

Research and Clinical Excellence Day
University of Pacific,
Arthur A. Dugoni School of Dentistry
May 20th, 2009

RESEARCH AND PUBLIC POLICY: DENTAL CARIES AND FLUORIDATION

Howard Pollick, BDS, MPH
Health Sciences Clinical Professor
Preventive & Restorative Dental Sciences
School of Dentistry
University of California San Francisco

October 6, 2009

UCSF Dental Public Health Seminar: PART 1

Dental Caries:

what happens when the rot sets in?

2

- Primary teeth
- Pit & Fissure
- Smooth Surface
- - Root surface
- **Pain**
- **Infection**
- **Abscess**
- **Restoration**
- **Root Canal**
- **Extraction**
- **Replacement**



California

What are our children's dental needs?

3

Research

Assessment of Needs

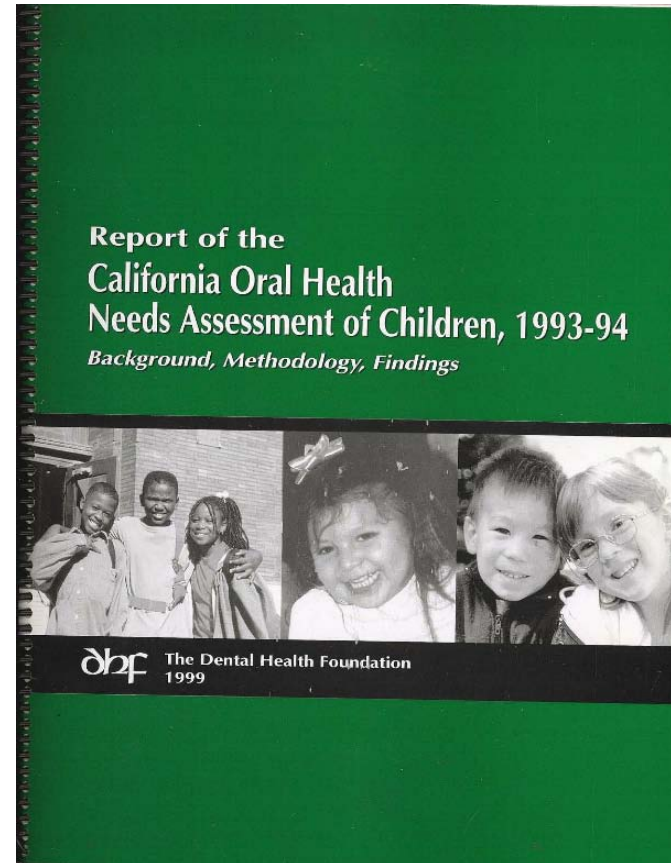
- Urban
 - Non-fluoridated
 - Fluoridated
- Rural
 - Non-fluoridated



California Oral Health Needs Assessment of Children, 1993-94

4

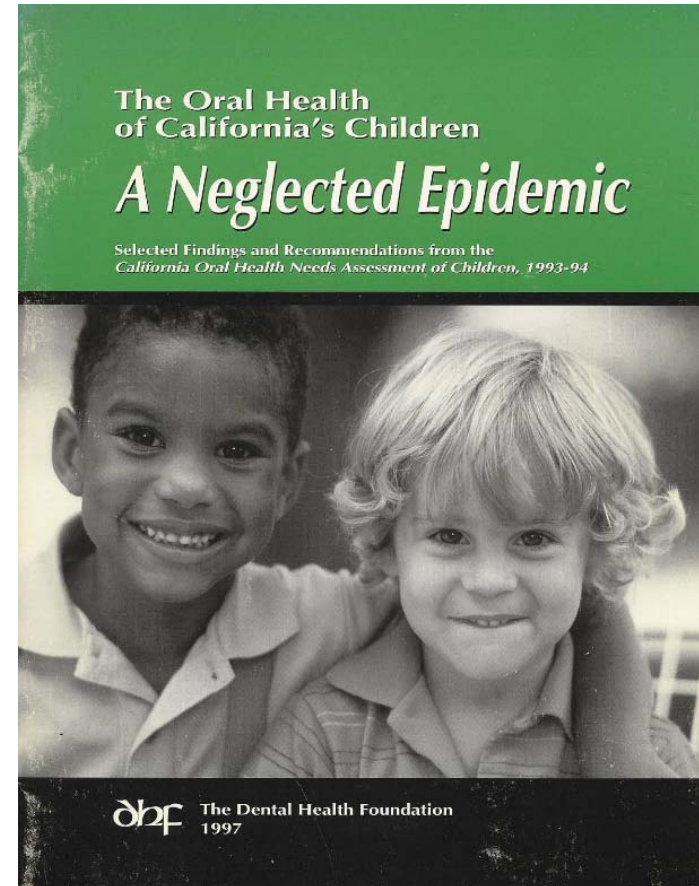
- 1993-94
- First Statewide data
- Pollick HF, Isman R, Fine JI, Wellman J, Kipnis P, Ellison J.
- Report of the California Oral Health Needs Assessment of Children, 1993-94: Background, Methodology, Findings.
- The Dental Health Foundation, Oakland, California. 1999



California Oral Health Needs Assessment of Children, 1993-94

5

- Preschools
 - Head Start
 - Non Head Start
- Elementary Schools
 - Grades K-3
- High Schools
 - Regular
 - Continuation



Caries Status in California: RESULTS

Preschools

6

- Of all preschool children,
- 31% have had some treated and/or untreated tooth decay
 - ▣ 1+ dmft
 - ▣ decayed,
 - ▣ missing
 - (due to extraction because of caries), and
 - ▣ filled primary teeth



Caries Status in California: RESULTS

Preschools

7

- Conversely,
- 69% of preschool children have no evidence of having had tooth decay
 - zero dmft

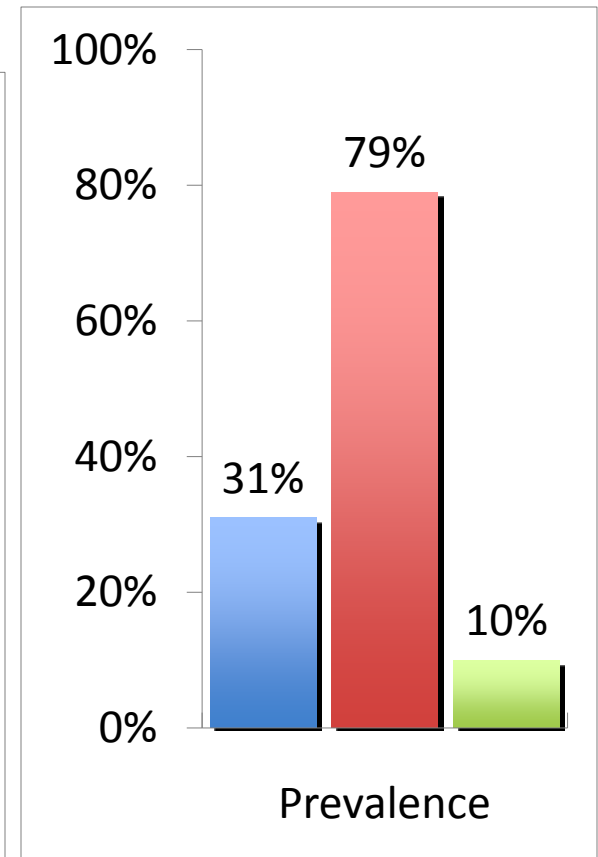
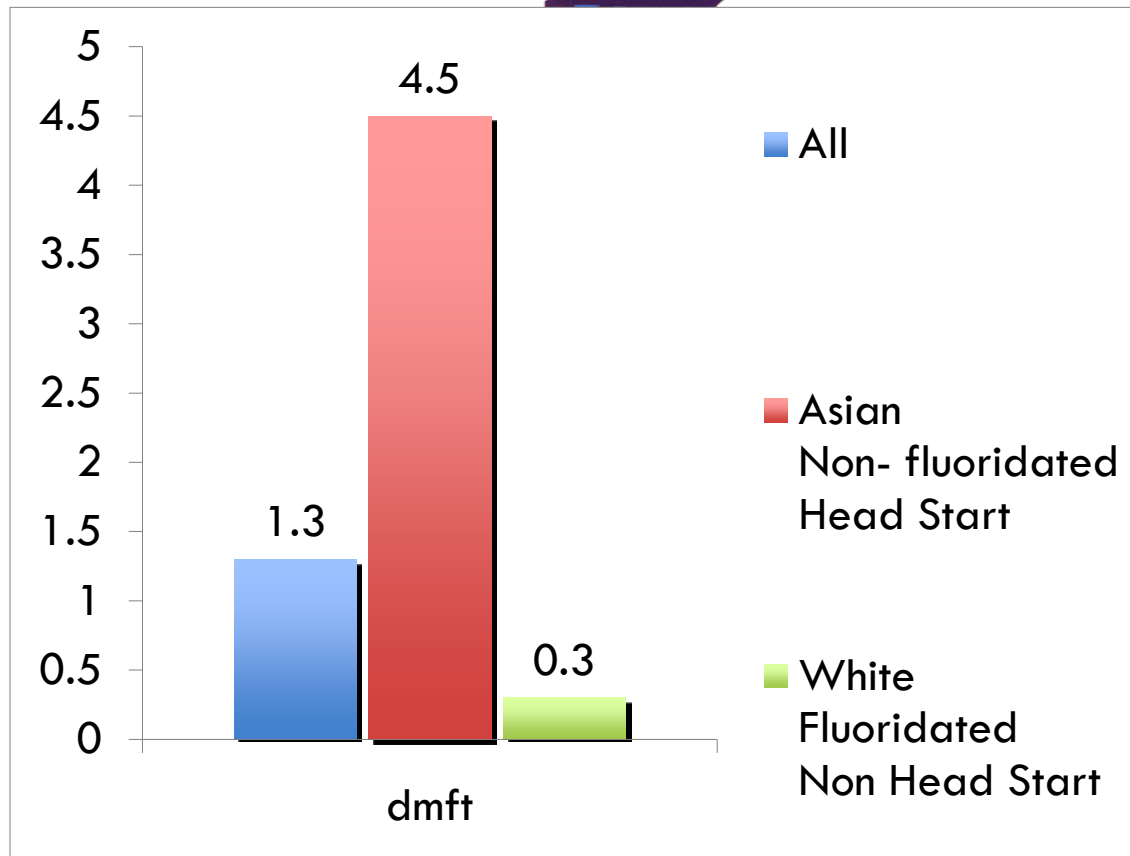
- Clinical Excellence!!!



Caries Status in California: RESULTS

Preschools: Disparities: Ethnicity, Region, Type of preschool

8



California Oral Health Needs Assessment of Children, 1993-94

METHODS: What did we look for?

9

Condition of Tooth and Condition of Surfaces

- 0 Sound
- s Incipient pit/fissure caries (would need a sealant)
- 1 Pit/fissure caries
- 2 Smooth surface caries
- 3 Metal intracoronal restoration
(amalgam or other metal)
- 4 Tooth colored intracoronal restoration
(composite or other)
- 5 Sealant present
(partial or complete pit/fissure sealant)
- 6 Crown (placed due to caries; any material)
- 7 Esthetic restoration (veneer, bonding, crown for esthetics or fracture)
- 8 Traumatized tooth (missing due to trauma, fractured due to trauma,
discolored due to trauma)
- 9 Missing/Extracted due to caries



Chewing surface
before sealant



Tooth protected by
shaded sealant

Caries Status in California: RESULTS

Elementary Schools: 6-8 year-olds

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Comparing California and US prevalence data
with *Healthy People Objectives*

<u>Decayed and filled teeth</u> <u>(1+ dft / DMFT)</u>	California 1993-94	<u>U.S.</u> <u>86-87/88-94</u>	<u>2000/2010</u> <u>Objective</u>
All 6-8-year-old children	73%	53%/52%	35%/42%
Children aged 6-8 years whose parents have less than a high school education	86%	70%/65%	45%/-
Black 6-8-year-old children	70%	61%/50%	40%/-
Latino / Hispanic 6-8-year-old children	84%	- /68%	-/-
Asian 6-8-year-old children	90%	-/-	-/-

- Not included in Healthy People 2000/2010 Objectives

Caries Status in California: RESULTS

High Schools

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Distribution (%) of Students with 0, 1-4, 5-8, 9+
Decayed, Missing, or Filled permanent tooth surfaces (DMFS)*

	<u>0 DMFS</u>	<u>1-4 DMFS</u>	<u>5-8 DMFS</u>	<u>9+ DMFS</u>
Regular High Schools	23.8	30.0	19.9	26.3
Continuation High	12.5	29.6	13.4	44.5
All High Schools	23.4	30.0	19.7	26.9

*range for DMFS: 0-128

Caries Status in California: RESULTS

High Schools

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Mean number (and standard error of the mean) of
Decayed, Missing, or Filled permanent tooth surfaces (DMFS)
and percentage of DMFS by components D, M, F

	<u>mean DMFS</u>	<u>SEM</u>	<u>%D/DMFS</u>	<u>%M/ DMFS</u>	<u>%F/ DMFS</u>
Regular High Schools	6.14	0.85	40.8	5.3	53.9
Continuation High	8.30	0.76	33.7	3.0	63.3
All High Schools	6.21	0.83	40.5	5.2	54.3

California Oral Health Needs Assessment of Children, 1993-94

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Urgency

- 1 No treatment needs
- 2 Non-urgent needs
- 3 Urgent needs



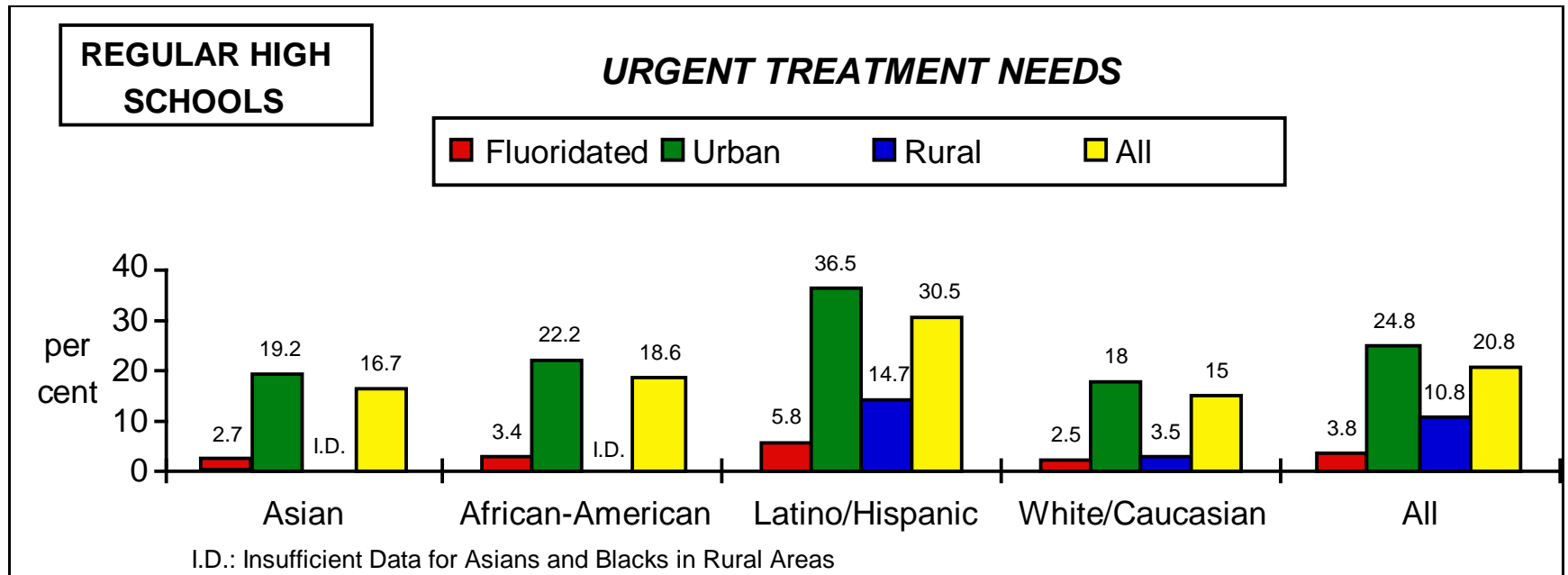
Remember: When in doubt, assign the less disease/need category

California Oral Health Needs Assessment of Children, 1993-94

High School Students

14

far fewer urgent treatment needs in fluoridated areas

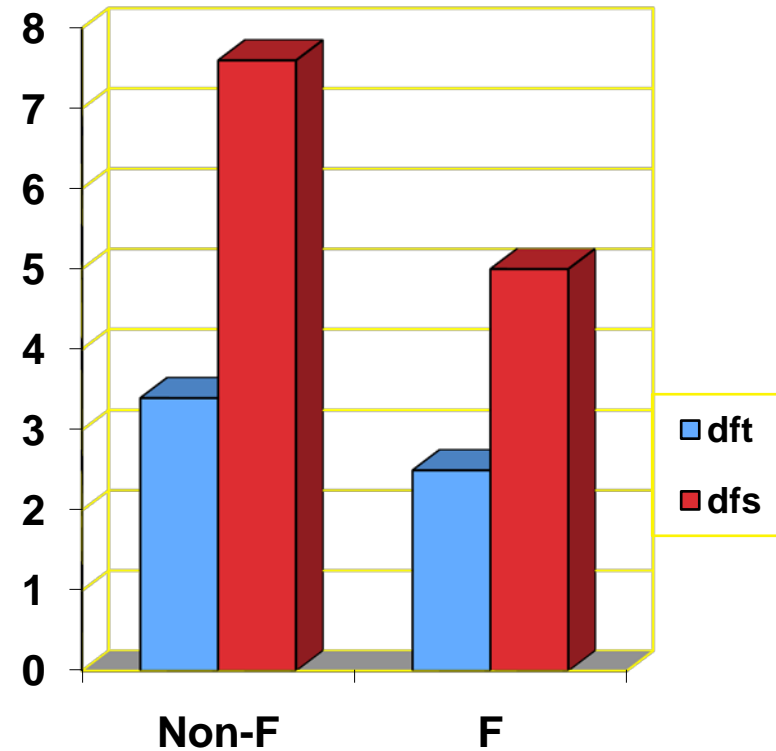


California Oral Health Needs Assessment of Children, 1993-94

Less tooth decay in fluoridated areas

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- Grades K-3: Lifetime residents
- Data weighted to represent California
- decayed and filled primary teeth/surfaces
 - dft / dfs
- **F** – Fluoridated (≥ 0.6 ppm F in water; zip code)
 - (N=571; mean age 6.9 years)
- **Non-F** - Non-Fluoridated (< 0.6 ppm F in water)
 - (N=901; mean age 7.0 years)



California Oral Health Needs Assessment of Children, 1993-94

Grades K-3: Sample Characteristic Differences

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	<u>Fluoridated</u>	<u>Non-Fluoridated</u>
<u>Single Parent</u>	38% (201)	30% (256)
<u>Asian</u>	23% (134)	17% (156)
<u>Black</u>	22% (125)	11% (102)
<u>Latino</u>	33% (189)	31% (282)
<u>White</u>	10% (57)	32% (289)
<u>Other</u>	12% (66)	8% (72)
<u>Fluoride supplement</u>	7% (39)	16% (135)
<u>Fluoride toothpaste</u>	84% (472)	90% (789)

California Oral Health Needs Assessment of Children, 1993-94

Grades K-3: Decayed and Filled Primary Teeth: Factors Associated with Caries Experience

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LESS CARIES

- FLUORIDATED COMMUNITY
or
- FLUORIDE SUPPLEMENTS

- EDUCATED PARENT
 - HIGH SCHOOL GRADUATE
 - COLLEGE GRADUATE

MORE CARIES

- Ethnicity
 - ASIAN
 - HISPANIC

- Economic Status
 - DENTI-CAL
 - POOR FAMILY

California Oral Health Needs Assessment of Children, 1993-94

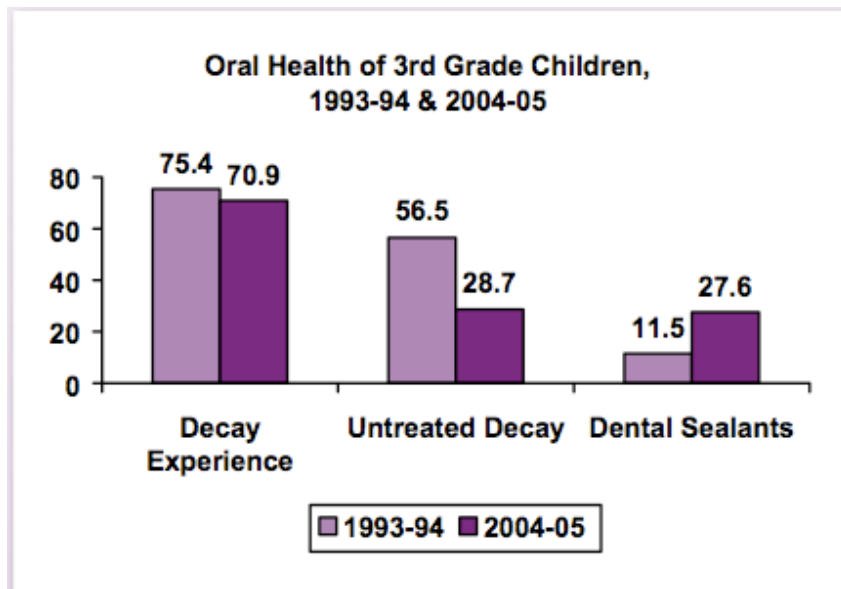
Acknowledgments

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- Maternal & Child Health Branch, California DHS
- California Wellness Foundation
- The Dental Health Foundation
- Original Team:
 - ▣ R. Isman, J. Fine, J. Wellman-Benson, J. Ellison, P. Kipnis
 - ▣ Advisory Committee
- 25 Dentist Examiners
- 9 Regional Coordinators and 31 Recorders
- 6792 children and their families

Caries and Sealant Status in California: 2004-5 Survey vs 1993-4 Survey

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- 3rd grade
- 4.5% reduction in decay experience
- 49% reduction in untreated decay
- 140% increase in dental sealants

http://www.dentalhealthfoundation.org/index.php?option=com_content&task=view&id=43&Itemid=60

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UCSF Dental Public Health Seminar: PART 2

2

Public Policy: Fluoridation

What can be done?

With all these dental treatment needs?

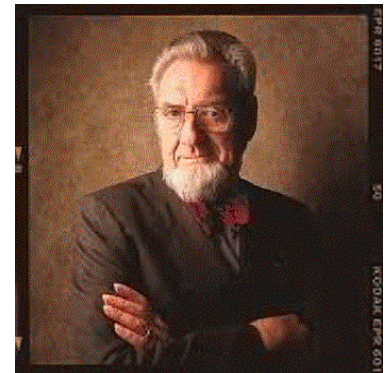
Who Says Fluoridation Works?

3

"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
United States Surgeon General
1981-1989



California Fluoridation Task Force

Formed in 1994

4

This Issue

- Escondido reverses ban on fluoride
- San Francisco expands fluoridation program
- CDC voices support for fluoride

California NOW

A newsletter of the California Fluoridation Task Force

Winter 2001-2002

Escondido City Council reverses ban on fluoride

City officials accept grant from State Work Group

The City Council of Escondido recently passed a measure to begin citywide water fluoridation, overturning a controversial ordinance passed by the city's previous council.

At its June 6 meeting, the council voted to accept a grant from the Fluoridation 2010 Work Group to cover capital costs associated with fluoridating Escondido's drinking water.

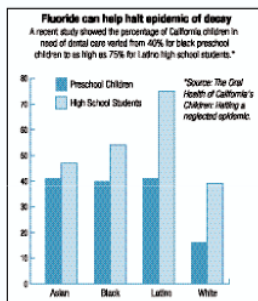


"Community water fluoridation is safe, effective and will benefit our children," said Councilwoman June Rady, who joined the 3-2 majority on the council to overturn the old ordinance against fluoridation. "I think it is the responsible thing to do. You cannot dispute the evidence in support of community water fluoridation."

Escondido residents and professionals attended the three-hour fluoridation discussion, during which council members addressed the unmet dental needs of the indigent and local community choice.

Councilwoman Rady noted that the scientific evidence overwhelmingly supports the position that water fluoridation is a safe, effective measure for preventing dental decay.

In response to a question from the council regarding fluoride safety, California Department of Health Services fluoridation consultant David Nelson, DDS, MPH, presented certification showing that the three fluoridation additives are safe in drinking water. Dr. Nelson also presented a letter from the California



Poison Control System - San Diego division director, stating: "Chronic (regular) ingestion of fluoride in the quantities found in fluoridated water plus typical food and beverage sources and toothpaste are not associated with adverse health effects. There is strong and convincing evidence that fluoridation decreases the incidence of dental caries (cavities) in children. Equally convincing are the numerous studies that have shown that fluoridation of drinking water is safe."

(continued on back)


Mountain View begins fluoridating water supply

71,000 residents now receive benefits of fluoridation

Two years after a successful citywide vote to add fluoride to its water supply, Silicon Valley's town of Mountain View can boast the flow of fluoridated water through its taps.

Mountain View's 71,000 residents voted overwhelmingly in favor of fluoridation in the November 1998 election.

"Fortunately, the residents of Mountain View pushed aside decades of political timidity and inertia

to develop a four-way funding partnership in the interest of the community. The dental health of Mountain View residents can only be enhanced by this successful effort," said Assemblyman Joe Simitian (D - Palo Alto), who helped champion the fluoridation effort. 



THE DENTAL HEALTH FOUNDATION

4340 REDWOOD HWY, #319
SAN RAFAEL, CA 94903
(415) 459-4648

February 10, 1994

Howard Pollick, B.D.S., M.P.H.
1801 Grant St.
Berkeley, CA 94703

Dear Dr. Pollick:

You are invited to become a member of the California Fluoridation Task Force (CFTF). This task force is being established to help extend the benefits of community water fluoridation to more California communities by strengthening its base of community and political support. By becoming a member of the Task Force, you will significantly strengthen the impact of this message to legislators, policy makers, and the public. A formalized alliance will maximize the opportunity to assure that the benefits of water fluoridation are available to all Californians.

Why is such a task force needed? California lags far behind most communities in the United States that are receiving the benefits of fluoridated water supplies. Of the 153 cities over 50,000 population in the U.S. that remain unfluoridated, 93 (61 percent) are in California. Only 17 percent of California's communities are served by fluoridated water supplies. A recent national survey of dental caries in U.S. school children indicated that 84 percent of our children have experienced dental caries by age 17.

To address this problem the California Dental Association, California Department of Health Services' Dental Health Section, the Oral Health Section of the California Public Health Association - North and the Southern California Public Health Association, and The Dental Health Foundation, a nonprofit foundation dedicated to improving the oral health of Californians, are collaborating to develop a strategic plan for water fluoridation and a plan of action to support and provide technical assistance to communities with an interest in fluoridating their water systems. One of the priorities of this plan is to form a task force to assist in the achievement of this goal.

"Promoting Dental Health through Community Education"

Fluoridation in California: Before 1995 till now

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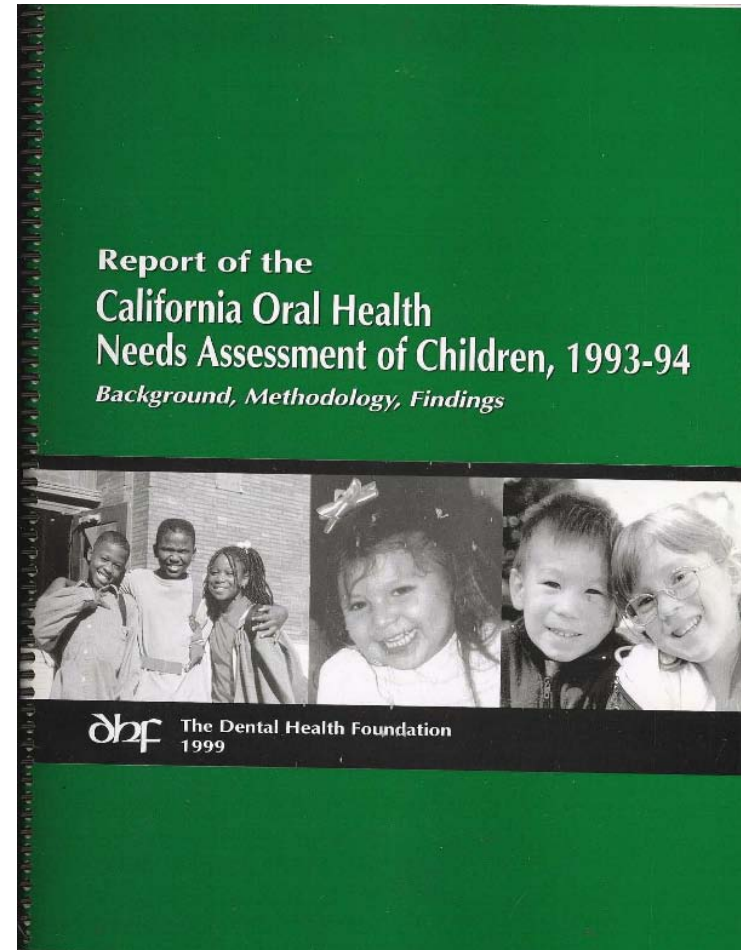
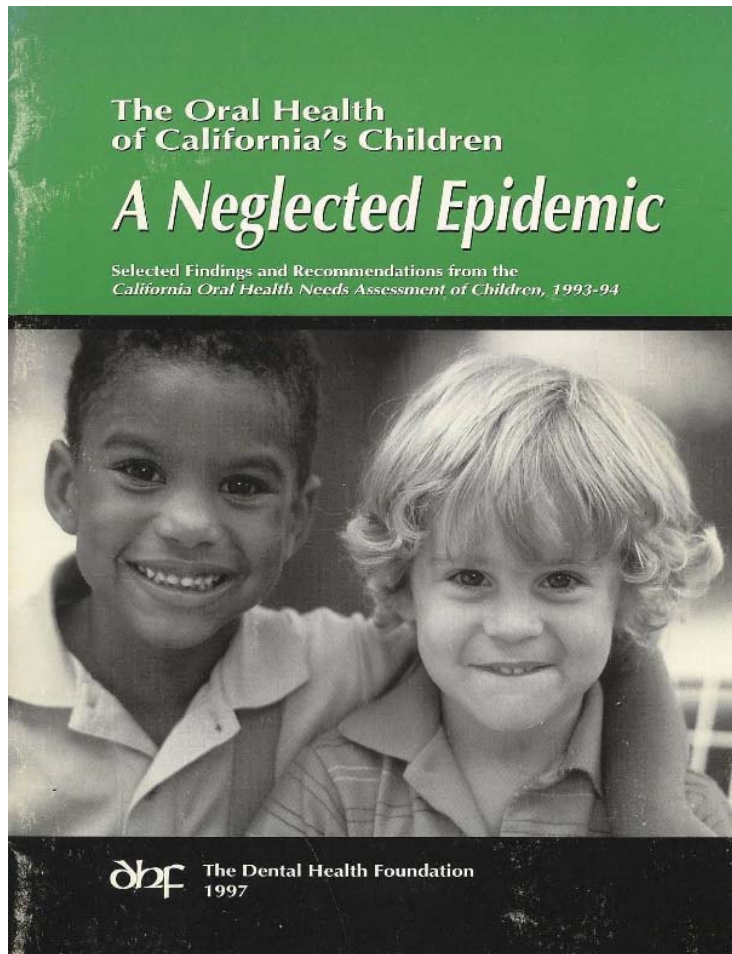


In 1995, then in the California State Assembly, Jackie Speier authored AB 733, the Fluoridation Act, which mandated the fluoridation of water systems with 10,000 service connections or more when funding was available.

- Prior to the implementation of AB 733, California was ranked 48th in the nation in the percent of residents receiving community water fluoridation (15.7% of population on public water supplies in 1992).
- Subsequent to the Fluoridation Act, the California Endowment allocated \$15 million to the Fluoridation Work Group to develop community support for fluoridation and allocate capital funds to selected communities.
- The Work Group members included: The California Dental Association, The California Department of Health Services, The Dental Health Foundation and the California Fluoridation Task Force.
- As a result of this project, the cities of Sacramento, Los Angeles, Santa Maria, Escondido, Mountain View and other communities now fluoridate their water supplies. The Metropolitan Water District has also fluoridated its water supplied to most of Southern California. San Diego is expected to start in 2010.
- San Jose remains the largest city in California and the nation without the benefit of community water fluoridation.

How did the California fluoridation law come about? Statewide Data – played a part, but reports came out later

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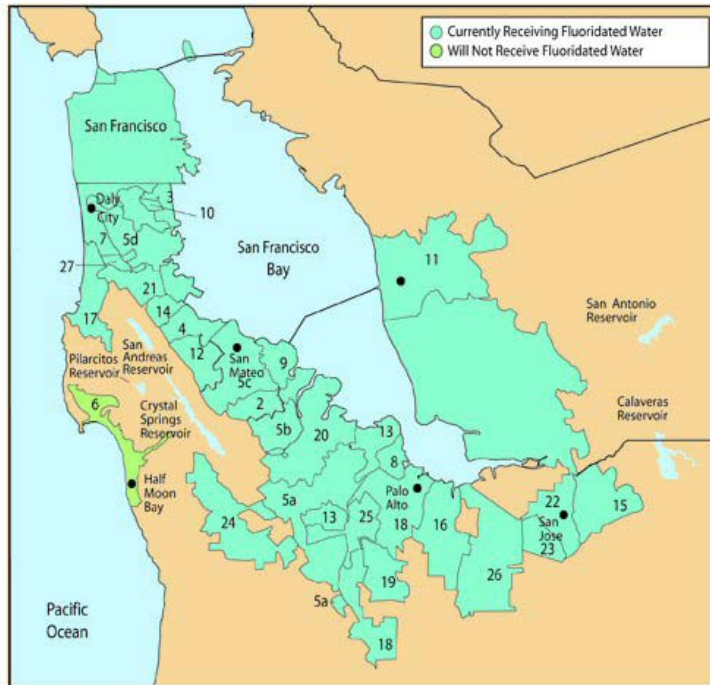


San Francisco PUC voted for the expansion of fluoridation - 2001

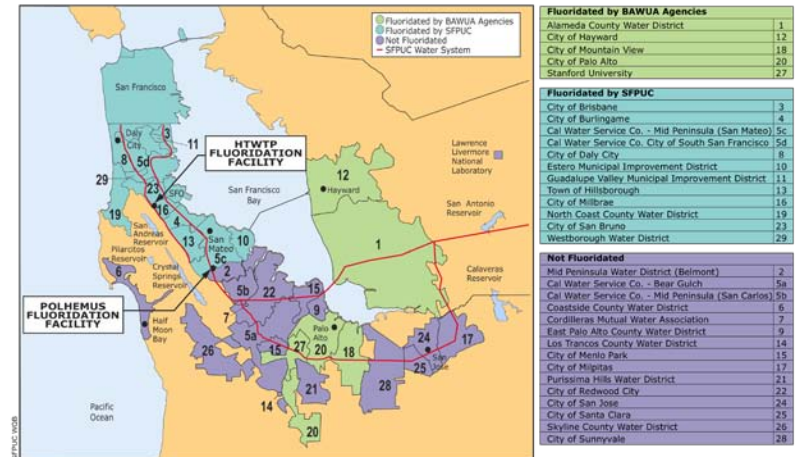
Since 2005

Before 2005

FLUORIDATION STATUS OF BAWSCA MEMBER AGENCIES



Fluoridation Status of SFPUC Water Currently Supplied to BAWUA Member Agencies (January 2002)



Palo Alto – 2003 referendum to stop fluoridation

Door Hangers, Lawn Sign and Button

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MEASURE B IS A NO-WIN SITUATION!

Measure B would remove the fluoride in our community water—a bad idea considering fluoride is a proven, safe, and effective way to maintain dental health.

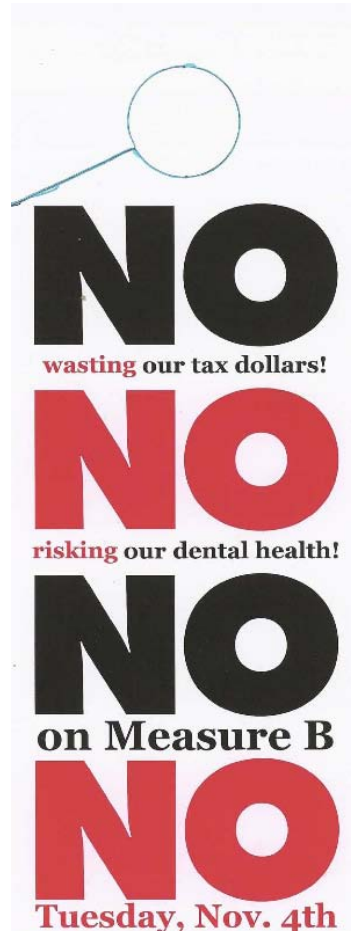
Measure B would cost our taxpayers a significant amount of money in expensive de-fluoridation equipment that our city would be forced to provide.

Vote NO on Measure B Nov. 4th and ensure that the fluoride that is so beneficial to us stays in Palo Alto's drinking water. Young or old, we all need the protection fluoride provides when we drink, brush, and rinse with fluoridated water every day.

Join the many health care professionals, elected officials and civic leaders in voting

NO on Measure B Nov. 4th

Paid for by Healthcare Community for No on Measure B, sponsored by



Palo Alto Keeps Fluoridation

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Is this the biggest win for a fluoridation referendum?

Santa Clara County, CA

November 4, 2003 Election

Measure B
Fluoridation
City of Palo Alto
Majority Approval Required

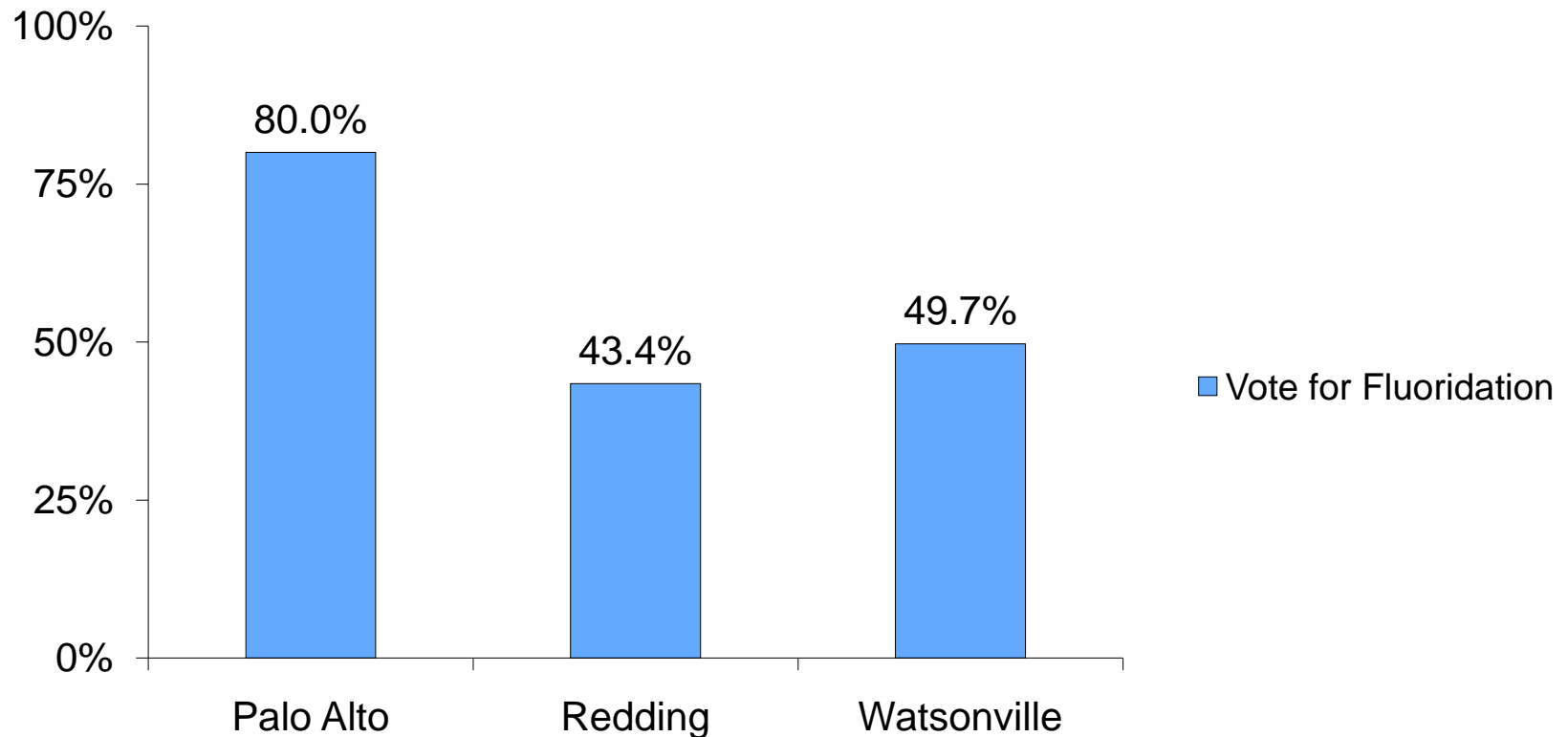
3,165 / **20.37%** **Yes** votes 12,372 / **79.63%** **No** votes





We don't always win: Comparison between Cities: 2000 Census data

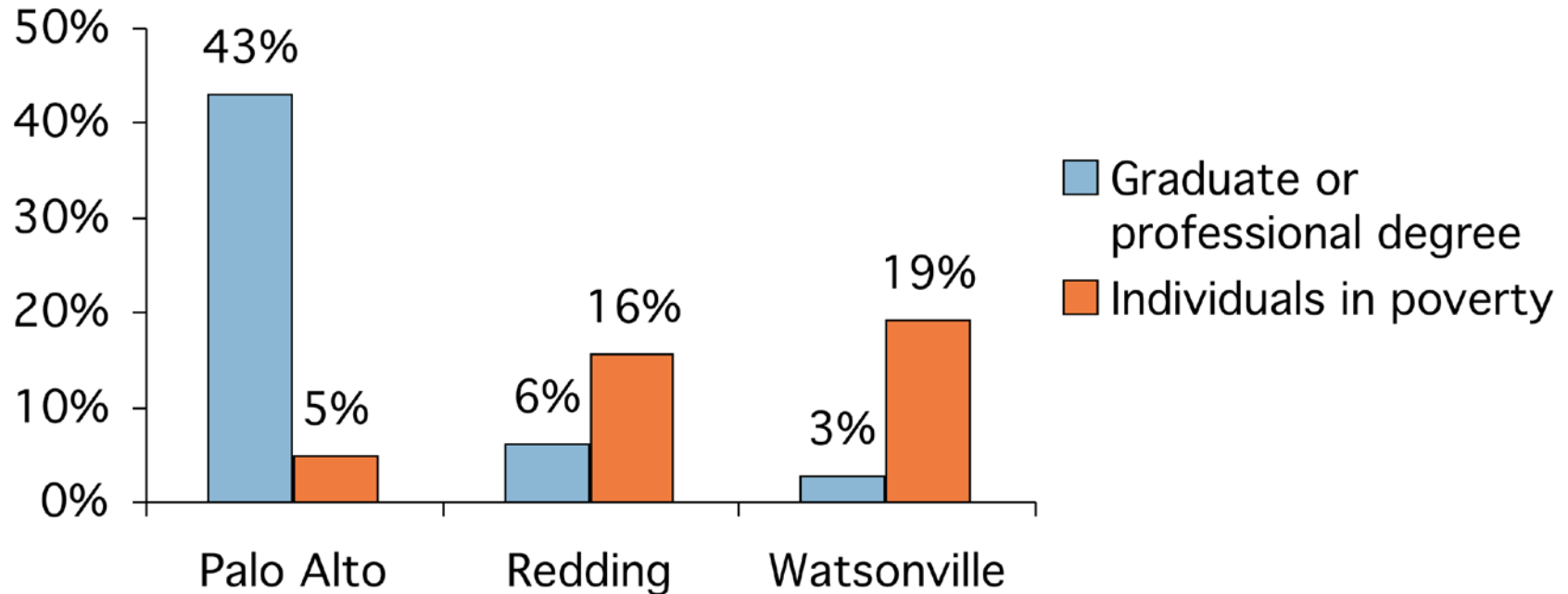
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Comparison between Cities

2000 Census data: Persons over 25 years of age

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Growth of California Fluoridation

January 2006 - December 2007

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California Population and Public Water Systems Receiving Fluoridated Water

Type	January, 2006		September, 2007		December, 2007	
	PWS Count	Population (Million)	PWS Count	Population (Million)	PWS Count	Population (Million)
Adjusted	46	8.46	50	8.63	53	9.27
Consecutive	29	1.44	35	1.69	67	2.92
Variable	11	1.12	10	1.05	163	10.47
Natural	3	0.02	6	0.07	6	0.07
Total	89	11.04	101	11.44	289	22.73

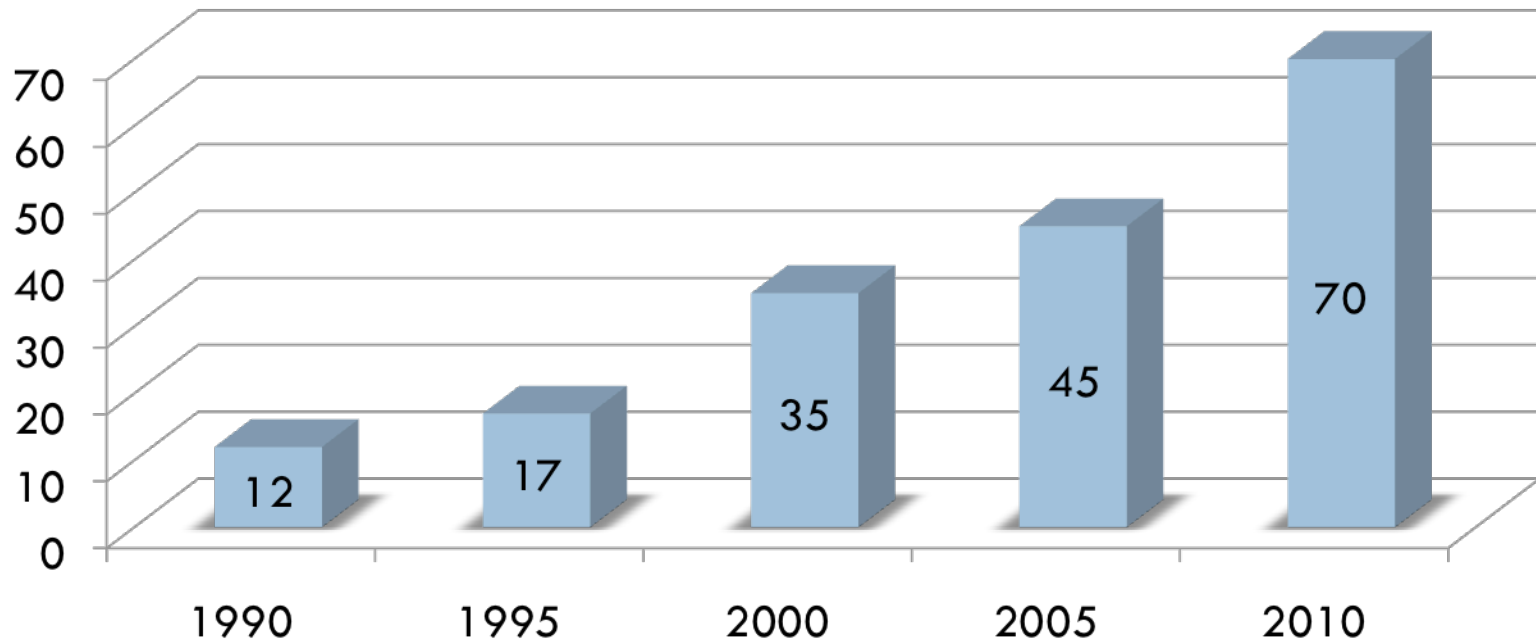
Note: 1/1/07 State population was 37.7 million. PWSs served approximately 36.6 million.

Source: Dave Lancaster, Sacramento District Engineer, CDPH. April, 2008

Projections for Fluoridation in California

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Percentage of Californians Receiving Fluoridated Water



California Dental Association Foundation

http://www.cdafoundation.org/access_to_care/direct_programs_for_the_underserved/fluoridation/

Fluoridation Information: Good Resources

American Dental Association:
Fluoridation Facts

www.ada.org/goto/fluoride

Centers for Disease Control & Prevention:
Community Water Fluoridation

www.cdc.gov/fluoridation


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ORAL HEALTH TOPICS A-Z

FLUORIDE & FLUORIDATION

- [Overview](#)
- [Additional Resources](#)

Overview

For over five decades, the American Dental Association has continuously endorsed the fluoridation of community water supplies and the use of fluoride-containing products as safe and effective measures for preventing tooth decay. Fluoride and Fluoridation contains resources that provide important facts and answer a myriad of questions. New information and resources will be added to this area as they become available. In the following sections, you will find the latest information about fluoride and fluoridation.



[Return to Top](#)

Additional Resources

[ADA's Fluoridation Facts](#)



Community Water Fluoridation

[Oral Health Home](#)

View by Topic

- > [Benefits](#)
- > [Safety](#)
- > [Statistics](#)
- > [Engineering and Operations](#)
- > [Other Fluoride Products](#)
- > [Fact Sheets](#)
- > [FAQs](#)
- > [Guidelines and Recommendations](#)
- > [Journal Articles](#)
- > [Related Links](#)

Contact Info

Centers for Disease Control and Prevention
Division of Oral Health
Mail Stop F-10
4770 Buford Highway NE
Atlanta, GA 30341

[Contact Us](#)

H1N1 Flu Info

- [E-mail this page](#)
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Overview

Community water fluoridation prevents tooth decay safely and effectively. CDC identifies it as one of 10 great public health achievements of the 20th century.

Learn more detailed information on the following topics:

- The [Benefits](#) page provides information on the oral health benefits of fluoride to individuals and communities.
- The [Safety](#) page provides references and other information about fluoride safety.
- The [Statistics](#) page provides access to data sources such as the National Oral Health Surveillance System.
- The [Engineering and Operations](#) page provides information on water fluoridation technical assistance resources to state programs.
- [Other Fluoride Products](#) describes forms of fluoride delivery other than water fluoridation.
- [Guidelines and Recommendations](#) offers technical information on programs, and [Fact Sheets](#) covers specific topics. See also [Journal Articles](#), [Related Links](#), and [FAQs](#).

Featured Items

[CDC Report on Community Water Fluoridation Progress](#)

Community water fluoridation reaches a new high in the U.S. A new CDC report documents key information for public health officials and policymakers working to improve oral health and meet public health objectives.

[Building Capacity to Fluoridate](#)  Word 1.2Mb

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Caries Prevalence in the USA:

Latest data

Continued Reduction from 1988-94 to 1999-2004 in Caries Experience for all over 6 years of age in U.S.

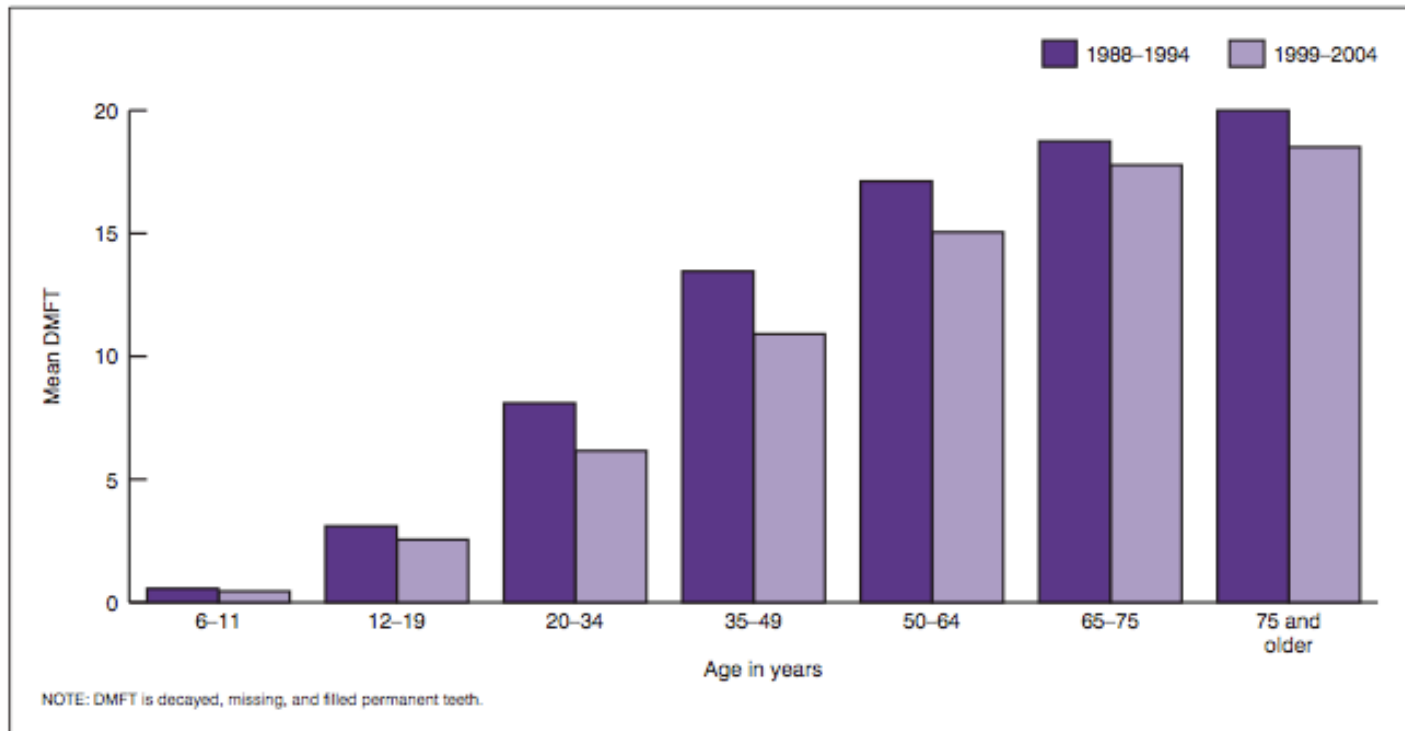


Figure 1. Mean DMFT scores for persons 6 years of age and older by selected age groups: United States, 1988-1994 and 1999-2004

Dye BA, Tan S, Smith V, Lewis BG, Barker LK, Thornton-Evans G, Eke PI, Beltrán-Aguilar ED, Horowitz AM, Li CH. Trends in oral health status: United States, 1988-1994 and 1999-2004. Vital Health Stat 11. 2007 Apr;(248):1-92 http://www.cdc.gov/nchs/data/series/sr_11/sr11_248.pdf



Caries prevalence from 1988-94 to 1999-2004 for 2-11 year-olds increased: or has it?

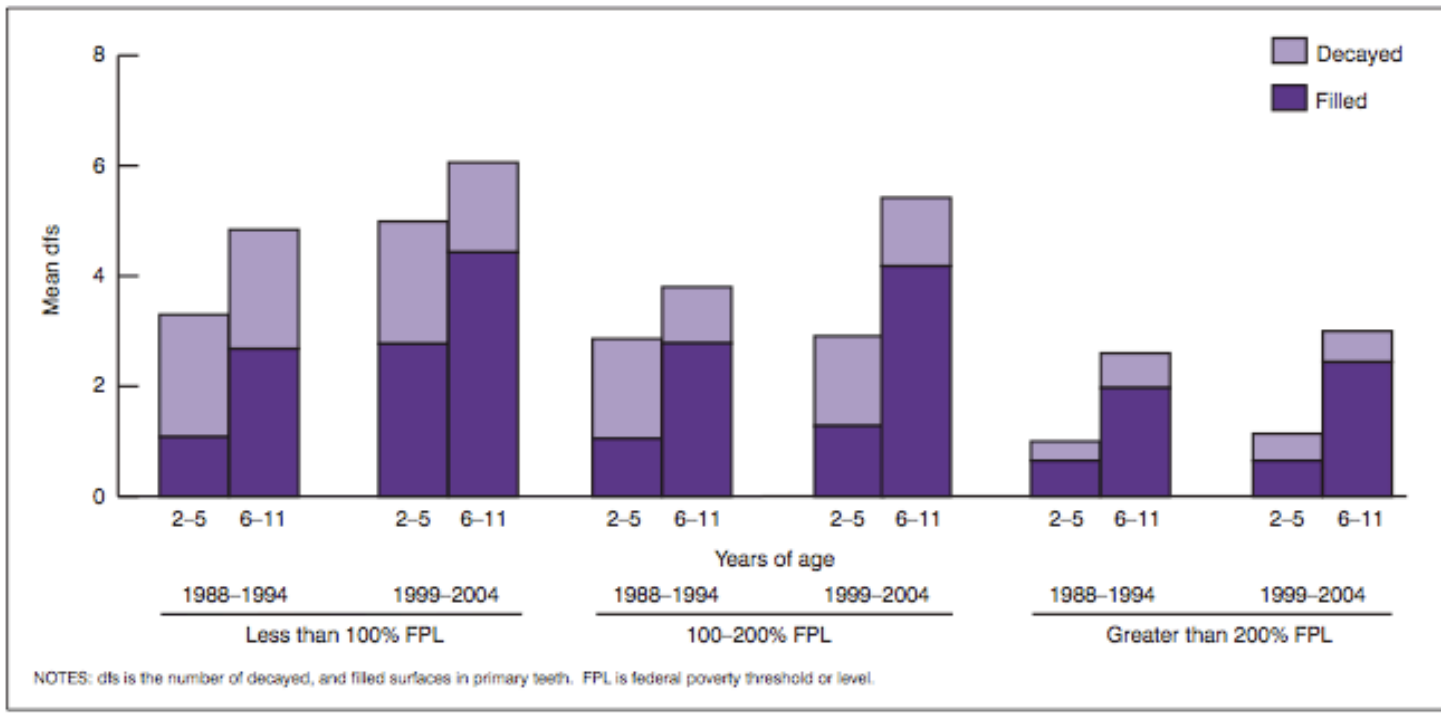


Figure 3. Decayed and filled primary dental surfaces (dfs) for youths 2–11 years of age by age groups and federal poverty level status: United States, 1988–1994 and 1999–2004

Dye BA, Tan S, Smith V, Lewis BG, Barker LK, Thornton-Evans G, Eke PI, Beltrán-Aguilar ED, Horowitz AM, Li CH. Trends in oral health status: United States, 1988-1994 and 1999-2004. *Vital Health Stat 11*. 2007 Apr;(248):1-92 http://www.cdc.gov/nchs/data/series/sr_11/sr11_248.pdf

Continued Reduction in DMFT and Extracted Teeth from 1988-94 to 1999-2004 for adults in U.S.

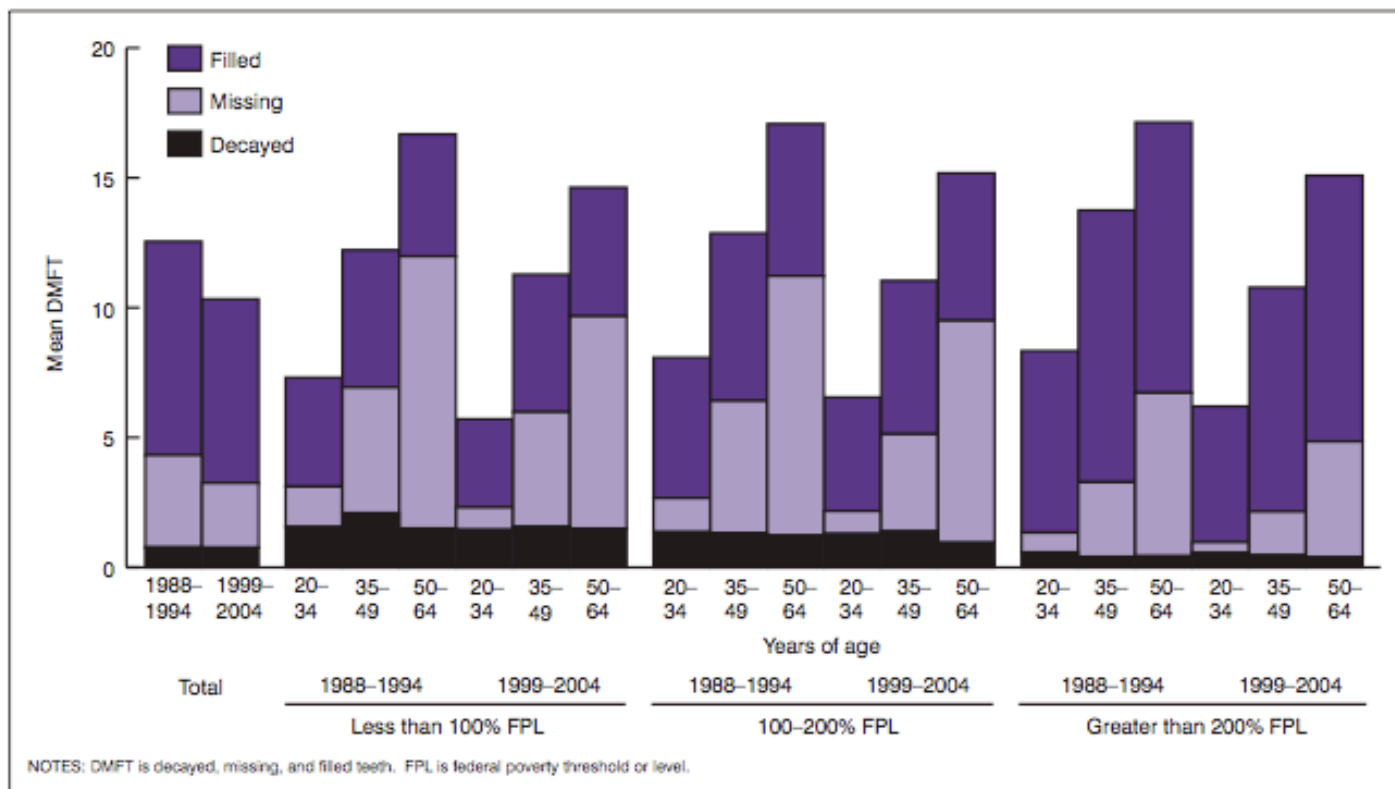


Figure 8. Decayed, missing, and filled permanent teeth (DMFT) for adults 20-64 years of age by age group and federal poverty level status: United States, 1988-1994 and 1999-2004

Dye BA, Tan S, Smith V, Lewis BG, Barker LK, Thornton-Evans G, Eke PI, Beltrán-Aguilar ED, Horowitz AM, Li CH. Trends in oral health status: United States, 1988-1994 and 1999-2004. *Vital Health Stat 11*. 2007 Apr;(248):1-92 http://www.cdc.gov/nchs/data/series/sr_11/sr11_248.pdf

Summary and Conclusion

Quote from Brian Burt:

Fluoridation and Social Equity

J Public Health Dent. 2002 Fall; 62(4): 195-200.

The overall reduction in caries prevalence and severity in the United States over recent decades is largely due to widespread exposure to fluoride, most notably from the fluoridation of drinking waters. Despite this overall reduction, however, caries distribution today remains skewed, with the poor and deprived carrying a disproportionate share of the disease burden. Dental caries, like many other diseases, is directly related to low socioeconomic status (SES). In some communities, however, caries experience has now diminished to the point where the need for continuing water fluoridation is being questioned. This paper argues that water fluoridation is still needed because it is the most effective and practical method of reducing the SES-based disparities in the burden of dental caries. There is no practical alternative to water fluoridation for reducing these disparities in the United States. For example, a school dental service, like those in many other high-income countries, would require the allocation of substantial public resources, and as such is not likely to occur soon. But studies in the United States, Britain, Australia, and New Zealand have demonstrated that fluoridation not only reduces the overall prevalence and severity of caries, but also reduces the disparities between SES groups. Water fluoridation has been named as one of the 10 major public health achievements of the 20th century by the Centers for Disease Control and Prevention, and promoting it is a Healthy People objective for the year 2010. Within the social context of the United States, water fluoridation is probably the most significant step we can take toward reducing the disparities in dental caries. It therefore should remain as a public health priority.

Brian Burt

FLUORIDATION AND SOCIAL EQUITY

California Oral Health Needs Assessment of Children, 1993-94

High Schools: Dental Fluorosis

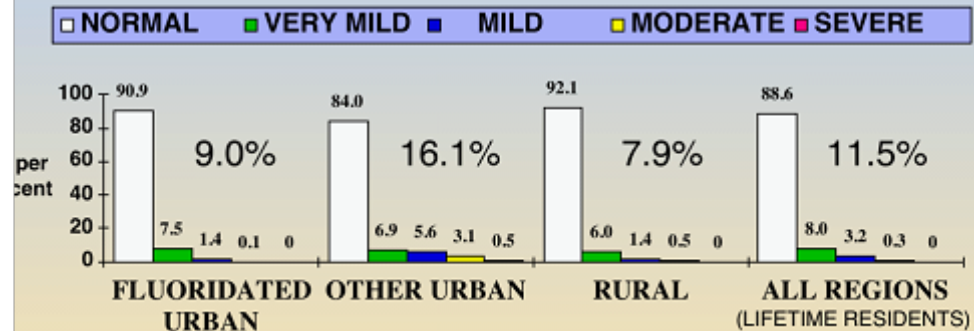
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□ Fluorosis Codes

- 0 = Normal
- 1 = Questionable
- 2 = Very mild
- 3 = Mild
- 4 = Moderate
- 5 = Severe

CALIFORNIA ORAL HEALTH NEEDS ASSESSMENT

Dental Fluorosis (Dean's Index) 10th grade students



Normal



Questionable



Very mild



Mild



Moderate

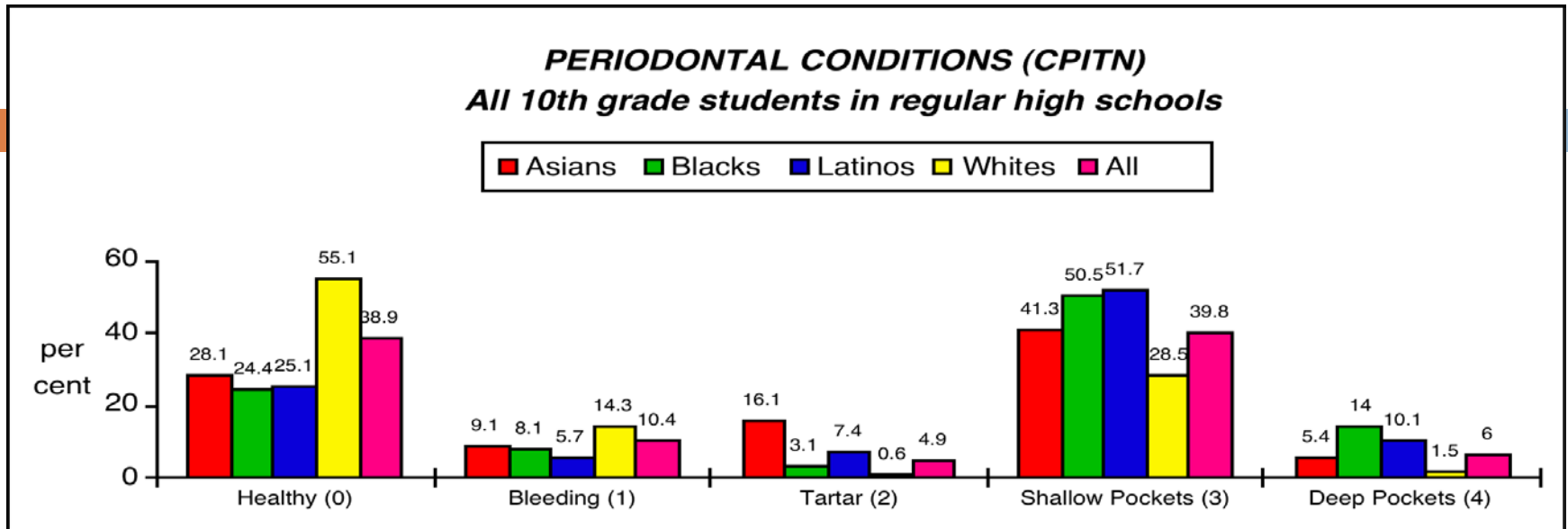


Severe

Source: Fluoridation Forum Report 2002 (Page 126)

California Oral Health Needs Assessment of Children, 1993-94

24



High Schools: Periodontal Conditions

- **Community Periodontal Index of Treatment Needs (CPITN)**
- High School Students
- 0 = Healthy
- 1 = Bleeding observed after probing
- 2 = Calculus felt during probing but all the black area of the probe visible
- 3 = Pocket 4-5 mm (gingival margin situated on black area of probe)
- 4 = Pocket >6 mm (black area of probe not visible)



California Oral Health Needs Assessment of Children, 1993-94: High Schools: Orthodontic Needs



Orthodontic Needs

WHO Index 1987

0 = None

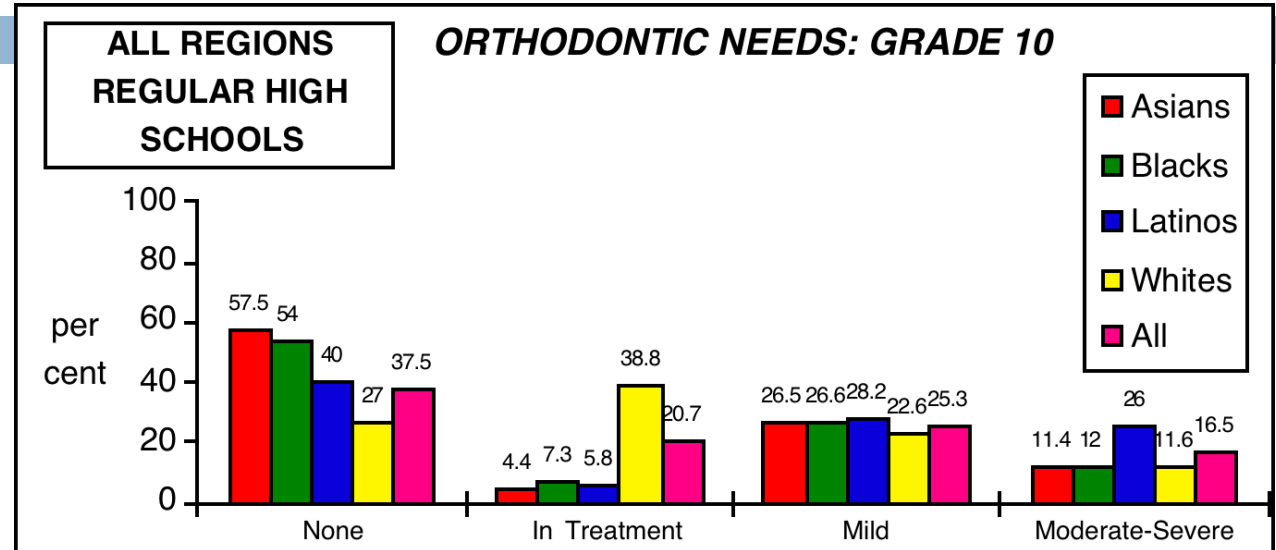
1 = In treatment (fixed or removable)

2 = Mild needs (one or more rotated or tilted teeth or slight crowding or spacing, which disturb the regular alignment of the teeth)

3 = Moderate-severe needs

including the presence of one or more of the following conditions of the incisors

- maxillary overjet 9mm or >9 mm;
- mandibular overjet/anterior crossbite equal to or greater than a full tooth depth;
- open bite;
- midline shift >4mm;
- crowding or spacing >4mm



Community Water Fluoridation Health Effects and Current Issues

Howard Pollick, BDS, MPH

Clinical Professor

School of Dentistry

University of California San Francisco

Presentation at the San Jose Water Company, August 5, 2009

Updated for the UCSF DPH Seminar, 10/6/09

OEHHA recently announced its intention to review fluoride

- OEHHA is the lead agency for the implementation of the California Safe Drinking Water and Toxic Enforcement Act of 1986, and periodically screens candidate chemicals for inclusion in the Proposition 65 list of chemicals.
- Fluoride was identified, along with 37 other compounds, from a total of 80, principally because of
- **“its important widespread use,”** as characterized by the chair of the committee, Thomas Mack, MD, MPH.
- Dr. Mack also noted on behalf of the committee that ranking a compound as a high priority for review in no way indicates that it is carcinogenic.
- http://www.oehha.ca.gov/prop65/public_meetings/pdf/cicMeetingTranscript052909.pdf
- http://www.oehha.ca.gov/prop65/public_meetings/052909coms/fluoride/CDAFluoride.pdf
- http://www.cda.org/library/cda_member/pubs/update0609/fluoride.htm

OEHHA

Office of Environmental Health Hazard Assessment

Public Health Goal for FLUORIDE in Drinking Water - 1 mg/L (1 ppm)

Office of Environmental Health Hazard Assessment, CA EPA (1997)

- A Public Health Goal (PHG) of 1 ppm (1,000 ppb) is developed for fluoride in drinking water.
- This level is intended to be an approximate year-round average.
- The U.S. Environmental Protection Agency's (U.S. EPA's) Maximum Contaminant Level (MCL) for fluoride is 4 mg/L. (to protect against crippling skeletal fluorosis)
- Secondary MCL of 2 mg/L (to protect against dental fluorosis)
- Moderate to severe dental fluorosis is rare when the drinking water fluoride level is in the range of 1 mg/L, but begins to become significant at concentrations close to 2 mg/L.
- The PHG is based on a no-observed- adverse-effect-level (NOAEL) of 1 mg/L for dental fluorosis in children.
- This level is judged to be the optimum level for reducing the prevalence of dental fluorosis while providing protection against dental caries.
- http://www.oehha.ca.gov/water/phg/pdf/fluor_c.pdf

OEHHA

Office of Environmental Health Hazard Assessment

Public Health Goal for FLUORIDE in Drinking Water - 1 mg/L (1 ppm)

- **Office of Environmental Health Hazard Assessment, CA EPA (June 2006)**
- “Our review has not identified data that appear likely to result in substantive changes to the risk assessment methodology or the conclusions reached in the 1997 PHG report for fluoride, although substantial updating of the animal toxicology and human cancer sections appear to be needed.”
- <http://www.oehha.ca.gov/water/phg/pdf/PHGinitiation0606.pdf>

Fluoridation and the Environment

- Pollick HF (2004). Water fluoridation and the environment: current perspective in the United States. Int J Occup Environ Health. 2004 Jul-Sep;10(3):343-50. <http://cdc.gov/FLUORIDATION/pdf/pollick.pdf>
- Pollick HF (2005). Scientific evidence continues to support fluoridation of public water supplies. Int J Occup Environ Health. 2005 Jul-Sep;11(3):322-6.
- Pollick HF (2006). Concerns about water fluoridation, IQ, and osteosarcoma lack credible evidence. Int J Occup Environ Health. 2006 12(1):91-4.
- **CDC. Health Effects and Environmental Impact**http://www.cdc.gov/Fluoridation/safety/health_effects.htm

Suboptimal fluoridation



Target concentration of fluoride in water with an acceptable range. However, some districts provide a lower than target concentration (suboptimal).

Within a community, one household may receive fluoridated water, while the one across the street does not. This is common where there is no central supply to all households in a community, which may be served by more than one water district, or more than one source where not all sources are fluoridated within a water district.

Due to the diffusion effect (people eat/drink at their neighbor's house or at a restaurant or school or workplace, or purchase foods and beverages that are grown or manufactured with a fluoridated water source) there is an average effect and benefit of fluoridation across the community that is not 100% fluoridated.

A community may be a neighborhood, a town or city, a county or a state or region.

Studies have shown that where 75% of a community is fluoridated, the diffusion effect accounts for the fact that everyone benefits to a similar extent, although they would have benefitted more if there was closer to 100% fluoridation.

WATER FLUORIDATION NOTICE

- **October 2007 The California Department of Public Health (CDPH) recommends suspending prescription fluoride supplements for one year in areas served by the Metropolitan Water District of Southern California.**

http://www.cda.org/library/pdfs/fluoridation_notification.pdf

Data on fluoridation from the California Department of Public Health

California Statewide Fluoridation Table

Water System Name	Public Water System ID	Population	Optimal Level (mg/L)	Monthly Average Fluoride Levels (mg/L)											
				Jan 2008	Feb 2008	Mar 2008	Apr 2008	May 2008	Jun 2008	July 2008	Aug 2008	Sep 2008	Oct 2008	Nov 2008	Dec 2008
SANTA CLARA COUNTY															
Adjusted Systems - Water Systems that add fluoride to the optimal level.															
City of Mountain View (650) 903-6329	4310007	76,000	0.9	1.1	1.0	1.1	1.0	0.9	1.1	1.0	1.0	1.0	1.0	1.0	1.0
City of San Jose (Evergreen) (408) 535-3500	4310020	91,500	0.8	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	1.0	0.9	0.9	0.9
Consecutive Systems - Water systems that distribute 100% fluoridated water that is received from another water system.															
City of Palo Alto [c] (650) 496-6967	4310009	62,000		1.0			1.0	1.0	1.0		1.1	1.0	0.9		1.0
Stanford University [c] (650) 725-8030	4310013	24,700		1.0			1.0	1.0	1.0		1.1	1.0	0.9		1.0
City of San Jose (NSJ/Alviso) [c] (408) 535-3500	4310019	4,200		1.0			1.0	1.0	1.0		1.1	1.0	0.9		1.0
Purissima Hills Water District [c] (650) 948-1217	4310021	6,300		1.0			1.0	1.0	1.0		1.1	1.0	0.9		1.0
Variable (Partially Fluoridated) Systems - Water systems with fluoride levels ranging from < 0.3 to 2.0 mg/L. Contact the water system for more information.															
City of Milpitas [i] (408) 586-3077	4310005	51,576													
City of Santa Clara [i] (408) 615-2000	4310012	104,000													
City of Sunnyvale [i] (408) 730-7510	4310014	125,800													

[c]....Water system receives fluoridated water from PWS ID 3810001 (100%). Listed Fluoride levels are from this system.

[i]....Water system receives fluoridated water from PWS ID 3810001 and uses non-fluoridated water sources.

Contact the water system for detailed fluoride level information.

<http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Fluoridation/Fluoridationdatafor2008.pdf>

California Regulations Related to Drinking Water



- **Fluoridation by Public Water Systems**
- <http://www.cdph.ca.gov/CERTLIC/DRINKINGWATER/Pages/Fluoridation.aspx> search <fluoridation>
- **California Regulations Related to Drinking Water (August 13, 2009)**
- <http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Lawbook/dwr-regulations-08-13-2009.pdf> search <fluoridation>



Safety of Water Fluoridation

Total intake and Margin of Safety

- Children up to age 8 years living in fluoridated areas or receiving fluoride supplements (0.5 mg to 1.0 mg per day) have a 1.5 to 3-fold margin of safety for moderate or severe dental fluorosis.
- Older children and adults living in fluoridated areas have a margin of safety for pre-clinical and clinical stages of skeletal fluorosis 4- to 8-fold and 10-fold respectively
- Kaminsky LS, Mahoney MC, Leach J, Melius J, Miller MJ. Fluoride: benefits and risks of exposure. Crit Rev Oral Biol Med. 1990; 1(4):261-81

Total Intake



Safety of Water Fluoridation

Fluoride Intake and Skeletal Fluorosis

- Extensive reviews of the scientific literature revealed no adverse effects unless fluoride intakes were greater than 10 mg/day for 10 or more years.
- At these high, chronic intake levels, the risk of skeletal changes consistent with preclinical or stage 1 skeletal fluorosis increases.
- Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board, Institute of Medicine (1999). Dietary reference intakes for calcium, phosphorus, magnesium, vitamin D, and fluoride. Washington, D.C.: National Academy Press. Available at <http://books.nap.edu/books/0309063507/html/288.html#pagetop>

Total Intake



Safety of Water Fluoridation

Total Intake and Enamel Fluorosis

- The Tolerable Upper Intake Level for children under 8 years of age (0.1 mg/kg/day) is exceeded by approximately 1 in 100 children in areas where the water fluoride concentration is 1.0 mg/liter or slightly higher
- In the 1930s and 1940s, no moderate or severe cases of enamel fluorosis were recorded in these areas
- Fluoride intake from water and the diet appears not to have increased since that time
- Additional intake by children at risk of enamel fluorosis almost certainly derives from the use of fluoride-containing dental products (toothpaste, prescription supplements)
- Institute of Medicine 1999

Total Intake



Safety of Water Fluoridation

Dietary fluoride intakes by adults from food, water and beverages

- where concentration is 1.0 ppm F in water
 - range from 1.4 to 3.4 mg fluoride per day
- where concentration is less than 0.3 ppm F
 - range from 0.3 to 1.0 mg/day
- Institute of Medicine 1999

Total Intake

Total Fluoride Intake

Age Group	Reference Weights kg (lbs)*	Adequate Intake (mg/day)	Tolerable Upper Intake (mg/day)
Infants 0-6 months	7 (16)	0.01	0.7
Infants 6-12 months	9 (20)	0.5	0.9
Children 1-3 years	13 (29)	0.7	1.3
Children 4-8 years	22 (48)	1.0	2.0
Children 9-13 years	40 (88)	2.0	10
Boys 14-18 years	64 (142)	3.0	10
Girls 14-18 years	57 (125)	3.0	10
Males 19 years and over	76 (166)	4.0	10
Females 19 years and over	61 (133)	3.0	10

Institute of Medicine, 1999

Table from <http://www.ada.org> - Dietary Reference Intakes for Fluoride

Safety of Water Fluoridation

Regulatory Standards	Meets the standards
Scientific Reviews	12 reviews in past 20 years
Health concerns	No health concerns
Cosmetic concerns	Cosmetic benefit Caries / Enamel fluorosis *
Environmental concerns	No negative effect
Total intake	Water fluoridation: OK *

No Impact of fluoridation on the environment: salmon

- The concentration of fluoride in the treated (fluoridated) water does not reach levels that could harm any plant or animal species.
- A report of the effect of industrial pollution, from an aluminum plant on salmon indicated that the usual fluoride concentration of the river was 0.1 mg/L, and when the concentration was raised experimentally to 0.5 mg/L, there was an effect on the salmon.
- Since rivers and streams are not fluoridated and the increase in the fluoride concentration of a river as a result of runoff from fluoridated water would be insufficient to raise the level to even 0.2 mg/L, fluoridation of water can have no effect on salmon.
- Tacoma-Pierce County Health Department. Tacoma–Pierce County Health Department Fluoridation Resolution. WAC 197-11-960 Environmental Checklist. August 2002. <http://www.bfsweb.org/documents/News%20Release%20-%20Fluoridation.pdf>
- <http://www.bfsweb.org/documents/SEPAchecklist.pdf>
- City of Port Angeles Public Works and Utilities, Washington. SEPA Fluoridation Checklist. October 2003.
- Damkaer DM, Dey DB. Evidence for fluoride effects on Salmon passage at John Day Dam, Columbia River, 1982–86. North Am J Fisheries Management. 1989; 9:154-62. [Abstract] http://www.nwfsc.noaa.gov/assets/2/5830_07272004_174503_damkaer.dey.1989.pdf
- Osterman JW. Evaluating the impact of municipal water fluoridation on the aquatic environment. Am J Public Health. 1990; 80:1230-5. http://www.ajph.org/cgi/content/abstract/80/10/1230?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&author1=Osterman&titleabstract=Fluoridation&searchid=1034872639658_1424&stored_search=&FIRSTINDEX=0&journalcode=ajph

Why are you putting medicine in my water?

- Fluoridation of water supplies is the adjustment of the naturally occurring level of fluoride in water to what has been found to be the optimal concentration for minimal tooth decay and minimal dental fluorosis in a community.
- Many water supplies actually have more fluoride naturally occurring than what is recommended; unfortunately, many more have much less.
- One of the purposes of a public water supply is to protect the public health of a community.
- In this regard, water could be described as “medicine”, though I hardly think most people think of water as medicine.
- Yet water will relieve and is used to treat thirst and dehydration.
- An optimal concentration of fluoride in the water is not considered as “medicine” either, but rather what our bodies need to help maintain optimal dental health.
- While the dose of water that each individual consumes varies according to a variety of factors, there has been no conclusive evidence of harm from fluoridated water.
- Each community decides through its representatives or electorate whether it wants fluoridation. So if government is for the people by the people, then the government has every right to dispense what the people want.

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

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/fl_caries.htm

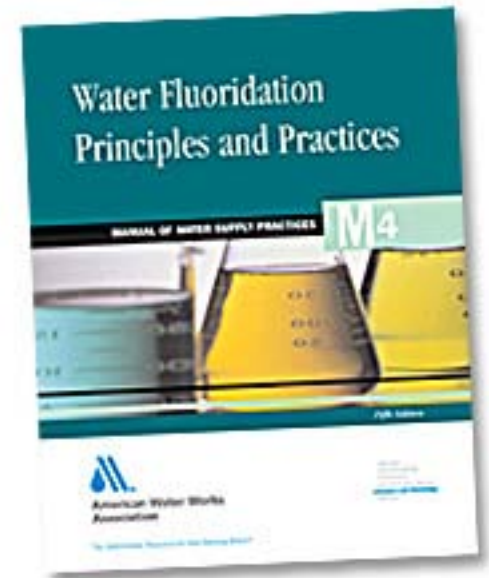
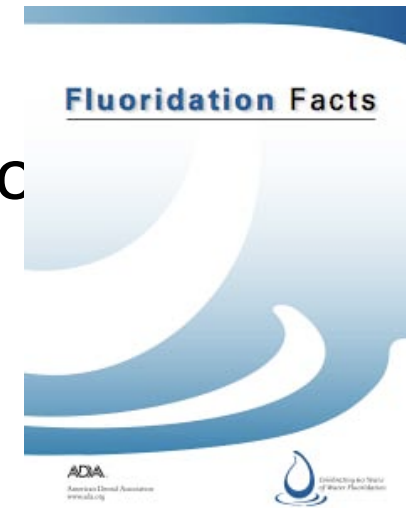


American Public Health Association Community Water Fluoridation in the US Updated policy: 2008

- <http://www.apha.org/advocacy/policy/policysearch/default.htm?id=1373>
- This position paper provides updated evidence for the many supportive policies held by the American Public Health Association (APHA) on community water fluoridation (CWF). This position paper provides the scientific basis and justification for the importance of continuing to support CWF for our nation's public water supplies. It also emphasizes the critical role that public health practitioners, health care professionals, and policymakers can play with respect to this important public health practice.
- 140 references

Excellent Resources

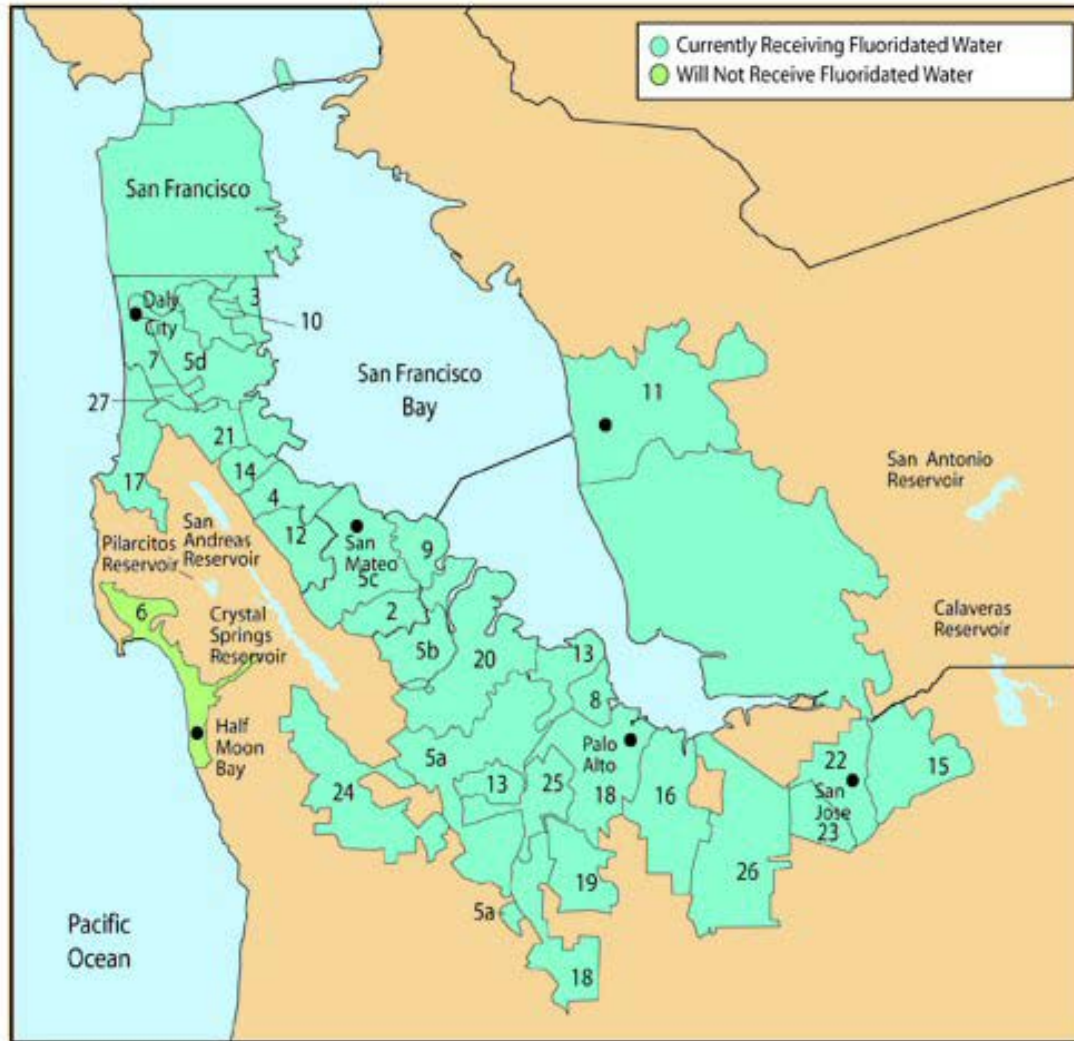
- American Dental Association Fluoridation
- www.ada.org/goto/fluoride
- CDC
- <http://www.cdc.gov/Fluoridation/>
- AWWA
- <http://www.awwa.org/files/about/Statements/2009Fluoridation.pdf>



Additional Resources

- Santa Clara Dental Society
- <http://www.sccds.org/public/Keytooralhealth/oralhealthtopicsAZ/F/fluoridation.asp>
- The Health Trust
- <http://www.healthtrust.org/services/dental/oralhealth.php>
- Have your patient check their water bill for the name of your patient's water supplier and request the latest water quality report for fluoride concentration online or by phone.

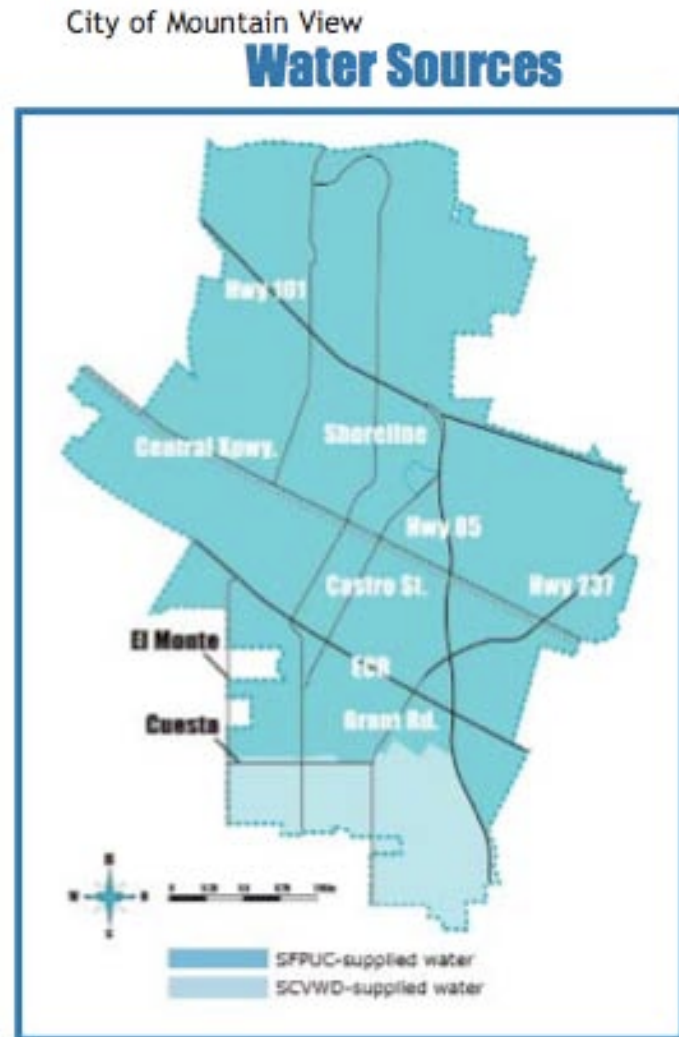
FLUORIDATION STATUS OF BAWSCA MEMBER AGENCIES



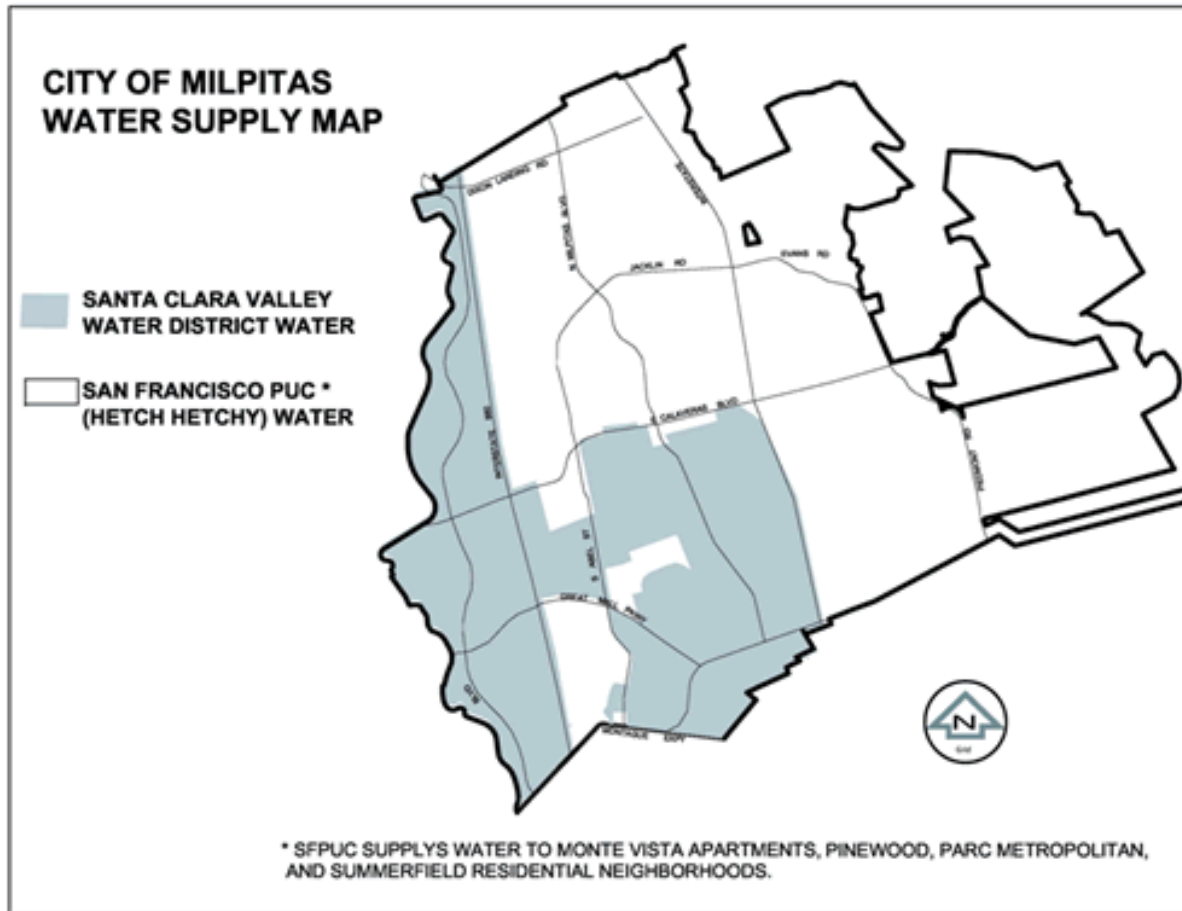
Mountain View – fluoridated

Since 2001, Mountain View supplied fluoridated water at approximately 1 part per million, the optimum level prescribed by the California Department of Health Services.

In November 2005, the SFPUC completed fluoridation of its entire wholesale service area. Mountain View is currently required to fluoridate only SCVWD and well supply.



Milpitas – partially fluoridated



San Jose Mercury News Editorial: Fluoridating Santa Clara County's water supply is overdue

- Posted: 02/15/2009 08:00:00 PM PST
- Only one of the 10 largest cities in America is so backward that it does not fluoridate its water.
- That would be San Jose, whose residents should be embarrassed that their city doesn't provide one of the most basic services to improve public health.
- Liz Kniss, a registered nurse and president of the Santa Clara County Board of Supervisors, understands that tooth decay is a serious problem throughout the county. She wants to work with the Health Trust — the valley foundation that makes grants to innovative and effective health care programs — to make fluoridating Santa Clara County's drinking water a reality by 2015, without seeking public money.

San Jose Mercury News Editorial: Fluoridating Santa Clara County's water supply is overdue

- Posted: 02/15/2009 08:00:00 PM PST
- The public health payoff for fluoridation is huge, especially for children. All city and county officials should get behind the goal.
- Fluoridating drinking water is regarded as one of the top 10 public health advancements of the 20th century. It has the support of the Centers for Disease Control, the World Health Organization, American Medical Association and the Santa Clara County Public Health Department.
- A vocal minority fights fluoridation, despite a lack of credible scientific evidence against it. Public officials need to stand up to opponents.

S.J. city water utility does indeed fluoridate

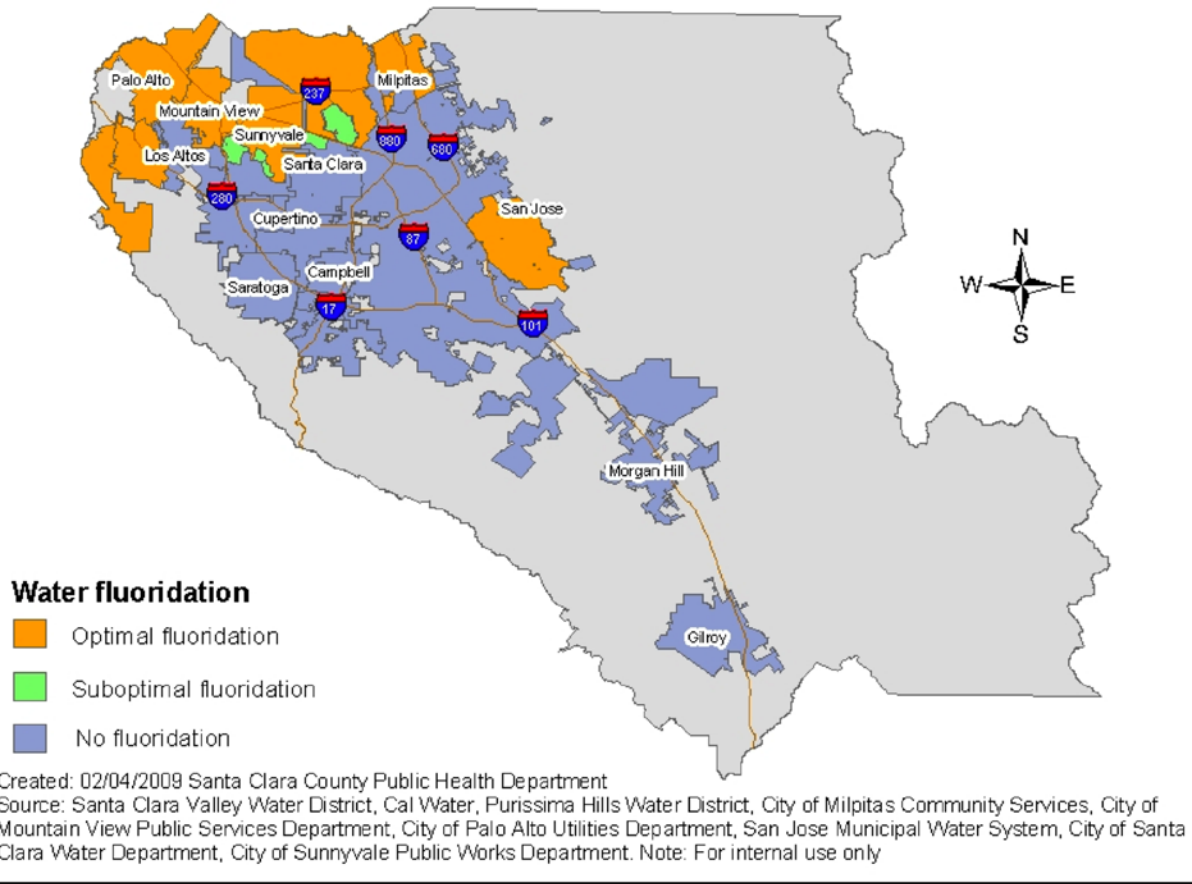
- From Mercury News readers
Posted: 02/20/2009 07:07:54 PM PST

The Mercury News (Editorial, Feb. 16) erroneously implied that the city of San Jose does not provide fluoridated water to our residents. To set the record straight, the city of San Jose does fluoridate the water it provides to all of the residents we serve through the municipal water utility. It is the private water supply companies serving the remainder of the city that do not currently do so. The city's water utility serves more than 120,000 (12 percent of the city's population) in Evergreen, North San Jose and Alviso. Evergreen residents have been drinking fluoridated water since 1965, and residents and businesses in North San Jose and Alviso started receiving it in November 2005. The city continues to recognize and support the benefits of fluoridation and its role in preventing tooth decay.

John Stufflebean

Director Environmental Services Department City of San Jose

Water Fluoridation in Santa Clara County





Water Fluoridation

Dental health for the whole community

What Is Water Fluoridation?

Water fluoridation is adding small amounts of fluoride to the water supply of a community. Fluoride protects people of all ages against tooth decay. It makes teeth stronger and harder, so that they last longer.

Water fluoridation is an inexpensive and safe practice. Many communities have been adding fluoride to their water for over 50 years to improve dental health!

Why Is Dental Health Important?

The health of your teeth affects the health of your whole body. Here are some benefits to healthy teeth:

- 💧 You will be able to eat better.
- 💧 You can speak clearly.
- 💧 You will have fewer toothaches.
- 💧 You will have a pleasant smile.



Public Health Department
Santa Clara Valley Health & Hospital System



The information provided in this card was adapted with permission from the Dental Health Foundation.

**Other presentations by
Dr. Pollick available on the
Internet:**

Questions?

howard.pollick@ucsf.edu

- <http://www.nationaloralhealthconference.com/docs/presentations/2009/0422/Water%20Fluoridation%20Debating%20-%20Howard%20Pollick.pdf>
- www.cdph.ca.gov/programs/Documents/Howard%20Pollick.ppt
- **What is the evidence that fluoride works to prevent dental caries?**
<http://www.oralhealth.ro/doc/V2-2004/V2-04-1.pdf>

Questions?

howard.pollick@ucsf.edu

Thank you