

**Canadian Association of Public Health Dentistry  
2022 Virtual Conference  
Shaping the Future, Together**

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- 4. CARIES RISK ASSESSMENT IN PRESCHOOLERS: A PILOT VALIDATION OF THE NEW CANADIAN TOOL FOR USE BY NON PRIMARY HEALTHCARE PROVIDERS**  
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- 6. 5 B5 @MG-C: 'H<9`-AD57H'C: '7 <=@F9B@CF5 @<95 @k`-B#5HJ9 PROGRAM ON FIRST NATIONS AND INUIT CHILDREN IN ATLANTIC CANADA, SASKATCHEWAN AND ONTARIO**  
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## TRENDS IN SELF-REPORTED COST BARRIERS TO DENTAL CARE IN ONTARIO

ABDELREHIM M<sup>1\*</sup>, SINGHAL S<sup>1,2</sup>, RAVAGHI V<sup>1,3</sup>, QUIÑONEZ C<sup>1,4</sup>

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**Objectives:** 1) To explore trends in self-reported cost barriers to dental care in Ontario; 2) To determine the socio-economic and demographic characteristics of Ontarians reporting cost barriers to dental care; and 3) To identify what predicts reporting cost barriers to dental care in Ontario.

**Methods:** A secondary data analysis of five cycles (2003, 2005, 2009-10, 2013-14 and 2017-18) of the Canadian Community Health Survey (CCHS) was undertaken. The CCHS is a cross-sectional survey that collects information related to health status, health care utilization, and health determinants for the Canadian population. Univariate and bivariate analyses were conducted to determine the characteristics of Ontarians who reported cost barriers to dental care. Poisson regression was used to calculate unadjusted and adjusted prevalence ratios to determine the predictors of reporting a cost barrier to dental care.

**Results:** In 2014, 34% of Ontarians avoided visiting a dental professional in past three years due to cost, up from 22% in 2003. In 2018, 22% of Ontarians avoided visiting a dental professional in the past 12 months due to cost, compared to 17% in 2007/09 for all Canadians (according to the Canadian Health Measures Survey). Having no insurance was the strongest predictor for reporting cost barriers to dental care, followed by being 20-39 years of age and having a lower income.

**Conclusion:** Self-reported cost barriers to dental care have generally increased in Ontario but more so for those with no insurance, low income, and aged 20-39 years.

## COSTING ANALYSIS OF A COMPREHENSIVE DENTAL CARE PROGRAM

GHONEIM A<sup>1\*</sup>, LAPORTE A<sup>2,3,4</sup>, HANCOCK-HOWARD R<sup>2,3</sup>, SINGHAL S<sup>1</sup>, QUIÑONEZ C<sup>5</sup>

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**Objectives:** This costing analysis aims to address the methodological limitations of previous costing analysis studies in the dental literature. Specifically, the objective is to estimate the total costs associated with providing a comprehensive dental care program from a societal perspective for those who have experienced cost-barrier to care in the last two years.

**Methods:** This costing analysis leverages a quasi-experimental single-group repeated-measures design to assess the impact of receiving cost-free dental care on individuals, their families, the healthcare system, and society. Participants who meet the eligibility criteria receive the needed dental care and are followed up at two-weeks after attaining oral health stability, at six months, and then at annual intervals. Using the micro-costing method, patient-level data captured via self-administered surveys and clinical records, we estimate the direct (i.e., costs directly related to the consumption of the services) and indirect costs (i.e., costs that are not directly related to patient care but related to care provision) associated with receiving care through the program.

**Results:** Data from the first 124 participants enrolled in the study were included in this costing analysis. Participants received the program's diagnostic, preventive, restorative, prosthetic, and surgical services. The direct costs of 1) services provided, and 2) medications prescribed as part of the treatment plan were included. In addition, the indirect costs captured were 1) traveling expenses to and from the clinic, 2) opportunity costs, and 3) caregiving expenses associated while receiving care. Over the first year of implementation, the average direct cost and indirect cost per patient were approximately \$2,235, and \$720, respectively.

**Conclusion:** This is the first study to utilize patient-level data to estimate the cost of running a dental program from a societal perspective. It is important to note that these direct costs are for the first year, when there were probably pent-up needs because of not being able to access dental care for the last two or more years. It would be interesting to observe how the cost per patient changes in the following years. The findings from this study will help inform decisions about the true societal costs of implementing a comprehensive dental care program.

# PREDICTORS OF SELF-RATED ORAL HEALTH IN THE CANADIAN POPULATION

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**Objectives:** To determine contextual and individual predictors of self-rated oral health (SROH) in the Canadian population over a 15-year period based on Andersen's behavioral model of health services use.

**Methods:** This retrospective study used data from the 2003 and 2017/18 cycles of the Canadian Community Health Survey. Participants who answered all questions regarding SROH, the outcome measure, and predictors including predisposing factors (demographics, income, education), enabling factors (having insurance), personal health practice (smoking habits, brushing frequency), and use of dental services (dental attendance). Multiple ordinal logistic regression was used for the analyses, and a p-value less than 0.05 was considered statistically significant.

**Results:** Data from 18,395 and 21,662 respondents from the 2003 and 2017/18 cycles were gathered. The relative frequencies of SROH in the two cycles (2003 vs 2017/18) were as follows: excellent (23.2% vs. 23.9%), very good (32.9% vs. 38.4%), good (30.1% vs. 27.5%), fair (10.3% vs. 7.5%), and poor (3.6% vs. 2.6%). In both cycles, visiting dentist more than once a year compared to emergency visits was the most important predictor of higher SROH (OR: 3.26 [2003], 3.43 [2017/18];  $P < 0.001$ ) followed by having income above \$80,000 (OR: 1.85 [2003], 1.90 [2017/18];  $P < 0.001$ ), brushing more than two times daily than once or less (OR: 1.77 [2003] 1.85 [2017/18],  $P < 0.001$ ), and being non-smokers compared to daily smoking (OR: 1.7 [2003], 2.3 [2017/18],  $P < 0.001$ ). Moreover, younger age, female sex, and having higher education were significantly associated with higher SROH ( $P < 0.001$ ). Having insurance had a small association in 2003 (OR: 1.07,  $P = 0.03$ ) but was not significant in 2017/18 ( $P = 0.14$ ).

**Conclusion:** There were no major shifts in SROH and its predictors in the Canadian population between 2003 and 2017/18. Personal health practices and use of dental services seem to be the most important predictors of SROH over time.

# TELEDENTISTRY WITHIN ORAL HEALTH CARE PROVIDERS' TRAINING: A SCOPING REVIEW

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**Objectives:** To explore the extent to which teledentistry (TD) is incorporated in the training of oral health care providers.

**Methods:** The JBI (Joanna Briggs Institute) methodology for scoping reviews was used, and studies on the TD content offered to oral health care providers were included. Two independent reviewers screened the literature in June and July 2022. Studies published between 1989 and June 4<sup>th</sup>, 2022 were searched in various databases, from the JBI Evidence Synthesis to Cochrane Database of Systematic Reviews, MEDLINE (Ovid), and MedEdPORTAL. ProQuest Dissertations and Theses Global; Google Scholar were used for the grey literature.

**Results:** A total of 2180 documents were found, and 376 were excluded as duplicates. The 1804 remaining documents were screened by the title and abstract; 59 studies were selected for full-text review; 19 were eligible for data extraction and included studies from the USA (n=13), Brazil (n=1), France (n=1), India (n=2), Saudi Arabia (n=1), Colombia (n=1), and Canada (n=1). Of all studies, 63.15% were published after the COVID-19 pandemic. Seven studies focused merely on undergraduate education. Dentists were targeted in 36.84% of the studies. The overarching objective of the training was to improve their TD knowledge. The following topics were most commonly addressed: TD consultation, capturing intraoral images, reimbursement and legal issues. Simulation, lecture, and hands-on practice were employed in most training programs. TD instruction varied from a one-hour didactic session to a fifteen-week course. Examination, self and peer evaluation, pre- and post-intervention surveys, and learners' ability to work with TD technology were among the assessment techniques mainly employed.

**Conclusion:** TD education has been emphasized following the current surge in teledentistry utilization during the COVID-19 pandemic. There is a variation in the existing TD educational programs, from hours of instruction to assessment techniques. It remains unknown the extent to which Canadian dental and dental hygiene schools teach TD.

# COVID-19-ASSOCIATED ANXIETY AMONG TRAINEES AND EMPLOYEES IN CANADIAN DENTAL SCHOOLS

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**Objectives:** The overall goal of this project was to evaluate differences in COVID-19-associated-anxiety (C19A) among trainees, including undergraduates, graduates, and residents, and employees, including faculty and support staff, across all Canadian dental schools over one year between April 2021 and April 2022. The specific objective of work reported in this abstract was to describe C19A in trainees and employees over the study duration.

**Methods:** We used a prospective cohort study design. A sample of 600 participants was recruited at baseline. Questionnaire data were collected at baseline and monthly between April 2021-April 2022. The questionnaires included a range of factors like demographics, role at dental school, work settings, infection status, vaccination status and C19A. C19A was evaluated using a validated COVID-19 Anxiety Syndrome Scale (C19ASS). This is a 9-item instrument with a Likert response scale. Higher scores indicate higher anxiety levels. Following descriptive analyses, a linear mixed model will be used to account for participants' C19A differences across the one-year study duration, controlling for confounders.

**Results:** The preliminary descriptive results indicate that: 53% of the participants were students; 41.7% were support staff and faculty combined; 66.8% were women, 29% were men, and 1% were gender diverse; 44.5% were aged 20-30 years, 15% between 30-40 years, 13% between 40-50 years, 16% between 50-60, and 6.5% above 60 years. Among all the participants, 49.2% provided in-person dental care, and 48.3% were not involved in dental care. Further data analyses will be performed to report C19A differences among trainees and employees over time.

**Conclusions:** Multiple studies have indicated high mental health problems among students during the pandemic. The results of this study will improve the understanding of COVID-19-associated-anxiety among those studying and working in an educational setting like dental schools and potentially promote the development of interventions to manage anxiety in this environment.

# EFFECTS OF BOTULINUM TOXIN-A INJECTION ON MANDIBULAR BONE IN PATIENTS WITH HYPERACTIVE MASTICATORY MUSCLES: A SYSTEMATIC REVIEW

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**Objectives:** Botulinum Toxin-A (Botox) is one of the most potent toxins known to man. Secreted by anaerobic bacteria *Clostridium botulinum*. Of recent, Botox emerged in the scope of dental practice for its ability to paralyse musculature and reduce hyperfunction. Though this may be a desirable effect in temporo- mandibular disorders (TMD) associated with hyperactive muscles of mastication, the potential adverse effects are overlooked. Botox is a well-established animal paralysis model leading to significant bone loss. This potential side effect is poorly addressed in humans. The objective of this study is to systematically review the literature for studies investigating changes in mandibular bone structure in patients receiving Botox in muscles of mastication.

**Methods:** Comprehensive search of Medline, Embase, and Web of Science retrieved 912 articles. Following screening 49 were included in our review for complying with our inclusion criteria. Of the included human articles, 7 were primary studies and 3 were single case reports.

**Results:** All studies involved female participants with 2 studies investigating both males and females. Age of participants varied from 26.9-55.3 years of age, with average of 36.7 years. Masseter and temporalis muscles represent the two most targeted muscles for treatment of TMDs. Most studies assess changes in bone via cone beam microcomputed tomography (CBCT) or conventional CT. Period of assessment of bone varied among studies (3-12 months), this is generally a short duration for slowly adapting bone structures. The condyle, coronoid and angle of mandible are the most investigated sites for bone changes. All primary studies except one presented quantifiable parameters for potential meta-analysis. Limitations ranged from study design to methodological shortcomings.

**Conclusion:** Overall, the literature found evidence of bone alterations following Botox injections, particularly with higher and repeated dosages. More vigorous study designs are required to establish safe margins for its use.



# EXPOSURE TO ORAL HEALTH RISK FACTORS DURING PERICONCEPTIONAL PERIOD AND PREGNANCY OUTCOMES: A MINI-REVIEW

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**Objectives:** Prenatal care is a well-established preventive health service for screening and management of risk factors ahead of childbirth. While this has evidenced in reducing maternal and child mortality, there is much to be desired given the rapidly changing lifestyle behaviours and its impact on maternal and neonatal health. Periconceptional period (14 weeks before and 10 weeks after conception) offers a unique window of opportunity to implement additional preventive measures to mitigate risk factors and avert adverse pregnancy outcomes. Oral health risk factors have been associated with poor birth outcomes (oro-facial clefts, preterm births, small-for-gestational-age SGA, etc.) during the prenatal period, but their effect during periconceptional period is not well studied.

Therefore, this mini-review aims to: 1. map maternal exposure to oral health risk factors (tobacco use, alcohol consumption, unhealthy diet, poor hygiene, poor social determinants) during periconceptional period and subsequent impact on pregnancy outcomes. 2. Enumerate available and/or suggested interventions to minimize adverse pregnancy outcomes.

**Methods:** Literature search of the bibliographic databases will be carried out using PubMed, Scopus and Google Scholar. Peer-reviewed empirical journal papers with a focus on periconceptional period and oral health risk factors will be included if they are: written in English, published in the last 10 years, with no regional restrictions.

**Results:** We aim to present the current state of the field, gaps in research, and future directions on the importance of periconceptional period and pregnancy outcomes as it relates to exposure to oral health risk factors.

**Conclusion:** Evidence emerging from this review hopes to throw light on the importance of primordial prevention by way of preconception care (PCC), with the inclusion of oral health counselling. Furthermore, interventions tackling oral health risk factors will help address non-communicable diseases (common risk-factor approach), promoting interdisciplinary care resulting in safe motherhood and neonatal health.

## THE ASSOCIATION BETWEEN MATERNAL ORAL INFLAMMATION AND THE COMPOSITION OF BREAST MILK: A COHORT STUDY

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**Objectives:** This study aimed to investigate the impact of maternal oral inflammatory load (OIL) on breast milk composition including neutrophil counts and activation state (based on cluster of differentiation (CD) markers expression), and fatty acid levels. The association between the infant health status and changes in breast milk neutrophils/activation state and fatty acid levels were also investigated.

**Methods:** This is a prospective cohort study where fifty breastfeeding mothers were recruited from St. Michael's hospital, Toronto, ON, Canada, and followed up from 2-4 weeks until 4-months *postpartum*. Oral rinse and breast milk samples were collected from the participants. OIL, as expressed by the absolute oral neutrophil counts was used to assess the oral inflammatory status of mothers. Mothers' oral health state was categorized into healthy ( $<0.5 \times 10^6$  oPMN/10ml), moderate ( $0.5-1 \times 10^6$  oPMN/10ml), and severe ( $\geq 1 \times 10^6$  oPMN/10ml) groups.

**Results:** Mothers with moderate to severe OIL had a statistically significant decrease in the expression of CD11b, CD64 and CD63 activation biomarkers on breast milk neutrophils and a decrease in the levels of long chain polyunsaturated fatty acids (docosahexaenoic acid (C22:6n-3; DHA) and arachidonic acid (C20:4n-6; AA) ) at follow-up compared to baseline ( $p < 0.01$ ). These changes were not observed in mothers with healthy OIL. Moreover, breast milk from mothers whose infants had health problems had neutrophils which expressed elevated levels of AA, compared to breast milk from mothers of healthy infants, after adjusting for confounding variables.

**Conclusion:** This study demonstrates for the first time that maternal OIL and poor health status of infants can affect breast milk composition. Future studies are needed to investigate the impact of the alterations in breast milk components on the infants' health over both the short and long term as growth and development proceed.

## **NUTRITIONAL STATUS AND FEEDING PRACTICES OF FIRST NATIONS AND METIS CHILDREN AND THEIR ASSOCIATION WITH EARLY CHILDHOOD CARIES**

GROVER RS\*, SCHROTH RJ, THE SCALING UP HEALTHY SMILE HAPPY CHILD TEAM

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Children's Hospital Research Institute of Manitoba

**Objectives:** To investigate the baseline nutritional status and feeding practices of First Nations and Metis children in Manitoba participating in a community-based participatory oral health study and whether there were any associations with early childhood caries (ECC).

**Methods:** This cross-sectional study assessed the oral health status of Indigenous children <72 months of age while their parent(s)/caregiver(s) completed a questionnaire, which included the Nutrition Screening Tool for Every Preschooler (NutriSTEP) and questions on children's dietary practices. The analysis included descriptive statistics, bivariate analyses, and linear regression. A p value  $\leq 0.05$  was significant.

**Results:** Overall, 146 children were recruited at a mean age of  $40.8 \pm 20.4$  months, and 59.6% had ECC. The mean decayed, missing, and filled primary teeth (dmft) score was  $4.9 \pm 5.3$  (range 0–20). While the mean NutriSTEP score was  $19.9 \pm 6.2$  (median 19.5) suggesting a low risk for impaired nutritional status, 50.0% of children were at moderate or high risk for impaired nutritional status. There was no significant difference in NutriSTEP scores between First Nations and Metis children ( $p=0.29$ ), and no association was found between NutriSTEP risk categories and ECC ( $p=0.77$ ). Children who frequently ate meat, fish, poultry, or alternatives (NutriSTEP Q5) were significantly more likely to have ECC ( $p=0.032$ ). Children who never received nutritional supplements (NutriSTEP Q13,  $p=0.05$ ) were significantly more likely to have ECC. Children who used a pacifier were less likely to have ECC than children who did not ( $p<0.01$ ).

**Conclusion:** Although half of the children classified using the NutriSTEP were at low risk, the other half were at moderate and high risk. Children classified as high risk were not shown to have a statistically significant association with ECC. Specific NutriSTEP questions, however, were shown to be significant for ECC. In addition, numerous childhood feeding practices were found to play a significant role in the prevalence of ECC.

## **CARIES RISK ASSESSMENT IN PRESCHOOLERS: A PILOT VALIDATION OF THE NEW CANADIAN TOOL FOR USE BY NON PRIMARY HEALTHCARE PROVIDERS**

OLATOSI OO<sup>1,2,3\*</sup>, SIRAY A<sup>2</sup>, LEE V<sup>2,3</sup>, MITTERMULLER BA<sup>2,3</sup>, FINCH A<sup>2</sup>, HU R<sup>2,3</sup>, DUFOUR L<sup>4</sup>, BURRY A<sup>5</sup>, BRONDANI M<sup>6</sup>, BERTONE M<sup>7</sup>, ALAI-TOWFIGH H<sup>2</sup>, SCHROTH RJ<sup>1,2,3</sup>

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**Objectives:** Caries risk assessment (CRA) is essential for successful management of dental caries in children. This study assessed the sensitivity and specificity of a new Canadian CRA tool for children < 6 years to predict caries development.

**Methods:** A prospective cohort study among children aged < 6 years recruited from 3 clinics in Manitoba from 2019 to 2022. At baseline the CRA tool was used to assess child's caries risk, information on sociodemographics, oral hygiene and feeding practices were provided by parents/caregivers via interview. Dental caries was diagnosed using the WHO criteria. A follow-up assessment was done after 12 months. P value  $\leq 0.05$  was considered significant.

**Results:** To date 247 children have been recruited. A total of 182 children mean age  $40.4 \pm 17.7$  months completed the 12 months clinical assessment. Most of the participants at baseline had high CRA rating (71.4%), and active caries or past evidence of dental treatment for caries (64.3%). Children with baseline visible caries and/or past evidence of dental treatment were more likely to have new caries at follow-up assessment ( $p < 0.0001$ ) when compared with other variables in the CRA tool. Children assigned to a high risk CRA rating were found to be significantly associated with development of new caries at follow-up assessment ( $p 0.0001$ ). The sensitivity and specificity for baseline CRA rating and development of new caries at follow-up were 85.9% and 44.3% with a positive and negative predictive value of 59.8% and 76.5%, respectively.

**Conclusion:** Our findings shows that Canadian CRA tool has a high potential to predict development of new caries in children, however future population-based studies are recommended.

## EFFECTS OF SILVER DIAMINE FLUORIDE ON ORAL BACTERIOME AND MYCOBIOME

MANERKAR M, CRUZ DE JESUS V\*, MITTERMULLER BA, LEE VK, SINGH S, ALAI-TOWFIGH H, CHELIKANI P, BERTONE M, KLUS B, SCHROTH, RJ

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**Objectives:** Silver diamine fluoride (SDF) is a simple and non-invasive agent to arrest caries in children. The purpose of this study is to investigate changes to the oral bacteriome and mycobiome in young children treated with SDF

**Methods:** Plaque samples were collected from 45 children with early childhood caries. Frequency regimens of SDF were two applications 4 months apart, two applications 6 months apart, and two applications 1 month apart. DNA was extracted and sent to Genome Quebec Innovation Center for library preparation and paired-end Illumina MiSeq PE300 sequencing of the V4 region of bacterial 16S rRNA and fungal ITS1 rRNA genes. Sequencing data was analyzed using QIIME2 2018.11.

**Results:** A total of 195 carious lesions in 44 children were treated at baseline and followed over two subsequent study visits. The overall arrest rates were 77.69% at Visit 2 and 93.61% at Visit 3 respectively. Arrest rates were higher for all lesions after two applications of SDF. The alpha diversity and beta diversity analysis showed no significant differences in the supragingival bacteriome and mycobiome for all three regimens. Taxonomic assignment showed that *Streptococcus*, *Corynebacterium* and *Actinomyces* were the most abundant genera for Bacteria and *Candida*, *Blumeria*, and *Malassezia* were the most abundant genera for Fungi. *Streptococcus mutans* and *Veillonella dispar* both showed a decrease in relative abundance, but these changes were a trend and not found to be statistically significant. *Candida albicans* was highly abundant in all groups regardless of number of visits or regimens. The differential abundance analysis showed significant changes in both bacterial and fungal species, particularly *Lactobacillus spp.*, *Bifidobacterium spp.* and *Candida spp.* Our study found a vast diversity of fungal species and differential abundance analysis suggested that SDF treatment may have an effect on the abundance of specific fungi.

**Conclusion:** SDF was an effective modality for arresting dental caries with higher arrest rates for all lesions after two applications of SDF. Further studies with a larger sample size are needed to confirm whether the presence or absence of various bacterial and fungal species are the result of SDF application at various frequencies.

## **ANALYSIS OF THE IMPACT OF CHILDREN'S ORAL HEALTH INITIATIVE PROGRAM ON FIRST NATIONS AND INUIT CHILDREN IN ATLANTIC CANADA, SASKATCHEWAN AND ONTARIO**

YEREX K<sup>1\*</sup>, LEE J, SCHROTH RJ, KIM K, MCNALLY M, EDWARDS JM, HAI-SANTIAGO K, BERTONE M, HAYES A, LAVOIE J, MARTIN D, MOFFATT M, L STAR, TAIT NEUFELD H, KEAYS-WHITE D, DUFOUR L, WHITE P, DOUGLAS J

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**Objective:** To review data from the Children's Oral Health Initiative (COHI) database to determine the impact that COHI is having on registered First Nations and Inuit children in three regions of Canada: Atlantic Canada, Saskatchewan and Ontario.

**Methods:** This study analyzed the COHI database between 2006-2016 to report the impact of COHI on Indigenous communities. Participating children ages zero to seven were divided into three groups to calculate the decayed, extracted and filled primary teeth (deft) scores. Analyses looked at the proportion of preventive services provided by COHI, including first dental visits, fluoride varnish applications, dental sealants and atraumatic restorative therapy (ART).

**Results:** The number of children ages zero to seven enrolled in COHI increased from 4,773 in 2006 to 7,442 in 2016 in Saskatchewan, Ontario, and the Atlantic Region. The average age for participation was  $3.83 \pm 2.19$  years. The proportion of children receiving first fluoride varnish treatments was highest in Saskatchewan ( $93.5 \pm 1.9\%$ ) and Ontario ( $92.7 \pm 3.2\%$ ). The proportion of children receiving sealants was the lowest preventive service across all regions, with an average range of 6.1% to 12.5%. The number of participants receiving ART increased from 2006 to 2012 in Saskatchewan (12.2% to 33.4%) and the Atlantic Region (58.3% to 90%). There was an overall stable trend in the decayed extracted filled teeth (deft) scores with an increase in the age of children in all three regions.

**Conclusion:** With the high prevalence of dental caries and oral disease in children in remote First Nations and Inuit communities, COHI is a vital resource to increase access to preventive oral health care services. The data may not show significant decreases in deft scores. Still, the consistency of first dental screenings and the oral health preventative services offered in these communities prevent a considerable increase in deft scores.