

UTAH DEPARTMENT OF HEALTH

Statement on Community Water Fluoridation

January 2010

What is fluoridation?

Fluoride is a mineral that occurs naturally in most community water supplies. In the 1940s, scientists discovered there was an optimal level of natural fluoride in these water supplies that was high enough to significantly reduce dental cavities among the residents but low enough to avoid serious side effects. Fluoridation is the adjustment of the natural fluoride concentrations to achieve this optimal level - about one part of fluoride to one million parts of water. Reliable scientific data have consistently indicated that water fluoridation is a cost-effective, safe and practical means for reducing the incidence of dental caries.

How does fluoride prevent cavities?

Fluoride researchers originally thought that fluoride changed the tooth surface and inhibited cavities only when incorporated in dental enamel as the tooth was developing, before the tooth erupted into the mouth. More recent research indicates that fluoride works primarily after teeth have erupted, especially when small amounts are maintained constantly in the mouth, specifically in dental plaque and saliva. Thus, adults also benefit from fluoride, rather than only children, as was previously assumed. Studies have shown that optimal water fluoridation reduces the amount of decay in children by as much as 40-60% and nearly 35% in adults. Maximum decay reduction is realized when fluoride is available in the right amount, in the right place at the right time. Water fluoridation helps maintain an appropriate concentration of fluoride in the mouth.

Why is fluoridation being considered by some Utah communities?

Fifty-five percent of Utah children six through eight years of age have at least one filling or untreated cavity. These rates are higher than in many other areas of the country. Utah adults also have dental restorations and decay at a rate that is above the national average. Utah community water supplies already contain some fluoride but at sub-optimal levels. Only 51% of Utah citizens have drinking water with fluoride levels that are adequate to prevent cavities.

Why is community water fluoridation necessary rather than just giving children fluoride drops or tablets?

The need for taking fluoride drops or tablets daily over an extended period of time is a major disadvantage of fluoride prescription programs, one that makes them much less practical and effective than community water fluoridation. In addition to these challenges, the overall cost of prescription supplements per child is much greater than the per capita cost of community water fluoridation. Community water fluoridation also provides decay prevention benefits for the entire population regardless of age, socioeconomic status, educational attainment or other social variables. This is particularly important for families who do not have access to regular dental services. The nationwide goal to prevent cavities through community water fluoridation is similar to previous public health efforts to prevent other common health problems. These include adding iodide to salt to prevent thyroid problems, adding iron to infant formula to prevent anemia, adding Vitamin D to milk to prevent rickets, adding niacin to flour and other foods to prevent pellagra, and adding folic acid to cereal grains products to prevent birth defects. Each of these public health efforts represent situations where a nutritional additive is provided to everyone or to large target populations since it is impossible to individually identify and effectively treat the significant number of people who are at risk. As a result of these programs thousands of cases of illness, disability, and death are prevented each year with no harm to the rest of the population.

How much experience is there with fluoridation in the United States?

In 1945, Grand Rapids, Michigan, began fluoridating its water supply, and several other cities implemented water fluoridation shortly thereafter. The studies in these cities demonstrated the oral health benefits of fluoridated water in communities and established water fluoridation as a safe, practical, effective public health measure that would prevent cavities. Of the 50 largest cities in the United States, 43 have community water fluoridation. Currently, more than 162 million Americans (65% of the population served by public water systems) live in areas where the fluoride level is adjusted in the water supply to bring it to the level considered best for dental health. Since 1945, many studies have demonstrated the dental health benefits of fluorides and fluoridation. In Utah, Brigham City and Helper have been fluoridating their water systems for more than 40 years.

Is fluoride safe?

A few small research projects have questioned whether increased rates of certain health problems were associated with community water fluoridation but these theories have not been confirmed by larger, well-designed studies. Despite the decades of experience with water fluoridation in communities with large populations, no legitimate large-scale epidemiological, laboratory, or clinical study has demonstrated that long-term ingestion of fluoride at optimal levels in water causes disease or illness. Community water fluoridation has served the American public extremely well as the cornerstone of dental decay prevention activities for more than 60 years. The preponderance of research continues to confirm the safety, effectiveness, efficiency, cost-effectiveness, and environmental compatibility of community water fluoridation.

What is enamel fluorosis and the possible increased risk when fluoridated water is added to infant formula?

Higher than recommended levels of fluoride (either naturally occurring or adjusted) in water may lead to enamel fluorosis. Enamel fluorosis is not a disease but rather affects the way teeth look. In the vast majority of cases, enamel fluorosis appears as barely noticeable faint white lines or streaks on tooth enamel and does not affect the function of the teeth. Recent studies suggest that mixing powdered or liquid infant formula concentrate with fluoridated water on a regular basis may contribute some risk to a child developing the faint white markings of very mild or mild enamel fluorosis. It is important to understand that some fluoride exposure to developing teeth also plays a long-term role in preventing tooth decay. For more information on infant formula and fluorosis go to:

http://www.cdc.gov/fluoridation/safety/infant_formula.htm

Is fluoride a toxic substance?

Like many common substances essential to life and good health - salt, iron, vitamins A and D, chlorine, oxygen and even water itself – fluoride can be toxic in excessive quantities. Fluoride in the much lower concentrations (0.7 to 1.2 parts per million) used in water fluoridation is not harmful or toxic. “Fluorine” is the thirteenth most abundant chemical element found in earth’s crust but in nature it is always found in combination with other elements such as sodium and these are called fluoride compounds.

What fluoride compounds are used in water fluoridation?

Nearly all of the fluoride compounds used in water fluoridation are obtained as a by-product of the phosphate fertilizer industry. The three most common compounds used in the United States for adjustment of community water fluoridation to optimal levels are sodium fluoride, sodium fluorosilicate, and hydrofluorosilicic acid. The production and use of these fluoride compounds meet all of the standards of American Water Works Association (AWWA), American National Standards Institute (ANSI) and National Sanitation Foundation (NSF) to ensure they are safe for human consumption. There is no evidence that any impurities in the fluoride chemicals used in water fluoridation have failed to meet any of these safety standards. More than 90% of U.S. public water suppliers use hydrofluorosilicic acid or sodium fluorosilicate chemicals for the purposes of community water fluoridation. These chemicals are less expensive than sodium fluoride, readily available, fully dissociate when they are diluted in water at the optimum level, meet safe drinking water standards and are equally effective in preventing tooth decay.

How much does water fluoridation cost?

There are three components to the costs that may be reported related to fluoridation:

- 1) Start up costs of purchasing fluoridation equipment. These costs will vary depending on the type of equipment purchased.
- 2) Ongoing costs of adding and monitoring fluoride and maintaining the equipment. It has been calculated by the Centers for Disease Control and Prevention that the annual cost of water fluoridation in the United States is \$0.72 per person, with a range between \$0.17 and \$7.62 per person, depending mostly on the size of a community, labor cost, and the type of fluoride compounds utilized.
- 3) Other improvements to water systems that occur at the same time. When initiating fluoridation, water companies may use the opportunity to upgrade other aspects of their equipment and facilities but these costs should not be considered part of fluoridation expenses.

Data from generally accepted scientific studies continue to confirm that fluoridation has substantial lifelong decay preventive effects and is a highly cost effective means of preventing tooth decay in the United States regardless of socioeconomic status.

Should fluoride compounds used in public water systems be FDA approved?

The U. S. Food and Drug Administration (FDA) has jurisdiction over pharmaceutical grade fluoride compounds, which are used in the formulation of prescription drugs. The FDA does not regulate chemicals added to public water systems. It has no expertise, experience, nor statutory authority from Congress to oversee public drinking water.

The Centers for Disease Control and Prevention (CDC) sets the optimal fluoride level in community water supplies for dental disease prevention. The U.S. Environmental Protection Agency (EPA) sets the maximum fluoride levels used in public water systems. The National Sanitation Foundation (NSF) International, the American National Standards Institute (ANSI) and the American Water Works Association (AWWA) set the quality standards of fluoride chemicals used in water fluoridation to ensure they are safe.

Where can I get additional, reliable information about fluoridation?

The internet can be a good source of information but there are many internet sites that contain inaccurate or incomplete information about fluoride. Those that provide scientifically accurate information include:

The Centers for Disease Control and Prevention: <http://www.cdc.gov/fluoridation/>

American Dental Association: http://www.ada.org/sections/professionalResources/pdfs/fluoridation_facts.pdf