

The Oral Health of American Indian and Alaska Native Children Aged 6-9 Years A Follow-up Report to the 2017 Survey

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Key Findings

1. The lack of regular dental care during the COVID-19 Pandemic may have led to an increase in oral health issues among American Indian and Alaska Native (AI/AN) children. Compared to 2017, fewer AI/AN dental patients have protective dental sealants on permanent molars, and more are experiencing oral pain or infection.
2. Oral health disparities continue to be a significant issue. Compared to other racial/ethnic groups, AI/AN children have the highest rates of tooth decay and untreated dental problems.
3. Although the COVID-19 Pandemic likely reduced access to protective dental sealants through clinic- and school-based programs, AI/AN children continue to have higher rates of sealants compared to the general U.S. population.

Introduction

It is well documented that American Indian and Alaska Native (AI/AN) children suffer disproportionately from dental caries (tooth decay). At the age of 2, about 40 percent of AI/AN children have already experienced tooth decay, and by the age of 5, this number rises to 80 percent.¹ For children aged 1 to 5 years, decay occurs in the primary (baby) teeth. Permanent (adult) teeth start to appear in the mouth at about 6 years of age, and these teeth must last a lifetime.

Monitoring the oral health of school-aged children as they acquire permanent teeth is critical for

promoting good oral hygiene habits, identifying and addressing early dental issues, and contributing to the overall health and well-being of students. In addition, monitoring the oral health of this age group is important because evidence suggests that children who experience poor oral health tend to exhibit lower academic performance, and the occurrence of school absences due to dental pain has a detrimental impact on academic achievement.^{2 3 4}

The 2023 IHS Oral Health Survey is the third look at the oral health status of AI/AN dental patients aged 6 to 9 years served by IHS, Tribal, and Urban Indian

Future Implications for Oral Health Surveillance

- Monitoring the oral health of AI/AN children aged 6-9 years through school-based surveys is time consuming and labor intensive. Given staff shortages and the reluctance of schools to participate in non-educational activities, school-based surveys may no longer be a viable option for monitoring the oral health of AI/AN school-aged children.
- Based on the results our surveys, dental clinic-based surveillance may overestimate the percentage of children with untreated decay and the percentage with dental sealants. Regardless, it is a viable method for monitoring trends in the oral health of AI/AN children living in or near Tribal communities.



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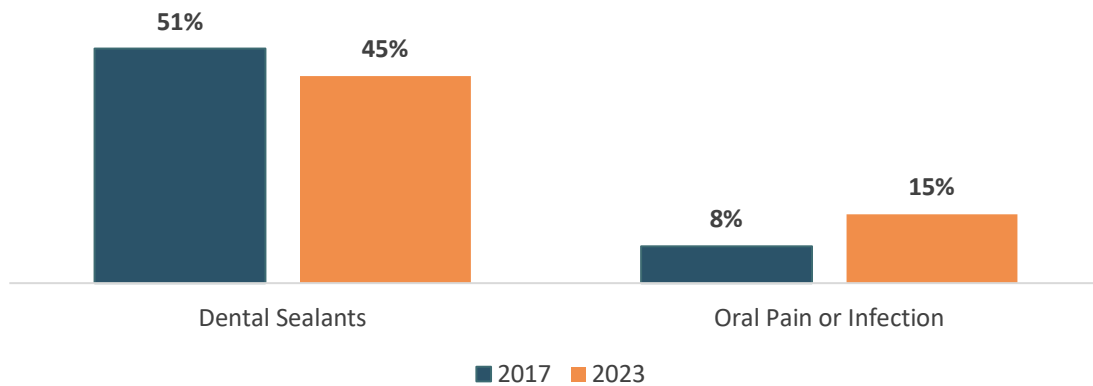
Organization (I/T/U) clinics. Previous surveys were conducted in 1999 and 2017. For the 2023 survey, 39 IHS service units screened 2,369 dental clinic patients between 6 to 9 years of age. In addition to the clinic-based survey, 3,399 AI/AN school children in kindergarten, first, second, and third grade were screened at 58 public, private, or Bureau of Indian Education (BIE) schools in 13 states. Of these, 2,943 were aged 6 to 9 years.

This data brief presents information on the prevalence of dental caries in the primary and

permanent teeth of AI/AN children; describes the prevalence of dental sealants, a plastic-like coating applied to the chewing surfaces of teeth to prevent tooth decay; assesses trends over time; and compares the oral health of AI/AN children to the general U.S. population and other racial/ethnic groups. The results of the 2023 oral health survey are presented as three key findings along with implications for future oral health surveillance activities.

Key Finding 1: The lack of regular dental care during the COVID-19 Pandemic may have led to an increase in oral health issues among AI/AN children. Compared to 2017, fewer AI/AN dental patients have protective dental sealants on permanent molars, and more are experiencing oral pain or infection.

Figure 1: Percentage of AI/AN Dental Patients Aged 6-9 years with Dental Sealants on Permanent Molars and Percentage Needing Urgent Dental Care Because of Oral Pain or Infection, 2017 vs. 2023.



On March 11, 2020, the World Health Organization declared the global spread of coronavirus disease 2019 (COVID-19) a pandemic and five days later the American Dental Association recommended that dental practices postpone elective dental procedures and provide emergency-only dental services. As a result, access to clinic-based dental care substantially decreased. In addition, many schools used virtual or hybrid learning throughout both the 2019-2020 and 2020-2021 school years, resulting in the inability to provide school-based oral

health services. Although schools reopened for the 2021-2022 school year, the backlog of learning caused by the disruptions of the COVID-19 Pandemic and other pressures resulted in a reluctance by schools to participate in non-educational activities such as school-based oral health programs.

One of the key preventive measures for dental health is the application of dental sealants on permanent molars. Dental sealants are a protective coating applied to the chewing surfaces of the back



teeth to prevent tooth decay. They create a barrier that helps shield the teeth from bacteria and food particles that can lead to cavities. However, due to restricted access to dental services during the COVID -19 Pandemic, fewer AI/AN children have been able to receive dental sealants. In 2017, 51 percent of school-aged dental patients had sealants compared to only 45 percent in 2023.

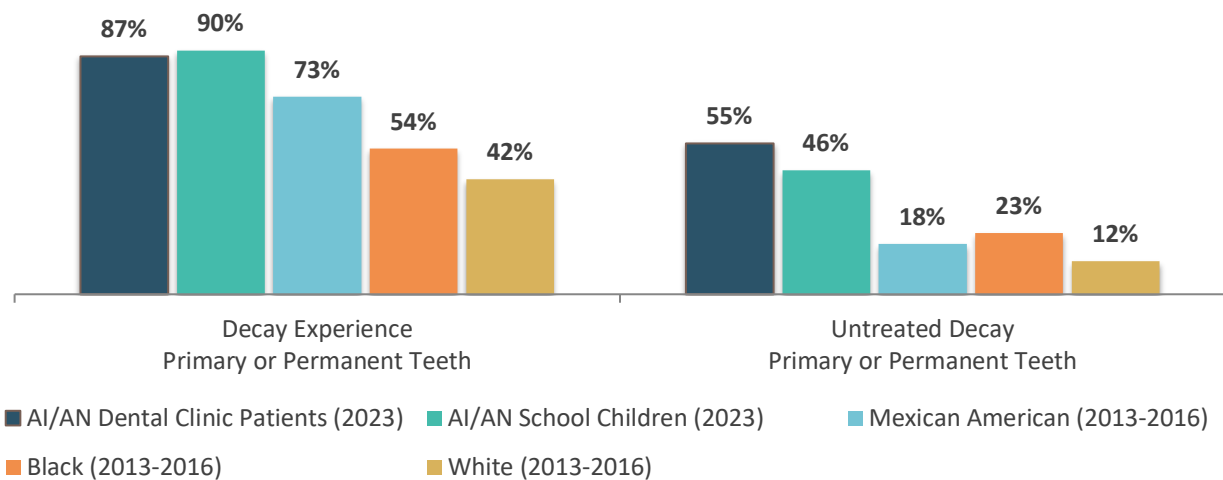
Lack of regular dental care and delayed or canceled appointments during the pandemic may have led to an increase in oral health issues among AI/AN children. Oral pain or infection is one of the

significant consequences of limited access to dental care. Without timely treatment, dental problems can progress, leading to discomfort, infection, and potentially more severe oral health issues. In 2023, 15 percent of the dental patients seen at the participating I/T/U clinics needed urgent dental care because of pain or infection, significantly higher ($p < 0.05$) than the percentage with pain or infection in 2017 (8 percent).⁵

The COVID-19 Pandemic may have exacerbated oral health disparities among the AI/AN community.

Key Finding 2: Oral health disparities continue to be a significant issue. Compared to other racial/ethnic groups, AI/AN children have the highest rates of tooth decay and untreated dental problems.

Figure 2: Percentage of Children Aged 6-9 Years with Decay Experience and Untreated Decay by Race/Ethnicity.



AI/AN children aged 6 to 9 years have a substantially higher prevalence of decay experience and untreated caries compared to similarly aged children from other racial/ethnic groups (Figure 2).⁶ Compared to U.S. Whites, AI/AN school children are more than twice as likely to have decay experience (42 percent vs. 90 percent respectively) and almost four times more likely to have untreated tooth decay

(12 percent vs. 46 percent respectively). When compared to Black children, the racial group with the second highest prevalence of untreated decay, AI/AN children are twice as likely to have untreated decay (23 percent vs. 46 percent respectively).

Social determinants of health play a crucial role in oral health disparities. The AI/AN populations,



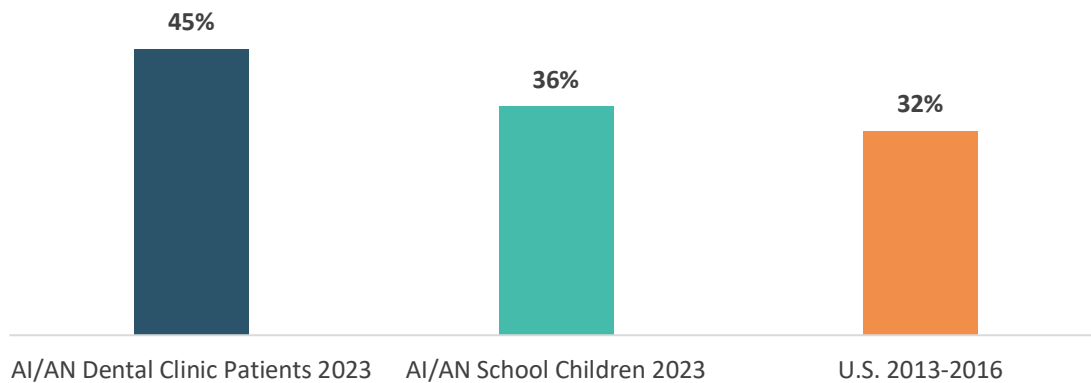
particularly those living in rural or remote areas, often experience higher poverty rates and limited access to dental providers. This lack of access to dental care can result in delayed treatment and preventive services, leading to higher rates of untreated tooth decay.

Addressing oral health disparities among AI/AN children requires a multifaceted approach. Efforts should focus on improving access to affordable and

culturally appropriate dental care services, increasing oral health education and awareness within the community, and addressing systemic factors that contribute to disparities. Collaborative efforts between Tribal communities, healthcare providers, policymakers, and oral health organizations are essential for implementing effective strategies to reduce these disparities and improve oral health outcomes for AI/AN children.

Key Finding 3: Although the COVID-19 Pandemic likely reduced access to protective dental sealants through clinic- and school-based programs, AI/AN children continue to have higher rates of sealants compared to the general U.S. population.

Figure 3: Percentage of Children Aged 6-9 Years with Protective Dental Sealants on Permanent Molars, AI/AN Children (2023) Compared to the General U.S. Population (2013-2016).



Dental sealants are a proven and cost-effective preventive measure that can significantly reduce the incidence of dental caries. The process of applying sealants is quick, painless, and non-invasive. Once applied, sealants provide a protective barrier that blocks out bacteria and food particles from the crevices of the teeth, reducing the risk of decay. Dental sealants can be applied by dentists, dental therapists, dental hygienists, and expanded function dental assistants in both traditional dental clinics and community-based settings such as schools.

School-based dental sealant programs play a crucial role in promoting oral health and

preventing dental decay among children. These programs provide a convenient and accessible way to deliver preventive dental care to students, particularly those who may have limited access to dental services. Indian Health Service and Tribal programs emphasize the importance of school-based programs as one way to improve the oral health of AI/AN children.

Many school-based programs, however, were put on hiatus during the COVID-19 Pandemic and efforts must be made to work with schools and school districts to reinstate this valuable service in Tribal communities.



Future Implication 1: Monitoring the oral health of AI/AN children aged 6 to 9 years through school-based surveys is time consuming and labor intensive. Given staff shortages and the reluctance of schools to participate in non-educational activities, school-based surveys may no longer be a viable option for monitoring the oral health of AI/AN school-aged children.

Collecting oral health status data from a representative sample of schools is the gold standard for monitoring the oral health of elementary school children. For oral health data to be posted on the Centers for Disease Control and Prevention (CDC) [oral health data portal](#), it must be from a probability sample of schools that is representative of the population of interest. School-based surveys, however, can be labor-intensive and challenging to conduct, especially in the context of staffing shortages faced at many I/T/U dental clinics. In addition, many schools are reluctant to participate in activities, including beneficial oral health surveys, because of the backlog of learning caused by the disruptions of the COVID-19 Pandemic and other pressures such as required hours of classroom

instruction. This was evident in our recent school-based survey. In 2023, only 35 of the 70 sampled schools participated, a 50 percent response rate. This response rate is substantially lower than the school response rate in our 2017 survey, 83 percent.

For the foreseeable future, schools will be focused on addressing educational needs and catching up on missed instruction time, which may lead them to prioritize academic activities over participating in surveys. Given these challenges, alternative approaches or strategies need to be considered to gather data for monitoring the oral health of AI/AN children.

Future Implication 2: Based on the results of our surveys, dental clinic-based surveillance may overestimate the percentage of children with untreated decay and the percentage with sealants on permanent molars. Regardless, it is a viable method for monitoring trends in the oral health of AI/AN children living in or near tribal communities.

Figure 4: Percentage of AI/AN Dental Clinic Patients and School Children Aged 6-9 Years with Decay Experience, Untreated Decay, and Dental Sealants, 2017 and 2023.

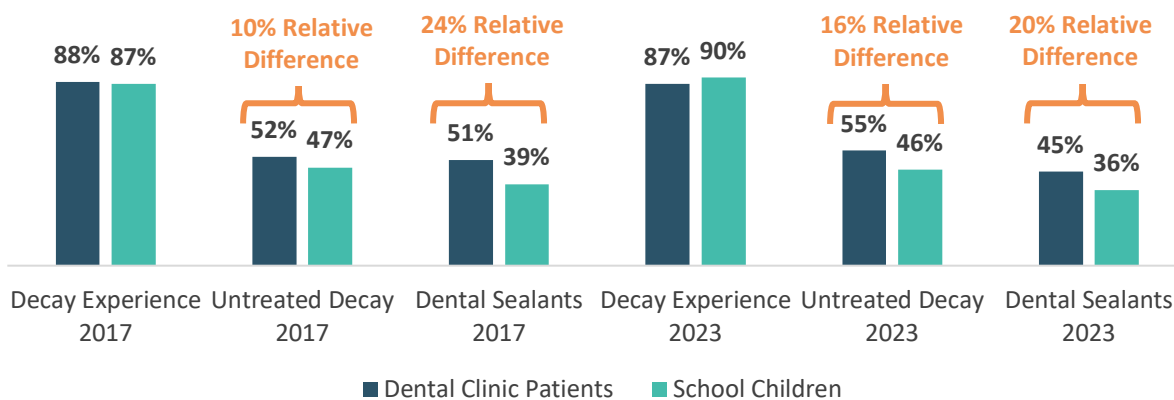


Figure 4 compares the percentage of children with decay experience, untreated decay, and dental sealants based on data from our 2017 and 2023 clinic- and school-based surveys. The percentage of children with decay experience was similar across both survey years and survey populations.

As previously mentioned, the gold standard for monitoring the oral health of school-aged children is a survey of children from a representative sample of schools. Our 2017 and 2023 school-based surveys screened children from a representative sample of public, private, and Bureau of Indian Education schools with at least 50 percent of enrolled children being AI/AN (40 percent in California and Oklahoma).

If we consider estimates from our school-based surveys to be the most accurate estimate of the oral health of AI/AN children living in or near Tribal communities, then clinic-based surveys appear to overestimate the prevalence of untreated decay by

about 10 to 15 percent and the prevalence of dental sealants by about 20 to 25 percent.

Given the previously described challenges associated with school-based surveys, and our knowledge of approximate overestimation, clinic-based surveys may be a viable method for monitoring trends in the oral health of AI/AN children living in or near Tribal communities. There are many benefits to using clinic-based surveys or electronic dental records (EDR) for monitoring oral health including accessible and comprehensive data along with the ability to monitor an individual's oral health over time.

While clinic-based surveillance has several benefits, it's essential to consider the limitations. First, only 290 out of 364 I/T/U dental programs use the IHS EDR. Second, within programs that use the IHS EDR, programs must turn on a separate survey tool to collect surveillance data and they must send aggregate information to a central location.

Data Source and Methods

This data brief is based on data from the 2022-2023 IHS oral health survey of AI/AN children. The survey sampled two different population groups – (1) elementary school students in kindergarten, first, second, and third grade and (2) patients aged 6 to 9 years seeking care at I/T/U dental clinics. Data from the [National Center for Education Statistics' Elementary/Secondary Information System](#) were used to develop the sampling frame for the school portion of the survey. All schools overseen by the BIE plus public and private schools where at least 50 percent of the enrolled children were AI/AN (≥ 40 percent for schools in California and Oklahoma) were included in the sampling frame. The sampling frame represents approximately 37 percent of all AI/AN children in BIE, public and private schools. The sampling frame was ordered by school type (BIE, public, private) and state. A systematic probability

proportional to size sampling scheme was used to select a national level sample – 70 schools in 18 states. Several clinics opted to screen additional schools and some clinics were unable to screen their assigned school(s). This brief includes data from 58 schools in 13 states representing 35 of the 70 sampling intervals (50 percent response rate).

For the dental clinic portion of the survey, the 2019 IHS user population was used to select a national level sample of service units. The 2019, rather than the 2021 user population estimates were used because of the decreased use of the IHS system during COVID-19. A service unit is how the IHS divides its services and can consist of more than one dental clinic. In 2019, there were 136 service units with a user population of 100 or more AI/AN children aged 5 to 9 years of age. Of these, 129 had a dental



clinic. The sampling frame was ordered by IHS Area and service unit number. A systematic probability proportional to size sampling scheme was used to select 44 service units. For a variety of reasons, some of the selected service units were unable to participate. Data is available for 36 of the 44 service units (82 percent response rate). Three additional service units volunteered to participate resulting in 39 service units. For the 39 participating service units, data was obtained at 45 different I/T/U dental clinics.

The following information was collected for each child: age, race, untreated decay, treated decay, rampant decay (no/yes), dental sealants on permanent molars (no/yes), and urgency of need for dental care (none, early, urgent). Race was recorded as AI/AN or other. Untreated and treated decay were recorded as none, primary teeth only, primary and permanent teeth, or permanent teeth only. Rampant decay was defined as having treated and/or untreated decay on seven or more teeth. Previous IHS surveys recorded the status of each tooth and estimates for the prevalence of dental sealants were limited to children with at least one permanent molar. The 2023 survey did not collect data on the presence of permanent molars so the denominator for dental sealants is all children screened. When comparing 2023 to 2017, 2017 data were reanalyzed to use all children as the denominator. For this reason, 2017 dental sealant estimates in this report do not match the dental sealant estimates in the 2017 report.

We used the *Basic Screening Survey* clinical indicator definitions and data collection protocols.⁷ Examiners included dentists, dental hygienists, and dental therapists employed by I/T/U programs. Examiners were required to view an examiner training webinar; no formal calibration was undertaken, and examiner reliability was not assessed. Screenings were completed using dental mirrors and an external light

source. Examiners collected data using paper forms which were forwarded to a central location by email or mail.

All statistical analyses were performed using the complex survey procedures within Statistical Analysis Software (Version 9.4; SAS Institute Inc., Cary, NC) and only children classified as AI/AN were included in the analyses. Clinic data were adjusted to the population and age distribution within each IHS Area while school data were adjusted to represent the AI/AN kindergarten to third grade enrollment within each IHS Area/Region (the Albuquerque, Navajo, Phoenix, and Tucson Areas were combined into one region).

Limitations

The sampling strategy for the school portion of the survey was based on grade rather than age; therefore, children between 6 to 9 years of age in the participating schools were not screened if they were in grades other than kindergarten through third grade. Because 9-year-olds may be in fourth grade, the school survey may underrepresent 9-year-old children. The 2023 survey was designed to obtain national, rather than IHS Area estimates; therefore, IHS Area specific data is not presented. It should also be noted that this survey was completed after the onset of the COVID-19 Pandemic while all national data were collected prior to the COVID-19 Pandemic.

Definitions

- Dental caries experience: Refers to having untreated decay or a dental filling, crown, or other type of restorative treatment such as silver ion antimicrobial. Also includes teeth that were extracted because of tooth decay.
- Dental sealants: Describes plastic-like coatings applied to the chewing surfaces of back teeth. The applied sealant resin bonds into the grooves of teeth to form a protective physical barrier.



- Rampant decay: Refers to having untreated or treated decay on seven or more teeth.
- Untreated dental caries: Describes dental cavities or tooth decay that have not received appropriate treatment.

Acronyms

- AI/AN: American Indian or Alaska Native
- BIE: Bureau of Indian Education
- CDC: Centers for Disease Control and Prevention
- EDR: Electronic Dental Record
- IHS: Indian Health Service
- I/T/U: IHS, Tribal and Urban Indian Programs

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Data Tables

Table 1: Number of AI/AN *dental clinic patients* screened by IHS area and age group, 2023 (unweighted).

IHS Area	6 Years	7 Years	8 Years	9 Years	Total
Alaska	77	69	64	68	278
Albuquerque	29	37	38	39	143
Bemidji	39	45	47	45	176
Billings	32	25	39	28	124
California	32	24	20	27	103
Great Plains	17	13	18	19	67
Nashville	39	42	29	26	136
Navajo	85	91	87	90	353
Oklahoma City	131	139	136	128	534
Phoenix-Tucson	70	76	69	76	291
Portland	40	41	39	44	164
TOTAL	591	602	586	590	2,369

Table 2: Percentage of AI/AN *dental clinic patients* with decay experience, untreated decay, and dental sealants in their primary and/or permanent teeth plus percentage with a history of rampant decay and percentage needing urgent dental care because of pain or infection by age group, 2023.

Dentition	6-8 Year Olds			6-9 Year Olds		
	Percent	Lower 95% CL	Upper 95% CL	Percent	Lower 95% CL	Upper 95% CL
Primary teeth						
Decay experience	85.8	81.8	89.9	84.5	80.3	88.7
Untreated decay	49.4	42.6	56.2	46.6	40.4	52.8
Permanent teeth						
Decay experience	31.6	26.3	36.9	36.8	32.2	41.5
Untreated decay	21.8	18.2	25.5	25.5	22.0	29.0
Dental sealants	40.1	33.4	46.9	45.0	38.1	51.9
Primary and/or permanent teeth						
Decay experience	86.9	82.9	90.9	87.4	83.5	91.2
Untreated decay	55.9	49.4	62.4	55.4	48.9	61.9
Rampant decay (7+ teeth)*	31.7	23.6	39.8	29.1	21.7	36.5
Needs urgent dental care	16.2	12.1	20.3	15.1	11.4	18.9

CL=Confidence Limit

*Information on rampant decay was missing for 83 children aged 6-9 years



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Table 3. Number of AI/AN *elementary school children* screened by grade and age, 2023 (unweighted).

Characteristic	Number Screened
Grade	
Kindergarten	689
First	923
Second	857
Third	930
Age	
5 years	315
6 years	794
7 years	772
8 years	870
9 years	507
10-11 years	63
Unknown/Missing	78

Table 4: Percentage of AI/AN *elementary school students* with decay experience, untreated decay, and dental sealants in their primary and/or permanent teeth plus percentage with a history of rampant decay and percentage needing urgent dental care because of pain or infection by age group, 2023.

Dentition	6-8 Year Olds			6-9 Year Olds		
	Percent	Lower 95% CL	Upper 95% CL	Percent	Lower 95% CL	Upper 95% CL
Primary teeth						
Decay experience	88.7	85.9	91.6	87.9	84.9	91.0
Untreated decay	38.9	30.6	47.2	38.2	30.0	46.3
Permanent teeth						
Decay experience	26.0	20.5	31.4	29.4	23.9	34.9
Untreated decay	18.7	13.1	24.3	20.5	14.6	26.4
Dental sealants	33.5	24.7	42.3	36.1	27.9	44.3
Primary and/or permanent teeth						
Decay experience	89.7	86.9	92.5	89.6	86.8	92.5
Untreated decay	45.5	36.5	54.5	45.6	36.7	54.4
Rampant decay (7+ teeth)*	38.8	28.7	48.8	37.7	28.0	47.4
Needs urgent dental care	10.5	6.2	14.8	10.4	6.2	14.6

CL=Confidence Limit

*Information on rampant decay was missing for 161 children aged 6-9 years



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