AMERICAN FLUORIDATION SOCIETY

Further Information for Cortland, NY
September 13, 2016

The following relates to specific questions raised at the recent Cortland fluoridation forum, followed by lists of pertinent peer-reviewed scientific literature. :

I. Questions about fluoride protection at 0.7 ppm concentration.

Fluoridation is about concentration level of fluoride in water. It is not about delivery of a specific dose of fluoride which has been determined to prevent dental decay. The following are excerpts from documents of the National Institute of Dental and Craniofacial Research (NIDR) and the US Department of Health and Human Services, which explain how the USPHS arrived at the original optimal range of 0.7 mg/liter in 1962, and the rationale behind the 2015 reset of that optimal range by DHHS, to simply the low end of that range, 0.7 mg/liter.

Hence, from the curious findings of Churchill's lab assistant, the mystery of the brown stained teeth was cracked. But one mystery often ripples into many others. And shortly after this discovery, PHS scientists started investigating a slew of new and provocative questions about water-borne fluoride. With these PHS investigations, research on fluoride and its effects on tooth enamel began in earnest. The architect of these first fluoride studies was Dr. H. Trendley Dean, head of the Dental Hygiene Unit at the National Institute of Health (NIH). Dean began investigating the epidemiology of fluorosis in 1931. One of his primary research concerns was determining how high fluoride levels could be in drinking water before fluorosis occurred. To determine this, Dean enlisted the help of Dr. Elias Elvove, a senior chemist at the NIH. Dean gave Elvove the hardscrabble task of developing a more accurate method to measure fluoride levels in drinking water. Elvove labored long and hard in his laboratory, and within two years he reported back to Dean with success. He had developed a state-of-the-art method to measure fluoride levels in water with an accuracy of 0.1 parts per million (ppm). With this new method in tow, Dean and his staff set out across the country to compare fluoride levels in drinking water. By the late 1930s, he and his staff had made a critical discovery. Namely, fluoride levels of up to 1.0 ppm in drinking water did not cause enamel fluorosis in most people and only mild enamel fluorosis in a small percentage of people.

This finding sent Dean's thoughts spiraling in a new direction. He recalled from reading McKay's and Black's studies on fluorosis that mottled tooth enamel is unusually resistant to decay. Dean wondered whether adding fluoride to drinking water at physically and cosmetically safe levels would help fight tooth decay. This hypothesis, Dean told his colleagues, would need to be tested.In 1944, Dean got his wish. That year, the City Commission of Grand Rapids, Michigan-after numerous discussions with researchers from the PHS, the Michigan Department of Health, and other public health organizations-voted to add fluoride to its public water supply the following year. In 1945, Grand Rapids became the first city in the world to fluoridate its drinking water.The Grand Rapids water fluoridation study was originally sponsored by the U.S. Surgeon General, but was taken over by the NIDR shortly after the Institute's inception in 1948. During

the 15-year project, researchers monitored the rate of tooth decay among Grand Rapids' almost 30,000 schoolchildren. After just 11 years, Dean- who was now director of the NIDR-announced an amazing finding. The caries rate among Grand Rapids children born after fluoride was added to the water supply dropped more than 60 percent. This finding, considering the thousands of participants in the study, amounted to a giant scientific breakthrough that promised to revolutionize dental care, making tooth decay for the first time in history a preventable disease for most people.

----The Story of Fluoridation
National Institute of Dental and Craniofacial Research
http://www.nidcr.nih.gov/oralhealth/Topics/Fluoride/TheStoryofFluoridation.htm

Relationship between dental caries and fluorosis at varying water fluoridation concentrations. The 1986–1987 Oral Health of United States Children survey has been the only national survey that assessed the child's water fluoride exposure, thus allowing linkage of that exposure to measures of caries and fluorosis.55 An additional analysis of data from this survey examined the relationship between dental caries and fluorosis at varying water fluoride concentrations for children and adolescents. Findings indicate that there was a gradual decline in dental caries as fluoride content in water increased from negligible to 0.7 mg/L. Reductions plateaued at concentrations from 0.7–1.2 mg/L. In contrast, the percentage of children with at least very mild dental fluorosis increased from 13.5% (standard error [SE] 5 1.9) to 41.4% (SE54.4) as fluoride concentrations in water increased from <0.3 mg/L to >1.2 mg/L.57

In Hong Kong, a small decrease of about 0.2 mg/L in the mean fluoride concentration in drinking water in 1978 (from 0.82 mg/L to 0.64 mg/L) was associated with a detectable reduction in fluorosis prevalence by the mid–1980s, from 64% (SE54.1) to 47% (SE54.5), based on the upper right central incisor only. Across all age groups, more than 90% of fluorosis cases were very mild or mild.58 The study did not include measures of fluoride intake. Concurrently, dental caries prevalence did not increase.59 Although not fully generalizable to the current U.S. context, these findings, along with findings from the 1986–1987 survey of U.S. schoolchildren, suggest that the risk of fluorosis can be reduced and caries prevention maintained toward the lower end (i.e., 0.7 mg/L) of the 1962 PHS recommendations for community water fluoridation.

----U.S. Department of Health and Human Services Federal Panel on Community Water Fluoridation. U.S. Public Health Service Recommendation for Fluoride Concentration in Drinking Water for the Prevention of Dental Caries. Public Health Reports. 2015;130(4):318-331.
MLA
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Dr. Connett noted that Warren and Levy did attempt to find an optimal dose of fluoride which could potentially lead to caries free dentitions, but were unsuccessful due to the existence of too many variables. While Connett uses this study to mislead the public into believing that establishment of an optimal level is not possible, thereby implying that the optimal level of 0.7 mg/liter is entirely arbitrary, he is comparing apples to oranges in so doing. The DHHS recommendation is a *concentration* level in water at which maximum benefit has been observed

to occur, with no adverse effects. The attempt by Warren and Levy was to find an optimal *dose*. Their lack of success with this attempt did not, in any manner, negate the validity of the recommended optimal concentration, nor cast any aspersions on it.

On page 6 of this document may be found a list of peer-reviewed studies, as current as 2015, which clearly demonstrate the effectiveness of fluoridation in the prevention of dental decay.

II. The following is a response to some points made by Connett, for which there was no opportunity to properly respond in the forum:

1. Brunelle and Carlos

Connett noted this study in an effort to trivialize the incidence of dental decay. The following is a response of Howard Pollick to Connett's distortions:

This study is routinely read superficially by folks eager to discount fluoridation.

The paper can be quoted as averages to minimize the effect because the 0.6 surface is the effect averaged over both age and geography. 5 year olds have only 1 or two permanent teeth and there is essentially no difference between cavity rates at that early age yet they are counted in calculating the "average"

By age 17 the difference between fluoridated and non-fluoridated is about 1.6 surfaces and the benefit curve is sharply accelerating with a benefit just under 3 times higher than the 0.6 so commonly quoted.

The graph was published in:

Int J Occup Environ Health. 2005 Jul-Sep;11(3):322-6. Scientific evidence continues to support fluoridation of public water supplies. Pollick HF.

Also, in areas where fluoridation is common the Halo effect minimizes the differences between the two types of water systems. Thus the average results actually hide both the Halo Effect and the remarkable differences between communities where fluoridation is uncommon. In the Pacific Region then fluoridated at 19% about the same as Oregon today the difference was a whopping 61%.

2. Connett routinely asks how fluoridation proponents can justify overlooking "300 studies which demonstrate harm".

A. PubMed lists over 53,000 fluoride studies. If after culling the literature, Connett and his staff were only able to identify 300 studies which support their position, this represents but approximately 0.5% of those studies. This must mean that 99.5% do not support Connett's position. Weight of evidence obviously overwhelms the anti position.

B. Connett simply states that there are "300" studies. He neither cites, nor quotes those studies. Therefore, he offers nothing more than his personal assertion that whatever studies to which he refers are relevant to fluoride at the level at which water is fluoridated, that they have been peer-reviewed and published in respected journals, or that they do, indeed provide any valid evidence of "harm". Given Connett's questionable track record with accurately representing the scientific literature, his assertion, in the absence of proper citation of studies, is meaningless. One journal from which Connett draws a significant amount of what he deems to be science, is "Fluoride", the long since discredited publication of the antifluoridationist group, International Academy for Fluoride Research". This publication is little more than an outlet for poor quality antifluoridationist literature.

3. Randomized Controlled Trials

Connett and his followers constantly cite the lack of RCTs on fluoridation as being of major concern. In actuality, RCTs are infeasible for large population-based public health initiatives, and would not provide the proper assessment of the success of fluoridation in preventing dental decay in entire populations as do the countless quality cross-sectional observational studies which provide perfectly acceptable scientific evidence.

The 2015 Cochrane Review which antifluoridationists constantly misrepresent, recognizes the infeasibility of RCTs for fluoridation, and the fact that they will never be done for this initiative:

"However, there has been much debate around the appropriateness of GRADE when applied to public health interventions, particularly for research questions where evidence from randomised controlled trials is never going to be available due to the unfeasibility of conducting such trials. Community water fluoridation is one such area."

and

"However, we accept that the terminology of 'low quality' for evidence may appear too judgmental. We acknowledge that studies on water fluoridation, as for many public health interventions, are complex to undertake and that researchers are often constrained in their study design by practical considerations. For many public health interventions, the GRADE framework will always result in a rating of low or very low quality. Decision makers need to recognise that for some areas of research, the quality of the evidence will never be 'high' and that, as for any intervention, the recommendation for its use depends not just upon the quality of the evidence but also on factors such as acceptability and cost-effectiveness (Burford 2012)."

-----Water fluoridation for the prevention of dental caries (Review)

4. The Scottish Childsmile program, and other such programs as substitutes for water fluoridation.

While such programs certainly have their place, they are by no means adequate substitutions for water fluoridation either in terms of widespread prevention of dental decay in entire populations, or in cost-effectiveness.

From the British Fluoridation Society:

The Scottish ChildSmile Program, while a good initiative, is saving no money. This program involves a supervised toothbrushing program in schools, twice yearly fluoride varnish applications in selected areas, and various education initiatives. The total number of children involved is 120,000. The total annual cost of the program is £15 million . This equals £125 per child per year.

By contrast, the entire fluoridation programme currently serving 6 million people in England is costing around £2.1 million a year and is benefiting everyone with natural teeth, regardless of age, education or socio-economic status. Importantly, it is benefiting all children. The cost per person of fluoridation in England is therefore around 35 pence per annum.

The fact that the British Dental Association in Scotland has recently come out publicly to call for Scottish communities to move towards introducing water fluoridation undermines the arguments of anti-fluoridation groups, whether in the United States or in the UK, that Childsmile is an adequate substitute for water fluoridation. The professional body representing dentists in Scotland does not see it that way.

Childsmile is drastically more expensive than fluoridation, restricted to 120,000 school children, is dependent upon compliance of those children, has decay reduction no greater than fluoridation, and does not appear to have reduced SES inequalities.

5. "Killing little boys"

This is probably one of Connett's most unconscionable claims. The basis for this claim is but one, single, thesis dissertation by then graduate student Eloise Bassin. Bassin's findings were based on a subset of preliminary data from a much larger Harvard study which found no association of osteosarcoma with optimally fluoridated water. Bassin's results have never been replicated, a basic for credibility of such findings. On page 10 of this document may be found a refute of Bassin's findings by Chester Douglass, the lead researcher of the Harvard study from which Bassin drew her data.

In contrast to the cherry-picked literature on which Connett bases his concerns with cancer, there is overwhelming peer-reviewed scientific literature which clearly demonstrates there to be no association of optimally fluoridated water with cancer. A list of such studies may be found on page 11 of this document.

Effectiveness Studies

1) 2015

Results
In the 3 areas the proportion of children who received a dental examination varied; 77.5% (n= 825) for the fluoridated area, 80.1% (n=781) for the pre-fluoridated area and 55.3% (n=523) for the non-fluoridated area. The mean dmft was 1.40 for the fluoridated area, 2.02 for the pre-fluoridated area and 2.09 for the non-fluoridated area. These differences were statistically significant ($p<0.01$). Differences were also noted in the proportion of children who were caries free, 62.6% fluoridated area, 50.8% for the pre-fluoride area and 48.6% for the non-fluoride location.

Conclusion
The children living in the well-established fluoridated area had less dental caries and a higher proportion free from disease when compared with the other two areas which were not fluoridated. Fluoridation demonstrated a clear benefit in terms of better oral health for young children.
---The Dental Health of primary school children living in fluoridated, pre-fluoridated and non-fluoridated communities in New South Wales, Australia
Anthony S Blinkhorn, Roy Byun, George Johnson, Pathik Metha, Meredith Kay, and Peter Lewis

BMC Oral Health 2015, 15:9 doi:10.1186/1472-6831-15-9http://www.biomedcentral.com/1472-6831/15/9

2) 2000

RESULTS:
The prevalence of dental caries was inversely related and the prevalence of fluorosis was directly related to the concentration of fluoride in the drinking water. The mean DMFS in the communities with 0.8 to 1.4 ppm fluoride was 53.9 percent to 62.4 percent lower than that in communities with negligible amounts of fluoride. Multivariate analysis showed that water fluoride level was the strongest factor influencing DMFS scores. The prevalence of fluorosis ranged from 1.7 percent to 15.4 percent, and the increase in fluorosis with increasing fluoride exposure was limited entirely to the milder forms.

-----J Public Health Dent. 2000 Summer;60(3):147-53.
The prevalence of dental caries and fluorosis in Japanese communities with up to 1.4 ppm of naturally occurring fluoride.
Tsutsui A, Yagi M, Horowitz AM.
Department of Preventive Dentistry, Fukuoka Dental College, Fukuoka, Japan. tutuia@college.fdcnet.ac.jp

http://www.ncbi.nlm.nih.gov/pubmed/11109211

3) 2000

CONCLUSIONS:
Caries levels are lower among children with fluoridated domestic water supplies. Decay levels are much lower in 2002 than they were in 1984 and in the 1960s. The oral health of the less well off is worse than that of the rest of the population. The prevalence of dental fluorosis is higher amongst children and adolescents with fluoridated water supplies. Comparisons with 1984 data show an increase in the prevalence of fluorosis since that time.

----Community Dent Health. 2004 Mar;21(1):37-44.
Dental caries and enamel fluorosis among the fluoridated and non-fluoridated populations in the Republic of Ireland in 2002.
Whelton H, Crowley E, O'Mullane D, Donaldson M, Kelleher V, Cronin M.
Source
Oral Health Services Research Centre, University Dental School and Hospital, Wilton, Cork, Ireland.

4) 1995

http://www.ncbi.nlm.nih.gov/pubmed/7643331

CONCLUSIONS:
The ingestion of water containing 1 ppm or less fluoride during the time of tooth development may result in dental fluorosis, albeit in its milder forms. However, in these times of numerous products containing fluoride being available, children ingesting water containing 1 ppm fluoride continue to derive caries protection compared to children ingesting water with negligible amounts of fluoride. Thus, the potential for developing a relatively minor unesthetic condition must be weighed against the potential for reducing dental disease.

-----J Public Health Dent. 1995 Spring;55(2):79-84.
Dental fluorosis and caries prevalence in children residing in communities with different levels of fluoride in the water.
Jackson RD, Kelly SA, Katz BP, Hull JR, Stookey GK.
Source
Oral Health Research Institute, Indianapolis, IN 46202-2876, USA.

http://www.ncbi.nlm.nih.gov/pubmed/15074871

5) 2004

Conclusions:
The results of this study support existing work suggesting water fluoridation together with the use of fluoridated dentifrice provides improved caries prevention over the use of fluoridated dentifrice alone. The social gradient between caries and deprivation appears to be lower in the fluoridated population compared to the non-fluoridated population, particularly when considering caries into dentine, demonstrating a reduction in inequalities of oral health for the most deprived individuals in the population.

----The association between social deprivation and the prevalence and severity of dental caries and fluorosis in populations with and without water fluoridation
Michael G McGrady, Roger P Ellwood, [...], and Iain A Pretty

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3543717/

6) 2012

CONCLUSIONS:
Fewer studies have been published recently. More of these have investigated effect at the multi-community, state or even national level. The dmf/DMF index remains the most widely used measure of effect. % CR were lower in recent studies, and the 'halo' effect was discussed frequently. Nevertheless, reductions were still substantial. Statistical control for confounding factors is now routine, although the effect on per cent reductions tended to be small. Further thought is needed about the purpose of evaluation and whether measures of effect and study design are appropriate for that purpose.

-----Community Dent Oral Epidemiol. 2012 Oct;40 Suppl 2:55-64. doi: 10.1111/j.1600-0528.2012.00721.x.
Effectiveness of water fluoridation in caries prevention.
Rugg-Gunn AJ, Do L.
Source
Newcastle University, UK. andrew@rugg-gunn.net

http://www.ncbi.nlm.nih.gov/pubmed/22998306

7) 2012

CONCLUSIONS:
Data showed a significant decrease in dental caries across the entire country, with an average reduction of 25% occurring every 5 years. General trends indicated that a reduction in DMFT index values occurred over time, that a further reduction in DMFT index values occurred when a municipality fluoridated its water supply, and mean DMFT index values were lower in larger than in smaller municipalities.

----Int Dent J. 2012 Dec;62(6):308-14. doi: 10.1111/j.1875-595x.2012.00124.x.
Decline in dental caries among 12-year-old children in Brazil, 1980-2005.
Lauris JR, da Silva Bastos R, de Magalhaes Bastos JR.
Source
Department of Paediatric Dentistry, University of São Paulo, Bauru, São Paulo, Brazil. jrlauris@fob.usp.br

http://www.ncbi.nlm.nih.gov/pubmed/23252588

8). 2012

Abstract
The effectiveness of fluoridation has been documented by observational and interventional studies for over 50 years. Data are available from 113 studies in 23 countries. The modal reduction in DMFT values for primary teeth was 40-49% and 50-59% for permanent teeth. The pattern of caries now occurring in fluoride and low-fluoride areas in 15- to 16-year-old children illustrates the impact of water fluoridation on first and second molars.

----Caries Res. 1993;27 Suppl 1:2-8.
Efficacy of preventive agents for dental caries. Systemic fluorides: water fluoridation.
Murray JJ.
Source
Department of Child Dental Health, Dental School, University of Newcastle upon Tyne, UK.

http://www.ncbi.nlm.nih.gov/pubmed/8500120

9) 1993

CONCLUSIONS:
The survey provides further evidence of the effectiveness in reducing dental caries experience up to 16 years of age. The extra intricacies involved in using the Percentage Lifetime Exposure method did not provide much more information when compared to the simpler Estimated Fluoridation Status method.

-----Community Dent Health. 2012 Dec;29(4):293-6.
Caries status in 16 year-olds with varying exposure to water fluoridation in Ireland.
Mullen J, McGaffin J, Farvardin N, Brightman S, Haire C, Freeman R.
Source
Health Service Executive, Sligo, Republic of Ireland. joej.mullen@hse.ie

http://www.ncbi.nlm.nih.gov/pubmed/23488212

10). 2012

CONCLUSIONS:
Children with severe dental caries had statistically significantly lower numbers of lesions if they lived in a fluoridated area. The lower treatment need in such high-risk children has important implications for publicly-funded dental care.

------Community Dent Health. 2013 Mar;30(1):15-8.
Fluoridation and dental caries severity in young children treated under general anaesthesia: an analysis of treatment records in a 10-year case series.
Kamel MS, Thomson WM, Drummond BK.
Source
Department of Oral Sciences, Sir John Walsh Research Institute, School of Dentistry, The University of Otago, Dunedin, New Zealand.

Response of Chester Douglass to Bassin Dissertation

In a letter to the editor of the journal Cancer Causes Control,

Chester Douglass, principal investigator of the Harvard Study, advises readers to be cautious when interpreting the [Bassin] findings, noting the following reasons:

• The preliminary findings from the overall analysis of the cases identified between 1993 and 2000 (second set of cases) do not show an association between osteosarcoma and fluoride in drinking water.

- The cases had been identified from the same hospitals within the same orthopaedic departments and the same pathology departments diagnosing osteosarcoma, and similar methods of fluoride exposure

Bone specimens were also provided by many of the cases – preliminary analysis of bone specimens suggests fluoride level in the bone is not associated with osteosarcoma.

The 1990 NIEHS National toxicology Program study found an association with high levels of fluoride in drinking water and osteosarcoma in male rats. However, the findings of their second study did not find an association.

Some of the limitations noted by Bassin et al in their paper include:

The estimates of fluoride in drinking water at each residence do not reflect the actual consumption of fluoride.

The study did no obtain biologic markers for fluoride uptake in bone.

The actual amount of fluoride in a fluoridated supply may vary (within guideline levels).

Natural fluoride levels can vary over time (the researchers thought this unlikely for the time spent at each residence).

There is a lack of data on other potential confounders.

Fluoride may not be causative agent
– another factor in drinking water may be correlated with the presence of fluoride.

Data to assess fluoride exposure from
diet, industrial sources of other sources such as pesticides was not available – cases
may have been exposed to other unknown factors such as contaminants or carcinogens in the bottled or well water, with the fluoride in these products or natural sources irrelevant, regardless of the concentration.

-------0Douglass, C.W. and K. Joshipura, Caution needed in fluoride and osteosarcoma study. Cancer Causes Control, 2006(17): p.481-482

Cancer Studies

There is overwhelming consensus that there is no valid evidence linking water fluoridation to ANY cancer.

A review of worldwide studies by The International Agency for Research on Cancer (IARC) concluded there was no evidence of an increase in cancer rates associated with fluoride in drinking water.

------International Agency for Research on Cancer, IARC Mondographs on the Evaluation of Carcinogenic Risks of Chemicals to Humans, Volume 27. 1982

• The San Francisco Department of Public HealthOccupational Health and Environmental Health Section states that within a search of relevant peer reviewed medical literature to September 2005, a total of seven (7) epidemiological studies were discovered, none of which showed a relationship between fluoride exposure and osteosarcoma

------ (Moss et al. 1995, Gelberg et al. 1995, Freni and Gaylor 1992, Grandjean et al. 1992, McGuire et al. 1991, Mahoney et al. 1991, Hrudey et al. 1990).
------San Francisco Department of Public Health, Current Scientific Evidence: Water Fluoridation is not associated with osteosarcoma. 2005,

Three small case control studies of osteosarcoma (McGuire et al 1995, Gelberg et al 1995, Moss et al 1995) have been reviewed by the Australian National Health and Medical Research Council in 1999. None of these studies found any evidence of fluoride increasing the risk of osteosarcoma.

-------Ahokas, J., et al., Review of water fluoridation and fluoride intake from discretionary fluoride supplements: review for NHMRC. 1999. Royal Melbourne Institute of Technology and Monash University: Melbourne.

The York Review (2000), a systematic review of 214 studies of varying quality, found no clear association between fluoridation of water and osteosarcoma.

-------McDonagh M S, et al., Systemic review of water fluoridation. BMJ, 2000. 321.

A study by Hoover et al found no relationship between osteosarcoma and fluoridation. This study is important because of the large numbers involved (125,000 incident cancers, and 2.3 million cancer deaths).

------Medical Research Council Working Group, Water fluoridation and health. 2002, Medical Research Council: United Kingdom.

In 2002 the British Medical Research Council agreed that overall, evidence does not suggest that artificially fluoridated water increase the risk of cancer.

-------Medical Research Council Working Group, Water fluoridation and health. 2002, Medical Research Council: United Kingdom.

A review of fluoride by the Scientific Panel on Dietetic Products, Nutrition and Allergies published by the European Food Safety Authority in 2005, found no increased risk of cancer from drinking fluoridated water.

------European Food Safety Authority, Opinion of the Scientific Panel on Dietetic products, Nutrition and Allergies on a request from the Commission related to the Tolerable Upper Intake Level of Fluoride. The EFSA Journal, 2005. 192: p. 1-65.

Cost-Effectiveness Studies

1. For most cities, every $1 invested in water fluoridation saves $38 in dental treatment costs.

------"Cost Savings of Community Water Fluoridation,"
U.S. Centers for Disease Control and
Prevention, accessed on March 14, 2011 at
http://www.cdc.gov/fluoridation/fact_sheets/cost.htm.

2. A Texas study confirmed that the state saved $24 per child, per year in Medicaid expenditures for children because of the cavities that were prevented by drinking
fluoridated water.

------ "Water Fluoridation Costs in Texas: Texas Health Steps (EPSDT-Medicaid),
Department of Oral Health Website (2000),
www.dshs.state.tx.us/dental/pdf/fluoridation.pdf,

3. A 2010 study in New York State found that Medicaid enrollees in less fluoridated counties needed 33 percent more fillings, root canals, and extractions than those in counties where fluoridated water was much more prevalent. As a result, the treatment costs per Medicaid recipient were $23.65 higher for those living in less fluoridated counties.

----------Kumar J.V., Adekugbe O., Melnik T.A., "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.

----------The original figure ($23.63) was corrected in a subsequent edition of this journal and clarified to be $23.65. See: "Letters to the Editor,"
Public Health Reports (November-
December 2010), Vol. 125, 788.

4. Researchers estimated that in 2003 Colorado saved nearly $149 million in unnecessary treatment costs by fluoridating public water supplies—average savings of roughly $61 per person.

------O'Connell J.M. et al., "Costs and savings associated with community water fluoridation programs in Colorado,"
Preventing Chronic Disease (November 2005), accessed on
March 12, 2011 at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1459459/.

5. A 1999 study compared Louisiana parishes (counties) that were fluoridated with those that were not. The study found that low-income children in communities without fluoridated water

were three times more likely than those in communities with fluoridated water to need dental treatment in a hospital operating room.

-------Water Fluoridation and Costs of Medicaid Treatment for Dental Decay – Louisiana, 1995-1996,"
Morbidity and Mortality Weekly Report, (U.S. Centers for Disease Control and Prevention), September 3, 1999, accessed on March 11, 2011 at
http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4834a2.htm.

6. By reducing the incidence of decay, fluoridation makes it less likely that toothaches or other serious dental problems will drive people to hospital emergency rooms (ERs)—where treatment costs are high. A 2010 survey of hospitals in Washington State found that dental disorders were the leading reason why uninsured patients visited ERs.

-------Washington State Hospital Association, Emergency Room Use (October 2010) 8-12, http://www.wsha.org/files/127/ERreport.pdf, accessed February 8, 2011.

7. Scientists who testified before Congress in 1995 estimated that national savings from water fluoridation totaled $3.84 billion each

------Michael W. Easley, DDS, MP, "Perspectives on the Science Supporting Florida's Public Health Policy for Community Water Fluoridation,"
Florida Journal of Environmental Health, Vol. 191, Dec. 2005, accessed on March 16, 2011 at
http://www.doh.state.fl.us/family/dental/perspectives.pdf.