OKLAHOMA

Community Water Fluoridation Plan

Dental Health Service

January 2023

OKLAHOMA
State Department
of Health

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[1] OSDH – Oklahoma State Department of Health
[2] DEQ – Department of Environmental Quality
[3] CWF – Community Water Fluoridation

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OKLAHOMA COMMUNITY WATER FLUORIDATION PLAN

Introduction

The practice of Community Water Fluoridation (CWF) is the adjustment of fluoride in drinking water to a level that is optimal for the reduction of tooth decay. Small amounts of fluoride are present naturally in water sources, soil, rocks, 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 75 plus years of research and studies, science supports that fluoridation is beneficial, cost-effective and safe to all those who drink fluoridated water (CDC, 2021a) (CDC, 2021b). 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, 2015).

The Website, I Like My Teeth, advocates oral health using health literacy concepts and illustrates that CWF prevents tooth decay for a lifetime in two ways. When children are young, fluoride that is swallowed enters the bloodstream and combines with calcium and phosphate as the tooth is formed under the gums. These teeth are more resistant to decay throughout childhood and the teenage years. For people of all ages, fluoride in beverages and foods mixes with the saliva. Saliva neutralizes acid produced by bacteria on teeth, and the fluoride heals the teeth and protects them from further decay (I Like My Teeth, 2022b) (Appendix A).

Communities that participate in water fluoridation have seen a reduction in dental caries among children and adults by 18 to 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, 2001).

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History Timeline

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 moved there as babies. McKay called this phenomenon “mottled enamel” and concluded the presence of some type of agent in the water system (McKay, F.S. & Black, G.V.,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, H.V.,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 during the 1930s and 1940s confirmed that populations receiving fluoridated water experienced lower caries prevalence than control populations without fluoridated water. 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, B.A. & Ekland, S.A.,1992). Subsequently, the U.S. Public Health Service (1962) set the fluoride level optimal range of 0.7 – 1.2 ppm depending on ambient temperature. This range was based on the assumption that people in hotter climates will drink more water than those living in cooler climates.

In 1945, Grand Rapids, Michigan became the first city in the U.S. to begin CWF (CDC, 2021b). In 1951, Nowata was the first community in Oklahoma to adjust the water fluoride level (OHB, 1964).

In January 2011, the U.S. Department of Health and Human Services (HHS) and the U.S. Environmental Protection Agency (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.

In April 2015, HHS' proposed recommendation of 0.7 milligrams per liter (mg/L) of water was implemented replacing the prior recommended range of 0.7 to 1.2 mg/L. These units of measure, ppm and mg/L, are equivalent and used interchangeably.

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Capacity to Meet Healthy People 2030 Objectives

The Safe Drinking Water Information System (SDWIS) is maintained by the Oklahoma Department of Environmental Quality (DEQ). This data is used to populate The Water Fluoridation Reporting System (WFRS) maintained by the CDC. Currently WFRS shows there are 1,073 active public water systems in Oklahoma, serving a total community water system population of 3.7 million. Of this total, 40 systems adjust the fluoride level, 255 purchase water from other public water systems that adjust, (referred to as consecutive water systems) and 60 systems are naturally fluoridated. Therefore, approximately 2.53 million Oklahomans on community water systems, or 68%, benefit from fluoridation (Appendix B).

The most current data show that 72.8% of the U.S. population on community water systems had access to optimally fluoridated water. According to Healthy People 2030, one of the oral health objectives is to increase the proportion of U.S. population served by community water systems with optimally fluoridated community water to 77.1% (HHS, 2016).

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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 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, 2018).

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, 2022).
In April 2015, HHS adopted the current Public Health Service recommendation for the optimal fluoride level in drinking water to prevent tooth decay. The new recommendation is for a single level of 0.7 milligrams of fluoride per liter of water. This update replaces the previous recommended range (0.7 to 1.2 mg/L) issued in 1962 (HHS, 2015).

The CDC provides education, technical assistance, and support while also providing recommendations regarding the optimal level of fluoride in the drinking water in order to prevent tooth decay.

Fluoridation Learning Online (FLO) is a free CDC water fluoridation training course. The self-paced training is designed to build the capability of state fluoridation programs, help increase knowledge and refine skills to implement and maintain community water fluoridation. Intended audience includes State oral health staff, water system operators, educators, and anyone interested in community water fluoridation.

State

The Oklahoma State Department of Health's (OSDH) role is to promote, advocate, and educate about public drinking water and community water fluoridation. The Department of Environmental Quality, a state arm of the EPA, regulates public water systems in accordance with the Safe Drinking Water Act.

In 2015, the OSDH notified the state's public water treatment systems participating in CWF regarding the HHS recommendation of the single 0.7 mg/L of fluoride supplement in water replacing the former range of 0.7 – 1.2 mg/L. This update was based on recent EPA and HHS scientific assessments to balance the benefits of preventing tooth decay while limiting unwanted health effects (HHS, 2015). It was also determined that the ambient temperature assumption of drinking more water in hotter climates was no longer relevant.

In Oklahoma, public water systems planning to participate in CWF typically seek approval by ordinance from the local governmental body. Influential decision makers may include a mayor, city council, city manager, town board of trustees or the utility authority board. Dental and other health professionals may inform policy-makers.

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, 2014a)
    - *Title 252 DEQ: Chapter 631: Public Water Supply Operation Amended* (DEQ, 2015)

Oklahoma does not have a notice of discontinuance rule or statute for water fluoridation. Other states that have enacted this type of legislation generally possess two components: 1) Requirement to notify the public within a certain amount of time when a public water system plans to discontinue CWF, and

2) Requirement to notify the OSDH and the DEQ within a certain amount of time when a public water system plans to discontinue CWF.
The OSDH advocates for and supports CWF notification policy.

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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 OSDH, along with stakeholders from the Oklahoma Oral Health Coalition and the Oklahoma Dental Association and other public health advocates, work collectively to promote and sustain oral health initiatives statewide.

The Association of State and Territorial Dental Directors (ASTDD) identified that the leadership of a state dental director and adequate/competent staff is essential for a successful state dental program. 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 (ASTDD, 2012).

The State Dental Director works full time for the OSDH. The director's responsibilities regarding CWF include:

- Promoting water fluoridation and drinking water
- Meeting with the media upon request
- Serving as a liaison with federal, state and local partners
- Providing information on CWF relating to health benefits, cost effectiveness and safety
- Increasing awareness regarding the effectiveness of water fluoridation among academic institutions, medical/dental organizations, and the public
- Providing important information to stakeholders and policy makers
- Obtaining CWF training and continuing education

In an effort to maintain state CWF activities and reporting, OSDH employs a Statistical Analyst. Their responsibilities regarding CWF include:

- Tracking CWF activities via monthly reports
- 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, state, and local partners
- Maintaining a fluoridation data base (WFRS) through CDC
- Creating technical and trend reports
- Obtaining CWF training and continuing education

The Statistical Analyst works with the State Dental Director to provide technical reports and trends relating to CWF.

Promotion

Promoting Community Water Fluoridation starts with public health champions aimed to draw attention from local leadership using evidence-based policy that is non-partisan. This is important to build relationships through education and to obtain support. There are many state and national resources available to communities interested in advocating for policy changes regarding CWF. Resources include:

- American Fluoridation Society
- Fluoride Exposed
- I Like My Teeth
- American Water Works Association
- American Academy of Pediatrics
- Centers for Disease Control and Prevention
- American Dental Association

New Fluoride Technology for Rural Areas

KC Industries, supported by the CDC, developed a fluoride tablet feeder system for smaller communities to implement water fluoridation without the prohibitive cost of traditional equipment and infrastructure. The new technology is uniquely designed for water systems with a daily flow of one million gallons per day or less which typically serves an approximate population of 10,000 people or fewer. An estimated 32,000 small water systems in the United States serving approximately 19 million people could benefit from this technology (CDC, 2021). This is the first advancement in water fluoridation technology in more than forty years and only now being introduced. For more information, contact the CDC or KC Industries. For Oklahoma, residents of rural communities could experience optimal fluoridated water and improved oral health in the future.

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Quality Control

Quarterly, primacy states such as Oklahoma, through the Department of Environmental Quality, 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 Maximum Contaminate Level (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, 2020).

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. Guidance is available in a DEQ Factsheet (Appendix D). 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 available for CWF: sodium fluoride, fluorosilicic acid, or sodium fluorosilicate. These additives are required to meet safety standards established by the American Water Work Association (AWWA, 2016) and the NSF (NSF 2019).

The monthly operating report data received by OSDH is entered into the Water Fluoridation Reporting System (WFRS) maintained by the CDC. This reporting system provides states with a tool to manage and track their water fluoridation status. 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, 2016).

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.

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Goal – Objectives – Action Plan

Goal: Improve the health status of Oklahoma by promoting CWF and drinking water

Objectives

- Update CDC's WFRS to reflect current data maintained in DEQ's SDWIS
- Provide information 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 2030 target to increase the proportion of the U.S. population served by community water systems with optimally fluoridated water to 77.1 percent by December 2031
- Evaluate, update as needed and promote the statewide fluoridation plan periodically

Action Plan

- Collect data consistently from all community water systems and monitor fluoride levels on a monthly basis
- Identify and contact community water systems regarding implementation or maintenance of CWF
- Identify and contact community water systems that discontinue–fluoridating to determine the reason
- Advocate for CWF notification mandates in Oklahoma
- Identify local community leaders and public health champions to promote CWF
- Educate on the benefits of CWF and drinking water via presentations, media and distribution of promotional materials across Oklahoma
- Encourage and award active community water systems for their participation in CWF, including certificates of achievement from the CDC
- Collaborate with partners such as the Oklahoma Oral Health Coalition, the Oklahoma Dental Association, and the Oklahoma Dental Hygienist' Association
- Meet with the DEQ on a semi-annual basis to ensure effective communication regarding the CWF program
- Ensure OSDH has sufficient staff and funding to manage the water fluoridation program
- Attend training and conferences dedicated to the practices, principles, and promotion of CWF

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Conclusion/Closing

The promotion of CWF and drinking water 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 a 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 Community Water 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. Water is life.

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OKLAHOMA
COMMUNITY WATER FLUORIDATION PLAN
Appendices

Appendix A - I Like My Teeth Illustration – “How Community Water Fluoridation Prevents Tooth Decay”

Appendix B - Fluoridation Summary Report CY 2022

Appendix C - OSDH Map – Status of Water Fluoridation in Oklahoma

Appendix D - DEQ Water Fluoridation Factsheet

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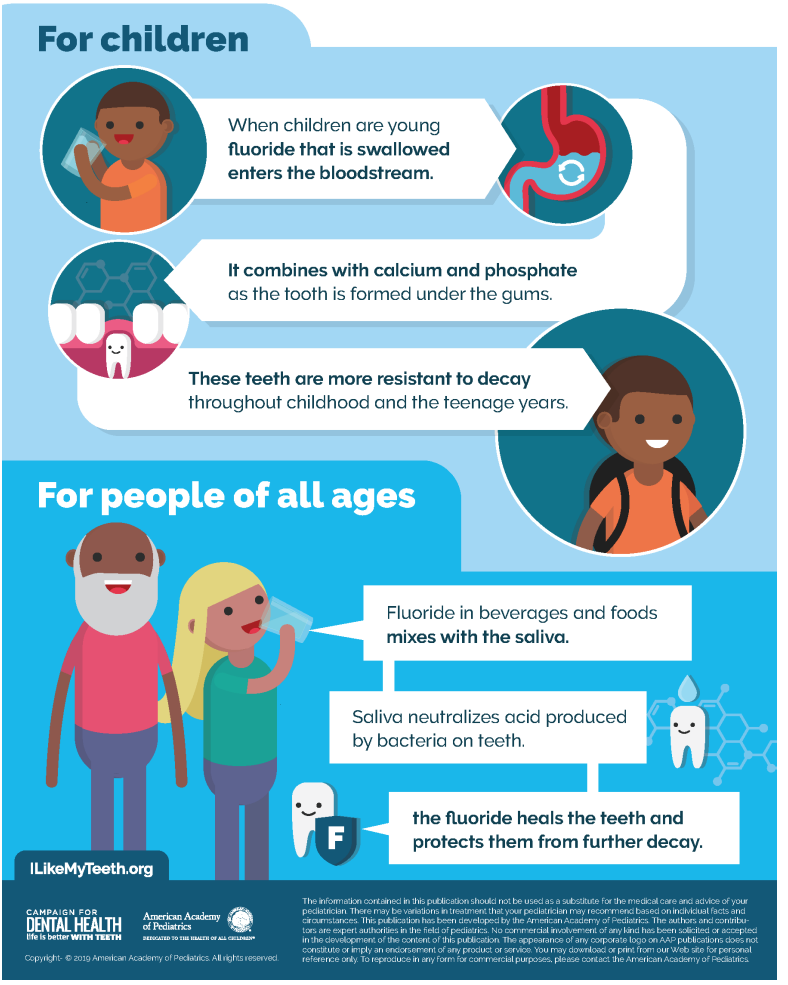
How Community Water Fluoridation Prevents Tooth Decay



Appendix B

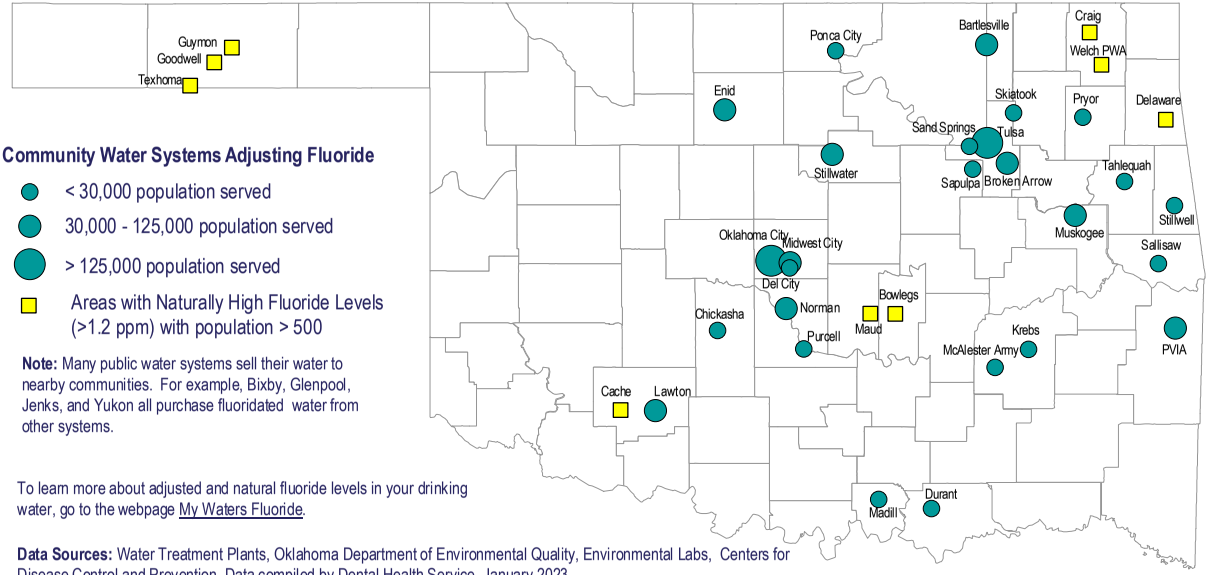
Fluoridation Summary Report

Data relating to Public Water Systems in Oklahoma created in WFRS

Fluoridation Status – Year End – December 2022

	Systems	Population	% of Fluoridated Systems	% of Fluoridated Populations	% of Total Systems	% of Total Populations
All Water Systems	921	3,527,317	--	--	100.00	100.00
Fluoridated						
Adjusted	27	1,731,328	11.59	77.68	2.93	49.08
Natural	59	58,062	25.32	2.61	6.41	1.65
Variable/Other	0	0	0.00	0.00	0.00	0.00
De-fluoridated	0	0	0.00	0.00	0.00	0.00
Consecutive	145	425,758	62.23	19.10	15.74	12.07
Multi-source	2	13,661	0.86	0.61	0.22	0.39
Total	**233**	**2,228,809**	**100.00**	**100.00**	**25.3**	**63.19**
Non-Fluoridated						
Non-Adjusted	467	1,084,394	--	--	50.71	30.74
Variable/Other	0	0	--	--	0.00	0.00
De-fluoridated	0	0	--	--	0.00	0.00
Consecutive	221	214,113	--	--	24.00	6.07
Multi-source	0	0	--	--	0.00	0.00
Total	**688**	**1,298,508**	--	--	**74.71**	**36.81**

Status of Water Systems Adjusting Fluoride in Oklahoma



Community Water Systems Adjusting Fluoride

- < 30,000 population served
- 30,000 - 125,000 population served
- > 125,000 population served
- Areas with Naturally High Fluoride Levels (>1.2 ppm) with population > 500

Note: Many public water systems sell their water to nearby communities. For example, Bixby, Glenpool, Jenks, and Yukon all purchase fluoridated water from other systems.

To learn more about adjusted and natural fluoride levels in your drinking water, go to the webpage My Waters Fluoride.

Data Sources: Water Treatment Plants, Oklahoma Department of Environmental Quality, Environmental Labs, Centers for Disease Control and Prevention. Data compiled by Dental Health Service, January 2023.

Projection/Coordinate System: USGS Albers Equal Area Conic

0 37.5 75 150

Miles

N

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.

OKLAHOMA State Department of Health

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

DEQ OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

Fluoridation

Health Benefits: (Source CDC)

- Since 1945, people in the United States have benefited from drinking water with fluoride.
- Drinking fluoridated water keeps teeth strong and reduces tooth decay by approximately 25 percent in children and adults.
- The Community Preventive Services Task Force strongly recommends community water fluoridation for the prevention and control of tooth decay, **the most common chronic disease in children**.
- Community water fluoridation is supported by the American Dental Association, American Academy of Pediatrics, U.S. Public Health Service, and the World Health Organization.
- Community water fluoridation is the single most effective public health measure to prevent tooth decay, and the CDC named it 1 of the 10 great public health achievements of the 20th century.

Costs: (Source CDC)

- Community water fluoridation is the most cost-effective method of delivering fluoride to all members of the community, regardless of age, educational attainment, or income level.
- By preventing tooth decay, community water fluoridation saves money for both families and the healthcare system.
- Widespread community water fluoridation prevents cavities even in neighboring communities that are not fluoridated.

Fluoride Levels:

Optimal fluoride level for good oral health = 0.7 mg/L (milligrams per liter)

Exceedance levels:

- 2.0 mg/L – National Secondary Drinking Water Standard – Exceeding this level may cause cosmetic effects in developing teeth of children and requires public notice.
- 4.0 mg/L – National Primary Drinking Water Standard – Maximum Contaminant Level – Exceeding this level may cause bone disease and requires public notice.

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(Fact Sheets\WQD\Fluoridation.indd 10/2021)

Fluoridation

Operational Requirements:

Analyze the water twice a day for fluoride content, both before and after fluoridation.

- Submit fluoridation monthly operational reports (MORs) to both DEQ and the Oklahoma State Department of Health. DEQ form No. 631-001 is available on DEQ's website at **https://go.usa.gov/xMw6K**.
- Perform monthly check samples of post-fluoridation water by comparing water plant lab results to that of a state accredited lab analysis of the water.
  - When difference is greater than 0.2 mg/L, take steps necessary to improve accuracy of the water plant lab results.
  - Ensure that a copy of the analytical report is forwarded to the Oklahoma State Department of Health.

Systems that intend to implement fluoridation must:

- Submit plans and specifications to DEQ and obtain a construction permit.
- Notify DEQ in writing when fluoridation has been discontinued and when it will be started again.

DEQ's Construction Standards and Operational Regulations can be found on DEQ's website.

- **252:626 Public Water Supply Construction Standards**
- **252:631 Public Water Supply Operation**

For more information on community water fluoridation, contact:

Oklahoma State Department of Health
Dental Health Service
123 Robert S. Kerr Ave., Ste. 1702
Oklahoma City, OK 73102
FluorideReports@health.ok.gov
(405) 426-8460

Visit the My Water's Fluoride webpage at:
https://go.usa.gov/xMw68

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