in our meta-analysis, which focused only on studies with exposed and reference groups, thereby precluding estimation of dose-related effects.

The results suggest that fluoride may be a developmental neurotoxicant that affects brain development at exposures much below those that can cause toxicity in adults (Grandjean 1982). For neurotoxicants, such as lead and methylmercury, adverse effects are associated with blood concentrations as low as 10 nmol/L. Serum-fluoride concentrations associated with high intakes from drinking-water may exceed 1 mg/L, or 50 μmol/L, thus more than 1000-times the levels of some other neurotoxicants that cause neurodevelopmental damage. Supporting the plausibility of our findings, rats exposed to 1 ppm (50 μmol/L) of water-fluoride for one year showed morphological alterations in the brain and increased levels of aluminum in brain tissue compared with controls (Varner et al. 1998).

The estimated decrease in average IQ associated with fluoride exposure based on our analysis may seem small and may be within the measurement error of IQ testing. However, as

research on other neurotoxicants has shown, a shift to the left of IQ distributions in a population will have substantial impacts, especially among those in the high and low ranges of the IQ distribution (Bellinger 2007).

The present study cannot be used to derive an exposure limit, as the actual exposures of the individual children are not known. Misclassification of children in both high- and low-exposure groups may have occurred if the children were drinking water from other sources (e.g., at school or in the field).

The published reports clearly represent independent studies and are not the result of duplicate publication of the same studies (we removed two duplicates). Several studies (Hong et al. 2001; Lin et al. 1991; Wang et al. 2001; Wang et al. 2007; Xiang et al. 2003; Zhao et al. 1996) report other exposures, such as iodine, and arsenic, a neurotoxicant, but our sensitivity analyses showed similar associations between high fluoride exposure and the outcomes even after these studies were excluded. Large tracts of China have superficial fluoride-rich minerals with little, if any, likelihood of contamination by other neurotoxicants that would be associated with fluoride concentrations in drinking water. From the geographical distribution of the studies, it seems unlikely that fluoride-attributed neurotoxicity could be due to other water contaminants.

Still, each of the articles reviewed had deficiencies, in some cases rather serious, which limit the conclusions that can be drawn. However, most deficiencies relate to the reporting, where key information was missing. The fact that some aspects of the study were not reported limits the extent to which the available reports allow a firm conclusion. Some methodological limitations were also noted. Most studies were cross-sectional, but this study design would seem appropriate in a stable population where water supplies and fluoride concentrations have remained unchanged for many years. The current water-fluoride level likely also reflects past

developmental exposures. In regard to the outcomes, the inverse association persisted between studies using different intelligence tests, although most studies did not report age adjustment of the cognitive test scores.

Fluoride has received much attention in China, where widespread dental fluorosis indicates the prevalence of high exposures. In 2008, the Ministry of Health reported that fluorosis was found in 28 provinces with 92 million residents (China News, 2008). Although microbiologically safe, water supplies from small springs or mountain sources created pockets of increased exposures near or within areas of low exposures, thus representing exposure settings close to the ideal, as only the fluoride exposure would differ between nearby neighborhoods. Chinese researchers took advantage of this fact and published their findings, though mainly in Chinese journals, and according to the standards of science at the time. This research dates back to the 1980s, but has not been widely cited at least in part because of limited access to Chinese journals.

In its review of fluoride, the US National Research Council (NRC 2006) emphasized that both the beneficial effects of fluoride on dental health and its adverse effects were incompletely documented. Our comprehensive review substantially extends the scope of research available for evaluation and analysis. Although the studies were generally of insufficient quality, the consistency of their findings adds support to existing evidence of fluoride-associated cognitive deficits, and suggests that potential developmental neurotoxicity of fluoride should be a high research priority. While reports from WHO and national agencies have generally focused on beneficial effects (CDC 1999; Petersen and Lennon 2004), the NRC report emphasized the need to consider potential adverse effects as well as benefits of fluoride exposure (NRC 2006).

In conclusion, our results support the possibility of adverse effects of fluoride exposures on children's neurodevelopment. Future research should formally evaluate dose-response relations based on individual-level measures of exposure over time, including more precise prenatal exposure assessment and more extensive standardized measures of neurobehavioral performance, in addition to improving assessment and control of potential confounders.

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Table 1. Characteristics of epidemiological studies of fluoride exposure and child's cognitive outcomes

Reference	Study Location	No. in high exposure group	No. in reference group	Age range (years)	Fluoride exposure: Assessment	Fluoride exposure: Range	Outcome Measure	Results
Ren et al. 1989	Shandong, China	160	169	8-14	High/low F villages	Not specified	Wechler Intelligence test	Children in highF, region had lower IQ scores
Chen et al. 1991	Shanxi, China	320	320	7-14	Drinking water	4.55 mg/L (high); 0.89 mg/L (reference)	CRT-RC[a]	The average IQ of children from high fluoride area were lower than that of the reference area
Guo et al. 1991	Hunan, China	60	61	7-13	F in coal burning	118.1-1361.7 mg/kg (coal burning area); Control area used wood	Chinese Binet	Average IQ in fluoride coal burning area was lower than that in the reference area
Lin et al. 1991	Xinjiang, China	33	86	7-14	Drinking water	0.88mg/L (high); 0.34 mg/L (reference)	CRT-RC[a]	Children in the high fluoride (low iodine) area had lower IQ scores compared with the children from the reference fluoride (low iodine) areas
Sun et al. 1991	Guiyang, China	196	224	6.5-12	Rate of fluorosis	Fluorosis: 98.36% (high); not specified (reference)	Japan IQ test	Mean IQ was lower in all age groups except ≤7 years old group in the area with high fluoride and aluminum (limited to high fluoride population only)
An et al. 1992	Inner Mongolia, China	121	121	7-16	Drinking water	2.1-7.6mg/L (high) 0.6-1.0 mg/L (reference)	Wechler Intelligence test	IQ scores of children in high fluoride areas were significantly lower than those of children living in reference fluoride area
Li et al. 1994	Sichuan, China	106	49	12-13	Buring of high-fluoride coal to cook grain in high fluoride area	4.7-31.6 mg/kg (high) 0.5 mg/kg (reference)	Child mental work capacity	Early, prolonged high fluoride intake causes a decrease in the child's mental work capacity
Xu et al. 1994	Shandong, China	97	32	8-14	Drinking water	1.8 mg/L (high) 0.8 mg/L (reference)	Binet-Siman	Children had lower IQ scores in high fluoride area than those who lived in the reference area.
Yang et al. 1994	Shandong, China	30	30	8-14	Well water	2.97 mg/L (high); 0.5 mg/L (reference)	Chinese comparative intelligence test	The average IQ scores was lower in children from high fluoride and iodine area than those from the reference area, but the results were not significant
Li et al. 1995	Guizhou, China	681	226	8-13	Urine, Dental Fluorosis Index(DFI)	1.81-2.69 mg/L (high); 1.02 mg/L (reference); DFI 0.8-3.2 (high) DFI <0.4 (reference)	CRT-RC[a]	Children living in fluorosis areas had lower IQ scores than children living in non-fluorosis areas
Wang et al. 1996	Xinjiang, China	147	83	4-7	Drinking water	>1.0-8.6 mg/L (high) 0.58-1.0 mg/L (reference)	Wechsler Intelligence Test	Average IQ score was lower in children in the high fluoride group than those in the reference group
Yao et al. 1996	Liaoning, China	266	270	8-12	Drinking water	2-11mg/L (high) 1 mg/L (reference)	CRT-RC[a]	Average IQ scores of children residing in exposed fluoride areas were lower than those in the reference area
Zhao et al. 1996	Shanxi, China	160	160	7-14	Drinking water	4.12 mg/L (high) 0.91 mg/L (reference)	CRT-RC[a]	Children living in high fluoride and arsenic area had significantly lower IQ scores than those living in the reference fluoride (and no arsenic) area

Reference	Study Location	No. in high exposure group	No. in reference group	Age range (years)	Fluoride exposure Assessment	Fluoride exposure Range	Outcome Measure	Results
Yao et al. 1997	Liaoning, China	188	314	7-14	Drinking water	2 mg/L (exposed) 0.4 mg/L (reference)	CRT-RC[a]	IQ scores of children in the high fluoride area were lower than those of children in the reference area
Zhang et al. 1998	Xinjiang, China	51	52	4-10	Drinking water	Not specified	Japan IQ Test	Average IQ scores of children residing in high fluoride and arsenic area were lower than those who resided in the reference area
Lu et al 2000	Tianjin, China	60	58	10-12	Drinking water	3.15 mg/L (high) 0.37 mg/L (reference)	CRT-RC[a]	Children in the high fluoride area scored significantly lower IQ scores than those in the reference area
Hong et al. 2001	Shandong, China	85	32	8-14	Drinking water	2.90 mg/L (high) 0.75 mg/L (reference)	CRT-RC[a]	Average IQ scores were significantly lower in high fluoride group (and iodine) than the reference group
Wang et al. 2001	Shandong, China	30	30	8-12	Drinking water	2.97 mg/L (high) 0.5 mg/L (reference)	CRT-RC[a]	No significant difference in IQ scores of children in the high fluoride/high iodine and reference fluoride/low iodine areas
Li et al. 2003	Inner Mongolia	720	236	6-13	Fluorosis	Endemic versus control regions defined by the Chinese Geological Office	CRT-RC[a]	Average IQ of children in high fluorosis area was lower than that in the reference area
Xiang et al. 2003	Jiangsu, China	222	290	8-13	Drinking water	0.57-4.5 mg/L (high) 0.18-0.76 mg/L (reference)	CRT-RC[a]	Mean IQ score was significantly lower in children who lived in the high fluoride area than that of children in the reference exposure area (both areas also had arsenic exposure)
Seraj et al. 2006	Tehran, Iran	41	85	Not specified	Drinking water	2.5 mg/L (high) 0.4 mg/L (reference)	Raven	The mean IQ of children in the high fluoride area was significantly lower than that from the reference fluoride area
Wang et al. 2006	Shanxi, China	202	166	8-12	Drinking water	5.54±3.88 mg/L (high) 0.73±0.28 mg/L (reference)	CRT-RC[a]	The IQ scores of children in the high fluoride group were significantly lower than those in the reference group
Fan et al 2007	Shaanxi, China	42	37	7-14	Drinking water	1.14-6.09 mg/L (high) 1.33-2.35 mg/L (reference)	CRT-C_2	The average IQ scores of children residing in the high F area were lower than those of children residing in the reference area
Wang et al. 2007	Shanxi, China	253	196	8-12	Drinking water and urine	3.8-11.5 mg/L (water, high) 1.6-11 mg/L (urine, high) 0.2-1.1 mg/L (water, reference) 0.4-3.9 mg/L (urine, reference)	CRT-RC[a]	Mean IQ scores were significantly lower in the high fluoride group than from the reference group in the fluoride/arsenic areas
Li et al. 2009	Hunan, China	60	20	8-12	Coal burning	1.24-2.34 mg/L (high) 0.962 mg/L (reference)	CRT-C_2	Mean IQ was lower in children in coal-burning areas compared to those in the reference group

Reference	Study Location	No. in high exposure group	No. in reference group	Age range (years)	Fluoride exposure		Outcome Measure	Results
					Assessment	Range		
Li et al. 2010	Henan, China	347	329	7-10	Drinking water	2.47±0.75mg/L (high)	CRT-RC	No significant difference in IQ scores between children in the exposed and reference groups
Poureslami et al. 2011	Iran	59	60	6-9	Drinking Water	2.38 mg/L (high) 0.41 mg/L (reference)	Raven	Children in the high fluoride group scored significantly lower than those in reference group

[a]CRT-RC denotes Chinese Standardized Raven Test, rural version (Wang et al. 1989)

Table 2. Sensitivity analyses of pooled random-effect standardized weighted mean difference (SMD) estimates of child's intelligence score with high exposure of fluoride

Model	Available studies for analysis	SMD (95% CI)	I^2	p-value test of heterogeneity
1. Exclude non-standardized tests[a]	23	-0.44 (-0.54, -0.33)	77.6%	< 0.001
2. Exclude non CRT-RC Tests[b]	16	-0.36 (-0.48, -0.25)	77.8%	<0.001
3. Exclude studies with other exposures (Iodine, Arsenic)[c] or non-drinking water fluoride exposure[d]	9	-0.29 (-0.44, -0.14)	81.8%	<0.001

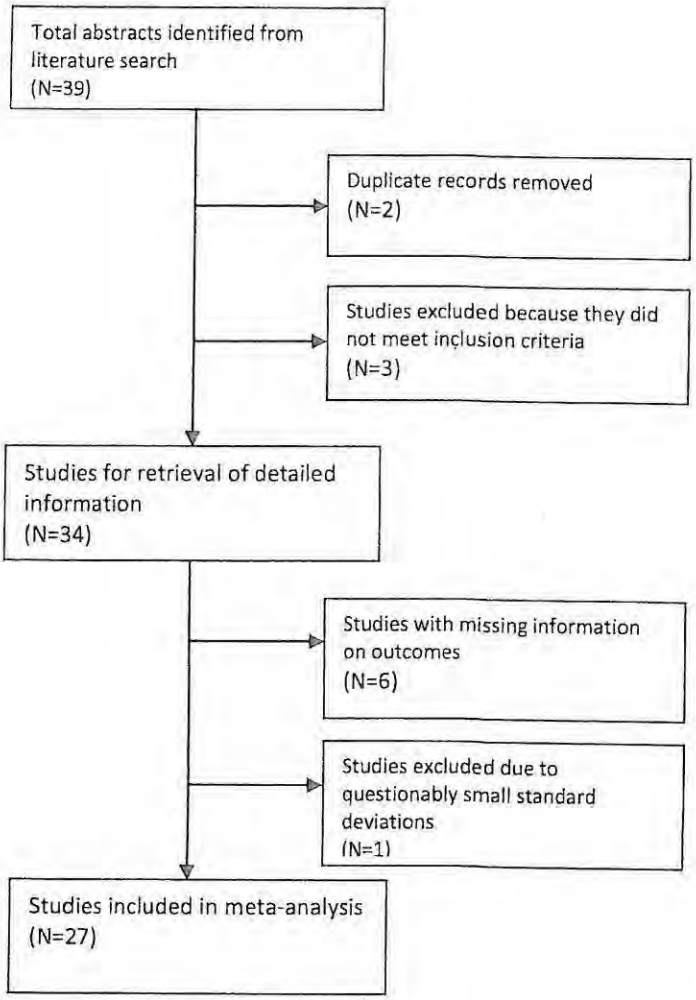
[a]Mental work capacity (Li et al. 1994); Japan IQ (Sun et al. 1991; Zhang et al. 1998); Chinese comparative scale of intelligence test (Yang et al. 1994)
[b]Weschler intelligence test (An et al. 1992; Ren et al . 1989; Wang et al. 1996); Chinese Binet IQ (Guo et al. 1991); Raven(Poureslami et al. 2011; Seraj et al. 2006); Binet-Siman (Xu et al. 1994)
[c]Iodine (Hong et al. 2001; Lin et al. 1991; Wang et al. 2001); Arsenic (Wang et al. 2007; Xiang et al. 2003; Zhao et al. 1996; Zhang et al. 1998 - already excluded, see footnote 1)
[d]Fluoride from coal-burning (Li et al. 2009; Guo et al. 1991; Li et al 1994 (already excluded, see footnotes a and b)

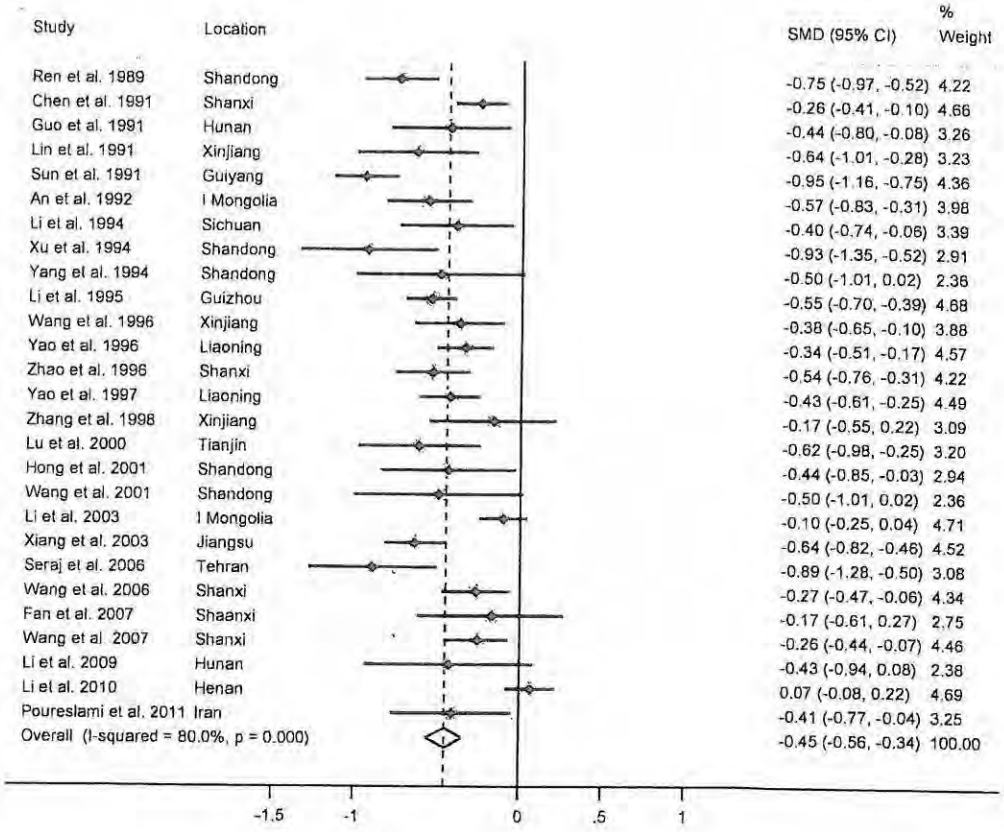
Figure Legend

Figure 1. Flow diagram of the meta-analysis

Figure 2. Random-effect standardized weighted mean difference (SMD) estimates and 95% CIs of child's intelligence score associated with high exposure to fluoride. SMs for individual studies are shown as solid diamonds (◆), and the pooled SMD is shown as a non-filled diamond (◊). Horizontal lines represent 95% CIs for the study-specific SMDs.

Figure 3. Begg's funnel plot showing individual studies included in the analysis according to random-effect standardized weighted mean difference (SMD) estimates (x-axis) and the standard error (se) of each study-specific SMD (y-axis). The solid vertical line indicates the pooled SMD estimate for all studies combined and the dashed lines indicated pseudo 95% confidence limits around the pooled SMD estimate


Total abstracts identified from literature search (N=39)
Duplicate records removed (N=2)
Studies excluded because they did not meet inclusion criteria (N=3)
Studies for retrieval of detailed information (N=34)
Studies with missing information on outcomes (N=6)
Studies excluded due to questionably small standard deviations (N=1)
Studies included in meta-analysis (N=27)


Study
Location
SMD (95% CI)
% Weight
Ren et al. 1989 Shandong -0.75 (-0.97, -0.52) 4.22
Chen et al. 1991 Shanxi -0.26 (-0.41, -0.10) 4.66
Guo et al. 1991 Hunan -0.44 (-0.80, -0.08) 3.26
Lin et al. 1991 Xinjiang -0.64 (-1.01, -0.28) 3.23
Sun et al. 1991 Guiyang -0.95 (-1.16, -0.75) 4.36
An et al. 1992 I Mongolia -0.57 (-0.83, -0.31) 3.98
Li et al. 1994 Sichuan -0.40 (-0.74, -0.06) 3.39
Xu et al. 1994 Shandong -0.93 (-1.35, -0.52) 2.91
Yang et al. 1994 Shandong -0.50 (-1.01, 0.02) 2.36
Li et al. 1995 Guizhou -0.55 (-0.70, -0.39) 4.68
Wang et al. 1996 Xinjiang -0.38 (-0.65, -0.10) 3.88
Yao et al. 1996 Liaoning -0.34 (-0.51, -0.17) 4.57
Zhao et al. 1996 Shanxi -0.54 (-0.76, -0.31) 4.22
Yao et al. 1997 Liaoning -0.43 (-0.61, -0.25) 4.49
Zhang et al. 1998 Xinjiang -0.17 (-0.55, 0.22) 3.09
Lu et al. 2000 Tianjin -0.62 (-0.98, -0.25) 3.20
Hong et al. 2001 Shandong -0.44 (-0.85, -0.03) 2.94
Wang et al. 2001 Shandong -0.50 (-1.01, 0.02) 2.36
Li et al. 2003 I Mongolia -0.10 (-0.25, 0.04) 4.71
Xiang et al. 2003 Jiangsu -0.64 (-0.82, -0.46) 4.52
Seraj et al. 2006 Tehran -0.89 (-1.28, -0.50) 3.08
Wang et al. 2006 Shanxi -0.27 (-0.47, -0.06) 4.34
Fan et al. 2007 Shaanxi -0.17 (-0.61, 0.27) 2.75
Wang et al 2007 Shanxi -0.26 (-0.44, -0.07) 4.46
Li et al. 2009 Hunan -0.43 (-0.94, 0.08) 2.38
Li et al. 2010 Henan 0.07 (-0.08, 0.22) 4.69
Poureslami et al. 2011 Iran -0.41 (-0.77, -0.04) 3.25
Overall (I-squared = 80.0%, p = 0.000) -0.45 (-0.56, -0.34) 100.00
-1.5
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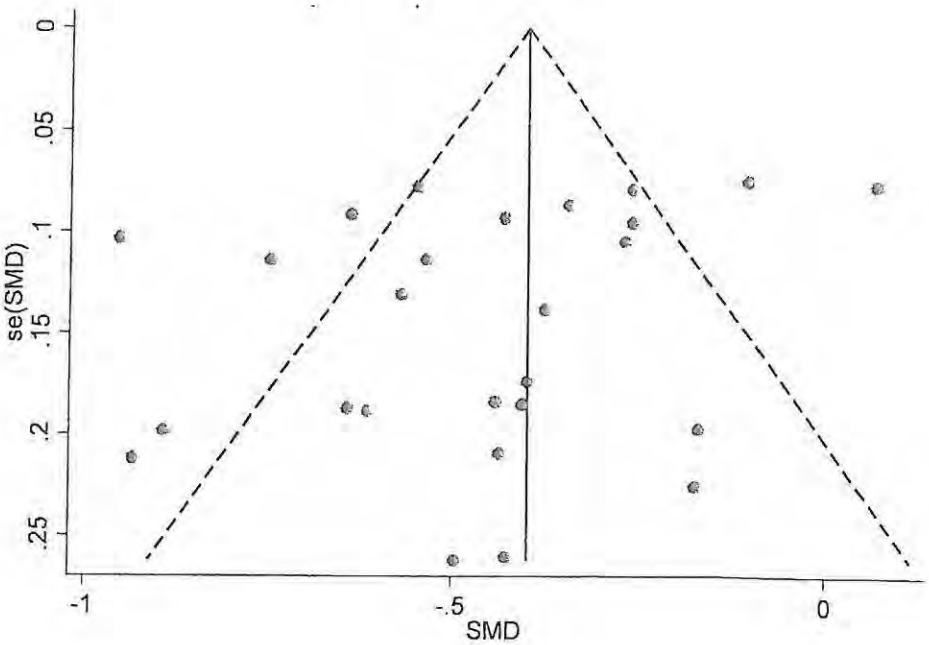
1


se(SMD)
0
.05
.1
.15
.2
.25
-1
-.5
0
SMD

A Regular Meeting of the Durham County Board of Health, held September 13, 2012 with the following members present:

Sue McLaurin, M. Ed., PT; Commissioner Brenda Howerton; John Daniel, Jr., MD; James Miller, DVM; Heidi Carter, MSPH; F. Vincent Allison, DDS, Michael Case, MPA , Jill Bryant, O.D, F.A.A.O; Teme Levbarg, MSW, PhD; and Nancy Short, DrPH, RN, MBA

Excused Absence: Stephen Dedrick, R.Ph, MS

Others: Gayle Harris, Attorney Bryan Wardell, Eric Ireland, Becky Freeman, Rosalyn McClain, Tekola Fisseha, Robert Brown, Dr. Jim Harris, Sue Guptill, Dr. Miriam McIntosh, Dr. Arlene Sena, Eric Nickens, Hattie Wood, Steven Garner, Corey Sturmer, Charlie Eades, Kelly McMullen, Jennifer Lazarus, Scott Boggs, Eric Billig and Rachel Godfrey.

CALL TO ORDER: - Chairman Sue McLaurin called the meeting to order at 5:14pm with a quorum present.

DISCUSSION (AND APPROVAL) OF ADJUSTMENTS TO AGENDA: The following budget ratifications were added to the agenda for Board approval.

- $24,338 - NC Department of Health and Human Services for the Tuberculosis Control Program
- $41,500 - NC Department of Health & Human Services, Division of Public Health for the Health Education Program
- $1,525 - NC Department of Health and Human Services, Diabetes Prevention and Control Program to support local health departments participating in the NC Diabetes Education Recognition Programs.
- $5,218 - NC Division of Public Health, Nutrition Services Branch for the Environmental Health Division. The Summer Food Service Program (SFSP) provides free meals to children during the summer months.

REVIEW OF MINUTES FROM PRIOR MEETING/ADJUSTMENTS/APPROVAL: Commissioner Brenda Howerton made a motion to approve the minutes for August 9, 2012 meeting. Mr. Case seconded the motion and the motion was approved.

PUBLIC COMMENTS:
The following citizens of Durham spoke to the board on Fluoride in the Drinking Water in Durham County.

1. Corey Sturmer
2. Charlie Eades
3. Kelly McMullen
4. Scott Boggs
5. Rachel Godfrey

The citizens requested the board to do due diligence in discussing, and evaluating, the information that was presented to them today and to make a recommendation to remove the fluoride in the drinking water in Durham County. The speaker notes and materials are attached to the minutes.

Ms. McClain will e-mail the materials presented at the meeting today to the board for them to review, research and be prepared to discuss at the next board meeting on October 11, 2012.

STAFF/PROGRAM RECOGNITION:
The staff acknowledged the death of Henry Pacheco, a Patient Relations Representative in Central Intake, collapsed on Main Street after leaving our staff meeting on September 5, 2012 and later died in the Duke ED.

Public Comment

Attachment 4(a)

Corey Sturmer

My name is Corey Sturmer and I am a resident at 14 Poppy Trail in Durham NC.

I am here today to raise awareness and hopefully provoke debate among the durham county health board about the well known practice of fluoridating our public water supplies.

Since December of 2011 I have researched this issue and been in touch with many members of our city government, health department and water treatment plant to get the FACTS on this. For those who are not aware, Fluoride in the form of Hydrofluosilicic acid has been systematically added to our public drinking water since 1962.

The reason according to Durham County and the Center For Disease Control is that fluoride is credited with being successful at preventing dental cavities. according to city and state health officials this is worth the risks associated with fluoridation and is used as the only basis upon which to continue fluoridation.

Ignoring the obvious ethical problems of medicating our water supplies without our approval– such a young practice deserves more scientific examination.

As I have shown, and will show, Fluoridation is factually NOT of critical benefit to the health of our teeth and may be a substantial danger to our health and well being. Since December, 2011 I have brought forward study after study which show links to fluoride being detrimental to our bones, ligaments, learning capability, and of ALL things, Even teeth!

I have also gone so far as to create a website which is dedicated to the removal of this chemical. As you can see by the presence of others here and WTVD Channel 11, the denial of our evidence will not make us go away.

Incredibly, in rebuttal to one of my appearances at the Durham City Council, the water management department ~~brought~~ called upon North Carolina's dental advisor, Kevin Buchholtz who actually admitted Quote: to defen dfluoride

"I live in Greensboro where the water is fluoridated. I'm proud of that."

"My 11 year old daughter DOES exhibit what would be classified as mild dental fluorosis, but you wouldn't notice unless you invaded her personal space and you knew what you were looking for."

So Not only are our own government officials having to admit to the negative side effects of Fluoridation, but in July 2012 Harvard released a study which concluded quote:

"Children in high fluoride areas had significantly lower IQ scores than those who lived in low fluoride areas, The results suggest that fluoride may be a developmental neurotoxicant that affects brain development at exposures much below those that can cause toxicity in adults."

We understand where the city gets their guidance. We understand that the Center For Disease Control believe that our concerns aren't warranted - But let me be the first, and not the last to say:

WE ARE NOT THE CENTER FOR DISEASE CONTROL. WE ARE THE CITIZENS OF DURHAM and YOU are our public servants. Furthermore, we are CUSTOMERS of the water department and are PAYING YOU for providing the service of public drinking water. According to even a cursory overview of the evidence, any rational, honest individual can conclude ON THEIR OWN that we should NOT have to pay to poison ourselves. Are you willing to sit there and deny what researchers at Harvard have uncovered?

Even my own teeth, being an athletic 26 year old, require more than 4 root canals and I currently have back molars with gaping HOLES IN THEM. Is that my fault or the city's? We'll never know but it doesn't seem like the City's ploy to help me has worked.

Finally, I would like to cite one last study which was done right here in Durham while I was in grade school attending Parkwood Elementary and I would like to address this directly to Mr. Vincent Allison, who is the dental expert on the board.

The Extract States:

Durham, NC, fluoridated since 1962, had an 11-month cessation of fluoridation between September 1990 and August 1991. The purpose of this study was to assess the effects of this break on the development of cavities and fluorosis in children. Study participants were continuously resident children in Kindergarten through Grade 5 in Durham's elementary schools. There were 1696 children, 81.4% of those eligible, for whom a questionnaire was completed and clinical data recorded. Age cohorts were defined by a child's age at the time that fluoridation ceased. Caries was recorded in children in the Birth Cohort through Cohort 3, and fluorosis for children in Cohorts 1 through 5. Caries was assessed in the primary first and second molars according to the decayed-filled index; fluorosis on the labial surfaces of the upper permanent central and lateral incisors was assessed by the Thylstrup-Fejerskov (TF) index. Mother's education was associated with caries; higher education of the mother had an odds ratio of 0.53 (95% CI 0.40, 0.76) for caries in the child. No cohort effects could be discerned for caries. Overall prevalence of fluorosis was 44%. Prevalence in Cohorts 1, 2, 3, 4, and 5 was 39.8%, 32.3%, 33.0%, 62.3%, and 57.1%, respectively. These cohort differences remained statistically significant in regression analysis. It was concluded that while the break had little effect on caries, dental fluorosis is sensitive to even small changes in fluoride exposure from drinking water, and this sensitivity is greater at 1 to 3 years of age than at 4 or 5 years.

So in conclusion, we have a Harvard study and another study done by our very own Duke University which show conclusively no link between cavity prevention and fluoride, but DO show a link between fluoridation and low IQ + the incidence of fluorosis. This should be all the evidence you need to finally put an end to this practice and I hope you will consider the words here spoken today by me and others as a final WARNING to take this as an opportunity to right a wrong.

Thank you for your time.

Charlee Eades

My name is Charlee Eades and I am a resident at 14 Poppy Trail in South Durham.

I would also like to say something about the issue of fluoridation.

Over the last year I have witnessed my boyfriend Corey research this subject and attempt to educate government employees, health professionals, dentists, and fellow citizens about the issue of Water Fluoridation. He cites different studies and new science to prove his case that Fluoride is not of critical health benefit, but rather, is a hazardous chemical, dubiously added to our public water supply.

With this said, I am not as scientifically interested in the subject. I have seen enough evidence to be personally convinced that it has no business being in our drinking water. Instead, I would like to ask the simple question,

Whose decision is to medicate our water?

Is it the city's? Is it the water department? Is it the county health department? Since December 2011 I have watched Corey go from person to person within the city government, in an attempt to find the answer to this, and here we are today... we still do not know who makes this decision and still do not know who can, in fact, reverse it.

I believe there is a very good reason for this: it was never any of your decisions to make!

Simply put, Fluoridation has been a practice we've all been duped into believing was good for us. Even you on the health board grew up drinking Fluoride without knowing the damage it has been doing to your own health.

We aren't here to demonize anyone; rather we would like an honest re-evaluation of the practice, given the new data which has been released and highlighted by Corey just now.

Based on what we know about fluoridation after 60 years of using it, we should know better than to abuse this chemical, and should be doing more to have it removed. Fluoridation is Not of Critical Health Benefit and therefore, should be reversed.

Even if you disagree with the new research, or still want to hold on the statements released from our CDC and our state government, you must ask yourself:

Is Fluoridation of the water supply here in Durham the best way to take care of the citizens?

Is it the best use of our taxpayer's money?

It is a fact that 99% of the water used does not get consumed. It is dumped down the bathtub drain or used for washing dishes. Inciting my next question, why does it cost, in excess of $100,000 per year, to fluoridate our water here in Durham? The answer, by now, should be abundantly clear.

As citizens of Durham County and Civil Servants, who hold positions specifically for our "Public Health", I implore you all to consider these questions, and the concerns of others, as serious complaints against a practice which should be stopped immediately.

Thank you for your time.

My name is ... Kelly McMullen

Attachment 4(c)
Kelly McMullen

We've all been told that Fluoride is good for our teeth, but the scientific evidence today is contrary to this myth.

The Fluoride chemical in our water is a **HAZMAT Class 8 Corrosive Substance** (which means it will burn a hole through all layers of your skin and beyond).

Chemically, it is "one of the most active chemicals in nature." (Dr Waldbott. *Allergic Reaction from Fluorides*, INTERNATIONAL ARCHIVES OF ALLERGY, 1958; Volume 12; Pages 347-355)

It does not magically disappear at the small doses in our water: it interferes with basic chemical processes in our cells and causes disease in our organ systems.

- In the mouth it causes Dental Fluorosis—which is a visible sign of damage to the internal structure of the tooth.
- In the brain it causes hyperactivity, memory problems and lower IQ in children.
- In the lungs, it causes emphysema in people who work around it.
- It impacts our cardiovascular system, our kidneys and the glands of our hormonal system.
- It causes gastrointestinal disorders and weakening of bones.
- It causes many allergic reactions—headaches, nasal congestion, hives and eczema, gastro-intestinal problems, urinary tract problems, and mouth ulcers.
- It is linked to bone and liver cancer.

So, WHY is this chemical in our water?

Fluoride shares a similar history to other toxic agents that we were told were safe.

The major scientific promotor of water Fluoridation was the same doctor who promoted putting lead in gasoline.

The leading scientific proponent of the idea that "1 ppm" of Fluoride in the water was safe is the same doctor responsible for experiments in which citizens in hospitals were injected with plutonium.

The public relations person who campaigned to put fluoride in water (on behalf of the fluoride lawyers industry) is the same person who portrayed smoking as liberating for women (on behalf of the tobacco industry).

Fluoride is produced by the aluminum and pesticide industries and government bomb projects. It is a by-product of chemical and bomb manufacturing.

The **history** of how it ended up in our water is told in the book ***The Fluoride Deception*** by investigative journalist Christopher Bryson, who was a radio producer for the BBC in New York.

You can also view a video interview with Bryson at
http://www.youtube.com/watch?v=Ly_QP4rGczo&feature=player_embedded

Kelly m

78

FLUORIDEALERT.ORG
Fluoride Action Network

NEW VISITORS TAKE ACTION RESEARCHERS

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NEW RESEARCH TRENDING TOPICS

NEW DATA HIGHLIGHTS FLUORIDE/ARTHRITIS RISK

The Fluoride Action Network (FAN) has obtained data showing that the risk of fluoride to bone and joints is far worse than U.S. health authorities have thus far acknowledged. The data shows that, under current U.S. safety standards, people can suffer chronic joint pain and stiffness, including the degenerative joint disease osteoarthritis.

LEARN MORE

"THE MOST DAMAGING ENVIRONMENTAL POLLUTANT OF THE COLD WAR"

THE FLUORIDE DECEPTION
Seven Stories Press 2004

22,680

FLUORIDE ACTION NETWORK MEMBERS

QUICK FACT:

Fluoride is not a nutrient.

SINCE 2010...

56

COMMUNITIES HAVE REJECTED FLUORIDE

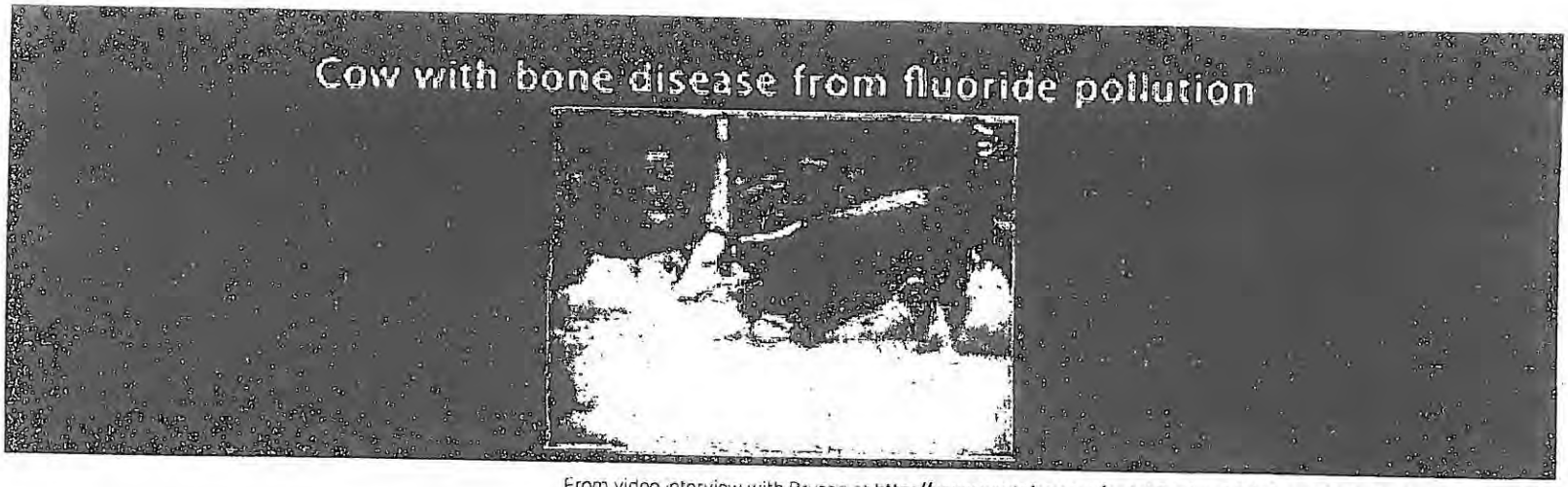
QUICK FACT:

40% of American teenagers have discolored teeth caused by fluoride.

QUICK FACT:

Fluoridation disproportionately harms black children.

It impacts other living creatures, too. It causes bone disease in cattle living near plants where it is produced. These cows with weakened bones can't even walk.



From video interview with Bryson at **http://www.youtube.com/watch?v=Ly_QP4rGczo&feature=player_embedded**

In 1970 the US Department of Agriculture said,

"Airborne fluorides have caused more worldwide damage to domestic animals than any other air pollutant."

FLUORIDEALERT.ORG
Fluoride Action Network

SINCE 2010...
56
COMMUNITIES HAVE REJECTED FLUORIDE.

The Fluoride Deception: an interview with Christopher Bryson

98%
of Western Europe
has rejected Water Fluoridation...

..And yet their children's teeth
are just as healthy as
children's teeth in the U.S.

Having learned more about Fluoride, I do not want my family or animals to continue ingesting this poison. It's my understanding that the City of Durham will implement your recommendation on whether to add it to our water or not. As a citizen here, I am asking that you recommend that the city remove this health hazzard from our drinking water.

Scott Boggs

My NAME IS. . LIVED IN DURHAM FOR 14 YEARS

Please Stop Fluoridating Durham THANK YOU FOR CONSIDERING THIS TOPIC.

1. Most developed countries do NOT fluoridate their water.
2. Fluoridation of water constitutes imposing a medical treatment on citizens without their consent.
    a. If people want to use fluoride they should do so themselves as a personal choice.
    b. Most people would do so using fluoride topically NOT internally.
3. Given the state of the economy, do we not have other safe and healthy ways to spend $100K or more each year?
4. Industrial and civic practices have numerous examples of being terribly wrong:
    a. At one time, lead was said to cause no harm and was considered safe for paints, pipes, and gasoline.
    b. Science once told us that tobacco caused no harm.
    c. Yet today, many studies already exist which indicate that fluoride's effects include:
        i. Damage to the brain
        ii. Lowering of IQ in children
        iii. Damage to endocrine glands including the thyroid and pineal glands
        iv. Damage to the skeletal system and arthritis-like symptoms
        v. And other studies have questioned whether fluoride in water actually benefits teeth.

In summary, it is not disputed that fluoride is a poison—if you jumped in a vat of it you would likely die—and, given the numerous dangers associated with this toxin, why would we spend large amounts of taxpayer money to force all so-called Bull Citizens to ingest this poison every time we drink a glass of water?

Please stop fluoridating Durham's water.

Thank you.

Scott Boggs

Rachel Godfrey

Water Fluoridation City Council Presentation

I am here today to request that we stop water fluoridation in ~~Wake County~~ Durham. We are currently spending $173,000 per year to purchase Hydrofluorosilicic Acid, a hazardous toxic waste product from the phosphate fertilizer industry, to add to the public water supply for the purpose of reducing tooth decay. **The EPA's Headquarters Professionals' Union opposes water fluoridation 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.** 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.i Why stop water fluoridation?

1.) **There is new evidence of potential serious harm resulting from long-term fluoride ingestion** including damage to the brain and nerves, immune system, endocrine system, the renal system and the skeletal system.[ii]
2.) **By adding fluoride to the public water supply it is increasingly difficult** if not impossible **to control the dose each individual is receiving.**
3.) **Water fluoridation violates the principle of informed consent.**

Water Fluoridation and Scientific Research

A fluoride toxicology study was published in March of 2006 by the National Academy of Science - National Research Council. The study is called "Fluoride in Drinking Water: A Scientific Review of EPA's Standards"iii. This documentation was based on studies that met strict criteria (i.e. peer-reviewed published evidence on the toxicology of fluoride).[iv]

Areas that showed risk of serious harm are:

1.) **Fluoride and Bones:** Fracture risk and bone strength have been studied in animal models. The weight of evidence indicates that, although fluoride might increase bone volume, there is less strength per unit volume. (See page 7)[v]
2.) **Fluoride and the Brain: Several studies from China have reported the effects of fluoride in drinking water on cognitive capacities** (X. Li et al. 1995; Zhao et al. 1996; Lu et al. 2000; Xiang et al. 2003a,b). **"The IQ scores in both males and females declined with increasing fluoride exposure."** (See pages 205-223)[vi] On the basis of information largely derived from histological, chemical, and molecular studies, it is apparent that fluorides have the ability to interfere with the functions of the brain and the body by direct and indirect means. To determine the possible adverse effects of fluoride, additional data from both the experimental and the clinical sciences are needed. (See page 222)[vii]

3.) **Fluoride and Behavior: A peer-reviewed study** published in the *Journal of Neurotoxicology and Teratology* **performed by Dr. Phyllis Mullenix showed that brain function was vulnerable to fluoride**, that the effects on behavior depended on the age at exposure and that fluoride accumulated in brain tissues. Rats exposed as adults displayed behavior-specific changes typical of cognitive deficits, whereas rats exposed prenatally had dispersed behaviors typical of hyperactivity. Brain histology was not examined, but the behavioral changes were consistent with those seen when hippocampal development is interrupted and memory problems emerge. **Overall, they concluded that the** rat **study flagged potential for motor dysfunction, IQ deficits and/or learning disabilities in humans.**[viii]

4.) **Fluoride and the Endocrine System:** "In summary, evidence of several types indicates that fluoride affects normal endocrine function or response; the effects of the fluoride-induced changes vary in degree and kind in different individuals. Fluoride is therefore an endocrine disruptor in the broad sense of altering normal endocrine function or response, although probably not in the sense of mimicking a normal hormone."[ix] "The effects of fluoride on various aspects of endocrine function should be examined further, particularly with respect to a possible role in the development of several diseases or mental states in the United States. Major areas for investigation include the following:

   a. **thyroid disease** (especially in light of decreasing iodine intake by the U.S. population);
   b. **nutritional (calcium deficiency) rickets**;
   c. **calcium metabolism** (including measurements of both calcitonin and PTH);
   d. **pineal function** (including, but not limited to, melatonin production); and
   e. **development of glucose intolerance and diabetes**."[x]

5.) **Fluoride and the Immune System:** "Studies of the effects of fluoride on the kidney, liver, and immune system indicate that exposure to concentrations much higher than 4 mg/L can affect renal tissues and function and cause hepatic and immunologic alterations in test animals and in vitro test systems."[xi] "In patients with reduced renal function, the potential for fluoride accumulation in the skeleton is increased. It has been known for many years that people with renal insufficiency have elevated plasma fluoride concentrations compared with normal healthy persons and are at a higher risk of developing skeletal fluorosis."[xii]

6.) **Fluoride and Cancer:** "Fluoride appears to have the potential to initiate or promote cancers, particularly of the bone, but the evidence to date is tentative and mixed... osteosarcoma is of particular concern as a potential effect of fluoride because of (1) fluoride deposition in bone, (2) the mitogenic effect of fluoride on bone cells, (3) animal results described above, and (4) pre-1993 publication of some positive, as well as negative, epidemiologic reports on associations of fluoride exposure with osteosarcoma risk."[xiii]

Elise Bassin's Harvard PhD thesis found an association between fluoride exposure in drinking water during childhood and the incidence of osteosarcoma among males but not consistently among females[xiv]

Water Fluoridation and Controlling the Dose

The population is exposed to several sources of fluoride including drinking water, bath water, toothpaste, processed cereals, commercial beverages, and more. Furthermore, there is no system in place to actively monitor individuals for over-exposure to fluoride or a mechanism to allow the individuals that have been over-exposed to opt-out of future exposure without significant cost. Following are sub-populations that are specifically at risk.

Infants & Young Children: The CDC's National Health and Nutrition Examination Survey shows that in 25 of the 28 largest cities in the U.S., fluoride levels in tap water alone will put 8 to 36 percent of all babies up to 6 months of age over the safe dose of fluoride on any given day.

The NHANES survey from 1999-2002 found an overall dental fluorosis rate of 32 percent among U.S. school children aged 6 to 19 years old (CDC 2005a, CDC 2005b).[xv]

Individuals with impaired kidney function: In patients with reduced renal function, the potential for fluoride accumulation in the skeleton is increased (see Chapter 3). It has been known for many years that people with renal insufficiency have elevated plasma fluoride concentrations compared with normal healthy persons (Hanhijärvi et al. 1972) and are at a higher risk of developing skeletal fluorosis (Juncos and Donadio 1972; Johnson et al. 1979).[xvi]

The National Kidney Foundation released a statement including the following recommendation: "It would also seem prudent to monitor the fluoride intake of patients with chronic renal impairment, particularly those living in areas of high naturally occurring fluoride, children, those with excessive fluoride intake, and those with prolonged disease." [xvii]

"Although several position statements recommend monitoring intake in the potentially susceptible Chronic Kidney Disease population,1,3 the absence of fluoride concentrations on food and beverage labels and lack of data about fluoride intake from dental products and other sources makes this difficult to implement."[xviii]

Elderly: "A study involving lifetime exposure to 4.3–8 ppm fluoride in drinking water found an elevated risk of hip fractures among elderly men and women; this elevated risk of hip fracture was also observed in a community with very low fluoride (0.25–0.34 ppm) in the water."[xix]

Because we have added fluoride to the public water supply we can assume that the public is now being exposed to several sources of fluoride in addition to drinking water. Fluoride is readily absorbed through the skin when showering or bathing. Fluoride is found in many

processed foods and beverages. The major sources of exposure to fluoride are drinking water, food, dental products, and pesticides.xx

Dose should be determined by how much fluoridated food and fluoridated beverages you consume in addition to other sources, such as toothpaste and bathing in fluoridated water. Then we have to consider body weight and size and the capability of each individual's body to eliminate fluoride.
This makes it very difficult to determine the actual amount of fluoride that each individual has consumed and that may be accumulating in our systems on a daily basis.

Water Fluoridation and Informed Consent

It is every individual's right to be informed about the benefits and risks of medical treatment and to decide what happens to his/her body. **By adding fluoride to the public water supply we are denying all individuals the right to review the relevant scientific studies, consider their own personal physiological factors, and make informed decisions to accept or reject treatment of fluoridation.**

By mandating that fluoride be added to the public water supply for the purpose of mass medicating the public to prevent tooth decay **we are requiring citizens to purchase a product from private industry. The product is hydrofluorosilicic acid, a non-pharmaceutical-grade hazardous waste from the phosphate fertilizer industry.** These chemicals are collected from the pollution scrubbers of the phosphate fertilizer industry. The scrubber liquors contain contaminants such as arsenic, lead, cadmium, mercury, and radioactive particles, are legally regulated as toxic waste, and are prohibited from direct dispersal into the environment. Upon being sold (unrefined) to municipalities as fluoridating agents, these same substances are then considered a "product", allowing them to be dispensed through fluoridated municipal water systems.xxi Secondly, **we are mass medicating the public without regard for sub-populations that may be at risk for harmful side effects. Additionally, this puts the citizens at risk for being ethically, legally, and financially liable for future lawsuits resulting from harmful effects caused by fluoride in affected individuals.**

Tooth decay is not a life-threatening or contagious disease. Fluoride is readily available in controllable doses in inexpensive products, such as toothpaste, to all socioeconomic groups. In this form it is more safely distributed for topical use for individuals that wish to benefit from its use and avoid any potential unwanted systemic side effects.

I would like to request from you the peer-reviewed, published toxicological and clinical studies that prove that long-term ingestion (not merely topical use) of the Hydrofluorosilicic Acid product that we currently allow in our public water supply is in fact safe and effective in preventing tooth decay and does not include any serious risks. If you determine that these studies either have not been performed or

that the results indicate harmful side effects I ask you to consider a moratorium on the practice of water fluoridation.

Please feel free to contact me for additional documentation or with any questions you may have.

Contact Information:
Rachel Godfrey
rkgodfrey@gmail.com

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[i] J. William Hirzy, Ph.D., NTEU CHAPTER 280 - U.S. ENVIRONMENTAL PROTECTION AGENCY, "WHY EPA HEADQUARTERS UNION OF SCIENTISTS OPPOSES FLUORIDATION", http://www.nteu280.org/Issues/Fluoride/NTEU280-Fluoride.htm,

[ii] Dr. Emily Kane, "Recent peer-reviewed publications about Fluoride", http://dremilykane.com/2007/09/27/recent-peer-reviewed-publications-about-fluoride/, September 27th, 2007.

[iii] Committee on Fluoride in Drinking Water, National Research Council, "Fluoride in Drinking Water: A Scientific Review of EPA's Standards", http://www.nap.edu/catalog.php?record_id=11571#toc, 2006.

[iv] Dr. Emily Kane, "Recent peer-reviewed publications about Fluoride", http://dremilykane.com/2007/09/27/recent-peer-reviewed-publications-about-fluoride/, September 27th, 2007.

[v] Committee on Fluoride in Drinking Water, National Research Council, "Fluoride in Drinking Water: A Scientific Review of EPA's Standards", pages 7, 131-180, http://www.nap.edu/catalog.php?record_id=11571#toc, 2006.

[vi] Ibid, pages 205-223, http://www.nap.edu/catalog.php?record_id=11571#toc,

[vii] Ibid, page 222, http://www.nap.edu/catalog.php?record_id=11571#toc,

[viii] Dr. Phyllis Mullenix, "Neurotoxicity of Sodium Fluoride in Rats", http://www.fluoridealert.org/health/brain/mullenix1995.pdf, 1995.

[ix] Committee on Fluoride in Drinking Water, National Research Council, "Fluoride in Drinking Water: A Scientific Review of EPA's Standards", page 223, http://www.nap.edu/catalog.php?record_id=11571#toc, 2006.

[x] Ibid, page 267, http://www.nap.edu/catalog.php?record_id=11571#toc,.

[xi] Ibid, pages 295-302, http://www.nap.edu/catalog.php?record_id=11571#toc,.

[xii] Ibid, page 172, http://www.nap.edu/catalog.php?record_id=11571#toc,.

[xiii] Ibid, page 336, http://www.nap.edu/catalog.php?record_id=11571#toc,.

[xiv] Bassin EB, Wypij D, Davis RB, Mittleman MA, "Age-specific fluoride exposure in drinking water and osteosarcoma (United States)". *Cancer Causes and Control, pages* 421–428.

[xv] Environmental Working Group, "National Academy Calls for Lowering Fluoride Limits in Tap Water", http://www.ewg.org/release/national-academy-calls-lowering-fluoride-limits-tap-water, March 26, 2006.

[xvi] Committee on Fluoride in Drinking Water, National Research Council, "Fluoride in Drinking Water: A Scientific Review of EPA's Standards", page 172, http://www.nap.edu/catalog.php?record_id=11571#toc, 2006.

[xvii] National Kidney Foundation, "Fluoride Intake in Chronic Kidney Disease", page 1, http://www.kidney.org/atoz/pdf/fluoride_intake_in_ckd.pdf, April 15th, 2008.

[xviii] Ibid, page 4, http://www.kidney.org/atoz/pdf/fluoride_intake_in_ckd.pdf.

[xix] U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, Public Health Service, Agency for Toxic Substances and Disease Registry, "TOXICOLOGICAL PROFILE FOR FLUORIDES, HYDROGEN FLUORIDE, AND FLUORINE", page 40, September 2003, http://www.atsdr.cdc.gov/toxprofiles/tp11.pdf.

[xx] Committee on Fluoride in Drinking Water, National Research Council, "Fluoride in Drinking Water: A Scientific Review of EPA's Standards", page 3, http://www.nap.edu/catalog.php?record_id=11571#toc, 2006.

[xxi] NTEU CHAPTER 280 - U.S. ENVIRONMENTAL PROTECTION AGENCY, "A STATEMENT OF CONCERN ON FLUORIDATION",http://www.nteu280.org/Issues/Fluoride/flouridestatement.htm, 2005.

Rachel God Rachel Godfrey

Coalition of U.S. Environmental Protection Agency Unions

August 5, 2005

RE: Bone Cancer-Fluoride Link

Hon. Stephen L. Johnson, Administrator
U.S. Environmental Protection Agency

Dear Administrator Johnson:

We, the undersigned representatives of a majority (eleven) of EPA's employee unions, are requesting that you direct the Office of Water to issue an Advanced Notice of Proposed Rulemaking setting the maximum contaminant level goal for fluoride at zero, in accordance with Agency policy for all likely or known human carcinogens. Our request is based on the overall weight of the evidence supporting the classification of fluoride as a human carcinogen, including new information from Harvard on the link between fluoride in drinking water and osteosarcoma in boys that was conveyed to you in a meeting with union officials on May 4, 2005.

We appreciate that the Agency anticipates a report next year from the National Research Council on the propriety of its current drinking water standards for fluoride. But it seems highly inappropriate for EPA to do nothing now that it is in possession of this science, while millions of young boys continue to be exposed unwittingly to the elevated risk of a fatal bone cancer as the Agency waits for the NRC to issue its report, then for the report to undergo peer review, and then for the Agency to undertake its own deliberations.

By issuing an Advanced Notice of Proposed Rulemaking the Agency would inform the public and local health authorities about the results of the doctoral dissertation from the Harvard School of Dental Medicine by Elise Bassin without committing the Agency to a formal rulemaking until all those other steps are taken.

It is noteworthy that when industry becomes aware of important new scientific findings like this, it has (depending on the specific statute) a very brief time to notify EPA. The Agency is then expected to take timely and appropriate action based on the specifics of that notification. In the present case EPA is aware of important new, high quality evidence of potentially serious danger to young boys drinking fluoridated water, and we believe EPA has an ethical duty to send an effective warning immediately about this hazard.

It may in fact be appropriate for you to direct EPA's Office of Criminal Enforcement to investigate why Dr. Bassin's study, which was of sufficient quality for her to earn her doctoral degree, remained hidden from EPA for four years. Alternatively, you could request that the Department of Justice undertake the investigation.

As you know, the apparent cover up of the link between water fluoridation and a seven-fold increased risk of osteosarcoma in young boys, shown by the research of Dr. Bassin, is now national news. Major newspapers, including the *Washington Post* and the *Wall Street Journal* have covered the story. The Environmental Working Group has petitioned the National

Toxicology Program to classify fluoride as a human carcinogen based in part on Dr. Bassin's work. (We recommend EWG's petition as a succinct and authoritative overview of the total weight of peer-reviewed evidence supporting the classification of fluoride as a human carcinogen.) EWG has also caused an investigation of the cover up to be started by Harvard and NIEHS, which funded the research.

The eyes of the nation are on the federal science establishment because of a host of scientific integrity issues. Former EPA Assistant Administrator Lynn Goldman and Roni Neff have just published a paper in the American Journal of Public Health on the cost of delayed adoption of health-protective standards that illuminates the real public health costs of the government's failure to act on sound scientific evidence.

We believe our Agency can make an important statement about its commitment to scientific integrity and its application to public health protection by taking the precautionary action we are recommending.

We at EPA can be ahead of the curve on this important issue or behind it. We do not think the latter choice is in the best interest of the public, the Civil Service or EPA, and we fervently and respectfully hope that you will agree with us. As a wise man once said, "The science is what the science is."

We will be happy to discuss this with you and your advisers at your convenience.

Sincerely,

Dwight A. Welch, President
NTEU Chapter 280
280
EPA Headquarters

J. William Hirzy, Vice-President
NTEU
EPA Headquarters

/s/Steve Shapiro, President
AFGE local 3331
EPA Headquarters

/s/Paul Sacker, President
AFGE Local 3911
Region 2 Office, New York

/s/Larry Penley. President
NTEU Chapter 279
EPA Cincinnati Laboratory

/s/Nancy Barron, President
NAGE Local R5-55
Region 4 Office, Atlanta

/s/Wendell Smith, President

/s/Patrick Chan, President

ESC/IFPTE Local 20
Region 9 Office, San Francisco

/s/Henry Burrell, President
AFGE Local 3428
Region 1 Office, Boston

/s/Frank Beck, President
AFGE Local 2900
Ada Laboratory

NTEU Chapter 295
Region 9 Office, San Francisco

/s/Alan Hollis, President
AFGE Local 3611
Region 3 Office, Philadelphia

/s/Mark Coryell, President
AFGE Local 3907
Ann Arbor Laboratory

cc:

Sen. James Inhofe
Sen. Mike Enzi
Sen. Saxby Chambliss
Sen. Ted Stevens

Sen. James Jeffords
Sen. Edward Kennedy
Sen. Tom Harkin
Sen. Daniel Inouye

Rep. Joe Barton
Rep. Sherwood Boehlert
Rep. Paul Gillmor
Rep. Nathan Deal
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Rep. John Dingell
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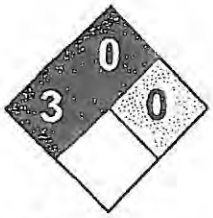
Rep. Sherrod Brown



Material Safety Data Sheet
Fluosilicic acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Fluosilicic acid

Catalog Codes: SLF1735

CAS#: 16961-83-4

RTECS: VV8225000

TSCA: TSCA 8(b) inventory: Fluosilicic acid

CI#: Not available.

Synonym: Hydrogen hexafluorosilicate

Chemical Name: Not available.

Chemical Formula: H2SiF6

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Fluosilicic acid	16961-83-4	100

Toxicological Data on Ingredients: Fluosilicic acid LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Extremely hazardous in case of skin contact (corrosive, irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Extremely hazardous in case of skin contact (corrosive, irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated or prolonged inhalation of vapors may lead to chronic respiratory irritation.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Corrosive liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal.

Section 7: Handling and Storage

Precautions:
Keep container dry. Do not breathe gas/fumes/ vapour/spray. Never add water to this product In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes May corrode glass. Store in an appropriate container.

Storage:
May corrode glass. Store In an appropriate container. Corrosive materials should be stored in a separate safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection In Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Fuming liquid.)

Odor: Pungent.

Taste: Not available.

Molecular Weight: 144.08 g/mole

Color: Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: Decomposes.

Melting Point: -20°C (-4°F)

Critical Temperature: Not available.

Specific Gravity: 1.3 (Water = 1)

Vapor Pressure: 218 mm of Hg (@ 20°C)

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (In Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans:
Extremely hazardous in case of skin contact (corrosive, irritant), of ingestion, of inhalation. Hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 8: Corrosive liquid.

Identification: : Fluorosilicic acid : UN1778 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Massachusetts RTK: Fluosilicic acid TSCA 8(b) Inventory: Fluosilicic acid

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC): R35- Causes severe burns.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Why EPA's Headquarters Professionals' Union Opposes Fluoridation

National Treasury Employees Union - Chapter 280 | May 1, 1999
by Dr. J. William Hirzy

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. For a history of how drinking water fluoridation began, see "Fluoride, Teeth and the Atomic Bomb" , by investigative reporters Joel Griffiths and Chris Bryson.

Then, as EPA was engaged in revising its drinking water standard for fluoride in 1985, an employee came to the union with a complaint: he said he was being forced to write into the regulation a statement to the effect that EPA thought it was alright for children to have "funky" teeth. It was OK, EPA said, because it considered that condition to be only a cosmetic effect, not an adverse health effect. The reason for this EPA position was that it was under political pressure to set its health-based standard for fluoride at 4 mg/liter. At that level, EPA knew that a significant number of children develop moderate to severe dental fluorosis , but since it had deemed the effect as only cosmetic, EPA didn't have to set its health-based standard at a lower level to prevent it. We tried to settle this ethics issue quietly, within the family, but EPA was unable or unwilling to resist external political pressure, and we took the fight public with a union amicus curiae brief in a lawsuit filed against EPA by a public interest group. The union has published on this initial involvement period in detail (1) .

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 0.01mg/kg-day from that source alone. This amount of fluoride is more than 100 times the Reference Dose. On the basis of these results the union filed a grievance, asking that EPA provide un-fluoridated drinking water to its employees.

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

*Read an interview with Dr. Hirzy concerning the NTP's Fluoride Cancer study
*Read Dr. Hirzy's June 2000 Testimony to the US Senate

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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Attachment 4(e) iv

Rachel Godfrey

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Neurotoxicity of Sodium Fluoride in Rats

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MULLENIX, P. J., P. K. DENBESTEN, A. SCHUNIOR AND W. J. KERNAN. *Neurotoxicity of sodium fluoride in rats.* NEUROTOXICOL TERATOL 17(2) 169–177, 1995.—Fluoride (F) is known to affect mineralizing tissues, but effects upon the developing brain have not been previously considered. This study in Sprague–Dawley rats compares behavior, body weight, plasma and brain F levels after sodium fluoride (NaF) exposures during late gestation, at weaning or in adults. For prenatal exposures, dams received injections (SC) of 0.13 mg/kg NaF or saline on gestational days 14–18 or 17–19. Weanlings received drinking water containing 0, 75, 100, or 125 ppm F for 6 or 20 weeks, and 3 month-old adults received water containing 100 ppm F for 6 weeks. Behavior was tested in a computer pattern recognition system that classified acts in a novel environment and quantified act initiations, total times and time structures. Fluoride exposures caused sex- and dose-specific behavioral deficits with a common pattern. Males were most sensitive to prenatal day 17–19 exposure, whereas females were more sensitive to weanling and adult exposures. After fluoride ingestion, the severity of the effect on behavior increased directly with plasma F levels and F concentrations in specific brain regions. Such association is important considering that plasma levels in this rat model (0.059 to 0.640 ppm F) are similar to those reported in humans exposed to high levels of fluoride.

Fluoride Neurotoxicity Central nervous system

DENTAL fluorosis has been on the rise since the 1950s, indicating that our total fluoride exposure is increasing (9). Fluoride, including sodium fluoride (NaF), has been added to public water supplies for over 40 years in the United States as a preventative measure against dental caries. Other sources of fluoride exposure include processed beverages, toothpastes, mouth rinses, dietary supplements, and food. Although dental fluorosis causes discoloration of teeth, it is not considered a public health concern because it does not hinder tooth function or oral health. In addition, no clear link has been established between fluoride and cancer risk, bone fractures, birth defects, or problems of the gastrointestinal, genito-urinary, or respiratory systems (1). Therefore, the impetus to limit total fluoride exposure in the United States is currently based on cosmetic concerns and a general desire not to expose the public to any more fluoride than the amount necessary to prevent dental caries.

One concern that has not been fully investigated is the link between fluoride and effects on the central nervous system (CNS). In vitro studies have shown that intracellular fluoride can alter the kinetic properties of calcium currents in hippocampal neurons (22). Fluoride is a normal component of cerebrospinal fluid (21), but it has not been found to accumulate there during endemic fluorosis or nervous system disease (21,41). Yet, there have been reports from Chinese investigators that high levels of fluoride in drinking water (i.e., 3–11 ppm) affect the nervous system directly without first causing physical deformations from skeletal fluorosis (13,20,40). One study of adult humans found attention affected by sublingual drops containing 100 ppm of sodium fluoride (39), an exposure level potentially relevant to humans because toothpastes contain 1000 to 1500 ppm fluoride (8,48) and mouthrinses contain 230–900 ppm fluoride (48).

Many years of ubiquitous fluoride exposure have not resulted in obvious CNS problems such as seizures, lethargy, salivation, tremors, paralysis, or sensory deficits. Still unexplored, however, is the possibility that fluoride exposure is linked with subtle brain dysfunction. The present study evaluates the neurotoxic potential of sodium fluoride in an animal model. It uses behavioral methodology that focuses on behavioral repertoire, responses to novelty and the temporal or sequential organization of spontaneous behavior, all important

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TABLE I

EFFECTS OF PRENATAL FLUORIDE EXPOSURE IN 9-WEEK-OLD RATS

Gestational Age of F Exposure	Body Weight (g ± SD)		Plasma F (ppm ± SD)		Behavior (RS Statistic)
	Control	Exposed	Control	Exposed	
Females					
Days 14–18	228.6 ± 15.6 n = 18	240.5 ± 15.6 n = 27			0.037 n = 18 pairs
Days 17–19	242.0 ± 15.0 n = 24	244.0 ± 22.9 n = 24	0.008 ± 0.002 n = 9	0.008 ± 0.003 n = 10	0.066 n = 20 pairs
Males					
Days 14–18	347.4 ± 25.3 n = 20	351.8 ± 38.7 n = 31			0.082 n = 20 pairs
Days 17–19	366.2 ± 37.9 n = 24	371.0 ± 32.4 n = 24	0.011 ± 0.003 n = 10	0.008 ± 0.002 n = 11	0.144* n = 20 pairs

*$p < 0.001$.

to the study of CNS function and cognitive processes (12, 32,35,46). Rats were exposed at various stages of development to determine critical periods of CNS susceptibility to fluoride. Also, effects on behavior were related to levels of fluoride found in plasma and in different regions of the brain.

METHOD

Animals

Five hundred and thirty-two pathogen-free Sprague–Dawley rats from the Charles River Laboratories (Kingston, RI) were evaluated in this study. All procedures were conducted under the auspices of Forsyth Dental Center's Animal Care and Use Committee. The animals were assigned randomly to either experimental or control groups and housed 2/cage/treatment and sex. Light cycles were maintained as 12L : 12D cycle (6:00 a.m. to 6:00 p.m.), and food and water were given ad lib except during the behavioral observation periods. Body weight was recorded once weekly and a t test was applied with a $p < 0.01$ required for significance. Further details of treatment protocols depended on the age at exposure.

Prenatal exposures. Twenty-nine timed pregnant dams were obtained on gestational day (GD) 8 (vaginal plug = day 1) and individually housed throughout gestation and lactation. At birth, litters were culled to 10 pups/dam with an equal number of males and females whenever possible. The diet of the dams consisted of Purina Rat Chow (Formulab), and the pups received Certified Purina Rat Chow (5002) after weaning on GD 21. Drinking water for both was deionized water throughout the study. On GDs 14–18 or 17–19, experimental dams (n = 7 and 9, respectively) received SC injections of 0.13 mg/kg sodium fluoride (in saline) two or three times daily (a total of 9 injections per group) at least 4 h apart. Control dams (13 total) received SC injection of an equal volume/body weight of saline on the same gestational days to match each experimental group. This route and concentration of fluoride exposure produces peak plasma fluoride levels of 0.15–0.20 ppm which return to control levels within 4 h in nongravid females (4). Beyond the prenatal period, these pups received no other experimental fluoride treatment.

Weanling exposures. At 19 days of age, male and female pups were shipped with dams having 10 pups/litter. When weaned on GD 21, the pups (n = 19–27/sex and treatment) were maintained thereafter on a low fluoride diet (< 10 ppm fluoride, Purina 5010, or Teklad L356, Madison, WI). When teeth were broken in either the control or experimental groups, this diet was given in powdered form for a few days until normal occlusion returned. Their drinking water contained either 0, 75, 100, 125, or 175 ppm fluoride (3.9, 5.3, 6.6, or 9.2 mM NaF in deionized water, respectively) for 6 or 20 weeks. The 175 ppm level, studied only in females, resulted in dehydration and the death of 10 of the exposed animals within 10 days. Therefore, the 175 ppm exposure was discontinued after 10 days, and the 11 survivors were given deionized water for the remainder of the study. Each fluoride treatment group had matching controls who received deionized water only. This range of fluoride exposures was selected because 100 ppm fluoride in drinking water produces dental fluorosis without other overt signs of toxicity in rats (11).

Adult exposures. Male and female rats (n = 21–24/sex/treatment) were obtained at 10 weeks of age and given 0 or 100 ppm sodium fluoride in deionized water for 5 to 6 weeks starting at 12 weeks of age. They were fed the same low fluoride diet as in the weanling exposure.

Plasma and Brain Fluoride

After the behavioral tests at the termination of each study, blood samples were collected by cardiac puncture under CO_2 anesthesia. When plasma fluoride determinations were needed at ages prior to termination of the study, blood samples were obtained from extra control and exposed animals not included in any behavioral study. All plasma fluoride concentrations were determined using an ion-specific electrode (Orion, Cambridge, MA), following the hexamethyldisiloxane diffusion method (HMDS) of Whitford and Reynolds (51). Brain fluoride concentrations also were determined for two treatment groups receiving weanling or adult exposures. After CO_2 euthanasia, these animals were decapitated and the brain removed, blotted, and chilled with further dissection performed on an ice-cooled glass plate. Seven regions of the rat brain were dissected:

1. Cerebellum,
2. Medulla oblongata,

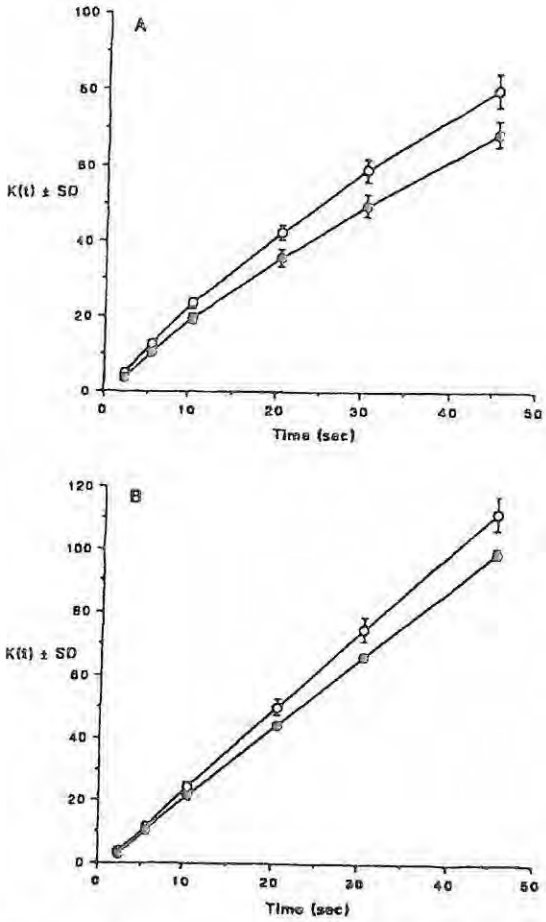

FIG. 1. Regardless of the gestational period of exposure or sex of the offspring, prenatal fluoride typically affected behavioral time structure but not behavioral initiations or total times. These example K functions illustrate the time-structure changes found in 9-week-old male rats significantly affected (RS = 0.144; $p < 0.001$) by fluoride exposure on GDs 17–19 (●) compared to respective controls (○). Significant dispersions (decreased K values) are shown for the behaviors groom/attention (A) and turn (B). Error bars indicate ± SD.

3. Hypothalamus,
4. Midbrain,
5. Striatum,
6. Hippocampus and
7. Cortex

The procedures described in detail by Glowinski and Iversen (17) were used. Each brain region was individually lyophilized and weighed, and the fluoride content was measured following diffusion of ionic fluoride (51).

Behavior

Methods to assess effects on behavior were the same as in prior studies of amphetamine induced hyperactivity and stereotypy (34), triethyltin induced hypoactivity (23), and cognitive deficits induced by CNS therapy (35,36). Except for

TABLE 2

EFFECTS ON BODY WEIGHT BY FLUORIDE EXPOSURE STARTED AT WEANING

F in Drinking Water	Exposure Duration	Age When Weighed	Controls $\bar{x}$ ± SD	Exposed $\bar{x}$ ± SD
Females				
75 ppm	6 weeks	9 weeks	248.1 ± 19.3 n = 20	257.0 ± 30.2 n = 21
100 ppm	6 weeks	9 weeks	247.0 ± 23.0 n = 22	242.0 ± 24.0 n = 22
125 ppm	6 weeks	9 weeks	237.7 ± 15.4 n = 21	208.3 ± 30.2† n = 26
	11 weeks	14 weeks	296.1 ± 25.8 n = 21	265.1 ± 26.2† n = 27
	16 weeks	19 weeks	329.0 ± 26.1 n = 21	300.4 ± 31.6* n = 27
	20 weeks	23 weeks	339.1 ± 30.1 n = 21	313.4 ± 33.4* n = 26
175 ppm	10 days	9 weeks	227.0 ± 20.8 n = 19	206.5 ± 11.5* n = 11
	10 days	18 weeks	352.9 ± 33.3 n = 16	331.4 ± 31.8 n = 11
Males				
75 ppm	6 weeks	9 weeks	381.1 ± 25.4 n = 20	380.9 ± 21.8 n = 21
125 ppm	6 weeks	9 weeks	380.1 ± 37.2 n = 21	330.1 ± 35.9‡ n = 24
	11 weeks	14 weeks	545.1 ± 56.1 n = 18	451.3 ± 30.1‡ n = 23
	16 weeks	19 weeks	656.6 ± 80.3 n = 21	553.6 ± 44.4‡ n = 25
	20 weeks	23 weeks	717.8 ± 90.8 n = 21	592.9 ± 66.3‡ n = 25

*$p < 0.01$, t-test; †$p < 0.001$, t-test; ‡$p < 0.0001$, t-test.

TABLE 3

PLASMA FLUORIDE LEVELS AFTER FLUORIDE EXPOSURE STARTED AT WEANING

F in Drinking Water	Exposure Duration	Age When Measured	Controls ppm ± SD	Exposed ppm ± SD
Females				
75 ppm	6 weeks	9 weeks	0.009 ± 0.003 n = 8	0.066 ± 0.02† n = 8
100 ppm	6 weeks	9 weeks	0.007 ± 0.001 n = 6	0.150 ± 0.03‡ n = 7
125 ppm	6 weeks	9 weeks	0.006 ± 0.001 n = 4	0.107 ± 0.028‡ n = 6
	20 weeks	23 weeks	0.015 ± 0.006 n = 8	0.640 ± 0.308‡ n = 8
Males				
75 ppm	6 weeks	9 weeks	0.012 ± 0.002 n = 10	0.170 ± 0.097‡ n = 10
125 ppm	6 weeks	9 weeks	0.011 ± 0.011 n = 4	0.126 ± 0.031† n = 7
	20 weeks	23 weeks	0.013 ± 0.005 n = 8	0.408 ± 0.255* n = 8

*$p < 0.01$, t test; †$p < 0.001$, t test; ‡$p < 0.0001$, t test.

fects from noise (24). This statistic encompasses all data produced in an experiment into one simple statistic. This is an advantage considering that the computer system generates over 100 behavioral measures of three distinctly different types (initiations, total times, and time structures) per experiment. The RS statistic indicates whether behavior is changed overall and the confidence level associated with that change. Statistical significance was set at the $p < 0.01$ level.

RESULTS

Prenatal Exposures

No maternal or offspring toxicity was indicated by reduced body weight in dams during treatment or in their pups soon after birth. Yet, prenatal exposure to sodium fluoride altered behavioral outcome in male offspring when exposure occurred on GDs 17–19 (Table 1). This effect consisted entirely of time structure changes in 11 behaviors and behavioral sequences, 10 of which were significantly dispersed compared to matching controls as illustrated in Fig. 1. These behavioral effects did not coincide with reduced body weight nor elevated plasma fluoride levels at 9 weeks of age (Table 1). At 3 weeks of age, plasma fluoride levels also were not elevated despite prenatal exposure on GD 17–19; plasma fluoride levels were no different in prenatal fluoride females (0.007 ppm ± 0.003 SD; $n = 7$) compared to matched controls (0.006 ppm ± 0.002 SD; $n = 7$) or in prenatal fluoride males (0.004 ppm ± 0.002 SD; $n = 8$) compared to controls (0.004 ppm ± 0.003 SD; $n = 8$).

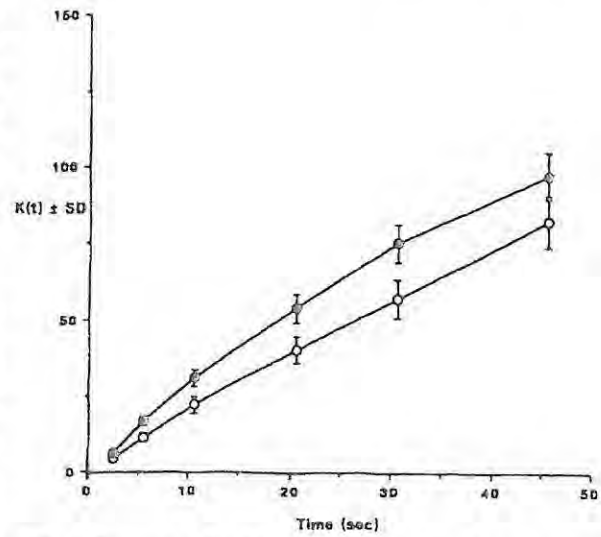

FIG. 4. Exposure to fluoride at the adult stage significantly altered (RS = 0.200; $p < 0.001$) behavior of female rats (●) compared to respective controls (○). This example K function illustrates time-structure changes typical of the adult F effect. Significant clustering (increased K values) is shown for the behavior groom/attention, which prenatal F, in contrast, significantly dispersed (Fig. 1A). Error bars indicate ± SD.

Weanling Exposures

When fluoride exposures began at 21 days of age, effects on body weight depended on the fluoride concentration in the drinking water (Table 2). Concentrations below 125 ppm did not affect body weight gain at any time during a 5- to 6-week exposure. In contrast, at 125 ppm body weight was reduced throughout 20 weeks of exposure in both sexes. The 11 survivors of a 10-day exposure to 175 ppm F also had stunted growth compared to matched controls at 9 weeks of age. However, by 18 weeks of age, stunting among the 175 ppm female survivors was ameliorated (Table 2).

Plasma fluoride levels were significantly increased in all exposed animals, but again the increase depended upon the fluoride concentration given in the drinking water (Table 3). At 75 and 100 ppm fluoride in drinking water of females for 6 weeks, plasma fluoride levels increased respective of dose. When concentration in the drinking water was 125 ppm for 6 weeks, plasma fluoride levels increased compared to controls but not to levels expected considering results observed at lower drinking water concentrations (Table 3).

Fluoride in drinking water of weanlings altered behavior in both sexes (Table 4). The duration and concentration of exposure determined whether significant effects occurred. In females, a 6-week exposure to 100 or 125 ppm was sufficient to alter behavior, whereas in males an 11-week exposure to 125 ppm in drinking water significantly affected behavior. Too few 175 ppm fluoride females (11 in total) survived after a 10-day exposure to determine an RS statistic for that group. A relationship between behavioral effects and plasma fluoride levels was observed in females exposed for 6 weeks to 75, 100, or 125 ppm fluoride. Figure 2 illustrates that as plasma fluoride levels increased, the RS statistic increased, with significant behavioral impact estimated to occur at a plasma fluoride level of approximately 0.107 ppm. Significant behavioral impact in males, however, did not occur until plasma levels exceeded 0.126 and 0.170 ppm (Table 3 and Table 4).

Regardless of sex, duration of exposure, or the fluoride concentration in the drinking water of weanlings, a common pattern among behavioral disturbances developed. Table 5 includes all behaviors that were significantly affected in BI and/or BTT by at least one fluoride exposure. Age and sex influenced the BI and BTT of these behaviors in controls, but still a general effect of fluoride emerged. Whether exposure lasted 6 or 16 weeks, at the 100 or 125 ppm level, in males or females, the same direction of change with respect to controls occurred for a certain array of behaviors and related behavioral clusters. Whereas the act of standing and the related attention cluster tended to increase in total time, the other acts consistently decreased in initiations and total times.

Adult Exposures

Male and female adult rats given 100 ppm fluoride for 6 weeks had significantly increased plasma fluoride levels with no effect on body weight, whereas behavior was affected only in females (Table 6). Compared to females exposed at weaning, females exposed as adults had a lower plasma fluoride level (0.077 ppm) associated with significant behavioral impact. However, the same pattern of BI and BTT changes seen with weanling exposures (Table 5) also developed in females exposed as adults. For example, initiations of sitting, the groom/attention cluster, and the groom/explore cluster in adult female controls (42.9 ± 3.0; 50.4 ± 5.4; 23.9 ± 2.4 SE, respectively) were more frequent than in adult exposed females (30.2 ± 3.0; 34.7 ± 3.7; 15.3 ± 1.8 SE, respectively; $p < 0.01$). Another similarity appeared among BTS effects when adult and weanling exposed rats approached 5 months of age (Fig. 3). Other BTS effects appeared to differ

TABLE 7

BRAIN REGION FLUORIDE LEVELS (ppm ± SE) IN 5- TO 6-MONTH-OLD RATS

	Hypothalamus	Cerebellum	Medulla Oblongata	Basal Ganglia	Mid-Brain	Cortex	Hippocampus
Females							
Control*	0.396 ± 0.073 n = 12	0.358 ± 0.055 n = 13	0.609 ± 0.107 n = 14	0.406 ± 0.103 n = 14	0.634 ± 0.213 n = 14	0.479 ± 0.107 n = 14	0.258 ± 0.043 n = 12
125 ppm F for 20 wks in weanlings	1.685 ± 0.565† n = 8	3.120 ± 0.968† n = 8	3.281 ± 1.054† n = 7	1.281 ± 0.229† n = 8	1.091 ± 0.194 n = 8	1.830 ± 0.383† n = 8	0.993 ± 0.168† n = 8
100 ppm F for 6 wks in adults	0.308 ± 0.043 n = 5	0.325 ± 0.052 n = 6	1.280 ± 0.445 n = 6	0.252 ± 0.043 n = 6	0.306 ± 0.087 n = 5	0.602 ± 0.195 n = 6	0.790 ± 0.328* n = 4
Males							
Control	0.364 ± 0.052 n = 14	0.292 ± 0.055 n = 13	0.281 ± 0.044 n = 14	0.273 ± 0.036 n = 14	0.246 ± 0.035 n = 14	0.372 ± 0.069 n = 14	0.287 ± 0.048 n = 14
125 ppm F for 20 wks in weanlings	0.839 ± 0.130† n = 7	2.133 ± 0.573† n = 8	1.875 ± 0.334 n = 8	0.697 ± 0.101† n = 8	0.770 ± 0.145† n = 8	1.727 ± 0.435† n = 8	0.834 ± 0.104† n = 8
100 ppm F for 6 wks in adults	0.340 ± 0.049 n = 5	0.412 ± 0.095 n = 6	3.922 ± 2.379† n = 5	0.422 ± 0.146 n = 5	0.378 ± 0.106 n = 6	0.350 ± 0.057 n = 6	0.411 ± 0.088 n = 6

*Controls pooled from 100 and 125 ppm fluoride exposures; *$p \leq 0.05$; one-factor ANOVA followed by Fisher's procedure for multiple comparisons; †$p \leq 0.01$; one-factor ANOVA followed by Fisher's procedure for multiple comparisons.

depending on the age when exposure occurred; the significant dispersing of groom/attention after prenatal fluoride (Fig. 1) is in contrast with the significant clustering of the same behavior by fluoride exposures started in adults (Figure 4). Future studies will have to determine if this variation is a function of the age at exposure or the age when tested.

Fluoride Levels in Brain

Fluoride exposure via drinking water elevated the fluoride levels in various brain regions (Table 7). In male and female rats exposed to 125 ppm fluoride for 20 weeks starting at weaning, brain fluoride levels increased in all seven brain regions examined. In rats exposed to 100 ppm fluoride for 6 weeks starting at 3 months of age, fluoride levels increased in the medulla oblongata in both sexes and in the hippocampus of females, the sex with significant behavioral disturbances.

DISCUSSION

This study demonstrates a link between certain fluoride exposures and behavioral disruption in the rat. The effect on behavior varied with the timing of exposure during CNS development. Behavioral changes common to weanling and adult exposures were different from those after prenatal exposures. Prenatal exposure on GDs 17–19 dispersed many behaviors as seen in drug-induced hyperactivity (34), while weanling and adult exposures led to behavior-specific changes more related to cognitive deficits (35,36). Prenatally induced behavioral effects were unaccompanied by changes in body weight or elevated plasma fluoride levels. Rather, the most obvious hypothesis is that the effects relied on transient peaks in maternal plasma fluoride levels, fluoride passing the placenta, and fluoride penetrating the blood–brain barrier of the fetus. Fluoride has been reported to pass the placenta in rats (45), and on GD 17–19 the blood–brain barrier is immature and readily penetrable (52). In contrast, the behavioral effects induced by weanling and adult exposures were accompanied often by weight reduction and always by elevated plasma fluoride levels. In fact, effects on behavior related directly to plasma fluoride levels and the fluoride accumulation in the brain. This contradicts findings from short-term fluoride kinetic studies, which found that the adult blood–brain barrier was relatively impermeable to fluoride when whole brain fluoride levels were measured within 1 h following IV injection (49,50). Considering the brain fluoride accumulations found in this study, such impermeability does not apply to chronic exposure situations.

Hyperactivity and cognitive deficits are generally linked with hippocampal damage (3), and in fact, the hippocampus is considered to be the central processor which integrates inputs from the environment, memory, and motivational stimuli to produce behavioral decisions and modify memory (12). GDs 17–19 in the rat is a period when pyramidal cells of the hippocampus are forming (6), and granule cells of the dentate gyrus of the hippocampus form at the ages when weanling and adult exposures were administered (7). Involvement of different cell types would explain variation in behavioral outcomes between prenatal, weanling, and adult exposures. The hypothalamus and the hippocampus in normal female rat brains have the lowest concentrations of fluorine, the element which was found to be the most regionally distributed by instrumental neutron activation analysis (10). The method used for ionic fluoride analysis in the present study also revealed that the brain region containing the lowest fluoride concentrations was the hippocampus of controls but only in females. This hippocampal selectivity was disrupted when adult females were exposed for 6 weeks to 100 ppm fluoride; hippocampal fluoride levels increased and behavior was affected. Adult males receiving the same fluoride exposure did not have significantly elevated fluoride levels in the hippocampus, nor did they have significant behavioral disturbances. Sex differences in hippocampal function have been described recently in other studies (2,47). Overall, the behavioral changes from fluoride exposure are consistent with interrupted hippocampal

development. Whether the hippocamus is indeed the brain region most susceptible to fluoride is a possibility deserving consideration in future studies.

Interruption of normal brain development often results in responses that are sex-dependent. The brain responds differently to drugs depending on which hormones are present at the time and whether the brain is male or female (30). In male primates the orbital cortex matures earlier than in females, and such developmental differences are thought responsible for the consequences of perinatal injuries appearing more frequently in males (18). This type of developmental difference might explain why transient peaks of fluoride on prenatal days 17–19 affected males and not females. The effects of chronic fluoride exposures at weanling and adult stages may have involved still other sexual dimorphisms. There are developmentally regulated sexual dimorphisms in hypothalamic somatostatin and growth-hormone-releasing factor signaling, growth hormone secretion and even hepatic metabolism (5,29,38). The sexually dimorphic control of growth would be especially important to fluoride distribution. The rate of fluoride uptake by bone depends on age or the stage of skeletal development; fluoride is deposited in mineralizing new bone more readily than in existing bone (49). As males experience greater and more prolonged growth spurts than females, their plasma fluoride might be directed more to bone than to brain, perhaps explaining why longer exposures and higher plasma fluoride levels were needed in males to affect behavior. Fluoride's tendency to seek developing bone may also explain why adult female rats had behavioral effects at a lower plasma fluoride concentration than did weanling female rats. Levels of fluoride in plasma and bone must be correlated with those in specific brain regions of both sexes to fully understand behavioral consequences.

Rats ingested 75–125 ppm fluoride for weeks to attain plasma fluoride levels of 0.059–0.640 ppm. Six weeks of consuming 75 and 100 ppm fluoride produced higher plasma fluoride levels than did 125 ppm. Perhaps a taste aversion limited water consumption at the 125 ppm level, prolonging the period needed to attain plasma levels that were achieved in 6 weeks by the two lower exposure levels. Regardless, it was fluoride levels in plasma, not fluoride levels of exposure, which best predicted effects on behavior. Similar plasma fluoride levels of 0.076–0.25 ppm have been found in humans ingesting 5–10 ppm fluoride in drinking water (19,37,42), and plasma levels as high as 0.28 to 0.43 ppm have been measured in children drinking water containing 16 ppm fluoride (44). This plasma fluoride range also occurs in certain therapies. Fasting serum fluoride levels of 0.2 to 0.3 ppm are used in the treatment of osteoporosis (31), and plasma fluoride levels as high as 1.44 ppm are found in children 1 h after receiving topical applications of an acidulated phosphate fluoride (1.23%) gel (14,15).

Because humans occasionally are exposed to high amounts of fluoride and plasma levels as high as those found in this rat study, neurotoxic risks deserve further evaluation. This is the first laboratory study to demonstrate that CNS functional output is vulnerable to fluoride, that the effects on behavior depend on the age at exposure and that fluoride accumulates in brain tissues. Experience with other developmental neurotoxicants prompts expectations that changes in behavioral function will be comparable across species, especially humans and rats (16,43). Of course behaviors per se do not extrapolate, but a generic behavioral pattern disruption as found in this rat study can be indicative of a potential for motor dysfunction, IQ deficits and/or learning disabilities in humans. Substances that accumulate in brain tissue potentiate concerns about neurotoxic risks, but the conditions leading to fluoride deposits in any species are still not clear such that quantitative extrapolations are not possible at this time. Thus, conclusions concerning the neurotoxic potential of fluoride require further rat and human studies, both focused on the relationship of plasma fluoride levels with the brain, behavior, and skeletal growth.

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Fluoride in Water Linked to Lower IQ in Children

Is this the end of water fluoridation?

NEW YORK, Dec. 21, 2010 /PRNewswire-USNewswire/ -- Exposure to fluoride may lower children's intelligence says a study pre-published in *Environmental Health Perspectives*, a publication of the National Institute of Environmental Health Sciences (online December 17, 2010).

Fluoride is added to 70% of U.S. public drinking water supplies.

According to Paul Connett, Ph.D., director of the Fluoride Action Network, "This is the 24th study that has found this association, but this study is stronger than the rest because the authors have controlled for key confounding variables and in addition to correlating lowered IQ with levels of fluoride in the water, the authors found a correlation between lowered IQ and fluoride levels in children's blood. This brings us closer to a cause and effect relationship between fluoride exposure and brain damage in children."

"What is also striking is that the levels of the fluoride in the community where the lowered IQs were recorded were lower than the EPA's so-called 'safe' drinking water standard for fluoride of 4 ppm and far too close for comfort to the levels used in artificial fluoridation programs (0.7 – 1.2 ppm)," says Connett.

In this study, 512 children aged 8-13 years in two Chinese villages were studied and tested – Wamaio with an average of 2.47 mg/L water fluoride (range 0.57-4.50 mg/L) and Xinhuai averaging 0.36 mg/L (range 0.18-0.76 mg/L).

The authors eliminated both lead exposure and iodine deficiency as possible causes for the lowered IQs. They also excluded any children who had a history of brain disease or head injury and none drank brick tea, known to contain high fluoride levels. Neither village is exposed to fluoride pollution from burning coal or other industrial sources.

About 28% of the children in the low-fluoride area scored as bright, normal or higher intelligence compared to only 8% in the "high" fluoride area of Wamaio.

In the high-fluoride city, 15% had scores indicating mental retardation and only 6% in the low-fluoride city.

The study authors write: "In this study we found a significant dose-response relation between fluoride level in serum and children's IQ."

In addition to this study, and the 23 other IQ studies, there have been over 100 animal studies linking fluoride to brain damage (all the IQ and animal brain studies are listed in Appendix 1 in

The Case Against Fluoride available online at
http://fluoridealert.org/caseagainstfluoride appendices.html).

One of the earliest animal studies of fluoride's impact on the brain was published in the U.S. This study by Mullenix et. al (1995) led to the firing of the lead author by the Forsyth Dental Center. "This sent a clear message to other researchers in the U.S. that it was not good for their careers to look into the health effects of fluoride – particularly on the brain," says Connett. Connett adds, "The result is that while the issue of fluoride's impact on IQ is being aggressively pursued around the world, practically no work has been done in the U.S. or other fluoridating countries to repeat their findings. Sadly, health agencies in fluoridated countries seem to be more intent on protecting the fluoridation program than protecting children's brains."

When the National Research Council of the National Academies reviewed this topic in their 507-page report "Fluoride in Drinking Water: A Review of EPA's Standards" published in 2006, only 5 of the 24 IQ studies were available in English. Even so the panel found the link between fluoride exposure and lowered IQ both consistent and "plausible."

According to Tara Blank, Ph.D., the Science and Health Officer for the Fluoride Action Network, "This should be the study that finally ends water fluoridation. Millions of American children are being exposed unnecessarily to this neurotoxin on a daily basis. Who in their right minds would risk lowering their child's intelligence in order to reduce a small amount of tooth decay, for which the evidence is very weak." (see *The Case Against Fluoride*, Chelsea Green, October 2010)
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organization that honors 100 nurses in North Carolina each year for professional excellence. This once in a life-time award, given to the "best of the best", is considered by many to be the crowning achievement to a lifetime spent caring for others. Ann, along with 99 other recognized registered nurses, will be honored at a Black Tie gala event in October in Greensboro.

Ms. Harris introduced Melissa Downey-Piper as the new Division Director of Health Education effective October 1, 2012.

Ms. Harris recognized Marcia Robinson, Public Health Administrator for her leadership role in organizing the 2012 Staff Development Day Training on October 3, 2012. The keynote speaker, Susan Hays Heath spoke on the book "SWITCH".

OLD BUSINESS:

- **Strategic Plan** ***(Activity 15.1)*** ***(Board)***

The Board reviewed and discussed the draft strategic plan. The following comments/changes were made:

- **page 10-11** Strengths/Weaknesses/Opportunities/Threats:
  - Add a statement that explains why responses appeared in multiple sections.
- **page 15** Goal Performance Benchmarks
  - Add quantitative part in the description (changes to be made throughout document)
- **page 15** Strategies for FY
  - Add columns: Anticipated Outcomes and Actual Outcomes (changes to be made throughout the document)
- **page 15** Workforce Development
  - Q - Is there an adequate distribution of supervisor/employee and what is the ratio?
    A - There are some inadequacies in the distribution of supervisors/employee ratio.
    The health department will push to have some type of leadership initiatives established to help employees see themselves in those roles.
- **Page 34** Access to Medical and Dental Care: Change wording of dental benchmark to read "Increase the total number of patients by 25% in the dental clinic"

The changes will be made to the strategic plan document and brought back to the board to be adopted. The board will also review the implementation process at the November 8, 2012 meeting.

Q: Where are we in the County Rankings?
A: In the 2012 rankings, Durham County ranked 8th when compared to the 100 NC counties.

- **Municipal Water Fluoridation** ***(Board)***

The Board acknowledged receipt of information sent by staff and appointed a subcommittee (Dr. Allison, Dr. Short, Dr. Miller and Ms McLaurin, as ex-officio) to review the information that the board has received and to gather any other information regarding fluoridation; then the subcommittee will make a recommendation to the board in the next 60 days. Ms. McClain will contact the subcommittee members to set up a meeting date.

- **Smoke-Free Initiative Update** ***(Activity 34.5)*** (Gayle Harris/Attorney Bryan Wardell)

Ms. Harris stated the City has not installed most of the signs as indicated in the Rule. It appears the City sees the Rule as a County project. The next steps will be to write a letter to the County Manager and the County

20 A Regular Meeting of the Durham County Board of Health, held November 8, 2012.

Statement of goals:

- The Rolling View Water Quality Monitoring Program is designed to inform the general public of the water quality for swimming purposes at the Rolling View swimming beach.
- The OSWP has tested the sampling protocol and lab result turnaround times with three sampling visits to Rolling View Beach. Each sampling visit requires three samples taken at evenly spaced intervals along the beach.

Issues:

- **Opportunities**
  - This program will inform interested citizens of the potential risks of swimming in naturally occurring water bodies. When fecal coliform bacteria counts exceed the established threshold, the beach will be closed until water quality improves.
- **Challenges**
  - Sampling turn-around time and beach closure postings will be the greatest challenge of this program. The spring and summer months are typically the busiest months of the year for all the On-Site Water Protection Programs.
  - Attention will be given to ensure the timely posting of results, facilitate closures when necessary, scheduling re-sampling, and re-opening the beach.

Implication(s)

- **Outcomes**
  - The major outcome of this program will be the educational value and health protection it provides for those swimming at Rolling View Beach.
  - The first three samples were run by the lab on 9/26/2012 to test lab equipment calibration and turnaround time.
  - Additional samples were collected and submitted to the lab on 10/15/2012 and 10/24/2012. Results were available from the lab within 24 hours for all three dates. The highest fecal colony count from the nine samples was 58, well below the threshold of 235 colonies per 100 milliliters.
- **Service delivery**
  - Environmental Health staff will make every effort to continue to deliver mandated services in a timely manner as well as provide water quality monitoring at the Rolling View Swim Beach during the 2013 summer swimming season.
- **Staffing**
  - Existing staff will assume the responsibilities of administering this program.
- **Revenue**
  - This program will produce no revenue for the county.

Next Steps / Mitigation Strategies

- Public Health is prepared to implement this program in April of 2013.

COMMITTEE REPORTS:

- **Ad Hoc Municipal Water Fluoridation Committee** ***(Activity 34.5) (Board)***

The subcommittee comprised of (Dr. Allison, Dr. Miller, Dr. Short, and Chairperson McLaurin, as ex-officio) will meet on Monday, November 19, 2012 at 6pm to discuss the board's next steps in the process.

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DURHAM, N.C. (WTVD) -- Corey Sturmer didn't know much about fluoride in his drinking water until a year ago, when his dentist told him he has fluorisis, a condition that causes white spotting, yellowing and browning of the teeth, and erosion of the enamel.

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"I asked my dentist ... is there fluoride in the drinking water? And he said, yeah ... it's good for your teeth. So then I began to wonder, if it's so good for your teeth, why am I, at 25 years old, having all these issues with my teeth?" Sturmer said.

Sturmer was a college athlete. He eats healthy food and exercises. He started doing research and found evidence that convinced him fluoride might not be as safe as he was led to believe. He came across an I-Team story ABC11 did five years ago in which a Durham dentist told us he believed we're getting too much Fluoride.

"Fluoride in the water is essentially a drug. It's an uncontrolled use of a drug," offered dentist Michael Fleming.

Sturmer said what he learned made him take action.

"That motivated me to reach to you and to continue spreading the word and building up the website and talking to people," said Sturmer.

Sturmer developed a www.durhamagainstfluoride.com website and took his cause to the Durham County Health Department. He's also raising awareness by putting information on cars in downtown Durham.

Sturmer said he's so concerned about the issue that he filters his tap water. His crusade may be limited to Durham, but he's not alone in his fight. A movement to ban fluoride in drinking water is heating up across the country.

In Portland, Oregon this fall, residents protested a city council vote to begin fluoridating tap water next year. They have enough signatures on a petition to take the issue to the ballot box next year. In Wichita, Kansas last week, voters rejected a plan to add fluoride to their public water supply.

"Our task was essentially one of just education. Myself, I thought fluoride was a good thing not long ago," explained Jonathan Hall with Wichitans Opposed to Fluoride.

As the I-Team dug into the science behind the fluoride controversy, we found study after study dating back to the 80s from respected academic and scientific institutions that connect fluoride to health dangers. Some of the studies were funded by the government. They suggest fluoride can be linked to brain, blood and bone deficiencies in humans. This past summer, Harvard University released a report after reviewing 27 studies of children in China exposed to fluoride. It concluded the higher the fluoride exposure, the lower the child's IQ.

One of the most recognized reports was published in 2006 by The National Academy of Sciences. It found fluoride can affect the thyroid gland and potentially lower the intelligence of children.

"EPA's drinking water standards are supposed to protect all persons against anticipated adverse health effects of the contaminant in question," explained Kathleen Thiessen - one of the scientists who worked on the 400-page study. "And we concluded after three years worth of work that the drinking water standard for fluoride was not protected and cannot be assumed to be safe for humans."

Thiessen said the EPA was warned about potential fluoride health dangers by one of its own chemists more than a decade ago. Dr. William Hirzy testified before a Senate subcommittee in 2000. He was representing the views of EPA scientists and staff who analyze hazards in the environment.

"In 1997, we voted to oppose fluoridation, and our opposition has grown stronger as more adverse data on the practice has come in," said Hirzy.

"The CDC and others say whatever beneficial effect there is from fluoride is from topical use. It's not from swallowing it. It never has been from swallowing it," said Thiessen.

The I-Team discovered most western countries do not fluoridate their water. Dental records kept by the World Health Organization show tooth decay in those countries has declined at the same rate as here in the United States - where we do fluoridate our water. The American Dental Association has endorsed fluoridation since it began in this country more than 50 years ago.

"[It] has been shown to be a very safe and very effective preventive measure for treating a disease that is rampant in our population," said Dr. Tim Wright with the UNC School of Dentistry. "There is no public health measure that is as cost effective as water fluoridation to prevent tooth decay ... Fluoride is like so many things that in the right amount it's very beneficial, and if you have too much, too much is not a good thing. So are we getting too much?"

Six years ago, the ADA thought infants might be getting too much fluoride and it warned parents not to use fluoridated water - but bottled water - to mix baby formula. Dentists also want to make sure children don't get too much when they brush their teeth.

"That is why we currently recommend a smear or a grain-sized amount. So a very small amount in a child from the time they first get their teeth - which is six months to a year - until they turn 3. And then at 3, the recommendation is to go to more of a pea-sized amount so there's a little bit more," Dr. Wright explained.

Sturmer points to the warning label on toothpaste.

"If you look on the other side of that toothpaste tube, it says 'Do not swallow.' We've been taught as kids, when you're brushing your teeth, do not swallow the toothpaste foam. Why is that?" he asked. "Because fluoride is poisonous ... So why is it in the water? Why do we need to drink it?"

The EPA doesn't believe the amount of fluoride in water is causing harm. It has not changed fluoride standards for drinking water more than six years after the report by The National Academy of Sciences, and that frustrates scientist Kathleen Thiessen.

"There probably never was a beneficial effect. Certainly by now when we have fluoride in toothpaste, we have fluoride in mouth rinse, we have fluoride in a number of sources. It is extremely easy to have too much fluoride. It's much harder to control it," she said.

"I think all city governments ... need to reconsider water fluoridation. The science is out there, the citizens who are concerned are out there, and they are making their voices known," said Sturmer.

Sturmer has convinced the Durham County Public Health Department to look into the safety of fluoride in the water.

The National Institutes of Health - for the first time ever - is currently funding an animal study to assess fluoride's effect on the brain.

Click here for more information on Fluoride

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Attachment 8

DCoBoard of Health Ad Hoc Committee: Municipal Water Fluoridation
November 19, 2012
Minutes

Members present: Dr. F. Vincent Allison, Chair; Dr. Nancy Short; Dr. Jim Miller; and Mrs. Sue McLaurin, Board Chair, Ex Officio member
Staff members present: Dr. Miriam McIntosh, Rebecca Freeman and Gayle Harris

The meeting convened at 6:00 p.m. in the Health Director's conference room with the expressed purpose of beginning the due diligence required to address the issue presented during the September Board of Health meeting – Should fluoride continue to be added to the municipal water supply in Durham?

Dr. Nancy Short provided the group with an article by Dr. Nancy E. Kass, "An Ethics Framework for Public Health." She suggested that the committee use this framework to approach this public health issue. The six steps outlined in the article are:

1. What are the public health goals of the proposed program?
2. How effective is the program in achieving its stated goals?
3. What are the known or potential burdens of the program?
4. Can burdens be minimized? Are there alternative approaches?
5. Is the program implemented fairly?
6. How can the benefits and burdens of a program be fairly balanced?

The committee watched the ABC11 I-Team report, "How safe is Fluoride in our water?" from the website: http://abclocal.go.com/wtvd/video?id=8887125&pid=8887007. The committee also viewed the website developed by Corey Sturmer, www.durhamagainstfluoride.com.

Committee members discussed information presented at the Board meeting and articles / fact sheets reviewed in preparation for this meeting. Dr. Allison provided two documents ("Responses to Misconceptions Regarding Community Water Fluoridation" and "Frequently Asked Questions on Community Water Fluoridation") for committee review. Dr. Allison also noted the difference between effectiveness of topical fluoride and systemic fluoride; topical fluoride protects the exterior of tooth surfaces for people of any age while systemic fluoride affects tooth development in utero up through teen years.

It was noted that Brevard, NC (Transylvania County, NC) removed fluoride from its municipal water supply. An internet search revealed that the Brevard City Council received a special presentation, "Fluoridation of Drinking Water - Considerations for Brevard City Council" from the Transylvania Board of Health on July 16,2012 during a regular meeting. The Committee asked the Health Director to contact the Director of Transylvania County Department of Public Health to 1) obtain the PowerPoint presentation used during the City Council meeting, 2) learn the history of what happened in 2007 to

lead to the removal of the fluoride, and 3) what has happened to cause discussions of putting fluoride back into the water.

The Committee discussed next steps:

1. Make clear the distinction between and the purpose of topical and system fluoride
2. Review materials from Transylvania County Department of Public Health. Speak directly with Health Director and / or Board of Health member(s) if clarification is needed.
3. Provide information in a way that the general public can understand
4. Identify and invite subject matter experts to speak to the full Board regarding allegations presented by community members and supporting science – pro and con. Committee will be sure to include non-dental professionals including a representative from EPA.

Copies of meeting minutes and documents discussed will be sent to the full Board.

The next Committee meeting will be held on Monday, December 17th at 6:00p.m. in the Health Director's conference room.

Submitted by Gayle Harris, Public Health Director and Secretary to the Board of Health

An Ethics Framework for Public Health

Nancy E. Kass, ScD

More than 100 years ago, public health began as an organized discipline, its purpose being to improve the health of populations rather than of individuals. Given its population-based focus, however, public health perennially faces dilemmas concerning the appropriate extent of its reach and whether its activities infringe on individual liberties in ethically troublesome ways. In this article a framework for ethics analysis of public health programs is proposed.

To advance traditional public health goals while maximizing individual liberties and furthering social justice, public health interventions should reduce morbidity or mortality; data must substantiate that a program (or the series of programs of which a program is a part) will reduce morbidity or mortality; burdens of the program must be identified and minimized; the program must be implemented fairly and must, at times, minimize preexisting social injustices; and fair procedures must be used to determine which burdens are acceptable to a community. (*Am J Public Health.* 2001;91:1776-1782)

Public health as an organized discipline began more than 100 years ago, with the goal of improving the health, primarily, of populations rather than of individuals. Given its population-based focus, however, public health continually faces dilemmas concerning the appropriate extent of its reach and at what point the work of public health professionals is infringing on individual liberties in ethically troublesome ways. Nonetheless, there have been few attempts to articulate an ethics of public health.

Bioethics, as a discipline, helps health care professionals identify and respond to moral dilemmas in their work. In this article I suggest that the contexts out of which bioethics emerged—medical care and human research—were oriented toward a different set of concerns than those typically arising in public health. While the founders of bioethics articulated principles equally relevant for public health, the more specific action guides and codes of health care ethics that have followed are an imperfect fit for public health. Codes of medical and research ethics generally give high priority to individual autonomy, a priority that cannot be assumed to be appropriate for public health practice.

A framework of ethics analysis geared specifically for public health is needed, both to provide practical guidance for public health professionals and to highlight the defining values of public health, values that differ in morally relevant ways from values that define clinical practice and research. A first attempt at such a framework is offered here.

PUBLIC HEALTH

Public health is the societal approach to protecting and promoting health. Generally through social, rather than individual, actions, public health seeks to improve the well-being of communities. By maintaining a safe water supply, immunizing schoolchildren, or engaging in epidemiologic research, public health seeks to ensure societal conditions under which people can lead healthier lives,[1] minimizing threats to our health "that can be averted or lessened only through collective actions aimed at the community."[1(p20)] The providers of public health interventions often are governments, rather than private practitioners. Indeed, the provision of health services, generally the domain of medicine, becomes the responsibility of public health departments when services are provided by public clinics or hospitals.

Public health interventions date back more than 3 centuries. In 1701, Massachusetts passed laws for isolation of smallpox patients and quarantine of ships.[1(p57)] In the early 1800s, Edward Chadwick demonstrated in England that differences in social conditions led to a more than 2-fold difference in life expectancy between upper and lower classes. Also in the 1800s, Lemuel Shattuck, in Massachusetts, implemented the first system of vital health statistics.[2] Governments began conducting investigations of housing conditions and garbage heaps and mapping them in relation to outbreaks of disease,[2] and by the end of the 19th century, state and local boards of health were being created to enforce sanitary regulations.[1(pp60–61)]

By the early 20th century, public health was seen as cost-effective as well as useful,[2] and more money was directed to public health programs. During World War II, given the need for a healthy population for the military, the US Public Health Service established the Center for Controlling Malaria in the War Areas, later the Centers for Disease Control and Prevention. Epidemiology developed as the science of public health, to study "the distribution and determinants of health-related states or events in defined populations and [to apply this knowledge] to the control of health problems."[3(p42)]

Today, public health practitioners use tools in addition to epidemiology to accomplish their work, still focusing primarily on communitywide, typically prospective, approaches to improve health. Some public health functions—surveillance, vital statistics, disease and injury reporting, and disease registries—relate to epidemiology and the collection of data. In addition, practitioners investigate outbreaks, conduct contact tracing, provide health education and other preventive interventions, and conduct research related to public health. Last, public health professionals sometimes create or enforce health-related regulations and legislation, for example, mandating screening, treatment, immunizations, or—rarely—quarantine.

States' authority to pass laws to improve the public's health dates to the 19th century and is referred to as the "police power": "coercive action under state authority to encourage educational efforts. . .seize property, close businesses, destroy animals, or involuntarily treat or even lock away individuals."[4(p42)] These various public health tools and functions, while together successful in decreasing morbidity and mortality, nonetheless raise ques-

tions of ethics in terms of the means by which these successes are achieved.

BIOETHICS AND PUBLIC HEALTH

Bioethics helps health professionals and public policymakers recognize moral dilemmas in health care and biomedical research and provides principles and moral rules with which to navigate through these dilemmas. (A framework of bioethics based on principles, as put forward by Beauchamp and Childress,[5] will be used here. However, there are many other bioethical frameworks, including, for example, ethics of care, casuistry, and virtue-based ethics.)

Dating to the 1960s and 1970s, bioethics grew out of questions of fairness in resource allocation, moral issues raised by new technologies, and a lack of oversight in human-subjects research. The public was swept up in debate about whether the first artificial kidney center should allocate scarce resources on the basis of social criteria and whether Karen Ann Quinlan should be kept alive artificially when she had no meaningful cognition.

In 1969, the Institute of Society, Ethics, and the Life Sciences (now the Hastings Center) was created to address questions of bioethics and to provide frameworks with which to analyze contemporary moral dilemmas in medicine and science.[6] In 1974, after several reports of US government–sponsored research that compromised the rights and welfare of study subjects, a new national commission issued the Belmont Report, which included ethics principles to guide the conduct of human subjects research—beneficence, respect for persons, and justice.[7] Early framers of bioethics elaborated on these principles and provided examples of how they were useful in analyzing dilemmas from other areas of health care, not just research.[5]

These early framers argued that, a priori, no principle ought to have moral superiority over any other. At the same time, the issues that animated bioethics in the early years—the need to tell patients and research subjects the truth, the patient's right to refuse care or research participation—were ones in which the principle of respect for autonomy, perhaps given too little moral attention previously, was now given preeminent moral status.[8–10] Informed consent, a practical application of the autonomy principle, became a hallmark of the new bioethics, and codes of ethics for clinical practice, while still emphasizing the need not to harm the patient, added clauses requiring physicians to "best care for the dignity of man in patients or research subjects."[11(p21)]

That contemporary medical ethics or research codes have made the right to noninterference central is understandable, given the context out of which they emerged. That public health practitioners, lacking guidelines of their own, must turn to these same codes for professional moral direction, however, is more problematic. In rare instances, existing medical or research codes do discuss traditional public health functions, such as breaching patient confidentiality to report diseases to the state.[12] In such instances, however, the physician's behavior is presented as an allowable exception to usual ethics rules in the name of public health.

At best, this leaves public health professionals needing to muddle through most other situations on their own; at worst, it could lead them, or even the public, to assume that public health is the branch of health care sanctioned by bioethics to make exceptions to existing ethics rules at will, in the name of public health and safety. Indeed, it is in great part *because* such power is vested in public health by law that a code or framework of ethics designed specifically for public health is so very important. The need for a code of ethics for public health, then, might be viewed as a code of restraint, a code to preserve fairly and appropriately the negative rights of citizens to noninterference.

A code or framework of public health ethics must emphasize positive rights as well, however. Public health has affirmative obligations to *improve* the public's health and, arguably, to reduce certain social inequities. A code of public health ethics is needed to address such social justice functions of public health. While frameworks have been put forward in medicine to help clinicians think through the ethical issues in a clinical case,[13,14] no analogous framework is available for public health practitioners.

We live in a morally pluralistic society, and it is inevitable that moral appeals will conflict when attempts are made to determine appropriate public policy. A framework for public health ethics will help public health professionals recognize the multiple and varied moral issues in their work and consider means of responding to them.

AN ETHICS FRAMEWORK FOR PUBLIC HEALTH

A 6-step framework is proposed for consideration. Components of this framework were proposed in an earlier article,[15] and a similar framework was proposed for public health and human rights by Gostin and Lazzarini.[16] This is not a code of professional ethics, which more likely would address general norms and expectations of professional behavior and probably would be the product of a professional society. Rather, this is an analytic tool, designed to help public health professionals consider the ethics implications of proposed interventions, policy proposals, research initiatives, and programs.

1. What are the public health goals of the proposed program?

The first step for any proposed public health program is to identify the program's goals. These goals generally ought to be expressed in terms of public health improvement, that is, in terms of reduction of morbidity or mortality. For example, an HIV screening program should have as its ultimate goal fewer incident cases of HIV, not simply that a certain proportion of individuals will agree to be tested. A health education program in cardiac risk reduction should have as its ultimate goal (or the ultimate goal of a larger program of which it is a part) that individuals will have fewer heart attacks, not simply that individuals will learn new information or even that they will change their behavior. A research study should have as its ultimate goal (or the ultimate goal of a larger trajectory of which it is a part) that findings, if positive, will be implemented with the target population and improve its health status.

While more proximate and process goals (such as whether individuals will learn health information or whether they will

agree to be tested) are critical pieces of program planning and evaluation and may be crucial to achieving health improvement, the fundamental goal of decreased morbidity and mortality is the outcome by which the program or series of programs ultimately must be assessed. This is not to say that each individual program or research study must achieve this end. Epidemiologic studies may provide descriptive data that lead scientists years later to develop an intervention that will result in a reduction in morbidity or mortality; a health education program may be one of multiple and varied interventions that together reduce risks and ill health. The argument put forth here, however, is that public health programs, interventions, or studies must be designed with an awareness of the relationship between this program and an ultimate reduction in morbidity or mortality.

Of course, other types of benefits, generally social benefits, can accrue from public health programs as well. Public health programs can result in greater employment, for example, as well as less tangible benefits, such as coalition-building or the strengthening of communities. These benefits are extremely important and should be given strong consideration. They are, however, the incidental or intermediary outcomes of public health programs, rather than the programs' final goal. If a program has as its goal to increase employment as an end in itself (rather than, for example, to increase employment as a means to lower psychological morbidity or as a means to improve socioeconomic status and therefore lead to improved health) or to strengthen communities (rather than to strengthen communities as a means to decrease interpersonal violence or as a means to help watch out for the well-being of the young or old persons in the community), then the program is primarily a social program, not a public health program.

As described further below, a reduction in morbidity and mortality need not and could not be the goal of every individual public health intervention or program; however, individual public health programs should not be undertaken that are not part of a larger package of programs whose combined goal is the reduction of morbidity and mortality.

According to this view, an intervention whose goal is to improve access to care among hard-to-reach populations has an extremely relevant public health goal, assuming, of course, the program is effective in improving access. Other examples of interventions designed to reduce social inequalities will be discussed further in step 5.

Also relevant when we consider public health goals and benefits is to whom the benefit will accrue. Public health interventions often are targeted to one set of individuals to protect *other* citizens' health. Partner notification programs and directly observed therapy for tuberculosis are designed primarily to protect citizens from the health threats posed by others. In some contexts, public health programs are designed primarily to protect individuals from themselves, revealing that much of public health is inherently and unabashedly paternalistic. Health education campaigns, blood pressure screening, seat belt laws, and 55-mile-per-hour speed limits, while motivated in part by social concerns about costs, are, I suggest, motivated primarily to further individuals' ability to protect their own health. Restricting someone's liberty to protect him- or herself and restricting liberty to protect another person pose different ethical burdens, discussed further in step 3.

2. How effective is the program in achieving its stated goals?

Proposed interventions or programs are based on certain assumptions that lead us to believe the programs will achieve their stated goals. Step 2 asks us to examine what those assumptions are and what data exist to substantiate each of them. A cardiac risk reduction program has as its ultimate goal the reduction of fatal and nonfatal cardiac events. The assumptions of this education program (or the larger effort of which it is a piece) are that the program will reach individuals at risk for cardiac events; those individuals will learn the risk reduction messages; individuals will change their behavior (e.g., stop smoking, change diets, increase exercise) in ways suggested by the program; these changes would not have occurred without the program; and the behavior change in itself will result in fewer cardiac events.

While many health education programs are very effective at transmitting information that recipients learn and understand, programs generally are less successful at inducing behavior change.[17,18] Thus, while a rather narrow evaluation may demonstrate success (in terms of participants' understanding the message), a program ultimately cannot claim success if behavior is unaffected and morbidity and mortality rates remain unchanged.

This is not to suggest that each program must reduce morbidity by itself. Individual health education or screening programs, for example, might be pieces of larger initiatives to reduce cardiac morbidity and mortality. Data may show that multiple education campaigns in different formats and with different messages are required to induce widespread behavior change. Multidimensional efforts are appropriate and useful, if data show that the combination is likely to evoke the desired result. Again, however, if the multiple approaches are simply hypothesized or assumed to reduce illness events, then further research must be done; a public health program is not yet justified.

This step of examining existing data to challenge our assumptions and implement only data-based policies or programs is often neglected in public health. One can assume that this is not because professionals are indifferent to whether their methods relate to their outcomes, but because we simply assume that they do, and we neglect to find data that prove us right or wrong. Thus, we introduce a program based on the assumption that some number of people who learn that cigarettes cause asthma and lung cancer will quit smoking, or we call for HIV screening because we assume that individuals who learn they are infected will begin to use condoms in sexual relationships. It is when our assumptions seem most intuitively obvious that we are at greatest risk of neglecting to determine to what extent they are supported by real evidence.

While all programs must be based on sound data rather than informed speculation, the quality and volume of existing data will vary. The question for policy and ethics analysis, then, is what quantity of data is enough to justify a program's implementation? As a rule of thumb, the greater the burdens posed

by a program—for example, in terms of cost, constraints on liberty, or targeting particular, already vulnerable segments of the population—the stronger the evidence must be to demonstrate that the program will achieve its goals. Indeed, because many public health programs are imposed on people by governments and not sought out by citizens, the burden of proof lies with governments or public health practitioners to prove that the program will achieve its goals. Thus, if at least some data do not exist that demonstrate the validity of a program's assumptions, the analysis can stop right here, and, ethically, the program should not be implemented. Conversely, the presence of good data alone does not justify the program; it allows us to move to the next stage of the analysis.

3. What are the known or potential burdens of the program?

If data suggest that a program is reasonably likely to achieve its stated goals, then the third step of the framework asks us to identify burdens or harms that could occur through our public health work.

Although a variety of burdens or harms might exist in public health programs, the majority will fall into 3 broad categories: risks to privacy and confidentiality, especially in data collection activities; risks to liberty and self-determination, given the power accorded public health to enact almost any measure necessary to contain disease; and risks to justice, if public health practitioners propose targeting public health interventions only to certain groups. Different types of burdens are more or less likely to result from different types of public health activities.

Disease surveillance and vital statistics, designed to monitor health and population trends, raise potential privacy concerns, especially since data collection is mandatory and data often are individually identifiable and, in many cases, publicly available. Although the types of data collected are not considered very personal or sensitive by most persons, everyone has his or her own boundary of privacy. Further, for some individuals, particular elements of vital statistics, such as paternity or cause of death, could be seen as invasions of their privacy. Finally, vital statistics and other publicly collected data can reveal patterns about ethnic groups or neighborhoods that may be stigmatizing or otherwise harmful.

Communicable disease reporting raises privacy concerns as well, but the infringement and risks potentially are greater, since names are reported only of those who have reportable (and often socially stigmatizing) conditions. Given that individuals typically want the ability to control whether and to whom private information is disclosed, disease reporting carries the additional risk of a breach of confidentiality if security measures are not followed or do not work. For some, there is a risk of privacy infringement only to the extent that confidentiality is not maintained and harms such as social stigma or loss of employment ensue from unwarranted disclosure. For others, the privacy infringement is viewed as a wrong in itself, regardless of whether any tangible harm ensues.

Disease reporting is an example of a public health function that, at least on its face, is distributionally unfair, in that the burdens of the program are borne by those with the disease, generally for the benefit of others who do not have the disease. This unevenness of burdens and benefits may be justified in certain instances, when the benefits are important and when there are no less burdensome ways to achieve them. Unevenness in benefits and burdens is never appropriate, however, if groups are burdened in ways that are arbitrary and without public health justification. Further, a program that does not target particular groups explicitly may, in fact, lead to targeting in its implementation. One study, for example, suggested that doctors are more likely to report a patient with HIV to the health department if the patient is Black and male,[19] despite language in the statute requiring the reporting of *all* persons with HIV. The appropriateness of creating targeted public health programs justified by epidemiologic data is discussed further in step 6.

Contact tracing, which sometimes accompanies communicable disease reporting, poses additional privacy risks. Not only are an individual's name and condition reported, but individuals are asked to provide the names of other (usually sexual) contacts they have had. Obviously a privacy infringement in itself, contact tracing also invades the privacy of individuals whose names are disclosed, who are not able to decide for themselves whether to release their names to officials. As stated above, harms can occur if confidentiality protections fail, and individuals can feel wronged simply by virtue of the violation of their privacy. Justice concerns also arise if contact tracing programs are not implemented fairly.

Health education poses interesting questions in terms of ethics. In certain ways, health education is the ideal public health intervention, since it is completely voluntary and seeks to empower people to make their own decisions regarding their health once they are equipped with accurate information. From an ethics perspective, education clearly is preferable to other preventive strategies, to the extent that they are equally effective, because it poses few, if any, burdens.

Health education, however, although an essential component of most public health campaigns, will not be appropriate for all situations. First, education may not work in all settings, and more burdensome measures may be required. Second, to increase effectiveness, educational programs may introduce ethically questionable practices, such as manipulation or even coercion. A smoking cessation program, for example, may try to manipulate attitudes by suggesting that smokers are unpopular and by providing only partial or even false information to achieve its ends.[20]

Third, all health education campaigns are potentially paternalistic, suggesting that certain ways of being (e.g., in greater aerobic health) are universally valued. Additional work is needed to examine when and where paternalism in public health is justified, especially since biomedical ethics generally has steered professionals away from paternalism except when it is specifically requested by patients. (See Bernard Lo for a discussion of paternalism in which he concludes that "when disagreements persist after repeated discussions, the patient's informed choices and definition of best interests should prevail,"[21 (pp39–43)] and a discussion of patients who do not want to make their own decisions.[21 (p29)])

Fourth, health education programs may target messages to certain audiences. Although such targeting is often justified on public health grounds (e.g., epidemiologic data demonstrate that members of this population are

at greatest risk, so their pictures will go on the billboards and messages will be promoted on the radio stations they listen to), the social and even public health ramifications of targeting must be seriously considered. Social stigma can result if, for example, certain subgroups of the population are assumed to be the ones who carry sexually transmitted diseases, and opportunities for public health intervention will be missed entirely if we all come to believe, through well-intentioned media campaigns, that only certain groups are at risk for domestic violence or HIV.

Finally, health education campaigns may be accompanied by incentives. Incentives generally are considered ethically less problematic than coercive measures or threats, but even incentives could be ethically questionable in certain contexts, such as when financial incentives are given for using particular types of birth control or avoiding pregnancy.[22]

Public health research carries burdens. Human subjects regulations already describe the types of harms that could occur through research participation. These include medical risks if the research is clinical, and psychological or social risks if the research is epidemiologic or social science. In recent years there has also been increased attention to the personal and social burdens that can result from injustice or exploitation in research when certain populations are disproportionately disadvantaged or privileged through research participation.

In addition to these well-articulated risks, however, is the harm that can occur if public health research findings are never implemented in public health policy or practice. Any study conducted imposes, at the very least, the burden of inconvenience on those who participate, and may, of course, pose more significant risks to the individuals or communities who volunteer. An institutional review board allows research to go forward because of the benefits expected to emerge from study findings. If research findings are never translated into policy, however—a situation that occurs far too often—no benefits accrue from the research. In such instances, participants were wronged through a misleading (albeit not deliberately so) informed consent process, and the risk-to-benefit ratio could rarely be considered favorable.

Regulations and legislation, strictly speaking, are coercive, since they impose penalties for noncompliance. As such, they pose risks to liberty and self-governance. While many of these measures, such as reduced speed limits, childproof bottles, and immunization, have demonstrated efficacy, they nonetheless are the most intrusive approach to public health. Edmund Pellegrino and David C. Thomasma write:

> Involuntary and coercive measures must be undertaken with a clear perception of the dangers they pose to a democratic society: loss of personal freedom to choose a lifestyle, dependence upon governments to define values and concepts of the good life, and the imposition of cultural homogeneity. Involuntary measures also assume a benign, wise, and responsive government—something history finds singularly rare.[10(p375)]

While threats to autonomy are the most obvious threats posed by public health regulations and legislation, such regulations and legislation can, in some circumstances, be associated with physical risks, or risks to individuals' health, as well. Federally approved and mandated vaccinations carry health risks to individuals; widespread spraying to prevent the spread of mosquito-borne viruses can cause proximate health problems to some individuals who inhale the chemicals. Finally, in this instance as well, the law can impose, by design or inadvertently, threats to justice if regulations impose undue burdens on particular segments of society.

4. Can burdens be minimized? Are there alternative approaches?

This piece of the framework requires us to minimize burdens once they have been identified. If step 3 suggests that a program or policy carries potential or actual burdens, we are ethically required to determine whether the program could be modified in ways that minimize the burdens while not greatly reducing the program's efficacy. Public health professionals, for example, when ready to report a patient's name and disease to the state, should inform patients that their names, by law, must be reported to public health authorities but that the law also requires that they be reported confidentially. Although reporting programs are not optional, the policy is more respectful of patients if patients are adequately informed.

Contact tracing programs, similarly, pose threats to privacy and confidentiality. Yet contact tracing programs, strictly speaking, are voluntary, in that no sanctions are imposed on citizens who refuse to cooperate. It is ethically incumbent on public health practitioners to inform individuals sought for contact tracing of their right to refuse to disclose the names of their partners, as well as of their right to inform partners themselves, have a known health care provider do it, or have partners contacted by an agent of the state.

If 2 options exist to address a public health problem, we are required, ethically, to choose the approach that poses fewer risks to other moral claims, such as liberty, privacy, opportunity, and justice, assuming benefits are not significantly reduced. Making this assessment relies on the existence of sound data. If data show that a voluntary screening program will test essentially the same number of individuals as a mandatory one, because almost no one refuses testing when asked, then it would be ethically improper to implement a mandatory program.[23(chap6)] If disease surveillance is equally effective with unique identifiers or with names, a program of unique identifiers is the morally preferable choice.

5. Is the program implemented fairly?

This piece of the framework corresponds to the ethics principle of distributive justice, requiring the fair distribution of benefits and burdens.[5(pp326–394)] Public health benefits, such as clean water, cannot be limited to one community, nor can a single population be subjected to disproportionate burdens. HIV screening programs, for example, cannot be implemented only in poor or minority communities without strong justification (see Stoto et al.[23] for a discussion of why universal HIV screening programs are ethically preferable to targeted programs); cardiac risk reduction programs cannot be targeted exclusively to White men when women and minorities are also at substantial risk of heart disease.

That programs be implemented fairly is even more important if restrictive measures are proposed. Injustice is wrong for its own sake, and also for the material harms it can evoke. Social harms result if social stereotypes are created or perpetuated, such as the stereotype that only certain segments of the population are vulnerable to sexually transmitted diseases. In addition, real public health

harms result when individuals do not believe that they are at risk for disease because they were never targeted in education campaigns, or because their own doctors never screened them for a condition because they didn't fit the popular risk profile.[24] This does not mean that programs or resources must be allocated equally to all communities—rather, the allocations must be fair. That is, differences cannot be proposed arbitrarily or on the basis of historical assumptions about who might be at risk. Again, unequal distributions of programs must be justified with data. Moreover, the social consequences must be considered if a community is allotted resources unequally, and these consequences must be balanced against the benefits to that community or others.

Discussed less frequently is whether, or the degree to which, public health has any explicit role in righting existing injustices, especially given the strong link between poor living conditions and poor health outcomes. To what extent is there a positive responsibility on the part of public health professionals to advocate better housing, better jobs, and better access to food programs, since such advocacy might be the best route to improving the public's health?

Several notions of justice allow and even require unequal allocation of benefits to right existing inequities. John Rawls posits that justice requires us to allocate our resources unequally to help the least well-off.[25] Norman Daniels discusses the need for all members of society to be brought to a level of "species-typical normal functioning,"[26] which also could result in the unequal distribution of certain resources. Admittedly, not all philosophers have adopted this notion of justice; some make a distinction between preexisting societal inequities that are unfair (because they resulted from a person or community having been wronged by an identifiable source), where intervention is owed, and inequities that are merely unfortunate (that is, due to acts of God or circumstance), where no intervention is morally required.[27]

Public health, I would argue, does have a positive responsibility to engage in programs and interventions that seek to lessen societal inequalities, at the very least when those inequalities relate (as essentially all do) to health outcomes. Indeed, it is hard to find a more powerful predictor of health than class,[28,29] and it is thus an appropriate, if not obligatory, function of public health to reduce poverty, substandard housing conditions, and threats to a meaningful education—if for no other reason than to reduce the incidence of disease.

6. How can the benefits and burdens of a program be fairly balanced?

If it is determined that a proposed public health intervention, policy, or program is likely to achieve its stated goals, if its potential burdens are recognized and minimized, and if the program is expected to be implemented in a nondiscriminatory way, a decision must be reached about whether the expected benefits justify the identified burdens. Recognizing, of course, that public policy is based on multiple considerations in addition to ethics, the question must still be asked whether, from an ethics perspective, the program should go forward. Health department officials and other public health professionals may not have the power to implement all programs they think would be beneficial, but they do have a responsibility both to advocate programs that do improve health and to remove from policy debate programs that are unethical, whether because of insufficient data, clearly discriminatory procedures, or unjustified limitations on personal liberties.

And yet while most reasonable people will agree, in the abstract, that burdens and benefits must be balanced, and that the most burdensome programs should be implemented only in the context of extensive and important benefits, disagreements are all but guaranteed over the details. Depending on one's perspective, there will be differing views over how burdensome various programs are, such as having one's name reported to the state or being required to immunize children before they start school. Citizens can be expected to differ over how important it is to protect a water supply for future generations, particularly if it means significantly higher taxes or prohibiting recreational use of a public body of water—which is clearly a benefit, not only in terms of individual pleasure, but also in terms of community cohesiveness.

Solutions to these inevitable disagreements must be reached through a system of fair procedures. Procedural justice requires a society to engage in a democratic process to determine which public health functions it wants its government to maintain, recognizing that some infringements of liberty and other burdens are unavoidable. There should be open discussion of what a society gains from good public health and why such benefits often cannot be obtained through less communal or more liberty-preserving methods. The discussion, of course, should also address why other interests also have moral claim. Such a process, even when procedurally fair by most standards, must not result in decisions based solely on the will of the majority. Indeed, deliberations, particularly around significantly burdensome proposals, must be scrutinized to ensure that the views of the minority are given due consideration. Highly burdensome programs should be preceded by public hearings, not just votes, so that minority views can be heard and considered.

At the same time, it is important to acknowledge that there will always be some number of persons who do not want their water fluoridated, do not want their children immunized, do not want to wear seat belts, and do not want speed limits on public roads. That there is dissent is insufficient justification for blocking a public health program; indeed, dissent is inevitable in all proposals. Dissent must be considered, however, and it deserves special attention if it is raised exclusively by a particular identified subgroup such as an ethnic minority, a particular age group, or residents of a particular neighborhood.

In balancing values and interests, the greater the burden imposed by a program, the greater must be the expected public health benefit, and the more uneven the benefits and burdens (that is, burdens are imposed on one group to protect the health of another), the greater must be the expected benefit. Programs that are coercive should be kept to a minimum, should never be implemented when a less restrictive program would achieve comparable goals, and should be implemented only in the face of clear public health need and good data demonstrating effectiveness. Nonetheless, we are a pluralistic society, including with regard to our notions of ethics. Different states and communities will decide differently which public health activities are appropriate and which are

overly burdensome. Ultimately, that different communities will enact different public policies, based on their own balancing of benefits and burdens, may be indicative of a fair process, or at least a pluralistic process, steering local public health policy.

CONCLUSION

Of course, public policy is based on many factors in addition to public health goals and ethical reasoning. Weighing alternatives according to this public health ethics framework should lead to an ethically acceptable option, but it may not lead to the politically preferable option for a given time. That politics often takes a divergent and somewhat unpredictable path, however, is not an excuse for abandoning ethics analysis when a public health proposal is up for discussion. An ethics analysis must always be conducted, both because bringing truth, fairness, and respect to our work is right in itself and also because, from a more utilitarian perspective, public health work will be more effective if we do.

Engaging in the steps of an ethics analysis makes us meticulous in our reasoning, requiring us to advocate interventions on the basis of facts and not merely belief. Further, an ethics analysis holds us to high standards, not only for scientific method but also for how respectfully we communicate with and involve constituent communities. The involvement of communities will help identify the public health threats divergent groups face and will create, if not partnerships, at least—one can hope—a reasonable amount of trust. To succeed, the field of public health must gain the public's trust that the inevitable higher proportions of government involvement and population targeting imposed by public health, relative to other branches of health care, are appropriate and in these various communities' best interests.

Public health professionals must go through the steps of an ethics analysis to assure the public of their integrity. The public must feel confident that public health professionals will offer only those proposals that will improve the health of the public, that proposed measures are minimally burdensome, and that a fair procedure has determined that the magnitude of the problem and the ensuing benefits justify overriding conflicting moral claims. It is reasonable to assume that the public will be concerned about which functions are necessary and which are overly burdensome, offensive, or simply wasteful. This process, then, must be integrated, constant, and ongoing. The most important asset that public health can have is the public's trust that work is being done on its own behalf. In such a context, public health professionals can and must advocate what they believe, on balance, are the ethically best approaches for furthering social justice and the public's health. ■

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December 3, 2012

Rob Elmore
News Director
WTVD-Channel 11
319 Fayetteville Street
Suite 107
Raleigh, NC 27601
Sent via email: news.director@abc11mail.com

Dear Mr. Elmore:

The Association of State and Territorial Dental Directors (ASTDD) provides leadership to promote a governmental oral health presence in each state and territory, to formulate and promote sound oral health policy, to increase awareness of oral health issues, and to assist in the development of initiatives for prevention and control of oral diseases. We represent state public health agency oral health programs.

We are writing to share our concern that WTVD aired a news story in mid-November that did its viewers a disservice by presenting a one-sided, incomplete and misleading view of fluoridated water—a health practice that has been praised by the Centers for Disease Control and Prevention (CDC) as one of "ten great public health achievements" of the 20th century.[1]

In the course of its story, WTVD quoted five people who voiced concerns about fluoridated water, and only one person who affirmed the value of fluoridation.[2] This lopsided ratio strongly suggests that your reporter may have allowed his own bias to shape this story. Your story left viewers with the false impression that most health experts have serious concerns about the safety of fluoridated water.

Indeed, the leading health and medical organizations endorse fluoridation, including the American Academy of Pediatrics, the Institute of Medicine, the Mayo Clinic, the American Academy of Family Physicians and the American Dental Association.[3] Your story cited the American Dental Association's endorsement, but did not point out that a broad consensus supports fluoridation—and this consensus extends well beyond the dental community.

Inaccurate, incomplete or misleading news reporting on health issues can have serious implications. We respectfully ask that you remove your story from the web or significantly revise the text to correct the 11 problems that we identify in this letter:

Problem #1: WTVD relies on a single dentist's opinion to falsely portray fluoridated water as a "drug."

Your story bases some of its concerns on the opinion of a single dentist who told your TV station five years ago: "Fluoride in the water is essentially a drug. It's an uncontrolled use of a drug."

It's worth noting that this argument has been used by fluoridation opponents for more than 50 years, and it has never gained traction in the courts or in the court of public opinion. In 1954, for example, the Oklahoma Supreme Court rejected this very argument. The court wrote that a city fluoridating its water supply is no more preparing a drug "than a mother would be who furnishes her children a well-balanced diet," and the court added: "No one would contend that this is practicing medicine or administering drugs."[4]

Problem #2: WTVD's story misrepresents what fluorosis is.

The news story that WTVD aired described fluorosis as "a defect that causes white spotting, yellowing and browning of the teeth, and erosion of the enamel."[5] This paints a misleading picture of fluorosis in the United States. Your story neglected to share five crucial details:

- Nearly all fluorosis in the U.S. is a mild, cosmetic condition that leaves faint white streaks on teeth. It does not cause pain, and it does not affect the health or function of the teeth.[6]

- Contrary to the alarming image your story created, the typical form of fluorosis is so subtle that most people are not aware they have it; only a dentist is likely to notice it.[7]

- Experts believe that the main reason for fluorosis is that some young children swallow fluoride toothpaste.[8] Toothpaste contains a concentration of fluoride that is roughly 1,000 times higher than the level in fluoridated water.[9]

- A peer-reviewed study published in 2010 found that mild fluorosis was *not* an adverse health condition and that it might even have "favorable" effects on overall health.[10]

Problem #3: WTVD created the impression that fluorosis can occur at any age.

Someone can develop fluorosis from their exposure to fluoride up to the age of 8. Unless a person has fluorosis by this age, there is no chance of acquiring it.[11] For this reason, WTVD should have known that it did not matter that Corey Sturmer "was a college athlete" or that he "eats healthy food and exercises." None of these factors would prevent fluorosis or make it go away. Unfortunately, Sturmer appears to be unaware of this, considering that he asked "why am I, at 25 years old, having all these issues with my teeth?" WTVD's story claimed that the I-Team "dug into the science," but if the station had thoroughly examined this issue, it would have educated Sturmer and would not have given viewers the false impression that fluorosis can happen at any age.

Problem #4: WTVD misrepresented a 2006 report on fluoride.

One piece of research cited by the WTVD story was a 2006 report on fluoride that was produced by the National Research Council (National Academies of Science). Yet your story omitted some crucial facts about the report.

- First, the health concerns raised by the report focused on areas of the U.S. where the drinking water has unusually high, *natural* fluoride levels, ranging from 2.0 to 4.0 parts per million (ppm). This is roughly three to five times higher than the level that Durham is using (0.7 ppm) to fluoridate the city's public water system.

- Second, nothing in this report casts doubt on the safety of fluoride at this recommended optimal level.[12] The National Research Council explicitly stated that its concerns "do not apply at the lower water fluoride levels commonly experienced by most U.S. citizens."[13]

Why was neither of these facts included in your story?

Problem #5: WTVD's story needlessly raised fears by presenting information without the necessary context or key details.

Here are two examples. First, your story quoted one member of the National Research Council committee, Kathleen Thiessen, who stated that "we concluded after three years worth of work that the drinking water standard for fluoride was not protected and cannot be assumed to be safe for humans." Without proper context, this statement implies that fluoridated drinking water "cannot be assumed" to be safe. WTVD omitted the critical fact that Thiessen was referring to the Council's request that the Environmental Protection Agency (EPA) review its maximum limit for fluoride in drinking water, which is 4.0 parts per million. The level used to fluoridate Durham's drinking water is roughly *80 percent below the EPA's limit.*[14] Why didn't you share this fact with your viewers? Second, your story refers to an EPA employee named William Hirzy who raised concerns about fluoridation in testimony to a Congressional subcommittee 12 years ago. "He was representing the views of EPA scientists and staff who analyze hazards in the environment," your story claimed. This is misleading. Hirzy was speaking as a spokesperson for an employee union at the EPA; he was not expressing the agency's position.[15] Indeed, a senior EPA official co-authored a statement last year noting the "strong evidence that water fluoridation is safe and effective."[16]

Problem #6: WTVD made a blanket statement creating unfounded fear about fluoridated water.

Your reporter asserted that "we found study after study dating back to the 80s from respected academic and scientific institutions that connect fluoride to health dangers." A blanket assertion like this should have been accompanied with a lot more detail, but WTVD's story offered few specifics. The story does not say how many studies it found nor does it list the sources for these studies. Your viewers deserved more details. As scientists recognize, there is a big difference between research showing that fluoride causes a health problem and studies that simply "connect" fluoride to a health condition. The I-Team reporters at your WTVD claim they "dug into the science," but whether they found reputable, peer-reviewed science is left in doubt. As the *New York Times* recently reported, conspiracy theories about fluoridation "now thrive online, where anyone, with a little help from Google, can suddenly become a medical authority."[17] As noted earlier, the *real* medical and health authorities endorse water fluoridation.

Problem #7: WTVD's story ignored crucial facts related to the fluoride-IQ studies.

One of the few studies your story shared for supporting its health concerns was an article co-authored by two Harvard University researchers. This article reviewed more than two dozen studies of children in China, Iran and Mongolia.[18] Your one-phrase summary of these studies ("the higher the fluoride exposure, the lower the child's IQ") was a sloppy and incomplete way to summarize these studies:

- The Chinese studies examined areas with "high fluoride" and "low fluoride" in drinking water, linking the *low*-fluoride communities with *higher* IQ scores. Your story should have disclosed that the low-fluoride areas had concentrations of fluoride that were closer to the levels used to fluoridate water in the U.S. than the high-fluoride areas that were tested. In other words, if there is any link between fluoride and IQ scores, the conclusion should be the opposite—fluoridated water is correlated with higher IQs.

- Your story ignored or overlooked the fact that the article co-authored by the Harvard researchers explained that "each of the [studies] reviewed had deficiencies, in some cases rather serious" and also noted "the actual (fluoride) exposures of the individual children are not known."[19]

- Two months before your story aired, these Harvard researchers took the unusual step of going public to distance themselves from the claims that anti-fluoride activists were making about these studies.[20]

Why didn't you share these important facts with your viewers?

Problem #8: WTVD did not fact-check its information.

WTVD's story used this quote from Kathleen Thiessen: "The CDC and others say whatever beneficial effect there is from fluoride is from topical use. It's not from swallowing it. It never has been from swallowing it." This is not an accurate description of CDC's view, and WTVD would have recognized this if the station had fact-checked her statement. CDC has written that fluoride's *primary* benefits—but not all of its benefits—are from topical sources. More significantly, the CDC has identified fluoridated water as a *topical source* because the trace levels of fluoride in drinking water mix with saliva and come in contact with teeth enamel.[21] If WTVD had explored this issue thoroughly, the station would have found research that demonstrates the benefits of non-topical exposure to fluoride.

Problem #9: WTVD promoted the online resources of anti-fluoride groups.

At the bottom of your online story, WTVD provided a "more information" link. Unfortunately, a person clicking on this link is taken to a resource page that is heavily weighted toward groups that strongly oppose water fluoridation. Indeed, the top two websites you promote are an anti-fluoride group called the Fluoride Action Network (FAN) and Fluoridation 101, a site operated by the New York State Coalition Opposed to Fluoridation. Incredibly, even the third and fourth links—under the heading of "Information specific to North Carolina"—direct readers to pages of

the FAN website. By contrast, there is no link to the North Carolina Department of Health and Human Services. Why did WTVD create a resource page that is so skewed toward groups opposing fluoridation?

Problem #10: WTVD misrepresented the use of fluoridated water by western nations.

"The I-Team discovered most western countries do not fluoridate their water," your story reported. This is very misleading because it gives viewers the impression that most western nations feel fluoride is unsafe or ineffective. More than 80 million people in Western Europe receive fluoride's benefits through fluoridated water, salt or milk. The countries that use one of these methods include Germany, Britain, Ireland, Switzerland, Spain, the Czech Republic and France.[22] Argentina, Columbia and Brazil—the continent's largest country—have water fluoridation programs, and more than 75 million Brazilians receive fluoridated water.[23] Peru and Chile operate milk fluoridation programs.[24]

Problem #11: WTVD's story misrepresented the Wichita vote and dialogue.

Your story referred to a recent vote on fluoridation in Wichita, Kansas, and quoted the leader of an anti-fluoride group there who stated, "Our task was essentially one of just education." But this "education" was not accurate and science-based. Were you aware that the CBS-TV affiliate in Wichita fact-checked three of the common arguments used by the city's anti-fluoride leaders and found that all three of these claims were either false or misleading?[25]

Although dental health has improved for many Americans in recent decades, tooth decay remains the most common chronic childhood disease—five times more prevalent than asthma.[26] Untreated tooth decay can undermine children's ability to sleep, grow, and learn.[27]

Fluoride counteracts tooth decay and strengthens teeth by fighting harmful acids and drawing calcium back into the enamel. Drinking water is an ideal vehicle for fluoride because it offers these benefits without requiring families to spend extra money or change their routine. People of all ages benefit from drinking fluoridated water, and research shows that fluoridated water reduces tooth decay by about 25 percent over a person's lifetime.[28]

As the CDC notes, "For many years, panels of experts from different health and scientific fields have provided strong evidence that water fluoridation is safe and effective."[29] Much like calcium and phosphorus, fluoride is a mineral that provides important health benefits. Yet all three minerals have the potential to cause adverse health effects if consumed by humans in extraordinarily high concentrations—levels that are rarely reached by Americans. We believe that WTVD exaggerated the risks of fluoride and created a sense of fear that is not supported by credible, scientific evidence.

If you consider doing additional stories on this topic, please contact us. For complete and accurate information about fluoridation, I encourage you to visit the CDC's website at http://www.cdc.gov/fluoridation/ or www.iLikeMyTeeth.org/fluoridation—a website supported by a coalition of organizations including ASTDD, the Pew Center on the States and the American Public Health Association.

Sincerely,

Harry Goodman, DMD, MPH

Harry Goodman, DMD, MPH
President, ASTDD

CC: Steve Daniels, Reporter (steve.daniels@abc11mail.com)
WTVD-ABC 11

Caroline Welch, President & General Manager (general.manager@abc11mail.com)
WTVD-ABC 11

Kelly McBride, senior faculty (kmcbride@poynter.org)
The Poynter Institute

Sources:

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[8] Timothy W. Martin, "Government Advises Less Fluoride in Water," *The Wall Street Journal* (January 8, 2011), http://online.wsj.com/article/SB10001424052748704739504576068162146159004.html; "Micronutrient Information Center: Fluoride," Linus Pauling Institute, Oregon State University, http://lpi.oregonstate.edu/infocenter/minerals/fluoride/; Dr. Paul Roumeliotis, "The Facts: The Benefits of Fluoridation," Eastern Ontario Health Unit, (April 2011), http://www.eohu.ca/_files/resources/resource1355.pdf.

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[17] Kate Zernike, "In New Jersey, a Battle Over a Fluoridation Bill, and the Facts," *New York Times*, March 2, 2012.

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2 A Regular Meeting of the Durham County Board of Health, held December 13, 2012.

COMMITTEE REPORTS:

- **Ad Hoc Municipal Water Fluoridation Committee** ***(Activity 34.5) (Board)***

Dr. Allison provided the board with an overview of the Ad Hoc Municipal Water Fluoridation Committee meeting on November 19, 2012. The meeting convened at 6:00 p.m. in the Health Director's conference room with the expressed purpose of beginning the due diligence required to address the issue presented during the September Board of Health meeting – Should fluoride continue to be added to the municipal water supply in Durham?

Dr. Nancy Short provided the group with an article by Dr. Nancy E. Kass, "An Ethics Framework for Public Health." She suggested that the committee use this framework to approach this public health issue. The six steps outlined in the article are:

1. What are the public health goals of the proposed program?
2. How effective is the program in achieving its stated goals?
3. What are the known or potential burdens of the program?
4. Can burdens be minimized? Are there alternative approaches?
5. Is the program implemented fairly?
6. How can the benefits and burdens of a program be fairly balanced?

The committee watched the ABC11 I-Team report. "How safe is Fluoride in our water?" from the website: http://abclocal.go.com/wtvd/video?id=8887125&pid=8887007. The committee also viewed the website developed by Corey Sturmer, www.durhamagainstfluoride.com.

Committee members discussed information presented at the Board meeting and articles / fact sheets reviewed in preparation for this meeting. Dr. Allison provided two documents ("Responses to Misconceptions Regarding Community Water Fluoridation" and "Frequently Asked Questions on Community Water Fluoridation") for committee review. Dr. Allison also noted the difference between effectiveness of topical fluoride and systemic fluoride; topical fluoride protects the exterior of tooth surfaces for people of any age while systemic fluoride affects tooth development in utero up through teen years.

It was noted that Brevard, NC (Transylvania County, NC) removed fluoride from its municipal water supply. An internet search revealed that the Brevard City Council received a special presentation, "Fluoridation of Drinking Water - Considerations for Brevard City Council" from the Transylvania Board of Health on July 16,2012 during a regular meeting. The Committee asked the Health Director to contact the Director of Transylvania County Department of Public Health to 1) obtain the PowerPoint presentation used during the City Council meeting, 2) learn the history of what happened in 2007 to lead to the removal of the fluoride, and 3) what has happened to cause discussions of putting fluoride back into the water.

The Committee discussed next steps:

1. Make clear the distinction between and the purpose of topical and system fluoride
2. Review materials from Transylvania County Department of Public Health. Speak directly with Health Director and / or Board of Health member(s) if clarification is needed.
3. Provide information in a way that the general public can understand

4. Identify and invite subject matter experts to speak to the full Board regarding allegations presented by community members and supporting science – pro and con. Committee will be sure to include non-dental professionals including a representative from EPA.

The next Committee meeting will be held on Monday, December 17th at 6:00p.m. in the Health Director's conference room.

Comment: Ms. Carter asked if the committee had looked at other states, countries that had removed the fluoride from the municipal water.

Answer: Chairperson McLaurin stated the committee did research other states/countries (New Mexico-southwest area). Chairperson McLaurin stated the committee is doing research nationally.

OLD BUSINESS:

- **Smoke-Free Initiative Update** *(Activity 34.5)* (Gayle Harris)

Ms. Harris stated that a meeting was scheduled with the County Manager, County Attorney Siler, Attorney Wardell Vice-Chair Miller, Gayle Harris and the City Manager. The meeting concluded with - the parties mutually agreeing that: 1) the County Manager would send the City Manager a copy of the letter that the County Manager and County Attorney received on the behalf of the Board of Health -; 2) the County Manager would discuss the letter with the City Manager at an already scheduled meeting; and 3) County Attorney Siler would follow-up with the City Attorney with a letter requesting an official response by January 7, 2013 so the Board could discuss the topic at the next Board of Health Meeting on January 10, 2013.

Ms. Harris stated that the Director of General Services, Motiryo Keambiroiro has agreed to have Durham County General Service staff place the signs at the bus stops as they are working in the geographic areas. The placement may take up to June 2013. The Board approved to move forward with the Durham County General Service Department placing non-smoking signs at designated bus stops.

Comment: Dr. Allison asked if there were designated funds or any additional cost to the health department to place the signs instead of the City.
Answer: Ms. Harris stated that the department has designated funds to pay for signage placement.

- **Policy Review/Discussion/Approval** *(Activity 15.3) (Eric Ireland)*

Based upon the accreditation requirements for the Department of Public Health, the Board of Health is required to conduct an annual review of adopted policies. The following Board of Health policies were reviewed, discussed and approved:

- Policy/Procedure Introduction, Implementation and Review

Ms. Carter made a motion to approve the policy with the changes presented. [e.g., Logo changed; DCHD changed to DCoDPH; Health Department changed to Durham County Department of Public Health (DCoDPH), Health Director changed to Public Health Director; annual review date added; DCBOH changed to BOH]. Dr. Bryant seconded the motion and the motion was approved

- Delegation of Authority to the Public Health Director

Ms. Carter made a motion to approve the policy with the changes presented. Dr. Levbarg seconded the motion and the motion was approved

Attachment 11

DCoBoard of Health Ad Hoc Committee: Municipal Water Fluoridation
December 17, 2012
Minutes

Members present – Dr. R. Vincent Allison, Chair; Mrs. Sue McLaurin, Board Chair, Ex Officio member
Members excused – Dr. Nancy Short and Dr. Jim Miller
Staff members present – Dr. Jim Harris, Rebecca Freeman, and Gayle Harris

The meeting was called to order by Dr. Allison at 6:24 p.m. in the Health Director's conference room.

The group reviewed copies of municipal water fluoridation documents presented at the Orange Water and Sewer Authority Natural Resources / Technical Systems Committee's December 5th meeting. The documents included: 1) copies of statements made by Dr. Rebecca King, Chief of NC Oral health Section and Allen Spalt, former Executive Director of Toxic Free North Carolina and 2) a copy of a letter from Dr. Harold Goodman, President of Association of State and Territorial Dental Directors. The letter was addressed to Rob Elmore, News Director WTVD-Channel 11 and copied to Steve Daniels, Reporter WTVD-ABC 11. Caroline Welch, President and General Manager, WTVD –ABC 11 and Kelly McBride, Senior Faculty The Poynter Institute.

The group decided to move forward with an expert panel presenting at the March 14th Board of Health meeting. Committee staff support will invite the following agencies / individuals to participate

- Representative from City Department of Water Management (focus on current levels of fluoride in Durham's municipal water)
- Dr. Rebecca King, Chief of Oral Health Section (reactions to assertions)
- Dr. Tim Wright, Bawden Distinguished Professor and Chair, UNC Department of Pediatric Dentistry (reactions to assertions and his portrayal by I-Team report)
- Representative from local Environmental Protection Agency (focus on EPA report referenced in I-Team report)
- Representative from the Nicholas School of the Environment (address natural occurring fluoride levels in our community)

Invitations are to be extended to the proposed panel members by first week in January.

Staff will review the assertions made during public comment period at the September Board of Health meeting.

The group reviewed "Fluoridation of Drinking Water: Considerations for Brevard City Council", a document developed by Transylvania County Board of Health. (This document was recommended Steve Smith, Public Health Director.) Using the format presented in the document, panel members will be asked to address assertions, evaluation of the assertions and provide conclusions.

The Committee proposes to handle the process similar to a Congressional Hearing. Each person will make an opening statement – either pro or con. Members of the Board will ask questions based on the assertions. Cost / benefit questions will be asked of the panelists. (Panelists will receive the assertions prior to the event.) The Board will be asked to make a recommendation in April that will be forward to Mayor Bell.

Next steps: Schedule the next Ad Hoc Committee meeting after the panelists are confirmed

Submitted by Gayle Harris, Public Health Director and Secretary to the Board of Health

A Regular Meeting of the Durham County Board of Health, held January 10, 2013 with the following members present:

Sue McLaurin, M. Ed., PT; John Daniel, Jr., MD; James Miller, DVM; Teme Levbarg, MSW, PhD; Stephen Dedrick, R.Ph, MS; Heidi Carter, MSPH; Commissioner Brenda Howerton and Nancy Short, DrPH, MBA, RN.

Excused Absence: Michael Case, MPA; F. Vincent Allison, DDS; and Jill Bryant, O.D.F.A.A.O

Others present: Gayle Harris, Eric Ireland, Becky Freeman, Rosalyn McClain, Melissa Downey-Piper, Robert Brown, Jim Harris, Dr. Miriam McIntosh, Dr. Arlene Sena, Eric Nickens, Hattie Wood, Marcia Robinson Michele Easterling, and Attorney Bryan Wardell.

CALL TO ORDER: - Chairman Sue McLaurin called the meeting to order at 5:05pm with a quorum present.

DISCUSSION (AND APPROVAL) OF ADJUSTMENTS TO AGENDA: The following item was added to the Agenda.

- Renewal of Financial Disclosure Statement for Ethics Policy

REVIEW OF MINUTES FROM PRIOR MEETING/ADJUSTMENTS/APPROVAL: Commissioner Howerton made a motion to approve the minutes for December 13, 2012 meeting. Mr. Dedrick seconded the motion and the motion was approved.

PUBLIC COMMENTS:
There were no public comments.

COMMITTEE REPORTS:

- **Nomination Committee Recommendations**

The Nominating Committee made a motion to recommend Dr. Jim Miller, as Chair and Mr. Michael Case, as Vice-Chair to the Board. Dr. Miller accepted the position as Chair and the board unanimously approved the nomination. Due to Mr. Case's absence, the board will vote in the Vice-Chair position at the next meeting.

- **Personnel Committee Appointment** ***(Activity 37.4 & 37.5)***

Ms. Harris reported for the Chair of the Personnel Committee (Michael Case). Mr. Case requested that the position of Chair for the Personnel Committee be a rotating position. Mr. Dedrick and Dr. Levbarg agreed to serve on the Personnel Committee. Dr. Miller will appoint a Chair for the personnel committee at the next meeting.

- **Finance Committee Appointment** ***(Activity 33.6)***

Dr. Short and County Commissioner Howerton agreed to serve on the Finance Committee. The Vice-Chair will also serve on the Finance Committee.

Dr. Short requested that information on program outcomes/evaluations be included in FY13-14 Budget data.

- **Ad Hoc Municipal Water Fluoridation Committee** ***(Activity 14.3 and 34.5) (Board)***

The subcommittee met on December 17 and reviewed copies of municipal water fluoridation documents presented at the Orange Water and Sewer Authority Natural Resources / Technical Systems Committee's December 5th meeting. The documents included: 1) copies of statements made by Dr. Rebecca King, Chief of NC Oral health Section and Allen Spalt, former Executive Director of Toxic Free North Carolina and 2) a copy of a

letter from Dr. Harold Goodman. President of Association of State and Territorial Dental Directors. The letter was addressed to Rob Elmore, News Director WTVD-Channel 11 and copied to Steve Daniels, Reporter WTVD-ABC 11. Caroline Welch, President and General Manager, WTVD –ABC 11 and Kelly McBride, Senior Faculty The Poynter Institute.

The group decided to move forward with an expert panel presenting at the March 14th Board of Health meeting. Committee staff support will invite the following agencies / individuals to participate

- Representative from City Department of Water Management (focus on current levels of fluoride in Durham's municipal water)
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- Dr. Tim Wright, Bawden Distinguished Professor and Chair, UNC Department of Pediatric Dentistry (reactions to assertions and his portrayal by I-Team report)
- Representative from local Environmental Protection Agency (focus on EPA report referenced in I-Team report)
- Representative from the Nicholas School of the Environment (address natural occurring fluoride levels in our community)

Invitations were to be extended to the proposed panel members by first week in January.

Staff will review and summarize the assertions made during public comment period at the September Board of Health meeting.

The group reviewed "Fluoridation of Drinking Water: Considerations for Brevard City Council", a document developed by Transylvania County Board of Health. (This document was recommended Steve Smith, Public Health Director.) Using the format presented in the document, panel members will be asked to address assertions, evaluation of the assertions and provide conclusions.

The Committee proposes to handle the process similar to a Congressional Hearing. Each person will make an opening statement – either pro or con. Members of the Board will ask questions based on the assertions. Cost / benefit questions will be asked of the panelists. (Panelists will receive the assertions prior to the event.) The Board will be asked to make a recommendation in April that will be forward to Mayor Bell.

Next steps: Schedule the next Ad Hoc Committee meeting after the panelists are confirmed

Since the meeting, the following experts have been contacted to participate at the March 14th Board meeting.

- Dr. Tim Wright (confirmed)
- Dr. Rebecca King (confirmed)
- Dr. Avner Vengosh, Nicholas School of the Environment (a traveling commitment conflicts with Board meeting. He was asked if he could submit a written summary that provides information regarding naturally occurring fluoride levels in Durham. Another name was suggested by Dr. Marie Lynn Miranda.)
- Dr. Anthony DeAngelo, local EPA representative listed on the Speakers Bureau as one who discusses water quality (Contact sent via link on EPA RTP Speakers Bureau. Staff will follow up with a phone call.)
- Mr. Don Greeley, Director, City's Department of Water Management (awaiting a response)

Commissioner Howerton asked if the fluoride issue has come up in other counties. Ms. Harris stated that it has come up in several counties.

STAFF/PROGRAM RECOGNITION:
Mr. Ireland introduced Marcia Johnson, who accepted the position as Senior System Administrator at the Department of Public Health. Ms. Johnson will assist the department with our technology needs. Ms. Johnson will also be the lead on implementing the Technology Objective for the department's Strategic Plan.

The Board recognized Ms. Sue McLaurin, Chairperson for her dedicated service to the Board of Health. Ms. McLaurin received a plaque in honor of her service.

The Board recognized Dr Nancy Short for her appointment to the NALBOH as Director- At-Large.

ADMINISTRATIVE REPORTS/PRESENTATIONS:

- **Public Health Vacancy Report:** *(Activity 33.6) (Marcia Robinson)*

The Board received a copy of the vacancy report which includes information on the currently vacant positions (22.60 FTEs) in December 2012 *(10 new positions, 6.6 resignations 1 transfer 2 promotions, and 3 reclassifications)*. (A copy of the vacancy report is attached to the minutes)

- **Review Year-To-Date Financial Report FY 12-13** *(Activity 33.6) (Marcia Robinson)*

Ms. Robinson provided an overview of the summary data and details of the department's expenditures and revenue with the Board. (A copy of financial report is attached to the minutes).

Ms. Harris stated that the Pharmacy is working on a detail report that will cost out the medications used in the Jail. The Board will receive a copy of the report when it is completed.

- **State of the County Report** *(Activity 38.1) (Mel Downey-Piper)*

The Partnership for a Healthy Durham and the Durham County Department of Public Health are pleased to release the annual State of Durham County's Health Report for 2012. Every three years Durham County conducts a comprehensive community health assessment in which county residents are interviewed about their health and data are compiled from many sources. The most recent assessment was completed in 2011 and the next community health assessment is in 2014. In the interim years, this report is presented to the public. The State of Durham County's Health report highlights challenges, progress, and addresses emerging issues. It provides the most current data highlighting county demographics, leading causes of death, and the county's seven health priorities. Its purpose is to educate the community about the health of its citizens and to serve as a resource for grant writing, local policies, budgets, and programs. This is a statewide effort to meet the Healthy North Carolina 2020 health objectives.

Ms. Downey-Piper presented an overview of the 2012 State of County Health Report data with the Board. (A copy of the PowerPoint presentation is attached to the minutes).

20 A Regular Meeting of the Durham County Board of Health, held February 14, 2013.

Implication(s)

- **Outcomes**
  - For the first time Environmental Health can provide the general public with local sampling results in order to reinforce the need for well water sampling.
- **Service delivery**
  - The availability of this information allows Environmental Health to provide a more convincing case for routine well water sampling.
- **Staffing**
  - Current staffing would allow for increased sampling.
- **Revenue**
  - Fees collected for sampling help defer the cost of this service.

Next Steps / Mitigation Strategies

- The findings of this report need to be placed on the Health Department website and included in any Environmental Health newsletters targeting the general public.

Attachment:

- 2012 Private Drinking Water Well Bacteriological Sample Report

COMMITTEE REPORTS:

- **Finance Committee Appointment** ***(Activity 33.6)***

The Finance Committee will meet with Public Health management to review the FY13-14 Budget on February 28, 2013

- **Ad Hoc Municipal Water Fluoridation Committee** ***(Activity 14.3 and 34.5) (Board)***

The next subcommittee meeting will be on February 22, 2013. Ms. Harris stated the following experts have been invited to speak on the "Fluoride in the Municipal Water" topic.

- ***Ms. Vickie Westbrook***, Assistant Director of Water Management, City of Durham (In addition to any other items, will specifically address history of fluoridation in Durham and current levels of fluoride in Durham's water supply)
- ***Ms. Amy Keyworth,*** Hyrogeologist, NC Department of Environment and Natural Resources, Division of Water Quality, Aquifer Protection Section (In addition to any other items, will specifically address natural occurring levels of fluoride in Durham and Piedmont Region and how these levels compare to those referenced in the cited studies)
- ***Dr. Rebecca King, MPH,*** Chief, NC Department of Health and Human Services, Division of Public Health, Oral Health Section (Will address issues and studies from her professional perspective)
- ***Dr. Tim Wright,*** Bawden Distinguished Professor and Chair, UNC-School of Dentistry, Department of Pediatric Dentistry (Will address issues and studies from his professional perspective and the November 15th ABC-11 Report)
- ***(Invited but not confirmed) Dr. Laura Gerald,*** State Health Director, NC Department of Health and Human Services, Division of Public Health (Asked to address issues and studies from her professional perspectives as State Health Director and a pediatrician)

OLD BUSINESS:

- **Accreditation Site Visit** ***(Activity 36.3)*** *(Gayle Harris)*

Ms. Harris provided an overview of the Accreditation Site Visit that will take place on April 25-26, 2013.

Site Visit Team:

Barry Bass, HD, Alamance
Jackie Glenn, RN, Mecklenburg

DCo Board of Health Ad Hoc Committee: Municipal Water Fluoridation
Meeting Minutes
February 22, 2013

Board of Health Members Present: Dr. F. Vincent Allison, Dr. Teme Levbarg, and Dr. Jim Miller
Staff Present: Rebecca Freeman, Dr. Jim Harris, Dr. Miriam McIntosh, and Gayle Harris

Dr. Allison called the meeting to order. He stated the purpose of the meeting was to finalize plans for the expert panel presentations and discussions at the March 14th Board of Health meeting. Items for discussion including reviewing list of confirmed panelists and specific topic areas to be covered during each presentation, questions the committee would like to have answered, and contents to be included in communication with the panelists prior to the March 14th meeting.

Gayle Harris reviewed the names of the confirmed panelists for the March 14th meeting

- ***Ms. Vickie Westbrook***, Assistant Director of Water Management, City of Durham (In addition to any other items, will specifically address history of fluoridation in Durham and current levels of fluoride in Durham's water supply)
- ***Ms. Amy Keyworth,*** Hyrogeologist, NC Department of Environment and Natural Resources, Division of Water Quality, Aquifer Protection Section (In addition to any other items, will specifically address natural occurring levels of fluoride in Durham and Piedmont Region and how these levels compare to those referenced in the cited studies)
- ***Dr. Rebecca King, MPH,*** Chief, NC Department of Health and Human Services, Division of Public Health, Oral Health Section (Will address issues and studies from her professional perspective)
- ***Dr. Tim Wright,*** Bawden Distinguished Professor and Chair, UNC-School of Dentistry, Department of Pediatric Dentistry (Will address issues and studies from his professional perspective and the November 15th ABC-11 Report)

In an effort to get a perspective from a pediatrician, it was decided that an invitation would also be extended to Dr. Laura Gerald, State Health Director. If Dr. Gerald is not available, Dr. Jonathan Kotch would be contacted. Gayle Harris will contact Dr. Gerald first and follow-up with Dr. Kotch, if necessary. Panel members will be asked to state his/her professional credentials (including educational background) prior to making opening statements.

During the discussion of the materials to be provided to the panelists, the following items were agreed upon:

- Water Fluoridation: Public Comment Assertions (summarized)
- Full statements and supporting documents provided by the community residents during the public comment period in the September meeting
- Notes from ABC-11 I-Team investigates November 15, 2012 story, "How safe is Fluoride in our water?"

The committee discussed questions they would like to be addressed by appropriate panelists. General thoughts were discussed. Dr. Levbarg agreed to fully develop the questions based on the discussion and send them to Gayle Harris the next day to include in the communication with the panelists.

The committee agreed that this panel is providing information to the Board of Health. Questions from the audience will not be entertained. A Public Comment period will remain on the Board of Health meeting agenda.

Submitted by Gayle Harris

Harris, Gayle

From:	Harris, Gayle
Sent:	Monday, February 25, 2013 4:26 PM
To:	Westbrook, Vicki (Vicki.Westbrook@durhamnc.gov)
Cc:	'fva1015@aol.com'; Teme Levbarg (teme.levbarg@gmail.com); Nancy Short (nshort@nc.rr.com); Jim Miller (jimmillerdvm@gmail.com); Freeman, Rebecca S.; Harris, James R.; McIntosh, Miriam
Subject:	March 14th Board of Health Meeting Topic: Municipal Water Fluoridation
Attachments:	Water Fluoridation Assertions (2).pdf; Public Comments-Fluoridation in Muncipal Waters.pdf; How safe is Fluoride in our water_.pdf

Vickie,

Thank you for agreeing to be a member of our "expert panel' regarding municipal water fluoridation.

Background Information

In August 2012, Mayor Bell asked the Durham County Board of Health to make a recommendation about continuing municipal water fluoridation in Durham following several challenges from Corey Sturmer, a life-time community resident. The Board of Health is committed to doing its due diligence prior to providing a recommendation. A subcommittee comprised of Board members and department staff worked to create a process that will present the best science that addresses the assertions made by community residents during our September Board meeting. To assist you in preparing for the meeting, the following documents are attached

1. Water Fluoridation: Public Comment Assertions (summary of the statements made during public comment period in the September meeting)
2. Full statements and supporting documents provided by the community residents during the public comment period in the September meeting
3. Notes from ABC-11 I-Team Investigates November 15, 2012 story, "How safe is Fluoride in our water? (http://abclocal.go.com/wtvd/story?section=news/abc11_investigates&id=8887007)

During the Public Comment period of December Board meeting, Mr. Sturmer referenced quotes from Reverend William Owens, Coretta Scott King and Bernice King on the hazardous effects of fluoride in the municipal water. During his comments he did not indicate the specific sources of the quotes, but a Google search directed me to this website that appears to reflect the views attributed to these individual by Mr. Sturmer: http://www.fluoridealert.org/issues/ej/

Format for March 14th Presentation

This discussion will be a part of our March 14th regular board meeting which starts at 5:00 pm, located on the 3rd Floor Durham County Human Services Building, 414 East Main Street, Durham 27701.
Panelists will be seated together at the front of the room. Questions for the panelists **will only come from members of the Board of Health**. Panelists are

- ***Ms. Vickie Westbrook***, Assistant Director of Water Management, City of Durham (In addition to any other items, will specifically address history of fluoridation in Durham and current levels of fluoride in Durham's water supply)
- ***Ms. Amy Keyworth,*** Hyrogeologist, NC Department of Environment and Natural Resources, Division of Water Quality, Aquifer Protection Section (In addition to any other items, will specifically address natural occurring levels of fluoride in Durham and Piedmont Region and how these levels compare to those referenced in the cited studies)

- ***Dr. Rebecca King, MPH,*** Chief, NC Department of Health and Human Services, Division of Public Health, Oral Health Section (Will address issues and studies from her professional perspective)
- ***Dr. Tim Wright,*** Bawden Distinguished Professor and Chair, UNC-School of Dentistry, Department of Pediatric Dentistry (Will address issues and studies from his professional perspective and the November 15th ABC-11 Report)
- ***(Invited but not confirmed) Dr. Laura Gerald,*** State Health Director, NC Department of Health and Human Services, Division of Public Health (Asked to address issues and studies from her professional perspectives as State Health Director and a pediatrician)

Each of you will state your professional credentials (including educational background) prior to making your statement. Then you will have five (5 minutes) to make your comments. **(Please bring copies of information shared regarding your credentials and your comments. This information will be included in the meeting minutes.)**

After the comments are concluded, Board of Health members will ask questions. Below are questions the subcommittee developed

1. If you were going to develop fluorosis, at what age would that occur? Can a teenager or adult develop fluorosis?
2. What are the ways that a person can get fluorosis?
3. What is the estimated cost of taking fluoride out of the community water system? What would be the estimated increase in dental needs/dental treatment?
4. What have studies shown regarding measuring the reduction of dental decay due to fluoridation in community water systems?
5. How does fluoride help to reduce the caries rate?
6. What do studies show by race, age and income regarding the reduction of cavities when there is fluoride added to the water?
7. Can you address how dental disease affects children and their ability to learn?
8. If the board of health were to recommend that fluoride be removed, would you expect to see a rise in the caries rate and the need for dental care? If so, when would those rates begin to increase? Does Durham County have the resources to meet those needs?
9. In the wrap up: Have you lived in a place where the water has been fluoridated? Did your children drink fluoridated water? And, if so, were you concerned about that?

I am sure additional questions will be generated by other Board members.

Please contact me if you have any questions regarding this process. Thank you again for participating in this very important discussion.

GAYLE B. HARRIS, MPH, RN
Public Health Director

Durham County Department of Public Health

Public Health

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Durham, North Carolina 27701
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gharris@dconc.gov

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BOARD OF HEALTH
AGENDA

03/14/13
5:00 PM
HUMAN SERVICES BUILDING (3RD FLOOR)
414 E. MAIN STREET
DURHAM, NC 27701

Type of meeting: **REGULAR SESSION**
Presiding: James Miller, DVM, **CHAIRMAN**

Note: Numbers in parentheses reflect accreditation activity according to benchmark. The State Public Health Statutes are available to the Board of Health during this meeting.

1. CALL TO ORDER	Chairman
2. DISCUSSION (AND APPROVAL) OF ADJUSTMENTS TO AGENDA	Board Action
3. REVIEW OF MINUTES FROM PRIOR MEETING/ADJUSTMENTS/APPROVAL – February 14, 2013	Board Action
4. PUBLIC COMMENTS	
5. PANEL DISCUSSION: FLUORIDATION IN THE MUNICIPAL WATER	Dr F. Vincent Allison/Dr. Jim Miller/Expert Panelists/Board

- Ms. Vicki Westbrook, City of Durham Water Management
- Ms. Amy Keyworth, NC DENR Division of Water Quality
- Dr. Rebecca King, NC DHHS Division of Public Health
- Dr. Tim Wright, UNC-School of Dentistry Department of Pediatric Dentistry
- Dr. Laura Gerald, NC DHHS Division of Public Health

10 minute break-----

6. COMMITTEE REPORTS	
• Finance Committee Report: Presentation of FY 13-14 Budget Request	Dr. Teme Levbarg/Marcia Robinson/Gayle Harris
7. OLD BUSINESS	
• Smoking Rule Update (Activity 34.5)	Gayle Harris/Attorney Bryan Wardell
8. NEW BUSINESS	
• Budget Amendments/Ratifications /Approval	Board Action
• Agenda Items for April 2013 meeting	Board Action
9. INFORMAL DISCUSSION	
10. MOTION TO ADJOURN	

Attachment 17

Board of Health Meeting

March 14, 2013

Attendance:
Board of Health:
James Miller, DVM; John Daniel, Jr., MD; Stephen Dedrick, R.Ph, MS; Commissioner Brenda Howerton; F. Vincent Allison, DDS; Jill Bryant, O.D.F.A.A.O; Nancy Short, DrPH, MBA, RN; Bergen Watterson, MSCP, BA and Heidi Carter, MSPH

Excused Absence: Michael Case, MPA; Teme Levbarg, PhD, MSW

Others present: Gayle Harris, Eric Ireland, Becky Freeman, Rosalyn McClain, Melissa Downey-Piper, Robert Brown, Dr. Jim Harris, Dr. Miriam McIntosh, Dr. Arlene Sena, Eric Nickens, Hattie Wood, Marcia Robinson, Michele Easterling, Marcia Johnson, Attorney Bryan Wardell, Vicki Westbrook, Amy Keyworth, Dr. Rebecca King, Dr. Tim Wright, and Corey Sturmer. (There were others in attendance who neither signed the attendance roster nor signed up to speak during the Public Comment period.)

Excerpts regarding Fluoridation in the Municipal Water

4. PUBLIC COMMENTS:

Mr. Corey Sturmer stated, "For those who do not know me I have been speaking about the issue that is going to be discussed tonight for about a year now. In that year's time I have learned a lot about how government works and I am always trying to learn more. I am just looking at the agenda here and see the folks who have been invited to participate and so before we get into the discussion I would like to encourage the board to really ask them the hard questions, the questions that matter as it pertains to this issue. Let's go down the line here, Ms. Westbrook the spokesperson for the Water Management Department, a great question to ask her is 'Where does fluoride come from?' I followed the paper trail and we purchase it from a fertilizer manufacturer and I would like to know, and this would be a question to ask the public health representatives; 'How is fertilizer waste beneficial in any way to the human body?' I don't see any internal medicine doctors here on this list and I think that is really important because we have to keep in mind and remember this is being topically applied and digested through our bodies and so it is not just about the teeth. It's about what we ingest and how it affects all systems of the body. Remember our bodies are seventy-five percent water, every organ requires water. If you read the literature the human body has no single lined process that requires the fluoride that is put in our water. Another topic that should be discussed with Mr.

Tim Wright, dental department, again ask him if it is his professional opinion that fluoride is beneficial to our bodies when ingested. If he is honest, he would not be able to answer that because he is not an internal medicine doctor. He is a dentist and there are different rules that apply. I just want to address the idea of the public health department, most of the times the City will say we follow the public health rules; that's not actually true, the decision is up to the citizens, the people in Durham who are drinking water. It is not the water department's decision, the public health department's decision; it is all of our decisions; so understand, that there are cities that have ended fluoride in spite of the reservations of their state health department and they did so because the citizens said so. So no matter what is said with these folks today, I hope that you give the choice to the citizens, we should have a vote, not a decision made behind closed doors where the citizens don't get to weigh in. Given the fact that Durham is a very equitable standing group of people that is a very reasonable request to ask, let's just have a vote and let the citizens decide. That's all I have to say today and that you guys will hold their feet to the fire and ask the right questions and consider the right relevance in relation to the issue. Thank you."

5. PANEL DISCUSSION: FLUORIDATION IN THE MUNICIPAL WATER

Chairman Jim Miller stated "The Ad-Hoc Committee, chaired by Dr. Vincent Allison, has brought these panelists together tonight to give the board more information related to fluoridation and more information in the area of water fluoridation, especially in municipal drinking water. This panel is, in part, the committee's effort to do due diligence in providing a careful, open, considered, educated recommendation to the City of Durham in regards to water fluoridation. We are trying to definitely take into consideration the public comments and will always entertain public comment and not making decisions behind closed doors and keeping this very much transparent. This evening's panel is here for the board and the committee to hear their presentations as well as to ask questions to the panel. Public questions will not be a part of this meeting and as such I expect no disruptions with the board and the panel that will allow them the time to get through the discussion and questions that we need. With that instruction, we will ask anyone who leads these disruptions to leave the facility for the rest of the evening. The other thing I would like to ask of the panelists is during your introductions, give us a little insight to your credentials, educational and additional training that will help us understand the area of your expertise." Chairman Miller asked if there was a particular order that the panel should begin discussion. Ms. Harris requested the panelists begin as they are listed on the agenda.

Vicki Westbrook: "I am Vicki Westbrook, BS Medical Technology and Grade IV Wastewater Operator Certification, (successfully completed 14 week Water Operators certification class), Assistant Director, City of Durham, Department of Water Management. I have been working with the City under its three different names for 27 years. I have been the Assistant Director

since 2006 and my areas of responsibility are the water supply facility, waste-water treatment facility, regulatory compliance and the administrative divisions of Water Management. Thomas Harden, BS in Environmental Science, Grade A Surface Water Operator Certification, Grade IV Wastewater Operator certificate, Water Supply & Treatment Superintendent, is here tonight to my right, has 30+ years of experience in the business and is here for any more technical questions that you would like to ask. The reason we are here is because we have been adding fluoride to our city water supply since 1962. In 1957, Durham water customers cast post card votes to support the addition of fluoride in the City drinking water. Following State Board of Health rules, formal action by Durham's City Council was taken on March 19, 1962 to add fluoride. Once the formal action was taken, equipment and supplies were ordered and the installation was inspected and approved by the NC Board of Health's Division of Sanitary Engineering. Fluoride was added to the water beginning May 1, 1962."

"Since that time, the City's Water Supply and Treatment staff have strictly adhered to guidelines established by the US Environmental Protection Agency (EPA) and overseen by NC Department of Environment and Natural Resources (DENR)-Division of Water Resources, Public Water Supply Section."

"The limits of fluoride go up to 4.0 milligrams per liter dosage. However, we have always had a target of 1.0 milligram per liter dosage and pretty much meet that consistently. Based on US EPA and US Health and Human Services recommendations, in February of 2011, NC DENR implemented 0.70 milligrams per liter dosage to balance the benefits of preventing tooth decay while limiting any unwanted health effects. This is in recognition that Americans have access to more sources of fluoride that when fluoridation was first introduced in the 1940s. Based on the recommendation we have modified our dosage consistently of 0.70 milligrams per liter dosage to meet that requirement. We test daily, and the information is submitted to the state on the operating reports on a regular basis."

"City staff made minor adjustments to meet the new target fluoride dosage; prior to the February 2011 Position Statement, the City had a target dosage of 1.0 mg/l. The staff continue to monitor all information provided by regulatory agencies and will adjust level as recommended."

"Information about the water treatment processes, chemicals used and levels in treated water is included in the City's Annual Water Quality Report. This report, first developed in 1997, is mailed to postal customers in Durham's service area on or before June 30 of each year. This report provides all our customers information on what is in the water; how the water is treated and the level of the different chemical that are used in the water. Annual reports are also posted on the www.DurhamSavesWater.org website. The City took the mandate from the customers at the time and the mandate to add fluoride at the appropriate levels."

"The total budget for 2012 for chemicals at the water treatment facilities was $2.3 million; fluoride purchases (in the form of hydrofluorosilicic acid) comprise about 3% of the chemical budget or just under $70,000."

"According to Kevin Buchholtz, DDS, with the NC Department of Health & Human Services (HHS), Oral Health Section:

a) Between 88% of public water systems in North Carolina fluoridate water.
b) Only one small community (5,000 customers) in Western NC has ceased adding fluoride to their drinking water (in 2007) and they are reconsidering this action.
c) The NC HHS supports the continued addition of fluoride to public drinking water for the reasons expressed above.
d) The majority of public water systems use the same fluoride additive as Durham---- Hydrofluorosilicic Acid."

"The Department defers to dental health experts regarding the benefits of fluoride in drinking water."

Amy Keyworth: "I am Amy Keyworth a Hydrogeologist with NCDENR, Division of Water Quality, Aquifer Protection Section. My current responsibilities include helping to implement a statewide program for resource evaluation, groundwater quality monitoring, and groundwater protection program development. I have 13 years experience working for the State of North Carolina, as a Geological Technician and Geologist with the NC Geological Survey, and as an Environmental Specialist and Hydrogeologist with the NC Division of Water Quality. I have a BA in Botany from Duke University and an MS in Geology with a concentration in Hydrogeology from NC State University."

"I was asked to be the expert on naturally occurring fluoride in groundwater in North Carolina. That is what I am going to speak to you on tonight."

"Fluoride is a naturally occurring ion of the element fluorine. It combines with many cations to form a variety of naturally occurring minerals such as calcium fluoride, sodium fluoride, aluminum fluoride, etc. Fluoride is found in groundwater in varying concentrations, depending on the local geology. Fluoride-bearing minerals are found in both igneous and sedimentary rocks."

"In Durham County, there are two primary geologic types – the Carolina Terrane to the north and west, and the Triassic Basin to the south and east. The Carolina Terrane is made up of rocks resulting from ancient, extinct volcanic activity. The Triassic Basin rocks are sedimentary rocks formed from the weathering and erosion of Carolina Terrane rocks. Both Carolina Terrane and Triassic Basin rocks contain some fluoride-bearing minerals."

"The attached map (Attachment 17a), produced by the NC Geological Survey, depicts analytical results of private drinking water well samples from the State Public Health Lab on a geologic map of Durham and Orange Counties. Fluoride in the groundwater in these counties varies from less than 0.2 mg/L to 1.07 mg/L. No private drinking water wells in Durham County had test results exceeding either the NC Groundwater Standard (2.0 mg/L) or the Federal MCL (4.0 mg/L) for fluoride."

"So to look at this map again, there is a legend up at the right that shows the yellow triangle, circles squares and blue dots. All the blue dots are basically are private well samples; and the analytical results for fluoride were below the 0.2mg/l to 1.07 mg/l levels. The yellow triangles show the fluoride levels are between 0.5 mg/l and 0.2 mg/l. The yellow circles are 0.2-0.3 mg/l and the yellow squares are 0.3-1.07 mg/l. These are all samples from private drinking waters in Durham and Orange Counties. Actually, if you go to the next map (Attachment 17b) I will explain a little about where this data comes from. The red dots on this map are fluoride samples that were greater than 0.2 mg/l. There are 131 in this database over 19,000 samples that came back exceeding the NC water standard. This data is all from private wells and is a little squid. Some counties are on a public water supply and there are no private wells being sampled. There are some counties that had private wells going back way beyond what the state starting requirements. There are many more samples from those counties than from counties that just came into the program in 2007. Then there are samples resulting in complaints (issue with water color, taste etc.)."

"The State has resource protection standards that apply to all groundwater in the state. The resource is protected as a source of drinking water for both public and private wells.

"From the NCDENR Division of Water Quality "Groundwater Standards" webpage, the below are quoted from the "Frequently Asked Questions" section (http://portal.ncdenr.org/web/wq/ps/csu/gwstandards). I picked three of the questions that were most relevant to our discussions tonight.

> **What are groundwater quality standards and how are they established?**
>
> Groundwater quality standards are the maximum allowable concentrations of pollutants in groundwater which may be tolerated without creating a threat to human health or which would otherwise render the groundwater unsuitable for use as a drinking water source.
>
> The Division of Water Quality's Classifications and Standards Unit is responsible for the development and maintenance of North Carolina's groundwater standards. Regulations pertaining to the classifications and water quality standards applicable to groundwaters of North Carolina are located in Title 15A of the North Carolina Administrative Code,

Subchapter 2L, Sections .0100, .0200, .0300 and .0400. These regulations can be located in the NC Administrative code at CSU Rules webpage.

How are groundwater quality standards established?

Groundwater quality standards are established as the lowest of the following six criteria:

1. A concentration protective of the non-cancer or systemic effects of a contaminant.
2. A concentration which corresponds to an incremental lifetime cancer risk of one-in-a-million;
3. The taste threshold limit value;
4. The odor threshold limit value;
5. The National Drinking Water Maximum Contaminant Level (MCL); or
6. The National Secondary Drinking Water Standard.

In addition to the standards listed in Section .0200 of the 2L rule, the DWQ Director may establish an interim maximum allow concentration (IMAC) for substances for which a standard has not been established.

What happens when naturally occurring background levels are higher than the groundwater standard?

Where naturally occurring substances exceed the established standard, the standard shall be the naturally occurring concentration as determined by the Division of Water Quality Director."

Dr. Rebecca King: "I am Dr. Rebecca King. I am a dentist and received both my dental degree and master's degree in public health from the University of North Carolina at Chapel Hill. I did my residency training in the specialty of dental public health at the North Carolina Division of Public Health, have been board certified in the specialty for 16 years; I am past president of the American Board of Dental Public Health and the American Association of Public Health Dentistry. I have worked in dental public health for 36 years, and my duties for the last 22 years have included support for community water fluoridation. I currently serve as the North Carolina state public health dental director and chief of the Oral Health Section in the Division of Public Health.

The safety of the public water system is of paramount importance to health professionals and government agencies, so the potential for fluoride in drinking water to cause adverse effects has been carefully examined. More than 3,000 studies or research papers have been published on the subject of fluoridation, meaning few topics have been as thoroughly researched as fluoride.

CDC states that: "the weight of the peer-reviewed scientific evidence does not support an association between water fluoridation and any adverse health effect or systemic disorder."

Leading health and medical organizations agree that there is strong evidence that water fluoridation is both safe and effective. A review of credible scientific studies concludes that water fluoridation safely reduces tooth decay between 18-40 percent for US schoolchildren, while also reducing tooth decay and tooth loss in adults, even with the widespread use of other forms of fluoride such as fluoride toothpaste. Even before the first community water fluoridation program began in 1945, epidemiologic data from the 1930's and 1940's revealed lower numbers of cavities in children consuming naturally occurring fluoridated water compared to children consuming fluoride-deficient water. Studies in Colorado, New York, Texas and Alaska show that a community that stops fluoridating or never starts this process will find that residents spend much more on decay-related dental procedures. For Durham residents, we would expect that cavities would increase if fluoridation was discontinued and that individuals and the health care systems would be absorbing the costs of treating the effects of increased dental disease. This is particularly significant for the Medicaid budget, as the low income population has the majority of the disease."

"Two published studies conducted by the CDC reaffirm the benefits and cost savings of community water fluoridation. I understand that Durham spends about $173,000 per year for fluoridation or less, or a cost of $.74 per person per year or less. Based on the CDC's estimate that every $1 invested in this preventive measure yields approximately $38 savings in dental treatment costs, this is a cost savings of more than $6.5 million. Put another way, the individual lifetime cost of fluoridation is less than the cost of one filling. Fluoridation saves money for families, and it saves money for taxpayers supporting public programs."

"Fluoride protects teeth two ways – systemically (before teeth erupt into the mouth) and topically (after they erupt). Fluoride exposure before teeth erupt remains important; however, current consensus recognizes fluoride's *primary* benefits—but not all of its benefits—are from topical sources. We drink fluoridated water and the trace levels of fluoride return to the mouth in the saliva. There, it provides topical protection as the teeth are continuously bathed by fluoride rich saliva."

"Caries rates have declined in all racial and ethnic groups in NC since community water fluoridation began, remarkably so. However, there are still major disparities in tooth decay rates according to race, ethnicity and income status. Overall, non-Hispanic blacks, Hispanics, American Indians and Alaska Natives have the poorest oral health of any racial and ethnic groups in the United States. Minority adults have nearly twice as much untreated tooth decay as non-Hispanic whites, and adults with less than a high school education have nearly three times the amount of untreated tooth decay than adults with at least some college education. The higher the risk status and level of decay, the greater the potential for benefits from preventive measures. Community water fluoridation is our most effective and efficient way to reduce decay. One of the strengths of water fluoridation is that it is an equitable method of disease prevention and

ethical public health intervention – all people benefit regardless of their incomes, ages, race/ethnicity and whether or not they have dental insurance or are able to get dental treatment. All you have to do is drink the water."

"I grew up in an area of North Carolina that did not fluoridate its water until I was a teen-ager. As a result, I suffered from a fairly high level of tooth decay as a child. Once a tooth has a filling, over time, that filling has to be replaced, and each time it is replaced, the filling gets larger until a number of my teeth eventually needed crowns, which was a significant expense. It is much better if we can prevent the decay process from beginning in the first place. Since my teen-age years, I have always chosen to live in an area with a fluoridated water system. I made sure that my children drank fluoridated water and as a result, they are now cavity-free young adults."

Dr. Tim Wright: "I am Tim Wright, Dentist. I received my dental training at the University of West Virginia, then went into public health for about a year, and then did my pediatric dentistry residency at the University of Birmingham Alabama. During that time I also completed a four year Health Cariology Research Training Fellowship that was primarily directed at understanding fluoride and fluoride effects and caries prevention. Since that time I have been in full-time academics in pediatric dentistry patient care. I am presently the Bawden Distinguished Professor and Chair at UNC-CH Department of Pediatric Dentistry. I have over 30 years of experience."

"Three key issues that are main components to this issue and that have been brought up in public hearings and when I lecture on fluoride to students.

1. Safety
2. Effectiveness
3. What is the Cost

As far as safety, there have been and continue to be challenges and will continue to be challenges to the safety of fluoride. If you go back in fluoride history, when it was discovered 100 years ago, it has been looked at as a great health benefactor. So what does the data suggest? It has accused fluoride and its derivative compounds of everything from down-syndrome to retardation, Osteosarcoma, and most recently the literature, has been on the IQ side on fluoride exposure in children. So what are the facts: osteosarcoma the earlier one, where they looked at different communities with different water levels. It is one of the only preventive health measures tested at the community level. The initial trials in Grand Rapids Michigan in 1945 were a comparison

of one community that was fluoridated and one that was not. This has been going on for over 65 years of water fluoridation in the United States. Concerns about osteosarcoma were big. There was a rat study, in RTP, that leaked some of the early information before they had completed the trial data that said there was evidence of high levels of osteosarcoma. They went back and analyzed all the data and it didn't pan out. The most recent scare of that was in Dr. Douglas's data from Harvard, where he was accused of hiding data by one of his post docs. Where it appeared, males were having a higher level of osteosarcoma based on the epidemiological studies of humans. They went back and analyzed the data fully with other groups and it didn't pan out. Osteosarcoma is extremely rare, and it had an effect you would expect to see a massive population base with these kinds of fluoride effects. The most recent IQ data would say it's a Harvard Study, so therefore it has to be great. Well, if you read the data, what it says is that they sampled communities in China and two communities in Iran. What they are comparing is called high fluoride levels which are anywhere from 4-to-10-to-20 times above .07 mg/l levels that the United States would consider to be optimally fluoridated. In most of those communities—not all of them, but most of them—there isn't a problem of lower IQ scores in those communities that are high. So the data, overwhelming show in thousands of studies that at the right level fluoride is beneficial and safe.

Dental caries is the most common disease in children in the United States and in North Carolina. Over 30% of North Carolina children entering kindergarten having experienced tooth decay and 17% have untreated dental caries. While this disease is disproportionally represented in low socioeconomic populations, it crosses all social, economic and racial boundaries. The idea of optimizing the population's exposure to fluoridated water to prevent dental caries evolved from observations in populations that had naturally low levels of fluoride to those with higher levels. Fluoride is the 13th most common element in the earth's crust and is found to naturally occur in many water sources, depending on the type of rock formations the water flows over and through. These early epidemiological studies revealed that optimal caries reduction and safety occurred around 0.7 to 1.2 ppm. Since the first community experiments on water fluoridation in the 1950's, the scientific evidence continues to overwhelmingly support the benefit and safety of water fluoridation. The Centers for Disease Control and Prevention currently recommends an optimal level of water fluoridation to prevent caries and be safe at 0.7ppm, which is the level of the Durham County water supply. Water fluoridation has several notable benefits over other approaches directed at preventing dental caries. Fluoridated water is available to all segments of the population served by that water source regardless of socioeconomic status.

Water fluoridation is the most cost effective method available to prevent dental caries. (Cost of Durham County residents estimated at less than $1 per year) and results in a marked reduction in dental caries in the population. This translates to significant health care cost reductions in the population (estimated millions of $ in dental care savings to Durham Country residents). Lower disease levels are associated with fewer missed work days, fewer missed school days, fewer

emergency room visits for dental caries and a reduction in tooth loss. Untreated dental caries in children has been associated with lower test scores in school. Studies continue to show

Groups arguing against water fluoridation site information regarding the risks of fluoride such as recent publications on children exposed to fluoride having lower IQ levels. In all of these study populations the children studied were exposed to many times greater the optimal level of fluoride (sometimes as much as 20 times) and the normal comparison group was typically children with fluoride exposure levels similar to or even greater than those drinking Durham Country water. Providing water fluoridation in fluoride deficient communities has been present in the United States for over 60 years, has been evaluated for safety on millions of people, and there remain no validated and scientifically supported harmful effects. The UNC Department of Pediatric Dentistry strongly supports continuing water fluoridation as a safe and effective approach to reducing the burden of dental caries in the population. She is a wonderful supporter of all caries prevention, especially fluoridation.

Dr. Laura Gerald was not able to be here in person, but sent her presentation by Dr. Rebecca King.

Dr. Laura Gerald is a pediatric physician with a Master's in Public Health from Harvard University. She did her pediatrics at John Hopkins University and she has a very distinguished career. She is originally from North Carolina, and came back to work in Robeson County for 10 years, during that time she worked in a rural low-income county and saw many children who suffered with dental disease. That's where she learned first-hand about the problem and as a pediatrician about things that can prevent tooth decay. Dr. Gerald currently serves as North Carolina's State Health Director.

Dr. King read Dr .Gerald's statement, "For more than 65 years, the safety of community water fluoridation has been studied more thoroughly than any other public health measure, and repeatedly confirmed as being both safe and the most cost effective preventative measure that can be taken to reduce tooth decay in people of all ages. A broad range of dental and non-dental health organizations (see http://www.ilikemyteeth.org/fluoridation/health-medical-authorities/), including the Division of Public Health, North Carolina Department of Health and Human Services, support fluoridation. North Carolina has supported the fluoridation of drinking water supplies for over sixty years-Charlotte fluoridated its water supply in 1949, and at that time was the largest water system in the world to adjust it fluoride level to the recommended optimal level. North Carolina has continued to be a leader in this area and the latest figures shows that, of those North Carolinians who receive their water from a community water system, 87 percent receive the benefits of fluoridated water. As the size of the population receiving fluoridated water has grown, our statewide dental surveys have documented dramatic improvements in the dental health of our citizens.

You may obtain more information at the following internet addresses:

- The Campaign of Dental Health:
  http://www.likemyteeth.org/fluoridation/
- The Center for Fluoride Research Analysis:
  http://www.fluoridescience.org
- The American Dental Association page on fluoridation:
  http://ada.org/fluoride.aspx
- The Centers of Disease Control and Prevention (CDC):
  http://www.cdc.gov/fluoridation
- Oral Health in America, A Report of the Surgeon General:
  http://www.nidcr.nih.gov/DataStatistics/SurgeonGeneral/sgr/
- NC Oral Health Section web page:
  http://www.oralhealth.ncdhhs.gov

The staff in the N.C. Division of Public Health, Oral Health Section, routinely monitor the literature to remain current on fluoridation issues. For additional information, please contact Dr. Rebecca King, Section Chief, N.C. Division of Public Health, Oral Health Section at 919-707-5487 or Rebecca.King@dhhs.nc.gov.

BOARD QUESTIONS/PANELISTS ANSWERS: FLUORIDATION IN THE MUNICIPAL WATER

Q: **Dr. Allison**: "This question is for Ms. Keyworth. What is the maximum standard for groundwater fluoride in North Carolina? And basically what you were saying that anything under 2.0 based on your department is safe to drink?"

A: **Ms. Keyworth**: "It is 2/mg/l in North Carolina. Yes".

Q: **Dr. Miller**: "I think I would like to add on to the question. Reflecting back to the maps, there were many wells, private wells that were sampled that had naturally occurring levels of fluoride."

A: **Ms. Keyworth**: "Yes and I am sorry that I did not think to break down the numbers."

Q: **Dr. Miller**: "It was 0.2 up to 1.07"

A: **Ms. Keyworth**: "Yes, up to 1.07. Durham didn't have anything above 1.07 that is in the naturally occurring ground water that has been tested in the private well program."

Q: **Dr. Miller**: "Is that the same fluoride?"

A: **Ms. Keyworth**: "Fluoride is an ion, so fluoride is fluoride. It doesn't matter what mineral it came from."

Q: **Dr. Miller**: "So the testing that is done on the Durham water is testing for the fluoride ion the same fluoride ion being tested in groundwater?"

A: **Ms. Keyworth**: "Correct, I can even give you the test that is being used. It is Fluoride Ion Chromatography EPA 300.0 RDV 2.1. Both the DWQ and the State of Public Health do the same test."

Q: **Commissioner Howerton**: "I am referring to the wells in Northern Durham that had some contamination years ago. We have been working with those. I was wondering if you had any idea if there would be any consequences around those wells."

A: **Ms. Keyworth**: "I am guessing that would be the Division of Waste Management that would be handling that. This is my supervisor, Evan King, who came along to support me; but there are incidents statewide of underground storage tanks leaks or spills on the surface that have effected local drought water in restricted areas. We call them containments elements. What I am talking about with fluoride is what is naturally in the water due to the rocks, so that is a different type of question."

Q: **Commissioner Howerton**: "I was just wondering if there would be any kind of back up due to contamination of those wells."

A: **Ms. Keyworth**: "It depends on the circumstances, often people whose wells have been spoiled by pollution incidences, are getting bottled water through a state fund. Often a nearby municipality will hook them up to City water. Generally that is a waste management function in the plant."

Q: **Ms. Watterson**: "So listening to the man that just left about it being fertilizer and there is an article in our packet about detrimental effects on our health. I see random e-mails come through from friends about how bad fluoride is. Is there any merit to these claims at all? Why are these people saying this?"

A: **Dr. King**: "My personal opinion is that people fall into two categories. The first category is that people read these things and they are scared and concerned. They think if it's on the internet, it must be true and most people are in that category, they are really trying to find out what is right and what is best for their health. The second category is a group called the Fluoride Action Network. These are the people that mainly take creditable studies and misrepresent what's in there and they are deliberately misrepresenting the facts. There are authors that I have seen listed on articles and I have contacted them and said this is not what your article said, and they have said they have contacted the source and asked that the misinformation be removed and they refuse to do so. So there are people who deliberately misrepresent the information. Most people do read the types of things you are referring to and just want to know the truth."

Q: Dr. Short: "Given that this young man is so adamant that a derivative of fertilizer product is what is entering into our water supply and yet our expert is saying it is naturally occurring."

A: Dr. Wright: "Fluoride is the 13th most common element in the earth's crust. It is a chemical. We are all chemicals. The comment about why is it a fertilizer. The phosphate, when they dig for fertilizer to add the phosphate. When they mine the phosphate, one of the by-products of that is different fluoride rich, because it is the earth's crust. They are digging it up and getting the phosphates. So it is a by-product of that industry. That is only one of the things that is used in municipalities. It is not the only thing that they would choose. When they say they are measuring fluoride ions, that is true; because when you put it into the water it dissolves. So you have the elements, the components of that. You will have sodium, silicate and fluoride and the fluoride is an ion. So you don't have fluorosilic acid, but some actually use liquid feeders that are hydrofluoric acid… So yes, that is a true statement; it is a by-product of that. We have lots of by-products, probably the first people that saw penicillin and said OOO-yukee! It's mold on bread, but how many lives have been saved by that? So you have to tease out what is the reality versus the emotional. It is very emotional to say it is a by-product, and it sounds like a chemical name with acid in it and sounds terrible, but it disassociates the fluoride ion so what they are measuring is the disassociated ion. It is true that it is toxic like most things if you have too much of it. It causes not only tooth problems, but systemic problems and if you take enough of it, it will kill you. Those are the truths as I see it, but at 0.7 parts per million, again these were studies done on humans from municipalities, thousands of people drinking at these different levels; that where you see between nothing and part per million as you got close to part per million, you got the best bang for your buck with no deleterious effects of any kind, systemic or anything else. That's how those were done back in 1940's, when they did the first community trial."

A: Dr King: "Can I make a point on going down to the .7 part per million. I think that is very positive, it demonstrates that people are looking at what is going on, measuring, this does reflect increases in fluoride from other areas. In February 2011 the recommendation was drop the optimal level from one part per million to 0.7. So that is the level we now consider given today's environment to be the best level. I find that reassuring that when changes need to be made, they are made."

Q: **Ms. Carter**: "Along those lines is there a lower level to see more benefit. Could we go lower and still see a significant benefit?"

A: **Dr. King**: "What we try to do with the optimal level, we use to have a range of .7 to 1.2 and that was based more on thinking that people in hot climates would drink more water, so they would get more fluoride, but in the 1940's they looked at a whole lot of different natural levels, plotted the decay rates and found the point where you got the best benefit. At that time it was .7 to 1.2. Below that point, you would start losing a lot of benefits, so that level today is probably lower, because back then there wasn't fluoridated toothpaste. It's lower but we don't want to get too low and it's a gradual wearing off where we would be losing benefit. When fluoridation was first discovered because of natural levels in the 1940's as Dr. Wright has mentioned; we knew even at that time, that about 10% of people would have mild levels of fluorosis. The question was, "what's the level where we get the greatest benefit, with the less amount of fluoride"? In my career I have seen tremendous changes in children's oral health, improvements, mostly to do with fluoridation."

A: **Dr. Wright**: "The only thing I would like to add is there is a dose response to fluoride. It is clear that the levels in toothpaste that most of you use are over a thousand times the level we are talking about. It is a dose response. It is where do you want to draw the line. If you go to .5 you will lose benefit."

Q: **Dr. Bryant**: "I would like for one of the dentists to explain what fluorosis is and how it occurs?"

A: **Dr. Wright**: "There is skeletal fluorosis, which is systemic, when you get really high levels, which is why you are not to have a municipality which is over 4 part per million because over that you start to have bone changes. Epidemiological studies were showing that post-menopausal, osteoporotic women were having an increase level of hip fractures. Skeletal fluorosis occurs from high doses over many years. The dental fluorosis occurs at the time of tooth development. So we are looking at the young ages as being the most sensitive, especially, for the anterior teeth, up to 8-9 years old. For the front teeth it would be 1-3 years old. So if you get too much, like from eating toothpaste, in our society, or on a well with too much, or

inappropriately prescribed. So whatever the exposure was during that window (1-3 years old), depending on the dosage, the higher the dosage the worst the defect is. Basically the enamel is mineralizing as well as it should. Fluoride has a variety of activities on cells and cell systems and physiology at those higher levels…People with minimal fluorosis have lower levels of caries."

A: **Dr. King**: "So it's like anything you want the proper levels, as far as discussion of fluorosis, there are some studies that say that changes the fluoridation levels probably wouldn't do much for fluorosis anyhow. As Dr. Wright mentioned, fluorosis comes from inappropriate use of toothpaste, little kids not being supervised and eating too much or kids getting a fluoride supplement when they are already on a community water system. So they are getting double the dosage of fluoride, we would expect there to be problems. It really is not so much related to the .7 one part per million that is in water."

Q: **Dr. Allison**: "Do you agree, and this is my opinion that the most of time when you see moderate or spear fluorosis is usually coming from young children unsupervised with toothpaste?"

A: Dr. King: "I have had kids come see me, and their teeth were dirty. We are talking about brushing their teeth,and they would say "I couldn't brush my teeth, because my brother ate the whole tub."

Q: **Dr. Allison**: "I just want to make a point that the public commenter made a point that there was no internal medicine people on the panel and I am so sorry that Dr. Gerald couldn't be here but as a dentist would you say that you have both the education, training and passion to take care or the whole body?"

A: **Dr. King**: "Absolutely and as far as groups that support it and the references on Dr. Gerald's sheet, one of the ADA references has a list of over a hundred health and professional groups that support it (American Academy of Pediatrics, Cancer Academy, etc.). These are all groups that support water fluoridation. If there were issues they would not be supporting it."

Q: **Dr. Short**: "When Mr. Sturmer was here back in the fall, he made a statement that really caught my attention and I have pondered on. He made the statement that it was unethical to medicate people through the water supply without their consent. I thought Dr. King in particular, you mentioned something about it was very ethical and that reawoke that thought back from the fall."

A: **Dr. King**: "Fluoride is not a medication. It is in there to prevent tooth decay. It's like vitamins. It is a preventive measure not a medicine".

Dr. Wright: "It is not a drug. If you look up the definition of a drug or medication, it (fluoride) is not. It is an ion. It is an element. You are not medicating people when you chlorinate the water...This is another prevention measure that is accepted."

Q: **Dr. Short**: "He further stated that there are no readily available or inexpensive filters, that if you really do feel like somehow that the City of Durham is forcing you to drink something that is against your will, there are no filters you can put on the whole house that are intensive enough, in other words, it's priced out those people that may be lower income. There was comment about it being aerosolized in our showers. Do you have anything you want to say to those concerns?"

A: **Dr. King**: "As far as if someone chose not to drink fluoridated water, they could go to the grocery store and buy Food Loin brand distilled water at a very low price."

A: **Dr. Wright**: "Fluoride gas doesn't float around. The other thing about fluoride is not only is it the 13th most common element in the crust, it is the most active element in the periodic table. It doesn't hang out, it bonds up with stuff. It's made in the earth's crust. It is the most reactive element in the earth's crust. It sticks to things. It doesn't exist as a floating gas. There is no scientific evidence to support that comment. It is just not the way fluoride works…It is true that those Brita filters do not remove fluoride."

A: **Dr. King**: "One concern I have with those last statements is that the people who benefit the most are the low-income people. He is talking about the ones who benefit the most and need it the most. I am really concerned when people get inaccurate information and out of fear, they try to do things that harm themselves."

Q: **Dr. Allison**: "If Durham decided to take the fluoride out of water, what segment of the population do you think would be hurt the most?"

A: **Dr. King**: "It would be all the minorities, low-income, low education level because those are all factors that influence high decay rates. So it would influence a tremendous part of the population, it would influence everybody, but the one who would hurt the most would be the low-income, low education and minorities."

Q: **Ms. Carter**: "Are you familiar with studies that show a correlation between fluoride in the water and student achievement in school?"

A: **Dr. Wright**: "Yes, there was a study most recently, in 2009 in North Carolina (Bill Vann and Stephanie Jackson) published on a North Carolina School kids was there looking at the effect of caries. It wasn't looking at specifically the type of fluoride, but what they found out was that the

kids that had caries were three times more likely to be missing days out of school. The same kids had lower aptitude test scores than their counterpart without caries. In North Carolina, the studies show that kids with caries miss more school, have lower aptitude test scores, and have learning issues. It is a huge issue for those kids and their development in school. If you do decide to de-fluorinate, that would increase."

A: Dr. King: "The other thing that they looked at in that study was kids who routinely missed school for dental appointments didn't have those problems. We also had one of the dental residents to look at fluorosis and the quality of life. He found that the fluorosis which is very, very mild was not negatively associated with the quality of life, but having tooth decay was certainly associated with quality of life, as you might suspect. But, it is nice to document those facts and get them published."

Q: **Mr. Dedrick**: "Do you discourage the use of bottled water?"

A: **Dr. King**: "There are a lot of concerns with bottled water a lot of it doesn't have fluoride and it is hard to measure. Some people drink a lot of bottled water, so they are missing out on getting the fluoride. Now some of the newer bottled waters, some of the nursery bottled water, where they put the fluoride back in at optimal levels and you are paying a healthy price for a little teeny-tiny amount of something you could get from your community water for a fraction of a penny. Also, with bottle water you don't have the same protections and controls that you have going through the state accreditation of the water systems. So you really get better quality water from your water system."

Q: **Dr. Allison**: "Ms Westbrook, one thing that I heard from another county that Graham just recently took the fluoride out of the water and one of the things that was discussed at that particular meeting was that the water utility folks wanted it out because they said that it was a cumbersome process in putting it in. Could you speak to that? They said that it was dangerous and they had to put on all of these bio- hazard suits and things on to put it in there."

A: **Ms. Westbrook**: "It doesn't require that level of guarding up. But at the highly concentrated levels that we receive it, it does require that you handle it carefully just as you would handle most of the other chemicals that we handle in the water treatment process. You just have to handle it carefully. We have the appropriate training, the appropriate personal protection and the equipment that we have to use, and we are very careful about it. Would they mind not handling it? Probably not. The workers take their job seriously and they know that it is there for the good of the public's health. They wouldn't miss it on one hand; on the other hand they would because of their own health."

A: Dr. King: "But I would hope that the decision whether or not to take this preventative measure is not based on the ease of work for someone working in the water plant."

A: Ms. Westbrook: "If I could reiterate, this was done as a matter of a public vote, the vote occurred in 1957, but it took them about 5 years to actively get the equipment in place and start adding it to the water. So it was a public opinion sway at that time and we wouldn't let certainly any ease or challenges with using fluoride or any other chemical change how we operate. As more and more stringent limitations come down for all sorts of water quality standards, we do what we need to do to make sure that the water we are providing meets and is better than any of those standards in place."

Q: Dr. Allison: "But the bottom line is that with proper training and the proper precautions there is no risk to the workers."

A: Ms. Westbrook: "If they follow all the directions and use their PPE, the risk is next to minimum."

A: Dr. King: "I have had a number of calls and e-mails from the folks in Graham, and Graham and Mebane have a joint water system. It is my understanding that it came up in the Graham City Council and they did not get good information and they voted immediately to stop but then they had to have Mebane to agree. My prospective from communicating with the folks in Graham is that they are embarrassed that they made the decision to stop without getting good information and that they would have no problem if Mebane decided not to stop. So they are kind of passing the buck to Mebane now."

Q: **Attorney Wardell**: "Given the efficacy of toothpaste and the occurring of fluoride in natural well water and ground water, I think one of the questions that came up in the past was do you really need fluoridation in the general system because it is not as effective as what we all do anyway, which is brush."

A: **Dr. Wright**: "Actually, if you look historically, the data of water fluoridation is more effective than tooth-brushing and tooth-brushing is a thousand times stronger. If you have safety concerns, the best bang for your buck is that. Here is the deal with water fluoridation. Not only does it reach all communities and all peoples out there, but it reaches you every time you take a sip of water and every time you consume anything that was made with that water. The thing about fluoride is that you can have a dose response but it is the frequency that is most important. So, if I can sit down and sip on water all day, every time I do that there is an opportunity for that fluoride to get into my enamel and help rebuild those crystallites. So there is no mechanism; there is nothing that we have other than water fluoridation that has that kind of benefit. At best,

people brush twice a day, a lot of people once a day, so it is a high-dose low frequency and low-dose high frequency. The game you want to play is low-dose, best safety, cheapest thing you got and high frequency. That's the most effective. So, if you control disease with that, almost any time that is the arena you want to play in. Water fluoridation is far way the best. I am the most expensive prevention you can buy. You come to my office that is the most expensive. That (water fluoridation) is the least expensive, and some people need to have each of the tiers of prevention to control the disease and in some people that doesn't work. But for the majority of people in that area, you want-low-dose, high frequency. It is **the** best delivery system we got for a lot of reasons."

A: **Dr. King**: "And talking about just using fluoride toothpaste to brush your teeth. In the health setting we see a lot of families who don't have fluoridated toothpaste; the parents don't supervise the brushing. We see kids who don't have a toothbrush. So these are the kids with the biggest potential for problems. So taking the fluoridated water away from them-a lot of them have nothing."

Q: **Dr. Miller**: "I am trying to get an appreciation for how much fluoride 0.7 parts per million is. I guess 0.7 milligrams per liter is the same. I was earlier trying to figure out how much water I drink. It sounds like it could be something such as a thousand liters a year. And then, I am basically trying to figure out how much fluoride I am getting from drinking water and if I am drinking a thousand liters per year, 700 milliliters. I am trying to figure it out. Am I looking at it right?"

A: **Dr. King**: "It is the same. A part per million is like one drop in a bathtub. You should probably be looking at the daily dose. The amount of fluoride in one part per million-one milligram per liter is like a drop of fluoride in 16 gallon bathtub. Are you asking are you getting enough or are you getting too much?"

Dr. Miller: "It just feels like it's a minuscule amount even on a yearly basis that you get from water."

A: **Dr. King**: "It is a minuscule, but as Dr. Wright has said, that's what you want is the very low level and continuance as much as possible. You continually get that very low level. That's what works."

A: **Dr. Wright**: "People had done studies that actually look at your daily dose and how much you get from what sources. So they did it in communities that have .3 parts per million above grounds 0.7 up-to 1. So what would be considered low fluoride and optimal fluoridated and you find that in the optimal fluoridated that it is coming a lot from water. If you havea really low level, a lot of it is coming from a supplement, You took a supplement. If you didn't take a fluoride supplement, you have overall pretty low levels. Overall, it is a minuscule amount if you

took it all; had a powder substance of fluoride. It would probably fit into a little satchel for the entire year. The maximum optimal dose is .05 milligrams per kilogram per day. That is a teeny-tiny amount and if you look a what most people get over the course of the day, it is around that amount, if you are in an optimally fluoridated area."

Q: Dr. Miller: "It sounds like one brushing has more fluoride in it than what we drink in a whole year."

A: Dr. King: "Probably so but hopefully you would spit that out. You would not be swallowing that. The lady who talked about pea size amount of toothpaste has the message for children. The ages that Dr. Wright was talking about we want to get a little tiny bit of fluoride-pea size because those young kids can't spit it out."

Dr. King stated she appreciated the board allowing them to come and answer the questions. Dr. Miller stated the board definitely appreciated the panel coming.

Q: Dr. Short asked the panel if they had any suggestions on how to put those individuals - there must be a certain population in our community feel very nervous about having this additive. "Do you have any suggestions on how we as a board or public health department might be able to allay some of these fears?"

A: Dr. King: "I say good luck, they don't want to hear anything but what they read. This is my experience over many years of dealing with this. It is all about providing good information. They got their mind made up and don't want to defer. There is a point where I would just discontinue the conversation and say we have to agree to disagree."

A: Dr. Wright: "Education is the best you can do."

Ms. Harris referred the board to a fluoride article in their packets to review as part of the information given today on Fluoridation.

Ms. Harris acknowledged the article in the board packet "Don't drink the water" came from a Ms. Doris T. Brown, who has a Durham County telephone number. Ms. Brown faxed this to her with note marked "urgent." Through e-mail, Ms. Harris received a 19-page document from a lady from Pagosa Springs, Colorado. Cathy Justice began "I have the sad distinction of owning the first horses to have ever died from chronic fluoride poisoning from artificially fluoridated municipal water."

Ms. Harris will send this article to the Board.

A: Dr. Wright: "That's unfortunate. This has never happened to humans."

Q: **Attorney Wardell**: "Do you know of any studies about the effect of fluoride regarding orthopedic issues such as osteoporosis and things of that sort?"

A: **Dr. Wright**: "I mentioned this a little earlier, so at low levels there is no evidence that there are any measurable system effects on the skeleton. Although there are deposits in growing children a large percentage of it is deposited but there is no positive or negative influence noted. When you get to the high levels, toxic levels, there are systemic skeletal changes that range from a slight increase of bone fracture to actual deformities when you get into the 10-20-30 times higher than the water fluoridation we are talking about."

Q: **Heidi Carter**: "Who actually makes the decision to keep water fluoridated or not? Does it vary from community to community? It seems like it would be a City Council decision."

A: **Dr. King**: "The Board of Health, although in North Carolina, we are abolishing these rules."

Ms. Harris: "The request came to us from Mayor Bell after he had several appearances from residents before the City Council about water fluoridation. In August, Mayor Bell punted it over to us and asked that you make a recommendation to the City Council about this issue. As a result, he also copied Mr. Sturmer on the message. Mr. Sturmer came to visit Sue McLaurin, former Board Chair and me to talk about the process. He appeared before the Board in September 2012."

Q: **Dr. Allison**: "Ms. Westbrook that would be a decision of the City Council that would make the final decision."

A: **Ms. Westbrook**: "That is my understanding, and it took an act of City Council to add it to the municipal water supply. They have not given us any charge to un-act that, so we consider that we have been charged to continue adding it."

Q: **Dr. Allison**: "So let me understand. It is our charge to give a recommendation back to the Mayor?"

A: **Ms. Harris**: "Yes, and I sent the Mayor a copy of our plans for this meeting,"

Q: **Dr. Miller**: "There was a statement from the Centers for Disease Control and Prevention in our packet as well. Will that be included in the minutes?"

A: **Ms. Harris**: "Yes it is behind tab #6 in your packet."

We also reached out to the EPA to get a statement regarding the EPA report. The report came from the EPA Union rather than the EPA. The EPA would not make a comment or recommendation because it is regulatory agency.

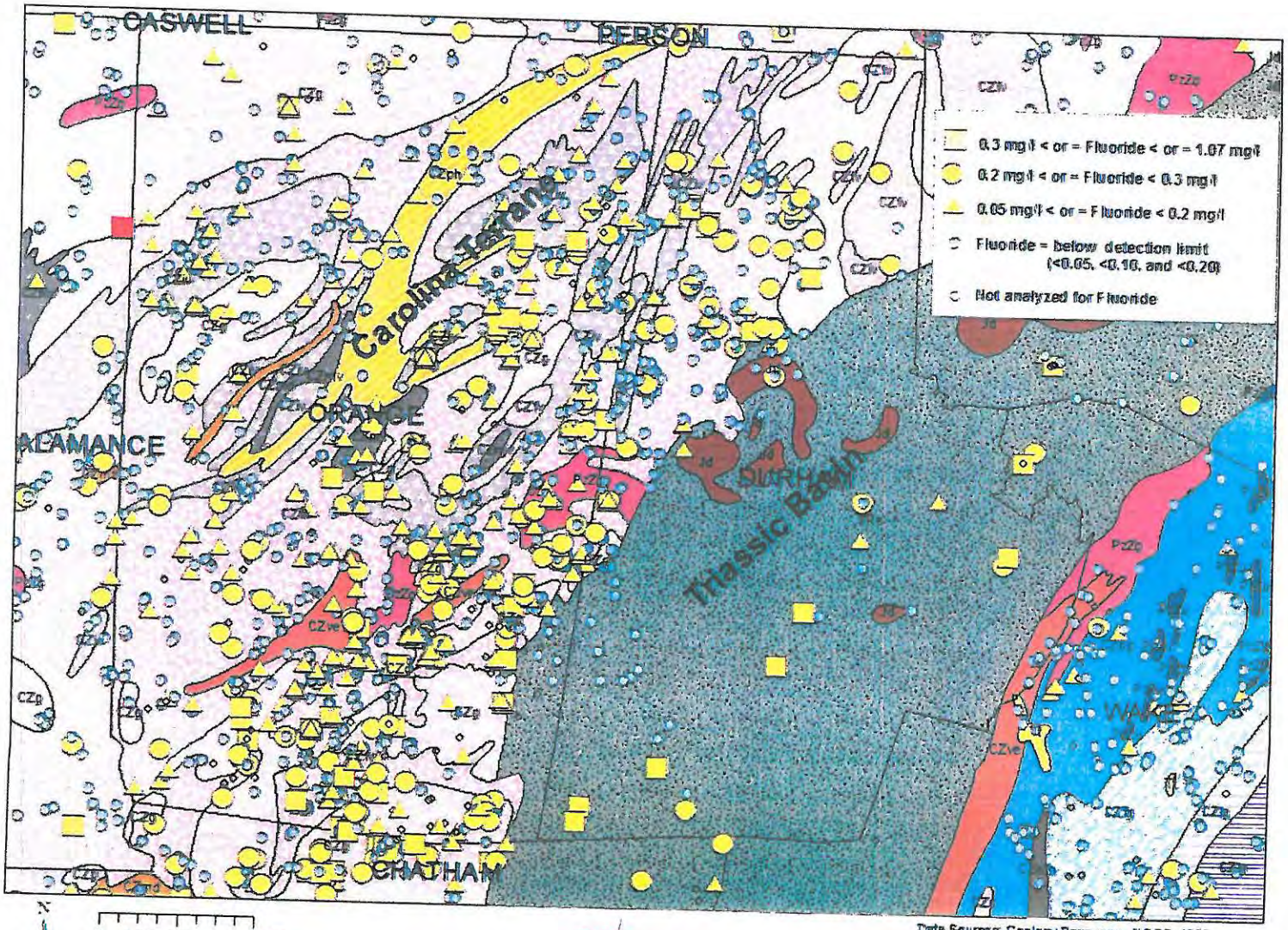
Q: **Dr. Allison**: "If you were raising children would you be concerned at all about having them drinking optimal fluoridated water?"

A: **Ms. Westbrook**: "I have an adult son who is twenty-nine, and I am starting to believe that my decision to live in a home that had a well, not community water, may have led to some of his ongoing dental issues today. I was raised in Norfolk, Virginia, and that was one of the first municipalities to have fluoridated water. I have really good teeth, and would like to attribute it to that. I am fortunate that I have a house on a well, but I can take my city water home in a jug every day."

Dr. King: "I have mentioned that I have always made a conscious effort to live in a fluoridated water system and to ensure that my children were raised on a fluoridated water system."

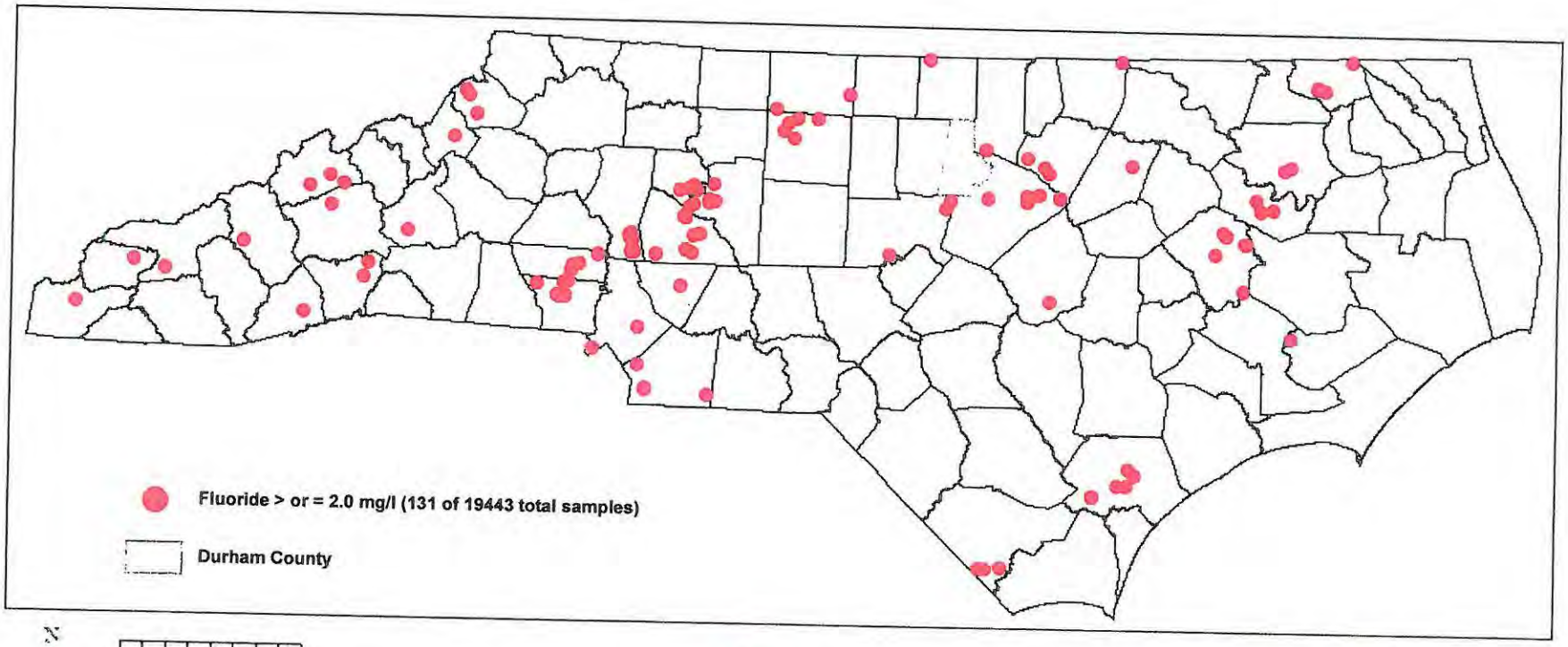
Dr. Wright: "I have three kids and had a lot of concerns about other things but the fluoridated water was not one of them. Half of your caries risk is generic and the other half is what we manipulate environmentally. None of my kids have caries; they benefited from sealants and fluoridated water."

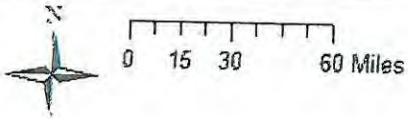
Dr. Allison stated he was born in Durham and got the benefits of fluoride when he was very young.



Fluoride in Groundwater in Durham and Orange Counties, NC

Attachment 17(a)





DRAFT

Fluoride in Groundwater in North Carolina
Concentration greater than 2.0 mg/L

Data Sources: Fluoride data - DHHS data up to 2008 and data through 2009 (may include duplicate data)

Attachment 17(b)

Attachment 18

CDC Letter

STATEMENT ON THE EVIDENCE SUPPORTING THE SAFETY AND EFFECTIVENESS OF COMMUNITY WATER FLUORIDATION

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DIVISION OF ORAL HEALTH
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CENTERS FOR DISEASE CONTROL AND PREVENTION

Durham County Department of Public Health
March 14, 2013

Introduction

On behalf of the Centers for Disease Control and Prevention, I am pleased to provide a statement on the evidence regarding the safety and benefits of community water fluoridation.

Good oral health—a mouth and teeth without cavities or other oral diseases—is an important part of good overall health and an essential part of our everyday lives. Having healthy teeth improves our ability to speak, smile, smell, taste, chew, swallow, and convey feelings and emotions through facial expressions. Overall, the oral health of children and adults in the United States is better than ever. However, for some of our most vulnerable citizens—poor children, the elderly, and many members of racial and ethnic minority groups—maintaining a healthy mouth and teeth can be challenging.

Fortunately, community water fluoridation has been shown to be effective in reducing the number and severity of cavities and is a major reason that Americans today have better overall dental health. Currently, more than 200 million people, or 73.9 percent of the U.S. population served by public water supplies, drink water with optimal fluoride levels to prevent tooth decay.[1] This is an increase of nearly 9 million people since 2008.

Safety and Effectiveness

For many years, panels of experts from different health and scientific fields have concluded that there is strong evidence that water fluoridation is safe and effective.[2] Water fluoridation is beneficial for reducing and controlling tooth decay and promoting oral health in children as well as adults.

A review of the effectiveness of community water fluoridation conducted by the Task Force on Community Preventive Services found that when tooth decay rates were measured before and after water fluoridation, decay rates decreased by a median 29.1% among children ages 4 to 17 compared with control groups.[3] Fluoridation was found to help decrease tooth decay both in communities with varying decay rates and among children of varying socioeconomic status.[4]

Although there are other sources of fluoride such as toothpaste, community water fluoridation continues to provide benefits. One recent review found that water fluoridation reduces tooth decay by about 25% in adults.[5]

Cost Effectiveness

The Task Force on Community Preventive Services also reviewed 5 studies of the cost-effectiveness of community water fluoridation. All studies found that community water fluoridation was cost-saving. In addition, three analyses of Medicaid dental claims data in New York,[6] Texas,[7] and Louisiana[8] found that fluoridation substantially reduced dental treatment costs among children and youth. Annual per person Medicaid treatment cost savings in these three states ranged from $27.6 to $66.8 (2010 US$).

Conclusion

In the seminal report, *Oral Health in America: A Report of the Surgeon General*, Surgeon General David Satcher observed a "'silent epidemic' of dental and oral diseases [...] with those suffering the most found among the poor of all ages."[9] The report affirms that community water fluoridation is "an inexpensive means of improving oral health that benefits all residents of a community, young and old, rich and poor alike." Because of its contribution to the dramatic decline in tooth decay over the past 65 years, the Centers for Disease Control and Prevention (CDC) named community water fluoridation one of 10 great public health achievements of the 20th century.[10]

Thank you for the opportunity to provide this statement.

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[1] CDC. 2010 Water Fluoridation Statistics. Available at http:/www.cdc.gov/fluoridation/statistics/2010stats.htm
[2] CDC. Community Water Fluoridation Benefits. Available at http://www.cdc.gov/fluoridation/benefits.htm
[3] Guide to Community Preventive Services. Preventing dental caries: community water fluoridation. www.thecommunityguide.org/oral/fluoridation.html
[4] Ibid.
[5] Griffin SO, Regnier E, Griffin PM, Huntley VN. Effectiveness of fluoride in preventing caries in adults. Journal of Dental Research 2007;86(5):410–414.
[6] Kumar JV, Adekugbe O, Melnik TA, Geographic variation in Medicaid claims for dental procedures in New York State: Role of fluoridation under contemporary conditions. Public Health Reports 2010;125(5):647-54.
[7] Texas Department of Health. Water Fluoridation costs in Texa: Texas Health Steps (EPSDT-Medicaid) 2000. www.dshs.state.tx.us/dental/pdf/fluoridation.pdf
[8] CDC. Water Fluoridation and Costs of Medicaid Treatment for Dental Decay – Louisiana, 1995-1996, MMWR1999;48(34);753-757.
[9] US Department of Health and Human Services. *Oral Health in America: A Report of the Surgeon General--Executive Summary*. Rockville, MD: US Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000.
[10] CDC. Ten Great Public Health Achievements -- United States, 1900-1999. MMWR 1999;48(12):241-243.

Let me introduce myself. I am Cathy Justus from Pagosa Springs, Colorado. I have the sad distinction of owning the first horses to ever be diagnosed with "chronic fluoride poisoning" from artificially fluoridated municipal water. I have this distinction not because it hasn't been happening for years all over this world, but because vets, like doctors and dentists are not taught in their schooling the science, toxicology, and biochemistry of fluoride and what it does to the body. I know of this lack of training of proven science because I have made it a point, over the last 25 years, to talk to hundreds of these professionals. We have now lost 8 horses and 4 dogs to this virulent cumulative toxin. This was scientifically proven by the world's authority on fluoride poisoning in animals at Cornell University in New York, Dr. Lennart Krook, DVM, PhD

I come from a whole different perspective than you have heard from those speaking about fluoride. I watched and lived the hell of my beloved animals getting progressively sicker and ultimately dying as others are doing with their animals, their friends and their family without these so called experts knowing why. The difference is that I have a background in knowing the science behind this toxin. Despite the science, and truth, behind fluoride poisoning, I could not get our water municipality to acknowledge the growing amount of proven, damning science against fluoride consumption from 1985 until 2005. It was at that point that they knew, from the scientific proof I provided about our horses, that either they stop this mass medication without consent, or there would be a class action lawsuit.

There have been many lives lost and are being lost to the very same ills our animals succumbed to. Vets, like doctors, just diagnose the symptoms and then treat these symptoms instead of looking for the cause. Until the cause is addressed, the symptoms will progress .The ills caused by fluoride consumption is a very lucrative business practice and when approached with the truth, like I did with the 8 vets that were consulted, these medical professionals get bent out of shape and say, "We are the experts", period. How can a person be an expert when the truth about a subject was never taught to them nor have they ever done their due diligence to find the truth? A perfect quote that fits this situation is ***"It is hard to convince someone of something when their income depends on them not believing it".*** To add to that quote, ***"And when their job standings depends on them not believing it"*** which is the case with the Public Health Authorities. CDC and EPA. Both these quotes are, I have found, the case, with not only most dentists, doctors and veterinarians but also the ADA, AMA, CDC, U.S. Public Health Service, and the EPA. They promote whatever will benefit them, whether or not it is scientific or ethical. Look at the science. The facts plainly reveal this. In fact between 2003 and 2006 the EPA commissioned the National Research Council, the highest scientific group in the U.S., to review the recent science on fluoride. There were 12 scientists from around the world on this distinguished panel, 3 of which I have personally talked to and have corresponded with quite a bit. The amount of damning science this panel of scientists found against fluoride was unbelievable, including 23 recent studies showing fluoride consumption reduces I.Q. This review has been published into a 507

page book called "Fluoride In Drinking Water, A Scientific Review Of EPA's Standards" available through The National Academy Press www.nap.edu in Washington, D.C.

There have now been, as of Dec 2012, 42 recent studies on intelligence and fluoride. Of these, 36 of the 42 were associated with lowered I.Q. in humans consuming fluoride. 17 of the 42 were on learning and memory, and 16 of this 17 found lowered learning and memory in animals. 30 of the I.Q. studies involved communities where the primary source of fluoride was the water. The National Research Council Review and the recent Harvard studies have deemed fluoride to be "A High Research Priority", yet no independent studies in the U.S. have ensued. WHY? Follow the money.

I have studied both sides of this issue. In the beginning when I had narrowed my horse's ills down to beginning when fluoridation began, I didn't want fluoridation to be the culprit. I knew that it would be harder to stop fluoridation than to change feed or any other causative agent. So I studied the pro side of fluoridation trying to convince myself it wasn't the fluoride causing the progression of my animal's ills. In a very short time it was very obvious that a deception was being promulgated onto the public. I also studied old science from back in the 30s, 40s, 50s, 60s and 1970s that was in my Dad's medical library. I purchased the books **"Fluoride The Aging Factor", "Fluoride, The Great Dilemma", "Fluoridation, Drinking Ourselves to Death",** and read through web sites like www.FluorideAction.net , www.slweb.org and the peer reviewed manuscripts in **FLUORIDE The Quarterly Journal of the International Society For Fluoride Research** at www.fluorideresearch.org which reiterated the old science I had read and furthered this damning information of fluoridation. When the book **"The Fluoride Deception"** came out, my suspicions were proven time and time again as I read this book, which was full of fluoride science, truth, and proven recently declassified top-secret government documentation. One third of this book is documented listings of reference materials on the science and history of fluoridation. The ills described paralleling those my horses were showing were too similar to ignore. Now there is a new book, **"The Case Against Fluoride" How Hazardous Waste Ended Up In Our Drinking Water and the Bad Science and Powerful Politics That Keep It There" by Dr. Paul Connett, et al,** that has all the recent science backing this title and what I am saying with researchable references.

I was raised to be independent of the good or bad opinions of others, to listen and to then do my own research and come to my own conclusion. I was also taught to never be swayed by other's words and especially when there is the possibility of these others to profit from what they say and promote.

My favorite quote is, ***"You simply must not ignore the facts because of your preconceived notions" Dr. Max Gerson.*** By saying something over and over and saying it with authority, like the USPHS, CDC, EPA, ADA, etc. have for over 60 years about fluoride's safety and efficiency, does not make what they say true, nor does it change the fluoride damning true science proven in over 60,000 world wide independent research studies. These so called self- proclaimed experts just count on you not doing your due diligence and taking their word as the gospel. These agencies promote and market

fluoridation disregarding the importance of FDA drug regulatory approval being totally missing and the fact that there are no scientific safety studies that have been done in the case of the fluoridation product. They disregard this lack of FDA approval, which shows their lack of concern to protect the public. No high quality studies are ever provided by them to support their claims of either safety or efficiency because there are none. They just count on you depending on their letters after their names as proof of their knowledge.

Our water municipality started fluoridating in 1985. Up until that time our animals were well. When fluoridation started, all our horses and dogs started getting many and varied ailments that seemed to have no connection to each other. We ultimately had 8 veterinarians, two of which were at Colorado State University when we took two mares there, tell us they had no idea what was causing these ailments nor why they were being added to and getting progressively worse as time went on. They were confused but eager to get paid to treat these many and varied symptoms.

We moved to Pagosa Springs in 1978 from Fallbrook, Calif, knowing that the clean air and water would be a great place to raise our Quarter Horses. And it was a perfect place for that until fluoridation started. As an important point, we are just below the source of our water, the Continental Divide, San Juan Mountains. This water is considered one of the top 3 cleanest in the U.S. without contaminants and then they started adding *hydrofluorosilicic acid* to artificially fluoridate it and the ills in our town started and grew over the years, not just in animals but humans too. The amount of **heart attacks, arterialsclerosis, cancer, thyroid problems, dental fluorosis, kidney problems, endocrine problems, etc., became rampant in humans and animals.**

The first symptom to manifest in our horses was **chronic colics**. Fluoride ingestion has been shown through proven science to change hydrochloric acid, meant to help digestion, into hydro*fluoric* acid, which can eat the stomach lining and cause such problems as acid reflux, digestive problems and ulcers. Colic in horses is deadly and is the number one killer of horses in America. Being well over 65% of America is fluoridated, no wonder this ailment is so rampant in horses. Colic would strike any of our horses at any time and this happened often. This symptom continued until we started hauling clean, unprocessed river water in 2004. That was the only change to bring upon this ceasing of colic. And didn't have a single colic before 1985 when fluoridation began. Every horse we purchased during fluoridation, that we boarded or that was raised here, became sick. The symptoms were many and varied. Here are just a few. **Colic, cancer, skeletal problems including skeletal fluorosis called arthritis, osteoporosis, muscles and ligaments hardening, skin allergy, reproductive problems, deformed fetus', abortions, thyroid problems, abscesses, head shaking, neurological problems and seizures, hormone problems, malocclusion of teeth, dental fluorosis, gum recession, teeth chipping and breaking, kidney problems, equine metabolic syndrome, laminitis, malformation of hooves, Cushing's disease, chronic coughing and lung problems, early onset of puberty, Alzheimer's, bone spurs, endocrine problems, heart attacks, fibromyalgia, and the list goes on.** Take a look at many of these symptoms from the human perspective and see just how many of these ailments have been multiplying in incidence in humans over the last 60 years since fluoridation started,

without the so called experts being able to tell what is causing them. They just keep dispensing drugs and doing surgery, two very lucrative actions. And when a patient dies they name the symptom and just move on to the next patient. Fluoridation has a very good record of producing these patients.

In the fall of 2004 we lost yet another mare. This was one of the two that had been taken to Colorado State University and brought home without a diagnosis. It was the straw that broke the camel's back. I had done my due diligence researching the possible causes for these ills but nothing but one thing, fluoride, had been proven to cause them all. Up until this time, it was my "theory" that fluoride was the culprit, after years of intense research on my own. My many years of research of some of the over 60,000 world wide independent scientific research studies had brought me to this conclusion. I was able to contact Dr. Lennart Krook, DVM, PhD., Emeritus, from Cornell University in New York. He was well known as the world's authority on fluoride poisoning in animals. I told him the many and varied symptoms my horses had and he said that all had been scientifically proven to be caused by fluoride but he would not give me a diagnosis without scientific proof. He said he needed bones and teeth. You can see the resulting necropsy and tooth report in color at www.myspace.com/poisonedhorses. Click on Profile and scroll down. Dr. Krook said the ills and deaths caused by fluoride consumption by my horses and others in our town shows that **"Horses are like the canaries in the mines".** *What showed up in them over the years of fluoridation in our town, is manifesting in humans too, just slower because horses drink so much more water in a much shorter time frame.* This poisoning of humans is also mirroring my horses in the sooner manifestation of ills with each generation. Look at the children with arthritis, cancer, early onset of puberty, kidney problems, etc. When I was young I knew no young person with these problems. Now it is rampant. There are even hospitals just for children with cancer and other diseases like these. I know fluoride is not the only cause of these many diseases in humans, but *fluoride is the number one most consumed and absorbed toxin*. That puts it at the top of the heap for damage done.

A small part of my fluoride horse hell, up until 2006, is told in the documentary DVD "Poisoned Horses" produced by Dr. David Kennedy and International Academy For Oral Medicne and Toxicology. It can be seen at www.youtube.com/watch?v=7TwwwNZyRVOA& It can be purchased from the International Academy For Oral Medicine and Toxicology. 8297 ChamionsGate Blvd, Ste.193, ChampionsGate, FL 33896. (863)420-6373. I would also suggest their two DVDs with multiple documentaries about fluoride toxicity with interviews of scientific research experts called "Let The Truth Be Told" volumes 1 and 2. The DVD called "Professional Perspectives" can be purchased from www.fluorideAction.net It contains interviews from many fluoride scientists including 4 that were on the National Research Council's 3 plus year review of the recent science on fluoride that the EPA commissioned. The EPA has pretty much ignored the recent science this NRC review produced and their recommendations. Why? It didn't reveal what the EPA wanted. The results didn't support their many years of promotion of fluoridation, which puts them squarely in line for litigation along with the whole chain of command down the line directly to commissioners and the water municipalities.

Of course the story didn't end when fluoridation ended in Pagosa Springs. Just before the documentary, Poisoned Horses, was released we lost Skipper, my husbands young gelding, that we had raised. This is told at the end of this documentary. What isn't told is that Skipper was second generation consuming fluoridated water and he had huge cancerous tumors in his lungs, and his kidneys were full of cancer. According to the California EPA there is enough ***arsenic*** in the product used to artificially fluoridate municipal water, sodium fluorosilicates, to kill people of lung, kidney, and bladder cancer. Skipper had two of these cancers. He was only 9 years old when he died a horrific death The two surgeons and pathologist who did the necropsy said the kind of cancer he had was very slow growing and, no doubt, had started by the time he was a yearling. He was born in 1999. Skipper was second-generation consuming fluoridated water so his fluoride caused ills came sooner and in fact he was born with many. Look at the children with the above mentioned ills these days. Why? Could it be from the consumption and absorption of fluoride, well known in true science as a very potent, cumulative poison? Could it be that we are now several generations post the start of fluoridation so the toxicity is greater and this is the main reason America is getting sicker? Fluoride is the number one most consumed toxin, far and above any other toxins since fluoridation started 60 years ago and it is not just in many water systems but also in foods and pesticides and Teflon cooking pans, etc. Go to the site "Fluoride In The National Food Supply" at http://www.ars.usda.gov/Services/docs.htm?docid=6312 and add up a typical days menu. Then tell me that you find it necessary to put fluoride into the municipal water to bring the general public's ingestion of fluoride up to the "so called optimal" 1 ppm. We are already being overdosed with fluoride through processed food, beverages, etc. What you see on this site in ppm amounts of fluoride in food, comes from food processed with fluoridated water. In final dry processed products cooked in fluoridated water and then the water is evaporated off, the fluoride is concentrated. Fluoride does not cook off like chlorine.

Follow the money to be made from illness caused by fluoride consumption. Follow the ***money to be saved by the fluoride polluting industries that produce this toxic waste they call a "toxic soup***", by convincing you to put it into our municipal water and letting us and our beloved animals carry it to their early graves and slowly but surely polluting the environment. It would cost these industries over $7,000.00 a truckload to dispose of this same toxic waste at an A1 toxic dump for the worst of the worst toxins. Instead they, I have no doubt, pay lobbyists, the ADA, the CDC, the Health Departments and the EPA lawmakers to promote it and they get help by these agencies miss placed authority given them by those who would believe their lies. And at the same time saving the fluoride polluting industries billions of dollars in disposal costs.

Fluoridation has been touted by many agencies as "one of the top 10 health care advances in the 20th century". One should note that this quote was written by a dentist, who will benefit monetarily from this practice, from the damage done to teeth and gums. His co-author was an environmentalist. Neither of these people are scientists. Neither of these people had ever written a scientific paper ever before, and this paper was never peer reviewed. *This quote has no validity other than saying these two people's personal*

opinion. Despite this, the so-called authorities, all of which benefit monetarily for the promotion of fluoride, have taken this statement and repeated it time and time again as the gospel and scientific truth by using the promotional advertising practice of saying it with authority will make everyone believe it and eventually make what they say fact, whether proven or not.

The Federal government has never appointed a tracking agency to gather and report fluoride consumption's side effects, like it has for all other drugs. Why is this? So if you want to find the detrimental effects you must do it yourself. The ADA, CDC, EPA, USPHS have used the ridiculous lie that, ***if you don't look, you won't see, and therefore the science doesn't exist. They say the people against fluoridation have no science to back up their warnings. Yet another lie!*** Plus, the amount of fluoride consumed by each individual cannot be regulated by it being put into the water systems. This fact is a "no brainer". These agencies don't expect you to think about this either. There will be those, like babies, who will drink far more liquid in comparison to their body weight. And those with renal problems, such as diabetics and those with heart problems and the elderly, whose kidneys cannot filter out up to 50% of the fluoride consumed as healthy people can. But remember that even those with a healthy renal system will retain the other 50% in their body, mostly in the bones, slowly accumulating and poisoning their system everyday. Add to this, it has been shown that Blacks and Hispanics have even more problems with fluoride consumption. They have an inherent susceptibility to fluoride's damaging effects.

In 2010, in February, we lost Skipper's full brother, Win, to a massive heart attack. Yes fluoride has been proven many times over to cause **heart and artery damage and arterialsclerosis**, the number one killer in the U.S. He was only 12 years old. He too was second-generation drinking artificially fluoridated drinking water. He too, like Skipper was born with physical problems caused by fluoride absorbed during gestation from his mother's consumption of artificially fluoridated water. Win was born in 1998. While his dam was nursing Win, Skipper was being gestated. So their dam was drinking up to twice the amount of fluoridated water to nurse Win while Skipper was being gestated. Fluoride has been proven to not go into the milk but it does pass through the placental barrier, so Skipper was getting a huge amount of fluoride deposited into his bones and system before he was even born. No wonder his health was worse when he was born and he died earlier than Win.

Win had also developed Fibromyalgia symptoms from the poisoning by the toxins in the fluoridated water. We found a vet who specialized in toxins who found not only fluoride toxicity but also arsenic, mercury, lead, cadmium, beryllium, and even radio-active poisoning in Win's system. The industries that produce the fluoridation product call this product they send water municipalities to artificially fluoridate their city's water, a "toxic soup" because it contains all these carcinogens and more. This product is between 17% and 23% fluoride. The radio-activity, fluoride, and other toxins comes from the phosphate rock dug up for phosphate fertilizer. This very same phosphate rock is dug up for radio-active uranium too. This toxic soup is then sent to water municipalities for a cheap source of fluoride and these industries don't have to spend the billions of dollars it

would cost them to dispose of this unwanted and non usable toxic soup. Instead they pay off officials and self -appointed experts who gain monetarily from the ailments caused, money hungry to promote and convince water municipalities to put this poison in the water. When water is fluoridated, we all get to carry it to our early graves with most people's last years being plagued with ill health. Again, follow the money. Who is profiting? Those who promote fluoridation of course.

Recently, since hurricane Katrina knocked out many of the phosphate industry fluorosilicate holding ponds, the fluoride product being used in a lot of U.S. communities is now coming from China. This now puts fluoridating with this product in a deeper **National Security issue** than it has been. No one in their right mind would allow any other country access to their water systems, especially a country that we are not in very good terms with and has a track record of sending us products tainted with toxins. Recently there was a scientific group in Boulder, Colorado who did research on this imported fluoride product and they found ingredients in it that they still don't know what they are. And this is being put in our drinking water? Where has common sense gone?

I think here is where I need to tell you how fluoride is capable of doing such a hugely diverse amount of damage to the body. Fluoride research in true science, not arguable by either side of this issue, reveals that fluoride is just slightly less poisonous than arsenic and more poisonous than lead and cumulative like lead. It is a systemic poison, disturbing and changing mechanisms of the body at the very core of life. It has been scientifically proven that fluoride changes the DNA by breaking it's protein bonds and also does damage to the DNA repair system. Fluoride changes the mineralization system, known as the collagen system, that is supposed to know to keep the skin soft and the bones hard. It pulls calciumapetite (calcium) out of the bones and teeth and replaces with fluoroapetite (fluoride) making the bones harder and more crystalline, therefore being more likely to break. Look at the hip fracture rate in the U.S. With the calcium replaced by fluoride in the bones, the body needs to put it somewhere so it finds places like the veins and arteries (cholesterol and hardening of the arteries), kidneys and bladder (as stones), cartilage (arthritis) and so on. All these problems are increasing in the U.S. including in children. Fluoride kills enzymes and changes their shapes so they don't fit into their receptors. Enzymes are needed to catalyze every metabolic system and function in the body. The easiest to see outward sign of this enzyme disruption is dental fluorosis, the mottling, brown and white spotting, and pitting of the teeth. This happens when the fluoride is consumed during the time of the tooth bud's formation. This disturbance, changing of shape and killing of these tooth forming enzymes results in the dental fluorosis mottling, brittleness and malocclusion of teeth when they erupt. For the USPHS, ADA, CDC, EPA to say this is merely a cosmetic effect shows their ignorance and ignoring of the science that has proved this biological action of fluoride. Dental fluorosis is the outward showing of a **systemic poisoning of the whole body**, not just the teeth. In the U.S., the CDC has now said that 41% of 12 to 15 year olds has dental fluorosis. When anything is consumed, it has side effects. This is very clear in any of the commercials seen today about drugs. Fluoride also displaces iodine needed for the thyroid to make thyroxin that regulates many of the body's systems and hormones. And the list goes on of the biological disturbances that fluoride consumption and accumulation

has been proven scientifically to cause. Being fluoride is a systemic toxin, disturbing at the very core systems of life, it can cause virtually any chronic degenerative disease *depending the individual's inherent weakness*. Just these mentioned above disturbed mechanisms alone are, I would think, enough to stop fluoridation. But ***if you don't see or find the science, the science doesn't exist*** seems to be the working orders for these organizations that push the practice of fluoridation. Or in other words, ***don't look for the science and it won't exist and you can honestly say so.*** This has been proven time and time again in legal cases and the so called experts have been made to look like idiots because of this lack of real proven science to support their "endorsements." When asked to openly debate with those who know the proven science, these so called experts will refuse to show up for this reason. They know nothing of what they say they know. And remember, ***endorsements are not science. They are merely opinions by those whose job and or income depend on what they say.***

We have been asked, if fluoridation stopped in 2005 and we started hauling clean un-processed river water in 2004, why are our horses still sick and dying? Common sense and a little research would explain that **fluoride is a cumulative toxin.** It accumulates in the bones. Bone cell turn over is the slowest and can take many, many years for these poisoned cells and accumulation of fluoride to release. While at the same time, as long as this toxin is in your body it is progressively poisoning you system. Fluoride poisons going in, poisons while trapped in your bones and poisoning when released during cell turn over.

We only have two horses left that had consumed the artificially fluoridated water. One is the gelding that developed the crooked pasturn (front leg) shown in the Poisoned Horses DVD. He had a chronic cough while he consumed fluoridated water, besides having chronic colic. The coughs have almost completely stopped now. The colics stopped when he didn't drink the fluoridated water anymore. He has had what most would call Alzheimer's in humans, and has for many, many years. He didn't remember where he ate everyday and would stand around in a daze, among other things. It was very sad but this symptom is slowly improving since his consumption of fluoridated water ceased. His brain has even improved so much since he quit consuming fluoridated water that he can figured out how to unlatch gates to let himself out and he is now in his now 26 years old. The other horse is the sorrel mare that had the weird allergy bumps all over her body shown in the DVD, Poisoned Horses. We have bred her three times to two different stallions. She has conceived all three times. By 60 days she has lost the foals. She is only 10 years old now. She also still has thyroid problems caused by her fluoride consumption. Both of these horses have dental fluorosis and gum recession. This gum recession is caused by the shrinking of the alveolar bone, the bone that the teeth hook into, which shrinks when fluoride is deposited into it through fluoride's accumulation. The gums are pulled up with this bone shrinkage. The incidence of gum disease and gum recession is yet another growing problem in the U.S. population.

The horses we have purchased since we started hauling clean river water in 2004 and when fluoridation ceased in 2005 have remained healthy without a single ailment that all the others had manifested. Never allowing them to consume artificially fluoridated water

is the only thing that has been changed since then. We are feeding the same feed and the same supplements.

And then there is the issue of pollution. The very product, hydrofluosilicic acid, if it gets spilled into the air, land, ocean or waterways, is considered by the EPA a toxic waste very hazardous product and must have people in hazmat suits called in to clean it up immediately. Yet when this very same hazardous waste is put into our municipal water, it suddenly becomes a product that is good for us. This is an impossibility, yet most have been convinced by the mantra, "safe and effective and good for your teeth" by 60 years of this being said. I ask that you go to http://www.wqad.com/videobeta/9e389127-335a-426e-b690-b1db6b88e3f2/News/Hazmat-Called-To-Rock-Island-Water-Department-Building and see the hydrofluorosilic acid used to fluoridate municipal water eating through the concrete and they still tell us it's safe. And remember that 99% plus of this toxin put into the municipal water goes into the environment through household use, flushing toilets, showering, watering lawns, etc., slowly accumulating and poisoning our earth and all that inhabits it. So what in the world is the EPA doing endorsing this product that is poisoning the environment they are supposed to protect?

There have now been an editorial and **two "peer reviewed scientific research manuscripts" written on our horses.** They can be seen in the Journal FLUORIDE, The Quarterly Journal of The International Society For Fluoride Research. www.fluorideresearch.org. This scientific journal is well known as the "fluoride bible". The editorial written about our horse/fluoride story is at www.fluorideresearch.org/391/files/3911-2.pdf. It is titled "Failure To Diagnose Fluoride Poisoning In Horses Caused By Water Fluoridation". The first peer reviewed manuscript is "Fluoride Poisoning Of Horses From Artificially Fluoridated Drinking Water" www.fluorideresearch.org/391/files/3913-10.pdf . The second peer reviewed manuscript is entitled "Allergy In Horses From Artificially Fluoridated Water" at www.fluorideresearch.org/392/files/39289-94.pdf I would suggest you log onto this site and read many of the hundreds of peer reviewed scientific manuscripts from around the world on fluoride's toxicity. Many of these peer-reviewed manuscripts from this journal were referenced in the fluoride review of recent research by the National Research Council, the highest scientific group in the US, for their 3 plus year review of fluoride. Again, this NRC review, by 12 world wide prestigious experts in the science of fluoride, has been ignored by the EPA who commissioned this review. Why? No doubt because this review didn't find the benign findings about fluoride that previous biased government reviews did. *Follow the money.* This is the first review that had a very diverse panel of 12 scientists who had the expertise and knowledge to look at, and scientifically review the recent science on fluoride in an honest, nonbiased way. They also found credible science that shows fluoride damages the endocrine system, including the thyroid, lowers I.Q, causes osteoporosis, arthritis and cancer. All these are ailments that manifested in my horses and are increasing significantly across the US in humans and other animals. They also found very vulnerable subsets of the population to fluoride consumption like the elderly, the young, those with diabetes, and kidney malfunction and those who have immune system dysfunction and those who have mineral imbalances. The so called experts pushing this stupidity of fluoridation never take these subsets into

consideration nor the rest of the bodily systems that fluoride harms. By what they say, they seem to think we are just big mouths full of teeth and nothing else.

These so-called experts never reveal that solid scientific proof of **fluoride stopping cavities has never been proven.** Common sense, if looked at, reveals that after 60 years of fluoridation, if it really worked, there would be very little dental decay in the U.S. People have just believed their superiors and trade organizations, the ADA and AMA, the CDC, US Public Health Department and the EPA telling them this lie. There has never been scientific proof that fluoride is a necessary element for the body either. Cavities don't come from lack of fluoride just as headaches don't come from lack of aspirin.

The Surgeon General has come out saying there is a "*Silent Epidemic*" of pit and fissure cavities. If fluoride actually worked as touted by these so-called experts, then taking fluoride into the body systemically, it would be incorporated into the teeth and saliva and stop all cavities even in the pits and fissures. If pit and fissure cavities are such a problem, then it must means they think that these pits and fissures don't get fluoride deposited there and the saliva just skips over these pits and fissures and makes these places more susceptible to cavities. How can that happen if their "theory" works? Give me a break! How dumb do they think we are? A lot of people use fluoridated toothpaste too and even that addition of fluoride is not working to stop this "silent epidemic". Fluoride doesn't work! Good nutrition and oral hygiene are what keeps you from getting cavities, not fluoride. And the CDC came out in 1999 saying fluoride's benefits are "***topical***". This means swallowing fluoride does not work. But yet the CDC keeps on endorsing fluoridation because they can't back off their long time lies for fear of swift litigation.

The ADA, merely a trade union who's sole purpose is the financial gain of their members, nor any of their dentist members are licensed for internal medicine so for them to tout a substance to be taken internally to do something medically, they are practicing medicine without a license. I have a letter from the Calif. Dental Association. It clearly states that "ingested fluoride is not within the purview of dentistry". So again, for dentists or the ADA to promote this practice of fluoridating municipal water, they are going beyond what they are licensed to do. They don't, nor will they ever, look at the systemic side effects of fluoride consumption. They don't want you to either. It would hurt their income if this scientific information got out as general knowledge. But this knowledge is getting out and their time is coming. In an ADA survey, they found that dentists working in fluoridated cities make 17% more income. In another survey it was found that out of the 10 cities where dentists make the most money in the U.S., 9 were fluoridated. Why would this be? They get to whiten teeth that have fluorosis, fix cracked and broken teeth, treat gum disease and recession, and do orthodonture, all created by fluoride consumption and absorption. And the medical doctors and vets get to make money from treating the systemic ailments caused by fluoride's accumulation and damage.

At our countywide forum put on by our water municipality to see what the populous thought about this issue, the state head of the Health Dept., the state Epidemiologist, the

state fluoride expert and a local dentist came to give their side for the practice of fluoridation. What they touted about fluoride was "safe and effective and good for your teeth". The very same old mantra touted by all the pro side of this issue. These so called experts had no science to back them up. The well informed audience, who had done their due diligence and researched the science behind fluoride, ate these so called experts up and showed them for what they were.....followers of those in charge, spewing lies with written, practiced monologues. These so called experts had no science to back their words up because there is no credible science to do so, although they said "there are thousands of research studies showing fluoride's benefits". Saying it doesn't mean it exists. The same as saying those who are opposed to fluoridation have no credible science. Avoiding true science has always been a deliberate and chosen tactic of the promoters of fluoridation. They just keep touting their credentials and authority and expect you to fall for their untruths.

I also have a letter from the EPA lawmakers saying the EPA has no safety research on the fluoridation product. So why do they continue to promote it? Follow the money and as Dr. Hirzy, PhD, past vice president of the EPA Union says, "They have a tiger by the tail and can't let loose". We have to be the ones who do the right thing and stop this stupidity. One should realize that the EPA worker's 11 Unions of over 7,000 scientists, lawyers, etc. have asked for a permanent moratorium on fluoridation on the cancer assays they have alone. Dr. Hirzy, representing these unions, has even gone in front of a Senate Sub Committee asking for this permanent moratorium, yet the EPA lawmakers, not scientists, continue to promote fluoride. Follow the money.

Fluoridation has resulted in the unholy alliances between the ADA, USPHS, CDC, and the EPA lawmakers to now cover their rears for this stupidity and to keep the money rolling in thinking water municipalities and city councils are going to ultimately be the scapegoat. They are the ones who actually would be making the final decision to fluoridate and doing the deed of putting this toxin in the municipal water. So they are the ones who will receive the brunt of the blame and liability, although this chain of command, right up to the top, will ultimately be named when the lawsuits ensue. These so called authorities are very willing to leave the liability of ills and deaths caused by fluoridation in the hands of city councils and water municipalities. And they have a record of doing this in past lawsuits saying they were "just recommending fluoridation". It has been said that the pay-outs for the ills and deaths from fluoride consumption is going to make the cigarette payouts look like peanuts. Everyone drinks water, not every smokes.

As far as the long list of organization endorsements that the so-called experts wave in front of you and others, one must clear their mind and realize that <u>endorsements are not science</u>. Those two things are totally different things but the experts are counting on you not thinking this through. And in fact, the National Kidney Foundation pulled it's endorsement of fluoridation when approached by a lawsuit detailing the kidney problems fluoride causes. Not one of the organizations endorsing fluoridation has done any credible, double blind scientific research on the "side effects" of pharmaceutical fluoride put into toothpaste, let alone any health effects caused by the "toxic soup" product used

to artificially fluoridate municipal water, which is an industrial waste product. The EPA even says they have no safety science about this product.

Again the ADA, AMA, and other medical associations are simply and merely trade unions whose sole goal is to ensure the financial gain of their members. No wonder they endorse fluoride. It is well known in true science that fluoride ruins teeth and gums and causes dental fluorosis and other tooth problems. Along with these, many and varied systemic health problems too. Look at what it did to my horses teeth and bodies, and horses don't eat sugary things like humans do to ruin their teeth. JADA, The Journal of the American Dental Assoc., does contain research material but it is from outside the ADA and is always slanted towards their ultimate goals of producing income for their members. Their promotion of fluoridation is perfect for this goal. Research the source of these studies and you will find that these studies are paid for by those who will ultimately gain from fluoride's promotion. ***Science that knows the end result of the research before it is finished in not true science.*** This is what you see in pro-fluoridation manuscripts. Bad methodology, skewed results and fudged numbers. Paying for the end result wanted, is not science. Only in true science does the end result come without being manipulated to come to the end result wanted. Fluoride ingestion has been proven scientifically in "independent" research to cause dental fluorosis and need for whitening, need for braces from malaclution of teeth, brittle teeth that chip and break, all by doing enzyme damage at the cellular level and all things the ADA and it's members profit from. Follow the money.

Why is it that on the back of all fluoridated toothpaste, it says ***"if more than a pea size amount of toothpaste is swallowed, call the poison control center immediately"***? What is used in toothpaste is pharmaceutical grade fluoride, not the toxic soup put into municipal water. This safety warning is mandated by the FDA. Know that there is ¼ milligram fluoride in that pea size amount of toothpaste and it has a safety warning? That ¼ milligram is the same amount of toxic waste fluoride in one glass of water. Why is it that there is no safety warning on your water bill or water quality report for the 1 ppm of fluoride put into municipal water saying if more than one glass of water is consumed, call your poison control center immediately? Why is it that doctors suggest everyone drink 8 glasses of water per day, which would be a huge overdose according to the FDA's toothpaste safety warning? There is never a mention that if this water is fluoridated, that you should call the poison control center immediately?

You need to realize that 1ppm fluoride is *confusing the amount put into water with the dose consumed.* Just because you put 1ppm fluoride in the drinking water does not insure that everyone will only drink that amount. Those with any kind of kidney dysfunction, heart problems, diabetes, athletes, babies who drink far more liquids than adults when comparing weight to liquid consumption, and outside workers, etc., drink far more water than most. So these people can consume way more than the "so called" optimal amount of fluoride. This is just one of the reasons fluoridation is so ridiculous. ***You can't control the dose. I challenge you to think of a single other drug that is safe for everyone, no matter of age weight or medical conditions, can be consumed in any***

amount, and is recommended to be taken the rest of your life no matter your health changes like fluoride is.

The EPA is the controlling agency for water and toxins. It has no authority for drugs or medications. That is the FDA's charge. Why is the EPA's policy of the promotion of fluoridation so different from the FDA's non-approval of any fluoride product meant for consumption? Why are the very same products, sodium fluorosilicates, said to be ok put into our drinking water for us to consume yet not ok if spilled onto the land, water-ways or ocean? The government agencies are not doing their job of protecting the populous and obviously not conversing with each other to get their stories and jobs in order.

Do you know that in 2006 the ADA came out with a memo to it's "dentist members only", that they should tell their patients that babies should not have their infant formula reconstituted with fluoridated water? Did you know that the CDC backed this up? But yet this has not gone out to the media even today. Why has this information not been put in water quality reports from water municipalities in fluoridated communities? Could it be that the so-called experts have again failed their job and just not told you because it would hurt their bottom line or show fluoridation for what it truly is?

Now, I do agree that giving people the choice if they want to use fluoridated toothpaste or other fluoride dentifrices is fine, even though I do not and would not use it because all fluoride is poisonous and cumulative. *Everyone should have the ability to choose what they want to use for their own health.* And these sources of fluoride are very cheap and a way to distribute these products could be easily done instead of forcing fluoridation on everyone. This could be done much cheaper than fluoridating the water, therefore putting the liability on the individual who chooses these sources of fluoride for themselves, as individuals, instead of on the city councils and water municipalities and all the agencies above them.

As far as putting fluoridation up for a vote of the populous, that again takes away individual rights. Millions of men and women have fought and died to retain our ***individual freedoms***. Squelching these hero's ultimate sacrifice for our freedom by forcing a mass medication that some don't want is against our God given and Bill of Rights given rights as individuals?

During our discussions with our water municipality, they wanted to show us that naturally occurring fluoride was already in our water so it was ok to add more. Pagosa Springs is the first town that the water from the source, the mountains, gets to. There is no source of fluoride or pollution before the water is taken directly from the river by our water department for our town. The municipality presented samplings of water collected all around our town from the multiple bodies of water and rivers. Downstream and in town, in the river, there was quite a bit of fluoride in the water. In lakes that had a lot of homes around them, there was quite a bit of fluoride in the water. In the samplings from the river that the municipality gets our water from, that runs through town, as they took samplings going up the river getting closer and closer to the mountains, the source of our water, the fluoride got less and less. Thus showing that, as has been proven many times

in research, most of this artificially fluoridated water is not consumed, but goes into the environment through household use. In fact it has been proven that over 99% of this toxic waste ends up in the environment slowly accumulating and poisoning it. Again the EPA is not doing their job to protect us, nor the environment. This is a major double standard by the EPA promoting fluoridation. In fact, back in 1983, Rebecca Hanmer, the deputy assistant administrator for water at the EPA described the practice of fluoridation as "*an ideal solution to a long standing problem. By recovering by-product fluorosilicic acid from fertilizer manufacturing, water and air pollution are minimized, and water authorities have a low-cost source of fluoride available to them*". This alone shows that common sense has flown out the window on this subject when it comes to government agencies. How stupid can these agencies be? Again, as Dr. Hirzy, PhD, past vice president of the EPA workers union (who wants fluoridation to cease immediately on the proven cancer research they have done alone) has said, "They have a tiger by the tail and can't let loose". He has said that the EPA's lawmakers seem to think that "the solution to pollution is dilution". This stuff is still getting into the environment and if 99% plus is not consumed, where is it going? The environment, of course! Dr. Hirzy argues with the EPA lawmakers saying that "The public water supply should not be used as a means of getting rid of hazardous waste", and in his testimony before the U.S. Senate in 2000 he described Hanmer's views as "linguistic de-toxification". The EPA lawmakers, and other agencies, have promoted this toxin for far too long and if they admit what they know, the lawsuits will ensue and the government agencies are going to loose all credibility. Take a look at the lawsuits for ills caused by asbestos, DDT, lead in gas, and all the drugs once said to be "safe and effective" like VIOX and Phen Fen, and all those products with advertisements from lawyers on TV wanting people to come forward to sue because of ills and damage done by these so called safe and effective things. Lawsuits that are certain to ensue, and are beginning with the many and varied scientifically proven ills caused by fluoridation. Go to www.slweb.org and click on Fluorinated Pharmaceuticals to find yet another source of fluoride.

Do you know that the EPA was started because of fluoride pollution and the making ill and killing of people, animals and the land? It was the Denora, Penn. incident, many, many years ago. This incident was caused by a weather inversion of effluent (toxic smoke) of the very same stuff captured by wet scrubbers and put into fluoridated water. You can read about it in the book "The Fluoride Deception" which is a must read for anyone wanting to learn the history of fluoridation and who is consuming fluoridated water or products.

Have you read the story of how Dr. William Marcus PhD., the head toxicologist of the EPA, found that fluoride caused two very bad, but *used to be* rare cancers? He turned his research into the EPA lawmakers who immediately downgraded his scientific results 4 points therefore nullifying his research. These EPA lawmakers are supposed to take the proven science from their scientists and make law on them to protect us, but that didn't happen then, nor is it happening now. Dr. Marcus started telling people about his findings, he was warned to keep quiet, his integrity wouldn't allow him to be quiet because he knew people were dying from the consumption of fluoride, and he was fired. He sued and won and the EPA was forced to rehire him. It was because of this pressure

from the EPA lawmakers on their own scientists that they are supposed to support, that the EPA Workers Union was formed. Now, as I said before, all eleven EPA Unions, over 7,000 scientists, lawyers, etc. have signed a petition and gone in front of a Senate Sub Committee and asked for a permanent moratorium on fluoridation on the cancer data alone they have found. Part of this filmed testimony is on the "Poisoned Horses" documentary. www.youtube.com/watch?v=7TwwNZyRVOA A very large part of this filmed testimony is on the first "Let the Truth Be Told" documentary series mentioned above. It also contains an interview with Dr. Hirzy.

Not only did we have the proven science from a world fluoride expert at Cornell University behind us, Dr. Krook, when fluoridation was ceased here in Pagosa Springs, but we also made our water municipality realize that *we do have a choice as to what we put into our bodies as individuals*. We revealed to them a major court case, after 9/11, where the Federal government was going to force all troops to receive anthrax and other vaccinations. These drugs had not been FDA approved, same as has no fluoride product meant for ingestion ever been FDA approved. A lot of the troops refused these vaccinations and were court marshaled. It went to **Federal court and the *final ruling was that no one, not even the Federal government has the right to force anyone to take into their body a non approved drug***. This case was Doe verses Rumsfeld. This court case has set a major legal president for future lawsuits including those about fluoridation and the ills it causes. Recently, in a national lawyer publication, it was revealed that people with *ailments caused by fluoride consumption is a potential goldmine for litigation.* The truth is becoming known.

The action of fluoridation is against all rules of pharmacology. No doctor is allowed to prescribe a drug to any of his patients without first seeing and diagnosing them and getting written consent on an individual basis. Then the patient can still refuse, even after this consent is signed. No doctor would prescribe the same medication to every patient, no matter their age, weight, personal medical situation, allergies, etc. Nor would he tell them to take as much as they like and take it the rest of their life as is done with fluoridated municipal water. For any water municipality to put a substance into the water solely for treating humans, as fluoridation is, they are **mass medicating, for medical purposes, with a substance never FDA approved for ingestion, by a non medical entity who has no medical license (water municipality and city council) without ever getting signed consent from each individual consumer and without knowing if anyone has an allergy or other medical problem that would make it even more toxic and deadly**. That is setting all those involved up for major lawsuits just on those merits alone. No licensed medical professional is allowed to do this. And there have been cases when the municipalities have been sued, they have asked the so called authorities that have pushed them into fluoridating or continuing fluoridation, to be expert witnesses in court. These promoting, so called authority's answer has been in the past, that they were just recommending the council and municipality to fluoridate and would not testify leaving the council and municipality holding the lions share of the liability. **It is said that ignorance of the law is no sound defense to legal charges brought against you. This fact is the same that ignorance of the medical facts of the fluoride product being put into everyone's water source, is no defense either.** This is especially true

when that information can be easily accessed. Believing the so-called experts would be called "hear say" in court. And remember that the Nuremberg Trials established the precedent that the statement "I was only following orders" does not hold water.

Please remember that when it comes to municipal water, the one and only job of councilors, of water municipalities and mayors is to deliver clean water to the populous, and to improve the quality of that water. Fluoridation does neither. Their job is NOT to medicate the population with a non-approved drug. Water fluoridation does nothing for the water quality. Fluoridation's only purpose is to medicate. Looks like fluoridation is a major liability lawsuit waiting to happen to me. And the lawsuits are increasing in number nation wide as we speak.

A new recent development is that a world wide insurance company has stated that they will not cover water municipalities or those who deliberately do something that has been scientifically shown to do harm, which includes approving and sending out fluoridated water to their customers. How many other insurance companies will follow suit? This again puts the liability squarely in the laps of those who promote fluoridation and deliver fluoridated water as individuals, and could very well void Directors and Officers insurance.

Another development is the question of **"Fluoridegate"**. This scandal is widening with calls for hearings as new revelations highlight the fact that science is in conflict with official's promotions and statements on water fluoridation safety. A very new documentary has been produced and released called "FLUORIDEGATE, AN AMERICAN TRAGEDY". You can see it at www.fluoridegate.com. It is a must see for the truth about how the EPA has lied and deceived us for years about fluoridation and what it is capable of doing to our bodys.

And another development is that fluoride trucks have been identified by our government as terrorist targets. If this stuff is benign, why is this true?

I am writing this because I am scared. I have seen personally, over many, many years, seen the devastating ills that fluoride is capable of doing to the body. You are seeing it too, you just aren't aware that fluoride is the cause and the self proclaimed authorities want to keep you in the dark while they pad their pockets with money made through suffering from fluoride consumption and accumulation. Please realize that by putting this toxic waste into municipal water, it is not only doing physical harm to living beings but also to the environment.

Please remember that we who are against fluoridation have nothing to gain but our health and freedoms and that of others and future generations and also the stopping of the poisoning of this wonderful planet we live on. Not so with the promoters of this toxin. Their pockets are growing full either from the gain of their jobs promoting this, or by treating the bad teeth, gums and internal ailments fluoride consumption creates. Again, follow the money when it comes to these promoters. Read the book "The Fluoride

Deception" by Christopher Bryson and the newly release book "The Case Against Fluoride" How Hazardous Waste Ended Up in Our Drinking Water and the Bad Science and Powerful Politics That Keep It There… by Dr. Paul Connett, Phd, James Beck, MD, PhD, and H.S. Micklem, Dphil. These book's truths about fluoride and fluoridation are backed up by recently declassified "top secret" government documents and peer reviewed scientific research. We who are against fluoridation are spending our precious time and resources trying to regain our rights given to us by God, the Bill of Rights, and those who have died to retain those freedoms. We should be able to decide, as individuals, what we take into our bodies. Please do the right thing, legally, morally, intelligently and integrally. Do what is necessary to stop this stupidity.

Thank you for your time in reading this.

Sincerely,

Cathy Justus
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(970) 264-4462
justusoriginals@pagosa.net

REFERENCE LINKS:

"FLUORIDE" The Quarterly Journal of The International Society For Fluoride Research
www.fluorideresearch.org

"FAILURE TO DIAGNOSE FLUORIDE POISONING IN HORSES CAUSED BY WATER FLUORIDATION: Editorial on our horses.
www.fluorideresearch.org/391/files/3911-2.pdf

"FLUORIDE POISONING OF HORSES FROM ARTIFICIALLY FLUORIDATED DRINKING WATER: Peer reviewed, scientific, published manuscript on our horses and others. **www.fluorideresearch.org/391/files/3913-10.pdf**

"ALLERGY IN HORSES FROM ARTIFICIALLY FLUORIDATED WATER: Peer reviewed, scientific, published manuscript on our horses.
www.fluorideresearch.org/392/files/392/files/39289-94.pdf

www.myspace.com/poisonedhorses Web site with lots of scientific information about our horses and others in Pagosa Springs including the first necropsy and tooth report from

Dr. Lennart Krook, PhD, DVM from Cornell University in New York. Go to "Profile" and scroll down to the letter, necropsy and tooth report from Dr. Krook, PhD, DVM

www.youtube.com/watch?v=7TwwNZyRVOA The short documentary called "Poisoned Horses" produced by Dr. David Kennedy, DDS and the International Academy or Oral Medicine and Toxicology

www.slweb.org/ftrcpersonalstories_cathy.html Our fluoride story up until 2006

www.FluorideAction.net All the recent research and happenings world wide on fluoride plus recent videos from medical and scientific professionals who know the truth about fluoride.

www.FluorideAlert.org More information about fluoride.

www.Slweb.org Go to bibliography and see over 75 pages of listings of just a few of the over 60,000 damning proven independent scientific manuscripts about fluoride. Click on Fluorinated Pharmaceuticals to find drugs that contain fluoride.

www.SpotsOnMyTeeth.com Shows the detrimental outward showing of the internal poisoning by fluoride consumption while the tooth buds are forming.

www.KeepersOfTheWell.org Lots of information.

www.youtube.com/watch?v=a14crJyR-qc&feature=related Dr. Paul Connett, PhD, Chemistry seminar in Denver in September 2010.

www.youtube.com/watch?v=995oooY-CQjk My seminar along with Dr. Paul Connett, PhD, Chemistry in Denver in September 2010.

www.ars.usda.gov/Services/docs.htm?docid=6312 or **www.ars.usda.gov/SP2UserFiles/Plack/12354500/Data/Fluoride/F02=pdf** See the USDA charts that list the amount of fluoride in processed foods consumed everyday by Americans. This alone should reveal that putting even more fluoride in municipal water is beyond ridiculous.

www.fluoridegate.com A new documentary entitled FLUORIDEGATE, AN AMERICAN TRAGEDY by Dr. David Kennedy. It reveals how we are being deceived by being told that fluoridation is safe and effective. It reveals the true science of fluoride, and what it does to the body and how many are dying because of this deception.

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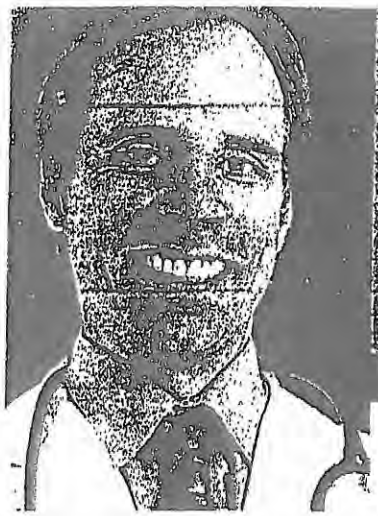

BOTTOM LINE
Natural Healing
with Dr. Mark Stengler
Vol. 7, No. 8 / August 2011
DEEPER CURES FROM AMERICA'S TOP NATURAL PHYSICIAN

FEEL GOOD!

Don't take NSAIDs after a heart attack. Copenhagen University researchers have found that use of prescription nonsteroidal anti-inflammatory drugs (NSAIDs)—such as *diclofenac* (Voltaren) and *celecoxib* (Celebrex)—after a heart attack caused a 45% increased risk for a recurring heart attack within one week of taking the drugs and a 55% increased risk three months after a heart attack. If you are recovering from a heart attack and need a painkiller, consider using methylsulfonylmethane (MSM) mentioned in the story on page 3.

Better postexercise drink. It is better to drink a protein drink after aerobic exercise—not a carbohydrate drink, such as Gatorade—say Colorado State University researchers. After six weeks of exercise, researchers found that more new muscle formed in people drinking protein drinks (20 grams provided the benefit). *One source:* Whey, available at health-food stores.

Health of older couples is linked. A study published in *Health Psychology* found similarities between spouses' depressive symptoms (such as loneliness and unhappiness) and functional limitations (ability to climb stairs or cook). If you are part of a longtime married couple, it is a good idea to watch your own health when your spouse is ill.

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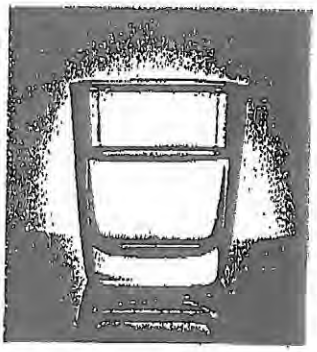
Don't Drink the Water
Why Fluoride Puts Your Health At Risk

p. 1



Have you ever wondered why there is a warning on the labels of toothpastes? It tells users to keep the product away from children and to seek medical attention if more than the recommended amount for brushing is swallowed. *Reason:* Toothpaste contains fluoride.

For years, this chemical has been added to our water to reduce the occurrence of dental cavities—but unbelievably, the newest evidence shows that fluoridated water does not protect against cavities. In fact, it turns out that we don't need fluoride to protect our teeth at all.

Dentists advise that children use toothpaste that contains fluoride—and yet we keep all kinds of other medications and dangerous products away from children. But is toothpaste as dangerous? Yes. The average tube of toothpaste contains enough fluoride to kill a child. And how safe is a glass of fluoridated tap water?

Fluoride occurs naturally in soil, water and some plants. It also is a by-product of phosphate fertilizer production and is an industrial waste product of the aluminum smelting industry. The FDA maintains that fluoride is a drug. It's also known to be a highly toxic substance, even more toxic than lead. Once used as rat poison, it can cause serious health problems when ingested in unsafe amounts, including weak bones, hormone disruption and neurological damage.

And the truth is—fluoride is everywhere. It's not only in dental-hygiene products but also still in our water supply. It's been there since the 1940s, when extensive tooth decay was common across the US. In 1999, the

LIVE BETTER

Surprising source of household pathogens. *In 60% of homes tested, yeast and mold were found on remote controls, says NSF International, a group that develops public safety standards. Helpful: Clean these regularly with natural antimicrobial cleaners that contain tea tree oil.*

In this issue

2 Dr. Stengler Says...Eat Your Way to Skin Health
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4 Help or Hype? Nondairy Yogurts
5 Try It: Essential Oils Help All Around Your Home
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8 Health Effects: Black Pepper

Dr. Stengler says...

Eat Your Way to Skin Health

Summer is in full swing, and that means a lot more sun exposure and increased vitamin D levels! But one of the primary health concerns during the summer is preventing sun damage. I'm sure you already wear sunscreen regularly—preferably one that does not contain potentially harmful chemicals such as *oxybenzone* or *retinyl palmitate*. But did you know that you can consume foods that help protect your skin from sun damage?

Brightly colored fruits and vegetables are rich in carotenoids, which are potent antioxidants that help to prevent the breakdown of collagen, the body's main protein. In fact, the brighter the food, the greater the concentration of carotenoids. *Examples:* Cantaloupe, watermelon, apricots, papaya, peaches, cherries, tomatoes, peppers (all colors), kale, sweet potatoes and carrots. While these foods are good for your skin year-round, they are especially helpful when you are exposed to the sun. I recommend consuming at least two servings daily of carotenoid-rich foods for the rest of the summer—and on into the early, sunny days of fall. Your skin will be better for it.

Dr. Mark Stengler

Centers for Disease Control and Prevention (CDC) called water fluoridation one of the 10 greatest public health achievements of the 20th century.

Fast forward to 2011...and we are at risk for health problems because we are overexposed to fluoride. It is even in a number of products that our families consume (either when we add in fluoridated water or when the products themselves are made with fluoridated water), such as baby formula, processed cereals, juice, soda, tea, wine and beer. *What you need to know to protect yourself...*

FLUORIDE IN TAP WATER

It's not only the natural medicine community that is alarmed. Earlier this year, for the first time in about 50 years, the US Department of Health and Human Services (HHS) announced that there was too much fluoride in the US water supply and recommended reducing the amount of fluoride added to water to 0.7 parts per million (ppm) everywhere. The limit had previously been 0.7 ppm in warm climates where people drink a lot of water to 1.2 ppm in cooler climates (where people presumably drink less).

FLUORIDE CAUSES HEALTH PROBLEMS

When you ingest fluoride, about half is excreted by the kidneys. The rest is stored in your bones and teeth, where it does the opposite of what it is supposed to do—it causes damage. According to the CDC, 41% of American adolescents now have dental fluorosis, an increase from 23% in 1987. This disfigurement of tooth enamel in teeth, which can range from white patches to brown mottling, typically occurs before age eight (when permanent teeth are all formed). This very high rate of fluorosis is thought to be caused by fluoride intake during childhood, from drinking fluoridated water (including commercial drinks made with fluoridated water) and swallowing toothpaste with fluoride.

In addition to fluorosis, fluoride causes other health problems...

Fluoride decreases bone strength. A 2010 *Journal of Dental Research* study found that bone strength in animals decreases with increased levels of fluoride in bones. HHS also has noted that excess fluoride can result in bone fractures and skeletal fluorosis, a crippling condition.

Fluoride impairs brain function in children. A 2008 systematic review published in *Biological Trace Element Research* found that children in China who live in an area with fluoridated water have five times greater risk for a lower IQ than children who live in a nonfluoridated or slightly fluoridated area. The water was fluoridated at a level of 2.47 milligrams per liter (mg/L), three times the US safe level. (Note that 1 ppm equals 1 mg/L.)

Fluoride upsets cardiac function. Increased fluoride can result in

BOTTOM LINE
Natural Healing

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Bottom Line Natural Healing™ is dedicated to empowering readers with the deepest understanding of natural and alternative therapies—and the knowledge to use them to stay well and heal disease.

Dr. Mark Stengler is a licensed naturopathic medical doctor and a leading authority on the practice of alternative and integrative medicine. An adjunct associate clinical professor at the National College of Natural Medicine in Portland, Oregon, from which he received his doctorate in naturopathic medicine, Dr. Stengler has served on a medical advisory committee for the Yale University Complementary Medicine Outcomes Research Project and is the author or coauthor of 16 books, including three best sellers—*The Natural Physician's Healing Therapies*, *Prescription for Natural Cures* and *Prescription for Drug Alternatives*. Dr. Stengler is board-certified in integrative medicine and certified in intravenous nutrient therapy. He is the founder and medical director of the Stengler Center for Integrative Medicine in Encinitas, California. For an in-person or phone consultation with Dr. Stengler, call his clinic at 760-274-2377. Dr. Stengler has no financial interest in any of the products mentioned in this newsletter unless otherwise noted. To learn more about Dr. Stengler, go to www.DrStengler.com.

The information in **Bottom Line Natural Healing** is not intended as a substitute for personal medical advice. Before making any decision regarding your health, please consult a physician or another health-care practitioner—especially if you are pregnant, take medication or have a chronic illness. Pricing and availability of products mentioned can change by the time the issue is delivered. We regret that not all products are available in all locations worldwide.

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abnormal calcification of cardiac tissue. This can impair cardiac function in animals, say researchers from Agricultural University Wageningen in the Netherlands, whose study was published in *Biological Trace Element Research*.

Fluoride interferes with cell metabolism. Research published in *Toxicology Letters* in 2010 points to chronic fluoride exposure as a possible cause of oxidative stress, which results in inflammation throughout the body.

In addition, in 2006, the National Research Council (NRC) reviewed EPA water-safety standards. The NRC found that excessive fluoride intake was associated with hormone disruption, impaired thyroid function, increased free radical activity in the brain (potentially contributing to dementia) and abnormal insulin response.

IT DOESN'T REDUCE CAVITIES

Population studies show that people who live in communities that fluoridate their water have no fewer cavities, on average, than people in communities without fluoridated water. While it's true that the US has experienced dramatic declines in cavities and tooth decay over the past 50 years, the same holds true for people in Europe, where many countries discontinued the practice of water fluoridation starting in the 1970s. It is believed that cavities have decreased despite water fluoridation cessation because of better oral hygiene.

MINIMIZE YOUR FLUORIDE INTAKE

Water fluoridation is an unsafe practice that should be stopped. If you live in the US, there's a 70% chance that your tap water is fluoridated. Since water fluoridation is left up to individual states and municipalities, practices vary from town to town. *Examples:* New York City, Minneapolis and Chicago currently maintain a water fluoride content of 1 mg/L. To check the fluoride content of your water, contact your local water

Continued on page 6

NATURAL SOLUTIONS

DMSO—Rub On Quick Pain Relief

When I was in medical school, one of my professors said that a doctor who can't help relieve a patient's pain quickly won't be seeing that patient again. I find that he's right. People in pain want relief—and it's understandable that they want it quickly. When I am helping patients achieve immediate pain relief for burns, sprains, back pain or arthritis, I often turn to *dimethyl sulfoxide* (DMSO), a remarkable topical alternative medication for pain that has its own remarkable history. *Find out how it can help you...*

CONTROVERSIAL DMSO

The fascinating story of DMSO began in the 1960s, when Stanley Jacob, MD, head of the organ transplant program at Oregon Health Sciences University in Portland, was investigating compounds that might help preserve organs for transplant. DMSO, which had been used as an industrial solvent, attracted his attention because of the way it penetrates skin without damaging it. He experimented with DMSO and found that it could relieve pain.

The discovery of DMSO inspired the discovery of another related sulfur remedy, *methylsulfonylmethane* (MSM), a compound with similar pain-relieving effects. I often recommend it be taken orally instead of NSAIDs for pain associated with headaches, fibromyalgia, heartburn and muscle and sports injuries. MSM also is known to ease allergies and asthma.

From the start, DMSO was highly controversial—and some were worried that this "miracle" drug had harmful side effects, although nothing specific was found. By the mid-1960s, DMSO was a popular product in health-food stores. It was inexpensive—and it worked! The only approval DMSO has received from the FDA is for organ preservation during transplantation and as a local treatment for interstitial cystitis, a painful condition that involves inflammation of the bladder. DMSO is, however, approved for use throughout Canada and Europe as a topical treatment for pain, inflammation, scleroderma (an autoimmune disease of the skin) and arthritis.

It also is widely used by veterinarians to treat animal injuries, especially in horses. If you have never heard of DMSO, I can understand that you may doubt its usefulness, but I know it to be a safe and effective treatment and so do my patients who use it.

THE POWER OF DMSO

DMSO works in several ways. First, as a topical compound, it has analgesic properties and reduces pain quickly—which is why it is great for rubbing on sore muscles and joints. Laboratory studies suggest that it decreases pain by blocking *peripheral nerve C*

TITLE PHOTO: © ISTOCKPHOTO.COM/KENTANNENBAUM

COVER STORY: WATER

continued from page 3

utility or visit http://apps.nccd.cdc.gov/MWF/Index.asp. You can join the growing number of people who are letting their local government agencies know about the health concerns of fluoridated water.

To further protect yourself...

Drink spring water. It usually contains less than 0.1 ppm of fluoride.

Use a water filter. One of the best types of filters for removing fluoride is the reverse-osmosis filter, available at appliance stores for $300 to $400. Many household filters, such as Brita and Pur, do not eliminate fluoride.

AVOIDING FLUORIDE IN DENTAL PRODUCTS

The concentration of fluoride in many commercially made toothpastes is high—about 1,000 ppm to 1,500 ppm. Even when you don't swallow fluoridated toothpaste, some fluoride is absorbed by the body and goes into the bloodstream. I'm convinced that there is no benefit from any kind of topical application of fluoride—whether it's toothpaste, mouthwash or even a onetime fluoride treatment from the dentist. Both children and adults should not use fluoride treatment or supplements of any kind.

Switch to a toothpaste that doesn't include fluoride—and that does contain only natural ingredients. Make sure these include *xylitol*, a compound derived from plant fibers that is known to prevent cavities. Many such toothpastes are available at health-food stores. Also, work with a holistic dentist to ensure dental health. NH

Coming soon...

- Homeopathy for Depression
- Why You Should Think Again About Getting That Root Canal
- Healthful Salmon—from a Can
- Can You Bring Mindfulness to Chores?

QUICK CURE FOR A BEE STING

Instead of a topical treatment to relieve the pain and swelling of a bee sting, I often recommend the homeopathic remedy *Apis*. The dosage is two 30C potency pellets right after you are stung. Repeat the dose in 15 minutes if you still feel the sting. There are no side effects, and it's safe for everyone. If the pain doesn't ease up after two doses, stop taking it. If swelling continues or you have difficulty breathing, see a doctor.

>> NATURAL EFFECTS

Want an Easy Way to Lose Weight? Cut Out Wheat

I'm going to let you in on a little-known secret about a very easy way to lose weight. It's simply this—when you stop eating wheat, the pounds drop off. Most of my patients who make this dietary change don't do it to lose weight. They do it because they have a sensitivity to wheat, which is the most common source of ingested gluten, a group of proteins also found in rye and barley. When someone with this sensitivity consumes gluten, it triggers an abnormal immune response, which, in some people, causes damage to the villi that line the small intestine wall.

When these people reduce their intake of products with gluten, including wheat, health problems, such as fatigue and depression, headache, irritable bowel syndrome, sinusitis and joint pain, clear up—and they have more energy. They also lose weight—and so can you, even if you are not sensitive to wheat. *Here's why...*

We think of wheat (at least, the whole-grain variety) as good for us. But most of the wheat that Americans eat is refined and does not contain a lot of health-promoting fiber. The refined carbohydrates from the wheat are treated by the body like sugar, spiking insulin and contributing to inflammation and obesity. Wheat sensitivity also causes water retention, which adds water weight.

Wheat is everywhere. Wheat is pervasive in the foods we eat, even in unexpected places—including soy sauce, preservatives and many alcoholic drinks. So you are probably eating wheat knowingly—in breads and pastas—and unknowingly in other foods.

What to eat instead. Many of my patients who cut wheat from their diets achieve a more healthful balance among carbohydrates, fats and protein. *Important:* They didn't just replace the foods they are not eating with junk food. They skip the bread at mealtimes... consume healthy grains, such as quinoa and brown rice...increase the amount of vegetables on their plates...and consume healthful portions of lean protein (fish, chicken and legumes, such as beans). Once you get used to consuming less wheat, it isn't that hard to do. You will feel satisfied and no longer be on an insulin roller coaster... you won't miss wheat...and the weight will come off naturally!

Harris, Gayle

From: McClain, Rosalyn
Sent: Monday, March 18, 2013 1:47 PM
To: 'F. Vincent Allison III'; 'Nancy Short'; 'Teme Levbarg'; 'Jim Miller'
Cc: Harris, Gayle; Freeman, Rebecca S.; McIntosh, Miriam; Harris, James R.
Subject: FW: Additional Info In Response to Expert Panel on Water Fluoridation

FYI.
Thanks

ROSALYN MCCLAIN
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Please note that as of October 22, 2012, my e-mail address has changed. All previous Durham County e-mail addresses will remain active until June 30, 2013.

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From: Sturmer, Corey [mailto:CoreyS@AddressDoctor.com]
Sent: Friday, March 15, 2013 12:12 PM
To: Health
Cc: charlee.eades@gmail.com
Subject: Additional Info In Response to Expert Panel on Water Fluoridation

Dear Durham Public Health Board,

Now that you have heard the state's position and personal opinion on community water fluoridation, I would like to follow up that discussion with a simple and straightforward presentation of the facts.

You heard from many different individuals who have personal opinions on the practice, and despite their endorsement of the policy you heard a resounding agreement that "high levels" of fluoride are proven to have adverse side effects. Like all substances, dosage is key!

While I agree that Durham equally distributes the fluoride into the drinking water, what they cannot control is the equitable distribution into our bodies. Remember – if this chemical is being applied as a preventative medicine how does one control the dose? This is controlled only by how much water one drinks!

Further, I'd like to outright contend Dr. Tim Wright's assertion that Fluoride is not a drug or medicine when the FDA clearly states any article intended to treat, mitigate or prevent a disease is defined as a DRUG. By the FDA's own definition, Fluoride is an unapproved chemical for use in water supplies to prevent cavities.

Please consider the below speeches and articles which highlight these basic truths about public water fluoridation. I trust you will make the correct decision and put this matter before the citizens who can then decide for themselves what chemicals are added to their drinking water.

Raleigh North Carolina Violates State and Federal Drug Laws by Practicing Medicine without a License

City Governments are NOT Immune to Legal Action! Stop Medicating Our Drinking Water NOW!

Thank you for your consideration,

Corey Sturmer
AddressDoctor – An Informatica Company

Account Manager | CoreyS@AddressDoctor.com
Tel +1 866 402 2800 ext 816 | Mobile: (919) 880 7883 | Fax: +1 866 234 7768 | www.AddressDoctor.com

Attachment 22

ADA American Dental Association

April 22, 2013

Surgeon general endorses fluoridation

Huntsville, Ala.--U.S. Surgeon General Regina Benjamin, M.D., April 22 officially endorsed community water fluoridation as "one of the most effective choices communities can make to prevent health problems while actually improving the oral health of their citizens."

Dr. Regina Benjamin

Dr. Benjamin made her endorsement via a letter read at the opening ceremony at the National Oral Health Conference in Huntsville.

"Fluoridation's effectiveness in preventing tooth decay is not limited to children, but extends throughout life, resulting in fewer and less severe cavities," Dr. Benjamin wrote. "In fact, each generation born since the implementation of water fluoridation has enjoyed better dental health than the generation that preceded it."

Every surgeon general for the past 50 years has endorsed community water fluoridation of community water supplies as a safe and effective weapon in the war against tooth decay.

The American Dental Association has supported fluoridation since 1950.

"The ADA's policies regarding community water fluoridation are based on the best available science showing that fluoridation is a safe, effective way to prevent dental decay," said ADA President Robert A Faiella. "The ADA, along with state and local dental societies, continues to work with federal, state and local agencies to increase the number of communities benefiting from this very effective public health measure. We applaud Dr. Benjamin for making this public endorsement of fluoridation."

Dr. Benjamin's letter to the National Oral Health Conference is available on ADA.org.

ADA American Dental Association

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Dear Conference Attendees:

Welcome to the 2013 National Oral Health Conference. I want to thank you for the leadership and efforts you are providing to the nation in the area of oral health.

As Surgeon General I have been working hard to encourage individuals and communities to make healthy choices because I believe it is better to prevent illness and disease rather than treat it after it occurs. Community water fluoridation is one of the most effective choices communities can make to prevent health problems while actually improving the oral health of their citizens.

One of water fluoridation's biggest advantages is that it benefits all residents of a community—at home, work, school, or play—through the simple act of drinking fluoridated water. Where water fluoridation is a community-wide intervention, the benefits are not limited by a person's income level or their ability to receive routine dental care. It also is a very cost-effective intervention. A lifetime of cavity prevention can be obtained for less than the cost of one dental filling.

Fluoridation's effectiveness in preventing tooth decay is not limited to children, but extends throughout life, resulting in fewer and less severe cavities. In fact, each generation born since the implementation of water fluoridation has enjoyed better dental health than the generation that preceded it.

As then-Surgeon General David Satcher noted in *Oral Health in America: A Report of the Surgeon General* (May 2000), community water fluoridation continues to be the most cost-effective and practical way to provide protection from tooth decay in a community. The U.S. Centers for Disease Control and Prevention has recognized fluoridation as one of 10 great public health achievements of the 20th Century.

This year marks the 68th anniversary of community water fluoridation.

I join with previous Surgeons General in acknowledging community water fluoridation as an effective public health strategy, and recommend its continued use and expansion to enhance the oral health of all Americans.

Regina M. Benjamin, MD, MBA
VADM U.S. Public Health Service
Surgeon General

Attachment 24

EPA

Newsroom

News Releases - Water

EPA and HHS Announce New Scientific Assessments and Actions on Fluoride / Agencies working together to maintain benefits of preventing tooth decay while preventing excessive exposure

Release Date: 01/07/2011

Contact Information: HHS Office of the Assistant, Secretary for Health (OASH)–, Public Affairs, ashmedia@hhs.gov, 202-205-0143, EPA, Jalil Isa (Media Inquiries Only), isa.jalil@epa.gov, 202-564-3226, 202-564-4355

WASHINGTON – The U.S. Department of Health and Human Services (HHS) and the U.S. Environmental Protection Agency (EPA) today are announcing important steps to ensure that standards and guidelines on fluoride in drinking water continue to provide the maximum protection to the American people to support good dental health, especially in children. HHS is proposing that the recommended level of fluoride in drinking water can be set at the lowest end of the current optimal range to prevent tooth decay, and EPA is initiating review of the maximum amount of fluoride allowed in drinking water.

These actions will maximize the health benefits of water fluoridation, an important tool in the prevention of tooth decay while reducing the possibility of children receiving too much fluoride. The Centers for Disease Control and Prevention named the fluoridation of drinking water one of the 10 great public health achievements of the 20th century.

"One of water fluoridation's biggest advantages is that it benefits all residents of a community—at home, work, school, or play," said HHS Assistant Secretary for Health Howard K. Koh, MD, MPH. "Today's announcement is part of our ongoing support of appropriate fluoridation for community water systems, and its effectiveness in preventing tooth decay throughout one's lifetime."

"Today both HHS and EPA are making announcements on fluoride based on the most up to date scientific data," said EPA Assistant Administrator for the Office of Water Peter Silva. "EPA's new analysis will help us make sure that people benefit from tooth decay prevention while at the same time avoiding the unwanted health effects from too much fluoride."

HHS and EPA reached an understanding of the latest science on fluoride and its effect on tooth decay prevention, and the development of dental fluorosis that may occur with excess fluoride consumption during the tooth forming years, age 8 and younger. Dental fluorosis in the United States appears mostly in the very mild or mild form – as barely visible lacy white markings or spots on the enamel. The severe form of dental fluorosis, with staining and pitting of the tooth surface, is rare in the United States.

There are several reasons for the changes seen over time, including that Americans have access to more sources of fluoride than they did when water fluoridation was first introduced in the United States in the 1940s. Water is now one of several sources of fluoride. Other common sources include dental products such as toothpaste and mouth rinses, prescription fluoride supplements, and fluoride applied by dental professionals. Water fluoridation and fluoride toothpaste are largely responsible for the significant decline in tooth decay in the U.S. over the past several decades.

HHS' proposed recommendation of 0.7 milligrams of fluoride per liter of water replaces the current recommended range of 0.7 to 1.2 milligrams. This updated recommendation is based on recent EPA and HHS scientific assessments to balance the benefits of preventing tooth decay while limiting any unwanted health effects. These scientific assessments will also guide EPA in making a determination of whether to lower the maximum amount of fluoride allowed in drinking water, which is set to prevent adverse health effects.

The new EPA assessments of fluoride were undertaken in response to findings of the National Academies of Science (NAS). At EPA's request, NAS reviewed new data on fluoride in 2006 and issued a report recommending that EPA update its health and exposure assessments to take into account bone and dental effects and to consider all sources of fluoride. In addition to EPA's new assessments and the NAS report, HHS also considered current levels of tooth decay and dental fluorosis and fluid consumption across the United States.

Comments regarding the EPA documents, Fluoride: Dose-Response Analysis For Non-cancer Effects and Fluoride: Exposure and Relative Source Contribution Analysis should be sent to EPA at FluorideScience@epa.gov. The documents can be found at http://water.epa.gov/action/advisories/drinking/fluoride_index.cfm

The notice of the proposed recommendation will be published in the Federal Register soon and HHS will accept comments from the public and stakeholders on the proposed recommendation for 30 days at CWFcomments@cdc.gov. HHS is expecting to publish final guidance for community water fluoridation by spring 2011. You may view a prepublication version of the proposed recommendation at: http://www.hhs.gov/news/press/2011pres/01/pre_pub_fm_fluoride.html.

More information about the national drinking water regulations for fluoride:

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View selected historical press releases from 1970 to 1996 in the EPA History website.

Recent additions

06/11/2013 EPA Seeking Organization to Host New York-New Jersey Harbor and Estuary Program EPA to Hold Informational Session on June 26, 2013 in New York City

06/10/2013 EPA Regional Administrator Judith A. Enck and Congress Member Sean Patrick Maloney Assess Cleanups at Superfund Sites in Orange and Dutchess Counties

06/07/2013 Gulf of Mexico Large Marine Ecosystem Program Receives First Place Gulf Guardian Award in the Binational Category

06/07/2013 Monsanto Company receives First Place Gulf Guardian Award in the Business/Industry Category

06/07/2013 Naval Support Activity Panama City Receives First Place Gulf Guardian Award in the Partnership Category

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http://water.epa.gov/drink/contaminants/basicinformation/fluoride.cfm

Q&A's on latest EPA actions on fluoride:
http://water.epa.gov/lawsregs/rulesregs/regulatingcontaminants/sixyearreview/upload/2011_Fluoride_QuestionsAnswers.pdf

More information on EPA's fluoride assessment and to comment:
http://water.epa.gov/action/advisories/drinking/fluoride_index.cfm

More information about community water fluoridation, information on tooth decay prevention and dental fluorosis:
http://www.cdc.gov/fluoridation

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Last updated on Thursday, June 13, 2013 http://yosemite.epa.gov/opa/admpress.nsf/3881d73f4d4aaa0b85257359003f5348/86964af577c37ab285257811005a8417!OpenDocument

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Freeman, Rebecca S.

From: Harris, Gayle
Sent: Thursday, June 13, 2013 9:10 AM
To: Freeman, Rebecca S.
Subject: FW: Durham Guinea Pig Reports; Duke University study links fluoridation with dental damage

Importance: High

You might want to include some of the message below from Martha Ann Keels one of the PIs on the Study done in 1990-1991 in addressing the assertions.

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From: Martha Ann Keels [mailto:marthaann.keels@duke.edu]
Sent: Thursday, June 13, 2013 5:51 AM
To: Harris, Gayle
Subject: Re: Durham Guinea Pig Reports; Duke University study links fluoridation with dental damage

No :)

Sent from my iPhone

On Jun 13, 2013, at 12:12 AM, "gharris@dconc.gov" <gharris@dconc.gov> wrote:

Martha Ann,
As always you are great. One question – did your findings suggest that fluoride should be removed from drinking water?

GAYLE B. HARRIS, MPH, RN
Public Health Director

<image002.jpg>Durham County Department of Public Health
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From: Martha Ann Keels [mailto:marthaann.keels@duke.edu]
Sent: Thursday, June 13, 2013 12:09 AM
To: Harris, Gayle
Subject: Re: Durham Guinea Pig Reports; Duke University study links fluoridation with dental damage

Hi Gail -- just getting hime after a very long day in the OR. The genesis of the study Dr. Burt and I did – came from the fact that Durham had a "Break" in the container that help fluoride at one of the plants (Williams I think) and the policy at the time was to turn OFF fluoride at the Brown Plant until the Williams Plant container could be fixed – which took almost a year and no one really knew until I figured it out with multiple water testing kits of my clinic's water and noted the reports from the state said it had not fluoride --- they led to the NIH funding Brian and me to study the effects of turning off fluoride in the water for almost a year ---- this is a very complex study – where we have 5 Cohort of children - - ranging from cohort 1 – who were born 5 years before the "Break" through to Cohort #5 – born on year after the "Break" --- we were trying to see if we could see a "sensitive age period" whereby the LACK of Fluoride made a difference in either more caries experience OR less fluorosis --- the CARIES RATE stayed steady across the 5 age cohorts – probably due to the STRONG HALO effect of fluoride being in soda, etc ... that protected the teeth despite the water fluoridation being turned OFF ------ the other finding was that there was LESS FLUOROSIS observed in the children who were 0-3yo at the time of the BREAK versus ages 4-5 ---- in other words the fluorosis had already occurred in the kids who were 4-5yo at the time of the "Break" ---- so the potential CRITICAL PERIOD to Affect FLUOROSIS would be ages birth to 3yo ---- which biologically makes sense. This is a very difficult study to follow – I would focus on the beauty of the HALO EFFECT of FLUORIDE in the diet protecting the teeth despite the fact the city water was not fluoridated.

Hope this helps ! Martha Ann

From: "gharris@dconc.gov" <gharris@dconc.gov>
Date: Wednesday, June 12, 2013 11:56 AM
To: Martha Ann Keels <MARTHAANN.KEELS@DM.DUKE.EDU>
Subject: FW: Durham Guinea Pig Reports; Duke University study links fluoridation with dental damage

Good Morning Martha Ann,
It has been a while since we've talked. The Board of Health is finalizing a report regarding their efforts to make an informed recommendation regarding the use of fluoride in Durham's water supply. One of the documents cited by Corey Sturmer is a study that you participated in between 1990 and 1991. His e-mail below contains the link and his conclusions. Can you give me more info about the project and a response to Corey's comments below? (Written/ verbal comments will be fine.) Our Board meets tomorrow. Thanks.

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Please note that as of October 22, 2012, my e-mail address has changed.
All previous Durham County e-mail addresses will remain active until June 30, 2013.

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From: Corey Sturmer [mailto:csturmer@gmail.com]
Sent: Thursday, July 12, 2012 1:58 AM
To: Westbrook, Vicki
Cc: Greeley, Don
Subject: Durham Guinea Pig Reports; Duke University study links fluoridation with dental damage

Durham Guinea Pig Reports; Duke University study links fluoridation with dental damage

Press Release

July 12, 2012

Durham, NC

Durham Guinea Pig reports; Duke University study links fluoridation with dental damage

http://www.youtube.com/watch?v=NceIP1U3sno&feature=player_embedded

The Williams Water plant that supplies the city of Durham with your tap water spends over $100,000 of YOUR money adding an admitted dangerous substance to the drinking water. Ironically, the city of Durham's own Duke University in conjunction with Professor Brian A Burt conducted a study when this writer was living in Durham at the age of 4-5 years. The study involved the city turning off public water fluoridation for a period of 11 months during 1990-1991, whilst observing the incisor changes in over 1800 K-5 aged children in Durham, NC. The study concluded no increase in dental cavities (the very claimed benefit of fluoridation), but a decrease in fluorosis – the Center for Disease Control's admitted malady to fluoridating public water supplies.

This incredible hipocrisy and public health danger should be stopped as soon as possible!
Spread the video and the study to all mindful citizens!
Get Involved – thegldnrule@gmail.com

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Attachment 26

PubMed

Display Settings: Abstract

J Dent Res. 2000 Feb;79(2):761-9.

The effects of a break in water fluoridation on the development of dental caries and fluorosis.

Burt BA, Keels MA, Heller KE.

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Abstract

Durham, NC, fluoridated since 1962, had an 11-month cessation of fluoridation between September, 1990, and August, 1991. The purpose of this study was to assess the effects of this break on the development of caries and fluorosis in children. Study participants were continuously -resident children in Kindergarten through Grade 5 in Durham's elementary schools. There were 1696 children, 81.4% of those eligible, for whom a questionnaire was completed and clinical data recorded. Age cohorts were defined by a child's age at the time that fluoridation ceased. Caries was recorded in children in the Birth Cohort through Cohort 3, and fluorosis for children in Cohorts 1 through 5. Caries was assessed in the primary first and second molars according to the decayed-filled index; fluorosis on the labial surfaces of the upper permanent central and lateral incisors was assessed by the Thylstrup-Fejerskov (TF) index. Mother's education was associated with caries; higher education of the mother had an odds ratio of 0.53 (95% CI 0.40, 0.76) for caries in the child. No cohort effects could be discerned for caries. Overall prevalence of fluorosis was 44%. Prevalence in Cohorts 1, 2, 3, 4, and 5 was 39.8%, 32.3%, 33.0%, 62.3%, and 57.1%, respectively. These cohort differences remained statistically significant in regression analysis. It was concluded that while the break had little effect on caries, dental fluorosis is sensitive to even small changes in fluoride exposure from drinking water, and this sensitivity is greater at 1 to 3 years of age than at 4 or 5 years.

PMID: 10728978 [PubMed - indexed for MEDLINE]

Publication Types, MeSH Terms, Grant Support

Publication Types

Comparative Study

Research Support, U.S. Gov't, P.H.S.

MeSH Terms

Age Factors

Analysis of Variance

Chi-Square Distribution