Replies to Questions of Fluoridation Opponents in Selmer, Tennessee

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Contents

Questions and Replies

The questions below are a list presented to the Public Health County Director, Tennessee Department of Health, in 2009. The questions are heavily biased toward the contentions of fluoride opponents, and based on false assumptions, including, but not limited to:

A. That there are risks to ingestion of optimally fluoridated water. There are not.

B. That Hydrofluorosilic acid is ingested in fluoridated water. It is not.

C. That the effects of fluoride are topical, not systemic. The effects are both topical and systemic.

D. That the benefits of fluoridation are questionable. They are not.

E. That water treatment personnel have any role in fluoridation other than to carry out their duties in regard to the proper addition of fluoridation substances to the water supply, as directed by local elected/ appointed officials under whose jurisdiction falls a local water supply…...as these personnel do for all routine water additives….in full compliance with all local, state, and federal laws, mandates, and regulations.

The questions are not designed to obtain honest information, but to confirm erroneous pre-conceived conclusions of the antifluoridationists. While the questions are directed to the Tennessee Department of Health, the replies in this document have not been made with any input from, or knowledge of, the Tennessee Department of Health, and do not reflect any opinions or position of the TDH.

The following are specific answers to each of the 45 questions.

1. ***Question****: Are you able to provide an estimate for the full range of daily water ingestion by consumers in Selmer, including specific ranges for laborers, athletes, the excessively thirsty such as those individuals with diabetes, and those encouraged by health professionals to use water for health or detoxifying purposes? If yes, please submit the data specific data specific to this request and identify the published source of your estimates.*

Reply:
In discussions of fluoridation it is important to remain focused on that which is relevant to the issue and not get sidetracked into diversions from the facts. What is being asked here is whether the amount, or "dose" of fluoride ingested from optimally fluoridated water in addition to that from all other normal sources of fluoride is safe for everyone. The answer is yes. When the maximum amount of a substance which can be ingested falls below the threshold of adverse effects, then dose is not an issue in regard to adverse effects. This is the case with chlorine, fluoride, ammonia, and the myriad other substances routinely added to public water supplies.

Simply put, water is fluoridated at 0.7 mg/liter (ppm=mg/liter). Thus, for every liter of fluoridated water consumed, the "dose" of fluoride intake is 0.7 mg. The average daily water consumption by an adult is 2-3 liters per day. The US CDC estimates that of the total daily intake, or "dose", of fluoride from all sources including dental products, 75% is from the water.

The US National Academy of Medicine (formerly the US Institute of Medicine) has established that the daily upper limit for fluoride intake from all sources, for adults, before adverse effects will occur, short or long term, is 10 mg. As can be noted from a simple math equation, before the daily upper limit of fluoride intake could be attained in association with optimally fluoridated water and all other normal sources of fluoride intake, water toxicity would be the concern, not fluoride. Even if one doubles the average amount of water consumption, the fluoride ingested would still be below the threshold of adverse effects.

The range of safety between the minuscule few parts per million fluoride that are added to existing fluoride levels in water, is so wide that "dose" is not an issue. (1)

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2. ***Question****: Are you able to identify the estimated range of total daily water ingestion by infants and children by age in Selmer? If yes, please submit the data specific to this request and identify the published source of your estimates.*

Reply:
As in question #1, that which is being asked is if the dose of fluoride in addition to that from all other normal sources of fluoride, is safe for everyone. Again, the answer is yes. While the amount of daily fluoride intake for infants and children may exceed the NAM established daily upper limit, the only potential consequence is the chance of mild dental fluorosis during the teeth developing years of 0-8. Mild dental fluorosis is a barely detectable effect which causes no adverse effect on cosmetics, form, function, or health of teeth. As peer-reviewed science has demonstrated mildly fluorosed teeth to be more resistant to decay, many consider this effect to not even be undesirable, much less adverse. (2)

There is no valid, peer-reviewed scientific evidence of any adverse effects on infants, children, or anyone of any other age group, from optimally fluoridated water.

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3. ***Question****: Is there any identifiable range of water consumption, age of consumer, population afforded equal protection, list of populations with specific diseases, or list of populations with higher risk for certain diseases or harmful effects that the Town of Selmer does not have the mission of providing delivery of water that is safe for lifetime consumption without anticipated adverse health effect? If so, please state for what occurrence or population the health department advises that the Town's duty to provide stewardship over the public drinking water ceases? If not, please state No.*

Reply:
Again, what is being asked is whether optimally fluoridated water is safe for consumption of everyone. The answer is again yes.

Fluoride has always existed in water, and always will, fluoridated or not. So, if having fluoride in the public water system is considered to be inadequate stewardship of that water, then fluoridation is irrelevant. In considering stewardship one must consider how best to utilize the existing minerals in that water. Fluoridation simply adjusts the concentration of existing fluoride in water to that level at which maximum benefit will be obtained from those ingesting that water, while strictly maintaining that level well below the threshold of adverse effects. When a very valuable health benefit such as prevention of a significant amount of dental infection can be attained in an entire population simply by a slight adjustment of the concentration of an existing mineral in the water supply, the real question is whether it is adequate stewardship to deny the population that benefit, even though fluoride will continue to be ingested.

Fluoride at the optimal level at which water is fluoridated is odorless, colorless, and tasteless. In the entire 72 year history of fluoridation, hundreds of millions having chronically ingested optimally fluoridated water during that time period, there have been no proven adverse effects. Nearly 75% of the United States benefits from the dental decay prevention accorded by water fluoridation. Is intentionally depriving a citizenry the benefits of a public health initiative, currently the standard in nearly 75% of the US, which has a 72 year track record of benefits with no adverse effects, providing good stewardship? Is there not an enormous risk of liability in denying an entire population such benefits, which are standard practice in the overwhelming majority of the United States, based on nothing more than groundless claims and misinformation provided by activist groups?

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4. ***Question****: As the free-fluoride ion is not removed by simple carbon filtration, what is the estimated cost installation and yearly maintenance for a whole-house residential water treatment system to limit drinking, cooking, and dermal fluoride exposures from baths and showers for a family of four? Please identify your source.*

Reply:
Fluoride has always existed in water. This fluoride is colorless, tasteless, odorless, and causes no adverse effects. There is no scientifically defensible reason to consider removal of this fluoride when it exists in a concentration of 2.0 mg/liter or less in water. Anyone who chooses to remove fluoride from the water piped into their home is entirely free to do so. Reverse osmosis filters are readily available for purchase. However, as this is a personal preference, it is not the responsibility of society to bear the cost of satisfying this preference.

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*5. **Question**: Has the Tennessee Department of Health informed the general public of Selmer, or any medical professionals attending to the personal health of citizens of Selmer, of an specific foods, beverages or produce that may contain significant concentrations of fluoride that consumers may consider in supplementing their daily exposures or restricting their daily exposures?*

Reply:
A One of the main benefits of water fluoridation is the provision of a constant, consistent bathing of the teeth in a low concentration of fluoride all throughout the day, a very effective means of prevention of dental decay. Fluoride in foods and beverages provide only sporadic exposure to differing levels of fluoride, which peak in the oral cavity within an hour, and then are gone. Relying on foods and beverages to be a substitute for fluoridation is comparing apples to oranges.

B. In the absence of exposure to abnormally high concentrations of fluoride within well-water or from environmental fluoride pollution, there is no more need to restrict fluoride intake in association with optimally fluoridated water than there is to restrict chlorine intake in association with chlorinated water. For anyone exposed to the abnormally high levels of fluoride required to chance adverse effects, removal of the 0.7 mg/liter fluoride from optimally fluoridated water would be akin to removal of a drop of water from a tsunami. Technically the drop would contribute to the tsunami. However, neither would its removal have any effect on that tsunami, nor could that drop cause a tsunami in the absence of the massive amount of water from other sources.

When there are adverse effects from fluoride in the water and/or environment, as there are in those countries with high levels of fluoride pollution, the problem is with those other sources, not from the minuscule 0.7 mg/liter fluoride in optimally fluoridated water.

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*6. **Question**: If the Tennessee Department of Health has not provided the public with specific knowledge of sources of fluoride exposure, does the health department contend that the health department has no duty, nor any other government entity has a duty, to inform the consumer of sources of fluoride exposures while advising water operators to increase exposures through the water supply? If no government entity has such a duty, please so state. If there is a duty to inform the public by some government, please identify that entity.*

Reply:
A. The duty of public health departments is to protect the health of the public. As there is no danger to that health from optimally fluoridated water in conjunction with all other normal sources of fluoride intake, there is no more reason for the health department to inform the public of sources of fluoride intake, any more than there is to inform the public of sources of chlorine, ammonia, or any of the substances routinely added to public water supplies.

B. All recommended and mandated maximum allowable levels of fluoride in drinking water are set with full consideration of fluoride intake from all sources, not simply that from the water. The US CDC estimates that of the total fluoride intake from all sources, 75% is from water and beverages. (3)

The US EPA strictly mandates the maximum allowable level of contaminants in water supplies, contaminants basically being any substance other than the water itself.

From the EPA:

"The Safe Drinking Water Act (SDWA) defines "contaminant" as any physical, chemical, biological or radiological substance or matter in water. Drinking water may reasonably be expected to contain at least small amounts of some contaminants. Some contaminants may be harmful if consumed at certain levels in drinking water. The presence of contaminants does not necessarily indicate that the water poses a health risk." (4)

The EPA mandated maximum allowable level of fluoride in water is 4.0 mg/liter. Local water supplies are legally held to this maximum. If exceeded then the supplies in question are in violation of the SWDA and subject to the same consequences as for any other violations of federal law.

The US Department of Health and Human Resources officially recommended optimal level of fluoride in drinking water is 0.7 mg/liter. This is a non-enforceable recommendation. However, this is the level utilized by 74.5% of the United States.

The first adverse effect to be of any concern as a result of chronic fluoride intake would be severe dental fluorosis. In its final report, the 2006 NRC Committee on Fluoride in Drinking Water clearly noted that severe dental fluorosis does not occur in communities with a water fluoride content of 2.0 mg/liter, or less. This takes into consideration the fluoride intake from all sources. Water is fluoridated at 0.7 mg/liter, one third this level. (5)

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*7. **Question**: With the publication of the National Research Council Report on Fluoride in December 2006, and evidence contained therein that endocrine systems and thyroid functions are impaired at exposure levels below the consumption levels expected from drinking optimally fluoridated water, does the department of health or the water system operator have any duty of care as a learned intermediary to inform the consumer of contraindications when a direct water additive with such identified risks is purposely administered? Please state Yes, if so. If not, please state No.*

Reply:
A. It is not the function of water treatment personnel to assess the health effects of substances which they are charged to properly and routinely add to public water supplies. They are not qualified to make such

assessment, and it is not their job description to attempt to do so. This assessment is the function of duly authorized regulatory agencies. The US EPA has specific water quality requirements which must be met by all water at the tap. It is the duty of water treatment personnel to insure that these requirements are met, in full compliance with the law and the charge of local officials under whose jurisdiction these supplies fall. It is the duty of duly elected or appointed officials to oversee these personnel and insuring that the water systems under their jurisdiction are in full compliance with all local, state, and federal water quality standards.

B. The 2006 NRC Committee on Fluoride in Drinking Water was charged to evaluate the adequacy of the EPA primary and secondary MCLs for fluoride, 4.0 ppm and 2.0 ppm respectively, to protect against adverse effects. The final recommendation of this Committee was for the primary MCL to be lowered from 4.0 ppm. The sole reasons cited by the Committee for this recommendation were the risk of severe dental fluorosis, bone fracture, and skeletal fluorosis, with chronic ingestion of water with a fluoride content of 4.0 ppm or greater. Nothing else. Had this Committee deemed there to be any concerns with endocrine, thyroid, or anything else with fluoride at this level, it would have been responsible for stating so and recommending accordingly. It did not.

Additionally, the NRC Committee made no recommendation to lower the secondary MCL of 2.0 ppm. Water is fluoridated at 0.7 ppm. one third the level which the 2006 NRC Committee on Fluoride in Drinking Water made no recommendation to lower. (5)

In March of 2013, Dr. John Doull, Chair of the 2006 NRC Committee on Fluoride in Drinking Water made the following statement:

"I do not believe there is any valid, scientific reason for fearing adverse health conditions from the consumption of water fluoridated at the optimal level"

---John Doull, MD, PhD, Chair of the National Academy of Sciences, National Research Council 2006 Committee Report on Fluoride in Drinking Water (6)

C. It is not the responsibility of the department of health, or anyone else, to inform consumers of unsubstantiated claims put forth by fluoridation opponents, which have no foundation in the peer-reviewed science.

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8. **Question**: The National Research Council 2006 report on fluorides says that kidney patients and diabetics are "susceptible populations" that are particularly vulnerable to harm from ingested fluorides. This statement was made with regard to whether the fluoridated water is a 1 ppm concentration or up to 4 ppm concentration. If Selmer continues to fluoridate its water, what specific steps will the Tennessee Department of Health take to ensure that all kidney patients and diabetics in our area are made aware of this information? How will the Tennessee Department of Health pay for these steps?

Reply:
A. See item 7-B above in regard to the findings of the 2006 NRC Committee.

B. There is no valid, peer-reviewed scientific evidence of any adverse effects on the kidneys or any other bodily system from optimally fluoridated water. The 2006 NRC Committee would have stated such concern as a reason for its final recommendation if it had deemed there to be such concern with fluoride at the level of 4.0 mg/liter or below. It did not.

Ludlow, et al. 2007 found:

"Because the kidneys are constantly exposed to various fluoride concentrations, any health effects caused by fluoride would likely manifest themselves in kidney cells. However, several large community-based studies of people with long-term exposure to drinking water with fluoride concentrations up to 8 ppm have failed to show an increase in kidney disease."

"People exposed to optimally fluoridated water will consume 1.5mg of fluoride per day. Available studies found no difference in kidney function between people drinking optimally fluoridated and non-fluoridated water. There is discrepant information in studies relating to the potential negative effects of consuming water with greater than 2.0 ppm of fluoride."

"Available literature indicated that impaired kidney function results in changes in fluoride retention and distribution in the body. People with kidney impairment showed a decreased urine fluoride and increased serum and bone fluoride correlated with degree of impairment; however, there was no consistent evidence that the retention of fluoride in people with stage four or stage five CKD, consuming optimally fluoridated water, resulted in negative health consequences." (7)

C. As there are no health risks to kidney patients and diabetics from optimally fluoridated water, there is nothing of which the Tennessee Department of Health needs to inform these patients, nor of any cost in so doing.

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9. ***Question****: Since fluorides accumulate over time in the body's pineal gland)per the National Research Council report on fluorides), and since the report indicated that "the elderly are another population of concern because of their long-term accumulation of fluoride into their bones" a) other than by painful bone biopsy or indirect indicators such as blood or urine fluoride levels, how can a Selmer-area resident learn the specific amount of fluoride that has accumulated over time in his or her bones or joints, and b) who is to pay for costs related to any method you suggest*.

Reply:

A. Out-of-context quotes plucked from the 2006 NRC Report on Fluoride in Drinking Water do not provide an honest or accurate representation of the findings of this committee. If this committee had any concerns with accumulation of fluoride in the pineal gland resultant of consuming water with a fluoride content of 4.0 mg/liter or less in addition to fluoride from all other normal sources, it would have been responsible for so stating and recommending accordingly. It did not.

B. There is no valid, peer-reviewed scientific evidence of any adverse effects from accumulation of fluoride resultant of consuming optimally fluoridated water. There is therefore no need to subject the elderly, or anyone else of any age, to tests determining the "amount of fluoride accumulated over time in his or her bones or joints."

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10. ***Question****: Please identify any subset of the population that the health departments determined does not have readily-available and affordable access to beverages, such as fruit juice from concentrate, juices containing white grape juice, sodas from leading vendors such as Coca-Cola and Pepsi, teas in powder, bag or prepackaged form; processed foods such as cereals, mechanically de-boned chicken, processed lunch meats, prepared-to-eat fish products; product such as head lettuce, leaf lettuce, tomatoes, tomato paste, potties, cabbage, grapes, raisins, and citrus fruits; and/or any other combination of prepare foods, beverages and produce that may contain significant concentrations of fluoride. For any subset of the population in Selmer or McNair County identified, please submit the study, and the number of individuals represented as not having access to these foods.*

Reply:
A. Relying on fluoride obtained from foods and beverages, in lieu of water fluoridation, is not an acceptable substitution. These foods and beverages do not provide the consistent bathing of the teeth in a low concentration of fluoride all throughout the day, as does optimally fluoridated water, and are not as consistent in the amount of fluoride provided to the dentition, as is optimally fluoridated water.

The US CDC has estimated that of the total fluoride intake from all sources, including those noted in this question, 75% is from water and beverages. Given that hundreds of millions of individuals of all ages have chronically consumed optimally fluoridated water during the 72 year history of water fluoridation, with no proven adverse effects, there is no reason to doubt the validity of this estimation. (3)

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11. ***Question****: If, as purported, there are no labeling requirements, and if in fact commercially available foods do not routinely divulge the fluid content of readily-available processed foods, beverages, and produce, how does the health department contend that consumers are able to evaluate their exposures in order to increase or reduce their fluoride consumption*?

Reply:
A. The US CDC has estimated that of the total fluoride intake from all sources, including those noted in this question, 75% is from water and beverages. Given that hundreds of millions of individuals of all ages have chronically consumed optimally fluoridated water during the 72 year history of water fluoridation, with no proven adverse effects, there is no reason to doubt the validity of this estimation. (3)

B. It is the responsibility of each individual or his/her parent or guardian to understand the contents of any foods and beverages consumed. When the maximum amount of a substance that can be ingested falls below the threshold of adverse effects for that substance, then precise amounts are not of concern in regard to adverse effects.

Given that there are no proven adverse effects of optimally fluoridated water in combination with all other normal sources of fluoride intake, it is not the responsibility of the health department, or anyone else to determine the precise amount of fluoride intake for each individual, any more than it is the responsibility

of the health department to determine the precise amount of chlorine intake, or that of the myriad other substances routinely added to public water supplies. See #1 above.

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*12. **Question**: Does the Tennessee Department of Health consider the American Dental Association a reliable source for determining recommended dosages for certain children's ages for supplemented fluoride in non-fluoridated communities, as represented by the CDC's reference to the ADA's fluoride supplement schedule? If so, upon what authority from Congress does the American Dental association merit the right to establish dosage schedules for prescription drugs?*

Reply:
While prescription drugs have no relevance to water fluoridation, as a matter of information, dentists and MDs are licensed and authorized by state licensure and the United States Drug Enforcement Agency to prescribe the full range of drugs, medications, and other substances requiring such prescription. This authorization is based upon the recognition of these entities that the education, training, experience, and knowledge of dentists and MDs are sufficiently comprehensive to allow for proper understanding of the effects of substances within the body, and with each other.

The American Dental Association is one of the foremost authorities in the world, and the foremost authority in the United States, in regard to fluoride supplementation. It does not require any Congressional approval to provide authoritative information on fluoride and fluoridation. In considering fluoride and oral health, it would be irresponsible to not obtain the recommendations of the ADA. The ADA's recommendations are based upon the most current peer-reviewed scientific evidence and research available. That the United States Centers for Disease Control and Prevention defers to the ADA in regard to fluoride supplement schedule, is clear evidence of the confidence of the US government in the reliability of the American Dental Association recommendations in regard to fluoride. Given that there have been no proven adverse effects of fluoride at the level recommended by the ADA, there is no reason to doubt the validity of its recommendations.

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*13. **Question**: Based on the estimates of the full range of water consumption by age in your answer in #2 above, please determine the amount of excess fluoride consumed by each children's age range drinking the "optimally" fluoridated tap water, in comparison to the ADA supplement schedule of what a health professional would be able to prescribe for the same age range.*

Reply:
The only consequence of children exceeding the NAM (formerly known as the Institute of Medicine) established daily upper limit of fluoride intake in association with optimally fluoridated water is mild to very mild dental fluorosis in the teeth developing years of 0-8. Mild to very mild dental fluorosis is a barely detectable effect which causes no adversity on cosmetics, form, function, or health of teeth. As peer-reviewed science has demonstrated mildly fluorosed teeth to be more decay resistant, many consider this effect to not even be undesirable, much less adverse. (2)

There is no valid, peer-reviewed scientific evidence of any adverse effects on children from optimally fluoridated water.

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14. ***Question:*** *What is the EPA's Integrated Risk Information System (IRIS) Reference Dose (RfD) for fluoride?*

Reply:
The RfD for fluoride is irrelevant to water fluoridation. This public health initiative was not meant, or promoted, to be a remedy for a nutritional deficiency, nor does it provide fluoride in a dose that even nears the threshold of toxicity, even in conjunction with all other normal sources of fluoride intake. It is the simple adjustment of the existing level of a naturally occurring mineral in drinking water supplies to that concentration at which maximum benefit is obtained by those ingesting that water, with no adverse effects. Humans have been ingesting fluoride in their drinking water since the beginning of time. Fluoridation simply insures that maximum benefit is received when so doing.

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15. ***Question****: Please provide a determination of how many, or what percentage, of children in Selmer will exceed the RfD if their infant formula is mixed with fluoridated tap water. Please identify the source of your information.*

Reply:
Due to the existing fluoride content of powdered infant formula, the use of optimally fluoridated water to reconstitute this powder chances mild to very mild dental fluorosis in the developing teeth of the infant. This level of dental fluorosis is barely detectable and causes no adverse effect on cosmetics, form, function, or health of teeth. For those parents who are concerned with mild to very mild dental fluorosis, in spite of the increased resistance of these teeth to decay, the CDC and the ADA have suggested that they use non-fluoridated bottled water to reconstitute powdered formula, or simply use pre-mixed formula, most, if not all, of which is made with low fluoride content water. (8)

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16. ***Question****: Please provide a determination of how many or what percentage of children in Selmer will exceed the RfD for fluoride when considering the full range of water consumption and fluoride from sources other than water. Please identify the source of your information.*

Reply:
There is no valid, peer-reviewed scientific evidence of any adverse effect on children resultant of chronic consumption of optimally fluoridated water in conjunction with all other normal sources of fluoride intake. Seventy two years of experience, hundreds of millions having chronically consumed optimally fluoridated water during that time, with no adverse effects……clearly supports this fact.

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17. ***Question****: As in your prepared presentation to our Board you continually made reference to the American Dental Association, does the Tennessee Department of Health recognize any specific authority that the American Dental Association may possess to determine the safety or effectiveness of a specific product intended to treat or prevent disease? If Yes, please so state*.

Reply:
The American Dental Association is one of the most highly respected healthcare organizations in the world. On matters of oral health, the ADA is a fully recognized authority. In the US, it is the recognized authority on such matters. The information provided by the ADA is based on the latest research and the latest, fully verifiable peer-reviewed scientific evidence. Neither the ADA, nor any other source requires "authorization" to provide expert input on matters of oral health when asked to do so.

A more pertinent question would be as to what are the qualifications for antifluoridationist groups to provide credible recommendations on fluoridation, or any other healthcare issue.

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18. ***Question****: Does the American Dental Association's claim of safety and effectiveness, or the Tennessee Department of Health's claim of safety and effectiveness, extend to the specific American Development Corporation hydrofluorosilic acid product as added to the Selmer water supply? If so, please state Yes.*

Reply:
A. That optimally fluoridated water is safe and effective is a fact fully supported by volumes of peer-reviewed science. A list of 10 of the countless studies clearly demonstrating the effectiveness of fluoridation is provided at the end of this document. This list is current through 2016. The ADA stays on top of this science, and is constantly aware of the most current information on fluoridation available. This is the basis of the ADA's support for fluoridation.

B. Hydrofluorosilic acid is merely a vehicle which delivers additional fluoride ions into water supplies. HFA does not reach the tap. HFA is not ingested. There are no concerns with safety and effectiveness of a substance which does not exist at the tap, and is not ingested.

All water at the tap, including that in Selmer, must meet the EPA mandated stringent quality certification requirements under Standard 60 of NSF International…..regardless of the source of raw, undiluted substances routinely added to water systems at the treatment plant.

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19. ***Question****: As this issue is often contentious and confusing in terms, please do not confuse this request as a request for epidemiological studies for which the study does not question whether the*

subjects drank the tap water, the volume of water the subjects drank, nor the subjects' exposure to fluoride from other sources—-in other words, without isolating for quantitative exposure to the substance to determine confidence in its causative effect.

Please provide a true and complete copy of any chronic toxicological studies on the health and behavioral effect of continues consumption of hydrofluorosilic acid, the actual substance added to Selmer's water supply

If the Tennessee Department of Health is able to provide a specific toxicological study on the long term health effects of hydrofluorosilic acid, please identify the dated peer-reviewed journal in which the study was published, from what entity the actual chemical was sourced, and a list of any contaminants that were included.

If you cannot provide a true and complete copy, please state that the Tennessee Department of Health cannot produce a chronic toxicological study on the health and behavioral effects of hydrofluorosilic acid.

Reply:
There is nothing contentious or confusing about water fluoridation, except amongst those who rely upon false claims and misinformation from antifluoridationist groups, in lieu of properly educating themselves on the issue from reliable, respected sources of accurate information.

A. Hydrofluorosilic acid does not exist at the tap in fluoridated water. It is not ingested. There are no toxicological studies required or needed for a substance that is not ingested and has no contact with consumers. Therefore this whole question is of no relevance. (9)

B. A detailed list of the contents of fluoridated water at the tap, including precise amounts of any contaminants detected, and the EPA mandated maximum allowable level for each, may be found on the "Fact Sheet on Fluoridation Substances" located on the website of NSF International:

http://www.nsf.org/newsroom/nsf-fact-sheet-on-fluoridation-chemicals

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20. ***Question****: Is it true that fluorides are more effective in preventing cavities on the flat surfaces of the teeth where only approximately 15% of cavities occur, than in the pits and grooves of the back molars where approximately 85% of cavities occur?*

Reply:
There are 5 surfaces on each molar. Four are smooth ("flat") surfaces. Restoring smooth surfaces in between teeth is the most involved treatment and most often requires inclusion of the pit and fissure occlusal surfaces. In protecting the smooth surfaces, fluoridation prevents decay in the most difficult

areas of the teeth, leaving only the far easier to restore pit and fissure occlusal surfaces, as the less protected. Restoration of occlusal surfaces does not require involvement of any other surfaces.

As Horowitz stated:

"Because fluoridation protects smooth tooth surfaces best, including approximal surfaces of posterior teeth, proportionally fewer complex, multisurface fillings are placed in optimally fluoridated communities than in areas with fluoride-deficient water. Pits and *fissures* of teeth also receive protection from consumption of fluoridated water, but to a lesser extent. Hence, caries in pits and fissures persists as the predominant type of decay in fluoridated communities. These cavities are easy to detect and, because they are generally easier to restore than approximal cavities, they require less of a dentist's time." (10)

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*21. **Question**: If a chemical manufacturer of hydrofluorosilic acid will not declare that their specific product, inclusive of any contaminants, is effective at reducing the incidence of tooth decay ingested in dilution amounts consistent with fluoridation goal of 0.7 to 1.2 milligrams of fluoride ion per liter, and safe for the full range of expected human consumption at these dilution ranges, including for infants, children, the elderly, and and other populations afforded equal protection, as intended by our Town's decision to add the product to the public drinking water, will the Tennessee Department of Health endorse its addition to the public water supply? If so, please state Yes. If not, please state No*.

Reply:
Hydrofluorosilic acid does not exist at the tap in fluoridated water. It is not ingested. Therefore, this question is of no relevance to water fluoridation.

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*22. **Question**: If a chemical supplier of hydrofluorosilic acid will not make such a claim for their specific product, will the Tennessee Department of Health make such a claim, and indemnify the chemical supplier and our water system against the occurrence of adverse effects or claims of harm?*

Reply:
Hydrofluorosilic acid does not exist at the tap in fluoridated water. It is not ingested. Therefore, this question is of no relevance to water fluoridation.

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*23. **Question**: If a chemical manufacturer of hydrofluorosilic acid does not fulfill the published requirements for all direct water additives for manufacturer's certification to meet ANSI/NSF Standard 60 as Tennessee laws, regulations, or codes require, does the Tennessee Department of Health support or endorse that specific product's addition to Selmer's public water supply? If so, please state Yes. If not please state No*.

Reply:
If a chemical manufacturer does not meet all certification requirements under local, state, and federal statutes, it is in violation of the law, and will be prosecuted by the appropriate authorities. The

manufacturers of HFA are in complete compliance with these laws and regulations. Otherwise there products would not be allowed in public water systems.

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*24. **Question**: As the cover story of the July 2000 Journal of the American Dental Association (JADA) clarifies that even if tooth enamel were to contain as much as 1000 parts per million fluoride as a result of systemic ingestion it would not be any more protective acid dissolution (decay) than if the tooth enamel contained its normal 20 parts per million, or 100 parts per million as it is found in fluoridated communities or with subjects that take fluoride supplements, can the Tennessee Department of Health produce any peer-reviewed physiological studies that refute this finding, and show physiologically that the fluoride content of the enamel from systemic ingestion is directly correlated to being more protective of acid dissolution?*

If yes, please identify and produce a copy of the peer-reviewed journal or journalist which the physiological study or studies were published after the appearance of the JADA article, and the corresponding response or responses from the author of the July 2000 article.

If the department cannot produce a specific physiological study (not review), as opposed to the non-qualified epidemiological studies referred to above, please No.

Reply:
The JADA cover story to which is referred was:

The Science and Practice of Caries Prevention
John D.B. Featherstone, M.SC., PH.D.

Featherstone concluded fluoride benefit to be primarily from topical application, rather than from systemic incorporation into the tooth structure. This does not preclude the benefit of systemic fluoride, nor did Featherstone indicate as such. A large part of the topical activity of fluoride comes from systemic incorporation of fluoride into the saliva. This in turns, results in a consistent bathing of the teeth in a low concentration of fluoride all throughout the day. In addition, systemic fluoride which becomes incorporated into dental plaque also keeps a low level of fluoride in contact with the teeth all throughout the day. Featherstone did not dispute the value of optimally fluoridated water, and demonstrated its value in providing a significant amount of dental decay prevention.

"In summary, fluoride present in the water phase at low levels among the enamel or dentin crystals adsorbs to these crystal surfaces and can markedly inhibit dissolution of tooth mineral by acid. Fluoride that acts in this way comes from the plaque fluid via topical sources such as drinking water and fluoride products. Fluoride incorporated during tooth development is insufficient to play a significant role in caries protection. Fluoride is needed regularly throughout life to protect teeth against caries."

Additionally, while Featherstone believed fluoride incorporated into developing teeth does not play a significant role in dental decay, there is peer-reviewed evidence that systemic fluoride incorporated into developing teeth, does, indeed provide increased resistance of those teeth to decay. Dental fluorosis is an effect caused by the action of systemic fluoride on developing teeth. Iida and Kumar demonstrated that mildly fluorosed teeth are more resistant to dental decay. This is clear demonstration of the systemic action of fluoride in the prevention of dental decay. (2)

Iida and Kumar found:

"This study's findings suggest that molars with fluorosis are more resistant to caries than are molars without fluorosis"

Additionally:

Buzalaf found:

"Evidence also supports fluoride's systemic mechanism of caries inhibition in pit and fissure surfaces of permanent first molars when it is incorporated into these teeth pre-eruptively." (11)

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25. ***Question****: Please identify the entity that the Tennessee Department of Health asserts bears the burden of cost for installation and maintenance of any fluoride removal system for a consumer identified in government scientific literature as unusually susceptible to fluorides's adverse health effects, i.e., the consumer, and entity promoting or endorsing fluoridation, the local dental society, the American Dental Association, an insurance company, the water system operator, the Tennessee Department of Health, etc.*

Please identify under what conditions any entity listed above may be held accountable for these costs.

Reply:
As there is no valid, peer-reviewed scientific evidence of any adverse effects of fluoride at the optimal level at which water is fluoridated, there is no scientifically valid reason for anyone to remove fluoride below the concentration of 2.0 mg/liter, from any water supply. Any who seek to remove fluoride from the water in their homes is entirely free to do so. However, any costs in so doing are the responsibility of that person, not of society.

Given that there is no need to remove fluoride from drinking water supplies, there is no scenario which comes to mind in which any entity other than the person who personally prefers non-fluoridated water, to be "held accountable" for any costs to remove fluoride from the tap water in his/her dwelling.

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26. ***Question****: Please identify the entity that the Tennessee Department of Health asserts bears the burden of determining the "objectionable" nature of any dental fluorosis, i.e. the parent, the child, the attending dentist, the local dental society, the American Dental Association, an insurance company, the child at age of maturity, the water system operator, the Tennessee Department of Health, etc.*

Reply:
Any concerns with the esthetics of teeth are entirely up to the patient or his/her legal guardian. As the only dental fluorosis in any manner attributable to optimally fluoridated water, is the barely detectable mild to very mild, concerns with esthetics is a moot point in regard to water fluoridation.

The true concerns about which fluoridation opponents should be aware are the lifetimes of extreme pain, debilitation, black discoloration and loss of teeth, development of serious medical conditions, life-threatening infection, and potentially death, which can occur from but one untreated cavity in one tooth……cavities of which can be, and are, prevented by water fluoridation.

Are fluoridation opponents willing to guarantee the lifetimes of massive medical, hospital, and dental expenses as a direct result of untreated dental infection, the prevention of which these opponents have done their best to undermine with false claims and misinformation? In 2012, a 12 year old African-American child died as a direct result of a brain infection arising from one untreated cavity in one tooth. The tragedy of this death aside, the medical, hospital, and dental costs of the failed attempt to save his life, were in excess of $250,000. Presumably, some, if not all, of this expense was borne by taxpayer funded programs such as Medicaid. And this was but for one individual.

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*27. **Question**: CDC data (MMWR, Aug 26, 2005) show that approximately 2-4% of citizens experience permanent and costly-to-repair moderate and severe dental fluorosis teeth damage (staining and pitting) from fluorides. For citizens with this teeth damage who do not wish to live the balance of their lives with the disfigurement, but who do not have funds to pay for teeth veneers or other teeth repair, who does the Tennessee Department of Health say should pay for their teeth repair work: i.e., the parent, the child, the attending dentist, the local dental society, the American Dental Association, an insurance company, the child at age of maturity, the water system operator, the Tennessee Department of Health, etc.*

Reply:
The only dental fluorosis which may be attributable to optimally fluoridated water is mild to very mild, a barely detectable effect which causes no adverse effect on cosmetics, form, function, or health of teeth. As peer-reviewed science has demonstrated mildly fluorosed teeth to be more decay resistant, many consider this effect to not even be undesirable, much less adverse, As mild dental fluorosis requires no treatment, there is no cost to be borne by anyone for so doing.

Moderate to severe dental fluorosis is caused by improper swallowing of toothpaste, or exposure to abnormally high levels of environmental or well-water fluoride during the teeth developing years of 0-8. The rarity of this level of dental fluorosis in the 74.5% fluoridated United States, provides clear demonstration that optimally fluoridated water is not a factor. For those chronically exposed to the high levels of fluoride necessary to cause moderate/severe dental fluorosis, removal of a minuscule 0.7 mg/liter fluoride from the water, will not prevent this from occurring.

Yet once again, the more pertinent question is whether fluoridation opponents are prepared to pay the enormous lifetime medical, hospital, and dental costs associated with untreated dental decay which can be, and is, prevented by the water fluoridation they seek to deny all citizens.

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*28. **Question**: What specific percentage of citizens experiencing a) mild, b) moderate, and c) severe dental fluorosis would the Tennessee Department of Health consider to be an acceptable upper limit*

percentage of persons with each of these conditions both in Selmer or any other given city? What we are looking for here is not a generalized statement that reducing dental fluorosis is desirable and a description of methods to hopefully reduce the amount occurring, but rather actual, specific numerical percentages for acceptable upper limit amounts and a justification as to how these numbers were attained.

Reply:
The only dental fluorosis which may, in any manner, be attributable to to optimally fluoridated water is mild to very mild, a barely detectable effect which causes no adversity on cosmetics, form, function, or health of teeth. As peer-reviewed science has demonstrated mildly fluorosed teeth to be more decay resistant, many consider this effect to not even be undesirable, much less adverse.

If fluoridation opponents are aware of areas where there is chronic exposure to the abnormally high levels of fluoride required to cause moderate/severe dental fluorosis, they should report this to the proper authorities. It is irrelevant to water fluoridation.

In 2014, Onoriobe, Rozier, et al found that dental fluorosis had no negative effect on Oral Health Related Quality of Life (OHRQoL) perceptions, while the presence of dental caries had a significant negative effect.

"No associations between fluorosis and any OHRQoL scales met statistical or MID thresholds. The difference (5.8 points) in unadjusted mean ECOHIS scores for the no-caries and moderate-to-high caries groups exceeded the MID estimate (2.7 points) for that scale." (12)

The more pertinent question is what percentage of children who suffer the lifetime devastating effects of untreated dental infection, do opponents deem to be acceptable?

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*29. **Question**: Should individuals with moderate or severe dental fluorosis be personally willing to accept these conditions as an acceptable side effect for the public as a whole to continue use of fluorides for cavity reduction*?

Reply:
As moderate/severe dental fluorosis is not attributable to optimally fluoridated water, this question is of no relevance.

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*30. **Question**: Please identify the estimated current cost for a dental veneer intended to repair "objectionable" dental fluorosis, the length of service that the dental industry expects a veneer to*

provide, and the estimated number of replacements that an individual receiving a veneer should expect over a lifetime.

Reply:
A. There is no such thing as a "dental industry". There is simply the dental healthcare profession.

B. The only dental fluorosis which may be attributable to optimally fluoridated water is mild to very mild, a barely detectable effect which causes no adverse effect on cosmetics, form, function, or health of teeth. Mild dental fluorosis requires no treatment.

Untreated dental decay, on the other hand, frequently requires expensive decay removal, restorative foundations, crowns, and root canals, if the teeth can be saved. The initial cost for saving one such tooth destroyed by dental decay that can be, and is, prevented by water fluoridation, can easily be $4000 to $5000. If the tooth cannot be saved and requires extraction, the cost to replace it can be far more than the cost to save it.

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*31. **Question**: Is the Tennessee Department of Health willing to openly publish photos of mild, moderate, and severe dental fluorosis, along with the pro's and con's of use and ingestion of fluorides, to enable citizens with these conditions to judge the risks as well as the benefit of fluorides and fluoridation for themselves.*

Reply:
A. The only dental fluorosis which may be attributable to optimally fluoridated water is mild to very mild, a barely detectable effect which causes no adverse effect on cosmetics, form, function, or health of teeth. Examples of mild dental fluorosis from the American Dental Association are below:

American Dental Association
http://www.ada.org/en/member-center/oral-health-topics/fluorosis

B. There are no risks to ingestion of optimally fluoridated water.

C. There are no cons to water fluoridation.

32. ***Question****: Does CDC's statement that every dollar spent on fluoridation saves $38 dollars in dental repair work factor in the costs of repair of teeth for persons with dental fluorosis.*

Reply:
The only dental fluorosis which may, in any manner, be attributable to optimally fluoridated water is mild to very mild, a barely detectable effect which causes no adverse effect on cosmetics, form, function, or health of teeth. There is no treatment necessary for mild dental fluorosis. There is therefore no cost involved.

A list of peer-reviewed studies demonstrating the cost-effectiveness of fluoridation may be found at the end of this document.

33. ***Question****: Will the Tennessee Department of Health indemnify the City against any adverse health effects or claims of harm for which the Tennessee Department of Health has assured our Board will not occur?*

Reply:
There are no adverse effects of optimally fluoridated water. Seventy two years experience, hundreds of millions having chronically ingested optimally fluoridated water during this time, with no proven adverse effects clearly demonstrates the validity of this fact.

Questions "from our black community"

1) ***Question****: The Tennessee Department of Health says that fluorides in toothpaste and water supplements are safe, but we've learned that the Centers for Disease Control has information that shows that blacks have disproportionate amounts of teeth staining and pitting from fluorides called dental fluorosis and that we particularly have significantly more moderate and severe dental fluorosis. Why hasn't the Department of Health shared this information with the black community and also showed pictures of the various types of dental fluorosis to the black community?*

Reply:
A. The goal of public health is to protect the health of the public. It is beyond the scope and ability of any Health Department, state or local, to provide information to everyone, at all times, about every possible effect or disorder. Information on dental fluorosis is readily available from the American Dental Association, the US CDC, the American Academy of Pediatrics, the World Health Organization, and many other respected sources.

B. The only dental fluorosis which may in any manner be attributable to optimally fluoridated water is mild to very mild, a barely detectable effect which causes no adversity on cosmetics, form, function, or health of teeth. Any who may have moderate/severe dental fluorosis have been chronically exposed to abnormally high levels of environmental or well-water fluoride during their teeth developing years of 0-8. Such exposure is rare in the US. However, any who believe they have been exposed to such high levels of fluoride should report this to their local health authorities. Moderate/severe dental fluorosis has no relevance to water fluoridation.

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2) ***Question****: If blacks have dental fluorosis caused by fluorides, are we expected to simply "live with it" and accept it*?

Reply:
A. See question #1 in this section.

B. That this question reads "if blacks have dental fluorosis…." is indicative of the fact that opponents who wrote these questions cannot produce anyone who does indeed exhibit moderate/severe dental fluorosis from ingestion of optimally fluoridated water.

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3). ***Question****: Why hasn't the Tennessee Department of Health told the black community about CDC's recommendation that parents might want to consider using unfluoridated water for mixing infant milk formula*?

Reply:
A. That are any number of things of which state health departments are simply not able to inform each and every citizen. Questions about prenatal care and subsequent infant care are answered by the OB/Gyn doctors, pediatricians, and/or local health department clinics which expectant and new mothers see on a regular basis. If there are concerns about the information, recommendations, and treatment provided by these healthcare entities, this should be taken up with those entities, or with appropriate oversight boards.

B. In regard to infant formula, due to the existing fluoride content of powdered infant formulas, the use of optimally fluoridated water to reconstitute it may chance mild to very mild dental fluorosis in the developing teeth of the infant. For those parents who are concerned with even mild dental fluorosis, in spite of the greater resistance of these teeth to decay, the CDC and the ADA have suggested they use non-fluoridated bottled water to reconstitute this powder, or simply use pre-mixed formula, most, if not all, of which is made with low fluoride content water. (8)

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4) ***Question****: What steps will the Tennessee Department of Health take to ensure that black families with babies and caregivers of infants and babies effectively hear and understand the news about fluoridated water and milk formula?*

Reply:
Information on proper care of infants is provided by the local health departments, pediatricians, or clinics which new mothers see on a regular basis.

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5) ***Question****: If a black family doesn't have money to filter household water remove fluorides for baby milk or for family use, who can we look to for funds for bottled water or a filtration system to remove fluoride from water?*

Reply:
Optimal level fluoride in water is colorless, tasteless, odorless, and causes no adverse effects. Unless the fluoride content of a water supply exceeds 2.0 mg/liter, there is no scientific reason for anyone to even consider filtering fluoride out of water. Those who desire to filter, for whatever reason, are certainly free to do so. However, any costs involved in satisfying personal preferences in that manner are the responsibility of the individuals, not of society.

It is unfortunate that people listen to the unsubstantiated and false claims of antifluoridationists to the point of going out and wasting money on unnecessary filtration systems. However, that is one consequence of placing trust in uninformed antifluoridationist groups, in lieu of heeding the advice and recommendations of respected science and healthcare.

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*6) **Question**: Since blacks have disproportionately ore diabetes and kidney disease, and kidney disease and diabetes are issues of real concern to the black community, why hasn't the Tennessee Department of Health told us the National Kidney Foundation says that kidney patients should be notified of the potential risk of fluoride exposures, and that the National Research Council has designated kidney patients and diabetics as susceptible groups that are particularly more vulnerable to harm from fluorides?*

Reply:
A. There is no valid, peer-reviewed scientific evidence of any adverse effects on the kidneys, or on those with diabetes, from optimally fluoridated water. In fact, just the opposite has been demonstrated in a 2016 study by Fluegge, in which he found that communities fluoridated with hydrofluorosilic acid have less incidence of diabetes. Therefore, according to this study, HFA fluoridated systems are protective against diabetes, not causative of it.

From Fluegge:

"The findings suggest that a 1 mg increase in the county mean added fluoride significantly positively predicts a 0.23 per 1,000 person increase in age-adjusted diabetes incidence ($P < 0.001$), and a 0.17% increase in age-adjusted diabetes prevalence percent ($P < 0.001$), while natural fluoride concentration is significantly protective. For counties using fluorosilicic acid as the chemical additive, both outcomes were lower: by 0.45 per 1,000 persons ($P < 0.001$) and 0.33% ($P < 0.001$), respectively." (13)

B. The 2006 NRC Committee on Fluoride in Drinking Water exhaustively reviewed the relevant scientific literature on fluoride up to that point. It then reported what was in that literature, and made a final recommendation based on concerns it believed valid in regard to fluoride at the level of 4.0 mg/liter. This committee made no mention of concerns with kidneys or diabetes in its final recommendation to lower the EPA primary MCL of fluorides from 4.0 mg/liter. If the committee had deemed there to be any concern with kidneys or diabetes at that level of fluoride, it would have been responsible for so stating and recommending accordingly. It did not. (5)

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*7) **Question**: What steps will the Tennessee Department of Health take to ensure that black kidney patients and diabetics find out that the National Research Council says that kidney patients and diabetics are particularly susceptible to harm from ingested fluorides?*

Reply:
A. The 2006 NRC Committee did not "say" this. It reported that this was in the scientific literature. The fact that there was no mention of kidney patients and diabetics as a reason for the final recommendation, is clear demonstration that this committee did not deem this to be of concern with fluoride at the level of 4.0 mg/liter or below in water.

B. There is no valid, peer-reviewed scientific evidence "that black kidney patients and diabetics are particularly susceptible to harm from ingested fluorides." Ludlow demonstrated just the opposite. (7)

C. See #6 above in regard to the 2006 NRC Committee.

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8) ***Question****: Does the Tennessee Department of Health believe it has a moral responsibility to actively share all this information with the black community?*

Reply*:*
Departments of Health rely upon valid, peer-reviewed science in making it health assessments and recommendations. These entities have procedures in place to notify the public of any necessary health information These entities have no responsibility to disseminate unsubstantiated, erroneous claims made by antifluoridationists.

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9) ***Question****:Why has the Minority Health Department of the Tennessee Department of Health not shared the information about dental fluorosis and kidney patient and diabetic fluoride susceptibility with the TN black community?*

Reply:
It is not the responsibility of any public health entity, or anyone else, to notify everyone of each and every false and unsubstantiated claim made by antifluoridationists. State and local health departments have ample information available on fluoridation and dental fluorosis readily available to anyone.

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10) ***Question****: We have learned that the National Research Council says senior citizens are more at risk from fluorides because of long term accumulation of fluorides in their bones. Why hasn't the Minority Health Department of the Tennessee Department of Health shared this with black seniors? How will this information be shared with black seniors so they actually and effectively hear it?*

Reply:
There is no valid, peer-reviewed scientific evidence of any adverse effects of optimal level fluoride resultant of "long term accumulation of fluorides in their bones". See #6 above for an explanation of what that Committee deemed of any concern with fluoride at the level of 4.0 mg/liter or below.

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11) ***Question****: Does the Tennessee Department of Health believe that black and other minority families in our area who are economically disadvantaged, or who have limited computer skills, or who have limited English ability, have found, read, and fully understood the information and ramifications of CDC's statement inside its website that families with babies may wish to consider using unfluoridated water for infant formula?*

Reply:
See item #4 above.

References

(1) Dietary Reference Intakes (DRIs): Tolerable Upper Intake Levels, Vitamins

Food and Nutrition Board, Institute of Medicine, National Academies

http://www.nationalacademies.org/hmd/~/media/Files/Activity%20Files/Nutrition/DRI-Tables/4_%20UL%20Values_Vitamins%20and%20Elements.pdf?la=en

(2) The Association Between Enamel Fluorosis and Dental Caries in U.S. Schoolchildren

Hiroko Iida and Jayanth V. Kumar*J Am Dent Assoc* 2009;140;855-862

(3) Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States

MMWR
Recommendations and Reports
August 17, 2001 / 50(RR14);1-42

(4) Contaminant Candidate List (CCL) and Regulatory Determination

Definition of “Contaminant"
https://www.epa.gov/ccl/definition-contaminant

(5) Fluoride in Drinking Water: A Scientific Review of EPA's Standards
Committee on Fluoride in Drinking Water, National Research Council 2006
pp 352

(6) Doull Statement
http://www.ilikemyteeth.org/wp-content/uploads/2013/03/Doull-Email-on-CWF-March-2013.pdf

(7) Ludlow M, Luxton G, Mathew T. Effects of fluoridation of community water supplies
for people with chronic kidney disease. Nephrol Dial Transplant 2007; 22:2763-2767

(8) Community Water Fluoridation

Infant Formula

US CDC

https://www.cdc.gov/fluoridation/faqs/infant-formula.html

(9) Reexamination of Hexafluorosilicate Hydrolysis By F NMR and pH Measurement

William F. Finney, Erin Wilson, Andrew Callender, Michael D. Morris, and LW Beck

Environmental Science and Technology/ Vol 40, No. 8, 2006

(10) Fluorides, Sealants, and dental decay

Herschel Horowitz
Pediatric Dentistry: Volume 4. Number 4

(11) Buzalaf MAR (ed): Fluoride and the Oral Environment. Monogr Oral Sci. Basel, Karger, 2011, vol 22, pp 97–114

(12) Effects of enamel fluorosis and dental caries on quality of life
J Dent Res. 2014 Oct;93(10):972-9
Onoriobe U, Rozier RC, Cantrell J, King RS

(13) J Water Health. 2016 Oct;14(5):864-877.
Community water fluoridation predicts increase in age-adjusted incidence and prevalence of diabetes in 22 states from 2005 and 2010.
Fluegge K1.

Effectiveness Studies

1) 2015

Conclusion
The children living in the well-established fluoridated area had less dental caries and a higher proportion free from disease when compared with the other two areas which were not fluoridated. Fluoridation demonstrated a clear benefit in terms of better oral health for young children.

---The Dental Health of primary school children living in fluoridated, pre-fluoridated and non-fluoridated communities in New South Wales, Australia
Anthony S Blinkhorn, Roy Byun, George Johnson, Pathik Metha, Meredith Kay, and Peter Lewis
BMC Oral Health 2015, 15:9 doi:10.1186/1472-6831-15-9http://www.biomedcentral.com/1472-6831/15/9

2) 2000

RESULTS:
The prevalence of dental caries was inversely related and the prevalence of fluorosis was directly related to the concentration of fluoride in the drinking water. The mean DMFS in the communities with 0.8 to 1.4 ppm fluoride was 53.9 percent to 62.4 percent lower than that in communities with negligible amounts of fluoride. Multivariate analysis showed that water fluoride level was the strongest factor influencing DMFS scores. The prevalence of fluorosis ranged from 1.7 percent to 15.4 percent, and the increase in fluorosis with increasing fluoride exposure was limited entirely to the milder forms.

-----J Public Health Dent. 2000 Summer;60(3):147-53.
The prevalence of dental caries and fluorosis in Japanese communities with up to 1.4 ppm of naturally occurring fluoride.
Tsutsui A, Yagi M, Horowitz AM.
Department of Preventive Dentistry, Fukuoka Dental College, Fukuoka, Japan. tutuia@college.fdcnet.ac.jp

http://www.ncbi.nlm.nih.gov/pubmed/11109211

3) 2000

CONCLUSIONS:
Caries levels are lower among children with fluoridated domestic water supplies. Decay levels are much lower in 2002 than they were in 1984 and in the 1960s. The oral health of the less well off is worse than that of the rest of the population. The prevalence of dental fluorosis is higher amongst children and adolescents with fluoridated water supplies. Comparisons with 1984 data show an increase in the prevalence of fluorosis since that time.

----Community Dent Health. 2004 Mar;21(1):37-44.
Dental caries and enamel fluorosis among the fluoridated and non-fluoridated populations in the Republic of Ireland in 2002.
Whelton H, Crowley E, O'Mullane D, Donaldson M, Kelleher V, Cronin M.
Oral Health Services Research Centre, University Dental School and Hospital, Wilton, Cork, Ireland.

4) 1995

http://www.ncbi.nlm.nih.gov/pubmed/7643331

CONCLUSIONS:
The ingestion of water containing 1 ppm or less fluoride during the time of tooth development may result in dental fluorosis, albeit in its milder forms. However, in these times of numerous products containing fluoride being available, children ingesting water containing 1 ppm fluoride continue to derive caries protection compared to children ingesting water with negligible amounts of fluoride. Thus, the potential for developing a relatively minor unesthetic condition must be weighed against the potential for reducing dental disease.

-----J Public Health Dent. 1995 Spring;55(2):79-84.
Dental fluorosis and caries prevalence in children residing in communities with different levels of fluoride in the water.
Jackson RD, Kelly SA, Katz BP, Hull JR, Stookey GK.
Oral Health Research Institute, Indianapolis, IN 46202-2876, USA.

http://www.ncbi.nlm.nih.gov/pubmed/15074871

5) 2004

Conclusions:
The results of this study support existing work suggesting water fluoridation together with the use of fluoridated dentifrice provides improved caries prevention over the use of fluoridated dentifrice alone. The social gradient between caries and deprivation appears to be lower in the fluoridated population compared to the non-fluoridated population, particularly when considering caries into dentine, demonstrating a reduction in inequalities of oral health for the most deprived individuals in the population.

----The association between social deprivation and the prevalence and severity of dental caries and fluorosis in populations with and without water fluoridation
Michael G McGrady, Roger P Ellwood, [...], and Iain A Pretty

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3543717/

6) 2012

CONCLUSIONS:
Fewer studies have been published recently. More of these have investigated effect at the multi-community, state or even national level. The dmf/DMF index remains the most widely used measure of effect. % CR were lower in recent studies, and the 'halo' effect was discussed frequently. Nevertheless, reductions were still substantial. Statistical control for confounding factors is now routine, although the effect on per cent reductions tended to be small. Further thought is needed about the purpose of evaluation and whether measures of effect and study design are appropriate for that purpose.

-----Community Dent Oral Epidemiol. 2012 Oct;40 Suppl 2:55-64. doi: 10.1111/j.1600-0528.2012.00721.x.
Effectiveness of water fluoridation in caries prevention.
Rugg-Gunn AJ, Do L.

http://www.ncbi.nlm.nih.gov/pubmed/22998306

7) 2012

CONCLUSIONS:
Data showed a significant decrease in dental caries across the entire country, with an average reduction of 25% occurring every 5 years. General trends indicated that a reduction in DMFT index values occurred over time, that a further reduction in DMFT index values occurred when a municipality fluoridated its water supply, and mean DMFT index values were lower in larger than in smaller municipalities.

---Decline in dental caries among 12-year-old children in Brazil, 1980-2005.
-Int Dent J. 2012 Dec;62(6):308-14.
Lauris JR, da Silva Bastos R, de Magalhaes Bastos JR.
Department of Paediatric Dentistry, University of São Paulo, Bauru, São Paulo, Brazil.
http://www.ncbi.nlm.nih.gov/pubmed/23252588

8). 2012

Abstract
The effectiveness of fluoridation has been documented by observational and interventional studies for over 50 years. Data are available from 113 studies in 23 countries. The modal reduction in DMFT values for primary teeth was 40-49% and 50-59% for permanent teeth. The pattern of caries now occurring in fluoride and low-fluoride areas in 15- to 16-year-old children illustrates the impact of water fluoridation on first and second molars.

----Caries Res. 1993;27 Suppl 1:2-8.
Efficacy of preventive agents for dental caries. Systemic fluorides: water fluoridation.
Murray JJ.
Department of Child Dental Health, Dental School, University of Newcastle upon Tyne, UK.
http://www.ncbi.nlm.nih.gov/pubmed/8500120

9) 1993

CONCLUSIONS:
The survey provides further evidence of the effectiveness in reducing dental caries experience up to 16 years of age. The extra intricacies involved in using the Percentage Lifetime Exposure method did not provide much more information when compared to the simpler Estimated Fluoridation Status method.

-----Community Dent Health. 2012 Dec;29(4):293-6.
Caries status in 16 year-olds with varying exposure to water fluoridation in Ireland.
Mullen J, McGaffin J, Farvardin N, Brightman S, Haire C, Freeman R.
Health Service Executive, Sligo, Republic of Ireland.
http://www.ncbi.nlm.nih.gov/pubmed/23488212

10). 2012

CONCLUSIONS:
Children with severe dental caries had statistically significantly lower numbers of lesions if they lived in a fluoridated area. The lower treatment need in such high-risk children has important implications for publicly-funded dental care.

------Community Dent Health. 2013 Mar;30(1):15-8.
Fluoridation and dental caries severity in young children treated under general anaesthesia: an analysis of treatment records in a 10-year case series.
Kamel MS, Thomson WM, Drummond BK.

Cost-Effectiveness

1. For most cities, every $1 invested in water fluoridation saves $38 in dental treatment costs.

------"Cost Savings of Community Water Fluoridation,"
U.S. Centers for Disease Control and
Prevention, accessed on March 14, 2011 at
http://www.cdc.gov/fluoridation/fact_sheets/cost.htm.

2. A Texas study confirmed that the state saved $24 per child, per year in Medicaid expenditures for children because of the cavities that were prevented by drinking
fluoridated water.

------ "Water Fluoridation Costs in Texas: Texas Health Steps (EPSDT-Medicaid),
Department of Oral Health Website (2000),
www.dshs.state.tx.us/dental/pdf/fluoridation.pdf,

3. A 2010 study in New York State found that Medicaid enrollees in less fluoridated counties needed 33 percent more fillings, root canals, and extractions than those in counties where fluoridated water was much more prevalent. As a result, the treatment costs per Medicaid recipient were $23.65 higher for those living in less fluoridated counties.

----------Kumar J.V., Adekugbe O., Melnik T.A., "Geographic Variation in Medicaid Claims for Dental Procedures in New York State: Role of Fluoridation Under Contemporary
Conditions,"
Public Health Reports, (September-October 2010) Vol. 125, No. 5, 647-54.

----------The original figure ($23.63) was corrected in a subsequent edition of this journal and clarified to be $23.65. See: "Letters to the Editor,"
Public Health Reports (November-
December 2010), Vol. 125, 788.

4. Researchers estimated that in 2003 Colorado saved nearly $149 million in unnecessary treatment costs by fluoridating public water supplies—average savings of roughly $61 per person.

------O'Connell J.M. et al., "Costs and savings associated with community water fluoridation programs in Colorado,"
Preventing Chronic Disease (November 2005), accessed on
March 12, 2011 at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1459459/.

5. A 1999 study compared Louisiana parishes (counties) that were fluoridated with those that were not. The study found that low-income children in communities without fluoridated water were three times more likely than those in communities with fluoridated water to need dental treatment in a hospital operating room.

-------Water Fluoridation and Costs of Medicaid Treatment for Dental Decay – Louisiana,
1995-1996,"
Morbidity and Mortality Weekly Report, (U.S. Centers for Disease Control and Prevention), September 3, 1999, accessed on March 11, 2011 at
http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4834a2.htm.

6. By reducing the incidence of decay, fluoridation makes it less likely that toothaches or other serious dental problems will drive people to hospital emergency rooms (ERs)—where treatment costs are high. A 2010 survey of hospitals in Washington State found that dental disorders were the leading reason why uninsured patients visited ERs.

-------Washington State Hospital Association, Emergency Room Use (October 2010) 8-12, http://www.wsha.org/files/127/ERreport.pdf, accessed February 8, 2011.

7. Scientists who testified before Congress in 1995 estimated that national savings from water fluoridation totaled $3.84 billion each

------Michael W. Easley, DDS, MP, "Perspectives on the Science Supporting Florida's Public Health Policy for Community Water Fluoridation,"
Florida Journal of Environmental Health, Vol. 191, Dec. 2005, accessed on March 16, 2011 at http://www.doh.state.fl.us/family/dental/perspectives.pdf.

Organizations Recognizing the Public Health Benefit of Water Fluoridation

Acad Dentistry InterNatl
Acad General Dentistry
Acad for Sports Dentistry
Alzheimer's Assoc
America's Health Insurance Plans
Am Acad Family Physicians
Am Acad Nurse Practitioners
Am Acad Oral and Maxillofacial Pathology
Am Acad Orthopaedic Surgeons
Am Acad Pediatrics
Am Acad Pediatric Dentistry
Am Acad Periodontology
Am Acad Physician Assistants
Am Assoc for Community Dental Programs
Am Assoc for Dental Research
Am Assoc for Health Education
Am Assoc for the Advancement Science
Am Assoc Endodontists
Am Assoc Oral and Maxillofacial Surgeons
Am Assoc Orthodontists
Am Assoc Public Health Dentistry
Am Assoc Women Dentists
Am Cancer Society
Am College Dentists
Am College Physicians / Am Society Internal Medicine
Am College Preventive Medicine
Am College Prosthodontists
Am Council on Science and Health
Am Dental Assistants Assoc
Am Dental Assoc
Am Dental Education Assoc
Am Dental Hygienists' Assoc
Am Dietetic Assoc
Am Federation Labor and Congress of Industrial Orgs
Am Hospital Assoc
Am Legislative Exchange Council
Am Medical Assoc
Am Nurses Assoc
Am Osteopathic Assoc
Am Pharmacists Assoc
Am Public Health Assoc
Am School Health Assoc
Am Society for Clinical Nutrition

Am Society for Nutritional Sciences
Am Student Dental Assoc
Am Water Works Assoc
Assoc for Academic Health Centers
Assoc Am Medical Colleges
Assoc Clinicians for the Underserved
Assoc Maternal & Child Health Programs
Assoc State & Territorial Dental Directors
Assoc State & Territorial Health Officials
Assoc State & Territorial Public Health Nutrition Directors
British Fluoridation Society
Canadian Dental Assoc
Canadian Dental Hygienists Assoc
Canadian Medical Assoc
Canadian Nurses Assoc
Canadian Paediatric Society
Canadian Public Health Assoc
Child Welfare League America
Children's Dental Health Project
Chocolate Manufacturers Assoc
Consumer Federation America
Council State & Territorial Epidemiologists
Delta Dental Plans Assoc
FDI World Dental Federation
Federation Am Hospitals
Hispanic Dental Assoc
Indian Dental Assoc (USA.)
Institute of Medicine
Institute for Science in Medicine
InterNatl Assoc for Dental Research
InterNatl Assoc for Orthodontics
InterNatl College Dentists
March Dimes Birth Defects Found
Natl Assoc Community Health Centers
Natl Assoc County & City Health Officials
Natl Assoc Dental Assistants
Natl Assoc Local Boards Health
Natl Assoc Social Workers
Natl Confectioners Assoc
Natl Council Against Health Fraud
Natl Dental Assistants Assoc
Natl Dental Assoc
Natl Dental Hygienists' Assoc
Found Dentistry for the Handicapped
Natl Head Start Assoc

Natl Health Law Program
Natl Healthy Mothers, Healthy Babies Coalition
Oral Health America
Robert Wood Johnson Found
Society for Public Health Education
Society Am Indian Dentists
Special Care Dentistry
Acad Dentistry for Persons with Disabilities
Am Assoc Hospital Dentists
Am Society for Geriatric Dentistry
The Children's Health Fund
The Dental Health Found (of California)
US Department Defense
US Department Veterans Affairs
US Public Health Service
Health Resources & Services Administration (HRSA)
Centers for Disease Control & Prevention (CDC)
Natl Institute Dental & Craniofacial Research (NIDCR)
World Federation Orthodontists
World Health Org