

## “Not all studies carry equal weight.”

– NPR reporter Jon Hamilton, March 30, 2012

The Pew Center on the States agrees. The issue of community water fluoridation demonstrates how flawed studies sometimes can prompt or shape health policy decisions.

Over the past 18 months, fluoridation has made headlines in *USA Today*, *The New York Times* and other newspapers as the issue has arisen in a number of states and communities. Legislators in Arkansas passed a 2011 law expanding fluoridation across the state. Last fall, one of Florida’s largest counties voted narrowly to end the practice, and New Jersey’s legislature considered a bill this year to mandate fluoridation.

There is substantial evidence that fluoridated water reduces the rate of tooth decay in both children and adults.<sup>1</sup> Numerous studies that were conducted after fluoride toothpaste became widely

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used reinforce earlier findings that fluoridated water reduces decay. A 1995 study of Illinois communities reviewed changes in decay rates during the 1980s and concluded that water fluoridation was “the dominant factor” in the decline of cavities.<sup>2</sup> Over the past three years, studies from Nevada, New York and Alaska have provided additional evidence of fluoridated water’s health benefits.<sup>3</sup> The Centers for Disease Control and Prevention (CDC) has praised fluoridation as one of “ten great public health achievements of the 20th century.”

Yet anti-fluoride activists persist in attacking the health practice, and they increasingly point to

“studies” — research they claim shows that fluoridated water is harmful. However, a closer examination reveals that opponents often cite studies that had flawed methodologies, were not properly peer-reviewed, or were not relevant to water fluoridation in the United States.

Anti-fluoride groups sometimes cite one-of-a-kind case studies to help explain their opposition. For example, a New York-based anti-fluoride group posted an online statement in 2009 claiming that “even water fluoridation will cause arthritic-like symptoms in susceptible individuals.”<sup>4</sup> But the anti-fluoride group provided no solid evidence linking the two. Instead, the group cited an article from a French medical journal, describing a peculiar case study that was *not* about water fluoridation. This French case study referred to a woman who brushed her teeth 18 times a day and swallowed the toothpaste — consuming a tube of toothpaste every two days.<sup>5</sup> Using such an example to attack water fluoridation is not scientifically sound.

*Fluoride*, a publication managed by fluoride opponents, has published a number of flawed or scientifically incomplete studies. The articles in *Fluoride* do not undergo the rigorous level of peer-review by independent scientists that is standard protocol for reputable journals.<sup>6</sup>

### A Web of Misinformation

Opponents have established a strong presence on the Internet. As *New York Times* reporter Kate Zernike noted, conspiracy theories about fluoridation “now thrive online, where anyone, with a little help from Google, can suddenly become a medical authority.”<sup>7</sup>

Dental fluorosis is a typical issue raised by anti-fluoride groups, which circulate photos from India or other countries that are not representative of

fluorosis in America.<sup>8</sup> Fluorosis is a change in the appearance of teeth enamel that can occur if children up to the age of 8 receive an excessive amount of fluoride.<sup>9</sup>

Research shows that nearly all fluorosis in the U.S. is a mild, cosmetic condition that leaves faint white streaks on teeth. The condition is so subtle that only a dentist is likely to notice it.<sup>10</sup> Mild fluorosis does not cause pain and does not affect the health or function of the teeth. Nonetheless, opponents refer to fluorosis as “damaged teeth,” an inflammatory term that paints a false picture of fluorosis in the U.S.<sup>11</sup> And the Fluoride Action Network has claimed incorrectly that the American Dental Association (ADA) recommends “that children under 12 months of age should not consume fluoridated water.”<sup>12</sup>

To view examples of mild fluorosis, visit this American Dental Association web page: <http://www.ada.org/5576.aspx?currentTab=1>.

### **Misrepresenting Research and News**

In some cases, opponents cite reputable research but misrepresent the findings. For example, they frequently raise fears by citing a 2006 report on fluoride by the National Research Council (NRC).<sup>13</sup> But the report voiced concerns about areas of the U.S. where the *natural* fluoride levels in well water are extraordinarily high — much higher than the level used to fluoridate public water systems. Opponents neglect to mention that the NRC explained that its concerns “do not apply at the lower water fluoride levels commonly experienced by most U.S. citizens.”<sup>14</sup>

Anti-fluoride activists have also misrepresented the 2011 decision by the U.S. Department of Health and Human Services (HHS) to revise its recommended level of fluoride in drinking water for the purpose of reducing decay. The HHS

decision moved from a range (0.7 to 1.2 milligrams per liter of drinking water) to a target of 0.7 mg./L.<sup>15</sup> Opponents cite this change to validate their concerns about fluoride’s safety.<sup>16</sup> But this argument ignores the fact that both the previous and new recommended fluoride levels are far below the maximum level for safety set by the Environmental Protection Agency.<sup>17</sup>

The new fluoride level recommended by HHS reflects two facts. First, Americans today get fluoride from more sources (such as toothpaste and mouth rinses) than they received when the original level was set. Second, a range was no longer necessary because research revealed that people who live in different U.S. climates consume similar amounts of water. This decision by HHS will continue to protect teeth from decay while minimizing the chance of fluorosis.

More than 3,000 studies or research papers have been produced on the topic of fluoride or fluoridation.<sup>18</sup> The overwhelming weight of the evidence reinforces the safety and effectiveness of fluoride. As the CDC writes, “For many years, panels of experts from different health and scientific fields have provided strong evidence that water fluoridation is safe and effective.”<sup>19</sup>

In a recent editorial, the *Bozeman Daily Chronicle*, a Montana newspaper, made this observation: “There are many things in medical science that are unsettled. The benefits of fluoridated drinking water is not one of them.”<sup>20</sup>

State and local officials have a critical role in making decisions about human health. Pew believes these decisions should be based on sound science, not unfounded fears.

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**Learn more about Pew’s oral health research and policy recommendations at: [www.pewstates.org/dental](http://www.pewstates.org/dental)**

## Sources:

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- <sup>1</sup> S.O. Griffin, E. Regnier, P.M. Griffin and V. Huntley, "Effectiveness of Fluoride in Preventing Caries in Adults," *The Journal of Dental Research*, (2007), Vol. 86, No. 5, 410-415, <http://www.ncbi.nlm.nih.gov/pubmed/17452559>; a national task force of experts found that decay was reduced by a median rate of 29 percent. The children who experienced this reduction in the median decay rate were aged 4 to 17. See: "Summary of Task Force Recommendations and Findings," The U.S. Task Force on Community Preventive Services, (2002), <http://www.thecommunityguide.org/oral/fluoridation.html>, accessed November 22, 2011.
- <sup>2</sup> R.H. Selwitz et al., "Prevalence of Dental Caries and Dental Fluorosis in Areas with Optimal and Above-optimal Water Fluoride Concentrations: a 10-Year Follow-up Survey," *Journal of Public Health Dentistry*, (Spring 1995), Vol. 55, No. 2, 90.
- <sup>3</sup> M. Ditmyer, G. Dounis, C. Mobley and E. Schwarz, "A case-control study of determinants for high and low dental caries prevalence in Nevada youth," *BMC Oral Health*, (2010), Vol. 10, No. 24, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2989299/>; J.V. Kumar, O. Adekugbe and T.A. Melnik, "Geographic Variation in Medicaid Claims for Dental Procedures in New York State: Role of Fluoridation Under Contemporary Conditions," *Public Health Reports*, (September-October 2010) Vol. 125, No. 5, 647-54; "Dental Caries in Rural Alaska Native Children – Alaska, 2008," *Morbidity and Mortality Weekly Report*, Centers for Disease Control and Prevention, (September 23, 2011) Vol. 60, No. 37, 1275-1278, [http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6037a2.htm?s\\_cid=mm6037a2\\_x](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6037a2.htm?s_cid=mm6037a2_x).
- <sup>4</sup> "Fluoride Linked to Arthritis, Study Shows," New York State Coalition Opposed to Fluoridation, August 26, 2009, <http://voices.yahoo.com/fluoride-linked-arthritis-study-shows-4139607.html?cat=5>.
- <sup>5</sup> J. Roos, A. Dumolard, et al., "Osteofluorosis caused by excess use of toothpaste," *Presse Medicale* (France), November 2005, Vol. 19, No. 34, 1518-20, <http://www.ncbi.nlm.nih.gov/pubmed/16301964?dopt=AbstractPlus>.
- <sup>6</sup> "The AntiFluoridationist Threat to Public Health," a white paper by the Institute for Science in Medicine, (April 2012), 5, <http://www.scienceinmedicine.org/policy/papers/AntiFluoridationist.pdf>.
- <sup>7</sup> Kate Zernike, "In New Jersey, a Battle Over a Fluoridation Bill, and the Facts," *New York Times*, March 2, 2012.
- <sup>8</sup> For one example of these photos, see: "Skeletal Fluorosis: Recent Reports from India," Fluoride Action Network, accessed March 22, 2012, <http://www.fluoridealert.org/fluorosis-india.htm>.
- <sup>9</sup> "Community Water Fluoridation: Dental Fluorosis," U.S. Centers for Disease Control and Prevention, [http://www.cdc.gov/fluoridation/safety/dental\\_fluorosis.htm](http://www.cdc.gov/fluoridation/safety/dental_fluorosis.htm), accessed March 13, 2012.
- <sup>10</sup> "Oral Health Topics: Fluorosis," American Dental Association, <http://www.ada.org/5576.aspx?currentTab=1>; this view is reinforced by a 2002 study, which noted that the faint streaks on teeth that mild fluorosis causes are typically "not noticed by most people or, indeed, by the individual himself or herself." See: W.H. Bowen, "Fluorosis: Is it really a problem?" *Journal of the American Dental Association*, (October 2002), Vol. 133, 1406.
- <sup>11</sup> "Fluoride Decays Teeth," New York State Coalition Opposed to Fluoridation, March 28, 2011, <http://voices.yahoo.com/fluoride-decays-teeth-8161581.html?cat=5>.
- <sup>12</sup> "Health Effects: Fluoride Warnings for Infants," Fluoride Action Network, <http://www.fluoridealert.org/health/infant/>, accessed April 26, 2011.
- <sup>13</sup> "Fluoride in Drinking Water: A Scientific Review of EPA's Standards," National Research Council – Committee on Fluoride in Drinking Water, The National Academies Press (2006), [http://www.nap.edu/openbook.php?record\\_id=11571](http://www.nap.edu/openbook.php?record_id=11571).
- <sup>14</sup> "Fluoride in Drinking Water: A Scientific Review of EPA's Standards," Report in Brief, National Research Council, (March 2006), [http://dels.nas.edu/resources/static-assets/materials-based-on-reports/reports-in-brief/fluoride\\_brief\\_final.pdf](http://dels.nas.edu/resources/static-assets/materials-based-on-reports/reports-in-brief/fluoride_brief_final.pdf).
- <sup>15</sup> "HHS and EPA announce new scientific assessments and actions on fluoride," joint press release by the U.S. Department of Health and Human Services and the Environmental Protection Agency, (January 7, 2011), <http://www.hhs.gov/news/press/2011pres/01/20110107a.html>.
- <sup>16</sup> Mark Amberg, "New Fluoride Rules Yet to Be Proven Safe," letter to the *Des Moines Register*, January 19, 2011.
- <sup>17</sup> "Basic Information about Fluoride in Drinking Water," Environmental Protection Agency, <http://water.epa.gov/drink/contaminants/basicinformation/fluoride.cfm>.
- <sup>18</sup> K.K. Cheng, I. Chalmers and T.A. Sheldon, "Adding fluoride to water supplies," *British Medical Journal*, (October 6, 2007), Vol. 335, 699.
- <sup>19</sup> "Community Water Fluoridation: Safety," U.S. Centers for Disease Control and Prevention, <http://www.cdc.gov/fluoridation/safety.htm>, accessed April 10, 2012.
- <sup>20</sup> "Bozeman's fluoridated water is not a health risk," *Bozeman Daily Chronicle*, April 4, 2012, [http://www.bozemandailychronicle.com/opinions/article\\_07cdd5f6-7e75-11e1-9be3-0019bb2963f4.html](http://www.bozemandailychronicle.com/opinions/article_07cdd5f6-7e75-11e1-9be3-0019bb2963f4.html).