Community Dental Health (2018) **35,** 67–70
Received 27 June 2016; Accepted 10 April 2017

doi:10.1922/CDH_4021Veschusio04

Dental Public Health in Action

Readying community water fluoridation advocates through training, surveillance, and empowerment

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Abstract: This paper describes the Community Water Fluoridation Advocacy Training Project that was designed to develop networks of community water fluoridation advocates in rural communities. The South Carolina (SC) Department of Health and Environmental Control Division of Oral Health staff and the SC Dental Association were responsible for developing and facilitating the training sessions for key policy influencers, which included medical and dental providers, early childhood educators, and water system operators and managers. Findings from the post-training survey indicate that participants increased their knowledge and skills to discuss the impact of water fluoridation on the dental health of community residents. Participants identified a need for online access to water fluoridation education and advocacy materials. Dental public health competencies illustrated: communication and collaboration with groups and individuals to advocate, implement and evaluate public health policy, legislation and regulations.

Key Words: *fluoridation, training, community network, dental health education*

Initial Impetus for Action

Community water fluoridation (CWF) is recognised by the Centers for Disease Control and Prevention (CDC) as one of the 10 great public health achievements. It has had a profound impact on oral health through the prevention of dental caries (CDC, 1999). Adjusting the level of naturally occurring fluoride to an optimal level for the prevention of dental caries in the community water supply, has led to a 25 percent reduction in tooth decay in children and adults (Griffin et al., 2007). CWF remains the most equitable, effective and cost-effective method of delivering fluoride to the entire community, regardless of age, educational attainment, or income level (US DHHS, 2000). Although communities have been providing fluoridated water for over 70 years, local challenges persist across the United States. A survey conducted by the South Carolina (SC) Department of Health and Environmental Control, Division of Oral Health (DHEC-DOH) and the Bureau of Water (2009), to assess the current status of water fluoridation equipment and training needs, found that over half of the water systems reported that they will need to replace their fluoridation equipment within the next few years. In addition, nearly 70% of the water operators expressed an interest in fluoridation training. In SC, public water systems provide fluoridated water to nearly ninety-four percent of the state's population (CDC, 2012). However, several small rural public water systems have attempted to, or have, stopped adjusting fluoride in their water due to aggressive local anti-fluoridation efforts.

Solutions Suggested

The DHEC-DOH, in collaboration with the SC Dental Association (SCDA), had previously conducted several community water fluoridation education and advocacy training sessions. These were adapted from the CDC's Water Fluoridation Principles and Practices Training (2005), developed for water treatment facility operators. The American Dental Association's Fluoridation Manager provided technical assistance for all state-level CWF training sessions conducted in conjunction with the SCDA. In response to community level water fluoridation threats, the SCDA developed the *Strike Force* – a small band of dentists who were poised to respond to local threats to water fluoridation in their communities.

The Water Fluoridation and Advocacy Project was designed to ready networks of community water fluoridation advocates through training, surveillance and empowerment. The innovative approach for the project was based on the Spectrum of Prevention, a systematic framework for developing community prevention efforts, in this case, community water fluoridation (Chehimi et al., 2011). Figure 1 describes the conceptual framework of the project within the Spectrum of Prevention. The intervention consisted of funding fluoridation equipment in rural water systems, with the caveat that key influencers of local public policy, including medical providers, dentists, community water system operators and management and early childhood development program administrators in a water fluoridation engage in advocacy training.

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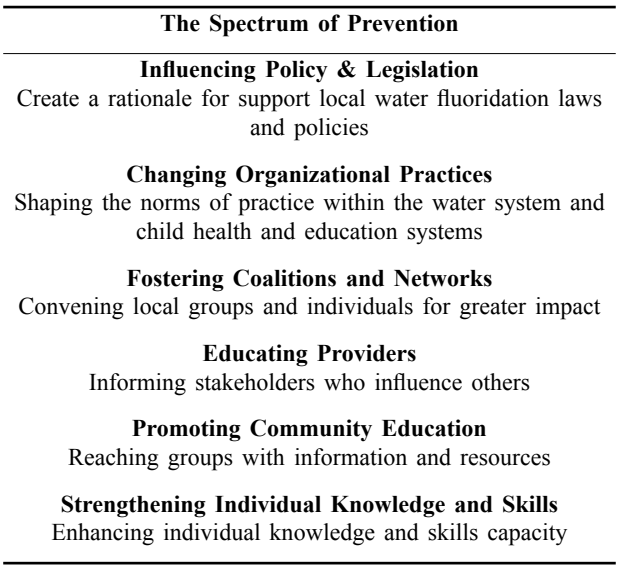

Figure 1. *The Spectrum of Prevention (Chehimi et al., 2011)*

DHEC-DOH and SCDA have demonstrated significant leadership in water fluoridation advocacy. However, this is the first time fluoridation infrastructure investment has been tied to advocacy training. This approach enhances the ability of water system managers and operators to demonstrate to city and county councils why they should retain water fluoridation. The fluoridation equipment funding and the education and advocacy training, which collaboratively address levels of the Spectrum framework, puts in place a community level network of water fluoridation advocacy that will remain long after the equipment investments have been made (Chehimi et al., 2011).

During the three-year funding period, fluoridation equipment mini-grants were awarded to seven rural PWSs, based on data from the Water Fluoridation Reporting System (WFRS), a national surveillance tool. The items of WFRS information used to select areas for funding were the PWS's fluoride levels, the proportion of the state population served and that already receiving optimally fluoridated water (CDC, 2015).

After receiving the funding, CWF training sessions were conducted with key influencers of local public policy, including medical providers, dentists, community water system engineers, and early childhood development program staff. DHEC-DOH and SCDA developed and facilitated the sessions which, aimed to:

- Improve participants' understanding of CWF, how it prevents tooth decay and why it is important for local residents. (Knowledge)
- Describe, through an updated report, the status of CWF in each community (Surveillance)
- Empower the local community with advocacy skills to ensure access to optimally fluoridated water for its members with access to public water. (Public Health in Action).

The training included the State Oral Health Epidemiologist (surveillance/data), State Dental Director (policy), SCDA Executive Leadership (clinical) and the Public Health Education Specialist (overall course quality). Self-reported impacts of the training on the participants' knowledge, skills and confidence in advocating for CWF were assessed.

The design of the training was informed by best practices in public health risk communication that include:

- Engaging local community partners in local community health education and advocacy
- Involving stakeholders before there is an issue
- Creating mutually beneficial relationships
- Listening to stakeholders to better understand their perspectives
- Honest and open dialogue
- Using clear, non-technical language
- Personalizing the risks and benefits of CWF (Covello, 2003).

The content areas below were used to organise the training with each section including learning objectives, format and delivery methods and additional resources.

Water Fluoridation Knowledge: A presentation, titled "Fluoridation: Tap into Your Health" developed by the American Dental Association, was delivered in person (2012). Group discussion topics addressed the risks of CWF, the benefits of CWF to children and adults, and how to address arguments against CWF.

Surveillance: the primary objective of this section was to enable participants' knowledge of local CWF data, their receipt of the CDC-ASTDD Water Quality Awards, and how to access CDC's online CWF portal, *My Water's Fluoride*. Group discussions considered how to obtain information on fluoride levels of private wells.

Public Health in Action: This content area focused on CWF education strategies developed by the SCDHEC for the three primary audiences of the training. Technical Posters were provided and compact disc (CD) describing the CDC Principles and Practices of Water Fluoridation. Discussion: topics included information on CDC's in-person training.

DHEC-DOH has developed a content area about the integration of CWF into medical and dental practices that includes identifying the role all providers play in its support, the importance of providing basic information about the benefits of CWF to patients, how to assess the patient's main source of water, understand how CWF affects a child's risk for tooth decay and how to counsel parents accordingly. Spanish and English language flyers for parents about fluoridation were disseminated. Topics of discussion included examples of how paediatricians have integrated CWF information into their practices and how one paediatric practice initiated a well-water testing programme for fluoride.

Historically, the third audience, Head Start and Child Care Programs, have worked with DHEC-DOH to integrate the Parents Fluoridation Information flyers in their programmes through staff training. One important topic discussed is the requirement that all Head Start Centers must know the level of fluoride level of the water provided at their centres.

DHEC-DOH and SCDA conducted the training sessions at the communities' water system plants. Didactic presentation of information was followed by facilitated discussion. Participants were invited to ask questions during the training, which lasted approximately two hours.

Actual Outcomes

After completing the six training events (one served two communities) between September 2013 and July 2015, all participants were invited to complete an online survey to determine its effectiveness in building a local water fluoridation network. The survey aimed to determine

whether participants had opportunities to use their education and advocacy skills to sustain CWF in their communities and to determine their self-efficacy.

All individuals (N=34) who attended a training session were invited to participate. Seven email addresses were deemed undeliverable. Consent to participate was indicated by completion of the survey.

Based on the learning objectives, the included fixed choice, rating and open-ended questions and took approximately 10-15 minutes to complete.

Survey Monkey (www.surveymonkey.com), hosted the survey. To increase response rates, the participants were emailed an invitation to complete it, which explained its rationale and included unique online links to the site. Invitations were sent in September 2015, with a timeline for completion within one month. Weekly reminders were sent until the final deadline.

The analysis was descriptive with participant characteristics and their responses presented as frequencies and percentages. Free text responses were analysed thematically.

Of the 27 available participants, sixteen (60%) completed the survey. The largest professional group to complete it was dentists, hygienists and assistants (43%) followed by water system managers and operators (31%). early childhood programme staff (12%) and one physician (6%).

Outcomes

Water Fluoridation Knowledge

Table 1 shows the distribution of responses about water fluoridation knowledge and skill utilisation after training. Most participants identified opportunities to define CWF and discuss its benefits and impact on the dental health of the community.

Surveillance

Seventy-five percent understood how to access online information about fluoride levels of public water systems. However, twenty-five percent either did not or were unsure of how to do so.

Water Fluoridation Advocacy

Table 2 shows the distribution of responses about participants' knowledge and comfort level in regards to fluoridation advocacy, and the value place on local community partners that support water fluoridation. Acquisition of knowledge about water fluoridation ranged from a moderate level to a great deal for nearly 88% of participants. Sixty-nine percent felt their confidence in water fluoridation advocacy increased a great deal or a lot, but nearly 13% noted a moderate amount and 19% found little increase in confidence.

Seventy-five percent found participation with other community professionals had some positive impact on their own values as they related to CWF . One free text comment stated, "it certainly didn't influence my values, but I was very happy to see such a wide variety of professionals present."

Use of Educational Resources

Nearly 98% of PWS participants used the "Drink Water with Fluoride" signage disseminated at the training. Most (67%) of PWS personnel used the Water Fluoridation Plant Poster, a technical resource specifically designed by CDC for water treatment plants. Only 25% had used the CDC Water Fluoridation Principles and Practices Training Compact Discs. In the free text feedback, one water system worker noted that they had used "parent flyers and information sheets."

Once again, the "Drink Water with Fluoride"signage was the most commonly used resource by medical, dental, Head Start professionals and other community advocates.

Table 1. Distribution of responses (n=16) to items about water fluoridation knowledge and skill utilization after the training

Questions	*Yes*	*No*	*Unsure*
	N, %	*N, %*	*N, %*
Was the participant able to define community water fluoridation and how it works	14, 87.5	2, 12.5	0, 0.00
Was the participant able to describe the benefits of community water fluoridation: safe, effective and cost-effective	15, 93.3	0, 00.0	1, 6.7
Did the participant know how how optimally adjusted fluoridated water impacts the dental health of your community regardless of age	15, 93.8	0, 00.0	1, 6.7
Did the participant understand how to access online information in regards to the fluoridation levels in your Public Water System	12, 75.0	1, 6.3	3, 18.8

Table 2. Distribution of responses (n=16) about group participant's knowledge and comfort level in regards to fluoridation advocacy, as well as the value place on local community partners that support water fluoridation

Questions	*A great deal*	*A lot*	*A moderate amount*	*A little*	*None at all*
	n, %	*n, %*	*n, %*	*n, %*	*n, %*
As a result of the training, to what degree did your knowledge about advocating for community water fluoridation change?	4, 25.0	4, 25.0	6, 37.5	2, 12.5	0, 0
To what degree did your confidence or comfort with advocating for community water fluoridation change?	5, 31.3	6, 37.5	2, 12.5	3, 18.8	0, 0
To what degree did being trained with a variety of professionals (e.g. doctors, dentists, water system operators, and other child health advocates) influence your own values around community water fluoridation?	6, 37.50	5, 31.25	1, 6.25	4, 25.0	0, 0

Forty-six percent of the group used the "Parent Water Fluoridation Information"sheets, while only 33% used the DHEC-DOH website to access water fluoridation resources. Free text comments identified inability to find the Parent WF Information sheets on the DHEC website.

Challenges Addressed

Despite the relatively short training, participants reported positive changes in their knowledge, skills or comfort with the benefits of CWF and its impact on dental health. These results are important as recent research has found that even when the public can identify some level of benefit of CWF, only half are able to identify its purpose (Mork & Griffin, 2015).

Shortcomings identified in the training, such as access to online information will be addressed in future sessions.

Implications

These results support a proactive approach to sustaining CWF by building local advocacy networks of diverse stakeholders – from policy makers to community residents – that understand the importance of CWF to the community.

Learning Points

Opportunity to Sustain Public Trust at the Community Level

Research to determine important considerations in forming and changing individuals, views on CWF identifies public trust as foundational for building and maintaining public support for it. These training events opened a door for DHEC-DOH and SCDA to enter as trusted oral health advisors who understand the importance of working together with the community to establish common ground relating to maintaining CWF (Rosell & Furth, 2007).

Maintain Relationships with Water System Managers and Operators:

Including both water system managers and water operators was important. A large, multi-state study to determine the knowledge level of water plant operators responsible for adjusting fluoride to the recommended level, found most small water system operators could identify the correct level of fluoride. However, their understanding of the rationale for maintaining the fluoride level was lower than their urban counterparts (Lalumalder, 2001). Due to the small number of participants, no specific conclusions can be drawn about water operators' knowledge. However, by establishing a relationship with rural PWSs, the stage has been set for an ongoing relationship between DHEC-DOH and SCDA to support their CWF educational needs.

Continue Innovative Approaches for Delivery of Water Fluoridation Information and Signage

As trusted sources of health care information, medical and dental providers are an integral component of CWF networks in rural communities. SC DHEC needs to continue to disseminate simple, parent-focused messages on CWF and its impact on their children's oral health through these CWF networks.

As the internet and social media inundate our communities with misinformation about fluoridation safety, health benefits and cost-benefits (Mertz & Allukian, 2014), public health practitioners will need to continue to develop innovative strategies to ensure that the public has access to culturally appropriate water fluoridation information.

Acknowledgement

This project was funded by HRSA/Bureau of Health Professions, T12HP24722 Martin (PI) 09/01/12 – 08/31/15.

References

CDC (1999): Achievements Public Health, 1900-1999: Fluoridation of Drinking Water to Prevent Dental Caries. *Morbidity Mortality Weekly Report,* 48, 933-940.

CDC (2012): 2012 Water Fluoridation Statistics. http://www.cdc.gov/fluoridation/statistics/2012stats.htm

Douglass K, Veschusio C, English M, Gravelle W. (2010). Water Fluoridation Equipment & Training Needs of South Carolina's Water Systems. National Oral Health Conference. St. Louis, MO.

CDC (2015): Water Fluoridation Reporting System (WFRS) Fact Sheet. Accessed on 1/3/2017 at: https://www.cdc.gov/fluoridation/data-tools/wfrs_factsheet.htm

Chehimi S, Cohen L, Valdovinos E. (2011): In the first place: community prevention's promise to advance health and equity, *Environment and Urbanization*, 23, 71-89.

Covello VT. (2003): Best Practices in Public Health Risk and Crisis Communication, *Journal of Health Communication*, 8, 5-8.

Griffin SO, Regnier E, Griffin PM, Huntley VN. (2007). Effectiveness of fluoride in preventing caries in adults. *Journal of Dental Research,* 86, 410–414.

Lalumandier JA, Hernandez LC, Locci AB, & Reeves TG. (2001): US drinking water: fluoridation knowledge level of water plant operators. *Journal of Public Health Dentistry,* 61, 92-98.

Martin AB, Vyavaharkar M, Veschusio C, Kirby H. (2012): Rural-urban differences in dental service utilization among an early childhood population enrolled in South Carolina Medicaid. *Maternal and Child Health Journal*. 16, 203-11.

Mertz A, & Allukian M. (2014): Community water fluoridation on the Internet and social media. *Journal of the Massachusetts Dental Society,* 63, 32-36.

Mork N & Griffin S. (2015): Perceived safety and benefit of community water fluoridation: 2009 HealthStyles survey. *Journal of Public Health Dentistry* 75, 327-336.

Viewpoint Learning, Inc. Rosell S, Furth I. (2007): Effectiveness of Population-Based Interventions to Promote Oral Health, Understanding Public Judgment on Science-Intensive Issues: San Diego Dialogues on Community Water Fluoridation. .

US Department of Health and Human Services (2000). Oral Health in America: A Report of the Surgeon General-- Executive Summary. (2000). Rockville, MD: US Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health.