MICHIGAN
Oral Health Coalition

August 14, 2025

To: St. Clair County Advisory Board of Health
From: Michigan Oral Health Coalition

Subject: Support for Community Water Fluoridation: Evidence-Based Review and Response to Recent Concerns

Dear Members of the Advisory Board of Health,

On behalf of the Michigan Oral Health Coalition (MOHC), I am writing to provide information as you deliberate the decision as to whether to order the removal of supplemental fluoride from the community water supplies of St. Clair County municipalities. As President of the Michigan Oral Health Coalition, and Dean of the School of Dentistry, there are several reasons that bring me to write this letter.

Having practiced in Michigan for 40 years (Almont, Michigan and in Adrian, Michigan in addition to having served an attending staff member for Henry Ford Health Systems and owner of my own practice) I urge you to carefully consider the facts regarding the safety and efficacy of community water fluoridation (CWF). As you deliberate your decision, the most compelling story as to why CWF should not be discontinued is that we already know what happens when CWF is discontinued. We have seen it in other cities and there is data to show what happens.

As Dean and Professor of the School of Dentistry at the University of Detroit Mercy, it is clear that dental decay has not been eradicated with all that we have done, and while we are graduating more dentists than ever in the United States, more that 40% of adults do not have regular dental care an equal number or more have untreated dental problems. Discontinuing CWF will make the next generation suffer even more.

As a Board Certified Specialist in Dental Public Health, I have extensive experience on the topic of community water fluoridation (CWF), and I wanted to provide you with the attached document, *Support for Community Water Fluoridation: Evidence-Based Review and Response to Recent Concerns*. With this paper, we have consolidated decades of scientific research, public health data, and economic analysis to demonstrate why community water fluoridation (CWF) is one of the most effective, safe, and equitable public health measures available.

This document also addresses, in an evidence-based and respectful manner, concerns that have recently been raised regarding CWF's safety, necessity, and chemical composition. These points are discussed throughout the paper within their relevant

scientific and policy contexts, supported by peer-reviewed research and authoritative sources. We understand that trust is central to your decision and we encourage you to critically evaluate your sources of information.

Our objective is not only to provide clarity on the facts but to help protect the oral health and overall well-being of St. Clair County residents. CWF has been shown to reduce dental disease across all populations, lower healthcare costs, and prevent needless pain and suffering — particularly among children, older adults, and low-income residents.

We respectfully urge the St. Clair County Advisory Board of Health to maintain community water fluoridation and stand with decades of sound science and public health leadership. I am happy to answer any questions, provide additional data, or arrange for expert testimony from independent scientists and dental public health professionals.

Sincerely,

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Support for Community Water Fluoridation:
Evidence-Based Review and Response to Recent Concerns

A Policy Paper from the Michigan Oral Health Coalition

Executive Summary

Community water fluoridation (CWF) is recognized by the Centers for Disease Control and Prevention (CDC), American Dental Association (ADA), American Academy of Pediatrics (AAP), and the World Health Organization as one of the most cost-effective and equitable strategies to prevent dental decay. At the optimal level of 0.7 milligrams per liter (mg/L), CWF safely reduces cavities in children and adults by approximately 25% over a lifetime (CDC, 2022).

Concerns have been raised in St. Clair County about the safety and necessity of fluoride in public drinking water. Upon review, the claims rely on misapplication of high-exposure data from international studies, misunderstandings about water treatment standards, and omissions of robust epidemiological evidence from North America.

This document presents:

- The scientific evidence supporting CWF's safety and effectiveness.
- Local and global case studies of communities that discontinued fluoridation and saw increased tooth decay.
- Clarification on water treatment chemical standards and safety oversight.
- Context on other water additives and contaminants that pose greater health risks than optimally fluoridated water.
- The economic and health equity benefits of maintaining CWF.

1. The Proven Effectiveness of Community Water Fluoridation

1.1 Decades of Evidence

Community water fluoridation (CWF) has been recognized for more than 80 years as a foundational public health measure to reduce the prevalence of dental caries in populations of all ages. The Centers for Disease Control and Prevention (CDC) lists CWF as one of the "Ten Great Public Health Achievements of the 20th Century" (CDC, 1999), a recognition grounded in decades of scientific research and consistent epidemiological findings.

A 2015 Cochrane systematic review — one of the most rigorous forms of scientific evidence — concluded that CWF is associated with a 35% reduction in decayed, missing, and filled primary teeth in children and a 26% reduction in decayed, missing, and filled permanent teeth (Iheozor-Ejiofor et al., 2015). Importantly, these benefits persist even in modern populations that have access to fluoridated toothpaste, fluoridated mouth rinses, and professional fluoride varnishes (Slade et al., 2018).

The CDC (2022) affirms that at the optimal concentration of 0.7 milligrams per liter (mg/L), CWF reduces cavities in both children and adults by approximately 25% over a lifetime — regardless of income, insurance status, or proximity to a dentist.

Counter to Claim from Dr. Nevin: *Dr. Nevin's memorandum cites studies suggesting fluoridation is unnecessary due to the widespread availability of fluoride toothpaste. However, large-scale epidemiologic evidence clearly demonstrates that toothpaste alone does not provide equivalent benefits to CWF. Fluoridated water delivers a consistent, low-level exposure to fluoride throughout the day, maintaining enamel strength between brushing episodes, which toothpaste cannot achieve on its own (Griffin et al., 2007*).

1.2 Real-World Case Studies
Historical and contemporary case studies demonstrate that when fluoridation is discontinued, dental disease rates rise — often rapidly.

Calgary, Alberta, Canada:
In 2011, Calgary removed fluoride from its municipal water supply. A comparative analysis conducted five years later found that the rate of primary tooth decay among grade 2 children increased significantly compared to Edmonton, which maintained fluoridation. Specifically, there was an average of 3.8 more decayed, missing, or filled surfaces per child in Calgary than in Edmonton (McLaren et al., 2021). Public outcry and scientific evidence led to a 2021 referendum in which Calgary residents voted to reinstate fluoridation.

Windsor, Ontario:
Windsor discontinued fluoridation in 2013. Within five years, emergency dental visits for children increased, particularly among lower-income households. In 2018, the Windsor City Council voted to reinstate fluoridation, citing the clear deterioration in children's oral health (CBC News, 2018).

Juneau, Alaska:
Following the cessation of CWF in 2007, Medicaid-eligible children and adolescents in Juneau required significantly more dental treatment, with an average annual increase in treatment costs of $94 per child — representing a total additional cost of $300,000 annually to the Medicaid program (Meyer et al., 2018).

Key Point: In each of these communities, removal of fluoridation led to measurable increases in tooth decay within just a few years, especially among vulnerable populations. The consistency of these outcomes across diverse geographic and demographic contexts underscores the protective effect of CWF.

1.3 Michigan-Specific and Local Data
Michigan is not immune to the consequences of inadequate fluoride exposure. According

to the Michigan Department of Health and Human Services (MDHHS), approximately 28% of third-grade children have untreated tooth decay. This is higher than the national average of 13.2% of children aged 5–19 had untreated dental caries during 2015–2018 (CDC, n.d.).

In St. Clair County specifically, children's dental health already shows disparities aligned with income and insurance status. Removing fluoridation will likely widen these disparities, particularly for residents who face transportation barriers or lack dental insurance.

Counter to Claim from Dr. Nevin: *Dr. Nevin's memorandum suggests that modern dietary changes, improved dental care, and sealants offset the need for fluoridation. While these measures are important, they are not accessible to all residents equally. Preventive sealants, for example, are largely dependent on regular dental visits — a resource many rural and low-income residents cannot access consistently. In addition, sealants only protect the biting surfaces of teeth not the sides and between teeth., CWF remains the only public health intervention that protects the entire population without requiring individual compliance.*

1.4 Summary
CWF's effectiveness is supported by:

- Over 75 years of consistent epidemiologic data in diverse populations.
- Rigorous systematic reviews showing significant cavity reduction even with other fluoride sources in use.
- Clear and repeatable case studies documenting oral health decline after cessation.
- Local and state data confirming that non-fluoridated communities in Michigan have worse oral health outcomes.
- The science is unequivocal: CWF continues to provide meaningful, population-wide protection against tooth decay, particularly for those most at risk.

2. Safety of Fluoride at Optimal Levels

2.1 Regulatory Oversight
Fluoride levels in U.S. drinking water are subject to strict federal and state regulation.

Environmental Protection Agency (EPA) Standards: The EPA sets a maximum contaminant level (MCL) for fluoride of 4.0 mg/L to prevent skeletal fluorosis — a rare condition caused by prolonged exposure to very high fluoride levels (EPA, 2023).

The EPA also maintains a secondary, non-enforceable standard of 2.0 mg/L to minimize the risk of moderate to severe dental fluorosis, which is a cosmetic condition, not a health hazard.

The U.S. Public Health Service recommends a target level of 0.7 mg/L for CWF — a concentration that maximizes cavity prevention while minimizing any risk of fluorosis (U.S. Public Health Service, 2015).

This means the fluoride levels in St. Clair County's drinking water — currently averaging 0.63 mg/L per the Port Huron 2023 Consumer Confidence Report — are nearly seven times lower than the EPA's Maximum Limit and within the optimal range for dental health benefits.

2.2 Addressing Neurodevelopmental Concerns
Dr. Nevin's memorandum references studies linking fluoride exposure to lower IQ in children. While it is important to evaluate all research objectively, these studies have critical limitations:

- Many of the studies come from regions of China, India, and Iran where naturally occurring fluoride levels exceed 2–10 mg/L — several times higher than U.S. fluoridation levels (Choi et al., 2012).
- Many of the studies lack controls for confounding factors, such as arsenic exposure, iodine deficiency, or socioeconomic variables, all of which can independently impact neurodevelopment (Broadbent et al., 2015).
- The National Toxicology Program (2024) emphasized that existing data are insufficient to conclude causality at 0.7 mg/L.

Large, high-quality cohort studies in fluoridated communities have found no association between optimal fluoridation (0.7 mg/L) and adverse neurodevelopmental outcomes:

- New Zealand Dunedin Study: Followed participants for more than 30 years; found no difference in IQ between those in fluoridated and non-fluoridated areas, even after controlling for confounders (Broadbent et al., 2015).

Key Point: Comprehensive reviews by Broadbent et al. (2015), Public Health England (2016), the National Toxicology Program (2024), and the U.S. Public Health Service (2015) conclude that there is no credible evidence of neurotoxic effects from community water fluoridation at recommended levels.

2.3 Dental Fluorosis in Context
Mild dental fluorosis — faint white streaks on teeth — may occur in a small percentage of children in fluoridated communities. This condition is cosmetic, not harmful, and often detectable only by dental professionals (ADA, 2023).

The prevalence of moderate or severe dental fluorosis in the U.S. remains below 2% (Beltrán-Aguilar et al., 2010), and such cases are generally associated with excessive ingestion of toothpaste or supplements during early childhood, not optimally fluoridated water.

Counter to Claim from Dr. Nevin: *Suggesting that mild fluorosis outweighs the cavity-preventing benefits of CWF ignores the fact that untreated tooth decay is far more prevalent, painful, and costly to treat.*

2.4 Water Treatment Chemical Standards

Counter to Claim from Dr. Nevin: *Dr. Nevin's representation implying that the processes and materials used in water treatment are "industrial chemicals" and implying because they are not pharmaceutical grade and therefore unsafe.*

Municipal water treatment systems use up to 40 different chemicals during the water treatment process. All municipal water treatment chemicals — including chlorine, coagulants, corrosion inhibitors, and fluoride additives — are classified as "industrial grade" because they are produced at scale for infrastructure use.

- They must comply with NSF/ANSI Standard 60, which limits the presence of impurities and ensures safety for human consumption (NSF International, 2024).
- The American Water Works Association (AWWA) sets additional purity standards, requiring documentation of composition, source, and safety for each product used.
- Multiple independent audits confirm that fluoride additives contribute less than 1% of the allowable contaminant levels in finished drinking water (McLaren & Emery, 2012).

Key Point: "Industrial grade" in water treatment does not mean unsafe — it means formulated for large-scale treatment systems under strict safety oversight.

2.5 Comparative Risk: Fluoride vs. Other Contaminants
While fluoride at optimal levels poses no health hazard, other regulated substances in drinking water carry greater toxicological concern at comparable concentrations.

- Chlorination By-products: Trihalomethanes (TTHMs) and haloacetic acids (HAA5) form when chlorine reacts with organic matter. Elevated levels have been associated with bladder and colorectal cancers (Villanueva et al., 2022; Rahman et al., 2022).
- Port Huron 2023 Water Quality:
    - Fluoride: 0.63 mg/L (MCL 4.0 mg/L) — safe and beneficial.
    - TTHMs: 36.7 ppb (MCL 80 ppb).
    - HAA5: 14.0 ppb (MCL 60 ppb).

These values are compliant but illustrate that the greater toxicological risks in drinking water are not from fluoride.

2.6 Summary
At 0.7 mg/L, CWF is:

- Safe: Far below levels associated with any adverse systemic effects.
- Well-Regulated: Monitored under EPA, NSF, and AWWA standards.
- Misinterpreted Risks: Global studies showing harm involve fluoride levels multiple times higher than U.S. recommendations.
- Comparatively Low Concern: Many other regulated contaminants pose higher risk.

The safety of optimal CWF is supported by decades of regulatory review, global consensus from public health authorities, and extensive North American epidemiological research.

3. Addressing Misconceptions About Fluoride and Water Treatment Chemicals

3.1 Perspective on Chemical Additives in Drinking Water
Opponents of CWF sometimes portray fluoride as an unnecessary chemical addition to drinking water, equating it with industrial pollution. This framing ignores the fact that all municipal water is chemically treated to ensure safety.

- Common Additives Include: Chlorine (disinfection), aluminum sulfate (coagulation), orthophosphate (corrosion control), and lime (pH adjustment).
- None of these are naturally "pure" in source form — all are refined industrial products subjected to strict quality control before use.
- Purpose Matters: Fluoride is added at a precisely controlled dose to prevent disease, just as chlorine is added to prevent deadly outbreaks of waterborne illness.

The World Health Organization (2017) explicitly supports the use of fluoride additives in public water systems when natural concentrations are below optimal, calling CWF "the most effective public health measure for the prevention of dental caries."

Opponents sometimes frame community water fluoridation as an infringement on personal choice, arguing that individuals should decide whether to consume fluoride. However, public health measures often involve fortifying common food and water supplies to prevent disease. Vitamin D is routinely added to milk to prevent rickets, and niacin is added to bread to prevent pellagra — both are accepted as essential health protections, even though "unfortified" options are not always readily available. Similarly, CWF ensures equitable access to cavity prevention across the population, particularly for those who lack access to regular dental care (American Academy of Pediatric Dentistry, 1989).

3.2 Chemical Grade: Industrial vs. Pharmaceutical
Dr. Nevin's memorandum claims that "industrial-grade" fluoride compounds are unsafe and contaminated with toxic metals. This is misleading for three reasons:

1. Definition of “Industrial Grade”: In water treatment, “industrial grade” simply means produced in large quantities for municipal use — it does not mean poor quality or unsafe.
2. Rigorous Certification: All fluoride additives must meet NSF/ANSI Standard 60 requirements for purity and safety. This standard limits heavy metal contaminants such as arsenic, lead, and cadmium to levels far below EPA health-based limits (NSF International, 2024).
3. Negligible Contribution to Overall Exposure: Independent analyses show that fluoride additives contribute less than 1% of allowable contaminant levels in treated water (McLaren & Emery, 2012).

Key Point: The same “industrial grade” classification applies to chlorine and other essential water treatment chemicals — yet these are universally accepted as necessary for public health.

3.3 Comparative Toxicology: Why Fluoride Should Not Be the Primary Concern
If the objective is to minimize chemical-related health risks from drinking water, fluoride at 0.7 mg/L should be low on the priority list.

Chlorination By-products:

- Trihalomethanes (TTHMs): Form when chlorine reacts with organic matter; long-term exposure at high levels is associated with bladder cancer (Villanueva et al., 2022).
- Haloacetic Acids (HAA5): Linked to increased risk of colorectal cancer at elevated concentrations (Rahman et al., 2022; Shi et al., 2024).

Port Huron 2023 Consumer Confidence Report:

- Fluoride: 0.63 mg/L — well below the EPA MCL of 4.0 mg/L and within optimal range.
- TTHMs: 36.7 ppb — under the 80 ppb limit but with documented long-term cancer associations at elevated levels.
- HAA5: 14.0 ppb — under the 60 ppb limit, but toxicological risks increase with higher exposure.

Conclusion: From a toxicology standpoint, the chemicals with the greatest documented health risks in drinking water are not fluoride at optimal levels, but disinfection by-products. Yet, these risks are accepted because chlorination prevents potentially deadly waterborne diseases, just as fluoridation prevents widespread dental decay.

3.4 Risk-Benefit Analysis
Public health decisions require weighing risks against benefits:

- Fluoride at 0.7 mg/L:
    - Benefits: Reduces cavities by ~25%, saves millions in dental costs, protects health equity.
    - Risks: Minimal, cosmetic-only in rare cases (mild fluorosis).
- Removing CWF:
    - Benefits: None supported by credible scientific evidence.
    - Risks: Documented increase in cavities, higher treatment costs, more pain and infection, disproportionate harm to vulnerable groups.

Bottom Line: Targeting fluoride for removal while accepting higher-risk chemicals in the same water supply is scientifically inconsistent and ignores the overwhelming benefit-to-risk ratio of CWF.

4. Economic and Equity Benefits of Community Water Fluoridation

4.1 Cost Savings: A Proven Return on Investment
CWF is one of the **most cost-effective public health interventions** ever implemented.

- National Analysis: For every $1 invested in CWF, communities save $20–$38 in avoided dental treatment costs (Ran et al., 2016).
- Small Community ROI: Even in smaller systems (<5,000 people), CWF still returns an estimated $4 for every $1 invested (Griffin et al., 2001).
- Annual Savings in Michigan: The Michigan Department of Health and Human Services estimates that CWF prevents approximately $62 million in dental treatment costs annually across the state.

Dr. Nevin's claim that CWF is an "unnecessary expense" omits the fact that the cost per person per year is typically less than $1 — far less than the cost of a single filling, which averages $150–$200.

Case Example:
When Windsor, Ontario discontinued fluoridation in 2013, the city saved only $0.57 per person per year in operational costs, but saw emergency dental visits rise sharply — particularly for children — leading to far higher costs for families and the healthcare system (CBC News, 2018).

4.2 Avoided Healthcare Burden
Dental decay is the most common chronic disease in children, yet it is almost entirely preventable.

- Emergency Department Impact: Each year, an estimated 2.2 million U.S. emergency visits are due to preventable dental problems, costing the healthcare system $2.1 billion (American Dental Association, n.d.).

- Michigan Impact: In 2022, more than 14,000 emergency visits in Michigan were for dental-related issues — with Medicaid covering roughly half of the costs. CWF significantly reduces the incidence of untreated decay that leads to such visits.

When CWF is removed, the number of residents seeking costly, invasive treatment increases — especially among those with limited access to regular dental care.

4.3 Health Equity: Closing the Gap
CWF is unique because it benefits everyone, regardless of income, insurance status, age, or geography.

Most Impact on Vulnerable Groups:

- Children in low-income households have twice the rate of untreated decay compared to higher-income peers (CDC, 2022).
    - Seniors — especially those in long-term care — often lose dental coverage upon retirement, making prevention critical.
- Bridging the Access Gap:
    - Rural areas and medically underserved populations benefit disproportionately from CWF because it does not rely on access to a dental clinic or ability to pay.
    - In communities without fluoridated water, disparities in oral health widen over time (Slade et al., 2018).

Key Point: Removing CWF removes the only truly universal, no-cost-to-patient preventive dental service — a decision that disproportionately harms those with the fewest resources.

4.4 Economic Loss from Removal: Real-World Data
Several communities have learned the hard way that removing CWF creates hidden costs:

Community	Year Removed	Result	Financial Impact
Calgary, Alberta	2011	Significant increase in childhood decay rates within 5 years	City voted to reinstate in 2021
Windsor, Ontario	2013	Rise in pediatric emergency visits	Costs to families & healthcare exceeded savings from removal
Juneau, Alaska	2007	Medicaid-eligible children required more treatment	Additional treatment costs averaged $300–$500 per child (Meyer et al., 2018)

4.5 Public Health Cost-Benefit Equation
The cost-benefit profile of CWF is overwhelmingly positive:

With CWF:

- Cost: ~$0.50–$1.00 per person/year.
- Savings: $20–$38 in avoided treatment costs per person/year.
- Impact: Fewer cavities, less pain, improved quality of life.

Without CWF:

- Savings: ~$0.50–$1.00 per person/year in avoided operational costs.
- Costs: Hundreds of dollars per person in treatment expenses over a lifetime, plus indirect costs from missed school/work.

Bottom Line: CWF is not just a public health tool — it is an economic safeguard that prevents avoidable costs, protects families from financial strain, and reduces the burden on publicly funded healthcare programs. The data make it clear: cutting CWF will ultimately drive-up disease and treatment costs.

5. Conclusion
The evidence is clear: CWF is safe, effective, cost-saving, and a cornerstone of oral health equity. Concerns about its safety and necessity, while important to address, do not withstand scrutiny when examined alongside decades of high-quality research, U.S. regulatory standards, and real-world data.

Maintaining CWF in St. Clair County will prevent disease, save money, and protect vulnerable populations.

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