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

UCSF Dental Public Health Seminar: PART 1
October 6, 2009
Dental Caries: what happens when the rot sets in?

- Primary teeth
- Pit & Fissure
- Smooth Surface
- Root surface
- Pain
- Infection
- Abscess
- Restoration
- Root Canal
- Extraction
- Replacement
What are our children’s dental needs?

Research
Assessment of Needs

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

- 1993-94
- First Statewide data
- The Dental Health Foundation, Oakland, California. 1999

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

UoP Research Day May 20, 2009
Caries Status in California: RESULTS
Preschools

- 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

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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

![Graph showing dmft and Prevalence](image-url)

- dmft: 1.3, 4.5, 0.3
- Prevalence: 79%, 31%, 10%

**Notes:**
- Asian: Non-fluoridated Head Start - 31%
- White: Fluoridated Non Head Start - 10%

May 20, 2009

METHODS: What did we look for?

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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>All 6-8-year-old children</td>
<td>73%</td>
<td>53%/52%</td>
<td>35%/42%</td>
</tr>
<tr>
<td>Children aged 6-8 years whose parents have less than a high school education</td>
<td>86%</td>
<td>70%/65%</td>
<td>45%/-</td>
</tr>
<tr>
<td>Black 6-8-year-old children</td>
<td>70%</td>
<td>61%/50%</td>
<td>40%/-</td>
</tr>
<tr>
<td>Latino / Hispanic 6-8-year-old children</td>
<td>84%</td>
<td>- /68%</td>
<td>-/-</td>
</tr>
<tr>
<td>Asian 6-8-year-old children</td>
<td>90%</td>
<td>-/-</td>
<td>-/-</td>
</tr>
</tbody>
</table>

- 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)*

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

*range for DMFS: 0-128*
### 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

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

Urgency

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

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

far fewer urgent treatment needs in fluoridated areas

URGENT TREATMENT NEEDS

REGULAR HIGH SCHOOLS

Fluoridated | Urban | Rural | All
--- | --- | --- | ---
Asian | 2.7 | 19.2 | I.D. | 16.7
African-American | 3.4 | 22.2 | I.D. | 18.6
Latino/Hispanic | 5.8 | 36.5 | 14.7 | 30.5
White/Caucasian | 2.5 | 18 | 3.5 | 15
All | 3.8 | 24.8 | 10.8 | 20.8

I.D.: Insufficient Data for Asians and Blacks in Rural Areas
Less tooth decay in fluoridated areas

- 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)
### Grades K-3: Sample Characteristic Differences

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

- Maternal & Child Health Branch, California DHS
- California Wellness Foundation
- The Dental Health Foundation

Original Team:
- 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

- 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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DENTAL CARIES AND FLUORIDATION

Howard Pollick, BDS, MPH
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University of California San Francisco
What can be done?

With all these dental treatment needs?
"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

Esccondido City Council reverses ban on fluoride
City officials accept grant from State Water 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 Fluoride 2000 Work Group to cover capital costs associated with restoring Escondido's drinking water.

Also at the meeting, the council reversed its 1994 ban on fluoride, which was lifted when Councilwoman Jody Barish, who opposed the ban, joined the council after her election.

"Community water fluoridation is safe, effective and will benefit all children," said Councilwoman Jody Barish, who joined the 3-2 majority on the council to overturn the old ordinance against fluoridation. "I think it is the right 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 concerns and benefits of the proposal and local community decision.

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

In response to a question from the council regarding fluoridation safety, California Department of Health Services fluoridation consultant Daniel 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 activities are not associated with adverse health effects. There is strong and convincing evidence that fluoride decreases the incidence of dental caries (cavities) in children. Fluoridating community water supplies has been 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, Arlen Silson's town of Mountain View can boast the flow of Fluorinated water through its taps.

Mountain View's 71,000 residents voted overwhelmingly in favor of fluoridation in the November 1997 election.

"Fortunately, the residents of Mountain View pulled aside decades of political inertia and inertia to develop a forward-looking partnership in the interest of the community. The dental health of Mountain View residents can only be enhanced by this successful effort," said Assemblywoman Sue Scheinman (D-Palo Alto), who helped champion the fluoridation effort.

UoP Research Day

May 20, 2009

The Dental Health Foundation

4452 Birmingham Blvd

San Ramon, CA 94583

(510) 450-1644

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 30,000 population in the U.S. that remain unfluoridated, 55 (41 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"
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.


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
San Francisco PUC voted for the expansion of fluoridation - 2001

**Since 2005**

**Before 2005**

Fluoridation Status of SFUC 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**

---

**NO wasting our tax dollars!**

**NO risking our dental health!**

**NO on Measure B Tuesday, Nov. 4th**

---

**Vote NO on Measure B Keep 'em Smiling!**

---

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Palo Alto Keeps Fluoridation

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

Vote for Fluoridation

Palo Alto: 80.0%
Redding: 43.4%
Watsonville: 49.7%

May 20, 2009
Comparison between Cities

2000 Census data: Persons over 25 years of age

<table>
<thead>
<tr>
<th>City</th>
<th>Graduate or professional degree</th>
<th>Individuals in poverty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palo Alto</td>
<td>43%</td>
<td>5%</td>
</tr>
<tr>
<td>Redding</td>
<td>16%</td>
<td>6%</td>
</tr>
<tr>
<td>Watsonville</td>
<td>19%</td>
<td>3%</td>
</tr>
</tbody>
</table>
California Population and Public Water Systems Receiving Fluoridated Water

<table>
<thead>
<tr>
<th>Type</th>
<th>January, 2006</th>
<th>September, 2007</th>
<th>December, 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PWS Count</td>
<td>Population (Million)</td>
<td>PWS Count</td>
</tr>
<tr>
<td>Adjusted</td>
<td>46</td>
<td>8.46</td>
<td>50</td>
</tr>
<tr>
<td>Consecutive</td>
<td>29</td>
<td>1.44</td>
<td>35</td>
</tr>
<tr>
<td>Variable</td>
<td>11</td>
<td>1.12</td>
<td>10</td>
</tr>
<tr>
<td>Natural</td>
<td>3</td>
<td>0.02</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>11.04</td>
<td>101</td>
</tr>
</tbody>
</table>

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

Percentage of Californians Receiving Fluoridated Water

California Dental Association Foundation
http://www.cdafoundation.org/access_to_care/direct_programs_for_the_underserved/fluoridation/

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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
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.

Additional Resources

ADA’s Fluoridation Facts
Community Water Fluoridation

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)
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.

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

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

Summary and Conclusion

Quote from Brian Burt:
Fluoridation and Social Equity
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.
Fluorosis Codes

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

8/5/09
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.cda.org/library/cda_member/pubs/update0609/fluoride.htm](http://www.cda.org/library/cda_member/pubs/update0609/fluoride.htm)
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.
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.”

Fluoridation and the Environment


• CDC. Health Effects and Environmental Impact http://www.cdc.gov/Fluoridation/safety/health_effects.htm
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

<table>
<thead>
<tr>
<th>Water System Name</th>
<th>Public Water System ID</th>
<th>Population</th>
<th>Optimal Level (mg/L)</th>
<th>Monthly Average Fluoride Levels (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SANTA CLARA COUNTY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted Systems - Water Systems that add fluoride to the optimal level.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Mountain View</td>
<td>(650) 903-6329</td>
<td>76,000</td>
<td>0.9</td>
<td>1.1</td>
</tr>
<tr>
<td>City of San Jose (Evergreen)</td>
<td>(408) 535-3500</td>
<td>91,500</td>
<td>0.8</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Consecutive Systems</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Palo Alto [c]</td>
<td>(650) 496-6967</td>
<td>62,000</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>Stanford University [c]</td>
<td>(650) 725-8030</td>
<td>24,700</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>City of San Jose (NSJ/Alviso) [c]</td>
<td>(408) 535-3500</td>
<td>4,200</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>Purissima Hills Water District [c]</td>
<td>(650) 948-1217</td>
<td>6,300</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>Variable (Partially Fluoridated) Systems - Water systems with fluoride levels ranging from &lt; 0.3 to 2.0 mg/L. Contact the water system for more information.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Milpitas [i]</td>
<td>(408) 586-3077</td>
<td>51,576</td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Santa Clara [i]</td>
<td>(408) 615-2000</td>
<td>104,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Sunnyvale [i]</td>
<td>(408) 730-7510</td>
<td>125,800</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[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.

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/dwrregulations-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.
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.
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
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 Fluoride Intake

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

Institute of Medicine, 1999
Table from http://www.ada.org - Dietary Reference Intakes for Fluoride
# Safety of Water Fluoridation

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulatory Standards</td>
<td>Meets the standards</td>
</tr>
<tr>
<td>Scientific Reviews</td>
<td>12 reviews in past 20 years</td>
</tr>
<tr>
<td>Health concerns</td>
<td>No health concerns</td>
</tr>
<tr>
<td>Cosmetic concerns</td>
<td>Cosmetic benefit Caries / Enamel fluorosis *</td>
</tr>
<tr>
<td>Environmental concerns</td>
<td>No negative effect</td>
</tr>
<tr>
<td>Total intake</td>
<td>Water fluoridation: OK *</td>
</tr>
</tbody>
</table>
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.


• http://www.bfsweb.org/documents/SEPAchecklist.pdf


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

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

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 Facts
- www.ada.org/goto/fluoride
- CDC
- http://www.cdc.gov/Fluoridation/
- AWWA
Additional Resources

• Santa Clara Dental Society
• The Health Trust
• 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.
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 fluoride 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
San Jose Municipal Water District
Water Fluoridation in Santa Clara County

Water fluoridation
- Orange: Optimal fluoridation
- Green: Suboptimal fluoridation
- Blue: No fluoridation

Created: 02/04/2009 Santa Clara County Public Health Department
Source: Santa Clara Valley Water District, Cal Water, Purisima Hills Water District, City of Milpitas Community Services, City of Mountain View Public Services Department, City of Palo Alto Utilities Department, San Jose Municipal Water System, City of Santa Clara Water Department, City of Sunnyvale Public Works Department. Note: For internal use only.
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.

The information provided in this card was adapted with permission from the Dental Health Foundation.
Other presentations by Dr. Pollick available on the Internet:


• 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
Questions?

howard.pollick@ucsf.edu

Thank you