

# OKLAHOMA

## COMMUNITY WATER FLUORIDATION PLAN



**Dental Health Service**

**March 2016**



Oklahoma State  
Department of Health  
Creating a State of Health

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<sup>1</sup> OSDH – Oklahoma State Department of Health

<sup>2</sup> DEQ – Department of Environmental Quality

<sup>3</sup> 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 70 plus years of research and studies, science supports that fluoridation is beneficial, cost-effective and safe to all those who drink fluoridated water (CDC, 2015a) (CDC, 2015b).

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, 2016b) (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, 2014).

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 (ADA, 2015). 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 2020 Objectives**

The State 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 1,115 active public water systems in Oklahoma, serving a total community water system population of 3.5 million. Of this total, 42 systems adjust the fluoride level, 277 purchase water from other public water systems that adjust, (referred to as consecutive water systems) and 58 systems are naturally fluoridated. Therefore, approximately 2.4 million Oklahomans on community water systems, or 69%, benefit from fluoridation (Appendices B, C).

The most current data show that 74.7% of the U.S. population on community water systems, or a total of 214.2 million people, had access to optimally fluoridated water

(CDC, 2014). According to Healthy People 2020, 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 79.6% (HHS, 2011).

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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). Presently, 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, 2016).

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 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 2015, the Oklahoma State Department of Health (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 any unwanted health effects (HHS, 2011b). It was also determined that the ambient temperature assumption of drinking water more in hotter climates is 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. Also, 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)

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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 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 Oklahoma 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. 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 several tasks such as:

- Promoting water fluoridation
- Meeting with the media upon request
- Serving as a liaison with federal, state and local 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 and 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, state and local partners
- Maintaining a publicly accessible fluoridation data base (WFRS) through CDC

An epidemiologist works with the State Dental Director and Fluoridation Consultant 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.

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## 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, 2014b).

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). 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 available for CWF: sodium fluoride, fluorosilicic acid, or 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, 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** (Appendix E)

**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
- 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 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

### **Action Plan**

- Collect data consistently from all community water systems and monitor fluoride levels on a monthly basis
- Identify and contact community water system personnel that discontinued fluoridating to determine the reason
- Identify local community leaders to promote CWF
- Inform 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 Oklahoma 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
- Comply with current federal and state regulations regarding fluoridated water
- 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
- Adhere to quality control measures implemented by federal and state entities
- Contact community water systems regarding program requirements as needed

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## **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 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.

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**OKLAHOMA  
COMMUNITY WATER FLUORIDATION PLAN  
Appendices**

Appendix A - I Like My Teeth illustration – “Community Water Fluoridation”

Appendix B - Fluoridation Summary Report CY 2015

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

Appendix D - DEQ Water Fluoridation Factsheet

Appendix E - OSDH CWF Logic Model

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# Community Water Fluoridation

## Preventing Tooth Decay for a Lifetime 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.



[ILikeMyTeeth.org](http://ILikeMyTeeth.org)

## Fluoridation Summary Report

WFRS Data Relating to Public Water Systems in Oklahoma  
Fluoridation Status - Year End - December 2015

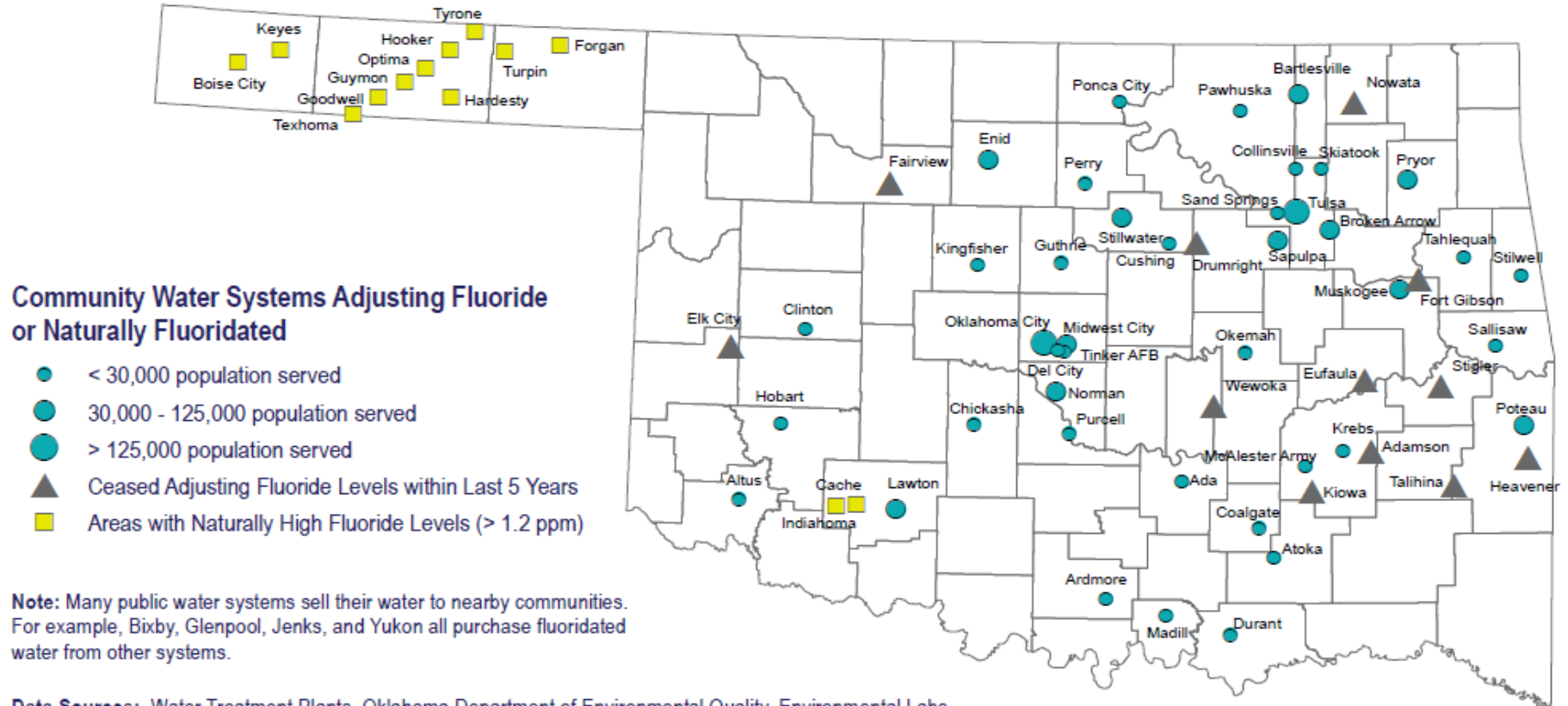
	<b>Systems</b>	<b>Population</b>	<b>% of Fluoridated Systems</b>	<b>% of Fluoridated Population</b>	<b>% of Total Systems</b>	<b>% of Total Population</b>
Public Water Systems	1115	3,531,702	--	--	100.00	100.00
<b>Fluoridated</b>						
Adjusted	42	1,872,915	11.14	76.66	3.77	53.03
Natural	58	61,846	15.38	2.53	5.20	1.75
Variable/Other	0	0	0.00	0.00	0.00	0.00
Defluoridated	0	0	0.00	0.00	0.00	0.00
Consecutive	277	508,329	73.47	20.81	24.84	14.39
Multi-source	0	0	0.00	0.00	0.00	0.00
<b>Total</b>	<b>377</b>	<b>2,443,090</b>	<b>99.99</b>	<b>100.00</b>	<b>33.81</b>	<b>69.17</b>
<b>Non-Fluoridated</b>						
Non-Adjusted	445	843,736	--	--	39.91	23.89
Variable/Other	0	0	--	--	0.00	0.00
Defluoridated	0	0	--	--	0.00	0.00
Consecutive	293	244,876	--	--	26.28	6.93
Multi-source	0	0	--	--	0.00	0.00
<b>Total</b>	<b>738</b>	<b>1,088,612</b>	<b>--</b>	<b>--</b>	<b>66.19</b>	<b>30.82</b>

### Notes:

A public/community water system may have more than one water treatment plant. Example: Oklahoma City's Water System has three water treatment plants. Two of the plants function year round while one plant functions during peak periods.

As of July 1, 2015 the estimated total population of Oklahoma is 3,911,338 (U.S. Census Quick Facts)

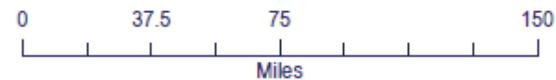
# Status of Water Fluoridation in Oklahoma



**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.

**Data Sources:** Water Treatment Plants, Oklahoma Department of Environmental Quality, Environmental Labs, Centers for Disease Control and Prevention, Oklahoma Dental Loan Repayment Program - Dental Health Professional Shortage Areas. Data Compiled by Dental Health Service, September 2015.

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 12.21.2009. Revised by Community  
Epidemiology and Evaluation 10.22.2015

# WATER

July 2015

## Fluoridation Factsheet

### Health Benefits: (Source CDC)

- For 70 years, 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% in children and adults.
- The U.S. Community Preventive Service strongly recommends community water fluoridation for the prevention and control of tooth decay.
- 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 has been shown to save 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

- 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:

- Analyze the water twice a day for fluoride content, both before and after fluoridation.
- Submit monthly fluoridation operational reports to both DEQ and the State Health department. DEQ form No. 631-001 is available at: <http://www.deq.state.ok.us/wqdnew/forms.html>.
- Perform monthly check samples of post-fluoridation water comparing water plant lab results to that of a state accredited lab analysis of the water.
- When difference is greater than 0.1 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 State Health Department.

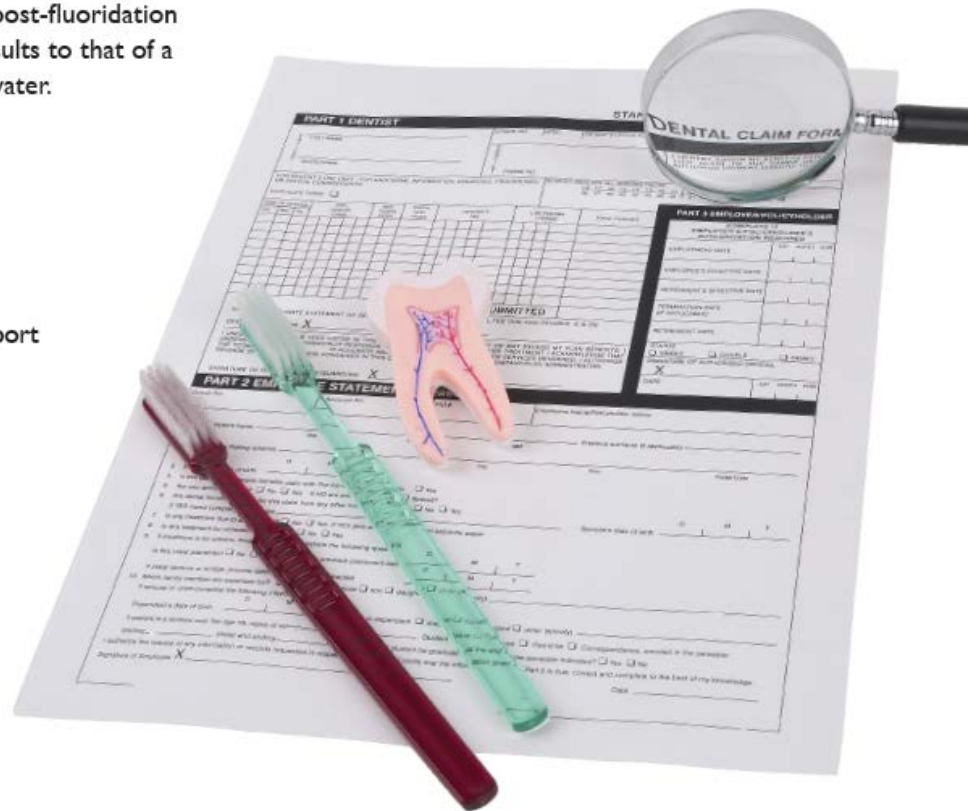
## Systems that intend to implement fluoridation must:

- 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 Health Service,  
405-271-5502

Visit the My Water's Fluoride webpage at:

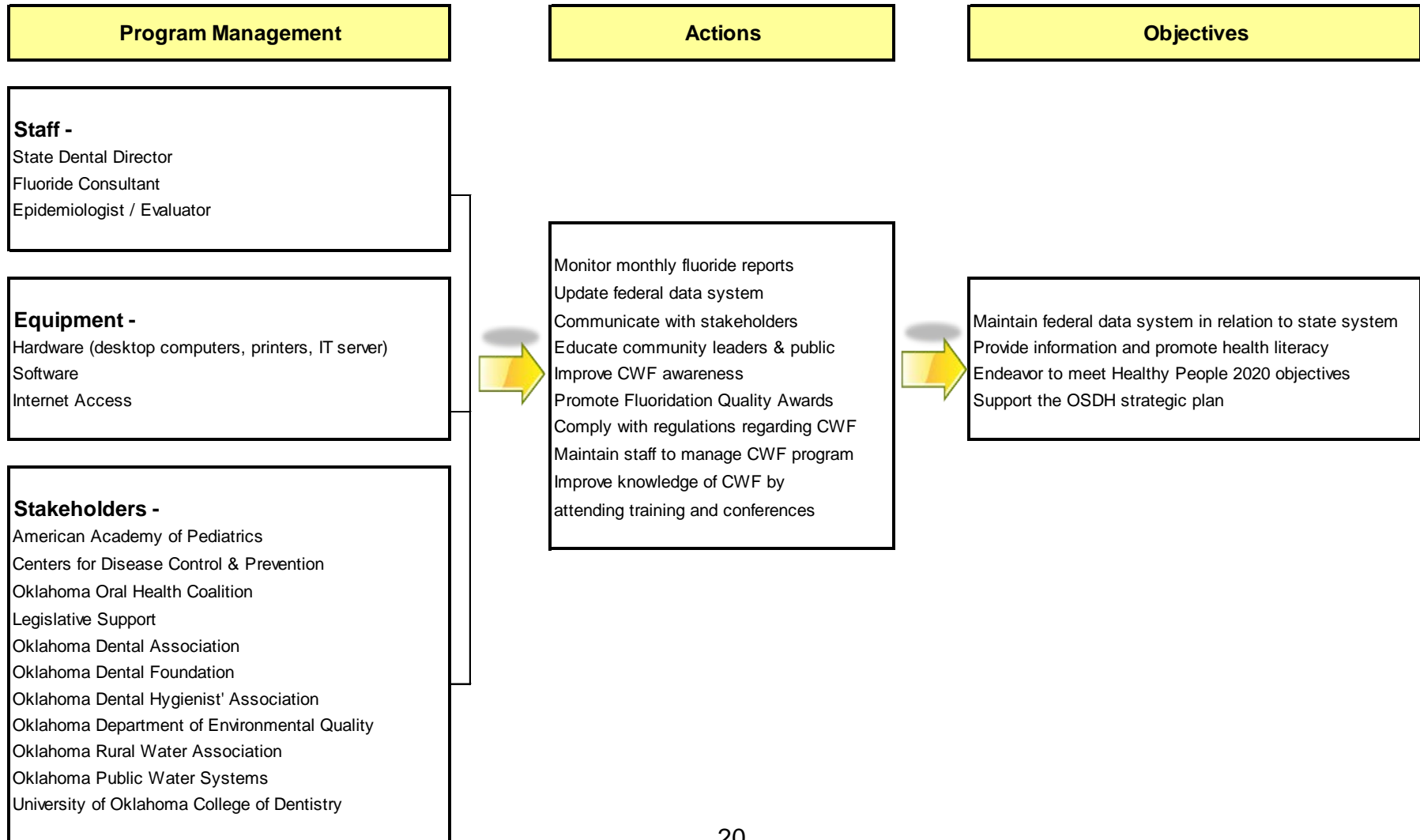
[https://nccd.cdc.gov/DOH\\_MWF/Default/Default.aspx](https://nccd.cdc.gov/DOH_MWF/Default/Default.aspx)



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

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



# NOTES



# NOTES

**For a copy of this document contact:  
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