



Questions and Answers on Fluoride

The U.S. Environmental Protection Agency today announced that it has reevaluated the current science on fluoride. EPA will rely on these new assessments to review the existing maximum level of fluoride allowed in drinking water and determine whether its drinking water regulations for fluoride should be revised. EPA will review the drinking water standard to make sure that it continues to protect against unwanted effects of excessive exposure. EPA's examination of the fluoride drinking water public health goal and enforceable standard will be based on this new science, along with other information such as analytical methods and treatment feasibility.

This fact sheet provides information on community water fluoridation as well as current federal activities to update guidance and regulations concerning community water fluoridation. The Department of Health and Human Services (HHS) oversees the national water fluoridation program.

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Existing Drinking Water Standards for Fluoride

1) What is the current drinking water standard for fluoride?

The current enforceable drinking water standard for fluoride is 4.0 mg/L. This is the maximum amount that is allowed in water from public water systems. It is set to meet the current public health goal for protection against increased risk of crippling skeletal fluorosis, a condition characterized by pain and tenderness of the major joints.

EPA also has a non-enforceable secondary standard for fluoride of 2.0 mg/L, which is recommended to protect children against the tooth discoloration and/or pitting that can be caused

by excess fluoride exposures during the formative period prior to eruption of the teeth. Although water systems are not required to comply with secondary standards, for fluoride, EPA does require that systems notify customers if the average water levels exceed the secondary standard.

2) What are the drinking water standards for fluoride? What do you mean by an MCL, an MCLG, and a secondary standard for fluoride? What is the difference?

The current enforceable drinking water standard for fluoride is 4.0 mg/L. This is the maximum amount that is allowed in water from public water systems, also called the Maximum Contaminant Level (MCL). The MCL is set to be as close to the public health goal as EPA finds may be achieved with the use of the best available technology, taking cost into consideration. The public health goal, called a Maximum Contaminant Level Goal (MCLG), is not enforceable and is based solely on possible health risks and exposure over a lifetime. For fluoride, analytical methods or treatment technology do not pose any limitation so the MCL currently equals the MCLG of 4.0.

A secondary standard is a non-enforceable guideline to regulate contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color of drinking water). EPA recommends secondary standards to water systems but does not require systems to comply. For fluoride, the secondary standard is 2.0 mg/L.

3) What are the public notification requirements if my system exceeds the MCL or the secondary standard for fluoride?

Community water systems that exceed the fluoride MCL of 4 mg/L must notify persons served by that system as soon as practical, but no later than 30 days after the system learns of the violation.

Community water systems that exceed the fluoride secondary standard of 2 mg/L must notify persons served by that system as soon as practical but no later than 12 months from the day the water system learns of the exceedance.

4) Why is EPA's drinking water standard different than Department of Health and Human Service's recommended optimal fluoridation level for community drinking water systems?

EPA's drinking water standard differs from the Department of Health and Human Service's recommended optimal fluoridation level because the two benchmarks have different purposes and are set under different authorities. The EPA's enforceable standard for the highest level of

fluoride that is allowed in public water supplies is 4.0 milligrams per liter, is set to protect against risks from exposure to too much fluoride. The HHS recommended optimal level of 0.7 milligrams per liter is set to promote public health benefits of fluoride for preventing tooth decay while minimizing the chance for dental fluorosis.

Current EPA Actions

5) Why did the EPA decide to conduct new risk and exposure assessments?

In 2003, 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. The panel also recommended that EPA update its public health goal to be protective of pitting of tooth enamel, clinical stage II skeletal fluorosis, and bone fractures, in addition to the stage III skeletal fluorosis that is addressed by the current public health goal.

6) What were the findings of the new risk and exposure assessments?

These risk assessments consider new health effects data on skeletal and dental fluorosis and also update exposure estimates to reflect current conditions. Data indicate that fluoride exposure levels among the population have increased in the last 40 to 50 years resulting in an increase in some effects on teeth. Based on the data presented in this report, it is likely that some children are exposed to too much fluoride at least occasionally. The impact of the overexposure on the risk for severe dental fluorosis in one or more teeth depends on the frequency and duration of the overexposures.

EPA has proposed a reference dose (RfD) of 0.08 mg/kg/day for protection against pitting of the tooth enamel (severe dental fluorosis) and concluded that this value is also protective against fractures and skeletal effects in adults. The reference dose is the estimate of the daily exposure that is likely to be without harmful effect during a lifetime.

7) What has changed in your conclusions about risk from fluoride? Have we learned about new health effects?

The new assessments have clarified what we know about the relationships between fluoride exposure and dental fluorosis, bone fractures, and skeletal fluorosis. The new assessments also reflect updated exposure estimates that account for changes in fluoridation practices and use of consumer dental products since the original drinking water standard was set.

8) Does EPA plan to revise the fluoride drinking water standard?

At this time and with the finalization of the new risk assessment, the Agency has not yet made a decision about revising the drinking water standard for fluoride. The Agency will review the new risk assessment of fluoride along with other information (e.g. analytical methods and treatment feasibility, occurrence and exposure, etc) to determine whether it is appropriate to revise the drinking water standard.

9) What is the next step for the EPA?

The Agency will review the new risk assessment of fluoride along with other information (e.g. analytical methods and treatment feasibility, occurrence and exposure, etc) to determine whether it is appropriate to revise the drinking water standard.

Fluoride Exposure

10) How does fluoride get into tap water?

Fluoride can occur in drinking water naturally as a result of the geological composition of soils and bedrock. Some areas of the country have high levels of naturally occurring fluoride which can dissolve easily into ground water as it moves through gaps and pore spaces between rocks.

Fluoride can also be added to public drinking water supplies as a public health measure for reducing cavities among the treated population. Fluoridation is not required by EPA, which is prohibited by the Safe Drinking Water Act from requiring the addition of any substance to drinking water for preventive health care purposes. 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. The decision whether or not to add fluoride to drinking water is made on a local basis. Consumers served by public water systems who wish to learn about fluoridation of their drinking water can visit the Centers for Disease Control and Prevention (CDC)'s My Water's Fluoride (MWF) Web site at <http://apps.nccd.cdc.gov/MWF/Index.asp>.

11) Does my public water system add fluoride to the water?

If you have questions about whether your community has fluoridated water, you can call your public water system. If you live in one of the 39 states that participate in the Centers for Disease Control and Prevention's "[My Water's Fluoride](#)" program, you can go online and find information on your water system's fluoridation status. The best way to find the fluoride level of your local public water system is to contact your water utility provider for more information. Consumers can find the name and contact information of the water utility on their water bill.

12) Doesn't fluoride occur naturally in water? What if my water system has naturally-occurring fluoride above 4.0 mg/L?

Fluoride can occur in drinking water naturally as a result of the geological composition of soils and bedrock. Community water systems are required to ensure that levels of fluoride in their drinking water are less than 4.0 mg/L in order to be in compliance with EPA drinking water regulations. If your water system has naturally-occurring fluoride above this level, the EPA requires systems to take action to reduce it. If you want the most up-to-date information about the current fluoride level in your water, contact your local water supplier directly.

13) Are there public water systems that exceed the drinking water standard for fluoride? Why? What do they do about it?

A very small proportion of the public water systems nationwide have exceeded the drinking water standard for fluoride. In these cases, the high level of fluoride is generally the result of natural background resulting from the geologic composition of local soils and bedrock. When routine monitoring indicates that fluoride levels are above the MCL of 4 mg/L, the public water system must take steps to reduce the amount of fluoride so that it is below that level.

14) In addition to water, what are other specific sources of fluoride?

Fluoridated toothpaste is another main source of fluoride intake. Other fluoride-containing dental products are applied or prescribed by a health care professional such as gels, varnishes, pastes and restorative materials. These products are used only occasionally on the outside of the tooth and do not contribute much to the total intake of fluoride. Small amounts of fluoride can also come from industrial emissions, pharmaceuticals and pesticides.

15) Why has exposure to fluoride increased?

Previously, the only source of exposure to fluoride was that which occurred naturally in drinking water or food as a result of the geological composition of soils and bedrock. Currently, exposure to fluoride comes from more sources including fluoridated dental products such as toothpaste and mouthwash, as well as the voluntary addition of fluoride to drinking water, which some systems do as a public health measure for reducing tooth decay.

16) Does bottled water contain fluoride?

Bottled water products labeled as de-ionized, purified or distilled have been treated in such a way that they contain no or only trace amounts of fluoride, unless they specifically list fluoride as an added ingredient. Other bottled water products (such as spring water) can contain fluoride that is added or naturally present in the original source of the water. FDA sets limits for fluoride in bottled water based on several factors, including the source of the water. These limits range from 0.8 to 2.4 milligrams per liter. To learn more, check out the CDC's [Fact Sheet on Questions about Bottled Water and Fluoride](#) and FDA's Website: www.fda.gov/ForConsumers/ConsumerUpdates/ucm203620.htm

Potential Adverse Health Effects of Fluoride

17) What are the effects of excess levels of fluoride and why are they different for children and adults?

Adults exposed to excessive consumption of fluoride over a lifetime may have increased likelihood of bone fractures, and may result in effects on bone leading to pain and tenderness. For effects to teeth, children are most likely to be affected by excessive exposure to fluoride because it impacts teeth while they are still in formative phases. 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. For prevention of tooth decay, the beneficial effects of fluoride extend throughout the life span.

18) Are children or adults exposed to too much fluoride?

Based on the data evaluated in this risk assessment, EPA concludes that it is likely that some children 8 and younger are exposed to too much fluoride at least occasionally while their teeth are forming because of their high fluid intake relative to their body weight and/or because of high natural levels of fluoride in their local drinking water. The impact of overexposure on the risk for pitting of enamel in one or more teeth depends on the frequency and duration of the overexposures.

19) Who is at risk from excessive fluoride exposure?

Children are most likely to be affected by excessive exposure to fluoride because it impacts teeth while they are still in formative phases (birth through formation of the wisdom teeth). EPA's risk assessment compared age-specific exposure estimates to the fluoride dose associated with pitted enamel and found that children 8 and younger may be those most at risk. The maximum dose that is protective for children will also protect adults from long-term effects on bone.

What You Can Do

20) Is my child getting an appropriate amount of fluoride from drinking water and tooth brushing?

Yes, if you and your child are among the 196 million Americans who receive their water from an optimally fluoridated community water system (0.7 to 1.2 milligrams per liter) and you follow guidelines in your child's tooth brushing, then it is highly unlikely that your child is receiving too much fluoride. Centers for Disease Control recommends that children under 6 who are using fluoride toothpaste should use a small, pea-sized amount on the brush, spit out the excess paste, and rinse well after brushing. Begin using toothpaste with fluoride when your child is 2 years old. Use toothpaste with fluoride earlier only if your child's doctor or dentist recommends it. You can discuss the correct use of fluoride treatments and fluoride-containing toothpaste with your child's dentist. In addition, you can go to the Centers for Disease Control and Prevention website, to learn how young children can use fluoride-containing products to prevent dental fluorosis. www.cdc.gov/OralHealth/publications/factsheets/brushup.htm.

In some regions in the United States, community drinking water and home wells can contain levels of naturally occurring fluoride that are greater than the optimal levels recommended by the CDC for prevention of tooth decay. EPA currently has a non-enforceable recommended guideline for fluoride of 2.0 mg/L that is set to protect against cosmetic effects. If your home is served by a water system that has fluoride levels exceeding this recommended guideline, current EPA recommends that children should be provided with alternative sources of drinking water

21) What can I do to limit my exposure to fluoride?

Talk with your dentist about the best use of fluoride to prevent tooth decay. In adults in the U.S., there is little concern about unwanted health effects even from the combined level of fluoride from all sources. The main sources of fluoride intake for a child are from swallowing toothpaste and from water. Fluoride toothpaste is effective for preventing tooth decay and does not contribute to fluorosis unless it is swallowed. Because children under 6 have poor control of their swallow reflex, they tend to swallow much of the toothpaste on their brush. Parents or caregivers

should supervise their child's tooth brushing, ensuring that that the child uses only a small pea-sized amount of paste, spits out the excess paste, and rinses well after brushing. For parents of children under two years of age, check with your dentist before using fluoride toothpaste.

Water fluoridation is beneficial for reducing and controlling tooth decay and promoting oral health in children and adults. Recent estimates of reductions in tooth decay can be credited to community water fluoridation. You can check with your local water supplier to see how much fluoride is in your drinking water. Because high levels of fluoride are generally the result of natural background levels, consumers served by private wells may want to have their water tested by a state certified laboratory. You can find one in your area by contacting your state water certification officer. Contact information for your state can be found at <http://water.epa.gov/scitech/drinkingwater/labcert/>.

22) Are there methods I can use to remove fluoride from my drinking water at home? For example, boiling or use of commercially available water filters and units.

The typical charcoal-based water filtration systems used in most homes do not remove fluoride from water. Boiling water does not remove fluoride. More costly distillation and reverse osmosis are treatment methods that have proven to be effective for removing fluoride to below 4.0 mg/L. If you choose to use home water treatment, make sure that the filter you use is certified to address your concerns. There are several independent American National Standards Institute (ANSI) certified organizations that test and certify home water treatment units. More information about these organizations and other issues related to your water safety can be found at http://water.epa.gov/aboutow/ogwdw/upload/2005_11_17_faq_fs_healthseries_filtration.pdf

23) Should my children stop brushing their teeth with fluoride toothpaste?

Children over 2 years old should continue to brush their teeth with their usual fluoride containing toothpaste. Questions specific to your own child should be discussed with your child's dentist or pediatrician. See parent tips at See Brush Up on Healthy Teeth: www.cdc.gov/OralHealth/publications/factsheets/brushup.htm

24) Should I reduce the number of times I brush my teeth daily?

Continue to brush your teeth at least twice a day. Adults and children 2 years of age and older should brush their teeth preferably after each meal or at least twice a day, or as directed by a dentist or doctor.

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