

# Dental Public Health Activity Descriptive Report

**Practice Number:** 24002  
**Submitted By:** Office of Oral Health, Massachusetts Department of Public Health  
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**SECTION I: PRACTICE OVERVIEW**

**Name of the Dental Public Health Activity:**  
**Community Water Fluoridation in Massachusetts**

**Public Health Functions:**  
 Assessment – Acquiring Data  
 Policy Development – Collaboration and Partnership for Planning and Integration  
 Policy Development – Oral Health Program Policies  
 Assurance – Population-based Interventions  
 Assurance – Building Linkages & Partnerships for Interventions

**Healthy People 2020 Objectives:**  
 OH-1 Reduce the proportion of children and adolescents who have dental caries experience in their primary or permanent teeth.  
 OH-4 Reduce the proportion of adults who have ever had a permanent tooth extracted because of dental caries or periodontal disease  
 OH-13 Increase the proportion of the U.S. population served by community water systems with optimally fluoridated water

<b>State:</b> Massachusetts	<b>Federal Region:</b> Northeast Region 1	<b>Key Words for Searches:</b> Fluoride, fluoridation, community water fluoridation, fluoridation law, community costs
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**Abstract:**

Several fluoridation efforts are ongoing in Massachusetts’ communities. Under Massachusetts General Law 111, Section 8C, fluoridation initiatives in Massachusetts are initiated locally and are aimed at providing both oral health education and preventive services to community residents. The Massachusetts Department of Public Health (MDPH), Office of Oral Health (with its staff of a state fluoridation coordinator and a program coordinator) assists communities by providing education, engineering and technical assistance to local Boards of Health as they work to promote oral health through community water fluoridation efforts. The MDPH also assumes the initial costs of fluoridation for communities. The Preventive Health Services Block Grant and State funds support the initiation of the program. The program continues in 2014, with state and federal funds.

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**SECTION II: PRACTICE DESCRIPTION**

**History of the Practice:**

In May 1951, the City of Danvers became the first community in Massachusetts to initiate community water fluoridation. Since that time, 135 other communities have followed suit. The fluoridation

process in Massachusetts is governed by Massachusetts General Law 111, Section 8C. This law provides local Boards of Health (BOH) with the authority to order community water fluoridation for their respective communities. Should residents in a community wish to vote on the issue, a petition, signed by 10% of the registered voters, must be filed within ninety days of the order. This petition allows for a binding referendum at the next city/town election. Over the last thirty years, several local Boards of Health have ordered fluoridation only to have the decision repealed by resident voters. For over thirty years, the Office of Oral Health (OOH) has supported local Boards of Health by providing education and training as well as technical assistance with respect to fluoridation engineering practices.

### **Justification of the Practice:**

Numerous national and international professional organizations and agencies recognize the prevention benefits of community water fluoridation. The Centers for Disease Control and Prevention (CDC), the National Institute of Dental and Craniofacial Research (NIDCR), as well as the Surgeon General's Report on Oral Health have reported community water fluoridation to be one of the greatest public health achievements of the twentieth century. In addition, a special task force reported in MMWR in August 2001, that the greatest oral health benefits are received by individuals living in fluoridated communities, who drink the fluoridated water and brush twice daily with fluoridated toothpaste.

In Massachusetts, a pre- and post-fluoridation comparison study was conducted among Holyoke school children from 1968 to 1981. Rates of dental disease prevalence in seven-year-old children decreased 84% during the ten-year study period. In teenaged children, thirteen-year-old males and females demonstrated a 50% reduction in tooth decay, while fourteen year old girls and boys demonstrated a 48% and 27% decrease respectively, when compared to their 1968 counterparts. Presently, 3,738,727 residents living in 136 of the Commonwealth's 351 communities receive community water fluoridation. This number represents 68% of the Commonwealth's population served by a community water system. Sixty-two communities in Massachusetts do not have the capacity to fluoridate since they do not have community water systems. Recognizing the 79.6% target of the HP2020 Oral Health Objective to increase the proportion of the U.S. population served by community water systems with optimally fluoridated water, the office continues to assist new communities establish and older communities maintain community water fluoridation.

### **Inputs, Activities, Outputs and Outcomes of the Practice:**

The role of the OOH is to provide education and technical assistance to local Boards of Health and their community residents on water fluoridation. In that role, the Office works in conjunction with the CDC, the EPA, the NIDCR, the Massachusetts' dental institutions and other prominent oral health organizations to keep abreast of the scientific evidence as it is released from various scientific and educational institutions. In addition, the Office consults with the organizations listed above for updates and consensus statements with respect to the safety and effectiveness of community water fluoridation.

The OOH's fluoridation effort is administered and supported by the Program Coordinator. In the past, the State Fluoridation Engineer conducted feasibility studies, provided engineering design, estimates cost for fluoride product and system maintenance, educated and trained new water operators, provided bi-yearly education and training updates for all fluoride operators, and monitored fluoride levels in all fluoridating communities. The Program Coordinator provides education, training and technical assistance to local Boards of Health and community residents, and develops and disseminates oral health education materials for the purpose of educating community residents.

The Massachusetts Department of Public Health posts a procurement of funds to help water systems update their equipment or begin fluoridation. These costs include: 1) a feasibility study; 2) the purchase of fluoridation equipment and its installation; 3) the fluoride chemical for the first year; and 4) education and training programs for Boards of Health as well as all new water operators. The total community costs vary and are determined by the size of a community, the number of wells and the engineering requirements of the individual communities. CDC Prevention Block and State funds were initially utilized to cover the expenses of the Fluoridation Engineer, the Program Coordinator, and the cost of fluoridation start-up equipment and chemical. In 2014, state and federal funds continue to support the oral health program.

### **Budget Estimates and Formulas of the Practice:**

Budget estimates (2002) for construction and start-up of fluoridation activities vary from one community to another and are generally based upon the number of sites where fluoridation metering equipment must be installed. The type of fluoride chemical also factors in to this cost. Hexafluorosilicic acid is the least expensive fluoride chemical used in Massachusetts to fluoridate community water supplies. Communities that can be fluoridated from one location with hexafluorosilicic acid are generally the least expensive. In North Attleboro, a community with 27,143 residents, it cost the State of Massachusetts \$55,000, for the purchase and installation of sodium fluoride metering equipment and accessories necessary to fluoridate four (4) public water supply sources. In a smaller community, Rowley, with 5,500 residents, the costs for two sodium fluoride metering systems at two wells cost the State approximately \$20,000.

### **Lessons Learned and/or Plans for Improvement:**

Lessons learned through the establishment and efforts of community water fluoridation in Massachusetts include the need to educate the local Boards of Health, community residents, and dental and non-dental professionals on the safety and effectiveness of community water fluoridation.

### **Available Information Resources:**

CDC MMWR Weekly Report, August 17, 2001/Vol.50/No. RR-14 Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States

CDC MMWR Weekly Report, October 22, 1999/48(41); 933-940 Achievements in Public Health; 1900-1999 Fluoridation of Drinking Water to Prevent Dental Caries

CDC MMWR Weekly Report, September 29, 1995/Vol. 44/No. RR-13 Engineering and Administrative Recommendations for Water Fluoridation, 1995

Oral Health in America: A Report of the Surgeon General; National Institutes of Health 2000  
Fluoridation Facts, American Dental Association, March 1999

AAPHD brochure on Community Water Fluoridation from the AAPHD website ([www.AAPHD.org](http://www.AAPHD.org)) -- the Office of Oral Health purchases and distributes the brochure.

## **SECTION III: PRACTICE EVALUATION INFORMATION**

### **Impact/Effectiveness**

*How has the practice demonstrated impact, applicability, and benefits to the oral health care and well-being of certain populations or communities (i.e., reference scientific evidence, outcomes of the practice and/or evaluation results)?*

In the August 17, 2001 MMWR, a special task force, established by the CDC, identified frequent exposure to small amounts of fluoride as the best means for reducing and controlling dental caries for all age groups. As such, the group recommended that community water fluoridation be continued and expanded. The fluoridation process in Massachusetts is governed by Massachusetts General Law 111, Section 8C. This law provides local Boards of Health (BOH) with the authority to order community water fluoridation for their respective communities. For over thirty years, the Office of Oral Health has supported local Boards of Health by providing education and training as well as technical assistance with respect to fluoridation engineering practices. According to the CDC in 2012, seventy percent of Massachusetts' residents on community water supplies, in 140 communities, receive fluoridated water. Massachusetts state and local health officials are working together to promote fluoridation and increase participation in this program.

**Efficiency**

*How has the practice demonstrated cost and resource efficiency where expenses are appropriate to benefits? How has the practice demonstrated realistic and reasonable staffing and time requirements? Provide unit cost analysis or cost-benefit analysis if appropriate.*

Community water fluoridation is recognized by leading professional organizations and agencies as the most cost-effective means for providing oral health benefits to all residents of a community. In a 2001 report published in the Journal of Public Health Dentistry entitled, An Economic Evaluation of Community Water Fluoridation, researchers found that individuals living in fluoridated communities could expect an annual reduction of \$19.00 in treatment costs. In Massachusetts, CDC Prevention Block and State funds are utilized to cover the expenses of the Fluoridation Engineer, the Program Coordinator, and the cost of fluoridation start-up equipment and chemical. The distribution of responsibilities, between the two staff members, provide for an efficient program model. A Fluoride Engineer initially worked in conjunction with a Program Coordinator to assist communities and local BOH establish and maintain community water fluoridation. In 2014, there is no fluoridation engineer, but we have a fluoridation coordinator who monitors all fluoridation levels regularly. As part of the Office's quality assurance program, education and training is provided to all water operators participating in community water fluoridation. In addition, unannounced site-visits are conducted and fluoride levels are evaluated. Massachusetts' communities continue to receive awards from the CDC for maintaining optimum levels of fluoride in the drinking water.

**Demonstrated Sustainability**

*How has the practice showed sustainable benefits and/or how has the practice been sustainable within populations/communities and between states/territories? What mechanisms have been built into the practice to assure sustainability?*

For all Massachusetts communities who seek to establish community water fluoridation, the Massachusetts Department of Public Health (MDPH) provides funding, as available, for the initial start-up costs associated with construction, fluoridation equipment, and fluoride chemical for the first year of operation. Annually they post a procurement of funds to help water systems update their equipment or begin fluoridation. Originally after year one, communities were required to provide the financial means to continue community water fluoridation. Since fluoridation began in Danvers in 1951, all 140 communities have demonstrated the capacity to sustain their fluoridation efforts. Funding from the CDC Block Grant continues assisted the OOH in providing the initial start-up funds for the Massachusetts Fluoridation Program. Massachusetts continues to support the fluoridation program with a mix of state and federal funds.

**Collaboration/Integration**

*How has the practice built effective partnerships/collaborations among various organizations and integrated oral health with other health projects and issues? What are the traditional, non-traditional, public and private partnerships/collaborations established by the practice for integration, effectiveness, efficiency and sustainability?*

Massachusetts General Law 111, Section 8C provides the local BOH with the authority to order community water fluoridation for their respective communities. The Massachusetts Department of Public Health, Office of Oral Health (OOH) collaborates with Board members, water operators and other community residents to provide education and assist with fluoridation activities. In addition, the OOH, the Fluoridation Engineer and the Massachusetts Department of Environmental Protection have developed a partnership which provides training and monitoring of fluoride levels to assure quality drinking water, using chemicals in accordance with the ANSI/NSF Standard 60: Drinking Water Treatment Chemicals – Health Effects (ANSI/NSF, 1999).

**Objectives/Rationale**

*How has the practice addressed HP 2020 objectives, met the National Call to Action to Promote Oral Health, and/or built basic infrastructure and capacity for state/territorial/community oral health programs?*

Dental disease disproportionately afflicts many low-income and cultural and ethnic minority groups. As such, public health efforts aimed at reducing this oral health disparity are critical. Community water fluoridation helps to decrease this disease disparity by providing prevention benefits to all residents of a community regardless of race, sex, age and socio-economic status. The Surgeon General's Report, entitled: Oral Health in America: A Report of the Surgeon General, reports community water fluoridation to be a "highly cost-effective prevention strategy" providing the "cornerstone" of dental caries prevention in the United States.