

# Everything You Need to Know About Fluoride to Talk With Your Patients



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# What is Fluoride ?

- Fluoride is an inorganic, monatomic anion with the chemical formula  $\text{F}^-$  whose salts are typically white or colorless. Fluoride salts usually taste somewhat bitter and are odorless.
- Fluoride is found in every natural ground water source; streams, rivers, lakes, oceans and aquifers.
- Amount of naturally occurring fluoride varies widely.
- Ideal amount in community water systems is approximately 0.7 ppm. Spokane aquifer has approximately 0.1 ppm.

# Other sources

- Toothpaste: amounts vary from 1000-1500 ppm.
- Supplements: know amount in water and other sources.
- Varnish and gels: 1.23%-2.26%.
- All provide a temporary elevation in salivary levels of fluoride but return to normal levels.
- Red wine and other beverages!

# Review of cavity formation

- Enamel is composed of hydroxy apatite crystals, forming the hardest tissue in the human body.
- Biofilms containing bacteria form on dentition, usually w/in 24 hours.
- Bacteria [streptococcus mutans, etc.] feed on fermentable carbohydrates and produce an acid that attacks apatite crystals and effects the ph of the oral cavity for about 20 minutes.
- Acid causes areas of demineralization which produces a break in the crystalline structure [cavity] allowing more bacteria to penetrate into the enamel.



Food

+



Germs

+



Time on  
teeth

=



Cavities

# Fluoride mechanism

- Fluoride ions replace some anions in the hydroxy apatite crystals to make the enamel less susceptible to the acid.
- Requires enough fluoride to keep the process going in the right direction... into enamel.
- May also interfere with bacterial adherence to teeth.
- Fluoride levels in saliva are the key to long term effect.
- Sources of fluoride in saliva include: toothpaste, supplements, rinses, gels, food, and water.
- Amounts vary: toothpaste [1000-1500ppm]

# Evidence of effectiveness

- More than 70 years and tens of thousands studies show community water fluoridation decreases cavities from 20-40 percent.
- Meta analysis from 1989 showed up to 35% reduction.
- Meta analysis from 1994 of 113 articles: 40-50% reduction.
- 2013 Australian study revealed 30% reduction in adults who lived 50-75% of their lives in fluoridated areas.
- 2008 study of children in Alaska living in non-fluoridated areas had 32% higher rates of cavities.

# More evidence

- New York Medicaid enrolled children in non-fluoridated areas needed 33% more dental fillings/treatment.
- Twelve year old's in Israel in a non-fluoridated city had cavity rates 41% higher than those in a similar fluoridated city.
- Kindergarten students in Tacoma [fluoridated since 1970] were 14% more likely to be cavity free than those in Spokane.

# Safety: EPA and FDA

- EPA has authority over what is in drinking water; including additives such as chlorine, ph adjusting materials, fluoride, etc.
- NSA/ANSI Standard 60 – international drinking water health standard.
- EPA has established a maximum contaminant level [MCL] for fluoride which complies with Standard 60 requirements. [MCL is 4ppm]
- FDA has authority over fluoride in Rx and OTC products.
- 70 years of use and thousands of studies confirm safety.



# Dental fluorosis

- Defined as a modeling of the teeth caused by too much fluoride during enamel formation; not due to amount in CWF alone.
- Spectrum of mild to severe.
- Mild: slight whitening/chalky appearance usually not noticeable.
- Moderate: greater chalky and rougher surface of the enamel which usually diminishes over time.
- Severe: discolored teeth with rough enamel.
- Does not affect health; cosmetic concern.



# Opposition to fluoride

- 1950s: Communist plot
- 1960s: Cardiovascular issues
- 1970-80s: Cancers
- 1990-2000s: Arthritis, thyroid and developmental concerns
- Today: Neurologic/IQ
- Tomorrow ?

# Neurological assertions

- Several studies purport to show fluoride decreases IQ.
- “Harvard” study: analysis of mostly Chinese studies using varying amounts of fluoride and not controlling for lead or other known environmental hazards known to effect brain development.
- 2019 Canadian study [Green, et. al] suggesting that there was a connection between CWF and children’s IQ. This study lacks key data such as mothers’ IQ, sources of extra fl, post study exposure to neurologic toxins, etc.
- Canadian Agency for Drugs/Technology called study weak.

# Neurologic effects

- 2017 Swedish study found “zero effects on cognitive ability”.<sup>8</sup>
- New Zealand study published in 2014 followed IQ scores over a 30-year-period and found no link between fluoride and IQ.<sup>9</sup>

8

9 Aggeborn and Ohman; Am J Public Health, 2014.

# Other misinformation

- Fluoride added to drinking water is a toxic industrial by product.

Many substances can be considered toxic in high concentrations; including vitamin D.

The 2 most common additives are sodium fluoride and hydroxyfluorosilicic acid. Sodium fluoride is a solid salt that must be dissolved in water before being added to community water. HFS acid is a liquid obtained by removing fluoride from rock and can be added to community water without another step. Remaining phosphates are used in fertilizer production.

EPA allows negligible amounts of other minerals to also be present.

# More misinformation

- Community water fluoridation is mass medication and infringes on personal choice.

No more than adding Vitamin D to milk or iodine to salt as public health measures.

Similar to chlorinating drinking water or adjusting the pH to improve the quality of the water.

Provides an efficient and economical way to make sure everyone, not just children, gets the benefit of the ideal amount of fluoride.

# Countering misinformation

- Don't get drawn into an argument with a patient.
- Do express your opinion; patients trust and value what you say as a professional.
- If you don't know answers; offer trusted sources of information:
  - CDC
  - Ilikemyteeth.org
  - Washingtonwaterfluorodation.org

# Arcora Foundation

- Philanthropic arm of Delta Dental Washington
- Available resources to the medical profession;  
“Educating patients...How to .“  
Mouth Matters promotion.



# MouthMatters Flyer

## Mouth Matters

Integrating Oral Health  
into Medical Care



### Unleash the Power of Oral Health in Your Primary Care Practice:

When tooth decay goes untreated, the  
consequences can be serious and lifelong.

#### Tooth decay is the most common disease of childhood.

**4x** more common  
than early-  
childhood obesity.

**5x** more common  
than asthma.

**20x** more common  
than diabetes.

Fluoride varnish\*  
**reduces** tooth decay by

**↓ 37%**

\*Fluoride varnish is an evidence-based  
standard of care that is supported by  
AAP, Bright Futures, AAFP, USPSTF,  
ADA and AAPD.

Three interventions can stop the  
painful impacts of tooth decay.

- 1 Screen**  
Spot tooth decay early and prevent painful  
cavities from occurring.
- 2 Educate**  
Teach parents and children about oral  
hygiene and healthy eating.
- 3 Apply Fluoride**  
Apply fluoride varnish to protect teeth  
from decay.

MouthMatters is a program of Arcora Foundation, supporting the integration of oral health services into medical care across Washington state. Arcora Foundation is a nonprofit dedicated to improving oral health and health equity by partnering with communities to prevent oral disease, transforming health systems and increasing access to care. Funded by nonprofit Delta Dental of Washington, the state's largest dental benefits company, we work toward a shared vision: All people enjoy good oral and overall health, with no one left behind.

A Program of  
**ARCORA**  
The Foundation of  
Delta Dental of Washington

### Delivery of oral health services can pay off.

The AVA requires all insurers to cover fluoride varnish with no copay. In Washington state, Arcora Foundation's MouthMatters program provides the required training to receive Medicaid's full reimbursement.

**\$29.46 + \$27.58 + \$13.25 = \$70.29**

For oral screening

For oral education

For fluoride varnish  
application

Medicaid  
reimbursement

### MouthMatters makes integration of oral health services easy.

We provide free of charge:

- ✓ **Pre-training guidance** to set up your team and systems for success.
- ✓ **A one-hour training**, which all providers must take to bill. [1.5] AMA PRA Category 1 Credit(s)™
- ✓ **Ongoing support** and trouble shooting.
- ✓ **Tools** to make easy referrals to dentists.



"Integrating oral health screening and fluoride varnish application into our practice was really easy. The training and support from Arcora Foundation's MouthMatters program staff was excellent."

— Beth Harvey, MD, Pediatric Associates, Olympia, Wash.

### Contact us to learn more:

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