Dental Health: Prevention of decay and fluoridation of water

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Dental Care in Nunavut

How dental care is funded?
1. Non-Insured Health Benefits program.

**Dental insurance, client funded, etc.

How dental care is delivered?
1. Dental Therapy program (Arctic Bay, Arviat, Rankin, Iqaluit).
2. Children’s Oral Health Project.
3. Oral Health Promotion program.

**Private dental service in Iqaluit.
Oral Health Status of Children and Youth in Nunavut

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<tr>
<td>Children (3-5 years)</td>
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<tr>
<td>Decay prevalence</td>
<td>85.9%</td>
<td>85%</td>
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<tr>
<td>Untreated decay</td>
<td>35.2%</td>
<td>49.0%</td>
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<td>Children (6-11 years)</td>
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<tr>
<td>Decay prevalence</td>
<td>93.9%</td>
<td>93.4%</td>
<td>57.0%</td>
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<tr>
<td>Untreated decay</td>
<td>16.7%</td>
<td>32.0%</td>
<td>14.5%</td>
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<td>Children (12-19 years)</td>
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<tr>
<td>Decay prevalence</td>
<td>91.4%</td>
<td>96.7%</td>
<td>59.0%</td>
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<tr>
<td>Untreated decay</td>
<td>22.9%</td>
<td>38.1%</td>
<td>13.6%</td>
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Why Prevention?

- Oral health impacts all aspects of daily living and general health.
- Decay is preventable.
- Preventive dental programs can drastically lower decay in children.
- Less missed school days.
- Instills good oral hygiene practices at a young age.
- High levels of decay in children are costly and traumatic to treat.
Why children (school based)?

• Not an individual responsibility.
• 1/3 of Nunavut spends 1/3 of day in the school.
• Catch them early.
• Safe and well accepted.
• Mitigate behaviour and a good starting point.
• Future workforce.
Inuit Oral Health Survey - Recommendation

“Oral health conditions cannot be treated away, even if more resources could be applied. More emphasis (should be placed) on community based primary preventive measures backed up by early detection and prompt basic treatment”. 
Nunavut Children’s Oral Health Project

- 2013 – Pilot project in 3 communities.
- 25 communities.
- Based on the Children’s Oral Health Initiative (COHI) program.
- Community Oral Health Coordinators (COHCs) – Inuit oral health service providers (75%).
Oral Health Education and Promotion

“Teeth for Life”
Dental Screening
Dental Sealants

• Protective coating on newly erupted adult teeth.
• Pits and fissures – Most vulnerable.
• Grades 2 – 7.
• Contain fluoride – act as reservoir.
• Evaluation – 6 months.
• Highly Efficacious.
• Provider.
• Great patient acceptance.

http://wakedentalwellness.com/dental-sealants/
Fluoride Varnish

• Safe, effective and highly efficacious.
• Applied on anyone with teeth.
• Bi-annual application.
• Adhesive.
• High fluoride (22000 ppm) concentration using small amounts.
• Provider.
• Ease of application, fast setting and greater patient acceptance.
Fluoride Mouth Rinse Program

- Rinse liquid containing fluoride at school (once a week).
- Supervision of a trained staff member.
- Begin in grade one (children older than 6 years).
- Provider.
- Cons.

School Tooth Brushing Program

• Most toothpastes contain 1000 ppm of fluoride.
• Supervision of a trained staff member.
• Amount of toothpaste.
  <3 years: Adult should brush; Rice grain
  3-6 years: Adult should assist; Pea size
• Provider.
• Benefits.

http://www.esperanca.org/what-we-do/u-s-program/
Interim Stabilization Therapy

• Simple way of stabilizing the decay process.
• Hand instruments.
• Special filling material, which contains fluoride.
• High client acceptability - No freezing.
• Benefits.
• Provider.

http://www.mistrymedical.com/item/8657/instramed-sterile-spoon-excavator-d-ended--s42-9403-
Fluoride in Community Water Fluoridation

The “F” word
Community Water Fluoridation

• Water is naturally fluoridated – high/low.

• Adjusting the amount of fluoride in drinking water to optimal level that prevents tooth decay and reduces the chances of dental fluorosis.

• In 2007, Health Canada’s Fluoride Expert Panel recommended water fluoridation levels be reduced to 0.7 ppm (Maximum Acceptable Concentration is 1.5 ppm).
How much is ppm?

• 1 penny in $10,000.
• 1 minute in 2 years.
• 1 drop in 50 litres of water.
• 2.5 cm in 25 Kms.
• 1 inch in 16 miles.
Fluoride: How does it work?

• Constant low level of fluoride is maintained in the oral cavity.

Post-eruptive (major)
• Remineralization of early carious lesions.
• Inhibition of glycolysis.

Pre-eruptive (minor)
• Prevents enamel solubility.
• Incorporation of fluoride into hydroxyapatite crystals.
Status of Community Water Fluoridation in Canada and Nunavut

• Iqaluit and Arviat (28.9%).

• Rankin Inlet - July 2016.

• Canada - < 35%.
Community Water Fluoridation in Nunavut

- Municipal decision in Canada.
- Logistics - Robust capital investments.
- Feasibility.
- Not clear that people drink tap water regularly.
- Misconceptions and fear.
- Other sources of fluoride.
Systematic Review

- Systematic Review of Water Fluoridation. UK/International study, 2000. [http://www.bmj.com/content/321/7265/855.full](http://www.bmj.com/content/321/7265/855.full)
- Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States. US Department of Health and Human Services Centers for Disease Control and Prevention, 2001. [http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm)
- A Systematic Review of the Efficacy and Safety of Fluoridation
Safety of Fluoride

- Safety aspects have been extensively studied.

- Toxicity of any substance is related to the level of exposure or dose (the amount ingested over a period of time).

- Substances essential for life like water, oxygen, and salt can be toxic in excess amounts.

- In concentrations used, fluoride is not toxic or harmful.

- The optimal range of fluoride already has a built-in margin of safety that takes into consideration the various sources.
Health Effects

- Dental fluorosis - most widely studied adverse effect.
- Mild and very mild - Not an adverse effect.
- Moderate - is a potential aesthetic concern.
- Severe fluorosis is a concern.
- The 2007-2009 Community Health Measures Survey revealed that moderate to severe dental fluorosis is so low that it is unreportable.
Health Effects

• Skeletal fluorosis is the most serious effect with prolonged exposure to high levels of fluoride (8-10 ppm daily for many years). Not seen in Canada.

• Overall, the weight of evidence does not support a link between exposure to fluoride in drinking water and bone fracture, intelligence quotient, skeletal fluorosis, immunotoxicity, reproductive toxicity, genotoxicity, cancer or neurotoxicity based on a Maximum Allowable Concentration (MAC) of 1.5 ppm.
Do we still need water fluoridation?

- Safe.
- Cost-effective.
- Equitable.
- Lack of compliance.
- Valid.
- No evidence of negative environmental impacts.
Silver Diamine Fluoride: New (old) way to treat tooth decay
What is Silver Diamine Fluoride (38%)?

- Colorless liquid
- pH around 8.0
- 25% silver: antimicrobial
- 8% ammonia: solvent
- 5% fluoride: remineralization

Silver Diamine Fluoride has been around.....
Silver Diamine Fluoride

• Arrests tooth decay by 80%; 90% when 2X/year.

• Prevents decay – directly and indirectly.

• $220/bottle = ~250 drops.

• ~88¢/drop; 1 drop treats ~5 teeth.

• 18¢/tooth.

• **Disadvantage:** Staining (permanent and temporary)
Program costs/person

- Community Water Fluoridation: $0.77¢ - $4.00\(^a\)
- Dental Sealants: $20.00 - $36.00\(^b\)
- Tooth Brushing Program: $6.74\(^c\)
- Fluoride Varnish: $2.5
- Fluoride Rinsing Program: $2.24 - $6.10
- Interim Stabilization Therapy: $16.20 - $24.80
- Silver Diamine Fluoride: <$1

Note: Cost provided does not include any estimates for the costs of shipment and storage of supplies, training and staff remuneration (including travel).

\(^a\) Current cost analyses data that the annual cost to fluoridate a Canadian community
\(^b\) Costs reflect NHIS fees for initial sealant per quadrant
\(^c\) Cost assumes an 8 month school year in which each participant receives 3 toothbrushes and 2 tubes of toothpaste
Day Surgery for Tooth Decay in Nunavut

www.cihi.ca
Dental Treatment under General Anesthetic – Estimation

• As of March 6 2017, the waitlist was 588.
• Serious morbidity and potential mortality.
• $3,000 - $5,000 to treat*.
• Avoidable health care costs.
• Detrimental long term cognitive effects.

*Cost provided does not include any estimates for the costs of travel, accommodation, food, facility fee, escort charges, etc.
Moving Forward

• Approaches are not exclusive of each other.

• Multi-faceted approach.

• Common-risk factor approach.
Questions?

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