



Dentistry as Primary Care

Talking with your Patients about Safe Drinking Water and Community Water Fluoridation (CWF)

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 University of North Dakota
 School of Medicine & Health Sciences



Objectives for Today

- Attendees will be able to describe the benefits of Safe Drinking Water over bottled water
- Attendees will learn, understand, and be able to share with their patients the importance of oral health and fluoride
- Attendees will be able to address CWF and impact on dental disease
- Attendees will be able to address the status of fluoride and CWF in North Dakota

Safe Drinking Water

Bottled Water vs Tap Water



3

The Benefits of Safe Drinking Water

Bottled Water: Concerns

- Regulated by FDA - Food
- Doesn't have strict controls which are applied to tap water
- Precautions by EPA¹:

*Some people may wish to take special precautions with the water they drink. In particular, people with immune systems that are weakened by AIDS, chemotherapy or transplant medications are more vulnerable to microbial contaminants in drinking water such as Cryptosporidium² **



1. Source: Accessed May 1, 2021 [Water Health Series Bottled Water Basics \(epa.gov\)](https://www.epa.gov/water-health-series/bottled-water-basics)
2. Pregnant mothers

4

The Benefits of Safe Drinking Water

Bottled Water^{1,2}: Concerns

- Distrust of tap water
- Perceived as more pure than tap
- Estimated by 2055 there will be more plastic bottles in oceans than fish
- Landfill nightmare
- No requirement to list background fluoride content – range from ND – double that in CWF¹
- **Mold – Kroger recall³**



1. Source: Accessed March 21, 2022: Information available by calling manufacturer or searching on website International Bottled Water Association [Bottled Water | International Bottled Water Association](#)
2. Source Accessed March 21, 2022: Information on Fluoridated Bottled Water: [BWA webpage](#)
3. Source: Kroger recalls "Comfort for Baby" water because of mold, December 2017; <https://bit.ly/2QKlpm>

5



The Benefits of Safe Drinking Water

Tap Water

- **Purest water available on planet – U.S.**
- Undergoes strict testing requirement of the EPA
- Constantly monitored for impurities (contaminants)
- Hesitancy to use, especially among immigrants whose tap water was not clean – were encouraged to drink bottled water



6

Fluoride and community water fluoridation (CWF)

Preventing the disease for which our profession began



7

CWF: Nature's way to prevent tooth decay

- Fluoride is a natural **mineral** found in all bodies of water
 - It is found in lakes, rivers and groundwater.
 - Ocean water contains 0.8 to 1.4 mg/L of fluoride.
 - Optimal level for caries prevention is 0.7 mg/L (ppm)
- Nearly 3 in 4 U.S. residents (73%) who are served by a community water system receive water that is fluoridated.
- **CWF reduces cavities by 25% for adults and children over their lifetimes.**



(Sources: Centers for Disease Control and Prevention, "Fluoridation Basics," web page updated January 28, 2021; Kandrui D, Sterbenk P, Artnik B. Fluoride: A Review of Use and Effects on Health, *Materiasociomedica*, 2016, 28(2.) 8

To learn about the history of fluoridation

Read the **Story of Fluoridation:**

<https://www.nidcr.nih.gov/health-info/fluoride/the-story-of-fluoridation>

NIH National Institute of Dental and Craniofacial Research

The Story of Fluoridation

It started as an observation, that soon took the shape of an idea. It ended, five decades later, as a scientific revolution that shot dentistry into the forefront of preventive medicine. This is the story of how dental science discovered-and ultimately proved to the world-that fluoride, a mineral found in rocks and soil, prevents tooth decay. Although dental caries remains a public health worry, it is no longer the unbridled problem it once was, thanks to fluoride.



NIH dentists examined these Grand Rapids schoolchildren once a year to document the effects of fluoridation

A Mysterious Disorder

In 1909 Dr. McKay (r) persuaded the Colorado State Dental Association to invite Dr. Green Vardiman Black (l), one of the nation's most eminent dental researchers, to attend 1909 convention where McKay's findings were to be presented. The two men began joint research and discovered other areas of the country where brown staining of teeth occurred.





9

North Dakota leads the nation in CWF

- North Dakota ranks **#5** in the U.S. of residents on community water systems having CWF
- **96.5%** of residents receive CWF
- 688,710 out of 713,531 people in state
- Far exceeds the Healthy People 2030 Goal for CWF in the U.S. of 77.1%



(Source: CDC fluoridation statistics, 2018; <https://www.cdc.gov/fluoridation/statistics/2018stats.htm> Healthy People 2030 [goal](#) for CWF accessed 3-21-2022)

10

Both forms of fluoride are needed



Community Water Fluoridation

What is community water fluoridation?	+
Does my public water system add fluoride to the water?	+
If I am drinking water with fluoride, why do I also need to brush with toothpaste that contains fluoride?	-

Both drinking water and toothpaste with fluoride provide important and complementary benefits. Fluoridated water keeps a low level of fluoride in saliva and dental plaque all day. The much higher concentration of fluoride in toothpaste offers additional benefit. Fluoride slows the activity of bacteria that cause decay and combines with enamel on the tooth surface to make it stronger and better able to resist decay. Together, the two sources offer more protection than using either one alone.

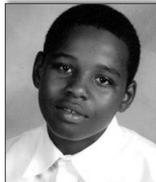


(Source: Centers for Disease Control and Prevention, "Community Water Fluoridation" [webpage](#), March 21, 2022.) 11

Dental cavities – a devastating disease

Dental cavities are the **most common chronic disease** for children and teens. It's significantly more common than *asthma, obesity, and diabetes*. **Infectious and Transmissible**

- Severe pain (toothaches)
- Difficulty in chewing
- Poor weight gain
- Difficulty concentrating
- Predictor of cavities later in life
- Costly to treat
- Deaths



12

The head really is connected to the body

Oral Health – Systemic Health Implications

- Facial Cellulitis
- Systemic infection – Septicemia, brain abscess
- Diabetes – Strong evidence exists for a causal link between periodontal disease
- Obesity
- Coronary artery disease
- Metabolic syndrome
- Pregnancy outcomes/Preterm labor
- Oral health after menopause
- Rheumatoid Arthritis



(Source: Smiles for Life curriculum; "The Relationship of Oral and Systemic Health"; Personal photo courtesy Dr. Jay Kumar)

Clinical Case #1

Community Water Fluoridation

- 1. Cessation effects**
- 2. Impact on Early Childhood Caries (ECC)**
- 3. Sources of information on scientific-fictional claims**

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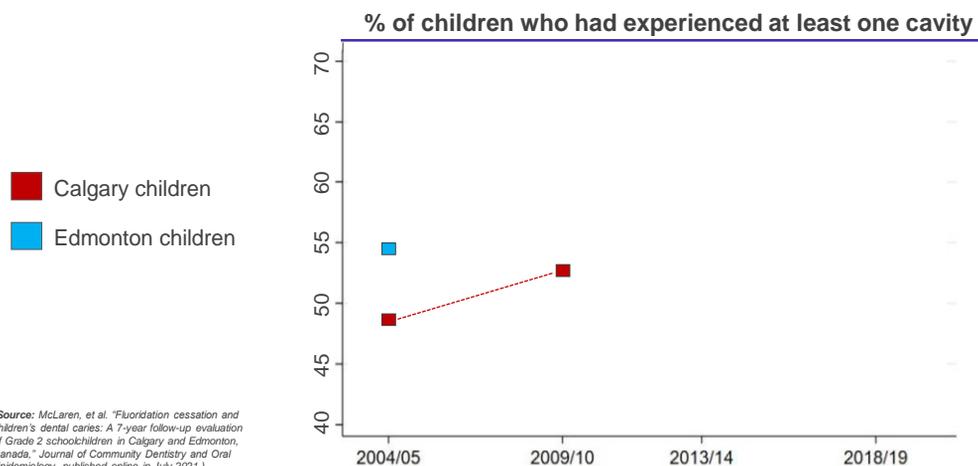
1. What happens when a community ends fluoridation?



17

Two Canadian cities fluoridated their water

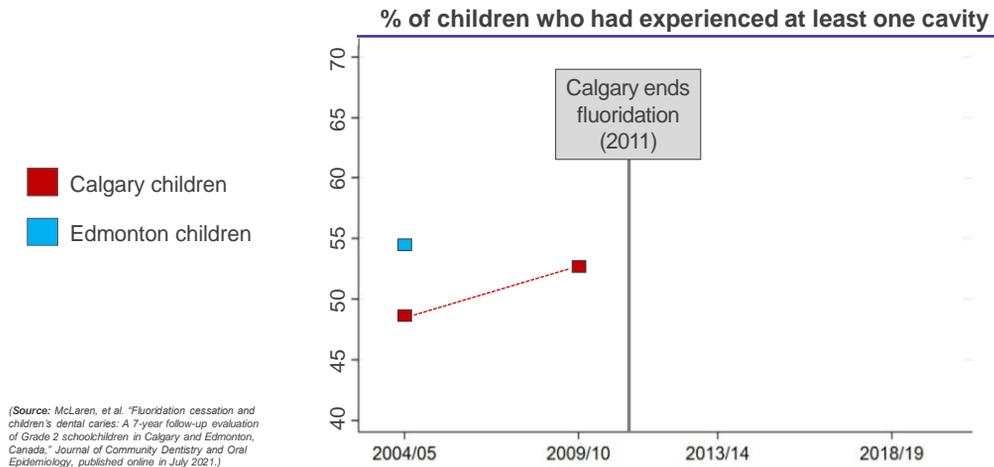
STUDY: What percentage of 2nd grade children had at least one decayed, extracted, missing or filled primary teeth?



18

Then Calgary ended water fluoridation

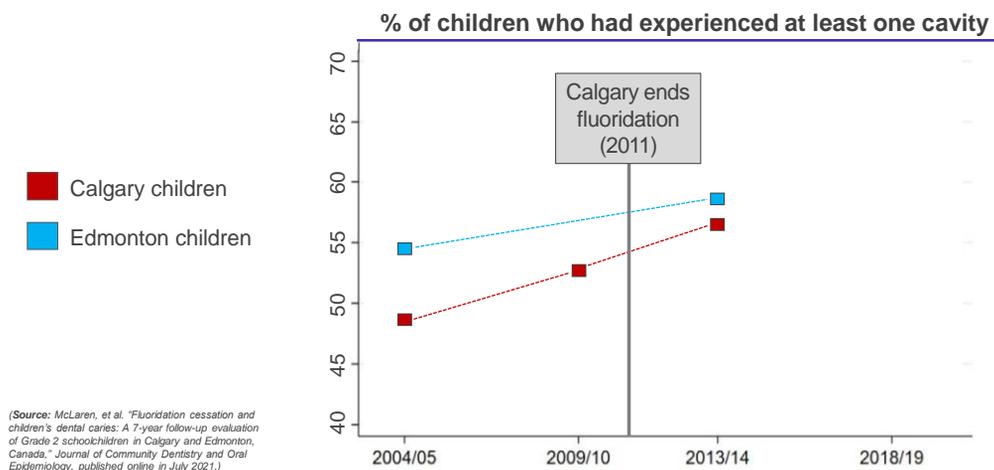
STUDY: What percentage of 2nd grade children had at least one decayed, extracted, missing or filled primary teeth?



19

After Calgary ended fluoridation

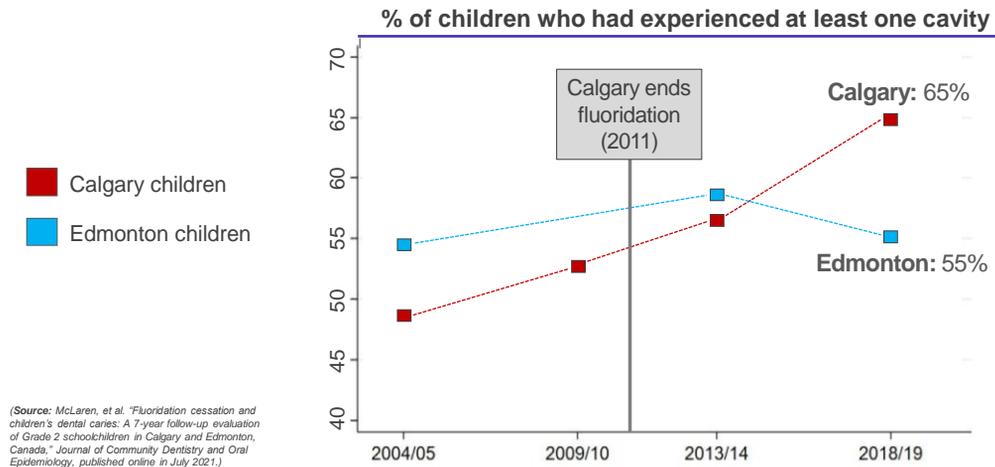
STUDY: What percentage of 2nd grade children had at least one decayed, extracted, missing or filled primary teeth?



20

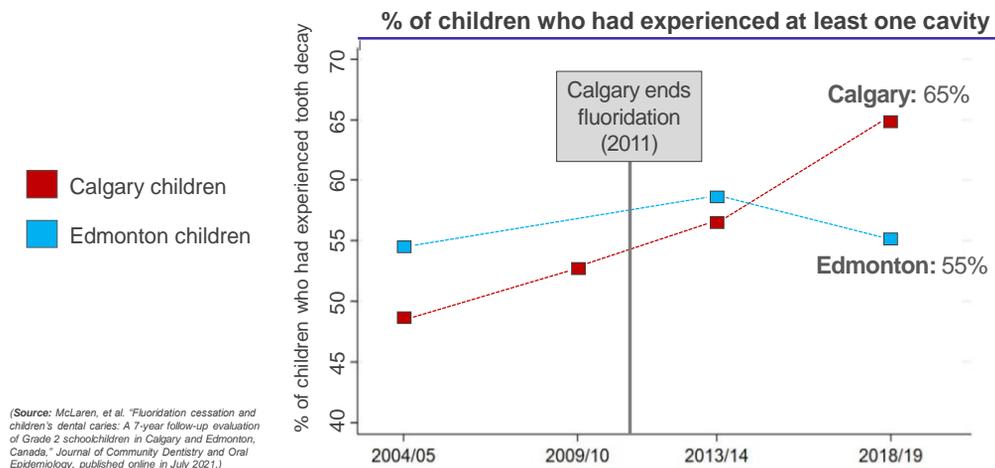
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21

After Calgary ended fluoridation



22

Community Water Fluoridation

1. Cessation effects
2. Impact on Early Childhood Caries (ECC)
3. Sources of information on scientific-fictionous claims



23

CWF impact on Early Childhood Caries

- U.S. and International studies confirm benefits for children – 66-75% drop in OR with GA for ECC
- Water Operators **prevent more cavities** by fluoridating the water than all of us can do in our lifetimes



(Sources: J. Daley, "Tooth Decay: A Silent Epidemic, Especially For Poor Kids In Colo.," Colorado Public Radio, March 12, 2015; An alternative marker for the effectiveness of water fluoridation: hospital extraction rates for dental decay, a two-region study, Elmer et al, British Dental Journal 2014; 216: E10; Klivitsky et al., "Hospitalizations for dental infections - Optimally versus non-optimally fluoridated areas in Israel," Journal of the American Dental Association; Public Health England "Water Fluoridation: Health Monitoring Report for England 2022)

24

Full mouth restorative care



Stages of ECC



Community Water Fluoridation - Opponents

1. Cessation effects
2. Impact on Early Childhood Caries (ECC)
3. Sources of information on scientific-fictional claims



27

Common claims by opponents - FALSE

- No toxicological testing has been conducted on fluoride
- The ADA says it shouldn't be used in infant formula
- Fluorosis is a sign of toxic effects
- It causes ADHD
- It causes Alzheimer's
- It harms the kidney, the immune system and other systems
- It's a conspiracy — the phosphate fertilizer industry is disposing of its "hazardous waste"
- Cavities have fallen in all nations, so fluoridation must not matter
- Some people are allergic to fluoridated water
- It causes thyroid problems
- The only way fluoride works is by topical application
- This is "forced medication"
- The Cochrane Group says there's no evidence behind fluoridation
- Water systems should use a pharmaceutical grade of fluoride



28

References for refuting false claims

CDC: [Water Fluoridation Information](#): General and specific information on CWF

American Fluoridation Society:

- For the [latest](#) information on studies, explaining them, refutations, and scientific hyperlinks
- [Frequently asked questions](#)
- [Refuting common claims](#)

American Dental Association:

- [Fluoridation Facts](#): Detailed information on common claims and charges made against CWF with answers and fully referenced
- [Mouth Healthy](#): More information on Fluoridation from ADA

American Academy of Pediatrics:

- [Campaign for Dental Health](#) Fluoridation Information and resources



29

Reading beyond the abstract

Purpose:

- To educate our own on how to ID good from poor studies
- A collaborative effort between the British Fluoridation Society and the American Fluoridation Society
- Addresses 9 key Suggestions for Assessing a Research Paper
- Goes through a recent paper on IQ
- Includes a “Spoof Paper” to apply your knowledge

**How to Read
a Study about
Fluoride or
Fluoridation**



How to Read a Study about
Fluoride or Fluoridation
A guide for the non-expert

(Source: [“How to Read a Study about Fluoride or Fluoridation”](#))



30

Clinical Case #2

North Dakota Fluoride and CWF

How to locate this information

CDC's My Water's Fluoride

“My Waters Fluoride” (MWF) – CDC public website for Reports¹ and County level fluoride data²

MWF Home Page



North Dakota

List of Counties All Water Systems By County Fluoridation Reports

List of Counties

Select a county to view its public water systems.

53 Counties

Adams	Barnes	Benson	Billings
Bottineau	Bowman	Burke	Burleigh
Cass	Cavalier	Dickey	Divide
Dunn	Eddy	Emmons	Foster
Golden Valley	Grand Forks	Grant	Griggs
Hettinger	Kidder	LaMoure	Logan
McHenry	McIntosh	McKenzie	McLean
Mercer	Morton	Mountain	Nelson
Oliver	Pembina	Pierce	Ramsey
Ransom	Renville	Richland	Rolette
Sargent	Sheridan	Sioux	Slope
Stark	Steele	Stutsman	Towner
Trall	Wah	Ward	Wells
Williams			

1. Source: My Water's Fluoride: [North Dakota](#)
 2. Source: My Waters Fluoride: https://nccd.cdc.gov/doh_mwf/Default/CountyList.aspx



Average Fluoride Levels by Month Report

My Water's Fluoride

My Water's Fluoride Home

About My Water's Fluoride

Community Water Fluoridation

State Fluoridation Reports ←

My Water's Fluoride Glossary

[Natural Systems Report](#)

[Average Fluoride Levels by Month Report](#)

Report Options

Year: 2021

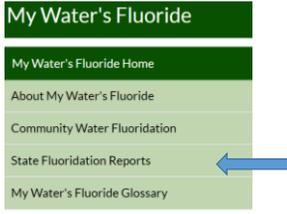
Average Fluoride Levels by Month - North Dakota, 2021

[Export](#) [Print](#)

PWS ID	PWS Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
ND - 5301152	R & T WATER SYSTEM	0.65	0.70	0.58	0.63	0.62	0.66	0.61	0.51	0.51		0.91	0.70	0.64
ND - 5301012	WILLISTON CITY OF	0.56	0.45	0.52	0.50	0.60	0.57	0.68	0.67	0.62	0.65	0.64	0.66	0.59
ND - 5200458	HARVEY CITY OF		0.71	0.65	0.71	0.75	0.73	0.74	0.74	0.70	0.80	0.78	0.68	0.73
ND - 5100660	MINOT CITY OF	0.79	0.73	0.72	0.74	0.69	0.88	0.75	0.72	0.80	0.79	0.64	0.58	0.74
ND - 5000773	PARK RIVER CITY OF	1.08	0.94	1.04	0.93	1.00	1.12	1.10		0.98	1.00	1.12	0.90	1.02
ND - 5000408	GRAFTON CITY OF	0.93	0.92	0.79	0.77	0.90	0.96	0.98	0.83	0.80	0.86	0.96	1.03	0.89
ND - 4900622	MAYVILLE CITY OF	0.75	0.86	0.60	0.64	0.68	0.55	1.24	0.64	0.64	0.64	0.77	0.80	0.73
ND - 4900482	HILLSBORO CITY OF	0.60	0.70	0.60	0.60		0.70	0.70	0.70	0.60	0.60		1.13	0.69
ND - 4701303	STUTSMAN RURAL WATER DISTRICT (GROUND WATER)	0.74	0.74	0.70	0.75	0.76	0.86	0.92	0.79	0.89	0.89	0.86	0.76	0.81



Natural Fluoride Levels in water – NOT CWF!!



Report Options

Enter a fluoride concentration greater than or equal to 0.6 mg/L: mg/L [View Report](#)

Natural Systems Report (North Dakota) [Export](#) [Print](#)

Natural Fluoride Concentration Greater Than or Equal To 0.60 mg/L

PWS ID	PWS Name	Primary County	Population Served	Natural Fluoride Level	Status
ND-0200510	KATHRYN CITY OF	Barnes	50	0.63	Natural
ND-0300553	LEEDS CITY OF	Benson	410	0.87	Natural
ND-0600119	BOWMAN CITY OF	Bowman	1,586	1.95	Natural
ND-0700344	FLAXTON CITY OF	Burke	63	0.92	Natural

[Natural Systems Report](#)

[Average Fluoride Levels by Month Report](#)



Importance of knowing natural fluoride level

Fluoride Supplements

- When fluoride in water is suboptimal (<0.6ppm)
- For infants, children, and teens
- Prescribe fluoride supplements according to the ADA fluoride schedule
- Must take into account source of fluoride outside of the home: daycare, school

Age	Fluoride Ion Level in Drinking Water (ppm)*		
	<0.3	0.3-0.6	>0.6
Birth-6 months	None	None	None
6 months-3 years	0.25 mg/day**	None	None
3-6 years	0.50 mg/day	0.25 mg/day	None
6-16 years	1.0 mg/day	0.50 mg/day	None

*1.0 part per million (ppm) = 1 milligram per liter (mg/L)
 **2.2 mg sodium fluoride contains 1 mg fluoride ion



Summary:

What you Have to do



37

Inoculate your community - CWF challenges

Chairside chats:

- Discuss fluoride and water fluoridation at every checkup
- If your community is not fluoridated, discuss with the patient/parent that they're experiencing more cavities and more severe cavities than they would if their water was fluoridated
- If your community is fluoridated, discuss the healthiness of the teeth with the patient/parent and how fortunate we are to have fluoridated water
- If you are on well water, we will need to check it for fluoride level to see if it is adequate or not



38

Keep your community healthy and smiling



What questions do you have?

CONTACT INFORMATION

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