

# Fluoride: Science Says it is Safe

Science Facts and Analysis from Science for Georgia

Fluoride is a naturally occurring mineral in water. Decades of scientific research have repeatedly demonstrated that measured levels [of fluoride in water are safe and prevent tooth decay](#). Fluoride has recently been in the news as several states are considering banning it based on common misrepresentations. Much like anything, an overabundance of fluoride can be harmful; however, the fluoride levels in our water supply are safe and provide a positive benefit to society. For low-income communities, fluoridated drinking water may be the only preventive care available for their oral health. Fluoride is a simple and effective public health measure that has shown great value to children's health. It promotes healthy teeth, which promotes healthy individuals, which increases community well-being, and saves everyone money.

Herein we outline the benefits of fluoride, recommended safe levels, and then address common misconceptions.

## Fluoride Benefits

Fluoride occurs naturally in drinking water, as it is absorbed as water runs over fluoride-rich rocks. The amount of fluoride varies based on geographic location. [The recommendation to add fluoride in drinking water was made because studies showed a significant decrease in the number of children with tooth decay after they drank naturally occurring water that was rich in fluoride](#).

[Based on these scientific studies showing, in 1945, Michigan was the first state to begin water fluoridation](#). This public health effort has been supported by scientific research and health organizations like the U.S. Surgeon General and the National Institute of Dental and Craniofacial Research. [The United States Public Health Service \(USPHS\) has recommended fluoride in drinking water since 1962 to prevent tooth decay](#). [Water fluoridation benefits over 200 million Americans and prevents about 25% of tooth decay in children and adults](#).

**Cities that had fluoride in their water supply and removed it have witnessed an increase in tooth decay among children.** For example, [in Alberta, Canada](#) and [Juneau, Alaska](#), researchers found that ceasing the use of fluoride in their water supply consequently resulted in an uptick of tooth decay among children. [Removing fluoride from drinking water exacerbates health disparities](#). An Australian study examined a decision made in 2012 to stop the use of fluoridated water. Using an index to measure socioeconomic advantages and disadvantages, the researchers found that lower-income areas were more prone to having less access to fluoridated water—thus, increasing the likelihood of developing dental disease.

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## Fluoride FAST FACTS

Fluoride is a natural substance that is found in rocks, soil, and water. It prevents tooth decay in children and adults.

### Fluoride helps keep teeth healthy by:

- Stopping the growth of bacteria that cause cavities
- Strengthening tooth enamel
- Reversing early tooth decay by replacing and preventing the loss of minerals that make teeth healthy



The U.S. Public Health Service recommends 0.7 parts per million of fluoride in drinking water, or about 3 drops of fluoride in a 55-gallon barrel, to prevent tooth decay.



Today, the majority of the U.S. population receives fluoridated water.\*

63%



\* Decisions about water fluoridation are made at the state or local level.

### You can get fluoride by:

- Drinking local tap water that has fluoride in it
- Using fluoride toothpaste/ mouth rinse
- Getting varnish/gel at the dentist's office
- Taking a dietary supplement



After adding fluoride to the community water supply, tooth decay decreased in both children and adults, and complete tooth loss in older adults became much less common.



1940s 2014

Tooth Decay  
in U.S. Schoolchildren



1960-62 2017-19

Complete Tooth Loss in  
U.S. Adults Ages 65-74

At about age 2 (or sooner if a dentist or doctor suggests it), brush your child's teeth with a tiny amount of fluoride toothpaste.



For children aged 3 to 6, parents should put the toothpaste on the brush. Use only a pea-sized amount of fluoride toothpaste. Encourage your child to spit out the toothpaste rather than swallow it.



Additional resources



National Institute of Dental  
and Craniofacial Research

From: National Institute of Dental and Craniofacial Research. [Community Water Fluoridation](#) | [National Institute of Dental and Craniofacial Research](#)



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## Recommended Safe Levels

The USPHS has set the recommended level of fluoride for drinking water at 0.7 milligrams per liter (mg/L). [According to the Centers for Disease Control and Prevention \(CDC\), this equates to three drops in a fifty-five-gallon barrel.](#) Since fluoride in water is naturally occurring, it is impossible for water suppliers and people who drink well-water to keep to an exact number. Thus, the [Environmental Protection Agency \(EPA\), has set the acceptable range for fluoride to 0.7 mg/L to 2.0 mg/L.](#)

In 1996, [Congress amended the Safe Drinking Water Act to require an annual report about water quality in each US county.](#) If you wish to know the concentration in your local supply, please contact your water supplier and ask how much fluoride is in your water.

### What about Toothpaste?

Toothpaste contains higher levels of fluoride than drinking water. This is because people should not swallow and instead should spit-out their toothpaste after brushing. Toothpaste for children often contains no, or reduced amounts, of fluoride, because they are more apt to swallow it.

## Common Misconceptions

Everything in moderation. Fluoride, like any other element exceeding the recommended amount, poses an adverse effect on human health. Several studies have demonstrated what can happen when people far exceed the recommended amounts. [Science is clear that fluoride, when used at the recommended levels, is safe.](#)

## Cancer Risk

A 1990 study by the National Toxicology Program sparked a debate on whether fluoride causes cancer. [This study on rats](#) found greater bone tumor growth in rats given water with high levels of fluoride. In response, [the USPHS reviewed over fifty epidemiologic studies spanning over forty years and concluded that fluoridated water did not serve as a cancer risk to people.](#) Further comprehensive studies, including ones in [1993](#), [1999](#), and [2011](#) also found no link between fluoridization and cancer.

## Impact on Sleep

The pineal gland, also called the sleep gland, sits outside of the blood-brain barrier, and is exposed to systemic concentrations of fluoride. [Some people believe fluoride calcifies the pineal gland and detracts sleep and thyroid function.](#) It is true that fluoride easily converts to calcium. Thus far, [studies have been inconclusive about the impact of fluoride on pineal gland calcification.](#) Currently, the possible negative impact on sleep is far outweighed by the positive benefits on oral health.



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## Impact on Cognition

Some studies have raised concerns that [fluoride exposure can lead to reduced cognition](#) (IQ levels). In a meta-analysis conducted in 2023, researchers found that [“fluoride exposure at the concentration used in community water fluoridation is not associated with lower IQ scores.”](#) In this study, the researchers divided the studies into those that tested impacts at high levels (well above USPHS, CDC, EPA recommended levels) of exposure versus low levels of exposure. The only studies that [show a link between reduced IQ and fluoride were those that administered fluoride at levels above the recommended levels](#). Additionally, other variables, such as environmental exposures and socioeconomic status (SES), variables that can also have a negative impact on IQ, were not properly considered.

## Fluoride Regulations

The U.S. EPA regulates what concentrations of fluoride are acceptable for drinking water and community water systems are required to monitor fluoride levels regularly to ensure compliance with EPA standards. This monitoring also enables cities to create annual reports on water quality in compliance with the Safe Drinking Water Act. The CDC also provides tools like the [Water Fluoridation Reporting System](#) (WFRS) [to help states manage and monitor fluoridation quality. If fluoride exceeds the maximum level, the water system must notify people within 30 days of discovering the violation.](#)

Fluoride in water is a safe, effective, and simple public health measure. It increases oral health. Poor oral health can result in an inability to concentrate and missed school days, this causes poorer school outcomes, which, in turn, leads to a negative impact on society. In many lower-income communities, fluoride in water is the only dental care people receive. Water providers are required by law to monitor fluoride levels to ensure compliance with regulated safe levels.

## About Science for Georgia

Science for Georgia is a 501c3 dedicated to bridging the gap between scientists and the public through training, outreach opportunities, and direct contact with the public, policymakers, and the press. Science for Georgia highlights how science can impact people’s lives and advocates for the responsible use of science in public policy.

Please reach out with any questions or comments [info@sci4ga.org](mailto:info@sci4ga.org)



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