WATER FLUORIDATION DEBATING

THE CASE FOR COMMUNITY WATER FLUORIDATION

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Some Debating tips

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

Why a Debate is inappropriate

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

The Case for Community Water Fluoridation

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

The Case for Community Water Fluoridation

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

Photographs from Forum on Water Fluoridation in Ireland, 2002

Enamel Fluorosis and Tooth Decay

Unesthetic Tooth Decay

Tooth Decay and abscesses
The Case for Community Water Fluoridation

Fluoridation is effective
• in minimizing tooth decay and
• minimizing enamel fluorosis

pre-1945 studies

Fluoridation is effective
• the original fluoridation community trials


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

<table>
<thead>
<tr>
<th>City</th>
<th>F status</th>
<th>Year</th>
<th>Age</th>
<th>Mean DMFT</th>
<th>% Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grand Rapids</td>
<td>No F</td>
<td>1945</td>
<td>12-14yrs</td>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>1959</td>
<td></td>
<td>4.3</td>
<td>55.5</td>
</tr>
<tr>
<td>Evanston</td>
<td>No F</td>
<td>1946</td>
<td>12-14yrs</td>
<td>9.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>1959</td>
<td></td>
<td>4.7</td>
<td>48.8</td>
</tr>
<tr>
<td>Sarnia</td>
<td>No F</td>
<td>1959</td>
<td>12-14yrs</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>Brantford</td>
<td>F</td>
<td>1959</td>
<td></td>
<td>3.2</td>
<td>56.7</td>
</tr>
<tr>
<td>Kingston</td>
<td>No F</td>
<td>1960</td>
<td>13-14yrs</td>
<td>12.4</td>
<td></td>
</tr>
<tr>
<td>Newburgh</td>
<td>F</td>
<td>1960</td>
<td></td>
<td>3.7</td>
<td>70.1</td>
</tr>
</tbody>
</table>

Effectiveness of water fluoridation

- 60% difference in Pacific Coast
- 20% fluoridated
- 0% difference in Midwest
- 75% fluoridated

Explored by Halo or diffusion effect
The Case for Community Water Fluoridation

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

- Fluoridation is effective
  - in an era of fluoride toothpaste use
CDC's MMWR Recommendations and Reports (RR-21) November 30, 2001

**Review of Benefits**

Promoting Oral Health: Interventions for Preventing Dental Caries, Oral and Pharyngeal Cancers, and Sports-Related Craniofacial Injuries

A Report on Recommendations of the Task Force on Community Preventive Services

CDC: Fluoridation protects teeth in two ways

- When delivered through the water supply to children during the tooth forming years.
- Through direct contact with teeth throughout life.

www.cdc.gov/fluoridation/benefits.htm

The Case for Community Water Fluoridation

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

Safety of Water Fluoridation

National Fluoridation Symposium July, 2005

Celebrating 60 Years of Water Fluoridation

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

Review of Safety and Benefits

Recommendations for Preventing dental caries

- Community water fluoridation (strongly recommended)
- School-based sealant programs (strongly recommended)

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

<table>
<thead>
<tr>
<th>Study Status</th>
<th>mean dft (SE)</th>
<th>mean dfs (SE)</th>
<th>% caries-free</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 200% (N=211)</td>
<td>2.2 (.17)</td>
<td>5.0 (.47)</td>
<td>36.0</td>
</tr>
<tr>
<td>Above 200% (N=222)</td>
<td>1.6 (.24)</td>
<td>3.6 (.43)</td>
<td>59.5</td>
</tr>
</tbody>
</table>

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

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

www.cdc.gov/fluoridation/benefits.htm

The Case for Community Water Fluoridation

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  - 60+ years of experience
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Safety of Water Fluoridation

**Definition of Safety**

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

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Safety of Water Fluoridation

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

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

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

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Fluoride is cost-effective

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

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Safety of Water Fluoridation

**U.S. and International Scientific Reviews**

- National health and medical research council, Australia, 2007
- Forum on Fluoridation, Ireland (2002)
- Institute of Medicine, U.S.A. (1999)
- Lambeth Health Canada (1999)
- City of Calgary, Calgary Regional Health Authority (1998)
- U.S. Public Health Service (1991)
- Kintzinsky et al., New York State Dept. of Health (1990)

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The Case for Community Water Fluoridation

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

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Comparing Annual Costs (1999 $)

<table>
<thead>
<tr>
<th>Fluoride Mode</th>
<th>Annual cost / person</th>
<th>People benefiting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water fluoridation</td>
<td>$0.72</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</td>
<td>$1.41</td>
<td>Schoolchildren (&gt;6 years) High caries risk</td>
</tr>
<tr>
<td>Fluoride Supplements</td>
<td>$37</td>
<td>Ages 6 month to 16 years (Poor compliance)</td>
</tr>
<tr>
<td>Professional topical fluoride</td>
<td>$66 (year)</td>
<td>High caries risk</td>
</tr>
</tbody>
</table>

Fluoridation is supported by major health and science organizations:
- World Health Organization
- American Medical Association
- American Dental Association
- American Public Health Association
- US Public Health Service
- US Surgeons General
- American Water Works Association etc.

CDC: One of the ten great public health achievements of the 20th century.

What is the difference between opponents and supporters of fluoridation?

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

What I expect opponents to say

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

What I expect opponents to say

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

Conclusions

- Overwhelming evidence to confidently state that
- Community Water fluoridation is
  - Effective
  - Safe
  - Inexpensive
In 2006, the percentage of the U.S. Population on Public Water Supply Systems receiving Fluoridated Water is 69.2%, but varies from State to State.

Oregon: 27%
Portland is not fluoridated


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

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

http://www.kidney.org/atoz/atozItem.cfm?id=205

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

http://www.cdc.gov/fluoridation/safety/infant_formula.htm