



# Early Childhood Caries in Indigenous Communities

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The oral health of Indigenous children of Canada (First Nations, Inuit, and Métis) and the United States (American Indian and Alaska native) is a major child health disparity when compared with the general population of both countries. Early childhood caries (ECC) occurs in Indigenous children at an earlier age, with a higher prevalence, and at much greater severity than in the general population. ECC results in adverse oral health, affecting childhood health and well-being, and may result in high rates of costly surgical treatment under general anesthesia. ECC is an infectious disease that is influenced by multiple factors, but the social determinants of health are particularly important. This policy statement includes recommendations for preventive and clinical oral health care for infants, toddlers, preschool-aged children, and pregnant women by primary health care providers. It also addresses community-based health-promotion initiatives and access to dental care for Indigenous children. This policy statement encourages oral health interventions at early ages in Indigenous children, including referral to dental care for the use of sealants, interim therapeutic restorations, and silver diamine fluoride. Further community-based research on the microbiology, epidemiology, prevention, and management of ECC in Indigenous communities is also needed to reduce the dismally high rate of caries in this population.

## INTRODUCTION

Indigenous children of Canada (First Nations [FN], Inuit, and Métis) and the United States (American Indian and Alaska native [AI/AN]) face significant health disparities compared with non-Indigenous populations. The oral health disparities Indigenous children experience exemplify the inequities and major need for oral health promotion, caries prevention, and early, locally available dental care services for them. Although general guidelines on oral health promotion, caries prevention, and risk assessment exist, the severity of dental disease and the barriers to care in Indigenous communities require special consideration.

## abstract

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Early childhood caries (ECC) is defined as tooth decay in any primary tooth in a child younger than age 6 years.<sup>1</sup> Also referred to as early childhood tooth decay or baby-bottle tooth decay, the term ECC better characterizes the disease as complex and involving transmission of infectious bacteria, dietary habits, and oral hygiene. ECC is an infectious disease, with *Streptococcus mutans* being the most commonly recognized causative organism. The causative triad for caries includes cariogenic bacteria, fermentable carbohydrates, and host susceptibility (integrity of tooth enamel). Caries has been described as the most prevalent pediatric infectious disease and the most common chronic disease of children.<sup>2</sup>

Tooth loss as a result of ECC may result in malocclusion and low oral health-related quality of life.<sup>3</sup> Children with ECC are at increased risk of further caries throughout childhood and adolescence.<sup>4,5</sup> The effects of ECC go beyond the oral cavity and influence overall childhood health and well-being, which are already compromised for many Indigenous children.<sup>3,6-8</sup>

Severe early childhood caries (S-ECC) is an aggressive form of ECC and is classified by location of the caries, number of teeth affected, and age.<sup>1</sup> S-ECC commonly requires surgical treatment under general anesthesia (GA).<sup>9</sup> Children with S-ECC experience more nutritional problems, including iron-deficiency anemia, low vitamin D, and overweight or obesity. S-ECC that penetrates the tooth pulp can lead to painful dental infections or abscesses and, rarely, death.<sup>6-8,10</sup>

## ORAL HEALTH STATUS IN INDIGENOUS CHILDREN

In 2011, the prevalence of ECC in 3- to 5-year-old FN and Inuit children was 85%, and the prevalence of S-ECC was as high as 25%.<sup>11-13</sup> Oral

health surveys performed by the Indian Health Service (IHS) in 2014 revealed that 75% of AI/AN children between the ages of 3 and 5 years had ECC, and in many communities, the caries rate was >90% (5 times greater than that of the general US child population).<sup>14,15</sup> The true burden of ECC in Indigenous children is not only the disparate ECC prevalence but also the disease severity. The average number of decayed or filled teeth in AI/AN children 2 to 5 years old was 5.8, almost 5 times that of the general US preschool population.<sup>15,16</sup>

An important consequence of ECC severity is the need for dental surgery under GA.<sup>9,13,17</sup> Rehabilitative surgery is expensive and carries the potential risks of GA. Overall, the rate of dental surgery to treat ECC under GA in Canada was 7 times higher for children from communities with a high proportion of Indigenous peoples than communities with lower Indigenous populations.<sup>9,17</sup> In the more remote Indigenous regions of Canada, the rates of dental surgery under GA exceed 200 per 1000 children younger than 5 years each year, a rate 15 times higher than the overall annual Canadian rate.<sup>9,17</sup> Exact data on the overall number of AI/AN children undergoing dental surgery for caries are limited, but one study in the Yukon-Kuskokwim Delta of Alaska reported that by 6 years of age, 73% of Alaska native children had undergone dental surgery under GA, a rate at least 50 times that in the general US population.<sup>18</sup>

## EPIDEMIOLOGY OF ECC

Indigenous children often develop ECC at earlier ages than other children. The 2014 IHS Oral Health Survey reported that 21% of AI/AN 1-year-olds and 40% of AI/AN 2-year-olds had caries, whereas most dental surveys suggest ECC is rare among US children before 12 months of age, and only 10% of US children

younger than 2 years have ECC.<sup>19</sup> The etiology of ECC in Indigenous children is multifactorial. The typical “window of infectivity” for the acquisition of cariogenic microorganisms, including *S mutans*, is between 19 and 31 months. However, 2 recent studies reported that AI/AN children acquire *S mutans* at earlier ages: 37% of 12-month-olds and 60% of 16-month-olds had *S mutans* colonization.<sup>20,21</sup> Additionally, primary teeth erupt at an earlier age in AI/AN infants, which may result in earlier *S mutans* colonization and earlier progression to caries.<sup>22</sup> Authors of a recent review of caries reiterate that newly erupted teeth are much more prone to caries.<sup>23</sup> Additionally, a recent study of Canadian FN children revealed that children with S-ECC had a significantly different plaque microbiome than their caries-free counterparts, with the S-ECC group harboring higher levels of known cariogenic organisms, particularly *S mutans*.<sup>24</sup> The early acquisition of *S mutans* in Indigenous children is likely mediated by factors associated with poverty, including household crowding, family size, nutrition, and other health behaviors.<sup>25</sup> Unfortunately, Indigenous children in the United States and Canada experience poverty at rates 2 to 3 times greater than the general population. For children younger than 5 years, 52% of FN children live in poverty, as do 25% Inuit and 23% of Métis children, compared with 13% of nonracialized Canadian children.<sup>26</sup> More than 37% of AI/AN children in the United States live in poverty, compared with 10% of their white American counterparts.<sup>27</sup>

Other known ECC risk factors are commonly found in Indigenous children. Caries in parents is associated with increased risk in their infants.<sup>28</sup> ECC is also associated with prolonged bottle-feeding, consumption of sugar-containing drinks, high frequency of sugary snacks,<sup>29-33</sup> and exposure to tobacco

smoke.<sup>13,34</sup> Breastfeeding for up to 12 months of age can reduce ECC risk by half, most likely via immune-modulating effects and promotion of a healthy microbiome. Furthermore, a recent study demonstrated that breastfeeding did not provoke a decrease in biofilm pH and, therefore, did not facilitate ECC.<sup>35</sup> If the infant breastfeeds to sleep, the gums and erupting teeth should be wiped to minimize the risk of caries.<sup>36</sup> However, breastfeeding beyond 12 months of age, especially with at-will nighttime feeding, is associated with increased risk of ECC.<sup>37-39</sup> Obesity has also been shown to be associated with ECC, although it is unclear whether this risk occurs independently from dietary factors.<sup>3,10,40-42</sup> In addition, gestational diabetes, which is prevalent in Indigenous populations, may have an effect on early childhood dental development and caries risk.<sup>43-45</sup>

## PREVENTION STRATEGIES

### Prenatal Oral Health Care

ECC prevention is optimal if initiated prenatally.<sup>46</sup> Given the evidence for transmission of cariogenic bacteria from mother to child, routine dental assessments and preventive dental care, oral hygiene education, optimal prenatal nutrition, and the use of fluoride toothpaste for pregnant women are strategies that may prevent or delay ECC in their children.<sup>46</sup> Recent guidelines conclude that dental care in pregnancy is safe.<sup>47-49</sup>

### Fluoride

All major Canadian and American dental and pediatric societies endorse the use of fluorides as safe and effective for caries prevention.<sup>50-54</sup> All of the aforementioned organizations support the use of fluoridated toothpaste twice daily for all children. They recommend that children younger than 3 years have

their teeth brushed by an adult with a grain of rice-sized portion of fluoridated toothpaste and that children 3 to 6 years of age be assisted with brushing with a green pea-sized portion of fluoridated toothpaste.<sup>51,52</sup>

Community water fluoridation is safe, effective, and inexpensive and does not require daily adherence.<sup>55,56</sup> Community water fluoridation in AN communities has been associated with a 40% reduction in caries.<sup>57</sup> In North America, there is wide disparity in the access to community water fluoridation. In 2017, 38.7% of Canadians using community water supplies had access to fluoridated water, compared with only 2.3% of FN people.<sup>58</sup> Although 74.4% of US residents had access to fluoridated community water, only 50% of Alaskans received fluoridated community water, with only 5.3% receiving optimal fluoride levels.<sup>18,59</sup>

Topical fluorides have been shown to be effective in preventing caries.<sup>18,59</sup> Studies in Indigenous children in Canada and the United States have shown reduction in caries with fluoride varnish, although the results were not statistically significant.<sup>60,61</sup>

These modestly favorable results for fluoride varnish in AI/AN children are tempered by 2 larger studies with longer follow-up. First, a 5-year IHS program targeting AI/AN children initially resulted in a small decrease in ECC in children younger than 2 years, but these benefits were lost for children 2 to 5 years of age.<sup>62</sup> A second cluster-randomized controlled trial (RCT) testing 4 fluoride varnish applications (and oral health-promotion activities) by trained tribal health workers in Head Start classrooms did not yield a reduction in ECC.<sup>63</sup> These studies suggest that fluoride varnish should be initiated with the first tooth eruption in Indigenous children to achieve maximal benefit. Although the data on fluoride varnish are

mixed for Indigenous populations, fluoride varnish is still recommended because the potential benefits far outweigh any risks. Fluoride varnish applications help to enhance both the mineralization of healthy enamel (making it more resistant to caries) and the remineralization of early incipient caries lesions (ie, white spot lesions) in primary and permanent teeth that have not yet progressed to the cavitation (ie, cavity) stage. The American Dental Association still recommends fluoride varnish for all children. However, the challenge is that fluoride varnish is not effective in arresting and remineralizing more advanced lesions that have cavitated through the enamel (ie, cavities), which are known to be more prevalent in young Indigenous children. Therefore, early applications of fluoride varnish to newly erupted teeth, beginning at the eruption of the first primary tooth at the 6-month developmental age milestone, is paramount.

### Oral Health Education

Evidence surrounding the effectiveness of conducting dental examinations and provision of parental counseling to prevent ECC in preschool-aged children is mixed.<sup>60,61,64,65</sup> Studies of oral health education in Indigenous families resulted in increased parental knowledge but rarely demonstrate reduction in caries.<sup>63,66</sup> One large RCT of motivational interviewing in parents of AI preschool-aged children reported increased parent and caregiver knowledge but no reduction in ECC.<sup>63</sup> A previous Canadian RCT reported that motivational interviewing was associated with a reduction in the degree of severe caries among Cree children in northern Quebec.<sup>64</sup> Other studies suggest that oral health education for pregnant women and mothers of infants can reduce S-ECC from 32% to 20%.<sup>67-69</sup> Like the early receipt of fluoride varnish, evidence suggests that receiving oral health education at

the time of first tooth eruption is more beneficial.

### **Community-Based Strategies**

Evidence is clear that caries were rare in Indigenous communities until the introduction to European settler diets, including refined sugar and other processed foods.<sup>70-73</sup> In Canada, there are several community-based efforts to reduce ECC, some of which promote traditional Indigenous diets.<sup>74-77</sup> One program in a Cree community encourages breastfeeding and promotes the introduction of traditional first foods instead of processed infant foods.<sup>78</sup> These efforts are promising, but there are no data regarding their effects on ECC.

## **ASSESSMENT AND TREATMENT STRATEGIES**

### **Caries Risk Assessment**

Timely caries risk assessment (CRA) is an important first step to reduce the risk for ECC. Several pediatric and dental organizations have developed easy-to-use CRA tools that can identify a child's risk of developing caries.<sup>79</sup> CRAs also assist nondental primary health care providers in assessing the need for anticipatory guidance, fluoride varnish, and referral for dental evaluation.

### **Sealants**

Pit and fissure dental sealants have traditionally been used on occlusal tooth surfaces of permanent molars to reduce dental caries. Recent reviews concur that in populations at high risk of caries, such as Indigenous children, sealants can be placed on primary molars after eruption.<sup>80,81</sup> Studies suggest that 74% of sealed primary molars remain caries-free and that sealing primary molars is cost-effective in reducing caries progression and the need for operative repair.<sup>82</sup> The American Dental Association recommends sealants on primary molars and fluoride varnish every 3 to 6 months

to arrest or reverse noncavitated carious lesions on the occlusal surfaces of primary teeth.<sup>83</sup> However, dental sealants may be challenging to apply on the teeth of infants and toddlers.

### **Interim Therapeutic Restorations**

Minimally invasive dental restorative techniques, such as glass ionomer products, provide a practical option for managing cavitated lesions in young children. Interim therapeutic restorations can be used to restore and prevent caries progression in young and uncooperative children, in children with special health care requirements, and in circumstances in which the placement of traditional restorations is not possible.<sup>84</sup> Interim therapeutic restorations can be provided by midlevel dental professionals, including dental therapists (DTs) and hygienists, in many locales.

### **Silver Diamine Fluoride**

Silver diamine fluoride (SDF) has been used extensively outside North America for caries arrest, with good results.<sup>85,86</sup> SDF is indicated for the arrest of cavitated caries lesions in primary teeth as part of a comprehensive caries management program.<sup>83</sup> SDF will turn the carious lesion hard and black, but this side effect is generally well accepted by parents.<sup>87</sup> At present, the use of SDF in the United States and Canada is limited to the dental profession, because there are no formal guidelines for its use outside of dentistry.

Frank Mendoza, DDS, an IHS dentist, pioneered the use of silver ion products at a tribal health clinic for caries arrest and demonstrated that only 2% of treated patients needed eventual operative repair.<sup>19</sup> Several other IHS and tribal programs now use SDF, with positive results.<sup>88</sup> There is an emerging consensus that SDF may be an important treatment option for children at high risk for

progression to severe ECC.<sup>89</sup> If the use of SDF becomes more widespread, primary care health providers will play a critical role in identifying patients for referral and in promoting adherence to treatment. Evidence-based clinical guidelines from the American Dental Association and the American Academy of Pediatric Dentistry for nonrestorative treatment of caries recommend biannual applications of 38% SDF to arrest advanced cavitated lesions on primary teeth, with the recognition that additional applications may occasionally be necessary.<sup>90</sup>

### **Repair Under GA**

Given the prevalence and severity of ECC in Indigenous children, operative repair is often required. However, because ECC is largely preventable, each child requiring operative repair is a costly failure of our preventive and treatment systems. Operative repair is expensive, and prevention is more cost-effective, less painful, and less time-consuming for the patient.<sup>9,91</sup> Furthermore, the acute risks associated with anesthesia and the evidence that GA in young children may have potential cognitive effects are additional reasons to avoid this consequence of ECC.<sup>92,93</sup>

Authors of a cost-effectiveness review of preventive interventions such as water fluoridation, fluoride varnish, tooth brushing with fluoride toothpaste, and use of sealants concluded that these interventions are collectively relatively inexpensive and cost-saving and, if fully used, could reduce S-ECC requiring operative repair.<sup>18</sup> The major benefit of increased use of SDF is the arrest of the progression of already established caries and a subsequent reduction in the need for operative repair with GA.

## **ACCESS TO EARLY ORAL HEALTH CARE**

Severe dental workforce shortages in Indigenous communities contribute to the high rates of untreated caries in



Indigenous children. The 2014 Oral Health Survey reported the ratio of dentists per person was 1:2800 for AI/AN communities compared with the US average of 1:1500<sup>16</sup> and that 45% of 5-year-old AI/AN children had untreated caries compared with 19% of US children.<sup>15</sup>

All major Canadian and American dental and pediatric societies have called for comprehensive dental health care from dentists for children by 12 months of age: the “age-one dental visit.”<sup>94,95</sup> The chronic shortage of dentists in Indigenous communities suggests we look to expanded roles of other dental providers (eg, DTs and hygienists) and other nondental providers to increase access to oral health care, with an emphasis on preventive services.

In the 1970s, Health Canada supported the use of DTs for FN communities, and many began practice in the northern communities of Canada.<sup>96</sup> DTs are midlevel dental providers who work under the supervision of a dentist. Reviews of DTs in more than 50 countries reported that DTs expand access to dental care in a safe and effective manner.<sup>97</sup> Unfortunately, over time, an increasing number of Canadian DTs chose to work in urban settings rather than rural communities. The urban migration of DTs and the ongoing opposition by professional dental societies led the Canadian federal government to discontinue funding DT training programs in 2011.<sup>98</sup>

As Canada was reducing its support for the training of DTs, the Alaska Native Tribal Health Consortium began a dental health aide therapist (DHAT) program. The Alaska DHAT program has been linked to better oral health access and outcomes in remote villages and has been well received by health care providers and community members.<sup>99-101</sup> DHAT programs also have been

implemented in tribal clinics in the states of Washington and Minnesota. The National Indian Health Board champions the use of DHATs as a strategy to increase access to oral health and a legitimate exercise of tribal sovereignty.<sup>102</sup> The Department of Indigenous Services Canada and the Canadian Dental Hygienists Association have recently proposed the reestablishment of a training program for dental therapy that would see dental hygienists complete an extra year of education to be able to provide expanded oral health services.<sup>103</sup>

Primary care providers (pediatricians, family physicians, nurse practitioners, community health nurses, physician assistants, and dietitians) in Indigenous communities in North America are in unique positions to complement the work of dental health professionals. These nondental providers provide early and frequent care to children before they see a dental provider. In many Indigenous communities, well-infant, infant health, and immunization clinics are provided on a regular basis through community health nurses and physicians. These nondental providers have an opportunity to assess children’s risk for caries and promote oral health as part of their overall health-promotion activities. In addition, they can provide oral health screening for infants and young children, provide fluoride varnish, and coordinate referrals to dental health professionals. Moreover, because of the high rates of obesity and type 2 diabetes mellitus in Indigenous populations, Indigenous youth may undergo dietary assessments and may be seen by dietitians. These visits provide opportunities for collaboration between primary care and dentistry to encourage limited consumption of sugars, a shared risk factor for both obesity and caries.

## ORAL HEALTH RECOMMENDATIONS FOR INDIGENOUS COMMUNITIES

Caries prevention interventions that have worked well in the general population have been less effective in Indigenous children; therefore, the prevention and treatment recommendations described here should be informed by what is known of ECC epidemiology in Indigenous children. Indigenous children acquire *S mutans* colonization at an earlier age, develop caries at an earlier age, and commonly experience severe ECC. The health care community needs to recognize that “two is too late” for preventive interventions in Indigenous children to be successful and that new strategies with earlier intervention are needed to reduce this health disparity.

### Community-Based Promotion Initiatives

- Promote changes in Indigenous communities to reduce frequent consumption of sugar-containing drinks and sugary snacks through education and improved access to healthy foods in communities.
- Emphasize the importance of oral health for the pregnant woman and her infant(s) through community-based activities.
- Promote exclusive breastfeeding for the first 6 months and breastfeeding until 12 months of age.
- Ensure that Indigenous communities benefit from community water fluoridation and know the fluoridation level of their water supply.
- Promote collaboration between oral health and obesity and type 2 diabetes mellitus prevention efforts for Indigenous communities.

### Clinical Care Recommendations

- Consider early childhood oral health as an integral part of overall childhood health and well-being.

- Ensure that Indigenous women receive preconception and prenatal screening for oral health, anticipatory guidance for oral health and hygiene, and referral for dental care.
- Discuss oral health during well-child care visits with a CRA and anticipatory guidance on oral hygiene and diet, starting with the first tooth eruption.
- Recommend the establishment of a dental home by 12 months of age.
- Promote supervised twice-daily use of fluoridated toothpaste for all Indigenous children beginning with the eruption of the first tooth (rice grain-sized portion of toothpaste for children <36 months of age and a green pea-sized portion for children ≥36 months of age).
- Provide fluoride varnish by either dental or nondental health care providers in primary care settings and by trained lay workers in other settings starting with the first tooth eruption (and then every 3–6 months thereafter).
- Promote the incorporation of SDF into caries management protocols for Indigenous children with ECC to decrease or arrest caries progression and reduce or avoid the reliance on GA to facilitate operative repair.
- Consider promoting the incorporation of interim therapeutic restoration into caries management protocols.
- Consider promoting the use of sealants on primary molars to prevent caries and the need for operative repair.

### Workforce and Access

- Provide early access to dental health professionals by 12 months of age to establish a dental home with the full range of oral health–promotion and interceptive disease-prevention services.
- Consider roles that DTs, dental hygienists, and primary health care providers can assume in areas

where it is difficult to recruit and retain a sufficient number of dentists to provide early oral health services.

- Ensure that dentists, dental hygienists, DTs, and assistants working in Indigenous communities receive education to practice in a culturally appropriate manner.

### Advocacy

- Advocate for an adequate dental workforce that can include the training and use of midlevel professionals such as DTs.
- Advocate for increased representation of Indigenous people in oral health professions.
- Advocate for regular and sustained ambulatory dental care in or near Indigenous communities.

### Research

- Support further community-based participatory research on the epidemiology, prevention, management, and microbiology of ECC and ECC-prevention projects in Indigenous communities.

### RECOMMENDED RESOURCES

- American Academy of Pediatric Dentistry. *Best Practice on Fluoride Therapy*. Chicago, IL: American Academy of Pediatric Dentistry; 2018. Available at: [http://www.aapd.org/media/Policies\\_Guidelines/BP\\_FluorideTherapy.pdf](http://www.aapd.org/media/Policies_Guidelines/BP_FluorideTherapy.pdf).
- American Academy of Pediatric Dentistry. *Clinical Practice Guideline on Use of Silver Diamine Fluoride for Dental Caries Management in Children and Adolescents, Including Those with Special Health Care Needs*. Chicago, IL: American Academy of Pediatric Dentistry; 2017. Available at: [http://www.aapd.org/media/Policies\\_Guidelines/G\\_SDF.pdf](http://www.aapd.org/media/Policies_Guidelines/G_SDF.pdf).
- American Academy of Pediatric Dentistry. *Best Practice on Caries-Risk Assessment and Management for Infants, Children, and*

*Adolescents*. Chicago, IL: American Academy of Pediatric Dentistry; 2014. Available at: [http://www.aapd.org/media/Policies\\_Guidelines/BP\\_CariesRiskAssessment.pdf](http://www.aapd.org/media/Policies_Guidelines/BP_CariesRiskAssessment.pdf).

- American Academy of Pediatrics, Section on Oral Health. Protecting All Children's Teeth (PACT): a pediatric oral health training program. Available at: <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Oral-Health/Pages/Protecting-All-Childrens-Teeth.aspx>.
- American Academy of Pediatrics, Section on Oral Health. Maintaining and improving the oral health of young children. *Pediatrics*. 2014; 123(6):1224–1229. Available at: [www.pediatrics.org/cgi/doi/10.1542/peds.2014-2984](http://www.pediatrics.org/cgi/doi/10.1542/peds.2014-2984).
- American Academy of Pediatrics, Section on Oral Health. Oral Health Advocacy Toolkit. Available at: <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Oral-Health/Pages/Oral-Health-Advocacy-Toolkit.aspx>.
- American Academy of Pediatrics, Section on Oral Health. Campaign for Dental Health/Community Water Fluoridation Resource. Available at: <https://ilikemyteeth.org/>.
- American Academy of Pediatrics, Section on Oral Health. Fluoride use in caries prevention in the primary care setting. *Pediatrics*. 2014; 134(3):626–633. Available at: <http://pediatrics.aappublications.org/content/134/3/626>.
- American Academy of Pediatrics. Caries Risk Assessment Tool. Available at: [https://www.aap.org/en-us/Documents/oralhealth\\_RiskAssessmentTool.pdf](https://www.aap.org/en-us/Documents/oralhealth_RiskAssessmentTool.pdf).
- Casamassimo P, Holt K, eds; National Maternal and Child Oral Health Resource Centre. *Bright Futures in Practice: Oral Health Pocket Guide*. 3rd ed. Washington, DC: Georgetown University; 2016. Available at: <https://www>.

mchoralhealth.org/PDFs/  
BFOHPocketGuide-booklet.pdf.

- Indian Health Service. IHS Early Childhood Caries Collaborative. Available at: <https://www.ihs.gov/doh/index.cfm?fuseaction=ecc.display>.
- Oral Health and the Aboriginal Child. Knowledge transfer site. Available at: <http://oralhealth.circumpolarhealth.org>.
- Winnipeg Regional Health Authority. Early childhood tooth decay. Healthy Smile Happy Child pamphlets and other resources. Available at: <https://wrha.mb.ca/oral-health/early-childhood-tooth-decay/>.
- Smiles for Life: A National Oral Health Curriculum. Available at: <https://www.smilesforlifeoralhealth.org/buildcontent.aspx?tut=555&pagekey=62948&cbreceipt=0>.
- Canadian Caries Risk Assessment Tool (< 6 years). Available at: [http://umanitoba.ca/CRA\\_Tool\\_ENG\\_Version.pdf](http://umanitoba.ca/CRA_Tool_ENG_Version.pdf).

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#### ABBREVIATIONS

AI/AN: American Indian and Alaska native  
CRA: caries risk assessment  
DHAT: dental health aide therapist  
DT: dental therapist  
ECC: early childhood caries  
FN: First Nations  
GA: general anesthesia  
IHS: Indian Health Service  
RCT: randomized controlled trial  
SDF: silver diamine fluoride  
S-ECC: severe early childhood caries

\* The views expressed in this article/publication or information resource do not necessarily represent the positions, decisions, or policies of the First Nations and Inuit Health Branch liaisons or their organization.

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## REFERENCES

1. American Academy of Pediatric Dentistry. Policy on early childhood caries (ECC): classifications, consequences, and preventive strategies. *Pediatr Dent*. 2017;39(6): 59–61
2. US Department of Health and Human Services. *Oral Health in America: A Report of the Surgeon General*. Rockville, MD: US Department of Health and Human Services; 2000
3. Schroth RJ, Harrison RL, Moffatt ME. Oral health of indigenous children and the influence of early childhood caries on childhood health and well-being. *Pediatr Clin North Am*. 2009;56(6): 1481–1499
4. Almeida AG, Roseman MM, Sheff M, Huntington N, Hughes CV. Future caries susceptibility in children with early childhood caries following treatment under general anesthesia. *Pediatr Dent*. 2000;22(4):302–306
5. Peretz B, Ram D, Azo E, Efrat Y. Preschool caries as an indicator of future caries: a longitudinal study. *Pediatr Dent*. 2003;25(2):114–118
6. Schroth RJ, Levi JA, Sellers EA, Friel J, Kliewer E, Moffatt ME. Vitamin D status of children with severe early childhood caries: a case-control study. *BMC Pediatr*. 2013;13:174
7. Schroth RJ, Levi J, Kliewer E, Friel J, Moffatt ME. Association between iron status, iron deficiency anaemia, and severe early childhood caries: a case-control study. *BMC Pediatr*. 2013;13(1): 22
8. Deane S, Schroth RJ, Sharma A, Rodd C. Combined deficiencies of 25-hydroxyvitamin D and anemia in preschool children with severe early childhood caries: a case-control study. *Paediatr Child Health*. 2018;23(3): e40–e45
9. Schroth RJ, Quiñonez C, Shwart L, Wagar B. Treating early childhood caries under general anesthesia: a national review of Canadian data. *J Can Dent Assoc*. 2016;82:g20
10. Davidson K, Schroth RJ, Levi JA, Yaffe AB, Mittermuller BA, Sellers EAC. Higher body mass index associated with severe early childhood caries. *BMC Pediatr*. 2016;16:137
11. Health Canada. *Inuit Oral Health Survey Report 2008-2009*. Ottawa, Canada: Health Canada; 2011
12. The First Nations Information Governance C.. *Report on the Findings of the First Nations Oral Health Survey (FNOHS) 2009-10*. Ottawa, Canada: The First Nations Information Governance Centre; 2012
13. Schroth RJ, Halchuk S, Star L. Prevalence and risk factors of caregiver reported Severe Early Childhood Caries in Manitoba First Nations children: results from the RHS Phase 2 (2008-2010). *Int J Circumpolar Health*. 2013;72
14. Batliner T, Wilson AR, Tiwari T, et al. Oral health status in Navajo Nation Head Start children. *J Public Health Dent*. 2014;74(4):317–325
15. Phipps K, Ricks TL. *The Oral Health of American Indian and Alaska Native Children Aged 1-5 Years: Results of the 2014 IHS Oral Health Survey*. Rockville, MD: Indian Health Service; 2015
16. Indian Health Service. *An Oral Health Survey of American Indian and Alaska Native Dental Patients. Findings, Regional Differences and National Comparisons*. Rockville, MD: Indian Health Service; 1999
17. Canadian Institute for Health Information. *Treatment of Preventable Dental Cavities in Preschoolers: A Focus on Day Surgery Under General Anesthesia*. Ottawa, ON: Canadian Institute for Health Information; 2013
18. Thomas TK, Schroth RJ. Promising efforts to improve the oral health of indigenous children. In: 8th International Meeting on Indigenous Child Health; March 22–24, 2019; Calgary, Alberta
19. Robertson LD. The Warm Springs Model: a successful strategy for children at very high risk for dental caries. *CDA J*. 2018;46(2):8
20. Lynch DJ, Villhauer AL, Warren JJ, et al. Genotypic characterization of initial acquisition of *Streptococcus mutans* in American Indian children. *J Oral Microbiol*. 2015;7:27182



21. Warren JJ, Kramer KW, Phipps K, et al. Dental caries in a cohort of very young American Indian children. *J Public Health Dent.* 2012;72(4):265–268
22. Dawson DV, Blanchette DR, Douglass JM, et al. Evidence of early emergence of the primary dentition in a Northern Plains American Indian population. *JDR Clin Trans Res.* 2018;3(2):161–169
23. Pitts NB, Zero DT, Marsh PD, et al. Dental caries. *Nat Rev Dis Primers.* 2017;3:17030
24. Agnello M, Marques J, Cen L, et al. Microbiome associated with severe caries in Canadian First Nations children. *J Dent Res.* 2017;96(12):1378–1385
25. Gibson S, Williams S. Dental caries in pre-school children: associations with social class, toothbrushing habit and consumption of sugars and sugar-containing foods. Further analysis of data from the National Diet and Nutrition Survey of children aged 1.5–4.5 years. *Caries Res.* 1999;33(2):101–113
26. Macdonald D, Wilson D. *Shameful Neglect. Indigenous Child Poverty in Canada.* Ottawa, Canada: Canadian Centre for Policy Alternatives; 2016
27. US Census Bureau. American Community Survey, poverty status in past 12 months by sex and age. Available at: <https://www.census.gov/aacs/www/data/data-tables-and-tools/american-factfinder/>. Accessed April 15, 2021
28. Mattila ML, Rautava P, Sillanpää M, Paunio P. Caries in five-year-old children and associations with family-related factors. *J Dent Res.* 2000;79(3):875–881
29. Smith PJ, Moffatt ME. Baby-bottle tooth decay: are we on the right track? *Int J Circumpolar Health.* 1998;57(suppl 1):155–162
30. Lawrence HP, Romanetz M, Rutherford I, Cappel L, Binguis D, Rodgers JB. Effects of a community-based prenatal nutrition program on the oral health of Aboriginal preschool children in northern Ontario. *Probe.* 2004;38(4):172–190
31. Tsubouchi J, Tsubouchi M, Maynard RJ, Domoto PK, Weinstein P. A study of dental caries and risk factors among Native American infants. *ASDC J Dent Child.* 1995;62(4):285–287
32. Weinstein P, Troyer R, Jacobi D, Moccasin M. Dental experiences and parenting practices of Native American mothers and caretakers: what we can learn for the prevention of baby bottle tooth decay. *ASDC J Dent Child.* 1999;66(2):120–126, 85
33. Schroth RJ, Smith PJ, Whalen JC, Lekic C, Moffatt ME. Prevalence of caries among preschool-aged children in a northern Manitoba community. *J Can Dent Assoc.* 2005;71(1):27
34. Aligne CA, Moss ME, Auinger P, Weitzman M. Association of pediatric dental caries with passive smoking. *JAMA.* 2003;289(10):1258–1264
35. Neves PA, Ribeiro CC, Tenuta LM, et al. Breastfeeding, dental biofilm acidogenicity, and early childhood caries. *Caries Res.* 2016;50(3):319–324
36. Wong JP, Venu I, Moodie RG, et al. Keeping caries at bay in breastfeeding babies. *J Fam Pract.* 2019;68(3):E1–E4
37. Tham R, Bowatte G, Dharmage SC, et al. Breastfeeding and the risk of dental caries: a systematic review and meta-analysis. *Acta Paediatr.* 2015;104(467):62–84
38. American Dental Association. Statement on early childhood caries. 2000. Available at: <https://www.ada.org/en/about-the-ada/ada-positions-policies-and-statements/statement-on-early-childhood-caries>. Accessed February 7, 2020
39. Wong PD, Birken CS, Parkin PC, et al.; TARGet Kids! Collaboration. Total breastfeeding duration and dental caries in healthy urban children. *Acad Pediatr.* 2017;17(3):310–315
40. Hooley M, Skouteris H, Boganan C, Satur J, Kilpatrick N. Body mass index and dental caries in children and adolescents: a systematic review of literature published 2004 to 2011. *Syst Rev.* 2012;1:57
41. Li LW, Wong HM, Peng SM, McGrath CP. Anthropometric measurements and dental caries in children: a systematic review of longitudinal studies. *Adv Nutr.* 2015;6(1):52–63
42. Vázquez-Nava F, Vázquez-Rodríguez EM, Saldívar-González AH, Lin-Ochoa D, Martínez-Perales GM, Joffre-Velázquez VM. Association between obesity and dental caries in a group of preschool children in Mexico. *J Public Health Dent.* 2010;70(2):124–130
43. Boone MR, Hartsfield JK, Avery DR, Dean JA, Sanders BJ, Ward RE. Maternal diabetes and its effect on dental development [abstract]. *Int J Paediatr Dent.* 2003;13(suppl 1):29
44. Grahnen H, Edlund K. Maternal diabetes and changes in the hard tissues of primary teeth. I. A clinical study. *Odontol Revy.* 1967;18(2):157–162
45. Grahnen H, Möller EB, Bergstrom AL. Maternal diabetes and changes in the hard tissues of primary teeth. 2. A further clinical study. *Caries Res.* 1968;2(4):333–337
46. American Academy of Pediatric Dentistry. Perinatal and infant oral health care. 2016. Available at: [www.aapd.org/media/Policies\\_Guidelines/BP\\_PerinatalOralHealthCare.pdf](http://www.aapd.org/media/Policies_Guidelines/BP_PerinatalOralHealthCare.pdf). Accessed February 7, 2020
47. California Dental Association Foundation. *Oral Health During Pregnancy & Early Childhood. Evidence-Based Guidelines for Health Professionals.* Sacramento, CA: California Dental Association Foundation; 2010
48. Oral Health Care During Pregnancy Expert W. *Oral Health Care During Pregnancy: A National Consensus Statement.* Washington, DC: National Maternal and Child Oral Health Resource Centre; 2012
49. New York State Department of Health. *Oral Health Care During Pregnancy and Early Childhood: Practice Guidelines.* Albany, NY: New York State Department of Health; 2006
50. American Dental Association. ADA fluoridation policy. American Dental Association supports fluoridation. 2018. Available at: <https://www.ada.org/en/public-programs/advocating-for-the-public/fluoride-and-fluoridation/ada-fluoridation-policy>. Accessed February 7, 2020
51. American Academy of Pediatric Dentistry. Policy on use of fluoride. 2018. Available at: [www.aapd.org/media/Policies\\_Guidelines/P\\_FluorideUse.pdf](http://www.aapd.org/media/Policies_Guidelines/P_FluorideUse.pdf). Accessed February 7, 2020
52. Canadian Dental Association. CDA position fluoride. 2012. Available at:

- www.cda-adc.ca/en/about/position\_statements/fluoride/. Accessed February 7, 2020
53. Section on Pediatric Dentistry and Oral Health. Preventive oral health intervention for pediatricians. *Pediatrics*. 2008;122(6):1387–1394
  54. Godel J. The use of fluoride in infants and children. *Paediatr Child Health*. 2002;7(8):569–582
  55. Riley JC, Lennon MA, Ellwood RP. The effect of water fluoridation and social inequalities on dental caries in 5-year-old children. *Int J Epidemiol*. 1999;28(2):300–305
  56. McLaren L, Emery JC. Drinking water fluoridation and oral health inequities in Canadian children. *Can J Public Health*. 2012;103(7, suppl 1):eS49–eS56
  57. Centers for Disease Control and Prevention (CDC). Dental caries in rural Alaska Native children—Alaska, 2008. *MMWR Morb Mortal Wkly Rep*. 2011;60(37):1275–1278
  58. Public Health Agency of Canada. *The State of Community Water Fluoridation Across Canada*. Ottawa, Canada: Public Health Agency of Canada; 2017
  59. Alaska Department of Health and Social Services. *Complete Health Indicator Report of Water - Fluoridated Drinking Water (HA2020 Leading Health Indicator: 20)*. Anchorage, AK: Alaska Department of Health and Social Services; 2018
  60. Petti S. Why guidelines for early childhood caries prevention could be ineffective amongst children at high risk. *J Dent*. 2010;38(12):946–955
  61. Garcia R, Borrelli B, Dhar V, et al. Progress in early childhood caries and opportunities in research, policy, and clinical management. *Pediatr Dent*. 2015;37(3):294–299
  62. Ricks TL, Phipps KR, Bruerd B. The Indian Health Service Early Childhood Caries Collaborative: a five-year summary. *Pediatr Dent*. 2015;37(3):275–280
  63. Braun PA, Quissell DO, Henderson WG, et al. A cluster-randomized, community-based, tribally delivered oral health promotion trial in Navajo Head Start children. *J Dent Res*. 2016;95(11):1237–1244
  64. Harrison RL, Veronneau J, Leroux B. Effectiveness of maternal counseling in reducing caries in Cree children. *J Dent Res*. 2012;91(11):1032–1037
  65. Ismail AI, Ondersma S, Jedele JM, Little RJ, Lepkowski JM. Evaluation of a brief tailored motivational intervention to prevent early childhood caries. *Community Dent Oral Epidemiol*. 2011;39(5):433–448
  66. Naidu R, Nunn J, Irwin JD. The effect of motivational interviewing on oral healthcare knowledge, attitudes and behaviour of parents and caregivers of preschool children: an exploratory cluster randomised controlled study. *BMC Oral Health*. 2015;15:101
  67. Feldens CA, Giugliani ER, Duncan BB, Drachler ML, Vitolo MR. Long-term effectiveness of a nutritional program in reducing early childhood caries: a randomized trial. *Community Dent Oral Epidemiol*. 2010;38(4):324–332
  68. Kay E, Locker D. A systematic review of the effectiveness of health promotion aimed at improving oral health. *Community Dent Health*. 1998;15(3):132–144
  69. Bader JD, Rozier RG, Lohr KN, Frame PS. Physicians' roles in preventing dental caries in preschool children: a summary of the evidence for the U.S. Preventive Services Task Force. *Am J Prev Med*. 2004;26(4):315–325
  70. Steggerda MH, Hill TJ. Incidence of dental caries among Maya and Navajo Indians. *J Dent Res*. 1935;15(5):10
  71. Collins H. Caries and crowding of teeth of the living Alaska Eskimo. *Am J Phys Anthropol*. 1932;16(4):12
  72. Parfitt GJ. A survey of the oral health of Navajo Indian children. *Arch Oral Biol*. 1960;1:193–205
  73. Levin A, Sokal-Gutierrez K, Hargrave A, Funsch E, Hoeft KS. Maintaining traditions: a qualitative study of early childhood caries risk and protective factors in an indigenous community. *Int J Environ Res Public Health*. 2017;14(8):e907
  74. Harrison R, White L. A community-based approach to infant and child oral health promotion in a British Columbia First Nations community. *Can J Community Dent*. 1997;12:7–14
  75. Harrison RL, MacNab AJ, Duffy DJ, Benton DH. Brighter Smiles: service learning, inter-professional collaboration and health promotion in a First Nations community. *Can J Public Health*. 2006;97(3):237–240
  76. Schroth RJ, Edwards JM, Brothwell DJ, et al. Evaluating the impact of a community developed collaborative project for the prevention of early childhood caries: the Healthy Smile Happy Child project. *Rural Remote Health*. 2015;15(4):3566
  77. Schroth RJ, Wilson A, Prowse S, et al. Looking back to move forward: understanding service provider, parent, and caregiver views on early childhood oral health promotion in Manitoba, Canada. *Can J Dent Hyg*. 2014;48(3):99–108
  78. Cidro J, Zahayko L, Lawrence H, McGregor M, McKay K. Traditional and cultural approaches to childrearing: preventing early childhood caries in Norway House Cree Nation, Manitoba. *Rural Remote Health*. 2014;14(4):2968
  79. American Academy of Pediatric Dentistry. Caries-Risk Assessment and Management for Infants, Children, and Adolescents. In: *The Reference Manual of Pediatric Dentistry*. Chicago, IL: American Academy of Pediatric Dentistry; 2020:243–247
  80. Azarpazhooh A, Main PA. Pit and fissure sealants in the prevention of dental caries in children and adolescents: a systematic review. *J Can Dent Assoc*. 2008;74(2):171–177
  81. Beauchamp J, Caufield PW, Crall JJ, et al.; American Dental Association Council on Scientific Affairs. Evidence-based clinical recommendations for the use of pit-and-fissure sealants: a report of the American Dental Association Council on Scientific Affairs. *J Am Dent Assoc*. 2008;139(3):257–268
  82. Akinlotan M, Chen B, Fontanilla TM, Chen A, Fan VY. Economic evaluation of dental sealants: a systematic literature review. *Community Dent Oral Epidemiol*. 2018;46(1):38–46
  83. Slayton RL, Urquhart O, Araujo MWB, et al. Evidence-based clinical practice guideline on nonrestorative treatments for carious lesions: a report from the American Dental Association. *J Am Dent Assoc*. 2018;149(10):837–849.e19

84. American Academy of Pediatric Dentistry. Policy on interim therapeutic restorations (ITR). *Pediatr Dent*. 2018; 40(6):58–59
85. Rosenblatt A, Stamford TC, Niederman R. Silver diamine fluoride: a caries “silver-fluoride bullet”. *J Dent Res*. 2009; 88(2):116–125
86. Peng JJ, Botelho MG, Matinlinna JP. Silver compounds used in dentistry for caries management: a review. *J Dent*. 2012;40(7):531–541
87. Clemens J, Gold J, Chaffin J. Effect and acceptance of silver diamine fluoride treatment on dental caries in primary teeth. *J Public Health Dent*. 2018;78(1): 63–68
88. Robertson LD. *Early Childhood Caries in American Indian Children: Looking Beyond the Usual Causes*. Ottawa, Canada: Canadian Dental Association; 2018
89. Horst JA, Ellenikiotis H, Milgrom PL. UCSF protocol for caries arrest using silver diamine fluoride: rationale, indications and consent. *J Calif Dent Assoc*. 2016;44(1):16–28
90. Crystal YO, Marghalani AA, Ureles SD, et al. Use of silver diamine fluoride for dental caries management in children and adolescents, including those with special health care needs. *Pediatr Dent*. 2017;39(5):135–145
91. Schroth RJ, Morey B. Providing timely dental treatment for young children under general anesthesia is a government priority. *J Can Dent Assoc*. 2007;73(3):241–243
92. Casamassimo PS, Hammersmith K, Gross EL, Amini H. Infant oral health: an emerging dental public health measure. *Dent Clin North Am*. 2018;62(2):235–244
93. Lee H, Milgrom P, Huebner GE, et al. Ethics rounds: death after pediatric dental anesthesia: an avoidable tragedy? *Pediatrics*. 2017;140(6): e20172370
94. Canadian Dental Association. CDA position on first visit to the dentist. 2012. Available at: [www.cda-adc.ca/\\_files/position\\_statements/firstVisit.pdf](http://www.cda-adc.ca/_files/position_statements/firstVisit.pdf). Accessed January 7, 2020
95. Hale KJ; American Academy of Pediatrics Section on Pediatric Dentistry. Oral health risk assessment timing and establishment of the dental home. *Pediatrics*. 2003;111(5 pt 1): 1113–1116
96. Canada H. *First Nations and Inuit Health Program Compendium 2011/2012*. Ottawa, Canada: Health Canada; 2012
97. Nash DA, Friedman JW, Mathu-Muju KR, et al. A review of the global literature on dental therapists. *Community Dent Oral Epidemiol*. 2014;42(1):1–10
98. Leck V, Randall GE. The rise and fall of dental therapy in Canada: a policy analysis and assessment of equity of access to oral health care for Inuit and First Nations communities. *Int J Equity Health*. 2017;16(1):131
99. Chi DL, Lenaker D, Mancl L, Dunbar M, Babb M. *Dental Utilization for Communities Served by Dental Therapists in Alaska’s Yukon Kuskokwim Delta: Finding from an Observational Quantitative Study*. Seattle, WA: University of Washington; 2017
100. Chi DL, Lenaker D, Mancl L, Dunbar M, Babb M. Dental therapists linked to improved dental outcomes for Alaska Native communities in the Yukon-Kuskokwim Delta. *J Public Health Dent*. 2018;78(2):175–182
101. Chi DL, Hopkins S, Zahlis E, et al. Provider and community perspectives of dental therapists in Alaska’s Yukon-Kuskokwim Delta: a qualitative programme evaluation. *Community Dent Oral Epidemiol*. 2019;47(6):502–512
102. Gladoosby BS. Indian Country leads national movement to knock down barriers to oral health equity. *Am J Public Health*. 2017;107(S1):S81–S84
103. Canadian Dental Hygienists Association. *The Canadian Dental Hygienists Association 2017-2018 Annual Report*. Ottawa, Canada: Canadian Dental Hygienists Association; 2018

## Early Childhood Caries in Indigenous Communities

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