

---

# Position statement on community water fluoridation

July 2022 update



This publication is released under the Open Government License – Alberta

For more information about this document contact: Office of the Chief Medical Officer of Health,  
Alberta Health P.O. Box 1500 Strn Main Edmonton AB, T5J 2N3

Email: [OCMOH@gov.ab.ca](mailto:OCMOH@gov.ab.ca)

This publication is available online at: <https://open.alberta.ca/publications/position-statement-community-water-fluoridation>

## **Required**

Position Statement on Community Water Fluoridation: July 2022 update | Alberta Health

© 2022 Government of Alberta | July 29, 2022 | ISBN 978-1-4601-5493-9



## Summary Statement:

Alberta Health and Alberta Health Services recognize that community water fluoridation effectively prevents tooth decay, especially among people who are most vulnerable. It offers significant benefits with very low risk and reaches all residents who are connected to a municipal water supply. Therefore, Alberta Health and Alberta Health Services endorse community water fluoridation as a foundational public health measure to prevent tooth decay and improve oral health.

# Contents

**Background ..... 5**  
**Effectiveness ..... 6**  
**Safety ..... 6**  
**Cost-effectiveness ..... 8**  
**Ethics ..... 8**  
**Conclusion..... 9**  
**References..... 10**

# Background

## Introduction

Good oral health is important for overall health. However, some groups of people such as the elderly, children, people living on low incomes, people with disabilities, and members of ethnic minority groups continue to face significant disparities in oral health. This can be due to a range of factors at the individual or family level, but is predominantly a socio-economic issue. The universal health care system in Canada does not include dental care, which limits some people's access to dental care professionals.<sup>1</sup> The Government of Alberta supports community water fluoridation (CWF) and this document outlines its rationale.

## Tooth decay is a significant public health problem

Tooth decay occurs when bacteria present in the mouth turn sugars into acids that attack the tooth enamel. Despite many improvements in oral health over the last several decades, tooth decay continues to be a common health problem among Canadians, with consequences including pain, infection, impaired chewing ability, compromised appearance and tooth loss. Tooth decay in young children can have a negative impact on their nutrition, sleep, learning, and social development. It is also one of the most common causes of emergency department visits, hospitalization and procedures under general anesthesia in young children.<sup>2,3</sup> Poor oral health can adversely impact, and in many cases aggravate chronic diseases such as diabetes and cardiovascular diseases in adults.

The majority of children and adults in Canada experience tooth decay, and it is more prevalent among people who do not have the financial or other resources to access dental care.<sup>4</sup> Tooth decay may require repeated treatments and repair over the years. Poor oral health affects the wellbeing and quality of life of many Albertans while costing money and time off from school and work. Reducing the prevalence of tooth decay benefits everyone by improving both individual wellbeing and overall population health, reducing lost productivity and avoiding emergency health care system costs.<sup>5</sup>

## Dental care is out of reach for many Albertans

People of all ages and socio-economic background can benefit from CWF to prevent tooth decay. The cost of dental care is high and many Albertans who do not have dental insurance coverage are less likely or unable to access care for themselves and their children because of financial barriers.<sup>6</sup> CWF has been identified as the most cost-effective method of delivering fluoride to all members of a community, regardless of socio-demographic factors that may otherwise affect their oral health.

Dental care is estimated to have cost Canadians approximately \$13.5 billion in 2021 through both private insurance-covered costs and out-of-pocket expenses.<sup>7</sup> Tooth decay is a costly public health concern that affects the wellbeing of Albertans. Preventing tooth decay through CWF is a safe and effective option.<sup>8</sup>

## Community water fluoridation supports oral health

Fluoride is known to have a protective effect against tooth decay throughout life. In infants and children with pre-erupted teeth, ingested fluoride is incorporated into the structure of developing tooth enamel, making it more resistant to tooth decay after eruption. In addition, for children and adults, drinking fluoridated water reduces the rate of demineralization and promotes the re-mineralization of early decay. Fluoridated drinking water is able to provide a more constant supply of fluoride to teeth throughout the day than what brushing with fluoridated toothpaste offers alone.

The fluoride-containing compounds that are used for CWF have been shown to dissolve fully in water to release fluoride ions. These same fluoride ions can be found naturally in water. Most municipal drinking water sources in Alberta have very low levels of fluoride and therefore require the addition of fluoride to obtain health benefits, while some drinking water sources have too high levels of natural fluoride requiring adjustment. Health Canada recommends the adjustment of fluoride concentration to an optimal level of 0.7 mg/L for fluoridation programs. Municipal water treatment operators in Alberta are required to regularly monitor their water supply to ensure that fluoride levels are maintained within the recommended level and never exceed the Maximum Allowable Concentration of 1.5 mg/L set by Health Canada in the [Guidelines for Canadian Drinking Water Quality](#).

An international body of scientific evidence, developed over decades, supports the effectiveness of community water fluoridation in preventing tooth decay and reducing inequities in oral health. A 2021 systematic review including 43 studies of intervention programs to reduce tooth decay among children found that community water fluoridation for the whole population is more likely to reduce inequities in children's oral health than targeted population and individual interventions.<sup>9</sup>

There is also evidence from Alberta that children in communities with fluoridated drinking water have less tooth decay compared to those from communities without fluoridated drinking water.<sup>10</sup> In May 2011, the City of Calgary stopped water fluoridation that had previously been in place since 1991. This provided an opportunity to compare children's tooth decay rates in Calgary to those in Edmonton, where the municipal water supply has been fluoridated since 1967.<sup>10</sup> Despite evidence of better access to dental treatment in Calgary, more tooth decay was found in the baby teeth of children in Calgary compared to Edmonton. This study confirms the effectiveness of community water fluoridation and demonstrates the negative impact on children's oral health from the decision to discontinue fluoridation of public water supplies. The City of Calgary held a plebiscite in October 2021 on the issue and, following approval of fluoridation by the majority of voters, the city council voted to reinstate CWF starting in 2023.

There have been many scientific studies evaluating the effectiveness, safety, cost effectiveness and ethics of CWF. The remainder of this document will highlight the current weight of evidence in key areas.

## Effectiveness

Scientific studies show that fluoridation continues to be an effective strategy in reducing tooth decay even in an era with widespread availability of fluoride from other sources, such as fluoridated toothpaste. There have been several major systematic reviews of the literature published on this topic in addition to dozens of individual studies confirming the benefits of community water fluoridation (CWF).

In 2019, The Canadian Agency for Drugs and Technologies in Health (CADTH) completed a Health Technology Assessment on Community Water Fluoridation Programs. CADTH concluded "there is consistent evidence that CWF protects against dental caries in children and adults and leads to improved oral health outcomes with very minor side effects, and that CWF programs are cost saving from a societal perspective."<sup>11</sup>

Systematic literature reviews of the large body of scientific evidence have consistently concluded that CWF is effective at decreasing the prevalence and severity of tooth decay. Effects include significant increases in the proportion of decay-free children and significant reductions in the number of teeth or tooth surfaces with tooth decay in both children and adults. Additionally, comparisons between communities have demonstrated less tooth decay in communities with fluoridated drinking water.<sup>10,12</sup>

A systematic review conducted in Brazil in 2021 summarized the impact of CWF on the reduction of tooth decay in the context of the wide use of fluoridated toothpaste in Brazil. The review included 26 studies and found that CWF remains effective in preventing tooth decay in children younger than 13 years, even with the widespread use of fluoridated toothpaste.<sup>13</sup>

A 2015 Cochrane review of the literature, which included 107 studies, concluded that water fluoridation is effective in reducing tooth decay in primary and permanent teeth in children.<sup>14</sup> This review found that, in comparison to the control group, fluoridation was associated with:

- a 35 per cent reduction in decayed, missing or filled primary teeth; and
- 15 per cent more decay free children in primary dentition, and 14 per cent more in permanent dentition.

The overall body of scientific evidence supports community water fluoridation as an effective public health strategy to reduce tooth decay.

## Safety

It is important to distinguish between fluoride effects at high dose levels and effects that may occur at the levels recommended for CWF. The recommended level of fluoride in public water supplies (0.7 mg/L) is the ideal level to prevent tooth decay without causing health risks. The most recent report from the Canadian Agency for Drugs and Technologies in Health (CADTH) concluded there continues to be consistent evidence for the safety of CWF with the only known adverse effect being

mild to very mild dental fluorosis.<sup>15</sup> The remainder of this section will summarize findings on dental fluorosis, cognition and reviews of other health risks in the literature.

## Fluorosis

Intake from all sources of fluoride, including fluoride in drinking water, toothpaste and dietary fluoride supplements, increase the likelihood of dental fluorosis, which is a hypo-mineralization of the teeth that occurs during development. Dental fluorosis ranges from barely visible lacy white markings in mild cases to pitting of the teeth in the rare, severe form. There is a dose-response relationship between fluoride intake and fluorosis. The risk for, and severity of dental fluorosis depends on the amount, timing, frequency, and duration of fluoride intake. The Canadian Drinking Water Guideline maximum recommended level for fluoride in drinking water is 1.5 mg/L. This level protects children 8 years old and younger against dental fluorosis even when combined with other sources of fluoride intake.<sup>16</sup>

A study conducted recently in Alberta confirmed that the concentration of fluoride adjusted at water treatment facilities in Alberta is maintained at the approximate optimal level of 0.7 mg/L.<sup>17</sup> The study involved collecting water samples from 141 daycare facilities in 35 municipalities across Alberta as the endpoint to measure fluoride concentration. Therefore, the fluoride levels in Albertan communities with water fluoridation are safe to protect against both tooth decay and dental fluorosis.

The Canadian Health Measures Survey 2007–2009 identified less than 0.3 per cent of children as having moderate to severe dental fluorosis in Canada.<sup>18</sup> In Canada, the prevalence of dental fluorosis of cosmetic concern is minimal. Most people with very mild dental fluorosis are unaware; it is barely noticeable to the untrained eye and does not affect tooth functionality and health. Therefore, the burden of this condition at the population level is very small and it is not a public health concern.

## Cognition

Recent studies applicable to the Canadian context of CWF conducted in Sweden<sup>19</sup>, Canada<sup>20</sup> and New Zealand<sup>21</sup> found no association between fluoride exposure and cognition<sup>15</sup>. After reviewing the available evidence from these and 16 other less relevant studies, the Canadian Agency for Drugs and Technology in Health (CADTH) concluded that there is no evidence that Intellectual Quotient (IQ) and cognitive function are negatively impacted by fluoride at the recommended level for CWF.<sup>22</sup>

Following the CADTH review, two studies<sup>23,24</sup> from Mexico, where salt fluoridation is used as opposed to CWF, found associations between mothers' maternal urine fluoride concentration and IQ scores and attention deficit hyperactivity disorder in their children. In Canada, maternal urine fluoride concentration levels in CWF communities were similar to those seen in the Mexico studies<sup>25</sup> and an association between mothers' maternal urine fluoride concentration and IQ scores in their children was also reported.<sup>26</sup> After carefully reviewing this new research, Alberta Health concluded that the studies provide weak evidence that is not generalizable and cannot infer causality. A subsequent rapid literature review of this new finding, conducted by CADTH, supports the conclusion of insufficient evidence.<sup>27</sup>

Since the 2019 CADTH review, there have been recently published studies examining the association between fluoride exposure and IQ and attention deficit hyperactivity disorder (ADHD) in children. One study was conducted in China<sup>28</sup>, and two studies<sup>29,30</sup> were from Canada. These studies prompted CADTH to conduct an updated review on the effects of fluoride exposure through CWF on the neurological or cognitive development in children and adolescents less than 18 years of age.<sup>31</sup> The 2020 CADTH review concluded that there is insufficient evidence to conclude that fluoride exposure at the Canadian water fluoride levels (optimum at 0.7 mg/L) affects neurological development in children and adolescents in Canada. The reviewed studies had multiple limitations such as insufficient control of confounding factors, potential misclassification of exposure, and inadequate study design.<sup>31</sup> The findings of these studies would be difficult to interpret and generalize to the Canadian context.

These studies point to a need for further research in this area to better determine if the observed associations are meaningful, however, the overall weight of evidence on the relationship between CWF and cognition continues to support the safety of CWF. Alberta Health will continue to monitor new evidence in this area.

## Reviews of other potential health risks

A systematic review conducted in the UK in 2000 considered 214 studies on the safety and efficacy of water fluoridation; 88 studies concerned side effects other than dental fluorosis.<sup>32</sup> The review included all studies showing any negative effects from water fluoridation in humans. They found no association with water fluoridation and adverse effects such as cancer, bone fracture and Down's syndrome.

A systematic review commissioned by the Australian National Health and Medical Research Council completed in 2008 evaluated the literature relating to health effects of fluoride and fluoridation. Although the review found that water fluoridation has little effect in fracture risk, the authors did not have enough evidence available to determine if the effect was protective or harmful.<sup>33</sup>

Health Canada's Expert Panel review of fluoridation examined all identified human health risks, taking into account new studies and approaches including a literature review and total diet study.<sup>34</sup> The report concluded that fluoride in drinking water up to twice the recommended amount is unlikely to cause adverse health effects, including cancer, bone fracture, immunotoxicity, reproductive/developmental toxicity, genotoxicity, and/or neurotoxicity. A fluoride level of 0.7 mg/L in drinking water prevents excessive intake of fluoride through multiple sources of exposure.

In 2011 the European Commission's critical review<sup>35</sup> of new evidence on the hazard profile, health effects, and human exposure to fluoridated water found:

- the weight of evidence did not substantiate adverse health effects such as carcinogenicity, developmental neurotoxicity and reproductive toxicity;
- exposure of water organisms to fluoridated water is not expected to lead to unacceptable risks to the environment; and
- the fluoridation additive, hydrofluorosilicic acid, rapidly hydrolyzes in water and acts as if fluoride is naturally present in the water. Any slight impurities in the additive are at least 100 times less than drinking water guidelines established by the World Health Organization and are not regarded as a health risk.

The overall body of scientific evidence supports CWF as a safe public health measure to prevent tooth decay.

## Cost-effectiveness

There have been multiple studies evaluating the cost-effectiveness of CWF including studies from the US, Australia and Canada. All of these studies have indicated that CWF is cost-effective. CWF began in Canada in 1945 and early results showed a 39 per cent reduction in tooth decay among primary teeth and a 53 per cent reduction in tooth decay for permanent teeth; all at a cost of less than 20 cents per person per year.<sup>36</sup> Further, dental care costs decreased significantly for children born in fluoridated communities after fluoridation began.

A cost-effectiveness analysis of community water fluoridation for schoolchildren in Ireland published in 2021, found that the annual lifetime treatment savings associated with caries prevented for a sample of five, eight, and 12-year-old schoolchildren, was estimated to be €2.95 million. The cost-effectiveness analysis was conducted from the health-payer perspective and compared the incremental costs and consequences associated with the CWF intervention to no intervention for schoolchildren living in Ireland in 2017.<sup>37</sup>

In a 2015 systematic review<sup>38</sup> it was concluded that the economic benefit of CWF exceeds the intervention cost. Furthermore, the cost-benefit ratio improves as the community population size increases. For larger communities of more than 20,000 people, it is estimated that every \$1 invested in this preventive measure yields approximately \$38 savings in dental treatment costs.

Although other fluoride-containing products are available and contribute to the prevention and control of tooth decay, CWF has been identified as the most cost-effective method of delivering fluoride to all members of a community, regardless of socio-demographic factors that may otherwise affect their oral health.

## Ethics

CWF, like most public health measures, has to balance the inherent tension between protecting valued individual rights and achieving positive societal goals such as avoided disease and greater equity or fairness in health. While individual choice should be preserved, when possible, exceptions exist if there is a significant benefit to the broader community. The benefits of fluoridation significantly outweigh its potential negative effects and therefore justify limiting the freedom of choice for people who do not wish to have their water fluoridated. In addition, fluoride toothpaste and dental treatments alone will not reduce inequalities (unfair differences) in oral health because their use depends on individual behaviour and personal cost.

In a 2003 Section 7 Charter of Rights and Freedoms analysis, the Supreme Court of British Columbia dismissed an applicant's claims for damages for personal injuries resulting from the fluoridation of public water. The Court determined that adding



fluoride (a naturally occurring substance in water) was different than adding a drug or medication that did not naturally occur. Fluoridation at optimum levels was a minimal intrusion into a person's right to liberty and security of the person, which are protected under the Charter.

A systematic review of current evidence on socio-economic inequality and tooth decay found that the odds of having poor oral health are significantly greater for those with lower incomes or in individuals and families experiencing lower completion of formal education.<sup>39</sup> A study was conducted in 2016 to compare the socio-economic patterns of children's tooth decay in Calgary, in 2009/10 when CWF was in place, and in 2013/14, after it had been discontinued. The study demonstrated increasing inequities in tooth decay in the absence of CWF which was associated with lower socio-economic status.<sup>40</sup> In 2007 the Nuffield Council on Bioethics (UK) advised that the reduction of ill health and reduction of health inequalities, especially among children, make fluoridation justifiable when balanced against the principles of avoiding coercive interventions and minimizing interventions in personal life.<sup>41</sup>

The Canadian Agency for Drugs and Technologies (CADTH) review concluded that CWF is ethically justifiable from a public health perspective because of its health benefits and equitable approach. It is also appropriate and imperative, that governments, including municipal councils, take steps to promote the health of the populations they serve.<sup>42</sup>

## Conclusion

The best available scientific evidence supports fluoridation as a safe and effective public health measure to improve oral health and reduce tooth decay. Alberta Health and Alberta Health Services value the oral health of Albertans and support fluoridation as a public health approach to minimize tooth decay and related complications. Municipal governments can be confident that the use of CWF at the recommended level is a safe public health measure that promotes the oral health of the population, and reduces oral health inequities within communities. Alberta Health, Alberta Health Services, Health Canada, the Public Health Agency of Canada, the United States Centers for Disease Control, and the World Health Organization, continue to monitor scientific evidence on this issue and continue to support fluoridation as a safe and effective way to prevent tooth decay in communities and across the lifespan.

## References

1. Canadian Association of Public Health Dentistry. Dental Care Call to Action 2021 [Internet]. 2021. Available from: <https://www.caphd.ca/sites/default/files/pdf/Dental%20Care%20Call%20to%20Action%202021.pdf>
2. Canadian Institute for Health Information. Measuring Trends in Health Inequalities in Cities: Hospitalization and Day Surgery Indicators. [Internet]. 2019. Available from: <https://www.cihi.ca/en/day-surgery-rates-for-dental-carries-in-canadian-cities>
3. Friedman ME, Quiñonez C, Barrett EJ, Boutis K, Casas MJ. The Cost of Treating Caries-Related Complaints at a Children's Hospital Emergency Department. *J (Canadian Dental Association)*. 2018 May 1;84:i5.
4. Report on the findings of the oral health component of the Canadian health measures survey [Internet]. 2007. Available from: <https://www.caphd.ca/sites/default/files/CHMS-E-tech.pdf>
5. Figueiredo R, Fournier K, Levin L. Emergency department visits for dental problems not associated with trauma in Alberta, Canada. *International Dental Journal*. 2017 Dec 1;67(6):378-83. <https://doi.org/10.1111/idj.12315>
6. Alberta Health. Alberta Dental Review Report [Internet]. Alberta.ca. 2016 [cited 2022 Feb 11]. Available from: <https://open.alberta.ca/publications/alberta-dental-review>
7. Canadian Institute for Health Information (CIHI). National Health Expenditure Trends [Internet]. Cihi.ca. 2021 [cited 2022 Feb 11]. Available from: <https://www.cihi.ca/en/national-health-expenditure-trends>
8. Cronin J, Moore S, Harding M, Whelton H, Woods N. A cost-effectiveness analysis of community water fluoridation for schoolchildren. *BMC Oral Health*. 2021 Dec;21(1):1-2. <https://doi.org/10.1186/s12903-021-01490-7>
9. Shen A, Bernabé E, Sabbah W. Systematic review of intervention studies aiming at reducing inequality in dental caries among children. *International journal of environmental research and public health*. 2021 Jan;18(3):1300. <https://doi.org/10.3390/ijerph18031300>
10. McLaren L, Patterson SK, Faris P, Chen G, Thawer S, Figueiredo R, Weijs C, McNeil D, Wayne A, Potestio M. Fluoridation cessation and children's dental caries: A 7-year follow-up evaluation of Grade 2 schoolchildren in Calgary and Edmonton, Canada. *Community Dentistry and Oral Epidemiology*. 2021 Jul 26. <https://doi.org/10.1111/cdoe.12685>
11. CADTH. Community Water Fluoridation Programs [Internet]. 2019. Available from: <https://www.cadth.ca/sites/default/files/pdf/ht0022-fluoridation-evidencehighlight-e.pdf>
12. McLaren L, Patterson S, Thawer S, Faris P, McNeil D, Potestio M, Shwart L. Measuring the short-term impact of fluoridation cessation on dental caries in Grade 2 children using tooth surface indices. *Community Dentistry and Oral Epidemiology*. 2016 Jun;44(3):274-82. <https://doi.org/10.1111/cdoe.12215>
13. Belotti L, Frazão P. Effectiveness of water fluoridation in an upper-middle-income country: A systematic review and meta-analysis. *International Journal of Paediatric Dentistry*. 2021 Sep 26. <https://doi.org/10.1111/ipd.12928>
14. Iheozor-Ejiofor Z, Worthington HV, Walsh T, O'Malley L, Clarkson JE, Macey R, Alam R, Tugwell P, Welch V, Glenny AM. Water fluoridation for the prevention of dental caries. *Cochrane Database of Systematic Reviews*. 2015(6). <https://doi.org/10.1002/14651858.CD010856.pub2>
15. Community water fluoridation exposure: A review of neurological and cognitive effects -A 2020 update [Internet]. Cadth.ca. 2020 [cited 2022 Feb 10]. Available from: <https://www.cadth.ca/sites/default/files/pdf/htis/2020/RC1314%20-%20CWF%20exposure%20Final.pdf>
16. Guidelines for Canadian Drinking Water Quality—Summary Table. Health Canada. 2020 [cited 2022 Feb 10]. Available from: [https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt\\_formats/pdf/pubs/water-eau/sum\\_guides\\_recom/summary-table-EN-2020-02-11.pdf](https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guides_recom/summary-table-EN-2020-02-11.pdf)
17. Gianoni-Capenakas S, Popadynetz J, Younger J, White T, Hodgkinson P, Patterson S, Pacheco-Pereira C, Figueiredo R. Comparison of Adjusted Fluoride Concentrations Between Water Treatment Facilities and Endpoints in Alberta, Canada. *J Can Dent Assoc*. 2021;87(112):1488-2159.
18. Cooney P. Report on the findings of the oral health component of the Canadian Health Measures Survey 2007–2009. Ottawa: Health Canada. 2010:1A111.
19. Aggeborn L, Öhman M. The effects of fluoride in drinking water. *Journal of Political Economy*. 2021 Feb 1;129(2):465-91. <https://doi.org/10.1086/711915>
20. Barberio AM, Quinonez C, Hosein FS, McLaren L. Fluoride exposure and reported learning disability diagnosis among Canadian children: Implications for community water fluoridation. *Canadian Journal of Public Health*. 2017 May;108(3):e229-39. <https://doi.org/10.17269/cjph.108.5951>

21. Broadbent JM, Thomson WM, Ramrakha S, Moffitt TE, Zeng J, Foster Page LA, Poulton R. Community water fluoridation and intelligence: prospective study in New Zealand. *American journal of public health*. 2015 Jan;105(1):72-6. <https://doi.org/10.2105/AJPH.2013.301857>
22. Canadian Agency for Drugs and Technology in Health (CADTH) Community water fluoridation programs: a health technology assessment — review of dental caries and other health outcomes. CADTH Technology review no. 12. Ottawa (ON): CADTH; 2019
23. Bashash M, Thomas D, Hu H, Angeles Martinez-Mier E, Sanchez BN, Basu N, Peterson KE, Ettinger AS, Wright R, Zhang Z, Liu Y. Prenatal fluoride exposure and cognitive outcomes in children at 4 and 6–12 years of age in Mexico. *Environmental health perspectives*. 2017 Sep 19;125(9):097017. <https://doi.org/10.1289/EHP655>
24. Bashash M, Marchand M, Hu H, Till C, Martinez-Mier EA, Sanchez BN, Basu N, Peterson KE, Green R, Schnaas L, Mercado-García A. Prenatal fluoride exposure and attention deficit hyperactivity disorder (ADHD) symptoms in children at 6–12 years of age in Mexico City. *Environment international*. 2018 Dec 1;121:658-66. <https://doi.org/10.1016/j.envint.2018.09.017>
25. Till C, Green R, Grundy JG, Hornung R, Neufeld R, Martinez-Mier EA, Ayotte P, Muckle G, Lanphear B. Community water fluoridation and urinary fluoride concentrations in a national sample of pregnant women in Canada. *Environmental health perspectives*. 2018 Oct 10;126(10):107001. <https://doi.org/10.1289/EHP3546>
26. Green R, Lanphear B, Hornung R, Flora D, Martinez-Mier EA, Neufeld R, Ayotte P, Muckle G, Till C. Association between maternal fluoride exposure during pregnancy and IQ scores in offspring in Canada. *JAMA pediatrics*. 2019 Oct 1;173(10):940-8. <https://doi.org/10.1001/jamapediatrics.2019.1729>
27. Community Water Fluoridation Exposure: A Review of Neurological and Cognitive Effects | CADTH [Internet]. Cadth.ca. 2019. Available from: <https://www.cadth.ca/community-water-fluoridation-exposure-review-neurological-and-cognitive-effects>
28. Wang M, Liu L, Li H, Li Y, Liu H, Hou C, Zeng Q, Li P, Zhao Q, Dong L, Zhou G. Thyroid function, intelligence, and low-moderate fluoride exposure among Chinese school-age children. *Environment international*. 2020 Jan 1;134:105229. <https://doi.org/10.1016/j.envint.2019.105229>
29. Till C, Green R, Flora D, Hornung R, Martinez-Mier EA, Blazer M, Farmus L, Ayotte P, Muckle G, Lanphear B. Fluoride exposure from infant formula and child IQ in a Canadian birth cohort. *Environment international*. 2020 Jan 1;134:105315. <https://doi.org/10.1016/j.envint.2019.105315>
30. Riddell JK, Malin AJ, Flora D, McCague H, Till C. Association of water fluoride and urinary fluoride concentrations with attention deficit hyperactivity disorder in Canadian youth. *Environment international*. 2019 Dec 1;133:105190. <https://doi.org/10.1016/j.envint.2019.105190>
31. Community Water Fluoridation Exposure: A Review of Neurological and Cognitive Effects – A 2020 Update. Ottawa: CADTH; 2020 Nov. (CADTH rapid response report: summary with critical appraisal)
32. McDonagh MS, Whiting PF, Wilson PM, Sutton AJ, Chestnutt I, Cooper J, Misso K, Bradley M, Treasure E, Kleijnen J. Systematic review of water fluoridation. *Bmj*. 2000 Oct 7;321(7265):855-9. <https://doi.org/10.1136/bmj.321.7265.855>
33. Yeung CA. A systematic review of the efficacy and safety of fluoridation. *Evidence-based dentistry*. 2008 Jun;9(2):39-43. <https://doi.org/10.1038/sj.ebd.6400578>
34. Health Canada. Guidelines for Canadian drinking water quality [Internet]. Canada.ca. 2010. Available from: <https://www.canada.ca/content/dam/canada/health-canada/migration/healthy-canadians/publications/healthy-living-vie-saine/water-fluoride-fluorure-eau/alt/water-fluoride-fluorure-eau-eng.pdf>
35. European Commission. Scientific Committee on Health and Environmental Risks (SCHER). Critical review of any new evidence on the hazard profile, health effects, and human exposure to fluoride and the fluoridating agents of drinking water, 2011.
36. Lynn McIntyre MD. Drinking water fluoridation in Canada: Review and synthesis of published literature. Available from: [http://www.wedeservesafewater.com/forum/uploaded/Synthesis\\_flouridation\\_Alberta\\_Health\\_fluoridation.pdf](http://www.wedeservesafewater.com/forum/uploaded/Synthesis_flouridation_Alberta_Health_fluoridation.pdf)
37. Cronin J, Moore S, Harding M, Whelton H, Woods N. A cost-effectiveness analysis of community water fluoridation for schoolchildren. *BMC Oral Health*. 2021 Dec;21(1):1-2.
38. Griffin SO, Jones K, Tomar SL. An economic evaluation of community water fluoridation. *Journal of public health dentistry*. 2001 Jun;61(2):78-86. <https://doi.org/10.1111/j.1752-7325.2001.tb03370.x>

39. Schwendicke F, Dörfer CE, Schlattmann P, Page LF, Thomson WM, Paris S. Socioeconomic inequality and caries: a systematic review and meta-analysis. *Journal of dental research*. 2015 Jan;94(1):10-8. <https://doi.org/10.1177/0022034514557546>
40. McLaren L, McNeil DA, Potestio M, Patterson S, Thawer S, Faris P, Shi C, Shwart L. Equity in children's dental caries before and after cessation of community water fluoridation: differential impact by dental insurance status and geographic material deprivation. *International journal for equity in health*. 2016 Dec;15(1):1-9. <https://doi.org/10.1186/s12939-016-0312-1>
41. Nuffield Council on Bioethics. Case study – Fluoridation of water, chapter 7 in public health: ethical issues [Internet]. 2007. Available from: <https://www.nuffieldbioethics.org/wp-content/uploads/2014/07/Public-health-Chapter-7-Fluoridation-of-water.pdf>
42. Canadian Agency for Drugs and Technology in Health (CADTH) Community water fluoridation programs: a health technology assessment — Evidence highlights. CADTH Technology review no. 12. Ottawa (ON): CADTH; 2019