

OKLAHOMA

COMMUNITY WATER FLUORIDATION PLAN



**Dental Health Service
June 2012**



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Introduction

The practice of Community Water Fluoridation (CWF) is the adjustment of fluoride in drinking water to a level that is optimal for reduction of tooth decay. Small amounts of fluoride are present naturally in water sources, soil, plant life, and the food we eat. Reports from the Centers for Disease Control and Prevention (CDC) confirm that CWF is one of the most cost-effective preventive measures available to the public. Through 65 plus years of research and studies, science supports that fluoridation is beneficial, cost-effective and safe to all those who drink fluoridated water (CDC, 2011a).

The influence of fluoride was so immense that the CDC acknowledged water fluoridation as one of the ten great public health achievements of the twentieth century in the United States (U.S.) (PEW, 2010). The web site, [I Like My Teeth](#), advocates oral health using health literacy concepts and illustrates that by consuming fluoridated water, teeth are safeguarded systemically as fluoride is received into the bloodstream and topically as fluoride flows directly over a person's teeth (I Like My Teeth, 2012).

Communities that participate in water fluoridation have seen a reduction in dental caries among children and adults by between 18 and 40 percent. For every dollar invested on water fluoridation, a person saves up to \$38.00 in oral health treatment costs, according to The Pew Center on the States (Pew, 2010). The safe and effective use of CWF has been reviewed extensively with no scientific merit to support an association between fluoride and adverse health effects (APHA, 2008).

The “halo” effect of fluoridated water proves to be an effective and efficient public health intervention irrespective of geography, age, socioeconomic status and educational level. The diffusion of fluoride assists in reducing the prevalence of dental caries in both fluoridated communities and non-fluoridated communities in the U.S. Beverages and food processed in fluoridated areas but consumed in non-fluoridated areas provide the

benefits of fluoridated water to non-fluoridated communities lessening the effects of caries among communities, therefore, reducing oral health disparities (CDC, 2001b).

The implementation of CWF is an excellent example of community-based public health intervention originating from a simple observation. In 1901, a young dentist named Dr. Frederick S. McKay moved to Colorado Springs, Colorado to begin his practice. He observed unusual permanent stains on the teeth of his patients who had been born there or who had come as babies. McKay called this phenomenon “mottled enamel” and concluded the presence of some type of agent in the water system (FS. McKay, GV. Black, 1916). Through a laboratory chemical analysis, McKay confirmed, in 1931, there was a high concentration of fluoride in the public water systems, up to 14 parts per million (ppm) (Churchill, 1931).

In 1931, Dr. H.T. Dean, the first dentist of the National Institutes of Health, began to expand the observations regarding the inverse relationship between fluoride and dental caries. Experiments conducted through a 21-city study confirmed that populations receiving fluoride water experienced lower caries prevalence. Upon conclusion of continued epidemiological studies, it was determined that the optimal level of fluoride needed in the drinking water to support caries reduction with no detrimental effects to the teeth was 1.0 to 1.2 ppm (Burt/Eklund, 1992). This became the nationally accepted standard in the U.S. and is acknowledged as an optimal range of 0.7 – 1.2 ppm.

In 1945, Grand Rapids, Michigan became the first city in the U.S. to begin CWF (ADA, 2012). The CDC states there are currently 195 million people in the U.S. served by public water systems containing enough fluoride to protect teeth. In 1951, Nowata was the first community in Oklahoma to adjust the water fluoride level (OHB, 1964).

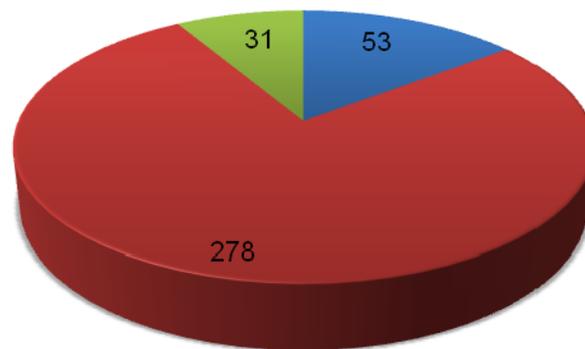
Capacity to Meet Healthy People 2010/20 Objectives

The State Drinking Water Information System (SDWIS) maintained by the Oklahoma Department of Environmental Quality (DEQ) currently shows there are 1,095 active

community water systems in Oklahoma, serving a total community system population of 3,553,940. Of this total, 53 systems adjust the fluoride level, 278 purchase water from other public water systems that adjust, (referred to as consecutive water systems), and 31 systems are naturally fluoridated.

Fluoridated Community Water Systems in Oklahoma

■ ADJUST FLUORIDE LEVELS ■ PURCHASE ADJUSTED WATER
■ NATURAL FLUORIDE



Active Systems (SDWIS 2011)

The U.S. population served by community water systems receiving optimally fluoridated water was 72.4% in 2008. According to Healthy People 2020, an oral health objective is to increase the proportion of U.S. population served by community water systems with optimally fluoridated community water to 79.6% (HHS, 2011a). The Oklahoma Children's Health Plan (2011), an outgrowth of the Oklahoma Health Improvement Plan (OHIP) 2009, complements this objective, and has identified strategies trending toward the HP 2020 target.

Laws and Regulations

Federal

The National Primary Drinking Water Regulations (NPDWRs) and National Secondary Drinking Water Regulations (NSDWR) are reviewed periodically (“not less often than every 6 years”) and revisions are made by the U.S. Environmental Protection Agency (EPA) under the Safe Drinking Water Act (SDWA). The EPA has set a Maximum Contaminant Level (MCL) of 4 mg/L or 4 ppm and a Secondary Maximum Contaminant Level (SMCL) of 2 mg/L or 2 ppm for fluoride (ADA, 2005).

In 1974, under the SDWA, the EPA defined that fluoridation programs will be determined by individual states and not managed as a federal program (EPA, 1974). Although the optimal fluoride range has been set by the U.S. Public Health Service at 0.7 ppm to 1.2 ppm, each state is allowed to set an acceptable range at or around the national levels (ADA, 2012). The CDC has been tasked with providing technical assistance and support while also providing recommendations regarding the optimal level of fluoride in the drinking water in order to prevent tooth decay.

State

In Oklahoma, public water systems planning to participate in CWF typically seek approval by ordinance from the local governmental body i.e. a mayor and town counsel, the board of trustees of the town or the utility authority board.

Public water systems that intend to implement a fluoridation program must:

- Comply with DEQ Operational and Construction Standards regulations found on the [DEQ website](#).
 - *Title 252 DEQ: Chapter 626: Public Water Supply Construction Standards Amended* (DEQ, 2011a)
 - *Title 252 DEQ: Chapter 631: Public Water Supply Operation Amended* (DEQ, 2011b)

In January 2011 the U.S. Department of Health and Human Services (HHS) and the EPA announced important steps to ensure that standards and guidelines on fluoride in drinking water continue to provide the maximum protection to the American people to support good dental health, especially in children. If implemented, the HHS' proposed recommendation of 0.7 milligrams of fluoride per liter of water will replace the current recommended range of 0.7 to 1.2 milligrams. This updated recommendation is based on recent EPA and HHS scientific assessments to balance the benefits of preventing tooth decay while limiting any unwanted health effects (HHS, 2011b).

The current optimal fluoride range in Oklahoma is set at 0.7 ppm to 1.2 ppm. If the recommendation from the HHS and EPA is adopted, a new range for Oklahoma will be addressed upon implementation.

Program Management

Community water systems that implement CWF receive services from federal and state entities. In Oklahoma, the DEQ and OSDH work together to assist communities with water fluoridation. The DEQ, as the regulatory agency, has specific authority to ensure the delivery of safe drinking water to the consumer under state rules for safe drinking water. The OSDH, along with stakeholders from the Governor's Task Force on Children and Oral Health, the Children's Oral Health Coalition, and the Oklahoma Dental Association work collectively to promote and sustain oral health initiatives statewide.

The Association of State and Territorial Dental Directors (ASTDD) has identified that the leadership of a state dental director and adequate/competent staff is essential for a successful state dental program (ASTDD, 2012). A state oral health program's capacity to address oral disease prevention will be enhanced by an infrastructure that includes a full-time dental director, program coordinators for dental sealants and water fluoridation, a program evaluator/epidemiologist and educators.

The state dental director works full time for the OSDH. The director's responsibilities regarding CWF include several tasks such as:

- Promoting water fluoridation
- Meeting with the media upon request
- Serving as a liaison with federal and state partners
- Providing information on water fluoridation relating to health effects, cost effectiveness and safety
- Increasing awareness regarding the effectiveness of water fluoridation among academic institutions, medical and dental organizations
- Providing important information to stakeholders and policy makers.

In an effort to maintain state CWF activities and reporting, OSDH employs a fluoridation consultant to assist in activities such as:

- Promoting and tracking CWF activities
- Communicating with water treatment plants to determine fluoridation status
- Recording and compiling data from the water plants and other stakeholders
- Serving as a liaison with federal and state partners
- Maintaining a publicly accessible fluoridation data base through CDC.

A program manager provides guidance to staff while supporting the historical perspective of the state's fluoridation program.

An epidemiologist works with the state dental director, fluoridation consultant and program manager to provide statistical analysis and trends relating to CWF.

Employees working with the fluoridation program attend the CDC's water fluoridation training course to stay informed on CWF principles and practices. The state dental director conducts public health training and publishes articles regarding water fluoridation. Fluoridation information, including journal articles and fact sheets, is available from the OSDH.

Quality Control

Quarterly, primacy states such as Oklahoma, submit data to the EPA SDWIS/FED, an automated database maintained by EPA. The data submitted include, but are not limited to, PWS inventory information, the incidence of MCL, Maximum Residual Disinfectant Level (MRDL), monitoring, and treatment technique violations; and information on enforcement activity related to these violations. The SDWA requires states to provide EPA with an annual report of violations in each of six categories: MCLs, MRDLs, treatment techniques, variances, and exemptions, significant monitoring violations and significant consumer notification violations. Violation and enforcement action data are stored in the SDWIS/FED database (DEQ, 2011c).

Community water systems adjusting fluoride levels in Oklahoma are required to complete a monthly operation report and submit the report to the DEQ and OSDH. Within the report, the water system documents the amount of water treated, the fluoride application, the residual fluoride levels upon distribution, and type of fluoride additive applied. There are three additives used for CWF: sodium fluoride, fluorosilicic acid, and sodium fluorosilicate. These additives are required to meet safety standards established by the American Water Works Association (AWWA) and the NSF International (NSF).

The monthly operating report data received by OSDH is entered into the Water Fluoridation Reporting System (WFRS) maintained by the CDC and the ASTDD. This reporting system was generated in order to provide states with a tool to manage and track their water fluoridation plan. The data is owned by the states or tribes and is used to generate reports that help in improving the general quality of fluoridation. The data collected from WFRS is then utilized to populate the [My Waters Fluoride](#) web page which is a source of information regarding the fluoridation status of a water system within a state or territory (CDC, 2011c).

Community water systems implement and practice safety principles to provide safe drinking water to customers. In addition to a monthly operation report, community water systems participating in CWF collect and analyze a check sample, once a month. The sample is collected by water system personnel from the point of entry to the distribution system and divided in two parts. One part is analyzed by water system personnel while the second part is sent to a state approved laboratory for analysis. This practice ensures the integrity of the fluoridation program.

Goal – Objectives – Action Plan

Goal: Improve the oral health status of Oklahoma by promoting CWF

Objectives

- Update CDC's WFRS to reflect current data maintained in DEQ's SDWIS by December 2012
- Provide education and promote health literacy to increase awareness relating to water fluoridation for state legislators, community leaders and the public
- Endeavor to meet the Healthy People 2020 target to increase the proportion of the U.S. population served by community water systems with optimally fluoridated water to 79.6 percent by December 2021
- Evaluate, update as needed and promote the statewide fluoridation plan annually, in compliance with current state coalitions, plans, and programs
- Continue to acknowledge strategies identified in the Oklahoma Health Improvement Plan trending toward the HP2020 target of 79.6% of the population on public water systems receiving optimally fluoridated water

Action Plan

- Collect data consistently from all community water systems and monitor fluoride levels on a monthly basis
- Identify and contact community water systems that discontinued fluoridating to determine the reason

- Identify local community leaders to promote CWF
- Educate the public concerning the advantages of CWF by making presentations to community leaders, civic groups and other stakeholders
- Improve awareness of CWF in fluoridated and non-fluoridated regions by creating and distributing materials through print and broadcast media
- Encourage and award active community water systems for their participation in CWF, including certificates of achievement from the CDC.
- Collaborate with partners in the Governor's Task Force on Children and Oral Health, the Children's Oral Health Coalition, and the Oklahoma Dental Association to advocate oral health initiatives, including CWF
- Meet with the DEQ on a semi-annual basis to ensure effective communication regarding the CWF program
- Develop accurate fluoridation cost estimates
- Assist community water systems in exploring funding for CWF initiatives
- Comply with current federal and state regulations regarding optimally fluoridated water
- Ensure that the OSDH has sufficient staff and funding to manage the water fluoridation program
- Adhere to quality control measures implemented by the federal and state entities
- Contact community water systems regarding program requirements as needed

Conclusion/Closing

The promotion of CWF is ongoing for the OSDH along with partners and stakeholders. Widespread CWF has resulted in a remarkable decline in the prevalence and severity of dental decay, saving money for both families and the health care system.

A community's participation in fluoridation programs is unique because fluoride is added to the water supply solely to reduce dental decay. By reducing dental decay, overall health is improved. Participating in CWF is an ideal public health measure whether you are child or an adult, just drink and use the water to receive a benefit.

It is recommended that all applicable public water systems in Oklahoma be fluoridated to the optimal level for oral health. The goal of the Oklahoma Fluoridation Plan is to improve the oral health status of Oklahoma, thus improving the overall health of Oklahomans. The OSDH supports CWF and recognizes the practice as safe, cost-effective and beneficial to all who drink and use the water.

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OKLAHOMA COMMUNITY FLUORIDATION PLAN

OSDH CWF Logic Model

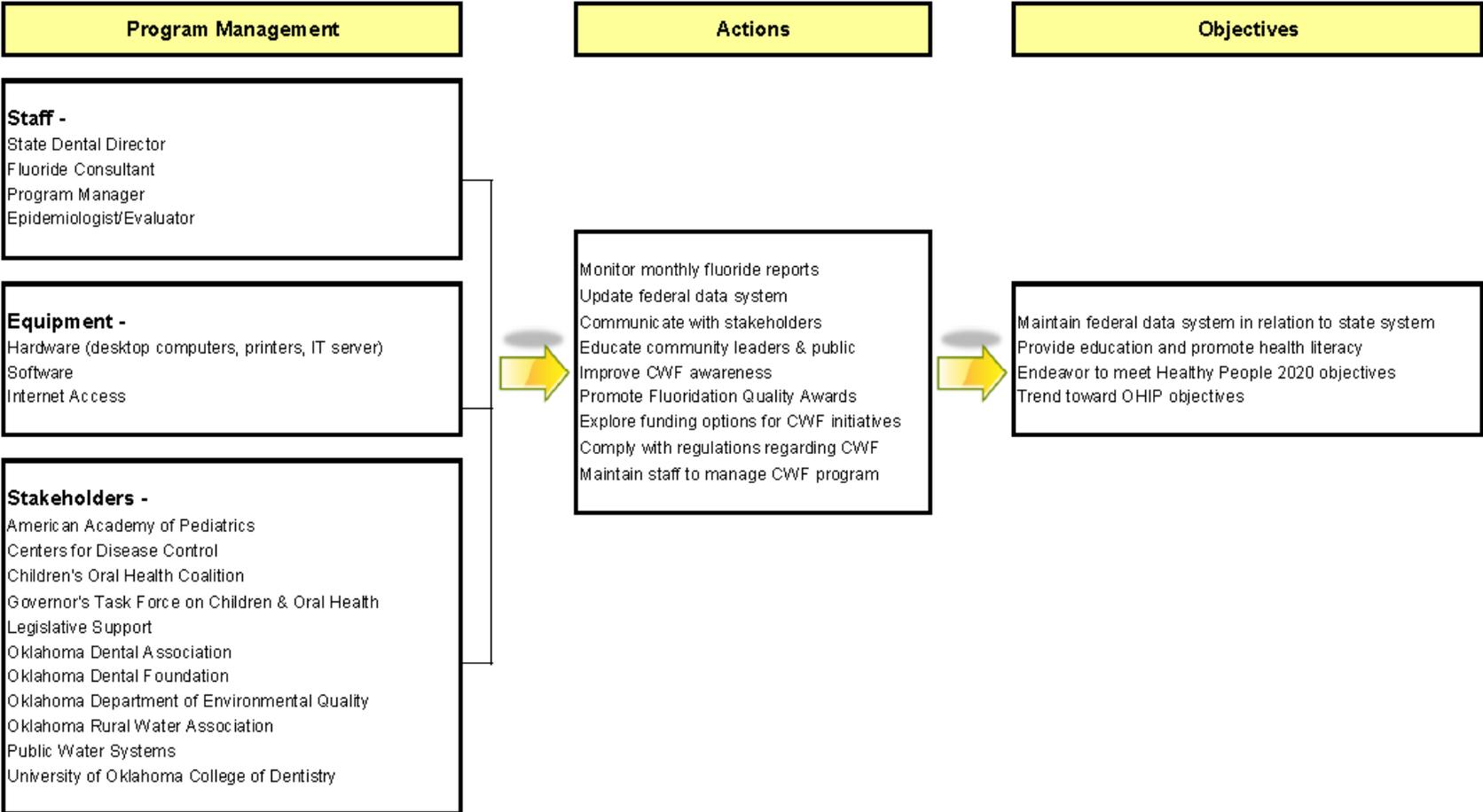
OSDH Map – Status of Public Water System Fluoridation Levels...

DEQ Water Fluoridation Factsheet

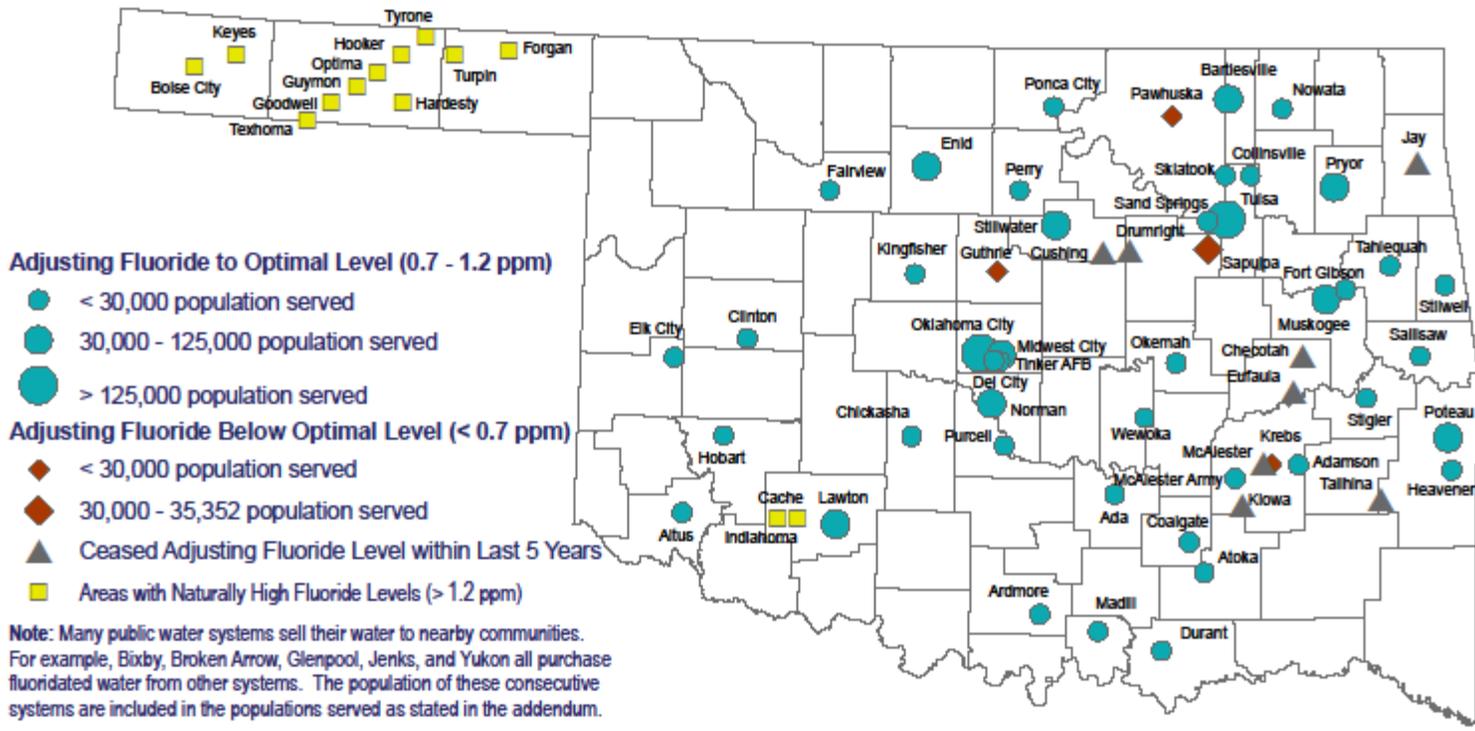
I Like My Teeth Illustration – “How Fluoride Works”

Oklahoma State Health Department
 Dental Health Service
 Community Water Fluoridation Logic Model

Goal: Improve the oral health status of Oklahoma by promoting CWF



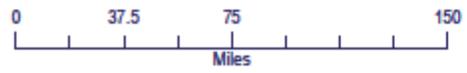
Status of Public Water System Fluoridation Levels with Reference to the Optimal Range for Dental Health (0.7 - 1.2 ppm)



Note: Many public water systems sell their water to nearby communities. For example, Bixby, Broken Arrow, Glenpool, Jenks, and Yukon all purchase fluoridated water from other systems. The population of these consecutive systems are included in the populations served as stated in the addendum.

Data Sources: Water Treatment Plants, Oklahoma Department of Environmental Quality, Environmental Labs. Data compiled by Dental Health Service, May 2012.

Projection/Coordinate System: USGS Albers Equal Area Conic



Disclaimer: This map is a compilation of records, information and data from various city, county and state offices and other sources, affecting the area shown, and is the best representation of the data available at the time. The map and data are to be used for reference purposes only. The user acknowledges and accepts all inherent limitations of the map, including the fact that the data are dynamic and in a constant state of maintenance.



Dental Health Service
Community and Family Health Services
Oklahoma State Department of Health
Map created by Health Care Information
on 12.21.2008. Revised 05.23. 2012

WATER

September 2009

Fluoridation Factsheet

Health Benefits: (Source CDC)

- Community water fluoridation is an effective, safe, and inexpensive way to prevent tooth decay. This method of fluoride delivery benefits Americans of all ages and socioeconomic status.
- Fluoride works by stopping or even reversing the decay process. It keeps tooth enamel strong and solid.
- Children in communities without community water fluoridation have an increased cost for dental treatment per child that was twice as high as those children living in fluoridated communities.
- Because older Americans are now keeping their teeth longer, fluoride will continue to be important for preventing tooth decay in this age group. Older Americans are especially susceptible to tooth decay because of exposed root surfaces and mouth dryness that may result from many medications.



Costs: (Source CDC)

Estimated cost per person to implement, including equipment and installation:

- Large communities with single point of fluoridation - \$3.00 to \$6.00 per capita
- Smaller communities with several wells requiring fluoridation - \$8.00 to \$12.00 per capita

Estimated cost per person to maintain, including cost of chemical:

- Average estimated cost each year - \$1.00 to \$2.00 per capita

Fluoride Levels:

Optimal fluoride level for good oral health = 0.7 to 1.2 mg/L

- Exceedance levels:
 - 2.0 mg/L – National Secondary Drinking Water Standard - this level may cause aesthetic effects in developing teeth of children and requires public notice
 - 4.0 mg/L – National Primary Drinking Water Standard - Maximum Contaminant Level –exposure over many years to this level may cause bone disease and requires public notice



Regulation Requirements:

Systems that fluoridate must:

- Analyze the water twice a day for fluoride content, both before and after fluoridation
- Perform monthly check samples comparing their water plant lab results for post fluoridation water to that of a state certified lab analysis of the water
- Submit monthly fluoridation operational reports to both DEQ and State Health Department

Systems that intend to implement fluoridation must:

- Submit plans and specs to DEQ to get a construction permit
- Notify the DEQ in writing if you have previously fluoridated and want to begin fluoridating again

Operational and Construction Standards regulations may be found on the DEQ website at:

- <http://www.deq.state.ok.us/mainlinks/deqrules.htm>
- == 252-626 Public Water Supply Construction Standards
- == 252-631 Public Water Supply Operation amended



For more information on Fluoridation effects and costs contact:

Oklahoma State Department of Health Dental Service, **405-271-5502**

To view community fluoridation information go to My Water's Fluoride website:
<http://apps.nccd.cdc.gov/MWF/Index.asp>.



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HOW FLUORIDE WORKS

When fluoridated water is consumed while the bones and teeth are still growing, fluoride works in two ways.



Fluoride mixes with saliva to reach the surface of the teeth, where acid from bacteria in the mouth can cause damage. Fluoride heals that damage and shields teeth from further decay.



Fluoride is absorbed into the bloodstream through the stomach, and enters the teeth and bones.



Fluoride combines with the phosphate and calcium to create a strong barrier to protect teeth from cavities. Fluoride makes teeth stronger and able to withstand the acid produced by bacteria found in the mouth.

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