

THE FLUORIDATION OPPOSITION:

- FEAR TACTICS
- PERSONAL OPINION
- THE POWER OF TWISTING SCIENCE

Aka: *Lies, Damned Lies, and Pseudo-Statistics*

August 1, 2014

FLUORIDATION:

WHAT THE SCIENCE SAYS

FEBRUARY 11, 2014
PORT ORANGE, FL
CITY COUNCIL WORKSHOP

Used with permission of Jay Kumar, DDS, MPH
Updated data and additional literature, Johnny Johnson, Jr., DMD, MS

Daniel Patrick Moynihan

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*“Everyone is entitled to his
own opinions.....*



.....but not his own facts”

Why Do Cavities Matter?

- Infection
- Extreme pain
- Difficulty in chewing
- Poor weight gain
- Difficulty concentrating
- Missed school hours
- Predictor of cavities in later life
- Costly treatment



Facial Cellulitis



Dental Caries



Dental Extraction



Dental Caries

Strategies for controlling tooth decay

Why Water Fluoridation?

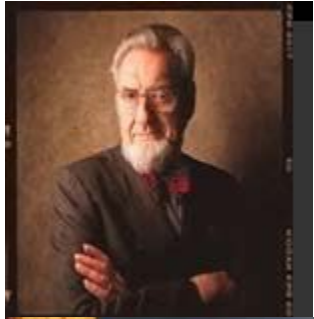
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- ❑ Reduces cavities - for both children and adults by at least 25% in addition to those prevented by fluoridated toothpaste, rinses, varnish
- ❑ Helps Americans keep their teeth longer into adulthood more than ever before
- ❑ Saves millions in treatment costs and eliminates pain and suffering
- ❑ Nearly every large city and more than 210 million Americans benefit
- ❑ CDC: One of 10 great public health achievements of the 20th century



Source: Pew Children's Dental Campaign

A Public Health Achievement



“Fluoridation is the single most important commitment a community can make to the oral health of its children and to future generations.”

Dr. C. Everett Koop

Surgeon General (1982-1989)



“Fluoridation is the single most effective public health measure to prevent tooth decay and improve oral health over a lifetime, for both children and adults.”

David Satcher, MD, PhD

Surgeon General (1998-2002)



“With the development of fluoridated drinking water and dental sealants, Americans are less likely to experience tooth loss and gingivitis by middle age ... Community water fluoridation continues to be a vital, cost-effective method of preventing dental [cavities].”

Dr. Regina Benjamin,

U.S. Surgeon General (2009-current)

The Weight of Science



World Health Organization

MAYO CLINIC



E.A.P.D
EUROPEAN ACADEMY OF PAEDIATRIC DENTISTRY



No widely respected
medical and health
organizations opposes
fluoridation

Is Water Fluoridation Still Necessary?

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J.V. Kumar. *Adv Dent Res* 20:8-12, July, 2008

Community Guide	Changes in caries at the tooth level (deft/DMFT)	
	Effect of starting or continuing CWF	-29.1% (-110.5%, 66.8%)
	Effect of stopping CWF	17.9% (-42.2%, 31.7%)
	Changes in caries at the tooth level (deft/DMFT)	
	Effect of starting or continuing CWF	-50.7% (-68.8%, -22.3%)
	Effect of stopping CWF	59.90%
Additional Systematic Review - Effectiveness in Adults		
Griffin et al (2007)	Preventive Fraction	27.2% (19.4, 34.3)

Reviews – Benefits & Safety

(Expert committees; systematic reviews)

9

- U.S. Guide to Community Preventive Services (2002), Updated in April 2013
- EPA Reports (2012)
- Scientific Committee on Health and Environmental Risks of the European Commission (SCHER 2011)
- Health Canada Report on Fluoride and Human Health (2008)
- National Health and Medical Research Council, Australian Government (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)
- U.S. Surgeon General's Report (2000)
- CDC. Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States (2001)
- University of York, U.K. (2000)
- Institute of Medicine, U.S.A. (1999)
- U.S. Public Health Service (1991)
- New York State Department of Health (1990)

DEBATES ON SCIENCE

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FACTS:

Debates on the science of any topic takes place in *expert panels* that have been set up to critically evaluate the literature

□ Community Preventive Services Taskforce

- Blue Ribbon Panel Established by Congress: Purpose is to scientifically evaluate the literature and provide recommendations
- **THE COMMUNITY GUIDE**

□ National Research Council's *“Scientific Review of EPA Standards on Fluoride in Drinking Water, 2006”*

- 3 ½ years of *debate*
- Recommendations and findings

The Community Guide – What Works

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The Guide to Community Preventive Services
THE COMMUNITY GUIDE
What Works to Promote Health

Community Preventive Services
Task Force



Task Force Releases 2012 Annual Report to Congress

Highlights include activities, evidence gaps, future systematic reviews, and how Task Force recommendations have been used to improve public health.

1 2 3 4

Task Force

2013 Meetings
June 19–20
October 23–24

Annual Reports to Congress

Text Size: [S](#) [M](#) [L](#) [XL](#)

Get Email Updates

Submit your email address to get updates on The Community Guide topics of interest.

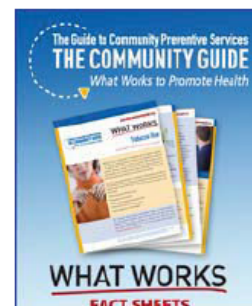
Your email address

[Submit](#) [What's this?](#)

Topics

Adolescent Health	Diabetes	Motor Vehicle Injury	Social Environment
Alcohol - Excessive Consumption	Emergency Preparedness	Nutrition	Tobacco
Asthma	Health Communication	Obesity	Vaccination
Birth Defects	Health Equity	Oral Health	Violence
Cancer	HIV/AIDS, STIs, Pregnancy	Physical Activity	Worksite
Cardiovascular Disease	Mental Health		

[What is The Community Guide?](#)



Community Water Fluoridation

School-Based Dental Sealant Delivery Programs

****Recommended****

Recommended

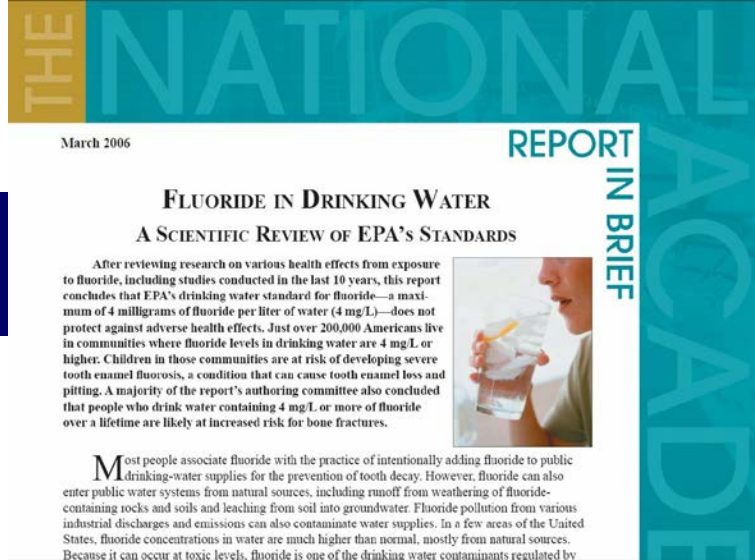
National Research Council

THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

Report issued in March 2006 Focused on naturally occurring high levels of fluoride in drinking water

Reviewed studies:

Effects of Fluoride on Teeth
Musculoskeletal Effects
Reproductive and Developmental Effects
Neurotoxicity and Neurobehavioral Effects
Effects on the Endocrine System
Effects on the Gastrointestinal, Renal, Hepatic, and Immune Systems
Genotoxicity and Carcinogenicity



States with high levels of fluoride naturally occurring:

Colorado 11.2 mg/L
Oklahoma 12.0 mg/L
New Mexico 13.0 mg/L
Idaho 15.9 mg/L
Virginia 6.3 mg/L
Texas 8.8 mg/L
S. Carolina 5.9 mg/L

EPA DRINKING WATER STANDARDS

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- **MCLG:** The maximum contaminant level goal (MCLG) is a health goal set at a concentration which ***no adverse health effects*** are expected to occur and the margins of safety are judged “adequate”.
- MCL: The maximum contaminant goal is the “enforceable” standard that is set as close to the MCLG as possible
- The MCLG and MCL for fluoride is the same, 4mg/L (4ppm)
- **SMCL:** A secondary maximum contaminant level has been for fluoride of ***2mg/L to protect the teeth for aesthetic or cosmetic effects***

National Research Council Report – Fluoride in Drinking Water (2006)

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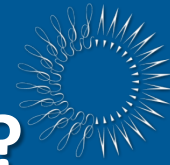
- The Committee considered three toxicity end points for which there were *sufficient relevant* data for assessing the adequacy of the MCLG (4 mg/L) for fluoride to protect public health:
 - ❖ 1. severe enamel fluorosis
 - ❖ 2. skeletal fluorosis, and
 - ❖ 3. bone fractures. (NRC Report, page 346)
 - ❖ NRC Panel *concluded* that the *only effect* from fluoride that naturally occurs in water *below 4mg/L* is dental fluorosis

Statement by John Doull, Chairman, NRC Committee:

“I do not believe there is any valid scientific reason for fearing adverse health conditions from the consumption of water fluoridated at the optimal level.”

(Source: email to Pew Charitable Trusts, March 22, 2013)

Which sets of teeth have mild fluorosis?



THE
PEW
CENTER ON THE STATES



Sample A



Sample B



Sample C



Sample D

Tooth Decay



Tooth Defects –
Cause unknown



Mild Dental Fluorosis



Severe Dental Fluorosis



Claims

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- ▣ Not needed, doesn't work, small effect , there are alternatives
- ▣ Lower IQ in children
- ▣ Increases lead uptake
- ▣ Cancer
- ▣ Down Syndrome
- ▣ Allergies
- ▣ AIDS
- ▣ Alzheimer's disease
- ▣ Reproductive problems
- ▣ Effects on the renal, gastrointestinal, and immune systems

Claim: *Fluoridation causes serious health problems such as cancer*

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- National Cancer Institute, National Research Council (NRC), FDA, California EPA OEHHA Committee
 - ▣ *No convincing evidence of causal link between fluoridation/fluoride and cancer*
- CDC
 - ▣ *“No persuasive evidence” that CWF poses harmful health effects*
- At least 100 million Americans have been drinking fluoridated water for decades without developing health issues.
- In India and China alone – over 200 million people are exposed to very high levels of fluoride where skeletal fluorosis is common *but not osteosarcoma.*

Osteosarcoma

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- Bassin, Elyse, et al, 2006
- “Age specific Exposure in drinking water and osteosarcoma”
- *Our exploratory analysis found an association between fluoride exposure in drinking water during childhood and the incidence of osteosarcoma among males but not consistently among females. Further research is required to confirm or refute this observation”*

- Kim, F.M, et al, 2011
- “An Assessment of Bone Fluoride and Osteosarcoma”
- *“This study did not demonstrate an association between fluoride levels in bone and Osteosarcoma”*

LATEST CANCER STUDY REAFFIRMS NO LINK BETWEEN FLUORIDE IN WATER AND CANCER

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- **“Is fluoride a risk factor for bone cancer? Small area analysis of osteosarcoma and Ewing sarcoma diagnosed among 0-49-year-olds in Great Britain, 1980-2005”, *Int J Epidemiol.*, 2014 Jan 14, Blakely et al**
- The study analysed 2566 osteosarcoma and 1650 Ewing sarcoma cases.
- **CONCLUSIONS:**
“The findings from this study provide no evidence that higher levels of fluoride (whether natural or artificial) in drinking water in GB lead to greater risk of either osteosarcoma or Ewing sarcoma.”

Claim: *Fluoridation chemicals are different from naturally occurring fluoride*

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Pharmacokinetics of ingested fluoride: Lack of effect of chemical compound

G.M. Whitford^{a,*}, F.C. Sampaio^b, C.S. Pinto^c, A.G. Maria^c, V.E.S. Cardoso^d,
M.A.R. Buzalaf^c

Archives of Oral Biology (2008)

Conclusions: Considered together with published reports, the present findings support the conclusion that the major features of fluoride metabolism **are not** affected differently by the chemical compounds commonly used to fluoridate water, **nor** are they affected by whether the fluoride is present naturally or added artificially.

Claim: “no double-blind studies ever done”

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Fact:

- ☐ Population-based studies are used routinely to assess observational findings.
- ☐ No Double-blind studies have ever been done on:
 - Tobacco
 - Alcohol
 - STD's
- ☐ Population-based studies were used
- ☐ Population-based studies are used to evaluate fluoride's safety and effectiveness
- ☐ No Double-blind studies needed to be conducted to connect the dots between tobacco and lung disease/cancer, Alcohol and its health effects, or the damages from STD's

Claim: *“The ADA warns parents not to add fluoridated water to infant formula because of its harmful effects”*

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FACT: ADA recommendations -

- Continue use of liquid or powdered concentrate infant formulas reconstituted with optimally fluoridated drinking water while being cognizant of the potential risk for **mild** enamel fluorosis.

www.ada.org/4052.aspx#reconstitute

- Use ready-to-feed formula or liquid or powdered concentrate formula reconstituted with water that is either fluoride-free or has low concentrations of fluoride when the potential risk for **mild** enamel fluorosis is a concern.

http://ebd.ada.org/contentdocs/ADA_Evidence-based_Infant_Formula_Chairside_Guide.pdf

Claim: *Fluoridation causes a decrease in IQ*

24

FACT: **Low quality** studies of IQ effect from high fluoride communities in China

“In our appraisals we found that the study design and methods used by many of the researchers had serious limitations. The lack of a thorough consideration of confounding as a source of bias means that, from these studies alone, it is uncertain how far fluoride is responsible for any impairment in intellectual development seen.”

Bazian. “Independent critical appraisal of selected studies reporting an association between fluoride in drinking water and IQ. A report for South Central Strategic Health Authority. February 2009.”

IQ and Harvard's review

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“Harvard University scientists say that Wichita voters shouldn’t depend on a research study they compiled to decide whether to put fluoride in the city’s drinking water to fight tooth decay.

While the studies the Harvard team reviewed did indicate that very high levels of fluoride could be linked to lower IQs among schoolchildren, the data is not particularly applicable here because it came from foreign sources where fluoride levels are multiple times higher than they are in American tap water.”

Wichita Eagle: Anna Choi and Philippe Grandjean in email to Wichita Eagle

Read more here: <http://www.kansas.com/2012/09/11/2485561/harvard-scientists-data-on-fluoride.html#storylink=cpy>

Appetitive-based learning in rats: Lack of effect of chronic exposure to fluoride

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ARTICLE INFO

Article history:

Received 6 June 2008

Received in revised form 11 February 2009

Accepted 11 February 2009

Available online xxx

Keywords:

Fluoride

Learning

Brain

ABSTRACT

Background: Chronic ingestion of optimally fluoridated water (ca. 1.0 mg/L) has not been associated with any adverse health effects. Possible effects on the nervous system, however, have received little attention. One study with rats given high doses of fluoride reported subtle behavioral changes. The authors suggested that the ability of humans to learn might be reduced and recommended further study with humans and rats. The present study was done to provide data with which to assess this suggestion.

Methods: Weanling, female rats ($n = 32$) were provided with water containing graded doses of fluoride (0, 2.9, 5.7, 11.5 mg/kg body weight/day) for eight months. While under restricted food access they were tested for their ability to learn an operant response for food and to adjust their responding under schedules of reinforcement requiring high rates of responding (5 days) and then low rates of responding (10 days). Bone, plasma and seven regions of brain were analyzed for fluoride.

Results: There were no significant differences among the groups in learning or performance of the operant tasks. Tissue fluoride concentrations were directly related to the levels of exposure. In the 11.5 mg/kg/day group the bone, plasma and brain concentrations were 99, 305 and 221 times higher, respectively, than those in the control group. The average brain-to-plasma fluoride concentration ratios in each of the seven brain sections fell within a narrow range and did not exceed 0.40. There was no consistent evidence for the preferential uptake of fluoride by any given brain section.

Conclusion: Chronic ingestion of fluoride at levels up to 230 times more than that experienced by humans whose main source of fluoride is fluoridated water had no significant effect on appetitive-based learning.

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J. Neurotoxicology and Teratology. 2009.

Conclusion: Chronic ingestion of fluoride at levels up to 230 times more than that experienced by humans whose main source of fluoride is fluoridated water **had no significant effect** on appetitive-based learning.

Claim: *"Fluoridated water contains 250 x more fluoride than mother's milk."*

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FACTS:

- *There are no known adverse health effects for infants.* Milder form of dental fluorosis is the only risk.
- *Vitamin D* is added to milk because mother's milk *lacks* sufficient amounts. The National Academy of Sciences and the American Academy of Pediatrics recommends vitamin D per day beginning during the first 2 months of life.

http://www.nyhealth.gov/prevention/dental/fluoride_guidance_during_infancy.htm

New Guidelines for Vitamin D Intake, Pediatrics Vol. 111 No 4 April 2003.

Claim: *“We should discontinue fluoridation because 40% of children in the US have dental fluorosis.”*

The association between enamel fluorosis and dental caries in U.S. schoolchildren

Hiroko Iida, DDS, MPH; Jayanth V. Kumar, DDS, MPH



Conclusion. This study's findings suggest that molars with fluorosis are more resistant to caries than are molars without fluorosis.

Clinical Implications. The results highlight the need for those considering policies regarding reduction in fluoride exposure to take into consideration the caries-preventive benefits associated with milder forms of enamel fluorosis.

JADA 2009;140(7):855-862.

Claim: *Most countries in Western Europe don't fluoridate, so why do we?*

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- The U.K., Spain, and Ireland have fluoridated water
- In some parts of western Europe, large number of water systems make CWF logistically challenging, so they practice salt fluoridation instead
- 405 million people in 60 countries drink fluoridated water

Claim: *“The National Kidney Foundation withdrew its support of water fluoridation”*

30

FACT: *"The NKF has **no position** on fluoridation of water. "*

- 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.
- There is *no consistent evidence* that the retention of fluoride in people with these stages of CKD (stages 4 & 5) who consume optimally fluoridated drinking water results in *any negative health consequences*.

Claim: “*Fluoride works primarily topically, not systemically*”

31

FACT: Studies show fluoride works via both topical and systemic effects. There is a pre-eruptive caries preventive effect and continuous exposure to small amounts of fluoride is the best for remineralization of tooth enamel (benefits both adults and children).

*“The findings indicated that **pre-eruption** exposure was required for a caries-preventive effect and that **exposure after eruption alone** did not lower caries levels significantly. However, the maximum caries-preventive effects of fluoridated water were achieved by high pre- and posteruption exposure.”*

Singh KA, Spencer AJ, Armfield JM. Relative Effects of Pre- and Posteruption Water Fluoride on Caries Experience of Permanent First Molars. J Public Health Dent. 2003;63(1):11 – 19.

Claim: *Fluoride is an additive, equivalent to forcing people to take medicine*

32

Fact:

- Fluoridation: the adjustment of *natural* (background) water fluoride levels to bring to optimum. The City of Port Orange's *natural* level is 0.19ppm. It needs to be adjusted upwards to 0.7ppm for maximum benefit in reducing cavities.
- Fortification is a common practice - Folic acid, Vitamin D, Iodine etc.
- U.S. courts have rejected the idea that fluoride is a medication and should not be allowed in water supply.

Claim: *Cannot manage fluoride intake*

33

- There is no need to control water intake. Fluoride from *dental products, primarily **swallowed** toothpaste by young children,* needs to be used appropriately as they are a *major contributor* to fluorosis, even in areas *without* fluoridation.
- There is a history of nearly 70 years of safety record of fluoridation in the United States.
- **NRC Report** showed that Severe fluorosis *near zero* below 2mg/L (2ppm)
- **EPA's analysis** provides that the HHS Recommended level of 0.7 mg/L of F⁻ *does* protect against *any* potential adverse health effects.

Claim: *“FSA is not acceptable because it adds dangerous impurities like arsenic and lead to water supply.”*

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FACT:

- To ensure the public's safety, all additives used at a water treatment facility must meet *strict quality standards*.
- American Water Works Association (**AWWA**) and the **NSF/ANSI** (National Sanitation Foundation/American National Standards Institute) measure levels of impurities.
- The average concentration of arsenic and lead from all samples of water fluoridated with FSA, tested by NSF International from 2000 to 2006 was *less than 0.1 ppb* (parts per billion). Allowable level is 10ppb

Claim: *There are better ways to deliver fluoride*

35

- The *National Preventive Dentistry Demonstration Program* found community water fluoridation (CWF) to be the most effective in terms of cost and outcomes
- *Strong* support from economic analysis
- *CWF benefits all, regardless* of SES, dental insurance coverage and access to dental care
- Even with fluoridated toothpaste, areas with CWF show lower rates of tooth decay

Claim: *“Communities are putting an end to fluoridation..”*

36

FACTS:

- ❑ In 2012, 74.6% of the U.S. population on community water systems, or about 210.7 million people, had access to fluoridated water.¹
- ❑ In Florida, over 13.3 million (78%) people receive optimally fluoridated water.²
- ❑ The percent of the U.S. population on community water systems increased from 69.2% in 2006 to 74.6% in 2012.^{1,2}

Data Sources:

1. <http://www.cdc.gov/fluoridation/statistics/2012stats.htm>

2. http://www.cdc.gov/fluoridation/statistics/reference_stats.htm

CLAIM: “PROPONENTS MANIPULATE DATA TO OVEREXAGGERATE BENEFITS”

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- Presentation given by Paul Connett, Director of FAN (Fluoride Action Network), Brooksville, FL, City Council *Workshop on Fluoridation*, August 27, 2013
- Connett presented what he claimed were grossly overstated claims of benefits of fluoridation to “sell” community water fluoridation in Australia
- Connett typically cherry picked their data to ***purposefully*** mislead the Brooksville City Council on fluoridation

What is the Alternative?

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- Evidence of benefits and risks
- Effectiveness and cost effectiveness
- Return on investment
- Reach and impact

Summary

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- Water fluoridation
 - ▣ benefits all members of the community, regardless of age, race, SES, access to dental care
 - ▣ offers a great return on its investment: For every \$1 invested in fluoridation, \$38 in dental treatment costs/person/year is avoided
 - ▣ is recommended by the Task Force on Community Preventive Services and all major health organizations; CDC, AAP, ADA, AMA.....
- “Fluoridation is the single most important commitment a community can make to the oral health of its children and to future generations.”
 - Surgeon General C. Everett Koop



Department of Health and Human Services

Centers for Disease Control and Prevention

Community Water Fluoridation

Normal



Questionable



Very mild



Mild



Moderate



Severe



Accurate Photos of Enamel Fluorosis

Community Water Fluoridation

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THANK YOU!!

*KEEP FIGHTING THE GOOD
FIGHT!!!!*





How did they get the 65% less decay ?

Table 4: Caries experience (decayed, missing or filled surfaces) in the permanent dentition

Age (years)	n	Townsville		n	Brisbane		Difference		Prevalence	
		DMFS ^a	SD ^b		DMFS ^a	SD ^b	%	Absolute	Townsville	Brisbane
6	300	0.04	0.23	472	0.10	0.54	60	0.06	4	4
7	240	0.09	0.37	440	0.26	0.83	65	0.17	6	13
8	262	0.25	0.68	375	0.52	1.09	52	0.27	15	26
9	226	0.41	0.93	403	0.51	1.05	20	0.10	24	26
10	205	0.57	1.10	387	1.13	1.96	50	0.56	29	42
11	188	0.65	1.26	370	1.45	2.25	55	0.80	31	48
12	69	0.94	1.63	205	1.80	2.79	48	0.86	36	54

Note: (a) DMFS = number of decayed, missing or filled surfaces per child. (b) SD = standard deviation




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Note: (a) DMFS = number of decayed, missing or filled surfaces per child. (b) SD = standard deviation

Percentage Difference at age 12, when these permanent 6 year old molars have been in the mouth for ~6 years is **48%** (NO X-RAYS are taken in observational studies; only mirror and explorer)

Table 4: Caries experience (decayed, missing or filled surfaces) in the permanent dentition

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Source: Paul Connett presentation Brooksville, FL City Council Workshop, August 27, 2012