Role of Indigenous Mothers in Infant Oral Care

Herenia P. Lawrence, DDS, MSc, PhD
Amy J. Nahwegahbow, BA

7th International Meeting on Indigenous Child Health
March 31 to April 2, 2017
Denver, Colorado
Boozhoo! Tansi! Hi! Bonjour!
Unusakut (good afternoon)

Faculty/Presenter Disclosure

• Herenia P. Lawrence and Amy J. Nahwegahbow have no relevant financial relationships with the manufacturer(s) of commercial services discussed in this CME activity.

• Herenia P. Lawrence and Amy J. Nahwegahbow do not intend to discuss unapproved/investigative use of a commercial product/device in this presentation.
Closing the Knowledge Gaps: National Canadian, First Nations and Inuit Oral Health Surveys


• First Nations Regional Longitudinal Health Survey (RHS) 2008–2010 (FNIGC, 2012)

• First Nations Oral Health Survey (FNOHS) 2009–2010 (FNIGC, 2012)

• Inuit Oral Health Survey (IOHS) 2008–2010 (Health Canada and partners, 2011)

\(^a\)Included persons claiming Aboriginal heritage living off reserve.
Oral Health of First Nations living in Remote and Non-Remote Communities in Canada

- First Nations Information Governance Centre and the Office of the Chief Dental Officer of Canada
- The First Nations Oral Health Survey (FNOHS) found that dental disease in First Nations children and adolescents was 2 to 3 times that of the rest of Canada (see the next slide)
# Dental Caries in Children and Adolescents: National Comparisons

<table>
<thead>
<tr>
<th>Age Group</th>
<th>CHMS 2007–09&lt;sup&gt;a&lt;/sup&gt;</th>
<th>FNOHS 2009–10&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Children (ages 3–5)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caries prevalence</td>
<td>Not collected</td>
<td>85.9%</td>
</tr>
<tr>
<td>dmft</td>
<td>Not collected</td>
<td>7.62</td>
</tr>
<tr>
<td>Untreated caries (dt/dmft)</td>
<td>Not collected</td>
<td>35.2% (2.68 teeth)</td>
</tr>
<tr>
<td><strong>Children (ages 6–11)</strong></td>
<td></td>
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</tr>
<tr>
<td>Caries prevalence</td>
<td>55.2%</td>
<td>× 1.7</td>
</tr>
<tr>
<td>dmft+DMFT</td>
<td>2.28</td>
<td>× 2.9</td>
</tr>
<tr>
<td>Untreated caries (dt+DT/dmft+DMFT)</td>
<td>14.5% (0.33 teeth)</td>
<td>16.7% (1.10 teeth)</td>
</tr>
<tr>
<td>Sealant prevalence</td>
<td>31.9% (2.87 molars)</td>
<td>21.2% (2.15 molars)</td>
</tr>
<tr>
<td><strong>Adolescents (ages 12–19)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caries prevalence</td>
<td>57.7%</td>
<td>× 1.6</td>
</tr>
<tr>
<td>DMFT</td>
<td>2.43</td>
<td>× 2.5</td>
</tr>
<tr>
<td>Untreated caries (DT/DMFT)</td>
<td>13.6% (0.33 teeth)</td>
<td>22.9% (1.41 teeth)</td>
</tr>
<tr>
<td>Sealant prevalence</td>
<td>50.0% (3.59 molars)</td>
<td>27.4% (3.06 molars)</td>
</tr>
</tbody>
</table>

<sup>a</sup>Source: Non-Aboriginals in the Oral Health Component of the Canadian Health Measures Survey (CHMS) 2007–09

<sup>b</sup>Source: First Nations Oral Health Survey (FNOHS) 2009–10
Oral Health in Inuit Nunangat

- Office of the Chief Dental Officer of Canada, Inuit Tapiriit Kanatami, Nunavut Tunngavik Inc., Nunatsiavut Government, Inuvialuit Regional Corporation

- The Inuit Oral Health Survey (IOHS) found that dental disease in Inuit children and adolescents was 2 to 4 times that of the rest of Canada (see the next slide)
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<td></td>
<td></td>
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<tr>
<td>Caries prevalence</td>
<td>Not collected</td>
<td>85.3%</td>
</tr>
<tr>
<td>dmft</td>
<td>Not collected</td>
<td>8.22</td>
</tr>
<tr>
<td>Untreated caries</td>
<td>Not collected</td>
<td>49.4% (4.06 teeth &lt;sup&gt;E&lt;/sup&gt;)</td>
</tr>
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<td></td>
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<td>dmft+DMFT</td>
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<td>7.08 × 3.1</td>
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<td>Sealant prevalence</td>
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<td>F</td>
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</tr>
<tr>
<td>DMFT</td>
<td>2.43 × 3.9</td>
<td>9.49</td>
</tr>
<tr>
<td>Untreated caries</td>
<td>13.6% × 2.8 (0.33 teeth &lt;sup&gt;E&lt;/sup&gt;)</td>
<td>38.0% × 2.8 (3.61 teeth &lt;sup&gt;E&lt;/sup&gt;)</td>
</tr>
<tr>
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<td></td>
<td></td>
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<sup>b</sup>Source: Inuit Oral Health Survey (IOHS) 2008–09  
<sup>E</sup> = Interpret with caution (CV 16.6% to 33.3%)  
<sup>F</sup> = Data suppressed due to insufficient sample size or extreme sampling variability
## Trends in the Oral Health of First Nations and Inuit Children Aged 6 and 12

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>6-year-old prevalence of caries: % with dmft + DMFT &gt; 0</td>
<td>91.0</td>
<td>94.6</td>
<td>86.0</td>
<td>92.4</td>
</tr>
<tr>
<td>6-year-old caries severity: mean dmft + DMFT</td>
<td>7.8</td>
<td>9.1</td>
<td>8.3</td>
<td>7.8</td>
</tr>
<tr>
<td>12-year-old prevalence of caries: % with DMFT &gt; 0</td>
<td>91.0</td>
<td>91.2</td>
<td>F</td>
<td>82.2</td>
</tr>
<tr>
<td>12-year-old caries severity: mean DMFT</td>
<td>4.5</td>
<td>4.4</td>
<td>F</td>
<td>3.9</td>
</tr>
</tbody>
</table>

FNIOHS = First Nations and Inuit Oral Health Survey 1990–91 (University of Toronto and National School of Dental Therapy, 1992)
FNIOHS = First Nations and Inuit Oral Health Survey 1996–97 (Saskatchewan Indian Federated College, National School of Dental Therapy, 2000)
F = Data suppressed due to insufficient sample size or extreme sampling variability
Prevalence and Severity of Dental Caries among First Nations and Inuit Children Aged 3–5 years, by National Survey

<table>
<thead>
<tr>
<th>Caries index</th>
<th>IOHS 2008–09</th>
<th>FNOHS 2009–10</th>
</tr>
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<tbody>
<tr>
<td>Caries prevalence: % with dmft &gt; 0</td>
<td>85.3</td>
<td>85.9</td>
</tr>
<tr>
<td>Caries severity: mean dmft</td>
<td>8.22</td>
<td>7.62</td>
</tr>
<tr>
<td>Untreated caries:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% dt/dmft and (mean dt)</td>
<td>49.4</td>
<td>35.2</td>
</tr>
<tr>
<td></td>
<td>(4.06 teeth E)</td>
<td>(2.68 teeth)</td>
</tr>
</tbody>
</table>

Sources: IOHS = Inuit Oral Health Survey 2008–09 (Health Canada et al., 2011)
FNOHS = First Nations Oral Health Survey 2009–10
E = Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
Early Childhood Caries (ECC)
Treating ECC under General Anesthesia –
The New Norm
Sioux Lookout Zone (SLZ) Hospital Dental General Anesthesia (GA) Statistics, Sioux Lookout, ON 2000–15

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean no. of births per year (Standard Deviation)</th>
<th>Mean no. of dental GA cases completed per year (SD)</th>
<th>% children treated for ECC under GA per year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>420 (55)</td>
<td>287 (78)</td>
<td>68%</td>
</tr>
</tbody>
</table>
Policy Response #1: The Children’s Oral Health Initiative (COHI)

Motivated by the high proportion of children needing dental caries treatment under general anesthesia (GA) before their 6th birthday.

Started as a pilot project in 2004 in 41 First Nations and Inuit communities (307 FN/I communities by August 2015 = approx. 48% of all eligible FN communities).
Children’s Oral Health Initiative (COHI)

- COHI is a prevention-based initiative that targets:
  - Children aged 0–7
  - Parents and caregivers of these children
  - Prenatal women and families
- Promotes use of community-based staffing

- COHI services are provided by:
  - COHI Aides (trained community workers)
  - Dental Therapists
  - Dental Hygienists
  - Head Start Workers, Dental Assistants, Dentists, Nurses, Health Educators
COHI Services and Delivery Models

• Services
  • Dental screening
  • Fluoride varnish applications based on risk assessment*
  • Sealants
  • Alternative Restorative Therapy (ART)
  • Promotion of products containing Xylitol (presently on hold)*
  • Oral health information sessions*

• Service Delivery Models
  • Through Provincial Health Units and Community Health Access Centres
  • Through direct Contribution Agreements with First Nations communities

*Services that can be delivered by a COHI Aide
Policy Response #2: Nunavut Children’s Oral Health Project

• In 2013 the Government of Nunavut (GN), Health Canada (HC) and the Public Health Agency of Canada (PHAC) began collaboration on a project to improve the oral health status of all children in Nunavut from birth to 7 years of age.
• The goal is to reduce the need for hospitalization and treatment under general anesthetic (GA)
• The project focuses on oral health promotion, prevention and treatment activities over a three-year period (2014–2017)
• From FY 2016/17 the OHP’s age limit was extended to age 9
• Funding end date: March 31, 2018
Nunavut Children’s Oral Health Project (OHP): Services Provided

• Free dental checkups by a dentist/dental therapist
• Oral hygiene instruction to children and parents/caregivers
• Fluoride varnish 2x yearly, sealants, temporary fillings (IST), tooth extractions, and referral for additional treatments (i.e., GAs).
• DDS(s), DTs, DHs, COHCs, TCOHCs
Why is ECC so difficult to prevent?

- Early childhood caries (ECC) is highly prevalent in vulnerable populations, including children of impoverished, minority, immigrant, migrant and homeless families whose social and economic capital is limited.
- Overwhelming dominance of social determinants on the prevalence and incidence of ECC.
Why is ECC so difficult to prevent? (cont’d)

- Poverty and household overcrowding
- Disruption of community and family wellness related to culture loss
- Food insecurity including limited access to healthy food choices/traditional foods
- Gaps in social capital and social support
- Institutional racism and the legacy of residential schools
- Health care services which are not culturally appropriate
- Lack of timely access to dental care and preventive services
- Shortage of dental care providers in remote communities
- No community water fluoridation
- Low levels of parental education and health literacy
Changes in the Nutritional Habits of Inuit Infants and Young Children in Canada

- Excess dietary free sugar intake ("Drop the Pop!")
- Low rates of breastfeeding
- Decreased rates of premastication/pre-chewing of traditional foods
- Low food literacy
- Many social determinants of health (e.g., food insecurity, smoking)
WHY ARE MOTHERS IMPORTANT IN INFANT ORAL HEALTH CARE?
A pregnant mother’s untreated caries increases the risk of early childhood caries (ECC) in her infant.

Dental care during pregnancy helps prevent ECC in Indigenous populations, though utilization rates of care among prenatal Aboriginal women in Canada are unknown.
**Baby Teeth Talk Study: Access to Care and Oral Health among Prenatal Aboriginal Women**

- Dental caries experience and gingivitis prevalence are high among prenatal Aboriginal women
- 1 in 2 accessed dental services within the preceding year
- 43% regularly visit for dental check-ups; 39% lower than that of non-Aboriginals
- Availability of dental services and transportation are major barriers

Baby Teeth Talk Study: Access to Care and Oral Health among Prenatal Aboriginal Women (cont’d)

- Strongest risk indicators for untreated dental caries:
  - lack of access to care
  - young age of mother
  - living on reserve

- Those who accessed care had better oral health outcomes potentially reducing their children’s risk of ECC

- Efforts should focus on controlling dental caries in pregnant women to reduce bacterial transmission to their newborns
Role of Indigenous Mothers in Childhood Nutrition

- Indigenous children are among those most significantly affected by early childhood caries (ECC) and childhood obesity
- Childhood nutrition has a significant impact on health in later life
- Eating habits and patterns are established very early in life
Food Insecurity in Canada’s Indigenous Communities

- Aboriginal peoples are at a higher risk than non-Aboriginal peoples to experience food insecurity.
- Interventions directed at mothers that increase their understanding of healthy food choices.
- Critical role of the family in making healthy choices is key to addressing issues of dental disease and childhood obesity.
What Can Indigenous Mothers Do to Prevent ECC in their Infants?

• Oral health care during pregnancy
• Infant oral health care
• Infant feeding practices (e.g., increase breastfeeding & decrease bottle feeding with sugar-laden formula/drinks)
• Dental check-ups
• Fluoride varnish treatments
• Increase in traditional/country foods
### Baby Teeth Talk Study: Proportion of toddlers in NutriSTEP® risk categories by mothers’ knowledge of baby bottle use

#### Item (range 0–5) Higher score = greater knowledge

<table>
<thead>
<tr>
<th>Item</th>
<th>Risk for Nutrition Concern</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Low n = 145 Mean ± SE</td>
<td>Moderate n = 113 Mean ± SE</td>
<td>High n = 88 Mean ± SE</td>
<td></td>
</tr>
<tr>
<td>Putting the baby to bed with a bottle helps the child to be better fed.</td>
<td>*4.11 ± 0.10</td>
<td>3.53 ± 0.11</td>
<td>3.43 ± 0.14</td>
<td></td>
</tr>
<tr>
<td>Putting the baby to bed with a bottle helps the child fall asleep and/or stay asleep.</td>
<td>*3.70 ± 0.12</td>
<td>2.89 ± 0.12</td>
<td>2.52 ± 0.14</td>
<td></td>
</tr>
<tr>
<td>Putting the baby to bed with a bottle helps the child to gain weight and grow.</td>
<td>*4.15 ± 0.09</td>
<td>3.63 ± 0.10</td>
<td>3.48 ± 0.15</td>
<td></td>
</tr>
<tr>
<td>There is nothing wrong with putting the baby to bed with a bottle.</td>
<td>*4.14 ± 0.09</td>
<td>3.59 ± 0.11</td>
<td>3.47 ± 0.15</td>
<td></td>
</tr>
<tr>
<td>TOTAL (range 0–20), n = 346 Higher score = greater knowledge</td>
<td>*16.05 ± 0.34</td>
<td>13.62 ± 0.34</td>
<td>12.90 ± 0.45</td>
<td></td>
</tr>
</tbody>
</table>

Possible responses with scores from 0 to 5 = strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, strongly disagree.  
SE = Standard Error.  
*Significantly higher than the moderate and high risk groups; Tukey HSD, p = 0.05.  
Spearman’s rho between the scores on Toddler NutriSTEP and the mothers’ knowledge of baby bottle use = -0.368, p < 0.001.  
Nishtam Niwiipitan (My First Teeth): A Multi-Pronged Approach for Improving Mother and Child Oral Health in Aboriginal Communities

CIHR Team Grant: Pathways Implementation Research Team – Component 2 – Oral Health (2016)
Aim of the *Nishtam Niwiipitan* (My First Teeth) Study

- To strengthen the effectiveness and scalability of a multi-pronged preventive and behavioural intervention to reduce ECC rates in Aboriginal communities through community-informed enhancements or adaptations using an implementation science approach.
The Baby Teeth Talk Study (BTTS)

• Study design:
  - Community-based, multi-national, multi-site, block-randomized delayed intervention comparison design, using a participatory research model
  - Three collaborating countries (CA, AU & NZ)

• Participants:
  - 544 Canadian First Nations (93%) and Métis women (pregnant at baseline) and their infants and toddlers living in urban and on-reserve communities in Ontario and Manitoba
Interventions

Over three years participants received:

- Dental care during pregnancy
- Oral health anticipatory guidance
- Motivational interviewing
- 5% sodium fluoride white varnish applied to the children’s teeth biannually by Community-based Researchers (CBRs)
Why Fluoride Varnish?

- FV is a concentrated topical fluoride, with a resin or synthetic base to hold it in place, which is “painted” onto teeth
- It acts in two ways – antibacterial and enamel remineralization
- Effective in the prevention of ECC, particularly in Indigenous populations.¹ ²

¹ Lawrence et al. Community Dent Oral Epidemiol. 2008

Fluoride Varnish Community Controlled Trial to Prevent ECC

- 6 months to 5 years old (n=1275)
- Biannual fluoride varnish applications over 24 months
- 17 test and 8 control First Nations communities in the Sioux Lookout Zone, NW Ont.
- Non-Aboriginal sample – Partnership with the Thunder Bay District Health Unit et al. in NW Ont.
- Clinical oral examinations at baseline, 12 & 24 months conducted by trained & calibrated dental hygienists

Lawrence JIF et al. Community Dentistry and Oral Epidemiology 2008;36(6):503–515

Results of the Fluoride Varnish Trial

- Effective: 18% ‘relative risk reduction’ (or Prevented Fraction)
- Cost effective: $2374.55 per dmfs avoided; $10.55 in larger Aboriginal communities (n=1000)
- Reduced the need for dental treatment under general anaesthesia: Odds ratio of 0.77 (95% CI: 0.53–0.98; P = 0.035)
- Improved child’s oral health related quality of life and wellbeing

CIHR RSP (Grant # MOP-84271) and the Toronto Hospital for Sick Children Foundation (Grant # X6 03-067). ClinicalTrials.gov identifier: NCT0045000
Promising Interventions to Prevent ECC

Anticipatory Guidance (AG)

Pro-active, developmentally-based counseling technique focusing on the needs of a participant or child at a particular life stage.\(^1\)

Extensively and successfully used in oral health.\(^2\)-\(^4\)

Traditionally, AG occurs in one-on-one settings with information tailored specifically for each child.


Motivational Interviewing (MI)

MI is a collaborative, goal-oriented style of communication with a particular attention to the language of change. It is designed to strengthen personal motivation for and commitment to a specific goal by eliciting and exploring the person’s own reasons for change within an atmosphere of acceptance and compassion. (Miller & Rollnick, 2013)
Promising Interventions to Prevent ECC (cont’d)

“MI already within our culture”

- How ask people to change?
  - Focus on positive words & thoughts
    - “Live a better life”
    - “Focus on health of children”
    - “Deep inside is inner strength”
  - Be accepting; nonjudgmental
  - Be a role model

Motivational Interviewing: Goals

- Goal one (pregnancy); encouraging mother to attend for dental care during pregnancy
- Goal two (child aged 6 months); encouraging child to receive fluoride varnish
- Goal three (child aged 12 months); encouraging child to consume less sugary foods and drinks
- Goal four (child aged 18 months); encouraging child to attend for dental check-up
8 CBRs were trained every year over 3 years by the Motivational Interviewing Network of Trainers.

CBRs received coaching sessions on a regular basis.

AG/MI sessions occurred at baseline (pregnancy) and when children were 6-, 12- and 18-months.

The directives for each of these sessions were:
• Encourage dental appointments during pregnancy.
• Education on the importance of non-cariogenic foods and drinks for their children.
• Emphasize the importance of fluoride varnish in ECC prevention.
• Promote dental check-ups for children.
Clinical Oral Health Examinations at Ages 2 and 3 Years

- Examiner Training and Calibration
  - Sioux Lookout, ON
  - Thunder Bay, ON
  - UofT, Toronto, ON
  - UofM, Winnipeg, MB

- Participation rate: approx. 70%
ECC Preventive Intervention Mixed Methods Design (Exploratory Sequential Design)

**Phase 1**
Jan–Jun 2017

QUAL Data Collection & Analysis

- Interpretation of QUAL Results

**Phase 2**
Jul 2017–Jun 2019

ECC Preventive Intervention Trial

- Pregnancy
  - MI w/ Digital Story Telling, Family Focus and AG
- Child 6-12 months
  - MI w/ DQI, Family Focus and AG
- Child 18 months
  - MI w/ DQI, Family Focus and AG
- Child 24 months
  - Evaluation
  - FV

**Phase 3**
Jul–Dec 2019

QUAN Data Collection & Analysis

- Inferences drawn
- Integration and Interpretation of MM Results

Use QUAL results to:
- Enhance/adapt intervention
- Develop community relevant pre- and post-test measures
- Identify: 1. Barriers to, and facilitators of, oral health and wellness promoting behaviours; 2. Underlying determinants of oral health; 3. Existing community-based systems of health and health knowledge sharing

CBPR & Indigenous Analytic Framework

QUAL: Qualitative Methods
QUAN: Quantitative Methods
MM: Mixed Methods
CBPR: Community-based Participatory Research
Knowledge Sharing Learning Circle
Supported by NWAC PEKE

- Community-informed intervention enhancements and cultural adaptations:
  - Digital Storytelling as a Motivational Interviewing Tool: community-specific traditional teachings around childrearing practices (and stories of lived experience in infant/child oral care) delivered via the technology of new media
  - Incorporation of Aboriginal ceremonies, stories and ways of knowing
  - Family-centred approach to AG/MI
  - Programmatic integration
Ethical Considerations

• Ethics Reviews
• Research Agreements
• Chief and Council
• Chapter 9 of the Tri-Council Policy Statement 2 (TCPS2)
• 4 R’s of research – respect, reciprocity, relevance, and responsibility
• OCAP™
• PAC
Geographic Locations & Research Partners

- Support also from the Office of the Chief Dental Officer of Canada, Public Health Ontario and the Collaborative Program in Aboriginal Health at the University of Toronto
Native Women’s Association of Canada
Partner for Engagement & Knowledge Exchange

- Amy J. Nahwegahbow
  Senior Project Manager, NWAC PEKE
Pathways to Health Equity for Aboriginal Peoples

Funded as a Partner for Engagement and Knowledge Exchange (PEKE) by the Canadian Institutes of Health Research (CIHR) under the Pathways to Health Equity for Aboriginal Peoples Initiative.

To engage in health research in four priority areas: suicide prevention, tuberculosis, diabetes/obesity, and oral health.
To improve the health and well-being of Aboriginal women, their families, and their communities through health research, knowledge exchange, and action.
Activities

**Capacity building:** facilitate webinars/presentations to researchers and community members on Aboriginal research ethics and research guidance.

**Engagement:** connect Implementation Research Teams with community, and/or organizations, meetings/conference calls, and joint proposals.

**Advise:** input on engagement strategy and community protocols.

**Communications:** respond to information requests from research teams and partners. Dissemination of information.

**Knowledge Translation:** conduct focus group sessions with communities on effective AKT strategies, joint abstracts, factsheets, presentations, and papers.
Summary

• Fluoride varnish *can* decrease caries incidence in early childhood
• Lifestyle and behavioral changes are needed to reduce biofilm stress
• The broader community needs to be brought on board
• The prevention of ECC is best accomplished by integrating oral health into the overall health care of the mother/family and the child
Summary (cont’d)

• Multi-pronged intervention strategies work better than strategies employing one intervention
• Policies that can help tackle the upstream determinants of oral health disparities are imperative
• Integration of traditional teachings, practices, languages and ceremonies with preventive ECC interventions is a foundation for success
Gchi-Miigwetch! Ekosani! Qujannamiik! Quanaqpiiaqquqtin! Thank You! Merci!

• Participants, dedicated staff/CBRs, dental examiners, research partners, study advisory committees, collaborators

• CIHR-IAPH/IMHA Grants:
  – IDP-103988 & PI1-151324

• Parent/caregiver permission has been obtained for all the photos used in this presentation as well as permission from all others depicted
Questions?

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