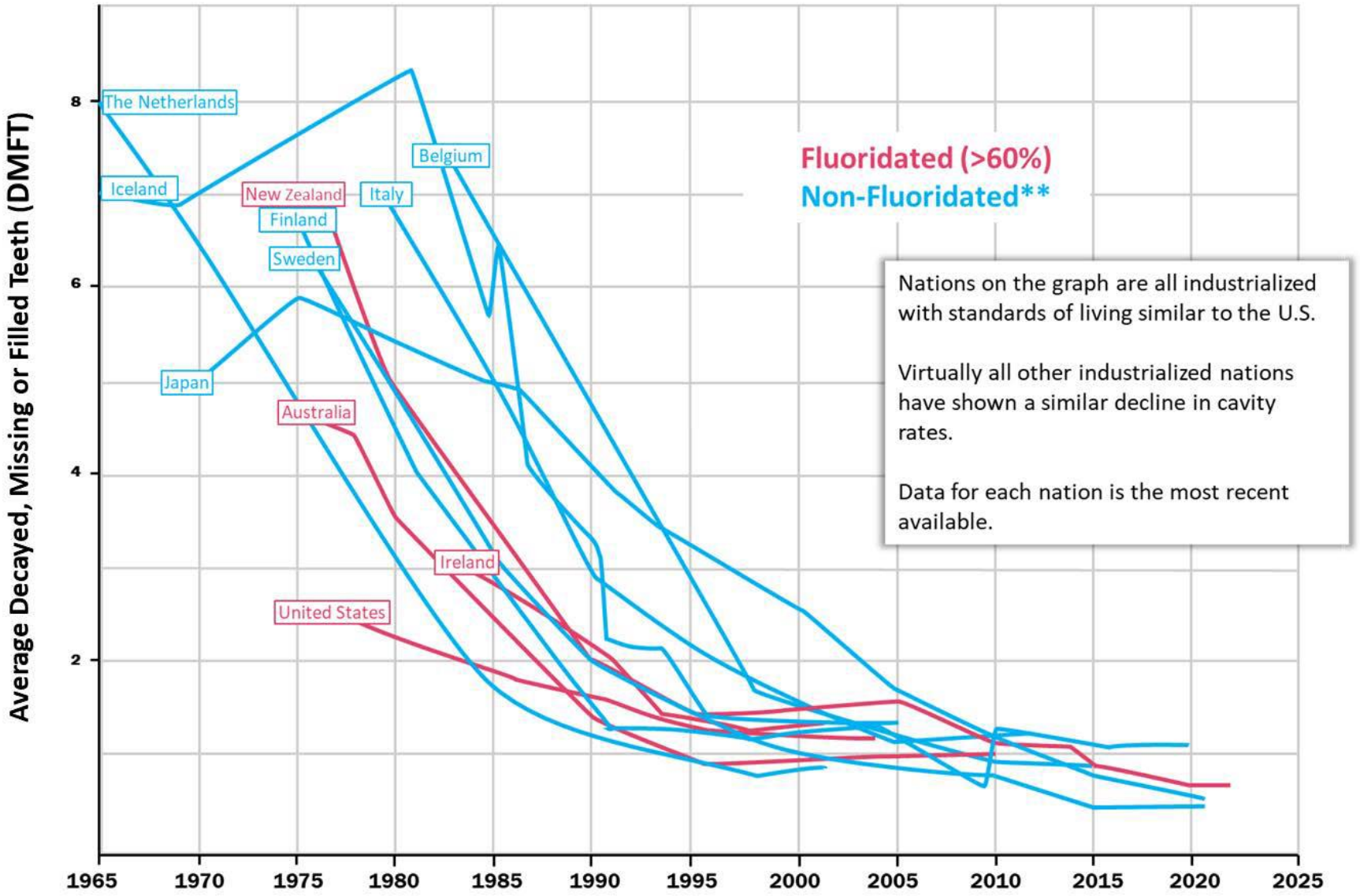
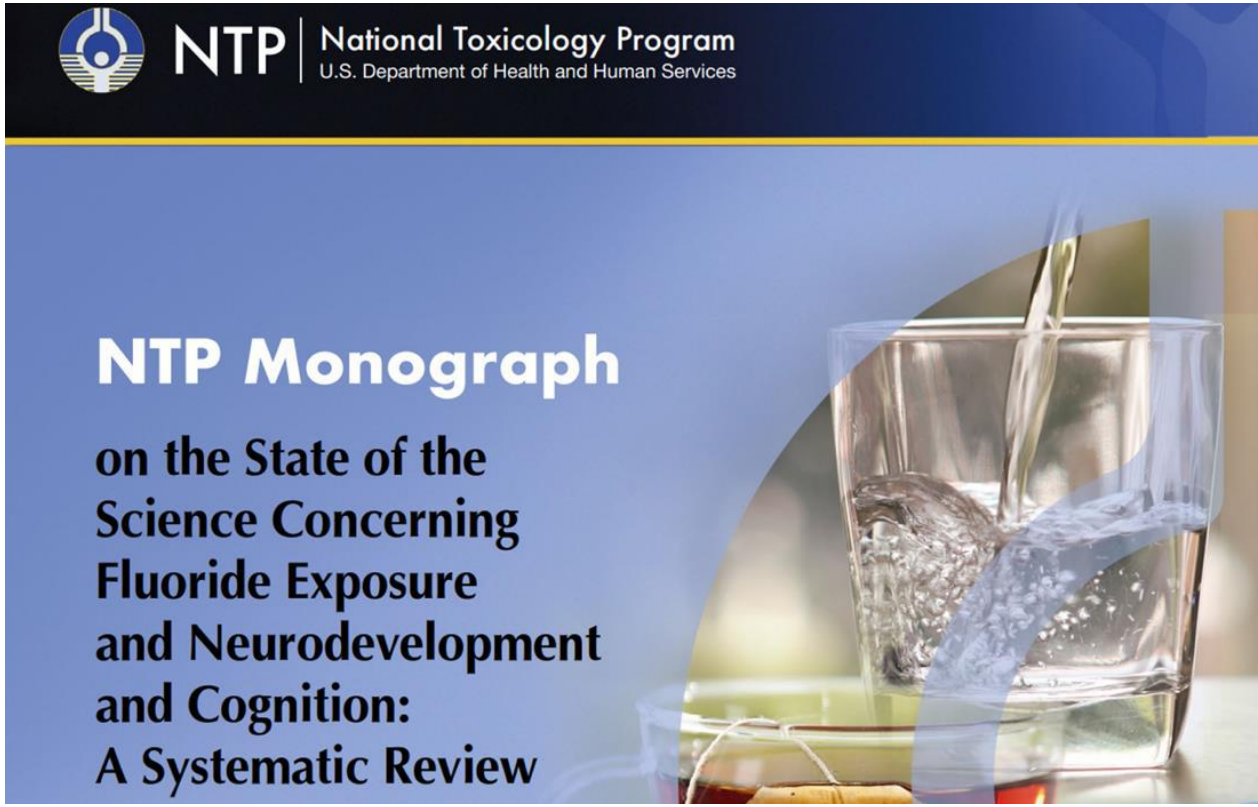
World Health Organization Data:
Tooth Decay Trends For Children in Fluoridated Versus Non-Fluoridated Countries*



*World Health Organization (WHO), Collaborating Centre for Education, Training, and Research in Oral Health, Malmo University, Sweden. DMFT in 12-year-olds. https://capp.mau.se/country-areas/ (accessed April 2024).

** No salt or water fluoridation program present in country.

National Toxicology Program (NTP) Monograph



- From studies published up to 2023
- 64 studies on fluoride and IQ found that higher fluoride was associated with lower child IQ
- 18 high quality studies found that higher fluoride was associated with lower child IQ
- "there is **moderate confidence** in the body of evidence that estimated fluoride exposure is **inversely associated with IQ in children**" (NTP, 2024)

Original Investigation

August 19, 2019

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

Rivka Green, MA[1]; Bruce Lanphear, MD[2,3]; Richard Hornung, PhD[4]; David Flora, PhD[1]; E. Angeles Martinez-Mier, DDS[5]; Raichel Neufeld, BA[1]; Pierre Ayotte, PhD[6,7]; Gina Muckle, PhD[7,8]; Christine Till, PhD[1]

» Author Affiliations | Article Information

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Conclusion:

Fetal development is a critical period of concern for neurotoxicity.

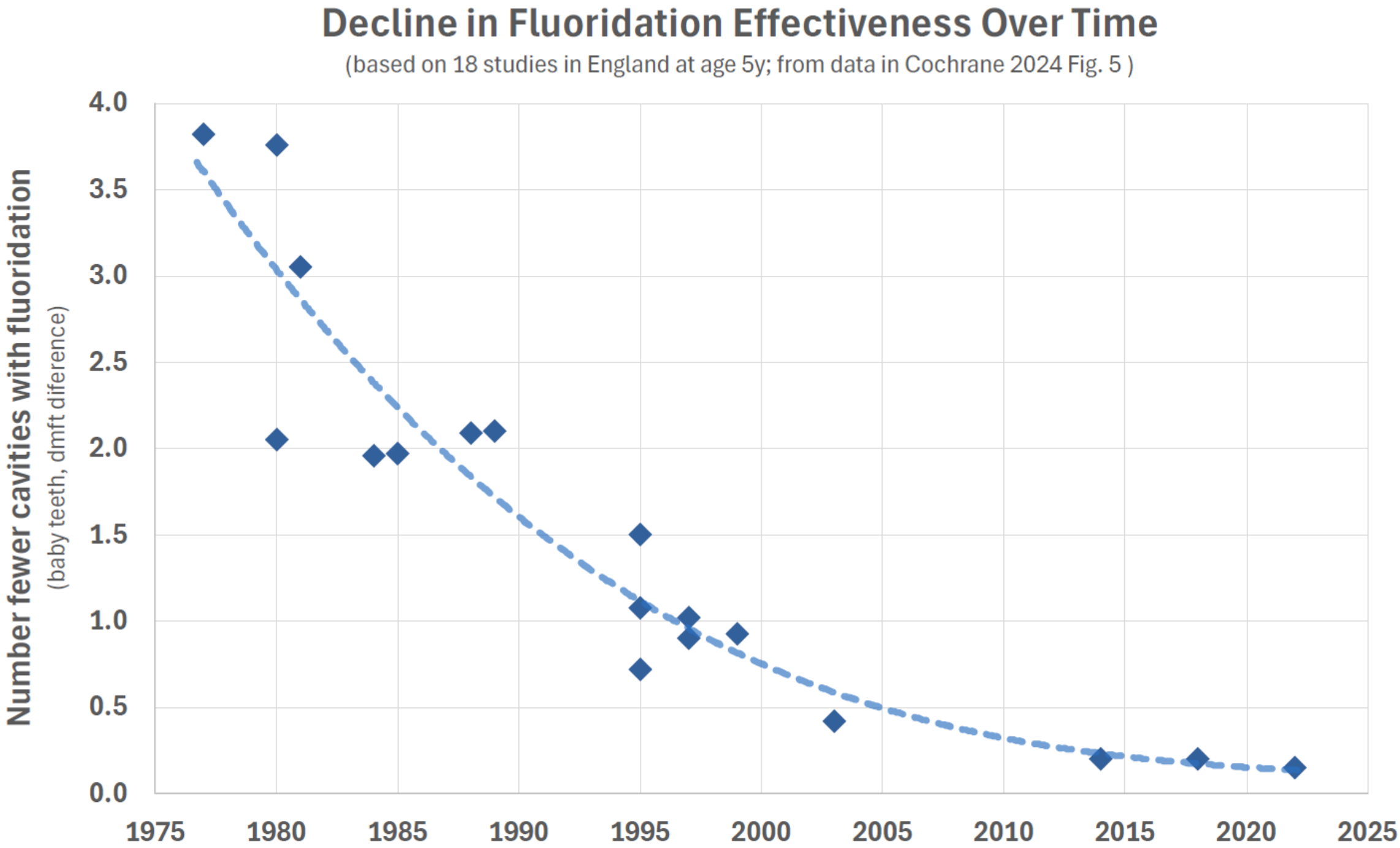
- There are 3 well-conducted prospective birth cohort studies: Bashash et al. 2017; Valdez-Jiménez et al. 2017; Green et al. 2019

- All report adverse effects of fetal exposure to fluoride *vs*. no prenatal studies showing safety

In September 2024 a Federal Court ruled:

- “the Court finds that fluoridation of water at 0.7 milligrams per liter (“mg/L”) – the level presently considered “optimal” in the United States – **poses an unreasonable risk of reduced IQ in children.**”

- “The scientific literature in the record provides a high level of certainty that a hazard is present; fluoride is associated with reduced IQ.”


Decline in Fluoridation Effectiveness Over Time
(based on 18 studies in England at age 5y; from data in Cochrane 2024 Fig. 5)
Number fewer cavities with fluoridation
(baby teeth, dmft diference)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025

What Does the Precautionary Principle Mean for Evidence-Based Dentistry?

Journal of Evidence Based Dental Practice 2006

"Some issues that make fluoridation ripe for applying a precautionary approach include the following:"

- **"The National Institute of Dental Research conducted the largest study of its kind in 1989 and found that there was little difference in the incidence of cavities between children receiving fluoride and those who were not."**
- **"Further, studies have shown that the incidence of cavities has fallen throughout the western industrialized world regardless of fluoride use."**
- **"…increased incidence of hip fractures, increased hyperactivity, effects on the central nervous system, damage to the brain, confusion, and drowsiness."**

Margin of Safety

- **A factor of 10 is standardly used by toxicologists due to uncertainty factors**
- **.7PPM is the current level of fluoride in the water**
- **When applied to a known level of toxic effects for fluoride (which is 1.5 PPM in water) then the level in the water should only be .15 PPM**

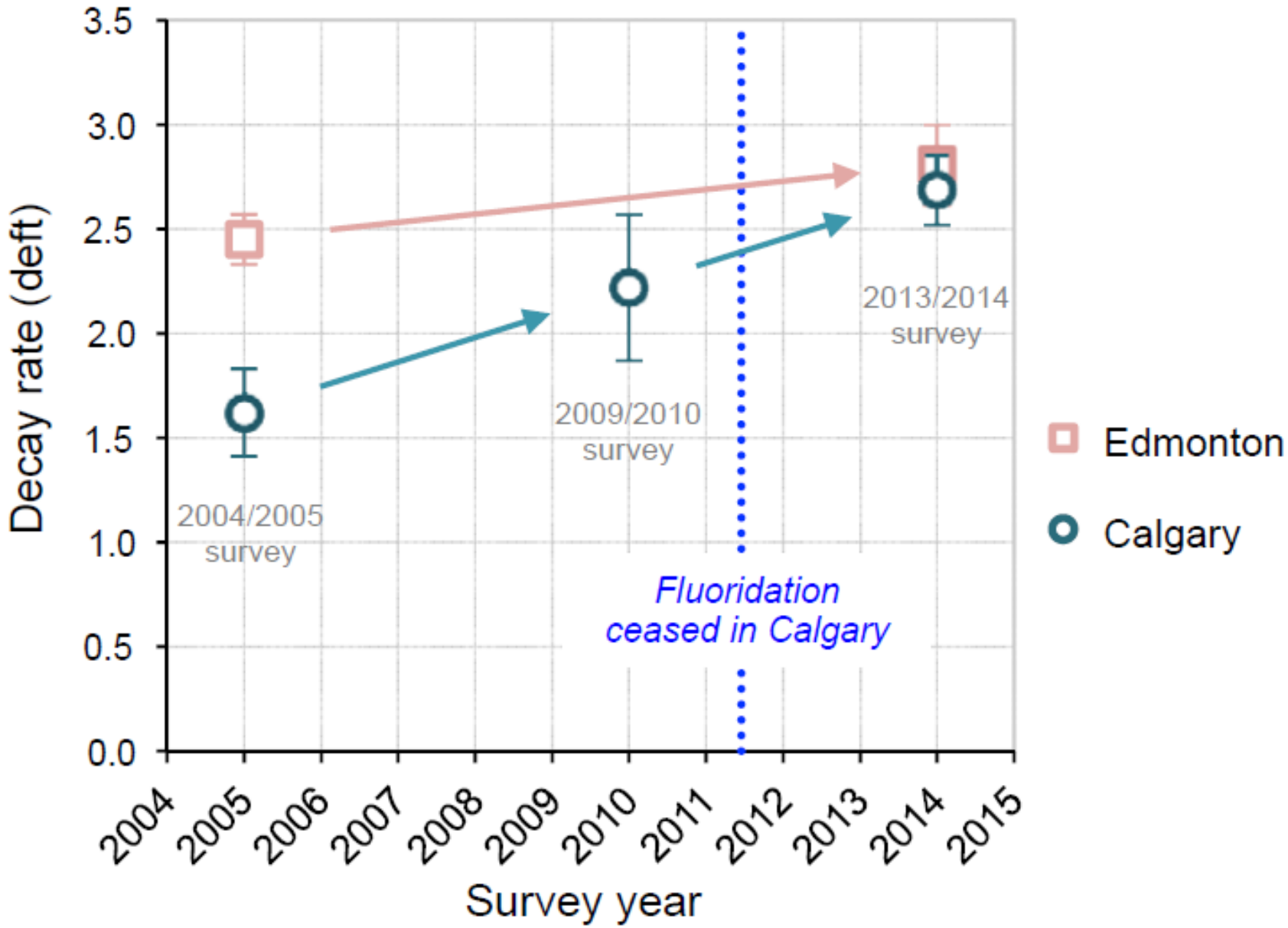
Dental Fluorosis

- **Excess fluoride in children known to result in dental fluorosis**
- **Condition in which the teeth enamel becomes irreversibly damaged and 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 David Kennedy and are used with permission from victims of dental fluorosis


Dental Fluorosis

(B) Decay rates over time in Calgary and Edmonton (deft)



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COMMENTARY

WILEY Community Dentistry and Oral Epidemiology

Limitations of fluoridation effectiveness studies: Lessons from Alberta, Canada

Christopher Neurath[1] | James S. Beck[2] | Hardy Limeback[3] | W. Gary Sprules[4] | Michael Connett[5] | Bill Osmunson[6] | Donald R. Davis[7]

[1]American Environmental Health Studies Project, Lexington, MA, USA

[2]Faculty of Medicine, University of Calgary, Calgary, AB, Canada

[3]Faculty of Dentistry, University of Toronto, Toronto, ON, Canada

[4]Department of Biology, University of Toronto Mississauga, Mississauga, ON, Canada

[5]Fluoride Action Network, Los Angeles, CA, USA

[6]Smiles of Bellevue, Private Dental Practice, Bellevue, WA, USA

[7]Biochemical Institute, University of Texas at Austin, Austin, TX, USA

Correspondence
Christopher Neurath, American Environmental Health Studies Project, Lexington, MA, USA.
Email: cneurath@AmericanHealthStudies.org

Abstract

A paper published in this journal, "Measuring the short-term impact of fluoridation cessation on dental caries in Grade 2 children using tooth surface indices," by McLaren et al had shortcomings in study design and interpretation of results, and did not include important pertinent data. Its pre–post cross-sectional design relied on comparison of decay rates in two cities: Calgary, which ceased fluoridation, and Edmonton, which maintained fluoridation. Dental health surveys conducted in both cities about 6.5 years prior to fluoridation cessation in Calgary provided the baseline. They were compared to decay rates determined about 2.5 years after cessation in a second set of surveys in both cities. A key shortcoming was the failure to use data from a Calgary dental health survey conducted about 1.5 years prior to cessation. When this third data set is considered, the rate of increase of decay in Calgary is found to be the same before and after cessation of fluoridation, thus contradicting the main conclusion of the paper that cessation was associated with an adverse effect on oral health. Furthermore, the study design is vulnerable to confounding by caries risk factors other than fluoridation: The two cities differed substantially in baseline decay rates, other health indicators, and demographic characteristics associated with caries risk, and these risk factors were not shown to shift in parallel in

caries risk factors other than fluoridation: The two cities differed substantially in baseline decay rates, other health indicators, and demographic characteristics associated with caries risk, and these risk factors were not shown to shift in parallel in Edmonton and Calgary through time. An additional weakness was low participation rates in the dental surveys and lack of analysis to check whether this may have resulted in selection biases. Owing to these weaknesses, the study has limited ability to assess whether fluoridation cessation caused an increase in decay. The study's findings, when considered with the additional information from the third Calgary survey, more strongly support the conclusion that cessation of fluoridation had no effect on decay rate. Consideration of the limitations of this study can stimulate improvement in the quality of future fluoridation effectiveness studies.

KEYWORDS
caries, epidemiology, fluoridation, public health policy, study design