

# Fluoridation

... at a glance

## Background

In October 2007, the Metropolitan Water District of Southern California is scheduled to join a majority of the nation's public water suppliers in adding fluoride to drinking water in order to prevent tooth decay.

In line with recommendations from the California Department of Public Health, as well as the U.S. Centers for Disease Control and Prevention, Metropolitan will adjust the natural fluoride level in the water, which ranges from 0.1 to 0.4 parts per million, to the optimal range for dental health of 0.7 to 0.8 parts per million.

Fluoride levels in drinking water are limited under California state regulations at a maximum dosage of 2 parts per million.

## About Fluoride

- Fluoride is a naturally occurring mineral found both in surface water (water from snowmelt, rivers and streams) as well as groundwater.
- Fluoride's benefits for teeth were discovered in the 1930s by scientists who saw extremely low tooth decay rates among people whose water supplies had a significant amount of natural fluoride.
- Fluoride helps teeth resist decay by strengthening the protective layer of tooth enamel, and can reverse newly formed cavities.
- Fluoride has been added to U.S. drinking water supplies since 1945.
- The three primary agents used to fluoridate water are sodium fluoride (made of sodium and fluoride atoms bonded together), sodium fluorosilicate (sodium, silicon and fluoride) and fluorosilicic acid (hydrogen, silicon and fluoride). Metropolitan will use fluorosilicic acid because of the safety and reliability this treatment chemical offers.
- Of the 50 largest cities in the U.S., 43 fluoridate their drinking water.
- While exposure to fluoride can cause dental fluorosis, most cases in communities with optimally fluoridated water are very mild and characterized by barely visible white opaque spots on the teeth.
- The U.S. Department of Health and Human Services has not recognized claims that low-level fluoride exposure is linked to occurrences of cancer, brain damage or osteoporosis.



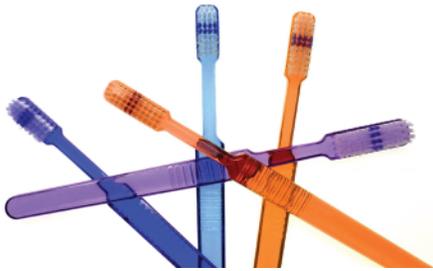
## Benefits

- At a cost of less than a dollar a family per year, the dental and medical health communities believe fluoridation offers Southern California consumers an additional level of public health protection. Metropolitan estimates the total cost to be less than \$2 per acre-foot of water. An acre-foot (nearly 326,000 gallons) serves two typical Southland families for one year.
- The American Dental Association estimates that the lifetime cost per person to fluoridate a water system is less than the cost of one dental filling. Every dollar spent on fluoridation saves \$38 in avoided dental bills, according to the CDC.
- More than 60 years of scientific research and experience have found that people living in communities with fluoridated water have healthier teeth and fewer cavities than people living where water is not fluoridated.
- Fluoridated water cuts across socioeconomic dividers, offering everyone equal health benefits.

“Community water fluoridation continues to be the most cost-effective, practical and safe means for reducing and controlling the occurrence of tooth decay in a community.”

— U.S. Surgeon General

# Fluoridation FAQ



Thousands of research studies and more than 60 years of experience have demonstrated that fluoridating public drinking water is not only safe and effective, it is the best method of improving oral health in a community. In fact, the Centers for Disease Control and Prevention (CDC) recognized drinking water fluoridation as one of the 10 great major public health achievements of the 20<sup>th</sup> century.

Although tooth decay is considered largely preventable, it remains the most common chronic disease, particularly in children aged 5 to 17 years. Fluoridation of drinking water, proven to reduce tooth decay in both children and adults, is endorsed by the American Dental Association (ADA). Studies have concluded that people in communities with fluoridated water have up to 60 percent less tooth decay than those in communities without fluoridated water. Along with the CDC and the ADA, the American Medical Association, the American Cancer Society, the American Academy of Pediatrics, the National Institutes of Health, the PTA, and the World Health Organization support drinking water fluoridation.

Based on these benefits, the Metropolitan Water District of Southern California—the primary supplier of imported water in the Southland—is scheduled to begin fluoridating its drinking water supplies in October 2007.

Despite fluoridation's proven record, many consumers may not be familiar with its benefits or may be concerned about adding a chemical to their drinking water. The answers to some of the more frequently asked questions about fluoride are provided below.

## **Q ■ What is fluoride?**

Fluoride is the electrically charged atom (or “ion”) that makes up the naturally occurring element fluorine. Although fluoride comes from fluorine, its properties are very different, just like chloride in common table salt is very different from chlorine. Most sources of drinking water contain some naturally occurring fluoride.

## **Q ■ What is fluoridation?**

Fluoridation is the addition of fluoride to a drinking water supply so that it contains the level recommended for optimal protection against tooth decay.

## **Q ■ Why is Metropolitan fluoridating its water supplies?**

At a cost of less than a dollar a family per year, Metropolitan joins the dental and medical health communities in believing fluoridation offers Southern California consumers an additional level of public health protection. In the end, adding fluoridation at its five treatment plants represents the greatest cost benefits for Metropolitan's 26 member public agencies and the 18 million people they serve.

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Metropolitan's Board of Directors has been examining fluoridation since passage of a state law that conditionally mandates fluoridation of any public water supply that has at least 10,000 service connections or customers. Although Metropolitan was exempt from conditions of the law, local public health officials continued to push for large-scale fluoridation to be applied in order to maximize the financial and medical benefits of treating municipal water supplies. After an appeal by a group of public health officials representing six Southern California counties, Metropolitan's board voted to adopt a policy to fluoridate at the district's five treatment plants.

### **Q ■ How does fluoride protect teeth against tooth decay?**

Tooth enamel and the material underneath are made mostly of two common minerals—calcium and phosphate. Tooth decay occurs when acids produced by bacteria in the mouth dissolve or “demineralize” the teeth. Fluoride protects against tooth decay by slowing down or stopping demineralization, promoting “remineralization,” and keeping the bacteria from producing too much acid.

### **Q ■ What proof is there that fluoridated water prevents tooth decay?**

The benefits of fluoride in drinking water have been observed in numerous studies and have been shown for people of all ages. Reductions in the rate of tooth decay in fluoridated communities have ranged from 30 to 60 percent for baby teeth, from 20 to 40 percent for teeth of children from 8 to 12 years old and from 15 to 35 percent for teenagers, adults and seniors.

Some of the earliest evidence of the benefits of fluoride in drinking water came from comparing the rate of tooth decay in communities that had naturally optimized levels of fluoride in their water with communities with naturally low levels. In fact, the original recommendations for fluoridating water supplies came from this early work.

The first community in the world to add fluoride to its water supply was Grand Rapids, Michigan in 1945. Fifteen years after fluoride was introduced, a study compared tooth decay in children who had consumed fluoride in drinking water from birth with children before fluoridation was started. The children who had consumed fluoridated water from birth had less than half the tooth decay of children who did not have fluoridated water. Communities who have fluoridated their water supplies in more recent years also have seen reductions in tooth decay although not as dramatic. That's because there is now widespread use of fluoridated toothpastes and there are other sources of fluoride, even in communities that have not fluoridated their water. (See answer to the next question.)

### **Q ■ If I use a fluoridated toothpaste, am I already getting enough fluoride to protect against decay?**

The benefits from water fluoridation build on those from fluoride in toothpaste or other sources. The use of fluoridated toothpastes became common in the 1970s. Communities that initiated fluoridation in the mid '70s have generally shown a lower rate of tooth decay than communities that did not fluoridate, even though fluoridated toothpastes have been in wide use.

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### **Q ■ How much fluoride is used to treat drinking water supplies?**

The California Department of Public Health has adopted regulations that establish standards for addition of fluoride to drinking water. According to those standards, any public water agency that fluoridates its water supply must maintain fluoride levels within the control range that has been established for its climate.

### **Q ■ How much fluoride will be in my drinking water once Metropolitan starts to fluoridate?**

Metropolitan's water supply contains natural levels of fluoride of 0.1 to 0.4 milligrams per liter (mg/L) or parts per million. Once Metropolitan begins to fluoridate, levels will average about 0.7 to 0.8 mg/L in treated water. Because Metropolitan supplies about half of the water used in Southern California, the water delivered to your home may not come from Metropolitan. Most utilities have more than one source of supply. Interested consumers should contact their water provider to find out how much fluoride is likely to be in their tap water.

### **Q ■ What chemical is Metropolitan using to fluoridate its supplies?**

While there are three chemicals commonly used to fluoridate municipal drinking water, Metropolitan selected fluorosilicic acid as the most cost-effective bulk chemical to be used in the district's treatment processes. The appropriate state drinking water authorities must approve all drinking water additives. Metropolitan's use of fluorosilicic acid was approved by the California Department of Public Health

### **Q ■ What are Metropolitan's costs to fluoridate at its treatment plants?**

Metropolitan's estimated cost to fluoridate its supplies is roughly less than \$2 per acre-foot of water treated. This cost is largely dependent on the cost of the fluoride treatment chemical.

### **Q ■ Once Metropolitan adds fluoride at its treatment plants, do its member agency and retailers still need to treat their supplies?**

Any agency relying on Metropolitan for 100 percent of its treated drinking water will benefit from fully optimized fluoride concentrations. If a water system blends Metropolitan supplies with other non-fluoridated supplies, additional fluoride treatment would be required within its system to maintain optimal fluoride levels. If no additional fluoride is added in the blended system, fewer overall health benefits would be provided.

### **Q ■ Is fluoride harmful to my health?**

There have been literally hundreds, if not thousands, of studies that have looked at whether fluoride in drinking water is harmful to human health. These studies have looked at whether there is a link between fluoride and cancer, bone fractures as well as adverse effects on the immune system, kidneys, digestive system and reproductive system. The American Dental Association (ADA), in reviewing the body of scientific evidence, concluded that "the overwhelming ... evidence indicates that fluoridation of community water supplies is both safe and effective."

That doesn't mean that *no* studies have ever shown a link between an adverse health effect and fluoride in

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drinking water. Some of the studies that suggested a link looked at drinking water with fluoride levels ten or more times higher than will be in water fluoridated by Metropolitan or recommended by public health officials. Other studies, when repeated, did not find any link, were inconclusive or suggested that fluoride actually *reduced* the rate of certain diseases. It is important to look at the whole body of scientific evidence and the quality of the studies. Fortunately, many studies have been performed, and the conclusions of the ADA are based on a review of the many studies that have been undertaken.

**Q ■ If my local water district fluoridates its water and Metropolitan also adds fluoride to its supplies, wouldn't this result in over-fluoridated water?**

Blending fluoridated water from different sources does not increase total fluoride levels in water. The final fluoride concentrations in blended supplies will be a weighted average of the fluoride in the various sources.

**Q ■ How does Metropolitan plan to guard against over-feeding fluoride into its water supply?**

Public water systems must monitor fluoride levels in their drinking water on a daily basis to ensure that fluoride levels remain within the prescribed control range. To prevent chemical overfeed, Metropolitan will monitor its treatment plant effluent on a continuous basis using on-line analyzers and “grab” sampling with data recording once per shift for plant status and compliance reporting.

**Q ■ I heard that fluoride can cause teeth to become discolored or pitted, is that true?**

Dental fluorosis—a condition that changes the appearance of the teeth—can be caused by ingesting too much fluoride in early childhood when teeth are forming. This condition occurs at levels much higher than the drinking water control ranges. When public health officials were determining the optimal level of fluoridation for community water supplies, they took into account the relationship between fluoride levels, prevention of tooth decay and dental fluorosis. The vast majority of dental fluorosis is caused by the ingestion of fluoridated products such as toothpastes and fluoride supplements, not from fluoridated water supplies.

Although dental fluorosis has increased since fluoridation began, most cases have been very mild in communities with optimally fluoridated water. Both very mild and mild forms are characterized by opaque white areas on the tooth surface. More severe cases are characterized by stained and pitted enamel.

**Q ■ Should I give fluoridated water to my infant?**

A National Research Council study has raised the possibility that infants could receive a greater than optimal amount of fluoride through liquid concentrate or powdered baby formula that has been mixed with water containing fluoride during a time that their developing teeth may be susceptible to enamel fluorosis. The American Dental Association has issued interim guidance on fluoride intake for infants and young children. Among the recommendations are that if liquid concentrate or powdered infant formula is the primary source of nutrition for infants, it can be mixed with water that is fluoride free or contains low levels of fluoride to reduce the risk of fluorosis. The complete list of recommendations can be found on the ADA's Web site.

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**Q. Will I miss the benefits from fluoridation if I drink bottled water, vended water or water from a “water store”? What about home filtration devices?**

If you mostly drink bottled water, water from vending machines or water from water stores, you may miss the benefits of an optimally fluoridated water supply. That’s because all of these alternatives typically contain fluoride levels that are below the optimal level for prevention of tooth decay.

If you use bottled water, you can call the consumer service number on the bottle’s label and ask how much fluoride is in the water. Bottled water companies are required to monitor for fluoride, and so they should be able to tell you. Optimal fluoride concentrations for areas like Southern California with its warmer climate are typically 0.7-0.8 mg/L. If you use vended water or purchase water from a water store and the water is treated by reverse osmosis or distillation, the water is most likely low in fluoride. You can call the number on the vending machine or ask the water store owner how the water is treated. You may also miss the benefits of fluoridated water if you use certain types of home filtration devices. Reverse osmosis systems and distillation units both remove significant amounts of fluoride.

**Q. I still would rather not drink water that has fluoride added to it, what choices do I have?**

You have several choices. Many brands of bottled water contain some levels of fluoride. You can call the consumer information number on the bottle’s label and ask about the level of fluoride and whether this level is naturally low. Other brands of bottled water take tap water and then further treat it. The additional treatment, if by reverse osmosis or distillation will remove a significant amount of both naturally occurring fluoride and any fluoride added through fluoridation. These bottled waters will say “purified” water on the label and should have very low levels of fluoride. Again, call the consumer service number on the bottle’s label for more information about the level of fluoride.

If you are considering vended water or water from a water store, make sure the water has been treated by reverse osmosis or distillation. You can also use home treatment devices that are reverse osmosis systems or distillation units. The California Department of Public Health certifies certain reverse osmosis home treatment devices and distillation units for the reduction of fluoride. For a list of state-certified devices, go to: <http://www.cdph.ca.gov/certlic/device/Pages/watertreatmentdevices.aspx>. Home filtration devices must be maintained according to the manufacturer’s instructions in order to ensure their effectiveness.

**Q. Will fluoridated water harm my pets?**

No evidence exists that indicates fluoridated water at the levels prescribed for human consumption is harmful to animals or pets.

**Q. Where can I get more information about fluoride?**

The ADA has a web site that provides very good information about fluoride and fluoridation. Go to [www.ada.org/public/topics/index.asp](http://www.ada.org/public/topics/index.asp).

# Fluoridation

## Supporters

- Community water fluoridation is supported by most major national and international health service organizations. Supporters include: the American Dental Association, American Medical Association, American Academy of Pediatric Dentistry, U.S. Centers for Disease Control and Prevention, and the World Health Organization.
- The U.S. Centers for Disease Control and Prevention has recognized fluoridation of drinking water as one of the 10 great public health achievements of the 20th century.
- Since 1945, the U.S. Surgeon General's office has committed its support for community fluoridation. As then-Surgeon General Dr. Richard H. Carmona said in July 2004, "Community water fluoridation continues to be the most cost effective, practical and safe means for reducing and controlling the occurrence of tooth decay in a community."

## Metropolitan's Position

Metropolitan's Board of Directors first took a serious look at fluoridation in October 1995, when Gov. Pete Wilson signed a new state law conditionally requiring fluoridation of any public water supply with at least 10,000 customers. Because the law did not provide funding for utilities, many water agencies found the cost of fluoridating prohibitive. Some cities, including two of Metropolitan's member agencies, Los Angeles and Santa Monica, did move forward with fluoridation in the absence of state funding. Two other MWD member agencies—the cities of Long Beach and Beverly Hills—as well as member agencies of the Municipal Water District of Orange County, the cities of Fountain Valley and Huntington Beach—fluoridated water prior to the 1995 law.

Although Metropolitan was exempt from the conditions of the law, local public health officials pressed hard for large-scale fluoridation at the district's treatment plants. As part of that push, seven public health officials representing each of the six Southern California counties in Metropolitan's 5,200-square-mile service area, urged the MWD board to reconsider fluoridating its supplies. In February 2003, Metropolitan's board adopted a policy that directed the cavity-fighting agent to be added to the district's treatment processes.

In September 2003, the California Dental Association Foundation, in conjunction with the California Fluoridation 2010 Work Group, provided Metropolitan \$5.5 million in grant monies to design and construct fluoridation facilities at each of its five treatment facilities. This grant funding represents the capital cost for planning, design, purchase and installation of the equipment necessary to begin fluoridating Metropolitan's treated water supply. This change in Metropolitan's treatment process was permitted and approved by the state of California Department of Public Health.

**Centers for Disease Control and Prevention**  
<http://www.cdc.gov/OralHealth/factsheets/fl-background.htm>

**National Cancer Institute**  
<http://www.cancer.gov/cancertopics/factsheet/Risk/fluoridated-water>

**American Dental Association**  
<http://www.ada.org/public/topics/fluoride/news.asp>

**National Institute of Dental and Craniofacial Research**  
<http://www.nidcr.nih.gov/HealthInformation/DiseasesAndConditions/Fluoride/default.htm>

**American Water Works Association**  
<http://www.awwa.org/Advocacy/pr/991110.cfm>

**California Department of Public Health**  
<http://www.cdph.ca.gov/certlic/drinkingwater/pages/fluoridation.aspx>

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### Mission Statement

The mission of the Metropolitan Water District of Southern California is to provide its service area with adequate and reliable supplies of high quality water to meet present and future needs in an environmentally and economically responsible way.

