U.S. Environmental Protection Agency's National Drinking Water Advisory Council Public Meeting

November 30, 2022

Meeting Summary

Chair's Welcome and Council's Introduction

The National Drinking Water Advisory Council's (NDWAC) Designated Federal Officer **Elizabeth Corr** opened the meeting, reviewed logistics, and introduced the NDWAC's Chair, **Lisa Daniels**, Director of the Bureau of Safe Drinking Water at the Pennsylvania Department of Environmental Protection.

Ms. Daniels welcomed everyone to the meeting and said she is pleased to be here to discuss several very important and timely topics. She explained that there would be discussions around both the Lead and Copper Rule (LCR) and the most recent updates regarding the Microbial and Disinfection Byproducts (MDBP) Rule Revisions Working Group. Ms. Daniels then turned to the other NDWAC members, who introduced themselves as follows:[1]

- **Yolanda Barney** from the Navajo Nation.
- **Elin Betanzo** from Safe Water Engineering.
- **Scott Borman,** General Manager for the Benton/Washington Regional Public Water Authority and a regional wholesaler in northwest Arkansas.
- **Alexandra Campbell-Ferrari,** Executive Director of the Center for Water Security and Cooperation and Adjunct Professor of Water Law at the University of Maryland and American University Washington College of Law.
- **Shellie Chard**, Water Quality Division Director for the Oklahoma Department of Environmental Quality. Ms. Chard added that she oversees the state's drinking water program, the funding programs, and the Clean Water Act programs
- **Steve Elmore**, Program Director for the Bureau of Drinking Water and Groundwater at the Wisconsin Department of Natural Resources.

[1] NDWAC member Nancy Quirk , Director of Green Bay Water Utility, joined the meeting at the start of the consultation on the Proposed National Primary Drinking Water Regulation: Lead and Copper Rule Improvements. All NDWAC members are also listed in Appendix A.

- **Eagle Jones,** Director of Water Operations for the Pechanga Tribal Government and an Instructor of Water Treatment at Palomar College.
- **Jana Littlewood,** Alaska Representative on the Board of Directors for the National Rural Water Association.
- **Jennifer Peters,** National Water Programs Director at Clean Water Action.
- **Alex Rodriguez**, Chief Executive Officer of Diversity Consulting Group and President of the La Cumbre Mutual Water Company Board of Directors.
- **James Proctor**, Senior Vice President and General Counsel of McWane, Inc., a manufacturer of water infrastructure products.
- **Jeffrey Szabo,** Chief Executive Officer of the Suffolk County Water Authority.
- **Mac Underwood,** a Principal Consultant at Raftelis Financial Consultants, Inc.

Ms. Daniels then asked the NDWAC's liaisons for the Centers for Disease Control (CDC) to introduce themselves.

- **Dr. Arthur Chang** introduced himself as the Chief Medical Officer of the Division of Environmental Health Science and Practice at the National Center for Environmental Health.
- **Dr. Vincent Hill** introduced himself as the Branch Chief for the Waterborne Disease Prevention Branch within the Division of Foodborne, Waterborne, and Environmental Diseases in the National Center for Emerging and Zoonotic Infectious Diseases.

Office of Water's Welcome

Ms. Daniels introduced **Radhika Fox**, Assistant Administrator for EPA's Office of Water.

Ms. Fox welcomed everyone, thanked council members for their engagement, and expressed appreciation for the Council's partnership, expertise, and input on National Primary Drinking Water Regulations (NPDWRs) including the proposed regulation of per-and polyfluoroalkyl substances (PFAS) and especially the work to remove lead in drinking water through the Lead and Copper Rule (LCR). Ms. Fox discussed the Lead and Copper Rule Improvements (LCRI) as a great example of how the Office of Water looks to combine its regulatory authority with the historic new funding under the Bipartisan Infrastructure Law (BIL) to better protect public health under the Safe Drinking Water Act (SDWA). She explained that the Office of Water has been developing the LCRI to address key issues that were identified in the review of the Lead and Copper Rule Revisions (LCRR) and that EPA intends to propose the LCRI for public comment in 2023 and finalize it in 2024. She also highlighted the Administration's commitment to replacing 100 percent of lead service lines and the $15 billion down payment through the Drinking Water State Revolving Fund (DWSRF) to achieve this.

Ms. Fox highlighted the Office of Water's recognition of the unique opportunity that BIL funding presents to prioritize communities struggling with PFAS and other forever chemicals, noting that the DWSRF provides $4 billion in funding to address PFAS and other emerging contaminants and that an additional $5 billion in grants is available to support small and disadvantaged communities. She thanked the Office of Ground Water and Drinking Water for their work on getting critical BIL resources out during the past year and noted that as BIL funding has rolled out EPA has been working in close partnership with states and tribes to target disadvantaged communities so that they may use these investments

through grants and forgivable loans, one of the many ways in which BIL funding can be used to help communities adhere to the SDWA.

Ms. Fox also previewed upcoming work shaped by the NDWAC, sharing that EPA anticipates publishing the proposed Consumer Confidence Report (CCR) rule revision for public comment in 2023, with final rule promulgation in 2024, and thanking NDWAC members for their input as well as the seven members who participated in the CCR Rule Revisions Working Group. She also flagged that EPA will be looking for the Council's input on potential revisions to MDBP rules and provided updates on the NPDWR for PFAS as a top priority for the Office of Water, noting that EPA anticipates releasing a proposed NPDWR for public comment very soon and expects to promulgate the final rule by the end of 2024.

In closing, Ms. Fox said that the work of the NDWAC is instrumental to EPA's success and expressed that the team looks forward to hearing from the Council on the LCRI. She again thanked NDWAC members for their work and then gave the floor to **Jennifer McLain**, Director of the Office of Ground Water and Drinking Water.

Office Director's Update

Dr. McLain thanked Ms. Daniels and Ms. Corr for their support of the meeting and thanked the NDWAC members for their current and future work and support, noting that their support and expertise have been instrumental as EPA develops regulatory frameworks like the LCRI.

Dr. McLain provided an update on the Office of Ground Water and Drinking Water's reorganization, which reflects EPA's expanded portfolio provided by Congress under the SDWA including infrastructure investments under the BIL, done to keep up with this increase in responsibilities. She highlighted the new Drinking Water Capacity and Compliance Assistance Division and a new unit within the Water Infrastructure and Cyber Resilience Division focused solely on cybersecurity.

Dr. McLain discussed EPA's focus on implementing the BIL's transformative infrastructure investments, including $35.7 billion dedicated to drinking water system infrastructure through the DWSRF and the Water Infrastructure Improvements for the Nation (WIIN) Act grant program for emerging contaminants. She discussed how in the past these funds didn't keep up with infrastructure investment needs of disproportionally affected communities and explained that there will now be more funding and outreach to underserved communities, in part through technical assistance programs and outreach to identify and overcome barriers and accelerate the improvement of water infrastructure. She highlighted the Justice40 Initiative, which sets a goal that at least 40 percent of benefits from federal programs flow into disadvantaged communities and includes the DWSRF program, the WIIN Act Reducing Lead in Drinking Water Grant program, and all other funding programs supported by BIL funding.

Dr. McLain mentioned that another BIL priority is to support the resilience and climate mitigation/adaptation of the nation's drinking water infrastructure, including projects that address drought/flooding. She noted that EPA is also looking to use BIL funding to support projects that address cybersecurity resilience. She acknowledged increasing cybersecurity concerns in the water sector and flagged EPA's continuing work with states, other federal agencies, and a variety of partners to develop tools and provide technical assistance, adding that EPA is using a combination of regulatory and nonregulatory approaches to address cybersecurity concerns.

Dr. McLain discussed work with partners and other agencies under EPA's PFAS Strategic Roadmap, noting that last year EPA released drinking water health advisories on four PFAS chemicals,[2] and again flagged EPA's preparations to propose a PFAS drinking water rule. Dr. McLain reemphasized that BIL funding provides a unique opportunity to bring together regulatory actions and investments in communities that are struggling with PFAS contamination. She also discussed preparations to implement the Unregulated Contaminant Monitoring Rule, which requires monitoring for 29 different PFAS chemicals and for lithium, mentioning that the rule will provide significant support to more small drinking water systems through special appropriations from Congress allowing EPA to find out more about state-wide and regional distribution of PFAS contamination in drinking water.

Dr. McLain highlighted upcoming updates from the MDBP Rule Revisions Working Group, thanking NDWAC members for their support of this work. She clarified that the primary focus of the current meeting is lead in drinking water, including the consultation regarding the LCRI and discussion of EPA's work on using BIL funding to reduce lead in drinking water under current drinking water regulations. Dr. McLain also mentioned two other rules to be released in 2023—the Water System Restructuring Assessment Rule and the CCR rule revisions proposal. Dr. McLain then gave the floor to Ms. Corr.

Public Comment to the National Drinking Water Advisory Council

Ms. Corr reviewed procedures and asked pre-registered speakers to introduce themselves and speak for no more than three minutes.[3]

John F. Mueller Jr. introduced himself as a concerned activist and retired public works engineer, noting that his career included more than 25 years with water utilities in the public sector, including wastewater and drinking water treatment plant operations and maintenance. He then provided the following comments. He explained that his comment today was a brief recap of the three-page statement he previously submitted, with some supplementary information. He noted that the most immediate issues surrounding water fluoridation include but are not limited to the following. Community water fluoridation since its beginning in 1945 has failed in its mission of preventing childhood tooth decay. Childhood tooth decay is recorded to be at epidemic levels among intercity minorities and other underserved populations. Additionally, he noted that the CDC's water fluoridation program, the Community Water Fluoridation (CWF), recklessly attempts to treat all communities against tooth decay, a treatable oral disease, whether this treatment is needed or not and added that this policy is regardless of the community demographics and without any follow-ups or gathering of informed consent to implement this treatment. Mr. Mueller called for a dramatic paradigm shift if the CDC hopes to achieve its objective of preventing childhood tooth decay. He said that achieving this goal efficiently and effectively will involve dismantling the CWF program. He noted that one comment that was not included in his written public comment submittal is that misinformation and outright falsification can come from pro-fluoridation dentists, which typically include false statements and fear mongering. An example of these false statements came from a recently published press release from the American

[2] Dr. McLain also thanked the NDWAC for recommendations provided to EPA by the Council in April 2018 for the health advisory process. The recommendations are available on EPA's NDWAC website at: health_advisory_letter_to_administrator_180409.pdf (epa.gov) and health_advisory_response_to_charge_180409.pdf (epa.gov).

[3] Written comments to the NDWAC provided by pre-registered speakers and other members of the public are in Appendix D.

Fluoridation Society who made an attempt to marginalize and denigrate the integrity of the National Toxicology Program (NTP) to support their claim that fluoridation is safe and effective. Mr. Mueller also referenced the recommendations from the National Research Council's 2006 report on fluoridated drinking water. He commented that the EPA now has enough data from high-quality studies and expert testimony in the current Toxic Substances Control Act (TSCA) lawsuit to inform the rulemaking that revises the maximum contaminant level (MCL) and the maximum contaminant level goal (MCLG) of fluoride. He also commented that CDC should dismantle its fluoride program in favor of a more effective, individualized program for improving oral health where it is needed most. Mr. Mueller challenged the EPA Office of Water and EPA Administrator Regan to embrace the intent of the SDWA and reverse the Trump Administration's denial of the citizens' petition filed under Section 21 of TSCA -- the petition to ban the addition of fluoridation chemicals to public water supplies. He stated that this action should be a high priority that falls into the scope of the recently released EPA's fiscal year 2023 top management challenges, which was released by the EPA Inspector General.

Dr. David Kennedy introduced himself as a third-generation dentist and a past president of both the International Academy of World Medicine and Toxicology and the Preventative Dental Health Association. He provided the following comments. He explained that his focus for the last 50 years has been oral health. He noted that hydrofluorosilicic acid (HFSA), or sodium silica fluoride, is the only substance that is added to public drinking water that is not related to water treatment. Dr. Kennedy stated that fluoride is contaminated with lead and arsenic, which is not an argued fact. In the California v. Coshow lawsuit, the State of California stipulated that sodium silica fluoride is contaminated with arsenic at a level that increases the cancer death rate from the bladder and lungs. He stated that fluoride was still used in drinking water due to a claim that was made in 1945 that is not supported by the scientific literature, adding that there are no broad-based, blind studies of animals or humans that have shown that adding HFSA to water reduces tooth decay. Dr. Kennedy also noted that lead is chelated by HFSA. As an example, he discussed how, when San Diego began to fluoridate their water supply in 2011, they removed 160 drinking water fountains because HFSA chelates lead from brass. There is even a patent for this chelation process in the U.S. Patent office. He noted that it was in the purview of the U.S. EPA and CDC to prevent this process from continuing to occur since the funding for fluoridation is coming from the U.S. government. He noted that the argument for water fluoridation is to decrease public tooth decay, but a side effect is that some individuals who are not provided informed consent will unwillingly develop dental fluorosis. Dental fluorosis is a physical indication of a fluoride overdose and occurs in 100 percent of cases where babies are fed fluorinated tap water at the EPA's MCLG. He noted that the MCLG level is supposed to be representative of levels that are the safest for human health, but with high cases of dental fluorosis at this level, this level is not safe. He explained that dental fluorosis is also linked to mental fluorosis and bone fluorosis, meaning current fluoridation levels poison babies' brains, bones, and teeth. Dr. Kennedy asked the EPA and the CDC to take their position in human health seriously and promote oral health through safe water. He noted that even advocates for fluoridation and the American Dental Association (ADA) acknowledge that fluoridated tap water should not be given to babies to avoid harmful impacts such as dental fluorosis. He also said that the argument that fluoridation is good for the greater good is not supported since the U.S. Food and Drug Administration (FDA) has never approved any fluoride-containing substance intended to be ingested for the purposes of decreasing tooth decay. He asked the EPA and CDC to do their job and promote oral health and safety by not allowing infrastructure funding to go towards adding more HFSA to the water. He acknowledged that this task may garner pushback from the industry.

Karen Spencer introduced herself as a citizen who has been harmed by municipal water and provided the following comments. She explained that the SDWA says that no national agency can require any substance to be added to water for the purpose of treating people. However, national agencies and private partners spend hundreds of millions of dollars annually to promote fluoridation policy. She noted that the 2006 National Research Council advised EPA that its MCLG of 4 parts per million (ppm) for fluoride in drinking water was not protective of human health and stated that, since this recommendation, EPA has done nothing to address the MCLG for fluoride. Moreover, Ms. Spencer noted that the 2006 National Research Council (NRC) advised that there was significant evidence of harm to bodies, brains, and bones from fluoride in drinking water with concentrations deemed safe by the EPA and no safe concentrations for susceptible subpopulations such as pregnant women and their fetuses, bottled fed infants and young children, the elderly, and those in fragile health. Yet, the EPA has done nothing in 16 years to address this gap in science. Ms. Spencer noted that 99 percent of fluoridation chemicals added to municipal water go directly into the environment, along with arsenic, aluminum, barium, palladium, manganese, lead, and others. She said that this pollution, much of which is imported from China and Mexico, persists in our environment. However, she said that EPA has enabled easement for these contaminants and subcontracted oversight of these to a private agency in an effort to put distance between EPA and the intentional pollution of communities across the U.S., acting willfully blind to the accumulative impact on the general population from water sources. Ms. Spencer also said that EPA's maximum and secondary contaminant levels of fluoride cause misery in millions of Americans and that EPA, among other fluoride advocates, does not care about the damage this chemical additive causes. She explained that these groups will spend hundreds of thousands of dollars to protect the profit of the fluoridation policy, which is in violation of the SDWA and explicit regulations under TSCA, rather than following their mission to protect public health and the environment. Ms. Spencer discussed a study from 2021 that used benchmark dose analysis and found that 0.2 ppm of fluoride in drinking water has a similar adverse effect on babies' brains to lead. Other studies have documented that 0.5 ppm of fluoride impedes normal thyroid function. She elaborated that fluoridation schemes target 0.7 ppm concentration and diabetics and kidney patients who drink excessive amounts of water, and therefore consume higher doses of fluoride than the average person from optimally fluoridated municipal water, are trapped in a vicious cycle that damages kidneys. Furthermore, an analysis of recent National Health and Nutrition Examination Survey (NHANES) data show that adolescents living in fluoridated communities have blood markers suggesting they are at heightened risk of kidney and liver disease. Just as fluoride pollution accumulates in the environment, Ms. Spencer noted that studies have also shown the potential for fluoride to accumulate in bones where it causes inflammation and makes the bones more brittle in populations that have consumed more fluoride over time. However, she said that EPA continues to protect its fluoride policy rather than protect people. She closed her comments by saying that fluoride facilitates the absorption of lead, copper, and other metals into the body. Additionally, fluoride leaches lead and copper out of drinking water infrastructure. The Sandy City, Utah overfeed in 2019 ruined appliances and sickened people which resulted in trips to emergency rooms and in hospital visits for many, including at least one infant.

Dr. John William Hirzy said he was originally hired by EPA in 1981 as a GS-15 Senior Scientist in the Office of Pesticides and Toxic Substances. He provided the following comments. He explained that he was hired at this level based on his experience in industry working on risk assessment and management. While at EPA, he helped organize and serve as president of the labor union that represents EPA professional employees at Headquarters. He noted that the union was organized under the premise of

protecting employees' right to scientific integrity in the workplace. Dr. Hirzy's subject matter expertise is fluoride developmental neurotoxicity, scientific integrity, and the long-past need to have a health advisory issued to pregnant women by EPA to avoid fluoridated water. He noted that he got involved with fluoride issues as a union officer to represent the interests of employees. The union was approached in 1985 over the concern that EPA's proposed health-based drinking water standard at 4 ppm of fluoride violated scientific integrity and was not protective of public health. The National Academy of Sciences (NAS) also found EPA's ruling to not be representative of public health protection. He noted that other union members brought the subject of drinking water fluoride levels up to the director of the Office of Drinking Water and were rebuffed. Dr. Hirzy and the other union members began a study of this subject on their own time. By 2006, the NAS published a report titled "Fluoride in Drinking Water" which says, "it is apparent that fluorides have the ability to interfere with the functions of the brain." In 2017, a petition had just been filed with EPA to ban the addition of fluoride chemicals in drinking water based on the extant research on the impact on development and neurotoxicity. A lawsuit was then subsequently filed pursuant to that goal and is now pending. Between the time of the petition being filed and now, more research has been published on the neurotoxicity of fluoride. Dr. Hirzy's main point was that peer-reviewed U.S. and Canadian government-funded prospective epidemiology studies of urine fluoride levels in pregnant women and their offspring have shown statistically and clinically significant decrements in Intelligence Quotient (IQ) of offspring that have been exposed in utero to fluoride levels typical among women drinking fluoridated water. Based on these data, he asked EPA when a health advisory would be promulgated for pregnant women. He also cited peer-reviewed and published ecological studies which found an ecological relationship between fluoridated water and attention deficit hyperactivity disorder (ADHD). The National Toxicology Program (NTP) announced in 2019 that "fluoride is a presumed neurotoxic hazard" based on extant data. He explained that since these data have been published it has had five peer reviews on a study called "State of the Science," the latest version of which was published in May 2022. He noted that most chemicals only have one peer review from NTP that is open to the public. The peer reviews for the NTP study on fluoride have been kept secret and the director of NTP said that he is not sure if they are ever going to publish the findings from their study. Dr. Hirzy explained that this situation indicates that there is political influence on the use of fluoride and suggests that the EPA pay attention.

Brenda Staudenmaier provided the following comments. Ms. Staudenmaier asked the audience why anyone would purposefully add industry garbage to public drinking water. She explained that fluoride is fertilizer waste that is known to be contaminated with lead and arsenic. Furthermore, lead and arsenic levels in fluoride chemicals violate EPA's goal of no presence of these contaminants. Ms. Staudenmaier introduced herself as a member of the Wisconsin water industry and explained that she has been studying fluoride since her friend died of a rare bone cancer over a decade ago. While her friend was dying, a study out of Harvard was published examining boys' drinking fluoridated water during a critical window of susceptibility with a higher risk of bone cancer. She found a sufficient number of studies that found fluoride at levels relevant to fluoridated communities was harmful to human health and was met with a lot of resistance from fluoride promoters. She stated that fluoridation is not required by EPA and said that the SDWA prohibits the addition of any substance to drinking water for preventive healthcare purposes. She also stated that the CDC provides recommendations for optimal levels of fluoride in drinking water in order to prevent tooth decay; however, the CDC is neither for nor against any specific fluoride legislation. She said that fluoride is just as toxic to the brain of a fetus and developing baby as lead exposure. She added that government spends billions to eliminate lead in drinking water while

governmental agencies seem to turn a blind eye to fluoride neurotoxicity evidence and accompanying lead contamination. She noted that the NTP is currently doing a systematic review of fluoride exposure in neurodevelopmental and cognitive health effects and explained that in this study the NTP has identified over a dozen studies identifying fluoride causes permanent brain harm at or below levels of 0.7 ppm. She said that fluoride promoters distract us from low levels causing harm and instead focus on levels of 1.5 ppm and above. Ms. Staudenmaier said that it is estimated that over 4.5 million IQ points are lost per year due to fluoride neurotoxicity, costing $100 billion per year in economic damage. She stated that these costs are much more than the commonly stated and overexaggerated dental benefits from the addition of fluoride. Furthermore, she said it is estimated that about 70 percent of today's children have some form of dental fluorosis, which is a pathology expensive to fix with veneers and not covered by dental insurance. Ms. Staudenmaier explained she and her children are plaintiffs in a lawsuit about TSCA against EPA over the neurotoxicity of fluoride chemicals added to the public drinking water supply. She thanked EPA for their time.

Natalie Perry introduced herself as a mother of four children living in the pacific northwest of Washington and provided the following comments. She explained that keeping harmful toxins away from her children is a continual challenge. She noted that lead is associated with all kinds of health challenges such as impaired brain function and development. Understanding the harm that lead does during development is permanent, she would have thought that anything that increased a child's absorption of lead should be identified and eliminated. While Ms. Perry does what she can to provide a clean and safe home for her children, she noted that fluoridation additives are chemicals that her children come in contact with daily that increases her family's absorption of lead and is brought directly into her home via her water utility service through fluoridation. She explained that health surveys from the CDC show that children living in artificially fluoridated communities have higher levels of lead in their blood compared to non-fluorinated communities. This impact is exacerbated when individuals live in older homes, which concerned Ms. Perry since she lives in a community that fluoridates artificially and in a mid-century home. She noted that research has also indicated that cities that fluoridate water experience changes in water pH levels, which contributes to the pipes leaching lead. Additionally, animal studies have shown that when there is co-exposure to both lead and fluoride the lead blood levels are three times higher than when animals are exposed to lead alone. Ms. Perry explained that these studies indicate there is a serious negative synergy between lead and fluoride. Furthermore, fluoride additives are contaminated with toxins such as lead. Ms. Perry's own city uses an additive that has lead in the raw product and all fluoridated chemicals are contaminated with some toxins. She stated that since fluoride encourages the body to retain and absorb lead, even a trace amount of fluoride in water should be cause for alarm. She explained that even if the concern for lead exposure was completely eliminated, fluoridation chemicals still have a negative effect on children's brain development. She said that National Institute of Health-funded studies have demonstrated that children living in fluoridated communities have decreased IQ compared to those living in non-fluoridated ones. Furthermore, she said that behavioral disorders and learning disabilities are more prevalent in communities with artificially fluoridated water. As a mother, Ms. Perry is disturbed that people are encouraged by EPA to drink a chemical that exacerbates the damage that lead does. She expects government agencies to safeguard human health rather than intentionally expose children to neurotoxins and subsequently add lead to our drinking water. She stated that no matter the proposed benefit of fluoridation chemicals, it could not be more important to the cognitive health of children. She said that the council would be remiss not to see how fluoridation programs undermine the efforts made to reduce lead exposure for children. Ms. Perry

asked EPA to lower the MCLG for fluoride to zero. She closed her comments by thanking the Council for listening to her concerns.

Consultation on Proposed National Primary Drinking Water Regulation: Lead and Copper Rule Improvements

Ms. Daniels introduced **Hannah Holsinger,** Supervisor for the Regulatory Assessment and Development Branch, Standards and Risk Management Division, in EPA's Office of Ground Water and Drinking Water; and **Michael Goldberg,** the LCRI Team Lead in the Regulatory Assessment and Development Branch.

Mr. Goldberg indicated that the meeting purpose was to solicit input from the NDWAC members on the proposed LCRI. He provided background on lead in drinking water and the LCR, an overview of the LCRR published in January 2021, and annualized cost estimates from the LCRR economic analysis that had been inflated to 2021 dollars. Mr. Goldberg also provided a summary of the outcome of EPA's review of the LCRR that was published in the December 2021 *Federal Register* and the agency's plans to propose and finalize the rule. Mr. Goldberg then read the questions, which are delineated below with NDWAC members' comments categorized by topic area, developed by EPA to collect input and generate discussion among NDWAC members.[4]

Topic 1: Achieving 100 Percent Lead Service Line Replacement (LSLR)

Mr. Goldberg presented the following guiding questions and **Ms. Daniels** facilitated the Council's discussion.

- How quickly can systems achieve 100 percent LSLR?
- What factors impact a system's rate of LSLR?
- What barriers exist for engaging customers about full LSLR?
- How can systems ensure equity in replacements?
- What are the most effective and equitable ways for water systems to replace LSLs?

Mr. Borman stated that achieving 100 percent LSLR will depend on each system's size and funding availability. He noted that larger systems often have crews at their disposal while smaller systems do not. He said that this broad question does not really have a good answer that he could supply from a utility standpoint.

Ms. Chard started by thanking EPA for preparing these presentations and discussion questions. She agreed with everything that Mr. Borman said and also mentioned the difficulty of supply chain issues, noting that these issues have been affecting every part of the industry and that things that used to be quick and easy to obtain now take much longer to get to utilities. Ms. Chard also described the costs of construction projects—which she suggested are rising to anywhere from 25 percent to 45 percent higher than six months ago—as outpacing the rate at which funding is happening, even when taking the funds provided by the BIL into consideration, and emphasized that this will extend the timeline for systems looking to complete 100 percent LSLR. She also said that there are states and localities that prohibit using public funds to construct on private property, plus a number of other political and legal barriers. Regarding equitable ways to provide full LSLR, Ms. Chard said that every system will have to

[4] Mr. Goldberg's presentation is in Appendix B.

look at its situation and determine the best course of action. She added that progress on full LSLR will be very dependent on homeowners' ability to pay for their private side replacement, which could result in a focus on only the wealthiest communities to complete full LSLR.

Ms. Quirk stated that Green Bay replaced all LSLs over the course of five years. She discussed how finding an inventory of LSLs proved to be a major difficulty and noted that the city had to get into more than 2,700 homes to inspect and replace private side lines and plumbing. She added that they are still working on the private side of their galvanized lead program. Ms. Quirk also addressed the private side funding issue brought up by Ms. Chard, saying that Wisconsin also does not allow federal funds to be used on private side plumbing, adding that the state used Safe Drinking Water provided funds to pay for LSLR in Green Bay. She also suggested that states could combine BIL funding and Safe Drinking Water loans to provide to lower-income households. She emphasized that not all people want to get their lines replaced and suggested that states need to get people involved in the process; for example, Green Bay had to get ordinances to replace some LSLs. She agreed on the difficulties that current supply chain predicaments present.

Mr. Elmore stated that the rate at which full LSLR can be completed depends in large part on each system's motivation. He said that in Wisconsin they found that the systems that performed full LSLR the quickest were looking to avoid installing corrosion inhibitors (orthophosphate). Mr. Elmore said that if EPA were to require full LSLR over a certain amount of time, this would be a significant motivator to get systems working on replacement. Other factors that may impact the rate of LSLR in Wisconsin include staff resources at the system level and financial resources, local political support and community motivation, the quality of the inventory, the availability of materials and labor, and the timing coinciding with highway or road projects that may be outside the control of the water system. In terms of an equitable approach to fully replacing LSLs, Mr. Elmore listed the following steps that could be taken: Prioritizing customers with multiple pathways to lead exposure, neighborhoods with high environmental justice (EJ) scores, and communities with high-risk populations; providing funding to vulnerable communities; establishing local ordinances to require full LSL replacement; following health and safety precautions when conducting LSLR (*i.e.*, offering filters before, during, and after replacement); offering a diversity of outreach materials in all relevant languages; engaging with well-known and respected community members to deliver messaging (community organizers, health organizations, etc.); and staggering construction and replacement projects. Mr. Elmore also provided some LSLR costs for Wisconsin, averaging around $4,600 per replacement with a range of $2,200 to $13,000 per replacement. He concluded by thanking EPA for the presentation and for the opportunity to comment.

Mr. Jones agreed with everything that Mr. Elmore mentioned. In response to the question on equity, he said that states treat all systems equally in regard to health, safety, and deadlines; however, ensuring equity across the board is more difficult. He noted that cost estimates and system needs are going to be very different for each system; that small systems don't have full construction crews; and that inventorying will also be difficult for many communities. He emphasized that it may be necessary for states to be a little more intrusive into these systems, asking: Do they have the manpower and the funding, and do they have the amount of time necessary to complete LSL tasks or do the timelines need to be adjusted? Mr. Jones thanked everyone for their comments.

Mr. Proctor stated that eliminating all LSLs will take substantial time and resources and noted that many disadvantaged communities where there are more LSLs will remain vulnerable over the course of this

time. He stated that lead leaching was most often caused by failing to maintain proper water chemistry, leading to corrosion of LSLs. He suggested that EPA consider engaging utilities to embrace new technologies that allow them to monitor water quality in real time instead of tap sampling every now and then, adding that if monitoring occurred continuously utilities could react before the situation becomes a crisis. He said that technology that performs continuous monitoring does exist and is relatively affordable.

Ms. Betanzo asked EPA to reconsider their definition of an LSL, which was revised to no longer consider lead goosenecks. She emphasized that lead goosenecks should be added back into the definition of an LSL since a gooseneck is a part of distribution and thus contributes to lead exposure. Ms. Betanzo also listed several barriers to participation that exist: The public/private dividing line (who is conducting the replacement, who pays for the replacement based on the ownership, etc.); overly complex paperwork when applying for grant programs; and that many residences have a lack of information and/or incomplete information on the risk of lead in drinking water and LSLs, requiring a real shift in messaging. She also emphasized that there was a need for EPA to highlight that the cost of and the work done on LSLs should be integrated into the rest of the water infrastructure work being done on a regular basis. In order to ensure that all LSLs can be replaced, Ms. Betanzo suggested that there be local ordinances and requirements within the LCR that require full replacement of LSLs. There also need to be multiple ways and funding methods to "catch" the residents that need LSLRs. She emphasized that, at the same time, states must ensure against jumping around from property to property so there are not increases in prices. She concluded by stating that where service line material records are not extensive, 100 percent verification is critical for equitable replacement of LSLs.

Ms. Peters said that a lot of what she wanted to say had been brought up already. She mentioned that if states truly want all LSLs to be replaced, they cannot expect everyone to pay for their own private side; using this approach would allow for only those who can afford it to get lines fully replaced. She said that there also needs to be prioritization of the most vulnerable communities and people, especially when considering supply chain issues. She shared an example of one way that Denver Water ensures equity with LSLR. The water system conducted a health, equity, and EJ analysis to identify communities that have multiple EJ factors that they're facing as well as homes that are likely to have young children and are more at risk for lead exposure. They ensure that those customers are getting prioritized for replacement and make sure that the LSLR rate for homes most at risk is equal to or greater than the total replacement rate. She added that states must look at total replacement rates for these communities and make sure they are greater than or equal to that of other communities in an effort to make sure they do not get left behind.

Ms. Daniels thanked participants for their helpful comments so far. She stated that the first major challenge is locating LSLs. She pointed out that previous regulations only required inventories for sampling purposes – by no means were the inventories extensive. She further pointed out that inventorying will be most of the work that will be done between now and October 2024 and that completing an inventory is easier said than done. Even after establishing inventories, there remain questions regarding how many systems will end up with lines composed of undetermined materials and when do you start requiring systems to replace those. She observed that states may also have to get a little more realistic about the availability of construction crews, as BIL funding is being made available for many different types of infrastructure and will result in a significant increase in demand for

construction crews. She then circled back to Ms. Holsinger and Mr. Goldberg to see if they had any other questions or comments regarding complete LSLR.

Ms. Holsinger and **Mr. Goldberg** stated that they did not have anything to add and thanked council members for their involvement and feedback.

Eric Burneson, the Director of the Standards and Risk Management Division in EPA's Office of Ground Water and Drinking Water, asked whether anyone could provide greater detail on the supply chain issues that systems are facing.

Ms. Chard replied that supply chain shortages and delays were affecting everything from materials and equipment to personnel.

Mr. Borman reaffirmed this statement. He stated that they have projects on hold because of the lack of availability of construction crews. He noted that shortages and delays of pipes and other materials have also occurred rather often and added that systems could be waiting six to eight weeks for small-sized materials and 24 to 48 weeks for medium-sized materials. He further added that the 15 to 20 percent increase in prices on most materials and many different people competing for materials as they take advantage of BIL funding must also be taken into account. Mr. Borman did not envision the supply chain issues getting much better any time soon.

Mr. Burneson also asked for clarification about what Ms. Betanzo's statement on 100 percent verification would entail. He asked whether or not this would be excavation of service lines.

Ms. Betanzo confirmed that this would involve getting eyes on every service line, as this seems to be the only way to clearly identify lead. She said that in the future technology may progress further for this but as of now it is not there. She suggested potholing may be an option and referred to Denver's approach as an example of the implementation of a great method for identifying LSLs. She emphasized again that, when there is a question about a service line, having true verification and not just a records-based review is important in making sure everyone's LSLs get replaced.

Mr. Burneson asked for reactions regarding this response.

Ms. Quirk said that a lot of records that utilities have include indications of when they began and stopped buying lead pipe materials. She noted that Green Bay has kept records since 1886, and that Madison has kept records of lead pipe procurement and stopped purchasing lead pipe in 1927, which means it can be assumed that there were no new lead pipe installations after the 1940s. She noted that in Wisconsin they have meters and whenever a meter needs to be changed or replaced, records are made about the pipe materials. She also explained that at the curb stop at the terrace of private properties service crews can hydrovac down and examine either side of the stop to determine the pipe material. She explained that in Wisconsin they also use a camera to run through the service line and identify pipe material; however, her utility, as a small to medium utility, has 36,000 service lines, and other utilities may have even more service lines, which represents a daunting task to use cameras. She explained how, to further complicate matters, the pipe material could change in between the curb stop and the meter. Ms. Quirk also discussed how, when examining older homes (*e.g.*, built before 1945) where LSLs are more likely to be present, her utility prioritized them by entering and conducting LSL inventories. She added that, although her utility did not see LSLs in homes built after the 1940s, they

continued to visit private homes and continue with meter replacements. She noted that making assumptions about pipe materials is essential to completing LSL inventory work in a timely manner.

Mr. Borman agreed with Ms. Quirk's suggestion of conducting inventories when servicing meters and curb stops. He noted that his utility has used cameras in smaller systems to evaluate pipe materials. He explained that all inventories go back to relying upon existing service line records, since construction on each private property is unrealistic, and further described difficulties regarding public non-acceptance of digging up yards to verify service line material. Mr. Borman also emphasized the difficulties of entering private property, referring to the difficulties of accessing private housing at smaller systems to install and maintain point of use (POU) devices and explaining that most small systems will let utilities in to install and maintain POU devices, but there will always be a pushback on entering private property. He observed that he always had an issue with EPA's allowing POU devices because of this.

Ms. Betanzo mentioned a Water Quality Technology Conference presentation describing how the City of Denver had reviewed their potholing data and found value in not potholing at the curb stop; they were getting better information from areas where they are not traditionally potholing or hydrovacing. Ms. Betanzo said that she wanted to revisit these data at a later time. Ms. Betanzo agreed with earlier commenters that it is useful to know the record of a town's LSL installation so LSLR or LSL inventories can be prioritized based on the highest risk. She explained that she has seen that the programs that work at a neighborhood scale can efficiently verify the service lines of all homes and provided the example of Benton Harbor. Within this context, Ms. Betanzo said doing a 100 percent check of all service lines within homes located in a small city and older homes was logical in some situations. Ms. Betanzo also said that she has noticed that some waste line excavations in her neighborhood leave a pile of dirt on people's yards, which she noted is off-putting for residents. She explained that when residents are later approached for LSLR, they imagine a similar situation where the job is done haphazardly; however, she explained, for the majority of LSLRs, especially when there is not full excavation, one cannot tell whether work has been done unless they need to hit the pavement. She concluded that there is a huge opportunity for outreach in the form of pictures, videos, and demonstrations of private property LSLR to provide residents with more context about what the experience is like.

Ms. Quirk followed up on Ms. Betanzo's comment and emphasized the importance of public outreach. She suggested that public outreach should not just involve CCRs and direct messages. Ms. Quirk noted that her utility has used public outreach via surveys to have private property owners self-identify if they had LSLs. She explained that a large portion of the survey respondents claimed they had LSLs, but when the utility went out to physically check these locations there were significantly fewer LSLs than reported. Ms. Quirk noted that, despite public education materials, the utility still needed to check all service lines manually to determine the material. She concluded that public education will be a huge tool for utilities going forward as they pursue LSL inventories with their residents.

Ms. Campbell-Ferrari commented that the discussions indicated there is a workforce development opportunity. She noted that her organization has worked with non-profits and other advocacy organizations who frequently discuss the fact that rural, smaller, and low-income communities have fewer experts who can actually do work. She discussed matching these communities with the few experts and construction crews with low job opportunities as a huge opportunity to improve the workforce in these areas. Ms. Campbell-Ferrari also discussed the issue of equity with LSLR, explaining that with BIL funding there is a huge opportunity to support and raise up communities, including within

communities, that have been historically discriminated against and cannot bear the burden of higher rates. She noted that there needs to be prioritization of funding towards LSLR in these vulnerable communities since there are other ratepayers that can afford potential rate increases from LSLR. She concluded by restating the importance of tying BIL funding to LSLR work in disadvantaged and primarily Black, Indigenous and People of Color (BIPOC) communities going forward.

Topic 2: Tap Sampling and Compliance

Mr. Goldberg presented the following guiding questions and **Ms. Daniels** facilitated the Council's discussion.

- Should EPA require systems to collect both 1st and 5th liter samples at LSL sites and use the higher concentration in the 90th percentile concentration for lead?
    - What potential challenges may systems face when complying with an updated tap sampling protocol?

Ms. Quirk commented that her utility provides sampling bottles to homeowners at night and asks them to test in the morning after they have run the toilet or the sink for the first time. If 1st and 5th liter sampling were required, utilities would need to provide homeowners with five bottles. She explained that she has been on some workgroups that have found that the highest lead concentrations may be in the 6th or 7th liter of sampled water; however, the first sample out of a faucet may also contain lead. Either way, Ms. Quirk explained, each sampling method showed the concentrations of contaminants a resident may consume.

Mr. Jones agreed with Ms. Quirk and said that not all systems are created equal and, therefore, service lines will vary in length. The 5th liter sample may not be a good representative sample based on service line length, and a 1st liter sample may be better for shorter lines, whereas as a 6th or 7th liter sample may be more representative for longer service lines. He said that the other challenge will be training customers to conduct this new sampling. Mr. Jones explained that asking a customer to get one sample is difficult enough, let alone trying to get them to get five samples accurately. He added that small water systems will experience these issues more significantly when implementing this new sampling approach.

Ms. Chard agreed with the previous comments. She noted that this rulemaking may be an opportunity for EPA's Office of Research and Development, EPA research laboratories in general, the regional labs, and the NDWAC to work together to come up with a new method to conduct samples that is representative of line length and age of faucets. She also noted that the largest action item for the next year is to increase public education outreach in order to increase willingness to take samples. She explained that her organization has worked with water systems that have tried to get customers to allow the city to come in and take the samples. While this process comes with many different challenges, the largest challenge is getting the workforce necessary to have sampling occur in several different residential locations before water is used in a household.

Ms. Betanzo said that Michigan has been conducting 1st and 5th liter sampling since 2019 and suggested that EPA look to this example to see how implementing this sampling technique is going in real life. She noted that she published an analysis of Michigan's sampling data in the American Water Works Association (AWWA) Water Science Journal that EPA can review. She said that the sampling procedure was complicated at first but now Michigan water utilities are getting used to the sampling. She agreed

with past commenters who noted that the 5th liter is not always the highest lead sample, but, she said, there is a balance between making a clear and implementable rule and getting the perfect liter of water. One thing that some water facilities have done to facilitate sampling is to use the 1st liter bottle and then use a three-liter container to catch water in between the 1st and 5th liter. She noted that the three-liter container could be in the form of a pitcher that could be left with the resident as a gift for participating in the program. Ms. Betanzo acknowledged that in the LCRR it was a 5th liter-only sample for LSL sites. She encouraged EPA to keep the 1st liter sample along with the 5th liter because it is best to have consistent data and adding the 1st liter would provide context to previous datasets. She explained that the 1st liter also helps capture information about the household plumbing contribution to lead contamination since the LSL is not the only source of lead in the home. She added that, furthermore, plumbing also is more likely to leach copper and the 1st liter will help catch copper from plumbing structures in the sample. Ms. Betanzo concluded that there are many reasons for keeping the 1st liter sample and monitoring for both lead and copper in that sample.

Ms. Campbell-Ferrari said that in addition to the technical aspect it is also important to think about the practical aspect of sampling. She discussed, for example, that one must consider when someone typically drinks water out of the faucet and whether someone is more likely to drink water immediately when the tap is run than to let the water run for a moment before drinking the water. Based on this practical aspect, she noted that both the 1st and 5th liter sample are important because copper and lead can come out at multiple points and consumers may drink tap water immediately or let the water run.

Mr. Elmore said that requiring public water systems to complete 1st and 5th liter sampling will make sampling more challenging; however, there will also be logistical challenges with obtaining, delivering, and shipping extra bottles or even with Ms. Betanzo's idea of a sampling pitcher. He noted there will be educational challenges in explaining this new sampling routine to homeowners and there will likely be sampling errors that occur at a greater frequency. He furthermore noted that more samples will also cause logistical challenges for labs since it will double the need for lab capacity compared to the current rule. He also explained that the current LCRR requires systems to prioritize sampling at LSL sites and if more than the required number of samples are taken to only count results from LSL sites, saying that this approach will not make sense if systems are only taking the 1st liter sample because the 1st liter sample measures the lead levels of water stagnating in fixtures and premise plumbing. Mr. Elmore said that if we really want a picture of what is stagnating in the LSLs at these required LSL sampling sites, taking the 5th liter is necessary regardless of complications that may come from taking both the 1st and 5th liter samples. He noted that Wisconsin recently required all small and medium municipal community water systems with LSLs and no corrosion inhibitor to conduct sequential sampling at homes with LSLs. In these systems, peak lead levels were often found to be two to ten times higher than the 1st liter sample. Therefore, he noted, Wisconsin has certainly seen that the 5th liter or some other sequential sampling value was a lot higher than the 1st liter sample in lead. Mr. Elmore said that Wisconsin understands that the 90th percentile is intended to be a measure of corrosivity in water and not a representation of the worst-case scenario; however, measuring lead levels of water that may have been stagnating in plastic piping materials is not an accurate reflection of water corrosivity, which is what the 1st liter sample would be measuring. Finally, he noted that the "find and fix" provision in the LCRR suggests that compliance sampling is intended to serve the dual purpose of measuring corrosivity of water and identifying and addressing the worst-case scenario. He concluded by saying that the 1st liter

sampling at LSL sites does not actively protect public health and meet the previously stated two objectives.

Ms. Daniels agreed with a lot of the comments presented on sampling. She reiterated that this is one of the most complex rules there is when it comes to monitoring because systems have to rely on the homeowners to monitor; therefore, there is always a concern over the potential for increased sampling errors and homeowners removing themselves from the sampling pool when monitoring becomes even more complicated than it already is. She said that she has heard that getting volunteers to be a part of a sampling pool continues to be a problem for water systems and added that water systems have attempted to use incentives such as payments to get more volunteers to sample. For example, Ms. Daniels said that her state had a program where they provided a $50 credit on homeowners' utility bills or an outright payment to those who volunteer to join the sampling program. She noted that she believes the science informs that both 1st and 5th liter samples are necessary, and therefore, there will be a need for trainings to make the learning process more straightforward for sampling volunteers. She suggested making YouTube tutorials to show how to sample and to explain the process of laboratory analysis. Ms. Daniels concluded with a discussion on the topic of water quality parameter (WQP) sampling. She noted that although lead and copper sampling is important, the other means that EPA has to ensure proper optimized corrosion control treatment, which in turn leads to lead control, is if WQPs are in control. She said that EPA should monitor the frequency of WQPs and the distribution of monitoring across a system to ensure effective, continuous, and consistent treatment through actions such as pH adjustment or inhibitor concentrations. This would also ensure equitable water quality when looking at these sample values across a water distribution system.

Ms. Betanzo added that a method she has seen be effective for recruiting community members for sampling and for recruiting homeowners for LSLR is to form strong community relationships through partnering with community members, community block leaders, and people who generally live in the community. She noted that there is also an opportunity to hire community ambassadors to do community outreach instead of water utility contacts. Ms. Betanzo suggested a certification program for LSLR, including information on more complicated sampling, to which new contractors can refer to indicate they have training in LSLR. She suggested that this will help these contractors build business and scale up quickly. She added that the certification program would also allow additional training from EPA to make sure LSLR and lead sampling are being completed well and would further EPA's LSLR goals.

Ms. Barney commented on school systems and their sampling protocols. She explained that her area had a school that had automatic dispensers for water due to COVID. She noted that there was no effort to conduct flushing and described how her agency had to work with the school to change infrastructure so they could conduct sampling. She said that sampling protocols are good ideas but that there needs to be oversight so they are implemented correctly.

Ms. Campbell-Ferrari built on Ms. Betanzo's earlier comment by saying that using high schools or school systems in general to build student participation in lead sampling would be a great way to get kids excited about science as well as get their parents more excited about the process. She explained that having their children involved could get parents more invested. Ms. Campbell-Ferrari acknowledged that some sampling requirements may be complicated and may require older students, such as high school or college, but this could generally engage student populations. She mentioned that a group in Michigan

had spoken about a successful student-led initiative. She asked EPA, if it is possible, to consider this idea in the rulemaking.

Topic 3: Reducing Rule Complexity

Mr. Goldberg presented the following guiding questions and Ms. Daniels facilitated the Council's discussion.

- What are the opportunities and challenges related to complying with a revised action level (AL) and trigger level (TL) construct?
    - What potential revisions to the AL/TL construct could reduce rule complexity?
    - Should EPA maintain the TL?
    - What is a feasible AL lower than 15 ppb?
    - Should additional steps be required to be taken to protect public health in systems with sustained levels of lead above the AL?

Ms. Chard commented that the TL in addition to the AL could increase rule complexity and noncompliance and recommended that EPA consider what is to be gained from including both metrics and whether the gains are worth potentially increased complexity. Ms. Chard explained that this change should also be considered in the context of practicality of application in the field when it comes to the levels chosen (*e.g.*, an MCL or an AL). She said that the State of Oklahoma would prefer not to have a TL in addition to an AL.

Ms. Betanzo commented that the complexity of this rule needs to be reduced, and that it needs to be made implementable, clear, and straightforward. She said that adding a TL to the rule would only add to the rule complexity, making it even harder to be proactive about lead issues because there will be two sets of criteria to be followed instead of one. She requested that EPA make this rule as proactive as possible because lead is a potent neurotoxin with no safe level of exposure. Ms. Betanzo suggested that responding to an AL would be a responsive action rather than a proactive action to avoid lead exposure. She said that a more straightforward and simple approach would be to switch from an AL to an MCL to reduce complexity. She suggested selecting a lower MCL, for example 5 parts per billion (ppb), as has been proposed by some groups. Ms. Betanzo also discussed how additional steps to protect human health and ensure equity would entail providing a reliable source of safe drinking water during a sustained lead AL exceedance. She elaborated that this could include providing residents with filters or bottled water as an option to make sure disadvantaged community members have easy access to these sources and emphasized that these communities should not have to ask for these services. Ms. Betanzo explained that, in communities that she has worked with that have experienced lead AL exceedances, only those individuals that go out of their way to ask for filters or bottled water actually receive those services; however, if these services are not readily available to all community members, those interventions are not reaching the people that need them the most. She explained that filters are very effective in reducing lead to 5 ppb and in most cases non-detect values and stated that these filters represent easy and cheap ways to reduce lead and must be made accessible to all communities exposed to lead.

Mr. Elmore stated that the TL and AL construct in the current LCRR provides little or no public health benefit while adding a substantial additional workload for primacy agencies and public water supply

staff. He noted that this additional time would be better spent identifying and removing lead from the public water distribution system. He said that Wisconsin recommends removing the TL and lowering the lead AL to 10 ppb. He noted that there needed to be a technical feasibility analysis and economic analysis to see if reducing the AL to 10 ppb would be manageable. He stated that substantial simplicity requirements are needed in the rule, particularly in the section outlining corrosion control studies and steps following a lead AL exceedance. He noted that these steps are complex since systems can be in and out of compliance and that there needed to be clear regulatory requirements in these situations. He stated that for corrosion control treatment the studies need to be streamlined to allow flexibility to use different types of studies (*e.g.*, desktop and coupon studies) or minimize the use of other studies.

Ms. Peters agreed that having both the AL and TL is unnecessarily complex and confusing, especially to the public. She would support lowering either the AL or MCL to 5 or 10 ppb with additional studies to determine the cost and feasibility of setting these values. She believed that lowering these values and choosing just one would simplify the rule and protect public health. Ms. Peters also supports additional actions that can be taken regarding public health in systems that have sustained levels of lead above the AL, which include the use of filters. She explained an approach that she said has been very successful in Denver's Lead Reduction Program, in which every single household that has a known or suspected LSL gets a pitcher filter and replacement filters mailed directly to their home. She explained that the program recognizes that not everyone will get their LSLs replaced in the first few years and that this addresses equity concerns of some populations in the program not receiving benefits while they wait for LSLR. Ms. Peters thinks this is a very effective model for how a system can implement additional actions. She noted that the program involved a lot of public outreach, including interaction with community groups and reaching out to residents to inform them how to use the filters properly. She suggested that EPA look at Denver's program closely.

Ms. Daniels indicated that she had helped develop the TL rule construct and said that she felt it was a good idea at the time. States, through the Association of State Drinking Water Administrators (ASDWA), thought it would serve a good purpose as the intent was to look at proactive measures and interventions that would be triggered to keep a system from reaching the AL. She explained that the TL was a way to look at these early interventions that would have some value in terms of protecting public health. She recalled that at the beginning of the rulemaking it was unclear what direction EPA might be going and people generally did not feel comfortable looking at an MCL value. They were also not interested in a treatment technique that would require corrosion control treatment for all systems through chemical addition because there are pros and cons with this process as well. She said that some systems struggle with effectively and safely operating chemical treatment. Ms. Daniels said that now that everyone has had a chance to look at the provisions within the rule construct, she acknowledged that the addition of the TL does add some complexity. However, she thinks the original reasoning was sound. She noted that states are in a position now to get rid of the TL and set the new AL at 10 ppb.

Ms. Betanzo added her thoughts on additional steps to protect public health, pointing out that a non-regulatory intervention opportunity that EPA has is to get filters included in the Women, Infants, and Children (WIC) programs, whereby vulnerable residents can get easy access to filters that are certified for lead reduction, for all families with pregnant women, children, and infants. This would remove the responsibility from the water utilities and get these filters to the most vulnerable populations.

Mr. Elmore added to the discussion on additional steps to protect public health, saying that there is a need for an EPA-led initiative to come up with clear risk communication materials with health partners such as the CDC. He envisioned that materials could be open source and be used and customized by public water systems, such as with programs in the past like "Water Sense" or "Fix a Leak Week." These materials would help utilities communicate the risk of lead effectively and communicate how the public should protect themselves, particularly if an AL has been exceeded.

Ms. Chard noted that, as EPA considers POU filters and filter pitchers, people do not only drink water from the kitchen faucet—describing for example how a cup at the bathroom sink can be used to brush teeth or take a drink. She said that EPA must keep this in mind when talking about filters being solutions to lead problems. She explained that while POU filters help they are not an individual household-size system, and there will still be children and other targeted groups getting water from other places in the home.

Ms. Quirk said she heard several stories from Wisconsin utilities that gave people filters to use in the interim of LSLR where residents forgot to change their filters and experienced major water quality and taste issues. She acknowledged that perhaps Denver has found a way to instruct people on how to properly use filters, but said that she has been concerned about sickness from filter misuse. She commented that PFAS compounds are a concern in regard to bottled water distribution. She said when her area gave residents notices on PFAS they also told them not to drink bottled waters because they have not been tested for PFAS. Ms. Quirk concluded that EPA should be careful what they are recommending as they go forward with this rulemaking.

Ms. Betanzo commented that there are strategies to help with filters but that any filter distribution program is best when accompanied by a filter education program. She mentioned how, when discussing the agency's filter study in Benton Harbor, EPA recommended that Benton Harbor residents receive hands-on education on how to use, install, and maintain their filters. She said that if the filter distribution program collects phone numbers they could set up an automated text message reminder to residents when they should change their filters. She concluded that an upfront investment may be needed to implement these strategies, but there are plentiful strategies available to increase filter knowledge and compliance.

Topic 4: Small System Flexibility

Mr. Goldberg presented the following guiding questions and **Ms. Daniels** facilitated the Council's discussion.

- If the LCRI requires small systems to replace LSLs regardless of their 90th percentile lead level, should the LSLR remain a small system compliance option for small systems exceeding the lead AL?
- Should other compliance options be added for small system flexibility (as a reminder, these options include LSLR, corrosion control treatment, point of use (POU) filters, and replacement of lead-bearing plumbing)? If so, what would such compliance options be?
- Should EPA reduce the small system flexibility threshold from 10,000 (*e.g.*, to 3,300 of fewer) for all or some of the compliance options?

Mr. Jones stated that he believes that it is important for EPA to reach out to and work with small systems when it comes to their capacity to comply with these regulations, adding that this may include supply chain, staffing, and funding challenges. He indicated that getting in contact with these systems would mean determining a more feasible compliance timeline. He said that the population threshold of 10,000 still works and emphasized that many of these systems would be open to working with EPA on making sure their needs are met. He added that equity in this case would mean listening to these systems and accommodating their specific needs.

Ms. Chard reemphasized that POU filter flexibility may be very effective within the appropriate systems and locations, such as non-transient non-community water systems. With locations like publicly owned residential buildings, POU filters may not be the most appropriate response. Ms. Chard also said that, whether or not EPA decides to keep the population threshold as 10,000 or something less, the agency should stick with that population number. She emphasized that there is a significant portion of small systems in her state that serve only 100, 200, or 500 people. She said that it was important to ask about the specifics of who we are trying to protect when establishing this small system definition. Ms. Chard stated that if EPA decides to pursue the regulatory decision to have all systems, regardless of size, be required to replace all LSLs, the agency should be upfront about this as early as possible and should not be discussing small system flexibilities.

Mr. Elmore stated that replacing all LSLs should always be an option, even for small systems. He proposed that POU filters and replacement of lead-bearing plumbing should be options made available only to non-community systems and in public buildings such as hospitals and prisons and apartment complexes with water bills included in rent. These options should not be made available to individual residential units and businesses in community water systems.

Ms. Campbell-Ferrari highlighted her concerns about equity, saying that the idea behind giving smaller systems other opportunities is to help them, but at the same time this could result in a reduction in the quality of service received. Ms. Campbell-Ferrari believed that this was a great opportunity to remind these systems of the immense amount of funding now provided under the BIL. These are examples of communities (in addition to disadvantaged communities) that would benefit most from these funds and are the ones the agency should prioritize; as such, there shouldn't be as great of a need to provide small system flexibility.

Mr. Borman stated that the objective of utilities is to get the lead out of the system. He asked whether it was possible to tap into another fund to address small system residences that exceed the 90th percentile. This could trigger some action on those residences and get the process going. Mr. Borman said that he views small systems as serving a population of 3,300 or fewer people, rather than at the 10,000 threshold because those can usually handle themselves pretty well. He said that the best way to approach this is to provide equity that allows these systems to also remove LSLs. He also mentioned that he does not believe that POU filters will work within small systems. From his experience, when states attempt to put these filters into use, residents will often forget to replace filters or will not use them in the first place. Mr. Borman said he believes that there are a couple of options available to these systems: Replace LSLs at all locations where the AL is exceeded or implement corrosion control treatment, which he noted could introduce simultaneous compliance issues. He thought that there could possibly be some flexibility in terms of when and how quickly lines will be replaced, but the

ultimate goal for any system should be to get lead out of the system, especially with the available BIL funding.

Ms. Daniels thanked everyone for their input and touched on equity in water systems, saying that equity in this sense means that all customers should drink from water sources of equitable water quality. She agreed that all systems, regardless of size, should have the option to conduct full LSLR. Ms. Daniels mentioned that the BIL funding has taken away one of the major barriers for small systems and added that some of Pennsylvania's first technical assistance programs involved reaching out to small and disadvantaged communities and informing them about the funding that is available. She agreed with several other commentors that use of POU filters has its challenges and added that this would have to be the alternative to centralized treatment in order to provide equitable results from system to system. She said that if using this alternative systems must ask themselves how they can make POU filters equally protective of public health. She also discussed how, to be more realistic about this, there must be some considerations put into which systems can use this option and said that in this case considering a small system to be one that serves a population of 3,300 or fewer would be better, explaining that this way states can target these smaller systems with technical assistance. Ms. Daniels also agreed with other commenters in that using POU filters and removing lead-bearing plumbing would be viable options for locations like non-transient non-community water systems and even some community water systems that run their own internal plumbing systems.

Ms. Littlewood expressed that the small system flexibilities should be for systems serving 10,000 or fewer people, noting that these systems usually have a smaller number of service connections. She noted that many systems with populations of anywhere from 2,500 to 10,000 people seem to have the same access to funding opportunities, though they don't usually have the same infrastructure capabilities (construction crews, excavation crews, etc.) that systems serving a population over 10,000 have. She stressed there are many other reasons that this definition should keep a population of 10,000 as the threshold. Ms. Littlewood also suggested other options for small system flexibilities, saying that there could be some changes to monitoring frequency and requirements on how quickly corrosion control should be discontinued (if at all). She elaborated that often these monitoring frequency requirements will require small systems to take more samples that push them just over the 90th percentile and said that, especially if these systems have already replaced LSLs, there shouldn't be this same requirement to monitor as often. Ms. Littlewood also suggested putting some of the power back into the state's hands to allow the state to assist with what makes the most sense in terms of action for each water system. She suggested that it may be helpful to have someone from the state come and sit down with these small systems and discuss their options to address lead.

Ms. Barney said that 10,000 should remain the population threshold for small systems.

Mr. Goldberg, Ms. Holsinger, and **Dr. McLain** thanked everyone for their comments.

<u>Topic 5: Additional Questions</u>

Mr. Goldberg opened the discussion up for any other additional questions or comments/feedback about the rule and presented the following discussion questions. **Ms. Daniels** facilitated the Council's discussion.

- Is there any additional information or concerns you would like to share with EPA?

- EPA would appreciate any information and data that you are able to provide on their experiences with:
    - Inventory and LSLR?
    - Sampling programs?
    - Public education?
    - CCT (corrosion control treatment)?
    - Sampling for lead in schools and child care facilities?
    - **Other aspects of drinking water lead control programs?**

Mr. Jones reiterated that providing training and technical assistance to states and regions as well as outreach to rural and underserved communities is important. He stated that he believes that this is a very important piece of regulation, and that the more training available, the more success there will be.

Ms. Chard asked EPA to consider looking at galvanized pipes currently or previously downstream of lead lines. She also requested that EPA consider looking at lead connectors. She mentioned that, even if excellent corrosion control is implemented and all lead lines are replaced, states may still need to address the premise plumbing, adding that, oftentimes, this is usually the source of higher lead levels. Ms. Chard also emphasized that states should take time to consider the use of corrosion control. She explained that usually this entails adding orthophosphate or phosphorous to drinking water. She cautioned that systems need to be wary of how much phosphorous is being added, as adding phosphorus can incur additional costs within wastewater treatment plants as they look to avoid algal blooms or over-nutrification and could cause an infinite loop of paying to treat it and to add it. Ms. Chard also touched on some concerns she had regarding lead sampling in schools and child care facilities, noting that there seem to be some contradictions regarding sampling at these locations, as the direction given is sometimes inconsistent with EPA's 3Ts (Training, Testing, and Taking Action) sampling protocol. She suggested that these sampling processes need to be more streamlined and much clearer. Finally, she said that the Safe Drinking Water Information System (SDWIS) has to exist and function properly and that it should also be provided in a user-friendly format for both regulators and the public to establish confidence in their water systems.

Mr. Elmore emphasized the need for a clearer definition of a licensed child care facility. He asked whether this would include licensed in-home facilities and whether there should be a size threshold, saying that how EPA chooses to define these parameters could impact the number of child care facilities that are tested and treated for lead contamination. He pointed out that some states might not track the smallest child care facilities, so this is especially important to catch. He also suggested delaying the compliance date by a year for testing in schools and child care facilities because states and public water systems have not had the time to prepare or administer this program because they were directed to hold off on this portion of the LCRR. He added that this section of the rule will take time to administer. Mr. Elmore also stated that if EPA requires all LSLs be replaced there also needs to be a process to start taking out corrosion control treatment once those LSLs have been replaced—adding phosphorous introduces its own compliance problems. He emphasized that EPA would need to establish a pathway to phase out corrosion control treatment if it is not needed, as this option doesn't currently exist between states and utilities. He also recommended that EPA revise the 90th percentile calculation so that only the highest lead and copper results are included; doing this could prevent the "dilution" of samples done by some utilities in which they take more samples in order to reduce the average contaminant level

recorded. He observed that there is currently no regulation to address this and that it is important to eliminate this loophole.

Ms. Quirk stated that licensed daycares in communities are a bit fluid (many go out of business one year while another is established). She asked whether or not there should be a clean inventory done every year because of this. Ms. Quirk also asked if the 3Ts manual should be delivered to schools and child care facilities via physical copy or through an internet link. She discussed the example of how her utility gave it to their school district in 2016 after Flint, Michigan, and the school district went through their facilities and found that in some schools the water fountains were made of lead, all of which they ended up replacing. Ms. Quirk said she would like some guidance on how to deal with these instances. She also mentioned that her utility has been testing lead galvanized lines that were previously attached to full LSLs and found that these galvanized lines are not resulting in high lead levels. As such, Ms. Quirk emphasized, states should focus more on LSLs rather than on galvanized lines.

Ms. Peters reemphasized the importance of public outreach and education. She again used Denver as an example of a robust education and outreach program. She recognized that not every water system will be able to replicate that, but she suggested that EPA provide some public education and outreach resources (toolkits, best language, etc.) so that utilities can pull from them. She added that there are also things that water systems can do to educate people on how to reduce their lead exposure from all sources. Ms. Peters was pleased to hear that people are showing concern about orthophosphate treatment for corrosion control in drinking water as all lines get replaced. She mentioned that she also has huge concerns about water systems located in arid areas flushing around 80 percent of effluent from wastewater utilities in the late summer and early fall months. She is concerned about additional phosphorus loading, as this would be a huge cost to wastewater utilities. She also flagged the issue of residents who use a significant amount of water to landscape, noting for example, that a study in the Denver area showed that 40 percent of water use was for lawns and landscaping. She observed that this usage would bypass treatment and the water would still make its way back into the watershed, introducing further problems.

Ms. Betanzo shared her thoughts on the find-and-fix approach. She stated that she fully supports investigating high individual levels of lead; however, corrosion control treatment should not be the primary means by which these issues are fixed. She said that the focus should instead be on finding those localized sources of lead in interior plumbing and replacing these fixtures if they are determined to be the cause. She again asked EPA to reevaluate and revise the definition of an LSL by including lead goosenecks and said that the section of pipe within the house should also be a part of this definition, noting that Michigan defines an LSL as "the pipe into the house to the first shut-off valve or eighteen inches, whichever is shorter," which captures that portion of the line. She said that this needs to be fixed within the rule. Ms. Betanzo also asked where states should send their information and data. **Mr. Goldberg** said that a slide with the necessary contact information will be provided.

Ms. Daniels agreed that the largest sources of lead are the LSLs and that they should remain the focus of LCRI. However, she also acknowledged that removing all LSLs would not necessarily make a system lead-free. For systems that remove LSLs, Ms. Daniels stated that corrosion control treatment may still be needed but the system will probably need to re-evaluate optimized treatment for the new condition of dealing with lead and copper within premise plumbing and fixtures. This issue may be looked at a bit differently, but that does not mean that corrosion control treatment will be taken away. She also said

that if the LCRI is looking at a certain percentage for LSLR, the preference would be for the rule to set that rather than leave it to states to determine on a case-by-case basis. Ms. Daniels also mentioned that there seems to be a discrepancy between the 3Ts monitoring approach for schools and child care facilities versus public water systems. She observed that this creates some confusion and that EPA should be able to establish a maximum stagnation time for public water systems just as they did for schools and child care facilities, which would help improve everyone's understanding of the monitoring. Ms. Daniels also recommended that the phrasing "find-and-fix" be changed to "find and assess." The current phrasing assumes that the issue can be fixed or will be fixed by the water system; however, this is not always the case, especially if the problem is with the premise plumbing of the residence. Ms. Daniels also stressed the importance of making sure schools are trained to properly use pitcher filters and POU devices. She suggested that there may also be a need to look at filtration use at the bottle-filling stations that schools have been using to provide safe drinking water in order to make sure proper instruction is provided.

Mr. Elmore mentioned the need for staggered deadlines in the LCRI when starting the new compliance monitoring, as the six-month monitoring frequency will introduce lab capacity issues. He added that this initial compliance monitoring will not result in much from a public health standpoint. Mr. Elmore stated that he believed that systems could get more out of looking at the 5th liter sample instead of increasing the monitoring frequency. He also mentioned that, in terms of data management for recording compliance, his state does not use SDWIS and instead has their own data reporting system. He concluded by saying that the state needs data entry instructions for both the LCRR and LCRI as soon as possible to update their data reporting systems accordingly.

Ms. Littlewood addressed Ms. Daniel's statement on maximum stagnation time, saying that, from her experience in 70 very small systems, it is difficult to not allow people to flush their faucets before "starting the clock" to meet the six-hour minimum stagnation time. Ms. Littlewood stated that it has been a challenge to communicate that they need at least six hours of stagnation time when customers often don't know when they last used their faucets and recommends, in order to make sure that customers are meeting the requirements of the current rule, telling them to flush their faucets for a minute, write down the time the faucet ran, and then take the sample any time after the six-hour period (though before 10 hours is recommended). Having people write down these times also helps utilities figure out if they have a corrosion issue at the system's source or in the premise plumbing. She elaborated that this method can allow water systems to identify outliers (samples that may be non-representative). Having a maximum stagnation time for the water systems would be excellent in order to quantify how all the samples are being done. Ms. Littlewood said that at the end of the day the goal is to get lead out of the system, and the means by which this is done will differ between homes and service lines.

Ms. Daniels asked EPA if they had any clarifying questions, which they did not.

Mr. Goldberg highlighted the next steps. He noted that in addition to this consultation EPA has been seeking input from other key stakeholders and entities to inform the proposed LCRI. He mentioned that this consultation was the last one, noting that other stakeholders contacted included the Science Advisory Board, the Small Business Advocacy Review Panel, Unfunded Mandates Reform Act/Federalism consultation, tribal government officials, EJ-related organizations, and others. He restated that EPA intends to publish the proposed rule for public comment in 2023 and promulgate a finalized rule by

October 16, 2024, and noted that any questions or additional data/information can be sent to Ms. Holsinger or Mr. Goldberg.

Mr. Goldberg, Ms. Holsinger, and **Dr. McLain** all thanked council members.

Ms. Daniels noted that **Ms. Barney** sent a second comment in the chat feature. Ms. Barney, hearing the concerns expressed during public comment with chemical reactions with fluoride additives, recommended that more research be conducted to ensure thorough knowledge of lead and fluoride reaction.

During a roll call conducted by the DFO Ms. Corr**, Ms. Betanzo** shared that she had a question and asked because of the public comment if EPA was considering updating the MCL and MCLG for fluoride since it has been 16 years since the last NAS report.[5]

Microbial & Disinfection Byproducts Rule Revisions Working Group Update

Ms. Daniels presented updates on the NDWAC Microbial & Disinfection Byproducts (MDBP) Rule Revisions Working Group purpose, the Working Group composition, information on prior public engagements and input, the content covered in Working Group meetings, and the timeline for next steps.[6] She noted that the next three meetings will take place on December 13, 2022; January 24, 2023; and March 9, 2023. Ms. Daniels provided key takeaways from the Working Group meetings thus far that included recognition of the Working Group's need to have a foundation of understanding the problem and root causes before providing comments and suggestions about these complex and interdisciplinary issues.

Mr. Rodriguez echoed Ms. Daniels's comments on the level of complexity of the discussions and noted the high-quality technical experts translating the rule. He explained that the experience has been very rewarding personally and that he appreciated the Working Group and EPA's time during these meetings.

Ms. Quirk noted the major disinfection byproducts (DBPs) and microbial contaminants the Working Group is reviewing during these meetings, including chlorite, *Cryptosporidium*, haloacetic acid (HAA5-HAA9), heterotrophic bacteria, *Giardia lamblia*, *Legionella*, total trihalomethanes (TTHMs), viruses, nitrosamines, and bromate. She noted that the Working Group is receiving a lot of technical information, health effects and occurrence data, and compliance data to assess different compliance issues for small, large, and consecutive systems. She explained that the health experts were highlighting important data and solutions for consideration. She concluded that this topic was important to her and that she continued to learn a lot throughout the process.

Mr. Borman agreed with Ms. Quirk's comments and noted that from a utility perspective the Working Group has made a lot of progress. He explained that he helps run 17 consecutive systems that deal with TTHM issues and that he believes that, after the NDWAC provides suggestions for the new rule, the rule would become a lot easier with which to comply from a utility perspective while still providing public health protection. He noted Working Group members' success in informing what the rulemaking is intended to do, and said that he is looking forward to future meetings.

[5] Dr. McLain circled back to public comments on fluoride in her closing remarks.
[6] Ms. Daniels presentation is in Appendix C.

Ms. Betanzo echoed the others' comments and said that it has been great to get updates on the latest science for MDBPs. She said that as the NDWAC moves forward to revising old solutions and coming up with new solutions to these problems, she is looking forward to seeing a complete analysis of compliance data to streamline and better protect public health.

Ryan Albert (EPA OGWDW) thanked Ms. Daniels for the presentation and noted the Working Group's importance. He added that EPA is looking forward to consensus advice on potential changes they can make to the MDBP Rules. **Mr. Burneson** thanked the Working Group for their time.

Closing Remarks

Ms. Daniels thanked everyone for all the input and engagement for the LCRR and LCRI discussions. She stated that she finds value in all of the feedback provided and will consider all of what was suggested going forward. Ms. Daniels also mentioned that she was happy to provide an update on the MDBP Rule Revisions Working Group.

Dr. McLain thanked Ms. Daniels for leading the discussion. She also thanked the public commenters for providing their concerns about fluoride in drinking water, stating that it is ensured that EPA reviews drinking water standards every six years and that the agency utilizes the best available peer-reviewed science while conducting its deliberations. Dr. McLain again thanked the NDWAC members for coming to the meeting prepared to answer all of the LCRR and LCRI discussion questions. She added that EPA anticipates additional information to be sent by the members after the meeting. Finally, Dr. McLain thanked the Working Group, noting that EPA recognizes that this is very important work that has been very fruitful and informative. She thanked everyone for the very successful meeting, including Ms. Corr as DFO.

NDWAC Roster 11/30/22

Members, National Drinking Water Advisory Council	
Ms. Lisa D. Daniels, NDWAC Chair Director, Bureau of Safe Drinking Water Pennsylvania Department of Environmental Protection Harrisburg, PA	Ms. Yolanda Barney Environmental Program Manager Navajo Public Water System Supervision Program Navajo Nation Environmental Protection Agency Window Rock, AZ
Ms. Elin W. Betanzo Founder and Principal Safe Water Engineering, LLC Detroit, MI	Mr. D. Scott Borman General Manager Benton/Washington Regional Public Water Authority Rogers, AR
Ms. Alexandra Campbell-Ferrari Co-Founder and Executive Director The Center for Water Security and Cooperation Washington, DC	Ms. Shellie R. Chard Director, Water Quality Division Oklahoma Department of Environmental Quality Oklahoma City, OK
Mr. Steven B. Elmore Program Director Bureau of Drinking Water and Groundwater Wisconsin Department of Natural Resources Madison, WI	Mr. Eagle Jones Director of Water Operations Pechanga Tribal Government Temecula, CA
Ms. Jana Littlewood National Rural Water Association Board of Directors -- Alaska Representative Wasilla, AK	Ms. Jennifer L. Peters National Water Programs Director Clean Water Action/Clean Water Fund Littleton, CO
Mr. James M. Proctor, II Senior Vice President and General Counsel McWane, Inc. Birmingham, AL	Ms. Nancy A. Quirk General Manager Green Bay Water Utility Green Bay, WI
Mr. Alex Rodriguez President and Chief Executive Officer DCG Public Affairs Diversity Consulting Group, LLC Santa Barbara, CA	Mr. Jeffrey W. Szabo Chief Executive Officer Suffolk County Water Authority Oakdale, NY

Mr. Macaroy "Mac" Underwood Principal Consultant Raftelis Financial Consultants, Inc. Vestavia, AL	
Liaisons, Centers for Disease Control and Prevention	
Dr. Arthur S. Chang Chief Medical Officer Division of Environmental Health Science and Practice National Center for Environmental Health Centers for Disease Control and Prevention Atlanta, GA	Dr. Vincent Hill Chief, Waterborne Disease Prevention Branch Division of Foodborne, Waterborne and Environmental Diseases National Center for Emerging and Zoonotic Infectious Diseases Centers for Disease Control and Prevention Atlanta, GA

Proposed Lead and Copper Rule Improvements (LCRI)
NDWAC Consultation Meeting
November 30, 2022

What is the purpose of today's meeting?

- To provide the National Drinking Water Advisory Council (NDWAC) with information on the development of the proposed Lead and Copper Rule Improvements (LCRI) National Primary Drinking Water Regulation (NPDWR)
  - Discuss basics of lead in drinking water
  - Provide an overview of the Lead and Copper Rule Revisions (LCRR) published in January 2021
  - Discuss cost information
  - Discuss key areas of consideration for potential LCRI requirements
- Solicit input from National Drinking Water Advisory Council (NDWAC) and their members on the proposed Lead and Copper Rule Improvements (LCRI)

What do I need to know about lead in drinking water?

EPA
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- Lead in pipes, solder, and faucets can dissolve in water or break off as particles.
- When present, lead service lines are the most significant source of lead in drinking water.
- In children, exposure to lead can cause serious health effects like lower IQ, learning and behavioral problems.
- In adults, health effects can include higher risk of heart disease, high blood pressure, and kidney or nervous system problems.

What is the Lead and Copper Rule?

- The Safe Drinking Water Act (SDWA) authorizes EPA to establish regulations for public water systems.
- EPA first established the Lead and Copper Rule in 1991 to reduce exposure to lead and copper in drinking water.
- Applies to ~68,000 community (CWS) and non-transient non-community (NTNCWS) public water systems serving over 300 million people.
- The rule requires some water systems to treat drinking water to keep lead in place when lead (or copper) levels in water require action. This is called corrosion control.
- When corrosion control is not enough to reduce lead levels, the LCR requires water systems to take additional actions including lead service line replacement and public education.

What is the Lead and Copper Rule?

- Maximum Contaminant Level Goal (MCLG) for lead: 0 µg/L
  - The MCLG is zero because there is no level of exposure to lead that is without risk.
- Action Level (AL) for lead: 15 µg/L
  - The AL is set at a level based on feasibility.
- The LCR requires water systems to test water at the tap in certain homes that have lead in the plumbing.
- Water systems must compare the 90th percentile of lead sample results to the AL to determine if they need to take actions to reduce lead exposure.

The Lead and Copper Rule Revisions (LCRR)

EPA
OFFICE OF GROUND WATER AND DRINKING WATER

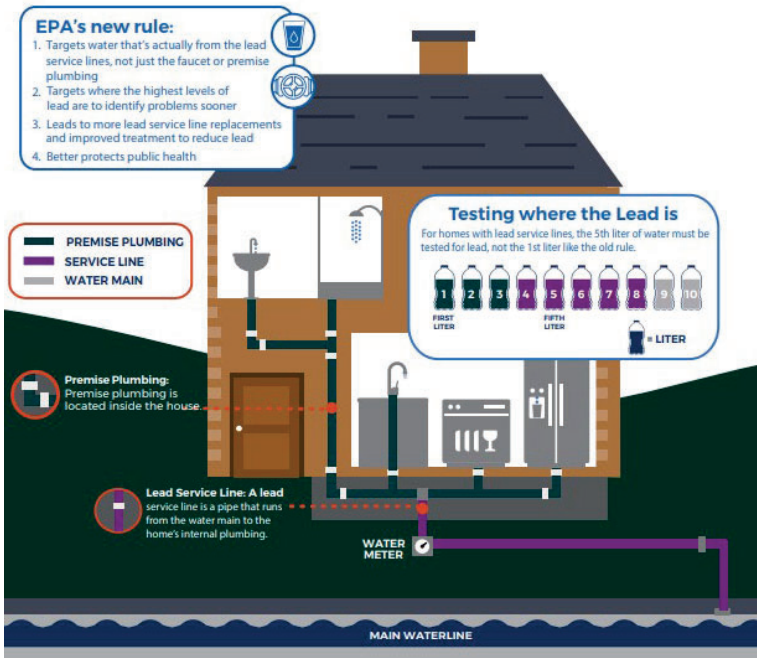
- The LCRR was promulgated on January 15, 2021.
- EPA extended the effective date to December 16, 2021, to conduct a review of the LCRR in accordance with Executive Order 13990.
- EPA delayed the compliance date of the LCRR until October 16, 2024, to:
  - Maintain the same time period between the effective date and compliance date in the LCRR, and
  - Provide drinking water systems with adequate time to take actions needed to assure compliance with the LCRR after it takes effect.

LCRR Lead Service Line Inventory

- Requires water systems to develop a lead service line (LSL) inventory.
- Service line inventories must be publicly available (online for systems serving > 50,000 people).
- Water systems must notify customers annually if they have an LSL, galvanized requiring replacement (GRR), or unknown.

LCRR Tap Sampling

- Requires water systems to sample for lead at homes served by lead service lines (LSLs).
  - 5th liter sample
- Prohibits water systems from providing instructions that may temporarily reduce lead levels before sampling.
- Requires the use of wide-mouth sampling bottles.



LCRR Lead Trigger Level

- Establishes a new Trigger Level (TL) of 10 µg/L in addition to the AL.
- Systems that exceed the TL are required to take actions sooner:
  - If a system does not have corrosion control treatment (CCT), they must conduct a study which prepares the system to install CCT if they later exceed the AL.
  - If a system has CCT, they must make adjustments, so it is more effective at reducing lead levels.
  - If a system has LSLs, they must start a goal-based replacement program and inform the public of opportunities to have their LSLs replaced.

LCRR Monitoring Frequency

- Systems above the TL must monitor for lead at least annually. They must continue annual monitoring for at least two years after the last monitoring period above the TL.
- Systems above the AL must monitor every six months. They must continue six-month monitoring for at least two years after the last monitoring period above the AL.
- Systems with a source water or long-term treatment change must monitor every six months.

LCRR Corrosion Control Treatment

- Improves CCT requirements.
- Removes provisions allowing water systems to stop the CCT installation process if they drop below the lead AL.
- "Find-and-Fix" requires water systems to evaluate individual sites with lead tap sample results greater than 15 µg/L.
  - Water system must determine if a "fix" is needed (e.g., localized adjustment to CCT, flushing, etc.).
  - The fix may be outside of the system's control (e.g., premise plumbing) but they must provide documentation to the State.

LCRR Replacing Lead Service Lines

- Water systems that exceed the AL must fully replace LSLs to count towards the mandatory replacement rate (3%).
- Eliminates loopholes that allowed LSLs to remain in place (e.g., test out provisions) after replacement requirement is triggered.
- Water systems serving > 10,000 people that exceed the TL must implement a goal-based lead service line replacement (LSLR) program.
- Water systems serving > 10,000 people must conduct LSLR if they exceed the AL regardless of CCT status.
  - Must conduct LSLR until the system is at or below the AL for two years.

LCRR Small System Flexibility

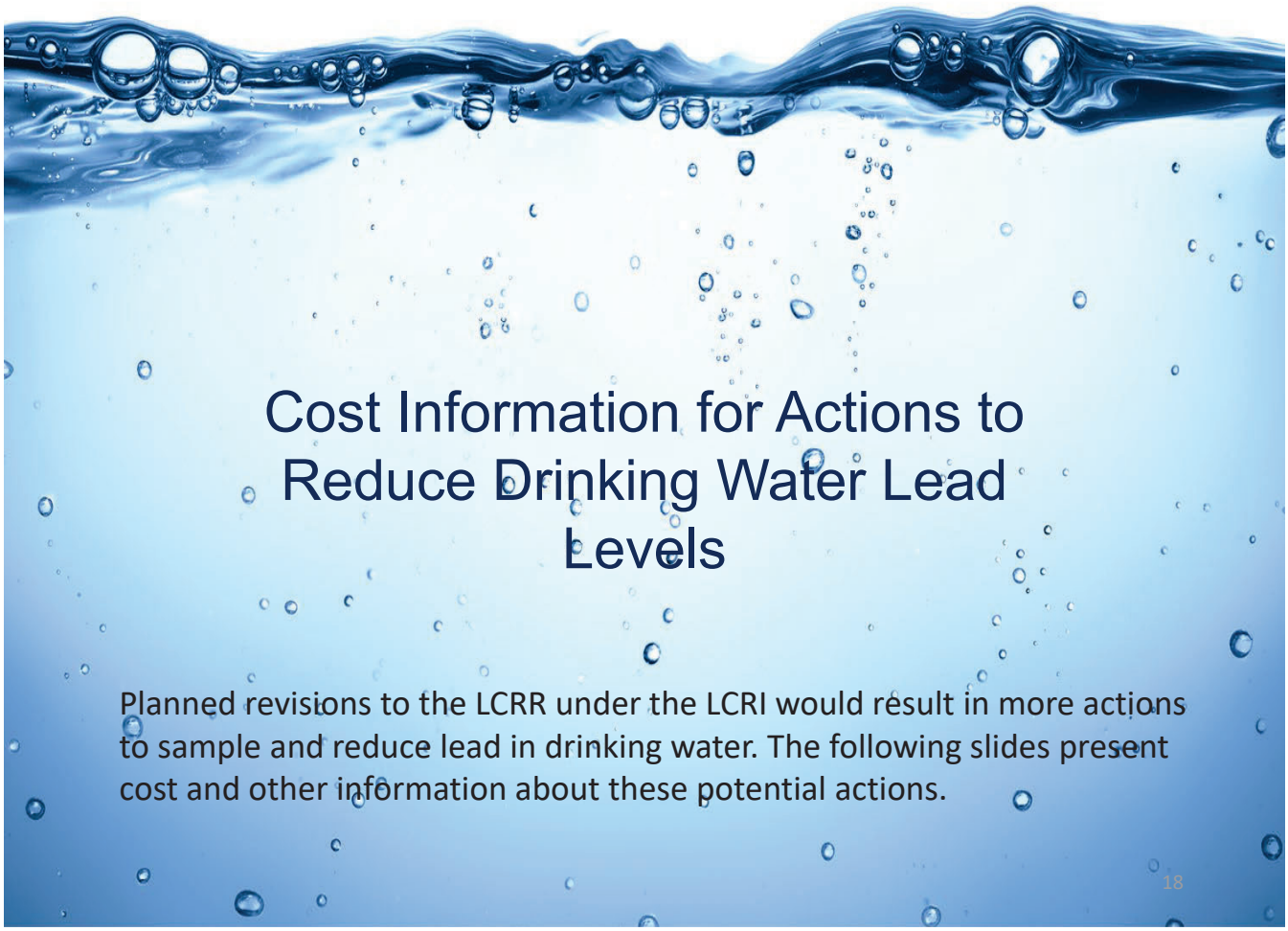
- Applies to small community water systems (CWSs) serving ≤ 10,000 people and non-transient non-community water systems (NTNCWSs).
- If a water system exceeds the TL, they must choose a compliance option and obtain approval from the State.
- The water system must implement the approved option if they later exceed the lead AL.
- Compliance options:
  - Install and maintain optimized CCT.
  - Replace all LSLs within 15 years (cannot stop once started).
  - Install and maintain point-of-use devices (POUs).
  - Replace all lead-bearing plumbing.

LCRR Public Education and Notifications

- Requires water systems to notify customers within 24 hours if the system exceeds the lead AL (WIIN Act).
- Water systems must notify customers whose individual tap sample > 15 µg/L within 3 days.
- Requires water systems to deliver public education materials to impacted consumers during water-related work that may disturb LSLs.
- Revises the Consumer Confidence Report requirements:
  - Clear health effects language
  - Statement on availability of LSL inventory
  - Range of tap sample levels and public access to results

LCRR Sampling for Lead in Schools

- Requires CWSs to test for lead in elementary schools and child care facilities.
  - Develop a list of all licensed schools and child care facilities they serve.
  - Elementary schools and child care facilities are sampled once over a 5-year period.
  - Secondary schools are sampled if they request it.
- After one 5-year round, the water system must sample for lead in any school or child care facility on request.
- Systems must provide a copy of EPA's 3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities.
- EPA does not have the statutory authority under SDWA to require schools and child care facilities to take remediation actions or conduct additional sampling.



Cost Information for Actions to Reduce Drinking Water Lead Levels

Planned revisions to the LCRR under the LCRI would result in more actions to sample and reduce lead in drinking water. The following slides present cost and other information about these potential actions.

Tap Sampling and Point-of-Use

- Tap Sampling
  - Per household estimated sampling costs range from $49 to $109 (2021$).
  - Includes average lab costs, costs for providing and delivering sampling materials, and sample pick-up costs
  - These estimates were developed for the LCRR. We expect revisions to the sampling protocol to increase costs.
- Point-of-Use Devices (POU)
  - The annual average cost of POUs ranges between $125 - $128 per household per year (2021$)
  - Includes device purchase, scheduling and installation labor, labor for maintenance, and replacement filters
  - These estimates were developed for LCRR and may change based on LCRI requirements.

Estimated Number of LSLs by System Size Category

System Size (Population Served)	1991 RIA, Adjusted[a]			Cornwell *et al.*, 2016[b]		
	Number of Systems with LSLs	Total Number of LSLs	Average Number of LSLs per System for Systems with LSLs	Number of Systems with LSLs	Total Number of LSLs	Average Number of LSLs per System for Systems with LSLs
≤100	1,750	41,000	20	2,430	9,000	5
101-500	3,110	292,000	90	3,180	56,000	20
501-1,000	2,090	559,000	270	1,190	64,000	50
1,001-3,300	3,120	690,000	220	1,730	223,000	130
3,301-10,000	2,090	965,000	460	1,040	402,000	390
10,001-50,000	1,470	1,639,000	1,120	1,270	2,696,000	2,130
50,001-100,000	240	564,000	2,330	290	728,000	2,540
100,001-1M	250	2,504,000	9,790	200	1,444,000	7,290
> 1M	10	1,984,000	146,010	10	666,000	57,050
TOTAL	**14,130**	**9,239,000**		**11,340**	**6,287,000**	

RIA = Regulatory Impact Analysis.

Source: See "Derivation of LSL Number CWS", available in the docket at EPA-HQ-OW-2017-0300 at www.regulations.gov.

[a] USEPA. 1991. Drinking Water Regulations; Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper; Regulatory Impact Analysis. RIN 2040-AB51. The total number of LSLs and average number of LSLs per system were adjusted to account for mandatory and voluntary LSLR and system consolidation since 1988. See Section 4.3.4 of the LCRR Economic Analysis document for additional information on the adjustments.

[b] Cornwell, D.A, R.A. Brown, and S.H Via. 2016. National Survey of Lead Service Line Occurrence. Journal American Water Works Association. 108(4): E182-E191.

EPA computed the number of systems with LSLs using information on the percentage of all systems with LSL.

Example Costs for LSLR

Low and High Estimates for LSLR Unit Costs (2021$)			
Type of LSLR	**Average**	**Low**	**High**
Utility-Side	$5,000	$2,700	$6,300
Customer-Side	$3,900	$2,800	$4,300
Full Replacement	$5,600	$4,400	$6,600
Utility-Side, Planned	$4,000	$2,200	$5,000
Full Replacement, Planned	$4,500	$3,500	$5,300

1. Values are based on utility reported estimates (total of 38 utilities, converted to 2016$ then inflated to 2021$ with GDP price deflator). Values are rounded.
2. The planned costs in the last two rows are further adjusted downward 20 percent to represent replacements that are part of planned capital improvements
3. The low value is the 25th percentile and the high value is the 75th percentile
4. Source: Exhibit 3-A of the Economic Analysis Appendices for the final LCRR.
5. EPA intends to update these numbers for the LCRI EA

- Full LSLR costs range from $3,500 to $6,600 per line.

CCT Cost Information

Initial Capital and Annual O&M Cost for Systems Installing CCT by System Size Category

Population Served	Initial Capital Cost	Annual O&M (per year)
> 500,000	$621,000 to $8,268,000	$237,000 to $3,067,000
100,001 to 500,000	$233,000 to $2,372,000	$68,000 to $598,000
50,001 to 100,000	$174,000 to $1,770,000	$31,000 to $269,000
10,001 to 50,000	$83,000 to $681,000	$11,000 to $79,000
3,301 to 10,000	$69,000 to $324,000	$5,000 to $26,000
501 to 3,300	$25,000 to $196,000	$3,000 to $16,000
25 to 500	$23,000 to $93,000	$3,000 to $7,000

1. Costs originally reported in 2017$ and are inflated to 2021$ with GDP price deflator
2. Capital costs are initial, one-time costs
3. Costs reflect installing and operating a new CCT for systems that do not currently have CCT in place. Systems that adjust or reoptimize existing CCT would have lower costs
4. Annual O&M costs are in dollars per year
5. Costs assume the same CCT technology is applied at all entry point to the distribution system
6. The range of costs shown reflect variations in the following: WBS model component cost level (low, mid, or high), choice of CCT technology (phosphate addition, pH adjustment, or both), water source (ground water or surface water), variations in starting and target pH

CCT Cost Information (cont.)

Annualized Costs for Systems Installing and Maintaining CCT by System Size Category

Population Served	Annualized Cost at 3%	Annualized Cost at 7%
> 500,000	$277,000 to $3,618,000	$294,000 to $3,842,000
100,001 to 500,000	$82,000 to $756,000	$89,000 to $821,000
50,001 to 100,000	$42,000 to $388,000	$46,000 to $436,000
10,001 to 50,000	$16,000 to $124,000	$19,000 to $143,000
3,301 to 10,000	$11,000 to $49,000	$12,000 to $57,000
501 to 3,300	$7,000 to $30,000	$8,000 to $35,000
25 to 500	$5,000 to $13,000	$5,000 to $15,000

1. Costs originally reported in 2017$ are inflated to 2021$ with GDP price deflator
2. Annualized costs are total capital costs, annualized at the discount rate shown over the useful life of the technology, plus annual O&M Costs

Lead and Copper Rule Improvements

- Propose Lead and Copper Rule Improvements (LCRI) in 2023 and finalize by October 16, 2024.
- Key areas:
  - Replacement of lead service lines (LSLs) while equitably improving public health protection.
  - Improving the methods to identify and require action in communities that are most at risk of elevated drinking water lead levels.
  - Exploring ways to reduce the complexity of the regulation.
- Other options may include the LCRR provisions for
  - small system flexibility,
  - school and child-care sampling,
  - risk communication, and
  - corrosion control treatment.

Identifying and Replacing Lead Service Lines: Key Questions

What are the opportunities and challenges related to identifying and replacing service lines:

- Achieving 100% LSLR
  - How quickly can systems achieve 100% LSLR?
  - What factors impact a system's rate of LSLR?
  - What barriers exist for engaging customers about full LSLR?
  - How can systems ensure equity in replacements?
- What are the most effective and equitable ways for water systems replace lead service lines?

Tap Sampling and Compliance: Key Questions

What are the opportunities and challenges related to tap sampling and compliance:

- Should EPA require systems to collect both 1st and 5th liter samples at lead service line sites and use the higher concentration in the 90th percentile calculation for lead?
  - What potential challenges may systems face when complying with an updated tap sampling protocol?

Reducing Rule Complexity: Key Questions

- What are the opportunities and challenges related to complying with a revised action level and trigger level construct:
  - What potential revisions to the AL/TL construct could reduce rule complexity?
  - Should EPA maintain the TL?
  - What is a feasible AL lower than 15 ppb?
  - Should additional steps be required to be taken to protect public health in systems with sustained levels of lead above the AL?

Small System Flexibility: Key Questions

What are the opportunities and challenges related to the small system flexibility:

- If the LCRI requires small systems to replace LSLs regardless of their 90th percentile lead level, should the LSLR remain a small system compliance option for small systems exceeding the lead AL?
  - Should other compliance options be added for small system flexibility? If so, what would such compliance options be?
  - Should EPA reduce the small system flexibility threshold from 10,000 (e.g., to 3,300 or fewer) for all or some of the compliance options?

Additional Questions

- Is there any additional information or concerns you would like to share with EPA?
- EPA would appreciate any information and data that you are able to provide on their experiences with:
  - Inventory and lead service line replacement
  - Sampling programs
  - Public education
  - Corrosion control treatment
  - Sampling for lead in schools and child care facilities
  - Other aspects of drinking water lead control programs

Next Steps

- In addition to this consultation, EPA is seeking input from other key stakeholders and entities to inform the proposed LCRI.
  - Science Advisory Board, Small Business Advocacy Review Panel, UMRA/Federalism, tribal government officials, environmental justice-related organizations, and others
- EPA anticipates publishing the proposed rule for public comment in 2023 and promulgating a final rule by October 16th, 2024.

Questions

- Consultation questions and follow-up:
  - Michael Goldberg, EPA Office of Ground Water and Drinking Water (Goldberg.Michael@epa.gov)
  - Hannah Holsinger, EPA Office of Ground Water and Drinking Water (Holsinger.Hannah@epa.gov)
- Additional information on the LCRR/LCRI:
  - https://www.epa.gov/ground-water-and-drinking-water/revised-lead-and-copper-rule
  - https://www.epa.gov/ground-water-and-drinking-water/lead-and-copper-rule-improvements

Consideration of Potential MDBP Rule Revisions – Update about Working Group Activities to Inform NDWAC Advice and Recommendations

Lisa Daniels
Co-Chair, Microbial and Disinfection Byproducts Rule Revisions Working Group
November 30, 2022

Presentation Overview

- Microbial and Disinfection Byproducts (MDBP) Rule Revisions Working Group purpose
- Working Group composition
- Prior public engagements and input
- Working Group meetings
- Timeline for next steps

MDBP Rule Revisions Working Group Purpose and Charge

- EPA is seeking consensus recommendations from the NDWAC that would improve public health protection provided by the MDBP regulations, better assure the regulations equitably protect consumers' health, particularly disadvantaged communities, and be implementable.
- EPA charged the NDWAC to provide the agency with consensus advice and recommendations on key issues related to potential revisions to MDBP rules.
- To support the work of the NDWAC, EPA requested that the council form a working group (the MDBP Rule Revisions Working Group).
- The MDBP Rule Revisions Working Group is asked to consider issues related to potential rule revisions.
- The Working Group is endeavoring to conclude its work by Fall 2023.

Working Group Composition

Lisa D. Daniels* – WG Co-chair, Pennsylvania Dept of Environmental Protection
Andy Kricun** – WG Co-chair, Moonshot Missions
Elin W. Betanzo*, Safe Water Engineering LLC
D. Scott Borman*, Benton/Washington Regional Public Water Authority
John Choate, Tri-County Regional Water Distribution District
Kay Coffey, Oklahoma Department of Environmental Quality
Jeffrey K. Griffiths, Tufts University School of Medicine
Michael Hotaling, Newport News Waterworks Department
Jolyn Leslie, Washington State Department of Health
Rosemary Menard, City of Santa Cruz
William F. Moody, Mississippi State Department of Health
Erik D. Olson, Natural Resources Defense Council
Benjamin J. Pauli**, Kettering University
Nancy A. Quirk*, Green Bay Water Utility
Lisa J. Ragain, Metropolitan Washington Council of Governments
Alex Rodriguez*, Diversity Consulting Group
Lynn W. Thorp, Clean Water Action/Clean Water Fund
Gary Williams, Florida Rural Water Association

*Member of U.S. EPA's National Drinking Water Advisory Council.
**Member of U.S. EPA's National Environmental Justice Advisory Council.

Public Engagements Prior to Working Group Formation

- EPA held an initial virtual public meeting in October 2020, followed by six virtual meetings from May to November 2021 to solicit broad input and information on MDBPs in drinking water.
- Each meeting in 2021 focused on specific topics identified through public feedback and new information.
- EPA provided the MDBP Rule Revisions Working Group with the information gathered through the public docket, the virtual public meetings, and results of analyses conducted to inform deliberations.

MDBP Rule Revisions Working Group Meeting #1: May 23, 2022

- Purpose was to make member introductions, review previous public engagements (2020 and 2021) and Working Group member interview findings, and start a discussion on the use of technical support for the Working Group.
- Key meeting highlights included preliminary discussions about Working Group priorities, challenges, and elements of common purpose related to the Working Group effort; and review of the Working Group process plan and approach for providing technical support to inform Working Group discussions.

MDBP Rule Revisions Working Group Meeting #2: August 17, 2022

- Purpose was to create a common understanding of the current regulatory framework related to the Surface Water Treatment Rules (SWTRs); provide an inventory of Public Water Systems (PWSs) subject to the SWTRs; establish agreement about the proposed scope and content of overall problem characterization relative to the Working Group's purpose; and begin problem characterization discussions on opportunistic pathogens and disinfectant residuals.
- Key meeting highlights included discussions about problem characterization related to the SWTRs such as root causes, problem magnitude, and degree of certainty. In addition, Working Group members identified the types of information they were seeking that would be helpful to further understand opportunistic pathogen-related and disinfectant residual problems.

MDBP Rule Revisions Working Group Meeting #3: September 20, 2022

- Purpose was to continue problem characterization discussions on opportunistic pathogens and disinfectant residuals; create a common understanding of the current regulatory framework related to the Disinfectants/Disinfection Byproducts Rules (D/DBPRs); provide an inventory of PWSs subject to the D/DBPRs; and begin problem characterization discussions on disinfection byproducts.
- The meeting included input and panel discussions with technical analysts from different backgrounds to help inform Working Group discussions.
- Key meeting highlights included discussions about problem characterization related to the D/DBPRs such as root causes, problem magnitude, and degree of certainty. In addition, Working Group members identified the types of information they were seeking that would be helpful to further understand DBP-related problems.

MDBP Rule Revisions Working Group Meeting #4: November 3, 2022

- Purpose was to continue problem characterization discussions on opportunistic pathogens, disinfectant residuals, and disinfection byproducts; and create a common understanding of the current regulatory framework related to interdependencies between the SWTRs and D/DBPRs.
- Building on the success of the third meeting, the fourth meeting included input and panel discussions with technical analysts to help inform Working Group discussions.

Moving Forward

- Planning for Working Group meetings:
  - Meeting #5 – December 13, 2022
  - Meeting #6 – January 24, 2023
  - Meeting #7 – March 9, 2023
- Consideration of potential rule revisions.

Key Takeaways to Date

- Working Group members have provided valuable input and contributed to meaningful discussions relevant to the Working Group purpose.
- There is recognition of the depth and complexity of technical information provided to the Working Group for supporting discussions and deliberations.
- Information provided by the technical analysts is helpful for supporting the Working Group.
- **Input from NDWAC members serving on the Working Group.**

Appendix D: Written Public Comments to the NDWAC

The Preventive Dental Health Association
David Kennedy, DDS **email:davidkennedydds@gmail.com**
1068 Alexandria Drive **Phone: (619) 247-5738**
San Diego CA 92107-4115

Written statement to: The U.S. Environmental Protection Agency's (EPA) Office of Ground Water and Drinking Water virtual meeting of the National Drinking Water Advisory Council (NDWAC or Council) as authorized under the Safe Drinking Water Act (SDWA) submitted on behalf of the Preventive Dental Health Association a California educational non-profit founded in 1984.

California 2004 Office or Environmental and Human Health (1) established a minimum risk level for arsenic in drinking water of 0.000004 mg/L or 4 PPT based on an increased risk of cancers of bladder or lung.

While there are many substances that are and should be of concern to the EPA agency responsible for setting standards for safe drinking water there is only one substance (HFSA) that is intentionally added to systemically medicate the water user. That is Hydrofluosilicic acid (HFSA). HFSA is used in 91% of the fluoridation schemes and not FDA approved to treat or prevent tooth decay systemically. (2)

The US Food and Drug Administration (FDA) since 1975 has reviewed and rejected over 37 applications for systemic fluoride intended to be ingested to reduce tooth decay. (3) The Congressional Investigation of 2000 determined that there are no fluoride containing substances intended to be ingested that have ever been approved FDA to reduce, prevent, ameliorate tooth decay.

In the Escondido vs. Coshow safe water lawsuit (4) all parties including the State of California agreed (stipulated) that on average batches of HFSA test are contaminated with significant amounts of arsenic. Extrapolating from the measurements and the minimum risk level of 1 cancer per million, the arsenic levels alone increases the risk of bladder or lung cancer from 1 per million to 1 per 15,000 resident water users. The sodium fluoride used is also lead and arsenic contaminated but was not included in the lawsuit Escondido vs. Coshow safe water analysis.

The 2006 National Research Council Review of Fluoride in Drinking Water (5) elucidated the enormous gap between the perceived safety and the numerous injuries from ingested fluoride to kidney, bone, neurological and endocrine functions. They concluded that, "**the safe drinking water standard for fluoride (4 ppm) causes significant damage to teeth, and places consumers at elevated risk for bone damage, including bone fracture and joint pain**." Robert Issacson noted in the neurological chapter that extremely fluoride resistant rats showed measurable neurological harm at the alleged beneficial level of 1 PPM F. (6) There are now over 70 human studies that have found harm to brain health from ingested fluoride. (7) There are biased reviews but no clinical studies, valid by today's rigorous scientific standards (broad based, blinded with most

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variables controlled: dose, education, income), that have not found measurable neurological injury to babies and fetuses exposed to fluoride.

After the NRC released the scathing review the American Dental Association (ADA) sent a warning to their members in an egram November 9th, 2006 stating, *"If liquid concentrate or powdered infant formula is the primary source of nutrition, it should be mixed with water that is fluoride free or contains low levels of fluoride to reduce the risk of fluorosis."*

The CDC 2001 in the MMWR Vol. 50/No. RR-14 reported that, *"The prevalence of dental caries in a population is not inversely related to the concentration of fluoride in enamel."* (8)

Munksgaard 1996 reported, *". . a higher concentration of enamel fluoride is not necessarily more efficacious in preventing dental caries."* (9)

Considering the fact that the NRC documented thyroid and endocrine disruption by fluoride occurs in humans at 0.05-0.1 normal iodine and 0.03 mg/kg/day with iodine deficiency and an infant fed 0.7 mg/L tap-water-formula on average receives 0.05 mg/kg/day it is irresponsible to continue allow harmful levels of fluoride in drinking water for no particularly good reason. (10)

Featherstone in 2000 published in JADA that*, "The fluoride incorporated developmentally—that is systemically in to the normal tooth mineral – is insufficient to have a measurable effect on acid solubility."*

And *"Even when the outer level of enamel has higher fluoride levels, such as 1000 ppm, it does not measurably withstand acid-induced dissolution any better than enamel with lower levels of fluoride."* (11)

It is time to protect babies and not out of date dogma.

Sincerely,

David Kennedy, DDS

(1) https://oehha.ca.gov/water/chemicals/arsenic
(2) NDA withdrawn for fluoride and vitamin combinations due to "No evidence of effectiveness" Drug Therapy June 1975
(3) Kirkman Laboratories, Inc. Warning letter (January 13, 2016)
(4) https://caselaw.findlaw.com/ca-court-of-appeal/1492563.html
(5) https://nap.nationalacademies.org/catalog/11571/fluoride-in-drinking-water-a-scientific-review-

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of-epas-standards

(6) Varner et al., Chronic administration of aluminum-fluoride or sodium-fluoride to rats in drinking water: alterations in neuronal and cerebrovascular integrity 1998

(7) https://fluoridealert.org/issues/health/brain/https://www.govinfo.gov/content/pkg/FR-2000-06-22/html/00-13546.htm

(8) Centers for Disease Control MMWR Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States Vol. 50. RR-14 Clarkson BH, et al., Rational use of fluorides in caries control. In: Fejerskov O, Ekstrand J. Burt BA, eds. Fluoride in dentistry. 2nd ed. Copenhagen

(9) Munksgaard, 1996, Nature and roll of loosely bound fluoride in dental caries. Journal of Dental Research Vol. 69 1990

(10) NRC 2006 Chapter 8 Endocrine Summary of major fluoride effects in humans Table E-2 p. 262

(11) Featherstone JD. The science and practice of caries prevention. J Am Dent Assoc. 2000 Jul;131(7):887-99 10.14219/jada.archive.2000.0307

Please accept the following in testimony for the November 30, 2022 meeting.

TESTIMONY:

The Safe Water Drinking Act (SWDA) says that no national agency can require any substance be added to water for the purpose of treating people, but national agencies (*primarily HHS & CDC*) and private partners spend hundreds of millions of dollars annually promoting fluoridation policy.

The 2006 National Research Council (NRC/NASEM) advised the EPA that its maximum contaminant level goal (MCLG) of 4 ppm for fluoride in drinking water was not protective of human health, but EPA has done nothing to address that charge.

Moreover, the 2006 NRC advised there was significant evidence of harm to bodies, brains and bones from fluoride in drinking water at concentrations deemed safe by the EPA and no evidence of safety at any concentration for susceptible subpopulations who include pregnant women & their fetuses, bottle-fed infants & young children, the elderly and those in fragile health (*i.e. those with kidney and thyroid disease or diabetics*.) Yet, EPA has done nothing in over 16 years to address that gap in science.

Approximately 99% of the fluoridation chemicals added to municipal water go directly into the environment along with the tramp contaminants from those chemicals which include arsenic, aluminum, barium, cadium, manganese, lead, etc. This pollution, much of it imported from China & Mexico, persists in our environment. But EPA has enabled easements for those contaminants and subcontracted oversight to a private agency (NSF) in an effort to put distance between itself and the intentional pollution of our communities, willfully blind to the culminative effect on American water sources.

Today, we have hundreds of studies documenting that not only are the EPA maximum and secondary contaminant levels for fluoride (*and please note that fluoride is a toxin used as a medicine as well as being recognized by the EPA as a water contaminant and developmental neurotoxicant*) causing misery in millions of Americans, we also know that the EPA and other players in the fluoridation charade don't care - that they will spend hundreds of thousands of dollars to protect the profitable fluoridation policy in violation of the intent of the SDWA and the explicit regulations of the Toxic Substances Control Act (TSCA) rather than fulfill their mission of protecting health and environment.

One of those studies, a 2021 Benchmark Dose Analysis, found that 0.2 ppm fluoride in drinking water has an adverse effect on baby brains similar to lead. Others have documented that 0.5 ppm impedes normal thyroid function. Fluoridation schemes target a 0.7 ppm concentration, and diabetics and kidney patients who drink excessive amounts of water and so get higher doses of fluoride from 'optimally' fluoridated municipal water are in a vicious cycle that damages kidneys. Even analysis of recent NHANES data shows that adolescents living in fluoridated communities have blood markers suggesting they are at heightened risk of kidney and liver disease. And just as fluoride pollution accumulates in our environment, studies document that fluoride accumulates in bones where it causes inflammation and makes the bones more brittle in populations who have consumed this poison for decades. Yet, the EPA protects their policy rather than protect people.

Finally, let me remind you that fluoride facilitates the absorption of lead, copper and other metals into the body. Heck, fluoride leaches lead and copper out of pipes and fixtures. The Sandy, Utah fluoridation

overfeed in 2019 ruined appliances and sickened people - resulting in trips to the emergency room of hospitals for many including at least one infant. The Sunset, Utah overfeed in 2022 was less dramatic, but fluoridation overfeeds happen all the time in every state.

And at every opportunity, the EPA not only turns a blind eye to the harm caused by fluoridation schemes, it actively resists fulfilling its mission.

Do the right thing: Make the MCLG for fluoride zero, inform HHS that fluoridation schemes are neither advisable nor sustainable, and tell states to stop enabling fluoridation schemes.

(Attached annotated biography contains over 100 scientific citations published since 2015.)

_____

Karen Spencer

To whom it may concern:

I believe any chemical should be demonstrated safe before it's allowed for human consumption.

Fluoride - at levels in fluoridated water - hasn't been demonstrated safe.

Therefore, fluoridated water shouldn't be allowed.

A brief summary of the scientific evidence:

The National Research Council determined in 2006 that fluoride caused dental fluorosis, was an endocrine disruptor, increased hip fractures, kidney disease and severity of diabetes, and decreased thyroid function. It also concluded that **"it is apparent that fluorides have the ability to interfere with the functions of the brain,"** citing several studies showing lowered IQs in children. (https://nap.nationalacademies.org/catalog/11571/fluoride-in-drinking-water-a-scientific-review-of-epas-standards - p. 222)

Since 2006, the scientific evidence on fluoride's many harms has increased and the data on significantly lowering IQs has become especially compelling:

- 2012: A Harvard-funded meta-analysis found that children ingesting higher levels of fluoride tested an average of 7 IQ points lower in 26 out of 27 studies. Most had higher fluoride concentrations than in U.S. water, but many had total exposures to fluoride no more than what millions of Americans receive. (https://ehp.niehs.nih.gov/doi/10.1289/ehp.1104912)

- 2019: An initial draft systematic review of 149 human studies and 339 animal studies by the U.S. National Toxicology Program (NTP) concluded **that "fluoride is presumed to be a cognitive neurodevelopmental hazard to humans."** (https://fluoridealert.org/articles/references3/ #14)

- 2019: Numerous internationally-known scientists publicly stated that fluoridated water is **equivalent to lead** in lowering IQ. (https://fluoridealert.org/content/quotes-equating-effect-size-in-green-2019-paper-to-that-of-lead-on-iq/)

- 2020: In a lawsuit against the EPA for allowing water fluoridation (*Food and Water Watch et al vs. Environmental Protection Agency*), the EPA's lead scientist acknowledged that the four highest-quality scientific studies, all funded by the National Institutes of Health, linked higher fluoride levels with lower IQs or increased ADHD rates – **all at levels in fluoridated water**. (https://fluoridealert.org/content/bulletin_6-16-20/)

- 2022: A follow-up NTP review showed that 25 out of the 27 highest quality neurotoxicity studies linked higher fluoride with lower IQs in children, **11 at levels in fluoridated water**. (https://fluoridealert.org/wp-content/uploads/ntp.neurath.submission-to-nas-on-revised-ntp-monograph.10-19-20.pdf)

Fluoridated water can't be demonstrated safe. On the contrary, extensive scientific evidence makes it obvious that it can be harmful.

Moreover, there is a consensus (including the CDC) that fluoride's effectiveness in preventing cavities is mostly topical, such as in toothpaste, not from swallowing. The Cochrane Collaboration, the gold standard of evaluating effectiveness, said that "We did not identify any evidence . . . to determine the effectiveness of water fluoridation for preventing caries in adults . . . There is insufficient evidence to determine whether water fluoridation results in a change in disparities in caries levels across socio-economic status." (https://www.cochrane.org/CD010856/ORAL_water-fluoridation-prevent-tooth-decay). Finally, World Health Organization data show cavity rates in children have dropped as much in nations that don't fluoridate as in those that do. (https://fluoridealert.org/content/who-data/).

Bottom line, water fluoridation presents significant risks while providing little or no benefits. Please end this practice as soon as possible.

Thank you,

Richard North

November 21, 2022
US Environmental Protection Agency
Office of Ground Water and Drinking Water
National Drinking Water Advisory Council

Dear Members of the Council:

My name is Amanda Sleeper, and I live in Landenberg, PA. I have a Ph.D. in Neurobiology and Pharmacology from Yale University, I am a registered nurse and a wellness coach certified in brain health by Amen Clinics.

I would like to share some personal insights into the issue of public water fluoridation. I realize that many believe fluoridation is safe for everyone. Based on my own experience, I can say unequivocally that this is false. I first became interested in water fluoridation in 2012 when I was diagnosed with a fluoride hypersensitivity. This was detected by an ALCAT test (attached), which examines reactions to food and chemicals. I was surprised by the finding since fluoride is so widely accepted as safe and has been added to water for many years.

I have lived in fluoridated communities my entire life. I did some research and learned that the dental benefits of fluoridated water are minimal at best. There is a small but significant portion of the population (likely upwards of 5%, based on scientific studies) that is hypersensitive to fluoride at the concentrations added to public water supplies. There are a variety of associated symptoms that include fatigue, brain fog, weakness, headache/migraines, gastrointestinal distress, and rashes. Further, I was extremely concerned by the compelling body of high-quality, peer-reviewed research that shows fluoride is a neurotoxin to the developing brain, at concentrations added to public water supplies, and can cause loss of IQ and an increase in ADHD rates.

The most recent CDC data from 2018 states that 207,426,536 individuals receive fluoridated drinking water. That means that over 10,000,000 United States citizens are suffering harm to their health from fluoride hypersensitivity alone – and the vast majority of these citizens never realize it's because of fluoridation.

To evaluate the impact of fluoride on my health, I decided to eliminate fluoride from my dental products and my drinking and cooking water. Fluoride is difficult to remove from water, requiring distillation or reverse osmosis filtration. I purchased a distiller, stopped using canned foods and beverages containing unknown water sources, and I stopped purchasing meals or beverages from restaurants. Within weeks I had a significant increase in my energy. I had chronic rashes on my hands that caused redness, itching, and chapped, cracking skin. This quickly went away, and I have not experienced it since. Further, I used to get many respiratory illnesses every winter, leaving me run down for weeks and requiring antibiotics. After eliminating fluoride, I have had very few infections and have recovered quickly without requiring antibiotics. My personal experiences, confirmed by the independent ALCAT test, show that my

significantly improved health is a result of avoiding fluoride. Avoiding fluoride exposure transformed my health and quality of life.

I also have significant dental fluorosis in my teeth, known to be caused by over-exposure to ingested fluoride when I was a child. Fluoridation supporters say that fluorosis is barely noticeable and doesn't bother anyone. Again, this is false. Like many people, I found the staining objectionable, and I have attempted to minimize it cosmetically, at significant expense.

As you consider the water fluoridation policy in the United States, I urge you to consider the effects on those of us who are hypersensitive to fluoride. Most developed nations do not fluoridate water, and programs such as Scotland's Childsmile have reduced disparities in dental health using alternate strategies. Including fluoride in the water system as a mass treatment for dental caries denies the basic human right to informed medical consent. For those who desire potential dental benefits from fluoride, there are many cost-effective, topical applications such as toothpaste. Conversely, the removal of fluoride from tap water is expensive, time-consuming, and beyond the reach of low-income families who cannot afford to protect themselves. This is a serious social justice issue.

Again, thank you for your time and open-mindedness on this important issue, and I strongly urge you to end the practice of water fluoridation.

Sincerely,

Amanda A. Sleeper, PhD, RN

Enclosure: Amanda Sleeper Lab Report: ALCAT_01-17-12.pdf

Dear National Drinking Water Advisory Council:

I am interested in making a 3 minute public statement on November 30th. My name is Brenda Staudenmaier and I am one of the plaintiffs in the Federal TSCA Lawsuit against the US EPA over the neurotoxicity of fluoride chemicals added to the public drinking water supply. It is estimated that around 4.5 million IQ points are lost per year due to fluoride neurotoxicity. This equates to about $100 billion per year in economic damage.

I am also one of Nancy Quirk's rate payers in Green Bay. I am writing over my concerns with the trace amounts of lead and arsenic contaminating the fluoride chemicals used in Green Bay and other communities in the US. Any level of lead and arsenic violates the MCL Goal of zero. Please see my attachment for reference to the amount of lead and arsenic in the Green Bay fluoride chemicals.
Nancy has not been very helpful regarding the neurotoxicity evidence of fluoride or the best science that we have to date finding it lowers IQ and increases rates of ADHD. Nancy has gone above and beyond to discount this science, even going as far as being listed in 2020 as an advisor to the American Fluoridation Society which is the largest group in the US who lobbies for fluoride chemicals. This group is made up of highly biased dentists who know very little about epidemiology, endocrinology, child development, and neurotoxicity. This group will prop up poor studies conducted using surveys, studies that lack individual fluoride biomarkers such as urine samples, and use biased studies that support their side. These people claim fluoride has been well studied and proven to reduce tooth decay when added to drinking water, while there has never been a randomized controlled trial done. The entire fluoride program is based on highly biased and outdated evidence supported by endorsements.

According to Dr. Slade of the University of North Carolina Chapel Hill, "Dental health benefits of fluoride in drinking water have never been tested in a randomized controlled trial (RCT). Instead, results from observational studies and a few non-randomized, community intervention studies were sufficient to justify addition of fluoride to many public water systems during the 20th century and to defend against fluoridation's critics."

I want to remind your group of the research EPA has done finding fluoride is harmful to children. EPA scientists conducted research finding fluoride is much more toxic to the brain than lead:

A Meta-Analysis of Stressors from the Total Environment Associated with Children's General Cognitive Ability (2020)
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7432904/
From section 3.2.1. Chemical Stressors: Toxic Elements "When examined individually, Hg [mercury] resulted in a 10% increase in impacting childhood cognition (OR = 1.10, $p \leq 0.001$), which is not unexpected as mercury is a known neurotoxicant.** Lead was also observed to have a slight (3%) increase in impact to cognition (OR = 1.03, $p \leq 0.001$), and has been widely described to cause cognitive delays. Fluoride was observed to have the greatest increase in impacting cognitive ability [40% increase] (OR = 1.40, $p \leq 0.05$) and it is often reported to affect memory and cause cognitive deficits."
Nilsen FM, Ruiz JDC, Tulve NS. A Meta-Analysis of Stressors from the Total Environment Associated with Children's General Cognitive Ability. Int J Environ Res Public Health. 2020 Jul 29;17(15):5451.

I also want to provide you with the research used in our lawsuit.
Maternal and fetal exposures to fluoride during mid-gestation among pregnant women in northern California
https://ehjournal.biomedcentral.com/articles/10.1186/s12940-020-00581-2?eType=EmailBlastContent&eId=5e4bf31d-32d9-49e1-a78a-8fc83cf8cab7
Maternal-Infant Research on Environmental Chemicals (**MIREC**):
http://www.mirec-canada.ca/en/

1. **Association Between Maternal Fluoride Exposure During Pregnancy and IQ Scores inOffspring in Canada. Rivka Green, Bruce Lanphear, Richard Hornung, et al. JAMAPediatrics. August 19, 2019 [online ahead of print].**
2. **Fluoride exposure from infant formula and child IQ in a Canadian birth cohort. Till C,Green R, Flora D, Hornung R, Martinez-Miller EA, Blazer M, Farmus L, Ayotte P, Muckle G,Lanphear B. Environment International. Nov, 18, 2019.**
3. **Fluoride exposure and thyroid function among adults living in Canada: Effect modification by iodine status. Ashley J. Malin, Julia Riddell, Hugh McCague, ChristineTill. Environment International. Volume 121, Part 1, December 2018, Pages 667-674.**
4. **Community Water Fluoridation and Urinary Fluoride Concentrations in a NationalSample of Pregnant Women in Canada. Christine Till, Rivka Green, John G. Grundy, etal. Environmental Health Perspectives. 2018.**

5. **Association of water fluoride and urinary fluoride concentrations with attention deficit hyperactivity disorder in Canadian youth. Julia K. Riddell, Ashley J. Malin, DavidFlora, Hugh McCague, Christine Till. Environment International. Volume 133, Part B, 2019**

Early Life Exposures in Mexico to Environmental Toxicants (**ELEMENT**): [SEP]
https://sph.umich.edu/cehc/element/index.html

1. **Prenatal Fluoride Exposure and Cognitive Outcomes in Children at 4 and 6-12 Years of Age in Mexico. Morteza Bashash, Deena Thomas, Howard Hu, et al. Environ HealthPerspect. Sept 2017. Vol 125, Issue 9.**
2. **OP V - 2 Prenatal fluoride exposure and neurobehavior among children 1-3 years of age in Mexico. Deena Thomas, Brisa Sanchez, Karen Peterson, et al. Occup Environ Med.2018;75:A10.**
3. **Prenatal fluoride exposure and attention deficit hyperactivity disorder (ADHD)symptoms in children at 6-12 years of age in Mexico City. Morteza Bashash, MaelleMarchand, Howard Hu, et al. Environment International. Volume 121, Part 1, December 2018, Pages 658-666.**
4. **Fluoride exposure and pubertal development in children living in Mexico City. YunLiu, Martha Téllez-Rojo, Howard Hu, et al. Environ Health. 2019 Mar 29;18(1):26.**

These are the studies that have been conducted with CDC data:

"Our finding that neutrophils and monocytes are associated with higher plasma fluoride in U.S. children and adolescents is consistent with animal data showing fluoride related effects of increased inflammation." Fluoride exposure and blood cell markers of inflammation in children and adolescents in the United States: NHANES, 2013–2016
https://ehjournal.biomedcentral.com/articles/10.1186/s12940-022-00911-6
"Water fluoridation results in higher plasma fluoride levels in those with lower renal function. How routine water fluoridation may affect the many millions of Americans with Chronic Kidney Disease, who are particularly susceptible to heavy metal and mineral accumulation, needs to be further investigated."
Role of renal function in the association of drinking water fluoride and plasma fluoride among adolescents in the United States: NHANES, 2013–2016.
https://pubmed.ncbi.nlm.nih.gov/35688217/
Environ Res . 2022 Oct;213:113603. doi: 10.1016/j.envres.2022.113603. Epub 2022 Jun 7.

"Fluoride exposure may contribute to complex changes in kidney and liver related parameters among U.S. adolescents. As the study is cross-sectional, reverse causality cannot be ruled out;

therefore, altered kidney and/or liver function may impact bodily fluoride absorption and metabolic processes."
Fluoride exposure and kidney and liver function among adolescents in the United States: NHANES, 2013-2016
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6754771/

"This study suggested that fluoride exposure may affect childhood blood pressure."
Association between fluoride exposure and blood pressure in children and adolescents aged 6 to19 years in the United States: NHANES, 2013-2016
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"Median (IQR) water and plasma fluoride levels were 0.48 (0.53) mg/L and 0.34 (0.30) μmol/L respectively. An IQR increase in water fluoride was associated with a 3.3 month earlier first menstrual period (B= -0.28, 95%CI: -0.54, -0.02, p = 0.05). Additionally, we observed a significant interaction between plasma fluoride and race/ethnicity in association with age of menarche (p = 0.01). For non-Hispanic black females, each IQR increase in plasma fluoride was associated with a 5-month earlier age of menarche (B=-0.42, 95%CI: -0.61, -0.23, p < 0.001)."
Fluoride exposure and reproductive health among adolescent females in the United States: NHANES 2013-2016
https://ehp.niehs.nih.gov/doi/abs/10.1289/isee.2020.virtual.O-OS-619

"In 2001-2002, the weighted percentage prevalence of the denoted dental fluorosis categories were: 49.8% normal (i.e., unaffected), 20.5% questionable, and 29.7% very mild and above. In 2011-2012, the weighted percentage prevalence categories were: 31.2% normal, 7.5% questionable, and 61.3% very mild and above. When comparing years 2001-2002 with the years 2011-2012, the prevalence of very mild and above fluorosis increased by 31.6% (P <.0001) for the 2011-2012 group." "There was a difference of 31.6% in dental fluorosis prevalence between 2012-2011 when compared to data from 2002-2001 in adolescents aged 16 and 17 years. The continued increase in fluorosis rates in the U.S. indicates that additional measures need to be implemented to reduce its prevalence."
Dental Fluorosis over Time: A comparison of National Health and Nutrition Examination Survey data from 2001-2002 and 2011-2012. https://pubmed.ncbi.nlm.nih.gov/29500282/ J Dent Hyg . 2018 Feb;92(1):23-29.

Concentrations of fluoride in water and plasma for US children and adolescents: Data from NHANES 2013-2014
https://pubmed.ncbi.nlm.nih.gov/28110134/ Environ Toxicol Pharmacol . 2017 Mar;50:20-31. doi: 10.1016/j.etap.2017.01.006. Epub 2017 Jan 17.

“Fluoride exposure may contribute to changes in sleep cycle regulation and sleep behaviors among older adolescents in the US. Additional prospective studies are warranted to examine the effects of fluoride on sleep patterns and determine critical windows of vulnerability for potential effects.”
Fluoride exposure and sleep patterns among older adolescents in the United States: a cross-sectional study of NHANES 2015-2016
https://pubmed.ncbi.nlm.nih.gov/31818308/ Environ Health . 2019 Dec 9;18(1):106. doi: 10.1186/s12940-019-0546-7.

Summary of the International Academy of Oral Medicine and Toxicology (IAOMT) Position against Fluoride Use in Water, Dental Materials, and Other Products

Other than its natural existence in minerals, as well as in soil, water, and air, fluoride is also chemically synthesized for use in community water fluoridation, dental products, fertilizers, pesticides, and an array of other consumer items. For example, hydrogen fluoride is used to make aluminum, electrical components, fluorescent light bulbs, herbicides, high-octane gasoline, plastics, refrigerants, and etched metal and glass (such as that used in some electronic devices). Additionally, fluorinated compounds are present in a significant quantity of pharmaceutical drugs, and perfluorinated chemicals are used in carpets, cleaners, clothing, cookware, food packaging, paints, paper, and other products.

Unfortunately, all of these applications were introduced before the health risks of fluoride, safety levels for its use, and appropriate restrictions were adequately researched and established. Compounding this dangerous status quo is the fact that the National Research Council concluded the maximum contaminant level goals for fluoridated drinking water should be lowered in 2006, but the Environmental Protection Agency has yet to lower the level.

Fluoride is not a nutrient and has no biological function in the body. Furthermore, hundreds of research articles published over the past several decades have demonstrated potential harm to humans from fluoride at various levels of exposure, including levels currently deemed as safe. Scientific research has examined fluoride's effect on the skeletal system in detail and has indicated a definitive link between fluoride exposure and skeletal fluorosis, as well as dental fluorosis (which is permanent damage to the developing tooth, is the first visible sign of fluoride toxicity, and is currently on the rise in the United States). Fluoride is also known to impact the cardiovascular, central nervous, digestive, endocrine, immune, integumentary, renal, and respiratory systems, and exposure to fluoride has been linked to Alzheimer's disease, cancer, diabetes, heart disease, infertility, and many other adverse health outcomes.

The need to update previously established fluoride guidelines is extremely urgent, as fluoride exposures have dramatically increased for all Americans since the 1940's, when community water fluoridation was first introduced. In the subsequent decades, fluoride was also introduced for use in dental products applied in the office and at home, such as toothpaste and mouth rinse, and during this time frame, it was also added to other consumer products. Understanding fluoride exposure levels from all sources is crucial because recommended intake levels for fluoride in water and food should now be based upon these common multiple exposures.

However, accurate data currently does not exist for either collective sources or singular sources of fluoride exposure. Another concern is that fluoride has a synergistic interaction with other elements. Fluoride is also known to impact each individual differently based on allergies to fluoride, nutrient deficiencies, genetic factors, and other variables. Additionally, susceptible populations with low body weights, such as infants and children, and individuals who consume increased amounts of water, such as athletes, military personnel, outdoor laborers, and those with diabetes or kidney dysfunction, can be more intensely effected by fluoride. Therefore, recommending an optimal level of fluoride or "one dose fits all" level is unacceptable.

It is obvious that risk assessments must consider the total fluoride exposure from all sources, as well as individual susceptibility. Furthermore, there is a significant gap, if not a major void, in scientific literature that includes fluoride releases from products administered at the dental office, such as

dental filling materials and varnishes, as part of overall fluoride intake. Part of this is likely due to the fact that the research attempting to evaluate singular exposures from these dental products has demonstrated that determining any type of "average" release rate is virtually impossible.

Moreover, there is even doubt about fluoride's efficacy in preventing tooth decay. For example, research has indicated that fluoride does not aid in preventing pit and fissure decay (which is the most prevalent form of tooth decay in the U.S.) or in preventing baby bottle tooth decay (which is prevalent in poor communities). Also, research has suggested that in malnourished children and individuals of lower socio-economic status, fluoride can actually increase the risk of dental caries due to calcium depletion and other circumstances.

An important consideration is that the trend of decreased decayed, missing, and filled teeth over the past several decades has occurred both in countries with and without the systemic application of fluoridated water. This suggests that increased access to preventative hygiene services and more awareness of the detrimental effects of sugar are responsible for these improvements in dental health. Research has also documented decreases of tooth decay in communities that have discontinued water fluoridation.

Additionally, ethical questions have been raised in regard to the use of fluoride, especially because of fluoride's ties to the phosphate fertilizer and dental industries. Researchers have reported difficulties with getting articles published that are critical of fluoride, and an urgent need for an appropriate application of the precautionary principle (i.e. first, do no harm) related to fluoride usage has emerged.

The issue of consumer choice is vital to fluoride usage for a variety of reasons. First, consumers have choices when it comes to utilizing fluoride-containing products; however, many over-the-counter products do not offer appropriate labeling. Second, materials used at the dental office provide virtually no consumer informed consent because the presence of fluoride (and its risks) in these dental materials is, in many cases, never mentioned to the patient. Third, the only choice consumers have when fluoride is added to their municipal water is to buy bottled water or costly filters. Concerns have been raised that fluoride is added only for allegedly preventing tooth decay, while other chemicals added to water serve a purpose of decontamination and elimination of pathogens.

Educating medical and dental practitioners, students, consumers, and policy makers about fluoride exposures and the associated potential health risks is essential to improving the dental and overall health of the public. Since a scientific understanding of the health effects of fluoride has been limited to promoting its benefits, the reality of its overexposure and potential harms must now be conveyed to healthcare workers and students, such as those in the medical, dental, and public health fields.

Although informed consumer consent and more informative product labels would contribute to increasing public awareness about fluoride intake, consumers also need to take a more active role in preventing caries. In particular, a better diet (with less sugar), improved oral health practices, and other measures would assist in reducing tooth decay.

Finally, policy makers are tasked with the obligation of evaluating the benefits and risks of fluoride. These officials have a responsibility to acknowledge the dated claims of fluoride's alleged purposes, many of which are based on limited evidence of safety and improperly formulated intake levels that fail to account for multiple exposures, fluoride's interaction with other chemicals, individual variances, and independent (non-industry sponsored) science.

In summary, given the elevated number of fluoride sources and the increased rates of fluoride intake in the American population, which have risen substantially since water fluoridation began in the 1940's, it has become a necessity to reduce and work toward eliminating avoidable sources of fluoride exposure, including water fluoridation, fluoride-containing dental materials, and other fluoridated products.

To NDWAC members and relevant EPA and CDC officials:

This statement is my basis for a condensed 3-minute oral presentation for EPA's National Drinking Water Advisory Council (NDWAC) public meeting, Wednesday November 30, 2022

Thank you for this opportunity to share important material for a rare and time-sensitive challenge. I am John Mueller, a licensed civil engineer, having practiced in the broad field of water resources engineering. I am retired after a professional career that included 25+ years with water utilities in the public sector, including wastewater and drinking water treatment plant operations and maintenance. My college degree is in geophysical engineering from the Colorado School of Mines, one of the world's premier research universities for science and engineering for developing Earth's mineral resources.

While this is my first time attending a NDWAC public meeting, I have been attending NEJAC and WHEJAC public meetings and have spoken at more than a few of them beginning with WHEJAC's inaugural meeting in March last year. Those meetings have created an unprecedented and rare opportunity under President Biden's initiatives. At those meetings I presented statements that argue the need to end water fluoridation. The time is ripe to further share the argument with EPA's decision-makers through the NDWAC. I know that other activists aspiring to help end fluoridation have also addressed the issue with the NEJAC and WHEJAC, some of them personally suffering painful physical, mental, family, and economic hardships from sensitivities to their respective fluoride exposures. Since I have some knowledge of what others may be submitting for this meeting, I'll forego extraneous references to the overwhelming science presented by others and go straight to the essence of my argument, which is the following:

> EPA Administrator Michael Regan, with full authorization and justification from the initiatives created by and with Presidential EOs #13990 and #14008, can and must concede in the current TSCA lawsuit pending in the court of Judge Edward M. Chen in San Francisco, Federal District Court of the Northern District of California. The lawsuit, filed in April 2017 by plaintiffs "pursuant to TSCA, 15 U.S.C. § 2620(b)(4)," petitions EPA to institute rulemaking that will ban the addition of fluoridation chemicals to public water supplies. During the ongoing trial, the original petition, filed in November 2016, has been supplemented with additional high-quality, peer reviewed science published in reputable journals since the petition's original 2016 filing, including sources cited here in this quoted excerpt from a court filing:
>
> > "1) the trial record together with Plaintiffs' admitted exhibits and summary of the record; 2) the MIREC and ELEMENT studies; 3) the pooled BMD analysis of the MIREC and ELEMENT data; 4) the National Toxicology Program's [NTP's] revised draft monograph containing a systematic review of the fluoride literature; 5) a published statement from former NTP director Dr. Linda Birnbaum, about the 'consequential' findings of the NTP's revised monograph; 6) the facts to which the parties stipulated at trial; and 7) several orders of this Court which reject legal positions that EPA relied upon in its denial of the initial petition."
>
> EPA declined to review the supplemental information for the plaintiffs and the court, claiming lack of resources due to other priorities.
>
> We know the petition was initially denied by Administrator Scott Pruitt during the Trump Administration. Now, respecting President Biden's initiatives and the rare opportunities to right many wrongs, the denial under the Trump administration in 2017 can and must be reversed. Detailed justification for a proposed rulemaking

to be published in the Federal Register can be essentially bulletproofed as it is readily available in the evidence, the overwhelming weight of evidence, and expert testimony presented in the case. EPA's resource requirements to settle the case by concession would be the least of any other alternatives, especially if, in case EPA continues its scientific opposition, a ruling for the plaintiffs is left to Judge Chen with automatic opportunity for appeal, which would further delay protection of public health and would do so at significant additional cost. In that case, EPA might again claim absence of resources, and then the case goes, and on, and on, and on . . .

The most immediate issues needing acknowledgement and attention include but are not limited to the following:

THE UNFORTUNATE

- Community Water Fluoridation (CWF) had its beginnings as a scientific study in 1945 in Grand Rapids, Michigan - its purpose ostensibly to help prevent tooth decay (also known as dental caries) in children. Data in public health reports reveal it has failed miserably in achieving that objective, and instead has contributed to the problems of environmental justice issues. Attached to this email are documents acknowledging fluoridation as an environmental injustice.
- The public health issue of childhood dental caries is also reported to be at epidemic levels and rampant in the inner cities, on Tribal lands and in other areas lacking adequate professional dental care, and in populations living with poor diet and nutrition in neighborhood areas identified as grocery deserts.
- The CWF program wastefully attempts to treat everyone against tooth decay, whether needed or not, rich or poor, Black or White or in between; it claims to have achieved quantified but unverifiable rates of success that vary largely depending on who makes the claim and under what circumstances. So a dramatic paradigm shift is in order and desperately needed if the CDC hopes to achieve the longstanding and well-intentioned objective of preventing childhood tooth decay, which CWF has failed to accomplish.

THE MOST DAUNTING CONUNDRUM, INDEED!

- The functional relationship or interface of the EPA's regulatory authority with CWF is subject to the reality that the CWF program of the CDC's Division of Oral Health will come to an abrupt halt, surprising and disturbing to many, when EPA initiates rulemaking that will ban the addition of fluoridation chemicals to public water supplies, with predictable pushback from the special interests on a grand scale. Furthermore, CWF has been seen as the life-blood program of that division in the CDC. Interagency cooperation will be necessary and can be facilitated by the White House Environmental Justice Interagency Council (IAC), created by EO #14008.
- Despite the obstacles created and cultivated by the history of fealty to special interests, the EPA has this rare opportunity to take a giant leap and show more credibility of its leadership's morality, responsibility, and effectiveness in safeguarding public health. It must stop allowing fluoridation and begin the necessary rulemaking, and relegate CWF to the history books as a program which has for too long gone against the spirit and intent of the SDWA and as an egregious violation of the public trust among the exponentially growing population segment of the well-informed.

THE PATH-FORWARD SOLUTION

- After decades of promoting fluoridation as being "safe and effective" and "one of the ten greatest public health achievements of the twentieth century," the CDC and HHS will

need an out. The most effective out can be in the form of a PR strategy that shields public opinion from the guilt of contaminating our water, and forwardly channels it to the future positives of new programs that are guaranteed to be more effective at treating childhood tooth decay, with programs that can be achieved with the more technologically advanced, individualized treatment services, and with more scientifically advanced dental industry policies, practices and localized, targeted programs where needed most, along with increased Medicaid reimbursements for practicing dentistry professionals.

- The general public does not read the FR, so they will only see the positives of the newer, much more effective programs to the credit of the dental industry (ADA). But water utility managers and specialists at the AWWA do pay attention to the FR as a matter of course to ensure they stay current with regulations and recommendations. They and the other special interests will have to develop their own PR strategies similarly to advance and embolden the public trust.
- Dentistry's considerable advancements over seven decades, in knowledge and understanding of how oral health impacts a person's overall general health, should be applied where it is now needed most, as it has been with those who can afford regular check-ups and have reasonable and regular access to good diet and nutrition. Highly successful programs like Scotland's Childsmile can serve as models for CDC to develop and support with grant funding as the latest and greatest alternative to fluoridation.
- The Division of Oral Health will have an all new mission with its effectiveness having a much brighter future with staff having far greater job satisfaction from boots on the ground progress in promoting oral health. Such targeted and focused community service programs can have multiple, positive ripple effects in community economic development through improved school attendance and less time off from work needed by parents to care for sick children, along with their overall public health improvements.
- The evidence presented in the original TSCA citizens petition filed in November 2017, and additionally the scientific studies published since then, and the pending release of the NTP's report on fluoride's developmental neurotoxicity, provide all the science needed to fully justify on scientific grounds the EPA conceding in the TSCA trial and initiating the necessary rulemaking process.
- Answering the need for additional research, as was concluded in the NRC's 2006 report on fluoride in drinking water, now sixteen years later there is plenty of published scientific data necessary to inform and process the long overdue revisions to fluoride's MCLG and MCL.

Again, thank you for this opportunity to provide comment. EPA's integrity and public trust are at stake, and granting the petition to ban fluoridation can be a milestone in history to the credit of our current administration for the nation and the EPA.

Sincerely,

John Mueller
Guthrie, Oklahoma

LEAGUE of UNITED LATIN AMERICAN CITIZENS

Civil Rights Violation Regarding Forced Medication

WHEREAS, the League of United Latin American Citizens is this nation's oldest and largest Latino organization, founded in Corpus Christi, Texas on February 17, 1929; and

WHEREAS, LULAC throughout its history has committed itself to the principles that Latinos have equal access to opportunities in employment, education, housing and healthcare; and

WHEREAS, LULAC advocates for the well-being of, but not exclusively of, Hispanics throughout our country; and

WHEREAS, safe drinking water is a necessity for life; and

WHEREAS, the purpose of a public water supply is to supply water to the entire community which is composed of people with varying health conditions, in varying stages of life, and of varying economic status; not to forcibly mass medicate the population which is a civil rights violation; and

WHEREAS, fluoridation is mass medication of the public through the public water supply; and

WHEREAS, current science shows that fluoridation chemicals pose increased risk to sensitive subpopulations, including infants, the elderly, diabetics, kidney patients, and people with poor nutritional status; and

WHEREAS, minority communities are more highly impacted by fluorides as they historically experience more diabetes and kidney disease; and

WHEREAS, minorities are disproportionately harmed by fluorides as documented by increased rates of dental fluorosis (disfiguration and discoloration of the teeth); and

WHEREAS, the National Research Council in 2006 established that there are large gaps in the research on fluoride's effects on the whole body; a fact that contradicts previous assurances made by public health officials and by elected officials, that fluorides and fluoridation have been exhaustively researched; and

WHEREAS, a growing number of cities and health professionals have rejected fluoridation based on current science and the recognition of a person's right to choose what goes into his/her body; and

WHEREAS, the CDC now recommends that non-fluoridated water be used for infant formula (if parents want to avoid dental fluorosis – a permanent mottling and staining of teeth), which creates an economic hardship for large numbers of families, minority and otherwise; and

WHEREAS, the League of United Latin American Citizens (LULAC), founded in 1929, has historically been a champion of the disenfranchised and a leader in the fight for social and environmental justice; and

WHEREAS, City Council Districts I-6 of San Antonio (predominantly minority districts) voted overwhelmingly that the public water supply should not be contaminated with fluoridation chemicals; and

WHEREAS, the election to fluoridate the water, essentially disenfranchised the right of these minority Districts to safe drinking water for all; and

WHEREAS, the U.S. Health and Human Services and the EPA (January 2011) have recently affirmed the NRC Study results that citizens may be ingesting too much fluoride and that the exposure is primarily from drinking water; and

WHEREAS, the proponents of fluoridation promised a safe and effective dental health additive, but the San Antonio Water System's (SAWS) contract for fluoridation chemicals proves a "bait and switch"; as SAWS is adding the toxic waste by-product of the phosphate fertilizer industry, that has no warranty for its safety and effectiveness for any purpose from the supplier (PENCCO, Inc.) or the source (Mosaic Chemical); and

THEREFORE, BE IT RESOLVED, that LULAC commends efforts by organizations that oppose forced mass medication of the public drinking supplies using fluorides that are industrial grade, toxic waste by-products which contain contaminants (arsenic, lead, mercury) which further endanger life; and

BE IT FURTHER RESOLVED, that LULAC supports efforts by all citizens working to stop forced medication through the public water system because it violates civil rights; and

BE IT FURTHER RESOLVED, that LULAC opposes the public policy of fluoridation because it fails to meet legislative intent; and

BE IT FURTHER RESOLVED, that LULAC demands to know why government agencies entrusted with protecting the public health are more protective of the policy of fluoridation than they are of public health.

Approved this 1st day of July 2011.

Margaret Moran
LULAC National President

Attachments to John Mueller statement:

- **Water Fluoridation and Environmental Justice: Fluoride Action Network**
- **League of United Latin American Citizens: Civil Rights Violation Regarding Forced Medication**

Water Fluoridation and Environmental Justice

a report submitted to the

Environmental Justice Interagency Working Group

from

The Fluoride Action Network
http://fluoridealert.org/

September 25, 2015

Do you want them drinking a neurotoxic chemical ?

STOP

Artificial Water Fluoridation

FluorideAlert.org

Water Fluoridation and Environmental Justice

This report was prepared by Neil Carmen, Ellen Connett and Paul Connett, with contributions from other members of the Fluoride Action Network, including David Kennedy, Chris Neurath, John Graham, Tara Blank, and Dan Stockin**.**

The following individuals and organizations support the sentiments and arguments presented in the Executive Summary and the supporting document:

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Worldwide Alliance to End Water Fluoridation

Fluoride Action Network
http://fluoridealert.org/

September 25, 2015

To the Environmental Justice Interagency Working Group

Re: Water Fluoridation and Environmental Justice

We are submitting these comments to the EJ Interagency Working Group in support of the formation and agenda goals of this group. We believe that the attached report (Water Fluoridation and Environmental Justice) gives a clear example of how such an interagency group working cooperatively together can right a bad policy for poor families and communities of color.

Hitherto, water fluoridation has fallen through the cracks as far as regulation by federal agencies has been concerned. The Food and Drug Administration has never regulated fluoridation nor have they ever tested the safety of fluoride. Their position is that fluoride is an "unapproved drug." The Environmental Protection Agency's Office of Water, since 1985, has had no jurisdiction over any chemical ADDED to water, only contaminants. The Department of Health and Human Services promotes fluoridation through the Division of Oral Health at the Centers for Disease Control and Prevention.

Here is the nub of the problem that needs correcting by interagency action. The CDC's Oral Health Division has become a "rogue elephant" as far as this practice is concerned. Their mission is to promote fluoridation – and they do so effectively and aggressively – but the problem is that they have a conflict of interest when it comes to monitoring or even questioning the safety of this practice. That has led them into performing with gross negligence in regards to the adverse effects of fluoridation on the poor and communities of color for several decades. Moreover, the expertise in this department is largely dental. Few if any of their personnel have training in other areas of medicine, toxicology or health risk assessment.

Since 1950, when fluoridation was approved, the role of federal agencies has been only to support the policy and in so doing they have had to dismiss and discredit anyone or any of the thousands of studies that reveal the inherent risks in this anti-science experiment.
For over 60 years-American citizens have been treated to Public Relations and propaganda rather than a dispassionate and objective analysis of either the effectiveness or safety of this practice.

Now that serious health effects have been documented – particularly fluoride's neurotoxic effects - it is time to end this practice. Very seldom can the simple turning off a tap (i.e. the spigot at the public water works) do so much good for so many.

We urge you to continue on the trajectory you have started. Working together you may be able to right many wrongs and in so doing regain the respect and trust of the American people.

Neil Carman, Ellen and Paul Connett
and other members of the Fluoride Action Network

"Federal agencies must identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations."
(Presidential Executive Order 12898
of February 11, 1994)

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WATER FLUORIDATION and ENVIRONMENTAL JUSTICE

Executive Summary

Evidence is presented that artificial water fluoridation as promoted by federal agencies has been ineffective in fighting tooth decay and in addition causes "*disproportionately high and adverse human health…effects…on minority populations and low-income* populations," in violation of Presidential Executive Order 12898 of February 11, 1994. This problem has been seriously compounded by the failure of these same agencies to warn communities of color of their special vulnerabilities to fluoride exposure in general and the water fluoridation program in particular. The agencies' actions are fueling calls by civil rights and environmental leaders for investigative hearings by Congress.

The way the EPA Office of Water is approaching its requirement to establish a safe level of fluoride in drinking water is not scientifically defendable, is politically compromised and makes absolutely no attempt to address numerous environmental justice issues that arise from water fluoridation.

There are more positive, effective, and comprehensive ways of fighting tooth decay, which also prevent disproportionate harm to poor families and communities of color and do not violate their civil rights.

Those who promote fluoridation correctly claim that most of tooth decay is concentrated in low-income families and those from communities of color. That is why it is tragic that 80% of dentists in the U.S. refuse to treat children on Medicaid. The poor need special and focused attention. Putting a toxic substance into everyone's drinking water is a very poor substitute. Water fluoridation has not evened-up the playing field as evidenced by the numerous reports of the dental crises being reported among low-income and communities of color in large U.S. cities that have been fluoridated for over 20 years. Far from helping low-income families and communities of color fluoridation causes them disproportionate harm.

Officials in the US Public Health Service knew as early as 1962 that African-Americans had a higher prevalence of dental fluorosis than whites. Dental researchers have continued to report this over many decades. In 2005 the CDC reported that both Blacks and Hispanic children had higher rates of dental fluorosis particularly in its most disfiguring categories (moderate and severe). However, in all this time neither the CDC nor any other federal agency that promotes water fluoridation has sought to warn communities of color of their particular vulnerability with respect to this permanent visually objectionable injury from systemic exposure to fluoride. Nor have they indicated what this means: their children have been over-exposed to fluoride before their permanent teeth have erupted and this over-exposure might indicate they have been damaged in other ways. This failure to warn communities of color of this problem is a clear example of environmental *injustice*.

When the US Public Health Service endorsed fluoridation in 1950 (before any trial had been completed or any meaningful health study had been published) it quickly fossilized into a policy that was considered beyond debate. Although the FDA has never *approved* any fluoride containing substance intended to be ingested for the purpose of reducing tooth decay it has *rejected* fluoride-containing vitamins stating that, "there is no substantial evidence of drug

effectiveness as prescribed, recommended, or suggested in its labeling." Drug therapy 1975.

Water fluoridation has never been subjected to an individual-based random control trial (RCT) for either effectiveness or safety. Very few basic health studies have been conducted in fluoridated countries and only in recent years have some of the studies of serious toxic and health effects of fluoride (e.g. lowered IQ) been published, and mainly in non-fluoridated countries.

Fluoride is not an essential nutrient. There is no need to swallow it: fluoride's beneficial action can be achieved with direct application of fluoridated toothpaste onto the tooth surface. Tooth decay in children from low-income families is not caused by too little fluoride but poor nutrition, including far too much sugar.

The EJ issue goes beyond just dental fluorosis and the failure of the government agencies to warn communities of color about their vulnerability. Fluoridation penalizes families of low-income in the following ways.

1) They cannot afford to avoid fluoridated water if they want to do so because both removal equipment and bottled water (for drinking and cooking) is very expensive.
2) They cannot afford the expensive treatments to conceal the effects of dental fluorosis (a discoloration and mottling of the enamel).
3) Dental fluorosis rates are higher in fluoridated communities especially in Black and Hispanic populations than White.
4) Fluoride's toxicity is made worse by poor nutrition.
5) Lactose intolerance is more frequent among Blacks and other ethnic groups than white, and less consumption of dairy products means lower exposure to calcium, which helps to protect against absorption of fluoride from the gut.
6) Low-income families from communities of color are less likely to breast-feed their children. Low fluoride ready-to-feed formula is more expensive as is distilled water therefore when baby formula is made up with fluoridated water, the baby gets over 100 times more fluoride than a breast-fed child.
7) Fluoride has been associated with lowered IQ in children in 45 studies (as of Sept 2015).
8) Children living in the inner cities are more likely to be exposed to lead from flaking old paint, air pollution, etc. leading to cognitive damage. Exposure to fluoride adds to this toxic burden. Research from the University of North Carolina demonstrated that the chemicals used in fluoridation increase the leaching of lead from brass plumbing fixtures into drinking water.
9) Communities of color have a greater incidence of kidney disease. Because poor kidney function makes it more difficult for the body to get rid of fluoride kidney patients must avoid as much exposure to fluoride as possible.
10) Communities of color have a greater incidence of diabetes, which can lead to increased consumption of water, which in turns leads to a greater consumption of fluoride.

Two strategic goals in the Interagency Working Group on environmental justice (EJ IWG) action agenda for fiscal years 2016- 2018, create a very positive framework within which we can move forward on this issue. These strategic goals are:

I. Enhance communication and coordination to improve the health, quality-of-life, and economic opportunities in overburdened communities;
II. Enhance multi-agency support of holistic community-based solutions to solve environmental justice issues;

These goals challenge us to find a plan not just to fight tooth decay in children but also to improve their "health, quality of life and economic opportunities" and to do so with "community-based solutions," which will involve "multi-agency support."

We have taken up this challenge in our 5-step alternative plan to water fluoridation.

Our positive, creative and holistic plan aims to fight tooth decay in low-income children but also find ways to improve their health, their fitness, their quality of life, their intellectual development and possibly even their employment within the community. We would like to go further. Our plan also works on other aspects of community development, including its food supply, its discarded resources, its local employment and business opportunities and the need to lower its carbon footprint.

In our 5-step program we are proposing that we start with ending water fluoridation in step 1 and then use the money saved on chemicals, equipment and promotion to finance step 2. This second step involves an educational program for young children modeled after programs in Scotland and Denmark. One aim of this is to reduce sugar consumption. If that is done well it will also help to fight obesity and that over the long-term will produce huge savings in health costs. This should encourage the HHS to provide additional funding needed for step 2 and some of the funding for steps 3 and 4. Here is a summary of the 5 steps:

1) **End water fluoridation.** The EPA's Office of Water could do this swiftly if they were instructed to determine a safe level of fluoride to protect all children from lowered IQ. This would not only remove a threat to children's intellectual development and future economic potential, but it would also end a number of extra and unnecessary health threats for communities of color, especially for people with poor kidney function; borderline iodine deficiency and diabetes. Never has turning off a tap promised so much.
2) **Establish the equivalent of both Scotland's very successful Childsmile program and the Danish program for pre-schoolers**, in all pre-school programs, kindergarten and primary schools (and possibly churches) and WIC programs in low-income areas.
3) **Set up dental clinics either in schools or stand-alone facilities** in the inner city and other low-income areas. In these we should use trained dental nurses to restore decay-damaged teeth and to remove infected ones.
4) **Expand these dental clinics into community centers** aimed at improving the child's overall health**.** They could support better nutrition, physical fitness and cultural activities. Ideally these community centers would be linked to local community gardens and farms close to the city.

5) **Further expand these community centers** into job-creating operations and a foundation for local business opportunities. One concrete way of doing this is to integrate a ”reuse and repair” operation into the Zero Waste approach for handling discarded materials.

More than anything else a scientifically balanced approach allows the transition from the politics of “no” to the politics of “yes.” Once we get off the shortsighted notion that we can battle tooth decay by putting a neurotoxic chemical into the public drinking water, we can unleash not only the full potential of the children from low-income communities, but also of the communities themselves. The three key words are education, nutrition and justice. We need education (not fluoridation) to fight tooth decay and obesity. We need better nutrition to keep our children and ourselves as healthy as possible and we need Environmental Justice for all.

1. Abstract

Evidence is presented that artificial water fluoridation as promoted by federal agencies has been ineffective at helping fight tooth decay in the inner cities and in addition causes "*disproportionately high and adverse human health…effects…on minority populations and low-income populations,"* in violation of Presidential Executive Order 12898 of February 11, 1994. This problem has been seriously compounded by the failure of these same agencies to warn minority populations of their special vulnerabilities to fluoride exposure in general and the water fluoridation program in particular. The current *ongoing* determination by the Environmental Protection Agency's (EPA) Office of Water of a new Maximum Contaminant Level Goal (MCLG) and the Maximum Contaminant Level (MCL) for fluoride as reported in 2011 is scientifically flawed and betrays an insensitivity to Environmental Justice issues. There are more positive and creative ways of fighting tooth decay in the inner city, which also address other EJ issues in a holistic fashion.

2. Introduction

Water fluoridation is the deliberate addition of a fluoride-containing compound to the water supply to produce a concentration of free fluoride ions at about 1 ppm (i.e. 1.0 milligram of fluoride per liter). As of April, 2015 the new recommended level by the U.S. Department of Health and Human Services (HHS) is 0.7 ppm. The stated purpose of this practice is to help fight tooth decay.

Fluoridation began in the U.S. and Canada in 1945 (see timeline below). This is a very unusual practice as it is the only time that the public water supply has been used as a vehicle to deliver medical or human treatment. All the other chemicals added to water are added to make the water safe or palatable to drink.

While fluoridation is widely practiced in the USA **most countries do not fluoridate their water.** 97% of the European population does not drink fluoridated water (a few countries fluoridate their salt, which allows the consumer the choice of whether to buy it or not). Yet according to World Health Organization (WHO) data (available online) there is little difference in tooth decay in 12-year-olds between fluoridated and non-fluoridated countries today.

In 1999 the CDC published a figure (see Figure 1) that suggests that dental caries was being reduced in 12-year-olds from the 1960's to the 1990's as the percentage of the US population drinking fluoridated water had increased.

Figure 1

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

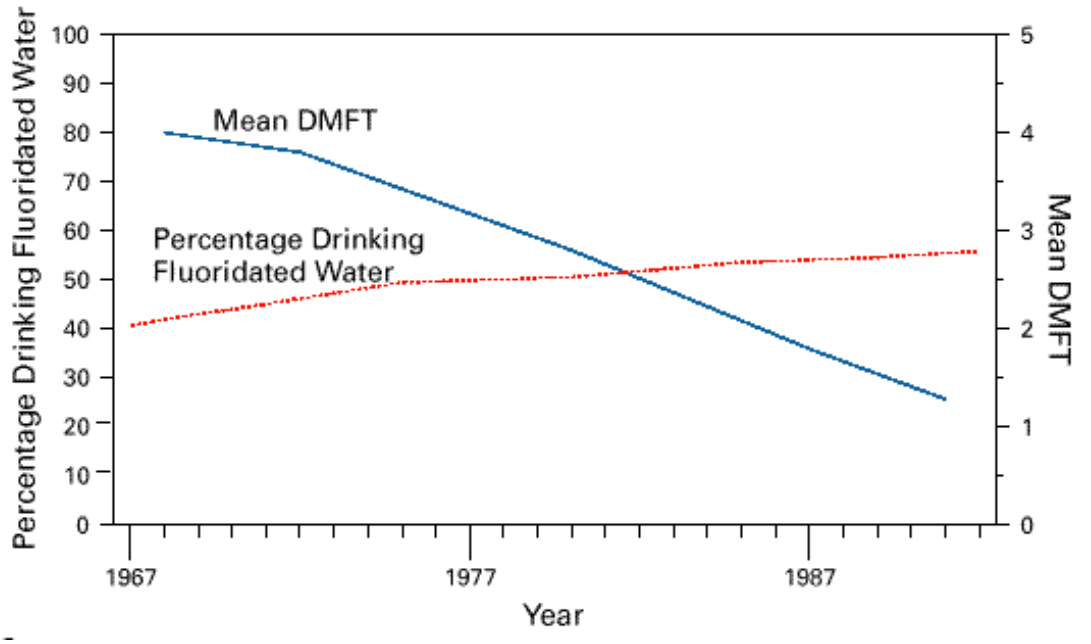


Figure 1: A copy of Figure 1 in the CDC review, TITLE CDC (1999).

However, in Figure 2, World Health Organization (WHO) data is plotted for tooth decay in 12-year-olds for both fluoridated and non-fluoridated countries, and it can seen that the decay rates have been coming down as fast, if not faster, in the non-fluoridated countries as the fluoridated countries. It is surprising therefore the CDC should conclude that the declines in the US have been caused by fluoridation.

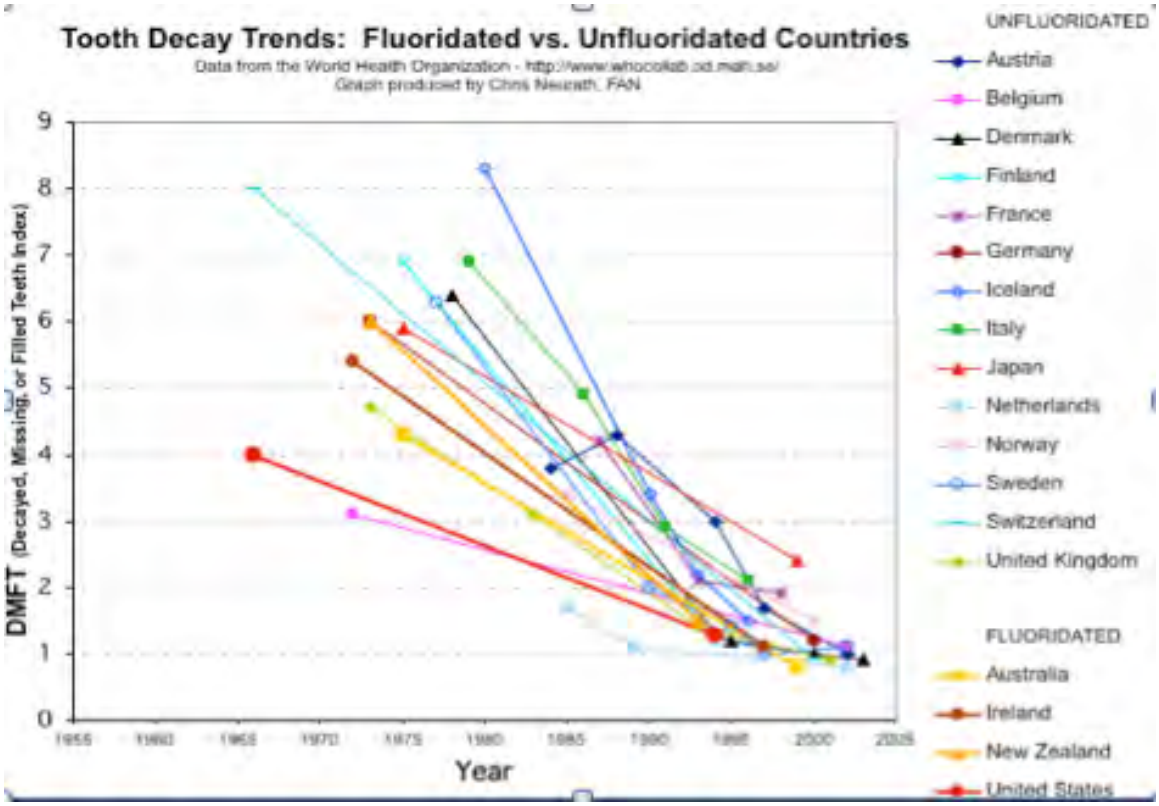


Figure 2: WHO data on tooth decay in 12-year-olds for 18 countries, 4 Fluoridated, 13 non-fluoridated and 1 (UK) partially fluoridated, plotted from the 1960s to 2000's (Graph by Chris Neurath; see FAN, 2012a).

We would do well to study the ways that European countries have achieved reduction of tooth decay in low-income families without forcing their citizens to swallow fluoride. Of particular interest are the Childsmile program in Scotland and the Nexø Program in Denmark.

3. Why are some people opposed to the practice of Water fluoridation?

The arguments given by many citizens and scientists opposed to fluoridation include the following.

1) Once added to the water there is no way that the dose each individual receives can be controlled.

2) Nor can we control who receives the treatment – it goes to everyone regardless of age, health or nutritional status.

3) It violates the individual's right to informed consent to human treatment.

4) It is difficult and expensive to avoid, as cheap filters don't remove the fluoride. This makes this doubly unethical for low-income families who don't want this treatment.

5) No doctors are overseeing the treatment or monitoring side-effects.

6) The Food and Drug Administration (FDA) has never regulated fluoride for ingestion. According to the FDA fluoride is an "unapproved drug".

7) Incredibly, after 70 years there has not been one single individually-based randomized control trial (RCT) to demonstrate safety or effectiveness

8) Fluoride is not an essential nutrient. No one has ever shown that if an animal is starved of fluoride in its diet that it develops a disease. An individual can have perfectly good teeth without fluoride. Tooth decay is not caused by too little fluoride but by poor dental hygiene and a poor diet, including too much sugar.

9) There is not one biological process in the body that needs fluoride to function properly but many that are harmed by it. Fluoride inhibits enzymes and interferes with G-proteins, which carry important messages across cell membranes. See Barbier et al. (2010) for a review of the biochemical mechanisms of fluoride's toxic action.

10) Nature in her wisdom has kept fluoride away from the baby. The level in mothers' milk is very low (0.004 ppm, NRC, 2006; 0.004 to 0.008, Sener, 2007) Thus the breast-fed baby is protected from fluoride, but that protection is removed by water fluoridation. A bottle-fed baby where the formula is made up with fluoridated tap water (at the new recommended guideline of 0.7 ppm fluoride) gets over 100 times more fluoride than a breast-fed baby.

11) Even promoters of fluoridation now admit the predominant mechanism of fluoride's beneficial action on the teeth is *topical* not *systemic* (CDC, 1999). In other words one does not need to swallow this toxic substance to get the purported benefit. Brushing the teeth with fluoridated toothpaste is a more rational delivery system, which minimizes exposure to other tissues and does not force it on people who don't want it.

12) Fluoridation promoters have wildly exaggerated the benefits of swallowing fluoride. A recent Cochrane review (the gold standard for evidence-based medicine) concluded that the scientific studies that have purported to demonstrate effectiveness have been of a very poor quality (Iheozor-Ejiofor et al., 2015) .

13) Fluoridation poses many health risks.

14) Of particular concern is the large number of animal and human studies that indicate that fluoride is neurotoxic (i.e. it can enter and interfere with brain chemistry) including 45 (out of 51) studies that have associated fairly modest exposure to fluoride and lowered IQ in children.

15) The last children in the USA that need their IQ lowered are children from low-income families, who are precisely those who have been targeted by those promoting this practice.

16) There are many other health concerns. These include lowered thyroid function (Peckham et al., 2015); accumulation in the human pineal gland (Luke 1997, 2001); ADHD (Malin and Till, 2015); accumulation in the bone (arthritis, NRC, 2006, increased hip fractures in the elderly, Li et al, 2001) and an increased risk of osteosarcoma in young boys when exposed in their 6^{th} -8^{th} years (Bassin et al, 2006).

17) U.S. children are being hugely over-exposed to fluoride from all sources as evidenced by the prevalence of dental fluorosis, which now impacts 41% of 12-15 year olds (Beltrán-Aguilar et al., 2010). The rates are higher for Black and Hispanics (Beltrán-Aguilar et al., 2005).

18) Now that it has become clear that low-income and minority communities are more

vulnerable to dental fluorosis and probably fluoride's other toxic effects fluoridation has become a major Environmental Justice issue and needs to be re-assessed from that perspective.

4. Fluoridation and Environmental Justice.

Those who promote fluoridation often do so based upon equity considerations. They correctly claim that most of tooth decay is concentrated in low-income families and especially in communities of color. In the United States, according to Kaste at al. (1996), 25 percent of children and adolescents experience 80 percent of all dental decay occurring in permanent teeth. However, the evidence suggests that promoters were being overly optimistic when they thought that forcing everyone to swallow fluoride would even-up the playing field when it comes to these dental inequalities.

As we explain below fluoridation far from helping low-income families is actually hurting them. In fact fluoridation is a rather graphic example of environmental *injustice*.

Fluoridation penalizes families of low-income, especially communities of color in the following ways.

1) Low-income families cannot afford to avoid fluoridated water if they want to do so because both removal equipment and bottled water (for drinking and cooking) is very expensive.

2) Low-income families cannot afford the expensive treatments to conceal the damage that fluoride can cause to the enamel (dental fluorosis).

3) Dental fluorosis rates are higher in Black and Hispanic communities than White communities especially in the more severe forms that require treatment (Beltrán-Aguilar et al., 2005).

4) Fluoride is more toxic when exposure is accompanied by poor nutrition. Poor nutrition is more likely to occur in low-income families than those with higher incomes. This is what was said about this issue in a 1952 article that appeared in the Journal of the American Dental Association:

> "The data from this and other investigations suggest that malnourished infants and children, especially if deficient in calcium intake, may suffer from the effects of water containing fluorine while healthy children would remain unaffected…Thus low levels of fluoride ingestion which are generally considered to be safe for the general population may not be safe for malnourished infants and children. Therefore, the nutritional status must be carefully assessed and guarded in areas with endemic fluorosis. Nutritional studies should be included in any comprehensive program of fluoridation of water with special attention to chronically ailing infants and children." (Massler & Schour 1952).

5) Lactose intolerance is more frequent among Blacks and other ethnic groups than white, and less consumption of dairy products typically means lower exposure to calcium. Calcium in the diet helps to a certain extent to protect against absorption of fluoride from the gut.

6) Minority families are less likely to breast-feed their children. When baby formula is made up with fluoridated water it leads to over 100 times more exposure to fluoride than breast-feeding.

7) Fluoride is neurotoxic and in 45 studies it has been associated with lowered IQ in children. The last children that need their IQ lowered are children from low-income families.

8) Low-income and minority groups living in the inner city are likely to have a greater exposure to lead. Fluoride appears to enhance the toxicity of lead. Lead increases the risk of dental fluorosis. Both lead and fluoride are neurotoxic.

9) Children from low-income families are more likely to get mercury amalgam fillings than families with higher income. Mercury is neurotoxic. The combined impact of mercury and fluoride on a child's mental development may be greater than either acting alone.

10) Minority communities have a greater incidence of kidney disease. Poor kidney function increases fluoride's uptake into the bone, which is likely to increase the rates of arthritis and hip fractures (over a lifetime).

11) Minority communities have a greater incidence of diabetes, some forms of which lead to an increased consumption of water, which in turns leads to a greater consumption of fluoride.

Many of these issues are discussed in more detail and documented in the text below.

5. The history of the water fluoridation program with a special emphasis on dental fluorosis and environmental justice issues

A timeline from the early 1900's to 2015

In the early 1900's a handful of dentists, particularly Frederick McKay (1916, 1928) and G.V. Black & McKay (1916) were interested in what was causing a condition (which was prominent in both Texas and Colorado), which led to discoloration and marking of the teeth. The condition was called "dental mottling." McKay described dental mottling as "the most poorly constructed enamel of which there is any record in the history of dentistry."

1925

Norman Ainsworth in a study of 4000 children in Essex County in England reported a lowered prevalence of dental caries in Maldon and Heybridge, which were areas endemic for "dental mottling" (now known as areas with high natural levels of fluoride in the water) – (see Mullen, 2005).

1928

Frederick Mckay (1928) noted that while the discoloration and marking of the teeth in cases of "dental mottling" looked very bad it did not appear to increase the child's susceptibility to tooth

decay, in fact there appeared to be less tooth decay among children with dental mottling than those without.

1931

In 1931 three separate research teams (Smith et al., 1931; Churchill et al, 1931 and Vehu, 1931) identified the cause of this condition as fluoride in the drinking water and the name was changed to "dental fluorosis," which literally means "poisoning of the teeth by fluoride." It was quickly recognized that dental fluorosis was a "systemic" not a "topical" effect. It can only be contracted *before* the permanent teeth have erupted. It is occasionally seen in the primary teeth (Warren et al., 1999) but it is most frequently observed in the secondary teeth.

1930 and 40's

Under the leadership of H. Trendley Dean the US Public Health Service (PHS) studied the occurrence of this condition throughout the USA. In addition to this mapping exercise Dean subsequently published his famous classification of the different levels of severity of this condition: very mild, mild, moderate and severe. According to Dean et al. (1934, 1935):

> ***Very mild*** ranged from white patches on the cusp of the teeth to up to 25% of the enamel impacted.
> ***Mild*** impacted between 25 and 50% of the enamel.
> ***Moderate*** impacted 100% of the enamel.
> ***Severe*** impacted 100% of enamel with pitting and chipping.

Pictures illustrating these four levels of dental fluorosis are given in Figure 3

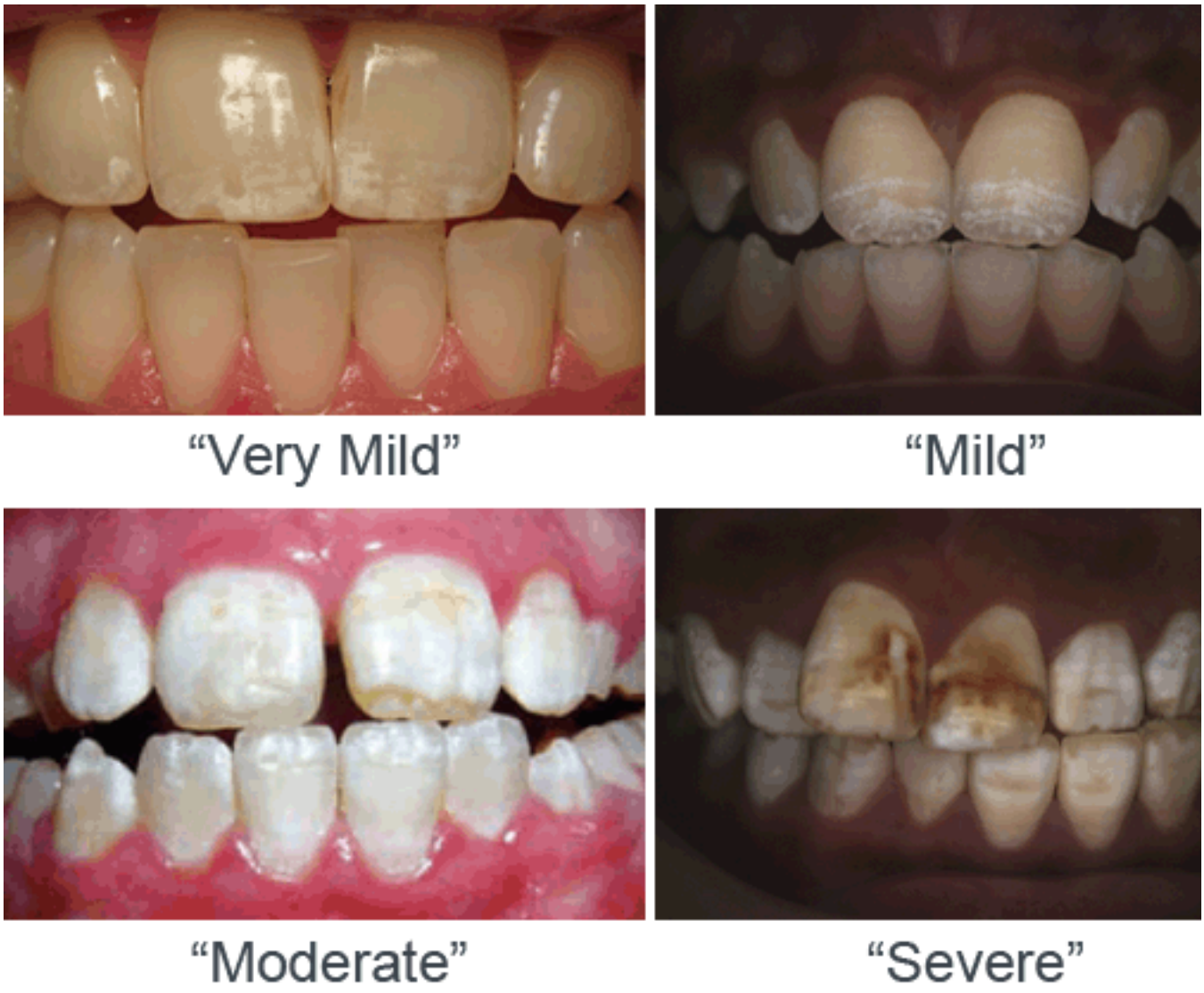


Figure 3. Pictures of the four levels of dental fluorosis. (Photographs by Dr. Hardy Limeback and Dr. Iain Pretty, et al. - see more photos)

1942.

In 1941-1942, Dean and his colleagues published his famous 21-city study which purported to show that as the fluoride level in the water went from about 0.1 to 2.6 ppm tooth decay fell. Most of reduction occurred between 0.1 and 0.9 ppm, with only a modest further decrease occurring between 0.9 and 2.6 ppm. He further noted that there was little noticeable dental fluorosis occurring below 1 ppm. Thus was born the notion that the "optimal level" for reducing tooth decay while minimizing the risk of dental fluorosis was 1 ppm. Dean later indicated that at 1 ppm only about 10% of children would have dental fluorosis and only in the *very mild* category. Dean later testified in the US Congress that *mild* dental fluorosis would not be an acceptable trade off for lowered tooth decay. This is what he said to the Delaney Committee in 1952:

> "We don't want any 'mild' [fluorosis] when we are talking about fluoridation. We don't want to go that high…I don't want to recommend any fluoridation where you get any 'mild'". (Connett et al., 2010, page 110).

All the children in Dean's 21-City study were white: there were no Blacks or Hispanics in the 7,257 children studied.

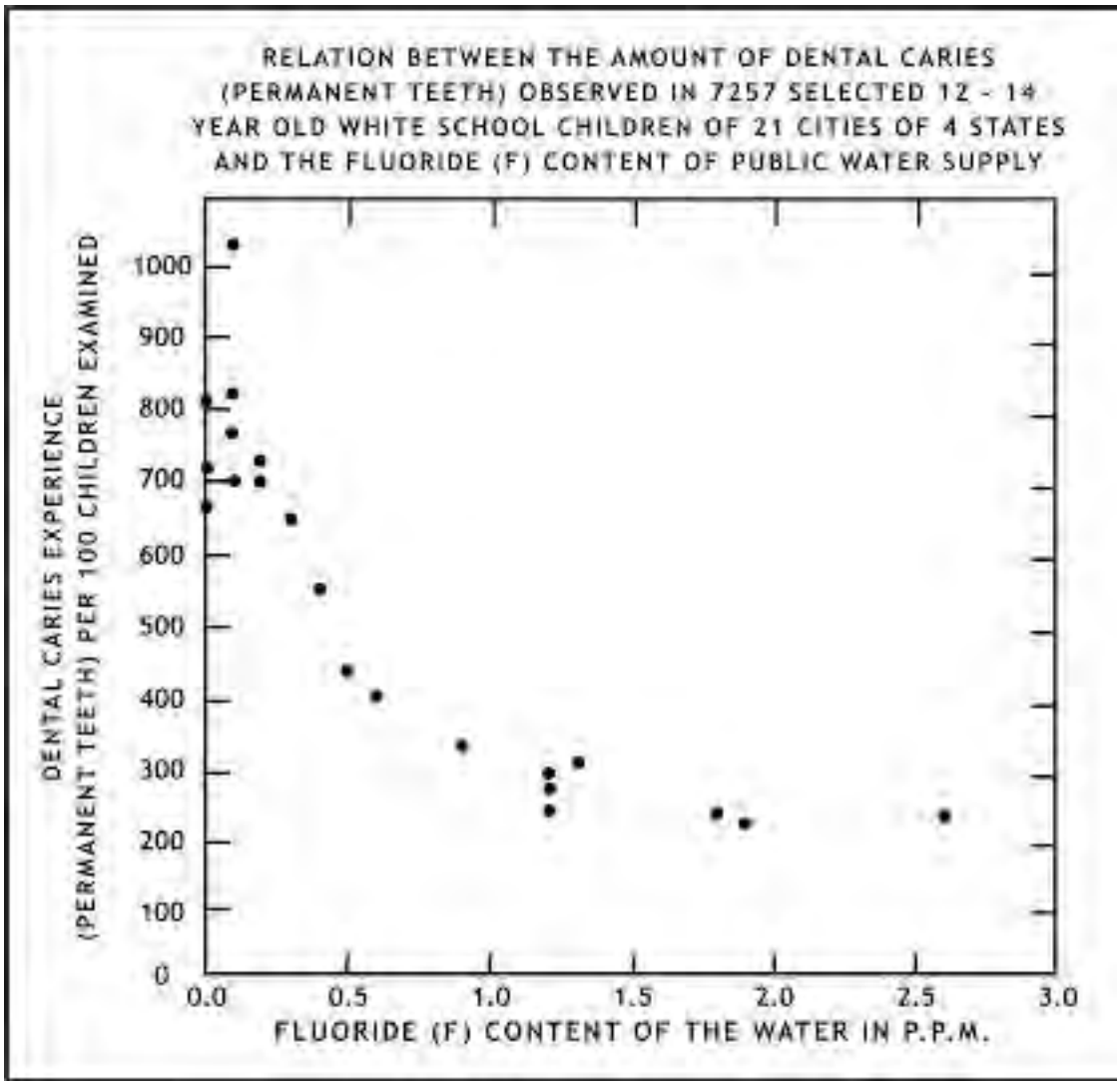


Figure 4: Dean's famous 21-city plot of Dental caries experience in each community versus the concentration of fluoride in the community's water supply in ppm (Dean et al., 1941, 1942)

1945

By 1945 Dean and others were convinced that natural levels of fluoride in the water lowered tooth decay and there were no side effects other than dental fluorosis. The question became: could one deliberately add a fluoride-containing compound to the public water supply and achieve the same result? The PHS decided to run a series of experiments to check this out. Instead of these experiments being conducted in the form of randomized control trials on

individual volunteers they were launched on whole cities. In their discussions the early promoters did not want to use the word experiment because as they said, "people don't like to be experimented upon!" They also saw them more as demonstrations – demonstrating that what they had seen with natural fluoride could be reproduced with artificial fluoride. These fluoridation experimental trials began in 1945 in Grand Rapids, MI; Newburgh, NY and Brantford, Ontario, Canada using sodium fluoride at 1 ppm (1 mg fluoride/liter of water). Most now agree that the methodology used in these experiments would not be acceptable by modern epidemiological standards but nevertheless they provided the foundation for the widely accepted belief in this practice for many decades. Dr. Philip Sutton wrote two monographs and a whole book on the inadequacies of these experimental trials, and his arguments have never been successfully rebutted by proponents (Sutton, 1959, 1960, 1996).

1950

The trials were meant to last for 10 years, but before any of them had been completed the PHS endorsed fluoridation in 1950 and over the next two years with little science on the table it was endorsed by nearly every dental, public health and medical body in the country. Despite their lack of science these endorsements have been used heavily by promoters ever since.

1956

In 1956, Schlesinger et al. published the health findings for the Newburgh, NY (control city Kingston, NY) experiment. They reported that young men in fluoridated Newburgh had a significantly greater number of cortical bone defects than non-fluoridated Kingston (about 2 to 1). There was no follow-up on this finding, which is surprising because the cortical bone is the outside layer of the bone and protects against fracture. However, Dr. Caffey who examined the X-rays said in 1955 that the age, sex and anatomical distribution of these defects were remarkably similar to osteosarcoma. 20 years later this comment prompted the National Academy of Science (NAS) in 1977 to recommend that researchers check to see if there was an increase in osteosarcoma in young men under 30 in fluoridated communities (NAS, 1977). The other finding by Schlesinger was that young girls were menstruating on average 5 months earlier in the fluoridated community than in the non-fluoridated one. This observation was not considered important at the time but today it is intriguing in the context of Luke's findings, a) that fluoride accumulates in the human pineal gland (Luke, 2001) and b) lowers melatonin production in animals and shortens the time to puberty (Luke, 1997).

1962

A January 10, 1962 internal memorandum, from a top PHS official, F.J. Maier, in connection with the first fluoridation trial, revealed that, "negroes in Grand Rapids had twice as much [dental] fluorosis than others." Based on this, Maier asked, "In a community with a larger number of negroes (say in Dekalb County, Georgia) **would this tend to change our optimum fluoride levels?"**(Maier, 1962).

1983

In 1983 the U.S. Surgeon General convened a panel to review the literature as part of the process of determining a safe drinking water standard for fluoride (the MCL, or Maximum

Contaminant level). One member of the panel on reviewing pictures of dental fluorosis stated that, "You would have to have rocks in your head to allow your child much more than two parts per million (Grossman, 1990 – see Appendix A)…" Over-exposure to fluoride damages teeth as the photos of the various stages of dental fluorosis above, also known as enamel fluorosis, clearly show**.**

1985

When the EPA published its rationale for both a MCL and MCLG (goal) at the very high level of 4 ppm they did not include dental fluorosis as an *adverse health effect* but as a "cosmetic effect" (for which they produced a non-enforceable secondary standard of 2 ppm). Instead of dental fluorosis the EPA used skeletal fluorosis as the health effect of concern – even so, they did not use the first signs of skeletal fluorosis (which are identical to arthritis) but the terminal stages in which the patient is crippled, i.e. crippling skeletal fluorosis. Choosing the gross end point of the problem conflicts with the normal way that the EPA comes up with protective standards. Normally they determine the Lowest Observable Adverse Effect Level (LOAEL) and then apply safety factors to that. Note also that U.S. standard of 4 ppm is about three times the WHO guideline of 1.5 ppm, which is the standard adopted by Canada, Mexico and most of the rest of the world.

Professionals at the EPA who witnessed this process have stated that the level of 4 ppm was chosen for political not scientific reasons. It was chosen to accommodate concerns of states like South Carolina which did not want to spend a lot of money removing high natural fluoride levels from drinking water if a lower level were chosen (Grossman, 1990 in Appendix A; and FAN, 2007).

1985

In a Texas survey, published in 1985, Butler et al. reported that the prevalence of dental fluorosis among African-American children was greater than for Hispanic and non-Hispanic white children. The reported Odds Ratio was 2.3.

1986-7

The National Institute of Dental Research (NIDR) conducted one of the largest surveys of tooth decay and dental fluorosis ever carried out in the USA. They looked at the teeth of approximately 39,000 children in 84 communities. The *dental caries* results were reported in 1990 by Brunelle and Carlos but the *dental fluorosis* data was not reported until 1997 by Heller et al. The latter reported 29.9% of the children living in communities with fluoride levels between 0.7 and 1.2 ppm had some form of dental fluorosis. Of these 22.5 % had very mild, 5.8% had mild, 1.3% had moderate and none were in the severe category.

As far as dental caries was concerned Brunelle & Carlos found that for children aged 5-17, who had lived all their lives in a fluoridated versus a non-fluoridated community, the *average* saving in tooth decay was 0.6 of one tooth surface (see their Table 6). There are 4 and 5 surfaces for the "cutting" and "chewing" teeth respectively, and by the time all the child's teeth have erupted there are a total of 128 tooth surfaces. Even this very modest saving of 0.6 of one tooth

surface was not shown by the authors to be statistically significant, but this did not stop them declaring:

> "The results show that water fluoridation has played a dominant role in the decline of caries and must continue to be a major prevention methodology."

Brunellle and Carlos also noted that, "Contrary to some earlier observations, however, white children had lower mean DMFS scores than non-whites (blacks and all others) at most ages (Fig. 7)."

1988

In 1988, Bette Hileman, in an important review in *Chemical and Engineering News* reported disagreements among dental researchers as to whether dental fluorosis rates were increasing among children in the U.S.:

> "Dennis Leverett, chairman of the department of community dentistry at the Eastman Dental Center in Rochester, N.Y., claims that the prevalence of dental fluorosis today in communities with fluoridated water is twice the level that H. Trendley Dean, a dental surgeon in the Public Health Service, reported in 1942 … In contrast, William S. Driscoll, acting chief of the disease prevention and health promotion branch at the National Institute of Dental Research (NIDR), and his coworkers report that surveys in 1980 "suggest that no important changes in the prevalence and severity of fluorosis have taken place" since **Dean's studies.** However, Driscoll did find eight children with either moderate or severe fluorosis in a community with a fluoride level of 1 ppm…" (Hileman, 1988)

1990

In 1990, Williams and Zwemer in a study from Georgia, reported that dental fluorosis was more severe among African-American children than white children. As the following table shows, 16.7% of black children in Augusta, Georgia had moderate/severe fluorosis versus 9.1% of white children. In Richmond County, the respective rates were 3.3% vs 0% (see Table 1)

Table 1. **Dental Fluorosis Rates in Augusta & Richmond County, Georgia**

Residence/Race	**No Fluorosis** (TSIF Score = 0)	**Very Mild/Mild Fluorosis** (TSIF Score = 1 - 3)	**Moderate/Severe Fluorosis** (TSIF Score = 4 - 7)
City/**Black**	19.6%	63.7%	**16.7%**
City/White	18.2%	72.7%	9.1%
County/**Black**	47.8%	48.9%	**3.3%**
County/White	44.9%	55.1%	0%

SOURCE: Williams JE, Zwemer JD. (1990).

In 1990 the long-awaited animal cancer study (requested by Congress) was published by the National Toxicology Program (NTP, 1990). This report caused great consternation because the authors reported a statistically significant increase in a bone cancer (osteosarcoma) in the male rats, which was "equivocal" evidence that fluoride was carcinogenic.

1991

Soon after the 1990 NTP study was published a cover story was published in the *Journal of the American Dental Association* speculating that fluoridation may actually be *protective* against cancer (McGuire et al., 1991). It was clear from the comments in this article that the authors were more worried that a finding that fluoride caused cancer would end water fluoridation, than it might be killing a few young men each year. They wrote:

> "An incorrect inference implicating fluoride carcinogenicity and its removal from our water systems would be detrimental to the oral health of most Americans…a disruption in the delivery of fluoride through municipal water systems would increase decay rates over time…Linking of fluoride ingestion and cancer initiation could result in a large-scale defluoridation of municipal water systems under the Delaney clause." (Connett et al., 2010, p. 187)

One of the authors of this report was Professor Chester Douglass, chairman of the Harvard dental department. In 1994 he received a large grant from the National Institute of Environmental Health Sciences to investigate the possible connection between fluoridation and osteosarcoma. This raises serious questions about why an investigation that had the potential to end fluoridation was given a) to a dental school and b) to a dental professor who was known to be pro-fluoridation and was simultaneously a consultant for Colgate (FAN, 2006).

Despite these doubts in 2001, Douglass's graduate student, Elise Bassin, as part of her doctoral thesis, discovered in a carefully matched case control study that young boys exposed to fluoridated water in their 6^{th}, 7^{th} or 8^{th} years had a 5-7-fold increased risk of succumbing to osteosarcoma by the age of 20. Over the next three years, Douglass – given several opportunities - hid this finding from his peers, his funders and the National Research Council of the National Academies (NRC) review panel. Bassin's thesis (2001) was not "found" until 2004. For the rest of this intriguing story see the Harvard/Bone Cancer files (FAN, 2006); Harvard Crimson, 2006; Connett et al., 2010, chapter 18**.**

1997

Heller et al. (1997) paper published (see above)

1997 also saw the publication of **a controversial report from the Institute of Medicine** (IOM). The title of the report included fluoride in a list of well-known nutrients needed for healthy bone growth: calcium, magnesium, phosphate and vitamin D (IOM, 1997). In response to a letter from a number of scientists complaining about this false classification of fluoride as a nutrient, Dr. Bruce Alberts, President of the National Academies, and Dr. Kenneth Shine, President of the IOM, wrote:

> First, let us reassure you with regard to one concern. Nowhere in the report is it stated that fluoride is an essential nutrient. If any speaker or panel member at the September 23rd workshop referred to fluoride as such, they misspoke. As was stated in *Recommended Dietary Allowances 10th Edition,* which we published in 1989: "These contradictory results do not justify a classification of fluoride as an essential element, according to accepted standards. Nonetheless, because of its valuable effects on dental health, fluoride is a beneficial element for humans." (Alberts and Shine, 1998).

We return to this story in section 26 where we challenge the EPA Office of Water for using the IOM report to support their false claim that fluoride is a nutrient in a 2010 report (EPA, 2010b, page 39).

1999 - 2000

Kumar et al. (1999) reported that "African-American children studied [in Newburgh and Kingston, NY] in 1995 were at higher risk for dental fluorosis than children of other racial groups. . . . The higher risk for dental fluorosis observed among African-American children is consistent with several other studies."

In 2000 Kumar et al. noted, "The results support our earlier findings that African-American children were at **higher risk for dental fluorosis** in the fluoridated area. Even in the nonfluoridated area, there was a suggestion that African-American children were at higher risk. Whether this higher risk for African-American children is the result of their lower threshold for fluoride or due to other unknown sources of fluoride is not known. It has been reported that African-American children in the United States drink more water and less milk compared to white children. In Newburgh, this difference in the fluid consumption may have resulted in a higher prevalence of fluorosis in African-American children. . . . Because a race fluorosis association could have important policy implications, a large-scale study in a representative sample should be conducted to test specifically the hypothesis that African-American children are at higher risk for fluorosis."

2003 -2006

The US EPA Office of Water asked the National Research Council of the National Academies to review their safe water standards for fluoride. A 12-membered panel (unusually for official reviews on fluoride, the panel was balanced with 3 pro-fluoridation, 3 anti-fluoridation and 6 undeclared) was appointed by the National Research Council of the National Academies to do this. The panel reported back in 2006 with a landmark 500-page review (NRC, 2006).

The NRC panel concluded that the safe drinking water goal and standard for fluoride in water (MCLG and MCL) of 4 ppm was not protective of health and a new risk assessment needed to be performed to determine a new MCLG (maximum contaminant level goal).

The panel had this to say on dental fluorosis:

> "Severe enamel fluorosis is characterized by dark yellow to brown staining and discrete and confluent pitting, which constitutes enamel loss... Severe enamel fluorosis compromises that health-protective function by causing structural damage to the tooth.

> The damage to teeth caused by severe enamel fluorosis is a toxic effect that is consistent with prevailing risk assessment definitions of adverse health effects...
>
> "Severe enamel fluorosis occurs at an appreciable frequency, approximately 10% on average, among children in U.S. communities with water fluoride concentrations at or near the current MCLG [maximum contaminant level goal] of 4 mg/L. Thus, the MCLG is not adequately protective against this condition...
>
> "The committee finds that it is reasonable to assume that some individuals will find *moderate* enamel fluorosis on front teeth to be detrimental to their appearance and that it could affect their overall sense of well-being. However, the available data are not adequate to categorize moderate enamel fluorosis as an adverse health effect on the basis of structural or psychological effects.
>
> "Since 1993, there have been no new studies of enamel fluorosis in U.S. communities with fluoride at 2 mg/L in drinking water. Earlier studies indicated that the prevalence of moderate enamel fluorosis at that concentration could be as high as 15%..." (NRC, 2006)

However, even though the NRC panel concluded that ***severe*** dental fluorosis constituted an adverse health effect no federal or state agency has gone to any lengths to inform the public that this is the case. Nor have they warned the African-American and Mexican American communities with a total population of 101 million people (Colby & Ortman, U.S. Census, Table 2, 2015) that they are particularly vulnerable to this condition,

2005

In 2005, the Centers for Disease Control and Prevention (Beltrán-Aguilar et al. See Table 2 below) acknowledged for the first time publicly that the black community has higher rates of dental fluorosis than the white community. It took a Freedom of Information Act request, however, to learn the full extent of this disparity. **58% of black children** were diagnosed with dental fluorosis in CDC's 1999-2004 national survey, versus 36% of white children. (Gracia, 2011; see also Stockin, 2015).

Table 2: A copy of Table 23. Enamel fluorosis* among persons aged 6- 39 years, by selected characteristics United States, National Health and Nutrition Examination Survey, 1999- 2002. Source: Beltrán-Aguilar et al., 2005 (CDC, 2005)
http://fluoridealert.org/content/table-23-enamel-fluorosis-among-persons-aged-6-39-mmwr-2005/

Characteristic	Unaffected		Questionable		Very mild		Mild		Moderate/Severe	
	%†	SE§	%	SE	%	SE	%	SE	%	SE
Age group (yrs)										
6–11	59.81	4.07	11.80	2.50	19.85	2.12	5.83	0.73	2.71	0.59
12–15	51.46	3.51	11.96	1.84	25.33	1.98	7.68	0.93	3.56	0.59
16–19	58.92	3.90	10.21	1.70	20.79	1.78	6.65	0.67	4.03	0.77
20–39	74.86	2.28	8.83	1.23	11.15	1.22	3.34	0.58	1.81	0.39
Sex										
Male	67.65	2.69	9.99	1.45	15.65	1.52	4.58	0.54	2.12	0.39
Female	66.97	2.84	9.83	1.34	15.58	1.36	4.84	0.61	2.78	0.49
Race/Ethnicity¶										
White, non-Hispanic	69.69	3.13	10.43	1.62	14.89	1.56	3.87	0.60	1.92	0.48
Black, non-Hispanic	56.72	3.30	10.40	2.16	21.21	2.16	8.24	0.82	3.43	0.54
Mexican-American	65.25	3.89	8.95	1.29	15.93	2.24	5.05	0.72	4.82**	1.81
Poverty status††										
<100% FPL	68.02	3.21	10.67	1.64	14.29	1.73	4.07	0.69	2.97	0.66
100%–199% FPL	66.92	2.91	9.11	1.79	16.11	1.46	5.21	0.78	2.65	0.56
≥200% FPL	68.88	2.75	10.73	1.93	15.56	1.56	4.83	0.50	2.00	0.37
Total	**67.40**	**2.65**	**9.91**	**1.35**	**15.55**	**1.37**	**4.69**	**0.49**	**2.45**	**0.40**

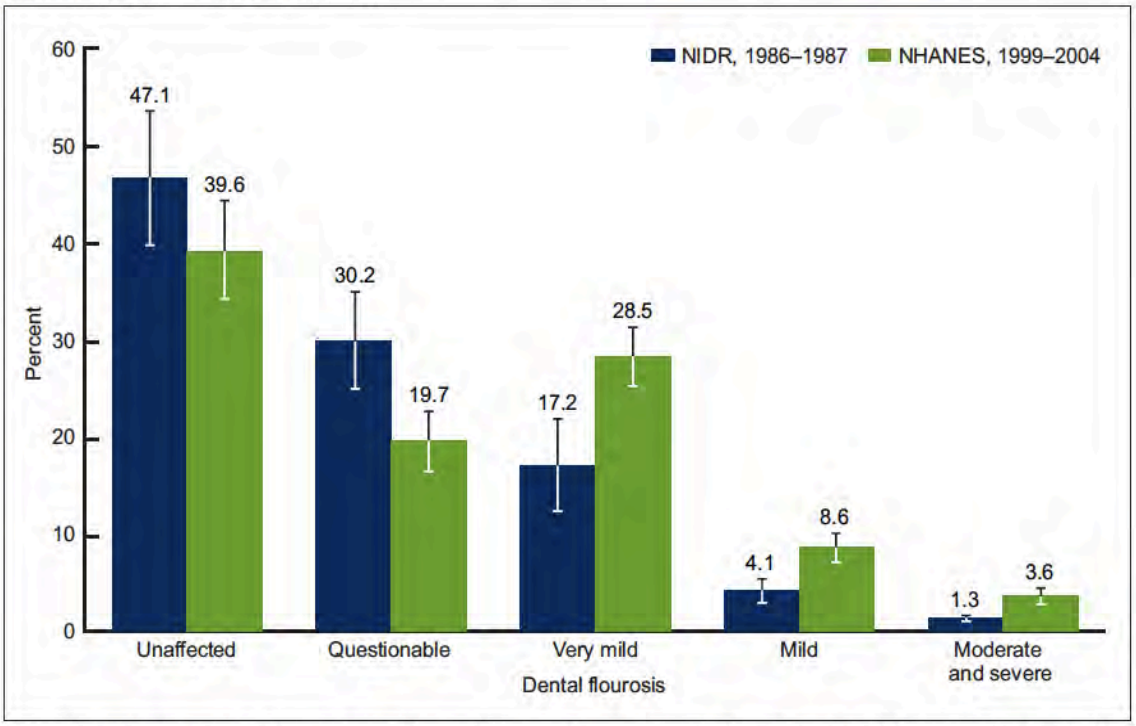
* Using Dean's index. All estimates are adjusted by age (single years) and sex to the U.S. 2000 standard population, except sex, which is adjusted only by age.
† Weighted prevalence estimates.
§ Standard error.
¶ Calculated using "other race/ethnicity" and "other Hispanic" in the denominator.
** Unreliable estimate: the standard error is 30% the value of the point estimate, or greater.
†† Percentage of the Federal Poverty Level (FPL), which varies by income and number of persons living in the household.

According to attorney Michael Connett and Special Projects Director for the Fluoride Action Network (FAN): "The epidemic of fluorosis now seen in the black community is the visible legacy of the government's failure to act on what it knew. They knew in 1962 that '**negroes in Grand Rapids had twice as much [dental] fluorosis than others'** (Maier, 1962)."

2010

In 2010 another report from the CDC revealed that **41% of U.S. children** between the ages of 12 and 15 had some form of dental fluorosis. This total included children from both fluoridated and non-fluoridated communities. No breakdown was given for race and ethnicity. A breakdown of the 41% total showed that **28.5 % has very mild, 8.6% had mild, and 3.6 % had either moderate or severe dental fluorosis** (Beltrán-Aguilar et al., 2010).

Figure 3. Change in dental fluorosis prevalence among children aged 12–15 participating in two national surveys: United States, 1986–1987 and 1999–2004



NOTES: Dental fluorosis is defined as having very mild, mild, moderate, or severe forms and is based on Dean's Fluorosis Index. Percentages do not sum to 100 due to rounding. Error bars represent 95% confidence intervals.

SOURCES: CDC/NCHS, National Health and Nutrition Examination Survey, 1999–2004 and National Institute of Dental Research, National Survey of Oral Health in U.S. School Children, 1986–1987.

Figure 6: Change in dental fluorosis prevalence among children aged 12-15 participating in two national surveys: United States, 1986-1987 and 1999-2004, 3 from Beltrán -Aguilar et al. (2010).

2011

On January 7 the U.S. Department for Health and Human Services and EPA held a joint press conference in Washington, DC (HHS, 2011a). The HHS announced its proposal to lower its recommended fluoride level in water to fight tooth decay from a range of 0.7 – 1.2 ppm to 0.7 ppm, largely because of the escalating prevalence of dental fluorosis among US children.

At this same press conference EPA's Office of Water announced that it had begun its determination of a new safe drinking water standard for fluoride (recommended by the NRC panel in March of 2006). While stating that they wanted to find a safe level for fluoride in drinking water (their federal responsibility), they also stated that they were interested in protecting children's teeth (*not* their federal responsibility). According to 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, 2011a)." (our emphasis)

EPA at this juncture threw away its objectivity in the setting of a "safe" Maximum Contaminant Level goal (MCLG) for fluoride in drinking water. In other words they were indicating that they were going to select the safe level for fluoride as a contaminant that would not conflict with the HHS recommended level for fluoride in the fluoridation program. Clearly that is a political judgment. However, from a legal point of view no consideration of any perceived benefit of a contaminant should be allowed to interfere with the EPA's obligation to determine a **safe** Maximum Contaminant Level Goal (MCLG). According to the Safe Drinking Water Act the MCLG should be determined based on a known or reasonably anticipated harmful effect, with appropriate safety factors applied to protect everyone in society, including vulnerable subsets. **Such calculations should be scientifically determined and should not be compromised by accommodating some perceived benefit.**

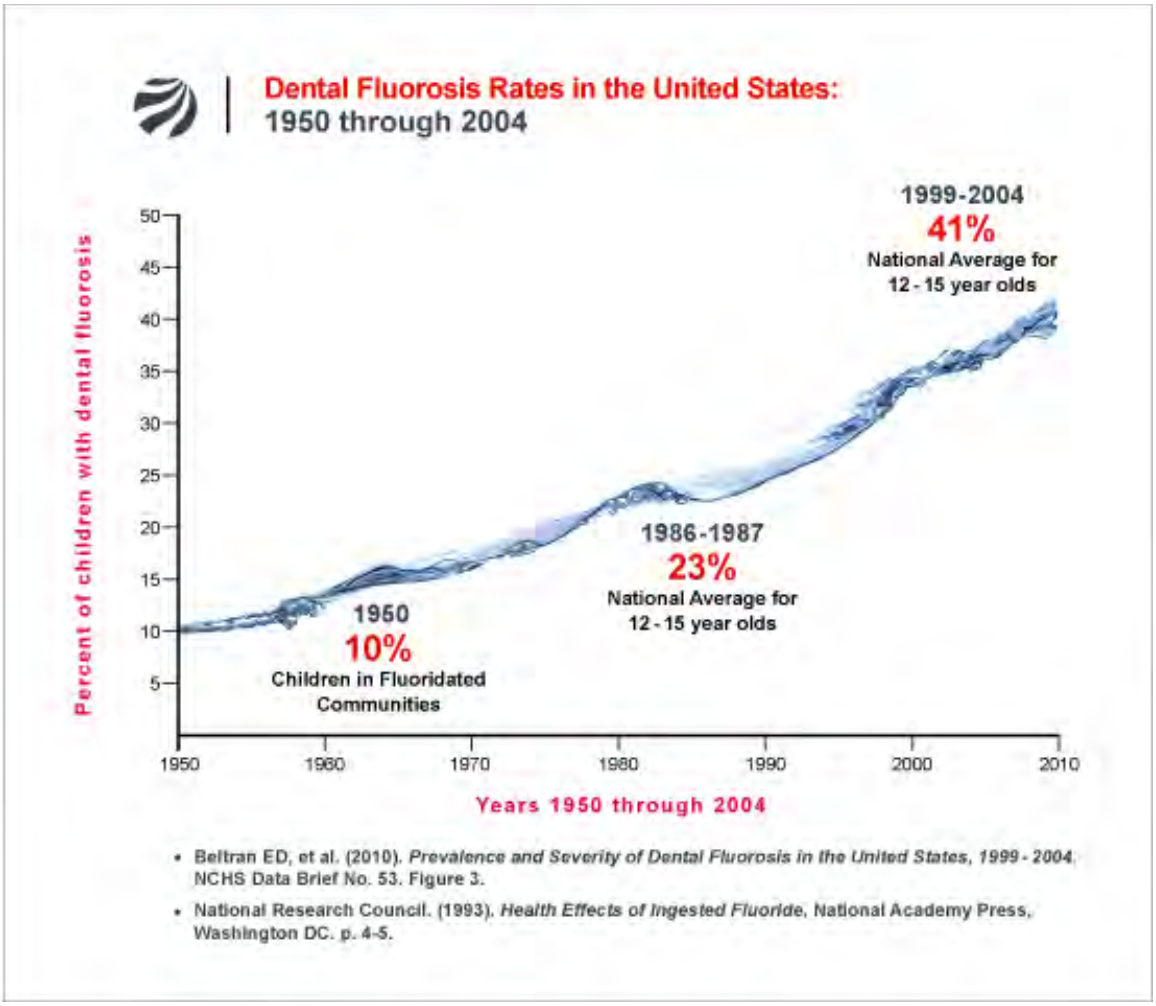
2015

The HHS formally announced its new recommended level of 0.7 ppm fluoride in water claiming that it would lower tooth decay, while minimizing the prevalence of the more objectionable stages of dental fluorosis (HHS, 2015). In so doing they continued their 60-year plus denial of any other potential health effect other than dental fluorosis at the doses experienced by any American, including the most vulnerable, drinking fluoridated water and getting fluoride from other common sources such as dental products (see section 25 for our response to this).

SUMMARY: DENTAL FLUOROSIS IN THE U.S. 1945-2015

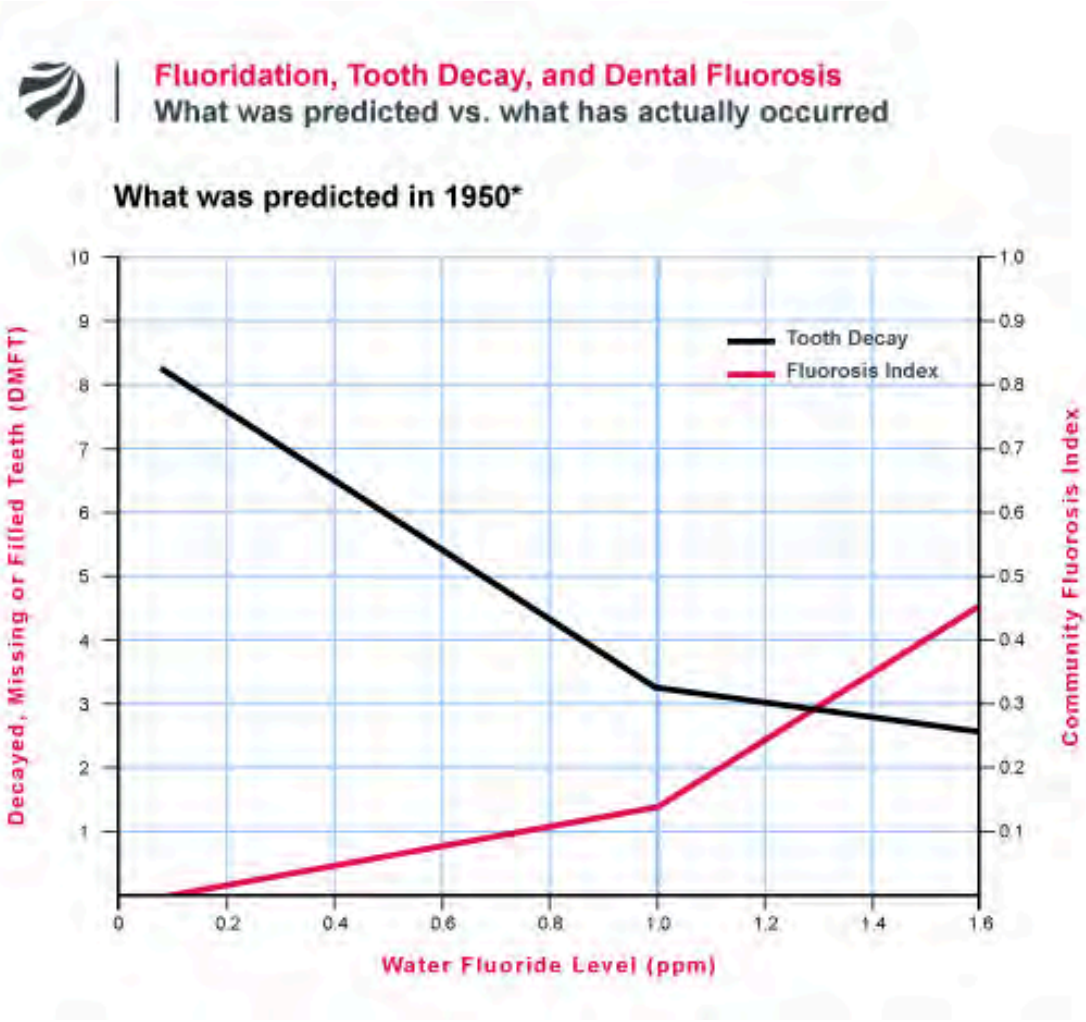
In 1945 Dean estimated that about 10% of children would develop dental fluorosis in communities fluoridated at 1 ppm. Since then children are being exposed to fluoride not only in fluoridated water but also from all the beverages and processed foods made with fluoridated water, and from many other sources including dental products, and pesticide residues on food, including EPA permitted fluoride residues – from the fumigant sulfuryl fluoride – of 900 ppm fluoride in powdered eggs, 130 ppm fluoride in wheat flour, and 70 ppm fluoride in 99.99% of all processed food (FAN, 2005). As a result the rates of dental fluorosis are getting significantly worse across the U.S. However, the CDC's Division of Oral Health continues to promote artificial water fluoridation despite its disproportionate impact on communities of color and low-income groups. Studies sponsored by this CDC division in 2005 and 2007 confirm the growing epidemic of dental fluorosis in minority populations. It is an open question as to whether reducing the fluoride levels from a range of 0.7 to 1.2 ppm across the country to a single value of 0.7 ppm, will have a major effect on decreasing the prevalence of this condition in general or in minority communities in particular. A larger question is whether the level of 0.7 ppm will cause other health problems, but for the CDC's Division of Oral Health that is a mute question since they adamantly deny that any other tissue is harmed by water fluoridation or from all sources combined.

Meanwhile, at no time have federal government officials ever taken steps to warn black communities of their heightened fluorosis risk.



(Graph by Fluoride Action Network)

Figure 7: Dental fluorosis rates in the United States: 1950 through 2004 (FAN).


Fluoridation, Tooth Decay, and Dental Fluorosis
What was predicted vs. what has actually occurred
What was predicted in 1950*
Tooth Decay
Fluorosis Index
Decayed, Missing or Filled Teeth (DMFT)
Community Fluorosis Index
Water Fluoride Level (ppm)
0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1
2
3
4
5
6
7
8
9
10
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

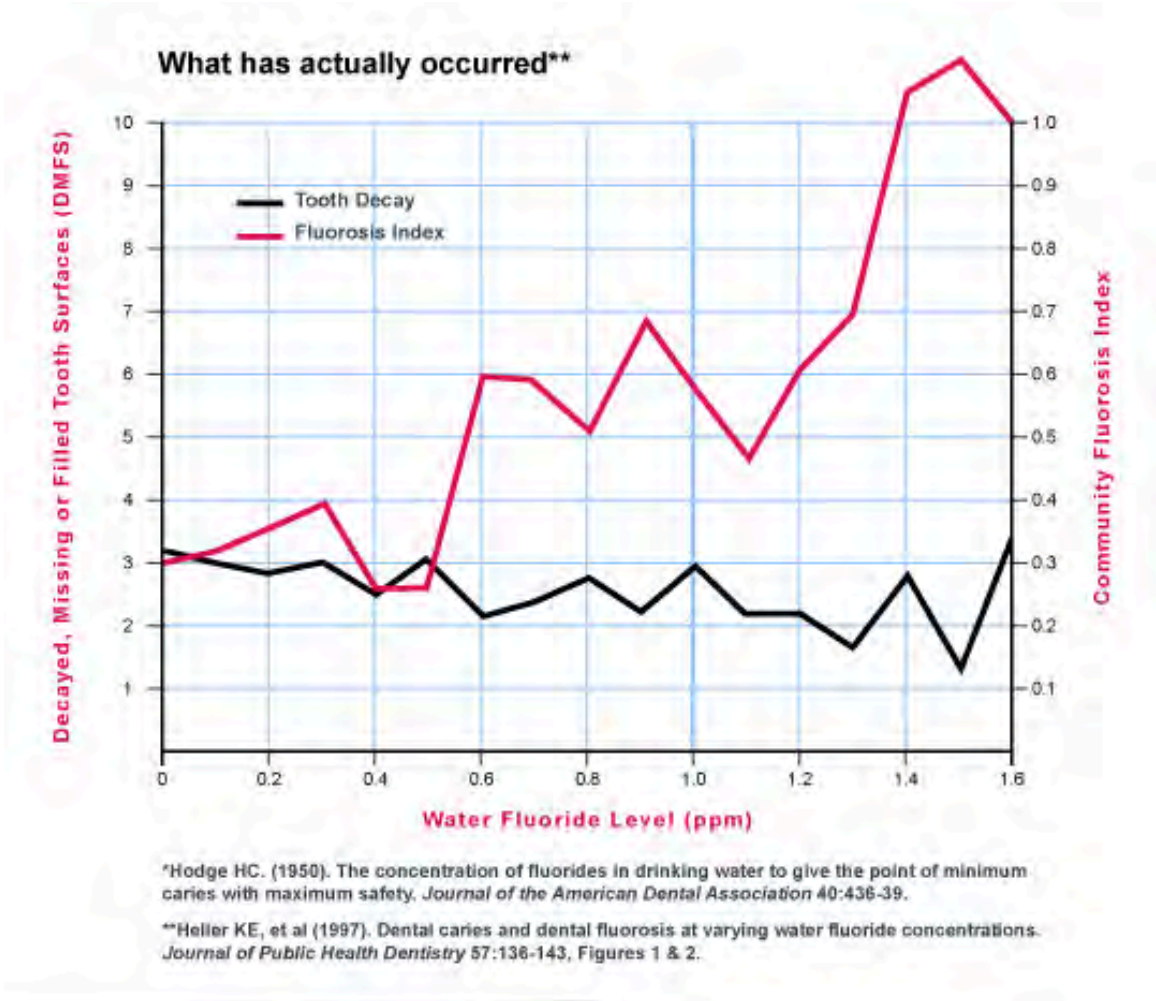


Figure 8: What was predicted in 1950 (top graph) vs. What has actually occurred (bottom graph). Legend: Black line is tooth decay measured as DMFT. Red Line is the Community Fluorosis Index. (FAN).

6. Has fluoridation helped reduce tooth decay in the Inner City?

While it is clear that the fluoridation program has failed to limit the prevalence of dental fluorosis to levels anticipated in 1945, what about the other half of the program? Has it reduced tooth decay? And in the context of this discussion has it reduced tooth decay in low-income families and minority communities especially in the inner city?

Despite the laudable aim to reduce the inequalities in dental care, putting fluoride in everyone's water to reduce tooth decay among inner city children has not been the magic bullet it was expected to be. Story after story in the media of major fluoridated cities in the US tell the same story: we still have a dental crisis among America's inner city children especially among poor and minority families. In Table 3 we summarize these reports from New Haven CT; Washington DC; Detroit MI; Boston MA; Concord NH; Manhattan and the Bronx in NY; Cincinnati OH; Pittsburgh PA; and San Antonio TX.

TABLE 3: Communities with water fluoridation and high dental decay	
Fluoridation Status	**Detail**
CONNECTICUT Mandatory Fluoridation since 1965 for water systems servicing a population of 20,000 or more 90.3% of the population receive fluoridated water as of 2012	… Peters [director of New Haven Public Schools school health centers] said this past June New Haven Public schools screened 484 Troup students, from kindergarten on up to grade 8, and found that 35 percent had moderate to severe dental needs. "The need for dental care is very clear in Connecticut and New Haven," Peters said at Troup Wednesday. "Tooth decay is the most common childhood disease. It is five times more common than asthma and its the leading reason for missed school across the state." … 2015. Markeshia Ricks M. The dentist comes to Troup. New Haven Independent. September 11.
CONNECTICUT See above	"Dental decay remains the most common chronic disease among Connecticut's children. Poor oral health causes Connecticut children to lose hundreds of thousands of school days each year. One in four Connecticut children is on Medicaid, but two of three Connecticut children receive no dental care. And DSS continues to exploit the seriously stretched public health providers and the few remaining private providers. There is an oral health crisis in Connecticut." 2005. Slate R. State must fund plan to provide oral health care for the poor. New Haven Register. May 5.
DISTRICT OF COLUMBIA Fluoridated since 1952	Washington DC has "one of the highest decay rates in children in the country." The "typical new patient, age 6, has five or six teeth with cavities — a 'staggering" number'" at the Children's National Medical Center. 2002. Morse S. Bottled Water: Just add Fluoride. Washington Post. March 5.
DISTRICT OF COLUMBIA Fluoridated since 1952	• Low-income Children in Washington, DC are at High Risk for Poor Oral Health and Consequently Inadequate School Readiness • a large proportion (44 percent) of the 144 students examined had a history of dental caries, • Examined students are primarily from some of the most impoverished Wards (5, 6, 7, & 8) and exhibit high caries incidence 2007. Issue Brief: Oral Health is Critical to the School Readiness of Children in Washington, DC. By Altarum Institute.
ILLINOIS	Thousands of low-income children and adults in Illinois suffer from untreated dental disease. They can't eat or sleep properly, do their best at

Fluoridation is mandatory 98.5% of the state's population receive fluoridated water (as of 2012)	school or work or smile and are at risk for other serious health problems… … Illinois has among the lowest rates in the nation for government funded dental care. As a result we face an oral health care crisis… Illinois currently has just one clinic per 8,400 children who rely on government insurance… 2009. Support Bill HB 388 for dental care. By Lauri Frichtl, Executive Director, Illinois Head Start. Pioneer Press.
INDIANA 94.8% of the state's population receive fluoridated water (as of 2012)	Results from the 2006 BRFSS also indicated that 47 percent of Hoosiers ages 18 and older have had permanent teeth extracted—a percentage that was significantly higher than the national median of 44 percent (see Figure 2). Groups with the highest prevalence of tooth extractions **included blacks; individuals with an annual household income of less than $35,000; and individuals with lower educational attainment.** Prevalence of extractions was highly associated with age – as age increased so did the percentage of Hoosiers who reported having had any permanent teeth extracted. … The elderly, minorities, and low income citizens often face the unfortunate need to have some or all of their teeth extracted. 2009. Oral Health Needs in Indiana: Developing an Effective and Diverse Workforce. Center for Health Policy. May.
MICHIGAN **Detroit** Fluoridated since 1967	**Excerpt from abstract:** To describe the epidemiology of dental caries among low-income African American children 5 years old and younger in the City of Detroit. **Conclusion: Dental Caries in primary teeth in children 5 years of age and younger in Detroit is a major dental public health problem.** 2006. Severity of Dental Caries Among African American Children in Detroit. By Ismail AI, Tellez M, Sohn W. Presented at the 35th Annual Meeting & Exhibition of the American Assoc. for Dental Research in Orlando, Florida. March.
MICHIGAN **Detroit** Fluoridated since 1967	From abstract: The aim of this study was to examine the relationship between dietary patterns and caries experience in a representative group of low-income African-American adults. Participants were residents of Detroit, Michigan, with household incomes below 250% of the federally-established poverty level (n = 1,021)… This population had severe caries, poor oral hygiene, and diets that are high in sugars and fats and low in fruits and vegetables. Apart from tap water, the most frequently consumed food item by adults of all ages was soft drinks; 19% of all energy from sugar came from soft drinks alone. 2006: Dietary Patterns Related to Caries in a Low-income Adult Population. By Burt BA, Kolker JL, Sandretto AM, et al. Caries Research 40(6):473–80.

MASSACHUSETTS 70.4% of the state residents receive fluoridated water	Children from low-income families and children from certain racial/ethnic groups not only have a much higher prevalence of oral disease but are also less likely to have had their dental caries treated. (Page 4) Significant racial, ethnic and socioeconomic disparities exist within all oral health indicators, at each grade level, and among the state's 14 counties. (page 5) Kindergarten • 39.4% of non-Hispanic Black kindergarten children have been affected by dental caries, 1.7 times higher than non-Hispanic white kindergarten children; • 40.9% of Hispanic kindergarten children have been affected by dental caries, 1.8 times higher than non-Hispanic white kindergarten children; and • 41.5% of kindergarten children from low-income families have been affected by dental caries, 1.9 times higher than kindergarten children from families with higher incomes. 2008. The Oral Health of Massachusetts' Children. By White BA, Monopoli MP, Souza BS. Catalyst Institute. January.
MASSACHUSETTS 70.4% of the state residents receive fluoridated water	…"Children are going to school with cavities, gum infections, rotting teeth. I don't think people know how serious a problem it is," said Ms. Cepeda, who has served as coordinator of the volunteer committee. The problem is one that a special state legislative commission last year called an oral health crisis in Massachusetts: Not enough dentists are available for people on MassHealth, the state's health plan that includes Medicaid and the Children's Health Insurance Program… 2001. Fluoridated Water Not Preventing Rampant Decay Among Southbridge's Poor. Telegram & Gazette (Massachusetts). October 14.
NEW HAMPSHIRE **Concord** Fluoridated since 1978	"It's overwhelming," said Deb Bergschneider, dental clinic coordinator at the Concord center. "Because we serve the uninsured, we see the lower level of the community and the need is just astronomical. … By the time they get to us, their mouths are bombed out. They are all emergency situations. It's a severe, severe, problem. It's sad." 2005. Gerth U. Nothing to smile about. Fosters Daily Democrat, May 22.
NEW YORK **Manhattan** Fluoridated since 1965	The level of untreated decay, %d/ dft, was 91%, significantly higher than the US national population which is 76% overall, and 76% for African Americans and Mexican Americans within the US national population. **CONCLUSIONS:** The children in this population have higher caries prevalence and a higher level of untreated caries than the national means as reported in NHANES III. The high level of untreated decay found in this particularly disadvantaged community suggests that enhanced dental services targeting the very young are needed in these communities.

	2002. Dental caries among disadvantaged 3- to 4-year old children in northern Manhattan. By Albert DA, Park K, Findley S, et al. Pediatric Dentistry, May;24(3):229-33. http://fluoridealert.org/studytracker/19188/
NEW YORK **Bronx** Fluoridated since 1965	"Bleeding gums, impacted teeth and rotting teeth are routine matters for the children I have interviewed in the South Bronx. Children get used to feeling constant pain. They go to sleep with it. They go to school with it. Sometimes their teachers are alarmed and try to get them to a clinic. But it's all so slow and heavily encumbered with red tape and waiting lists and missing, lost or canceled welfare cards, that dental care is often long delayed. Children live for months with pain that grown-ups would find unendurable. The gradual attrition of accepted pain erodes their energy and aspiration. I have seen children in New York with teeth that look like brownish, broken sticks. I have also seen teen-agers who were missing half their teeth. But, to me, most shocking is to see a child with an abscess that has been inflamed for weeks and that he has simply lived with and accepts as part of the routine of life. Many teachers in the urban schools have seen this. It is almost commonplace." 1991. Kozol J. Savage Inequalities. Harper Perennial.
OHIO **Cincinnati** Fluoridated since 1969-1970	"We cannot meet the demand," says Dr. Larry Hill, Cincinnati Health Department dental director. "It's absolutely heartbreaking and a travesty. We have kids in this community with severe untreated dental infections. We have kids with self-esteem problems, and we have kids in severe pain and we have no place to send them in Cincinnati. People would be shocked to learn how bad the problem has become." … An estimated 43 percent of the city's 8-year-olds living in low-income homes have significant teeth decay. The rate of infection stood at 37 percent in 1996. 2002. Solvig E. Special Report: Cincinnati's Dental Crisis. The Enquirer (Cincinnati, Ohio). October 6.
PENNSYLVANIA **Pittsburgh** Fluoridated since 1952	"Nearly half of children in Pittsburgh between 6 and 8 have had cavities, according to a 2002 state Department of Health report. More than 70 percent of 15-year-olds in the city have had cavities, the highest percentage in the state. Close to 30 percent of the city's children have untreated cavities. That's more than double the state average of 14 percent." 2005. Law V. Sink your teeth into health care. *Pittsburgh Tribune-Review* February 13.
TEXAS **San Antonio**	"After 9 years and $3 million of adding fluoride, research shows tooth decay hasn't dropped among the poorest of Bexar County's children it has only increased—up 13 percent this year. One out of two children in the Head

Fluoridated since 2002	Start program who were checked for cavities had some last year." 2011. Conger J. Added to our drinking water: A chemical more toxic than lead? KENS 5. November 11.

So despite being fluoride-overdosed, it's not working for poor families and communities of color in the U.S. as they still suffer from higher rates of tooth decay in fluoridated communities (see Table 3 and also FAN, 2013a). Many poor and minority communities suffer from what health officials have called a "silent epidemic" of untreated tooth decay.

According to Kaste et al. (1996), national data indicate that 80% of tooth decay in children is concentrated in 25% of the child population, with low-income children and racial/ethnic minority groups having more untreated decay on average than the U.S. population as a whole.

Little has changed since 1996. According to Dye et al. (2015): "Untreated tooth decay was higher for Hispanic (36%) and non-Hispanic black (42%) adults compared with non-Hispanic white (22%) and non-Hispanic Asian (17%) adults aged 20–64."

This is not just the opinion of handful of dental researchers it is also the view of the number one promoter of fluoridation in the country: the CDC's Division of Oral Health. In 2012, according to the CDC, the total population on fluoridated drinking water systems was 210,655,401 Americans or 67.1% of the population (CDC, 2012). Even with this astounding number, dental health disparities continue to thrive for communities of color and society's poorest – the very groups that fluoridation was meant to serve. In the words of the CDC (2015):

> • **Oral health disparities are profound** in the United States. Despite major improvements in oral health for the population as a whole, oral health disparities exist for many racial and ethnic groups, by socioeconomic status, gender, age and geographic location.
>
> • **Overall**. Non-Hispanic blacks, Hispanics, and American Indians and Alaska Natives generally have the poorest oral health of any racial and ethnic groups in the United States.
>
> • **Children and Tooth Decay**. The greatest racial and ethnic disparity among children aged 2–4 years and aged 6–8 years is seen in Mexican American and black, non-Hispanic children.
>
> • **Adults and Untreated Tooth Decay**. Blacks, non-Hispanics, and Mexican Americans aged 35–44 years experience untreated tooth decay nearly twice as much as white, non-Hispanics.

So fluoridation is not working for poor families and communities of color in the U.S.

Why is this the case? The simple truth is that tooth decay is not caused by not enough ingested fluoride but by poor diet and too much sugar as well as too little intervention from dental professionals. This is what the Senate Subcommittee on Primary Health and Aging said about

the lack of access to dental care in 2012. Millions of Americans are "unable to get even the basic dental care they need."(Sanders, 2012)

Poor nutrition and lack of access to professional dental care goes hand in hand with poverty. ***Sadly 80% of dentists in the US will not treat children on Medicaid because the financial returns are so low*** *(FAN, 2013b).*

Some of the children that need the most care get the least.

Fluoridation simply cannot compensate for poor diet, lack of early professional interventions and poor practices like baby's sucking on bottles of sugared water, juice, milk and even fizzy drinks for hours on end leading to baby bottle tooth decay (BBTD) which ravages the infant's first teeth. Such abuse of the primary teeth cannot be prevented with fluoridation but the prevalence can be reduced with better education.

Even though fluoridation promoters know that BBTD cannot be prevented by fluoridation – or should know –that doesn't stop them using pictures of BBTD as a scare tactic to persuade communities to start or to continue fluoridation. In Figure 9, a Medical Office of Health from Canada holds up a picture of BBTD falsely implying that fluoridation will address this problem. It won't. Such propaganda exercises are bad enough in the hands of rabid fluoridation promoters; they are even worse when practiced by civil servants whose salaries are paid for by the taxpayer.

Figure 9: In Canada, Medical Officer of Health Dr. Hazel Lynn holds up a picture of Baby Bottle Tooth decay (BBTD). Lynn claimed in Owen Sound's Sun Times (Jan 31, 2014) that water fluoridation prevents tooth decay and is a safe practice. The implication is

fluoridation will mitigate against BBTD. It won't! Photo: James Masters/QMI Agency (Langlois, 2014)

7. Why are African Americans more sensitive to fluoride's toxicity?

As discussed above African Americans and Hispanics have been shown to be at an increased risk of developing dental fluorosis, and have a higher risk of suffering from the more severe forms of this condition (Russell, 1962; Butler et al., 1985; Williams & Zwemer, 1990; Beltrán-Aguilar et al., 2005, 2010; Martinez-Mier & Soto-Rojas, 2010).

It is not yet known why blacks suffer higher rates of dental fluorosis. According to the CDC, it may be a result of "biologic susceptibility or greater fluoride intake." (Beltrán-Aguilar et al., 2005). Whatever the explanation, it is clear that the black community is being disproportionately harmed by current fluoride policies in the United States.

Here are a few possible explanations:

1) African Americans consume significantly more total fluids and plain water, and thus receive more fluoride from drinking water, than white children (Sohn et al., 2009).

2) According to CDC, African Americans are less likely to breastfeed than most other racial groups: "non-Hispanic blacks had a lower prevalence of breastfeeding initiation than non-Hispanic whites in all but two states…"-(CDC, 2010). As human milk contains very low levels of fluoride (Ekstrand et al., 1981, 1984; Sener et al., 2007), babies fed formula made with fluoridated water at 0.7 -1.2 mg/L will receive 100 to 200 times more fluoride than a human-fed baby simply through consumption of the water. If the parent reduces the amount of formula in a fluoridated community to save money as many poor parents do (Stein 2008; Egemen et al., 2002; Parraga et al., 1988), and adds more water than recommended, these children will receive even higher levels of fluoride.

3) Another possible explanation was suggested by a study by Leite et al. (2011). The authors found that rats treated with both lead and fluoride had worse dental fluorosis than rats treated with fluoride alone. Thus it is possible that children with lead exposure will be more susceptible to developing dental fluorosis. African-Americans in the inner-city have had more exposure to lead than white children. In 1995 Stevens reported, "Of impoverished black children aged three to five living in American inner cities, 90% have elevated blood-lead levels." CDC in 2003 stated, "Of the children reported with confirmed elevated [blood lead levels] between 1997 and 2001, approximately 17% were non-Hispanic whites, 60% were non-Hispanic blacks, 16% were Hispanic, and 7% were of other races or ethnicities. As reported by the MMWR in 2013:

> This report summarizes the results of that analysis, which indicated that the percentage of children aged 1–5 years with BLLs at or above the upper reference interval value of 5 μg/dL calculated using the 2007–2010 NHANES cycle was 2.6%. Thus, an estimated 535,000 U.S. children aged 1–5 years had BLLs ≥5 μg/dL based on the U.S. Census Bureau 2010 count of the number of children in this age group. (MMWR, 2013)

No federal agency has investigated or published studies on the interaction of neurotoxicants such as lead and fluoride on children in fluoridated inner-cities or anywhere else.

4) Fluoride's toxicity is exacerbated by inadequate nutrition, including lower intakes of iodine and calcium (see studies at FAN, 2012).

5) Certain racial groups are more likely to be lactose intolerant than others. Included among these are Central and East Asians (80-100% lactose intolerant; de Vrese et al., 2001), Native Americans (80-100% lactose intolerant; National Institute of Child Health and Human Development, 2006), African Americans (**75% lactose intolerant**), and Southern Indians (70% lactose intolerant; de Vrese et al., 2001). The elevated incidence of lactose intolerance may indicate lower rates of milk consumption, and higher consumption rates of water or other beverages, than Whites (21% lactose intolerant; Scrimshaw, 1988). Thus these groups may be more heavily exposed to fluoride in water and other beverages than are Caucasian Americans, and their calcium intakes may be compromised. Calcium in the diet is partially protective of fluoride because it lowers uptake of fluoride from the gut.

8. Reckless assumptions underpin fluoridation promotion

Dental fluorosis is a clear indicator that the child has been over-exposed to fluoride before their permanent teeth have erupted. This can be compared to the purple-blue line on the gums of those who have been over-exposed to lead. Both markers tell a story. But not all fluoride exposure outcomes are so easily recognizable as dental fluorosis.

One of the most reckless assumptions made by those who endorsed fluoridation in 1950 was the notion that while fluoride was interfering with some biochemical mechanism in the growing tooth cells causing the damage to the enamel which we call dental fluorosis, that it was not causing damage to any other developing tissue in a baby's body.

It was also reckless to ignore the fact that nature provides only a miniscule amount of fluoride in mothers' milk.

It was also reckless to ignore the fact that there is not one biochemical process in the body that needs fluoride to function properly.

It is even more reckless to ignore the fact that fluoride is highly toxic to many fundamental biological processes, see Barbier et al., 2010, The Biochemical Mechanisms of Fluoride's Toxicity.

If fluoride limits its toxic effects to the cells laying down the enamel in our teeth (Den Besten & Li, 2011), we have been extremely lucky and undeservedly so considering the recklessness of exposing a huge population to this toxic substance every day of their lives for a whole lifetime with every glass of water they drink.

9. Pro-fluoridation governments have undertaken very few studies to seriously investigate fluoride's potential to cause both short-term health effects in children or long-term health effects in adults.

The consequences of the reckless assumptions discussed in section 8 above have been largely hidden form the public and media because of an atrocious lack of basic research on fluoride's health effects until fairly recent years.

Once the Public Health Service had endorsed fluoridation in 1950 the U.S. government showed little interest in funding studies to investigate the health of fluoridated communities. The same has been true in other (largely English speaking) fluoridated countries.

Based on what has been reported in the scientific literature one would have expected a responsible government that has endorsed the experiment of fluoridation to have carefully investigated a possible association of the following conditions with an increased exposure to fluoride:

a) Arthritis rates
b) Decreased thyroid function
c) Lowered IQ in children
d) Increased ADHD rates in children.
e) Reduced time to puberty
f) Reproductive health
g) Alzheimer's disease

A responsible government would have also:

> Attempted to put the anecdotal reports of people claiming to be sensitive to fluoride on a scientific level using double-blind studies;
>
> Further investigated Bassin et al.'s (2006) suggested age window of vulnerability to osteosarcoma in young boys;
>
> Attempted to reproduce Jennifer Luke's findings of fluoride's accumulation in the human pineal gland and lowered melatonin production in fluoride-treated animals (Luke, 1997, 2001), and
>
> Made a comprehensive effort to monitor fluoride levels in urine, blood and bone to establish a baseline for future research. One simple strategy would have been to have collected the hip-bone of patients undergoing hip replacement (of which there are many thousands each year) and monitored them for fluoride. This was done in one small Canadian study and it was found that the levels were considerably higher in the bones collected in fluoridated Toronto compared to unfluoridated Montreal (Chachra et al., 2010). We need more studies like this.
>
> Used dental fluorosis as a biomarker for exposure to probe any possible correlation with bone fractures, osteosarcoma, age of puberty, even IQ scores.

Most of this research should have started 70 years ago before this reckless fluoridation experiment was begun. But Instead of basic scientific research like this the public has been treated to over 60 years of promotion, propaganda and PR. The central plank of which is the

foolish notion that "the absence of study is the same as the absence of harm." According to Paul Connett, PhD, retired chemistry professor, "**When policy is king, science becomes a slave."**

Another way that the pro-fluoridation health establishment in the U.S. has kept western scientists in the dark about fluoride's toxicity is the exclusion of the journal *Fluoride* from Pub Med, the largest online search engine for biomedical papers and maintained by the National Institutes of Health (NIH). Pub Med refuses to index the only scientific journal dedicated to all aspects of fluoride research. It is published by the International Society for Fluoride Research (ISFR) four times a year, and all issues are available online for free at http://www.fluorideresearch.org/backissues.pdf (see section 15 below).

Despite its exclusion from PubMed many studies published in *Fluoride* have been widely cited by scientists in the field — including U.S. government researchers. A review of the references in the landmark report on the toxicology of fluoride by the National Research Council of the National Academies in 2006 reveals an important story: the journal *Fluoride* had the highest number of references -see table 4 for the top 10 journals referenced by the NRC

Table 4: The top ten journals cited in the NRC (2006) review

Name of Journal	# of Citations
Fluoride	56
Journal of Dental Research	34
Community Dentistry and Oral Epidemiology	31
Journal of Public Health Dentistry	31
Journal of the American Dental Association	23
Journal of Bone and Mineral Research	21
Calcified Tissue Research	19
Caries Research	18
Bone	13
Pediatric Dentistry	12

The feeble excuses offered by the NIH for keeping *Fluoride* out of Pub Med is that the ISFR is anti-fluoridation (and therefore biased). But a) the ISFR has never taken a formal position against fluoridation and b) there is far more to fluoride research than the issue of water fluoridation so why deprive scientists access to that other research? It is true that the editors of *Fluoride* over many years have been anti-fluoridation, but if that is the reason for exclusion from Pub Med the NIH has exercised a glaring double standard here because the editors of every major dental journal are pro-fluoridation but that hasn't kept their journals out of Pub Med.

10. Non-fluoridated countries lead research effort on fluoride's toxicity

The understanding of fluoride's dangers and the potential risks posed by water fluoridation by independent scientists (outside government agencies) in the western world is changing because of research efforts in countries like India, China, Iran, and Mexico. These countries have high natural levels of fluoride in regions of their countries and are genuinely interested in finding out

what level of fluoride in water is safe to drink. Moreover, they do not have a fluoridation program to protect and their researchers are not worried about offending those who promote this practice. (There are also areas in the U.S. where drinking water contains high fluoride levels (FAN, 2007).

A great deal of this research effort was revealed to the Western world by the landmark review of fluoride's toxicity by the U.S. National Research Council of the National Academies report in 2006.

11. National Research Council of the National Academies review of 2006

It is hard to overstate the significance of this review titled, ***Fluoride in Drinking Water: A Scientific Review of EPA's Standards*** (NRC, 2006).

First and foremost the panel put together by the NRC was truly balanced which was most unusual for official reviews of fluoride's toxicity. In the 12-membered panel three were known to be pro-fluoridation, three anti-fluoridation and six undeclared.

Second, the panel was expected to take about one year to complete their review but they ended up spending three and half years on this task.

Third, the panel did not limit themselves to human epidemiological studies, they looked at animal studies, biochemical studies, clinical trials, case studies, epidemiological studies and even theoretical modeling in the case of fluoride's impact on the bone.

In short, they looked at everything that pertained to understanding fluoride's toxicity. Nor did they shun the use of the huge database provided by the journal *Fluoride*, which has published research papers on fluoride since 1968.

As a result the NRC's final report, which is 507 pages long, with over 1100 references, is a veritable textbook on the toxicology on fluoride. What they did not do was to review the practice or the purported benefits of water fluoridation, which they were asked not to do by the EPA. They described their mission as follows,

> The committee was charged to review toxicologic, epidemiologic, and clinical data on fluoride—particularly data published since the NRC's previous (1993) report—and exposure data on orally ingested fluoride from drinking water and other sources.
>
> On the basis of its review, the committee was asked to evaluate independently the scientific basis of EPA's MCLG of 4 mg/L and SMCL (secondary maximum contaminant level—a concentration intended to avoid cosmetic damage) of 2 mg/L in drinking water, and the adequacy of those guidelines to protect children and others from adverse health effects. The committee was asked to consider the relative contribution of various fluoride sources (e.g., drinking water, food, dental-hygiene products) to total exposure. The committee was also asked to identify data gaps and to make recommendations for future research relevant to setting the MCLG and SMCL for fluoride. *Addressing questions of artificial fluoridation, economics, risk-benefit assessment, and water-treatment technology was not part of the committee's charge* [emphasis added] (see

also Donahue, 2003).

The enormous breadth covered by this panel is revealed by the chapter titles:

1. Introduction

2. Measures of Exposures to Fluoride in the United States

3.Pharmakinetics of Fluoride

4. Effects of Fluoride on Teeth

5. Musculoskeletal effects

6. Reproductive and Development Effects of Fluoride

7. Neurotoxicity and Neurobehavioral Effects

8. Effects on the Endocrine System

9. Effects of the Gastrointestinal, Renal, Hepatic and Immune Systems

10. Genotoxicity and Carcinogenicity

11. Drinking Water Standards for Fluoride

This important publication can be searched online without charge at http://www.nap.edu/catalog/11571/fluoride-in-drinking-water-a-scientific-review-of-epas-standards

Based on this massive review the NRC panel concluded that the current MCLG (the maximum contaminant level goal) and MCL (maximum contaminant level) for fluoride (4 ppm) was not protective of health and recommended that the EPA's Office of Water (that commissioned the review) conduct a new risk assessment for fluoride to determine a new (and safer) MCLG.

The MCLG is supposed to be the safe level based upon the best science available on harmful effects with the application of appropriate safety factors to protect everyone including vulnerable subsets of the population from "known and reasonably anticipated" harm. The MCLG is an ideal goal. Once the MCLG has been identified the MCL (a federally enforceable standard) is determined and takes into account the economic costs of reaching this standard in a situation where there are high natural levels in the water, either naturally or from industrial pollution.

The NRC recommendation was made in March 2006, but as of September 2015 the determination of the MCLG (and hence the MCL) has still has not been completed by the EPA Office of Water (OW) and the U.S. continues to operate with an unsafe standard nearly three times higher than the WHO recommended safe level of 1.5 ppm, which has been adopted by nearly every other country in the world.

While not discounting any of the other health concerns revealed in the eleven chapters of the report, the authors singled out three clinical conditions that they believed triggered the need for

a new health risk assessment:

1. Clinical stage II skeletal fluorosis: "The committee judges that stage II is also an adverse health effect, as it is associated with chronic joint pain, arthritic symptoms, slight calcification of ligaments, and osteosclerosis of cancellous [porous] bones."

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

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

In addition to these end points the NRC panel pointed to many gaps in the literature and recommended numerous research questions that needed to be addressed. An independent observer should wonder why after over 60 years of fluoridation (as of 2006) there should be so many gaps in the literature. We have attempted to answer that question in section 9 above. This is what the chairman of the NRC panel had to say about this in a *Scientific American* article in January 2008:

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

On the day that the NRC (2006) was published the American Dental Association (ADA) rushed in to deny its relevance to fluoridation and six days later the CDC's Division of Oral Health did the same. This was an extraordinary position to take because in chapter 2 the NRC panel provided an exposure analysis, which clearly demonstrates that certain subsets of the population are exceeding the EPA's safe reference dose for fluoride (0.06 mg/kg/day) drinking fluoridated water. These subsets included high water drinkers, people with poor kidney function, people with borderline iodine deficiency and bottle-fed babies. The latter case is illustrated by figure 2.8 that appears on page 85 of the report.

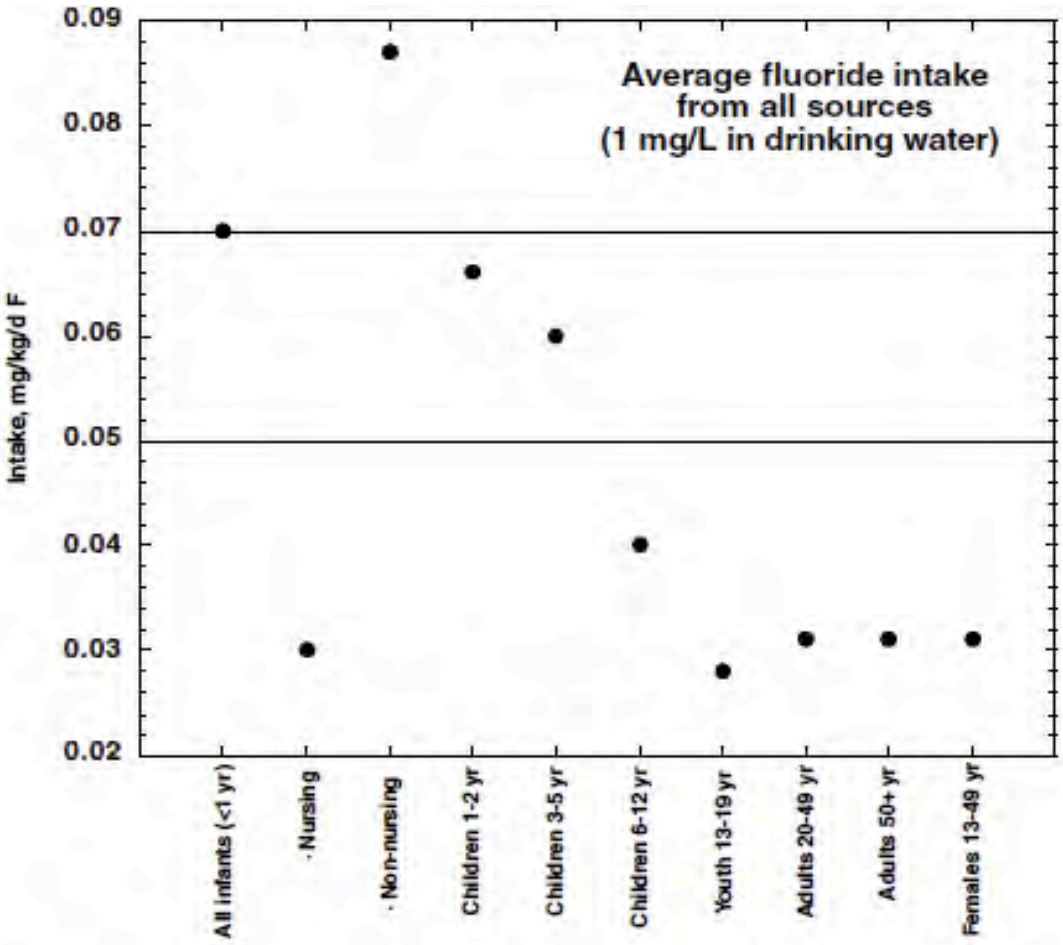


FIGURE 2-8 Estimated average intake of fluoride from all sources, at 1 mg/L in drinking water (based on Table 2-11). Horizontal lines indicate an intake of 0.05-0.07 mg/kg/day.

Figure 10: Copy of Figure 2-8 in NRC (2006), p.85.

More studies since 2006

Because of the huge delay in the EPA Office of Water completing the recommended risk assessment – its now been 9 years - more studies have been published since 2006, which further underline the need and urgency for a new more protective MCLG. These include many more studies on neurotoxicity, a key study on thyroid function, another on ADHD and an important study on osteosarcoma. Had these been available at the time of the NRC review it is more than likely that these would have been added to the list of endpoints cited above by the panel that should be considered in a new risk assessment.

The EPA's Office of Water in 2011 claimed that the end point of severe dental fluorosis will also protect against arthritic symptoms, bone fractures and harm to any other tissue.

Here we will start with some of the findings in the NRC review and update them with more recent studies.

12. NRC and Endocrine Disruption

The NRC panel labeled fluoride an endocrine disruptor. The authors state:

> "The chief endocrine effects of fluoride exposures in experimental animals and in humans include decreased thyroid function, increased calcitonin activity, increased parathyroid hormone activity, secondary hyperparathyroidism, impaired glucose intolerance, and possible effects on the timing of sexual maturity. Some of these effects are associated with fluoride intake that is achievable at fluoride concentrations in drinking water of 4 mg/L or less, especially for young children or for individuals with high water intake. (p. 8, NRC 2006)
>
> "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." (p. 266, NRC 2006)

The 2006 NRC report notes that six prior major reviews (1991, 1993, 1999, 2000, 2002, 2003) of the health effects of fluoride did not consider the endocrine system in detail apart from the reproductive system.

13. NRC on Thyroid Function

On thyroid function, the NRC panel reported: "Fluoride exposure in humans is associated with elevated TSH concentrations, increased goiter prevalence, and altered T4 and T3 concentrations; similar effects in T4 and T3 are reported in experimental animals, but TSH has not been measured in most studies." (p. 262)

The panel also indicated that affects on the thyroid have been observed at very low levels. They state that, "In humans, effects on thyroid function were associated with fluoride exposures of 0.05-0.13 mg/kg/day when iodine intake was adequate and 0.01-0.03 mg/kg/day when iodine intake was inadequate (Table 8-2)." (p. 263, NRC 2006).

To reach these dosages (which depend on bodyweight) it takes remarkably little fluoride. For those with borderline iodine deficiency it would only take the consumption of 0.1 to 0.3 mg of fluoride per day for a 10 kg infant and 0.7 to 2.1 mg/day for a 70 kg adult. These are easily exceeded in a fluoridated community. For someone whose iodine levels are adequate for a 10 kg infant it would take between 0.5 and 1.3 mg /day and for a 70 kg adult it would take 3.5 mg to 9.1 mg/day. The lower end of these ranges would be reached by some people in a fluoridated community.

These statements have been recently buttressed by new research conducted in the UK and published in 2015.

14. Hypothyroid and fluoride study from UK

This study by Peckham et al., 2015 used the records of over 98% of the General practices in England on the numbers of patients treated for hypothyroidism and examined the prevalence of this condition as a function of the fluoride levels in the local drinking water supplies. The authors noted that:

> **"**Approximately, six million people (10%) in England live in areas where drinking water contains natural fluoride or which has been artificially fluoridated at a target concentration of 1 ppm (1 mg/L). Using prevalence data from the UK QOF, an analysis was undertaken to determine whether prevalence was affected by practice populations being situated in fluoridated areas at >0.7 mg/L and areas with lower levels of fluoride. While there are other sources of fluoride in people's diet (e.g., tea), drinking water is the most significant source of ingested fluorides in the UK." (Peckham et al, 2015)

The UK research team found that higher levels of fluoride in drinking water was a useful predictor of the prevalence of hypothyroidism. They found that general medical practices located in the West Midlands (a wholly fluoridated area) are nearly twice as likely to report high hypothyroidism prevalence in comparison to Greater Manchester (non-fluoridated area). (Peckham et al, 2015)

They concluded:

> "In many areas of the world, hypothyroidism is a major health concern and in addition to other factors—such as iodine deficiency— fluoride exposure should be considered as a contributing factor. The findings of the study raise particular concerns about the validity of community fluoridation as a safe public health measure." (Peckham et al, 2015)

It is hard to overstate the significance of these findings.

First, Peckham's findings are not totally unexpected. Scientific and medical research stretching back to the 1920s has shown that fluoride can affect the thyroid. In fact from the 1930s to the 1950s doctors in Argentina, France and Germany used fluoride to lower thyroid function in hyperactive thyroid patients. The levels of fluoride used overlap with the levels of exposure known to occur in some people drinking artificially fluoridated water today (Galletti & Joyet, 1958).

Second, hypothyroidism is a very common disorder in the US. In fact, one of the most prescribed drugs in the USA is synthroid, which is used to treat hypothyroidism. It can have serious adverse health effects. For a further discussion of the extent and concern about hypothyroidism in the USA see Appendix B.

Third, race may be a factor in sensitivity to certain thyroid diseases, which may make communities of color more vulnerable to fluoride's impacts on thyroid function (see Appendix C).

Fourth, reduced thyroid function in pregnant women is linked to reduced IQ in their children and there is accumulating evidence that fluoride, at levels within the range to which fluoridated populations are exposed, is associated with lowered IQ. Fluoride's effect on thyroid function

might be the mechanism by which it lowers IQ.

15. Fluoride and brain function

Whether or not the mechanism for fluoride's ability to lower IQ is caused by fluoride's interference with thyroid function in pregnant women or not, there is a huge body of evidence from animal, fetal and human studies that fluoride is a potent developmental neurotoxin (see http://fluoridealert.org/issues/health/brain/). The NRC examined some of that evidence in 2006 but much more has been published (or translated) since then. For example, in 2006 the NRC panel reviewed 5 IQ studies, there have been – as of Sept 2015 - 45 studies (out of 52 studies) that have found an association between lowered IQ and exposure to fairly modest levels of fluoride.

27 of these IQ studies were subjected to a meta-analysis by a team from Harvard University, which included Philippe Grandjean (Choi et al., 2012). While they noted that many of the studies had weaknesses (particularly control of a number of conflicting variables) they also noted that the results were remarkably consistent considering the investigations had been conducted in different countries (China and Iran) in widely different geographical areas, at different times and by different research teams. 26 out of the 27 studies found a lowered IQ in the "high-fluoride" village compared with the low-fluoride village. The average lowering was 7 IQ points. Such a downward shift in a large population would have huge ramifications. It would halve the number of geniuses and double the number of mentally handicapped. This in turn would have enormous social and economic consequences.

In a press release from Harvard University that accompanied the Choi et al., 2012 meta-analysis, co-author Philippe Grandjean was quoted as saying that, "Fluoride seems to fit in with lead, mercury, and other poisons that cause chemical brain drain."

When one considers the pains that our society has taken to either eliminate or drastically reduce the use of lead and mercury (e.g. banning lead in paint, solder, and gasoline and the phasing out the use of mercury in industrial switches, thermometers and other medical equipment, as a fungicide in paint, use in alkaline batteries, limiting emissions from coal-fired power stations and incinerators, fish advisories and in some countries the use in dental fillings) all in the name of protecting children and pregnant women from known neurotoxins, it is absolutely bizarre that we should continue to knowingly add this neurotoxin (i.e. fluoride) every day to the drinking water of over 200 million people.

In a radio debate with Dr. Howard Pollick, a well-known promoter of fluoridation, Grandjean was more succinct when he said:

> "Because I've worked in this field long enough to know that with time, we have always found that lead, mercury and pesticides were more toxic than we originally thought. I am not willing to sit here and say, OK, let's expose the next generation's brains and just hope for the best." (WBUR, 2015)

Fluoridation promoters have done their best to dismiss the Choi et al. 2012 findings claiming

that the fluoride concentrations in the High-Fluoride villages made the findings irrelevant to artificial water fluoridation programs. It is true that in two of the studies the fluoride concentrations ranged as high as 11 and 11.5 ppm, but this was the exception not the rule. Table 5 gives the fluoride concentrations in the 20 studies where the fluoride exposure was from water not coal and for which the concentrations was given.

Table 5: A listing of the Fluoride concentrations in the "high-fluoride" villages in 20 of the 27 studies subjected to a meta-analysis by Choi et al., 2012. The data was compiled by Paul Connett from Table 1 in the Choi paper.

Author/year	ppm in High F village
Chen 1991	4.55
Lin 1991	0.88
An 1992	2.1 – 7.6 (mean = 4.9)
Xu 1994	1.8
Yang 1994	2.97
Li 1995	1.81 – 2.69 (mean = 2.25)
Yao 1996	2 – 11 (mean = 6.5)
Zhao 1996	4.12
Yao 1997	2
Lu 2000	3.15
Hang 2001	2.90
Wang 2001	2.97
Xiang 2003	0.57 – 4.5 (mean = 2.54)
Seraj 2006	2.5
Wang 2006	5.44 +/- 3.88 (1.52 – 9.32)
Fan 2007	1.14 - 6.09 (mean = 3.62)
Wang 2007	3.8 – 11.5 (mean = 7.65)
Li 2010	2.47 +/- 0.75 (1.72 – 3.22)
Poureslami 2011	2.38
Wang 1996	>1- 8.6 (mean = 4.8)

Mean of 20 results (using means) = 70.49 / 20 = 3.52

Taken from Choi et al, 2012 – Table 1, pp 24-26.

From Table 5 it can be seen that many of the studies had fluoride concentrations less than 3 ppm and that the mean for all the studies combined was 3.52 ppm, which is lower than the current safe drinking water standard in the USA (4 ppm). Such levels offer **no adequate margin of safety** to protect all children in a large population drinking fluoridated water (and getting fluoride from other sources) sufficient to protect against this serious harmful effect.

Such a conclusion becomes even more obvious when we look at the details of one particularly well-conducted study (Xiang et al. 2003a,b.).

Xiang controlled for iodine intake (Xiang et al, 2003a) and lead exposure (Xiang 2003,b) and retrospectively for arsenic. The average level of fluoride in the well water for the Low-fluoride village was 0.36 ppm (range 0.18 -0.76 ppm) and the average level in the High Fluoride was 2.5

ppm (range 0.57- 4.5 ppm). The average drop in IQ was 5-10 IQ points across the whole age range. Xiang et al also sub-divided the High- Fluoride village into 5 sub-groups (A,B,C,D and E) with mean fluoride concentrations of 0.75, 1.53, 2.46, 3.28 and 4.16 ppm. As can be seen from his Table 8 (reproduced below as our Table 6) as the fluoride concentration increases in these 5 sub-groups the mean IQ decreases in an apparent linear fashion (see the results plotted graphically in Figure 11.

Table 6: A reproduction of Table 8 in Xiang et al., 2003a

Table 8. Level of fluoride in drinking water and children's IQs

Village	F in drinking water (mg/L)			IQ and rate of retardation		
	Group	No. samples	Water F level (Mean±SD)	No. children	IQ (Mean±SD)	Rate of IQ<80 (%)
Xinhuai	F	290	0.36±0.15	290	100.41±13.21	6.55
Wamiao	A	9	0.75±0.14	9	99.56±14.13	0.00
	B	42	1.53±0.27	42	95.21±12.22*	9.52
	C	111	2.46±0.30	111	92.19±12.98†	14.41*
	D	52	3.28±0.25	52	89.88±11.98†	21.15†
	E	8	4.16±0.22	8	78.38±12.68†	37.50†

*$p<0.05$. †$p<0.01$ compared with group F.

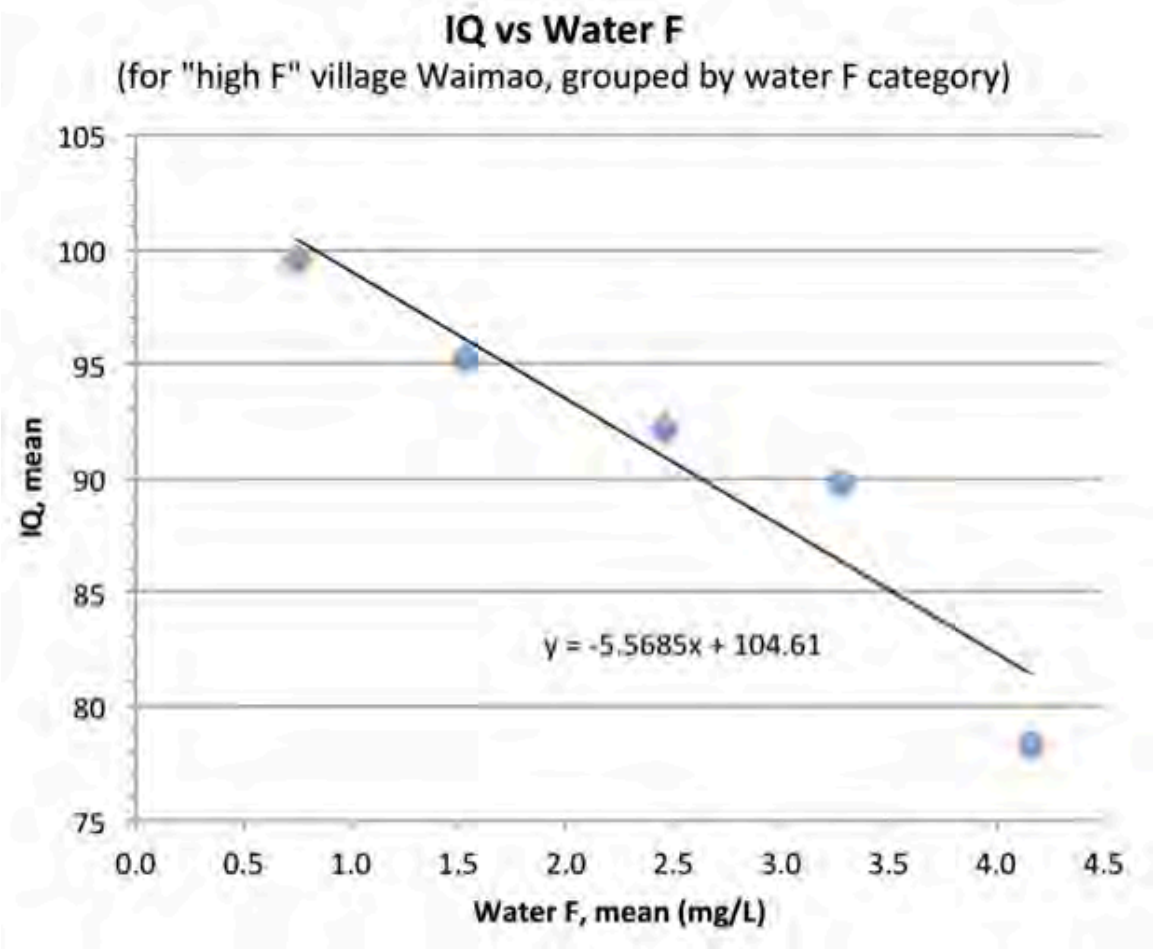


Figure 11: A plot of the mean IQ versus the mean IQ in the 5 sub-groups (A- E) in the high fluoride village, data taken from Table 8 in Xiang et al, 2003a.

From this plot one can see that IQ was lowered at a concentration somewhere between 0.75 and 1.5 ppm. This overlaps the range at which communities are fluoridated in the U.S. (0.7 to 1.2 ppm). This finding offers NO margin of safety to protect all children drinking fluoridated water from this serious end point. To make matters worse still according to the authors the children in these rural Chinese villages are unlikely to be using fluoridated toothpaste nor are they likely to be bottle-fed. Thus if we take into account these two sources many American children will be getting more fluoride *from all sources combined* than these Chinese children whose IQ was lowered.

Xiang also found that as the fluoride concentration went up in the 5 sub-groups the percentage of children with an IQ less than 80 (note that an IQ 70 -80 is borderline mentally handicapped and below 70 is outright mentally handicapped) increases dramatically from 0% (at 0.75 ppm) to 37.5% at 4.16 ppm (see Xiang's Table 8 reproduced above in Table 6).

By sub-dividing the children in the high-fluoride village Xiang eliminated any confounding factors that may have existed between the low and high-fluoride villages.

Other studies demonstrating fluoride's neurotoxicity

The evidence that fluoride is neurotoxic does not rest entirely on the 45 IQ studies. These findings are consistent with many animal studies that show that fluoride can enter the brain and alter brain chemistry in several ways. Of particular relevance are the 31 (out of 33) studies that show that when animals are placed in mazes they learn and memorize simple tasks less well when exposed to fluoride (see http://fluoridealert.org/issues/health/brain/).

There are also other human studies that have been conducted on very young children (too young to undertake IQ tests). One of these techniques tests the child's ability to copy and reproduce from memory drawings with a multiple of simple features. These have also shown that child's cognitive function is impaired by fluoride exposure. One example of this was a well-designed study from Mexico by Rocha Amador et al. (2009). They used the Rey-Osterrieth Complex Test (see Figure 12 below). They found that approximately **9 out of 10 children exposed to fluoride** were unable to copy the ROCF as expected for their age. For Immediate Recall, almost **6 out of 10 children** were unable to draw the figure as expected for their age.

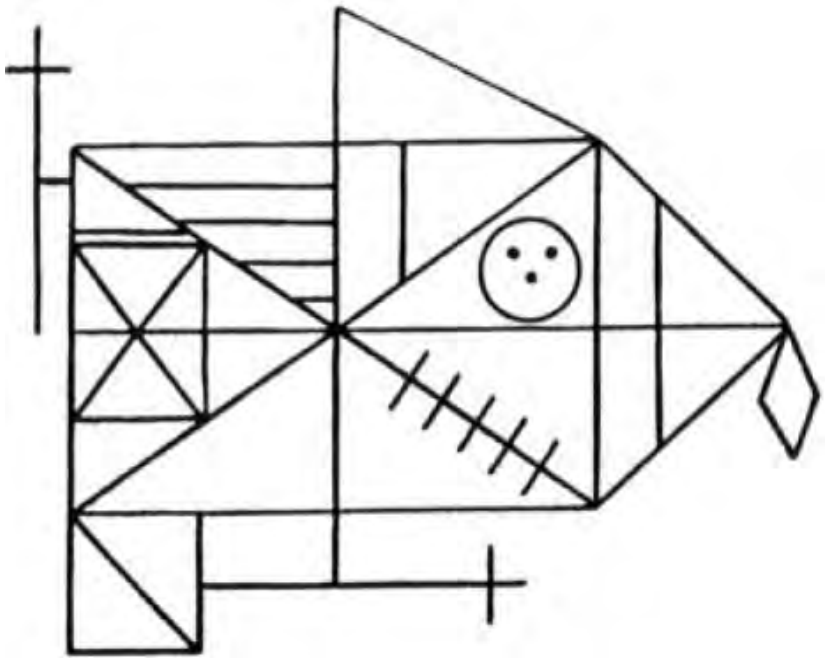


Figure 12: The Rey-Osterrieth Complex Figure Test used in the Rocha Amador et al. (2009) study.

There have also been four studies of aborted fetuses form China, which show that those from endemic fluorosis areas have impaired brain structures compared to non-fluorosis areas (Yu, 1996; Dong, 1989; Du, 1992; He, 1989).

The last children that need their IQ lowered in the US are children from low-income and minority families

16. Fluoridation and ADHD.

Attention Deficit Hyperactivity Disorder (ADHD) has become one of the most commonly diagnosed childhood behavioral disorders. Its basic characteristics are inattention, hyperactivity and impulsivity. "ADHD often continues into adolescence and adulthood, which can lead to medication dependency and a lifetime of treatment (Maddox, 2003)."

In early 2015 a study was published that examined the relationship between exposure to fluoridated water and ADHD prevalence among children and adolescents, ages 4-17, in the United States. The authors found that, "[s]tate prevalence of artificial water fluoridation in 1992 significantly positively predicted state prevalence of ADHD in 2003, 2007 and 2011, even after controlling for socioeconomic status. A multivariate regression analysis showed that after socioeconomic status was controlled each 1% increase in artificial fluoridation prevalence in 1992 was associated with approximately 67,000 to 131,000 additional ADHD diagnoses from 2003 to 2011. Overall state water fluoridation prevalence (not distinguishing between fluoridation types) was also significantly positively correlated with state prevalence of ADHD for all but one year examined." (Malin & Till, 2015). See figure 13 below

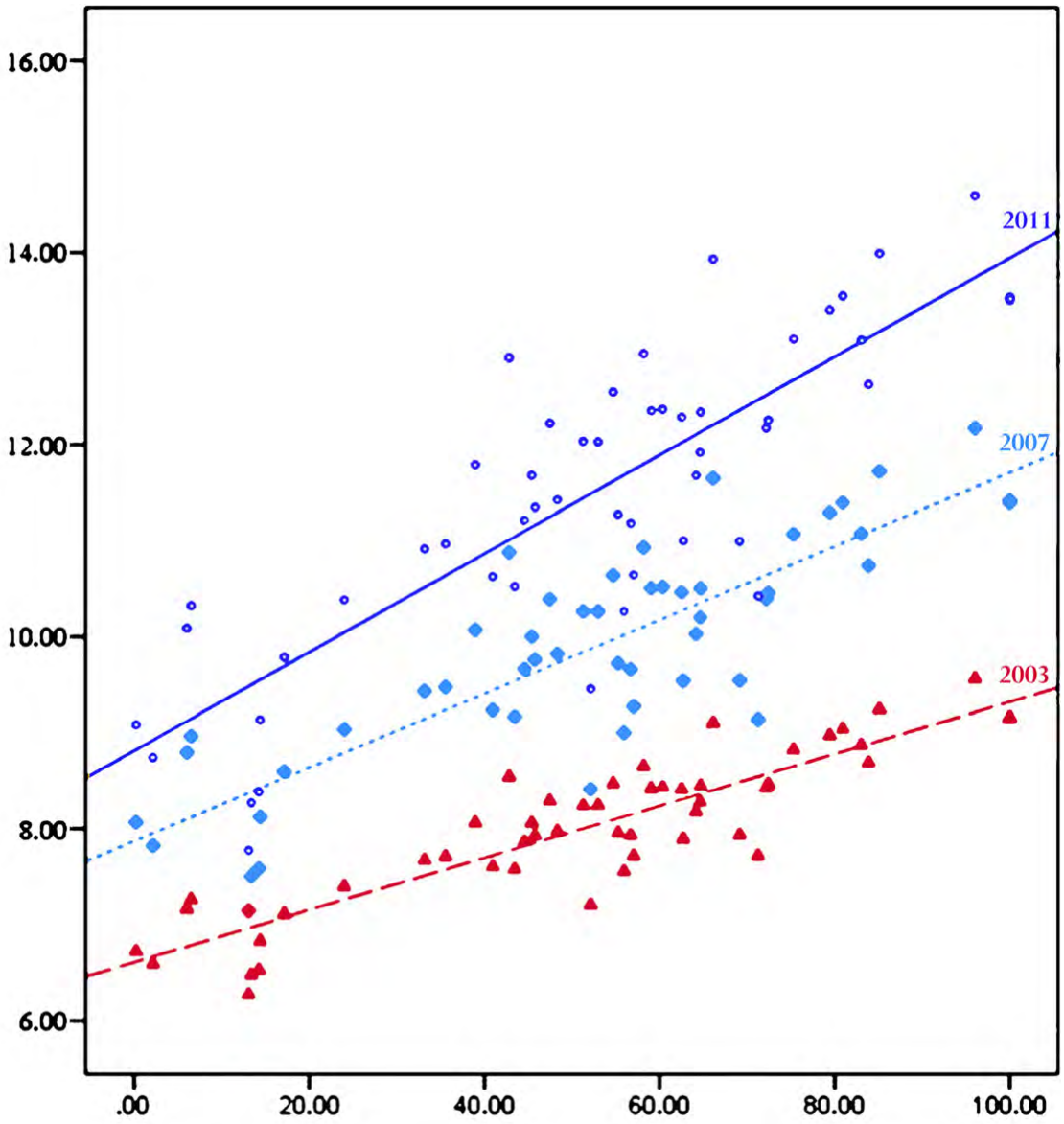


Figure 13: Percent of children with ADHD (by U.S. state) for 2003, 2007 and 2011 plotted against the % of population in each state fluoridated in 1992 (Malin & Till, 2015)

17. African Americans suffer greater exposure to other neurotoxins (lead and mercury)

LEAD

Lead exposure and lead poisoning have been concerns for decades in African American communities. The Huffington Post cites a CDC report that says that lead poisoning is a disease that primarily impacts African-Americans. According to the CDC (Jones et al.), children of color whose families are poor and who live in housing built before 1950 have the highest lead poisoning risk:

> On average, between 1999 and 2004, **black children were 1.6 times** more likely to test positive for lead in their blood than white children. And among children who tested positive for extremely high lead levels (≥10 micrograms per deciliter), the disparity was even more stark. Black children were nearly three times more likely than white children to have highly elevated blood-lead levels, the type of lead poisoning where the most damaging health outcomes occur. (Jones et al., 2009).

Combined Lead and fluoride exposure

As far we know, no federal agency has published anything on the synergistic effects of exposure to fluoride and lead. The Agency for Toxic Substances and Disease Registry (ATSDR, 2004) produced an "interaction profile" to exposures of the mixture containing uranium, fluoride, cyanide and nitrate. However, no information was available on any interaction.

There are some experiments that have exposed animals to a combination of lead and fluoride. These have reported the following:

•• Liu et al. (2008) reported that co-exposing rat pups to lead and fluoride resulted in "alterations in testis morphology and sperm quality, including low viability and high abnormality, thereby suggesting that disturbance of energy metabolism may be one of the mechanisms by which F or Pb affects the male reproductive system."

•• In the animal study cited above by Leite et al. (2011), rats treated with both lead and fluoride had worse dental fluorosis than rats treated with fluoride alone.

•• Niu et al. (2009) rat study: "Results showed that the learning abilities and hippocampus glutamate levels were significantly decreased by F and Pb individually and the combined interaction of F and Pb. The activities of AST and ALT (markers of lead toxicity) in treatment groups were significantly inhibited, while the activities of GAD were increased, especially in rats exposed to both F and Pb together. These findings suggested that alteration of hippocampus glutamate by F and/or Pb may in part reduce learning ability in rats."

•• Niu et al. (2008) study with adult rats: "From results of the Y-maze test, we can see a significant decrease in learning ability of animals in the HiF+HiPb (High fluoride with high lead) group."

•• Panov et al. (2015) reported the following from a study where rats were exposed to both fluoride and lead:

> * Comparison of the values obtained for the groups of separate and combined exposure shows that, for the majority of the toxicodynamic indices, the combined effect is more marked than the effect of fluoride alone or lead alone.
>
> * With a combined exposure of lead and fluoride (but not alone) significant reduction in the thyrotropin level was observed. Thyrotropin is a hormone secreted by the pituitary gland that regulates the production of thyroid hormones.

> * Neither fluoride nor lead produced a reduction in triiodothyronine level, but it was reduced under the combined effect (i.e. overt synergism took place). On the contrary, at exposure to lead alone or in combination with fluoride the level of thyroxine was raised.

In addition to the interaction between lead and fluoride is the additional problem that the chemicals used to fluoridate water appear to interact with chloramine (a common disinfection agent) to increase the dissolution of lead from brass fittings (see Appendix D).

MERCURY

According to Kaste et al. (1996), national data indicate that 80% of tooth decay in children is concentrated in 25% of the child population, with low-income children and racial/ethnic minority groups having more untreated decay on average than the U.S. population as a whole. This means that they also have greater exposure to mercury via mercury amalgam fillings.

According to the Food & Drug Administration,

> Dental amalgam is a mixture of metals, consisting of liquid (elemental) mercury and a powdered alloy composed of silver, tin, and copper. **Approximately 50% of dental amalgam is elemental mercury by weight.** The chemical properties of elemental mercury allow it to react with and bind together the silver/copper/tin alloy particles to form an amalgam.
>
> Dental amalgam fillings are also known as “silver fillings” because of their silver-like appearance. Despite the name, "silver fillings" do contain elemental mercury (FDA, 2015).

According to Counter & Buchanan (2011), “Children are particularly vulnerable to Hg intoxication, which may lead to impairment of the developing central nervous system, as well as pulmonary and nephrotic damage...” Exposures from dental amalgams “release Hg vapors, and Hg2+ in tissues… [and] fetal/neonatal Hg exposure from maternal dental amalgam fillings.” The authors state:

> It has been known for sometime that dental amalgam is a major source of Hg^0 (elementary mercury) exposure in humans because Hg is the principal metal in most dental fillings (approximately 50% Hg by weight) (Nadarajah et al., 1996). The health effects of dental amalgam Hg have been a subject of considerable debate for years, with no scientific consensus on an association between amalgam Hg exposure and adverse health consequences, either in adults or children (Clarkson, 2002; Ratcliffe et al., 1996). However, questions have been raised regarding a possible association between maternal Hg dental fillings and the health of the developing fetus, neonate, and infant. Significant levels of Hg have been measured in oral vapor, blood, and in organs of animals and humans with Hg containing dental amalgam restorations (Abraham et al., 1984; Snapp et al., 1989; Vimy et al., 1990, 1997). In the oral cavity, Hg0 vapor is rapidly oxidized to inorganic divalent Hg (Hg2+) in vivo after release from dental amalgam and absorbed through inhalation.

18. Association of pre-term births in upstate New York with community water fluoridation

According to the CDC:

> In 2012, preterm birth affected more than 450,000 babies—that's 1 of every 9 infants born in the United States. Preterm birth is the birth of an infant before 37 weeks of pregnancy. Preterm-related causes of death together accounted for 35% of all infant deaths in 2010, more than any other single cause. Preterm birth is also a leading cause of long-term neurological disabilities in children. Preterm birth costs the U.S. health care system more than $26 billion in 2005.
> http://www.cdc.gov/reproductivehealth/MaternalInfantHealth/PretermBirth.htm

In November 2009, Hart et al. presented an abstract at the American Public Health Association on the "Relationship between municipal water fluoridation and preterm birth in Upstate New York." In part, the authors stated:

> **"**The annual incidence of preterm birth (PTB) (<37 weeks gestation) in the United States is approximately 10% and is associated with considerable morbidity and mortality. Current literature suggests an association between periodontal disease and PTB. Domestic water fluoridation is thought to have lessened the burden of dental disease. Theoretically, one would expect water fluoridation to be protective against PTB. The aim of our study was to examine the relationship between municipal water fluoridation and PTB.
> **Domestic water fluoridation was associated with an increased risk of PTB (9545 (6.34%) PTB among women exposed to domestic water fluoridation versus 25278 (5.52%) PTB among those unexposed, p < 0.0001)). This relationship was most pronounced among women in the lowest SES groups (>10% poverty) and those of non-white racial origin.** Domestic water fluoridation was independently associated with an increased risk of PTB in logistic regression, after controlling for age, race/ethnicity, neighborhood poverty level, hypertension, and diabetes (Hart et al., 2009).

In 2013, the Henry J. Kaiser Family Foundation reported that non-Hispanic blacks had the highest rate for "*Preterm Births as a Percent of All Births by Race/Ethnicity."*
16.3% - Non-Hispanic Black
11.3% - Hispanic
10.2% - Non-Hispanic White
http://kff.org/other/state-indicator/preterm-births-by-raceethnicity/

19. State Oral Health Reports have provided little or no information on dental fluorosis and no warnings to communities of color on their extra vulnerabilities

While the federal government has been grossly negligent about warning communities of color about their findings that they are more vulnerable to dental fluorosis, at least they have provided important dental fluorosis data on the national level which allows interested parties to find out what is going on if they had the time and inclination to do so (Beltrán-Aguilar, 2005, 2010).

However, this has not happened to any significant extent at the state level. Most of the state reports on oral health (many funded by the CDC's Division of Oral Health) have provided no dental fluorosis rates and no racial breakdowns to the public. As a result practically no warnings have emerged at the state level. In Appendix E we have presented what we were able to find on these matters from reviewing **119 state reports published between 2000 and 2015.** Incredibly, 109 of these reports contained not one mention of dental (or enamel) fluorosis. Of the remaining 10 reports only two presented statistics on dental fluorosis. Two reports gave statistics for "white spot lesions" in Head Start children. While no definition of "white spot lesion" was given in the reports, it could include fluorosis as it is seen in the primary teeth (Warren et al., 1999; Hong et al 2006a) but most frequently observed in the secondary teeth.

> • The 2011 Washington state report gives the rate for White Spot Lesions in Head Start/ECEAP Preschoolers at 20.5%, with African American children having the highest percent.
>
> • The 2007 Georgia report notes: "20% of 2 to 5 year old Georgia Head Start children surveyed have white spot lesions."

A small non-profit called the Fluoride Action Network, not paid for, or funded by, any federal or state agency working on infant health, childhood health, or oral health, succeeded in getting New Hampshire to become the first state to require notification that infants under 6-months of age should not be routinely fed infant formula mixed with fluoridated water. The law passed in August 4, 2012, *against the opposition of nearly every health and oral-health group in the state (see list below)*, is a proactive approach to reduce fluorosis rates by notifying parents about the risk posed to their infants by fluoridated water so they can take action to prevent a further increase in overexposure to fluoride.

It was passed by the New Hampshire House, 253-23, unanimously by the Senate, and signed by the Governor, the legislation (HB-1416) read:

> "*If a public water supply is fluoridated, the following notice shall be posted in the water system's consumer confidence report: 'Your public water supply is fluoridated. According to the Centers for Disease Control and Prevention, if your child under the age of 6 months is exclusively consuming infant formula reconstituted with fluoridated water, there may be an increased chance of dental fluorosis. Consult your child's health care provider for more information.*'"

The law requires the above notice on all annual water consumer confidence reports in fluoridated communities, which must be mailed to all water consumers, be posted on water department websites, and available at city halls.

The legislation was initially introduced in 2011, but was killed in the House Health and Human Services committee, which at the time was chaired by a retired dentist and proponent of fluoridation. In 2012 the bill was sent to a different committee, the House Municipal and Public Works committee, **where it was approved by a 13-2 vote despite the same opposition it had met a year earlier by more than a dozen groups, including the**

New Hampshire Dental Association
New Hampshire Oral Health Coalition
Delta Dental
American Water Works Association
Municipal Association
Oral Health Advocacy Taskforce
Dental Hygienists' Association
Partners for a Healthier Community
Health Law Advocates
PEW Charitable Trusts
Granite State Children's Alliance (PEW Grantee)
New Hampshire Department of Health and Human Services

The simplest explanation for this negligence is that those who specialize in oral health are far more interested in promoting water fluoridation, than revealing its downside. However, whatever the explanation, minority communities have every reason to feel let down by those who are paid to protect their health.

In Appendix F we also examine the oral health reports prepared by private entities like the Pew Foundation. Again we find little or no discussion of dental fluorosis or the different prevalence for different races. Clearly their interest is in promoting fluoridation with little desire in undermining their message that fluoridation is "safe and effective" and certainly no desire to draw attention to the disproportionate harm this practice is causing poor and minority communities.

20. **Civil Rights Leaders mobilize to fight fluoridation because of the increased risks to minority communities.**

Beginning in March 2011 Civil Rights leaders began to speak out publicly about the lack of warning from the CDC and other health agencies about the higher rates of dental fluorosis and extra vulnerability of minority communities to fluoride's toxic effects. Below we provide excerpts of the statements from prominent leaders on this issue. Links to the full text of each statement listed below is in Appendix G.

We present them in chronological order starting with Rev. Durley's letter of March 9, 2011, presented in full.

1) March 9, 2011. Letter from Dr. Gerald L. Durley, Pastor, Providence Baptist Church, to Senator Chip Rogers, Senate Majority Leader, Georgia State Capital, Atlanta. **Re: Repeal of Georgia's Mandatory Fluoridation Law**.

> Dear Senator Rogers,
>
> As a citizen, a minister, and a community leader, I am writing to state my opposition to the practice of water fluoridation, and to ask that the current Georgia law mandating water fluoridation throughout our state be repealed.

First and foremost, water fluoridation takes away people's choice. We have a God-given right to not have fluoride forced into our bodies or the bodies of our children. Fluoridation supporters attempt to say that people are not forced to drink fluoridated water, but that is a disingenuous statement that ignores reality. Many families do not have funds to buy an expensive home water fluoride removal system, or to buy unfluoridated bottled water for making their babies' milk formula, so in truth they are forced to drink fluoride in their water simply because of their economic status or household income.

Second, fluoridation disproportionately harms members of the black community. The Centers for Disease Control's own information acknowledges that blacks have significantly more "dental fluorosis" teeth staining than whites. For many, the stains are not simply "barely visible" or "faint" in color, or "just a cosmetic issue" as fluoridation promoters call it. Common sense tells us that if fluorides affect the teeth, which are the hardest surfaces of the body to cause permanent staining, certainly other soft tissue organs in the body are affected. Also, the National Research Council of the National Academy of Science, has designated kidney patients, diabetics, seniors, and babies as "susceptible subpopulations" that are especially vulnerable to harm from ingested fluorides. Black citizens are disproportionately affected by kidney disease and diabetes, and are therefore more impacted by fluorides.

Third, we cannot control the dose of fluoride people ingest if we put fluoride in drinking water. Layered on top of this, we do not know what each person's medical history or nutritional status is. Therefore, the "one size fits all" approach to fluoridation makes no sense at all.

We need to focus on helping people get access to dentists. Lack of fluoride does not cause cavities. Too many sugars on the teeth, lack of access to dental care, and lack of dental health education –these cause cavities.

We also need to know why the full story about harm from fluorides is only just now coming out. I support the holding of Fluoridegate hearings at the state and national level so we can learn why we haven't been openly told that fluorides build up in the body over time, why are government agencies haven't told the black community openly that fluorides disproportionately harm black Americans, and why we've been told that decades of extensive research show fluoridation to be safe, when the National Research Council in 2006 listed volumes of basic research that has never been done. This is a serious issue for all Americans, of every race and in every location.

2) March 29, 2011. Letter from **Ambassador Andrew Young** to Chip Rogers, Senate Majority Leader, Georgia State Capitol, Atlanta, GA.

I am writing to convey my interest in seeing that Georgia's law mandating water fluoridation for Georgia communities be repealed…

I am most deeply concerned for poor families who have babies: if they cannot afford unfluoridated water for their babies milk formula, do their babies not count? Of course

> they do. This is an issue of fairness, civil rights, and compassion. We must find better ways to prevent cavities, such as helping those most at risk for cavities obtain access to the services of a dentist

3) April 6, 2011. Letter from **Matt Young, DDS**, President, International Academy of Oral Medicine and Toxicology, to Thomas Frieden, MD, MPH, Director, Centers for Disease Control and Prevention, Atlanta, GA. RE: Disproportionate Harm From Water Fluoridation to Babies, Kidney Patients, and African Americans.

> As President of the International Academy of Oral Medicine and Toxicology, I am writing to communicate our organization's concern that the CDC-supported practice of water fluoridation disproportionately harms certain subsets of the population: such as babies, kidney patients, and African Americans.
>
> There is much science we could cite here, but the purpose of this letter is to succinctly summarize the basis for our conclusion that fluoridation must end.

4) June 2011. **Alveda King**, nationally known minister and niece of civil rights leader Martin Luther King Jr.:

> ”This is a civil rights issue … No one should be subjected to drinking fluoride in their water, especially sensitive groups like kidney patients and diabetics, babies in their milk formula, or poor families that cannot afford to purchase unfluoridated water. Black and Latino families are being disproportionately harmed.”

5) July 1, 2011. A Resolution on fluoridation was passed by the **League of United Latin American Citizens (LULAC)** titled, Civil Rights Violation Regarding Forced Medication.

> WHEREAS, minority communities are more highly impacted by fluorides as they historically experience more diabetes and kidney disease; and…
>
> WHEREAS, minorities are disproportionately harmed by fluorides as documented by increased rates of dental fluorosis (disfiguration and discoloration of the teeth); and…
>
> WHEREAS, the CDC now recommends that non-fluoridated water be used for infant formula (if parents want to avoid dental fluorosis – a permanent mottling and staining of teeth), which creates an economic hardship for large numbers of families, minority and otherwise…

6) April 2013. **Portland chapter of the NAACP** voted to oppose the fluoridation of the public water supply.

> … Clifford Walker, chair of the branch veteran’s committee, says he believes the vote was unanimous. They had been **debating the issue vigorously** for several months,” Walker says. “People with **diabetes** would be [affected] by adding fluoride to the water. African-Americans have a higher rate of diabetes.” The decision, he says, is “in the best interest of our constituents.”

> A key narrative of this spring's fluoridation campaign has been that **fluoride supporters had gathered a coalition of 80 groups representing low-income and minority Portlanders**, while the anti-fluoride campaign had none.
> *WW* reported this morning that the pro-fluoridation campaign, Healthy Kids Healthy Portland, has **rewarded that support with cash payments totaling more than $119,000**. Groups like the Urban League, the Native American Youth and Family Center and the Latino Network are using that money for "outreach," according to Evyn Mitchell, the campaign manager for Healthy Kids. (Mesh, 2013)

7) November 11, 2014. A Resolution was passed by the **Santa Rosa-Sonoma County NAACP** Opposing Fluoridation of Our Public Water Supply.

> Whereas: Studies have found that in fluoridated communities, African-American and Latino children are at greater risk for dental fluorosis (discolored teeth from damaged tooth enamel caused by fluoride exposure) and,
>
> Whereas: Former Ambassador Andrew Young, one of many civil rights leaders opposed to fluoride, has pointed out that: "we...have a cavity epidemic today in our inner cities that have been fluoridated for decades"

8) May 11, 2015: Letter from **Rev. William (Bill) Owens, President of the Coalition of African American Pastors** to Rep. Barry Loudermilk, Chairman, House Subcommittee on Oversight / Science, Space, & Technology Committee, Washington DC:

> African Americans should have been told that we are disproportionately harmed by "dental fluorosis," the disfigurement of teeth caused by overexposure to fluorides as a young child. And who among us was told that kidney patients, diabetics, seniors, and children are susceptible subgroups that are especially vulnerable to harm from fluorides? There are more patients with kidney disease and diabetes in the black community, and this is all the more reason federal officials should have told us that kidney patients and diabetics are especially vulnerable to harm. Additionally, low-income families often times lack the resources to purchase unfluoridated water or a filtration system to remove fluoride from drinking water.

21. The emergency "fluoridation-defense" meeting held at Morehouse College

After the statements from civil rights leaders became public (Lillie Center, 2011; FAN, 2011c), Ambassador Young and Rev Gerald Durley were invited to a hastily organized semi-confidential meeting held at Morehouse College on June 1, 2011.

Freedom of Information documents reveal the enormous concern that the pro-fluoridation lobby (both inside and outside government) had about the traction the statements by the Civil Rights leaders were receiving both in the media and on the internet. An extraordinary number of important and influential governmental and professional representatives were brought together for this meeting.

This "army of officials" was a magnified version of the "shock and awe" tactics used to intimidate decision makers should they ever have the temerity to question the wisdom of the fluoridation program. Council chambers are flooded by dentists, dental students, local and state dental and health spokespersons claiming that if they should end fluoridation they would be threatening the future health and well-being of their children.

Those at the Morehouse meeting included the following (FAN, 2015a):

- Dr. David Satcher (former US Surgeon General)
- Dr. John Maupin, Morehouse School of Medicine
- Gwen Keyes Fleming, EPA, Administrator Region IV
- Dr. Ursula Bauer, Director, National Center for Chronic Disease Prevention and Health promotion
- Dr. Scott Presson, CDC program services
- Dr. Gina Thornton-Evans – CDC oral health epidemiologist
- Dr. Desmond Williams, Lead, Chronic Kidney Disease Initiative

Department of Health and Human Services/Office of Minority Health

- Dr. Garth Graham –Deputy Assistant Director for Minority Health
- Dr. Rochelle Rollins, Director, Division of Policy and Data
- Dr. Arlene Lester, Regional Minority Health Consultant, Georgia State

National Dental Association
(The NDA represents over 6,000 Black dentists, and 30 million Black Americans)

- Dr. Elizabeth Lense, State Dental Director, NDA
- Dr. Sheila Brown, President, NDA
- Dr. Roy Irons, DDS
- Dr. Kim Perry, Chairman of the Board, NDA
- Mr. Robert Johns, ED

American Dental Association (ADA)

- Dr. Bill Cainon, Pres-Elect, ADA
- Dr. Leon Stanislav, former Chairman NFAC
- Judy Sherman, Washington DC office, ADA

This was a lot of muscle to use against the two Civil Rights leaders who attended this meeting. It is a pity that a fraction of that muscle power has not gone into informing minority communities about the special risks posed to them by fluoride and water fluoridation. Some people might be impressed that so much effort is going into protecting children's teeth, for others it is disheartening that the rest of their bodies cause so little concern.

22. A better way of tackling tooth decay in the inner city and address other EJ issues

Here we offer a creative and positive holistic approach to address dental decay and other aspects of Environmental Justice in the Inner City. Our suggestions are in line with items I and II

of the "Action agenda on three collective and strategic goals for fiscal years 2016- 2018" of the Inter Agency Working Group on Environment Justice (EJ IWG), namely:

I. Enhance communication and coordination to improve the health, quality-of-life, and economic opportunities in overburdened communities;
II. Enhance multi-agency support of holistic community-based solutions to solve environmental justice issues

Our 5-step alternative plan to water fluoridation for low-income areas and the inner city.

1) **End water fluoridation.** This could be accomplished swiftly by the US EPA Office of Water (OW). If OW were to determine the safe dose of fluoride that would protect all our children from lowered IQ it would force an immediate end to fluoridation. Such protection against fluoride's neurotoxic effects would improve the "health, quality-of-life, and economic opportunities" for children and young people in many ways, especially from low-income families.

2) **Establish the equivalent of Scotland's very successful Childsmile program** in all kindergarten and primary schools (and possibly churches and WIC programs) in low-income areas. In this program involving both teachers and parents, children are taught to brush their teeth properly; are provided more nutritious snacks and beverages and encouraged to reduce sugar consumption. The program also provides annual dental check-ups and treatment if required. This could be combined with a program along the lines of the Danish program for pre-school toddlers – see Appendix I.

3) Set up dental clinics either in schools or stand-alone facilities in the inner city and other low-income areas. Recruit dentists, dental hygienists and nutritionists to provide part-time pro bono services to these clinics and support the educational services in step 2.

4) Expand these dental clinics into community centers aimed at improving the child's overall health, nutrition and physical fitness as well as stimulating other health supporting activities. Such a center, depending on local interest and skills could include keep-fit equipment and classes, community gardens, community composting, cooking, nutritional and canning advice. Depending upon demand It might also be linked to local farms..

5) **Expand these communities still further into job creating operations.** One example we know that works well is a "reuse and repair" operation to handle discarded appliances, furniture and other reuseable items from the local and nearby communities. Reuse and repair can also involve job training, skill-sharing, tool sharing, a community workbench and value added enterprises. Such an operation can be linked to a Zero Waste strategy involving source separation, composting, recycling and other waste reduction and prevention initiatives. This strategy not only fights the pollution generated by landfills and incinerators (which are often sited in low-income areas), it also provides many jobs and local business opportunities. One of the authors of this report has lectured and written extensively in this area, see *The Zero Waste Solution: Untrashing the Planet One Community at a Time* by Paul Connett (Chelsea Green, 2013). There are many other creative schemes including

community gardens, a community culinary school that teaches new chefs how to make food that is inexpensive, tasty and nutritious, and many many more.

6) It is not difficult to see how many federal and local agencies could be involved with such an ambitious scheme. These could include the HHS as well as the departments of Education and Agriculture and the waste management folks at the EPA. Step 5 could be integrated with the ongoing efforts along these lines in many municipalities. This is one of many ideas that with a little creativity a community can embrace.

More than anything else a holistic approach allows the transition from the politics of "no" to the politics of "yes." Once we get off the shortsighted notion that we can battle tooth decay by putting a neurotoxic chemical into the public drinking water, we can unleash not only the full potential of the child, but also of our communities and maybe even our civil and professional services. The three key words are education, nutrition and justice. We need education not fluoridation to fight tooth decay and obesity. We need healthy soil, to produce healthy food to produce healthy people to produce a healthy economy and ultimately a healthy planet and we need Environmental Justice for all. A great deal can be achieved with creativity and vision. A threatened community is a strengthened community when people work together to solve their problems in a creative and positive way..

23. FAN responds to HHS Jan 7, 2011 announcement proposing to lower recommended level of fluoride in water to fight tooth decay

In a joint press release issued January 7, 2011, the Department of Health and Human Services and the Environmental Protection Agency's Office of Water (OW) announced a recommendation to lower the level of fluoride in community water fluoridation schemes to 0.7 mg/L (down from the level set in 1962: 0.7 to 1.2 mg/L) (HHS, 2011). In this announcement Assistant Secretary for Health Howard K. Koh said: "**One of water fluoridation's biggest advantages is that it benefits all residents of a community…"** Simultaneous with this announcement the public was encouraged to submit **comments** on this new recommendation. On April 19, 2011, the Fluoride Action Network (FAN) responded with two submissions (a,b) and documented the issue of Environmental Justice as it pertains to fluoridation and African Americans (FAN, 2011a).

On April 19,2011 FAN sent a letter to the then director of HHS Kathleen Sebelius. Subsequently approximately 18,000 people sent in emails in support of this letter. A full copy of the letter can be found in Appendix H. Below is a shortened version.

Fluoride Action Network
February 4, 2011

To HHS and Honorable Secretary Sebelius

In response to your request for comments on the recent change in your recommended level of fluoride added to community drinking water, I respectfully submit the following points

supporting the stance that a reduction in fluoride levels is not sufficient, and that the United States should follow the approach of western Europe and end water fluoridation completely:

- Fluoride is not a nutrient, nor is it essential for healthy teeth…
- Using the water supply to mass medicate the population is unethical…
- The benefit and safety of ingested fluoride has never been proved by accepted medical standards…
- Any benefits of fluoride are primarily topical, not systemic…
- Americans will still be over-exposed to fluoride at 0.7 ppm.,.
- African-American children and low-income children will not be protected…
- HHS has failed to consider fluoride's impact on the brain…
- HHS has failed to consider fluoride as an endocrine disruptor…
- HHS has failed to consider or investigate current rates of skeletal fluorosis in the U.S. …
- HHS has failed to consider fluoride as a potential carcinogen…
- HHS has failed to confirm the safety of silicofluorides…

Most of the arguments listed above are covered in far more detail in the recently published book "The Case Against Fluoride" by Connett, Beck and Micklem (Chelsea Green, 2010). We urge director Sebelius to appoint a group of experts from HHS, who have not been involved in promoting fluoridation, to provide a fully documented scientific response to the arguments and evidence presented in this book. Were director Sebelius to do this we strongly believe that neither she nor these experts will want to see the practice of water fluoridation continue. The practice is unnecessary, unethical and hitherto the benefits have been wildly exaggerated and the risks minimized. A scientific response to this book from a HHS team would allow the public to judge the cases both for and against fluoridation on their scientific and ethical merits.

24. FAN's critique of the EPA's initial steps to determine a new MCLG for fluoride

In the timeline above (see section 5) it has already been explained how inappropriate it was for the EPA Office of Water (OW) at the HHS/EPA joint press conference on Jan 7, 2011 to indicate that it was going to take into account the benefits of the water fluoridation program while determining a new MCLG (safe drinking water standard goal) for fluoride in water (HHS, 2011a). Here we will address concerns about the way they have gone about determining the MCLG and indicate a) that it is based upon poor scientific assumptions and b) how it is insensitive to EJ issues.

In determining a new MCLG for fluoride the EPA announced that they were going to use **severe**

dental fluorosis as the most sensitive health effect for fluoride. They argued that if they found a safe level (safe reference dose or RfD) that protected against severe dental fluorosis it would protect against impacts on all other tissues including bones in adults. In so doing they completely ignored all the scientific evidence sent to them by Fluoride Action Network (FAN, 2011a,b; Thiessen 2011, 2015) and others that fluoride is a neurotoxin that has been associated with lowered IQ in children – a far more serious end point as far as protecting the population is concerned.

In order to support its hypothesis that severe dental fluorosis was the most sensitive outcome to fluoride's toxicity the EPA would have to show that in all the studies where IQ has been lowered (45 studies as of September 2015 at http://fluoridealert.org/studies/brain01/) *all the children with lowered IQ* had ***severe*** dental fluorosis. If any had moderate, mild or very mild dental fluorosis their hypothesis collapses. The EPA has not shown this; instead they have simply ignored all the evidence presented to them on IQ studies. In a delegation to the EPA's OW on Sept 8 2014 FAN provided evidence that children with moderate, mild and even very mild dental fluorosis had a lowered IQ. This evidence came from Xiang's important IQ study from 2003. Xiang was part of the delegation. EPA OW continues to remain silent on this evidence.

Figure 14: A photo taken of the FAN delegation (from left to right: Quanyong Xiang, Paul Connett, Chris Neurath and Bill Hirzy) outside the EPA's Headquarters after they had met with two top officials at the EPA Office of Water on Sept 8, 2014

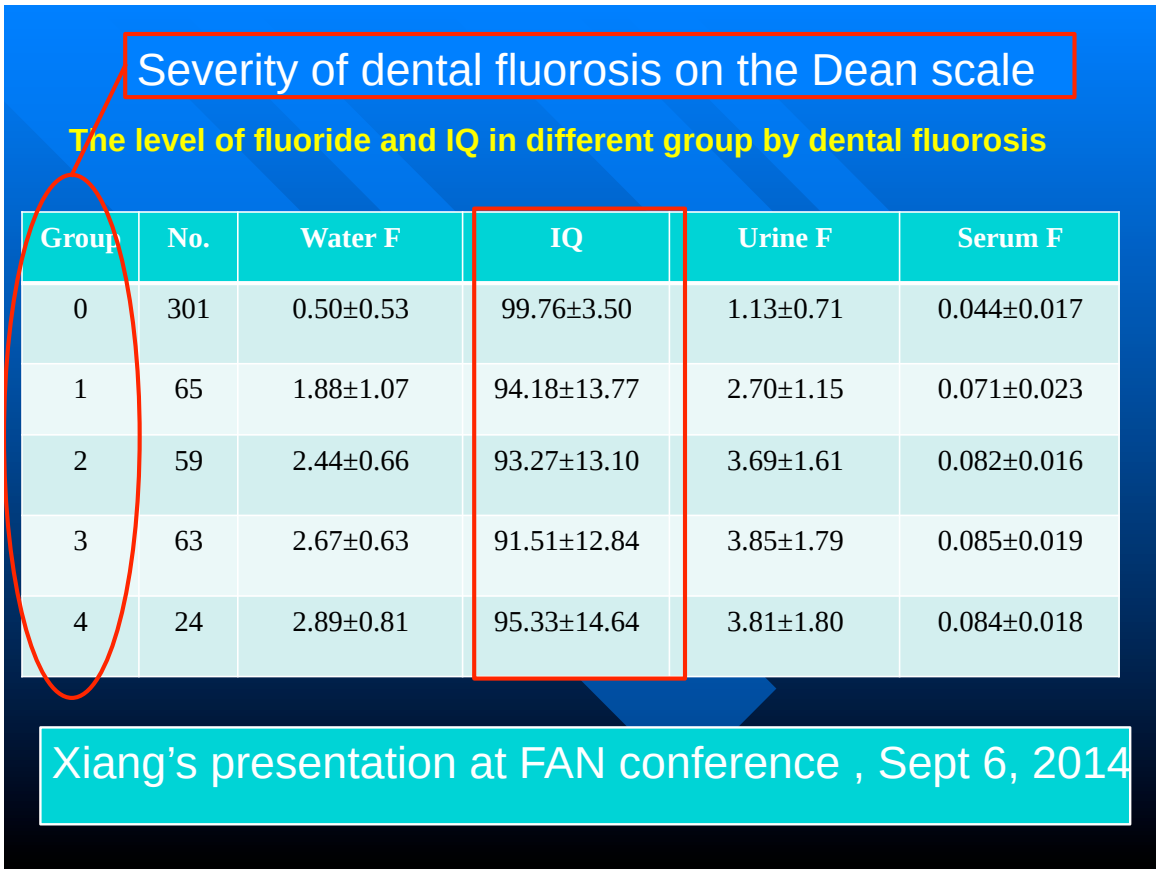


Figure 15: A copy of a slide in Dr. Quanyong Xiang's presentation at the FAN conference in Crystal City, Sept 6, 2014. The left hand column (0,1,2,3,4) corresponds to Dean's classification of the different levels of dental fluorosis (0 = none, 1 = very mild, 2 = mild, 3 = moderate and 4 = severe. Note by comparing with column 4 that children had lowered IQ who had very mild, mild and moderate dental fluorosis. This refutes the claim by the OW that *severe* dental fluorosis is the most sensitive health effect of fluoride exposure. Lowered IQ is a more sensitive end point.

The EPA further indicated in the calculations made available simultaneously in the Federal Register (HHS, 2011b) that they were going to use Dean's studies from the 1940's to estimate the threshold level where **severe** dental fluorosis would occur. Having estimated that level they then applied an "uncertainty factor of 1" to protect all the members of society – including the most vulnerable – from this effect.

Normally a factor of 10 is used to extrapolate from the study group to protect a large population to account for the very wide range of sensitivity expected in any large population (this is sometimes referred to as the intra-species variation factor). An uncertainty factor of 1 means 100% certainty that Dean's study in the 1940s was so large and so inclusive that it covered the full range of sensitivity of the total US population of children in the 21st century. This is extraordinarily cavalier. In his early studies (from the 1930s) Dean did look at age, sex and color and even mentioned in a 1933 paper, the case of a negro girl with mottled teeth in the bicuspids who used the fluoride water for just three years. However, in his 21-city study from 1942 he focused only on white children. Dean states, "The Study embraced 7,257 ***white*** urban school

children, aged 12 to 14 years of 21 cities…" (our emphasis).

Thus the only children who featured in Dean's 21-city study were white – so it wasn't even inclusive of the US population in 1942, let alone in the twenty-first century.

By using studies that did not include low-income families and communities of color clearly makes the EPA's calculations inappropriate for estimating a level which would protect every child from severe dental fluorosis – **without a safety factor applied to it** - especially in the light of the discussion above that indicates that both Blacks and Hispanics are more sensitive to dental fluorosis than Whites. Choosing an uncertainty factor of one is scientifically indefensible on the one hand, and betrays an insensitivity to EJ issues on the other.

If the EPA is serious about eliminating environmental injustice from its policy decisions this is a classic case to address. In determining a safe reference dose for fluoride and a new MCLG the EPA OW has to do two things:

> 1) They need to provide evidence that severe dental fluorosis is a more sensitive end point than lowered IQ. The last children in the U.S. who need their IQ lowered are children from low-income families.
>
> 2) Even if they use severe dental fluorosis as the end point they need to use a more appropriate database and uncertainty factors to produce a safe reference dose to protect all individuals in society including the most vulnerable.

If they don't do either of these things it will make a mockery of the Presidential Executive Order of 1994: ***"Federal agencies must identify and address, as appropriate, "disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations."*** (Presidential Executive Order 12898 of February 11, 1994)

The above discussion updates our concerns to those we submitted in two formal responses to the OW's reports, which appeared in the Federal Register at the same time as their press conference of Jan 7, 2011.

FAN's two formal responses submitted to the EPA's Office of Water in April 2011 can be accessed online at:
http://www.fluoridealert.org/wp-content/uploads/epa-2010.dose_.pdf
and
http://www.fluoridealert.org/wp-content/uploads/fan.exposure.revised.4-22-11.pdf

Below we have given a skeletal summary of our responses so that readers will have a quick access to the many criticisms we had of OW's assumptions and calculations in both documents.

A) A summary of FAN's Responses to EPA OW's report, Fluoride: Dose-Response Analysis For Non-cancer Effects**.**

We identified 16 flaws *in the methodology and rationale behind OW's proposed RfD (safe reference dose)*

We argued that

1) Consideration of the adverse effects of fluoride should take precedence over any presumed benefits in OW's determination of an RfD and MCLG

2) OW has failed to offer convincing evidence that severe dental fluorosis should be considered the critical effect associated with exposure to fluoride.

3) failed to consider potential variation in responses to the different types of fluoride in drinking water.

4) failed to apply appropriate safety factors.

5) unnecessarily delayed consideration of the potential carcinogenicity of fluoride.

6) failed to consider fluoride's effects on the brain.

7) failed to consider fluoride as an endocrine disruptor.

failed to consider the disproportionate impact on a number of susceptible populations in its analysis.

8) disregarded pregnant women and embryos/fetuses in its analysis.

9) completely ignored infants 0-6 months of age in its analysis, and has failed to consider the disproportionate burden placed on bottle-fed infants.

10) failed to consider the disproportionate impact on above-average water consumers, which account for at least 10% of the population.

11) failed to consider the disproportionate impact on minority Americans.

12) failed to consider the disproportionate burden placed on low-income families.

13) failed to consider the disproportionate harm to people with inadequate nutrition.

14) failed to consider those with impaired kidney function.

15) failed to consider those co-exposed to lead, arsenic, or aluminum.

16) failed to consider those with an increased sensitivity to fluoride.

B) A summary of FAN's Comments on the EPA OW's Report Fluoride: Exposure and Relative Source Contribution Analysis

*The policies used to calculate fluoride exposures are flawed, especially when no margin of safety is applied**. FAN identified 12 flaws in their analysis***

> *1) OW's policy of using the 90th percentile for water consumption ignores 10% of the U.S. population —nearly 31 million people*
>
> *2) OW's policy of using the mean drinking water fluoride concentration ignores as much as half of the population whose drinking water has higher fluoride levels.*
>
> *3) OW's policy of using the average body weight of the population of interest ignores as much as half of the population in the lower 50th percentile for weight.*
>
> *4) OW has failed to consider studies of urinary fluoride excretion as an estimate of total fluoride intake.*

5) OW has failed to consider fluoride exposures for several of the most sensitive groups — pregnant women, embryos/fetuses, and infants 0-6 months

6) failed to adequately consider racial, ethnic, regional, and socioeconomic differences in food and beverage consumption patterns

OW has ignored several sources of fluoride as contributors to total intake. OW has

> *8) ignored fluoride exposures from several dental products, including professionally applied topical fluorides, mouthwashes, and various dental devices.*
>
> *9) failed to consider fluoride exposure from dietary fluoride supplements in its analysis.*
>
> *10) failed to consider pharmaceuticals and anesthetics that metabolize to the fluoride anion in its exposure analysis.*
>
> *11) failed to consider ambient air as a source of fluoride in its exposure analysis.*
>
> *12) does not adequately consider exposure from cigarettes in its analysis.*

25. The EPA's false characterization of fluoride as a nutrient.

In addition to all the other flaws discussed above there is another major misrepresentation that the EPA made in both the documents discussed in section 24 above to which we would like to draw special attention because it is a false claim that is often made by promoters of fluoridation. This is the claim that fluoride is a nutrient. In the case of OW they should not have made this claim in 2011 because twice they were informed in 2003 that the source they were using had rejected the claim. Here are the details.

The EPA states that the source for this claim is the Institute of Medicine (IOM). Here are the exact quotes.

In their report, "Fluoride: Exposure and Relative Source Contribution Analysis" on page 39 EPA's Office of Water states:

> However, it should be recognized that **fluoride is a nutrient** and reconstitution of infant formulas with water containing lower levels of fluoride may result in infants not consuming the Adequate Intake for fluoride (0.5 mg/day) established by the Institute of Medicine (1997).

And in their report, Fluoride: Dose-Response Analysis For Non-cancer Effects, on page 95 they state:

> The dietary guidelines for fluoride were revised by the Institute of Medicine (IOM) in 1997. The 1997 revisions (see Table 5-1) considered **fluoride as a nutrient** based on its presence and function in bones and tooth enamel. (p. 95)

To appreciate the blatancy of this falsehood a little history is needed. In 1997 the Food and Nutrition Board of the IOM caused considerable consternation among scientists who have taken an interest in the fluoride debate. The IOM produced a report entitled, *Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride* (IOM, 1997) and held a public meeting in Washington DC, Sept 23, 1997, to discuss a draft of the report. William Hirzy PhD (then with the EPA) and Paul Connett PhD attended this day-long meeting and several times questioned the inclusion of fluoride among a list of well-known nutrients, when there is no scientific study justifying such a characterization for fluoride.

To demonstrate that a substance is an essential nutrient one has to remove the proposed nutrient from an animal's diet and demonstrate that some disease occurs as result. This has never been done for fluoride. Moreover, no one has ever shown that there is any biochemical process in the body that needs fluoride to function properly or any molecule (fat, amino acid, protein, nucleic acid or metabolite) that contains fluoride.

Despite the intervention of Hirzy and Connett the IOM went ahead and finalized its draft retaining fluoride among a list of known nutrients needed for healthy bone growth. About a dozen scientists wrote to the heads of both the Institute of Medicine (Dr. Kenneth Shine) and the National Academies (Dr. Bruce Albert) complaining of this false implication. Alberts and Shine (1998) replied as follows:

> First, let us reassure you with regard to one concern. Nowhere in the report is it stated that fluoride is an essential nutrient. If any speaker or panel member at the September 23rd workshop referred to fluoride as such, they misspoke. As was stated in *Recommended Dietary Allowances 10th Edition,* which we published in 1989: "These contradictory results do not justify a classification of fluoride as an essential element, according to accepted standards. Nonetheless, because of its valuable effects on dental health, fluoride is a beneficial element for humans."

Run the clock forward to April 2003 when Paul Connett had a semi-debate at the EPA headquarters in Washington DC as part of their annual science fair. Ed Ohanian of the EPA's Office of Water was present. He didn't formally debate Connett but he did summarize some of

the EPA's activities on fluoride. In these comments he cited the IOM (1997) as characterizing fluoride as a nutrient. Connett corrected him citing the Shine-Alberts letter (1998).

Then in October 2003 before Connett testified before the NRC panel, which was reviewing fluoride's toxicity discussed above (section 11), Joyce Donahue (2003), also of EPA's Office of Water, presented the parameters of the review they wanted from the panel. She also referred to fluoride as a nutrient and used the IOM report to justify that claim. Connett corrected her from the floor again citing the Alberts-Shine letter (1998).

it is extraordinary that the EPA 's Office of Water should try to get away with this false characterization yet again.

26. Fluoride has no known role in nutrition or biochemistry (a summary)

Here is what FAN submitted to the EPA in April 2011 on this point.

> Fluoride is not considered by knowledgeable experts to be an essential nutrient for humans, and it has no known, beneficial role in human biochemistry (Nielsen, 1996; Hunt & Stoecker, 1996; NRC, 1989).
>
> The U.S. authority for recommended dietary intakes concluded in 1989 that contradictory studies in rats and mice in the 1970s "do not justify a classification of fluorine [as fluoride] as an essential element, according to accepted standards" (NRC, 1989). (Because animal diets can be more stringently depleted in fluoride than human diets, studies in short-lived rats and mice are considered the best way to discover the possible essentiality of minerals in mammals.)
>
> In its most recent publication on recommended dietary intakes, the same U.S. authority makes no mention of fluoride essentiality in the diets of humans or animals (IOM, 1997).
>
> Human milk is extraordinarily low in fluoride, ranging from 0.007 parts per million (ppm) to 0.011 ppm (IOM, 1997)—100 times less than in fluoridated water in the U.S. (0.7 to 1.0 ppm).
>
> Human milk also has about 3 times less fluoride than the blood of the mothers producing it (Sener et al., 2007).
>
> Thus it seems clear that nature has evolved active mechanisms to limit the transfer of fluoride in humans—both from ingested food and water to blood, and from blood to breast milk.
>
> Thus either by accident or intent mothers' milk protects the baby from more than minimal exposure to fluoride. Water fluoridation removes that protection for bottle-fed babies.
>
> It is well-established that fluoride's toxicity may be exacerbated by poor nutrition. By not accounting for this fluoridation promoters are contributing to the disproportionate

harm fluoride exposure and water fluoridation may be causing both low-income and minority families, who are more likely to suffer from poor nutrition.

However, nutritional factors may enhance fluoride's toxicity. These include deficiencies in iodine, calcium, magnesium, and vitamin C (ATSDR, 1993, p.112), selenium, and vitamin D (e.g. ATSDR, 1993, p.112; NRC, 2006).

Poor nutrition has been found to increase the incidence and severity of dental fluorosis (Pandit et al., 1940; Murray et al., 1948; Littleton et al., 1999) and skeletal fluorosis (Pandit at al., 1940; Marier et al., 1963; Fisher et al., 1989; Teotia et al., 1984; Littleton et al., 1999).

The dose of fluoride at which disturbed endocrine function occurs is reduced in situations of iodine deficiency (NRC, 2006). Lin et al. (1991), in a UNICEF - sponsored study, found that even modest levels of fluoride in the water (0.88 mg/L vs. 0.34 mg/L) resulted in reduced IQ (and increased frequency of hypothyroidism) when combined with low iodine, even more so than with iodine deficiency alone.

The increasing dietary intake of fats in the U.S. may have negative repercussions in terms of fluoride metabolism, as "Diets high in fat have been reported to increase deposition of fluoride in bone and, thus, to enhance toxicity" (HHS, 1991).

As we have not received a response to our April, 2011 submission (as of Sept 2015), we have yet to hear whether the EPA OW has retracted their claim that fluoride is a nutrient or whether they are going to try to convince the world that it is.

27. Final HHS ruling in 2015 uses sleight of hand to dismiss FAN's input on fluoride's neurotoxicity

In April 2015 the HHS released its opinion in support of its recommended level of 0.7 mg/L level for water fluoridation programs in the US (DHHS, 2015). ***In this HHS document there is no mention of the Environmental Justice issue and thus no discussion of the adverse potential this recommended level bodes for the children of low-income and minority families.***

The HHS statement was accompanied by a statement from the director of the CDC's Division of Oral Health on the "evidence supporting the safety and effectiveness of fluoridation". In this statement the terms "minority" and "racial" were each used once; the term "poor" was used twice, and all with the same reference to the Surgeon General's report of 2000 (Weno, 2015; Surgeon General's reference) discussed above.

The CDC also rejected our concerns about Fluoride's neurotoxicity. Here is the short section that deals with this:

IQ and other neurological effects

.

The standard letters and approximately 100 unique responses expressed

concern about fluoride's impact on the brain, specifically citing lower IQ in children. Several Chinese studies considered in detail by the NRC review reported lower IQ among children exposed to fluoride in drinking water at mean concentrations of 2.5–4.1 mg/L—several times higher than concentrations recommended for community water fluoridation.

The NRC found that "the significance of these Chinese studies is uncertain" because important procedural details were omitted, but also stated that findings warranted additional research on the effects of fluoride on intelligence.

Based on animal studies, the NRC committee speculated about potential mechanisms for nervous system changes and called for more research "to clarify the effect of fluoride on brain chemistry and function."

These recommendations should be considered in the context of the NRC review, which limited its conclusions regarding adverse effects to water fluoride concentrations of 2–4 mg/L and did "not address the lower exposures commonly experienced by most U.S. citizens."

A recent meta-analysis of studies conducted in rural China, including those considered by the NRC report, identified an association between high fluoride exposure (i.e., drinking water concentrations ranging up to 11.5 mg/L) and lower IQ scores; study authors noted the low quality of included studies and the inability to rule out other explanations.

A subsequent review cited this meta-analysis to support its identification of "raised fluoride concentrations" in drinking water as a developmental neurotoxicant.

A review by SCHER also considered the neurotoxicity of fluoride in water and determined that there was not enough evidence from well-controlled studies to conclude if fluoride in drinking water at concentrations used for community fluoridation might impair the IQ of children. The review also noted that "a biological plausibility for the link between fluoridated water and IQ has not been established."

Findings of a recent prospective study of a birth cohort in New Zealand did not support an association between fluoride exposure, including residence in an area with fluoridated water during early childhood, and IQ measured repeatedly during childhood and at age 38 years. (CDC, 2015) **(our emphasis).**

Please note the highlighted section in this excerpt. This statement is referring to the Harvard meta-analysis by Choi et al., 2012 discussed in section above. We have already noted that fluoridation promoters have tried to dismiss the relevance of this review with respect to artificial water fluoridation by referring to the "high concentrations" in the "high–fluoride villages." However, we saw in table xx that for the 20 studies where the source of fluoride was water and not coal and for which fluoride concentrations were given, the mean value in the "high-fluoride" villages was 3.52 ppm, which is lower than the current safe drinking water standard of 4 ppm. We also noted that a number of studies were lower than 3 ppm, and when we looked at one study (Xiang et al. 2003 a,b) in more detail some of the children had their IQ

lowered at 1.5 ppm, and extrapolating from a linear fit of the data, could possibly have occurred between 0.75 and 1.5 ppm.

To see the "sleight of hand" operating here note the way the CDC authors qualify "high fluoride exposure" as " **drinking water concentrations ranging up to 11.5 mg/L.**"

When we look at the study in question (Wang, 2007) we find that the 11.5 ppm is one end of a range "3.5 to 11.5 ppm." Thus this value of 11.5 ppm was not experienced by all the children in this particular study, nor was it typical for all 20 studies, where the mean value was 3.52 ppm, so singling it out is highly misleading. (See Table 5, section 15)

Moreover, as any regulatory toxicologist should know when looking at a table of results like this it is not the *highest* value, which is of concern but the *lowest*. It is the lowest value (i.e. the lowest observable adverse effect level, or LOAEL), which is the starting point for determining the safe reference dose (RfD) needed to protect all the individuals in a large population that may be exposed to this toxic. The RfD is the stepping stone in determining the MCLG in water.

So once again we see the CDC Oral Health Division presenting the data in a way to minimize concerns about the practice they vigorously promote. This is not science but a public relations exercise in the name of protecting its long-standing policy. Once again we see an example of where, "**When policy is king, science becomes a slave."**

28. Summary

Water fluoridation is a very poor and unethical practice, which infringes on the right of every individual to informed consent to human treatment.

It throws an extra burden on poor families and communities of color. These range from an increased risk to dental fluorosis (the first telltale sign that the body has been over-exposed to this toxic substance) to a lowered IQ. The last children in the U.S. who need their IQ lowered are children from poor families and communities of color because their intellectual development is more likely to have have compromised by exposure to other neurotoxins like lead and mercury and because fluoride's toxicity is made worse by poor nutrition.

While the Oral Health Division of the Centers for Disease Control and Prevention lauds the fluoridation experiment as "One of the top public health achievements of the Twentieth Century" it is probably our greatest public health mistake and needs to be ended as soon as possible.

We believe that it is not enough to say "no" to this program but to say "yes" to a viable and better alternative. We have done this using the challenge of the agenda goals of the EJ IWG for 2016 – 2018 and have a proposed a 5-step plan which addresses these goals (see section 21)

29. Recommendations

The Environmental Justice Interagency Working Group (EJ IWG)

We urge all the agencies involved in the EJ IWG to see how they can become involved in our

proposed 5-step plan. We believe there is a role for every single agency.

The CDC.

If the CDC's Division of Oral Health resists our 5 step plan, and is going to continue to spend millions of taxpayers' dollars on fluoridation promotion then it should not be spent on propaganda. That should be left to private organizations like the ADA and Pew. The CDC's Division of Oral Health should provide balanced information. As well as providing information on benefits they need to do a better job of providing information on side effects. Such a task should be given over to a different section of the CDC, not the Oral Health Division, whose personnel have little or no training in specialized areas of medicine other than the teeth and no expertise in toxicology and risk assessment.

Meanwhile, the CDC should be warning, those particularly vulnerable to fluoride's toxic actions of their vulnerabilities. These citizens include low-income families and Black and Hispanic Americans.

The EPA

1) As we have made clear above the EPA Office of Water could end fluoridation tomorrow if it used the best science to determine a safe reference dose (RfD) for fluoride that would protect all our children from lowered IQ. If they use standard procedures and appropriate safety factors the RfD would be so low that an MCLG would have to be set at zero, as is the case for both lead and arsenic. Needless to say, as with arsenic and lead, an MCL (the federally enforceable standard) would have to be chosen, which took into account the costs of removing naturally-occurring fluoride down to some compromise that didn't make removal too cost-prohibitive. The key for the EPA under the Safe Water Drinking Act is to produce a scientifically defensible MCLG for fluoride.

2) The EPA should live up to its self-proclaimed interest in making sure that their decisions take into account EJ issues. In 2011 the EPA stated that:

> Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work.

An excellent place to start making these noble words into a reality would be for the EPA OW to take them into account in their ongoing determination of a safe MCLG for fluoride in water. As of Jan 7 2011 the initial steps they have taken in this determination conflicts with these goals in two fundamental ways:

A) They have ignored all the evidence that fluoride is neurotoxic falsely claiming that severe dental fluorosis is the most sensitive end point of fluoride's toxicity. If this is uncorrected it will further hurt the interest of children of low-income and communities of color: they are the last children that need their IQ lowered or have their mental development impacted in any way.

B) Even if severe dental fluorosis is erroneously accepted as the most sensitive end point it is ridiculous for them to use data from the 1930s and 1940s in which the vast majority of the

children were white. This foolishness was compounded by their applying to this outdated and incomplete data an uncertainty factor of one, instead of the normal default value of 10, when extrapolating from a small study that has found harm to produce a reference dose to protect all the individuals in a large population from that harm. The normal safety factor of 10 is used to protect for the full range of sensitivity to any toxic substance expected in a large population (i.e. intra-species variation). This variation in sensitivity is caused by many differences in a large population, including genetics, race, ethnicity, income levels, social circumstances, diet and health status. The fact that one of the factors which influences the prevalence of dental fluorosis – especially in its more severe forms - is race underlines the enormous insensitivity being shown to EJ issues by the EPA in their selection of this uncertainty factor and needs urgent and immediate correction.

3. The EPA should acknowledge that fluoride is not a nutrient unless they can produce science to substantiate this claim.

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APPENDICES

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APPENDIX I: The Nexø Method from Dermark

APPENDIX A

Fluoride's Revenge: Has this cure, too, become a disease?
The Progressive | December 1990 | By Daniel Grossman
(See Photocopy of this article)

Daniel Grossman is a free-lance science writer specializing in environmental and health issues. Research for this article was supported by a grant from the Fund for Investigative Journalism.

Terry Rich, a Colorado Spring dentist, recently treated Molly, a teenage patient, for an ugly brown stain on her front teeth. "She was dissatisfied with her teeth," he recalls, noting that dark, brown horizontal lines marred an otherwise straight smile. Though his acid-etching treatment failed to remove the stain, Rich hopes to try again with a different formula. Molly is Rich's own child. Like other people across the nation, she suffers from dental fluorosis, an ailment caused by excessive levels of the chemical fluoride in naturally mineral-rich water.

Moderate/Severe Dental Fluorosis (Photograph by BMC Oral Health)

An investigation of the health effects of fluoride, including two Freedom of Information Act requests that pried loose more than 10,000 pages of documentation, shows that a Government regulation intended to prevent fluorosis was derailed by a decades-old controversy between two agencies over a legally unrelated Government policy.

Officials at the Public Health Service, the Federal Government's all-purpose health agency, stopped the Environmental Protection Agency from issuing a standard to prevent dental fluorosis because they feared the rule would disrupt their own plans to protect dental health. As a result, what might have been an open public debate became an obscure internecine battle between two bureaucracies, each with its own idea of what makes good public policy. Though dental fluorosis is hardly a life-threatening ailment, this

story demonstrates how a powerful agency, intent upon enforcing its own view of the public good, can suppress anyone who gets in its way.

On October 31, 1985, employees of the EPA were circulating a memo written by Paul Price, a staff member in the regulatory agency's drinking water program. It was a spoof of an official press release issued that day to announce a new regulation.

"The Office of Drinking Water," it began, "proudly presents their new improved FLUORIDE REGULATION, or 'How We Stopped Worrying and Learned to Love Funky Teeth."' The takeoff reflected the frustration felt by staff members who had invested years in developing the protective regulation only to see it diluted because of pressure from another agency.

Though fluoride is best known as the chemical added to drinking water and toothpaste to prevent dental decay, it can also cause a variety of harmful ailments, including one that puts brown stains on teeth and may make them brittle and crumbly. The amount of fluoride added to drinking water to prevent tooth decay is about the same as the amount that can cause moderate staining.

Such staining, known as dental fluorosis, was discovered even before the beneficial effects of fluoride were recognized. The convoluted history of fluoride -- perhaps one of America's most bizarre encounters with a chemical contaminant -- holds the secret to why two agencies, each ostensibly concerned about the effects of fluoride on teeth, should clash.

Dental fluorosis was first noted in Colorado Springs at the turn of the century by a young dentist who became obsessed with discovering the cause of the disease, then known as "Colorado Stain." When minute amounts of fluoride dissolved in drinking water were identified as the culprit in 1931, the Public Health Service dispatched H. Trendly Dean, a talented epidemiologist, to determine the concentration at which the disease occurs.

"In moderate cases, all enamel surfaces of the teeth are altered," Dean wrote. "Brown stain is frequently a disfiguring feature." In severe cases, he added, "brown stains are widespread and teeth often present a corroded-like appearance." The disease, researchers later discovered, is caused in children up to the age of eight during the formation of their teeth.

Fluoride would probably be treated today with the same degree of concern as any other contaminant that affects human health, were it not for the fact that Dean also confirmed an observation that changed the course of preventative health care. He showed that people with dental fluorosis had fewer cavities--then considered a public-health scourge. This discovery was greeted with enthusiasm by activists in the dental community, especially in Wisconsin, a stronghold of the Progressive movement, where a small group of energetic dentists campaigned vigorously to add fluoride to drinking water.

Dean and his agency were more circumspect, as were the American Dental Association and the American Medical Association, which preferred to await the results of investigations of the benefits of fluoride. But by the mid-1940s, a few communities began experimenting with fluoridation - as the process of adding fluoride came to be known. By 1950, the Public Health Service, under increasing pressure from advocates, endorsed the process.

As a full-blown campaign to fluoridate the entire country - nourished by the once-skeptical Public Health Service - began to build, grass-roots opposition appeared as well. Some critics questioned the safety and efficacy of fluoridation, and others raised ethical, moral, and philosophical objections to the injection of a potent chemical into a public resource. There were crackpots, too, who countered advocates of fluoridation with McCarthy-era anticommunist and anti-Semitic rhetoric. One activist who gained

notoriety in California claimed that fluoridation would produce "moronic atheistic slaves." It would "weaken the minds of the people," she said, and make them prey to communists. Another called fluoridation a Jewish attempt to "weaken the Aryan race mentally and spiritually."

When the strategy of challenging fluoridation in local referendums began to threaten the nationwide endeavor, proponents responded by tarring all opponents - indeed the very idea of opposition - with this "quack" brush. According to fluoridation advocate G.F. Lull, for example, "We will find in the antifluoridation camp the antivaccinationists, the antivivisectionists, the cultists and quacks of all descriptions: In short, everyone who has a grudge against legitimate scientific progress."

The controversy over fluoridation is no longer as visible as it was in the 1950s, but it continues. The Public Health Service is still trying to make fluoridation universally available, and opponents are still at work with roadblocks and sandbags. Today, proponents note with alarm that fluoridation was actually rejected in about 100 of the more than 150 referendums on the measure in the past decade. With only two-thirds of the public water supplies served by what dentists consider the optimal level of fluoride today, the longstanding Public Health Service goal of 95 per cent by 1990 was recently lowered to 75 per cent by the year 2000.

Though many beneficial chemicals are dangerous when consumed at excessive levels, fluoride is unique because the amount that dentists recommend to prevent cavities is about the same as the amount that causes dental fluorosis. The Public Health Service recommends that about one part of fluoride be added for every million parts of water to prevent tooth decay -- the amount depends on the climate -- while the Environmental Protection Agency says water with as little as 0.7 parts per million of fluoride can cause moderate dental fluorosis in a small percentage of the people who drink it.

Today, according to the EPA, there are 1,300 communities -- mostly rural towns -- serving nearly two million people with water naturally enriched with fluoride in concentrations greater than two parts per million (ppm). And there are 200 communities serving more than a quarter-million people with water exceeding four ppm. At two ppm, according to agency studies, 10 per cent of all children will contract either moderate or severe fluorosis. At four ppm, nearly half the children will be afflicted. The Public Health Service estimates that nearly half a million American schoolchildren suffer from mild or severe dental fluorosis.

The EPA issued a regulation to protect the public from dental fluorosis in 1977, under authority of the then newly enacted Safe Drinking Water Act. The rule prohibited public water suppliers from distributing water with more than two ppm of fluoride, though the deadline for compliance extended until 1984. As the deadline neared, however, none of the offending suppliers moved to comply, since defluoridation equipment costs hundreds of thousands of dollars. Instead, EPA came under increasing pressure to reexamine the rule. The regulation was a temporary standard, promulgated hastily with the expectation that the agency would later issue a permanent rule based on further deliberations.

EPA staff scientists were convinced of the need to prevent fluorosis. "This was the only contaminant up to this time that we knew had a human health effect," recalls David Schnare, an EPA drinking water analyst. Other drinking-water contaminants, he explains, were recognized by the results of animal studies only.

Nevertheless, EPA was besieged by petitions from state governors and dental officials to weaken the standard or, better yet, replace the legally binding regulation with a less burdensome, voluntary standard. But voluntary standards are typically ignored.

Dental and other public-health officials opposed the binding rule because they feared EPA would encourage the antifluoridation camp and hinder the ongoing effort to fluoridate the entire country. EPA's

plans to regulate fluoride, said John Daniel, a dental official in South Carolina, "served only to stimulate ardent antifluoridationists in their fanatic quest to associate fluoride with every disease and unpleasantness known to mankind."

But many members of the medical community are cautiously beginning to question forty years of doctrinaire advocacy of fluoridation. Even Public Health Service officials are noting today that fluoride may not be as effective as they once claimed. "Perhaps we have been too much the crusaders," says Canadian dental official Alan Gray in calling on his colleagues to reconsider the benefits of fluoridation.

State governments opposed the binding regulation for another reason: because defluoridation is expensive and therefore politically unpalatable. According to EPA estimates, for instance, a typical family in a community that installed defluoridation equipment could expect an increase in its water bill of between $20 and $100 annually.

Though the Public Health Service has long been the chief Federal advocate of fluoridation -- and therefore a less-than-neutral judge -- EPA in 1981 asked Surgeon General C. Everett Koop, a Public Health Service leader, to convene a panel to advise the agency on the relationship between fluoride in drinking water and dental fluorosis. It was an unusual step; according to Joseph Cotruvo, the EPA official directly responsible for drinking-water standards, EPA had never before asked the Surgeon General to conduct such a review of a chemical, nor has it since.

Koop's office assembled a committee of dental researchers in various branches of the Service. Completed in 1982, their report concluded that dental fluorosis, though "cosmetically objectionable," is not a health hazard. Summarizing the report, Koop wrote to EPA: "No sound evidence exists which shows that drinking water...in the U.S. has an adverse effect on dental health."

Public Health Service documents verify that the wording of Koop's letter was intended to hinder EPA plans to set a binding fluoride standard. Unless EPA demonstrates that a contaminant has a "health effect," the agency cannot legally set a binding standard.

"If we send this letter," Koop explained in a memo to Edward Brandt, his superior in the Public Health Service, "it means that [EPA] would not be able to publish [binding] drinking-water regulations." Then he advised, "I think we should go with this letter, in spite of the fact that EPA will not like our response."

Still eager to demonstrate the need to regulate fluoride, the EPA asked the Surgeon General to assemble another panel in 1983, this time to consider the nondental effects of fluoride. A transcript of the panel's two-day meeting shows that, despite its nondental mandate, the panel was especially disturbed by what it learned about dental fluorosis. "You would have to have rocks in your head to allow your child much more than two parts per million," said Stanley Wallach, then medical-service chief of the Veterans Administration Medical Center in Albany, New York.

In the final draft of its report, panel chair Jay Shapiro concluded, "There was a consensus that... dental fluorosis per se constitutes an adverse health effect that should be prevented." Shapiro wrote a memo warning that "because the report deals with sensitive political issues which may or may not be acceptable to the PHS, it runs the risk of being modified at a higher level or returned for modification." He attached the memo to his draft and sent them on to John Small, a Public Health Service official. Small, in turn, forwarded the draft to Koop.

The final report, which Koop sent the EPA a month later, included none of the Shapiro draft's conclusions about dental fluorosis. Instead, it concluded that it was "inadvisable" for children to drink water

containing high levels of fluoride to prevent the "uncosmetic effect" of dental fluorosis. Koop had again foiled EPA by repeating his conclusion that dental fluorosis is not an "adverse health effect."

When contacted recently, members of the panel assembled by the Public Health Service expressed surprise at their report's conclusions; they never received copies of the final--altered--version. EPA scientist Edward Ohanian, who observed the panel's deliberations, recalled being "baffled" when the agency received its report. But, he added, "it's what they give us in writing that counts."

But William Ruckelshaus, then the administrator of EPA, wanted to set a binding standard to prevent dental fluorosis, so EPA tried one more time. In 1984, Ruckelshaus asked the National Institute of Mental Health to assemble a panel to examine the psychological effects of dental fluorosis. This time the request was submitted directly to NIMH rather than through the office of the Surgeon General.

Although there was no body of research on the psychological effects of dental fluorosis per se, the panel was guided by numerous studies of facial attractiveness and the behavioral impacts of other dental impairments, such as cleft lip and palate. Panel members were also impressed by photographs they were shown of the teeth of people suffering from severe dental fluorosis. They concluded that people with moderate or severe cases risked "psychological and behavioral problems or difficulties."

EPA staff members were pleased with the results of this study. "The staff response was: Here is our silver bullet," says Paul Price, then an analyst working on the standard. He recalls that the staff was vacillating between recommending a standard of one ppm or two ppm, to prevent the psychological effects of dental fluorosis.

Ruckelshaus was shown a set of pictures of dental fluorosis at a high-level meeting in July 1984, recalls drinking-water analyst Schnare. Ruckelshaus's comment: "That's an adverse health effect." But he stepped down as EPA administrator in January 1985 and was replaced by Lee Thomas, a man less sympathetic to staff concerns about dental fluorosis.

Recent interviews confirm that the staff was preparing at the time to recommend that Thomas issue a one-ppm standard. "It is legally and scientifically indefensible to set the [standard] at a level other than optimum (e.g., 1 ppm)," reads the draft of a memo prepared for Thomas's approval.

A handwritten note scribbled on this draft, however, says a higher-level office, controlled not by staff scientists but by political appointees, preferred a binding standard of four ppm, justified by the threat of skeletal fluorosis, another effect of fluoride, but a much less common one. The note added, "And they have the final say!"

The final draft, completed a few weeks later, concluded that dental fluorosis is merely a "cosmetic effect" and recommends a binding standard of four ppm, and a voluntary one of two ppm When issued six months later, the standard followed this recommendation.

One drinking water official believes Thomas succumbed to pressure. A native of South Carolina, a state abundantly endowed with fluoride-rich water, Thomas listened not to his staff but to Republican Senator Strom Thurmond, a relentless opponent of the fluoride standard. Edward Groth of the Consumers Union, who wrote a doctoral dissertation on the fluoridation controversy, surmises that Thomas took "the path of least resistance" in following the lead of the Surgeon General.

The technical staff was "devastated" at the decision to go with a standard of four ppm instead of one, according to Paul Price, who managed the writing of the standard and its official justification issued by the EPA. But, he says, once the decision was made, "there were arguments that could be made to justify it."

Price calls the struggle over fluoride regulation "a clash of two different cultures." The Public Health Service, he says, was guided by a 1950s-era attitude that health problems are solved with medication and that doctors know best; anyone questioning this is a crackpot. The Environmental Protection Agency, in contrast, works on the principle -- and is staffed with scientists who believe -- that nothing should be allowed in drinking water unless its safety can be proven. This conviction dictates stringent regulations justified by conservative analyses with ample margins of safety. In the case of fluoride, these two philosophies collide.

In Colorado Springs, where dental fluorosis was first studied almost a century ago, fluoride levels today reach nearly four ppm Dentist Terry Rich thinks this level is too high, though he concedes the city couldn't afford a treatment plant even if regulators required it.

And he views the high level of fluoride in his city's water as an opportunity for business. "It could be a money-making thing in my practice," he says, musing about treatment for people suffering from dental fluorosis - "if only I could figure out a way to do it."

APPENDIX B

Hypothyroidism in the USA

The following is from the **American Thyroid Association**
http://www.thyroid.org/media-main/about-hypothyroidism/

Prevalence and Impact of Thyroid Disease
More than 12 percent of the U.S. population will develop a thyroid condition during their lifetime.

- An estimated 20 million Americans have some form of thyroid disease.
- Up to 60 percent of those with thyroid disease are unaware of their condition.
- Women are five to eight times more likely than men to have thyroid problems.
- One woman in eight will develop a thyroid disorder during her lifetime.
- Most thyroid cancers respond to treatment, although a small percentage can be very aggressive.
- The causes of thyroid problems are largely unknown.
- Undiagnosed thyroid disease may put patients at risk for certain serious conditions, such as cardiovascular diseases, osteoporosis and infertility.
- Pregnant women with undiagnosed or inadequately treated hypothyroidism have an increased risk of miscarriage, preterm delivery, and severe developmental problems in their children.
- Most thyroid diseases are life-long conditions that can be managed with medical attention.

Facts about the Thyroid Gland and Thyroid Disease
The thyroid is a hormone-producing gland that regulates the body's metabolism—the rate at which the body produces energy from nutrients and oxygen—and affects critical body functions, such as energy level and heart rate.

- The thyroid gland is located in the middle of the lower neck.
- Although the thyroid gland is relatively small, it produces a hormone that influences every cell, tissue and organ in the body.
- Hypothyroidism is a condition where the thyroid gland does not produce enough thyroid hormone. Symptoms include extreme fatigue, depression, forgetfulness, and some weight gain.
- Hyperthyroidism, another form of thyroid disease, is a condition causing the gland to produce too much thyroid hormone. Symptoms include irritability, nervousness, muscle weakness, unexplained weight loss, sleep disturbances, vision problems and eye irritation.
- Graves' disease is a type of hyperthyroidism; it is an autoimmune disorder that is genetic and estimated to affect one percent of the population.

APPENDIX C

Certain Thyroid-Related Diseases May Vary by Race:
Study looked at Graves', Hashimoto's thyroiditis among U.S. military personnel.
http://www.webmd.com/women/news/20140415/certain-thyroid-related-diseases-may-vary-by-race

Race appears to be a factor in determining a person's risk of developing autoimmune thyroid conditions such as Graves' disease or Hashimoto's thyroiditis, a new study in the *Journal of the American Medical Association* (JAMA) says. African Americans and Asians are much more likely to develop Graves' disease than whites are, according to the study published in the April 16, 2014 issue of *JAMA*. On the other hand, whites have an increased risk of Hashimoto's thyroiditis when compared to other ethnic groups, the researchers found.

The findings are based on analysis of medical records from all United States active duty military personnel aged 20 to 54 from 1997 through 2011. "These stark race differences in the incidence of autoimmune thyroid disease raise the important question of why?" said lead author Donald McLeod, an endocrinologist and researcher at the QIMR Berghofer Medical Research Institute in Queensland, Australia. "If we can work this out, we may unlock the mechanisms of autoimmune thyroid disease, and potentially yield insights into other autoimmune disorders."

The thyroid gland plays a crucial role in regulating the body's metabolism, influencing how quickly a person burns calories, how fast their heart beats, and how alert they feel. Graves' disease occurs when the immune system begins producing an antibody that tricks the thyroid into producing too much hormone. It's the most common cause of hyperthyroidism, and affects about one in every 200 people, according to the U.S. National Institutes of Health (NIH).

Hashimoto's thyroiditis happens when the immune system attacks the thyroid gland itself, causing hormone production to fall and causing hypothyroidism. Hashimoto's affects as many as 5 percent of adults, according to the NIH.

The analysis found that, compared to whites, black women are about twice as likely and black men are about two and a half times more likely to have Graves' disease.

Asian/Pacific Islander women had a 78 percent increased risk of Graves' disease compared to whites, while Asian/Pacific Islander men had a more than threefold increased risk, the study noted. But the risk of Hashimoto's in both blacks and Asian/Pacific Islanders was much lower than the risk among whites, ranging from 67 percent to 78 percent less, the findings showed.

"The findings are striking, that there are so many more African Americans and Asian individuals who are coded as having Graves'," said Dr. James Hennessey, director of clinical endocrinology at Beth Israel Deaconess Medical Center in Boston. He was not involved with the new research.

Study author McLeod demurred when asked about how a person's race could influence their thyroid function. "Our current study can't answer whether racial differences in autoimmune thyroid disease incidence are due to genetics, environmental exposures or a combination of both," McLeod said. "Further work needs to be performed to find the underlying mechanisms of thyroid autoimmunity."

In the paper, the researchers rule out one potential environmental influence -- smoking. Smoking is associated with an increased risk for Graves' and a decreased risk for Hashimoto's. But whites have the highest smoking rates in the U.S. military, which runs counter to their increased risk for Hashimoto's and lower risk for Graves', the study authors added.

APPENDIX D

Fluoride chemical species & Lead: No mention by EPA of lead-fluoride-chlorine interactions

Lead poses a health concern in two ways with the addition of fluoride chemicals to public drinking water, and EPA needs to address the lead-fluoride **interactions** and the lead-fluoride-chlorine **interactions**.

1. First, lead is a known toxic contaminant in the industrial fluoride waste byproduct added to water at levels that may exceed the EPA's 15 ppb maximum level and contributes to lead poisoning.

2. Second, fluoride leaches lead salts from any lead-based plumbing systems in older homes common in poor urban areas heavily populated by low income, minority groups. There is a failure by public health officials to adequately monitor for toxic lead that is being leached from the water piping system and plumbing systems in fluoridated cities over decades, since hexafluorosilicic acid (likely the produced intact silicic acid) causes lead to escape from common materials (brass) used in the water supply system (reported as elevated blood lead levels in children that have been linked to fluoride in water (NRC 2006, Coplan et al. 2007).

Research by Masters and Coplan (1999) and Westendorf (1975) provide evidence that fluoride in drinking water increases blood lead levels and lead is a metal that interferes with acetylcholine esterase activity. Acetylcholine esterase is a key enzyme playing a vital role in neurotransmission throughout the human nervous system and one of the most fundamental enzymes in the body. Masters and Coplan (1999) stated referring to the silicofluorides as "Sifts":

> Unfortunately, and as surprising as it may seem, neither of these commercial-grade Sifts have been properly (or officially) tested for safety in fluoridating drinking water. Indeed, their use in water fluoridation has even been called an "ideal solution to a longstanding problem"11 as a way to dispose of a highly toxic by-product that is otherwise an enormous health hazard to the local environment. Meanwhile, our own research has revealed12 and recently confirmed13 a statistically significant association between silicofluoride-treated water and elevated blood lead levels, which, in turn, have disturbing implications in relation to their very unwelcome neurological and sociological consequences.

A recent study in rats found a synergistic effect of significantly higher concentrations of lead in both the blood and calcified tissues of animals that were exposed to both silicofluorides and lead (Sawan et al. 2010).

Masters and Coplan (2001) raised further concerns about silicofluorides interference effects on vital biological enzymes such as acetylcholinesterase.

> As pointed out in a recent comprehensive review,10 among the many different enzymes that initiate, control, and terminate various chemical changes in the body, acetylcholinesterase is one of the most fundamental. Therefore, in view of the extensive use of SiFs for water fluoridation (estimated to be 200,000 tons per year in the United States), Westendorf's seminal findings take on added importance in that they reveal that fluorosilicates are more potent in interfering with acetylcholinesterase activity than uncomplexed fluoride. These SiFs are industrial grade materials derived from HF and SiF4 emissions that are collected in water as toxic by-products in the manufacture of phosphate fertilizers from fluoride-bearing rock phosphate. During that step concentrated aqueous solutions of fluosilicic acid, H2SiF6, are formed containing residual HF and SiF4, together with variable low concentrations of contaminants like lead, arsenic, cadmium, beryllium, and heavy-metal radionuclides.

Recent analysis in Thunder Bay, Ontario, Canada (see below) shows that all 3 fluoride chemicals (H2SiF6 – hexafluorosilicic acid, NaF – sodium fluoride, and Na2SiF6 – sodium silicofluoride) used in artificial water fluoridation, increase the lead content in drinking water when lead pipes are used.

Fluoridation Impacts on Water Chemistry P3-4, Report No. 2009.123, (Thunder Bay, Ontario, 2009):

> "The drinking water produced from the Bare Point Water Treatment Plant is taken from Lake Superior and then treated. Water quality testing results of this source water have continually shown that the Lake Superior water is of high quality, is soft, and of low alkalinity. Testing has also demonstrated that the water is very low in dissolved major ions and metals. These characteristics mean that the water is of excellent quality and as a result has little buffering capacity – the ability to resist changes in the water chemistry.
>
> The effects on the water chemistry of three fluoridating agents, hydrofluorosilicic acid, sodium silicofluoride and sodium fluoride, were all tested on Bare Point drinking water in a laboratory controlled setting. The impact the water chemistry with fluoride addition was tested to determine whether the addition of fluoride would have a potential to increase the number occurrences of elevated lead levels in the community.
>
> The results of this preliminary study show that all fluoridating agents, when added to the drinking water at a concentration of 0.7 ppm (the optimal fluoride concentration rate as recommended by an expert panel convened by Health Canada in 2007), increased lead leaching from the lead pipe."

Research by Maas et al. 2007 in the journal *Neurotoxicology* demonstrate that lead in solder and brass metal in the water pipes, connections and other materials is also leached and released by all fluoride chemicals used in urban artificial water fluoridation. Their synergistic effects with chlorine and/or chloramine were demonstrated to increase the lead levels even further and yet the EPA has no discussion of this lead leaching concern. Maas et al. (2007) found levels of lead leaching from brass when coming in contact with fluorosilicic acid and chloramine:

CHLORAMINE, FLUOROSILICIC ACID & LEAD LEACHING FROM BRASS MATERIALS

Chemicals	**Median Lead level**
Chlorine	145.9 µg/DL (1.5mg/L)
Chloramine *	23.3 orami (0.23mg/L) or 233 ppb
Chlorine & sodium fluoride	185.3 µg/DL (1.85mg/L)
Chloramine* & sodium fluoride	28.1 µg/DL (0.28mg/L)
Chlorine and fluorosilicic acid	362.8 µg/DL (3.63mg/L) doubled
Chloramine* & fluorosilicic acid	42.6 µg/DL (0.43mg/L) doubled
Chloramine** & fluorosilicic acid	83.1 µg/DL (0.83mg/L) quadrupled

* with 100% extra ammonia added, to neutralize effect; note difference of one sample of chloramine without this extra ammonia (at **)
** without extra ammonia.

APPENDIX E

119 State Reports on Oral Health

109 of these reports have no mention of dental or enamel fluorosis
10 reports include a mention of dental fluorosis:

2 reports give limited fluorosis statistics: 2009 California and 2014 Idaho

2 reports cite fluorosis only in a reference citation

The Alabama 2010 report presents the most information on fluorosis, albeit very briefly

Out of the 119 reports, five mention "White Spots" which could be dental fluorosis.

- The 2007 Georgia report notes: "20% of 2 to 5 year old Georgia Head Start children surveyed have white spot lesions."
- The 2011 Washington state report gives the rate for White Spot Lesions in Head Start/ECEAP Preschoolers at 20.5%, with African American children having the highest percent.

State	Oral Health Report
Alabama	2007. **Dental Screenings by % W/Decay. In order by Dental District and % W/Decay. 2006-2007.** http://fluoridealert.org/wp-content/uploads/al-2007.pdf **Note:** 7,643 students were screened at 103 schools. **No mention of dental fluorosis.**
Alabama	2012. **The Oral Health of Alabama's Children, 2010-2012**. http://fluoridealert.org/wp-content/uploads/al-2012.pdf **No mention of dental fluorosis.**
Alabama	2013. **The Oral Health of Alabama's Kindergarten and Third Grade Children Compared to the General U.S. Population and Healthy People 2020 Targets**. Alabama Department of Public Health Data Brief February. http://fluoridealert.org/wp-content/uploads/al-2013.pdf **No mention of dental fluorosis.**
Alaska	Undated**. 13. Oral Health. Healthy Alaskans 2010 – Volume I.** http://www.fluoridealert.org/wp-content/uploads/ak.report.pdf **A 2 paragraph description of dental fluorosis is given.**
Alaska	2007. **Alaska Oral Health Plan: 2008-2012.** By BJ Whistler. Women's, Children's and Family Health, Division of Public Health, Alaska Department of Health and Social Services. Funding for the State Oral Health Plan was provided by the U.S. Centers for Disease Control and Prevention through the Chronic Disease Prevention and Health Promotion Programs Cooperative Agreement (U58/CCU022905). http://www.fluoridealert.org/wp-content/uploads/ak.2007.pdf **No mention of dental fluorosis.** **‹ "White Spot Lesions" is mentioned on page 12:** "Develop or identify education materials for parental/caregiver recognition of early enamel caries, 'white spot lesions', in relation to early childhood caries and prevention efforts."
Alaska	2012. **Alaska Oral Health Plan 2012-2016**. Alaska Department of Health and Social Services. July. Funding for the State Oral Health Plan was provided by the U.S. Centers for Disease Control and Prevention through the Chronic Disease Prevention and Health Promotion Programs Cooperative Agreement (U58/CCU022905). http://fluoridealert.org/wp-content/uploads/ak-2012.pdf **No mention of dental fluorosis.**

	‹ "White Spot Lesions" is mentioned on page 35 using the same language as above.
Alaska	2013. **Alaska Oral Health Surveillance System**. Oral Health Program, Department of Health and Social Services. November 1. Supported by a cooperative agreement with the U.S. Centers for Disease Control and Prevention. http://fluoridealert.org/wp-content/uploads/ak-2013.pdf *** Dental fluorosis mentioned once on page 12:** "Rates of dental fluorosis, a cosmetic condition in tooth enamel, may increase if fluoride levels in the drinking water are chronically in excess of optimal fluoride levels."
Arizona	2005. **The Oral Health of Arizona's Children. Current status, trends, and disparities**. Arizona Department of Health Services - Office of Oral Health. November. http://fluoridealert.org/wp-content/uploads/az.2005.pdf *** Dental fluorosis mentioned once on page 18: "Consistent with recommendations developed by the National Institute of Dental and Craniofacial Research, each tooth surface was scored for decay, restorations, sealants, fluorosis, trauma, premature loss, and eruption status. Additional information was gathered to determine treatment urgency and referral needs."** **However, no statistics were given on dental fluorosis** even though "More than 13,000 children received dental screenings." and "each tooth surface was scored for decay, restorations, sealants, fluorosis, trauma, premature loss, and eruption status…"
Arkansas	2002. **Too Few Visits to the Dentist? The Impact on Children's Health**. A Special Report from Arkansas Advocates for Children & Families. February. http://www.fluoridealert.org/wp-content/uploads/ar-2002.pdf **No mention of dental fluorosis.**
Arkansas	Undated. **Alaska Oral Health Assessment. Summary Report 2004-2005**. By the State of Alaska, Department of Health and Social Services, Division of Public Health, Oral Health Program. http://fluoridealert.org/wp-content/uploads/ak-2004-2005.pdf **No mention of dental fluorosis.**
Arkansas	2007. **Oral Health in Arkansas**. By Mouden LD, Phillips MM, Sledge R, Evans V. Office of Oral Health. August. http://fluoridealert.org/wp-content/uploads/ar-2007.pdf **No mention of dental fluorosis.**
Arkansas	2012. **Arkansas Oral Health Plan 2012-2015**. Arkansas Department of Health, Office of Oral Health. "Recommendation 2.8. Provide funding for public health clinic start up and maintenance grants and other safety net programs including community health centers and not-for-profit volunteer programs. Strategy: 1. On an ongoing basis, pursue funding for community health center dental expansion and volunteer community programs through the **Tobacco Master Settlement Agreement** and other funding mechanisms." http://fluoridealert.org/wp-content/uploads/ar-2012.pdf **No mention of dental fluorosis.**
Arkansas	2013. Office of Oral Health Surveillance Plan. Prepared by Abby Holt and Brian Whitaker. Arkansas Department of Health. "**Community water fluoridation (CWF) is promoted through a CDC cooperative agreement**. Activities include presentations on the benefits and costs of CWF internally within the ADH and externally to various governing bodies, community leaders and lay citizens through the distribution of informational packets and campaigns to include

	print and broadcast media. Internal partners include the ADH Section of Engineering and the Office of Communications and Marketing among others." http://fluoridealert.org/wp-content/uploads/ar-2013.pdf **No mention of dental fluorosis.**
California	2006. **"Mommy, it hurts to chew." The California Smile Survey. An Oral Health Assessment of California's Kindergarten and 3rd Grade Children.** Dental Health Foundation. February. http://fluoridealert.org/wp-content/uploads/ca-2006.pdf "During the 2004-2005 school year we surveyed over 21,000 California children in kindergarten or third grade, in nearly 200 randomly-selected schools spread across the State…" **No mention of dental fluorosis.**
California	2009. **Research and public policy: dental caries and fluoridation**. UCSF Dental Public Health Seminar: Part 1. By Howard Pollick. October 6. http://www.fluoridealert.org/wp-content/uploads/pollick-2009.pdf * This is not a report published by the state. However, there is a discussion on dental fluorosis and rates are given for "High Schools" 1993-94. It's difficult to read the small chart in the report for the percent of severity of dental fluorosis. **Percent of dental fluorosis given for 10th graders teeth 1993-94:** **Fluoridated Urban: 9.0%** **Other Urban: 16.1%** **Rural 7.9%** **All Regions (lifetime residents): 11.5%**
California	2009. **Dental Health Fact Sheet 2009 [for Santa Clara].** By the **Santa Clara** Public Health Department. http://fluoridealert.org/wp-content/uploads/ca-2009.santa-clara.pdf **No mention of dental fluorosis.**
California	2014. **Sonoma County Smile Survey. An Oral Health Assessment of Sonoma County's Kindergarten and Third Grade Children**. Prepared by Jenny Mercado MPH, Epidemiologist, Sonoma County Department of Health Services. November. http://fluoridealert.org/wp-content/uploads/ca-2014.sonoma-county.pdf **No mention of dental fluorosis.**
Colorado	2000. **Addressing the crisis of oral health access for Colorado's children.** Colorado Commission Children's Dental Health. A Report to the Honorable Bill Owens Governor, State of Colorado. December 2. "During the Colorado 2000 General Assembly session, **through tobacco settlement legislation, funds were designated** for the improvement of the Child Health Plan Plus, including the addition of a dental benefit to begin January 1, 2001, providing an 'adequate number of dentists are willing to provide services to eligible children.'" http://www.fluoridealert.org/wp-content/uploads/co-2000.pdf **No mention of dental fluorosis.**
Colorado	2005. **Smart Mouths, Healthy Bodies: An Action Plan to Improve the Oral Health of Coloradans**. Prepared for Oral Health Awareness Colorado by the Colorado Department of Public Health and Environment, Oral Health Program. Fall. http://fluoridealert.org/wp-content/uploads/co-2005.pdf **No mention of dental fluorosis.**
Colorado	**2011-2015 Colorado Oral Health Surveillance System Plan**. The Colorado Department of Public Health and Environment. http://fluoridealert.org/wp-content/uploads/co-2011.pdf **No mention of dental fluorosis.**
Colorado	2012. **Colorado Oral Health Plan**. Developed by Oral Health Colorado.

	http://fluoridealert.org/wp-content/uploads/co-2012.pdf **No mention of dental fluorosis.**
Connecticut	2007. **Oral Health in Connecticut**. Connecticut Department of Public Health. http://www.fluoridealert.org/wp-content/uploads/ct.report.2007.pdf *** A definition of dental fluorosis is given: "**However, excessive fluoride consumption can cause mottled enamel or fluorosis (i.e. whitish or brownish spots on teeth). Dental fluorosis results from the ingestion of high levels of fluoride during tooth development in children less than 8 years old."
Connecticut	2012. **The Oral Health of Connecticut's Children**. Connecticut Department of Public Health, Office of Oral Health. October. This publication was supported by the Cooperative Agreement Number 5U58DP001534-04 from The Centers for Disease Control and Prevention http://www.fluoridealert.org/wp-content/uploads/ct-2012.pdf **Key findings:** -- Dental decay continues to be a significant public health problem for CT's children -- There are significant oral health disparities in CT with minority and low-income children having the highest level of dental disease. **No mention of dental fluorosis.**
Connecticut	2013. **Oral Health Improvement Plan for Connecticut 2013-2018**. Connecticut Coalition for Oral Health. This publication was supported by the Cooperative Agreement Number 5U58DP001534-05 from the Centers for Disease Control and Prevention. http://www.fluoridealert.org/wp-content/uploads/ct-2013.pdf **No mention of dental fluorosis.**
Delaware	2002. **Delaware Oral Health Assessment of Third Grade Children**. Delaware Health and Social Services, Division of Public Health. May. http://www.fluoridealert.org/wp-content/uploads/de-2002.pdf **No mention of dental fluorosis.**
Delaware	2013. **KIDS COUNT in Delaware Issue Brief. Oral Health**. By the Center for Community Research, University of Delaware (Newark DE). Spring. This document (oral health issue brief) with funding provided by HRSA # T12HP14660. http://fluoridealert.org/wp-content/uploads/de-2013.pdf **No mention of dental fluorosis.**
Delaware	2013-b. **Delaware Smiles. The Oral Health of Delaware's Children**. Delaware Health and Social Services, Bureau of Oral Health and Dental Services. August. PROJECT FUNDING. Title V Block Grant, Delaware Division of Public Health, Maternal and Child Health Bureau. http://fluoridealert.org/wp-content/uploads/de-2013-b.pdf **No mention of dental fluorosis.**
Delaware	2014. **Delaware Oral Health Plan 2014. Goals and Objectives**. Delaware Health and Social Services, Bureau of Oral Health and Dental Services. June 5. http://fluoridealert.org/wp-content/uploads/de-2014.pdf **No mention of dental fluorosis.**
District of Columbia	2006. **Behavioral Risk Factor Surveillance System (BRFSS) 2006 Annual Report.** Government of the District of Columbia, Department of Health, Center for Policy, Planning and Epidemiology. "The BRFSS is conducted for the District of Columbia Department of Health, with funding and guidance provided by the CDC of the U.S. Public Health Service." http://www.fluoridealert.org/wp-content/uploads/dc.2006.pdf **No mention of dental fluorosis.**
District of Columbia	2007. **Issue Brief: Oral Health is Critical to the School Readiness of Children in Washington, DC**. By Altarum Institute and funded by Maternal and Child Health Bureau, Health Resources and Services Administration, U.S. Department of Health and Human

	Services. http://www.fluoridealert.org/wp-content/uploads/dc-2007.pdf **No mention of dental fluorosis.**
Florida	2013. **Florida Oral Health Metrics**. A Florida Public Health Institute Report. Report prepared by the Urban Health Solutions Research and Writing Team (Bello L, Dye M, Garces A, Rovira I, McCabe B). This report was made possible with generous support from the DentaQuest Foundation. http://fluoridealert.org/wp-content/uploads/fl-2013.pdf **No mention of dental fluorosis.**
Florida	Undated (after 2012). **Statewide Oral Health Surveillance Program: The Third Grade Basic Screening Survey**. By D. Solovan-Gleason, Florida Department of Health. http://fluoridealert.org/wp-content/uploads/fl-statewide-third-graders.pdf **No mention of dental fluorosis.**
Georgia	2006. **Oral Health of Georgia's Children. Results from the 2005 Third Grade Oral Health Survey**. By the Georgia Department of Human Resources. April. Funding was provided through the Health Resources and Services Administration, States Oral Health Collaborative Systems Grant, Georgia's Access to Dental Services Grant/GADS III http://fluoridealert.org/wp-content/uploads/ga-2006.pdf **No mention of dental fluorosis.**
Georgia	2007. **Status of Oral Health in Georgia, 2007. Summary of Oral Health Data Collected in Georgia**. Authors: Levin E, Kanny D, Duval T, Koskela L. Georgia Department of Human Resources. November. Publication Number: DPH07.155WH. http://fluoridealert.org/wp-content/uploads/ga-2007.pdf **No mention of dental fluorosis.** **‹ WHITE SPOT LESIONS MENTIONED: "20% of 2 to 5 year old Georgia Head Start children surveyed have white spot lesions."** **"White Spot Lesions (WSL)** – Considers only the six maxillary anterior (upper front) teeth and is defined as white spots found only at the cervical 1/3 of the tooth, with or without a break in the enamel surface, and with or without brown staining. The presence of WSL identifies a child as being "at risk for Early Childhood Caries (ECC)"
Georgia	2012. **Georgia's Oral Heath Plan**. Georgia Oral Health Coalition, Division of Health Promotion, Maternal and Child Health Section, Oral Health Prevention Program. This effort was made possible in part by funding from Centers for Disease Control and Prevention, Division of Oral Health, Oral Health Prevention Infrastructure Cooperative Agreement. http://fluoridealert.org/wp-content/uploads/ga-2012.pdf **No mention of dental fluorosis.**
Hawaii	2001. **Oral Health 2001: A strategic Plan for Oral Health in Hawai'i.** Produced by Hawai'i Primary Care Association. The Frear Eleemosynary Trust, the McInerny Foundation, and the G.N. Wilcox Trust, provided funds to support the planning process and production of this document. http://fluoridealert.org/wp-content/uploads/hi-2001.pdf **No mention of dental fluorosis.**
Hawaii	Undated. **Hawaii Community Focus Groups Determine Priorities for Oral Health Research**. By Harrigan R, DeCambra H, Easa D, Strauss R, Greer M, Beck J. http://fluoridealert.org/wp-content/uploads/hi-undated.harrigan.et_.al_.pdf Acknowledgments: This investigation/manuscript/etc. was supported by a NIDCR R-21 award (DE15020-01) "A Study of Oral Health Disparities in Adult Asian & Pacific Islanders" and a Research Centers in Minority Institutions (NCRR) award, P20 RR11091, from the National Institutes of Health. **No mention of dental fluorosis.** *Note from Fluoride Action Network:* Hawaii is a series of volcanic islands. On the Big

	Island volcanic smog (VOG) is a major issue. Off-gassing chemicals of greatest concern include hyrdrogen fluoride, a source for exposure for children to dental fluorosis.
Hawaii	2014. **Oral Health Surveillance in Hawaii, 2014**. Presented by Donald Hayes, MD, MPH, CDC Assigned Epideniologist, Hawaii Department of Health, Family Services Division. October 2. http://fluoridealert.org/wp-content/uploads/hi-2014.pdf **No mention of dental fluorosis.**
Idaho	2008. **Idaho Oral Health Plan 2008-2013.** The Idaho Department of Health and Welfare. http://fluoridealert.org/wp-content/uploads/id-2008a.pdf **No mention of dental fluorosis.**
Idaho	2014. **Idaho Smile Survey. 2013 Report**. Prepared by Ward Ballard, Research Analyst, Principal. Idaho Department of Health & Welfare.This report was supported by the Maternal and Child Health Block Grant and the Cooperative Agreement 1U58DP004914-01 from the Centers for Disease Control and Prevention. http://fluoridealert.org/wp-content/uploads/id-2014.pdf *** FLUOROSIS is mentioned on pages 2, 12, 13, 20** **• The rate for severe fluorosis (teeth show brown spots or pitting) was 0.1 percent for2013 for all third-grade students** **• Percent of Idaho Third-Grade Students with Fluorosis, 2001-2013:** 2001: 8.7 % 2005: 11.4% 2009: 7.8%2013: 5.8%
Illinois	2001 or 2002. **Proceedings of the Illinois Oral Health Summit and the Illinois Oral Health Plan. Illinois' response to the U.S. Surgeon General's report: Oral Health in America**. Partial funding to support the Illinois Oral Health Summit was provided by The federal Health Resources and Services Administration and The Association of State and Territorial Dental Directors. http://fluoridealert.org/wp-content/uploads/il-2001.pdf **No mention of dental fluorosis.**
Illinois	2007. **CSHCN Oral Health Report. Illinois IFLOSS Coalition**. http://fluoridealert.org/wp-content/uploads/il-2007.pdf **No mention of dental fluorosis.**
Illinois	2007. **Oral Health Care in Illinois. The Illinois Oral Health Plan II**. Spring. A compendium of information presented to the Illinois public by IFLOSS. http://fluoridealert.org/wp-content/uploads/il-2007-c.pdf **No mention of dental fluorosis.**
Illinois	2007. **Illinois Oral Health Surveillance System (IOHSS).** By Sangeeta Wadhavan, BDS, MPH, Oral Health Epidemiologist, Illinois Department of Public Health. NOHC 2007. http://fluoridealert.org/wp-content/uploads/il-2007-b.pdf **No mention of dental fluorosis.**
Indiana	2009. **Indiana Strategic Oral Health Initiative (SOHI). Project Report. 2009**. Center for Health Policy (09-C43) School of Public and Environmental Affairs Indiana University–Purdue University Indianapolis; and the Indiana State Department of Health. http://fluoridealert.org/wp-content/uploads/in-2009.pdf **No mention of dental fluorosis.**
Indiana	2013. **The Oral Health of Indiana's Third Grade Children Compared to the General U.S. Third Grade Population.** Indiana State Department of Health Data Brief. December. http://fluoridealert.org/wp-content/uploads/in-2013.pdf **No mention of dental fluorosis.**
Iowa	2006. **Oral Health Survey Report: FY06**. Report prepared by Tracy Rogers and Xia Chen.

	Iowa Department of Public Health, Oral Health Bureau. http://fluoridealert.org/wp-content/uploads/ia-2006.pdf **No mention of dental fluorosis.**
Iowa	2009. **Third Grade Open Mouth Survey Report**. Iowa Department of Public Health, Oral Health Bureau. http://fluoridealert.org/wp-content/uploads/ia-2009.pdf **No mention of dental fluorosis.**
Kansas	2004. **The Oral Health of Kansas Children 2004**. By Kimminau KS and Huang CC of the Kansas Health Institute; and McGlasson D and Kim J. of the Kansas Department of Health and the Environment. http://fluoridealert.org/wp-content/uploads/ks-2004.pdf **No mention of dental fluorosis.**
Kansas	2011. **Kansas Oral Health Plan 2011-2014**. Kansas Department of Health and Environment. January. Funding was provided by the U.S. Centers for Disease Control and Prevention through the Cooperative Agreement (1U5 8/ DP002834 - 01). http://fluoridealert.org/wp-content/uploads/ks-2004.pdf **No mention of dental fluorosis.**
Kentucky	2006. **Statewide Oral Health Strategic Plan - 2006**. The Commonwealth of Kentucky. • PAGE 50: Fluoride Varnish is currently funded through federal tobacco settlement dollars. • PAGE 4: This program is called KIDS SMILE and is funded from the tobacco settlement funds for children 0 through 5 years of age. • Early childhood funding through Kentucky's Federal Tobacco Settlement creates numerous opportunities. • CHANGE OPPORTUNITIES: 18. Tobacco tax for oral health. http://fluoridealert.org/wp-content/uploads/ky-2006.pdf **No mention of dental fluorosis.**
Kentucky	2007. **Kentucky's Oral Health Poses Challenges.** By Michael T. Childress and Michal Smith-Mello. Foresight, No. 50. http://fluoridealert.org/wp-content/uploads/ky-2007.pdf **No mention of dental fluorosis.**
Kentucky	2008. **Using Cartograms to Illustrate Disparities in Oral Health in Kentucky**. By Saman DM, Arevalo O, Johnson AO. University of Kentucky. http://fluoridealert.org/wp-content/uploads/ky-2008.pdf **No mention of dental fluorosis.**
Louisiana	2006. **Oral Health Survey Report: FY06**. Report prepared by Tracy Rogers and Xia Chen. Iowa Department of Public Health, Oral Health Bureau. http://fluoridealert.org/wp-content/uploads/ia-2006.pdf **No mention of dental fluorosis.**
Louisiana	Undated. **Louisiana Statewide Oral Health Coalition. State Plan for 2010-2013**. By the Louisiana Statewide Oral Health Coalition. http://fluoridealert.org/wp-content/uploads/la-state-plan-2010-2013.pdf **No mention of dental fluorosis.**
Louisiana	2010. **Oral Health in Louisiana. A document on the oral health status of Louisiana's population**. By Rishu Garg, Oral Health Program Epidemiologist/Evaluator. Department of Health and Hospitals, Oral Health Program. July. The creation of this document was made possible with funding from the Centers for Disease Control and Prevention, Division of Oral Health by Cooperative Agreement DP08 – 802. http://fluoridealert.org/wp-content/uploads/la-2010.pdf *** ENAMEL FLUOROSIS MENTIONED:**

	Fluoride supplements (page 34): "It is recommended that the risk of tooth decay should be weighted before issuing a prescription for these supplements in children younger than 6 years of age because these supplements also increase the risk of enamel fluorosis." Fluoride mouth rinse (page 34)"Children under 6 years old are not recommended to use it without the prescription of a dentist because of the risk of enamel fluorosis as they tend to swallow it more often than adults." Fluoride gel and foam (page 34): "These are usually applied in dental offices and pose less of a threat for fluorosis in children younger than six because of the big intervals in between the applications... Fluoride varnish has a fluoride concentration of 22,600 ppm…"
Louisiana	2011. **Bright Smiles for Bright Futures. Basic Screening Survey**. By Rishu Garg, MD, MPH, A Report of the Oral Health Status of Louisiana's Third Grade Children. http://fluoridealert.org/wp-content/uploads/la-2011.pdf **No mention of dental fluorosis.**
Maine	2007. **Maine Oral Health Improvement Plan**. Published by the Maine Dental Access Coalition. November. http://fluoridealert.org/wp-content/uploads/me-2007.pdf **No mention of dental fluorosis.**
Maine	2013. Oral Health in Maine. By Feinstein J, Gradie MI, Huston S, Mervis C, Ghouri, F, Nazare S, et al. The Maine Center for Disease Control and Prevention, an office of the Department of Health and Human Service. January. **No mention of dental fluorosis.**
Maryland	2007. **Survey of the oral health status of Maryland school children 2005-2006**. Authors: Richard J. Manski RJ, Chen H, Chenette RR, Coller S. University of Maryland Dental School. http://fluoridealert.org/wp-content/uploads/md-2007.pdf **No mention of dental fluorosis.**
Maryland	2011. **Maryland Oral Health Plan 2011-2015**. Holt K., ed. Maryland Dental Action Coalition. http://fluoridealert.org/wp-content/uploads/md-2011.pdf This publication was made possible with support from the DentaQuest Foundation and the Division of Oral Health, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. **No mention of dental fluorosis.**
Maryland	**2012 Annual Oral Health Legislative Report as required by Health-General Article**, Sections 13-2504(b) and 13-2506 and HB 70 (Ch. 656 of the Acts of 2009). http://fluoridealert.org/wp-content/uploads/md-2012.pdf **No mention of dental fluorosis.**
Maryland	2013. **Oral Health Survey of Maryland School Children, 2011-2012**. By Macek MD, Coller S, Chen H, Manski RJ, Manz M, Altema-Johnson D, Goodman HS. University of Maryland School of Dentistry. http://fluoridealert.org/wp-content/uploads/md-2013.pdf **No mention of dental fluorosis.**
Massachusetts	2008. **The Oral Health of Massachusetts' Children**. By White BA, Monopoli MP, Souza BS. Catalyst Institute. January. Assessment and report funded in part by Delta Dental of Massachusetts and the Association of State and Territorial Dental Directors (see acknowledgments for all funders). http://fluoridealert.org/wp-content/uploads/ma-2008.pdf

	*** ONLY MENTION OF DENTAL FLUOROSIS IS ONE REFERENCE CITATION.**
Massachusetts	2010. **Oral Health Plan for Massachusetts 2010-2015**. Better Oral Health for Massachusetts Coalition. http://fluoridealert.org/wp-content/uploads/ma-2010.pdf **No mention of dental fluorosis.**
Michigan	2006. **Michigan Oral Health Plan**. Michigan Department of Community Health; Michigan Oral Health Coalition. September. Funding for the State Oral Health Plan was provided by the Centers for Disease Control and Prevention through the Chronic Disease Prevention and Health Promotion Programs Component 4: Chronic Disease Prevention and Health Promotion Programs (U58/CCU522826). http://fluoridealert.org/wp-content/uploads/mi-2006.pdf **No mention of dental fluorosis.**
Minnesota	2006. **Minnesota Oral Health Data Book**. Children and Youth. By the Minnesota Department of Health, Community and Family Health Division. October. Funded by the U.S. Department of Health and Human Services Health Resources and Services Administration Grant Number H47MC02019. http://fluoridealert.org/wp-content/uploads/mn-2006.pdf *** ONLY MENTION OF DENTAL FLUOROSIS IS ONE REFERENCE CITATION.**
Minnesota	2013. **The Status of Oral Health in Minnesota**. By Khan B, Adeniyi A, Thoele MJ. Minnesota Department of Health, Oral Health Program. September. Funding sources: CDC Division of Oral Health Cooperative Agreement funding, DP08-802. Health Resources and Services Administration grants to states to support oral health workforce activities, T12HP14659. http://fluoridealert.org/wp-content/uploads/mn-2013.pdf **No mention of dental fluorosis.**
Minnesota	2013b. **Minnesota Oral Health Plan. 2013-2018**. Minnesota Department of Health, Oral Health Program. January. Funding was made possible by grants to support statewide oral health related activities from the Health Resources and Services Administration, Award T12HP1465, and Centers for Disease Control Prevention, Cooperative Agreement Grant Number 5U58DP0011579. http://fluoridealert.org/wp-content/uploads/mn-2013b.pdf **No mention of dental fluorosis.**
Mississippi	2006. **State of Mississippi Oral Health Plan 2006-2010**. By the Mississippi Department of Health. http://fluoridealert.org/wp-content/uploads/ms-2006.pdf **No mention of dental fluorosis.**
Mississippi	Undated. **Every Smile Counts. The Oral Health of Mississippi's Third Grade Children 2009-2010 School Year**. By the Mississippi State Department of Health, Office of Oral Health. http://fluoridealert.org/wp-content/uploads/ms-2009-2010-school-year.pdf **No mention of dental fluorosis.**
Missouri	2005. **The Oral Health of Missouri's Children**. Executive Summary. Missouri Department of Health and Senior Services, Oral Health Program. http://fluoridealert.org/wp-content/uploads/mo.2005.pdf **No mention of dental fluorosis.**
Missouri	2014. **Oral Health in Missouri 2014: A Burden Report by the Missouri Department of Health and Senior Services**. http://fluoridealert.org/wp-content/uploads/mo-2014.pdf **No mention of dental fluorosis.**
Montana	2006. **Montana Oral Health Plan. Montana's response to "A National Call to Action to Promote Oral Health, Healthy People 2010, and the Future of Dentistry".** Montana Department of Public Health and Human Services.

	http://fluoridealert.org/wp-content/uploads/mt-2006.pdf **No mention of dental fluorosis.**
Montana	2007. **Montana 2005-2006 Study of Oral Health Needs: 3rd Graders and Head Start Children**. By Rosina Everitte, MPH. June 22. http://fluoridealert.org/wp-content/uploads/mt-2007.pdf **No mention of dental fluorosis.**
Nebraska	2005. **Open Mouth Survey of Third Graders Nebraska 2005**. Nebraska Department of Health and Human Services Regulation and Licensure. Funding was provided through SSDI, a project of the U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau, HRSA/MCHB grant number HI8MC00031C0. http://fluoridealert.org/wp-content/uploads/ne-2005.pdf **No mention of dental fluorosis.**
Nevada	**2008 Nevada State Oral Health Plan**. Department of Health and Human Services, Nevada State Health Division, Bureau of Family Health Services. April. Funding for the 2008 State Oral Health Summit was provided by: The Department of Health and Human Services Health Resources and Services Administration Centers for Disease Control and Prevention Division of Oral Health http://fluoridealert.org/wp-content/uploads/nv-2008.pdf **No mention of dental fluorosis.**
Nevada	2009. **Third Grade Oral Health Survey 2008-2009**. Department of Health and Human Services, Nevada State Health Division, Oral Health Program. http://fluoridealert.org/wp-content/uploads/nv-2009.pdf **No mention of dental fluorosis.**
Nevada	2011. **Nevada Oral Health Surveiilance Plan**. By Pool C, Hansen AC, Cofano L.January. Department of Health and Human Resources. *The report is a draft, there is no final available.* http://fluoridealert.org/wp-content/uploads/nv-2011.draft_.no-final.pdf **No mention of dental fluorosis.**
Nevada	**2012-2013 Head Start Oral Health Survey. Nevada**. Department of Health and Human Services, Nevada State Health Division, Oral Health Program. February 2013. http://fluoridealert.org/wp-content/uploads/nv-2013.pdf **No mention of dental fluorosis.**
New Hampshire	2003. **New Hampshire Oral Health Plan: A Framework for Action.** Coalition for New Hampshire Oral Health Action. http://fluoridealert.org/wp-content/uploads/nh-2003.pdf **No mention of dental fluorosis.**
New Hampshire	2010. **New Hampshire 2008-09 Third Grade Healthy Smiles – Healthy Growth Survey. Oral Health and Body Mass Index Assessment of New Hampshire 3rd Grade Students**. By the N.H. Department of Health and Human Services. July. Funded by: HNH foundation, Northeast Delta Dental Foundation, New Hampshire Department of Health and Human Services. http://fluoridealert.org/wp-content/uploads/nh-2010-b.pdf **No mention of dental fluorosis.**
New Hampshire	2010. **New Hampshire Oral Health Data 2010**. By the New Hampshire Department of Health and Human Services, Oral Health Program. March. http://fluoridealert.org/wp-content/uploads/nh-2010.pdf **No mention of dental fluorosis.**
New Jersey	2009. **Pediatric Oral Health Action Plan for New Jersey's Children Aged 0-6.** Funded by New Jersey Head Start-State Collaboration Grant and The Association of State and Territorial Dental Directors. April. http://fluoridealert.org/wp-content/uploads/nj-2009.pdf **No mention of dental fluorosis.**

New Mexico	2006. **New Mexico Oral Health Surveillance System. NMORSS Special Report on Children 2006**. Office of Oral Health, Health Systems Bureau, New Mexico Department of Health. Funding was provided by State Oral Health Collaborative Systems Grant, # H47MCO1945, Health Resources Services Administration, US Department of Health and Human Services. http://fluoridealert.org/wp-content/uploads/nm-2006.pdf **No mention of dental fluorosis.**
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Virginia	2011. **Oral Health in Northern Virginia.** A report commissioned by the Northern Virginia Health Foundation. September 2011. http://fluoridealert.org/wp-content/uploads/va-2011.northern-va.pdf **No mention of dental fluorosis.**
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Wisconsin	2013 - **Healthy Smiles / Healthy Growth. Wisconsin's Third Grade Students**. By Olson M, Chaffin J, Chudy N, Yang A. The publication was made possible in part by funding from two grants from the Centers for Disease Control and Prevention. The Division of Oral Health, Cooperative Agreement DP08-802 and the Division of Nutrition, Physical Activity and Obesity Cooperative Agreement 5U58DP001494-05. http://fluoridealert.org/wp-content/uploads/wi-2013.pdf **No mention of dental fluorosis.**
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APPENDIX F

Pro-Fluoridation groups have also ignored dental fluorosis

The Pew foundation has probably been the most active foundation in promoting community water fluoridation since 2008 by setting up health care coalitions across the country to vigorously support fluoridation. According to Pew's main fluoridation campaigner, Matt Jacob (2012), Pew's outreach to states for community water fluoridation (CWF) included the following:

• Arkansas: "Funded a poll and offered other assistance to pass a state mandate in 2011."
• California: "Provided assistance to a successful campaign to secure CWF in San Jose."
• Kansas: "Assisted oral health advocates in Wichita pass a fluoridation policy."
• Mississippi: "Provided message training for oral health field staff."
• Montana: "Assisted successful effort to preserve CWF in the city of Bozeman."
• New Hampshire: "Helped defeat a statewide ban on CWF."
• Oregon: "Offering funds and research for a campaign [referendum] in Portland."
• Wisconsin: "Provided research and technical assistance to preserve CWF in Milwaukee."

• In May 2011, **The Pew Center on the States**, a major funder of pro-fluoridation groups, published **The State of Children's Health: Making Coverage Matter** (Pew, 2011, http://fluoridealert.org/wp-content/uploads/pew-2011.pdf). There is no discussion of dental fluorosis in this report.

• In July 2015, a report titled, **Fluoridation Advocacy: Pew's Contributions and Lessons that Emerge** (http://fluoridealert.org/wp-content/uploads/pew.july-2015.pdf) contained one citation on fluorosis (page 3) that came from the CDC's "FAQs for Dental Fluorosis." The Pew Charitable Trusts commissioned the **Children's Dental Health Project** (CDHP) to prepare this report. CDHP funders include the CDC, DHHS, Colgate-Palmolive and the W.K. Kellogg Foundation. An individual from the American Dental Association is on its board. There was one citation to African-Americans (page 15): "To build this consensus [for working on a referendum for fluoridation], Upstream formed a diverse coalition of Portland organizations called Healthy Kids, Healthy Portland (HKHP). The coalition included the **African Women's Coalition**, the Asian Pacific American Network of Oregon, Familias en Acción, Kaiser Permanente Northwest, Lutheran Community Services and the Oregon Business Association. (See below, *Portland, Oregon: Money given to minority groups to support fluoridation)*

• On the **Children's Dental Health Project (CDHP)** website (https://www.cdhp.org/) a search for "fluorosis" had two hits:

- April 27, 2015: "… The updated level for fluoride is expected to help reduce enamel fluorosis. Fluorosis is a change in the appearance of tooth enamel that does *not* affect the health or function of the teeth.*[In 2006 the NRC-2006 report stated that severe dental fluorosis was an adverse health effect.]* Typically, fluorosis in the U.S. is a mild, cosmetic condition that leaves faint, white spots or streaks on the surface of teeth. The effect is subtle, which is why many people with fluorosis don't even notice it; it often takes a dental professional to recognize it…" https://www.cdhp.org/blog/316-hhs-updates-fluoride-level
-

- January 10, 2011: Quote from Burton Edelstein, President of CDHP, "In no way does this adjustment mean that public health authorities are backing off of their commitment to fluoridating water" said Edelstein. "In fact, capping water levels at the newly recommended level (0.7 parts per million) is the best way to meet children's needs while also reducing the chance that a child will develop fluorosis. Edelstein added that "Parents can take steps to limit the chance of fluorosis from toothpaste by supervising tooth brushing." https://www.cdhp.org/resources/219-public-health-officials-reconfirm-value-of-water-fluoridation-while-adjusting-recommended-levels

• On Pew's website (http://www.pewtrusts.org/en/projects/childrens-dental-policy) **Children's Dental Policy,** a search for fluorosis gets 2 hits:

-- **Quote from Bill Maas, Advisor, Pew Children's Dental Campaign (and former Director of the Division of Oral Health at the CDC):** "Opponents have also raised concerns about community water fluoridation leading to severe cases of dental fluorosis. Fluorosis is a change in appearance of the tooth's enamel. Nearly all fluorosis in the U.S. is not harmful and results in white streaks on the teeth that are barely noticeable. Severe fluorosis can cause enamel damage and brown spots, but that problem is rare in our country, afflicting only people on private well water." - http://www.pewtrusts.org/en/research-and-analysis/q-and-a/2011/12/08/bill-maas-water-fluoridation

-- **FAQ's:** Q. What is dental fluorosis? Dental fluorosis is a change in the appearance of tooth enamel that occurs when someone is exposed to too much fluoride. In the U.S., fluorosis is typically a minor discoloration of teeth that is usually visible only to a dentist. It does not cause pain, and it does not affect the health or function of the teeth. The new HHS recommendation reflects the fact that Americans today receive fluoride from more sources (toothpaste, mouth rinses, and other products) than they were getting several decades ago. In 2006, the National Research Council examined water sources with a range of naturally occurring fluoride levels and found that severe fluorosis virtually never occurs in levels below 2 parts per million. Public water systems fluoridate at a concentration that's well below that level. - http://www.pewtrusts.org/en/research-and-analysis/q-and-a/2011/11/11/water-fluoridation-frequently-asked-questions

• In the Pew sponsored **Campaign for Dental Health** website http://ilikemyteeth.org/ , there were two "hits" for African Americans:

- A 2012 citation to a $9 million grant to the UCLA School of dentistry to give access to the city's Latino and African American children (birth to 5 years). - http://ilikemyteeth.org/million-dollar-grant-aims-increase-dental-care-access-las-youngest/
- -- Another 2012 citation noting, "U.S. National Health Interview Surveys from 1964 to 2010 showed that the once blatant racial gap in kid's dental care has been eliminated… African-American kids still have higher rates of cavities, and

there are still children of all races who do not have access to dental care." - http://ilikemyteeth.org/children-race-dentist/

There is no mention on the websites of the **Children's Dental Health Project,** the **Children's Dental Policy** or Pew's **Campaign for Dental Health** of another neurotoxin that children are exposed to: **mercury in dental amalgams**. The FDA defines them as, "is a mixture of metals, consisting of liquid (elemental) mercury and a powdered alloy composed of silver, tin, and copper. Approximately 50% of dental amalgam is elemental mercury by weight." - http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DentalProducts/DentalAmalgam/ucm171094.htm

APPENDIX G

Civil Rights Leaders have begun to mobilize to end fluoridation's threat to minority communities

This section contains the following:

May 21, 2015. **Letter from William Owens, Coalition of African American Pastors,** to Rep. Barry Loudermilk, Chairman, House Subcommittee on Oversight / Science, Space, & Technology Committee, Washington, DC.
http://fluoridealert.org/wp-content/uploads/owens-may.11.2015.pdf

November 11, 2014. Resolution of the Santa Rosa-Sonoma County NAACP Opposing Fluoridation of Our Public Water Supply.
http://fluoridealert.org/wp-content/uploads/sonoma.calif_.naacp_.nov-2014.pdf

April 17, 2013. Portland NAACP Opposes fluoridation.
http://fluoridealert.org/news/portland-naacp-opposes-fluoridation/

July 1, 2011. **Civil Rights Violation Regarding Forced Medication.** Resolution of the League of United Latin American Citizens.
http://lulac.org/advocacy/resolutions/2011/resolution_Civil_Rights_Violation_Regarding_Forced_Medication/

June 22, 2011. **Another King family member speaks out as Fluoridegate scandal builds in Atlanta.**
http://fluoridealert.org/news/another-king-family-member-speaks-out-as-fluoridegate-scandal-builds-in-atlanta/

April 6, 2011. Letter from Matt Young, DDS, President, International Academy of Oral Medicine and Toxicology, to Thomas Frieden, MD, MPH, Director, Centers for Disease Control and Prevention, Atlanta, GA.
http://fluoridealert.org/wp-content/uploads/iaomt-letter-to-cdc-april.6.2011.pdf

March 29, 2011. Letter from Andrew Young to Chip Rogers, Senate Majority Leader, Georgia State Capitol, Atlanta, GA.
http://fluoridealert.org/wp-content/uploads/young-andrew.letter-march.29.2011.pdf

March 9, 2011. Letter from Dr. Gerald L. Durley, Pastor, Providence Baptist Church, to Senator Chip Rogers, Senate Majority Leader, Georgia State Capital, Atlanta. **Re: Repeal of Georgia's Mandatory Fluoridation Law**.
http://fluoridealert.org/wp-content/uploads/durley_2011.pdf

APPENDIX H

On January 7, 2011, the U.S. Department of Health and Human Services (HHS) announced its recommendation to reduce the level of fluoride added to drinking water based on national survey data showing that 41% of American adolescents (ages 12-15) now have dental fluorosis *(a tooth defect caused by excess fluoride consumption during childhood). On January 13, 2011, the HHS published a* Federal Register notice *proposing to reduce the recommended fluoride level from the existing range of 0.7 to 1.2 parts per million (ppm) to 0.7 ppm. HHS solicited public comments on their recommendation. The Fluoride Action Network's submission to HHS is reproduced in full below. Over 18,000 emails were sent to HHS in support of FAN's submission.*

Fluoride Action Network
February 4, 2011

To HHS and Honorable Secretary Sebelius

In response to your request for comments on the recent change in your recommended level of fluoride added to community drinking water, I respectfully submit the following points supporting the stance that a reduction in fluoride levels is not sufficient, and that the United States should follow the approach of western Europe and end water fluoridation completely:

- **Fluoride is not a nutrient, nor is it essential for healthy teeth.** No study has ever revealed a diseased state resulting from lack of fluoride, including dental caries. (1,2) No American is, or ever was, "fluoride deficient."

- **Using the water supply to mass medicate the population is unethical.** The public water supply should not be used as a drug-delivery system without regard for an individual's age, weight, health status, or knowledge of how fluoride will interact with other drugs they are taking. No informed consent is requested or given, and no medical follow-up is offered.

- **The benefit and safety of ingested fluoride has never been proved by accepted medical standards.** The HHS has failed to inform the public that there is not a single randomized controlled trial (the gold standard of medical research) that demonstrates the effectiveness of water fluoridation. (3) HHS has also failed to inform the public that the Food and Drug Administration has never studied, or approved, the safety of fluoride supplements and continues to classify all fluoride supplements as "unapproved new drugs." (4, 5) Lastly, HHS has failed to inform the public that tooth decay rates have declined at the same general rate in all western, industrialized countries, irrespective of water fluoridation status. (6)

- **Any benefits of fluoride are primarily topical, not systemic**. The CDC has acknowledged this for over a decade (7). The Iowa Fluoride Study, funded by HHS, has reported little, if any, relationship between individual fluoride intake and caries experience. According to the study (the largest of its kind): "achieving a caries-free status may have relatively little to do with fluoride *intake*, while fluorosis is clearly more dependent on fluoride intake." (8)

- **Americans will still be over-exposed to fluoride at 0.7 ppm.** According to EPA's recent documents "it is likely that most children, even those that live in fluoridated communities, can be over-exposed to fluoride at least occasionally. (9) At present, nearly 41% of American adolescents aged 12-15 have some form of dental fluorosis (10), an outwardly visible sign of fluoride toxicity. Reducing the fluoride levels to 0.7 ppm will *not* remedy this problem as national statistics clearly show that dental fluorosis remains significantly elevated at 0.7 ppm. (11)

Drinking water is just one source of ingested fluoride; others include foods, beverages, dental products and supplements, pesticides and pharmaceuticals. For communities that practice artificial water fluoridation, this is the easiest source of fluoride to remove.

- **Infants will not be protected**. Infants fed formula made with fluoridated tap water—at the reduced level of 0.7 ppm—will still receive up to 175 times more fluoride than a breast-fed infant. In their supporting documents, EPA has not calculated the risks to the bottle-fed infant. In fact, infants from birth to six months of age were completely excluded from any consideration by EPA, despite HHS's own admission that "The period of possible risk for fluorosis in the permanent teeth…extends from about birth through 8 years of age." (12) As the most susceptible subpopulation, the potential for long-term, irreparable damage to developing infants must be seriously considered, and should extend beyond just their teeth.

- **African-American children and low-income children will not be protected.** HHS's reference (p. 2386) to the study by Sohn et al. (13) failed to mention that African-American and low-income children were found to consume significantly more total fluids and plain water, and thus receive more fluoride from drinking water, than white or higher-income children. African-Americans have been shown to have an increased risk of developing dental fluorosis, and are at higher risk for suffering from the more severe forms of this condition. (14) Despite receiving high intakes of fluoride, low-income and minority children living in fluoridated communities continue to suffer from rampant and severe dental decay (15-18)—undermining the common premise that fluoridation will prevent these problems. Additionally, low-income children have a greater risk for suffering from all forms of fluoride toxicity, as poor diet exacerbates the detrimental effects of fluoride. This is clearly, therefore, an environmental justice issue.

- **HHS has failed to consider fluoride's impact on the brain.** Over 100 animal studies have observed fluoride-induced brain damage (19), 24 human studies have reported lowered IQ in children exposed to various levels of fluoride (20), and at least 6 other studies have found non-IQ neurological effects such as impaired visuo-spatial organization. (21-26) One study of 500 children in China observed reduced IQ at a water fluoride level of 1.9 ppm (27, 28) and another reported a reduction in IQ at even lower (mean=1.3 ppm) water fluoride levels. (29) HHS's new recommendation of 0.7 ppm offers no adequate margin of safety to protect all of our children, including those with iodine deficiencies (30-32), from experiencing similar neurological damage.

- **HHS has failed to consider fluoride as an endocrine disruptor.** The 2006 NRC report (33) states that fluoride is an endocrine disruptor, and even at low levels can be detrimental to the thyroid gland. Pre- and post-natal babies, people with kidney disease, and above-average water drinkers (including diabetics and lactating women) are especially susceptible to the endocrine disrupting effects of fluoride in drinking water.

- **HHS has failed to consider or investigate current rates of skeletal fluorosis in the U.S.** According to EPA's supporting document (34), there is a general lack of information on the prevalence of stage II skeletal fluorosis in the U.S. Yet, many of the symptoms of stage II skeletal fluorosis (e.g. sporadic pain, stiffness of the joints) are identical to arthritis (35-40), which affects at least 46 million Americans. People with renal insufficiency are known to be at an elevated risk for developing skeletal fluorosis (33), as crippling stage III skeletal fluorosis with renal deficiency has been documented in the U.S. at water fluoride levels as low as 1.7 ppm. (41) Since skeletal fluorosis in kidney patients has been detected in small case studies, it is likely that systematic studies would detect skeletal fluorosis at even lower fluoride levels.

- **HHS has failed to consider fluoride as a potential carcinogen**. Bassin et al. (42) reported a significantly elevated risk of osteosarcoma in boys living in fluoridated communities, and thus

fluoride may be a carcinogen. Chester Douglass, who has serious conflicts-of-interest concerning fluoride research, has stated that a subsequent study will refute these findings (43), but no publication has appeared in the five years since he made this claim. As EPA has still not completed carcinogenicity testing for fluoride, HHS should not support the addition of a potential carcinogen to our drinking water.

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- **HHS has failed to confirm the safety of silicofluorides**. Despite being used in more than 90% of artificial water fluoridation schemes, no chronic toxicity testing of silicofluorides has ever been completed: "No short-term or subchronic exposure, chronic exposure, cytotoxicity, reproductive toxicity, teratology, carcinogenicity, or initiation/promotion studies were available" for the toxicological summary for silicofluorides, as prepared for the National Institute of Environmental Health Sciences. (44) However, recent epidemiological research has found an association between the use of silicofluoride-treated community water and increased blood lead concentrations in children (45) – a link that is consistent with recent laboratory findings. (46) HHS has failed to inform the American public that the fluoridating agent used in drinking water is a hazardous waste product from the phosphate fertilizer industry, and can be laced with arsenic and radionuclides, (47, 48) which are known carcinogens. HHS should not support the addition of a non-tested substance to our drinking water.

Most of the arguments listed above are covered in far more detail in the recently published book "The Case Against Fluoride" by Connett, Beck and Micklem (Chelsea Green, 2010). We urge director Sebelius to appoint a group of experts from HHS, who have not been involved in promoting fluoridation, to provide a fully documented scientific response to the arguments and evidence presented in this book. Were director Sebelius to do this we strongly believe that neither she nor these experts will want to see the practice of water fluoridation continue. The practice is unnecessary, unethical and hitherto the benefits have been wildly exaggerated and the risks minimized. A scientific response to this book from a HHS team would allow the public to judge the cases both for and against fluoridation on their scientific and ethical merits.

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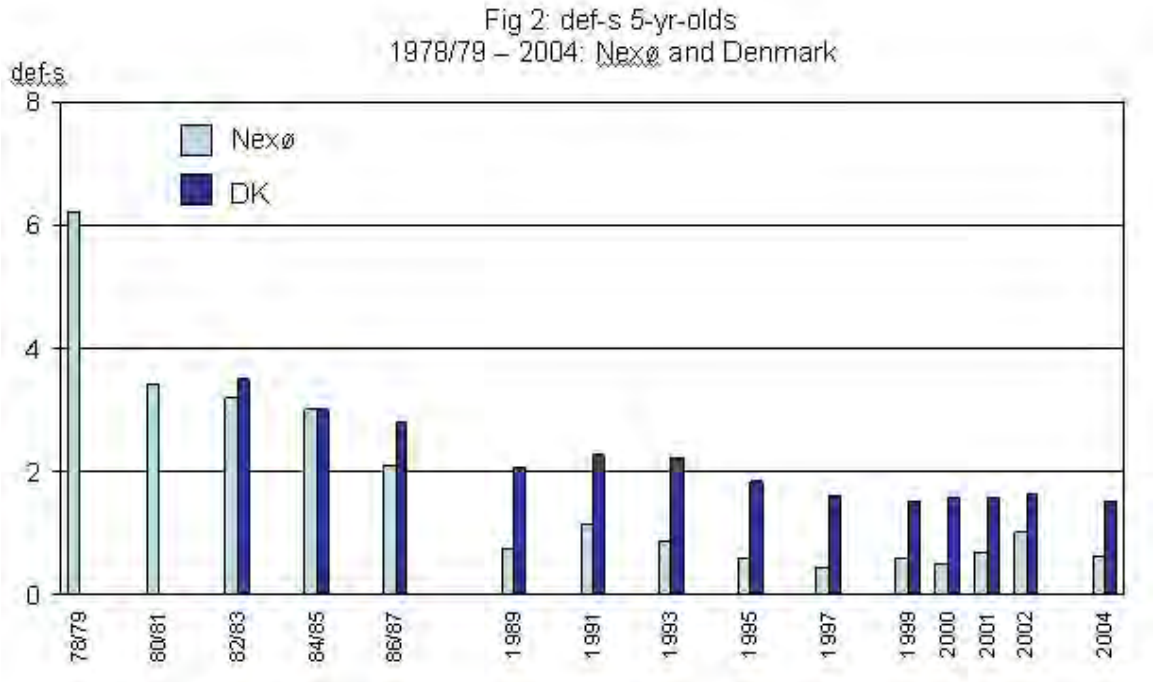
APPENDIX I

The Nexø Method

Some information from:
http://www.nexodent.com

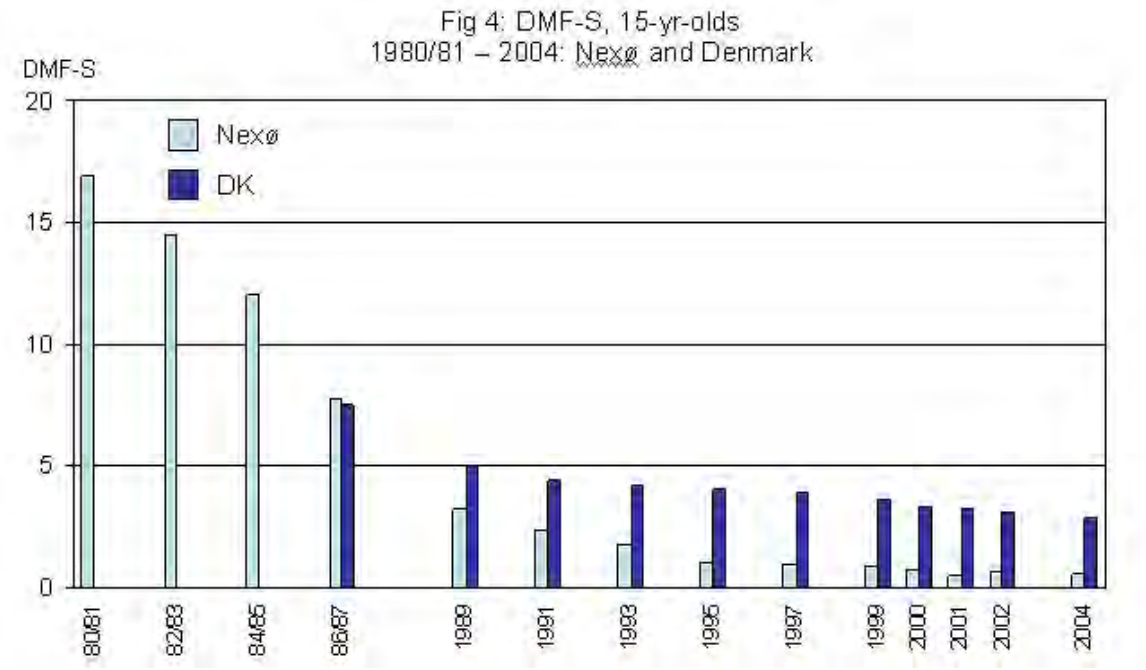
This public health dental program is based on similar principles as the ChildSmile system in Scotland, but is more comprehensive. It was developed in Denmark, with the initial trial in a community named Nexø. The results were so dramatic in rapidly lowering caries rates that the method has been extended to other communities in Denmark and other countries. Today, Denmark has the lowest childhood caries rates in the developed world according to WHO data [WHO 2015], and Denmark has never been fluoridated.

The caries rates over time in Nexø compared to those in the rest of Denmark which was not using Nexø Method, are shown in the graphs below. The first period 1978-1979 was the baseline period before the Nexø program began. The first graph is for primary teeth, dmfs:



http://www.nexodent.com/2a.jpg

For permanent teeth in 15 year olds, DMFS:



http://www.nexodent.com/4.jpg

When compared to the primary teeth, the permanent teeth took several years before the reduction in caries caught up to the Denmark level. Nexø started out as a high caries area, because it had relatively low SES compared to the rest of Denmark. The slower rate of improvement is likely because the children were already almost 15 years old when the program started. However, by 1995, by which time the 15 year olds had continuous exposure to the method since infancy, the benefit was already very dramatic. The DMFS rate was only 1.03 in Nexø compared to 4.01 in Denmark, for a 400% lowering. The largest difference ever claimed by water fluoridation has been about 70%, and today the claim is typically a 25% lowering of DMFS rates. By 2004 the rate in Nexø was just 0.56 compared to 2.85 in the rest of Denmark, a 500% reduction. These rates are all measures of decay by tooth surface ("S" for surfaces), not "T" for entire tooth, so they are higher than a tooth score.

The success of the Nexø Method has been documented in peer-reviewed scientific papers, both in Denmark and in other countries where it has been tried [Ekstrand 2005].

Here is the brief summary of the Nexø method itself:

> A dental health care program based on individualized non-operative caries treatment of children and adolescents aged 0-18. The aim of the program is to maintain sound teeth using the fewest resources possible.
>
> The treatment program is based on 3 principles - dosed at individually assessed recalls according to diagnosis and risk assessment:

1. Education of parents, children and adolescents in understanding Dental caries as a localized disease.
2. Intensive training in home-based plaque control.
3. Early professional non-operative intervention.

All parents and children in a community are given free oral hygiene training starting at 8 months age and continuing frequently through age 18. Parents and children are shown how to do proper oral hygiene and are checked to see how they are doing at each visit. If oral hygiene is not adequate or any caries starts developing, the next visit is scheduled sooner. Topical fluoride is given only if oral hygiene is not adequate or caries starts developing. Systemic fluorides are never considered. Even sealants are avoided because they are considered less effective than proper oral hygiene.

If any fillings or dental work is required, they are provided in a timely manner.

The program gets parents and children receiving frequent oral health visits throughout childhood. Dental auxiliaries perform most of the work rather than dentists to save expense.

The economics of the Nexø Method have also been examined using careful scientific and economic analyses [Ekstrand 2005, Vermaire 2013]. They found that the dramatic reduction in caries requiring treatment outweighs any additional cost for more frequent prevention visits. This net economic long-term benefit was found even in the context of an area like Denmark that has relatively low caries rate. For areas with high caries rates, due to low socio-economic status for example, the economic benefit would likely be higher.

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[1]Mr. Underwood introduced himself but did not participate in discussions.