

THE ORAL HEALTH OF AMERICAN INDIAN AND ALASKA NATIVE ADULT DENTAL PATIENTS: RESULTS OF THE 2015 IHS ORAL HEALTH SURVEY

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KEY FINDINGS

1. AI/AN adult dental patients suffer disproportionately from untreated dental caries, with twice the prevalence of untreated caries as the general U.S. population and more than any other racial/ethnic group.
2. AI/AN adult dental patients are more likely to have severe periodontal disease than the general U.S. population.
3. Compared to the general U.S. population, AI/AN adult dental patients are more likely to have missing teeth.
4. Compared to the general U.S. population, AI/AN adult dental patients are more likely to report poor oral health, oral pain, and food avoidance because of oral problems.
5. Since 1999, the oral health of AI/AN adult dental patients has improved. Fewer have untreated decay, the prevalence of severe periodontal disease has decreased, and more adults are keeping their teeth into older age.

Oral diseases such as dental caries (tooth decay), periodontal (gum) disease, and tooth loss are major health problems for American Indian and Alaska Native (AI/AN) adults. Dental caries is a multi-factorial disease process initiated by bacteria which metabolize sugars to form acids. These acids demineralize the tooth surface and eventually form a cavity. Tooth decay is preventable by a combination of community, professional, and individual measures including water fluoridation, dental sealants, professionally applied topical fluorides, use of fluoride toothpastes at home, and diet. Periodontal disease is also a multi-factorial disease process initiated by oral bacteria. If left untreated, it can result in the loss of the bone that holds the teeth in the jaw. Over time, the teeth can become loose, painful and may be lost. Certain medical and lifestyle conditions increase an individual's likelihood of having severe periodontal disease, including smoking and diabetes. The best ways to prevent periodontal disease are to avoid smoking, maintain control of diabetes, have regular dental cleanings, and practice good oral hygiene.

Poor oral health can have a negative effect on general health. For example, severe periodontal disease can adversely affect glycemic control in adults with diabetes and there is a direct relationship between periodontal disease severity and diabetes complications. Advanced dental caries can cause pain and infection, and can result in problems with eating, chewing, smiling, and communication. Having missing, discolored or damaged teeth can impact a person's quality of life by lowering self-esteem and, for some, reducing opportunities for employment. Furthermore, adults with severe tooth loss may experience nutritional problems because they are less likely to meet current dietary recommendations.

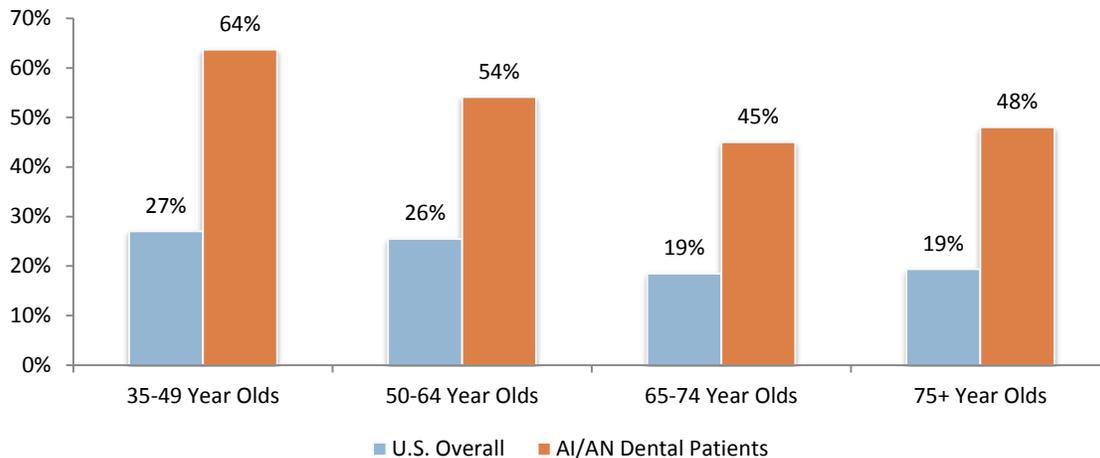
The 2015 IHS Oral Health Survey is the fourth look at the oral health status of AI/AN adult dental patients served by IHS and Tribal clinics. Previous surveys were conducted in 1984, 1991, and 1999. For the 2015 Oral Health Survey, the IHS collected data from 11,462 dental patients ranging in age from 35 to 103 years. This data brief focuses on the oral health of adult dental patients. It presents information on the prevalence of dental caries, severe periodontal disease, and tooth loss, and assesses trends over time. The results of the 2015 oral health survey are presented as five key findings (sidebar).



Indian Health Service Data Brief ❖ March 2016

KEY FINDING #1: AI/AN ADULT DENTAL PATIENTS SUFFER DISPROPORTIONATELY FROM UNTREATED DENTAL CARIES, WITH TWICE THE PREVALENCE OF UNTREATED CARIES AS THE GENERAL U.S. POPULATION AND MORE THAN ANY OTHER RACIAL/ETHNIC GROUP.

Figure 1: Percent of Adults with Untreated Dental Caries by Age Group
U.S. Overall (NHANES 2011-2012)¹ vs. AI/AN Dental Patients (IHS 2015)

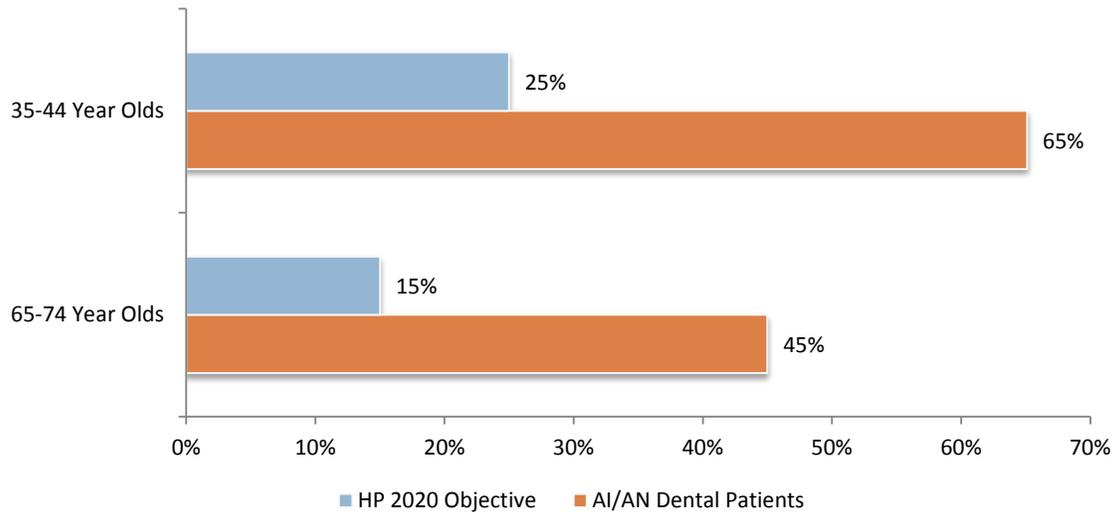


Regardless of age, AI/AN adult dental patients have a substantially higher prevalence of untreated caries than the general U.S. population. For example, among 35-49 year olds, 27% of the general U.S. population has untreated caries compared to 64% of AI/AN dental patients (Figure 1).¹ When compared to other racial/ethnic groups, AI/AN dental patients have almost three times as much untreated decay as U.S. whites (59% vs. 22% respectively) and almost 50% more than the next highest minority group, U.S. blacks (59% vs. 42% respectively). For those 65 years and older, AI/ANs have almost three times as much untreated decay as U.S. whites (46% vs. 16% respectively) and over 10% more than the next highest minority group, U.S. blacks (46% vs. 41% respectively).¹ There are probably two main reasons why such a high percent of AI/AN adults have untreated decay. First, the relative geographic isolation of many Tribal populations may limit access to dental care. Second, is the inability of AI/AN patients to access routine and preventive dental care due to other reasons such as staffing shortages. Information for the general U.S. population and other racial/ethnic groups was obtained through the National Health and Nutrition Examination Survey (NHANES); a non-clinic based survey. The lower prevalence of untreated caries in the U.S. population, compared to AI/AN dental patients, may be partially due to differences in sampling strategies.

Healthy People provides science-based, 10-year national objectives for improving the health of all Americans. Two of the Healthy People 2020 (HP2020) objectives for untreated decay among adults are (1) reduce the proportion of adults aged 35 to 44 years with untreated dental decay to 25% and (2) reduce the proportion of adults aged 65 to 74 years with untreated coronal caries to 15%. If IHS and Tribal programs are to meet the Healthy People 2020 objectives for untreated decay, considerable progress must be made in improving access to and utilization of the dental care system (Figure 2).

Indian Health Service Data Brief ❖ March 2016

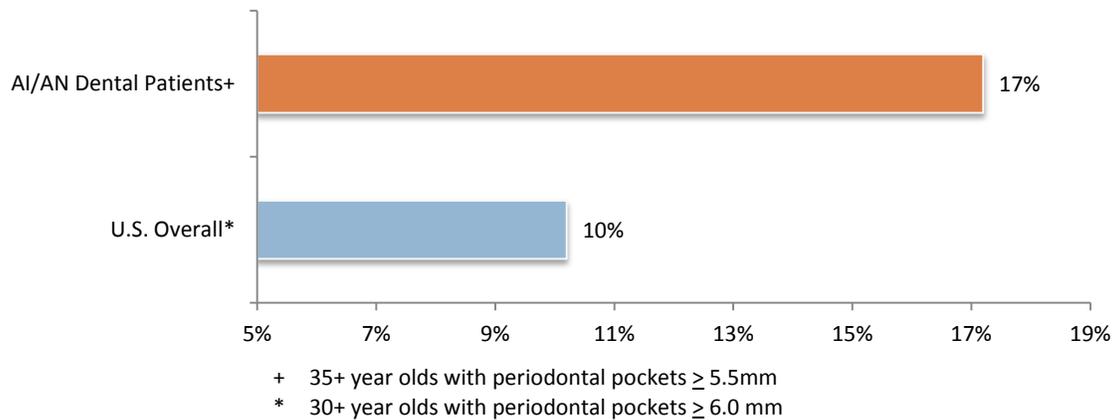
Figure 2: Percent of Adults with Untreated Tooth Decay by Age Group
AI/AN Dental Patients (IHS 2015) Compared to HP 2020 Objectives



KEY FINDING #2: AI/AN ADULT DENTAL PATIENTS ARE MORE LIKELY TO HAVE SEVERE PERIODONTAL DISEASE THAN THE GENERAL U.S. POPULATION.

Periodontal disease is an inflammatory disease that affects the soft and hard tissues that support the teeth. As the disease progresses, the supporting tissues are destroyed, bone can be lost, and the teeth may loosen or eventually fall out. Severe periodontal disease can adversely affect glycemic control in adults with diabetes and there is a direct relationship between periodontal disease severity and diabetes complications.² About 10% of U.S. adults (30+ years of age) have severe periodontal disease compared to about 17% of AI/AN dental patients aged 35+ years (Figure 3).³ Smoking is a risk factor for periodontal disease and the prevalence of severe periodontal disease is higher among AI/AN adults who smoke than among non-smokers (28% vs. 15% respectively).

Figure 3: Percent of Adults with Severe Periodontal Disease
U.S. Overall (NHANES 2009-2012)³ vs. AI/AN Dental Patients (IHS 2015)

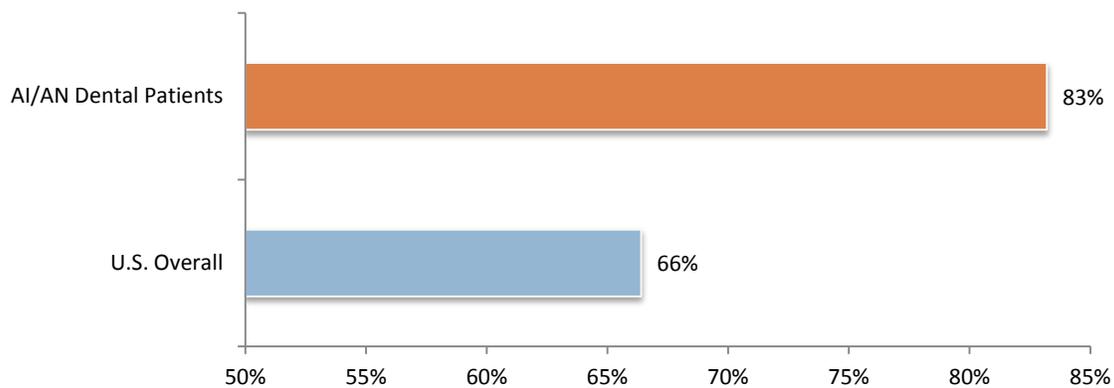


Indian Health Service Data Brief ❖ March 2016

KEY FINDING #3: COMPARED TO THE GENERAL U.S. POPULATION, AI/AN ADULT DENTAL PATIENTS ARE MORE LIKELY TO HAVE MISSING TEETH.

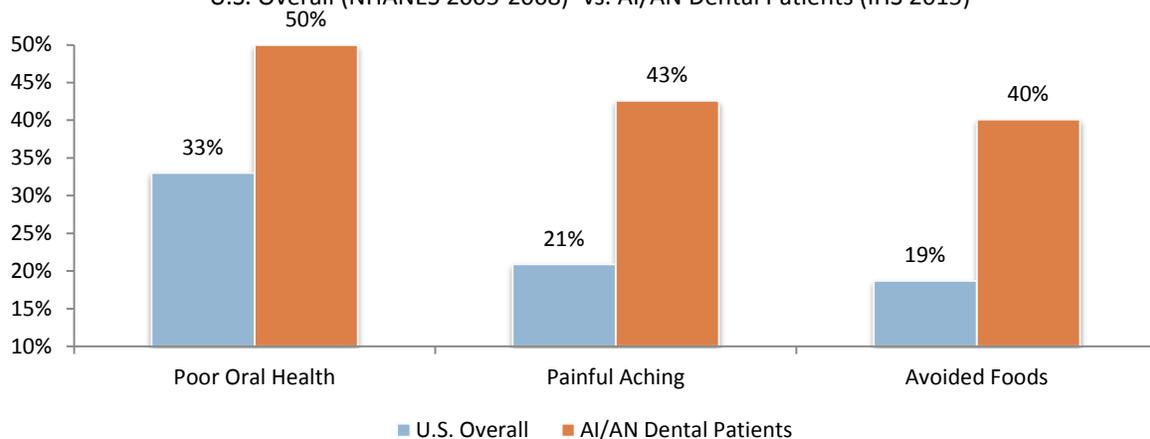
Dental caries and periodontal disease, when left untreated, can lead to tooth loss. Having missing teeth can impact a person's quality of life by lowering self-esteem and, for some, reducing employment opportunities. In addition, persons with extensive or complete tooth loss are more likely to substitute easier-to-chew foods such as those rich in saturated fats and cholesterol.⁴ About 83% of AI/AN adult dental patients aged 40-64 years have lost at least one permanent tooth compared to 66% of the general U.S. population of the same age.

Figure 4: Percent of Adults 40-64 Years with One or More Missing Teeth
U.S. Overall (NHANES 2011-2012)¹ vs. AI/AN Dental Patients (IHS 2015)



KEY FINDING #4: COMPARED TO THE GENERAL U.S. POPULATION, AI/AN ADULT DENTAL PATIENTS ARE MORE LIKELY TO REPORT POOR ORAL HEALTH, ORAL PAIN, AND FOOD AVOIDANCE BECAUSE OF ORAL PROBLEMS.

Figure 5: Percent of Adults 35+ Years that Reported Having Poor Oral Health, Painful Aching in the Mouth, or Avoided Foods Because of Mouth Problems During Last Year
U.S. Overall (NHANES 2005-2008)⁵ vs. AI/AN Dental Patients (IHS 2015)



The 2015 IHS Oral Health Survey included a patient questionnaire which asked the following questions about the condition of an individual's mouth and oral problems:

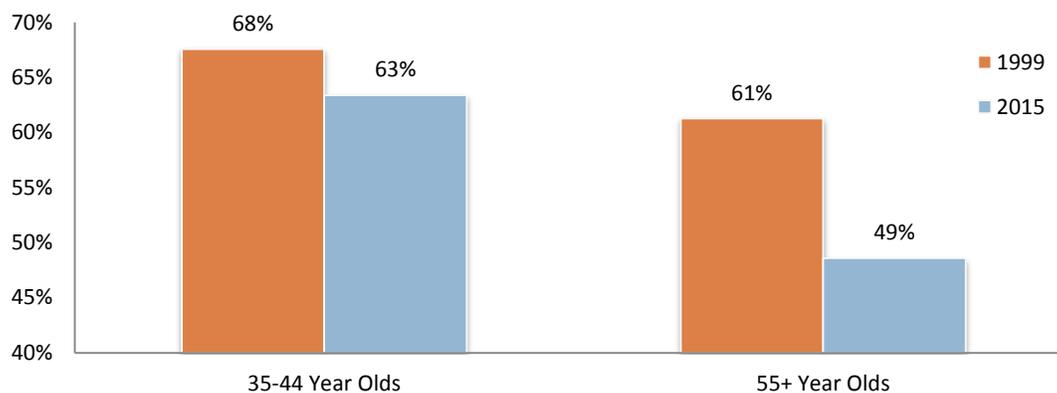
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- How would you describe the condition of your mouth and teeth, including false teeth or dentures? (excellent, very good, good, fair, poor)
- How often during the last year have you had painful aching anywhere in the mouth? (very often, fairly often, occasionally, hardly ever, never)
- How often during the last year have you avoided particular foods because of problems with your teeth, mouth or dentures? (very often, fairly often, occasionally, hardly ever, never)

AI/AN dental patients, compared to the general U.S. population, were more likely to report that their oral health was poor/fair and that they had painful aching or avoided foods either very often, fairly often or occasionally. For example, AI/AN dental patients were twice as likely to report painful aching (43% vs. 21%) and food avoidance (40% vs. 19%) compared to the general U.S. population (Figure 5).

KEY FINDING #5: SINCE 1999, THE ORAL HEALTH OF AI/AN ADULT DENTAL PATIENTS HAS IMPROVED. FEWER HAVE UNTREATED DECAY, THE PREVALENCE OF SEVERE PERIODONTAL DISEASE HAS DECREASED, AND MORE ADULTS ARE KEEPING THEIR TEETH INTO OLDER AGE.

Figure 6: Percent of AI/AN Dental Patients with Untreated Decay by Age Group and Survey Year, 1999 and 2015

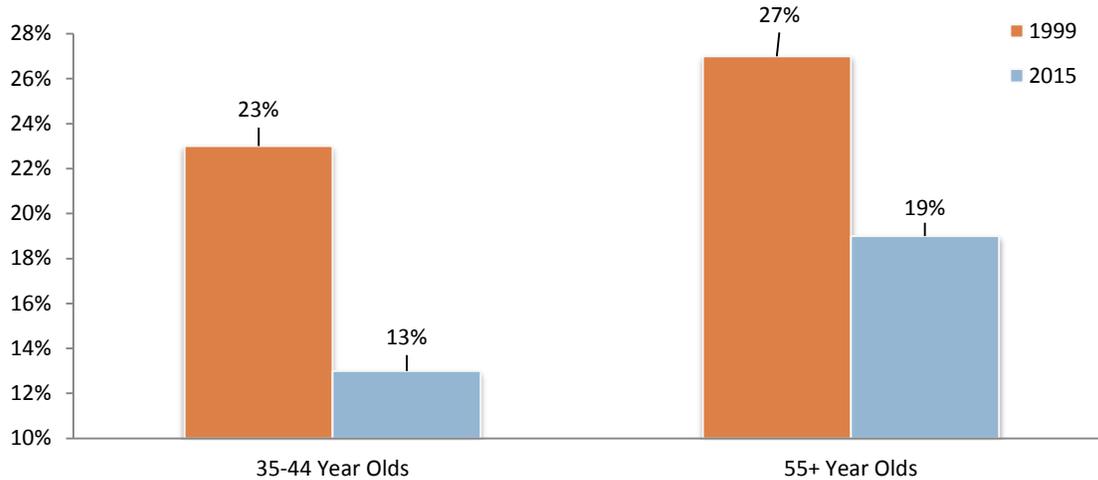


While AI/AN adult dental patients suffer disproportionately from oral disease compared to the general U.S. population, the gap has been steadily declining as AI/AN adult oral health status has improved since the previous IHS oral health survey in 1999. Among 35-44 year olds, the percentage with untreated decay has decreased by 7% but the difference is not statistically significant (Figure 6). For adults 55+ years, however, the decline in the percent with untreated decay from 61% in 1999 to 49% in 2015 is statistically significant ($p < 0.05$).

Similarly, the percentage of AI/AN adult dental patients with severe periodontal disease, characterized by deep periodontal pockets (Community Periodontal Index or CPI score of 4 in at least one sextant), has decreased since 1999 (Figure 7).

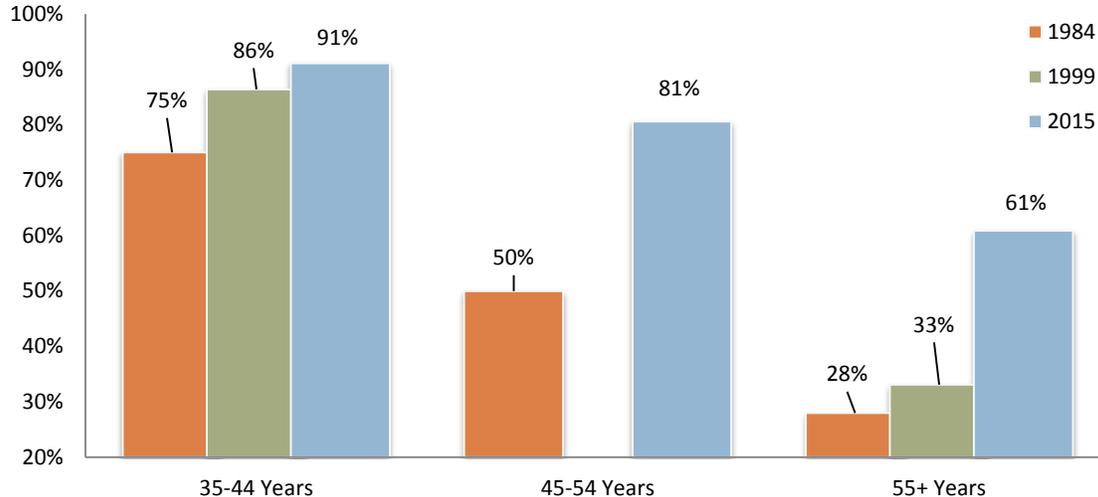
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Figure 7: Percent of AI/AN Dental Patients with Deep Periodontal Pockets (CPI=4) by Age Group and Survey Year, 1999 vs. 2015



The World Health Organization considers 20 teeth to be the minimum number for a functioning dentition.⁶ The percentage of AI/AN adult dental patients with 20 or more teeth has increased substantially over the last three decades (Figure 8).

Figure 8: Percent of AI/AN Dental Patients with 20+ Teeth by Age and Survey Year



Various changes over the past 16 years may help explain the improvements seen in oral health status of AI/AN adult dental patients. Access to dental care has continued to increase in Indian Health Service, Tribal, and Urban dental programs funded by the Indian Health Service; in 2010, for example, the proportion of AI/AN adults using the IHS healthcare system who were able to access dental services was 23.4% for 35-44 year-olds, 26.2% for 45-54 year-olds, 26.8% for 55-74 year-olds, and 20.5% for those 75 years old and older. By 2015, however, the proportion of AI/AN adults using the system and accessing dental care increased to 25.5% (35-44), 29.7% (45-54), 32.9% (55-74), and 27.2% (75+), respectively. Other positive changes which may have influenced the changes in oral health status of AI/AN adult dental patients include a decrease in dental vacancies over the last 16 years,

Indian Health Service Data Brief ❖ March 2016

training of dental assistants to provide expanded function basic periodontal services especially at remote locations without a dental hygienist, and increased preventive services provided to adult dental patients.

DATA SOURCE AND METHODS

The primary data source for this brief is the 2015 IHS Oral Health Survey of AI/AN dental patients aged 35+ years. The survey had two components – a dental screening and an optional patient questionnaire. A total of 11,462 AI/AN adults aged 35-103 years were screened and 9,662 completed a questionnaire. This is the largest number of adults ever screened by IHS and Tribal programs. The sampling frame for the 2015 survey consisted of all service units with an estimated 35+ year old user population of 100 or more. 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 62 service units. If a service unit refused to participate, another service unit within the same sampling interval was randomly selected. Data is available for 63 service units collected at 84 different IHS and Tribal dental clinics.

The dental screening collected the following information for each person: age, sex, presence of diabetes, use of tobacco products, tooth status, Community Periodontal Index, presence of removable dentures, need for removable dentures, and urgency of need for dental treatment. We used the *Basic Screening Survey* clinical indicator definitions and data collection protocols.⁷ The patient questionnaire collected self-reported age, presence of diabetes, current tobacco use, frequency of oral pain, frequency of food avoidance because of oral problems, condition of mouth, time since last dental visit, and reasons for not visiting the dentist in the last year.

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 the dental clinic 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.

LIMITATIONS

This was a survey of dental patients seeking treatment at Tribal or IHS dental clinics and it is not representative of the general population of American Indians and Alaska Natives. Because some AI/ANs seek dental care only when there is a problem, this survey may overestimate the prevalence of dental disease among all age groups. In addition, because adults without teeth are less likely to visit a dentist, this survey may underestimate the prevalence of total tooth loss.

DEFINITIONS AND ACRONYMS

NHANES: National Health and Nutrition Examination Survey

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

Periodontal disease: An inflammatory disease that affects the soft and hard structures that support the teeth.

Severe periodontal disease: Refers to individuals that, using the Community Periodontal Index (CPI), have periodontal pockets > 5.5 mm (CPI=4).

Indian Health Service Data Brief ❖ March 2016

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REFERENCES

1. Dye BA, Thornton-Evans G, Li X, Iafolla TJ. Dental caries and tooth loss in adults in the United States, 2011–2012. NCHS data brief, no 197. Hyattsville, MD: National Center for Health Statistics. 2015.
2. Llambés F, Arias-Herrera S, Caffesse R. Relationship between diabetes and periodontal infection. *World J Diabetes*. 2015;6:927-35.
3. Eke PI, Dye BA, Wei L, Slade GD, Thornton-Evans GO, Borgnakke WS, et al. Update on prevalence of periodontitis in adults in the United States: NHANES 2009 to 2012. *J Periodontol* 2015;86:611-22.
4. Ervin RB, Dye BA. The effect of functional dentition on Healthy Eating Index scores and nutrient intakes in a nationally representative sample of older adults. *J Public Health Dent*. 2009;69(4):207–216.
5. National Health and Nutrition Examination Survey (NHANES), 2005-2008. Secondary analysis of publicly available data sets.
6. Recent Advances in Oral Health. Geneva, Switzerland: World Health Organization; 1992:16–17 WHO Technical Report Series No. 826.
7. Association of State and Territorial Dental Directors. 2015. Basic screening surveys: an approach to monitoring community oral health. Retrieved from <http://www.astdd.org/basic-screening-survey-tool/>

Indian Health Service Data Brief ❖ March 2016

DATA TABLES

Table 1: Number of AI/AN adults screened by IHS area and age group, 2015

IHS Area	35-44 Years	45-54 Years	55+ Years	Total
Alaska	280	260	285	825
Albuquerque	334	396	445	1,175
Bemidji	289	290	434	1,013
Billings	318	330	449	1,097
California	430	411	593	1,434
Great Plains	164	163	249	576
Nashville	332	339	421	1,092
Navajo	221	222	288	731
Oklahoma City	298	303	467	1,068
Phoenix	348	355	539	1,242
Portland	272	278	476	1,026
Tucson	49	51	83	183
IHS Overall	3,335	3,398	4,729	11,462

Table 2: Number of questionnaires completed by AI/AN adults by IHS area and age group, 2015

IHS Area	35-44 Years	45-54 Years	55+ Years	Total
Alaska	69	82	99	250
Albuquerque	229	260	396	885
Bemidji	210	240	379	829
Billings	293	304	440	1037
California	242	267	459	968
Great Plains	174	198	287	659
Nashville	348	390	465	1203
Navajo	196	220	403	819
Oklahoma City	299	285	450	1034
Phoenix	225	261	367	853
Portland	232	253	447	932
Tucson	61	59	73	193
IHS Overall	2,578	2,819	4,265	9,662

Table 3: Tooth loss among dentate and edentulous AI/AN adults by age group, 2015 (3rd molars excluded)

Tooth Loss Variable	35-44 Years (n=3,276)			45-54 Years (n=3,343)			55+ Years (n=4,645)			35+ Years (n=11,264)		
	Percent	Lower 95% CL	Upper 95% CL	Percent	Lower 95% CL	Upper 95% CL	Percent	Lower 95% CL	Upper 95% CL	Percent	Lower 95% CL	Upper 95% CL
% with 28 teeth	28.7	24.8	32.7	17.4	15.6	19.2	8.3	6.8	9.9	16.7	15.3	18.2
% with 20 teeth	89.8	87.2	92.5	80.6	78.1	83.2	60.9	57.5	64.3	74.7	72.9	76.5
% with 0 teeth (edentulous)	1.4	0.6	2.1	1.7	1.0	2.3	5.5	3.9	7.1	3.2	2.6	3.9
Mean number of teeth present	24.5	24.1	24.9	22.8	22.5	23.1	19.3	18.7	19.9	21.7	21.4	22.1

Indian Health Service Data Brief ❖ March 2016

Table 4: Percent with untreated decay, mean number of teeth present and mean number of teeth decayed, missing due to caries or filled among dentate AI/AN adults by age group, 2015 (3rd molars excluded)

Variable	35-44 Years (n=3,227)			45-54 Years (n=3,261)			55+ Years (n=4,358)			35+ Years (n=10,846)		
	Percent	Lower 95% CL	Upper 95% CL	Percent	Lower 95% CL	Upper 95% CL	Percent	Lower 95% CL	Upper 95% CL	Percent	Lower 95% CL	Upper 95% CL
% with untreated decay*	65.1	60.5	69.8	58.5	53.1	63.9	49.4	44.4	54.4	56.6	52.8	60.4
Mean number of teeth present	24.8	24.5	25.1	23.2	22.8	23.5	20.4	20.0	20.8	22.5	22.2	22.7
Mean number of...												
Decayed teeth	3.1	2.7	3.6	2.6	2.1	3.0	1.9	1.6	2.3	2.5	2.1	2.8
Missing teeth	2.5	2.2	2.8	3.6	3.3	3.9	5.4	5.0	5.8	4.1	3.8	4.3
Filled teeth	6.9	6.4	7.4	8.1	7.6	8.6	8.8	8.3	9.3	8.0	7.7	8.4
Mean DMFT	12.5	12.0	13.1	14.2	13.7	14.8	16.1	15.6	16.7	14.6	14.1	15.0
Mean DFT	10.0	9.6	10.5	10.7	10.2	11.1	10.7	10.2	11.2	10.5	10.1	10.9

* Third molars included

Table 5: Highest Community Periodontal Index (CPI) score among dentate AI/AN adults by age group, 2015

Variable	35-44 Years (n=3,191)			45-54 Years (n=3,215)			55+ Years (n=4,263)			35+ Years (n=10,669)		
	Percent	Lower 95% CL	Upper 95% CL	Percent	Lower 95% CL	Upper 95% CL	Percent	Lower 95% CL	Upper 95% CL	Percent	Lower 95% CL	Upper 95% CL
% with highest CPI score												
0	3.6	2.2	5.0	3.8	2.3	5.3	2.4	1.4	3.4	3.1	2.1	4.2
1	12.6	9.7	15.6	9.0	6.6	11.4	11.4	8.8	14.0	11.1	8.5	13.6
2	39.3	34.6	44.0	34.9	30.2	39.6	32.0	27.9	36.1	35.0	31.3	38.6
3	31.1	27.3	34.9	33.6	29.0	38.2	35.4	32.2	38.6	33.6	30.5	36.7
4	13.4	10.3	16.5	18.7	15.6	21.7	18.8	15.8	21.8	17.2	14.7	19.7

SUGGESTED CITATION

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