

Water Fluoridation: Science and Advocacy

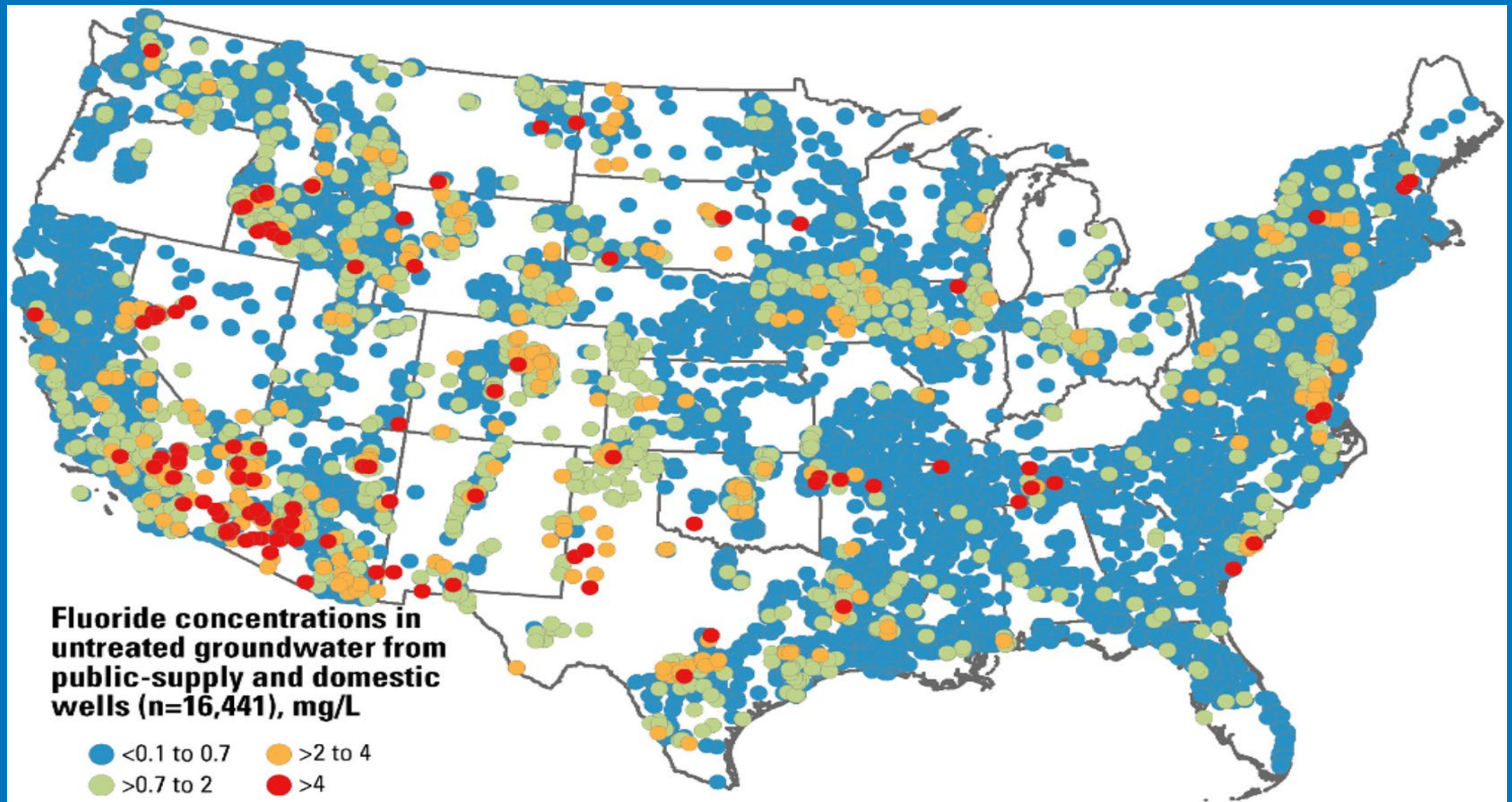
Mid States Dental Leaders Conference
Elizabeth C. Lense, DDS, MSHA, FAAOMP
August 7, 2026



Fluoride occurs naturally in...



- Rocks, soil
- Plants
- Air
- Water
 - Lakes, Rivers- 0.2 ppm
 - Groundwater- 0.2- >10 ppm
 - Ocean- 0.8- 1.4 ppm



History

- In 1901, Dr. Fredrick McKay identified “Colorado brown stain” on teeth, and invited Dr. G.V. Black to help find cause...
- Eventually, discovered to be fluoride in water
- Dr. Henry Klein examined >8,200 Al children around the SW; higher fluoride areas had less decay.
- Dr. Trendly Dean & assoc noted in areas around 1 ppm F less decay and no brown stains- can we replicate nature?



Dr. Fredrick McKay

Fluoridation Trials

- USPHS-NIDR; MI Dept Health, U Michigan worked together to design and run trials
- Trials cities paired w/similar control cities; started in 1945
- **Grand Rapids-** Muskegon, MI
- **Newburg-** Kingston, NY
- **Evanston-** Oak Park, IL
- **Brantford-** Sarnia, Ottawa
- Children born after fluoridation started had **SIXTY PERCENT LESS DECAY** in test cities



NIDR dentists examined these Grand Rapids schoolchildren once a year to document the effects of fluoridation

Fluoride in the U.S.

- In 2015, **USPHS** recommended water supplies be fluoridated at **0.7 mg/L (ppm)**.
- Water fluoridation is regulated by the EPA.
- **Primary** Max allowable level is 4.0 ppm; **Secondary** level is 2.0 ppm- water utilities need to inform consumers if natural levels are greater than 2.0 ppm.

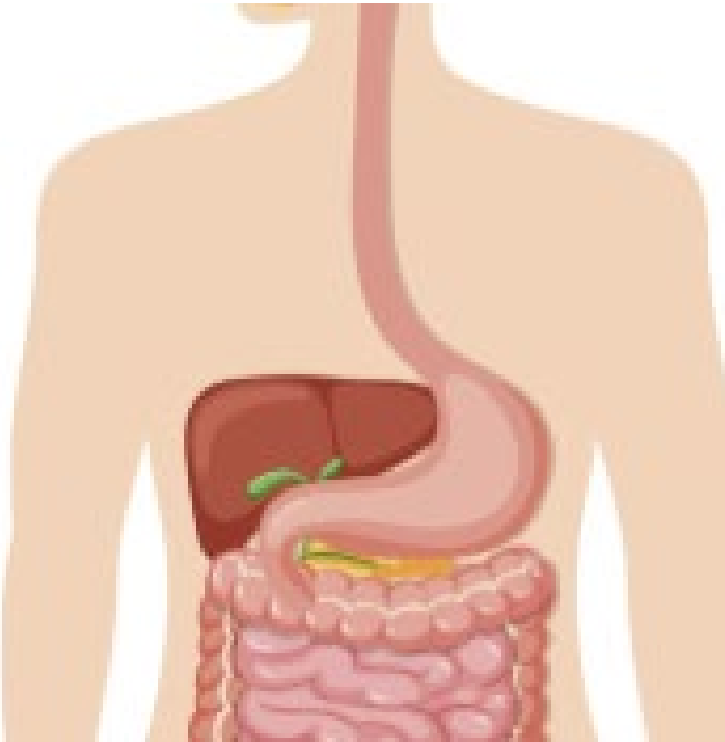
Fluoride: Small Solution. Big Benefits.

The U.S. Department of Health and Human Services announced a recommendation that community water systems adjust the amount of fluoride to **0.7 mg/L** to achieve an optimal fluoride level to help prevent tooth decay.

Just how much is 0.7 milligrams per liter of water? It's like ...

Visual Representation	Comparison
	1 inch in 23 miles
	1 minute in 1,000 days
	1 cent in \$14,000

How does fluoride work?...



Fluoride
Fluoride strengthens teeth and reduces your risk of cavities. Specifically, fluoride:

 Remineralizes your tooth enamel.	 Reverses early tooth decay.
	

**Why are
we still
fluoridating?**



Tooth decay is still a problem in the U.S.

- By age 8, over half of children have had a cavity; by age 18, over 2/3 have had a cavity
- **Children from low-income households are twice as likely to have cavities as children from higher-income households.**
Fluoridation reduces income disparities.
- On average, 34 million school hours are lost each year because of emergency dental care, and over \$45 billion in US productivity is lost each year due to untreated dental disease.
- In 2022, the total annual cost of ED visits for Non-Traumatic Dental Conditions rose to \$3.9 billion.

“But those baby teeth are going to fall out, right?”



- Infections in primary teeth can result in pain, problems with nutrition, speech delay, and lost school hours.
- Infections can spread to the brain or close off the airway
- Kids with ECC have a much higher incidence of decay in their permanent teeth.

Fluoridation works!

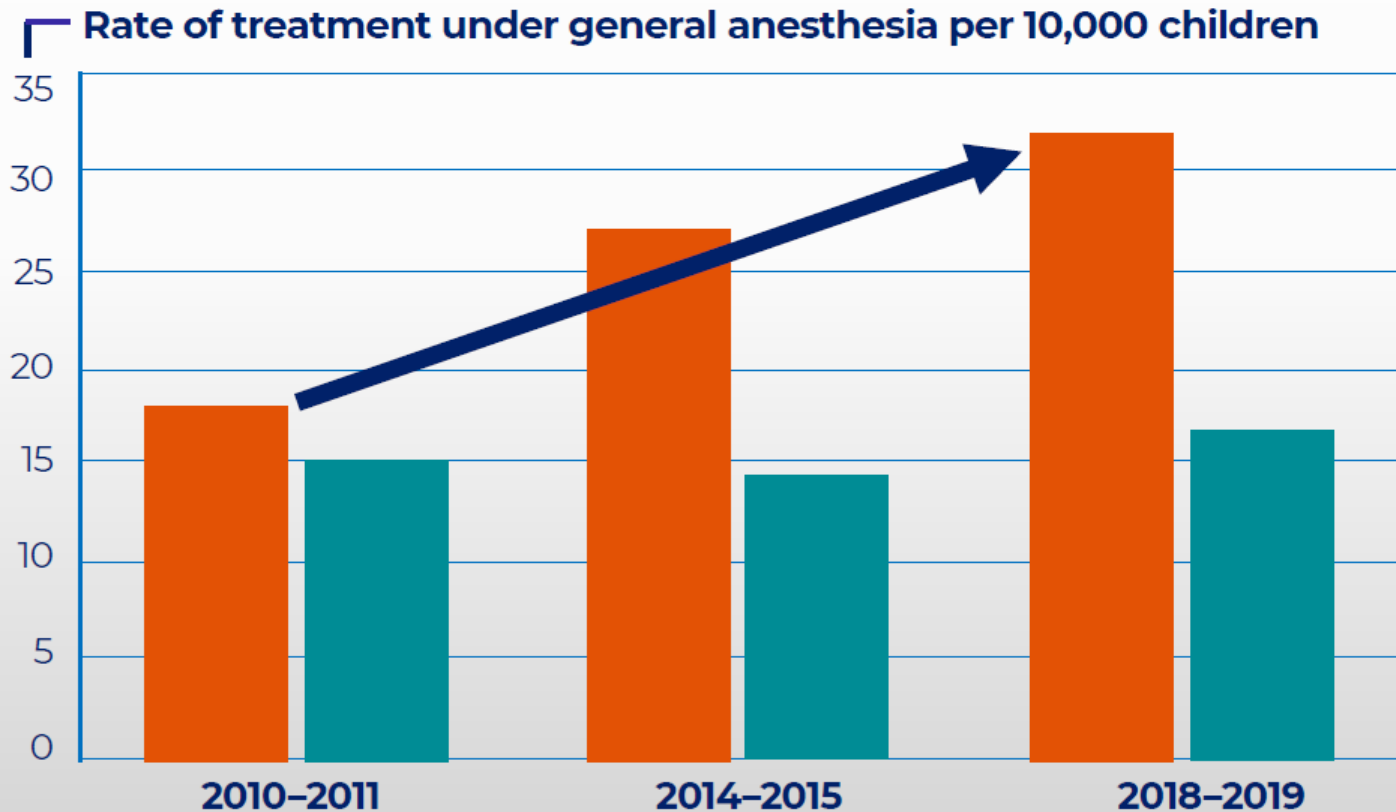
- More than 80 years of evidence from all over the world.
- 2015 Cochrane review, kids receiving fluoridated water had 35% fewer decayed primary teeth, 26% fewer decayed permanent teeth.
- CDC states overall, reduction of at least 25%.
- Systematic Reviews conducted in last 25 years include,
 - York (2000)
 - Comm Prev Services Task Force (2013)
 - Cochrane (2015, 2024)
 - Australia (2017); New Zealand (2021, 2024)
 - Belotti (2022)

How severe decay is treated

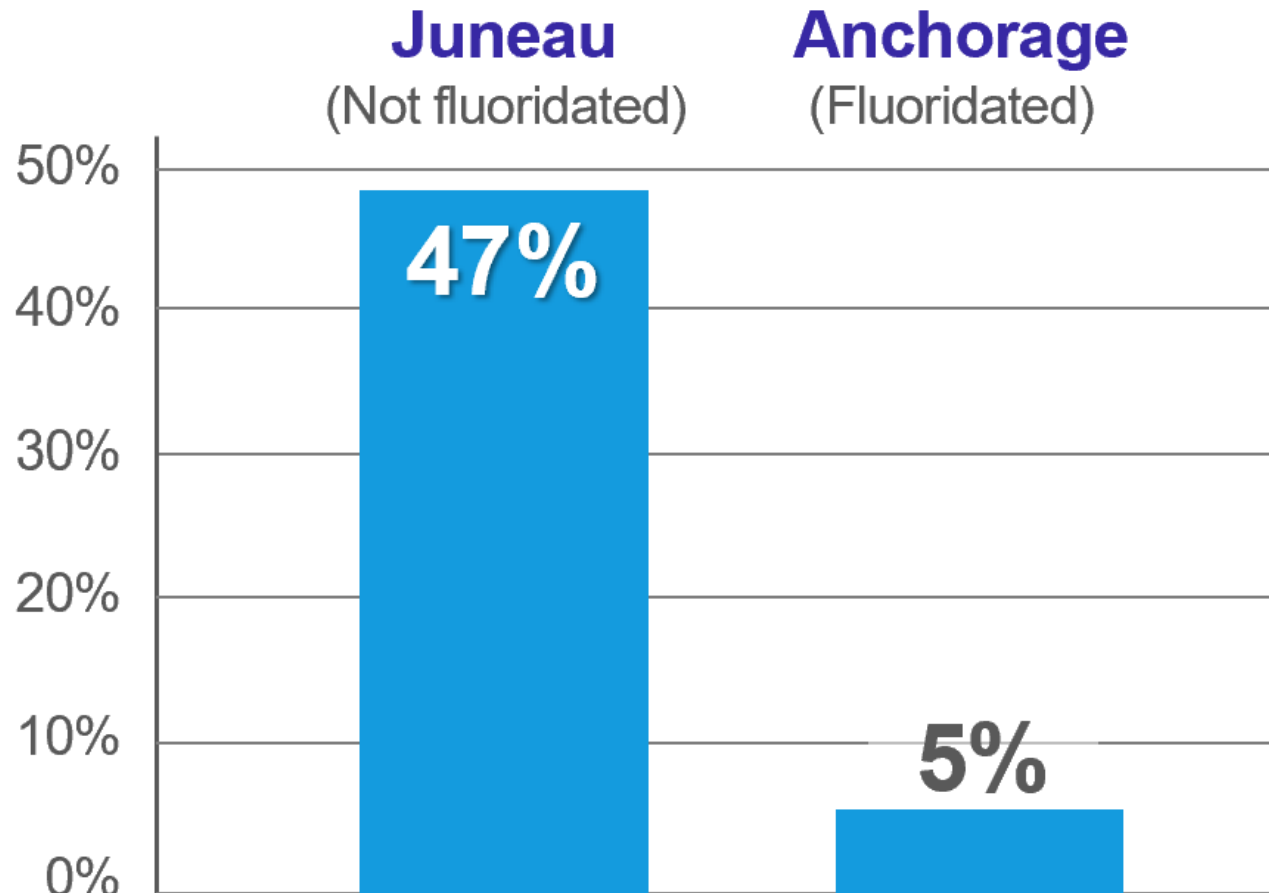
The need for GA treatment in Calgary rapidly increased

The GA treatment rate in **Calgary** jumped by 78%.

■ Calgary children
■ Edmonton children



If fluoride stops- decay & costs go up!



(**Source:** J. Meyer et al., “The Impact of Water Fluoridation on Medicaid-Eligible Children and Adolescents in Alaska,” *Journal of Primary Prevention*, 2022)

- In 2007, the city of Juneau decided to stop fluoridating, but Anchorage continued.
- Prior to stopping, the cities had comparable costs for treating decay.
- Nine years later, a study looked at increases in the avg per child cost to treat dental decay.

Providing **optimally fluoridated water** to
U.S. communities for one year saves

\$6.5B

in dental treatment costs and offers an
average **return on investment** of
\$20 for every **\$1** spent

On average, communities with water fluoridation
experience **25% fewer** cavities, saving **\$32 per
person annually** by avoiding dental treatment costs
and leading to fewer missed work and school days.

Economic benefits of fluoridation

- Studies from LA, TX, and NY showed Medicaid dental costs were lower in fluoridated communities.

Research Brief

State-Level Costs of Removing Fluoride from Community Water Systems

Authors: Deesha Bhaumik, PhD; Rebecca Starkel Weninger, PhD

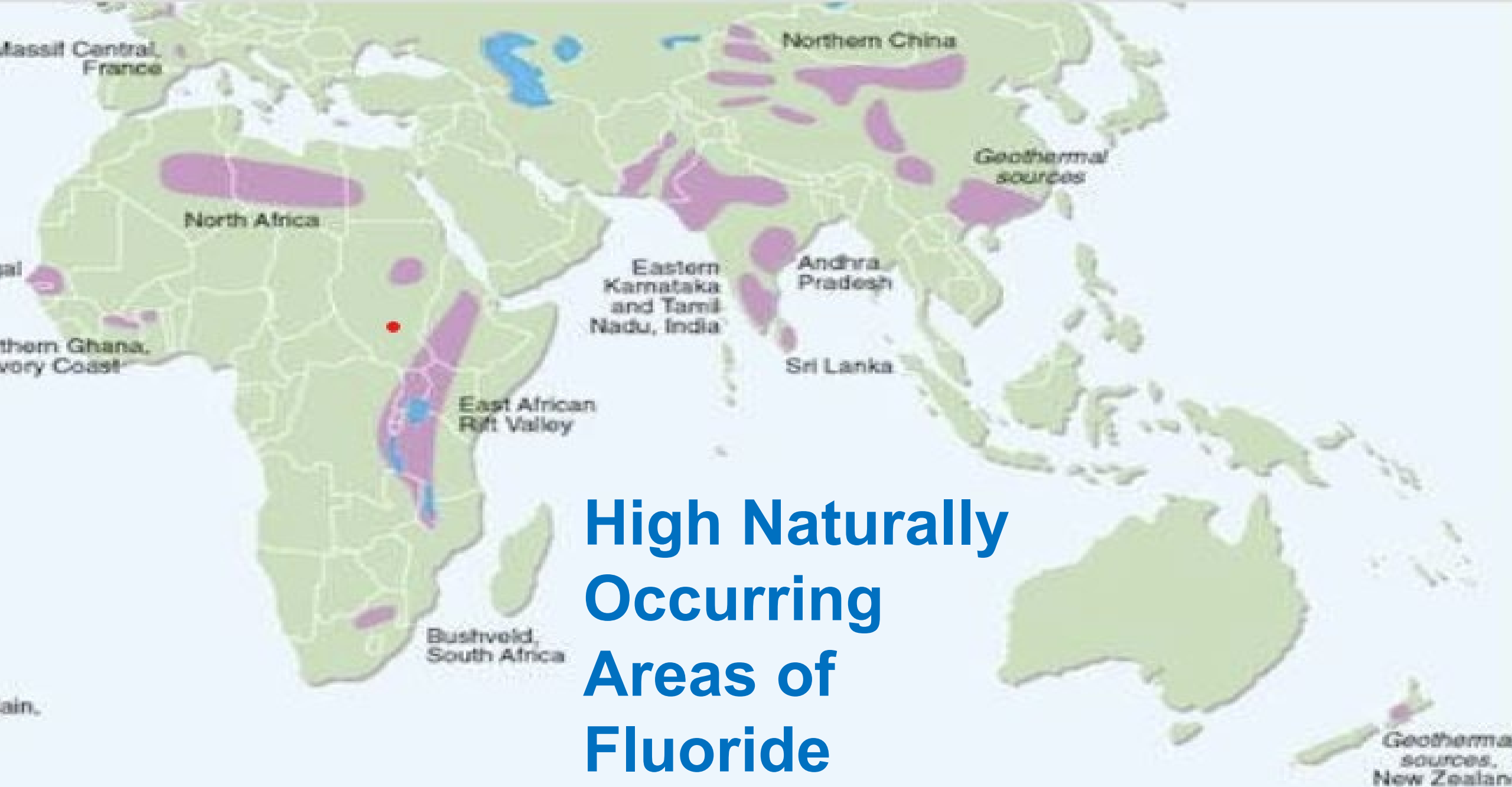
The Health Policy Institute (HPI) is a thought leader and trusted source for policy knowledge on critical issues affecting the U.S. dental care system. HPI strives to generate, synthesize, and disseminate innovative research for policy makers, oral health advocates, and dental care providers.

Key Messages

- *Decades of scientific evidence show that community water fluoridation (CWF) is a safe and effective means of preventing tooth decay, especially among children. Despite continued recommendation of fluoridated water from health organizations, several states are considering banning CWF based on guidance from the federal government.*
- *The estimated five-year costs associated with removing fluoride from community water systems in the U.S. is \$46 billion.*
- *Removing fluoride from community water systems – especially if combined with a ban on fluoride supplements – would not only deal a major blow to the nation's oral health, but would also entail major economic costs.*

But is water fluoridation safe?





High Naturally Occurring Areas of Fluoride

Opposition to Fluoridation

- Started with fluoridation in 1940s
- Communist Conspiracy
- Numerous groups have opposed- John Birch, Ku Klux Klan, Green Project
- Internet has made opposition more mainstream
- Accusations that fluoride causes... thyroid problems, arthritis, osteosarcoma, Down Syndrome, Alzheimer's, heart disease, kidney disease, hip and bone fractures, pineal gland disorders.... Neurocognitive effects???



Do you realize that fluoridation is the most monstrously conceived and dangerous communist

- Claims about effect of fluorides on IQ and neurodevelopment started at least 40 years ago
- Largely ignored because studies were consistency poor quality and conducted in impoverished rural areas in endemic fluorosis regions of China and India
- Gained traction in past several years, particularly due to Canadian **Maternal-Infant Research on Environmental Chemicals (MIREC)** study

Fluoridation and Lower IQ: The Claim *Du Jour*

The study that sparked most of the attention on fluoride and IQ

JAMA Pediatrics | Original Investigation

Association Between Maternal Fluoride Exposure During Pregnancy and IQ Scores in Offspring in Canada

Rivka Green, MA; Bruce Lanphear, MD; Richard Hornung, PhD; David Flora, PhD; E. Angeles Martinez-Mier, DDS; Raichel Neufeld, BA; Pierre Ayotte, PhD; Gina Muckle, PhD; Christine Till, PhD

Green et al. JAMA Pediatr
2019;173(10):940-8.

<https://jamanetwork.com/journals/jamapediatrics/fullarticle/2748634>

- Secondary analysis of Canadian birth cohort study
- Measured fluoride in maternal **spot** urine samples from biobank
- **Research assistants measured IQ, age 3**
- **Overall, no association...**so they tested it by sex
- “1-mg/L increase in MUF_{SG} was associated with a 4.49-point lower IQ score in boys, but there was no statistically significant association with IQ scores in girls.

Some of the Major Weaknesses of Green et al. Study

- Spot urine is invalid measure of F exposure
- Poor reliability of IQ measurements
- The linear regression line does not fit the data very well: primary model accounted for < 5% of variability in IQ
- Despite funding from NIEHS, investigators have refused to share data with outside investigators for independent analysis

National Toxicology Program (NTP)

- Headquartered in NIEHS (NIH)
- Due to recent studies, NTP decided in 2019 to conduct systematic review
- To ensure integrity, NTP asked National Academies of Sciences, Engineering, and Medicine (NASEM) to review its monograph
- Extensive criticism by NASEM on first two drafts on methodology, bias, analysis, and conclusions
- NTP bypassed NASEM and selected its own reviewers for final version.
- <https://nap.nationalacademies.org/catalog/25715/review-of-the-draft-ntp-monograph-systematic-review-of-fluoride>
- <https://nap.nationalacademies.org/catalog/26030/review-of-the-revised-ntp-monograph-on-the-systematic-review-of-fluoride-exposure-and-neurodevelopmental-and-cognitive-health-effects>

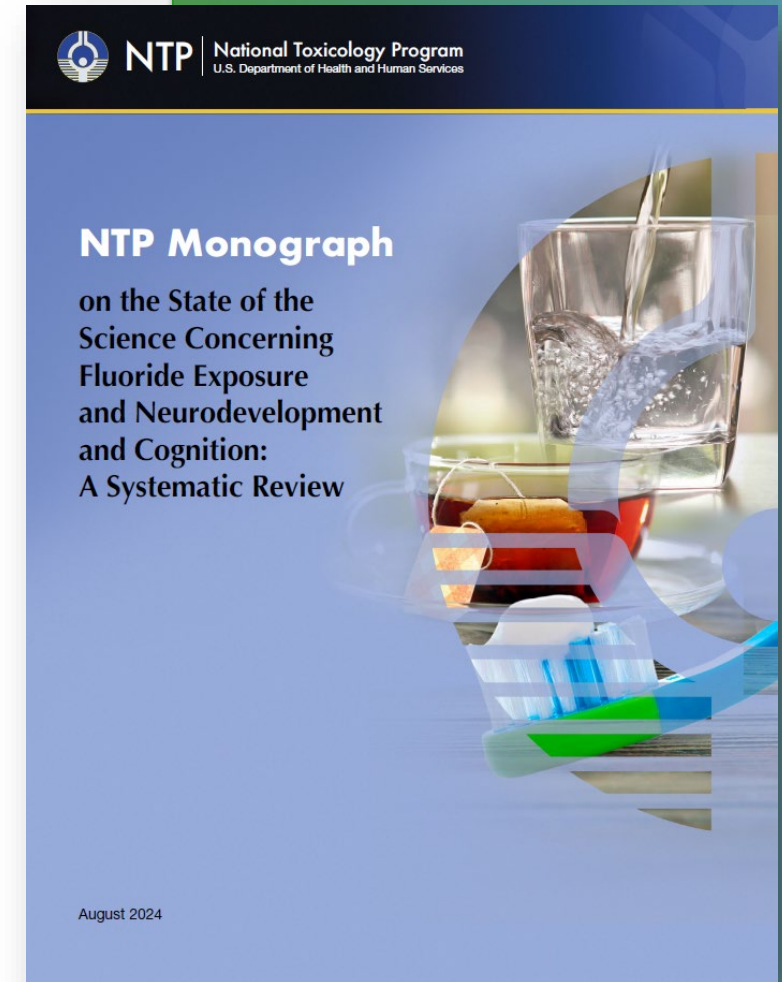
NASEM critique (2020)

- National Academies of Science, Engineering and Medicine review of the NTP report: “The monograph falls short of providing a clear and convincing argument that supports its assessment [that fluoride is a neurotoxin].
- It also needs to emphasize that much of the evidence presented comes from studies that involve relatively high fluoride concentrations and that the monograph cannot be used to draw conclusions regarding low fluoride exposure concentrations (less than 1.5 mg/L), including those typically associated with drinking water fluoridation.” _David Savitz, PhD

NTP Report on Fluoride and Neurodevelopment

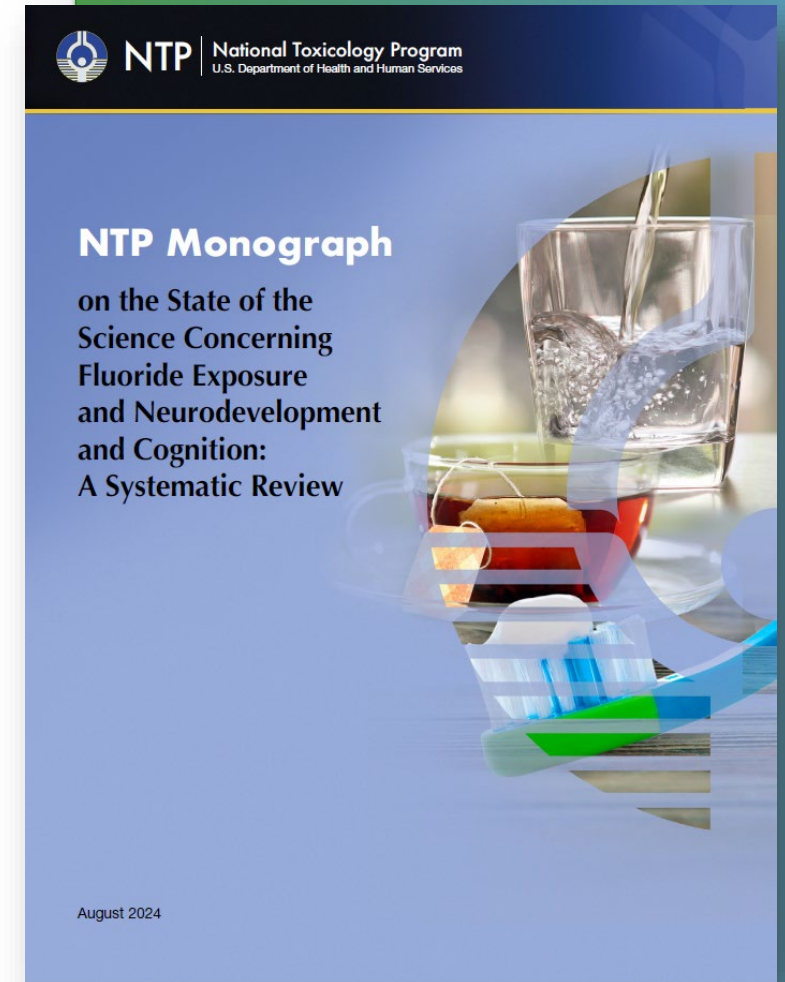
- Experimental animal studies inconclusive
- Included 72 studies on IQ in children
- **53 of those (74%) were judged by authors to be low quality studies at high risk of bias**
- 66 (92%) from China (47), India (15), or Iran (4)
- 19 papers published in non-peer-reviewed, anti-fluoridation journal *Fluoride*
- 13 non-peer-reviewed papers translated from Chinese by Fluoride Action Network, an anti-fluoridation group
- No studies from US

https://ntp.niehs.nih.gov/sites/default/files/2024-08/fluoride_final_508.pdf



Final NTP Report on Fluoride and Neurodevelopment

- “This Monograph and Addendum **do not address** whether the sole exposure to fluoride added to drinking water in some countries (i.e., **fluoridation, at 0.7 mg/L in the United States and Canada**) is **associated with a measurable effect on IQ**”
- “...association between fluoride exposure and children’s IQ is based primarily on studies with estimated fluoride exposures higher than what is generally associated with consumption of optimally fluoridated water in the United States.”

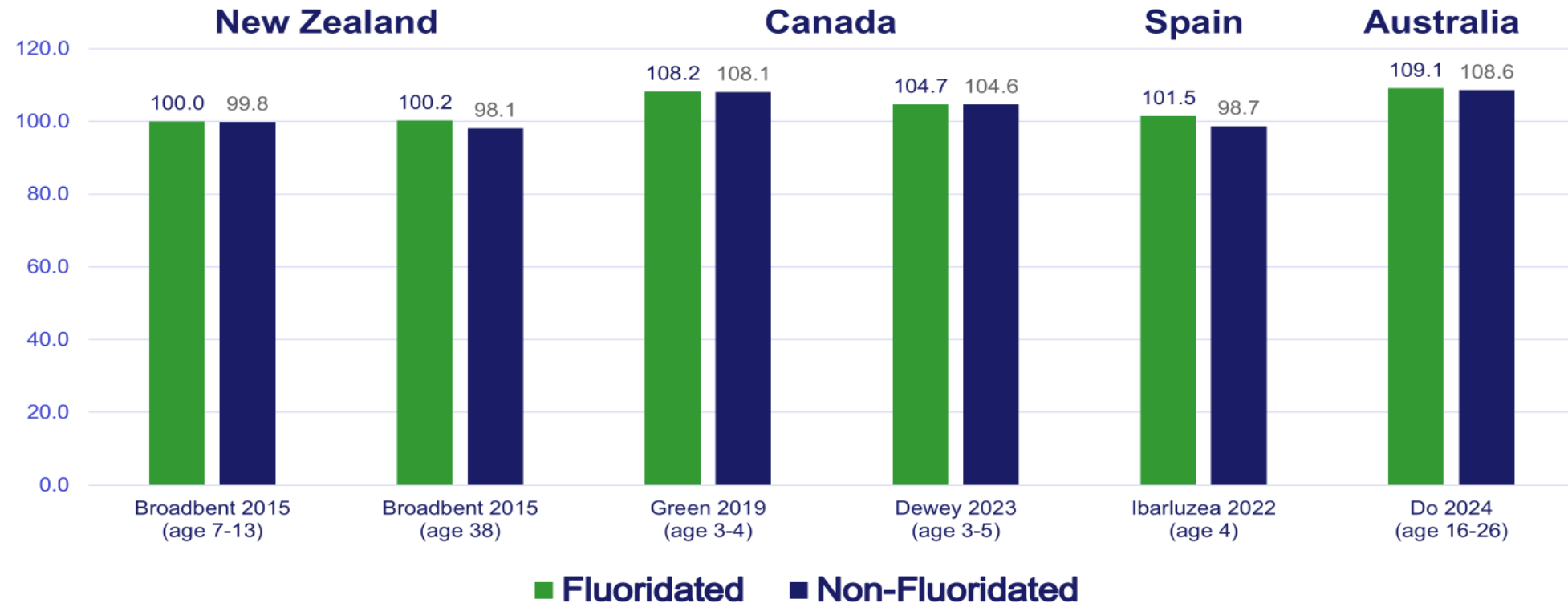


2025 Systematic Review and Meta-Analysis of Fluoride and IQ*

- Same authors as NTP report
- Hazard assessment removed from draft NTP Report, but same problems:
 - 59 studies used for mean effect analysis: 47 (80%) at high risk of bias; 93% of studies from China, India, Pakistan, or Iran
 - Evidence of high heterogeneity and publication bias
- No association between measures of F exposure and children's IQ in studies from Canada, Denmark, New Zealand, or Taiwan

* Taylor KW et al. JAMA Pediatr 2025. <https://jamanetwork.com/journals/jamapediatrics/fullarticle/2828425>

Cohort Studies at Community Water Fluoridation Levels Mean IQ or Cognition Scores, by Fluoridation Status



SMILECON is a registered trademark of the American Dental Association.

New US Study* on CWF Exposure and Cognition

- Data from High School and Beyond, which began as nationally representative probability sample of 58,270 sophomores and seniors in **1,020 American high schools** in 1980. They were reinterviewed at ~ age 60.
- Randomly selected subset of **26,820 sample members** selected for follow-up, reinterviewed on several occasions through 2021; 58% response rate among survivors in 2021
- Using schools' geolocations, characterized sample members' fluoride exposure from conception through secondary school, using data from CDC's Fluoridation Census and US Geological Survey data.
- JR Warren et al. Childhood fluoride exposure and cognition across the life course. Sci. Adv. 11, eadz0757(2025). DOI:10.1126/sciadv.adz0757

Results

- For each measure of adolescent cognitive performance, students performed better if they were exposed to sufficient levels of fluoride—either throughout childhood, or during part of childhood
- Fluoride exposure not statistically significantly associated with cognitive functioning at age ~60, but point estimates were also positive

Fluoride and IQ Study (Warren, April 2026)

- Analyzed 10,317 individuals who graduated from high school in 1957 in WI
- Used historical municipal records to determine fluoride exposure and standardized tests (Henmon-Nelson and WAIS) to measure intelligence.
- No IQ Impact: The researchers found no significant association between childhood exposure to fluoridated water and IQ scores measured at age 16.
- Lifetime Cognition: Exposure did not predict cognitive performance or decline in later life, specifically at ages 53, 64, 72, and 80.
- Consistent Results: These findings remained stable regardless of how long a participant lived in a fluoridated community or whether they moved.

"Municipal water fluoridation, adolescent IQ, and cognition across the life course: Evidence from the Wisconsin Longitudinal Study" was published in the Proceedings of the National Academy of Sciences (PNAS)

Food & Water Watch, Inc. vs. EPA

- Judge Edward Chen handed down a ruling on September 24, 2024, against the EPA. He stated that **“fluoridation of water at 0.7 mg/L poses an unreasonable risk of reduced IQ in children.”**
- Although he noted there was no evidence of any harm.
- The ruling cited the NTP monograph over 120 times but went much further than NTP’s conclusion.
- EPA appealed the ruling on July 25, 2025, citing judicial overreach
- **Appellate court overturned Judge Chen’s verdict- sent back to lower court on May 22, 2026.**

SUMMARY

- **No association between community water fluoridation (CWF) and changes in IQ**
- NTP report and subsequent meta-analysis based almost entirely on low quality studies conducted in endemic fluorosis regions of the world, with evidence of publication bias
- Judge's decision in lawsuit against EPA relied heavily on NTP report and reached conclusions unsupported by best available evidence
- Negative effects on US public health



Advocating for Fluoridation

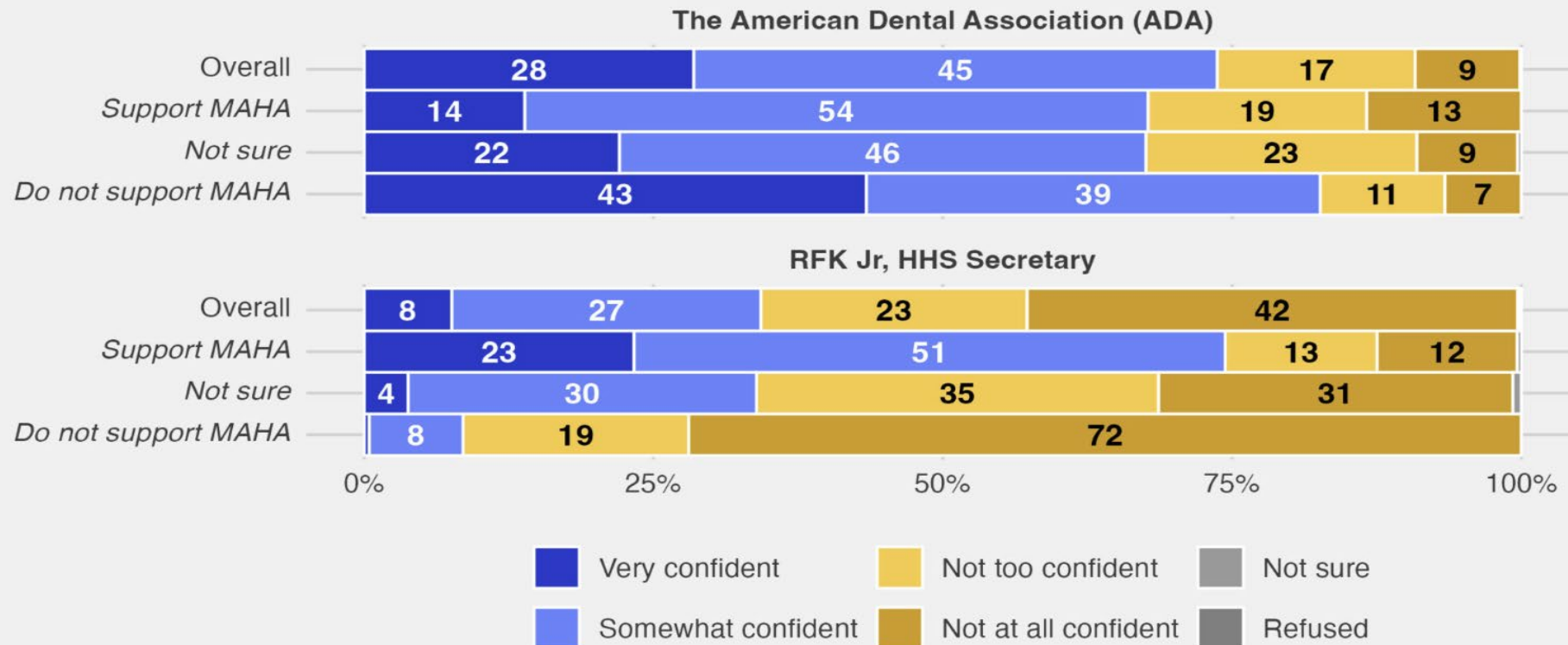
HEALTHY
COMMUNITIES

BUILD HEALTHY
FAMILIES

Annenberg Foundation Survey, June 2026

Confidence in the American Dental Association vs RFK Jr

In general, how confident, if at all, are you that _____ is providing the public with trustworthy information about the health effects of fluoride in drinking water? [by MAHA support]



Source: Annenberg Science and Public Health (ASAPH) Survey Apr. 2026, N=1639, MOE=+/-3.5%
 ©2026 Annenberg Public Policy Center, University of Pennsylvania

Best Sources of Fluoridation Information

Fluoridation Facts
and ADA Fluoride
website

Call ADA, State
Dental Association,
State/Local Health
Dept

Michigan Oral
Health Coalition
Fluoridation Toolkit

NIH/Fluoride Fact
Sheet for Health
Professionals

CDC Water
Fluoridation website

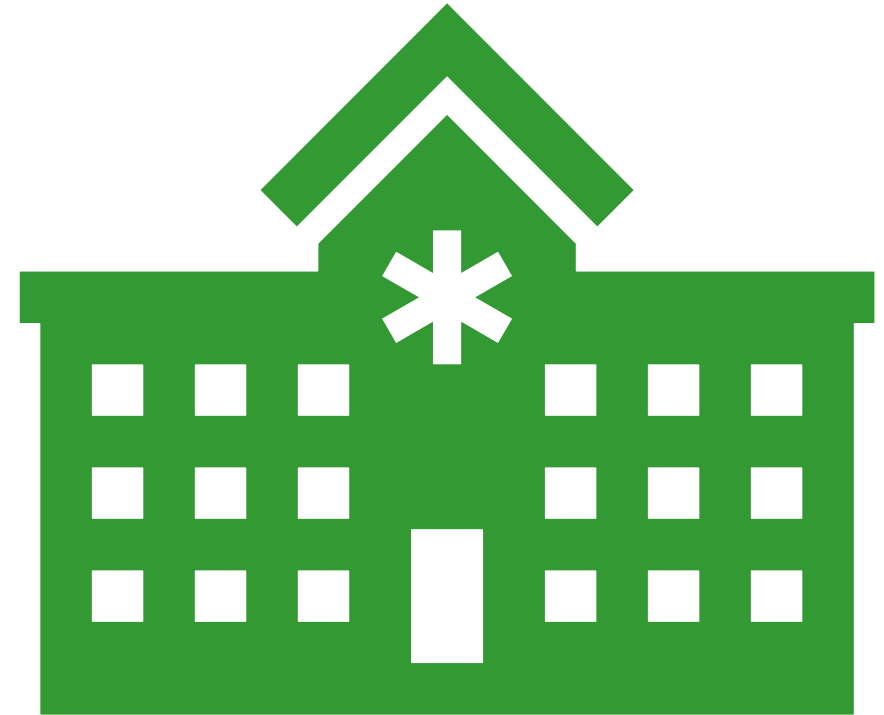
CDC Scientific
Statement on Water
Fluoridation

American
Fluoridation Society

AAP Campaign for
Dental Health-
ilikemyteeth.org/blog

Tips for Defending Water Fluoridation

- **Talk to your patients**
- **You are not alone!** Others in the community care- hygienists, pediatricians, family physicians, and school nurses
- Talk about oral health, patients... avoid too much science, our expertise is our patients' oral health.
- Know your water operators and utilities board
- Get in touch with local media outlets- be their trusted source.



Don't give up!

ADA Resources

- National Fluoridation Advisory Committee- 8 members
 - Dr. Scott Tomar, ADA Fluoridation Spokesperson
- ADA Rapid Response Team- Paul O'Connor (SGA); Katherine Merullo (Comms); Bob Burns (Fed/Reg); Liz Lense (Sci/Local)
- Recent efforts:
 - State Legis Challenges- 2026: 15 States/21 bills => NO new bans
 - FDA- Banning Fluoride Supplements- letter, grassroots appeal, testimonies
 - EPA vs. Food & Water Watch, Inc.- talking points, amicus brief
 - EPA Fluoride Toxicity Assessment- letter, grassroots appeal

***New Educational Resources- State Association Training Videos**

Want to be a Fluoridation Ambassador?



Questions:

- Dr. Elizabeth Lense
- Email: lensee@ada.org