



## Water: Basic Information about Regulated Drinking Water Contaminants

You are here: [Water](#) » [Drinking Water](#) » [Drinking Water Contaminants](#) » [Basic Information about Regulated Drinking Water Contaminants](#) » [Basic Information about Fluoride in Drinking Water](#)

# Basic Information about Fluoride in Drinking Water

## **New!** Review of Fluoride Drinking Water Standard

- [EPA reviews fluoride drinking water standard.](#)
- [Questions and Answers about new science assessments and decision to review drinking water standard PDF](#) (10pp, 55K, [About PDF](#))
- [New health effects and exposure assessments.](#)

EPA regulates fluoride in drinking water to protect public health. Fluoride may cause health problems if present in public or private water supplies in amounts greater than the drinking water standard set by EPA.

- [What is fluoride?](#)
- [Uses for fluoride.](#)
- [What are fluoride's health effects?](#)
- [What are EPA's drinking water regulations for fluoride?](#)
- [How does fluoride get into my drinking water?](#)
- [How will I know if fluoride is in my drinking water?](#)
- [How will fluoride be removed from my drinking water?](#)
- [How do I learn more about my drinking water?](#)

### What is fluoride?

Fluoride compounds are salts that form when the element, fluorine, combines with minerals in soil or rocks.

### Uses for fluoride.

Many communities add fluoride to their drinking water to promote dental health. If you are concerned about fluoride in a private well, please visit:

- [EPA's private drinking water wells Web site](#)
- [Water Systems Council Web site](#) [EXIT Disclaimer](#)

### What are fluoride's health effects?

Exposure to excessive consumption of fluoride over a lifetime may lead to increased likelihood of bone fractures in adults, and may result in effects on bone leading to pain and tenderness.

Children aged 8 years and younger exposed to excessive amounts of fluoride have an increased chance of developing pits in the tooth enamel, along with a range of cosmetic effects to teeth.

This health effects language is not intended to catalog all possible health effects for fluoride. Rather, it is intended to inform consumers of some of the possible health effects associated with fluoride in drinking water.

### Fluoride at a Glance

**Maximum Contaminant Level (MCL) = 4** milligrams per Liter (mg/L) or 4 parts per million (ppm)

**Maximum Contaminant Level Goal (MCLG) = 4 mg/L or 4 ppm**

#### Health Effects

Some people who drink water containing fluoride in excess of the MCL over many years could get bone disease (including pain and tenderness of the bones); children may get mottled teeth.

[Drinking Water Health Advisories provide more information on health effects](#)

#### Chemical Abstract Service Registry Number

7681-49-4

#### Sources of Contamination

Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories

[List of all Regulated Contaminants \(PDF\)](#)

(6 pp, 396K, [About PDF](#))

**What are EPA's drinking water regulations for fluoride?**

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur. These non-enforceable health goals, based solely on possible health risks and exposure over a lifetime with an adequate margin of safety, are called maximum contaminant level goals (MCLG). Contaminants are any physical, chemical, biological or radiological substances or matter in water.

The MCLG for fluoride is 4.0 mg/L or 4.0 ppm. EPA has set this level of protection based on the best available science to prevent potential health problems. EPA has set an enforceable regulation for fluoride, called a maximum contaminant level (MCL), at 4.0 mg/L or 4.0 ppm. MCLs are set as close to the health goals as possible, considering cost, benefits and the ability of public water systems to detect and remove contaminants using suitable treatment technologies. In this case, the MCL equals the MCLG, because analytical methods or treatment technology do not pose any limitation.

EPA has also set a secondary standard (SMCL) for fluoride at 2.0 mg/L or 2.0 ppm. 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, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards. Tooth discoloration and/or pitting is caused by excess fluoride exposures during the formative period prior to eruption of the teeth in children. The secondary standard of 2.0 mg/L is intended as a guideline for an upper bound level in areas which have high levels of naturally occurring fluoride. The level of the SMCL was set based upon a balancing of the beneficial effects of protection from tooth decay and the undesirable effects of excessive exposures leading to discoloration.

Fluoride is voluntarily added to some drinking water systems as a public health measure for reducing the incidence of cavities among the treated population. The decision to fluoridate a water supply is made by the State or local municipality, and is not mandated by EPA or any other Federal entity. The Centers for Disease Control and Prevention (CDC) provides recommendations about the optimal levels of fluoride in drinking water in order to prevent tooth decay. Information about CDC's recommendations can be found at:

<http://www.cdc.gov/fluoridation/>

States may set more stringent drinking water MCLGs and MCLs for fluoride than EPA.

The drinking water standards are currently under review. The Safe Drinking Water Act requires EPA to periodically review the national primary drinking water regulation for each contaminant and revise the regulation, if appropriate. In 2003 and as part of the first Six Year Review, EPA reviewed the drinking water standard for fluoride and found that new health and exposure data were available on orally ingested fluoride. EPA requested that the National Research Council (NRC) of the National Academies of Science (NAS) conduct a review of this data and in 2006, the NRC published their evaluation in a report entitled, Fluoride in Drinking Water: A Scientific Review of EPA's Standards. The NRC recommended that EPA update its fluoride risk assessment to include new data on health risks and better estimates of total exposure.

In March 2010 and as part of the second [Six Year Review](#), the Agency indicated that the Office of Water was in the process of developing its health and exposure assessments to address the NRC's recommendations. The Agency finalized the [risk and exposure assessments for fluoride](#) in January 2011 and [announced its intent to review the drinking water regulations for fluoride to determine whether revisions are appropriate](#).

**How does fluoride get into my drinking water?**

Some fluoride compounds, such as sodium fluoride and fluorosilicates, dissolve easily into ground water as it moves through gaps and pore spaces between rocks. Most water supplies contain some naturally occurring fluoride. Fluoride also enters drinking water in discharge from fertilizer or aluminum factories. Also, many communities add fluoride to their drinking water to promote dental health.

A federal law called the Emergency Planning and Community Right to Know Act (EPCRA) requires facilities in certain industries, which manufacture, process, or use significant amounts of toxic chemicals, to report annually on their releases of these chemicals. For more information on the uses and releases of chemicals in your state, contact the Community Right-to-Know Hotline: (800) 424-9346.

- [EPA's Toxics Release Inventory \(TRI\) Web site](#) provides information about the types and amounts of toxic chemicals that are released each year to the air, water, and land.

#### How will I know if fluoride is in my drinking water?

When routine monitoring indicates that fluoride levels are above the MCL, your water supplier must take steps to reduce the amount of fluoride so that it is below that level. Water suppliers must notify their customers as soon as practical, but no later than 30 days after the system learns of the violation. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

- [See EPA's public notification requirements for public water systems.](#)

If your water comes from a household or private well, check with your health department or local water systems that use ground water for information on contaminants of concern in your area.

- [For more information on wells, go to EPA's Web site on private wells.](#)
- [Water Systems Council website](#) [EXIT Disclaimer](#)

#### How will fluoride be removed from my drinking water?

The following treatment method(s) have proven to be effective for removing fluoride to below 4.0 mg/L or 4.0 ppm: distillation or reverse osmosis.

#### How do I learn more about my drinking water?

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect the supply of safe drinking water and upgrade the community water system. Your water bill or telephone book's government listings are a good starting point for local information.

Contact your water utility. EPA requires all community water systems to prepare and deliver an annual consumer confidence report (CCR) (sometimes called a water quality report) for their customers by July 1 of each year. If your water provider is not a community water system, or if you have a private water supply, request a copy from a nearby community water system.

- [The CCR summarizes information regarding sources used \(i.e., rivers, lakes, reservoirs, or aquifers\), detected contaminants, compliance and educational information.](#)
- [Some water suppliers have posted their annual reports on EPA's Web site.](#)

#### Other EPA Web sites

- Find an answer or ask a question about drinking water contaminants on [EPA's Question and Answer Web site](#) or call EPA's Safe Drinking Water Hotline at (800) 426-4791
- [Secondary Drinking Water Regulations: Guidance for Nuisance Chemicals](#)

#### Other Federal Departments and Agencies

- [Centers for Disease Control and Prevention, Community Water Fluoridation](#)

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