children's dental health project

October 6, 2014

Tom Heikkinen
General Manager
Madison Water Utility Board
119 East Olin Avenue
Madison, WI 53713
Sent via email: water@cityofmadison.com

Dear Mr. Heikkinen:

Because Madison officials are planning to discuss the topic of community water fluoridation later this month, the Children's Dental Health Project wishes to share information summarizing the scientific evidence about fluoridation's safety and effectiveness. We are an independent, nonprofit organization that monitors research, provides technical assistance, and advises federal and state policymakers on oral health issues. This letter includes links to numerous peer-reviewed studies, reports and research reviews. Please share this letter with other appropriate city officials.

Fluoride is a mineral that exists naturally in nearly all water supplies but usually at a concentration that is too low to prevent tooth decay. This explains why so many U.S. communities choose to fortify their water with additional fluoride.[1] And it's why the vast majority of public water systems in Wisconsin also engage in fluoridation.[2] The Centers for Disease Control and Prevention (CDC) reports that fluoridated water reduces tooth decay by about 25 percent over a person's lifetime.[3]

Prevention is key. Although America's dental health has improved significantly in recent decades, tooth decay is the most common chronic disease of early childhood—five times more prevalent than asthma.[4] Research shows that children with dental problems are much more likely to miss school, and teens with a recent toothache are four times more likely to struggle academically.[5] Last year, a CNBC story pointed out one of the consequences for adults with unhealthy or missing teeth: "In America, most people—including employers—make instant judgments based on appearance, including someone's smile and teeth."[6] Clearly, prevention is the best way to avoid the pain, cost and other negative impacts of tooth decay.

A strategy that saves money in two ways. Community water fluoridation is the most cost-effective health measure for preventing decay.[7] First, it saves money for families who would otherwise pay for more frequent fillings and other dental treatments.[8] A 2011 analysis revealed that if water fluoridation were ended in Milwaukee, dental treatment costs would increase by nearly $270,000 each year.[9] Second, fluoridation saves money for taxpayers. For example, a Texas study confirmed that the state saved $24 *per child, per year* in Medicaid costs for children because of the cavities that were prevented by drinking fluoridated water.[10]

Decades of research have produced a strong consensus supporting fluoridation. The ability of fluoridated water to prevent cavities has been established by hundreds of studies and research papers.[11] Ample evidence shows that fluoridated water is safe.[12] This solid research is why the American Academy of Pediatrics, the American Dental Association, the Institute of Medicine and other respected medical/health organizations endorse fluoridation.[13] The CDC named water fluoridation one of "10 great public health achievements of the 20th century."[14] Last year, the deans of Harvard University's three leading health institutions called fluoridation "an effective and safe public health measure for people of all ages."[15]

Drinking fluoridated water builds on the benefits of brushing with fluoride toothpaste. Although toothbrushing is crucial, numerous studies confirm that fluoridated water provides important, added protection against tooth decay. Over the past several years, studies in Nevada, Alaska and New York have demonstrated that kids in fluoridated communities have better oral health.[16] The Nevada study found that living in a community *without* fluoridated water was one of the top three risk factors for teens having dental problems.[17] Last year, a research paper concluded that community water fluoridation "is still the optimal method" for providing fluoride to the public.[18]

Fluoridated water benefits adults too. Fluoridation has played a key role in helping to reduce tooth loss among adults by at least 40 percent.[19] A 2013 study showed that adults who were born before fluoridation became widespread but who resided in fluoridated areas for at least three-quarters of their lives had 30 percent less decay than those who resided in fluoridated communities for less than one-quarter of their lives.[20]

Fluoridation remains an important strategy, even when topical fluoride treatments are available. Anti-fluoride activists claim that only fluoride that is applied topically prevents decay, but the scientific evidence tells a different story. Drinking fluoridated water significantly raises the concentration of fluoride in saliva—making the surface of tooth enamel more resistant to decay.[21] As the CDC explains, fluoride in water "comes in contact with the teeth every time you drink tap water or beverages made from tap water, as well as foods prepared with tap water."[22] *This regular, ongoing exposure to fluoride is crucial to protecting teeth from cavities.* In fact, a 2003 study examined the dental health of nearly 20,000 children and concluded: "The results supported water fluoridation as a public health measure in view of the need for continuous exposure for the maximum benefit."[23]

Fluoridation is safe. Numerous studies and reviews have demonstrated the safety of fluoridated water. The Toxicology Excellence for Risk Assessment, an independent U.S. research organization, explains that "medical scientists have agreed that small concentrations of fluoride have health benefits that vastly exceed any hypothetical health risk."[24] U.S. fluoridation practices are held to high standards of quality and safety. These additives' quality and safety are ensured by Standard 60—a set of guidelines developed at the request of the Environmental Protection Agency (EPA). Hundreds of samples have been taken and tested under Standard 60 to confirm the quality and purity of fluoride additives.[25]

Unfortunately, people searching "fluoride" or "fluoridation" online are likely to encounter various inaccurate or misleading statements. Many web pages posted by anti-fluoride groups misrepresent what the research shows:

- ***Opponents often cite studies from overseas that are flawed or do not reflect how fluoridation is practiced in the U.S.*** For example, opponents' claim that fluoride lowers children's IQ scores is based on flawed studies from areas of China and Iran where the fluoride concentration in water reached levels as high as 11.5 parts per million—roughly 10 times higher than the level used to fluoridate in the U.S.[26] Further, these studies failed to account for lead, arsenic or other factors that could affect IQs. (Many of China's water supplies are severely polluted.[27]) Even the leader of an anti-fluoride group admitted that criticisms of the methodology of these studies were "fair" and "reasonable."[28] The Harvard researchers who reviewed these studies publicly distanced themselves from the way anti-fluoride groups have interpreted the results.[29] Finally, a study just published by the *American Journal of Public Health* has found no link between fluoride levels in water and IQ scores.[30]

- ***Opponents have misrepresented reports.*** Opponents of fluoridation misinterpret the 2006 report issued by a National Research Council (NRC) committee. The NRC report explored the possibility of health concerns in U.S. communities where the *natural* fluoride levels in well water or aquifers are unusually high. Those natural fluoride levels are significantly higher than the level used to fluoridate public water systems. The NRC itself explained that its report was *not* an evaluation of water fluoridation.[31] In 2013, John Doull, the highly respected toxicologist who chaired this NRC committee, stated that he does not see "any valid scientific reason for fearing adverse health conditions from the consumption of water fluoridated at the optimal level."[32]

The experts continue to endorse fluoridation. For nearly 70 years, drinking water in the U.S. has been fortified with fluoride, and the scientific evidence shows this practice has improved Americans' health and well-being. U.S. Surgeons General have consistently recommended fluoridation, regardless of the president who appointed them.[33] Researchers at the Wellesley Institute concluded that ceasing fluoridation in a city would be "especially damaging" to the uninsured, people with disabilities and others who struggle to access dental care.[34]

We hope this information is helpful as you explore this topic. Please contact us if you have any questions.

Sincerely,

Patrice Pascual
Executive Director
Children's Dental Health Project

Sources

[1] "2012 Water Fluoridation Statistics," Centers for Disease Control and Prevention, http://www.cdc.gov/fluoridation/statistics/2012stats.htm.
[2] See statistics for Wisconsin in "2012 Water Fluoridation Statistics," Centers for Disease Control and Prevention, page updated on November 22, 2013, http://www.cdc.gov/fluoridation/statistics/2012stats.htm.
[3] "Fluoridation Basics," Centers for Disease Control and Prevention, July 25, 2013, http://www.cdc.gov/fluoridation/basics/index.htm

[4] For data illustrating the decline in tooth decay, see: "Dental Caries (Tooth Decay) in Adolescents (Ages 12-19)," National Institute of Dental and Craniofacial Research, http://www.nidcr.nih.gov/DataStatistics/FindDataByTopic/DentalCaries/DentalCariesAdolescents12to19; "Preventing Cavities, Gum Disease, Tooth Loss, and Oral Cancers: At A Glance 2010," Centers for Disease Control and Prevention (2010), http://www.cdc.gov/chronicdisease/resources/publications/AAG/doh.htm.

[5] S.L. Jackson et al., Impact of Poor Oral Health on Children's School Attendance and Performance," *American Journal of Public Health* (October 2011), Vol. 101, No. 10, 1900-1906, http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2010.200915; "Poor Oral Health Can Mean Missed School, Lower Grades," Ostrow School of Dentistry of USC, August 2012, http://dentistry.usc.edu/2012/08/10/poor-oral-health-can-mean-missed-school-lower-grades/.

[6] JoNel Aleccia, "Bad Teeth, Broken Dreams: Lack of Dental Care Keeps Many Out of Jobs," CNBC, June 13, 2013, http://www.thedailybeast.com/articles/2013/06/13/bad-teeth-broken-dreams-lack-of-dental-care-keeps-many-out-of-jobs.html.

[7] Fluoridation's status as the most-cost effective way to prevent tooth decay was noted by U.S. Surgeon General Richard Carmona in 2004, and it was the conclusion reached in a 2002 report by the National Institute of Dental and Craniofacial Research (NIDCR). For more information, see Dr. Carmona's statement at http://www.nidcr.nih.gov/OralHealth/Topics/Fluoride/StatementWaterFluoridation.htm. The NIDCR's conclusion can be accessed at http://drc.hhs.gov/report/2_0.htm.

[8] For more information on the lifetime treatment costs for decayed teeth, see "Lifetime Costs of a Cavity," Children's Dental Health Project, 2013, https://www.cdhp.org/resources/298-lifetime-costs-of-a-cavity-by-delta-dental.

[9] "Disease and Economic Analysis of Water Fluoridation," Delta Dental of Wisconsin, 2012, http://bit.ly/1uSjZSE. (Note: Based on 2011 insurance claims data and fluoridation research, Delta Dental concluded that ending fluoridation of the Milwaukee Water Works would increase the annual cost of dental care within a range of $149,212 and $397,900. Based on a Scottish study, the cost was projected to be $268,582 per year.

[10] "Savings from Water Fluoridation: What the Evidence Shows," Pew Center on the States, 2011, http://www.dmww.com/upl/documents/library/savings-from-fluoridation.pdf.

[11] "Is Fluoridation Effective?" Campaign for Dental Health, 2012, http://www.ilikemyteeth.org/fluoridation/effects-of-fluoride/.

[12] "National Academy of Sciences on Fluoride in Drinking Water," Centers for Disease Control and Prevention, July 25, 2013, http://www.cdc.gov/fluoridation/safety/nas.htm.

[13] "Protecting All Children's Teeth (PACT)," a training module by the American Academy of Pediatrics, accessed on Jan. 20, 2011 at http://www.aap.org/oralhealth/pact/ch6_intro.cfm; "Fluoride & Fluoridation," American Dental Association, accessed on Jan. 12, 2011 at http://www.ada.org/fluoride.aspx; *Improving Access to Oral Health Care for Vulnerable and Underserved Populations*, Institute of Medicine (2011), 63, http://books.nap.edu/openbook.php?record_id=13116.

[14] "Ten Great Public Health Achievements – United States, 1900-1999," Centers for Disease Control and Prevention, *Morbidity and Mortality Weekly Report,* April 2, 1999, Vol. 48, No. 12, 241-243, accessed on January 25, 2011 at: http://www.cdc.gov/mmwr/preview/mmwrhtml/00056796.htm.

[15] This letter, dated March 22, 2013, was signed by the deans of Harvard's Medical School, its School of Public Health, and its School of Dental Medicine, http://www.ilikemyteeth.org/wp-content/uploads/2013/05/Harvard-Letter-3-Deans-March-2013.pdf.

[16] M. Ditmyer, G. Dounis, C. Mobley and E. Schwarz, "A case-control study of determinants for high and low dental caries prevalence in Nevada youth," *BMC Oral Health*, (2010), Vol. 10, No. 24, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2989299/;"Dental Caries in Rural Alaska Native Children – Alaska, 2008," *Morbidity and Mortality Weekly Report,* Centers for Disease Control and Prevention, (September 23, 2011) Vol. 60, No. 37, 1275-1278, http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6037a2.htm?s_cid=mm6037a2_x; J.V. Kumar, O. Adekugbe and T.A. Melnik, "Geographic Variation in Medicaid Claims for Dental Procedures in New York State: Role of Fluoridation Under Contemporary Conditions," *Public Health Reports*, (September-October 2010) Vol. 125, No. 5, 647-54.

[17] M. Ditmyer, G. Dounis, C. Mobley and E. Schwarz, "A case-control study of determinants for high and low dental caries prevalence in Nevada youth," *BMC Oral Health*, (2010), Vol. 10, No. 24, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2989299/.

[18] J.M. ten Cate, "Contemporary perspective on the use of fluoride products in caries prevention," *British Dental Journal,* 2013, 214, 161 – 167, http://www.nature.com/bdj/journal/v214/n4/full/sj.bdj.2013.162.html.
[19] "Ten Great Public Health Achievements – United States, 1900-1999," Morbidity and Mortality Weekly Report, Centers for Disease Control and Prevention, April 2, 1999, 48:12, 241-243, http://www.cdc.gov/mmwr/preview/mmwrhtml/00056796.htm.
[20] G.M. Slade et al., "Effects of Fluoridated Drinking Water on Dental Caries in Australian Adults," *Journal of Dental Research*, (2013) Vol. 92, No. 4, 376-82, http://www.ncbi.nlm.nih.gov/pubmed/23456704.
[21] "Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States," *Morbidity and Mortality Weekly Report*, Centers for Disease Control and Prevention, August 17, 2001, http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm.
[22] "Community Water Fluoridation: Frequently Asked Questions," Centers for Disease Control and Prevention, updated on December 6, 2013, http://www.cdc.gov/fluoridation/faqs/.
[23] Singh, K.A., Spencer, J., and Armfield, J.M., "Relative Effects of Pre- and Posteruption Water Fluoride on Caries Experience of Permanent First Molars," *Journal of Public Health Dentistry*, Val. 63, No. 1, Winter 2003, 11-19.
[24] "Reader Question: Safe Level of Toxic Substance?" Toxicology Excellence for Risk Assessment, answer posted in June 2013 at http://kidschemicalsafety.org/health/reader-question-safe-level/.
[25] "NSF Fact Sheet on Fluoride Products," NSF International, February 15, 2013, http://www.nsf.org/newsroom_pdf/NSF_Fact_Sheet_on_Fluoridation.pdf.
[26] A.L. Choi et al., "Developmental Fluoride Neurotoxicity: A Systematic Review and Meta-Analysis," *Environmental Health Perspectives,* October 1, 2012, http://ehp.niehs.nih.gov/developmental-fluoride-neurotoxicity-a-systematic-review-and-meta-analysis/.
[27] "Millions face arsenic contamination risk in China, study finds," *The Guardian,* August 22, 2013, http://www.theguardian.com/environment/2013/aug/22/china-arsenic-contamination-risk-water.
[28] Paul Connett, executive director of the Fluoride Action Network, remarks delivered at the Glaser Center in Santa Rosa, Calif., October 21, 2013. (Note: Connett's relevant statement was made at approximately 0:59:35 of the video at http://www.cleanwatersonomamarin.org/get-the-facts/the-case-against-fluoride/.)
[29] Dion Lefler, "Harvard scientists: Data on fluoride, IQ not applicable in U.S.," The Wichita Eagle, September 11, 2012, http://www.kansas.com/2012/09/11/2485561/harvard-scientists-data-on-fluoride.html.
[30] J.M. Broadbent et al., "Community Water Fluoridation and Intelligence: Prospective Study in New Zealand," 2014, *American Journal of Public Health*, http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2013.301857.
[31] "Fluoride in Drinking Water: A Scientific Review of EPA's Standards," Report in Brief, prepared by the National Research Council (March 2006), accessed on April 20, 2011 at http://dels.nas.edu/resources/static-assets/materials-based-on-reports/reports-in-brief/fluoride_brief_final.pdf.
[32] Email communication by Dr. John Doull to the Pew Charitable Trusts, March 22, 2013, at 6:42 p.m. (ET), http://www.ilikemyteeth.org/wp-content/uploads/2013/03/Doull-Email-on-CWF-March-2013.pdf.
[33] "Surgeons General: Strong, Consistent Support for Community Water Fluoridation," Campaign for Dental Health (May 2013), accessed at http://www.ilikemyteeth.org/wp-content/uploads/2013/04/Surgeons-General-CWF.pdf.
[34] E. Wong, "The Real Cost of Removing Water Fluoridation: A Health Equity Impact Assessment," Wellesley Institute, September 2013, 7-8, http://www.wellesleyinstitute.com/wp-content/uploads/2013/09/The-Real-Cost-of-Removing-Water-Fluoridation.pdf.