

WATER FLUORIDATION IN ALBERTA: STUDY PLACES CALGARY RESEARCHER IN CENTRE OF HEATED DEBATE



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This interview has been condensed and edited.

The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association.

Dr. Lindsay McLaren, associate professor in the University of Calgary's Cumming School of Medicine, is the lead author of a research paper that examined whether removing fluoride from Calgary's municipal water supply has had an impact on children's oral health. The study, published in the February 2016 issue of *Community Dentistry and Oral Epidemiology* (see p. 33 for study summary), reported that children in Calgary experienced a greater increase in tooth decay for primary teeth compared to their counterparts in Edmonton, where municipal water continues to be fluoridated.

The intense media and public response to the paper's publication, which suggests a public health benefit from fluoridation, illustrates how closely this issue is followed in Canada and beyond, and the relationship between science and public policy. Soon after the study was published, Calgary city council's decision to stop fluoridating its drinking water in 2011 was called into question. According to media reports, city councillors who voted against fluoridation in the 10-3 council vote were asked whether they had changed their minds on the issue in light of the study's findings, and at least two city councillors met with Calgary's medical officer of health to discuss whether the province would help fund the cost of putting fluoride back in the water. It's possible that fluoridation may be back on the table for the 2017 municipal election in Calgary.

Not surprisingly, the study also attracted plenty of criticism from those opposed to fluoridation. Critics were quick to declare the study flawed and unscientific, and some attacked Dr. McLaren's motives and character.

We asked Dr. McLaren about the reaction to her study, and what it means for the debate about fluoridated drinking water.

Were you surprised that your study generated so much attention?

We knew there would be some interest. But I have to say I did not fully anticipate the level and intensity of the response. In hindsight, I guess it's not surprising considering the long-standing debate on the issue. I just want to be clear that the objective of our study was not to persuade anyone to support fluoridation, but rather to take advantage of the decision to discontinue fluoridation as an opportunity to conduct a research study and contribute to the literature.

Do you feel that the media accurately reported on your study?

I think some reported it accurately; others, less so. I think the issue is that sometimes the media and the public want a quick synopsis and that's not always possible. The study was complex. It took 3 papers to write up the results and there is a lot of nuance that was not captured in the media reports, which resulted in conclusions sometimes being misstated, or overstated, in some cases.

I noticed some news items reported there were more cavities in Calgary after fluoridation stopped, compared to Edmonton.

Yes, I saw that as well, but it's actually not true. At our post-cessation survey, levels of decay were very similar in the two cities—but what we were looking at was the change over time. Calgary used to be much better than Edmonton, and now the two cities are on par with one another.



The study at a glance

McLaren L, Patterson S, Thawer S, Faris P, McNeil D, Potestio M, et al. Measuring the short-term impact of fluoridation cessation on dental caries in Grade 2 children using tooth surface indices. *Community Dent Oral Epidemiol.* 2016 Feb 17. [Epub ahead of print]

The question: Does removing fluoride from municipal water have a short-term impact on dental caries of children's tooth surfaces?

Study population: Children in Calgary and Edmonton who were in grade 2 in 2004-05 (before fluoride was taken out of municipal water in Calgary) and in 2013-14 (after fluoride was removed in Calgary). Over 5,000 children were included in the study.

What was measured: Decayed, extracted (due to caries), and filled primary tooth surfaces (defs) and decayed, missing (due to caries), and filled permanent tooth surfaces (DMFS). Data were analyzed for all tooth surfaces and smooth surfaces only.

Results: For primary teeth, in both Calgary and Edmonton there was a statistically significant increase in tooth decay in 2013-14 (after fluoride cessation) compared to 2004-05 (before Calgary removed fluoride from its drinking water). But the increase was significantly greater in Calgary. For example, in Calgary, the number of defs rose, on average, by 3.8 between 2004-05 and 2013-14—the time during which fluoride was removed from city water—whereas in Edmonton, the average increased by 2.1.

For all tooth surfaces among permanent teeth, decay decreased (i.e., there was an improvement in oral health) in both Calgary and Edmonton, although the decrease was statistically significant only in Calgary.

However, when focusing on smooth surfaces among those affected (those with DMFS > 0), there was a non-significant trend towards an increase in decay in Calgary (after fluoride cessation) that was not apparent in Edmonton.

What it means: The authors conclude that for primary teeth, the study results show that removing fluoride from municipal water supplies in Calgary increased tooth decay over the short term (i.e., 2.5 to 3 years after fluoride cessation). Trends for permanent teeth hint at an early indication of an adverse effect, but it will be very important to continue monitoring these trends.



The other thing to mention is that studies like this do not provide definitive proof of anything. That's just their nature. They're observational, they're complex, and sometimes people are seeking definitive proof and we simply can't provide that. But this desire to have easy, quick answers has the consequence of information being misconstrued or overly simplified.

Do you think lack of scientific literacy is part of the challenge in helping decision makers understand the issue of fluoridation?

I do think that's an important challenge and I think, as researchers, we have a role to play in increasing scientific literacy, although we're not always very good at it. In our case, we made the decision to publish our work in open access format, which means that it is in the public domain, and to make ourselves available to present or explain the study, if needed.

People used your study's results to argue in favour of, or against, fluoridation, depending on who

was interpreting the data. Given the different reasons people have for opposing fluoridation, how important do you think scientific evidence is in the fluoride debates?

That was very interesting. We're well aware that this decision is not just about evidence. I think evidence needs to be part of it, but the available evidence needs to be considered as a whole and to be interpreted fairly and rigorously. City councillors are in a difficult position because they have to juggle all those different factors.

Did you read any of the public commentaries from those who were quick to denounce your research, or feel an urge to defend it?

Yes, the criticism came very quickly! We read some of it. Some of the comments were fair and what we would expect within the domain of scientific debate. But others were a bit more aggressive and we just weren't sure of the value of entering into those discussions.



Your study notes: “Collectively, the literature (including our study) indicates that the impact of fluoridation cessation on dental caries is not uniformly positive or negative, but varies by time and place, and sorting out the reasons for different patterns is important.” How do you think your study will inform decision making by Canadian municipalities that are reconsidering their fluoridation policy?

I think it's very important to pursue locally relevant research. If you look at the published research on fluoridation cessation, it's not all that locally relevant. Some of it is quite a bit older, going back to the 1950s. There's only one Canadian study, from 1992. Also, some have very limited local relevance and were conducted under social circumstances that are very different from Canadian urban environments today. Do I think that every city needs to do a study? Not necessarily. Canadian municipalities that are revisiting their fluoridation policy can read our studies and judge for themselves the extent to which our findings are relevant to their own setting. We're actually in the process of trying to publish our methods protocol so that if other cities want to do a study, they don't have to start from scratch. That will also allow our methods to be debated and improved, which will benefit the knowledge base.

Calgary mayor Naheed Nenshi said that based on the available evidence, he would vote in favour of putting fluoride back in the water. What role do you think your study should play in future decisions on fluoridation of Calgary's drinking water?

Back in early 2011, when those deliberations were happening in Calgary, this issue actually came up, that there was a very limited amount of locally relevant evidence on what would happen if fluoridation was stopped. So our study aimed to tackle the piece of the story that several of the councillors felt was missing at the time. I think our study should be part of the discussion; but it's certainly not the only part.

If a patient wants to discuss your study with their dentist, what are some of the key points you think dentists should convey?

I think the key points are that we conducted a careful study where we compared 2 similar cities, one where fluoridation had ceased and one where it continued. And we showed a significantly greater increase in dental caries in children in the cessation city. We considered a number of other factors and we addressed some of the limitations of previous studies in the field.

Will you do a follow-up study?

I hope so! We would love to do another study, we just need to secure some funding. With more data points, we can start to look more robustly at changes over time. ✦



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