



## Fluoride

Many water sources contain natural fluoride, the ionized form of fluorine. Fluorine is an abundant, naturally-occurring mineral, and may be found in conjunction with apatite, calcite, quartz, galena, pyrite and many other sulfides. But some water sources contain low fluoride content—the reservoirs or ground is not comprised of the type of minerals that may erode to produce fluoride in water.

### Initial discovery

In 1908, a dentist named Dr. Frederick McKay became interested in the lack of dental caries (more commonly known to non-dentists as “cavities”) in his Colorado Springs, Colorado, patients. Although these patients seemed to get cavities less frequently than others, their teeth seemed to be discolored, mottled or spotted. After much research, it was determined that fluoride was the cause of both the tooth discoloration (enamel fluorosis) and the lack of cavities. The optimum level of fluoride in water to prevent cavities without causing discoloration in most of the population was determined to be between 0.7 and 1.2 mg/L.

### USPHS endorsement

In 1962, the US Public Health Service endorsed the practice of adding fluoride to drinking water at doses of 0.7 mg/L in warmer climates and 1.2 mg/L in colder climates. The variation in fluoride concentration was based on the assumption that people in warmer climates drink more water, and therefore receive more fluoride. The basis for this endorsement was strictly protecting the public from cavities. There was no legal mechanism in place at that time to require the removal of excess fluoride from drinking water.

### USEPA regulation

Since 1974, the US Environmental Protection Agency has regulated drinking water through the Safe Drinking Water Act. Currently, the MCLG (a nonenforceable contaminant concentration that is protective of health) and the MCL (which represents an enforceable concentration that is technologically achievable) are the same for fluoride: 4.0 mg/L. There is also a secondary MCL for fluoride of 2.0 mg/L. Secondary MCLs are not enforceable, but are intended by USEPA to prevent adverse aesthetic effects, such as taste and odor or in regard to fluoride, the discoloration of teeth.

In 2011, the US Department of Health and Human Services and USEPA [announced steps](#) to ensure that standards and guidelines on fluoride in drinking water continue to provide maximum protection to support good dental health, especially in children. HHS proposed that the recommended level of fluoride in drinking water can be set at the lowest end of the current optimal range to prevent tooth decay, and EPA initiated a review of the maximum amount of fluoride allowed in drinking water.

### Related Resources

[Fluoridation Chemicals](#)

[Fluoride References](#)

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[Resources](#)

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