

THE ORAL HEALTH OF AMERICAN INDIAN AND ALASKA NATIVE CHILDREN AGED 1-5 YEARS: RESULTS OF THE 2014 IHS ORAL HEALTH SURVEY

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KEY FINDINGS

1. Tooth decay continues to be a significant health problem for American Indian and Alaska Native preschool children.
2. American Indian and Alaska Native children continue to have more tooth decay than other populations in the United States.
3. Early prevention, before the age of two, is essential to reduce the prevalence of tooth decay in American Indian and Alaska Native children.
4. Many American Indian and Alaska Native preschool children are not receiving the dental care they need.
5. Dental sealants on primary molars may be underutilized.

DATA SOURCE

The primary data source for this brief is the 2014 IHS oral health survey of AI/AN children aged 1-5 years. A total of 11,873 AI/AN children were screened at 81 different IHS and Tribal sites.

Tooth decay is a major health problem for American Indian and Alaska Native (AI/AN) children. When compared to other population groups in the United States, AI/AN preschool children have the highest level of tooth decay; more than 4 times higher than white non-Hispanic children.¹ The reasons why AI/AN children have more tooth decay are not known but it may be partially due to differences in host, bacterial, behavioral, sociodemographic, and environmental risk factors. If left untreated tooth decay can have serious consequences.

Tooth decay occurring in children 0-5 years of age is referred to as early childhood caries (ECC). Due to their young age and an inability to cooperate for dental care, treatment of preschool children with ECC is often provided in a hospital-based operating room under general anesthesia; the cost of treatment can be enormous. Tooth decay, however, is largely preventable by a combination of community, professional, and individual measures including water fluoridation, dental sealants, use of fluoride toothpastes at home, professionally applied topical fluorides, proper infant feeding practices, a healthy diet low in sugar and refined carbohydrates, and regular dental visits starting at 12 months of age.

The Centers for Disease Control and Prevention (CDC) recommends that health events be considered for ongoing surveillance if they affect many people, require large expenditures of resources, are largely preventable and are of public health importance.² In 2010, the Indian Health Service (IHS) implemented an ongoing oral health surveillance system designed to monitor trends in oral health among the AI/AN population served by IHS and Tribal programs. Since the implementation of the surveillance system, oral health data have been obtained from three different age cohorts; preschool children (2010 and 2014), elementary school children (2011) and adolescents (2012-2013). This data brief focuses on the oral health of preschool children. It presents information on the prevalence of tooth decay in the primary (baby) teeth of AI/AN children aged 1-5 years in 2014 at both the national and IHS Area level and assesses trends in oral health since 2010. The results of the 2014 oral health survey are presented as five key findings (sidebar).

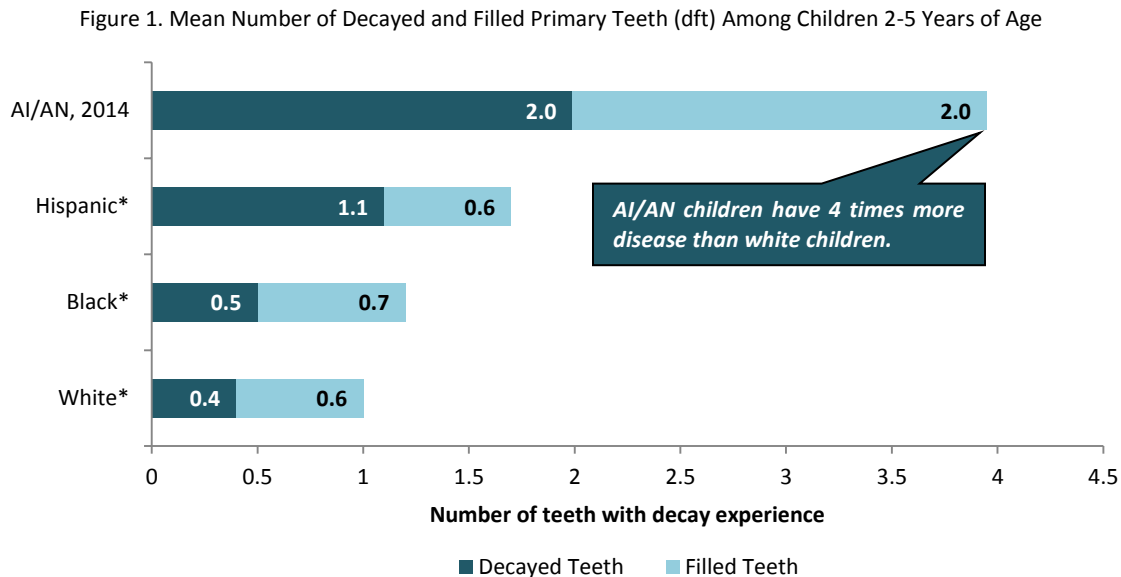


KEY FINDING #1: TOOTH DECAY CONTINUES TO BE A SIGNIFICANT HEALTH PROBLEM FOR AMERICAN INDIAN AND ALASKA NATIVE PRESCHOOL CHILDREN.

More than half of AI/AN children (54%) between 1-5 years of age have experienced tooth decay. Decay experience means that a child has had tooth decay in his or her lifetime. Decay experience can be past (fillings, crowns, or teeth that have been extracted because of decay) or present (untreated tooth decay or cavities). Left untreated, tooth decay can have serious consequences, including needless pain and suffering, difficulty chewing (which compromises children’s nutrition and can slow their development), difficulty speaking and lost days in school. Because of their young age, many children with decay must be treated in a hospital setting under general anesthesia at a cost exceeding \$6,000 per child.

KEY FINDING #2: AMERICAN INDIAN AND ALASKA NATIVE PRESCHOOL CHILDREN CONTINUE TO HAVE MORE TOOTH DECAY THAN OTHER POPULATIONS IN THE UNITED STATES.

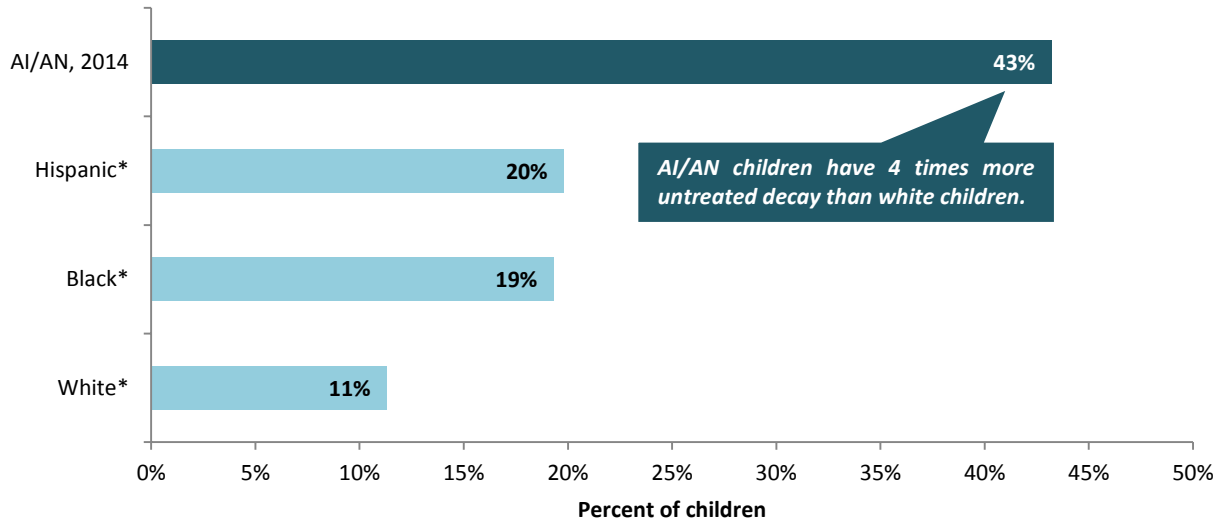
As depicted in the graph below, AI/AN preschool children have the highest level of tooth decay of any population group in the US, which is more than 4 times higher than white non-Hispanic children. On average, AI/AN children have 4 teeth with decay experience while white non-Hispanic children have about 1 tooth with decay. This disparity exists in spite of the implementation of dental decay prevention programs by IHS and Tribes, including fluoridation of community water systems, the use of topical fluorides and dental sealants, and oral health educational programs for children and parents.



* Data Source: National Health and Nutrition Examination Survey (NHANES), 1999-2002

When compared to other population groups, AI/AN children are more likely to have untreated tooth decay (Figure 2). Slightly more than 40% of AI/AN children between 3-5 years of age have untreated decay compared to only 11% of white non-Hispanic children; a 4-fold difference. There are probably two main reasons such a high percent of AI/AN children have untreated decay. First, parents may not understand the benefits of early dental visits or the importance of treating decay in primary (baby) teeth. Second, the relative geographic isolation of many Tribal populations may limit AI/AN children’s access to dental care.

Figure 2. Percent with untreated decay among children 3-5 years of age

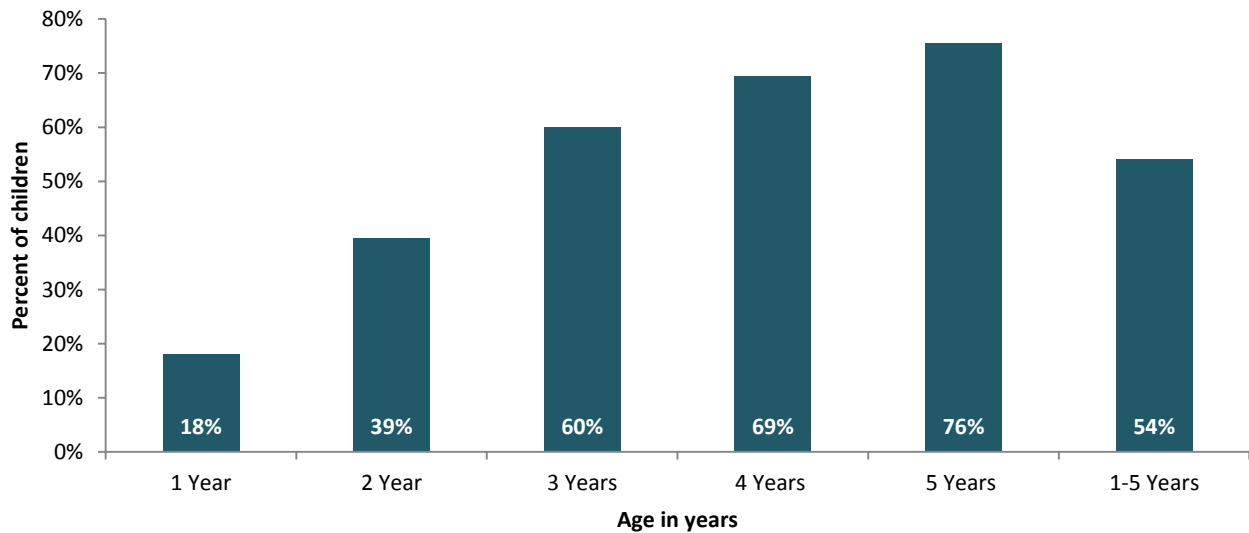


* Data Source: National Health and Nutrition Examination Survey (NHANES), 2009-2010

KEY FINDING #3: EARLY PREVENTION, BEFORE THE AGE OF TWO, IS ESSENTIAL TO REDUCE THE PREVALENCE OF TOOTH DECAY IN AMERICAN INDIAN AND ALASKA NATIVE CHILDREN.

Early prevention efforts are critical for the eradication of dental disease in AI/AN children. Almost 20% of 1-year old AI/AN children already have decayed teeth and the percentage with decay rises significantly with age. Medical and dental professionals must focus dental disease prevention efforts on children less than 2 years of age because age two is too late. The American Dental Association, the American Academy of Pediatric Dentistry and the American Academy of Pediatrics all recommend early preventive dental care and parent education. Good oral hygiene and dietary habits should start at birth and children should have regular dental visits starting at 1 year of age.

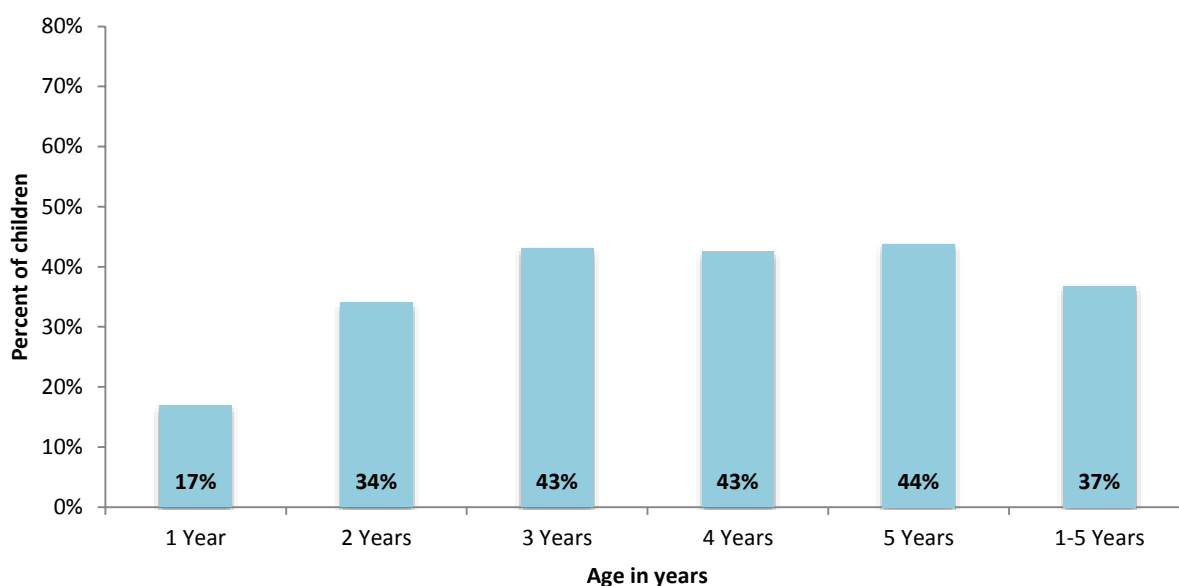
Figure 3. Prevalence of decay experience in the primary teeth of AI/AN children by age, 2014



KEY FINDING #4: MANY AMERICAN INDIAN AND ALASKA NATIVE PRESCHOOL CHILDREN ARE NOT RECEIVING THE DENTAL CARE THEY NEED.

More than 1 out of 3 AI/AN children (37%) between 1-5 years of age have untreated decay. The percent of children with untreated decay increases from 1 to 2 years of age (17% and 34% respectively) then remains at about 43% for children aged 3-5 years. About 6% of AI/AN children have a need for urgent dental care which means that they have pain or a serious oral infection. If this percentage is extrapolated to the total number of 1-5 year old children served by IHS and Tribal programs almost 8,500 AI/AN children between 1-5 years have a serious dental problem resulting in pain or infection.

Figure 4. Prevalence of untreated decay in the primary teeth of AI/AN children by age, 2014



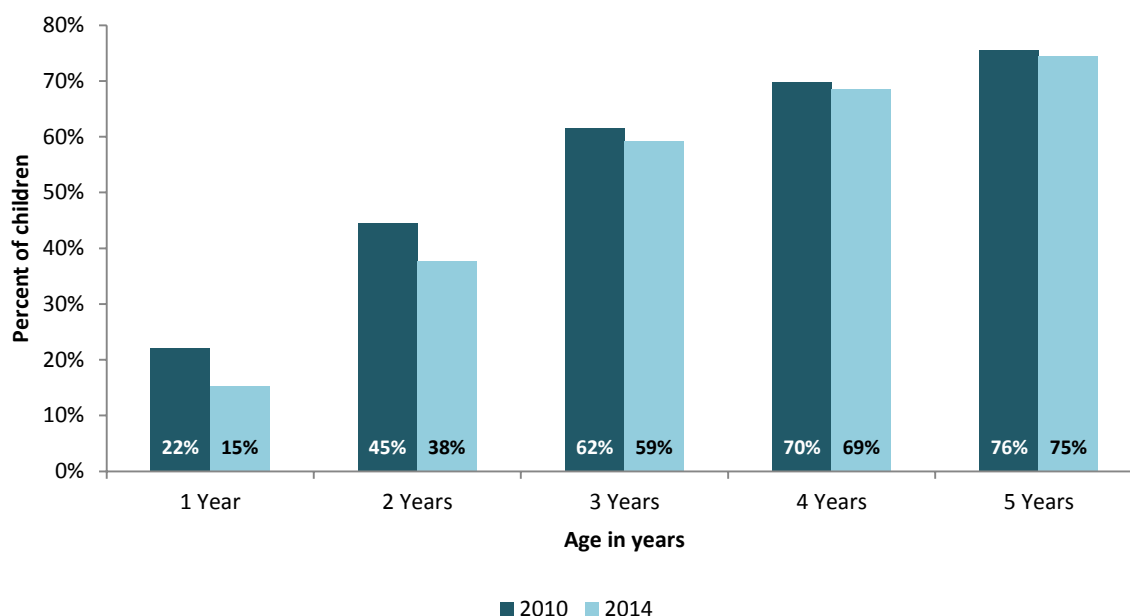
KEY FINDING #5: DENTAL SEALANTS ON PRIMARY MOLARS MAY BE UNDERUTILIZED.

Dental sealants are thin plastic coatings that are applied to the grooves on the back teeth to protect them from tooth decay. Most tooth decay in children occurs on these surfaces. Sealants protect the chewing surfaces from tooth decay by keeping bacteria and food particles out of these grooves. Only 6% of AI/AN children 1-5 years of age have at least one dental sealant on a primary molar tooth. The percent of children with a dental sealant increases with age from 2% among 1-2 year olds to 9% among 3-5 year olds.

TRENDS IN ORAL HEALTH FROM 2010 TO 2014

To monitor trends in the oral health of AI/AN preschool children, we compared results from the 2010 and 2014 oral health surveys for the **59 Service Units** that participated in both the 2010 (n=8,155) and 2014 (n=9,118) surveys. Between 2010 and 2014, there was a decrease in decay experience of 32% in 1 year old children and 15% percent in 2 year old children (Figure 5). **These differences, however, were not statistically significant.** Although not statistically significant, the decline in decay experience among the youngest children is encouraging and warrants continued surveillance to determine if decay rates are actually declining in AI/AN preschool children.

Figure 5. Prevalence of decay experience in AI/AN children 1-5 years of age at the 59 Service Units that participated in both the 2010 and 2014 IHS oral health surveys



DATA SOURCES AND METHODS

The primary data source for this brief is the 2014 IHS oral health survey of AI/AN preschool children aged 1-5 years. A total of 11,873 AI/AN children were screened, the largest number of 1-5 year olds ever screened by IHS and Tribal programs. The sampling frame for the 2014 survey consisted of all service units with an estimated 1-5 year old user population of 20 or more children. A stratified probability proportional to size (PPS) cluster sampling design was used to select IHS service units. The sampling frame was stratified by IHS Area, and service units were sorted within each Area based on operational status (Tribal or IHS) and/or state. A systematic PPS sampling scheme was used to select 56 service units. If a service unit refused to participate, another service unit within the same sampling interval was randomly selected. Data is available for 53 of the 56 sampling intervals. Twenty-eight service units that were not in the original sample volunteered to participate.

The following information was collected for each child: age, sex, race, tooth specific caries and sealant status plus treatment urgency. We used the *Basic Screening Survey* clinical indicator definitions and data collection protocols.³ Race was recorded as AI/AN or other. Only children classified as AI/AN were included in the analyses.

Examiners included dentists, dental hygienists and dental therapists employed by IHS or Tribal programs. Examiners were required to view an examiner training webinar; no formal calibration was undertaken and examiner reliability was not assessed. Screenings were completed in community-based settings using dental mirrors and an external light source. Examiners collected data using paper forms which were mailed to a central location. All statistical analyses were performed using the complex survey procedures within SAS (Version 9.3; SAS Institute Inc., Cary, NC). Sample weights were used to produce population estimates based on selection probabilities.

The secondary data source for this brief is the 2010 IHS oral health survey of AI/AN preschool children. In 2010, almost 8,500 AI/AN children aged 1-5 years were screened at 63 different Tribal and IHS sites across the country. Detailed survey methods have been published elsewhere.¹

DEFINITIONS

Untreated decay: Describes dental cavities or tooth decay that have not received appropriate treatment.

Decay experience: Refers to having untreated decay or a dental filling, crown, or other type of restorative dental material. 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 fills the grooves of teeth to form a protective physical barrier.

ABOUT THE AUTHORS

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3. Association of State and Territorial Dental Directors. Basic screening surveys: an approach to monitoring community oral health. (WWW document). URL: <http://www.astdd.org/basic-screening-survey-tool/> (accessed on August 1, 2014).

Indian Health Service Data Brief ❖ April 2015

DATA TABLES

Table 1. Number and percent of 1-5 year old AI/AN children screened by selected characteristics, 2014

Characteristic	Number	Unweighted Percent	Weighted Percent
Age			
1 year	1,180	9.9	17.4
2 years	1,358	11.4	19.5
3 years	3,068	25.8	20.1
4 years	4,003	33.7	21.4
5 years	2,264	19.1	21.7
Sex			
Female	5,808	48.9	49.3
Male	5,844	49.2	49.0
Unknown	221	1.9	1.7

Table 2: Number of AI/AN children screened by IHS Area and age, 2014

IHS Area	1 Year	2 Years	3 Years	4 Years	5 Years	Total
Alaska	99	108	211	383	282	1,083
Albuquerque	76	99	226	284	169	854
Bemidji	90	122	279	363	223	1,077
Billings	130	173	381	431	215	1,330
California	26	69	110	119	73	397
Great Plains	48	73	334	358	163	976
Nashville	141	153	280	322	335	1,231
Navajo	92	81	103	162	186	624
Oklahoma City	161	173	463	628	224	1,649
Phoenix	98	84	202	287	125	796
Portland	162	158	327	454	204	1,305
Tucson	57	65	152	212	65	551
Total	1,180	1,358	3,068	4,003	2,264	11,873

Table 3: Percent of AI/AN children with decay experience, untreated decay, primary molar sealants, and urgency of need for dental care by age in years, 2014

Variable	1 Year (n 1,180)		2 Years (n 1,358)		3 Years (n 3,068)		4 Years (n 4,003)		5 Years (n 2,264)	
Decay Experience	18.1		39.4		59.9		69.4		75.6	
(95% CI)	13.6	22.6	33.1	45.7	53.0	66.8	63.7	75.0	69.2	82.1
Untreated Decay	16.9		34.0		43.0		42.6		43.8	
(95% CI)	12.6	21.2	28.3	39.8	36.4	49.6	37.6	47.7	36.4	51.2
Primary Molar Sealants	0.3		3.3		8.5		7.9		10.2	
(95% CI)	0.0	0.8	1.4	5.2	4.7	12.4	4.3	11.4	5.5	15.0
Early or Urgent Care*	16.8		31.5		41.4		40.5		41.6	
(95% CI)	12.4	21.1	26.3	36.7	35.3	47.4	34.4	46.5	33.6	49.5
Urgent Care*	2.9		5.9		6.5		6.5		6.1	
(95% CI)	0.3	5.5	3.6	8.2	4.0	8.9	4.5	8.6	3.9	8.3

* Information on treatment urgency was missing for 137 children

Indian Health Service Data Brief ❖ April 2015

Table 4: Mean number of decayed, missing and filled teeth (dmft) and mean percent of erupted teeth with decay experience among AI/AN children by age in years, 2014

Variable	1 Year (n 1,180)		2 Years (n 1,358)		3 Years (n 3,068)		4 Years (n 4,003)		5 Years (n 2,264)	
Decayed Teeth (95% CI)	0.70		1.65		2.25		2.08		1.97	
	0.46	0.94	1.26	2.05	1.82	2.69	1.71	2.46	1.47	2.48
Missing Teeth (95% CI)	0.04		0.15		0.41		0.63		0.85	
	0.01	0.07	0.07	0.23	0.29	0.54	0.49	0.78	0.64	1.07
Filled Teeth (95% CI)	0.05		0.36		1.41		2.62		3.27	
	0.01	0.09	0.23	0.48	1.11	1.72	2.33	2.92	2.80	3.74
dmft (95% CI)	0.80		2.16		4.08		5.34		6.10	
	0.56	1.03	1.66	2.66	3.48	4.68	4.69	5.99	5.35	6.84
Percent of Teeth* (95% CI)	5.2		11.5		20.5		26.8		31.6	
	3.7	6.7	8.8	14.1	17.5	23.5	23.5	30.1	27.6	35.6

* Percent of erupted primary teeth with decay experience.

Note: 21 children had missing data for 1 or more teeth. Variables do not include teeth with missing data.

Table 5: Percent of AI/AN children with decay experience, untreated decay, primary molar sealants, and urgency of need for dental care by age group, 2014

Variable	1 5 Years (n 11,873)		2 5 Years (n 10,693)		3 5 Years (n 9,335)	
Decay Experience (95% CI)	54.1		61.7		68.5	
	48.9	59.3	55.9	67.4	62.7	74.4
Untreated Decay (95% CI)	36.8		41.0		43.2	
	32.0	41.7	35.6	46.4	37.6	48.8
Primary Molar Sealants (95% CI)	6.3		7.6		8.9	
	3.7	8.9	4.5	10.6	5.0	12.8
Early or Urgent Care* (95% CI)	35.0		38.9		41.1	
	30.0	40.0	33.2	44.5	35.1	47.1
Urgent Care* (95% CI)	5.7		6.2		6.4	
	4.2	7.2	4.7	7.8	4.7	8.0

* Information on treatment urgency was missing for 137 children

Table 6: Mean number of decayed, missing and filled teeth (dmft) and mean percent of erupted teeth with decay experience among AI/AN children by age group, 2014

Variable	1 5 Years (n 11,873)		2 5 Years (n 10,693)		3 5 Years (n 9,335)	
Decayed Teeth (95% CI)	1.77		1.99		2.10	
	1.47	2.07	1.65	2.34	1.74	2.46
Missing Teeth (95% CI)	0.44		0.52		0.64	
	0.34	0.53	0.41	0.64	0.51	0.77
Filled Teeth (95% CI)	1.63		1.96		2.46	
	1.43	1.83	1.72	2.21	2.15	2.77
dmft (95% CI)	3.84		4.48		5.20	
	3.36	4.32	3.93	5.03	4.58	5.81
Percent of Teeth* (95% CI)	19.8		22.9		26.4	
	17.3	22.3	20.1	25.7	23.3	29.6

* Percent of erupted primary teeth with decay experience.

Note: 21 children had missing data for 1 or more teeth. Variables do not include teeth with missing data.

SUGGESTED CITATION

Phipps KR and Ricks TL. The oral health of American Indian and Alaska Native children aged 1-5 years: results of the 2014 IHS oral health survey. Indian Health Service data brief. Rockville, MD: Indian Health Service. 2015.

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