

Government Review Finds Fluoride Exposure Is 'Consistently Associated with Lower IQ in Children'

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STORY AT-A-GLANCE

- › A 2024 National Toxicology Program review found consistent evidence linking higher fluoride exposure to lower IQ in children, raising concerns about current water fluoridation practices in the U.S.
- › Prenatal fluoride exposure has been associated with increased behavioral problems in children by age 3, including symptoms related to ADHD, autism and anxiety
- › Research suggests fluoride exposure during pregnancy may alter fetal proteins related to oxidative stress, inflammation and organ function, even at levels considered safe for water fluoridation
- › Multiple studies have linked prenatal fluoride exposure to reduced IQ scores and poorer cognitive performance in children, with effects seen at levels common in fluoridated water supplies
- › To reduce fluoride exposure, consider using high-quality water filters, opting for fluoride-free dental products and being aware of other sources like tea. Breastfeeding or using filtered water for formula is recommended

In the video above, Linda Birnbaum, Ph.D., a highly esteemed scientist with a 40-year career in federal service, shares her perspective on why water fluoridation is outdated. Her concerns stem from alarming evidence showing developmental neurotoxicity risks and a lack of demonstrated effectiveness.

Birnbaum, former director of the National Toxicology Program (NTP), initiated a program before she retired to conduct a review of fluoride's neurotoxicity. It faced many hurdles due to the political nature of water fluoridation. "There is a very, very strong dental lobby that believes fluoridation is protective against tooth decay," she said. "I will say, there is no benefit of ingesting fluoride."¹

After what she describes as a "long arduous process," NTP released a systematic review in August 2024, detailing the evidence linking fluoride exposure to neurodevelopmental and cognitive effects in humans.²

NTP Report Reveals Consistent Evidence of Lower IQ in Children with Higher Fluoride Exposure

The NTP's comprehensive review examined human and animal studies, as well as mechanistic data, to assess the potential health hazards of fluoride exposure. The review process involved extensive literature searches, yielding 25,450 unique references.

After thorough screening, 547 studies were considered relevant for analysis. These included 167 human studies, 339 non-human mammal studies and 60 in vitro/mechanistic studies.³ The NTP's evaluation focused primarily on high-quality, low risk-of-bias studies in children, as these provided the most reliable evidence for assessing the relationship between fluoride exposure and cognitive effects.

The review found 19 low risk-of-bias studies conducted across 15 study populations in five countries, evaluating more than 7,000 children. This robust body of evidence formed the basis for the NTP's conclusions regarding fluoride's impact on children's cognitive development.

The NTP review found, with moderate confidence, that higher fluoride exposures are consistently associated with lower IQ in children. Of the 19 high-quality studies, 18 reported an inverse association between estimated fluoride exposure and IQ scores. These studies included both prospective cohort and cross-sectional designs, providing

consistent evidence across different study populations, locations and exposure assessment measures.

The review noted that the quality of exposure assessment has improved over the years, with more recent studies using individual measures of urinary fluoride to estimate total fluoride exposure. This strengthens confidence in earlier studies that reported IQ deficits with high group-level fluoride exposure.

US Water Fluoridation Likely Lowering Children's IQ

The consistency of findings across various study designs and exposure measures adds weight to the conclusion that higher fluoride exposure is associated with lower IQ in children.

"Although the NTP's systematic review was not intended to define a safe lower dose, the information it compiled provides strong evidence that water fluoridation as done in the US by adding fluoride to a concentration of 0.7 milligrams per liter (mg/L) is very likely to be lowering the IQ of at least some children," Chris Neurath, science director at Fluoride Action Network (FAN), said in a news release.⁴

Further, according to the NTP report, "This review finds, with moderate confidence, that higher estimated fluoride exposures (e.g., as in approximations of exposure such as drinking water fluoride concentrations that exceed the World Health Organization Guidelines for Drinking-water Quality of 1.5 mg/L of fluoride) are consistently associated with lower IQ in children."⁵

Additionally, the review found some evidence suggesting that fluoride exposure may be associated with other [neurodevelopmental effects in children](#), such as attention deficit hyperactivity disorder (ADHD) and attention-related disorders. Despite these risks, water fluoridation remains widespread.

Fluoride is ubiquitous in your environment, coming from various sources including drinking water, foods, beverages, industrial emissions, pharmaceuticals and pesticides.

Approximately 67% of the U.S. population receives fluoridated water through community water systems.⁶

The U.S. Public Health Service has recommended adding fluoride to drinking water since 1962, with the current recommendation being 0.7 mg/L. However, according to the NTP report, "For many years, most fluoridated community water systems used fluoride concentrations ranging from 0.8 to 1.2 milligrams/liter (mg/L)."⁷

Since you receive fluoride from multiple sources, not just drinking water, your total fluoride exposure could be even higher than expected, even if you live in an area with fluoridated water. When gauging your own health risks, it's important to consider your total fluoride exposure from all sources, especially if you have young children or are pregnant, given the risks to neurodevelopment.

Prenatal Fluoride Exposure Linked to Behavioral Problems in Children

Another groundbreaking study provides some of the strongest evidence yet that fluoride exposure during pregnancy may harm children's developing brains.⁸ Researchers found that higher fluoride levels in pregnant women's urine were associated with increased behavioral problems in their children by age 3.

This includes symptoms related to ADHD, autism, anxiety and overall neurobehavioral issues. The study, conducted in Los Angeles where water is fluoridated, is the first to examine these effects in a U.S. population.

The researchers measured fluoride levels in urine samples from 229 pregnant women during their third trimester. When the children were around 3 years old, their mothers filled out a standardized questionnaire about their behavior.

A 0.68 mg/L increase in the mother's urinary fluoride (about the difference between fluoridated and non-fluoridated areas), was associated with an 83% higher chance of the child scoring in the "borderline" or "clinical" range for total behavioral problems.⁹ Higher

fluoride was also linked to more emotional reactivity, anxiety, somatic complaints, such as pain or fatigue, and autism spectrum symptoms in the children.

Fluoride's Effects on the Developing Brain

These findings align with a growing body of research suggesting fluoride can be neurotoxic, especially during critical periods of brain development. Animal studies have found that fluoride exposure during gestation and early life can alter brain biochemistry in ways that may contribute to neurodevelopmental disorders.

Specifically, it appears to increase oxidative stress, disrupt glutamate and acetylcholine signaling, and potentially **interfere with thyroid function** – all of which play important roles in healthy brain development.¹⁰

In humans, several studies in Canada and Mexico have also linked fluoride exposure during pregnancy to reduced IQ scores and poorer cognitive performance in children.¹¹

A pilot study examining cord blood from second-trimester pregnancies found significant associations between maternal serum fluoride levels and changes in fetal proteins.¹² Even at fluoride levels below or near the U.S. Centers for Disease Control's (CDC) recommended concentration for water fluoridation, researchers observed alterations in the fetal cord blood proteome.

This suggests that fluoride exposure during pregnancy may have more far-reaching consequences than previously thought.

The study revealed that as maternal fluoride levels increased, there were changes in fetal proteins related to oxidative stress and inflammation. Specifically, proteins involved in responding to toxic substances and cellular oxidant detoxification were upregulated. Additionally, proteins associated with peroxidase activity and oxidoreductase processes showed increased activity.

These findings provide the first human evidence of fluoride-related mechanisms that were previously only observed in animal studies. The implications are significant, as

oxidative stress and inflammation during fetal development are known risk factors for various health issues, including developmental neurotoxicity.

Fluoride's Effects on Vital Organs and Blood Function

The research also shed light on how fluoride exposure may impact vital organs and blood function in developing fetuses.¹³ Ingenuity Pathway Analysis of the cord blood proteins revealed that increasing maternal fluoride concentrations were associated with negative effects on kidney and liver function – organs that play crucial roles in systemic detoxification and are known to accumulate more fluoride than other organs in the body.

Furthermore, the study found that proteins related to the complement cascade, an important part of the immune system, were downregulated as maternal fluoride levels increased. This decrease in complement cascade activity is associated with inflammation, which can have wide-ranging effects on fetal development.

The research also indicated changes in proteins related to blood clotting, suggesting that fluoride exposure may influence blood function in developing fetuses. These findings underscore the potential for low-level fluoride exposure during pregnancy to have systemic effects on fetal development. This means even fluoride levels considered "safe" for water fluoridation may have unintended consequences for fetal development.

More Evidence Links Prenatal Fluoride Exposure to Lower IQ

Additional research also adds to the growing body of evidence that fluoride exposure during pregnancy may harm children's cognitive development. Researchers analyzed data from three prospective studies, including one from Denmark with lower fluoride levels, to examine the relationship between maternal urine fluoride levels during pregnancy and children's IQ scores.¹⁴

While the Danish cohort alone didn't show a clear association at its relatively low exposure levels, combining data from all three studies revealed a significant link. The researchers calculated a benchmark concentration of 0.47 mg/L, with a lower

confidence limit of 0.28 mg/L. This means adverse effects on children's cognitive abilities may occur at fluoride levels lower than previously thought – levels common in many fluoridated water supplies.

The strongest associations were seen with prenatal exposure. In the Mexican cohort, adjusting for children's own fluoride exposure only marginally reduced the association between maternal levels and IQ.

These findings raise serious questions about current fluoridation practices. As the researchers noted, "The pooling of results from three prospective cohorts conducted in areas with wide ranges of overlapping exposure levels offers strong evidence of prenatal neurotoxicity, and these findings should inspire a revision of water-fluoride recommendations aimed at protecting pregnant women and young children."¹⁵

How to Protect Yourself and Your Family from Fluoride

If you live in an area with fluoridated water, using a high-quality water filter certified to remove fluoride is one option to consider. Also opt for fluoride-free dental products, and be aware that certain foods and beverages like black and green teas can also contain significant fluoride. For infants, breastfeeding is the best option, as breastmilk contains little, if any fluoride.

If this isn't possible, using filtered, fluoride-free water to reconstitute formula is important to reduce early-life exposure.

It's important to note that even in non-fluoridated areas, some foods and products can contribute to fluoride intake. As research in this area continues to evolve, staying informed about the risks will help you make the best choices to protect your family's health and support optimal brain development in children.

Toward that end, when considering water filtration options to remove fluoride, you have several choices. Reverse osmosis, deionizers and activated alumina absorption media are effective at reducing fluoride levels.¹⁶ Distillation, though not technically filtration,

also removes fluoride. However, common carbon filters like PUR and Brita, as well as water softeners, do not filter out fluoride.

For comprehensive protection, consider installing a high-quality, whole-house water filtration system. Ideally, filter water both at the point of entry and at exit points like showers and kitchen sinks. This approach is particularly important when preparing infant formula. Each filtration method has its pros and cons.

Reverse osmosis (RO) removes about 80% of fluoride along with other contaminants, but requires regular maintenance to prevent bacterial growth. A tankless RO system with a compressor may be your best option, though professional installation might be needed.

Ion exchange filters remove dissolved salts and soften water but can have issues with bacterial contamination. They're often combined with carbon filters for better results. Granular-activated carbon filters are common in countertop and undercounter systems. They effectively remove organic contaminants and chemicals like chlorine and pesticides. However, they may not be as effective against hydrogen sulfide and require regular replacement.

For optimal fluoride removal, consider combining a granular-activated carbon filter with bone char, which has shown excellent results in studies.¹⁷ Whatever system you choose, ensure it fits your needs and budget while providing effective fluoride reduction. Keep in mind, too, that [achieving optimal oral health](#) and cavity prevention shouldn't involve drinking fluoridated water or using toothpaste containing fluoride.

While your toothbrush and fluoride-free toothpaste are essential tools, they're far from the sole options for dental care. Various natural substances, including the foods you consume, play a significant role in enhancing not only your dental health but also your overall well-being.

Sources and References

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