



Institute for Science in Medicine

COMMUNITY WATER FLUORIDATION

THE PROBLEM

Tooth decay continues to be the most common disease of mankind, having long caused misery and can even lead to life-threatening infections. One of the top public health achievements has been community water fluoridation (CWF), which now provides a safe, effective and economical way to help prevent tooth decay. Despite CWF's phenomenal success, a small but vocal movement of anti-fluoridation activists have, since the 1950s, spread unfounded fears among the public about it, with the result that some communities have opted to stop fluoridating their drinking water. Their destructive activities have manufactured a fake "scientific controversy" which ultimately results in a decline in dental health, lost productivity, and increased financial burdens on individuals and the health care systems.

BACKGROUND

Fluoride is necessary for developing and maintaining strong bones and teeth. In 1998, the Institute of Medicine classified fluoride a "nutrient" because of its important role in sustaining health.¹

Community water fluoridation (CWF) is the adjustment of the naturally-occurring fluoride content in drinking water for optimal health benefit. Worldwide, communities that fluoridate drinking water do so within the range of 0.6 to 1.2 ppm (parts per million).^{2,3,4,5,6} At this concentration, there is a wide margin of safety.⁷ Today in the United States, with many consumer products from toothpastes to fruit juices containing fluoride, a lower concentration of 0.7 ppm was proposed in 2011. It isn't until concentrations reach 4.0 ppm or greater that communities are required by the US Environmental Protection Agency to remove excessive naturally-occurring fluoride from drinking water.⁸ It should be noted that no communities in the United States add fluoride to drinking water to levels that exceed 1.2 ppm.

CWF is a safe, economical and effective way to deliver fluoride. Scientific studies have established that CWF lowers the rate of tooth decay by 20-40% in children, over and above the effect of topical fluoride products.⁹ Moreover, it benefits all residents of a community, regardless of socio-economic status.¹⁰ Fluoridation is one of the most cost-effective health strategies; for most communities, every \$1 invested in CWF saves \$38 to \$80 in dental treatment.^{11,12,13} CWF has been documented to eliminate millions of dollars in welfare medical costs, days lost at school and work, and in dental and emergency room visits.¹⁴ In 1995, fluoridation was estimated to be saving Americans an estimated \$3.8 billion per year.¹⁵ For example, according to a Texas study

published in 2000, CWF saved Medicaid \$24 per child per year.¹⁶ Research done in New Zealand determined that CWF is cost effective for communities of 1,000 or more inhabitants.¹⁷

The fluoride obtained from systemic sources actually becomes part of the tooth structure as baby teeth and permanent teeth develop under the gums of infants and children.¹⁸ These teeth are then considerably stronger and resist dental decay much better once they have erupted into the mouth. This protection, gained from getting fluoride from systemic sources, generally stays with the teeth throughout life.

Systemic sources of fluoride also benefit older children and adults. Fluoride from food and drink eventually ends up in a person's saliva. The fluoride in saliva constantly bathes the teeth so that the teeth are protected continuously through exposure to small amounts of fluoride. For those older children and adults fortunate enough to live in fluoridated communities, this constant protection of the teeth by saliva containing small amounts of fluoride is substantial. Through a process called remineralization, some very small cavities are not only prevented from getting larger, they actually can "heal" or repair themselves because of the action of these low levels of fluoride present in the saliva. Fluoride in saliva also inhibits attachment, metabolism, and reproduction of the bacteria implicated in the decay process, such that it inhibits the ability of these bacteria to produce enamel-destroying acids.^{11,19,20,21} CWF helps the elderly protect teeth that are at additional risk because of decreased saliva production and increased root exposure.²²

A recent increase in the incidence of tooth decay has been linked to the reliance on bottled water that does not contain sufficient fluoride content to promote dental health.^{23,24}

Antifluoridationists activists are small in number but tend to be very vocal. Since CWF's inception in 1945, they have made hundreds of invalid criticisms.²⁵ CWF has been a favorite target of conspiracy theorists; it has been charged with being a secret plot of Nazis, Communists, the Illuminati, the Centers for Disease Control and Prevention (CDC), the fertilizer industry, and many other groups.^{26,27}

The anti-fluoridation movement's allegations of harm from CWF are not scientifically substantiated. In particular, toxicity and carcinogenicity of fluoridation at the levels used in CWF have been ruled out by reliable scientific studies. The National Cancer Institute (NCI) states that CWF poses no increased risks for cancer.²⁸ The CDC has also concluded that there is "no credible evidence" for such a link.²⁹ Fluoride's only identified side-effect has been mild dental fluorosis — an almost unnoticeable *cosmetic* concern — and one where CWF makes only a small contribution.^{30,31,32,33}

Worldwide, some 400 million people have optimally fluoridated drinking water, with approximately 70% of the US, 90% of Australians, and 10% of the UK population having access.^{34,35,36} While studies indicate that most people favor CWF,^{37,38} this public health measure is not always implemented or retained. In January 2012, a prominent anti-fluoridation organization claimed 38 communities in the United States, Canada and New Zealand, together representing a population of 2,892,500, had been "freed from forced fluoridation" in just over a year.³⁹

The safety of CWF has been comprehensively reviewed by numerous public-health authorities and scientific institutions.⁴⁰ These include the US Public Health Service,⁴¹ World Health Or-

ganization,⁴² NCI,²⁸ CDC,⁴³ National Research Council,⁴⁴ and National Health and Medical Research Council (Australia).⁴⁵ None has ever identified any health risk with the levels of fluoride provided by CWF. As Consumers Union, another supporter of CWF, has aptly concluded:

*The simple truth is that there's no "scientific controversy" over the safety of fluoridation. The practice is safe, economical, and beneficial. The survival of this fake controversy represents one of the major triumphs of quackery over science in our generation.*⁴⁶

US courts have also recognized that there is no scientific controversy over the safety and efficacy of CWF. No appellate court – state or federal – has ever ruled that fluoridation of local water systems is an unconstitutional exercise of government power. Moreover, because fluoride is scientifically classified as a naturally-occurring mineral nutrient, like calcium or iron, courts have also consistently found that adjusting fluoride levels in water cannot be legally characterized as “mass medication.”^{47,48,49}

DISCUSSION

For a democratic society to make sound decisions about CWF, the debate that occurs should be reliably informed; scientific evidence and reasoning should be indispensable in making public health policy. Yet every year, some communities needlessly forego CWF, with resulting declines in dental health. Policy makers may see CWF as a place to trim public expenditures, especially when faced with local anti-fluoridation activists clamoring for an end to CWF, but it is a penny-wise, pound-foolish decision for the community. Decades of sound research and experience with CWF have made certain conclusions clear and inescapable.

Individuals can receive lifetime benefits from CWF, in improved quality of life, employment opportunities, and in the dental care savings (not only for the initial treatment for caries, but in the subsequent need for caps, root canals, tooth loss, dentures, etc.). Poor communities are especially impacted negatively by the lack of CWF.

No health risks have been identified with the levels of fluoride provided by CWF. Moreover, researchers continue to monitor changes in diet, climate, and life styles in order to insure the ideal levels of fluoride are present in drinking water.

Courts have repeatedly ruled that CWF neither interferes with constitutional freedoms nor is “mass medication” of a population. Since it already occurs in water naturally, CWF is an adjustment of that level. Water treatment should be determined by what is best for the community as a whole. The primary source of fluoride (hydrofluosilicic acid) is irrelevant; when added to water, this chemical breaks down into fluoride ions, sand and water. Water-treatment engineers have an excellent record of ensuring safe drinking water.

CWF is practical and economical for most communities. Where it is not, there are alternative sources of fluoride, but these are considerably more expensive than CWF and require more individual effort than CWF. Reliance on alternative sources of fluoride puts many children at risk.

The astounding success of CWF may make citizens and policymakers complacent about the seriousness of tooth decay and its costs to the community. It is short-sighted to bow to the demands made by anti-fluoridation activists solely on fiscal grounds. It is a sound investment for states and municipalities to establish, maintain, or modernize fluoridation equipment.

Anti-fluoridation activists use many conventional propaganda techniques, such as the “Big Lie.” The Internet allows false claims about fluoridation to reach a wide audience. Emotionally-charged claims undermine the public’s confidence in the proven safety and effectiveness of CWF and have led some communities to reject scientific arguments supporting CWF.

The public can be misled about CWF when the media, in attempting to provide “balanced” reporting on the “controversy,” frequently give weight to the views of antifluoridationists that are not warranted by the scientific facts of the matter.

NEEDED POLICY

To help protect the public’s dental health, policymakers need to maintain community water fluoridation (CWF) and expand it to underserved communities.

- In order to optimize the dental health of citizens, all communal water systems need to implement CWF as recommended by recognized public health authorities.
- States, NGOs, and insurance companies should financially assist local communities to create and maintain facilities for optimal fluoridation of drinking water.
- The National Institutes of Health and the US Public Health Service need to begin a widespread program of public education, emphasizing the benefits, cost-effectiveness and safety of CWF.
- State health departments, local health officials, and dental and medical societies need to determine the level of fluoride in local water supplies, while educating their states and communities about appropriate fluoride supplementation and the need for CWF. Educators should encourage parents to supervise their children’s use of toothpaste.
- State and local dental and medical societies and other health authorities should be prepared to counter unfounded health claims about fluoridation as they arise. While the false claims made by the anti-fluoridation movement need to be addressed, the public especially needs to become familiar with the significant benefits of CWF and its excellent safety record.
- State and local dental/medical societies need to make a priority of reintroducing CWF where the anti-fluoridation movement has stopped this vital public health measure. Citizens in these communities need to be made aware that they are not benefitting from the protections of CWF.
- All bottled water sold for drinking purposes should be required to contain optimal levels of fluoride. Bottled water labels should be required to state the fluoride concentration.
- Media should be mindful that their content is used by voters and policy makers to decide public health issues. Whenever a story touches on CWF, reporters and editors should fact-

check with reliable and authoritative sources, and balance the story in accordance with the weight of the facts.

- Policy makers should seek out scientifically reliable information and opinion, and base decisions about CWF accordingly.

**Approved by ISM Board of Directors
22 January 2012**

FURTHER READING

Campaign for Dental Health. "[Possible responses to common anti-fluoride claims.](#)" *Myths & Facts Sheet* [online], 2011.

Pew Center on the States. "[Savings from water fluoridation: what the evidence shows.](#)" [online] 2010.

Jason M. Armfield. "[When public action undermines public health: a critical examination of anti-fluoridationist literature.](#)" *Australia and New Zealand Health Policy* [online], 2007 Dec 9; 4:25.

C. Albert Young. "[A systematic review of the efficacy and safety of fluoridation.](#)" *Evidenced-Based Dentistry*, 2008 Jun; 9(2):39-43.

Committee on Fluoride in Drinking Water, National Research Council. *Fluoride in Drinking Water: A Scientific Review of EPA's standards*. Washington: National Academies of Science, 2006. (ISBN 978-0-309-10128-8)

National Cancer Institute. "[Fluoridated water: questions and answers.](#)" *NCI Fact Sheet* [online], reviewed 29 Jun 2005.

American Dental Association. *Fluoridation Facts*. Chicago: The Association, 2005.

British Fluoridation Society, UK Public Health Association, British Dental Association & Faculty of Public Health. *One in a Million: The Facts About Water Fluoridation*. Oldham, UK: The Society, 2nd edition, 2004 Jun.

US Centers for Disease Control and Prevention. "[Recommendations for using fluoride to prevent and control dental caries in the United States.](#)" *Morbidity & Mortality Weekly Report*. 2001 Aug 17; 50(RR14):1-42.

Michael W. Easley. "[Opposition to community water fluoridation and connections to the 'alternative medicine' movement.](#)" *Scientific Review of Alternative Medicine*. 2001; 5(1):24-31.

National Institute of Dental and Craniofacial Research. *Oral Health in America: A Report of the Surgeon General* (Rockville, MD: National Institutes of Health, 2000):158-166.

Division of Oral Health, National Center for Chronic Disease Prevention. "[Achievements in public health, 1900-1999: fluoridation of drinking water to prevent dental caries.](#)" *Morbidity and Mortality Weekly Report*, 1999 Oct 22; 48(41):933-940.

Michael W. Easley. "[A symposium on the new fight for fluorides, part I: The new anti-fluoridationists: who are they and how do they operate?](#)" *Journal of Public Health Dentistry*, 1985 Summer; 45(3):133-141.

Stephen J. Barrett & Sheldon Rovin, eds. *The Tooth Robbers: A Pro-Fluoridation Handbook*. Philadelphia: Stickley, 1980.

References

- ¹ Food and Nutrition Board, Institute of Medicine. *Dietary Reference Intakes: A Risk Assessment Model For Establishing Upper Intake Levels For Nutrients* (Washington: National Academies Press, 1998):20,22,23,28. ([ISBN 0-309-06348-5](#))
- ² National Institute of Dental and Craniofacial Research (2000), *op. cit., supra*, p.160.
- ³ National Health and Medical Research Council. “The Efficacy and Safety of Fluoridation.” *NHMRC Public Statement*, 2007 [online]. http://www.nhmrc.gov.au/_files_nhmrc/file/media/media/rel07/Fluoride_Flyer.pdf
- ⁴ British Medical Association. “Fluoridation of water.” *BMA Policy*, 2010 Jan 12 [online]. http://www.bma.org.uk/health_promotion_ethics/environmental_health/Fluoriwater.jsp
- ⁵ Clarkson J, McLoughlin J & O’Hickey S. “Water fluoridation in Ireland—a success story.” *Journal of Dental Research*, 2003 May; 82(5):334-337. [[doi](#)]
- ⁶ Health Canada. *It’s Your Health: Fluoride and Human Health* (Ottawa, Canada: Minister of Health, rev. 2010). (ISBN 978-1-100-17147-0) http://www.hc-sc.gc.ca/hl-vs/alt_formats/pacrb-dgapcr/pdf/iyh-vsv/viron/fluor-eng.pdf
- ⁷ Dodes JE, “Fluoridation in the 21st Century.” In Lehr JH and Keeley J, eds., *Water Encyclopedia: Domestic, Municipal, and Industrial Water Supply and Waste Disposal* (Hoboken, NJ: Wiley, 2005), 2:254-256. ([ISBN 978-0-471-73686-8](#))
- ⁸ National Research Council (2006), *op. cit., supra*.
- ⁹ Brunelle JA & Carlos JP. “Recent trends in dental caries in U.S. children and the effect of water fluoridation,” *Journal of Dental Research*, 1990 Feb; 69(Spec Iss):723-727; discussion, 820-823. [[abstract](#)]
- ¹⁰ National Institute of Dental and Craniofacial Research (2000), *op. cit., supra*, p.162.
- ¹¹ Division of Oral Health, Centers for Disease Control and Prevention. “Cost savings of community water fluoridation.” *CDC Fact Sheet*, 2009 Sep 1 [online]. http://www.cdc.gov/fluoridation/fact_sheets/cost.htm
- ¹² Centers for Disease Control and Prevention. *An ounce of prevention...what are the returns?* (Atlanta, GA: US Department of Health and Human Services, 2nd edn., 1999), p. 10. <ftp://ftp.cdc.gov/pub/Publications/mmwr/other/ozprev.pdf>
- ¹³ Centers for Disease Control and Prevention, “[Public health focus: fluoridation of community water systems](#),” *Morbidity & Mortality Weekly Report*, 1992 May 29; 41(21):372-375,381.
- ¹⁴ Berg JH & Slayton RL. *Early Childhood Oral Health* (New York: Wiley-Blackwell, 2009), p. 44. ([ISBN 978-0-8138-2416-1](#))
- ¹⁵ Silverstein SC. Testimony before the US Congressional Biomedical Research Caucus. Washington: 1995 Feb 10. Regarding a finding by the Federation of American Societies of Experimental Biology.
- ¹⁶ Texas Department of Health, “[Water fluoridation costs in Texas: Texas Health Steps \(EPSDT-Medicaid\)](#),” 2000 May.
- ¹⁷ Wright JC, Bates MN, Cutress T & Lee M. “The cost-effectiveness of fluoridating water supplies in New Zealand,” *The Australian and New Zealand Journal of Public Health*, 2001 Apr; 25(2):170-178. [[doi](#)]
- ¹⁸ Newbrun E, ed. *Fluorides and Dental Caries: Contemporary Concepts for Practitioners and Students* (Springfield, IL: Thomas, 1986, 3rd edn.). ([ISBN 0398051968](#))
- ¹⁹ Lambrou D, Larsen MJ, Fejerskov O & Tachos G, “The effect of fluoride in saliva on remineralization of dental enamel in humans,” *Caries Research*, 1981; 15(5):341-345. [[doi](#)]

-
- ²⁰ Jones S, Burt BA, Petersen PE & Lennon MA. “[The effective use of fluorides in public health](#),” *Bulletin of the World Health Organization*, 2005 Sep; 83(9):670-676.
- ²¹ American Dental Association (2005), *op. cit., supra*.
- ²² National Institute of Dental and Craniofacial Research (2000), *op. cit., supra*, p.161.
- ²³ Smith M. “Bottled water cited as contributing to cavity comeback,” *MedPage Today*, 2005 Sep 19 [online]. <http://www.medpagetoday.com/PrimaryCare/DentalHealth/1756>
- ²⁴ Division of Oral Health, Centers for Disease Control and Prevention. “Bottled water and fluoride.” *CDC Fact Sheet*, 2011 Jan 7 [online]. http://www.cdc.gov/fluoridation/fact_sheets/bottled_water.htm
- ²⁵ Bernhardt M & Sprague B, “The poisonmongers,” in Barrett & Rovin, eds., *op. cit., supra*, pp. 3-4.
- ²⁶ Easley MW (2001), *op. cit., supra*.
- ²⁷ Bowers B. “Truth about fluoride doesn't include Nazi myth.” *PolitiFact Florida*, 2011 Oct 6 [online]. <http://www.politifact.com/florida/statements/2011/oct/06/critics-water-fluoridation/truth-about-fluoride-doesnt-include-nazi-myth/>
- ²⁸ National Cancer Institute (2005), *op. cit., supra*.
- ²⁹ National Center for Chronic Disease Prevention (1999), *op. cit., supra*.
- ³⁰ Holloway PJ. “[Government should meet commitment made in white paper](#)” [letter], *British Medical Journal*, 2001 Jun 16; 322(7300):1486.
- ³¹ American Dental Association (2005), *op. cit., supra*, pp. 28-31.
- ³² Lewis DW & Banting DW, “Water fluoridation: current effectiveness and dental fluorosis,” *Community Dentistry and Oral Epidemiology*, 1994 Jun; 22(3):153-158. [doi]
- ³³ Division of Oral Health, Centers for Disease Control and Prevention. “Dental fluorosis.” *CDC Fact Sheet*, 2011 Jan 6 [online]. http://www.cdc.gov/fluoridation/safety/dental_fluorosis.htm
- ³⁴ British Fluoridation Society *et al.* (2001), *op. cit., supra*.
- ³⁵ Victoria Department of Health, “Water fluoridation in Victoria and Australia,” *Victorian Government Health Information*, 2011 Mar 10 [online]. <http://www.health.vic.gov.au/environment/fluoridation/flumap.htm>
- ³⁶ Division of Oral Health, Centers for Disease Control and Prevention, “2008 water fluoridation statistics,” *CDC Fact Sheet*, 2010 Aug 9 [online]. <http://www.cdc.gov/fluoridation/statistics/2008stats.htm>
- ³⁷ Mummery WK, Duncan M & Kift R. “Socio-economic differences in public opinion regarding water fluoridation in Queensland.” *Australian and New Zealand Journal of Public Health*, 2007 Aug; 31(4):336-339. [doi]
- ³⁸ American Dental Association (2005), *op. cit., supra*, p. 48.
- ³⁹ Fluoride Action Network. “Cities that voted against fluoridation.” *News*, 2011 Nov (rev 2012 Jan) [online, accessed 2012 Jan 14]. http://www.fluoridealert.org/breaking_news.aspx
- ⁴⁰ Division of Oral Health, Centers for Disease Control and Prevention, “Scientific reviews: assessing the weight of the evidence,” *CDC Fact Sheet*, 2010 Jan 29 [online]. <http://www.cdc.gov/fluoridation/safety/systematic.htm>
- ⁴¹ Ad Hoc Subcommittee on Fluoride, US Public Health Service. *Review of Fluoride: Benefits and Risks*. Report, 1991 Feb. <http://www.health.gov/environment/ReviewofFluoride/default.htm>

-
- ⁴² Fawell J, Bailey K, Chilton J, Dahi E, Fewtrell L & Magara Y. *Fluoride in Drinking-Water*. (London: IWA Publishing, 2006). [ISBN 9781900222969] http://www.who.int/water_sanitation_health/publications/fluoride_drinking_water_full.pdf
- ⁴³ Division of Oral Health, Centers for Disease Control and Prevention. “Community water fluoridation: overview.” *CDC Fact Sheet*, 2011 Jan 19. <http://www.cdc.gov/fluoridation/>
- ⁴⁴ Division of Oral Health, Centers for Disease Control and Prevention. “National Academy of Sciences on fluoride in drinking water: what is the National Academy of Sciences and why is its opinion important?” *CDC Fact Sheet*, 2011 Jan 7. <http://www.cdc.gov/fluoridation/safety/nas.htm>
- ⁴⁵ Young (2007), *op. cit., supra*.
- ⁴⁶ Botta JR. “Fluoridation: the cancer scare,” *Consumer Reports*, 1978 Jul, 43:392-396. Also, “The attack on fluoridation: six ways to mislead the public,” *ibid.*, 1978 Aug; 43:480-482. This series of articles was the subject of a libel action, with summary judgment for defendant affirmed, *Yiamouyiannis v. Consumers Union of the United States* (2nd Circuit, 1980), 619 F2d 932. http://174.123.24.242/leagle/xmlResult.aspx?xmlDoc=19801551619F2d932_11387.xml
- ⁴⁷ Block LE. “Antifluoridationists persist: the constitutional basis for fluoridation.” *Journal of Public Health Dentistry*, 1986 Sep; 46(4):188-198. [[doi](#)]
- ⁴⁸ *Safe Water Association v. City of Fond du Lac* (Wis App 1994), 184 Wis2d 365, 516 NW2d 13. <http://www.actionpa.org/fluoride/lawandcourts/wi-fond-du-lac.html>
- ⁴⁹ American Dental Association (2005), *op. cit., supra*, p. 47.

Copyright 2012 by Institute for Science in Medicine, Inc. Permission to reproduce in its entirety is hereby granted, provided that it is not altered, not distributed for commercial purposes, and this notice is included. All other rights are reserved.

Institute for Science in Medicine, Inc. (ISM) is an international, educational and public-policy institute, incorporated in the State of Colorado, and recognized as a 501(c)(3) organization for US federal tax purposes.