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What to know about fluoride's impact on health

Fluoride is a naturally occurring mineral that is commonly added to drinking water and dental products to prevent cavities, a significant public health achievement. However, prolonged exposure to high levels of fluoride can damage teeth and bones, and recent evidence suggests that moderate levels of fluoride may be linked to lower IQ in children. Balancing fluoride's profound oral health benefits while minimizing potential harms requires a careful examination of the latest data.

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Environmental exposures; drinking water

MORE THAN

200 million

people in the U.S. receive small amounts of supplemental fluoride from a public water system.

What is fluoride?

Fluoride is a naturally occurring mineral. Low levels of fluoride occur naturally in most sources of drinking water, typically from weathering or leaching from rocks and soils. Some industrial activities, such as smelting and battery manufacturing, can also be a source of additional fluoride in water due to wastewater from the manufacturing process.

What are the health benefits associated with fluoride?

Fluoride strengthens our bones and teeth enamel; the strengthening of enamel helps prevent cavities. Therefore, it is commonly added to toothpaste, oral rinses, and other dental products. The fluoridation of drinking water, initiated in the United States in 1945, has been demonstrated to be an effective, inexpensive solution to reduce cavities. Benefits may extend beyond teeth, as poor oral health is also linked to other problems, such as cardiovascular effects, and shame and social stigma. There are stark disparities, as many children who are living below the poverty limit have untreated tooth decay, which can contribute to pain, difficulty concentrating, poor school performance, and social stigma. Because the public water system reaches everyone in communities with water fluoridation, fluoridation can help address disparities in dental insurance and access to dental care.

How many Americans receive fluoridated water from public water systems?

More than 200 million people in the U.S. receive fluoridated water from a public water system. The decision to add small amounts of fluoride to public water is made on a state or local basis. This is because some areas may already have relatively high, naturally occurring background levels of fluoride in the water and therefore do not need to supplement it. In other places, voters have decided against fluoridation.

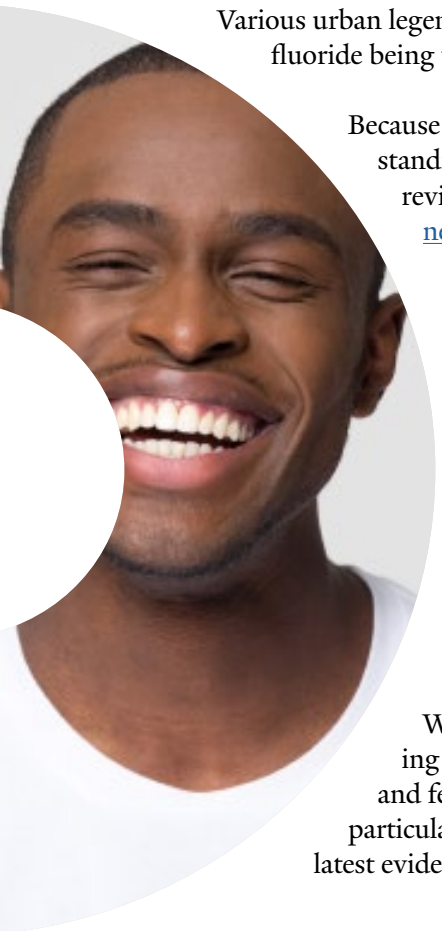
With fluoride in oral health care products, is fluoridating water necessary?

When fluoridation of drinking water was first implemented, its benefits were profound. The current benefits are more modest, due to the availability of fluoride in toothpaste and other oral hygiene products. However, fluoridated products and good dental care are not affordable and accessible to everyone. Because the public water system reaches everyone in communities with water fluoridation, fluoridation helps address disparities in dental insurance and access to dental care.

What happens when you get too much fluoride?

Both too little and too much fluoride can create health problems. While the benefits of fluoride are clear, prolonged exposure to high levels of fluoride can be harmful to teeth and bones (known as fluorosis), which includes causing discoloration, spots, or damage to teeth and bone fractures. There has also been more recent evidence that low to moderate levels of fluoride exposure may be linked to lower IQ in children. This recent research observed these negative effects at fluoride levels that were more than double the amounts recommended for U.S. community water fluoridation programs.

Why is fluoride considered controversial?



Various urban legends and false statements about fluoride are circulating. These include false statements about fluoride being used by the government for mind control, for example.

Because both too much and too little fluoride can negatively impact health, there has been long-standing, data-driven debate about the optimal level and how to weigh risks and benefits. As reviewed in a recent study, there is some evidence of links between high doses of fluoride and neurological and cognitive problems.

This evidence combined with the availability of fluoride in other products, has prompted some re-examination of whether the recommended fluoride concentrations and the maximum limits in drinking water should be lowered to maximize public health benefits. For example, in the U.S., the U.S. Public Health Service recommends a fluoride concentration of 0.7 mg/L, but the regulatory limit for fluoride in water to protect against fluorosis (damage to teeth and bones) is 4 mg/L. For context, 1mg/L is equivalent to about one cup of water in a swimming pool. The World Health Organization, in comparison, recommends a limit of 1.5 mg/L. There are areas of the U.S. – about 4.5% of community water systems – where the public water supplies have fluoride levels above 1.5 mg/L. Lowering the target amount of fluoride is not the same as eliminating it altogether.

When the scientific process works, it involves incorporating the latest evidence and re-examining the situation on the ground. Since the potential exposures and effects on maternal pregnancy and fetal development are not clear, it is important to reassess the risks and benefits of fluoride, particularly for pregnant women and infants and ensure our drinking water standards reflect the latest evidence.

What about people on private wells?

About 15% of the U.S. population relies on private wells, which are not covered by government regulations and therefore any testing or treatment is the responsibility of the homeowner. The U.S. Geological Survey estimates that approximately 28 million Americans have private well water with fluoride levels less than the 0.7 mg/L oral health benchmark, while 172,000 have levels above the maximum of 4 mg/L, suggesting that people served by private wells may be getting too little or too much fluoride exposure. Therefore, some health departments, like in Connecticut and Massachusetts, recommend that homeowners have their wells tested for fluoride, particularly if there is a child in the home.

What if I want to reduce my exposure to fluoride?

Typical charcoal-based water filtration systems are not designed to remove fluoride, but more advanced home treatment systems such as reverse osmosis remove fluoride from drinking water. Bottled water is often purified tap water and if labeled as deionized, purified, or distilled it likely has no or very low levels of fluoride, unless specifically listed as an added ingredient. Spring water may contain fluoride because it may be naturally occurring in the source water. The U.S. Food and Drug Administration (FDA) sets limits for fluoride in bottled water; however, the levels are not required to be listed on the label.

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