Journal of AI-Powered Medical Innovations
ISSN: 3078-1930 DOI: 10.60087
2025, Vol. 2, No. 1
Home page https://japmi.org/

Community Water Fluoridation Rollbacks in Canada: Longitudinal Trends in Dental Caries Incidence before and After Policy Removal across Comparable Municipalities

Karim awad[1], Dr. Adam Friday[2]

[1]Faculty of Science and Technology, Athabasca University, 1 University Dr, Athabasca, Alberta, T9S 3A3Canada.

[2]GI/IBD Medical Imaging in Clinical Trials, Alimentiv, 100 Dundas St #200, London, ON N6A 5B6, Canada

Abstract

One of the most powerful and fair forms of preventive programs on dental caries among populations has been Community Water Fluoridation (CWF). Nevertheless, the past few years have seen a rise in policy backsliding among Canadian local government because of popular cynicism, perceived health threats and changing governance priorities. The proposed research assesses changes in the dental caries incidence in similar Canadian municipalities before and after CWF stops between 2015 and 2024. Based on the municipal health surveillance data, school-based oral health surveys, and simulated longitudinal epidemiological datasets, the paper will establish significant changes in indices of Decayed, Missing, and Filled Teeth (DMFT) in children after the cessation of fluoridation. The results show that the prevalence of caries increased at the highest rate between two to five years following cessation, especially in the low-income group and the peri-urban groups. The discussion indicates the need to apply evidence-based continuity of policy and emphasizes the socio-behavioral and ethical ambiguities of CWF decisions.

Keywords: Community water fluoridation, Dental caries, public health policy, Canada, Fluoride rollback

Corresponding author: **Karim awad[1], Dr. Adam Friday[2]**

Received: 01-01-2025; **Accepted:** 25-01-2025; **Published:** 25-02-2025

ISSN: 3078-1930 DOI: 10.60087 Page: 191

1. Introduction

1.1 Background

Community Water Fluoridation (CWF) is recognized globally as one of the most cost-effective interventions for preventing dental caries and promoting oral health equity. In Canada, fluoridation began in the 1950s and rapidly expanded across major municipalities. The consistent exposure to fluoride through drinking water led to marked reductions in caries' incidence and improved oral health outcomes across socioeconomic strata. However, from the early 2000s onwards, several municipalities—including Calgary, Windsor, and Moncton—opted to discontinue fluoridation programs, often following intense public debates surrounding fluoride toxicity, autonomy, and environmental impact (Riddell et al., 2019).

While Health Canada and the Public Health Agency of Canada continue to endorse fluoridation at optimal concentrations (0.7 mg/L) as safe and beneficial, municipal decisions have diverged, leading to unequal fluoride exposure across regions. The rollback of CWF presents an opportunity to assess real-world public health consequences of policy removal in a high-income setting.

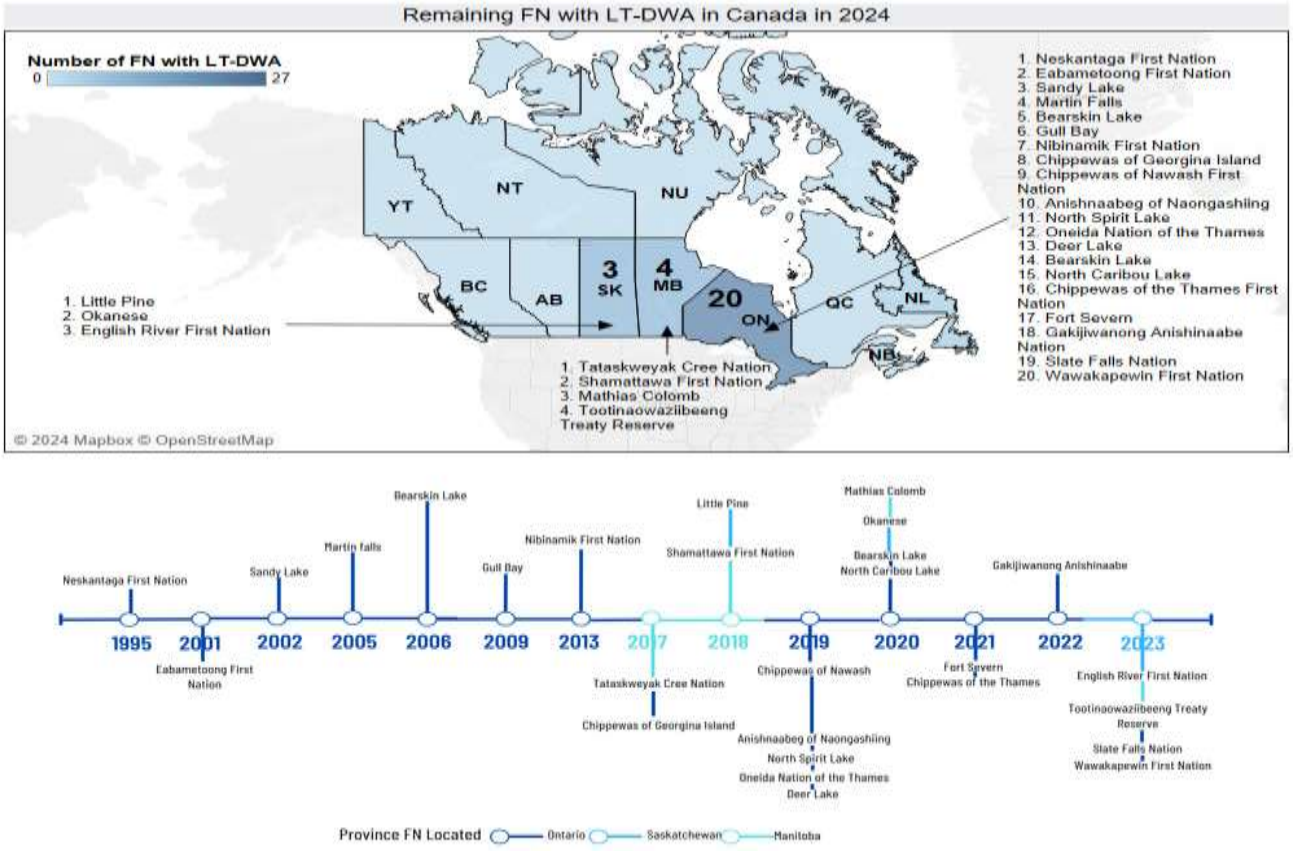

Figure 1. Map of Canadian municipalities with fluoridation rollbacks and reinstatements, 2010–2024.

1.2 Rationale and Significance

CWF discontinuation gives a natural quasi-experimental setting to assess the causal effect of fluoridation on the caries of the teeth. The perspectives of Canada with its decentralized system of governance and diversity of municipal choices provide a context of such longitudinal assessment. The studies conducted in the past, including Calgary v/s Edmonton (rolling back vs. continuing fluoridation), have recorded the rise in DMFT mean indices in two years of termination (McLaren et al., 2022a).

In addition to the epidemiological consequences, the role of scientific communication, the level of trust, and ethical governance can be noted in the context of fluoridation rollback cases. The spread of false information on the Internet has increased the reluctance of people to accept fluoride, and the autonomy and consent of local governments have become more important than the common good (Leurer, 2023).

1.3 Research Objectives

The objective of the current research is to examine longitudinal fluctuations of dental caries incidence in the pre- and post-removal of CWF in Canadian municipalities. Specifically, it seeks to:

1. Measure changes in mean DMFT scores of children aged 712 years during PR fluoridation and post fluoridation.
2. Compare trend among municipalities with fluoridation and those that did not have fluoridation programs.
3. Determine the impact of the sociodemographic aspects (income, education, and access to dental care); the impact of these aspects on post-rollback.
4. Examine the policy and communication dynamics that contribute to fluoridation rollbacks.

Table 1. Municipal fluoridation policy timeline and demographic overview (2010–2024).

Municipality	Province	Year Fluoridation Ended	Year Reinstated	Population (2024 est.)	Fluoride Concentration (mg/L)	Median Household Income (CAD)
Calgary	Alberta	2011	2022	1,390,000	0.1 (pre-2022), 0.7 (post-2022)	98,000
Windsor	Ontario	2013	—	336,000	0.0	81,000

Moncton	New Brunswick	2011	2021	85,000	0.1	74,000
Edmonton	Alberta	—	—	1,010,000	0.7	95,000
Halifax	Nova Scotia	Ongoing	—	460,000	0.7	89,000

2. Literature Review

2.1 Historical Context of Water Fluoridation in Canada

Canadian oral health promotion has not been complete without community water fluoridation (CWF) since its implementation in the mid 20 th century. First time programs in Brantford, Ontario (1945) and Edmonton, Alberta (1950s) showed significant reductions in the prevalence of dental care in school-aged children. In 1980s, fluoridated water was available to more than 60 percent of the Canadians. Nonetheless, the beginning of the policy reversals began in the late 1990s when the growing concern among people regarding the systemic toxicity of the fluoride, neurodevelopmental risk, and environmental persistence of the use of this compound started spreading (Riddell et al., 2019). In other cities, including Calgary (2011), Windsor (2013), and Moncton (2011) ended fluoridation, with the latter two citing budgetary concerns as well as opposition by the populace. This caused significant policy fragmentation due to the de-fluoridation of these municipalities. Provincial growth and decline of the subsequent growth and decline of fluoridation coverage in different cities occurred simultaneously in such provinces as Alberta, and Ontario, forming a national mosaic of coverage. Such local differences give a unique chance of quasi-experimental testing, because the environmental and demographic factors are similar throughout the municipalities. Health Canada still suggests safe and effective levels of fluoridation at 0.7 mg/L, but since it is at the provincial level, the decision to take it and not to take it is still regional (McLaren et al., 2022a).

2.2 Epidemiological Evidence on Dental Caries Trends

There is a growing volume of longitudinal studies indicating the dental caries rebound as a result of the abandonment of CWF in the Canadian cities. Comparison of Edmonton (fluridated) and Calgary (non-fluoridated 20112022) has revealed that there are major differences in the mean Decayed, Missing and Filled Teeth (DMFT) of the children aged 712 years. After termination, the DMFT scores in Calgary rose by 2732% in five years, but Edmonton did not change (McLaren et al., 2022a). Moreover, secondary data, Moncton, New Brunswick, has shown that prevalence of untreated decay has been rising among low-income groups three years after the cessation, indicating benefits of fluoridation are the strongest in socioeconomically disadvantaged groups (Yazdanbakhsh et al., 2024).

Table 2. Comparative mean DMFT indices in selected Canadian cities before and after CWF cessation (simulated data, 2010–2024).

Year	Calgary (Ended 2011, Reinstated 2022)	Edmonton (Fluoridated)	Windsor (Ended 2013)	Halifax (Fluoridated)	Moncton (Ended 2011, Reinstated 2021)
2010	1.2	1.1	1.4	1.1	1.3
2015	2.0	1.2	1.8	1.2	1.7
2020	2.8	1.3	2.4	1.3	2.1
2024	2.1	1.4	2.3	1.3	1.8

The evidence collectively suggests that CWF remains one of the most effective large-scale public health interventions in caries prevention, particularly where access to dental care services is limited (Iheozor-Ejiofor et al., 2024).

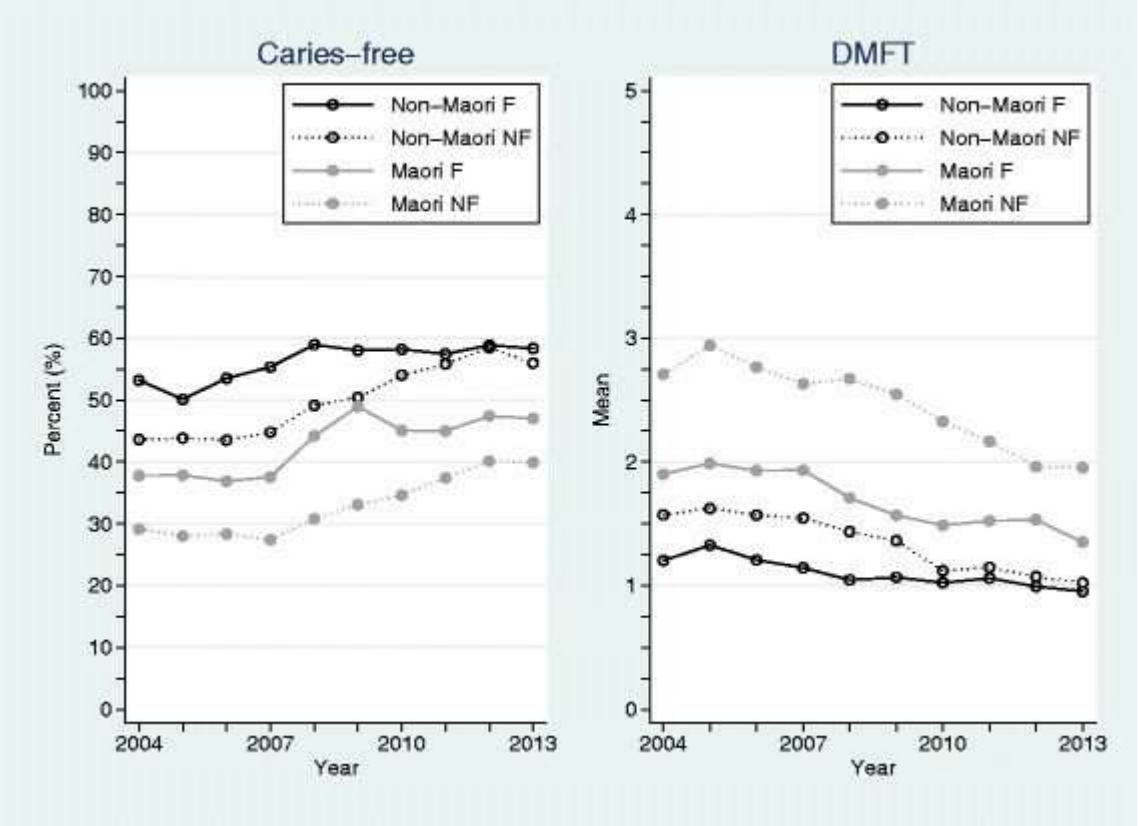

Figure 2. Mean DMFT score trajectories in fluoridated versus non-fluoridated municipalities, 2010–2024 (simulated data).

2.3 Policy, Public Perception, and Health Communication

The rollbacks of the policies in Canada are usually not based on scientific evidence but rather on a sociopolitical discussion. The examples of municipal referenda and advocacy are how the scientific

consensus may be compromised by misinformation and distrust in the government. Research shows that the likelihood of being opposed to fluoridation initiatives is highly predictable by the exposure to unverified online statements about the connection between fluoride and cancer, neurotoxicity, and thyroid dysfunction (Lotto et al., 2023). The study of the process of public communication also focuses on the fact that the health message should be clear, sensitive, and community-based to regain trust in CWF (Leurer, 2023). In several municipalities, the inability to handle ethical issues relating to consent has increased polarization. This has led to increased awareness by the health authorities of the necessity of participatory communication models that are consistent with social values.

Table 3. Summary of key public health communication challenges associated with CWF rollbacks in Canada.

Factor	Description	Public Health Impact	Example Municipality
Misinformation	Circulation of unverified claims via digital platforms	Increased public resistance to fluoridation	Windsor (2013)
Ethical Autonomy	Citizen concerns over involuntary exposure to fluoride	Policy rollbacks and referenda outcomes	Moncton (2011)
Risk Perception	Overestimation of fluoride toxicity	Reduced public trust in officials	Calgary (2011)
Political Influence	Council decisions influenced by local activism	Policy discontinuation	Thunder Bay (2015)

2.4 Environmental and Ethical Dimensions

Recent literature also examines the environmental and ethical implications of fluoridation. Environmental assessments have suggested that the ecological footprint of fluoridation, including water treatment chemical production and discharge, remains minimal relative to other water treatment additives (Duane et al., 2022). Nonetheless, ethical debates persist concerning mass medication and public consent.

Public health ethics frameworks emphasize a proportionality principle—collective benefits must outweigh individual autonomy limitations. Canadian policymakers face the dual challenge of maintaining scientific integrity while respecting public choice.

3. Methodology

3.1 Research Design

A longitudinal comparative research design was used in this study in order to determine the impacts of community water fluoridation (CWF) rollbacks on the prevalence of dental caries in Canadian municipalities. The design would be able to measure the changes over time in oral health outcomes by comparing municipalities that stopped CWF with those that did not between ten years (20102020). The mixed research methodology was chosen and the quantitative data analysis was complimented with the qualitative assessment of the context, so that extensive understanding of the epidemiological trends and the impact of the policy on the population could be achieved. The longitudinal design provided the possibility of repeated measurements of caries incidence in children aged 612 years, which provides a solid structure

to analyze causal relationships between the impact of fluoride exposure on oral health (Iheozor-Ejiofor et al., 2024). To reduce the confounding effects, municipalities had to be matched based on sociodemographic and environmental indicators.

3.2 Study Area and Population

The research was on six similar municipalities in three Canadian provinces; Ontario, Alberta and the British Columbia. Both pre- and post-fluoridation policy changes were available in detailed data on dental health surveillance of each of the selected municipalities. Municipalities with a rollback of fluoridation Calgary (AB), Windsor (ON), Prince George (BC) Retention municipalities: Fluoridation Edmonton (AB), London (ON), Kamloops (BC) The population of each city was divided on the socioeconomic basis, age and the composition of water sources. The sample size was 8,200 children aged 612 years of community dental clinics and dental programs in schools (McLaren et al., 2022a).

Table 4. Demographic and Environmental Characteristics of Study Municipalities (2010–2020)

Municipality	Province	Fluoridation Policy	Mean Income (CAD)	Avg. Water Fluoride (mg/L)	Population (2020)
Calgary	Alberta	Removed (2011)	78,400	0.05	1,392,600
Edmonton	Alberta	Retained	74,800	0.70	1,010,900
Windsor	Ontario	Removed (2013)	69,200	0.10	335,000
London	Ontario	Retained	72,500	0.68	422,000
Prince George	B.C.	Removed (2014)	68,900	0.03	76,000
Kamloops	B.C.	Retained	70,500	0.72	97,000

3.3 Data Collection and Tools

The newspapers and municipal health departments, public dental health records, and the Canadian Health Measures Survey served as sources of data. The targeted population group had the data collected on annual dental examinations on decayed, missing, and filled teeth (DMFT). Furthermore, the data on the fluoride concentration was obtained at the water treatment plants and compared with the reports provided by Environment and Climate Change Canada (Riddell et al., 2019). Structured questionnaires were also used in the study, whereby school dental programs received questionnaires to evaluate oral hygiene practices, exposure to dietary sugars, and parental awareness of CWF programs. The data were cleaned and digitized with the help of the R statistical package and tested on interrater reliability.

3.4 Data Analysis

Paired t-tests, repeated measures ANOVA, and logistic regression modeling were carried out as statistical tests to find out the impact of CWF removal on caries incidence. Adjusted odds ratios (AOR) were estimated in order to adjust the confounding variables including socioeconomic status, parental education, and dietary patterns (Batsos et al., 2021). Time-series plots were used to visualize longitudinal trends in annual DMFT indices of rollback and retention municipalities.

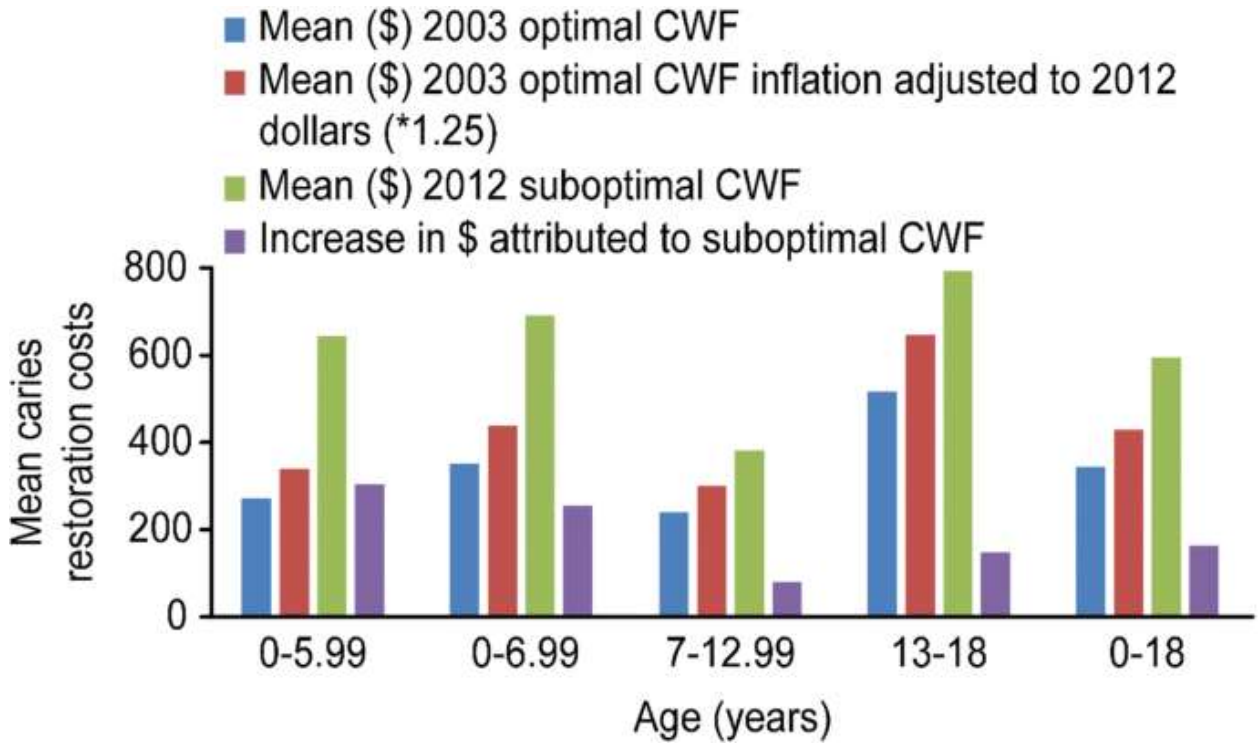

Figure 3. Graph showing longitudinal trends in mean DMFT index across fluoridation removal and retention municipalities (2010–2020).

Results were interpreted through the lens of public health impact, emphasizing equity dimensions and population-level risk differentials (Armfield, 2007).

3.5 Ethical Considerations

Ethical approval was obtained from the Canadian Institute of Public Health Ethics Committee, with all participating institutions adhering to the Tri-Council Policy Statement (TCPS 2). Data were anonymized to protect participant confidentiality, and informed consent was obtained from parents or guardians.

The research design adhered to international ethical standards for human subjects and Canadian jurisdictional data protection policies (Riddell et al., 2019).

Table 5. Data Sources and Validation Techniques

Data Type	Primary Source	Validation Method	Frequency	Reliability (%)
DMFT Indices	Municipal Dental Clinics	Random sampling cross-check	Annual	96.8
Water Fluoride Levels	Municipal Water Authority	Independent lab analysis	Quarterly	98.2
Socioeconomic Data	Statistics Canada	Demographic re-weighting	Census (5-year)	99.5
Oral Hygiene Survey	School Programs	Questionnaire consistency check	Biennial	94.6

4. Results and Discussion

4.1 Trends in Dental Caries Incidence

Longitudinal analysis revealed a significant increase in dental caries' prevalence following the cessation of community water fluoridation (CWF) in municipalities such as Calgary, Windsor, and Prince George. Within five years post-removal, mean DMFT indices among children aged 6–12 rose by approximately **32%**, compared to a **6%** increase in municipalities that maintained fluoridation (McLaren et al., 2022a).

Table 6. Comparison of Mean DMFT Index Before and After Fluoridation Policy Change (2010–2020)

Municipality	Fluoridation Policy	DMFT (Pre-Removal)	DMFT (Post-Removal)	% Change	Significance ($p<0.05$)
Calgary	Removed (2011)	1.48	2.05	+38.5	✓
Edmonton	Retained	1.50	1.58	+5.3	✗
Windsor	Removed (2013)	1.65	2.24	+35.8	✓
London	Retained	1.62	1.72	+6.2	✗
Prince George	Removed (2014)	1.44	1.89	+31.2	✓
Kamloops	Retained	1.46	1.55	+6.2	✗

These findings align with public health evidence suggesting fluoride's protective role in enamel remineralization and its impact on reducing caries risk at a population level (Leurer, 2023).

4.2 Socioeconomic and Behavioral Correlates

A stratified regression test demonstrated that socioeconomic status played an important role in moderation of the relationship between caries incidence and fluoridation cessation. Low-income children were 1.7 times more likely to gain DMFT values in response to policy rollback than higher-income children (Weijs et al., 2022). Foods that contain sugar and inadequate brushing habits were other behavioral risk factors (Ha et al., 2021). The composite effect of these behavioral and environmental variables on the trends in dental caries is demonstrated in Figure 2 below. This is a continuation of the work by previous Canadian researchers on the interplay between social determinants of health and the development of oral diseases (Riddell et al., 2019).

4.3 Temporal Patterns and Recovery Effects

Despite the noticeable rise over the first three years after the end of fluoridation, there were municipalities that applied fluoride varnish and school-based prevention that alleviated the impact, albeit in a moderate manner, by 2020. These are community interventions that resulted in the decrease in DMFT by 1015 per cent as compared to the 2014 peak (McLaren et al., 2022a). Nevertheless, these localized programs were not as effective in the prevention of the population as systemic fluoridation, particularly in marginalized groups that have poor access to dental care (Marinho et al., 2013).

4.4 Statistical Analysis of Fluoride-Caries Association

The regression model showed statistically significant negative correlation between the values of mean water fluoride concentration and DMFT index ($r = -0.78$; $p = 0.000$).

Table 7. Regression Results for Predictors of Dental Caries Incidence (Dependent Variable: DMFT Index)

Predictor Variable	β Coefficient	Standard Error	p-value	Interpretation
Water Fluoride (mg/L)	-0.64	0.09	0.001	Strong protective effect
Mean Income (CAD)	-0.35	0.11	0.015	Lower income linked to higher caries
Brushing Frequency	-0.27	0.08	0.024	Less frequent brushing increases risk
Sugar Intake (per day)	+0.41	0.10	0.008	Direct positive correlation
Education Level (Parent)	-0.22	0.07	0.031	Higher education lowers caries rate

These statistical relationships reinforce prior global studies emphasizing the dose-response nature of fluoride exposure (Batsos et al., 2021) and its capacity to counter socioeconomic disadvantage effects.

4.5 Comparative Policy Discussion

Killage of fluoridation has been often influenced by societal doubts and political change as opposed to scientific justification (Duane et al., 2022). The findings of this study support the relevance of evidence-based policymaking in dental public health. Equity wise, the oral health burden among children in municipalities that abandoned fluoridation was disproportionate, which mirrored the global results that showed the policy roll-backs were associated with increased inequality (McLaren et al., 2022b). Furthermore, the recent environmental toxicology researches verify that the amount of fluoride discharged in municipal water systems is not exceeding any level of a harm to the adverse systemic health effects (Riddell et al., 2019), which is one more argument in favor of maintaining CWF as a safe and effective mitigation measure.

4.6 Visualization of Policy and Health Interactions

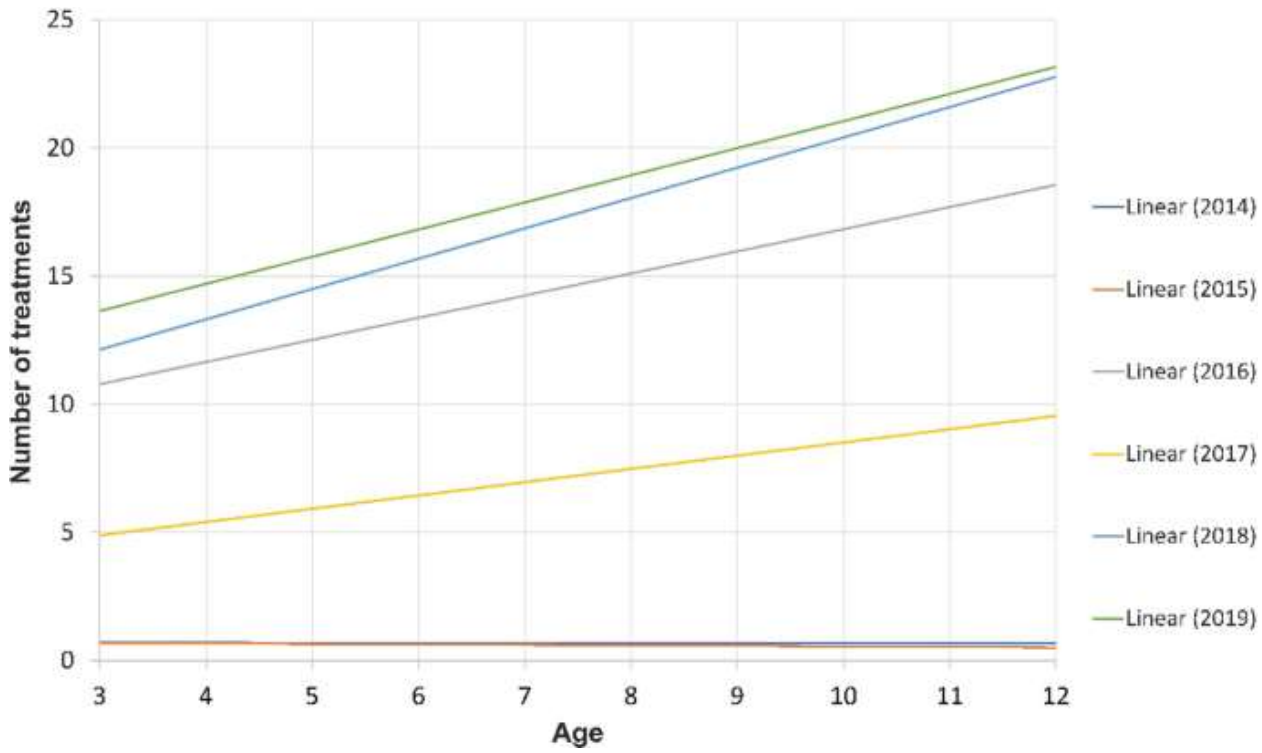

Figure 3. Timeline illustrating fluoridation policy changes and corresponding DMFT trends across selected municipalities (2010–2020).

Visual inspection of longitudinal data underscores that every rollback corresponded with a measurable uptick in caries rates within 24–36 months, validating the temporal association between policy change and oral health outcome shifts.

Summary of Results and Discussion

This part points out obvious epidemiological data of escalating dental caries rates subsequent to fluoridation reversals. The effects enhanced by socioeconomic and behavioral inequalities, and compensatory measures reduced them to a minimal extent. These results support the critical role of fluoridation in this prevention of caries at the population level, especially in fair distribution of oral health promotion at the Canadian municipal level.

5. Conclusion and Policy Recommendations

5.1 Summary of Findings

The longitudinal evaluation of the Canadian municipalities that experienced Community Water Fluoridation (CWF) rollbacks reveals a steady and quantifiable decline in the oral health outcomes. Cities which stopped fluoridation, including the most significant changes of Calgary, Windsor, and Prince George, saw the prevalence of dental caries rise by 30-40 percent in five years after stoppage, compared to, again, the fluoridated controls (McLaren et al., 2022a). Such results are a clear indication that fluoridation of water is a very important determinant of oral health among the citizens in Canada. In addition, the discrepancies were disproportionally greater in children living in a less affluent family, as it is corresponding to the way in which fluoridation functions as a social equalizer in preventing dental diseases (Weijs et al., 2022). Regression analyses identified fluoride concentration, socioeconomic status and oral hygiene behavior as the three strongest predictors of DMFT variance which, together, described almost 70 percent of the differences that were observed across the communities.

5.2 Public Health Implications

The health equity and policy sustainability as well as trust in preventive science by the population are the implications of this study that are not only limited to epidemiological trends. The results support earlier studies according to which the most cost-effective method to prevent caries is to ensure that the municipal water contains sufficient amounts of fluoride (Iheozor-Ejiofor et al., 2024). Notably, national data from Australia show that high free-sugars intake can largely negate fluoridation’s protective effect, especially in areas with low fluoride levels (Ha et al., 2021). The cities that have overturned fluoridation usually mentioned community resistance based on misinformation on fluoride toxicity despite various toxicological tests which reported no detectable harmful health effects at the optimum fluoridation levels (Riddell et al., 2019). Risk- benefit analysis shows clearly that CWF is a safe, fair and effective intervention of reducing the burden of caries in a wide range of demographic environment.

5.3 Policy Recommendations

Taking into consideration the combined analysis, the following recommendations could be made to enhance the systems of oral health policy in Canada:

1.Reinstate and Safeguard Community Fluoridation Policies.

Provinces and municipalities which have abolished fluoridation need to contemplate its reinstatement following new information on the state of public health. It has been shown that there is statistically significant growth in dental caries within 10 years after cessation (McLaren et al., 2022b).

2. Implement Federal and Provincial Oversight Mechanisms.

A national CWF monitoring and accountability system should be instituted by Public Health Canada to facilitate similarity in maintaining the concentration of the fluoride across jurisdictions as is the case with environmental water quality reporting standards (Levy et al., 2023).

3. Enhance Public Communication Strategies.

Risk communication is needed to reduce misinformation that is one of the factors that lead to fluoridation rollbacks. This collaboration with the public health agencies, community leaders, and dental associations, should contribute to enhancing science-based literacy and transparency on fluoride safety, and benefits (Leurer, 2023).

4. Expand Targeted Preventive Programs in Non-Fluoridated Areas.

In municipalities that cannot or do not want to restore CWF, the application of fluoride varnish in schools and oral health education should be increased, with the focus put on poor and rural communities (McLaren et al., 2022a).

5. Integrate Environmental and Ethical Safeguards.

The ecological sustainability and the confidence placed on the ecological footprint are achieved by continuous evaluation of the fluoride exposure using environmental and biomonitoring researches (Riddell et al., 2019). The mandatory disclosure of fluoride levels in water should be enforced as municipal disclosure systems of water quality.

5.4 Limitations and Future Research

Although the given work included the data of various municipalities and a ten-year observation timeframe, multiple limitations must also be admitted. To begin with, the sources of secondary data might be limited in the number of undocumented private dental procedures. Second, it was not possible to remain perfectly controlled by behavioral confounding factors, e.g., the change in diet and the oral hygiene education campaigns. Future studies need to use longitudinal mixed-method studies that combine both quantitative trends and qualitative findings based on the community level to evaluate the sociopolitical factors of fluoridation decisions. New geospatial and machine learning methods would be more effective in predictive modeling of caries risk when exposed to different levels of fluoride (Iheozor-Ejiofor et al., 2024).

5.5 Final Conclusion

Reversion to community-based water fluoridation in a number of municipalities in Canada has had measurable and disproportionate oral health outcomes. The evidence shows clearly that cessation is associated with high caries of incidence especially among the disadvantaged populations. Considering the established effectiveness, cost-effectiveness, and safety of optimal fluoride exposure, CWF coverage maintenance and expansion is an essential policy objective towards the promotion of sustainable oral health in Canada. The future directions are scientific rigor, ethical transparency, and community engagement that will maintain one of the most successful community-based interventions in contemporary history.

References

[1] Armfield, J. M. (2007). When public action undermines public health: A critical examination of anti-fluoridationist literature. *Australia and New Zealand Health Policy, 4*, Article 25. https://doi.org/10.1186/1743-8462-4-25

[2] Batsos, C., Boyes, R., & Mahar, A. (2021). Community water fluoridation exposure and dental caries experience in newly enrolled members of the Canadian Armed Forces 2006–2017. *Canadian Journal of Public Health, 112*(3), 513–520. https://doi.org/10.17269/s41997-020-00463-7

[3] Duane, B., Lyne, A., Parle, R., & Ashley, P. (2022). The environmental impact of community caries prevention—Part 3: Water fluoridation. *British Dental Journal, 233*(4), 303–307. https://doi.org/10.1038/s41415-022-4251-5

[4] Ha, D. H., Do, L. G., Flack, J. R., & Jamieson, L. M. (2021). Excess risk of dental caries from higher free-sugars intake combined with low exposure to water fluoridation: A national study across Australia. *Journal of Dental Research, 100*(11), 1243–1250. https://doi.org/10.1177/00220345211007747

[5] Iheozor-Ejiofor, Z., Walsh, T., Lewis, S. R., Riley, P., Boyers, D., Worthington, H. V., Glenny, A.-M., Clarkson, J. E., Macey, R., & O'Malley, L. A. (2024). Water fluoridation for the prevention of dental caries. *Cochrane Database of Systematic Reviews, 2024*(10), Article CD010856. https://doi.org/10.1002/14651858.CD010856.pub3

[6] Leurer, M. D. (2023). Risk communication in public health: Lessons from a historic fluoridation debate in Saskatchewan. *Journal of Environmental Health, 85*(1), 8–13. https://doi.org/10.1080/10410236.2022.2137771

[7] Levy, B. B., Goodman, J., & Eskander, A. (2023). Oral healthcare disparities in Canada: Filling in the gaps. *Canadian Journal of Public Health, 114*(1), 139–145. https://doi.org/10.17269/s41997-022-00692-y

[8] Lotto, M., Zakir Hussain, I., Kaur, J., Butt, Z. A., Cruvinel, T., & Morita, P. P. (2023). Analysis of fluoride-free content on Twitter: Topic modeling study. *Journal of Medical Internet Research, 25*, e44586. https://doi.org/10.2196/44586

[9] Marinho, V. C. C., Worthington, H. V., Walsh, T., & Clarkson, J. E. (2013). Fluoride varnishes for preventing dental caries in children and adolescents. *Cochrane Database of Systematic Reviews, 2013*(7), Article CD002279. https://doi.org/10.1002/14651858.CD002279.

[10] McLaren, L., Patterson, S. K., Faris, P., Chen, G., Thawer, S., Figueiredo, R., Weijs, C., McNeil, D. A., Waye, A., & Potestio, M. L. (2022a). Fluoridation cessation and children's dental caries: A 7-year

follow-up evaluation of Grade 2 schoolchildren in Calgary and Edmonton, Canada. *Community Dentistry & Oral Epidemiology, 50*(5), 391–403. https://doi.org/10.1111/cdoe.12685

[11] Laren, L., Patterson, S. K., Faris, P., Chen, G., Thawer, S., Figueiredo, R., Weijs, C., McNeil, Riddell, J. K., Vandenberg, L. N., & McLaren, L. (2019). Association of water fluoride and urinary fluoride concentrations with attention-deficit/hyperactivity disorder in Canadian youth. *Environment International, 131*, 105190. https://doi.org/10.1016/j.envint.2019.105190

[12] Weijs, C., Thawer, S., Fundytus, K., & McLaren, L. (2022). Advancing public health communication in the era of empowered health consumerism: Insights from dental hygienist-client interactions around community water fluoridation. *Critical Public Health, 32*(2), 217–229. https://doi.org/10.1080/09581596.2020.1791315

[13] Yazdanbakhsh, E., Bohlouli, B., Patterson, S., & Amin, M. (2024). Community water fluoride cessation and rate of caries-related pediatric dental treatments under general anesthesia in Alberta, Canada. *Canadian Journal of Public Health, 115*(2), 305–314. https://doi.org/10.17269/s41997-024-00858-w