Introduced by _____ Council Bill No. _____R 227-13_____

A RESOLUTION

discontinuing the addition of fluoridating agents to adjust the fluoride concentration in the water processed at the City of Columbia water treatment plant.

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF COLUMBIA, MISSOURI, AS FOLLOWS:

SECTION 1. The City shall discontinue the addition of fluoridating agents (including, but not limited to, sodium fluoride, fluorosilicic acid and sodium fluorosilicate) to adjust the fluoride concentration in the water processed at the City of Columbia water treatment plant.

SECTION 2. This resolution shall become effective on January 1, 2014.

ADOPTED this _____ day of _____, 2013.

ATTEST:

_____ _____

City Clerk Mayor and Presiding Officer

APPROVED AS TO FORM:

_____

City Counselor

Source: Health Agenda Item No:

To: City Council
From: City Manager and Staff

Council Meeting Date: Nov 4, 2013

Re: Community Water Fluoridation

EXECUTIVE SUMMARY:

This memo provides detail on activities which have taken place since November, 2012 to gather public opinion and investigate the City's use of hydrofluorosilicic acid (HFSA) for adjusting the fluoride concentration in Columbia's drinking water to 0.7 milligrams per liter (mg/L). The memo will also provide responses to some of the City Council's questions from the October 21, 2013 Council meeting.

DISCUSSION:

The following timeline combines excerpts from minutes of various public meetings and communications in which the issue of fluoride in Columbia's public water is discussed. Each timeline entry will highlight discussions and/or decisions made at City Council, Board of Health, Board of Health subcommittee, and Commission on Human Rights meetings, along with other communications, which the Council may find useful based on discussion from the October 21, 2013 Council meeting and to inform future conversations regarding the issue. The timeline is not meant to be a comprehensive account of all discussions which occurred at these meetings regarding fluoridation. In addition to the timeline, the Department of Public Health and Human Services consulted with the Water and Light Department to determine the true cost of HFSA. Over the past five fiscal years (FY 2009 - FY 2013), the amounts spent on HFSA per year ranged from $11,400 to $50,008 with an average of $34,753. More was spent on HFSA in years with drought conditions due to the increased demand for water in those years. For the Council's convenience, copies of the full minutes from each of the Board of Health, Board of Health subcommittee, and Commission on Human Rights meetings listed below are attached.

11/19/12 - City Council meeting: Amy Bremer provided scheduled public comment to the City Council regarding concerns she had with water fluoridation and asked the Council to vote to remove fluoridation from the City's water supply. Ms. Bremer cited several health concerns along with a concern that HFSA is being used to add fluoride to the water. Ms. Hoppe asked the Public Health and Human Services Department and the Board of Health to look at the information presented by Ms. Bremer and to provide Council a report with recommendations.

12/12 - Board of Health: Board members began requesting and sharing fluoridation information and articles to review.

12/3/12 - City Council meeting: During comments by the public, Brent Stafford discussed his concerns regarding water fluoridation and stated that O'Fallon, Missouri had stopped fluoridating its water two years ago due to health concerns. Eugene Elkin also commented on fluoride concerns and suggested the City remove fluoride from its water supply. Mayor McDavid recommended those opposed to fluoridation attend the Board of Health meetings as that Board would evaluate the issue and provide Council with a recommendation.

12/14/12 - Communication from the Department of Public Health and Human Services (PHHS) to Board of Health members: The Board was provided copies of scientific articles provided by Amy Bremer and links to YouTube videos and related resources provided by PHHS staff, and scientific articles and information provided by Board member Dr. Colin Malaker.

12/17/12 - City Council meeting: During scheduled public comment, Hal Williams expressed concern with fluoride and thought the City should stop putting fluoride in the water. Also, Daniel Redmond spoke about his

concerns that water fluoridation is harmful to one's health and a human rights violation. He asked the Council to vote to stop adding HFSA to the City's water supply. During comments by the public, Eugene Elkin wondered if water fluoridation had anything to do with his personal health issues.

1/7/13 - City Council meeting: During scheduled public comment, Shayna Fasken expressed concerns with health effects from fluoride and asked the Council to consider the evidence thoroughly before making a decision. Also, Ralph Robertson expressed concerns with fluoridation and asked the Council if they were in favor of or against removing fluoride from the City's water supply. Mayor McDavid explained the Board of Health would review the issue and provide a recommendation to the Council, and the Council would then discuss the issue after taking public comment. During comments by the public, Ms. Hoppe asked that handouts provided by speakers on fluoride at recent Council meetings be provided to the Board of Health for their review. Mr Matthes stated those documents had been forwarded.

1/10/13 - Board of Health meeting: Amy Bremer gave a presentation on her concerns about fluoride's impact, specifically on children and her concerns about handling and using HFSA in Columbia drinking water. Dr. Szewcyzk noted that many well respected organizations support the use of fluoride in drinking water. He felt that in order for the Board to overturn this recommendation, they would need credible evidence that it is the wrong position and Columbia should do otherwise. He also felt that the information provided did raise valid concerns and he had some reservations regarding the use of fluoride. Mr. Feirman recommended a subcommittee be set up to further discuss the issue. Based on the requests by Council, the Board decided to focus on two issues: 1) examine the evidence and determine if there is credible evidence to stop adding fluoride to City water to raise the fluoride level to 0.7 mg/L, 2) if the subcommittee determines that fluoridation at 0.7 mg/L should continue, then the subcommittee should determine which product, Sodium Fluoride, or HFSA, should be used.

1/22/13 - City Council meeting: During scheduled public comment, Lori Henderson spoke as a representative of the American Academy of Pediatric Dentistry and discussed information in support of fluoridation. She asked the Council to consider the large body of scientific evidence in favor of water fluoridation when making its decision on whether to continue fluoridating Columbia's water. Mr. Trapp asked if the dental industry had any financial incentive with the fluoride industry. Dr. Henderson replied no.

1/24/13 - Board of Health Subcommittee meeting: A teleconference had been scheduled for the meeting with Dr. William Hirzy, a leading opponent of water fluoridation. The teleconference was canceled due to Dr. Hirzy having a last minute conflict. The subcommittee received copies of articles and electronic files of videos from Dan Redmond. Background information was reviewed, including EPA fluoridation standards. EPA's current drinking water regulations set a maximum contaminant level of four mg/L of fluoride. EPA also has a secondary standard for fluoride at two mg/L. Secondary standards are non-enforceable guidelines regulating contaminants that may cause cosmetic effects such as skin or tooth discoloration or aesthetic effects such as taste or oder in drinking water. A January 2011 news release was discussed in which EPA and the Department of Health and Human Services (HHS) had new scientific assessments and actions on fluoride resulting in the HHS proposing a recommendation of lowering the optimal level of fluoride in drinking water to 0.7 mg/L. During the meeting, Mr. Feirman mentioned that the EPA and HHS standards are for two different things. The EPA standards are in relation to skeletal fluorosis, not discoloration of teeth. The HHS recommendation is the highest level that would prevent dental caries which would not contribute to dental fluorosis. In making this recommendation, one of the issues HHS took into consideration is that fluoride in drinking water is one of several available fluoride sources.

As part of the scheduled agenda, Mr. Mike Anderson of the Water and Light Department, answered questions from the subcommittee, including explaining that around 50 gallons of HFSA is added to 10 million gallons of water. Ms. Skala provided several additional references for the subcommittee to review, in addition to materials provided for the 1/10/13 Board meeting. Ms. Skala highlighted an article titled "Water Fluoridation and the Environment" (see attached). As part of the scheduled agenda, Dr. Lori Henderson spoke to the subcommittee in favor of continuing safe optimally fluoridated water in Columbia.

During the Public Comment period, several individuals spoke, including Dan Redmond. Dr. Redmond concluded his comments stating that government and independent experts do not agree; therefore, there is reasonable doubt regarding the safety and efficacy of adding chemicals to the water supply to artificially increase the concentration of fluoride. He would like to see the City consider alternative solutions for the $50,000 per year spent on fluoridation such as vouchers for toothpaste and/or fluoridated bottled water. Dr.

Bethany Baillargeion Marx provided comment in favor of fluoridation. She stated that there are people in dire financial situations who can't afford water, so it is doubtful they will spend money on toothpaste as their only other source of fluoride. She felt these people needed to be protected. Elizabeth Wiles spoke about her concerns regarding the adverse health effects fluoride may have on her family. She asked the subcommittee to embrace attitudes and policies that favor knowledge, education and respect for every person's rights regardless of their backgrounds or beliefs. Kevin Gamble discussed his concerns with fluoridation. He felt water fluoridation is being used as a medical treatment. He felt that if the board votes in favor of fluoridation, they would be prescribing a mandatory medical treatment to people they have never met and know nothing about. P.B. MacPherson signed up to provide public comment, but was not present at the time they were called on. Eugene Elkin expressed his concerns regarding fluorosis and read a letter to the subcommittee from Monta Welch, a member of A People's Visioning. The letter indicated that most of the people in A People's Visioning are supportive of full removal of the added fluoride in Columbia's and the county's water supplies. Paul Modesitt spoke regarding his questions on the source of the City's fluoride, and accumulation of fluoride in water heaters. He would rather see the funds spent on fluoridating City water be used to get rid of the dead end in the city water line. The subcommittee felt they needed more time to review all of the information they had been provided. Dr. Szewczyk wanted to know where the HFSA is coming from and what kind of testing is being done on it prior to the city receiving it. Ms. Skala asked Mike Anderson if he could contact the HFSA supplier and find out if they can give the group more detail on the product.

2/5/13 - Commission on Human Rights meeting: Dan Redmond made a presentation regarding his concerns with fluoridation. He stated he thought this was a human rights issue because it affected low-income families. The Commission decided to request the Board of Health subcommittee review any allegations that fluoridation disproportionately affects minority and low-income communities.

2/12/13 - E-mail communication: The Board received four e-mails from Dr. Lori Henderson which contained multiple letters of support for community water fluoridation.

2/14/13 - E-mail communication: The Board received an e-mail from Amy Bremer with an attached article for their review.

2/18/13 - E-mail communication: The Board received two e-mails from Dan Redmond with multiple articles for their review.

2/19/13 - E-mail communication: The Board received an e-mail from Dr. Lori Henderson with multiple articles for their review.

2/20/13 - E-mail communication: The Board received four e-mails from Dan Redmond with multiple articles and references for their review. One of the e-mails contained 52 references.

3/5/13 - E-mail communication: The Board received an e-mail from Dan Redmond with an attached article for their review.

3/12/13 - E-mail communication: The Board received three e-mails from Dan Redmond with multiple articles and references for their review.

3/13/13 - E-mail communication: The Board received four e-mails from Dan Redmond with multiple articles and references for their review.

3/14/13 - Board of Health meeting: Dr. William Hirzy made a scheduled presentation to the Board via teleconference. Dr. Hirzy mentioned that he felt that the Board members have a significantly higher standard for due diligence in reviewing all the information provided in depth than members of the Council or other lay people. Dr. Hirzy addressed a presentation previously made by Dr. Henderson, topical fluoride, a 2010 study examining fluorosis and water intake by small children, arsenic and mercury levels in City water projected to lead to an additional one case of lung/bladder case in three years, and then answered questions from the Board. Ms. Phillips stated that the City's water has 0.7 mg/L of fluoride and about half of that is naturally occurring and about half is added fluoride. She asked Dr. Hirzy if the City should filter out the naturally occurring fluoride, given toxicity concerns. Dr. Hirzy responded that filtering fluoride can be very difficult and did not recommend it, but noted that if there was a practical way of doing it, he would. He

recommended using monies saved by not fluoridating the water to buy fluoridated toothpaste. Under old business, the Board discussed fluoridation of City water. Ms. Skala mentioned an updated 2012 study on infant formula and the use of tap water. The CDC's website continues to advise it is safe to use fluoridated tap water for re-constituting infant formula (see attached). She provided the following summary of information reviewed over the last couple of months:

1. Information from a variety of sources, including the Missouri DHSS, CDC, ADA and WHO, about the prevalence of dental caries, its associated health risks, and the disproportionate impact of dental disease on low-income children and adults.

2. Information about the clinical effects of fluoride from CDC, EPA, ADA, WHO, the Australian National Health and Medical Research Council, and the Task Force of the Guide to Community Preventive Services. She noted that each of these organizations systematically reviewed the scientific literature (hundreds of articles altogether) regarding the efficacy and safety of fluoride ingestion at various dosage levels. These reviews covered the following concerns:

- Dental caries
- Dental fluorosis
- Fractures
- Cancer
- Neurotoxicity
- Effects on IQ
- Other possible adverse effects

Each of these organizations weighed the risks and benefits of various interventions, based on the literature, and made recommendations in favor of community water fluoridation.

3. Several individual articles published in peer-reviewed journals, most of which were included in the reviews listed above.

4. Information provided by proponents of community water fluoridation, including many articles, opinion pieces, information posted on websites, e-mails and a Power-point presentation and YouTube video by Dr. William Hirzy.

5. Letters of support from local dentists and several national dental authorities.

6. Information about the current EPA regulations establishing the Maximum Contaminant Level of four parts per million (ppm) fluoride in public water supplies, as well as the cyclical review process for all maximum contaminant levels (MCL) in water, and the current every six year review process underway for fluoride.

7. Information about current CDC recommendations, and the amended federal regulation proposed in 2011 to lower the recommended optimal fluoride concentration in public drinking water to 0.7 ppm, from the current level of 0.7 - 1.2 ppm (see attached).

8. Information about the product used to increase the fluoride levels in the Columbia public drinking water supply to the recommended level of 0.7 ppm, as well as the procedure used by Columbia Water and Light to add the fluoride, dilute it to the proper level and the routine testing program for fluoride and contaminants.

9. Ms. Skala asked Dr. Szewczyk to discuss testimony the Board has received. Dr. Szewczyk noted that Ms. Browning had been approached by Dr. Redmond with concerns that the proponents of water fluoridation had more opportunity to make presentations to the Board than the opponents. Dr. Szewczyk asked staff to review the tapes. He noted that only two individuals, both opponents of water fluoridation, Amy Bremer and Dr. Hirzy, were able to address the full Board. They had the floor for a total of 42 minutes. At the subcommittee meeting, Dr. Henderson and Dr. Baillargeion Marx, proponents of fluoridation had the floor for a total of 30 minutes. At that meeting, five members of the public spoke against fluoride for a total of 21 minutes. In addition, 260 minutes of video testimony against water fluoridation was provided for the Board members to review. All and all, the Board heard significantly more testimony by the opponents than the proponents.

Dr. Szewczyk asked Mike Anderson, Water and Light Department, to discuss the test results on the HFSA, the concentrated raw material being used to fluoridate the water. Mr. Anderson provided the Board with information from Mosaic, the supplier. He also provided analysis results from Inovatia, an independent lab which Columbia Water and Light asked to test the HFSA, at the request of the Board. Neither company identified lead in the samples. Arsenic levels were reported to be 40.75 ppm by Mosaic on a batch tested in November and Inovatia found an arsenic level of 62 ppm in a sample from February (copies of both reports are attached). Mike Anderson noted that the concentration level of HFSA would be 50 gallons added to 10 million gallons of water. Based on this dilution; his department has calculated that the final concentration would be approximately 0.00007 ppm. Mr. Anderson also stated that it would take 5,500 ppm of arsenic in the HFSA to reach the MCL levels for arsenic in the finished water. Ms. Phillips reiterated that the bottom line was whether or not lead and arsenic is showing up in the City's water monitoring data and independent testing shows that is not a concern. Mr. Anderson examined alternatives for using sodium fluoride and reported that bulk material costs would be massive and the start-up equipment and installation would be $250,000.

Ms. Skala commented on the data presented in the Chinese studies article regarding IQ from Dr. Hirzy's Power-point presentation. She noted that the fluoride levels noted in these studies were much higher than that found in Columbia. Even so, the analysis provided showed only one-half of one point difference in IQ between the groups of children with very high fluoride exposure and those with lower fluoride exposure similar to current CDC recommendations.

Dr. Dan Redmond spoke out from the audience that was not true and said that represented the standard deviation in IQ scores. Ms. Skala then read the quote directly from the article stating that it was actual IQ points. Dr. Malaker noted that the author of the Chinese studies article had stated that the results of the study do not allow a judgment to be made regarding the risks of typical water fluoridation in the United States.

Dr. Szewczyk mentioned receiving hundreds of documents to review. The Board decided to set a cut off date of March 21, 2013 to receive additional information regarding the fluoride issue. This will allow all the Board members the time needed to review the information before the next meeting, at which time the Board will vote on the issue.

Dr. Szewczyk asked for any additional testimony. Bill Folk provided public comment regarding an honors course he teaches on science and public policy. Water fluoridation is one case that was studied this semester. Students did not feel there was sufficient evidence to support water fluoridation as being a benefit in Columbia. Amy Bremer spoke on the issue of inequity, and that many people cannot afford to purify their water. Dr. Lori Henderson spoke, reiterating her strong support for water fluoridation. She responded to some of Dr. Hirzy's comments regarding her presentation. Dr. Wayne Hawks explained that he is a dentist working in Boonville and Columbia since 1972. He has noticed that the teeth in Boonville were extremely soft and saw the opposite situation in Columbia. He believes this is because of the fluoride added to Columbia water. Dr. Hawks concluded that it would be disastrous to do away with fluoride.

John Clark complimented the Board for their thorough investigation of the issue. He plans to look closely at all the information on the fluoride debate to learn more. He was very pleased Dr. Hirzy was given time to speak and answer questions. Dan Redmond gave each Board member a binder entitled "A Bibliography of Scientific Literature on Fluoride - Complied up to the 2006 NRC report". Dr. Redmond discussed Ms. Phillips earlier question on dropping the fluoride level from 0.7 ppm to 0.3 ppm. Due to the different forms of fluoride between the naturally occurring and the HFSA, dropping to 0.3 ppm would cause a higher percentage decrease. He felt the fluoride issue is more important than the chickens or feral cat issues previously examined by the Board and those went on for a fair amount of time. Dr. Redmond went onto say that he had asked both Dr. Henderson and Dr. Hawk to sign an affidavit regarding the safety of fluoride (see attached) and that both had refused to do so. The affidavit was a legal form stating "under the penalty of perjury", they feel fluoride is safe. Dr. Henderson spoke from the audience that she and Dr. Hawk were just given these forms by Dr. Redmond. Dr. Hawk stated he was appalled by the action. Several Board members also. voiced concern. Dr. Szewczyk noted that Dr. Redmond had sent an email to the Board members implying that if they vote to continue fluoride, they could potentially be liable for damages under the 1974 Safe Drinking Water Act. Dr. Szewczyk told Dr. Redmond that he felt it was inappropriate to intimidate Board members and speakers with threatening legal repercussions.

3/21/13 - E-mail communication: The Board received an e-mail from Dan Redmond with multiple articles and references for their review.

4/11/13 - Board of Health meeting: Under Old Business, the Board voted 7-2 on a motion that Columbia continue fluoridation at the current level of 0.7 ppm. Dr. Szewczyk read an email from Board member Jean Sax, who could not be at the meeting. Ms. Sax wanted it known she wanted no change to the City's current practice of water fluoridation. The Board also voted 9-0 to continue to use HFSA because it is the safest and a cost effective method. Dr. Malaker mentioned there is not a single dental product that has fluoride in it that has HFSA. He felt the decision should be made by public referendum. Ms. Phillips noted that we fortify grains in cereals to prevent pellagra, put vitamin D in milk to prevent rickets, iodize salt to prevent Graves' Disease, pasteurize milk to kill bacteria and chlorinate water to prevent exposure to bacteria. There are no referendums on any of these. She felt it would be a bad precedent to have a referendum each and every time a large population-based public health intervention is implemented and that this would undermine our ability to do public health. Dr. Malaker felt the difference was that people have a choice in the what kind of milk they buy and what kind of cereal they buy, but a lot of low income people don't always have that choice to buy bottled water or put in a reverse osmosis system. Ms. Phillips noted the evidence is that fluoridation benefits low income people who cannot afford dental care. Mr. Feirman suggested the Board form a subcommittee to continue to explore the dental health issues discussed, including why children are not brushing their teeth. The subcommittee was formed.

9/16/13 - City Council meeting: Katie Huddlestonsmith provided scheduled comment on benefits, risks, and analysis of water fluoridation. She suggested the City bolster existing aid programs for those that could not afford dental visits, help to make Medicaid and Medicare more viable insurance programs by increasing how much dentists are paid, and create a need-based voucher system for dental hygiene products instead of fluoridating the water. Dr. Dan Redmond provided a presentation on fluoride being known to cause harm per a 2006 National Research Council report. He believes those with infants needed to be provided the chance to be informed and to make their own decision.

10/7/13 - City Council meeting: During scheduled public comment, Dr. Dave Ries discussed the benefits of fluoride in the City water supply. He encouraged the Council to look at the science and avoid the half-truths surrounding water fluoridation. Also, William Swift discussed case law involving potential legal concerns regarding fluoridation of City water and concluded that case law fully supports water fluoridation. He urged the Council to stand by the practice of the last 50 years in terms of fluoridation because he believed it was in the best interest of the community and its children.

10/21/13 - City Council meeting: The Council accepted the City water fluoridation report from the Board of Health. Dr. Szewczyk answered questions from Council regarding the report. During comments by the public, Amy Bremer, Dan Redmond, Lori Henderson, and Eugene Elkin provided comment. These minutes have not yet been approved.

FISCAL IMPACT:

No fiscal impact - for informational purposes only.

VISION IMPACT:
http://www.gocolumbiamo.com/Council/Meetings/visionimpact.php

11 Vision Statement: Columbia is a supportive, compassionate, healthy community with high quality social services; a first-rate health care system and safe, quality affordable housing that are accessible to all.

SUGGESTED COUNCIL ACTIONS:

No action necessary - for informational purposes only.

FISCAL and VISION NOTES:					
City Fiscal Impact Enter all that apply		**Program Impact**		**Mandates**	
City's current net FY cost	$0.00	New Program/ Agency?	No	Federal or State mandated?	No
Amount of funds already appropriated	$0.00	Duplicates/Epands an existing program?	No	**Vision Implementation impact**	
Amount of budget amendment needed	$0.00	Fiscal Impact on any local political subdivision?	No	Enter all that apply: Refer to Web site	
Estimated 2 year net costs:		**Resources Required**		Vision Impact?	Yes
One Time	$0.00	Requires add'l FTE Personnel?	No	Primary Vision, Strategy and/or Goal Item #	11
Operating/ Ongoing	$0.00	Requires add'l facilities?	No	Secondary Vision, Strategy and/or Goal Item #	
		Requires add'l capital equipment?	No	Fiscal year implementation Task #	

Water Fluoridation and the Environment:

Current Perspective in the United States

HOWARD F. POLLICK, BDS, MPH

Evidence of water fluoridation's effects on plants, animals, and humans is considered based on reviews by scientific groups and individual communities, including Fort Collins, CO, Port Angeles, WA, and Tacoma-Pierce County, WA. The potential for corrosion of pipes and the use of fluoridation chemicals, particularly fluorosilicic acid, are considered, as is the debate about whether fluoridation increases lead in water, with the conclusion that there is no such increase. The arguments of anti-fluoridationists and fluoridation proponents are examined with respect to the politics of the issue. *Key words*: fluoridation; environment; toxicology.

INT J OCCUP ENVIRON HEALTH 2004;10:343–350

Prior to 1945, epidemiologic and laboratory studies confirmed the association between the environment (naturally-occurring fluoride in water supplies) and the health and cosmetic appearance of teeth.[1] Where fluoride levels were low, prevalences and severity of dental caries were high among lifetime residents, yet where fluoride levels were high, the prevalences and severity of dental caries were low, but dental fluorosis occurred with high prevalence and severity. This led to the concept of creating an ideal environment for optimal dental health through adjusting the naturally occurring fluoride level to about 1 mg/L (1 part per million). In 1986, the U.S. Environmental Protection Agency (EPA) set the maximum contaminant level (MCL) for naturally-occurring fluoride in public drinking water at 4 mg/L, with a secondary standard at 2 mg/L.[2]

Water fluoridation, then, is the controlled adjustment of fluoride concentrations of community water systems to optimal levels to minimize the incidence of dental caries (tooth decay) and dental fluorosis (enamel mottling). From initial efforts begun as community trials in 1945, water is now fluoridated in thousands of public water systems and reaches two thirds of the U.S. population served by such systems.[3] Community water fluoridation and other uses of fluorides, such as in toothpaste, have significantly reduced the prevalence of dental caries in the United States.[1]

Early investigations into the physiologic effects of fluoride in drinking water predated the first community field trials.[4–7] Since 1950, opponents of fluoridation have claimed it increases the risks for cancer, Down's syndrome, heart disease, osteoporosis and bone fracture, acquired immunodeficiency syndrome, low intelligence, Alzheimer disease, allergic reactions, and other health conditions.[8] The safety and effectiveness of water fluoridation have been re-evaluated frequently, and no credible evidence supports an association between fluoridation and any of these conditions.[9,10]

The Environment

Environmental concerns have been investigated in literature reviews for the Tacoma–Pierce County Health Department, Washington (August 2002),[11] and the City of Port Angeles, Washington (October 2003),[12] and no negative impact of water fluoridation on the environment has been established. Issues related to discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise have been found to be nonsignificant. Emissions of fluoride into the air are not released outside the well houses. Fluoride concentrations in rivers downstream of the discharges increase by less than 0.01 mg/L due to adding fluoride to the water supply system.

Fluoridated water losses during use, dilution of sewage by rain and groundwater infiltrate, fluoride removal during secondary sewage treatment, and diffusion dynamics at effluent outfall combine to eliminate fluoridation related environmental effects. In a literature review, Osterman found no instance of municipal water fluoridation causing recommended environmental concentrations to be exceeded, although excesses occurred in several cases of severe industrial water pollution not related to water fluoridation.[13] Osterman found that overall river fluoride concentrations theoretically would be raised by 0.001-0.002 mg/l, a value not measurable by current analytic techniques. All resulting concentrations would be well below those recommended for environmental safety.

A study conducted in Phoenix, Arizona, to test the efficacy of soil aquifer treatment systems indicated that fluoride concentrations decline as water travels under-

Received from the Department of Preventive and Restorative Dental Sciences, School of Dentistry, University of California San Francisco, San Francisco, California.

Address correspondence and reprint requests to: Howard Pollick, Department of Preventive and Restorative Dental Sciences, 707 Parnassus Avenue, San Francisco CA 94143-0758.

ground. This study suggests that 40–50% of the fluoride discharged to groundwater is removed as the water travels through the soil and aquifer. Thus, fluoride does not concentrate in groundwater.[14]

PLANTS AND ANIMALS

The concentration of fluoride in the treated water does not reach levels that could harm any plant or animal species.[11,12] A report of the effect of industrial pollution, from an aluminum plant on salmon indicated that the usual fluoride concentration of the river was 0.1 mg/L, and when the concentration was raised experimentally to 0.5 mg/L, there was an effect on the salmon.[15] Since rivers and streams are not fluoridated and the increase in the fluoride concentration of a river as a result of runoff from fluoridated water would be insufficient to raise the level to even 0.2 mg/L, fluoridation of water can have no effect on salmon.

There is no evidence that fluoridated water has any effect on gardens, lawns, or plants. Although silver fluoride is not used in water fluoridation, silver fluoride at 1 mg/L used as a disinfectant had no effect on growth of wheat.[16] There is evidence that very high concentrations of fluoride have no toxic effect on plants in ponds:

> The fate of fluoride in a simulated accidental release into an experimental pond was observed for 30 days in Grenoble, France. The components investigated were water, sediments, plants, algae, molluscs, and fish. Twenty-four hours after the release, most (99.8%) of the fluoride was distributed in the physical components (water and sediments), and the biological agents contained only 0.2% of the fluoride released. Despite an exposure to hot spots of 5,000 ppm at the beginning of the accidental release, no visible toxic effects were observed on the biological components such as plants, algae, molluscs, and fish.[17]

There is evidence that ladyfinger (okra) can withstand up to 120 mg/L fluoride. The consumption by people of this plant grown with fluoridated water at 1 mg/L would be 0.2 mg per kg:

> Because of suggestions that food is a rich source of fluoride to humans and the absence of permissible and upper limits of fluoride for irrigation water, plant uptake studies were conducted using fluoride-rich irrigation water. Ladyfinger was grown in sand and soil cultures for 18 wk and the accumulation of fluoride in various plant parts was studied. The potential for ingestion of fluoride by humans through this route was also considered. The percentage uptake was greater in sand-cultured plants than in soil-cultured plants. The root accumulates most of the fluoride supplied through irrigation water and the fruit accumulates the least. Up to 120 mg/L fluoride of irrigation water did not harm the plants. The ingestion of fluoride by humans from plants irrigated with water containing 10 mg/L fluoride would be 0.20 mg per 100 g ladyfinger.[18]

HUMANS

The Institute of Medicine, Food and Nutrition Board has estimated that the tolerable upper limit for human daily intake of fluoride is 10 mg per day for adults and children over 8 years of age.[19] Ten independent U.S. and Canadian studies published from 1958 to 1987 showed that dietary fluoride intakes by adults ranged from 1.4 to 3.4 mg/day in areas where the water fluoride concentration was 1.0 mg/L. Where the water concentration was less than 0.3 mg/L, daily intakes ranged from 0.3 to 1.0 mg/day.[19]

Several municipal or territorial reviews of the water fluoride issue have concluded that available information indicates that there is no significant adverse health impact associated with water fluoridation. The Fort Collins review[20] included reviews from other communities, including Brisbane, Australia (1997),[21] Natick, Massachusetts (1997),[22] Calgary, Alberta, Canada (1998),[23] Ontario, Canada (1999),[24] and Escambia County Utilities Authority, Florida (2000).[25] Additionally, the Fort Collins review considered several "Tier One" reviews, including reviews by or for the Centers for Disease Control and Prevention,[1] the Institute of Medicine (1999),[19] the World Health Organization (1994),[26] the National Research Council (1993),[9] the U.S. Public Health Service (1991),[27] the International Programme on Chemical Safety (1984),[28] the Medical Research Council, UK (2002),[29] the Agency for Toxic Substances and Disease Registry, U.S. Public Health Service (2001 draft and 1993),[30] and York, U.K. (2000).[31]

The Fort Collins report found that:

- The weight of the evidence suggests that there is caries (cavities) reduction in populations exposed to water fluoridation at or near an optimal level
- Likely total exposure values for children older than six months living in communities with water fluoridated at up to 1.2 mg/L (ppm) do not exceed the upper limit set to be protective of moderate dental fluorosis by the Institute of Medicine. Total dietary exposures of fluoride can exceed this threshold amount (0.7mg/day) in infants fed formula reconstituted with optimally fluoridated water.
- There is no consistent evidence from human or animal studies that exposure to optimally fluoridated drinking water and other sources causes any form of cancer in humans, including bone and joint cancer
- The FTSG agrees with the conclusion of the Medical Research Council of Great Britain that states, "The possibility of an effect on the risk of hip fracture is the most important in public health terms. The available evidence on this suggests no effect, but cannot rule out the possibility of a small percentage change (either an increase or a decrease) in hip fractures." [Medical Research Council 2002, page 3]

- At the concentrations of fluoride provided in Fort Collins water including exposures from all sources over a lifetime, skeletal fluorosis caused by drinking water exposure is not likely to be a health issue.
- At the concentrations of fluoride provided in Fort Collins water, in combination with other sources of fluoride, as many as one in four children under age 8 may develop very mild to mild dental fluorosis. This degree of fluorosis may or may not be detectable by the layperson. With oral health as the goal, this degree of dental fluorosis is considered an acceptable adverse effect given the benefits of caries prevention.
- In the literature reviewed, doses appropriate for caries reduction were not shown to negatively impact thyroid function. Studies in which humans received doses significantly higher than the optimum fluoride intake for long periods of time showed no negative impact on thyroid function.
- Overall, evidence is lacking that exposure to fluoride through drinking water causes any problems to the human immune system.[20]

In general, there is no credible evidence indicating a cause-and-effect relationship between water fluoridation and increased health risks.

CORROSION

According to the U.S. Environmental Protection Agency and the National Association of Corrosion Engineers, corrosion is not related to fluoride.[32] Corrosion by potable water is primarily caused by dissolved oxygen, pH, water temperature, alkalinity, hardness, salt, hydrogen sulfide, and certain bacteria. Fluoride, at concentrations found in potable water, does not cause corrosion. A small increase in the corrosivity of potable water that is already corrosive may occur after treatment with alum, chlorine, fluorosilicic acid, or sodium silicofluoride, which decreases pH. This may occur in some potable water sources with little buffering capacity; it can easily be resolved by adjusting the pH upward.[11,12,33]

CHEMICALS USED FOR FLUORIDATION

Fluorosilicates

Urbansky reviewed available information on fluorosilicates, with three objectives:

> (1) to enumerate unresolved chemical issues germane to understanding fluoridation and ascertaining the fate of fluoride and fluorospecies, (2) to critically review what is known or reported, and (3) to assemble a knowledge base to provide a starting point for future study.[34]

Urbansky states:

> Since [1962], toxicity and adverse health impacts have tested fluoride rather than fluosilicates. As a recent example, in 2001, the FDA reported that Americans' exposure to fluoride had increased from dentifrices, and it demonstrated that any increases did not produce observable health effects in rats. Fluoride salts were continually tested instead of fluorosilicates because the complete and fast dissociation-hydrolysis (eq 1) of fluorosilicates to fluoride and (hydr)oxosilicates was generally accepted as a chemical fact. Accordingly, no reason was apparent to test fluorosilicates separately.
>
> $$H_2SiF_6(aq) + 4H_2O(l) = 6HF(aq) + Si(OH)_4(aq) \quad \text{(eq 1)}$$
>
> all the rate data suggest that equilibrium should have been achieved by the time the water reaches the consumer's tap if not by the time it leaves the waterworks plant. . . . The most common fluoridating agents used by American waterworks are sodium fluoride (NaF), fluorosilicic acid (H_2SiF_6), and sodium fluorosilicate (Na_2SiF_6) (see table below).

TABLE[34]

	Sodium Fluoride	Sodium Fluorosilicate	Fluorosilicic Acid
(a) Number of Utilities	2491	1635	5876
(b) People served	11,700,000	36,100,000	80,000,000

*Data for the United States from the CDC's 1992 *Fluoridation Census*[35]: (a) Number of utilities using specific additives as reported by those that fluoridate their water; (b) Populations served by specific additives (millions of people) of those drinking supplementally fluoridated water (does not include waters with naturally occurring fluoride).

> Although 25% of the utilities reported using NaF, this corresponds to only 9.2% of the U.S. population drinking fluoride-supplemented tap water. The ease in handling NaF rather than fluorosilicates accounts for the disproportionate use of NaF by utilities serving smaller populations. On the other hand, the cost savings in using fluorosilicates result in large systems using those additives instead. The reduced cost of large volume offsets the costs associated with handling concentrated stocks of the fluorosilicates, which require accommodations similar to hydrochloric acid, which is sometimes used to adjust pH. In acidic solution, the dissociation and hydrolysis of fluorosilicic acid, which occurs upon dilution, is given by eq 1. In drinking water, pH is adjusted with the addition of base (e.g., NaOH, $NaHCO_3$). $H_2SiF_6(aq) + 4H_2O(l) = 6HF(aq) + Si(OH)_4(aq)$ (eq1).[34]

While there may be evidence of toxicity of these substances when workers involved in their production are not protected, there is no credible evidence of toxicity when they are diluted for use in fluoridated water. Fluorosilicic acid is diluted with water from an initial aqueous concentration of about 23–24% by about 1:250,000–1:300,000 when used for fluoridating

water.[36] This produces the final concentration of between 0.7–1.2 mg/L, the specific level set according to CDC guidelines.[37]

Concerns have been raised about arsenic and lead in fluorosilicic-acid–treated water.[38,39] However, there is no credible evidence that this is of concern.[40] Urbansky and Schock add:

> The vast preponderance of the lead(II) in nearly all tap waters originates from the plumbing materials located between the water distribution mains and the end of the faucet used by the consumer.

Arsenic and lead may be present at minute undetectable concentrations, well below all current (50 ppb) and proposed (10 ppb) EPA standards. Following dilution with water, the calculated range of arsenic concentrations in the finished water contributed by fluorosilicic acid feed is 0.10 to 0.24 µg/L (parts per billion, ppb).[36] The analytic detection limit for arsenic is 2 µg/L, so the amount added by the fluorosilicic acid would not be detected.[36] In Fort Collins, the concentration of lead in the source waters was below the detection limit for lead in the department's laboratory of 1.0 µg/liter (ppb). Because lead levels are below the detection limits both before and after the addition of fluorosilicic acid, the actual changes in lead concentrations were not measurable.[36]

Masters and Coplan have alarmed the public with their reports linking fluoridation, increased lead levels and crime.[39,41] Urbansky and Schock criticize the conclusion reached by Masters and Coplan by stating:

> Interestingly, the bibliographies of the Masters and Coplan study most strongly asserting the adverse effects of silicofluoride shows only a single reference related to sampling of drinking water or the control of lead or other metals by water treatment, so the level of awareness in the design of the studies and interpretation of the data is highly questionable. By not measuring or statistically testing numerous other water and plumbing characteristics that could correlate with lead(II) levels with equal to or greater statistical significance than those relationships that were put forth, the studies of [Reference 2] are intentionally biased towards what appears to be a preconceived conclusion. Even simple analytes that are known to affect lead mobility, such as pH or alkalinity, or analytes known to play important dietary roles in health, such as calcium, sodium or magnesium, were not reported to be measured in their study, so possible confounding variables are conspicuously excluded from evaluation.
>
> . . . Recent reports [41, 39] that purport to link certain water fluoridating agents, such as fluorosilicic acid and sodium fluorosilicate, to human lead uptake are inconsistent with accepted scientific knowledge. The authors of those reports fail to identify or account for these inconsistencies, and mainly argue on the basis of speculation stated without proof as fact. The sampling scheme employed in the studies is entirely unrelated to any credible statistically-based study design to identify drinking water lead and fluoride exposure as a significant source of blood lead in the individuals. The authors use aggregated data unrelated in space and time and then attempt to selectively apply gross statistical techniques that do not include any of thousands of other possible water quality or exposure variables which could show similar levels of correlation utterly by accident. Many of the chemical assumptions are scientifically unjustified, are contradicted by known chemistry data and principles, and alternate explanations (such as multiple routes of PbII exposure) have not been satisfactorily addressed. The choice in water fluoridation approach is often made for economic, commercial or engineering reasons that may have a regional component that could also be related to various community socio-economic measures, and so should not be considered to be a purely independent variable without investigation. At present, the highly-promoted studies asserting enhanced lead uptake from drinking water and increased neurotoxicity still provide no credible evidence to suggest that the common practice of fluoridating drinking water has any untoward health impacts via effects on lead(II) when done properly under established guidelines so as to maintain total water quality. Our conclusion supports current EPA and PHS/CDC policies on water fluoridation.[40]

Nevertheless, concerns have been raised about the acidity of drinking water that may be created by fluoridation. According to Urbansky and Schock, "one cannot demonstrate that an increase in blood lead(II) ion levels can be linked to acidity from SiF_6^{2-} hydrolysis any more than one can demonstrate it results from consuming soft drinks." Additionally they state: "Note that the species $PbSiF_6^0$ is present at such low concentrations that we would expect to find *only one molecule of this complex in more than 1,000 liters of tap water* at pH 6, which of course, far exceeds the volume possible for water consumption and the human stomach."

A critique of this review was included in "Comments on The April 17, 2002 ICCEC Approach to Silicofluorides Study" by Coplan.[42] The ICCEC is the U.S. Public Health Service National Toxicology Program (NTP) Interagency Committee for Chemical Evaluation and Coordination. Coplan states his concerns about the way in which Urbansky and the EPA and CDC have investigated silicofluorides. For example, he provides the following headings in his review: "EPA's acknowledged ignorance about a position they have adamantly held"; "EPA's continued effort at misdirection"; "Why Urbansky and Schock cannot be trusted"; "Why the CDC cannot be trusted"; "A substantial body of evidence has been submitted to the NTP clearly supporting the need for a comprehensive program of animal testing for health effects from chronic ingestion of SiF treated water. This

is true now and would remain true no matter what the EPA may learn about dissociation chemistry from a contractor selected by EPA employees whose objectivity and scientific integrity are less than impeccable."

Coplan's comments are in keeping with his stance as an anti-fluoridationist (one who is strongly opposed to the fluoridation of public water supplies).[43] It should be pointed out that Urbansky and Schock have been highly critical of the work of Masters and Coplan. It appears that the main thrust of contemporary anti-fluoridation tactics is to assert that the chemicals used in fluoridation are causing problems of one sort or another. Such tactics have emanated from the work of Masters and Coplan.

The toxicology of sodium fluorosilicate and fluorosilicic acid has been reviewed for the EPA.[44] The authors of that review state:

> In water, the compound (sodium fluorosilicate) readily dissociates to sodium ions and fluosilicate ions and then to hydrogen gas, fluoride ions, and hydrated silica. At the pH of drinking water (6.5-8.5) and at the concentration usually used for fluoridation (1 mg fluoride/L), the degree of hydrolysis is essentially 100%. . . . Like its salt, its (fluorosilicic acid) degree of hydrolysis is essentially 100% in drinking water. At equilibrium, the fluorosilicate remaining in drinking water is estimated to be <<1 part per trillion.[40] In addition, exposure to impurities in the fluoridating agent is judged to be of low health risk when properly treated water is ingested. For example, in fluorosilicic acid, iron and iodine are usually below the levels considered useful as a dietary supplement; the phosphorus level is reported to be insignificant; and silver is usually <4 parts per septillion in the fluoridated water.[45]

The Colorado City of Fort Collins has been fluoridating with fluorosilicic acid and has responded to concerns raised about that chemical.[36] The Report of the Fort Collins 2003 Fluoride Technical Study Group, April 2003, provides a comprehensive review that includes "The Potential for Increased Contaminant Levels Due to the Use of Hydrofluorosilicic Acid."

> The FTSG's review identified three potential concerns associated with hydrofluorosilicic acid (HFS). 1) co-contamination (i.e., arsenic and lead), 2) decreased pH leading to increased lead solubility or exposure, and 3) potential toxicological effects from incomplete dissociation products of HFS. The FTSG used the raw and finished water quality data for the City of Fort Collins to determine whether the addition of HFS was responsible for the potential addition of contaminants such as heavy metals to the city's drinking water. There was no evidence that the addition of HFS increased the concentrations of copper, manganese, zinc, cadmium, nickel, or molybdenum. The concentrations of arsenic and lead were below the detection limit for the Fort Collins Water Quality Control Laboratory in both the source water and the finished water and below the maximum contaminant level (MCL) for these naturally occurring elements. There was no evidence that the introduction of HFS changed the pH of the water appreciably. Concern that HFS incompletely disassociates may be unfounded when the fundamental chemical facts are considered. Therefore, it is unlikely that community water fluoridation poses a health risk from the exposure to any of these chemicals present in the water as it leaves the plant. Further studies related to the health effects of HFS are in progress.[36]

Reeves (fluoridation engineer at the CDC) outlined the process by which the safety of fluoridation chemicals is assured:

> Concern has been raised about the impurities in the fluoride chemicals. The American Water Works Association (AWWA), a well-respected water supply industry association, sets standards for all chemicals used in the water treatment plant, including fluoride chemicals. The AWWA standards are ANSI/AWWA B701-99 (sodium fluoride), ANSI/AWWA B702-99 (sodium fluorosilicate) and ANSI/AWWA B703-00 (fluorosilicic acid). The National Sanitation Foundation (NSF) also sets standards and does product certification for products used in the water industry, including fluoride chemicals. ANSI/NSF Standard 60 sets standards for purity and provides testing and certification for the fluoride chemicals. Standard 60 was developed by NSF and a consortium of associations, including the AWWA and the American National Standards Institute (ANSI). This standard provides for product quality and safety assurance to prevent the addition of harmful levels of contaminants from water treatment chemicals. More than 40 states have laws or regulations requiring product compliance with Standard 60. NSF tests the fluoride chemicals for the 11 regulated metal compounds that have an EPA MCL. In order for a product [for example, fluorosilicic acid] to meet certification standards, regulated metal contaminants must be present at the tap [in the home] at a concentration of less than ten percent of the MCL when added to drinking water at the recommended maximum use level. The EPA has not set any MCL for the silicates as there is no known health concerns, but Standard 60 has a Maximum Allowable Level (MAL) of 16 mg/L for sodium silicates as corrosion control agents primarily for turbidity reasons. NSF tests have shown the silicates in the water samples from public water systems to be well below these levels.[46]

Sources of Fluoride Pollution Unrelated to Water Fluoridation

The principal sources of fluoride pollution are industries, particularly phosphate ore production and use as well as aluminum manufacture, mining, and coal burning.[28,47,48] In the absence of adequate emission control in such settings environmental pollution can be a problem. Such pollution has been a problem in the past in

industrialized countries, and the WHO warns that unless proper environmental safeguards are adhered to, there is a danger of its occurring in developing countries with increasing industrialization. Fluoride pollution is therefore recognized as an industrial hazard; however water fluoridation is not considered a potential source of fluoride pollution.[46]

Arguments of Opponents and Proponents

Whereas anti-fluoridationists try to prevent the unnecessary exposure of living things to fluoride, often in the misguided belief that any amount of fluoride is toxic, pro-fluoridationists try to reduce tooth decay through the judicious use of fluoride, with the understanding that there is an optimum amount, appropriately delivered, that is both beneficial and safe. This distinction leads to a difference in interpretation of the scientific and popular literature on this topic, whether related to the effects of water fluoridation on teeth or other organs of the body, or the effects on the environment. Similarly, there are those who may judge water fluoridation on political or philosophical grounds, such as being supportive or opposed to what government agencies may advocate. Some may have personal or anecdotal experience that is counter to what opponents or proponents recommend. Newbrun has characterized the fluoridation debate as a religious argument.[49]

While opponents of fluoridation are not without their supporters and supporting groups,[50] almost every reputable, recognized, competent scientific and/or public health organization or government unit endorses fluoridation of drinking water as safe and effective.[51,52] Furthermore, community water fluoridation has been heralded as one of the ten great public health measures of the 20th century.[53]

Proponents of fluoridation assert that the dose of fluoride determines whether it is beneficial or toxic, and that there are threshold levels that must be exceeded before there are toxic effects. This is a basic principle of toxicology and is true of every chemical approved for use in treating drinking water. "All substances are poisons: there is none which is not a poison. The right dose differentiates a poison and a remedy." Paracelsus (1493-1541).[54]

While there has been considerable scientific study of the effects of fluorides on health and the environment, there will *always* be the need for more research.[29] However, proponents argue that it is not rational that the gains made from water fluoridation should be undone because not all the research has been completed. Further, it is strongly recommended that those communities that have not yet fluoridated their water supplies should do so to protect the dental health of their current and future residents.[55]

Both sides use arguments related to freedom of choice. Those supporting fluoridation argue that the public water supply is designed to protect public health and it is more important to protect people's health than to protect some people's concern for their freedom to use unfluoridated water.[56,57] Additionally, pro-fluoridationists invoke the ethical principle of social justice arguing that the safe public health measure is socioeconomically equitable, providing greater benefit to the disadvantaged.[1]

Current anti-fluoridation tactics have focused on chemicals used to fluoridate water supplies. As has been shown above, there is no credible evidence to support the notion that the chemicals are unsafe. In the past, tactics have focused on studies that purported to show that fluoridation was linked to cancer and myriad other health problems.[48] However, such assertions were based on improper science, and numerous subsequent studies found no association between fluoridation and cancer.[58]

CONCLUSION

Scientific evidence supports the fluoridation of public water supplies as safe for the environment and beneficial to people. Reports at the local, national, and international levels have continued to support this most important public health measure. There appears to be no concern about the environmental aspects of water fluoridation among those experts who have investigated the matter. Furthermore, since the chemicals used for water fluoridation are co-products of the manufacture of phosphate fertilizers, and the raw material used is a natural resource (rocks excavated for their mineral content), water fluoridation could accurately be described as environmentally friendly, as it maximizes the use made of these natural resources, and reduces waste.[59]

Note: In the text, the term "fluorosilicic" has been substituted for fluosilicic, hydrofluorosilicic, and hexafluorosilicic (all being synonymous); similarly, "fluorosilicate" for fluosilicate, hexafluorosilicate, and silicofluoride. However, the original terms in all references have not been substituted.

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Overview: Infant Formula and Fluorosis

The proper amount of fluoride from infancy through old age helps prevent and control tooth decay. Community water fluoridation (/fluoridation/index.htm) is a widely accepted practice for preventing and controlling tooth decay by adjusting the concentration of fluoride in the public water supply.

Fluoride intake from water and other fluoride sources, such as toothpaste and mouthrinses, during the ages when teeth are forming (from birth through age 8) also can result in changes in the appearance of the tooth's surface called dental fluorosis. In the United States, the majority of dental fluorosis is mild and appears as white spots that are barely noticeable and difficult for anyone except a dental health care professional to see.

Recent evidence suggests that mixing powdered or liquid infant formula concentrate with fluoridated water on a regular basis may increase the chance of a child developing the faint, white markings of very mild or mild enamel fluorosis.

You can use fluoridated water for preparing infant formula. However, if your child is exclusively consuming infant formula reconstituted with fluoridated water, there may be an increased chance for mild dental fluorosis. To lessen this chance, parents can use low-fluoride bottled water some of the time to mix infant formula; these bottled waters are labeled as de-ionized, purified, demineralized, or distilled.

What is the best source of nutrition for infants?

Breastfeeding is ideal for infants. CDC is committed to increasing breastfeeding throughout the United States and promoting optimal breastfeeding practices. Both babies and mothers gain many benefits from breastfeeding. Breast milk is easy to digest and contains antibodies that can protect infants from bacterial and viral infections. More can be learned about this subject at http://www.cdc.gov/breastfeeding/ (http://www.cdc.gov/breastfeeding/).

If breastfeeding is not possible, several types of formula are available for infant feeding. Parents and caregivers are encouraged to speak with their pediatrician about what type of infant formula is best suited for their child.

Why is there a focus on infant formula as a source of fluoride?

Infant formula manufacturers take steps to assure that infant formula contains low fluoride levels —the products themselves are not the issue. Although formula itself has low amounts of fluoride, if your child is exclusively consuming infant formula reconstituted with fluoridated water, there may be an increased chance for mild dental fluorosis.

Infants consume little other than breast milk or formula during the first 4 to 6 months of life, and continue to have a high intake of liquids during the entire first year. Therefore, proportional to body weight, fluoride intake may be higher for younger or smaller children than for older children, adolescents, or adults.

What types of infant formula may increase the chance of dental fluorosis?

There are three types of formula available in the United States for infant feeding. These are powdered formula, which comes in bulk or single-serve packets, concentrated liquid, and ready-to-feed formula. Ready-to-feed formula contains little fluoride and does not contribute to development of dental fluorosis. Those types of formula that require mixing with water—powdered or liquid concentrates—can be a child's main source of fluoride intake (depending upon the fluoride content of the water source used) and may increase the chance of dental fluorosis.

Can I use optimally fluoridated tap water to mix infant formula?

Yes, you can use fluoridated water for preparing infant formula. However, if your child is exclusively consuming infant formula reconstituted with fluoridated water, there may be an increased chance for mild dental fluorosis. To lessen this chance, parents can use low-fluoride bottled water some of the time to mix infant formula; these bottled waters are labeled as de-ionized, purified, demineralized, or distilled.

How can I find out the level (concentration) of fluoride in my tap water?

The best source of information on fluoride levels in your water system is your local water utility. Other knowledgeable sources may be a local public health authority, dentist, dental hygienist, or physician. CDC's Web site My Water's Fluoride (http://apps.nccd.cdc.gov/MWF/Index.asp) allows consumers in some states to learn the fluoridation status of their water system. Nearly all tap water contains some natural fluoride, but, depending on the water system, the concentration can range from very low (0.2 mg/L fluoride or less) to very high (2.0 mg/L fluoride or higher). Approximately 72% of all public water systems serving about 195 million people adjust the fluoride in their water to the level recommended to prevent tooth decay.

Will using only low fluoride water to mix formula eliminate my child's risk for dental fluorosis?

Using only water with low fluoride levels to mix formula will reduce, but will not eliminate, the risk for dental fluorosis. Children can take in fluoride from other sources during the time that teeth are developing (birth through age 8). These sources include drinking water, foods and beverages processed with fluoridated water, and dental products, such as fluoride toothpaste, that can be swallowed by young children whose swallowing reflex is not fully developed.

Additional Resource

Dental Fluorosis (/fluoridation/faqs/dental_fluorosis/index.htm) – Learn more about simple steps to reduce your child's risk for dental fluorosis.

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Content source: Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
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The Federal Register

The Daily Journal of the United States Government

Notice

Proposed HHS Recommendation for Fluoride Concentration in Drinking Water for Prevention of Dental Caries

A Notice by the Health and Human Services Department on 01/13/2011

Action

Notice.

Summary

The Department of Health and Human Services (HHS) seeks public comment on proposed new guidance which will update and replace the 1962 U.S. Public Health Service Drinking Water Standards related to recommendations for fluoride concentrations in drinking water. The U.S. Public Health Service recommendations for optimal fluoride concentrations were based on ambient air temperature of geographic areas and ranged from 0.7-1.2 mg/L.

HHS proposes that community water systems adjust the amount of fluoride to 0.7 mg/L to achieve an optimal fluoride level. For the purpose of this guidance, the optimal concentration of fluoride in

drinking water is that concentration that provides the best balance of protection from dental caries while limiting the risk of dental fluorosis. Community water fluoridation is the adjusting and monitoring of fluoride in drinking water to reach the optimal concentration (Truman BI, *et al,* 2002).

This updated guidance is intended to apply to community water systems that are currently fluoridating or will initiate fluoridation.1 This guidance is based on several considerations that include:

1Community water fluoridation of public drinking water systems has been demonstrated to be effective in reducing caries and producing cost-savings from a societal perspective. (Truman B *et al,* 2002). If local goals and resources permit, the use of this intervention should be continued, initiated, or increased (CDC 2001a).

- Scientific evidence related to effectiveness of water fluoridation on caries prevention and control across all age groups.
- Fluoride in drinking water as one of several available fluoride sources.
- Trends in the prevalence and severity of dental fluorosis.
- Current evidence on fluid intake in children across various ambient air temperatures.

Table of Contents

DATES:

To receive consideration, comments on the proposed recommendations for fluoride concentration in drinking water for the prevention of dental caries should be received no later than February 14, 2011.

ADDRESSES:

Comments are preferred electronically and may be addressed to CWFcomments@cdc.gov. Written responses should be addressed to the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, CWF Comments, Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), 4770 Buford Highway, NE, MS F-10, Atlanta, GA 30341-3717.

FOR FURTHER INFORMATION CONTACT:

Barbara F. Gooch, Associate Director for Science (Acting), 770-488-6054, CWFcomments@cdc.gov, Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), Centers for Disease Control and Prevention, 4770 Buford Highway, NE., MS F-10, Atlanta, GA 30341-3717.

SUPPLEMENTARY INFORMATION:

The U.S. Public Health Service has provided recommendations regarding optimal fluoride concentrations in drinking water from community water systems (CWS) [2] for the prevention of dental caries (US DHEW, 1962). HHS proposes to update and replace these recommendations because of new data that address changes in the prevalence of dental fluorosis, fluid intake among children, and the contribution of fluoride in drinking water to total fluoride exposure in the United States. As of December 31, 2008, the Centers for Disease Control and Prevention (CDC) estimated that 16,977 community water systems provided fluoridated water to 196 million people. 95% of the population receiving fluoridated water was served by community water systems that added fluoride to water, or purchased water with added fluoride from other systems. The remaining 5% were served by systems with naturally occurring fluoride at or above the recommended level. More statistics about water fluoridation in the United States are available at http://www.cdc.gov/fluoridation/statistics/2008stats.htm. Guidance for systems with naturally occurring fluoride levels above the recommended level are beyond the scope of this document. Systems that have fluoride levels greater than the national primary (4.0 mg/L) or secondary (2.0 mg/L) drinking water standards established by EPA can find more information at the following EPA Web site: http://water.epa.gov/drink/contaminants/basicinformation/fluoride.cfm. CDC's Recommendations for Fluoride Use (CDC, 2001b), available at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm, provides guidance on community water fluoridation and use of other fluoride-containing products.

Recommendation

HHS proposes that community water systems adjust their fluoride content to 0.7 mg/L [parts per million (ppm)].

Rationale

Importance of community water fluoridation:

Community water fluoridation is a major factor responsible for the decline of the prevalence and severity of dental caries (tooth decay) during the second half of the 20th century. From the early 1970's to the present, the prevalence of dental caries in at least one permanent tooth (excluding third molars) among adolescents, aged 12-17 years,[3] has decreased from 90% to 60% and the average number of teeth affected by dental caries (*i.e.,* decayed, missing and filled) from 6.2 to 2.6 (Kelly JE, 1975, Dye B, *et al,* 2007). Adults have also benefited from community water fluoridation. Among adults, aged 35-44 years,[4] the average number of affected teeth decreased from 18 in the early 1960's to 10 among adults, aged 35-49 years, in 1999-2004 (Kelly JE, *et al,* 1967; Dye B, *et al,* 2007). Although there have been notable declines in tooth decay, it remains one of the most common chronic diseases of childhood (USDHHS, 2000; Newacheck PW *et al,* 2000). Effective population-based interventions to prevent and control dental caries, such as community water fluoridation, are still needed (CDC, 2001a).

Systematic reviews of the scientific evidence related to fluoride have concluded that community water fluoridation is effective in decreasing dental caries prevalence and severity (McDonagh MS, *et al,* 2000a, McDonagh MS, *et al,* 2000b, Truman BI, *et al,* 2002, Griffin SO, *et al,* 2007). Effects included significant increases in the proportion of children who were caries-free and significant reductions in the number of teeth or tooth surfaces with caries in both children and adults (McDonagh MS, *et al,* 2000b, Griffin SO, *et al,* 2007). When analyses were limited to studies conducted after the introduction of other sources of fluoride, especially fluoride toothpaste, beneficial effects across the lifespan from community water fluoridation were still apparent (McDonagh MS, *et al,* 2000b; Griffin SO, *et al,* 2007).

Fluoride works primarily to prevent dental caries through topical remineralization of tooth surfaces when small amounts of fluoride, specifically in saliva and accumulated plaque, are present frequently in the mouth (Featherstone JDB, 1999). Consuming fluoridated water and beverages and foods prepared or processed with fluoridated water routinely introduces a low concentration of fluoride into the mouth. Although other fluoride-containing products are available and contribute to the prevention and control of dental caries, community water fluoridation has been identified as the most cost-effective method of delivering fluoride to all members of the community regardless of age, educational attainment, or income level (CDC, 1999, Burt BA, 1989). Studies continue to find that community water fluoridation is cost-saving (Truman B, *et al,* 2002).

Trends in Availability of Fluoride Sources

Community water fluoridation and fluoride toothpaste are the most common sources of non-dietary fluoride in the United States (CDC, 2001b). Community water fluoridation began in 1945, reaching almost 50% of the U.S. population by 1975 and 64% by 2008, http://www.cdc.gov/fluoridation/statistics/2008stats.htm; http://www.cdc.gov/fluoridation/pdf/statistics/1975.pdf. Toothpaste containing fluoride was first marketed in the United States in 1955 (USDHEW, 1980) and by the 1990's accounted for more than 90 percent of the toothpaste market (Burt BA and Eklund SA, 2005). Other products that provide fluoride now include mouthrinses, fluoride supplements, and professionally applied fluoride compounds. More detailed explanations of these products are published elsewhere (CDC, 2001b) (ADA, 2006) (USDHHS, 2010). More information on all sources of fluoride and their relative contribution to total fluoride exposure in the United States is presented in a report by EPA (US EPA 2010a).

Dental Fluorosis

Fluoride ingestion while teeth are developing can result in a range of visually detectable changes in the tooth enamel (Aoba T and Fejerskov O, 2002). Changes range from barely visible lacy white markings in milder cases to pitting of the teeth in the rare, severe form. The period of possible risk for fluorosis in the permanent teeth, excluding the third molars,[5] extends from about birth through 8 years of age when the preeruptive maturation of tooth enamel is complete (CDC, 2001b; Massler M and Schour I, 1958). When communities first began adding fluoride to their public water systems in 1945, drinking water and foods and beverages prepared with fluoridated water were the primary sources of fluoride for most children (McClure FJ, 1943). Since the 1940's, other sources of ingested fluoride, such as fluoride toothpaste (if swallowed) and fluoride supplements, have become available. Fluoride intake from these products, in addition to water and other beverages and infant formula prepared with fluoridated water, have been associated with increased risk of dental fluorosis (Levy SL, *et al,* 2010, Wong MCM, *et al,* 2010, Osuji OO *et al,* 1988, Pendrys DG *et al,* 1994, Pendrys DG and Katz RV 1989, Pendrys DG, 1995). Both the 1962 USPHS recommendations and the current proposal for fluoride concentrations in community drinking water were set to achieve a reduction in dental caries while minimizing the risk of dental fluorosis.

Results of two national surveys indicate that the prevalence of dental fluorosis has increased since the 1980's, but mostly in the very mild or mild forms. The most recent data on prevalence of dental fluorosis come from the National Health and Nutrition Examination Survey (NHANES), 1999-2004. NHANES assessed the prevalence and severity of dental fluorosis among persons, aged 6 to 49 years. Twenty-three percent had dental fluorosis of which the vast majority was very mild or mild. Approximately 2% of persons had moderate dental fluorosis, and less than 1% had severe. Prevalence was higher among younger persons and ranged from 41% among adolescents aged 12-15 years to 9% among adults, aged 40-49 years. The higher prevalence of dental fluorosis in the younger persons probably reflects the increase in fluoride exposures across the U.S. population through community water fluoridation and increased use of fluoride toothpaste.

The prevalence and severity of dental fluorosis among 12-15 year olds in 1999-2004 were compared to estimates from the Oral Health of United States Children Survey, 1986-87, which was the first national survey to include measures of dental fluorosis. Although these two national surveys differed in sampling and representation (schoolchildren versus household), findings support the hypothesis that there has been an increase in dental fluorosis that was very mild or greater between the two surveys. In 1986-87 and 1999-2004 the prevalence of dental fluorosis was 23% and 41%, respectively, among adolescents aged 12 to 15. (Beltrán-Aguilar ED, *et al,* 2010a). Similarly, the prevalence of very mild fluorosis (17.2% and 28.5%), mild fluorosis (4.1% and 8.6%) and moderate and severe fluorosis combined (1.3% and 3.6%) have increased. The estimates for severe fluorosis for adolescents in both surveys were statistically unreliable because of too few cases in the samples.

More information on fluoride concentrations in drinking water and the impact of severe dental fluorosis in children is presented in a report by EPA (US EPA 2010 b).

Relationship between dental caries and fluorosis at varying water fluoridation concentrations:

The 1986-87 Oral Health of United States Children Survey is the only national survey that measured the child's water fluoride exposure and can link that exposure to measures of caries and fluorosis (U.S. DHHS, 1989). An additional analysis of data from this survey examined the relationship between dental caries and fluorosis at varying water fluoride concentrations for children aged 6 to 17 years (Heller KE, *et al,* 1997). Findings indicate that there was a gradual decline in dental caries as fluoride content in water increased from negligible to 0.7 mg/L. Reductions plateaued at concentrations from 0.7 to 1.2 mg/L. In contrast, the percentage of children with at least very mild dental fluorosis increased with increasing fluoride concentrations in water. The published report did not report standard errors.

In Hong Kong a small change of about 0.2 mg/L [6] in the mean fluoride concentration in drinking water in 1978 was associated with a detectable reduction in fluorosis prevalence by the mid 1980's [7] (Evans R.W, Stamm JW., 1991). Across all age groups more than 90% of fluorosis cases were very mild or mild. (Evans R.W, Stamm JW., 1991). The study did not include measures of fluoride intake. Concurrently, dental caries prevalence did not increase. (Lo ECM *et al,* 1990). Although not fully generalizable to the current U.S. context, these findings, along with those from the 1986-87 survey of U.S. schoolchildren, suggest that risk of fluorosis can be reduced and caries prevention maintained toward the lower end (*i.e.,* 0.7 mg/L) of the 1962 USPHS recommendations for fluoride concentrations for community water systems.

Relationship of fluid intake and ambient temperature among children and adolescents in the United States:

The 1962 USPHS recommendations stated that community drinking water should contain 0.7-1.2 mg/L [ppm] fluoride, depending on the ambient air temperature of the area. These temperature-related guidelines were based on studies conducted in two communities in California in the early 1950's. Findings indicated that a lower fluoride concentration was appropriate for communities in warmer

climates because children drank more tap water on warm days (Galagan DJ, 1953; Galagan DJ and Vermillion JR, 1957; Galagan DJ *et al,* 1957). Social and environmental changes, including increased use of air conditioning and more sedentary lifestyles, have occurred since the 1950's, and thus, the assumption that children living in warmer regions drink more tap water than children in cooler regions may no longer be valid.

Studies conducted since 2001 suggest that fluid intake in children does not increase with increases in ambient air temperature (Sohn W, *et al,* 2001; Beltrán-Aguilar ED, *et al,* 2010b). One study conducted among children using nationally representative data from 1988 to 1994 did not find an association between fluid intake and ambient air temperature (Sohn W, *et al,* 2001). A similar study using nationally representative data from 1999 to 2004 also found no association between fluid intake and ambient temperature among children or adolescents (Beltrán-Aguilar ED, *et al,* 2010b). These recent findings demonstrating a lack of an association between fluid intake among children and adolescents and ambient temperature support use of a single target concentration for community water fluoridation in all temperature zones of the United States.

Conclusions

HHS recommends an optimal fluoride concentration of 0.7 mg/L for community water systems based on the following information:

- Community water fluoridation is the most cost-effective method of delivering fluoride for the prevention of tooth decay;
- In addition to drinking water, other sources of fluoride exposure have contributed to the prevention of dental caries and an increase in dental fluorosis prevalence;
- Significant caries preventive benefits can be achieved and risk of fluorosis reduced at 0.7 mg/L, the lowest concentration in the range of the USPHS recommendation.
- Recent data do not show a convincing relationship between fluid intake and ambient air temperature. Thus, there is no need for different recommendations for water fluoride concentrations in different temperature zones.

Surveillance Activities

CDC and the National Institute of Dental and Craniofacial Research (NIDCR), in coordination with other Federal agencies, will enhance surveillance of dental caries, dental fluorosis, and fluoride intake with a focus on younger populations at higher risk of fluorosis to obtain the best available and most current information to support effective efforts to improve oral health.

Process

The U.S. Department of Health and Human Services (HHS) convened a Federal inter-departmental,

inter-agency panel of scientists (Appendix A) to review scientific evidence related to the 1962 USPHS Drinking Water Standards related to recommendations for fluoride concentrations in drinking water in the United States and to update these proposed recommendations. Panelists included representatives from the Centers for Disease Control and Prevention, the National Institutes of Health, the Food and Drug Administration, the Agency for Healthcare Research and Quality, the Office of the Assistant Secretary for Health, the U.S. Environmental Protection Agency, and the U.S. Department of Agriculture. The panelists evaluated existing recommendations for fluoride in drinking water, systematic reviews of the risks and benefits from fluoride in drinking water, the epidemiology of dental caries and fluorosis in the U.S., and current data on fluid intake in children, aged 0 to 10 years, across temperature gradients in the U.S. Conclusions were reached and are summarized along with their rationale in this proposed guidance document. This guidance will be advisory, not regulatory, in nature. Guidance will be submitted to the Federal Register and will undergo public and stakeholder comment for 30 days, after which HHS will review comments and consider changes.

Dated: January 7, 2011.

Kathleen Sebelius,

Secretary.

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U.S. EPA (U.S. Environmental Protection Agency). 2010b. *Fluoride: Dose-response Analysis for Non-cancer Effects.* Health and Ecological Criteria Division, Office of Science and Technology, Office of Water, Washington, DC. EPA 820-R-10-019. Available at: **http://water.epa.gov/action/advisories/drinking/fluoride_index.cfm**. Comments regarding the document, *Fluoride: Dose-response Analysis for Non-cancer Effects,* should be sent to EPA at **FluorideScience@epa.gov**.

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Appendix A—HHS Federal Panel on Community Water Fluoridation

Peter Briss, MD, MPH—Panel Chair, Medical Director, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services.

Laurie K. Barker, MSPH, Statistician, Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services.

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Mary Beth Bigley, DrPH, MSN, ANP, Acting Director, Office of Science and Communications, Office of the Surgeon General, U.S. Department of Health and Human Services.

Linda Birnbaum, PhD, DABT, ATS, Director, National Institute of Environmental Health Sciences and National Toxicology Program, National Institutes of Health, U.S. Department of Health and Human Services.

John Bucher, PhD, Associate Director, National Toxicology Program, National Institute of Environmental Health Sciences, National Institutes of Health, U.S. Department of Health and Human Services.

Amit Chattopadhyay, PhD, Office of Science and Policy Analysis, National Institute of Dental and Craniofacial Research, National Institutes of Health, U.S. Department of Health and Human Services.

Joyce Donohue, PhD, Health Scientist, Health and Ecological Criteria Division, Office of Science and Technology, Office of Water, U.S. Environmental Protection Agency.

Elizabeth Doyle, PhD, Chief, Human Health Risk Assessment Branch, Health and Ecological Criteria Division, Office of Science and Technology, Office of Water, U.S. Environmental Protection Agency.

Isabel Garcia, DDS, MPH, Acting Director, National Institute of Dental and Craniofacial Research, National Institutes of Health, U.S. Department of Health and Human Services.

Barbara Gooch, DMD, MPH, Acting Associate Director for Science, Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services.

Jesse Goodman, MD, MPH, Chief Scientist and Deputy Commissioner for Science and Public Health, Food and Drug Administration, U.S. Department of Health and Human Services.

J. Nadine Gracia, MD, MSCE, Chief Medical Officer, Office of the Assistant Secretary for Health, U.S. Department of Health and Human Services.

Susan O. Griffin, PhD, Health Economist, Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services.

Laurence Grummer-Strawn, PhD, Chief, Maternal and Child Nutrition Branch, Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services.

Jay Hirschman, MPH, CNS, Director, Special Nutrition Staff, Office of Research and Analysis, Food and Nutrition Service, U.S. Department of Agriculture.

Frederick Hyman, DDS, MPH, Division of Dermatology and Dental Products, Center for Drug Evaluation and Research, Food and Drug Administration, U.S. Department of Health and Human Services.

Timothy Iafolla, DMD, MPH, Office of Science and Policy Analysis, National Institute of Dental and Craniofacial Research, National Institutes of Health, U.S. Department of Health and Human Services.

William Kohn, DDS, Director, Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services.

Richard Manski, DDS, MBA, PhD, Senior Scholar, Center for Financing, Access and Cost Trends, Agency for Healthcare Research and Quality, U.S. Department of Health and Human Services.

Benson Silverman, MD, Staff Director, Infant Formula and Medical Foods, Center for Food Safety and Applied Nutrition, Food and Drug Administration, U.S. Department of Health and Human Services.

Thomas Sinks, PhD, Deputy Director, National Center for Environmental Health/Agency for Toxic Substances and Disease Registry, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services.

[FR Doc. 2011-637 Filed 1-12-11; 8:45 am]

BILLING CODE P

Footnotes

1. Community water fluoridation of public drinking water systems has been demonstrated to be effective in reducing caries and producing cost-savings from a societal perspective. (Truman B *et al,* 2002). If local goals and resources permit, the use of this intervention should be continued, initiated, or increased (CDC 2001a).

Back to Context

2. For purposes of this guidance, a water system is considered a community water system if so

designated by the State drinking water administrator in accordance with the regulatory requirements of the U.S. Environmental Protection Agency. In general, public water systems provide water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year. A community water system is a public water system that supplies water to the same population year-round, http://water.epa.gov/infrastructure/drinkingwater/pws/factoids.cfm.

Back to Context

3. There were slight differences in the age groups used in both surveys. The 1971-1974 survey reported on adolescents aged 12-17 years (Kelly JE, 1975) while the 1999-2004 survey reported on adolescents and youths aged 12-19 years (Dye B, *et al.,* 2007). Because the prevalence of dental caries increases with age, the estimates for 12-17 year olds in the most recent survey (1999-2004) should be slightly lower than those published for 12-19 year olds (Dye B, *et al,* 2007).

Back to Context

4. There were slight differences in the age groups used in both surveys. The 1962 survey reported on adults aged 35-44 years (Kelly JE *et al* 1967) while the 1999-2004 survey reported on adults aged 35-49 years (Dye B, *et al,* 2007).

Back to Context

5. Risk for the third molars (*i.e.,* wisdom teeth) extends to age 14 years (Massler M, 1958) . Third molars are much less likely than other teeth to erupt fully into a functional position due to space constraints in the dental arch and may be impacted, partially erupted, or extracted. For these reasons third molars are not assessed for dental caries or dental fluorosis in national surveys in the U.S. In addition, based on their placement, these teeth are unlikely to be of aesthetic concern.

Back to Context

6. Fluoride concentrations in drinking water before and after the 1978 reduction were 0.82 and 0.64 mg F/L, respectively.

Back to Context

7. Fluorosis prevalence ranged from 64% (SE = 4.1) to 47% (SE = 4.5) based on the upper right central incisor only.

Back to Context

Mosaic™

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Telephone: (813) 677-9111 - TELX52666
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This product was produced at the
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CAR NO: SHPX205358

Deliveries: 5000998279

Material: Our / Your reference
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Quality Certificate
Date
01/29/2013
Purchase order item/date

Delivery item/date
5000998279 000010 / 11/12/2012
Order item/date

Customer number
2450

Inspection lot 110000002854 from 11/28/2012

Characteristic	Result	Unit
Chemical Analysis		
Net H2SiF6	23.92	%
P2O5	0.04	%
Free Acid	0.35	%
Lead	0.00	ppm
Arsenic	40.75	ppm
Physical Analysis		
Density	1.2210	g/cm3
APHA	30	CU

"We certify that product shipped with this Certificate of Analysis meets AWWA B703-11"

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ANALYSIS REPORT

Chain of Custody Number: R13-016
Project Name / Number: N/A / N/A
Date Collected: 02/13/13
Time Collected: 09:30

Sample Number: Fluorosidic Acid
Lab Number: R13-016-01
Sample Matrix: Liquid
Sample Type: N/A

Analysis	Result	Units	Reporting Limit	Analysis Method	Date - Analyst
Arsenic, Total	62.0	ppm	0.50	ICP-MS	3/11/2013 - MWL
Lead, Total	< 0.10	ppm	0.10	ICP-MS	3/11/2013 - MWL

Notes:

Report Date: 03/14/13

Affidavit

"In my professional opinion as a currently practicing private dentist, the ingestion of drinking water containing hydrofluosilicic acid, the chemical used for water fluoridation in the amount of 0.70 milligram per liter, is perfectly safe for infants, children adults and the elderly. There are no side effects."

Please read carefully and sign below.

As a licensed dentist, I hereby certify under penalty of perjury, under the laws of the State indicated below, the truth and accuracy of the above statement made in this individual personal affidavit.

Name	*Date*
Title	*City and State*
Signature	

COLUMBIA/BOONE COUNTY BOARD OF HEALTH
MEETING MINUTES
January 10th, 2013

The Columbia/Boone County Board of Health met for a regularly scheduled meeting at 5:30 p.m., Thursday, January 10th, 2013. The meeting was held at the Columbia/Boone County Department of Public Health and Human Services, 1005 W. Worley St. Public Health & Human Services Director Stephanie Browning represented the staff. Administrative Support Assistant Dawna Mavel recorded the minutes of the meeting.

MEMBERS PRESENT:	MEMBERS EXCUSED:	MEMBERS NOT EXCUSED
Ilalyn Irwin		
Dr. Colin Malaker		
Dr. Sally Beth Lyon		
Lynelle Phillips		
Mahree Skala		
Dr. Michael Szewczyk		
Harold Stearley		
Harry Feirman		
Jean Sax		
Beth Hussey		

CALL TO ORDER
Chair Ilalyn Irwin called the meeting to order at 5:30 p.m.

PRESENTATION:
Ms. Irwin welcomed the newest Board member, Dr. Beth Hussey, DVM. Dr. Hussey introduced herself as a small animal veterinarian in Columbia and a member of the Vicious Dog Advisory Board. She previously served on the Board of Health several years ago.

APPROVAL OF AGENDA:
The agenda was amended to include information provided from the Energy and Environment Commission.

APPROVAL OF MINUTES:
The minutes from the October 2012 meeting were approved as written.

ELECTION OF OFFICERS:
Ms. Irwin requested nominations for chairperson of the Board of Health. Ms. Lyon nominated Dr. Szewczyk to serve as Chair. No other nominations were made. Dr. Szewczyk accepted. Ms. Irwin then asked for nominations for Vice Chair. Ms. Sax

nominated Mr. Stearley. No other nominations were made. Mr. Stearley accepted. The new chair and vice chair were approved by acclamation.

NEW BUSINESS:

Ms. Browning introduced Jason Wilcox and Rachael Young who were reporting on the Health Impact Assessment (HIA) completed in 2012 looking at the local Transit system in Columbia. This was the first HIA done locally, and one of the few done in the state. Mr. Wilcox is the Health Impact Assessment Coordinator for the Columbia/Boone County Public Health and Human Services. Ms. Young serves as the Communications Coordinator for HIA. The information on the assessment will be presented to the City Council on February 4, 2013.

Mr. Wilcox mentioned that the HIA project has been going on for about a year. A copy of the executive summary was handed out for Board members as well as a PedNet document which was used as a secondary data source. This document summarized meetings held last year in four City wards where community members were invited to discuss transit issues. The HIA project was funded by two grants: one from the Missouri Foundation for Health provided to Central Missouri Community Action and a Robert Wood Johnson Foundation Roadmaps to Health Grant given to the PedNet Coalition. This was one of 12 such grants given nationwide and the only one in Missouri.

The eight member HIA partner team was formed with members from the Columbia/Boone County Public Health department and members from various local community and advocacy organizations. Mr. Wilcox provided background information about the transit system in Columbia. He noted that it came close to exhausting a reserve fund in the summer of 2011. It has been relying on the reserve fund since 2007 to run daily operations and this is unsustainable. This resulted in a fare increase for student and non-student riders as well as planned service reductions. The system does not run on Sunday and has limited hours Monday through Thursday.

Ms. Young mentioned this particular HIA assessment was conducted to research the potential health effects, positive or negative that would result from expanding transit services in Columbia. The HIA recognizes that policies made in different domains such as transportation, education and planning influence health even if health is not considered in the specific policy making process. The purpose of the HIA is to provide systematic evidence based research to explore what the potential health effects may be if specific policy parameters are modified. For example, an HIA was conducted in Kansas to determine health effects of building a Casino. The evidence showed there were both positive and negative health effects. The casino would provide more jobs with access to healthcare. Shift work and smoking could both result in negative health impacts.

Ms. Young mentioned the best time to do an HIA is during the discussion period for a proposed policy, program or plan. The handout given shows the specific details and

process used in conducting the Transit HIA assessment along with the objectives and results. Click **here** to view a more detailed look at the assessment.

The Columbia Transit HIA noted that some people who lacked their own vehicle had difficulty getting to health appointments and work. Many of these folks were bus riders. People who rely on the bus service struggled because there was limited availability of times. Students had difficulty getting to and from evening classes. During the discussion after the presentation, Board members noted literacy concerns with schedules which were hard to read, poor conditions of some of the bus stops, and many of the stops not being well marked. The HIA did find that adding more bus stops would actually increase rider's activity as more people would be walking to the stops.

Dr. Szewcyzk asked if there were any other cities similar to the size of Columbia in the United States who has a system that works well and makes money. Ian Thomas, a consultant from the PedNet Coalition, mentioned that he knew of three that seemed to be working very well: Champaign, IL, Ames, IA and Lawrence, KS. All three had a different operational model and funding sources.

New Business:

Dr. Szewcyzk led the discussion on the fluoridation issue. The goal was not to settle the issue tonight but to determine the process we would use to arrive at a recommendation to give to Council.

Amy Bremer gave a presentation on her concerns about fluoride's impact, specifically on children and her concerns about handling and using hydrofluorosilicic acid (HSFA) in Columbia's drinking water. She mentioned studies in the past have shown that it can include arsenic and lead. Mosaic is the company that supplies HSFA and Ms. Bremer tried to contact them three times to get further details regarding any other contaminants that may be in HSFA. She did not get a call back. Ms. Bremer was concerned about total dosage of fluoride and how much a child or adult should consume to have the benefit but to avoid dental fluorosis and other risks. For further details on Ms. Bremer's presentation go to the online Agenda for this meeting and open document attached.

Dr. Szewcyzk noted that many well respected organizations support the use of fluoride in drinking water. The "ruling on the field", by the CDC, the American Dental Association, the WHO, the American Academy of Pediatrics and many others, is that fluoride in the drinking water makes sense. He felt that in order for us to overturn this recommendation, we need substantial evidence that it is the wrong position and Columbia should do otherwise. That said, he felt that the information provided did raise valid concerns and he had some reservations regarding the use of fluoride. He noted that the literature and articles available supporting fluoride were old and that many consumer products now contain fluoride. He opened the discussion asking the Board to determine what methodology the group will use to examine the issue.

Ms. Skala suggested the group consider looking at a source of information called the Guide to Community Preventive Services. It is a set of recommendations developed by expert panels that review all the literature on a wide variety of topics and generate recommendations that are graded in their strength. Community water fluoridation is recommended by this body, but it might be helpful to understand the process of what they went through to come to this recommendation. It might be good to hear from someone from that group to find out about the process that was used.

Dr. Malaker said he believes that topical fluoride is far better than ingested fluoride. If you brush your teeth with fluoride toothpaste and have good oral health habits there is no need for water fluoridation. If you don't brush your teeth, having it in the water won't necessarily prevent cavities. One concern is the daily oral brushing habits of our young population. He noted that orthodontic patients are not allowed to brush their teeth at school after they eat. Dr. Malaker mentioned studies that show the overall trend in communities who don't have fluoride in their water is that they have about the same rates of dental caries as those communities that do fluoridate. Dr. Malaker felt it was very important the group study the issue further and offer a session for public comment.

Ms. Phillips asked if dental fluorosis can be used as a biomarker of excess fluoride exposure and do we have it in Columbia. Dr. Malaker said yes and that just about every teenager he sees in Columbia has at least a mild fluorosis. It is not caused by toothpaste. He mentioned that fluorosis is caused by the fluoride interacting with the tooth during enamel formation. Ms. Lyon felt it was important to collect data on this issue before making any further judgment.

Ms. Skala says there is good evidence over the last few decades the number of cavities in children has gone down. The stakes are high in terms of underprivileged population who may not have access to dental care or other forms of fluoride that are available. We can't lose sight of this.

Ms. Lyon asked the group to refocus on what the group's process should be in looking at the fluoride issue. She asked what exactly is the council requesting from the group. Ms. Browning said they did not specify exactly what they wanted, but based on public comment at the council meetings, the question is whether or not Columbia should be adding fluoride to the drinking water.

Ms. Lyon recommended that if our purpose is to make a recommendation to the council regarding the appropriateness of fluoridation, then it cannot be about general dental health. Dr. Szewczyk noted that Columbia's water supply is already has a fluoridation level of .3 mg/L. Ms. Phillips pointed out that what we really need to do is determine if there is substantial evidence to make a change from .7 mg/L to .3 mg/L rather than choose between the two.

Mr. Feirman recommended a subcommittee be set up to further discuss the issue at hand.

Motion was made by Ms. Phillips that the subcommittee examine the available evidence and determine if there is substantial evidence to change from .7 mg/L to .3 mg/L. In addition, if the subcommittee determines that fluoridation at .7 mg/L should continue, then the subcommittee should determine which product, Sodium Fluoride or HFSA, should be used. The motion carried.

Dr. Szewczyk asked for a show of hands on who would like to participate on the subcommittee and asked who might want to lead the group. Ms. Sax recommended Ms. Skala be the chair of the subcommittee. All agreed and Ms. Skala kindly accepted. A date will be picked and a meeting notice will be sent out to all Board members and will be posted on the website.

Ms. Irwin discussed information sent by the Energy and Environmental Commission (EEC) regarding homeowner radon exposure and their recommendation regarding home construction standards. It was unclear what, if anything, the EEC was requesting from the Board of Health. It was agreed that if the City Council would like us to review the issue, we would be happy to do so.

NEXT MEETING DATE February 14, 2013

ADJOURN: There being no additional business; the meeting was adjourned at 7:30 p.m.

COLUMBIA/BOONE COUNTY BOARD OF HEALTH
FLUORIDATION SUBCOMMITTEE MEETING MINUTES
January 24th, 2013

The Columbia/Boone County Board of Health fluoridation subcommittee met at 5:30 p.m., Thursday, January 24th, 2013. The meeting was held at the Columbia/Boone County Department of Public Health and Human Services, 1005 W. Worley St. Public Health & Human Services Director Stephanie Browning represented the staff. Administrative Support Assistant Dawna Mavel recorded the minutes of the meeting.

MEMBERS PRESENT:	MEMBERS EXCUSED:	MEMBERS NOT EXCUSED
Dr. Colin Malaker		
Dr. Sally Beth Lyon		
Lynelle Phillips		
Mahree Skala		
Dr. Michael Szewczyk		
Harry Feirman		

CALL TO ORDER
Chair Mahree Skala called the meeting to order at 5:30 p.m.

APPROVAL OF AGENDA:
The agenda was approved as submitted.

NEW BUSINESS:
Ms. Skala introduced John Conway, Chair of the City Water & Light Advisory Board. Mr. Conway asked to join the group and learn more about the information that is being presented. Mr. Conway said he is a licensed professional engineer and has been involved with the board for 23 years and has followed public water supply issues throughout the state of Missouri.

Ms. Skala reinforced the subcommittee purpose as it was defined at the January 2013 Board of Health meeting. In order to assist the Board of Health in making a recommendation to the City Council regarding fluoridation of the city water supply, the subcommittee will:

1) examine the available evidence and make a recommendation as to whether there is substantial, strong evidence that the level of fluoride in city water should be changed from the current level of 0.7 ppm to 0.3 ppm (the background rate), and
2) if the recommendation is to continue fluoridation at the 0.7 ppm level, evaluate whether the city should switch from using HFSA to sodium fluoride

As a result of the discussion at the January 2013 Board of Health meeting there were a number of questions raised so the current agenda is set up for the subcommittee to address those questions. Ms. Skala briefly reiterated the background of the problem as follows. Dental caries has been recognized as a significant public health problem that impacts both dental and physical health as it is associated with a higher risk of heart disease. Water fluoridation came about because there are wide variations in naturally occurring fluoride content of water supplies and there were observations made starting in the mid-20th century that higher fluoride levels were correlated with lower levels of dental caries. This led to community based studies in the post WWII period into

fluoridation research and practices as we know it now. Columbia implemented water fluoridation in 1974. In conjunction with the development of research and practice, the roles of federal agencies have evolved over time. The three agencies involved in fluoride and drinking water are:

1. The (EPA), Environmental Protect Agency regulates public drinking water supplies; they establish maximum contaminant levels for a wide variety of chemicals. Those regulations state water supplies cannot go over that maximum contaminant level and be in compliance with the law.
2. The (FDA) Food and Drug Administration performs a similar function as the EPA for bottled water.
3. The (DHHS) Department of Health and Human Services looks at the oral health aspect and research and makes recommendations regarding the optimum level of water fluoridation to achieve maximum caries reduction while minimizing fluorosis.

The landscape is always changing and in recent years there is more public exposure to fluoride and dental products such as toothpaste and mouth rinses, etc., and there have been documented increases in dental fluorosis. The EPA is required to review all of its maximum contaminant level standards every six years to take into account new research.

Ms. Skala proceeded with discussing agenda items in the order listed, but first mentioned that a leading opponent of water fluoridation Dr. Hirzy will not be joining in on a previous scheduled teleconference due to a last minute conflict. At the end of the subcommittee discussion a decision will be made on how to proceed with getting that information. Ms. Skala mentioned that public comments will be in the order of how people signed in with a time limit of 4 minutes each. An option to provide written comment was also offered. If time did not allow everyone to provide comment, another session will be scheduled to allow this to happen in the same fashion.

The first topic discussed (based on the information requested to be reviewed from the BOH meeting on January 10th) was information on a dental health assessment completed in Missouri in 2005 which studied the status of caries and fluorosis in the state. The survey was done by selecting random elementary schools and classrooms around the state (8 to 9 year olds in the third grade). Key findings showed that tooth decay is a significant health problem for Missouri children. While dental sealants have proven to be a good method in preventing decay, the majority of Missouri's third grade children did not have access to this preventive service at the time this survey was done. Other findings showed that African American and children from low-income school's oral health status and access to preventive dental sealants was less than the general population. The survey also showed 1 in 4 third graders and more than 1 in 5 special health care needs children in Missouri has untreated tooth decay, and many children in the state are attending school with infection or pain from dental disease. More details on this survey can be viewed from the following link: http://health.mo.gov/living/families/oralhealth/pdf/ShowMeSmile2005.pdf

Another study done around the same time period, 1999 to 2004, was done by the National Health and Nutrition Examination Survey (NHANES). Random samples of various age groups received intensive physical exams and the data was analyzed over the years. The study found that there was a prevalence of dental caries in children two to eleven year olds. This group had 42% dental caries in their primary teeth; blacks and Hispanic children and lower income children had a higher level of untreated and more severe decay; 59% among adolescents had dental caries; 92% adults ages 20 to 64 had dental caries. More detailed information on this survey can be viewed at the following link: http://www.nidcr.nih.gov/DataStatistics/FindDataByTopic/DentalCaries/
There is no specific data available for Boone County.

The topic moved to EPA Fluoridation standards. EPA's current drinking water regulations set a maximum level of 4mg/L of fluoride or 4 parts per million (ppm) for both mcl (maximum contaminant level) and mclg (maximum contaminant level goal). The EPA also has a secondary standard (SMCL) for fluoride at 2.0mg/L or 2.0 ppm. These standards are non-enforceable guidelines regulating contaminants that may cause cosmetic effects such as skin or tooth discoloration or aesthetic effects such as taste or odor in drinking water. Further information on EPA standards can be viewed from the following link: http://water.epa.gov/drink/contaminants/basicinformation/fluoride.cfm

Ms. Lyon asked for clarification on a news release dated January 2011. The release discusses the EPA and Department of Health and Human Services (HHS) new scientific assessments and actions on fluoride where the HHS has proposed a recommendation of lowering the amount of fluoride to 0.7 mg. The EPA is the regulatory body. Mr. Feirman mentioned that the EPA and HHS standards are for two different things. The EPA standards are in relation to skeletal fluorosis (potential damage to bones), not discoloration of teeth. The HHS recommendation is the highest level that would prevent dental caries that would not contribute to dental fluorosis. Dr. Szewczyk mentioned that they are two different organizations with two different perspectives. The EPA's concern is toxicity levels, not what is good or not good for teeth. The HHS wants what is good for teeth and would like to see the level stay at 0.7 mg per liter. HHS wants the lowest level that is safe and effective to prevent dental caries. 2400 public comments have been responded to on this subject matter and a ruling is still in process at the federal level. The following two links provide further details on this topic.

1. https://www.federalregister.gov/articles/2011/01/13/2011-637/proposed-hhs-recommendation-for-fluoride-concentration-in-drinking-water-for-prevention-of-dental#table_of_contents

2. https://petitions.whitehouse.gov/petition/prohibit-all-federal-agencies-promoting-endorsing-or-funding-fluoridation-public-drinking-water/SRYL4NwC

Ms. Skala introduced Mike Anderson, Engineering Supervisor for the City of Columbia. One question proposed was based on the level of fluoride in well water. Mr. Anderson said historically the level has ranged from .3 and .6 mg. Dr. Szewczyk mentioned that the city's baseline varies and wanted to know how much it varies. Mr. Anderson said there had not been any big spikes in the last several months. The average is around .24 mg versus the river level which is .37 mg.

Mr. Anderson moved on to discussing how the city decides how much fluoride to add to the water. He said it was based on monitoring the output. The state does confirm readings monthly. The resulting output samples are run between every two to four hours. Adjustments normally do not have to be made more than twice a day. A question was raised if everyone in the city limits get water from city water or is some provided by consolidated water districts? The city limit boundary is the same as the water service territory. The university has its own water system for the most part; a few buildings are served by the city. There are three remaining well sites within city limits providing their own water (grandfathered in) that Mr. Anderson said he was aware of. The fluoride levels of the university water, based on leak samples and information prior to 1970 is around 1 part per million (natural occurring fluoride). Ms. Skala asked Mr. Anderson to explain the chemical used to fluoridate the water and safety regulations used. Mr. Anderson said the city uses hydrofluorosilicic acid and said it was a very mild acid in its concentrated form. Staff does have to wear gloves and eye protection but does not suit up to work with it. Mr. Anderson did mention that the staff has no contact with the solution. It comes in a tanker trunk, goes into an outside tank, then into and inside tank. It is not touched at all. The day tank onsite holds approximately 150 gallons

of this chemical and around 50 gallons is added to 10 million gallons of water so the amount added is very minimal. Dr. Malaker asked if this chemical is ever tested prior to adding it to the water. Mr. Anderson said no, but the trucking company gives a test report that says what is in it and what is not in it. No independent testing has ever been done. Ms. Skala asked if there are any routine tests done to measure the levels of things like arsenic and lead. Mr. Anderson said samples are pulled and regularly tested through the water quality lab and are done annually or at special requests. Anytime there is a spill, tests do have to be done. A question was raised whether the strength of the fluoride changes based on how far down the distribution system the water goes and if it is checked at monitoring points throughout the system. Mr. Anderson said it is checked monthly at monitoring points and remains very stable once it is in the water. It does not break down or recompose. Further information on Columbia's 2011 water testing results can be viewed from the following link: http://www.gocolumbiamo.com/WaterandLight/Documents/watertest.pdf

Ms. Lyon asked Mr. Anderson what his response was to the concern that there might be other contaminants in the hydrofluoric acid received from the supplier. He said the city has to rely and trust the suppliers to use contaminant free containers and that is confirmed by the annual testing. Dr. Malaker mentioned a concern that the city does not know how reliable the tests are that are done by the manufacturers and trucking companies and asked the board think about doing some independent testing. Mr. Anderson said the only time the water would be tested for contaminants would be if there is a spill. One spill that was tested did not show any contaminants. Dr. Szewczyk recommended that the board could have someone call the vendor and ask them if they do testing and if they could send us results of that testing; and if we don't trust the vendor is being honest we could have an independent test done. Ms. Skala said there is an independent standards organization called (ANSI/AWWA) American National Standards Institute/American Water Works Association that assures chemicals used meet industry standards. Mr. Feirman asked Mr. Anderson what the rationale was for choosing HFSA rather than any other means of adding fluoride. Mr. Anderson said that it was before his time, but he understands it as being the easiest to add with the least amount of exposure to staff.

Ms. Skala mentioned an article that had some good information about the topic of chemicals used to add fluoride to water. It is called **Water Fluoridation and the Environment** and can be viewed from the following link: http://www.cdc.gov/fluoridation/pdf/pollick.pdf Dr. Szewczyk shared a specific sentence from that article he found interesting; *"While there may be evidence of toxicity in these substances when workers involved in the production are now projected, there is no credible evidence of toxicity when they are diluted for use in fluoridated water."* It is a worthy article to read and was in a peer reviewed journal containing several references.

Additional reference materials were supplied by Ms. Skala for the group to review at their convenience. The links are below:

NOTE: These are in addition to the materials supplied for the January 10, 2013 BOH Meeting

General information about dental caries
http://www.nlm.nih.gov/medlineplus/ency/article/001055.htm

Dental infection and vascular disease
http://www.ncbi.nlm.nih.gov/pubmed/21455852

Dental caries, water fluoridation and social class
http://www.ncbi.nlm.nih.gov/pubmed/17436972

General information about dental fluorosis
http://www.cdc.gov/fluoridation/safety/dental_fluorosis.htm

National Kidney Foundation statement, April 2008
http://www.kidney.org/atoz/pdf/fluoride_intake_in_ckd.pdf

In Their Own Words: What Respected Organizations Say about the Safety and Effectiveness of Community Water Fluoridation (The Campaign for Dental Health)
http://www.ilikemyteeth.org/wp-content/uploads/2011/03/RespectedOrgs-noPics_v2a.pdf

Proposed HHS Recommendation for Fluoride Concentration in Drinking Water for Prevention of Dental Caries, January 13, 2011
https://www.federalregister.gov/articles/2011/01/13/2011-637/proposed-hhs-recommendation-for-fluoride-concentration-in-drinking-water-for-prevention-of-dental#h-8

Joint Response Statement by HHS Asst. Secretary and Acting Asst. Admin for the EPA Office of Water, 2011
https://petitions.whitehouse.gov/petition/prohibit-all-federal-agencies-promoting-endorsing-or-funding-fluoridation-public-drinking-water/SRYL4NwC

Additional Information re EPA Six-Year Drinking Water Standards Review
Joint HHS/EPA Press Release, 2011
http://yosemite.epa.gov/opa/admpress.nsf/3881d73f4d4aaa0b85257359003f5348/86964af577c37ab285257811005a8417!OpenDocument

Fluoride: Dose-Response Analysis for Non-cancer Effects (160 pp, 820-R-10-019)
http://water.epa.gov/action/advisories/drinking/upload/Fluoride_dose_response.pdf

Fluoride: Exposure and Relative Source Contribution Analysis (210 pp, 820-R-10-015)
http://water.epa.gov/action/advisories/drinking/upload/Fluoridereport.pdf

Ms. Skala introduced Dr. Lori Henderson. Dr. Henderson directed everyone to the document she provided with several links about fluoride prior to beginning her presentation. If you would like further detail the links are provided below.

SAFE AND OPTIMAL FLUORIDATION OF COLUMBIA'S WATER, Brief List of References 1/22/2013 Lori Henderson, DDS
Board Certified Pediatric Dentist
drlori@ident.com

ADA Fluoridation Facts
http://www.ada.org/sections/newsAndEvents/pdfs/fluoridation_facts.pdf
pages 58-67 contain 359 peer-reviewed references

Creating a Healthier Missouri: A State Oral Health Plan 2009
http://health.mo.gov/living/families/oralhealth/pdf/OralHealthPlan.pdf

American Academy of Pediatric Dentistry
http://www.aapd.org/policies

2013 National Call to Action to Promote Oral Health, under the leadership of the Office of the Oral Surgeon
http://www.surgeongeneral.gov/library/calls/oralhealth/nationalcalltoaction.html

CDC Division of Oral Health
http://www.cdc.gov/oralhealth/topics/child.htm

Trends in Oral Health Status: US 1988-1994 and 1999-2004
http://www.cdc.gov/nchs/data/series/sr_11/sr11_248.pdf

Reconstitution of Infant Formula
http://www.cdc.gov/fluoridation/safety/infant_formula.htm

Mild Fluorosis Images
http://www.ada.org/5172.aspx?currentTab=2

CDC/NCHS 2010; Prevalence and Severity of Dental Fluorosis
http://www.cdc.gov/nchs/data/databriefs/db53.htm

CDC Water Fluoridation Additives, updated 2012
http://www.cdc.gov/print.do;jsessionid=B6C2750D24A031966FF0BD454618E7AA.node1?url=http%3A%2F%2Fwww.cdc.gov%2Ffluoridation%2Ffact_sheets%2Fengineering%2Fwfadditives.htm

Columbia City Water and Light, Water Quality Reports.
http://www.gocolumbiamo.com/WaterandLight/Water/WaterQualityReport.php
http://www.gocolumbiamo.com/WaterandLight/Documents/watertest.pdf

American Academy of Pediatrics Endorsement of Water Fluoridation, 2013
http://www.healthychildren.org/English/healthy-living/oral-health/Pages/Water-Fluoridation.aspx

American Academy of Family Physicians Endorsement of Water Fluoridation, 2012
http://www.aafp.org/online/en/home/clinical/clinicalrecs/guidelines/fluoridation.html

National and International Organizations that Recognize the Public Health Benefits of Community Water Fluoridation for Preventing Dental Decay
http://www.ada.org/4051.aspx

Ms. Henderson introduced herself as a board certified pediatric dentist in Columbia. Prior to coming to Columbia she worked with the US Public Health Service. Dr. Henderson mentioned she is the public policy advocate for the state of Missouri for the American Academy of Pediatric Dentists. The discussion started with Dr. Henderson mentioning she would like to talk in favor of continuing safe optimally fluoridated water in Columbia with a current level of approximately 0.65 ppm. The optimal has been set to 0.7 to 1.2 ppm. The science and recommendations over the past 60 years, the U.S. Public Health Service, CDC, American Academy of Family Physicians, etc. (over 100 organizations) endorse safe regulated optimal water fluoridation. Science and data

continue to confirm that in fluoridated communities, even in the presence of the use of fluoride toothpaste and rinses, we can still benefit from a 20 to 40% reduction in tooth decay in fluoridated vs. non-fluoridated communities. There is a range because some communities have been fluoridating longer. The common wisdom in the reduction in cost of dental care is for every dollar invested in water fluoridation is a $38 savings in dental care.

Dr. Henderson said that there has been a lot of talk about a decreasing trend in tooth decay over the last 20 years. This decrease was pretty solid for all age groups until 1999 at which time tooth decay started increasing in two and five year olds. The National Health and Nutrition Examination Survey (NHANES) shows tooth decay has increased from 1 out 4 children by the time they are 5 years olds by to 28%. 4 percent is a significant increase. This survey is a program of studies designed to assess the health and nutritional status of adults and children in the United States. The survey is unique in that it combines interviews and physical examinations.

Dr. Henderson showed a photo of one child with tooth decay and mentioned it is five times more common than asthma. It is a bacterial infection that can't be treated with antibiotics until it becomes a medical problem and leaves the tooth and goes into the body. Dr. Henderson said that this is not a small problem and that she sees significant tooth decay much more frequently than fluorosis in our community.

Dr. Henderson showed a bar graph from the CDC's Healthy People 2010 review that showed that our nation's 2 to 5 year old children did not reach the goal set for oral health. More information on this review can be viewed from the following link:
http://www.cdc.gov/nchs/healthy_people/hp2010/hp2010_final_review.htm

Dr. Henderson asked if anyone had any questions. Dr. Malaker commented that his understanding on dental fluorosis is that it is caused by inhibition of certain enzymes, specifically "G" proteins during the enamel formation. His question/concern was if fluoride consumed in our body goes in and does this during tooth development, what other "G" proteins are being inhibited for other development such as neurological in developmental aged children. If we are seeing ***mild*** fluorosis during tooth development, the concern is the "G" protein being prohibited causing fluorosis based on a study by Matsuo in 1998. Ms. Henderson said she would like to go back and look at that and mentioned studies like that are based on speculation because we can't do human studies. Ms. Skala said she would like to see if there is any published information on this particular issue and Dr. Henderson said there is no cause and effect data on what causes fluorosis, and that it is important that a child's medical history also needs to reviewed when looking at dental fluorosis cases. Dr. Malaker said he would send the article mentioned above to Dr. Henderson for review.

Ms. Skala welcomed everyone requesting public comment and said we would do our best to accommodate as many folks as possible based on the time allotted.

Public Comment 1: Dan Redmond
Dr. Redmond approached the Board as a concerned citizen. His concern was if .7 ppm concentration fluoride level was safe for the general population including his pregnant wife. He mentioned that some of the city water logs show at one point the level went up to .82 ppm. He felt we should be looking at dosage: mg/kg of body weight as these variables change over time. He also mentioned we need to look at the cumulative sources of fluoride such as how much food and water is consumed, and the length of bath/showers taken. Other sources of fluoride come from processed foods, prepared beverages, medications, food packaging adhesive, fluoride-based pesticides, mechanical deboning process in the meat industry. We need to take into account a

person's age, weight, nutritional status, medical conditions, etc. when looking at cumulative fluoride consumption.

Dr. Redmond mentioned the HHS and EPA's newest scientific assessments. The goal of these assessments is to balance the benefits of limiting tooth decay while limiting any unwanted health effects. At EPA's request, in 2006 the NAS reviewed new data on fluoride and issued a report recommending that EPA update its health and exposure assessments to take into account bone and dental effects and to consider all sources of fluoride. The HHS also considered current levels of tooth decay and dental fluorosis and fluid consumption across the U.S. Further information on the HHS and EPA assessment can be viewed from the following link: http://www.hhs.gov/news/press/2011pres/01/20110107a.html

Next, Dr. Redmond mentioned briefly a link from the ADA that gives more in depth information on whether topical fluoride decreases tooth decay: http://www.ada.org/sections/newsAndEvents/pdfs/fluoridation_facts.pdf

Laboratory and epidemiologic research suggests that fluoride prevents dental caries predominately after eruption of the tooth into the mouth, and its actions primarily are topical for both adults and children.

Some other highlights of Dr. Redmond's presentation included information from the NHANES survey and CDC/NCHS Study, both mentioned in earlier discussions of the meeting. He also mentioned Infant formula consumption and if it could be reconstituted with tap water. The following links give more detail on this subject: http://www.aapd.org/policies and www.cdc.gov/fluoridation/safety/infant_formula.htm.

The final topic covered HFSA contaminants and if there was arsenic, mercury and/or lead in our water as a result of fluoridation. More information on this can be viewed at: http://www.gocolumbiamo.com/WaterandLight/Documents/watertest.pdf

In conclusion, Dr. Redmond said the government and independent experts do not agree therefore there is reasonable doubt regarding the safety and efficacy of adding chemicals to the water supply to artificially increase the concentration of fluoride. He would like to see the city consider alternative solutions for the $50K/year spent on fluoridation such as vouchers for toothpaste and/or fluoridated bottled water.

Public Comment 2: Bethany Baillargeion Marx, DDS

Bethany Baillargeion Marx, DDS. Dr. Marx works at the Community Health Center located in Jefferson City and has been practicing community health dentistry for three years. Prior to dentistry she was a trained chemist. Dr. Marx said she was here in support of those people who can't afford to buy things such as toothpaste. She said she represents kids from low income families who **don't** have cavities, and one of the main reasons she felt was because they live in the city and drink fluoridated city water. A lot of those kids have parents who do not teach them about brushing. She told a story about a young woman, 17 years old with severe decay that had to have one of her front teeth extracted. After getting to know her better, Dr. Marx learned that her family did not have water and had to go elsewhere to even take a shower. If a family can't afford to buy water, then it is very doubtful they will spend money on toothpaste as their only other source of fluoride. There are people in dire situations that need to be protected.

Public Comment 3: Elizabeth Wiles
Elizabeth Wiles is a homemaker, mother of two children and one more child on the way, and a citizen of the first Ward in Columbia. Ms. Wiles said she is extremely vigilant and dedicated to the best health for her family. After very careful consideration she said her family has chosen to use fluoridated toothpaste and mouth rinse for themselves and five year old daughter. They have also chosen to use a drinking water filter that removes fluoride because after much consideration and research they could not find sufficient evidence that ingesting fluoride was effective in preventing dental caries and could not find information as to what was a safe fluoride exposure for herself and unborn child and entire family for ingesting and bathing. Ms. Wiles mentioned that the fluoride added to our water supply is not the same pharmaceutical grade fluoride added to toothpaste. As a family living on a single very modest income in the first Ward, she felt her family may be the type of people that health officials might worry about not having sufficient means to make sound health and dental choices; however, we live in the U.S. of America (not the Soviet Union, North Korea, China, etc.) where government appointed health experts make medical decisions for the entire population. That is exactly what we are doing by adding fluoride to our water. Entire populations are being force medicated without a diagnosis or consent. Money could be better spent on things like education and vouchers for fluoridated toothpaste for low income families. We could all come up with creative ideas that promote dental health that are more economical and empowering than dumping something in the water supply. More than anything, Ms. Miles mentioned she wants children to grow up in a world where free will to make the best choices is recognized and respected. Top down approaches of centuries past must be abandoned if we want to see real change that is lasting. We should embrace attitudes and policies that favor knowledge, education and respect for every person's rights regardless of their backgrounds or beliefs.

Public Comment 4: Kevin Gamble
Mr. Gamble is a father of two and Columbia resident for 38 years and is here as a concerned citizen who is not a member of the medical profession. Water fluoridation is being used as a medical treatment; a controlled substance is being dispensed to people to address a health issue. There are no studies of our specific community and there has been no identification as to the need or lack of need for this treatment. In the absence of that information, the primary defense of water fluoridation comes to the question of whether it causes harm. This is not the reason we give a medication to someone; because it doesn't cause harm. We give medication to someone because their individual health has been analyzed and determined that the individual has a health issue that needs to be addressed. In the case of vaccines, an analogous situation to fluoridation, treatment is done on a one on one basis and carefully adjusted based on age and health specifics of each individual being treated. The health professional, not the patient, determines the amount of medication the patient ingests and the patient gives consent. Mr. Gamble felt that if the board votes in favor of fluoridation, they would be prescribing a mandatory medical treatment to people they have never met and know nothing about. The stated intent of the board is to evaluate the merit of the difference in the base amount of fluoride in our water vs. the added amount. The ultimate responsibility is beyond how the board is framing the issue. The power you have been given is to stop or continue fluoridation based on the city council's decision to follow your recommendation.

Public Comment 5: P.B. MacPherson
Was not here

Public Comment 6: H. Eugene Elkin
Mr. Elkin, a citizen of Columbia, helped bring Habitat for Humanity to Columbia in 1988. He gave a quick update from the last meeting and said he spoke to the dentist here who showed him pictures of fluorosis. Just recently he was at a Wendy's restaurant in town and surprisingly noticed that the

young man serving him, around age 17 and noticed he had fluorosis. He said "Sir, you have fluorosis." The young man responded that there is a very large population of this. Mr. Elkin went on to read a letter addressed to you by Monta Welch, a member of the grassroots organization in Columbia called "A People's Visioning." It reads: This communication is to inform you that most of the people in the grassroots People's Visioning effort here in Columbia are supportive of full removal of the added fluoride in Columbia's and the county's water supplies.
There has been much and substantial evidence and testimony to support such an action. Our discussion and topic group on water and food security as part of the People's Visioning feels that the naturally occurring amounts of fluoride are sufficiently supportive for those who contend it must be ingested to get the supposed beneficial benefits and certainly when if dentists and individuals choose to recommend or use topical fluoride so prolific and readily available in our over the counter oral products. For this reason we ask that you save the approximately $50K spent on this additive and designate that amount to be used for the research and development of new cutting edge natural methods of water purification and assistance for any children unable to find appropriate funds for dental assistance. Thank you for taking this position of a sizeable number of citizens who significantly care about our community to participate in the grassroots people visioning. Respectfully requested, Monta Welch, the director of People's Visioning as well the co-founding president of Interfaith Care for Creation in Columbia.

Mr. Elkin said he feels that there is more and more evidence that we need to stop the fluoridation. What if the natural occurring amount of 3 ppm of fluoride? As the center of the nation of the United States of America and we need to set the first example that fluoride needs to be stopped. Mr. Elkin said because of the last meeting he takes this matter very seriously and mentioned that if he as one person can walk out and find one child with fluorosis, end of discussion.

Public Comment 7: Paul Modesitt
Mr. Modesitt is a citizen of Columbia. Mr. Modesitt said most of the topics he had have been well covered but did have some questions. One being what is the source of our fluoride? There are two sources, aluminum waste from Alcoa and from phosphate fertilizer. He thought there was some discussion that it was coming from phosphate fertilizer. Another question was related to the environmental factors of fluoride in that it does not break down. Mr. Modesitt mentioned that as you go through the river systems there are higher levels of fluoride the further you go away from the municipal discharges. He then shared that prior to 1960 fluoride was used as an insecticide and pesticide. The topic then moved to a concern that hot water heaters contain a high concentration of fluoride, not calcium like many people think. If this is in fact true, folks drinking their morning coffee using that water are receiving high levels. Mr. Modesitt mentioned that he would be interested in actually going to a junk yard and getting an old hot water heater to tear apart and have it analyzed. He then mentioned that fluoride is toxic to plants. It will completely stunt a plant. He recommended people grow two plants, use the same dirt, but water one with tap water and one with rain water, or water from a lake or something and see what happens.

Mr. Modesitt's final point was that he lives on a dead end on the city water line and fluoride is at a toxic level because of the dead end. He would rather see the $50K spent on fluoridating city water be used to get rid of the dead end. Toxic levels of fluoride are accumulating in areas around the city where there are slow spots such as dead ends and many people are being affected by it. Mr. Modesitt said his water is very toxic and is not drinkable, very bitter and has a horrible taste.

Subcommittee Discussion – final agenda item
Dr. Malaker said he felt the group has received a lot of both good and opposing information on the fluoridation topic and feels like he needs more time to take a much closer look at all of the details. He is concerned that from some of the things he has read it does appear there is a possibility of

side effects from fluoridation, even in small amounts and felt it was VERY important to spend more time for solid thought, writing things down, researching, etc. prior to any decision being made. He also said he would like for the group to meet again.

Ms. Phillips asked to clarify that the goal of the group was still to examine the available evidence and make a recommendation as to whether there is substantial, strong evidence that the level of fluoride in city water should be changed from the current level of 0.7 ppm to 0.3 ppm. Ms. Skala said she felt that is still the purpose. Ms. Phillips then mentioned that she has been reviewing the studies and categorizing the studies that pose a theoretical risk versus studies that contribute to balancing evidence of a true risk.

Dr. Szewczyk thanked everyone for coming and commented that the fact that we saw the same bar graph from a study from two different presenters from different sides of the issue shows us that this is a difficult issue. True public policy is not self-driven and felt those attending today were there because they are concerned not only about themselves but others as well. Dr. Szewczyk said he agreed with Dr. Malaker that there is a lot of evidence that we have heard and more articles coming in. He wants more time as well, step back and look at everything. He reiterated that he stands by what Ms. Phillips said that it is a call that has to be made because there is a really good reason to make that call; looking for substantial evidence, something that says that there is a reason why all those people that say we shouldn't fluoridate are wrong. He pointed out some information he remembered looking at that pointed to the International Academy of World Medicine and Toxicology. This prompted him to look at their website at which time he dug deeper to see how many members they had. They had 8 in Missouri, 4 in Iowa, and 477 total overall members. The ADA has 120,000 members. We need to think about where all the data comes from.

Mr. Feirman agreed that the group needs more time to examine all the evidence. The burden of proof is to overturn what some of the more leading sources say is an appropriate level of fluoridation. We need evidence to show that it isn't appropriate. The second question is if we go with that, we still need to look at the HFSA, is that appropriate or inappropriate. The same kind of criteria needs to be used when looking at that as well.

Ms. Skala asked the group what they felt the next step should be. Mr. Feirman mentioned to Ms. Skala that he would like to see if the responses from the CDC to the public comments on the proposed rule revision are publicly available. Ms. Skala said she could find that out. Dr. Szewczyk would like to know where the HSFA is coming from and what kind of testing is being done on it prior to the city receiving it. Ms. Skala asked Mike Anderson if he could contact the supplier and find out if they can give the group any detail. Ms. Phillips gave clarification as to what regulatory levels are. She said they are NOT toxicological thresholds; in other words, if you are exposed to water that exceeds a regulatory level, that does not mean you are going to get sick. The regulatory levels are set many magnitudes below the toxic level threshold. Ms. Phillips just asked the group to please keep this in mind as the group moves forward.

The next Board of Health meeting will be merged together with a meeting with the subcommittee on fluoridation.

NEXT MEETING DATE To be determined via a Doodle poll

ADJOURN: There being no additional business; the meeting was adjourned at 7:30 p.m.

Human Rights Commission
February 5, 2013 Meeting Minutes

Members Present: Dalton Calcote, Scott Dean, Virginia Law, Gina Long, Jessica Macy, Matt Mazick, Tom O'Toole

Members Excused:

Guests Present: Daniel Redmond, Dovie Weston

Staff Present: Steve Hollis, Christina Howerton, Cavanaugh Noce and Negar Rezvani

I **Call to Order/Introductions:** Dean called the meeting to order at 5:30 p.m.

II **Approval of Agenda:** Macy moved to approve the agenda. Her motion was seconded by Long and passed unanimously.

III **Approval of January 8, 2013 Meeting Minutes:** Long moved to approve the January 8, 2013 meeting minutes. Her motion was seconded by Law and passed unanimously.

IV **Presentation on Water Fluoridation:** Daniel Redmond stated his presentation was on the impact of water fluoridation on low-income families. He said the positive impact of water fluoridation was designed to treat tooth decay, but there were negative effects on children, elderly and minorities, with a specific impact on low-income families. Redmond said the City of Columbia treats the public water supply with hydrofluorosilicic acid which could contain mercury, lead, arsenic, other organic compounds and processed contaminants from other cities. Redmond said fluoridation is supposed to prevent or decrease dental caries (cavities). He stated selected statistics were used to support fluoridation and increased caries among low-income areas. Redmond said it was possible that those who drank free, fluoridated tap water may have more cavities. He said just because there was a reduction in caries after the introduction of water fluoridation, did not necessarily directly correlate with fluoridation. Redmond provided graphs from a Scientific American article and from World Health Organization data, showing statistics of other countries that have done studies on fluoridated and non-fluoridated water. Some show a decline while others show no effect. He pointed out the chart from New Zealand and how caries went down before fluoridation started, due to standard of living and medical increases. Redmond said the decrease in caries is said to be one of the ten greatest achievements in public health of the twentieth century, but was based on what one man said from the CDC's division for oral health based on 1993 data. Redmond used examples like lead paint, gasoline, DDT, formaldehyde and asbestos, which were once "safe". He said the same agencies are now advising of negative effects, such as ADA, EPA, GCA, etc. In 2006, the National Research Council did a review of the EPA, and then lowered the limit of fluoridation to .7 parts per million (ppm), which is the standard now. Some of the known risks are carcinogens, hip fractures, and dental fluorosis. If you drink fluoride it gets in your system. If it shows up on your teeth, then it is getting to other parts such as bones. Redmond said fluoride drops and tablets are not approved in the United States. He said fluoride was linked to lower IQ and neurological impairment. Some segments of the population are specifically susceptible such as post-menopausal women, elderly men, pregnant women and their fetus, people with deficiencies, people with cardiovascular and kidney problems and people that use dialysis. He stated any amount of fluoride can kill them. In 2006, the American Dental Association released an e-gram saying infants may be getting more than the optimal amount of fluoride and they recommend parents and caregivers not use or use low levels of fluoride. Redmond said the negative effects he wants to be examined besides dental fluorosis are the IQ loss in children,

liver and kidney damage, thyroid function damage, ADHD, cancer, bone density loss, high cholesterol, impotence and the Alzheimer's dementia link. He said fluoride acts as a transport across the blood brain barrier and it can take aluminum with it, and aluminum is linked to Alzheimer's dementia. He said low-income communities were at risk. Low levels of fluoride ingested were generally considered safe to the general population, but may not be safe for malnutritioned infants and children, notes the Journal of America Dental Association. Centro Latino, in Columbia, does not use fluoridated water; they have a reversed osmosis water system. The Chairman of the League of United Latin American Citizens representative from Texas said the Hispanic community is no longer going to be silent on the issue. Fluoridation was forcing the public to be medicated through the drinking water without consent or full disclosure of risks. Minority community leaders are against fluoridation. CDC published results that show African American children suffer significantly higher rates of dental fluorosis than children from other racial groups. Redmond said there was no way to opt-out of fluoridation. With vaccines anyone can get exemption forms, even if you have low-income. If you are low-income you would have to buy distilled, reverse osmosis or spring water. However, that is okay for drinking, but how would you do that for cooking? Also, fluoride is absorbed transdermally in the bath and shower, a method was used to treat hyperthyroidism back in the 1950's. Redmond stated he thought this was a human right's issue, was because it affected low-income families. Water is chemically treated and as such is a forced medication with no dosage control. Additionally, what is used in Columbia's water includes hazardous waste from the phosphate industry. He said there was never a vote by the citizens of Columbia or the City Council; this was part of a bill that went in for the water bill back in 1974 and there was no mention of fluoride anywhere. He said tooth decay is a problem, but like other countries that do not fluoridate there are other solutions. Water fluoridation is not a solution according to the graphs Redmond provided in his presentation. Redmond shared a video clip by a researcher from Dartmouth and a researcher from KU.

Hollis stated this issue had been presented to Council and assigned to Board of Health. He said the Board of Health has formed a sub-committee to put together research and a position. Dean said based on HRC duties, the most the Commission could do was submit a letter to the Board of Health suggesting they review the information from a human rights point of view. He said it was not a complaint of discrimination, and HRC would not be the best group to hold a public hearing on fluoridation. Law stated she would like to hear the final results from the Board of Health. Hollis stated he would share the results with the Commission. O'Toole made a motion to request the sub-committee formed by the Board of Health review any allegations that fluoridation disproportionally affects minority and low-income communities. His motion was seconded by Mazick and passed unanimously.

V Old Business:

a. **City of Columbia Web Site Accessibility**: See Rezvani's current event report.

b. **Fair Housing Testing**: Hollis said fair housing testing would be conducted annually. He said CDBG staff would set aside the funding each year, and ideally have a multi-year contract with MU Law School that could be renewed pending the allocation of funds. Rezvani said MU Law School signed the contract to conduct fair housing testing. She stated MU Law School was going to test twenty housing providers in the Columbia area. It would involve a Caucasian person and an African American person calling or going in person to see if they were treated equally. Hollis said generally to see what they are told, about which units were available, deposits, if credit checks were required, etc. Rezvani stated MU Law School would start the testing with race and depending on the results; they might expand into other protected categories.

VI **New Business:** None.

VII **Staff Reports:**

a. Division of Human Services: Hollis said he had been working with a group on a website for rental housing. He said CDBG funding had been allocated to Central Missouri Community Action (CMCA) for development of a neutral place to have information about rental housing, including code enforcement. Hollis said that his division's interest was fair housing and tenant rights and responsibilities. He said the goal would be to inform renters and housing providers in Columbia. Hollis said they had been intentional about having the website hosted by a non-profit so that is would be more neutral.

Dean asked if there was a timeline for transgender education. Rezvani said Dr. Eastman-Mueller would be taking the lead and submitting a proposal to the Commission. She said Dr. Eastman-Mueller was going to utilize her students to research the differences in the district, and see which businesses would be interested in getting the family friendly signs.

Education Report:

- *Boone County Family Resources*
  - *On January 25, 2013 Staff presented on human rights services for the staff of Boone County Family Resources*
- *Family Health Center*
  - *On January 25, 2013 Staff presented on human rights services for staff of Family Health Center*
- *New Horizons*
  - *On January 25, 2013 Staff presented on human rights services for staff of New Horizons.*
- *My Life Clinic*
  - *On January 25, 2013 Staff presented on human rights services for the staff of My Life Clinic*
- *Woodhaven*
  - *On January 25, 2013 Staff presented on human rights services for the staff of Woodhaven.*
- *Office of Creative Ministries*
  - *On January 25, 2013 Staff presented on human rights services for the staff of the Office of Creative Ministries.*
- *Red Cross*
  - *On January 25, 2013 Staff presented on human rights services for the staff of Red Cross.*
- *Columbia Sign Services*
  - *On January 25, 2013 Staff presented on human rights services for an employee of Columbia Sign Services.*
- *Veterans United Home Loans*
  - *On January 28, 2013 Staff presented on human rights services for the staff of Veterans United Home Loans.*
- *Las Margaritas Restaurant*
  - *On January 28, 2013 Staff presented on human rights services for the staff of Las Margaritas.*
- *Job Point*

- *On January 29, 2013 Staff presented on human rights services for the students at Job Point.*

Current Events:

- *Fair Housing Testing*
  - *The Community Development Department received funding from the Community Development Commission to contract with the University of Missouri to conduct fair housing testing in Columbia.*
  - *The Law School will conduct fair housing testing from January 1, 2013 until June 30, 2014 through performing tests in 20 housing providers in the Columbia area. Properties will be tested by phone and in person with a matched pair of testers. Each property will be tested twice.*
  - *The purpose of the project is to gather information about the amount of housing discrimination to assist in targeting educational and outreach efforts to combat housing discrimination.*
  - *A report of the analysis of results will be prepared for the City.*
- *Transgender Education*
  - *Dr. Heather Eastman-Mueller teaches a Women's and Gender Studies class entitled, "Sexual Health Advocacy and Service Learning" at the University of Missouri. Enrollment is comprised of undergraduate students who wish to receive not only a multicultural certificate but also a service learning designation on their transcript. In order for students enrolled to successfully complete the course each student must fulfill a minimum of 30-35 hours of service on a project associated with sex and gender.*
  - *Dr. Eastman-Mueller will be submitting a proposal regarding the unisex/family restrooms. If her proposal is approved by the Human Rights Commission her students would be carrying out the project with her supervision.*
- *Universal Design*
  - *The Universal Design Coalition met on January 23, 2013. They have started planning events for fair housing month. A virtual tour at the Columbia Home Expo in April of homes and rental properties that have incorporated universal design.*
  - *The Community Development Commission is accepting proposals from qualified non-profit developers through February for the Net Zero house. The Net Zero house will incorporate universal design features.*
- *Web Site Accessibility*
  - *Staff contacted Sam Shelby regarding web site accessibility. He stated that the policy was approved by the Information Management Planning Committee but had not been signed by the City Manager as of yet.*
  - *Mr. Shelby stated that he would forward the Human Rights Commission a final copy of the policy as soon as it is signed by the City Manager. He stated that the policy would not need City Council approval.*

b. Law Department: Cavanaugh Noce introduced himself as a stand-in until Boeckmann's position is filled.

VIII Commission Reports:

a. Columbia Citizen Police Review Board: Dean said CPRB had been talking about going into closed sessions to review complaints. He said if a complainant asks to discuss their complaint without being on TV and in front everyone, then CPRB would go into closed session for that section. Dean stated any discussion about the overarching

complaints and policy changes would be open session. Dean stated CPRB would have a meeting in March for further discussion.

CPRB Report – January 9th

- *Training: Sgt.Michael P. Hestir presentation on new hire orientation and field training.*
  - *Sgt. Hestir explained that it is his job to train new officers with the skills recruits don't walk in the door with. The training includes: a decision tree approved by a national police group (STAR), 2 weeks of training (~80 hours), basic report scenarios (pretend crimes to document), and the Missouri police chief's association training for defensive and pursuit driving (simulator). Sgt. Hestir informed us that he teaches a kind and friendly approach.*
    In answering Board member questions, Sgt. Hestir mentioned The Power of Unconditional Respect and The Lizard Brain video. Sgt. Hestir commented that new recruits performed better with 5 weeks vs. 2 weeks of training.
    In response to questions, Sgt. Hestir advised that not all simulations in the training involve dangerous or bad things happening; some of the simulations are quite boring.
    The training is divided into 3 phases: phase 1 – Field Training Officer; phase 2 – shadowing; phase 3 – back to Field Training Officer. Sgt. Hestir does not see many complaints at these phases.
    Sgt. Hestir invited us to discuss the CPRB at the new hire orientation. In addition, we are invited to view some or all of the orientation / training.
    Dr. Alexander and Steve Sheltmire question Sgt. Hestir on peer intervention (stopping bad actions even if the person performing the actions outranks you). Sgt. Hestir advised this is not in the training.
    Steve S. asked if there was an ongoing reinforcement of the values. Sgt. Hestir answered that it was only informal and not department-wide.
    Sgt. Hestir advised that Field Supervisors must have 5 years as an officer, with 3 of those being in Columbia. Field Training Officers must have 2.5 years as an officer as well as attend a school (LETI at MU and Missouri State Highway Patrol are two examples). The process is voluntary and there are currently 12 in the CPD.
    Daniel Jacob recommended that we go to the training.
- *Reports*
  - *Positive Connections*
  - *Betty Wilson had a client whose son had to go to a 96-hour commit at the MU hospital. The client advised that the officer involved was very kind and helpful.*
- *Outreach Subcommittee*
  - *Dr. Martin and Betty W. were recently on KFRU to discuss the board. David Lyle advised that members could come on regularly, perhaps as early as February. Mr. Lyle will update us.*
  - *Daniel J. has been speaking to a number of neighborhood associations with mixed results. He will be meeting in person with one soon.*
  - *Dr. Alexander will be giving a lecture on the CPRB to staff and faculty in his department, roughly 25 people.*
- *Mediation Task Force*
  - *No cases have been brought for mediation, yet. There is still no funding for a full-time position.*
- *Policy and Procedures Subcommittee*
  - *Jordon Hargrove advised that changes were made to the auditing forms. He advised that we can't go further until we see their policy, i.e., how they conduct investigations in IA. He asked that we discuss this at the February work session.*

- *The Chief advised that the Lexipol policy is the active policy. Human Resources and the Legal Department are confirming it abides by city law. Daniel J. asked why policies, guidelines, etc., are not online. The Chief advised that they are all being approved by Human Resources and the Legal Department.*

- *Unfinished Business*
  - *Initial Review of CPRB 2012-0007 – Appeal filed by Matthew Akins.*
  - *It was determined there is no way to find out who acquired the photo in question. Because of that, we can't call this a complaint against an officer. Dr. Martin asked who governs the posting of photos? Per the Chief, the poster was at a level that only police are in and it had to have been a police officer that posted it. The policy on posters now, essentially, is if you want to post useful information you can. The Chief, however, will entertain policy recommendations. There are, roughly, 60-70 posters up at any given time. It was agreed that a policy could just require the initialing of items posted. The Chief will draft a policy by next meeting.*
  - *Mr. Akins spoke and answered questions. In addition, Mr. Akins mother spoke.*
  - *There was a motion to close the case, as it did not (and cannot) allege misconduct. The motion was seconded and passed with all but Daniel J. voting "yes".*
- *New Business*
  - *Approval of the 2012 Annual Report.*
  - *Small recommendations will be added to the report and we will either continue with additions or approve at the February work session. The report is due by March 1st.*
  - *Initial Review of CPRB 2012-0008 – Appeal filed by Marlon L. Jordan.*
  - *Daniel J. wants to see the policy that would be relevant to this case. The board discussed the case. It was decided we would do a full review, including talking to the officer involved, and review the appropriate policies at our February meeting. In addition, it was decided we would invite the nurse that was involved. In total, 6 witnesses are to be invited and we hope to review the policy in question as well.*
- *Public Comment. – None.*
- *Board member and staff comment.*
  - *Daniel J. prepared a memo, which he hopes to bring to the City Council, which requests copies of all complaints. The memo was tabled until the February work session. Daniel J. also advised that he spoke to Councilman Kespohl, who agrees the memo should be written into the CPRB ordinance.*
  - *Betty W. welcomed two members of the board that established the CPRB.*
  - *There was general discussion on the February work session. Items added to the agenda include: closed sessions, the yearly report, and Daniel J.'s memo on complaints. Board members were invited to send additional items to Rose.*

b. Columbia Values Diversity Planning Committee Meeting: Rezvani stated that another group had already booked the room at Holiday Inn for 2014. Macy asked if the surveys showed if people would like to have breakfast celebration again. Hollis said they did but they were only from attendees. He would like to gather feedback from the community at large. He said another idea would be to have the event on the same Thursday but at night at the Missouri Theatre and without food.

c. Disabilities Commission: Rezvani stated she would not be able to attend the meeting on February 14th at 3 pm and asked if any of the commissioners would like to attend. Hollis stated Homer Page said at the next Universal Design (UD) group meeting he was going to bring up the idea of the City of requiring UD to be incorporated in City funded projects. Hollis

said he thought there were to two tracks to take in regard UD: building a demand in the market and policy and regulations.

VIII **Public Comment:** Weston stated there were no updates on the Service Animal training.

IX **Commissioner Comments:** Macy said she heard on the news that Boy Scouts were considering changing their policy relating to its long-standing ban on gay scouts and troop leaders.

Dean stated there was a ballot initiative to have the state of Missouri add sexual orientation as a protected category.

X **Closed Session to Discuss Pending Cases Pursuant to Section 610.021 (1) RSMo.:** O'Toole made a motion to move to closed session to discuss pending cases pursuant to Section 610.021(1) RSMo. The motion was seconded by Mazick and a roll call vote was taken. O'Toole called the roll with the following vote: Law – Aye, Macy-Aye, Dean – Aye, Calcote – Aye, Mazick – Aye, and O'Toole – Aye.

XI **Adjournment:** The meeting adjourned at 6:48 p.m.

Respectfully Submitted,

Steve Hollis,

Human Services Manager

COLUMBIA/BOONE COUNTY BOARD OF HEALTH
MEETING MINUTES
March 14, 2013

The Columbia/Boone County Board of Health met for a regularly scheduled meeting at 5:30 p.m., Thursday, March 14, 2013. The meeting was held at the Columbia/Boone County Department of Public Health and Human Services, 1005 W. Worley St. Public Health & Human Services Director Stephanie Browning represented the staff. Administrative Support Assistant Dawna Mavel recorded the minutes of the meeting.

MEMBERS PRESENT:	MEMBERS EXCUSED:	MEMBERS NOT EXCUSED
Ilalyn Irwin	Harold Stearley	
Dr. Colin Malaker		
Dr. Sally Beth Lyon		
Lynelle Phillips		
Mahree Skala		
Dr. Michael Szewczyk		
Harry Feirman		
Jean Sax		
Dr. Beth Hussey		
Denise Stillson		

CALL TO ORDER

The Chair, Dr. Michael Szewczyk, called the meeting to order at 5:30 p.m.

APPROVAL OF AGENDA

The agenda was amended to move a conference call with Dr. William Hirzy to the top of the agenda to accommodate Dr. Hirzy's schedule.

APPROVAL OF MINUTES

The minutes from the January 10, 2013 Board of Health meeting were approved as written.

Presentation from Dr. William Hirzy

Dr. Szewczyk called the meeting to order at 5:30 pm and immediately called Dr. William Hirzy to conference into the meeting. Dr. Szewczyk let Dr. Hirzy know that prior to the meeting, the members of the Board had received his biographical information, his PowerPoint presentation as well as links to a Youtube video of him providing testimony. Dr. Szewczyk turned the floor over to him. Dr. Hirzy asked if all the members were present. Dr. Szewczyk said that 2 members were absent (Ms. Phillips arrived shortly thereafter). He asked if everyone looked at the 27 minute YouTube video; nobody said they had not. Dr. Hirzy mentioned that he felt that the

Board of Health members have a significantly higher standard for due diligence in reviewing all the information provided in depth than members of the city council or other lay people.

Dr. Hirzy addressed the presentation previously given by Dr. Henderson. He noted that in her presentation she discussed the increase in decay rates in 2 to 5 year olds. According to Dr. Hirzy, in that age range the problem lies in children being put to bed with full bottles of milk. He also felt that if fluoridation was present and cavities increased, then one would think the increase in fluoridation over the years would cause the decay to decrease not increase. Dr. Hirzy felt that Dr. Henderson's assertion of 20 to 40% reduction in tooth decay for people of all ages was incorrect. Dr. Hirzy mentioned the largest epidemiological study ever done studied 39,000 children ages 5 to 17 in 84 communities and failed to show any statistical significance in decay rates between fluoridated and non-fluoridated communities. According to Dr. Hirzy, Dr. Henderson's comments that 60% of people ages 6 to 49 are not affected by dental fluorosis could be viewed that 40% are affected by dental fluorosis. He went on to state that this was the reason HHS and EPA revised the recommended fluoride levels in January 2011, since fluorosis rates were increasing.

Dr. Hirzy discussed topical fluoride and cited a CDC report from Aug. 2001 that showed the primary effect of fluoride to be topical and post-eruption. He stated that many earlier reports show the same thing. Dr. Hirzy disagreed with Dr. Henderson on whether tap water should be used to reconstitute formula. He noted that the CDC in the August 2001 MMWR recommended fluoride supplementation level for infants 0 to 6 months was zero and for 6 months to 3 years the recommendation was 0.25 mg per day. Columbia's levels show there is 0.16 mg in one 8 ounce glass of water. Dr. Hirzy felt that if a child drinks 16 ounces of formula constituted with fluoridated water, they are over the limit and being overdosed.

Dr. Hirzy mentioned a study published in the 2010 Journal of the American Dental Association which found that when considering only fluoride intake from ages 3 to 9 months, participants with fluorosis (97 percent of which was mild) had significantly greater cumulative fluoride intake from reconstituted powdered infant formula and other beverages with added water than did those without fluorosis. Considering only intake from ages 16 to 36 months, participants with fluorosis had significantly higher fluoride intake from water by itself and dentifrice than did those without fluorosis. In a model combining both the 3 to 9 months and 16 to 36 months age groups, the significant variables were fluoride intake from reconstituted powder concentrate formula (by participants at ages 3–9 months), other beverages with added water (also by participants at ages 3–9 months) and dentifrice (by participants at ages 16–36 months).

Another question previously addressed by Dr. Henderson was whether there is arsenic or mercury in our water and her answer was "no". Dr. Hirzy stated even if the laboratory reports say there is none present, there is some there. He referred to his PowerPoint that shows the impact of arsenic in HFSA based on the city's population of 91,000. Risk information values were taken from EPA's published Arsenic in Drinking

Water Rulemaking (2001). Dr. Hirzy determined the levels of arsenic in Columbia's HFSA from averaging the levels reported by the Phoenix Water Services Department for six batches of HFSA, a Denver Water Authority report on 11 batches and from a letter from the CDC Fluoridation Engineer. Dr. Hirzy felt that if Columbia had the same average arsenic content, this would result in 0.3 extra lung/bladder cancer cases per year of lifetime exposure (1 case in 3 years). Dr. Hirzy stated there are also studies which show a negative impact to the brain.

Dr. Hirzy asked for questions. Dr. Szewczyk noted that Dr. Hirzy had put in his power point that fluorination is "unethical." He asked Dr. Hirzy, "Why do you think the CDC, The National Health Service, The American Dental Association (ADA) and the American Academy of Pediatrics continue to recommend fluoride if the evidence is so strong against the use of fluoride? Are they unethical scientists and organizations?" Dr. Hirzy said the CDC does not push fluoride; that is not their main goal. There is a small group called the Oral Health Division within the CDC that handles the fluoride issues. Dr. Hirzy said he did not believe it was a conspiracy but it is a matter of saving professional reputations. He felt that the ADA was afraid it would be open to lawsuits if it stopped recommending water fluoridation. He also felt that there was a tremendous amount of money involved for those companies supplying the fluoride.

Ms. Skala asked where Dr. Hirzy was currently working. He said in 2008, he left EPA where he worked in the Office of Toxic Substances, and became a full time faculty member in the Chemistry Department at American University. Currently, he is still in this position. He has also previously done risk assessment work at Monsanto.

Dr. Malaker asked Dr. Hirzy to elaborate on the information in his power point presentation on how fluoride affects G-proteins and how it works with the enzymes and aluminum, etc. Dr. Hirzy mentioned that it is a mechanistic issue. Fluoride has the same size and a similar negative charge that the phosphate ion does. The phosphate ion plays a role in triggering the actions of a number of cell membranes. This is where the G-protein activation/deactivation takes place. Fluoride has the second highest hydrogen bonding capability and can interfere with the mechanism the phosphate ion plays a role in. Dr. Malaker had a follow-up question as to the effect of fluoride on in vitro fetuses. Dr. Hirzy mentioned a developmental neurotoxicity study of placental exposure to fluoride in rats that showed an increase in hyperactivity.

Ms. Phillips stated that Columbia's water currently has 0.7 ppm of fluoride and about half of that is because we add fluoride with the other half being naturally occurring. Ms. Phillips asked that if the City were to stop adding fluoride, given all the toxicity concerns, shouldn't the City filter out the naturally occurring fluoride. Dr. Hirzy said filtering fluoride can be very difficult and did not recommend it, but noted that if there was a practical way of doing it, he would. He recommended using the monies saved by not fluorinating the water to buy fluoridated toothpaste. Dr. Hirzy said that if he was in a decision making role at the EPA, he would set the maximum contaminant level for fluoride well below 0.1 ppm.

Dr. Szewczyk asked if there were any other questions for Dr. Hirzy. He let Dr. Hirzy know that besides the Board, there were several people in the audience that heard his discussion. There were no further questions. He thanked Dr. Hirzy for his time and the call was ended.

NEW BUSINESS

Dr. Szewczyk introduced the Board to its newest member, Denise Stillson. Dr. Szewczyk asked her to provide information on her background. Ms. Stillson stated that she had previously worked in Columbia as a mental health technician at the veterinary school and went on to graduate from the MU nursing school. She then worked as a trauma nurse at St. Mary's hospital in Jefferson City. She spent 10 years as a critical care nurse. She was originally from Minnesota and returned there to work as a trauma nurse. She then went to Oklahoma and spent five years as a nurse. Following that, she moved to Columbia and began writing her own book which is in the process of being published now. Dr. Szewczyk welcomed her to the Board and asked other members to introduce themselves, which they did.

REPORTS

Director's Report

Ms. Browning provided an overview of the department's plans to work with community partners over the next year to implement MAPP (Mobilizing for Action through Planning and Partnerships) in Boone County. MAPP helps communities prioritize public health issues, identify resources for addressing them, and implement strategies to improve health.

A partner orientation meeting was held in February. Dr. Szewczyk will represent the Board of Health at the partner meetings. There will be many opportunities for Board members to become involved along the way. Updates will also be provided during future Board meetings.

OLD BUSINESS

Fluoridation of City Water – Dr. Szewczyk turned the meeting over to Ms. Skala, Chair of the Fluoridation Subcommittee. Ms. Skala first mentioned that there is an updated study completed in 2012 on the issue of infant formula and the use of tap water. The CDC's website continues to advise it is safe to use fluoridated tap water for re-constituting infant formula. Ms. Skala then recapped what the group has been asked to do by the City Council, that is, provide a recommendation regarding fluoridation of the city water. She also provided detail on the information reviewed from many sources. Below is a summary of information reviewed over the last couple of months.

1. Information from a variety of sources, including the Missouri DHSS, CDC, ADA and WHO, about the prevalence of dental caries, its associated health risks,

and the disproportionate impact of dental disease on low-income children and adults.

2. Information about the clinical effects of fluoride from CDC, EPA, ADA, WHO, the Australian National Health and Medical Research Council, and the Task Force of the Guide to Community Preventive Services. She noted that each of these organizations systematically reviewed the scientific literature (hundreds of articles altogether) regarding the efficacy and safety of fluoride ingestion at various dosage levels. These reviews covered the following concerns:

    - Dental Caries
    - Dental Fluorosis
    - Fractures
    - Cancer
    - Neurotoxicity
    - Effects on IQ
    - Other possible adverse effects

    Each of these organizations weighed the risks and benefits of various interventions, based on the literature, and made recommendations in favor of community water fluoridation.

3. Several individual articles published in peer-reviewed journals, most of which were included in the reviews listed above.

4. Information provided by opponents of community water fluoridation, including many articles, opinion pieces, information posted on websites, e-mails and a power point presentation and YouTube video by Dr. William Hirzy.

5. Letters of support from local dentists and several national dental authorities.

6. Information about the current EPA regulations establishing the Maximum Contaminant Level of 4 ppm fluoride in public water supplies, as well as the cyclical review process for all maximum contaminant levels (MCL) in water, and the current every 6 years review process underway for fluoride.

7. Information about current CDC recommendations, and the amended federal regulation proposed in 2011 to lower the recommended optimal fluoride concentration in public drinking water to 0.7 ppm, from the current level of 0.7 – 1.2 ppm.

8. Information about the product used to increase the fluoride level in the Columbia public drinking water supply to the recommended level of 0.7 ppm, as well as the procedure used by Columbia Water & Light to add the fluoride, dilute it to the proper level and the routine testing program for fluoride and contaminants.

9. Ms. Skala asked Dr. Szewczyk to discuss testimony the Board has received. Dr. Szewczyk noted that Ms. Browning had been approached by Dr. Redmond with concerns that the proponents of water fluoridation had more opportunity to make presentations to the Board than the opponents. Dr. Szewczyk asked staff to the review the tapes. He noted that only two individuals, both opponents of water fluoridation, Amy Bremer and Dr. Hirzy, were able to address the full Board. They had the floor for a total of 42 minutes. At the subcommittee meeting, Dr Henderson and Dr. Baillargeion Marx, proponents of fluoridation had the floor for a total of 30 minutes. At that meeting, 5 members of the public spoke against fluoride for a total of 21 minutes. In addition, 260 minutes of video testimony against water fluoridation was provided for the Board members to review. All and all, the Board heard significantly more testimony by the opponents that the proponents.

Ms. Skala noted proper dosing was important and asked Dr. Szewczyk to provide a medical perspective on this concept. Dr. Szewczyk noted that most everything we ingest has a therapeutic range where too little does not help and too much can cause toxicity. He pointed out that some drugs, like Tylenol have a narrow therapeutic window. Because of this, the maximum safe daily dose of Tylenol has just recently been reduced from eight to six 500 mg tablets. If a 150 pound person consumes just 20 tablets they are at risk for potentially fatal liver failure. Dr. Szewczyk noted that high dose of vitamins can be problematic and too much iodine, which is added to salt, can cause thyroid cancer.

Dr. Szewczyk asked Mike Anderson, Water and Light Department, to discuss the test results on the HFSA, the concentrated raw material being used to fluoridate the water. Mr. Anderson provided the Board with information both from Mosaic, the supplier as well as Inovatia, an independent lab which did testing. Neither company identified lead in the samples. Arsenic levels were reported to be 40.75 ppm by Mosaic on a batch tested in November and Inovatia found an arsenic level of 62 ppm in a sample from February. Mike Anderson noted that the concentration level of HFSA would be 50 gallons added to 10 million gallons of water. Based on this dilution; his department has calculated that the final concentration would be approximately 0.00007 ppm. Mr. Anderson also stated that it would take 5,500 ppm of arsenic in the HFSA to reach the MCL level for arsenic in the finished water. Ms. Phillips reiterated that the bottom line was whether or not lead and arsenic is showing up in the City's water monitoring data and independent testing shows that is not a concern. Mr. Anderson agreed.

Mr. Anderson did look at alternatives on both of the sodium fluoride solutions and they were not practical. Bulk material costs would be massive and the start-up equipment and installation would be $250,000.

Ms. Sax noted that in her discussion with James Fisher, she learned that the University's water had a natural fluoride level of 1.0 ppm which was 30% higher than the City's fluoridated water. Given the concerns about fluoride that the Board has heard, Dr. Szewczyk asked if anyone knows of complaints, or calls by student groups, to lower the fluoride level in the University's drinking water. No one had.

Ms. Skala commented on the data presented in the Chinese studies article regarding IQ from Dr. Hirzy's power point presentation. She noted that the fluoride levels noted in these studies were much higher than that found in Columbia. Even so, the analysis provided showed only one half of one point difference in IQ between the groups of children with very high fluoride exposure and those with lower fluoride exposure similar to current CDC recommendations. Dr. Dan Redmond stated from the audience that was not true and said that represented the standard deviation in IQ scores. Ms. Skala then read the quote directly from the article stating that is was actual IQ points. Dr. Malaker noted that the author of the Chinese studies article had stated that the results of the study do not allow a judgment to be made regarding the risks of typical water fluoridation in the United States.

Dr. Szewczyk reported that Dr. Redmond recently gave a slide show to the Human Rights Commission, which in turn asked the Board of Health to consider the impact of water fluoridation on low income individuals during its deliberations. Dr. Szewczyk opened the floor for discussion of this issue. Discussion followed. It was noted that we had previously discussed this issue. Ms. Phillips read a quote from the Journal of Public Health Dentistry regarding water fluoridation which basically stated that low income individuals do not visit the dentist as often and do not brush their teeth as often and fluoridated water is the only practical method of providing fluoride to the entire population.

Dr. Malaker had heard that the children in schools were not given the opportunity to brush their teeth. Dr. Lyon, Chief Academic Officer at Columbia Public Schools, stated that the children are allowed and encouraged to brush their teeth. She would welcome hearing about any specific instances where that was not the case.

Dr. Szewczyk noted that in the days immediately preceding our meetings, the Board is given multiple articles and web links to review by concerned citizens. This leaves little time for thorough review before the meeting. He noted that the Board has received hundreds of pieces of information, frequently repetitive in nature. He recommended that the Board set a cut off date of 1 week from today's meeting, March 21, 2013, to receive additional information regarding the fluoride issue. This will allow all the Board members the time needed to review the information before the next meeting, at which time we will vote on the issue. There was agreement among the Board members to proceed in this fashion.

Dr. Szewczyk invited audience members interested in making public comments to come to the podium.

Speaker 1: Bill Folk
Mr. Folk introduced himself as a professor of biochemistry at MU. He teaches an honors course that looks at science and public policy. He stated that he tries to instill in his students that good public policy is based on sound evidence. Water fluoridation is one case that was studied this semester. The students were given the option of writing a paper about government mandates as part of either the Affordable Care Act

or the issue of water fluoridation. All the students chose water fluoridation as an example of forced medication. These are students who had an opportunity to look at the evidence on both sides. They did not feel there was sufficient evidence to support water fluoridation as being a benefit in Columbia, Missouri.

Speaker 2: Amy Bremer
Ms. Bremer spoke on the issue of inequity. She mentioned she was fortunate that she could afford to purify her water, but many people can't afford to buy, install or maintain a reverse osmosis system that will remove fluoride. She mentioned her daughter was hair tested for lead and the tests showed her level were high even with the reverse osmosis system. She reiterated this was very concerning to her and everyone should have a reason to be concerned.

Speaker 3: Lori Henderson, DDS
Dr. Henderson reiterated her strong support for water fluoridation. She responded to Dr. Hirzy's comments noting her qualifications including being board certified and trained in pediatric dentistry and having spent eight years in public health on a Navaho Indian reservation as a pediatric dentist before opening her local private pediatric practice. She is designated by the American Academy of Pediatric Dentistry as a policy spokesman. She stated that the science speaks to the facts. She went onto state that the safety her family, her patients and her community are important and she doesn't believe that there is an ongoing conspiracy over the last 60 years to improperly promote water fluoridation.

Speaker 4: Wayne Hawks, DDS
Dr. Hawks introduced himself as a local dentist who has been in Columbia since 1972. He has been watching the fluoride debate behind the scenes. He mentioned that he has been working on teeth for 45 years and sees 8 to 29 people each day. He mentioned his love of chemistry and dentistry. He worked in Columbia and also at Boonville for 2 days a week starting in 1972. He noticed that the teeth in Boonville were extremely soft and saw the opposite situation in Columbia. He believes this is because of the fluoride added to the water in Columbia. Dr. Hawks passed some photos of teeth for the Board to view exhibiting healthy and unhealthy teeth. He noted that bacteria plus sugar equals lactic acid production which is what harms teeth. Hydroxyapatite crystals are 100 times more soluble than lactic acid. Fluorapatite crystals are 100 times less soluble. In conclusion, Dr. Hawk said it would be disastrous to do away with fluoride.

Speaker 5: John Clark
Mr. Clark stated that he has been interested in water issues for years and has been filtering his water for years. He complimented the Board for their thorough investigation of the issue and encouraged the Board to extend the deadline for receiving information to March 28. He mentioned the Sunshine Law and that more work needs to be done on how groups can learn more about it. He noted that gathering and clarifying information is not the same thing as discussing information or making a decision on it. Mr. Clark said he plans to look closely at all the information

on the fluoride debate to learn more. He mentioned that he was very pleased Dr. Hirzy was given time to speak and answer questions.

Speaker 6: Dan Redmond
Dr. Redmond wanted to discuss Ms. Phillips question regarding dropping the fluoride level from 0.7 ppm to 0.3 ppm. Calcium fluoride is less absorbed than hydrofluoric acid. If we drop from 0.7 ppm to 0.3 ppm, this would cause a higher percentage decrease because the naturally occurring fluoride would be less absorbed in the body. Also, dropping to 0.3 ppm would be below levels that we know cause harm according to the National Research Council. He stated that adding fluoride could also be a liability issue. Dr. Redmond said he would look into the question of IQ points discussed earlier. Dr. Redmond said he felt the fluoride issue is more important than say the chickens and feral cat issues previously examined by the Board and those went on for a fair amount of time. He would like to see the Board produce a report similar to the one produced in Fairbanks, Alaska regarding the fluoridation issue.

Dr. Redmond went on to say that he had asked both Dr. Henderson and Dr. Hawk to sign an affidavit regarding the safety of fluoride and that both had refused to do so. The affidavit was a legal form stating that "under the penalty of perjury", that they feel fluoride is safe. Dr. Henderson spoke from the audience that she and Dr. Hawk were just given these forms by Dr. Redmond. Dr. Hawk stated he was appalled by the action. Several Board members voiced concern. Dr. Szewczyk noted that Dr. Redmond had sent an email to the Board members implying that if they vote to continue fluoride, they could potentially be liable for damages under the 1974 Safe Drinking Water Act. Dr. Szewczyk told Dr. Redmond that he felt it was inappropriate to intimidate Board members and speakers with threatening legal repercussions.

ADJOURN: There being no additional business; the meeting was adjourned at 7:30 p.m.

NEXT MEETING DATE April 11, 2013

COLUMBIA/BOONE COUNTY BOARD OF HEALTH
MEETING MINUTES
April 11, 2013

The Columbia/Boone County Board of Health met for a regularly scheduled meeting at 5:30 p.m., Thursday, April 11, 2013. The meeting was held at the Columbia/Boone County Department of Public Health and Human Services, 1005 W. Worley St. Public Health & Human Services Director Stephanie Browning represented the staff. Administrative Support Assistant Dawna Mavel recorded the minutes of the meeting.

MEMBERS PRESENT:	MEMBERS EXCUSED:	MEMBERS NOT EXCUSED
Ilalyn Irwin	Jean Sax	
Dr. Colin Malaker		
Dr. Sally Beth Lyon		
Lynelle Phillips		
Mahree Skala		
Dr. Michael Szewczyk		
Harry Feirman		
Dr. Beth Hussey		
Denise Stillson		

CALL TO ORDER
Chair, Dr. Michael Szewczyk, called the meeting to order at 5:30 p.m.

APPROVAL OF AGENDA
The agenda was approved as written.

APPROVAL OF MINUTES
Dr. Szewczyk asked for a motion to approve the minutes from the March 14, 2013 meeting. Mahree proposed one correction to page 6, third paragraph. Part of the wording in that paragraph will be reworded to read "*Mike Anderson noted that the concentration level of HFSA would be 50 gallons added to 10 million gallons of water. Based on this dilution; his department has calculated that the final concentration would be approximately 0.00007 ppm.*" The following statement will also be added: "*Mr. Anderson also stated that it would take 5,500 ppm of arsenic in the HFSA to reach the MCL level for arsenic in the finished water.*" Motion was approved with the above changes added to the minutes.

REPORTS
Director's Report:

Stephanie Browning reported on the Healthy Babies program which is for high risk moms in the community. The program received an award this month from the Missouri Prevention Partners for being a 2013 leader in child abuse prevention in Missouri.

The county health rankings were recently released. Last year, Boone County was ranked 9th in the Missouri, this year it is ranked 6th in the state. St. Charles County ranked number one and has been number one since the ratings started. Mr. Feirman asked if our county got better or if other counties got worse. Ms. Browning said she was not sure, but felt that our county's data has not significantly changed which makes it seem as if others had fallen in other areas. Dr. Szewczyk asked if there were specific areas that contributed to Boone not being ranked number one. Ms. Browning said the tool used in the rankings allows a county by county comparison and if you put St. Charles County next to Boone, you would see a much more diverse population and a higher number of children and adults in poverty in Boone County. Both factors impact health. The access to care and number of providers in Boone County is excellent. Where Boone County usually falls short is in physical environment criteria (fast food restaurants, number of liquor stores, etc.). These are things associated with college towns. Ms. Browning said she would be happy to share further information about the study and would send the link for everyone to see. Ms. Lyon said the County's ranking was something to celebrate and congratulated Ms. Browning on the achievement.

Ms. Browning said the department is working on the 2014 budget and is not anticipating any major program changes, but continues to watch what is happening with federal and state level funding.

Ms. Browning said the department continues to work with a number of community partners in developing the Community Health Assessment and Community Health Improvement Plan. There will be a variety of ways to help and invited anyone interested to please contact any of the partners. Ms. Browning said she would email the group a list of partners the department is working with.

Ms. Phillips recalled an adolescent health survey the department had conducted previously. Ms. Phillips asked Ms. Browning if the department was doing anything new regarding adolescent health. Ms. Browning mentioned that the department is actively involved with the TOP program with the schools, which is a mentoring program. Dr. Szewczyk asked the Board if they would like to hear more on the topic of adolescent health. There was agreement to do so. Ms. Browning said that she could make arrangements for a speaker.

OLD BUSINESS

Dr. Szewczyk noted that the minutes from the January 24, 2013 Fluoride Subcommittee meeting needed approval. The minutes were approved as written.

Dr. Szewczyk noted that at the Board's last meeting it was agreed to vote on the fluoride issue. He asked the group if there was anything they would like to discuss prior to voting. None of the Board members raised any issues. Mr. Feirman mentioned that the Board also needed to vote on whether or not the City continues with HFSA or changes to a different chemical. Dr. Szewczyk noted that first we would vote on the issue of fluoridating the water and if the Board votes to continue fluoridation, we would

then consider what product to use. Ms. Lyon made a motion that the Board recommend to the City Council that Columbia continue fluoridation at the current level of 0.7 ppm. Ms. Phillip's seconded the motion. Dr. Szewczyk asked each board member to state their vote and give a brief explanation on why they voted such. Following are the results from the vote:

Denise Stillson – Voted No – Is concerned about health-related issues: cancer, arthritis, fluorosis, bone-related issues as well as issues we may not yet be aware of; she was also concerned about potential neuro-degenerative problems related to use.

Dr. Beth Hussey – Voted Yes – Questioned whether 0.7 ppm is the current CDC-recommended level. Ms. Skala stated that 0.7 ppm is the level recommended in the DHHS proposed rule from 2011.

Lynelle Phillips – Voted Yes – Felt the epidemiology concerning the benefits of fluoride was more rigorous and compelling than the studies that claimed cause and effect relationships between fluoride and various health effects; strength of association between public water supplies which fluoridate and dental caries was compelling; continuing fluoridation is particularly important in this community where we have some significant dental access issues for our low income population – fluoridation serves as a safety net for our most vulnerable children in the community.

Harry Feirman – Voted Yes - Based on studies completed in the U.S. and a comprehensive study completed in Australia which was a review of multiple other studies looking at fluoridation (both pro and con). The Australian study considered the methodologies of these studies. He also considered the recommendations of international organizations and U.S. scientific organizations.

Dr. Colin Malaker – Voted No – Sees Columbia Medicaid children in his practice every day. The kids with caries and cavities don't brush their teeth. He believes fluoridation helps to a certain extent, but it is negligible. If the funds used for fluoridation would instead be used for school dental health programs in K-8th grades, we would not see the caries rate we see today. He also sees some mild fluorosis in the kids from his practice. The biggest reason he is voting "no" is that he doesn't feel the board has the power to determine for the public what should be in their water supply; instead, he feels it should be a public ballot issue. He feels the City Council should consider this as a public ballot issue also.

Dr. Sally Beth Lyon – Voted Yes – Agreed with Ms. Phillip's comments. She believes there is evidence of the effectiveness in reducing caries along with the literature stating that water fluoridation is a successful strategy in reducing the gaps in dental health associated with lower socio-economic status. She quoted from an article indicating that even when dental services are provided free of charge, they tend to be under used by lower socio-economic individuals. As an example, she stated there is stark and disturbing evidence of this in the collaboration efforts between the Department of Health and the school system to provide free flu vaccinations to all children. She noted that the

vaccination rate is much higher in the affluent schools than in the low socio-economic schools, despite the vaccine being free and being given on-site.

Ilalyn Irwin – Voted Yes – The peer-reviewed journal articles are compelling that we should continue to fluoridate. She also felt there should be on-going discussion on the issue as new data is presented.

Mahree Skala – Voted Yes – The evidence has been reviewed by a number of national and international bodies whose opinion she trusts. They are in favor of water fluoridation. She also felt the evidence of cost effectiveness of water fluoridation compared to other programs designed to improve oral health is well documented. The cost to the community is very small, compared to the overall budget for Water and Light. She has not seen any evidence that an educational program to try to teach children to brush their teeth would have nearly the same effect for the same amount of money.

Dr. Michael Szewczyk – Voted Yes – Struggled with the libertarian issues raised by Dr. Malaker. However, as a physician, he understands the role of government in providing basic services to improve public health. There is overwhelming evidence that fluoridation can make a difference. More importantly, in his research, he did not find the evidence against fluoridation at the 0.7 ppm level to be compelling. While too much fluoride could lead to problems, too much of most anything can cause illness. Overall he felt it important to trust the experts and he did not feel the bar had been met for the Board to overrule CDC, the American Academy of Pediatrics, the American Dental Association and dozens of other respected organizations.

Dr. Szewczyk summarized the results as 7 to 2 in favor of the motion. Ms. Sax did send an email noting that she was in favor of fluoridation. Since proxies are not allowed, her vote could not be part of the official vote. However Dr. Szewczyk felt it was important to share with the group her thoughts. She stated in her email, *"I will be out of town for the April meeting. For what it is worth on fluoride issue, my vote is no change to current policy. All I have read and the people I interviewed did not give reason to substantiate a change".*

Dr. Szewczyk noted that Harold Stearley was not at the meeting, having resigned his position as Vice Chairperson of the Board of Health. He did so because of potential conflict of interest with his new job as an attorney for the Missouri Supreme Court.

Dr. Szewczyk then moved on to the second question before the board which is whether or not to switch from HFSA to another fluoride product or a pharmaceutical grade fluoride. Ms. Skala moved that we continue to use HFSA. Ms. Phillip's seconded the motion. Dr. Malaker suggested the motion be amended to say that the Board felt it would be better to use pharmaceutical grade fluoride but consideration needed to be given to its cost effectiveness. Ms. Phillips said she would like the motion to stand as is. Ms. Phillips asked Ms. Skala to amend her motion to say that we recommend using HFSA because it is the safest and a cost effective method. Ms. Skala agreed. Ms. Lyon seconded the amended motion. Dr. Szewczyk called for a vote. All votes were "yes" to continue the current practice of using HFSA.

Dr. Szewczyk asked if there was anything else that needed to be discussed. Dr. Malaker mentioned that there is not a single dental product that has fluoride in it that has HFSA. He felt the decision should be made by public referendum. Ms. Phillips noted that we fortify grains in cereals to prevent pellagra, put vitamin D in milk to prevent rickets, iodize salt to prevent Graves' disease, pasteurize milk to kill bacteria and chlorinate water to prevent exposure to bacteria. There are no referendums on any of these. She felt it would be a bad precedent to have a referendum each and every time we do a large population based public health intervention and that this would undermine our ability to do public health. Dr. Malaker said he understands that, but the difference is that people have a choice in what kind of milk they buy and what kind of cereal they buy, but a lot of low income people don't always have that choice to buy bottled water or put in a reverse osmosis system. Ms. Phillips noted the evidence is that fluoridation benefits low income people who cannot afford dental care. She also mentioned that the water on campus is naturally fluoridated to 1 ppm and nobody seems concerned about that. Ms. Lyon mentioned for the record that she appreciated and endorsed all of Ms. Phillips' thoughts above.

Dr. Szewczyk said he will prepare a report to the City Council based on the Board's recommendations. Mr. Feirman recommended adding to that report the information that Ms. Skala presented at the last meeting summarizing the multitude of articles and documents reviewed by the Board. Mr. Feirman also asked that Dr. Szewczyk send the report to the board members for review and comments prior to sending to the City Council. Mr. Feirman suggested that we might also mention that funds be made available for dental health and education programs using some the surplus funds it has available. Dr. Malaker agreed. There was discussion. It was agreed that we keep the focus on the two issues at hand. Mr. Feirman asked if the City Council would want the Board of Health Chair to speak at a meeting and Dr. Szewczyk said he would be available to do that.

NEW BUSINESS

With Mr. Stearley leaving the Board, Mr. Feirman made a motion to nominate Ms. Skala as the Board's new Vice Chairperson. Ms. Phillips seconded the motion. No other nominations were offered. Ms. Skala accepted.

Mr. Feirman suggested the Board consider putting together a subcommittee to continue to explore the dental health issues discussed, including why children are not brushing their teeth. He recommended Dr. Malaker lead that subcommittee. Ms. Phillips, Ms. Lyon and Ms. Stillson agreed to serve on the subcommittee. Dr. Malaker mentioned that he has to write prescriptions for students to brush their teeth after lunch at school. Ms. Lyons felt that school children were able to brush their teeth at school and would be happy to offer whatever information she could.

Mr. Feirman told the group that a couple of months ago, towards the end of 2012, following the demise of the Mental Health Board, he and Ms. Sax were approached by Kathy Richardson. She set up an advisory board to the public administrator to look at

various mental health issues from a broad perspective. Ms. Richardson is both the Conservator and Guardian for individuals who are deemed not competent to run their own affairs. She has an immense number of clients who have mental health issues and there are very few services available to them. This board has brought in a number of representatives from Columbia Public Schools, Veteran's Hospital, Columbia Police Department, MU Hospital, etc. to help them. Mr. Feirman and Ms. Sax offered to be part of that advisory board and will serve as liaisons between it and the Board of Health.

Dr. Szewczyk brought up the question of how, in general, the Board of Health handles public comment. He brought up the issue of scheduled versus unscheduled public comment and whether or not to have either or both at each meeting or just certain meetings, perhaps quarterly. A short discussion led to Ms. Skala recommending the idea be tabled and discussed at a future meeting. Ms. Browning said she would share some details on how other boards handle public comment at the next meeting.

ADJOURN: There being no additional business there was a motion to adjourn the meeting at 7:30 p.m.

NEXT MEETING DATE May 9, 2013