

A Brief Report on the Effectiveness of Fluoridated Water

A Brief Report on the Effectiveness of Fluoride: An Analysis of the Saskatchewan Dental Screening Program, 2008-2009 Report

People see what they want to see:

Members of the Canadian dental association often cite reports that seem to demonstrate the efficacy of fluoridated water in maintaining good dental health.

One of these reports is the 2008-2009 report on the [Saskatchewan Dental Screening Program](#). If one reads the report, it becomes clear that the evidence provided is often unclear, even contradictory. In particular, proponents of this report tend to ignore the segment that shows the impact of household income on dental health, especially among children.

Graphs comparing the impact of household income versus access to fluoridated water show that the level of household income has a greater impact than fluoridated water for:

- Existence of current caries;
- Evidence of no dental care;
- Incidence of Early Childhood Caries (ECC);
- Incidence of being cavity-free; and
- Incidence of oral pain and/or infection.

This is a testament on how data can be manipulated by selecting evidence that supports a prevailing tenet while ignoring evidence that goes against accepted [beliefs](#).

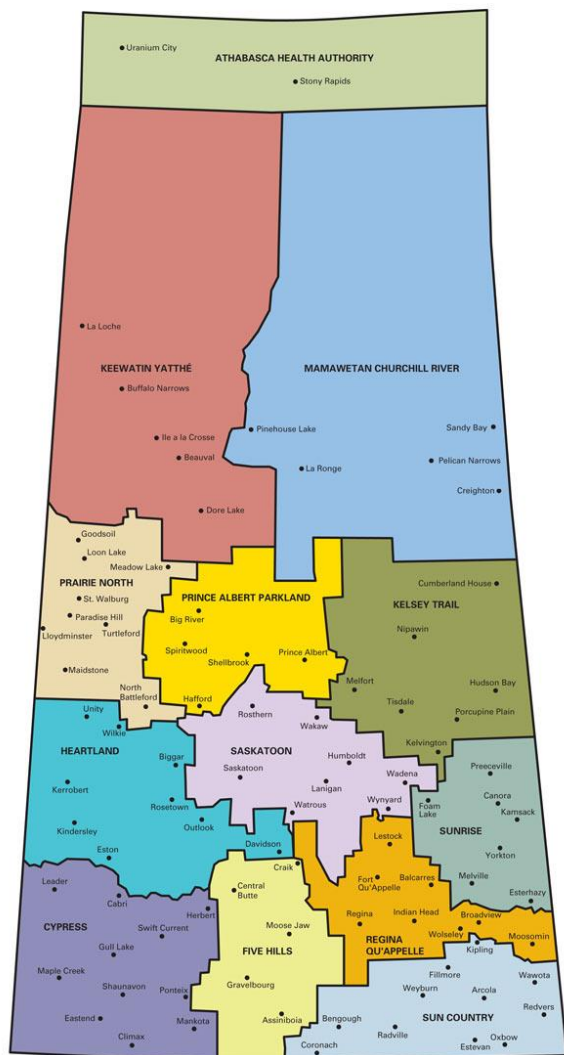
The reader should keep in mind that this is not a discussion on the topical application of fluoride on teeth, which takes place as part of the tooth cleaning procedure during a visit to a dentist; or on the topical application that takes place when brushing one's teeth with toothpaste containing fluoride. This is a discussion on the effectiveness of ingesting fluoridated water as a means to prevent dental disease.

The reader is encouraged to access the [Saskatchewan report](#) to see what the report says and draw conclusions therefrom.

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Water Fluoridation in Saskatchewan's Health Regions

Saskatchewan has 13 health regions. The Saskatchewan report mentions all but one (Athabasca Health Authority). At the time of the report, only 10 of the health regions provided fluoridated water to at least some of the population: along with Athabasca, the Mamawetan Churchill and Keewatin Yatthé health regions – encompassing the northern half of Saskatchewan - had no fluoridated water.



As for the other 10 health regions, the percentage of the population with access to fluoridated water ranged from 2.8% in Regina Qu'Appelle to 87.2% in Saskatoon. The percentage per health region is shown in the following table:

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Health Region	% of Pop. with Access to Fluoridated Water
Saskatoon	87.2%
Five Hills	72.6%
Cypress	44.2%
Kelsey Trail	40.1%
Heartland	38.2%
Sunrise	21.6%
Sun Country	20.1%
Prince Albert Parkland	11.1%
Prairie North	10.8%
Regina Qu'Appelle	2.8%
Keewatin Yatthé	0.0%
Mamawetan Churchill River	0.0%

Having shown the percentage of regional populations having access to fluoridated water, the Saskatchewan report then compares each region's success in achieving selected dental health benchmarks. The purpose of the report, one would believe, would be to demonstrate that those health regions that providing fluoridated water to the highest percentage of their respective populations would be the ones with greatest success in achieving dental health benchmarks.

It will be shown that those regions with the highest percentage of their populations with fluoridated water are not always the most successful in reaching dental health benchmarks. In fact, on some occasions they fail completely; and regions where a small percentage of the population has access to fluoridated water sometimes have greater success in achieving the benchmarks than those where a large percentage of the population has access to fluoridated water.

Before exploring the data, the reader will need to understand some of the acronyms used in the following pages:

DMFT index: this index is based on the number of teeth (primary and permanent) that have experienced tooth decay. The lower the score, the higher the health region is ranked.

DEFT index: this is a measure of the occurrence of dental disease . The lower the score, the higher the health region is ranked.

ECC: Early Childhood Caries. Again, the lower the percentage of children with ECC, the higher the health region is ranked.

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Table A

Health Region	% of Pop. with Access to Fluoridated Water	50% of children have never experienced dental decay	No more than 20% of Grade 1 children have unmet dental treatment needs	75% of children have never experienced decay in their permanent teeth	No more than 10% of Grade 7 children have unmet dental treatment needs	Average 'DMFT' of 1.0 or less	'Significant Caries Index', 'DMFT' of 3.0 or less.
Saskatoon	87.2%	50.8%	19.4%	74.8%	6.5%	0.6	1.81
Five Hills	72.6%	47.5%	27.8%	80.7%	9.3%	0.5	1.42
Cypress	44.2%	45.5%	21.1%	76.7%	8.3%	0.7	2.58
Kelsey Trail	40.1%	34.0%	32.8%	59.0%	14.1%	3.9	3.00
Heartland	38.2%	35.0%	28.1%	64.3%	12.9%	0.9	2.59
Sunrise	21.6%	35.7%	26.5%	57.6%	9.4%	1.1	2.64
Sun Country	20.1%	43.4%	29.6%	69.5%	15.0%	0.8	2.32
Prince Albert Parkland	11.1%	26.6%	29.0%	31.7%	12.1%	2.8	6.02
Prairie North	10.8%	37.8%	27.1%	62.9%	14.9%	0.9	2.57
Regina Qu'Appelle	2.8%	42.9%	31.9%	62.7%	14.9%	1.0	3.04
Keewatin Yatthé	0.0%	11.1%	62.2%	13.7%	47.1%	3.9	7.21
Mamawetan Churchill River	0.0%	21.6%	56.5%	53.5%	24.2%	1.4	3.79
All Saskatchewan		41.5%	27.1%	66.2%	11.4%	0.8	3.00

At first glance, Table A seems to show that the health regions that have the highest percentage of the population accessing fluoridated water, specifically, Saskatoon and Five Hills, are the most successful in achieving dental health benchmarks.

A closer examination of the data, however, reveals that the dental health picture is more complex.

The information for Table A is derived from Pages 23, 39 and 40 of the Saskatchewan study.

1. Benchmark: 50% of children having never experienced dental decay

Saskatoon is the only health region to achieve (barely) this target. Other regions that come close include Sun Country and Regina Qu'Appelle (43.4% and 42.9% of children, respectively), despite the fact that only 20.1% and 2.8% of the population, respectively, have access to fluoridated water.

The difference in frequency in dental decay is not proportional to the percentage of the regional populations with access to fluoridated water.

2. Benchmark: No more than 20% of Grade 1 children having unmet dental treatment needs

Again, Saskatoon is the only health region to meet this target. It is interesting to note that the Cypress Health Region, which has only 44.2% of its population accessing fluoridated water, is a close second with 21.1% of children having unmet dental treatment needs.

Also noteworthy is the fact that Sunrise and Prairie North health regions, with 21.6% and 10.8% of the population with access to fluoridated water, respectively, were able to equal or do better than the provincial average of 27.1% of children with unmet dental treatment needs. Meanwhile, the Five Hills region (72.6% of the population with access to fluoridated water) actually performed worse than the provincial average.

3. Benchmark: 75% of children having never experienced decay in their permanent teeth

Five Hills and Cypress health regions (72.6% and 44.2% of the population accessing fluoridated water, respectively) both met this target. Saskatoon missed the target despite being the health region with the highest percentage of the population with access to fluoridated water.

Sun Country, with only 20.1% of its population accessing fluoridated water, while not meeting the 75% target, was able to do better than the provincial average of 66.2%.

4. Benchmark: No more than 10% of Grade 7 children having unmet dental treatment needs

While Saskatoon was the best performing health region, this target was also met by Five Hills, Cypress and Sunrise regions, despite having a much lower percentage of their populations with access to fluoridated water.

5. Benchmark: Average DMFT of 1.0 or less

Five Hills is the best performing health region for this benchmark. On the other hand, the benchmark was also met by six other health regions, and three of these regions had 20% or less of their population with access to fluoridated water.

6. Benchmark: Combined Significant Caries Index & DMFT of 3.0 or less

Again, Five Hills is the best performing health region, but this benchmark was also met by eight other regions, three of which have 20% or less of their population with access to fluoridated water.

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Table B

Health Region	% of Pop. with Access to Fluoridated Water	Average deft/DMFT	% With Current Caries	% No evidence of dental care	% ECC present	% Cavity-free	% Pain & Infection
Saskatoon	87.2%	1.57	12.6	6.3	2.9	59.1	2.4
Five Hills	72.6%	1.63	19.5	9.9	1.2	57.1	0.4
Cypress	44.2%	1.89	15.6	5.9	2.4	56.3	1.3
Kelsey Trail	40.1%	2.45	22.0	10.7	4.3	41.4	3.5
Heartland	38.2%	2.42	18.7	6.9	2.9	43.6	2.5
Sunrise	21.6%	2.55	20.7	10.0	1.3	42.9	2.0
Sun Country	20.1%	1.92	21.6	11.4	2.9	52.3	3.5
Prince Albert Parkland	11.1%	N/A	N/A	8.5	1.9	28.8	1.4
Prairie North	10.8%	2.41	23.5	9.6	0.6	42.0	1.9
Regina Qu'Appelle	2.8%	2.37	24.6	11.8	5.2	50.2	3.1
Mamawetan Churchill River & Keewatin							
Yatthé	0.0%	4.51	48.4	13.6	21.3	21.6	3.6
All Saskatchewan		2.11	19.6	8.6	3.5	50.3	2.5

Table B is derived from Pages 23 and 51 of the Saskatchewan report.

1. Average DEFT/DMFT

While Saskatoon, which has the highest percentage of its population supplied with fluoridated water, has the best score, the health regions of Five Hills, Cypress and Sun Country also did well and were below the provincial average of 2.11.

2. Percentage of school children with current cavities

Again, Saskatoon is best performing health region. Three other health regions were better than the provincial average. It should be pointed out that the Cypress health region, with only 44.2% of its population with access to fluoridated water, performed better than the Five Hills health region, where 72.6% of the population have access to fluoridated water.

3. Percentage of school children with no evidence of dental care

Cypress health region (where 44.2% of the population has fluoridated water) is the best performing region with 5.9%. Saskatoon, Heartland and Prince Albert Parkland health regions all did better than the provincial average of 8.6%: the percentage of the population with fluoridated water in these regions is 87.2%, 38.2% and 11.1%, respectively.

4. Percentage of school children with ECC (Early Childhood Caries) present

Surprisingly, Prairie North health region, where only 10.8% of the population have access to fluoridated water, has the lowest percentage of ECC present: 0.6%. Most of the province's health regions did better than the provincial average of 3.5%. Also noteworthy is the fact that Saskatoon was outperformed by the health regions of Sunrise and Prince Albert Parkland, where the percentage of the population with access to fluoridated water is much less than Saskatoon.

5. Percentage of school children who are cavity free

Saskatoon health region (59.1%) has the highest percentage of school children who are cavity free. Four other health regions, including three regions with a much smaller percentage of their population having access to fluoridated water, equalled or did better than the provincial average of just over 50%.

6. Percentage of schoolchildren experiencing dental pain and/or infection

Five Hills health region was by far the most successful region, with only 0.4% of its school children experiencing dental pain and/or infection. Six other health regions did better than the provincial average of 2.5%.

Again, it is noteworthy that the health regions of Prince Albert Parkland, Prairie North and Cypress all did much better than Saskatoon despite having a much lower percentage of their populations with access to fluoridated water.

SUMMARY OF Tables A & B

Charts A & B show that there is no overwhelming evidence that fluoridated water helps in promoting good dental health.

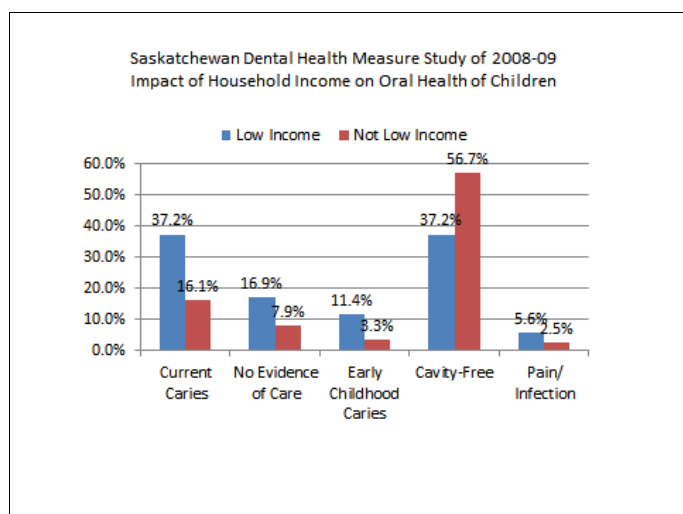
The evidence seems to indicate that some other determining factor is at play.

Graphs A & B, seen in the following page, seem to provide the answer to the puzzle. These graphs can be found in Pages 50 and 46 of the Saskatchewan report,

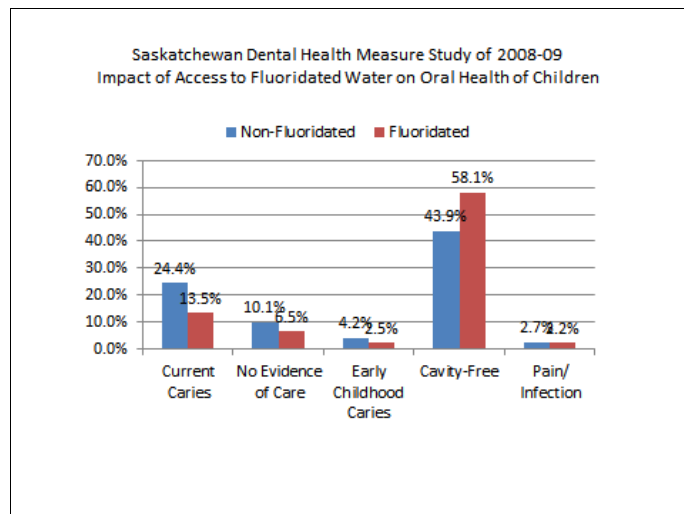
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Graphs A and B

A



B



Graph A shows how household income plays a direct role in the dental health of children and adults alike. This result is consistent with the fact dental care is a health service that is funded either directly out of pocket or through a co-pay arrangement with an insurance company.

Low income households are less likely to be able to afford to pay, out-of-pocket or in a co-pay arrangement, than middle and high income households. As a result, members of low income households visit a dentist less frequently and may be more prone to dental disease.

Income as a key determinant of dental health has been observed in many studies in recent years.

Graph B shows the relationship between access to fluoridated water and dental health. Compared to Graph A, it is evident that the impact of water fluoridation is much less pronounced than that of household income.

CONCLUSION

While the Saskatchewan Dental Screening Program has been cited as proof that fluoridated water has a positive impact on dental health, the 2008-2009 report does not provide strong evidence for the efficacy of fluoridated water. The report, in fact, provides strong evidence of the impact of household income.

The importance of household income in impacting a person's dental health is self-evident, and is logically connected with the fact that dental health services are mostly privately funded in Canada: either the patient pays out of pocket for the services or through a co-pay arrangement with an insurance provider.

Readers are encouraged to investigate the matter on their own and to reach their own conclusions.