

WATER FLUORIDATION DEBATING

THE CASE FOR COMMUNITY WATER FLUORIDATION

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Some Debating tips

- Attempt to trap your opponent, by anticipating the arguments beforehand and showing what is wrong with them.
- Never concede that you agree with the other side or suggest compromise positions.
- Even though antifluoridationists can have good arguments.
- Show that, if the opposing side were correct, then this would have absurd consequences.

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Why a Debate is inappropriate

- A debate is not the place to discuss the science.
- The science is discussed by several experts, over a period of months or years, pouring over the merits and demerits of peer-reviewed articles deemed worthy to include in a review.
- The outcome of a short debate as determined by an audience is most likely associated with preconceived ideas as well as appeal and rhetorical style of the debater or debaters.

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The Case for Community Water Fluoridation

- **Why Fluoridate?**
 - Without fluoridation more people, especially the poor, are suffering unnecessarily
- **Fluoridation is effective in reducing tooth decay**
 - especially for the most vulnerable
- **Fluoridation is safe**
 - 60+ years of experience
- **Fluoridation is cost-effective**
 - Low cost investment per person with high cost savings in reduced dental treatment
- **Fluoridation is supported by major health and science organizations**
 - World Health Organization, American Medical Association, American Dental Association, US Public Health Service, American Water Works Association etc.
- **One of the ten great public health achievements of the 20th century**

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- **Tooth decay continues**
 - Due to risk factors of diet, bacterial challenge, lack of fluoride, saliva
 - While the prevalence continues to decline
 - Due to fluoridation (69% of U.S.); fluoride toothpaste; sealants
 - Tooth decay remains the major reason for expensive dental treatment
 - fillings, crowns, root canals, extractions, bridges, implants, dentures
 - Untreated tooth decay can be fatal
- **Enamel fluorosis continues**
 - Due to excessive intake of fluoride from dental products
 - toothpaste (1992 pea-size), supplements (1994 schedule), infant formula
 - Prevalence is increasing, mainly very mild and mild
 - Minor reason for dental treatment
 - Untreated enamel fluorosis does not cause further morbidity

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Enamel Fluorosis and Tooth Decay



Photographs from Forum on Water Fluoridation in Ireland, 2002

6

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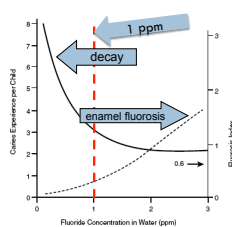
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- Fluoridation is effective
 - in minimizing tooth decay and
 - minimizing enamel fluorosis
- pre-1945 studies

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Fluoride in water: Caries and Fluorosis: Pre-1945 data The scientific basis for fluoridation

Historical Background



- Over 7000 children
- 12-14-year-olds
- Midwest US
- 21 cities

Number of cities studied	Number of children examined	Number of DMF teeth per 100 examiners	Fluoride content of water (ppm)
11	3 867	~100	< 0.5
3	1 140	~200	0.5 - 0.9
4	1 403	~300	1.0 - 1.4
3	847	~400	> 1.4

Dean, H.T. in *Dental caries and Fluorine*, Washington, American Association Advancement Science, pp. 5-31, 1946
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- Fluoridation is effective
 - the original fluoridation community trials
- Arnold FA Jr, Likins RC, Russell AL, Scott DB. Fifteenth year of the Grand Rapids Fluoridation Study. *J Am Dent Assoc.* 1962;65:780-785.
- Ast DB, Fitzgerald B. Effectiveness of water fluoridation. *J Am Dent Assoc.* 1962;65:581-587.
- Blayney JR, Hill IN. Fluorine and dental caries. *J Am Dent Assoc.* 1967;74:225-302.
- Hutton WL, Linscott BW, Williams DB. Final report of local studies on water fluoridation in Brantford. *Can J Public Health.* 1956;47:89-92.

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Comparison of caries scores in controlled-fluoride areas and low-fluoride areas

City	F status	Year	Age	Mean DMFT	% Reduction
Grand Rapids	No F	1945	12-14yrs	9.5	
	F	1959		4.3	55.5
Evanston	No F	1946	12-14yrs	9.0	
	F	1959		4.7	48.8
Samia	No F	1959	12-14yrs	7.5	
Brantford	F	1959		3.2	56.7
Kingston	No F	1960	13-14yrs	12.4	
Newburgh	F	1960		3.7	70.1

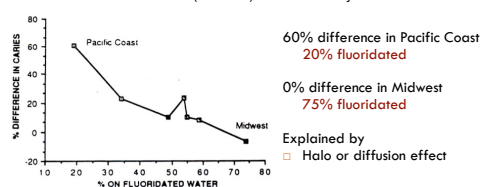
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- Fluoridation is effective
 - subsequent community fluoridation studies
- Brunelle JA, Carlos JP. Recent Trends in Dental Caries in U.S. Children and the Effect of Water Fluoridation. *Journal of Dental Research.* 1990 Feb; 69 (Special Issue); 723-727.
- Other studies include:
 - Hardwick JL, Teasdale J, Bloodworth G. Caries increments over 4 years in children aged 12 at the start of water fluoridation. *Br Dent J.* 1982 Sep 21;153(6):217-22
 - Jones CM, Worthington H. Water fluoridation, poverty and tooth decay in 12-year-old children. *J Dent.* 2000;28:389-393.
 - Singh KA, Spencer AJ, Brennan DS. Effects of water fluoride exposure at crown completion and maturation on caries of permanent first molars. *Caries Res.* 2007;41(1):34-42

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Effectiveness of water fluoridation

Difference in Caries Prevalence by U.S. Region according to % on fluoridated water. (1987-88) Children 5-17 year-olds



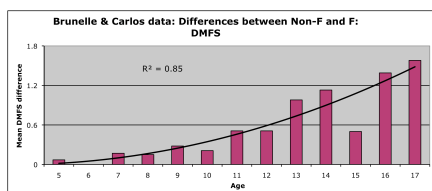
Newbrun E. Current regulations and recommendations concerning water fluoridation, fluoride supplements, and topical fluoride agents. *J Dent Res.* 1992 May;71(5):1255-65 (data from: Brunelle JA, Carlos JP Recent Trends in Dental Caries in U.S. Children and the Effect of Water Fluoridation *Journal of Dental Research.* 1990 Feb; 69 (Special Issue); 723-727.

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CARIES PREVENTION ASSOCIATED WITH WATER FLUORIDATION INCREASES WITH AGE

Further analysis of data from Brunelle JA, Carlos JP. Recent trends in dental caries in U.S. children and the effect of water fluoridation. J Dent Res. 1990 Feb;69 Spec No:723-7; discussion 820-3.

13



This chart shows the differences in mean DMFS (Decayed, Missing due to Caries, and Filled Permanent Tooth Surfaces) with a trendline created from Microsoft Excel.
Note that the difference in means for all children 5-17 years was 0.6 DMFS, but the difference increases with age.
Pollick HF. Scientific evidence continues to support fluoridation of public water supplies.
Int J Occup Environ Health. 2005 Jul-Sep;11(3):322-6.
http://www.ijoh.com/info/IJOEH_1103_Letters.pdf

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14

- **Fluoridation is effective**
 - reversal of caries protection when CWF discontinued

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Consumer Reports

A TWO-PART REPORT ON FLUORIDATION

**THE FACTS:
ANTIGO LEARNED THEM
THE HARD WAY**

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Consumer Reports

In 1960, however, the residents of Antigo, Wis., didn't realize that scare stories being circulated by local opponents of fluoridation were false. Antigo voted to discontinue its 11-year practice of fluoridating the water supply. The decision eventually led to a study by public health officials, who wanted to learn what effects the end of fluoridation would have on the dental health of Antigo youngsters.

During 1960, dental personnel from the Wisconsin Division of Health examined nearly all children in the kindergarten, second, fourth, and sixth grades of Antigo's schools. The examiners recorded the number of decayed, missing, or filled teeth for each child. Four years later, they repeated the examination among children in all of the same grades except the sixth.

The kindergarteners in 1964 had a rate of dental problems 92 percent higher than their counterparts four years earlier. Among second-graders, the decay rate in permanent teeth was up 183 percent. Among fourth-graders, it was up 41 percent. A subsequent examination of sixth-graders showed a 91 percent increase in decay rates. In 1965, Antigo voted to reinstate fluoridation.

16

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Consumer Reports

Editor's note: Soon after these reports were published, John Yiamouyiannis instituted an \$8-million libel suit against Consumers Union, charging that he had been defamed by CU's report. According to people who called us, the existence of the libel action was mentioned by opponents of fluoridation whenever our report was quoted or introduced at local hearings or public debates.

In May 1979, Yiamouyiannis's suit was dismissed by Judge Richard Owen of the U.S. District Court for the Southern District, who said: "...the suggestion is strong that the plaintiff's object in bringing this action is to use this court to discourage the publication of opposing views."

Yiamouyiannis appealed that decision, but in March 1980, the U.S. Court of Appeals for the Second Circuit unanimously upheld Judge Owen's decision, and added: "It is clear that (CU) made a thorough investigation of the facts. The unquestioned methodology of the preparation of the article exemplifies the very highest order of responsible journalism..."

17

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18

- **Fluoridation is effective**
 - in an era of fluoride toothpaste use

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CDC's MMWR Recommendations and Reports (RR-21) November 30, 2001

COMMUNITY Preventive Services
EVIDENCE-BASED RECOMMENDATIONS

Review of Benefits

- Promoting Oral Health: Interventions for Preventing Dental Caries, Oral and Pharyngeal Cancers, and Sports-Related Craniofacial Injuries
- A Report on Recommendations of the Task Force on Community Preventive Services

CDC
November 30, 2001 (Vol. 56, No. 48-49)
Recommendations and Reports

Promoting Oral Health: Interventions for Preventing Dental Caries, Oral and Pharyngeal Cancers, and Sports-Related Craniofacial Injuries
A Report on Recommendations of the Task Force on Community Preventive Services

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Recommendations for Preventing dental caries

COMMUNITY Preventive Services
EVIDENCE-BASED RECOMMENDATIONS

Review of Benefits

- Community water fluoridation
(strongly recommended)
<http://www.thecommunityguide.org/oral/oral-int-fluor.pdf>
- School-based sealant programs
(strongly recommended)
<http://www.thecommunityguide.org/oral/oral-int-seal.pdf>

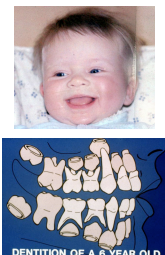
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CDC: Fluoridation protects teeth in two ways

When delivered through the water supply to children during the tooth forming years.

Through direct contact with teeth throughout life.

www.cdc.gov/fluoridation/benefits.htm



DENTITION OF A 6 YEAR OLD

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DENTAL CARIES EXPERIENCE OF PRIMARY TEETH OF GRADES K-3 CHILDREN (mean age 6.9 years) WHO WERE LIFETIME RESIDENTS, ACCORDING TO FLUORIDE STATUS OF THE WATER SUPPLIES AND POVERTY STATUS OF THE FAMILIES.

Data from the California Oral Health Needs Assessment, 1993-94

Poverty Status	mean dft (SE)		mean dfs (SE)		% caries-free	
	optimal F	suboptimal F	optimal F	suboptimal F	optimal F	suboptimal F
Below 200% (N=921)	2.7 (.17)	3.7 (.15) *	5.9 (.47)	8.2 (.45) *	36.0	32.8
Above 200% (N=293)	1.6 (.24)	1.9 (.21)	3.0 (.53)	3.6 (.43)	59.5	53.5

dft: decayed and filled primary teeth
dfs: decayed and filled primary tooth surfaces
SE: Standard Error
Poverty Status: Below 200% and Above 200%: of the Federal Poverty Level (according to family income and size)
N: sample size
optimal F: fluoride concentration of water supply in zip code of child's residence at or above 0.6 ppm or mg/L
suboptimal F: fluoride concentration of water supply in zip code of child's residence below 0.6 ppm or mg/L
* statistically significant difference between fluoride groups

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- Fluoridation is safe
 - 60+ years of experience
 - 16 reviews by scientific committees in past 20 years

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Safety of Water Fluoridation

National Fluoridation Symposium July, 2005

Celebrating 60 Years of Water Fluoridation

Hosted by the American Dental Association
and
U.S. Centers for Disease Control and Prevention

Review of Safety and Benefits

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Safety of Water Fluoridation

25

Definition of Safety

- The state of being certain that adverse effects will not be caused by some agent under defined conditions
- Water is safe to drink if it meets regulatory standards

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Safety of Water Fluoridation U.S. and International Scientific Reviews

26

Scientific Reviews

- National health and medical research council, Australia. 2007
- **National Research Council, U.S.A. (1993, 2006)**
- World Health Organization (1994, 1996, 2006)
- Agency for Toxic Substances and Disease Registry, U.S. Public Health Service (2003)
- International Programme on Chemical Safety, W.H.O. (2002)
- Forum on Fluoridation, Ireland (2002)
- **Medical Research Council, U.K. (2002)**
- University of York, U.K. (2000)
- **Institute of Medicine, U.S.A. (1999)**
- Locker: Health Canada (1999)
- City of Calgary, Calgary Regional Health Authority (1998)
- U.S. Public Health Service (1991)
- Kaminsky et al. New York State Dept. of Health (1990)

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Safety of Water Fluoridation

27

CDC Statement on the 2006 National Research Council (NRC) Report on Fluoride in Drinking Water

• The findings of the NRC report are consistent with CDC's assessment that water is safe and healthy at the levels used for water fluoridation (0.7 - 1.2 mg/L). CDC reviews the latest scientific literature on an ongoing basis and maintains an active national community water fluoridation quality assurance program. CDC promotes research on the topic of fluoride and its effect on the public's health. CDC's recommendation remains the same; that community water fluoridation is safe and effective for preventing tooth decay.

• **Water fluoridation should be continued in communities currently fluoridating and extended to those without fluoridation.**

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28

- **Fluoridation is cost-effective**
 - Low cost investment per person with high cost savings in reduced dental treatment

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Fluoride is cost-effective

29



- The **annual per-person cost** of fluoridation is approximately \$0.50 in communities of $\geq 20,000$ to approximately \$3.00 in communities $\leq 5,000$ (in 1995 dollars) for all but the smallest water systems.
- Even so, 100 million Americans do not have access to fluoridated water.
- Under typical conditions, the **annual per-person cost savings** in fluoridated communities ranged from \$16 in very small communities ($<5,000$) to nearly \$19 for larger communities ($>20,000$).
- The analysis takes into account the costs of installing and maintaining necessary equipment and operating water plants, the expected effectiveness of fluoridation, estimates of expected cavities in non-fluoridated communities, treatment of cavities, and time lost visiting the dentist for treatment.

http://www.cdc.gov/fluoridation/fact_sheets/cost.htm

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Comparing Annual Costs (1999 \$)
per person of different methods of fluoride use

30

Fluoride Mode	Annual cost / person	People benefitting
Water fluoridation (all costs)	\$0.72 (\$0.17 - \$7.62)	All ages, all groups
Fluoride toothpaste	\$6 - \$12	All ages, all groups
Fluoride mouthrinse school-based programs not including personnel/indirect costs	\$1.41	Schoolchildren (>6 years) (High caries risk)
Prescription Dietary Fluoride Supplements	\$37	Ages 6 month to 16 years (Poor compliance)
Professional topical fluoride application	\$66 (twice/year)	High caries risk

Centers for Disease Control and Prevention. Recommendations for using fluoride to prevent and control dental caries in the United States. MMWR Recomm Rep. 2001 Aug 17;50(RR-14):1-42.
Available at http://www.cdc.gov/fluoridation/fact_sheets/caries.htm

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31

- Fluoridation is supported by major health and science organizations
 - World Health Organization, American Medical Association, American Dental Association, American Public Health Association, US Public Health Service, US Surgeons General, American Water Works Association etc.
- CDC: One of the ten great public health achievements of the 20th century

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32

- Additional Resources
 - American Dental Association: Fluoridation Facts
 - www.ada.org/goto/fluoride
 - Centers for Disease Control and Prevention
 - www.cdc.gov/fluoridation/index.htm
 - American Public Health Association
 - 2008 Policy: Community Water Fluoridation in the US

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What is the difference between opponents and supporters of fluoridation?

33

- Anti-fluoridationists:
 - Prevent the unnecessary exposure of living things to fluoride, in the belief that any amount of fluoride is toxic
- Fluoridationists:
 - Reduce tooth decay through the judicious use of fluoride, with the knowledge that there is an optimum amount that is beneficial and safe

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What I expect opponents to say

34

- Exploit current societal concerns
- Scare tactics: communism, fascism
- Scare tactics: diseases and conditions
 - cancer, skeletal fluorosis, IQ
 - (diarrhea to constipation)
- Create doubt over conflicting experts and studies
- Take excerpts from particular studies out of context
- Unjustifiably extrapolate from animal studies
- Unconscionably ignore dose or concentration
- Assert personal rights to avoid fluoride
- Assert harm to the environment
- Be cynical about governmental policies and officials

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What I expect opponents to say

35

- dental health is improving without fluoridation
 - But it is improved more with fluoridation
- deprives individuals of freedom of choice once water is fluoridated
 - But people are deprived of a choice if the water is not fluoridated
- over-regulation by government
 - But regulation is good to protect health
- cynicism about governmental policies and officials
 - But we have some good people in government with good policies
- fluoridation is not effective in reducing dental disease
 - But the great preponderance of evidence indicates fluoridation is effective
- fluoridation is harmful to humans and the ecology
 - But there is a lack of evidence that fluoridated water is anything but healthy

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Conclusions

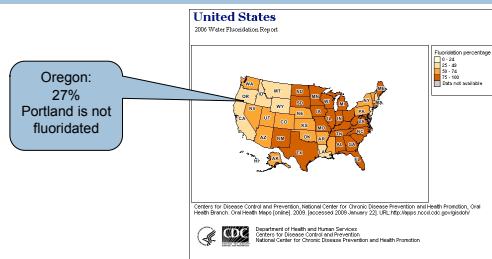
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- Overwhelming evidence to confidently state that
- Community Water fluoridation is
- Effective
- Safe
- Inexpensive

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In 2006, the percentage of the U.S. Population on Public Water Supply Systems receiving Fluoridated Water is 69.2%, but varies from State to State

37



<http://www.cdc.gov/fluoridation/statistics/2006stats.htm>

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National Kidney Foundation Fluoride Intake in Chronic Kidney Disease April 15, 2008

38

- There is insufficient evidence at this time to recommend the use of fluoride-free drinking water for all patients with renal disease.
- There is insufficient evidence to validate the concerns regarding persons with CKD, even at fluoride concentrations of 4 mg/L.
- Dietary advice for patients with CKD should primarily focus on established recommendations for sodium, potassium, calcium, phosphorus, energy/calorie, protein, fat, and carbohydrate intake. Fluoride intake is a secondary concern.
- The major benefit of water and dental products containing fluoride is the prevention of dental caries in people of all ages.
- <http://www.kidney.org/atoz/atozitem.cfm?id=205>

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Safety of Water Fluoridation

39

Infant Formula and Enamel Fluorosis - CDC

Infants

- For decades, parents have been mixing infant formula with optimally fluoridated tap water
- a level determined by the U.S. Public Health Service between 0.7 mg/L fluoride and 1.2 mg/L fluoride and maintained by your water utility to maximize decay prevention and limit fluorosis potential
- no association has been observed between infant formula use and an increased risk for moderate or severe fluorosis.
- http://www.cdc.gov/fluoridation/safety/infant_formula.htm

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