

# Summary of

## **INTERNATIONAL ACADEMY OF ORAL MEDICINE AND TOXICOLOGY (IAOMT) POSITION PAPER AGAINST FLUORIDE USE IN WATER, DENTAL MATERIALS, AND OTHER PRODUCTS FOR DENTAL AND MEDICAL PRACTITIONERS, DENTAL AND MEDICAL STUDENTS, CONSUMERS, AND POLICY MAKERS**



**PAPER NOTED ABOVE WAS...**

**Compiled, Developed, Written, and Released ON  
September 22, 2017 by**

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**Approved by the IAOMT Scientific Review and  
Clinical Practice Guideline Committee**

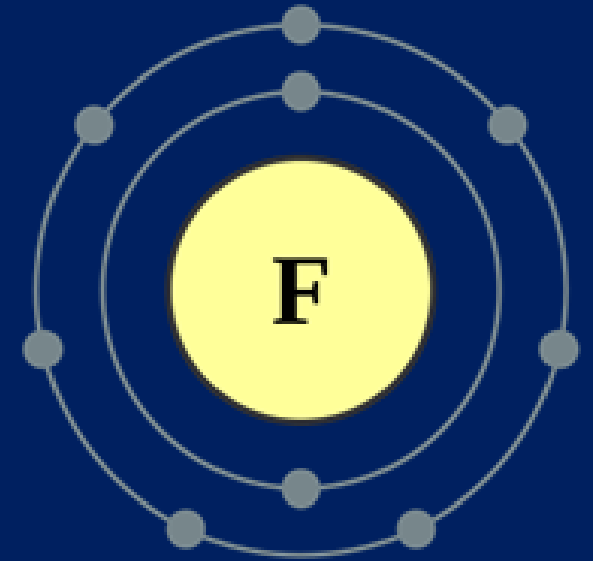
on March 25, 2017

**Approved by the IAOMT Board of Directors**

on July 3, 2017

# What is fluoride?

- Fluorine (F): Atomic number = 9
  - 13<sup>th</sup> most abundant element on the earth
  - Highly toxic, pale yellow diatomic gas
  - Most reactive element; combines with other elements readily because of high reactivity
- Fluoride (F<sup>-</sup>): fluorine with extra electron
  - Naturally exists in certain minerals
  - Chemically synthesized for industry/products
  - Not essential for growth and development
  - Identified as one of 12 industrial chemicals known to cause developmental neurotoxicity in humans



Graphic credit: Pumbaa  
(original work by Greg  
Robson) - File:Electron  
shell 009 fluorine.png  
[https://commons.wikimedia.org/wiki/Fluorine#/media/File:Electron\\_shell\\_009\\_Fluorine.svg](https://commons.wikimedia.org/wiki/Fluorine#/media/File:Electron_shell_009_Fluorine.svg)

## Fluoride is chemically synthesized and added to these items:

<b>Artificially fluoridated municipal water</b>	<b>Beverages (made with fluoridated water)</b>
<b>Dental cements with fluoride</b>	<b>Dental fillings with fluoride</b>
<b>Dental gels with fluoride</b>	<b>Dental varnishes with fluoride</b>
<b>Floss with fluoride</b>	<b>Fluoride drugs (“supplements”)</b>
<b>Food (that contains or has been exposed to fluoride)</b>	<b>Mouthwash with fluoride</b>
<b>Pesticides with fluoride</b>	<b>Pharmaceutical drugs with perfluorinated compounds</b>
<b>Stain resistant and waterproof items with PFCs</b>	<b>Toothpaste with fluoride</b>

**This chart includes some of the specific human health risks scientifically associated with fluoride exposure:**

<b>Acne and other dermatological conditions</b>	<b>Arterial calcification and arteriosclerosis</b>	<b>Bone weakness and risk of fractures</b>	<b>Cancer of the bone, osteosarcoma</b>
<b>Cardiac failure</b>	<b>Cardiac insufficiency</b>	<b>Cognitive deficits</b>	<b>Dental fluorosis</b>
<b>Diabetes</b>	<b>Early puberty in girls</b>	<b>Electrocardiogram abnormalities</b>	<b>Harm to the fetal brain</b>
<b>Hypertension</b>	<b>Immune system complications</b>	<b>Insomnia</b>	<b>Iodine deficiency</b>
<b>Lower fertility rates</b>	<b>Lower IQ</b>	<b>Myocardial damage</b>	<b>Neurotoxic effects, including ADHD</b>
<b>Osteoarthritis</b>	<b>Skeletal fluorosis</b>	<b>Temporomandibular joint disorder (TMJ)</b>	<b>Thyroid dysfunction</b>

# Why is the IAOMT concerned about fluoride exposure?

- toxic exposures from a lifetime of sources including water
- can potentially harm both children and adults
- infants can be overdosed when fed fluoridated tap-water-formula
- swallowed toothpaste can contribute to childhood overdose
- fluoride can cause a higher incidence of adverse health effects

## SUMMARY OF IAOMT POSITION:

Given the elevated number of fluoride sources and the increased rates of fluoride intake in the American population, which have risen substantially since water fluoridation began in the 1940's, it has become a necessity to reduce and work toward eliminating avoidable sources of fluoride exposure, including water fluoridation, fluoride-containing dental materials, and other fluoridated products.

## BRIEF HISTORY OF FLUORIDE, Part 1

**1886:** Elemental fluorine was isolated by chemist Henri Moissan, and then industry began experimenting with fluorine compounds.

**1930's:** High levels of fluoride occurring naturally in water were linked to dental fluorosis as discovered and purported by Frederick S. McKay, DDS.

**1942-45:** Uranium fluoride and thorium fluoride were used in atomic bomb production.

**1942:** H. Trendley Dean, DDS suggested that lower levels of fluoride may result in lower rates of dental caries.

**1944:** *A Journal of the American Dental Association* editorial and other authorities offered warnings about fluoride dangers.

**1945:** Grand Rapids, Michigan, was the first city to be artificially fluoridated for dental purposes (even though the experiment was never completed with the Muskegon, Michigan, control group).

## BRIEF HISTORY OF FLUORIDE, Part 2

**Circa 1950's:** Fluoride “supplements” were introduced and prescribed. Perfluorinated chemicals were introduced for surface protection in certain products.

**1960:** Fluoridation of drinking water for alleged dental benefits had spread to over 50 million people in the US.

**1960's:** Fluoridated toothpaste was introduced. Glass ionomer cement was invented.

**1970's:** Fluoride sealants were introduced.

**1980's:** Fluoroquinolones (i.e. type of antibiotics) were introduced.

**2014:** Over 210 million Americans (66%) are known to be drinking fluoridated water (versus only 3% of western Europeans).



# ADA's Position on Fluoride

**“The American Dental Association unreservedly endorses the fluoridation of community water supplies as safe, effective and necessary in preventing tooth decay. This support has been the Association's position since policy was first adopted in 1950.”**

**American Dental Association. ADA Fluoridation Policy: American Dental Association Supports Fluoridation. American Dental Association Website.**

**<http://www.ada.org/en/public-programs/advocating-for-the-public/fluoride-and-fluoridation/ada-fluoridation-policy>**

**Accessed July 6, 2017.**

# **“Safe” Level of Fluoride?: Overall Exposure Risks**

- No clear estimate of the amount of fluoride taken in by “average” person from ALL sources other than the water supply (i.e. no estimate how much fluoride is ingested overall)**
- Same safe “dosage” level for children and adults, even though children are smaller and still developing**
- No recognition of individualized response based on genetic factors, nutrient deficiencies, product usage, increased number of sources, etc.**
- Need special consideration for susceptible populations such as those who drink more water including athletes, military personnel, outdoor workers, pregnant and lactating women, as well as individuals with diabetes, renal problems, and other health conditions**

# “Safe” Level of Fluoride?: Drinking Water Risks

- The EPA maximum contaminant level (MCL) is 4 mg/L for drinking water, but evidence has shown that some Americans exceed this level.
- The U.S. Public Health Service recommendation level for *artificially fluoridated water* was 0.7 mg/L – 1.2 mg/L from 1962-2015.
- The level was changed to 0.7 mg/L in 2015 due to other sources of fluoride exposure and an increase in dental fluorosis.
- American babies are often fed formula after birth, which is powder reconstituted with water.
- Bottled water can also contain fluoride.

# “Safe” Level of Fluoride?: Fluoride Drug Risks

- Many dentists prescribe fluoride tablets, drops, lozenges, and rinses, which are often referred to as fluoride “supplements” or “vitamins.”
- These products contain 0.25, 0.5, or 1.0 mg fluoride, and they are not approved as safe and effective for caries prevention by the FDA.
- There have been warnings that fluoride supplements can carry more risk than benefit to children.

# “Safe” Level of Fluoride?: Dental Products Risks

- Many dental products vary in fluoride content by specific brand, and dental products used at the office are not included in intake estimates.
- Some fluoride-containing devices “recharge” with more fluoride.
- Prophy paste can contain 20 times more fluoride than toothpaste used at home. Gels and varnishes also contain high fluoride levels.
- Many of the options for filling materials contain fluoride, including *all* glass ionomer cements, *all* resin-modified glass ionomer cements, *all* giomers, *all* polyacid-modified composites (compomers), *certain types* of composites, and *certain types* of mercury amalgams.
- Many fluoride containing dental devices are not FDA approved for caries prevention. FDA regulations make the physician/dentist personally liable for off-label use of drugs.

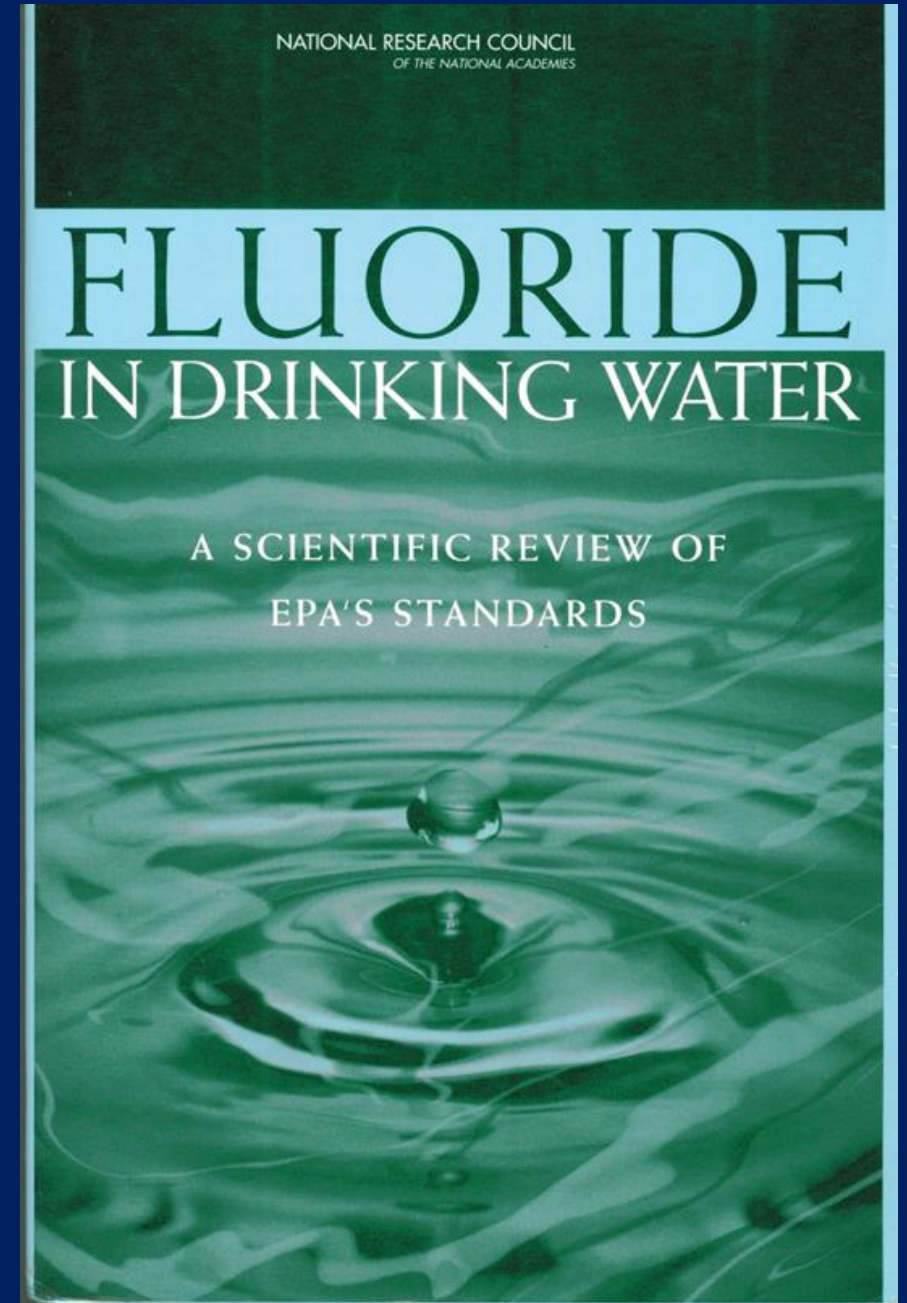
## **Silver Diamine Fluoride: A new dental treatment and a new risk**

- **This relatively new procedure was FDA approved in 2014 for treating tooth sensitivity but not dental caries.**
- **The brand used in the U.S. contains 5.0-5.9% fluoride.**
- **Concerns have been raised that it can permanently stain teeth black.**
- **Additionally, in a randomized control trial published in 2015, the researchers concluded that they were concerned about the lack of “adequate safety information regarding this preparation or the potential toxicity levels for children, but it provides a basis for future research.” *(Burns J, Hollands K. Nano Silver Fluoride for preventing caries. Evidence-Based Dentistry. 2015 Apr 1;16(1):8-9.)***

## National Research Council (NRC):

- Essential report about fluoride from 2006
- Recommended setting a lower level of fluoride

National Research Council. *Fluoride in Drinking Water: A Scientific Review of EPA's Standards*. The National Academies Press: Washington, D.C. 2006.



# Potential Health Risks from Fluoride Identified by NRC

- osteosarcoma (a bone cancer)
- musculoskeletal effects
- reproductive and developmental effects
- neurotoxicity and neurobehavioral effects
- genotoxicity
- carcinogenicity
- effects on other organ systems



## **NRC, 2006: Notable Quote**

**“Overall, there was consensus among the committee that there is scientific evidence that under certain conditions fluoride can weaken bone and increase the risk of fractures. The majority of the committee concluded that lifetime exposure to fluoride at drinking-water concentrations of 4 mg/L or higher is likely to increase fracture rates in the population, compared with exposure to 1 mg/L, particularly in some demographic subgroups that are prone to accumulate fluoride into their bones (e.g., people with renal disease).”**

# Dental Fluorosis

- Excess fluoride in children known to result in dental fluorosis
- Condition in which the teeth enamel becomes irreversibly damaged and the teeth become permanently discolored, displaying a white or brown mottling pattern and forming brittle teeth that break and stain easily
- Can range from mild to severe
- Considered the first sign of fluoride toxicity



*Photos from Dr. David Kennedy and are used with permission from victims of dental fluorosis*

# Dental Fluorosis Levels in the U.S.

**According to the Centers for Disease Control, 23% of Americans aged 6-49 and 41% of children aged 12-15 exhibit fluorosis to some degree.**

**These increases in rates of dental fluorosis were a crucial factor in the U.S. Public Health Service's decision to lower its water fluoridation level recommendations in 2015.**

*Centers for Disease Control and Prevention. Prevalence and severity of dental fluorosis in the United States, 1999-2004. NCHS Data Brief. November 2010, Number 53.  
<http://www.cdc.gov/nchs/data/databriefs/db53.htm>*

## Some other health conditions that have been linked to fluoride:

- Arthritis and hip fracture
- Behavioral problems
- Cardiovascular, digestive, endocrine, immune, and renal system dysfunction
- Dermatological problems
- Diabetes
- Learning difficulties
- Skeletal fluorosis
- Thyroid deficiency

“If we were to consider only fluoride’s affinity for calcium, we would understand fluoride’s far-reaching ability to cause damage to cells, organs, glands, and tissues.”

*Prystupa J. Fluorine—a current literature review. An NRC and ATSDR based review of safety standards for exposure to fluorine and fluorides. Toxicology Mechanisms and Methods. 2011 Feb 1;21(2):103-70.*

# Fluoride and Lead (Pb)

- Fluoride, in its form of hydrofluosilicic acid (which is added to many water supplies to fluoridate the water), attracts lead.
- Likely because of this affinity for lead, fluoride has been linked to higher blood lead levels in children, especially in minority groups.
- Lead is known to lower IQs in children, and lead has even been linked to violent behavior.

# Fluoride Poisoning:

“A history of enigmatic descriptions of fluoride poisoning in the medical literature has allowed it to become one of the most misunderstood, misdiagnosed, and misrepresented health problems in the United States today.”

Mullenix PJ. Fluoride poisoning: a puzzle with hidden pieces. *International Journal of Occupational and Environmental Health*. 2005 Oct 1;11(4):404-14. Page 404.

# Fluoride's Lack of Safety: Quote #1

“The prevalence of dental caries in a population is not inversely related to the concentration of fluoride in enamel, and a higher concentration of enamel fluoride is not necessarily more efficacious in preventing dental caries.”

“Few studies evaluating the effectiveness of fluoride toothpaste, gel, rinse, and varnish among adult populations are available.”

Centers for Disease Control and Prevention (CDC). Kohn WG, Maas WR, Malvitz DM, Presson SM, Shaddik KK. Recommendations for using fluoride to prevent and control dental caries in the United States. Morbidity and Mortality Weekly Report: Recommendations and Reports. 2001 Aug 17:i-42.

## Fluoride's Lack of Safety: Quote #2

“Fluoride exposure has a complex relationship in relation to dental caries and may increase dental caries risk in malnourished children due to calcium depletion and enamel hypoplasia...”

Peckham S, Awofeso N. Water fluoridation: a critical review of the physiological effects of ingested fluoride as a public health intervention. The Scientific World Journal. 2014 Feb 26; 2014.



## Fluoride's Lack of Safety: Quote #3

“These findings suggest that achieving a caries-free status may have relatively little to do with fluoride intake, while fluorosis is clearly more dependent on fluoride intake.”

Warren JJ, Levy SM, Broffitt B, Cavanaugh JE, Kanellis MJ, Weber-Gasparoni K. Considerations on optimal fluoride intake using dental fluorosis and dental caries outcomes—a longitudinal study. *Journal of Public Health Dentistry*. 2009 Mar 1;69(2):111-5.

# Fluoride's Lack of Safety: Quote #4

“Because the use of fluoridated dental products and the consumption of food and beverages made with fluoridated water have increased since HHS recommended optimal levels for fluoridation, many people now may be exposed to more fluoride than had been anticipated.”

Tiemann M. Fluoride in drinking water: a review of fluoridation and regulation issues. BiblioGov. 2013 Apr 5. Congressional Research Service Report for Congress.

# Fluoride's Lack of Safety: Quote #5

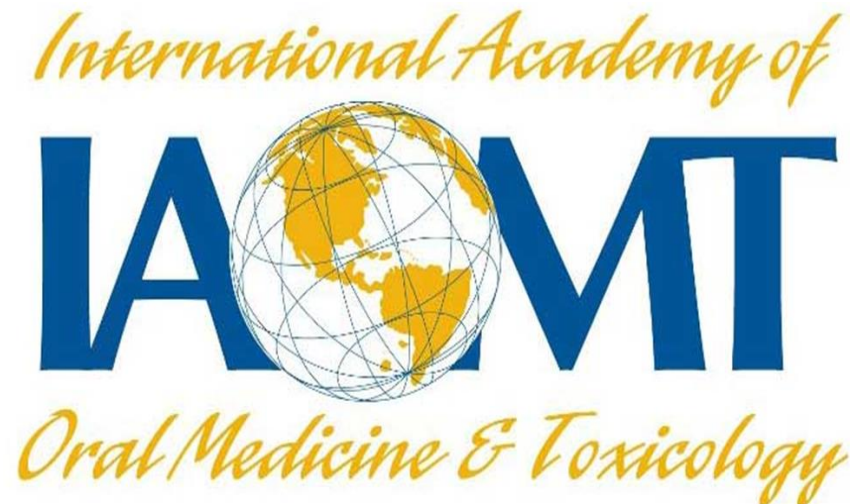
“The recommended Maximum Contaminant Level Goal (MCLG) for fluoride in drinking water should be zero.”

Carton RJ. Review of the 2006 United States National Research Council Report: Fluoride in Drinking Water. Fluoride. 2006 Jul 1;39(3):163-72.

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[Click here to read the full paper](#)  
[with more details and scientific citations:](#)  
[INTERNATIONAL ACADEMY OF ORAL MEDICINE AND TOXICOLOGY \(IAOMT\)](#)  
[POSITION PAPER AGAINST FLUORIDE USE](#)  
[IN WATER, DENTAL MATERIALS, AND OTHER PRODUCTS](#)  
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