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Fluoride

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National Academy Calls for Lowering Fluoride Limits in Tap Water

EWG Analysis of Government Data Finds Babies Over-Exposed to Fluoride in Most Major U.S. Cities

Severity of Overexposure Tied to Fluoride Levels in Water Used to Reconstitute Formula

(WASHINGTON, March 21) — A new report from the prestigious National Academy of Sciences (NAS) concludes that the current allowable level of fluoride in tap water is not protective of the public health and should be lowered, citing serious concerns about bone fractures and dental fluorosis, a discoloration and weakening of the enamel of the teeth that the committee noted is associated with other adverse health impacts.

The NAS report puts concerns about the safety of fluoride in tap water squarely in the mainstream of scientific thought. The committee called on the Environmental Protection Agency (EPA) to reevaluate and tighten current safety standards in light of these concerns.

In just one example of the potential health risks from water fluoridation, the committee cited concerns about the potential of fluoride to lower IQ, noting on page six of the report that the "consistency of study results appears significant enough to warrant additional research on the effects of fluoride on intelligence." IQ deficits, the committee noted, have been strongly associated with dental fluorosis, a condition caused by fluoride in tap water (NAS pg 175).

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The committee's findings support Environmental Working Group's (EWG's) recommendation that fluoride exposure should be limited to toothpaste, where it provides the greatest dental benefit and presents the lowest overall health risk.

EWG analysis shows infants overexposed

A new EWG analysis of fluoride exposure to bottle-fed babies supports the concerns the NAS committee raised.

EWG's analysis shows that in 25 of the 28 largest cities in the U.S., fluoride levels in tap water alone will put 8 to 36 percent of all babies up to 6 months of age over the safe dose of

fluoride on any given day. "These elevated early life exposures put children at risk for precisely the health problems that the NAS committee is concerned about," said Dr. Tim Kropp, toxicologist and senior scientist at EWG.

The safe dose for fluoride in the EWG assessment is the 0.7 milligrams per day dose developed by the Institute of Medicine (IOM) of the NAS in 2004 (IOM 2004). This dose applies specifically to children under 6 months of age, and has not been officially adopted by the EPA.

The analysis applies to all babies in the metropolitan areas served by these water systems, including breast-fed babies who are protected from fluoride in tap water because their mothers' bodies filter fluoride out of breast milk. The figures also include babies who are both breast- and bottle-fed, a phenomenon that increases as babies grow. At birth about 59 percent of babies are exclusively breast-fed. By 6 months of age this percentage is reversed, and about 64 percent of babies are exclusively bottle-fed.

Our analysis shows that babies who are exclusively formula fed face the highest risk; in Boston, for example, more than 60 percent of the exclusively formula fed babies exceed the safe dose of fluoride on any given day.

Our analysis assumes that infants in these cities are being fed formula made with fluoridated tap water that has not been treated in the home to remove fluoride. Even the most sophisticated home carbon filtration system will not remove fluoride from water. While reverse osmosis systems will strip fluoride from water, these systems in the home are rare.

The percentage of overexposed children in any given metropolitan area depends directly on the level of fluoride in the local tap water. Just 8 percent of infants would be over the safe dose in Los Angeles, where fluoride levels average about 0.61 parts per million (ppm), while more than one third of all infants would exceed a safe dose in Boston, where fluoride levels are more than twice as high, at 1.3 ppm. In San Jose, where fluoride is not yet added to the water, only 0.03 percent of all babies are exposed to unsafe levels of fluoride on any given day.

The analysis is based on fluoride levels in tap water in 28 U.S. cities from 1998 through 2002 as measured by water utilities, and data on infant formula consumption and infant weight from the National Health and Nutrition Examination Survey (NHANES) program at the Centers for Disease Control (CDC) for the years 2001 and 2002.

Fluorosis rates track infant overexposure incidence

Although these rates of elevated infant exposure may appear high, they track quite well with the strongest clinical evidence of over-fluoridation, the incidence of dental fluorosis in children. Dental fluorosis is a scarring, mottling and weakening of the tooth enamel that is caused by fluoride exposures during tooth formation that occurs from birth through age 6.

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

Dentists and public health officials generally agree that fluoride in tap water is the cause of the high rates of fluorosis in children. The NAS report released today concluded that fluorosis is associated with a number of adverse health effects, including IQ deficits.

Like bones, a child's teeth are alive and growing. Fluorosis is the result of fluoride rearranging the crystalline structure of a tooth's enamel as it is still growing. It is evidence of fluoride's potency and ability to cause physiologic changes within the body, and raises concerns about similar damage that may be occurring in the bones.

Recommendations

EWG's analysis shows that for many children, elevated fluoride exposures start at birth, when infant formula is reconstituted with fluoridated water. These exposures should be

eliminated. To achieve that goal, we recommend:

- That the EPA adopt the IOM safe level for infant fluoride exposure and explicitly incorporate this exposure into federal drinking water regulations for fluoride in tap water.
- That communities do not wait for the EPA to act, and instead move immediately to implement the IOM safe exposure level for infants, and lower fluoride levels in tap water to achieve a goal of no babies exposed to an unsafe level of fluoride.
- And finally, to get the benefits of fluoride, EWG recommends that everyone brush their teeth twice a day with either a fluoridated toothpaste or a toothpaste containing xylitol.

Methodology

This analysis was conducted using ingestion data on powdered, ready to feed and liquid formulas for 214 children aged 0-6 months found in the NHANES (CDC 2005a). NHANES is a survey designed to assess the health and nutritional status of adults and children in the U.S. and is the largest and most scientifically rigorous survey of its type.

This survey is designed to represent the U.S. population as a whole. Some localities may have differences from the national survey in the proportions of infant food intake as well as the amount that would affect the total percent of infants 0-6 months, but these are likely to be small.

Water levels were obtained from water utilities through EWG's National Tap Water Quality Database (<http://www.ewg.org/sites/tapwater/aboutdata.php>) and confirmed by phone or water utility Web site.

The percentages of children over the NAS "tolerable intake" level of 0.7 mg/day were calculated by using the tap water fluoride level for the one day's water intake for the intakes of each of the 214 children in the NHANES database. For liquid reconstituted formulas, the water added content was assumed to be 30 percent by weight to be conservative (liquid reconstituted formulas are 50 percent water added by volume); all liquid weight added to powdered formulas was assumed to be from tap water. The small amount of ready to feed formula was underestimated to have no fluoride, in the absence of fluoride data on these types of formulas.

References

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Infants Overexposed to Fluoride in Most Major US Cities

Findings Confirm NAS Concerns About Fluoride Limits in Tap Water

City	Average Fluoride Levels In Tapwater 1998-2002	Percent of All Babies Over Safe Fluoride Exposure Level*	Percent of Formula-Fed Babies Over Safe Fluoride Exposure Level*
Boston, MA	1.30	36.2	61.2
Detroit, MI	1.13	33.4	54.2
Minneapolis, MN	1.03	28.7	47.3
Seattle, WA	1.00	27.1	44.6
San Francisco, CA	1.00	27.1	44.6
Philadelphia, PA	1.00	27.1	44.6
New York City, NY	1.00	27.1	44.6
Memphis, TN	1.00	27.1	44.6
Atlanta, GA	1.00	27.1	44.6
Louisville, KY	0.96	26.2	44.2
Columbus, OH	0.95	26	43.1
Indianapolis IN	0.92	23.8	40.4
St. Louis, MO	0.91	23.8	39.8
Baltimore, MD	0.91	23.8	39.8
Chicago, IL	0.88	23	40.2
Tampa, FL	0.85	20.9	36.2
Austin, TX	0.81	18.2	32.7
Washington, DC	0.80	17.8	32.1
San Antonio, TX	0.80	17.8	32.1
Milwaukee, WI	0.80	17.8	32.1
Phoenix, AZ	0.75	14.5	26.7
Dallas, TX	0.68	10.6	19.6
Miami, FL	0.66	10.1	19.2
Los Angeles, CA	0.61	8.5	15.5
Jacksonville, FL	0.61	8.5	15.5
Houston, TX	0.31	0.6	1.2
San Diego, CA	0.30	0.6	1.0
San Jose, CA	0.13	0.03	0.1

* The safe dose for fluoride in this assessment is the 0.7 milligrams per day dose developed by the Institute of Medicine of the National Academy of Sciences in 2004 (IOM 2004). This dose applies specifically to children under six months of age, and has not been officially adopted by the EPA.

Source: Fluoride data from municipal drinking water systems, compiled by EWG. Data on infant fluoride and water consumption from the CDC's National Health and Nutrition Examination Survey (NHANES, 2001 & 2002)