

FLUORIDE EXPOSURE AND HUMAN HEALTH RISKS: A Fact Sheet from the IAOMT

In summary, 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.
 --IAOMT 2017 Position Paper against the Fluoride Use¹

SOURCES OF EXPOSURE

Although fluoride exists naturally in the environment, human exposure to fluoride has drastically increased since the 1940s. Since that time, an array of products containing fluoride and its compounds have been introduced to the average consumer, especially due to fluoride's alleged role in cavities prevention. Products that may contain added fluoride include the following:

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

In addition to these fluoride exposures, industrial pollution of fluoride and its compounds has also increased and can contaminate the air, soil, water, and vegetation in both the immediate vicinity and distant areas.² Anthropogenic sources of atmospheric fluoride can result from coal combustion by electrical utilities and other industries.³ Releases can also occur from refineries and metal ore smelters,⁴ aluminum production plants, phosphate fertilizer plants, chemical production facilities, steel mills, magnesium plants, and brick and structural clay manufacturers,⁵ as well as copper and nickel producers, phosphate ore processors, glass manufacturers, and ceramic manufacturers.⁶

HUMAN HEALTH RISKS FROM FLUORIDE

The impact of the exposure levels generated from *all* of these sources is often overlooked. Yet, this collective exposure can produce lifelong fluoride-related illnesses. Additionally, age, gender, genetic factors, nutritional status, weight, and other factors are known to influence each person's unique reaction to fluoride exposure. Furthermore, authors of a document for the Agency for Toxic Substance and Disease Registry (ATSDR) noted: "Existing data indicate that subsets of the population may be unusually susceptible to the toxic effects of fluoride and its compounds. These populations include the elderly, people with deficiencies of calcium, magnesium, and/or vitamin C, and people with cardiovascular and kidney problems."⁷

"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."

Source: 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.

In a 2006 report by the National Research Council (NRC) of the National Academy of Sciences in which the health risks of fluoride were evaluated, concerns were raised about potential associations between fluoride and osteosarcoma (a bone cancer), bone fractures, musculoskeletal effects, reproductive and developmental effects, neurotoxicity and neurobehavioral effects, genotoxicity and carcinogenicity, and effects on other organ systems.⁸ The following chart includes some of the specific health conditions that have been associated with fluoride exposure:

Table 1: Adverse Human Health Conditions Associated with Fluoride Exposure

Acne and other dermatological conditions ^{9 10 11}	Arterial calcification ¹² and arteriosclerosis ¹³	Bone weakness and risk of fractures ¹⁴	Cancer of the bone, osteosarcoma ¹⁵
Cardiac failure ¹⁶	Cardiac insufficiency ¹⁷	Cognitive deficits ¹⁸	Dental fluorosis ¹⁹
Diabetes ²⁰	Early puberty in girls ²¹	Electrocardiogram abnormalities ²²	Harm to the fetal brain ²³
Hypertension ²⁴	Immune system complications ²⁵	Insomnia ²⁶	Iodine deficiency ²⁷
Lower fertility rates ²⁸	Lower IQ ²⁹	Myocardial damage ³⁰	Neurotoxic effects, including ADHD ³¹
Osteoarthritis ³²	Skeletal fluorosis ^{33 34}	Temporomandibular joint disorder (TMJ) ³⁵	Thyroid dysfunction ^{36 37}

DENTAL FLUOROSIS

Dental Fluorosis Ranging from Very Mild to Severe; Photos from Dr. David Kennedy and used with permission from victims of dental fluorosis.



Fluoride taken into the human body enters the bloodstream through the digestive tract.³⁸ Most of the fluoride not released through urine is stored in the body. It is generally stated that 99% of this fluoride resides in the bone,³⁹ where it is incorporated into the crystalline structure and accumulates over time.⁴⁰ Thus, the teeth and bones are tissues of the body that concentrate the fluoride to which we are exposed.

Exposure to excess fluoride can result in dental fluorosis, a 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.⁴¹ It has been known since the 1940s that overexposure to fluoride causes this condition, which can range from very mild to severe. Dental fluorosis is also recognized as the first visible sign of fluoride toxicity. According to 2010 data from the Centers for Disease Control and Prevention (CDC), 23% of Americans aged 6-49 and 41% of children aged 12-15 exhibit fluorosis to some degree.⁴² These drastic increases of dental fluorosis were a crucial factor in the Public Health Service's decision to lower its water fluoridation level recommendations in 2015.⁴³

IN CLOSING

Clearly, official recommendations on fluoride use, many of which are not enforced, have been based on limited research and have only been updated after irreversible harm has occurred. Informed consumer consent is needed for all uses of fluoride, and this pertains to water fluoridation, as well as all dental-based products, whether administered at home or in the dental office. Providing education about fluoride risks and fluoride toxicity to medical and dental professionals, medical and dental students, consumers, and policy makers is crucial to improving the future of public health. There are fluoride-free strategies in which to prevent dental caries. Given the current levels of exposure, 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.

**FOR DETAILED
INFORMATION ABOUT
FLUORIDE, READ THE
IAOMT'S 2017 FLUORIDE
POSITION PAPER BY
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