



Community Water Fluoridation: Questions and Answers

The U.S. Department of Health and Human Services is proposing a change to the recommendation for the optimal fluoride level in drinking water to prevent tooth decay. The new recommendation, 0.7 milligrams of fluoride per liter of water, replaces the previous recommended range of 0.7 to 1.2 milligrams per liter. There are several reasons for this change, including that Americans have access to more sources of fluoride than they did when water fluoridation was first introduced in the United States. The new guidance will update and replace original recommendations provided in 1962 by the U.S. Public Health Service.

This fact sheet provides information on community water fluoridation, as well as current federal activities to update guidance and regulations on community water fluoridation.

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There is some potential for developing dental fluorosis when children consume fluoride during the time when teeth are forming under the gums (birth through age 8). To help prevent both tooth decay and dental fluorosis, the Centers for Disease Control and Prevention (CDC) recommends the following:

For parents: Children younger than 6 years have a poor swallowing reflex and tend to

swallow much of the toothpaste on their brush. Toothpaste that is swallowed (but not toothpaste that is spit out) contributes to a child's total fluoride intake. Therefore: As soon as the first tooth appears, begin cleaning by brushing without toothpaste with a small, soft-bristled toothbrush and plain water after each feeding. Begin using toothpaste with fluoride when the child is 2 years old. Use toothpaste with fluoride earlier if your child's doctor or dentist recommends it.

- Do not brush your child's teeth more than 2 times a day with a fluoride toothpaste,
- Apply no more than a pea-sized amount of toothpaste to the toothbrush, and
- Supervise your child's tooth brushing, encouraging the child to spit out toothpaste rather than swallow it. Additional information is available on-line:
<http://www.cdc.gov/oralhealth/publications/factsheets/brushup.htm>
- If your child's pediatrician or dentist prescribes a fluoride supplement (or vitamin supplement that contains fluoride), ask him or her about any risk factors your child has for decay and the potential for dental fluorosis. If you live in an area with fluoridated water, fluoride supplements are not recommended.
- You can use fluoridated water for preparing infant formula. However, if your baby is exclusively consuming infant formula reconstituted with fluoridated water, there is an increased potential for mild dental fluorosis. Additional information can be found in a CDC fact sheet on infant formula:
http://www.cdc.gov/fluoridation/safety/infant_formula.htm

For health professionals:

- Fluoride supplements can be prescribed for children at high risk of tooth decay whose primary drinking water has a low fluoride concentration. For children under 8, weigh the risk for decay without fluoride supplements, the decay prevention offered by supplements, and the potential for dental fluorosis.
- Counsel parents and caregivers on the use of fluoride toothpaste by young children, especially those younger than 2 years. Fluoride toothpaste is a cost-effective way to reduce the prevalence of tooth decay. However, because they do not have a well-developed swallowing reflex and may like the taste of the toothpaste, young children often swallow a large portion of the toothpaste put on their brush.
- The prescription dose of fluoride supplements should be consistent with the schedule established by the American Dental Association, the American Academy of Pediatric Dentistry, and the American Academy of Pediatrics.

1. What is fluoride?

Fluoride is a naturally occurring mineral that is proven to protect against tooth decay.

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2. Why is fluoride added to water and toothpaste?

Fluoride's action in preventing tooth decay benefits both children and adults throughout their lives. The health benefits of fluoridation are—

- Fewer cavities and less severe cavities.
- Less need for fillings and tooth extractions.
- Less pain and suffering associated with tooth decay.

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3. How does fluoride work to prevent tooth decay?

Fluoride works by stopping or even reversing the tooth decay process. It keeps tooth enamel strong and solid. Tooth decay is caused by certain bacteria in the mouth. When a person eats sugar and other refined carbohydrates, these bacteria produce acid that removes minerals from the surface of the tooth. Fluoride helps to remineralize tooth surfaces and prevents cavities from continuing to form.

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4. What is community water fluoridation?

Almost all water contains some naturally occurring fluoride, but usually at levels too low to prevent tooth decay. Many communities choose to adjust the fluoride concentration in the water supply to a level beneficial to reduce tooth decay and promote good oral health. This practice is known as community water fluoridation. Given the dramatic decline in tooth decay during the past 60 years, the Centers for Disease Control and Prevention (CDC) named water fluoridation one of **Ten Great Public Health Interventions of the 20th Century**.

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5. Why is the Department of Health and Human Services (HHS) developing new recommendations for community water fluoridation?

Sources of fluoride have increased since the early 1960s. At that time, drinking water and food and beverages prepared with fluoridated water accounted for nearly all of an individual's fluoride intake. Today, water is just one of several sources of fluoride. Other sources include dental products such as toothpaste and mouth rinses, prescription fluoride supplements, and professionally applied fluoride products such as varnish and gels. Recognizing that it is now possible to receive enough fluoride with slightly lower levels of

fluoride in water, the HHS set out to develop new recommendations for community water fluoridation.

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6. How is HHS developing new recommendations?

In September 2010, the Department of Health and Human Services convened a panel of scientists from across the U.S. government to review new information related to fluoride intake and to develop new recommendations for community water fluoridation.

The scientists reviewed the best available information on: the prevalence and trends in dental caries, water intake in children in relation to outdoor air temperature, changes in the percentage of U.S. children and adults with dental fluorosis, and the U.S. Environmental Protection Agency's (EPA) new assessments of cumulative sources of fluoride exposure and risks of children developing severe dental fluorosis.

This new information led HHS to propose changing the recommended level for community water systems to 0.7 milligrams per liter. The current recommended level is a range of 0.7 to 1.2 milligrams per liter. An **announcement** about the **proposed change** was published in the Federal Register. Public comment on the new proposed optimal fluoridation level is being sought and may be provided for 30 days. Comments will be considered by HHS in finalizing a new recommendation for community water fluoridation in the United States.

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7. How were the recommended levels previously set for fluoride in drinking water?

In 1962, based on scientific studies showing that fluoride reduces tooth decay, the U.S. Public Health Service recommended the amount of fluoride in drinking water range from 0.7 to 1.2 milligrams per liter. Scientists set the range by taking into account different levels of children's fluid intake according to the average annual temperature in different regions of the United States—less fluoride was added in warmer, southern climates where it was believed that people drank more water, and more was added in cooler, northern climates where it was believed that people drank less. Over the past several decades, many factors, including the advent of air conditioning, have reduced geographical differences in water intake.

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8. 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.

Fluoride can also be added to public drinking water supplies as a public health measure for reducing cavities. The decision whether or not to add fluoride to drinking water is made at the state or local level. Consumers served by public water systems who wish to learn about fluoridation of their drinking water can visit the CDC's "My Water's Fluoride" Web site at <http://apps.nccd.cdc.gov/MWF/Index.asp>.

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9. 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 CDC'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.

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10. Why is EPA's drinking water standard (referred to as the MCL or MCLG) different than HHS' recommended optimal fluoridation level for community drinking water systems?

EPA's drinking water standard differs from HHS' 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, and is set to protect against risks from exposure to too much fluoride. The HHS proposed 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.

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11. What is dental fluorosis?

Dental fluorosis is a change in the appearance of the tooth's enamel. It can result when children regularly consume higher-than-recommended amounts of fluoride during the teeth forming years, age 8 and younger. Most dental fluorosis in the U.S. – about 92 percent – is very mild to mild, appearing as white spots on the tooth surface that in many cases only a dental professional would notice. Moderate and severe forms of dental fluorosis, which are less common, cause more extensive enamel changes. In the rare, severe form, pits may form in the teeth. The severe form rarely occurs in communities where the level of fluoride in

water is less than 2 milligrams per liter.

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12. Since the optimal level of 0.7 milligrams per liter of fluoride is a “recommended” level (i.e., not a nationwide level or EPA enforceable level) in community drinking water systems, how do I know whether my community has or will reduce the level of fluoride in my drinking water? Does it have to?

This optimal level recommendation is voluntary. If your local water system adds fluoride to the water, reducing the level is a simple process that can be completed almost immediately, although it may be several days before the entire water system is at the new level. If you want the most up-to-date information about the current fluoride level in your water, contact your local water system.

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13. Why has exposure to fluoride increased?

Exposures to fluoride have increased since the early 1960s. At that time, drinking water and food and beverages prepared with fluoridated water accounted for nearly all of an individual's fluoride intake. Today, 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.

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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.

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15. Given that we get fluoride from other sources, is it still beneficial to fluoridate drinking water?

Yes, 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. Fluoride in drinking water provides some protection from tooth decay to all people who drink fluoridated water or eat food or drink beverages prepared in areas with fluoridated water. Additional information is available online at <http://www.thecommunityguide.org/oral/fluoridation.html>.

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16. Why does HHS think that 0.7 milligrams per liter is appropriate?

HHS has reviewed extensively the scientific literature on the relationship between fluoride and oral health. The optimal level of fluoride in drinking water provides enough fluoride to prevent tooth decay in children and adults while limiting the possibility for children to develop dental fluorosis in teeth that are forming under the gums. Analyses of national survey data show a gradual decline in tooth decay as fluoride content in water increases from very low levels to the recommended level of 0.7 milligrams per liter. However, there were limited changes in tooth decay as the level of fluoride in drinking water increased to 1.2 milligrams per liter. In contrast, the percentage of children with dental fluorosis increased as the fluoride concentration in water increased.

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17. What are the adverse health effects of excessive fluoride exposure?

Children under age 8 and younger exposed to excessive amounts of fluoride have an increased chance of developing pits in the tooth enamel. Excessive consumption of fluoride over a lifetime may increase the likelihood of bone fractures, and may result in effects on bone leading to pain and tenderness, a condition called skeletal fluorosis. Severe skeletal fluorosis is a rare condition in the United States. The EPA exposure analysis suggests that the effects on bone in adults are of greatest concern for those living in areas with high natural background levels of fluoride and favoring beverages, such as tea, that are high in fluoride.

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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.

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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.

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

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.

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21. 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 toothbrushing, then it is highly unlikely that your child is receiving too much fluoride. CDC 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 CDC's website to learn how young children can use fluoride-containing products to prevent dental fluorosis. See **Brush Up on Healthy Teeth**.

In some regions in the U.S., 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 recommendations are that children should be provided with alternative sources of drinking water.

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22. What are the drinking water standards for maximum levels of 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.

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23. Has the safety of community water fluoridation been evaluated?

The safety and effectiveness of fluoride at levels used in community water fluoridation has been thoroughly documented by scientific and public health organizations using scientific reviews and expert panels. These expert panels consist of scientists from the United States and other countries with expertise in various health and scientific disciplines, including oral health, medicine, biophysics, chemistry, toxicological pathology, and epidemiology. Experts have weighed the findings and the quality of the available evidence and found that the weight of peer-reviewed scientific evidence does not support an association between water fluoridation and any adverse health effect or systemic disorders.

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24. 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 the child uses only a small pea-sized amount of paste, spits out the excess paste, and rinses well after brushing.

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.

Consumers served by private wells may want to have their water tested by a state certified laboratory. You can find one by contacting your state water certification officer. Contact information for your state can be found at <http://water.epa.gov/scitech/drinkingwater/labcert/>

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25. 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 **Brush Up on Healthy Teeth**.

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26. 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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27. Should I refuse fluoride treatments at the dentist?

Your dentist will recommend fluoride treatments during a dental visit if it is the right treatment for you or your child. Professionally applied fluoride treatments are an effective way to prevent tooth decay. Discuss with your dentist whether you need fluoride treatments, and if so, how often they are advised for you.

Back to Top**28. If I am drinking water with fluoride, why do I also need to brush with toothpaste that contains fluoride?**

The combined use of fluoride toothpaste and fluoridated water offers protection above using either separately. Toothpaste contains a higher concentration of fluoride. Fluoride in drinking water is diluted, but it comes in contact with the teeth every time you drink tap water or beverages made from tap water, as well as foods prepared with tap water. This provides your teeth with a near constant (or continuous) exposure to fluoride all day. Use of both fluoridated water and fluoridated toothpaste is recommended because fluoride in water and fluoride in toothpaste work differently to help prevent tooth decay.

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Both drinking water and toothpaste provide important and complementary benefits. The drinking water provides long low-level protection, but the fluoride in toothpaste is at a high enough concentration that it has additional properties. Whether in water or toothpaste, fluoride works in two main ways: by slowing the activity of bacteria that cause decay, and by combining with the enamel on the surface of the teeth to make it stronger and more resistant to decay. Fluoride in the water, although at a lower concentration than in toothpaste, maintains a constant low level of fluoride in the dental plaque and saliva all day. Toothpaste provides a high level of fluoride, but only for 1-2 hours after brushing, so the water exposure during the remainder of the day takes over after that.

Back to Top**30. Does toothpaste contain too much fluoride to be recommended for children?**

All fluoridated toothpastes that can be purchased without a prescription are safe and effective for individuals ages 2 and older.

Back to Top**31. 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/boutow/ogwdw/upload/2005_11_17_faq_fs_healthseries_filtration.pdf
 (PDF-1.2M)

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32. Is there fluoride in infant formula? Should I try to remove fluoride from infant formula?

All formulas, either concentrates or ready-to-feed, have some fluoride, but most infant formula manufacturers develop their products to ensure low levels of fluoride. A recent study by the American Dental Association (ADA) confirmed that fluoride concentrations in commercially available infant formulas are very low. It is not possible to remove this small amount of fluoride by filtering or boiling the formula; however, at normal consumption amounts, infant formula alone does not contain fluoride at levels that would be higher than the daily upper limit established by the Institute of Medicine. In liquid or powdered infant formula concentrate, the majority of fluoride comes from the water used to mix the formula. Some parents may choose to use bottled water. To learn more, check out the CDC's **Bottled Water and Fluoride** and FDA's Website:

<http://www.fda.gov/ForConsumers/ConsumerUpdates/ucm203620.htm/>

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33. Is fluoride present in mouthwash and dental whitening products?

Some mouthwashes contain fluoride, and if so, are clearly labeled that way. Fluoride in mouthwashes can be another way to obtain the decay-preventing benefit of fluoride. Fluoride-containing mouth rinses are safe and effective when used as directed. Note that children under 6 should not use fluoride mouth rinses, unless directed by a dentist. Most dental whitening products do not contain fluoride and the decay preventing effectiveness of those that do is not currently known.

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34. 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 **Bottled Water and Fluoride** and FDA's Website:

<http://www.fda.gov/ForConsumers/ConsumerUpdates/ucm203620.htm>

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Page Located on the Web at http://www.cdc.gov/fluoridation/fact_sheets/cwf_qa.htm

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