

Natural Fluoride in the US

This fact sheet answers common questions about *fluoride occurring naturally in private wells and groundwater*.

How much fluoride is found naturally in drinking water sources?

Fluoride is present in all water sources at concentrations ranging from minimally perceptible to greater than 10 parts per million (ppm). Rivers, lakes and surface waters contain 0.1 to 0.2 ppm fluoride reflecting rainwater contact with windblown soils and other elements in the environment. Well water fluoride levels vary depending on the minerals in the rock and ores that the water passes through. Fluoride in ocean water (96.5 % of Earth's water) is typically in the range of 1.2 to 1.4 ppm.

Fluoride is the 13th most abundant element in the earth's crust

Parts per million (ppm) is equivalent to milligrams per liter (mg/L).

Groundwater with high fluoride concentrations, affects up to 60% of populations of Pakistan, East Africa (Sudan, Ethiopia, Uganda, Kenya and Tanzania), West Africa, Thailand, China, Sri Lanka, and Southern Africa.^{1 2} In the United States, fluoride levels vary less significantly. Less than one-half of one percent of U.S. residents

on community water systems have drinking water that exceeds 2 ppm and less than one-tenth of one percent have water that exceeds 4 ppm. Water samples from Colorado, analyzed when studying the association between Colorado children with yellow/brown stains and reduced tooth decay in the early 1900's, contained 2 to 12 ppm fluoride.

Who is responsible for monitoring fluoride found naturally in public/community water systems?

The Safe Drinking Water Act (SDWA) designated the Environmental Protection Agency (EPA) as the lead agency responsible for safe levels of substances in drinking water. The EPA is responsible for setting regulatory standards for the quality of public (community) drinking water systems defined as water systems with 15 or more service connections or serving 25 or more persons for 60 days in a year (for example, parks and recreational areas). The SDWA defines any physical, chemical, biological or radiological substances or matter in water found in drinking water as "contaminants" regardless of the effect or level of the substance on human health. Drinking water contains small amounts of many different contaminants below the identified regulatory safe level. EPA considers scientific literature on health effects of all regulated substances and establishes a maximum level in drinking water to protect against adverse health effects.

Who is responsible for monitoring fluoride found naturally in private drinking water sources (wells)?

Fourteen percent of U.S. residents rely on private wells that are not regulated by the EPA. Private groundwater wells serving fewer than 15 connections or fewer than 25 persons for no more than 60 days in a year are not regulated. It is the responsibility of the well owner to know the quality of the water and if is suitable for human consumption. The EPA recommends wells used for drinking water be tested once every 3 years since water quality can change over time. The US Geological Survey (USGS), the science agency for the US Department of the Interior, found that 23 percent of private wells exceeded the identified regulatory safe level for one or more contaminants at a level indicating a potential health concern. These substances were

¹ World Health Organization. *Fluoride in Drinking-water*. pp:5-8.2006.

² Petersen PE, Lennon MA. Effective use of fluorides for the prevention of dental caries in the 21st century: the WHO approach. *Community Dent Oral Epidemiol.* 2004; 32: 319-21

primarily radon, arsenic, uranium, manganese and nitrates.³ This compares to 1% with excessive fluoride levels. Few private well owners test for fluoride and they are likely unaware of the possibility of high fluoride content. The Association of State and Territorial Dental Directors (ASTDD) recommends that private well owners test their wells for drinking water contaminants that are of significant health concern.

What are the recommended levels for fluoride in drinking water sources?

Water is typically the largest fluoride exposure a person will experience at any level. There are no adverse health effects associated with fluoride under the U.S. Public Health Service (USPHS) recommended maximum levels for drinking water. The EPA has set maximum allowable concentrations of fluoride in drinking water at 2 ppm and 4 ppm to prevent enamel fluorosis and skeletal fluorosis, respectively. 4 ppm is enforceable and 2 ppm is not. The USPHS recommends 0.7 ppm fluoride in drinking water for protection

One part per million fluoride is a SMALL quantity, comparable to the length of a pickup truck and a road between New York City and Los Angeles.

against tooth decay. Fluoride in drinking water at 0.7 ppm is considered the optimum fluoride exposure; sufficiently reducing risk for tooth decay, while remaining low enough to avoid developing fluorosis, a staining of the teeth. Over 117 organizations, including the USPHS, Centers for Disease Control and Prevention (CDC), American Dental Association (ADA) and ASTDD, encourage the adjustment of the naturally occurring fluoride level to meet the optimal concentration for preventing dental decay.

If fluoride in drinking water is not adequate, fluoride supplements are recommended for children at risk for tooth decay. Health professionals need to know when the fluoride level in drinking water is less than the recommended level in order to safely and effectively prescribe fluoride supplements for children. Testing of individual private wells is necessary for appropriate prescriptions.

What water filtration systems reduce or remove excessive fluoride from drinking water?

Removal of fluoride from water is difficult and expensive for community water systems or for private wells. Reverse osmosis devices and water distillation can effectively remove fluoride. [NSF Standard 58](#) recommends that defluoridation devices achieve at least an 80 % fluoride removal rate to be considered adequate.⁴ Activated carbon filtration units sold for home use do not remove fluoride.

RESOURCES

As with many subjects, there are scientifically accepted, evidence-based facts as well as sources of erroneous information concerning fluoride in drinking water. Recognized and reliable sources for scientifically accepted information include:

[Centers for Disease Control and Prevention](#) <http://www.cdc.gov/oralhealth/>

Private Well Water and Fluoride <http://www.cdc.gov/fluoridation/faqs/wellwater.htm#q6>

Community Water Fluoridation <http://www.cdc.gov/fluoridation/>

[National Academy of Sciences and its National Research Council](#) at

<http://www.cdc.gov/fluoridation/safety/nas.htm>

[American Dental Association](#) www.ada.org

Fluoridation Facts

<http://www.ada.org/en/public-programs/advocating-for-the-public/fluoride-and-fluoridation/fluoridation-facts>

Fluoride Supplements

<http://www.ada.org/en/member-center/oral-health-topics/fluoride-supplements>

[Water Systems Council](#) - WSC is a national nonprofit organization dedicated to promoting the wider use of wells as modern and affordable safe drinking water systems and to protecting ground water resources nationwide. There are more than 60 available fact sheets available to be downloaded free. (See: [Fluoride and Well Water](#) AND [Well Water and Fluoride](#)) <https://www.watersystemscouncil.org/well-owners/wellcare-info-sheets/>

[Wellcare](#) hotline at 1-888-395-1033 or visit www.wellcarehotline.org

[National Groundwater Association](#) at <http://www.ngwa.org/Pages/default.aspx>

Consumer Fact Sheet Sample: [Addressing Safety Concerns, New York Community Water Fluoridation](#) @ <https://www.health.ny.gov/prevention/dental/fluoridation/docs/safety.pdf>

³ United States Geological Survey. USGS Water Science School. [Contamination in US Private Wells](#). 2009.

⁴A copy of the NSF/ANSI Standard 58 can be ordered from the website. <http://www.nsf.org/regulatory/regulator-nsf-standards>