Improving the Oral Health of Indigenous Children

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Ottawa, ON
Faculty/Presenter Disclosure

• Dr. Tom Hennessy has no relevant financial relationships with the manufacturer(s) of commercial services discussed in this CME activity
• Dr. Tom Hennessy does not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation.

• Dr. Robert Schroth has no relevant financial relationships with the manufacturer(s) of commercial services discussed in this CME activity
• Dr. Robert Schroth does not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation.
Objectives

• Review the epidemiology of dental caries in Indigenous children in the United States and Canada

• Discuss established and new methods to prevention and treatment

• Discuss new efforts to prevent and measure caries
Multi-factorial & Multi-level nature of child dental disease & Early Childhood Caries

Fisher-Owens et al: Pediatrics 120. 2007
US Summary

- Status of dental caries in AIAN persons
- Water Fluoridation
  - Evidence of value in Alaska villages
  - Goals for 2020
- Dental Health Aide Therapists
- Research Activities in Alaska
  - Use of electronic health records
  - Cost effectiveness of prevention
Dental Caries in American Indian and Alaska Native Pre-school Children*

- Ages 1-5 years
- Sample of Indian Health Service sites
  - 8461 children screened, 7% of population
- 62% with decay experience
  - 25% of non-hispanic white children
- 39% untreated decay
- 7% with primary molar sealants

Caries experience (2-5 y.o.)
- Lowest: Oklahoma 39%
- Highest: Navajo 86%
- Alaska: 68%

Untreated decay
- Lowest: Oklahoma 30%
- Highest: Navajo 66%
- Alaska: 47%
Healthy Alaskans 2020

• 25 leading health indicators
  • Critical health priorities for Alaska

• Indicator #20
  • “Increase the proportion of Alaskans protected against dental disease”
    • % of Alaskan population served by community water systems with optimally fluoridated water
    • 2010 baseline: 54.8% (US: 72.4%)
    • 2020 target: 58% (US: 79.6%)
Cavities in Primary Teeth by Village Fluoridation Status, Alaska MMWR, 2011

- **Non-fluoridated**
  - 4 – 5 years: 9.8
  - 6 – 11 years: 3.7
  - Mean: 6.2

- **Fluoridated**
  - 4 – 5 years: 3.1
  - 6 – 11 years: 1.8
  - Mean: 2.4

* p < 0.01
• **24.9%** had Severe Early Childhood Caries (S-ECC)

• Identified risk factors for S-ECC: age of child, low parental education, parental unemployment, maternal smoking during pregnancy, not breastfeeding, daily intake of soft drinks, juice, sweets, and fast food
Manitoba RHS 2008-2010

Barriers to healthcare access and S-ECC

Chi-square analysis  *Statistically significant (p≤ .05)  **Statistically significant (p≤ .001)

Schroth, Halchuk, Star. Int J Circumpolar Health 2013
Inuit Oral Health Survey – 2008-2009

Table 1: Sample Size

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Children 3 to 5 years</th>
<th>Children 6 to 11 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>wtd n</td>
</tr>
<tr>
<td>All</td>
<td>146</td>
<td>1,066</td>
</tr>
<tr>
<td>Male</td>
<td>72</td>
<td>518</td>
</tr>
<tr>
<td>Female</td>
<td>74</td>
<td>549</td>
</tr>
<tr>
<td>Visited a dental professional in the last year</td>
<td>67</td>
<td>503</td>
</tr>
<tr>
<td>Visited a dental professional more than a year ago</td>
<td>78</td>
<td>552</td>
</tr>
<tr>
<td>Dentate</td>
<td>146</td>
<td>1,066</td>
</tr>
<tr>
<td>Edentulous</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- ECC prevalence = 85.3%
- Mean dt = 4.06
- Mean mt = 1.83
- Mean ft = 2.33
- Mean dmft = 8.22

First Nations Oral Health Survey (FNOHS)

- 5 Canadian Provinces & 1 Territory
- Face-to-face interviews & clinical oral exams
- Included preschool children 3-5 years of age

- ECC prevalence = 85.9%
- Mean dt = 2.68
- Mean mt = 1.46
- Mean ft = 3.47
- Mean dmft = 7.62

### TABLE 4.2  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>
</thead>
<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%)
Treatment of Preventable Dental Cavities in Preschoolers: A Focus on Day Surgery Under General Anesthesia

Figure 1 – percentage of day surgery operations by type of procedure. 4-year pooled (2010-2011 to 2013-2014)

Schroth, Quinonez, Shwart, Wagar 2015 submitted
Figure 2 – Rate of day surgery for dental caries, children 1-4 years old, by Province or Territory

Schroth, Quinonez, Shwart, Wagar 2015 submitted
- Children living in communities with a high proportion of Aboriginal peoples had dental surgery rates 7.8 X higher.

- Annual hospital costs to treat S-ECC under GA exceed $21 million.

Schroth, Quinonez, Shwart, Wagar 2015 submitted.
Rate of Day Surgery for Dental Caries, Children 1-4 Years Old, by Health Region, 4-year pooled

Rate per 1,000
- 24.3 and higher
- 14.9 to <24.3
- 8.8 to <14.9
- 0.0 to <8.8
- Quebec elected to not participate in this study
Joint AAP CPS Position Statement on ECC in Indigenous Communities: Oral Health Recommendations for Indigenous Communities

- **Research Recommendations**
  Additional community-based participatory research on the epidemiology, prevention, management and microbiology of ECC in Indigenous communities and ECC prevention projects should be supported.

- **Clinical Care**
- **Community-based Promotion Initiatives**
- **Workforce and Access Issues**
- **Advocacy**

Irvine, Holve, Krol, Schroth 2011
Dental Therapists: A Definition

- Primary oral health care professionals
  - Basic clinical dental treatment and preventive services
  - Multidisciplinary team members
  - Advocate for the needs of clients
  - Refer for services beyond the scope of the dental therapist’s practice.*

*SASKATCHEWAN DENTAL THERAPISTS ASSOCIATION*
Dental Therapists:
• Decrease cost of care especially for children
• Improve access to care
• Provide care safely
• Public values the role of dental therapists
• Traditionally 2 years education


Supported by the W.K. Kellogg Foundation
Curriculum

DHAT curriculum adapted by AAPHD panel

American Association of Public Health Dentistry
- 11-person academic panel
- Model curriculum
- two-year, post-secondary
- Open access online:

The Journal of Public Health Dentistry, Special Issue: Workforce Development in Dentistry: Addressing Access to Care
Spring 2011 Volume 71, Issue Supplement S2
Improved Access and Quality

- 25 certified DHAT
- 81 communities in rural AK
  - Over 40,000 people have access
- Continuity of care
  - Higher level of care possible
  - Dentist working up to their licensure

DHAT Aurora Johnson, NZ Educated
DHAT Demographics

Median Age: 34 (23-57)
Gender: 80% female, 20% male
Percent AI/AN: 88%
Percent practicing in their home villages: 78%
Median years on the job: 5.1
Retention rate over 10 years: 81%

DHAT Students Bernadette Charles and Marian Petla at health fair 2008
DHAT Educational Program

Address:
4200 Lake Otis Parkway, Ste 204
Anchorage, AK 99508

Mary E. Williard, DDS
907-729-5602

DHAT training is ANTHCsmile
on Facebook

website: http://anthcoralhealth.org

Div. of Community Health Services- DHAT education
Survey

- 8,461 AI/AN children 12-71 months of age
- 63 IHS/tribal sites
- 75% of 5-year-olds had caries

Electronic Health Record (EHR)

- Uses existing data

Oral Health Research in Alaska

- Electronic dental records
  - Use for monitoring caries over time
    - Evaluate interventions
    - Community level evaluations
- Yukon Kuskokwim Health Corporation
- Alaska Native Medical Center
Oral Health Research in Alaska, II

- **Water fluoridation**
  - Comparison of caries in 4 cities
    - 2 with and 2 without water fluoridation
- **Cost effectiveness of community interventions in rural Alaska**
  - Fluoridation, sealants, early screening, fluoride varnish, brushing programs
    - Publication in 2015
Contacts

• Tom Hennessy
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  • tbh0@cdc.gov

• Mary Williard
  • Alaska Native Tribal Health Consortium
  • Dental Health Aide Program
  • mewilliard@anthc.org
CHANGE IN PRACTICE:

- Indigenous children can benefit from toothpaste
- Children at high-risk for caries needing toothpaste at early ages include:
  - living in a community with non-fluoridated water supply or low natural fluoride levels (< 0.3 ppm),
  - enamel defects, incipient caries (i.e. white chalky spots), or cavities,
  - frequent intake of sugary snacks/drinks between meals (including bottle or sippy cup containing liquids other than water and sweetened medications),
  - special health care needs that limit cooperation with brushing and oral hygiene,
  - teeth are not brushed daily,
  - premature birth and low birth weight,
  - parent or caregiver has tooth decay,
  - visible plaque on teeth.

*Some risk factors of early childhood tooth decay include if the child: is living in an area with non-fluoridated water, has visible plaque, has white chalky areas or cavities on teeth, has many sugary snacks/dinks between meals, teeth are not brushed daily, caregiver has tooth decay.*

For more information visit Healthy Smile Happy Child at: [http://www.whha.mb.ca/healthinfo/preventill/oral_child.php](http://www.whha.mb.ca/healthinfo/preventill/oral_child.php)

_Last Revised: December 2014_
Fluoride Varnish

CHANGE IN PRACTICE:
- Fluoride varnish recommended at least every 3 to 6 months for children < 6 years of age (American Dental Association 2013)

http://www.smilesforlifeoralhealth.org/default.aspx?tut=555&pagekey=62948&s1=2183598
Reducing dental caries in preschool children: a primer for non-dental health care professionals

Planning Committee:

Robert Schroth, DMD, MSc, PhD
Anna Rowan-Legg, MD
Lydia Hatcher, BSc, MD, CCFP, FCFP
Bruce Wheeler, MD, CCFP
James Irvine, MD, FRCPC

Learning Objectives

1. Describe common pediatric dental health problems, including dental caries
2. Provide anticipatory guidance to families related to dental health issues including early childhood caries (ECC) prevention strategies
3. Discuss the role of fluoride in preventing dental caries including the evidence for efficacy and safety
4. Assess dental caries risk in pediatric patients and make appropriate referrals to accessible dental practitioners
5. Understand the impacts of the disparity of oral health resources in Canada’s Aboriginal and rural children.
6. Perform a pediatric oral health exam and identify early signs of dental decay
CHANGE IN PRACTICE: Caries-Risk Assessment for Physicians and Non-Dental Health Care Providers

Table 1. Caries-risk Assessment Form for 0-3 Year Olds\textsuperscript{59,60} (For Physicians and Other Non-Dental Health Care Providers)

<table>
<thead>
<tr>
<th>Factors</th>
<th>High Risk</th>
<th>Low Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother/primary caregiver has active cavities</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Parent/caregiver has low socioeconomic status</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Child has &gt;3 between meal sugar-containing snacks or beverages per day</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Child is put to bed with a bottle containing natural or added sugar</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Child has special health care needs</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Child is a recent immigrant</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Protective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child receives optimally-fluoridated drinking water or fluoride supplements</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Child has teeth brushed daily with fluoridated toothpaste</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Child receives topical fluoride from health professional</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Child has dental home/regular dental care</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Clinical Findings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child has white spot lesions or enamel defects</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Child has visible cavities or fillings</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Child has plaque on teeth</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Circling those conditions that apply to a specific patient helps the health care worker and parent understand the factors that contribute to or protect from caries. Risk assessment categorization of low or high is based on preponderance of factors for the individual. However, clinical judgment may justify the use of one factor (e.g., frequent exposure to sugar containing snacks or beverages, visible cavities) in determining overall risk.

Overall assessment of the child’s dental caries risk:  

High □  Low □  

American Academy of Pediatrics Dentistry 2014
Baby Teeth Talk Study
International Collaborative Indigenous Health Research Partnership (ICIHRP)

- Multi-centred, block-randomized delayed intervention comparison design RCT

- To prevent ECC in Aboriginal children in Ontario & Manitoba, Canada

- Delayed intervention design involving:
  - Dental care during pregnancy
  - Fluoride varnish
  - Motivational interviewing
  - Anticipatory guidance

- 540 Canadian women recruited (89 from Winnipeg)

- Cohorts in Australia & New Zealand

Team: Herenia Lawrence (Lead PI); Sabrina Peressini, Marion Maar, Jaime Cidro & Robert Schroth (Co-investigators & Local PIs)
Funded by CIHR 🇨🇦
544 pregnant Aboriginal women recruited in the provinces of Ontario and Manitoba in sixteen months (Aug. 2011 to Nov. 2012)

283 randomly allocated to intervention group

261 randomly allocated to delayed intervention group

Pregnant mothers complete baseline questionnaire (items include oral health knowledge, oral self-care, dental service utilisation, oral health-related self-efficacy and oral health literacy)

Pregnancy: MI1, AG1 & mother dental care

Child aged 6-8 months; MI2, AG2 & FV1

Child aged 12 months; MI3, AG3 & FV2

Child aged 18 months; MI4, AG4 & FV3

24-month child dental check and mother follow-up questionnaire

MI2, AG2 & FV1 @ 24 mo

MI3, AG3 & FV2 @ 30 mo

MI4, AG4 & FV3 @ 36 mo

36-month child dental check and mother follow-up questionnaire

Mothers receive a $50 incentive (plus other incentives such as diapers, toothbrushes and toothpaste, and oral health information resource materials) per questionnaire completed and for their participation in the motivational interviewing (MI), oral health anticipatory guidance (AG) & fluoride varnish (FV) sessions
## Participant Update: Follow-up Response per Group as of March 2015

<table>
<thead>
<tr>
<th>Follow-up Response as of March 2015</th>
<th>GREEN Group n (%)</th>
<th>RED GROUP n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number recruited</td>
<td>283 (100.0)</td>
<td>261 (100.0)</td>
</tr>
<tr>
<td>TOTAL LOST TO FOLLOW UP(^1)</td>
<td>86 (30.0)</td>
<td>55 (21.0)</td>
</tr>
<tr>
<td>Continuing</td>
<td>197 (70.0)</td>
<td>206 (79.0)</td>
</tr>
</tbody>
</table>

\(^1\)Participants who moved to a different study site were not lost to follow up. Miscarriage, child deceased, e.g. SIDS, adoption out of Province will be excluded from the denominator.
Caring for baby teeth begins before baby arrives.

Vitamin D and calcium are essential building blocks for strong teeth.

Give your child dental friendly snacks like fruit, vegetables, and cheese. Vitamin D rich foods and supplements may also help prevent cavities.
CHANGE IN PRACTICE: Promoting Early Dental Visits
Manitoba Dental Association’s Free First Visit Program

QUEST 501(c)(3)

- **Quantifying, Understanding and Eliminating Severe Tooth Decay in AI/AN Children**
- With support from ADA and DentaQuest, QUEST has organized and hosted 4 symposia since 2009
- At the 2010 Symposium national leaders in caries research and dental public health concluded:
  
  “There are profound knowledge gaps impeding our progress in reducing the prevalence and severity of caries in high risk groups like indigenous children.”

ADA website for symposia reports:

Contact: drobertson@gorge.net
Profound Knowledge Gaps:

- Epidemiology and case definition
  - The current official case definitions (ECC & S-ECC) and using mean dmfs/dmft as a measure of severity are of little relevance for high risk groups of children.
  - Solution: the Epidemiology Workgroup is developing a new case definition and metric for morbidity.

- The microbiology of caries in high risk children*
  - A joint Canadian-US study is on-going to elucidate this.

- The role of enamel defects as a risk factor
  - A field guide is being developed to quantify & qualify enamel defects

- Truly effective preventive or curative products
  - Two clinical trials and several clinical practice projects using silver ion products (silver nitrate solution or SDF) are being supported by QUEST
Conclusions:

• Silver compounds are effective anti-caries agents
• Incomplete understanding of how they work
• Further research required
After Silver Nitrate Treatment

The caries is arrested, but a black ‘scar’ is left after an active cavity is treated.

This can be easily treated to remove the black color later.
Engagement and Knowledge Exchange Activities

"AS INDIGENOUS PEOPLE WE HAVE ALWAYS DONE RESEARCH, ALWAYS SEARCHED FOR UNDERSTANDING, WAYS OF BEING AND KNOWING THE WORLD AROUND US IN ORDER TO SURVIVE, WE JUST DIDN'T CALL IT RESEARCH"

(former Chief Norman Bone, Keeseekoowenin First Nation)

FIRST NATIONS HEALTH AND SOCIAL SECRETARIAT OF MANITOBA

PEKE

PARTNERS FOR ENGAGEMENT AND KNOWLEDGE EXCHANGE

Address health in a wholistic way, PIMATIZIWIN, walking in balance.

WWW.FNHSSM.COM
First Nations Health and Social Secretariat of Manitoba (FNHSSM) Partners for Engagement and Knowledge Exchange (PEKE)

First Nations Health & Social Secretariat of Manitoba - Partners for Engagement & Knowledge Exchange

Coordinating Committee
- Mabel Horton (Cree Elder)
- Henry Skywater (Dakota)
- Joe Hyslop (Dene)
- Victor Harper (Oji-Cree)
- Harry Bone (Ojibway)

Norman Bone (Ojibway Elder)
- Leona Star (AMC)
- Kathi Avery Kinew (AMC)
- Dr. Josée Lavoie (U of M)

Suicide Prevention
- Henry Skywater (Dakota Elder), Carla Cochrane (AMC), Christopher Lalonde (UVic), Michael A. Hart (UofM)

Obesity/Diabetes
- Joe Hyslop (Dene Elder), Amanda Meawasige (AMC), Wanda Phillips Beck (AMC), Sherri Di Lalio (ANAC), Caroline Chartrand (DIP), Lorraine McLeod (DIP), Dr. Sharon Bruce (U of M)

Tuberculosis
- Victor Harper (Oji-Cree Elder), Kathi Avery Kinew (AMC), Mary-Jane McCallum (UofW), Linda Larcombe (U of M), Phil O’Ror (U of M)

Oral Health
- Mabel Horton (Cree Elder), Leona Star (AMC), Bob Schroth (U of M), Peter Cooney (PHAC), Sheri McKinstrey (U of SF), Michael Moffatt (U of M), Hai Santiago (U of M), Martin Chartier (PHAC)

Social Determinants of Health
- Harry Bone (Cree Elder), Stephanie Sinclair (AMC), Dr. Josée Lavoie (U of M), Dr. Alan Katz (U of M), Dr. Barry Lavallee (DIP, U of M), Dr. Heather Gifford (Whikunan Research), Dr. Paul Reynolds (Te Atawhai o te Ao)

Allen Katz (U of M)

**Coordinating Committee**
- Traditional Knowledge Keepers
- Decision-makers
- National KT&E
- International KT & E
- Community Oriented Partners
The following resources are listed in our archive pages or can be browsed by doing a search of our new electronic library system:

- **Articles and reports** on Aboriginal child oral health from Australia, Canada, New Zealand/Aotearoa, and the United States.

- **Community oral health promotion resources** with Aboriginal content from Australia, Canada, New Zealand/Aotearoa, and the United States.

- **Website links** that contain oral health promotion with Aboriginal content from Australia, Canada, New Zealand/Aotearoa, and the United States.

http://oralhealth.circumpolarhealth.org/