THE 2010
INDIAN HEALTH SERVICE

ORAL HEALTH SURVEY

OF AMERICAN INDIAN AND ALASKA NATIVE PRESCHOOL CHILDREN

THE 2010 INDIAN HEALTH SERVICE Oral Health Survey of American Indian and Alaska Native Preschool Children

Indian Health Service
Office of Clinical and Preventive Services
Division of Oral Health

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Suggested Citation

Indian Health Service. The 2010 Indian Health Service Oral Health Survey of American Indian and Alaska Native Preschool Children. Rockville, MD: U.S. Department of Health and Human Services, Indian Health Service, 2013.

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Acknowledgements

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About 175 dentists, dental hygienists and dental therapists from 63 sites across the IHS participated as examiners in the 2010 Indian Health Service Oral Health Survey of AI/AN Preschool Children. Without their assistance, this survey would not have been possible.

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Forward

Since 1955, the Indian Health Service (IHS) has upheld the Federal Government's obligation to promote healthy American Indian and Alaska Native (AI/AN) communities and cultures, while honoring and protecting each Tribe's inherent sovereign rights. Our mission is to raise the physical, mental, social, and spiritual health of American Indians and Alaska Natives to the highest level.

This report presents the results of an oral health survey of AI/AN preschool children conducted by the IHS in 2010. Over the past three decades, information obtained from periodic surveys has been extremely valuable to the IHS and Tribes in planning to address the oral health needs of the AI/AN people of this Nation.

Good oral health is essential to improving each individual's overall health and well-being. Unfortunately, as the results of this survey indicate, a very high percentage of AI/AN preschool children have tooth decay that is substantially higher than other minority populations in the United States. Tribes have identified increasing access to preventive and curative dental care as a major health and budget priority.

The IHS remains committed to ensuring that comprehensive and culturally acceptable personal and public health services are available and accessible to AI/AN people. The findings of this report will help advance our ongoing efforts to achieve optimal oral health for AI/AN people.

Yvette Roubideaux, M.D., M.P.H.
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Executive Summary

Tooth decay in children is one of the major health problems in the United States – especially among low-income and minority populations. If left untreated, tooth decay can affect a child's growth, result in significant pain and potentially life-threatening infection, and can diminish a child's overall quality of life.

Tooth decay occurring in children 0-5 years of age is referred to as early childhood caries (ECC). Due to their young age, 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 and the risk to the child can be substantial. The good news is that tooth decay is largely preventable through early risk assessment and comprehensive prevention strategies at the individual, community and dental practice level.

The 2010 IHS Oral Health Survey of American Indian and Alaska Native (AI/AN) Preschool Children is the first look by the Indian Health Service (IHS) at the oral health status of a community-based sample of AI/AN preschool children. Almost 8,500 AI/AN children aged 1-5 years were screened at 63 different Tribal and IHS sites across the country.

The five key findings from the survey highlight the significance of tooth decay in AI/AN children and the disparities that continue to exist between the U.S. population as a whole and AI/AN children.

Key Findings

1. Tooth decay is a significant health problem for American Indian and Alaska Native preschool children.
2. Early prevention, before the age of two, is essential to reduce the prevalence of tooth decay in American Indian and Alaska Native preschool children.
3. Many American Indian and Alaska Native preschool children are not getting the dental care they need.
4. American Indian and Alaska Native children continue to have more dental disease than other minority populations in the United States.
5. There are significant oral health disparities among IHS Areas.

Recommendations

- Develop age-specific prevention programs to reduce the burden of dental disease and target those at highest risk. The importance of early prevention, annual or semiannual dental visits starting at 1 year of age, community water fluoridation, and preschool-based dental disease prevention programs should be stressed.
- Develop strategies to increase the number of dental providers available to provide care to AI/AN preschool children and to address the underlying burden of dental disease. For the general U.S. population there are approximately 1,500 people per dentist while in FY 2011 there were more than 2,800 AI/AN patients per dentist employed or contracted by the IHS and Tribal dental clinics.[1]
- Develop strategies to address the tremendous backlog of dental disease. The average expenditure for oral health care in the IHS in FY 2011 was about $99 per person compared to about $272 per person nationally.[2]
- Partner with non-dental health care providers such as physicians and nurses to help assess, educate, and refer children in need of dental care.
- Collaborate with health care administrators, Chief Executive Officers, Area Directors, and Tribal administrators to assure adequate support for both preventive and restorative dental programs.

A key message from the Surgeon General's report on oral health is that oral health is essential to the general health and well-being of all Americans and, given our knowledge of prevention and restorative care, can be achieved by all.[3] However, not all Americans have attained a high degree of oral health. Many, including many within the AI/AN population, still endure needless pain and suffering from oral disease.

To effectively address the oral health disparities outlined in this report, partnerships between public, private, and Tribal sectors are essential. By working together, using the information gathered in this oral health survey and the recommendations that arise from it, we can make excellent oral health a reality for all.

Introduction

Tooth decay, known formally as dental caries, is a bacterial disease process affecting both children and adults. It is probably the most widespread disease known to man. During childhood, tooth decay is the single most common chronic disease and is five times more common than asthma.[3] The public perception is largely that tooth decay is a natural and minor occurrence that deserves little attention or dollars. If left untreated, however, tooth decay can lead to difficulty in speaking, chewing, and swallowing, increased cost of care, loss of self-esteem, needless pain, and lost school days.

Tooth decay occurring in children 0-5 years of age is referred to as early childhood caries (ECC). Due to their young age, 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 and the risk to the child can be substantial. The good news is that tooth decay is preventable by a combination of community, professional, and individual measures including water fluoridation, dental sealants, use of fluoride toothpastes at home, proper infant feeding practices, a healthy diet low in sugar and refined carbohydrates, and regular dental visits starting at 12 months of age.

A Brief History of the IHS Oral Health Monitoring System

In the mid-1950's, the Indian Health Service (IHS) dental program implemented an annual reporting system for monitoring the oral health of American Indian and Alaska Native (AI/AN) dental patients. Although the monitoring system was limited to those who sought dental care, it provided important information regarding trends in the oral health of the AI/AN population. During the 1970s, the monitoring system changed from an annual reporting system to periodic surveys of dental patients. Surveys of dental patients were completed in 1984, 1991, and 1999. The periodic surveys collected data on children and adolescents 2-19 years, adults 35-44 years, and elders 55 years and older.

Within the IHS and Tribal health care delivery systems, preschool children are usually brought to the dental clinic because they have a problem. In other words, children with tooth decay are more likely to be dental patients than children without tooth decay. For this reason, the previous IHS dental patient surveys probably overestimated the prevalence and severity of tooth decay in children less than 6 years of age. In addition, elders without teeth are less likely to visit the dental clinic than elders with teeth so previous surveys may have underestimated the prevalence of total tooth loss (edentulism).

In 2010, the IHS developed and began the implementation of an oral health surveillance system to collect oral health status data from a community-based sample of children rather than dental patients. By evaluating the oral health of a community-based sample, the information collected by IHS will be more comparable to state and national oral health information contained in the National Oral Health Surveillance System and the Dental, Oral and Craniofacial Data Resource Center.[4,5] The surveillance system will be implemented in phases based on age group. This report presents information from phase 1; children 1-5 years of age.

Because of differences in both sampling and survey methods, results from the 2010 survey are not directly comparable to previous IHS oral health survey results.

Early Childhood Caries Collaborative

The Indian Health Service recently launched the Early Childhood Caries (ECC) Collaborative; a multi-faceted program designed to enhance knowledge about ECC prevention and early intervention among not only dental providers, but also among all healthcare providers and the community. The Collaborative provides the entire healthcare team with the tools to begin a successful ECC program. Increasing access to oral health care and evidence-based prevention is a collaborative effort that must include the oral health care team, medical providers,

Community Health Representatives, Head Start staff, and Women, Infant, and Children (WIC) program staff. The Collaborative also provides the framework to dental providers for ECC early intervention focusing on caries stabilization.

Purpose of the Survey

The primary purpose of the 2010 survey was to produce and distribute a wide range of information regarding the oral health of AI/AN children 1-5 years of age. The information will be used as baseline data for evaluating the ECC Collaborative and will be distributed throughout the Indian health care system for use in planning interventions and revising public policies on local, regional, and national levels.

Opportunities

The 2010 IHS Oral Health Survey of AI/AN Preschool Children and this report give Tribal leaders, health administrators, health care providers, and public health planners an effective tool with which to plan future interventions and revise public policies. This report provides information on opportunities for increased prevention, for engaging Tribes and communities, and for interdisciplinary approaches to the problems of oral disease, all of which will be needed if the oral health of AI/ANs is to be improved in the coming decade.

How this Report will be Used

Information from this survey will be used in several ways. It will be shared with Tribes, Congress, and other parties interested in the IHS dental program and the oral health of American Indians and Alaska Natives. It will be used to document the oral health status of AI/AN preschool children, and to track changes in their oral health over time. It will be used to plan programs and interventions directed toward specific oral health problems. This type of information can help increase access to both preventive and restorative care in order to eliminate the oral health disparities of the AI/AN population.

Survey Methods

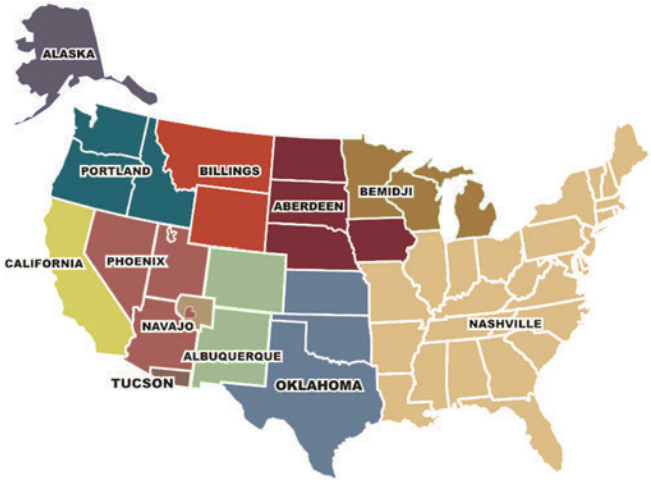
Background

The Indian Health Service (IHS), an agency within the Department of Health and Human Services, is responsible for providing federal health services to American Indian and Alaska Native (AI/AN) people. The provision of health services to federally recognized AI/ANs grew out of a special relationship between the federal government and Tribes. This government-to-government relationship is based on Article I, Section 8, of the United States Constitution, and has been given form and substance by numerous treaties, laws, Supreme Court decisions, and Executive Orders. The mission of the IHS, in partnership with AI/AN people, is to raise their physical, mental, social, and spiritual health to the highest level.

The IHS has carried out its responsibilities through developing and operating a health services delivery system designed to provide a broad-spectrum program of preventive, curative, rehabilitative, and environmental services. This system integrates health services delivered directly through IHS facilities, purchased by IHS through contractual arrangements with providers in the private sector, and delivered through programs operated by Tribes and urban Indian health programs.

The operation of the IHS health services delivery system is managed through local administrative units called service units. A service unit is the primary level of health organization for a geographic area served by the IHS program, just as a county or city health department in a state health department. A few service units cover a number of small reservations; some large reservations are divided into a number of service units. The service units are grouped into larger cultural-demographic-geographic management jurisdictions administered by Area Offices. The IHS is comprised of 12 Area Offices: Aberdeen, Alaska, Albuquerque, Bemidji, Billings, California, Nashville, Navajo, Oklahoma City, Phoenix, Portland, and Tucson (see map).

Fiscal year (FY) 2009, the most recent data available at the time, was used for selecting the sample. In FY 2009, the 12 IHS Areas consisted of 166 service units with 104 (63%) of which were tribally operated. These 166 service units provide care to an IHS user population of 1.5 million. The IHS user population is defined as the number of Indian registrants, residing within a service delivery area with at least one face-to-face, direct or contract, inpatient stay, ambulatory care visit, or dental visit during the prior three fiscal years. The service delivery area for the user population is called a "Contract Health Service Delivery



Area and only users who live inside one can be" counted as a user. The AI/ANs residing in the service delivery areas comprise about 56% of all AI/AN people residing in the United States. Tucson (25,562) and Nashville (51,491) have the smallest user populations while Navajo (242,331) and Oklahoma City (318,923) have the largest user populations.

Sample Selection

The sampling frame consisted of all service units with a FY 2009 estimated 0-5 year old user population of 20 or more children (158 service units). A stratified probability proportional to size (PPS) cluster sampling design was used to select service units. The sampling frame was stratified by Area, and service units were sorted within each Area based on operational status (Tribal or IHS) and/or state. A systematic probability proportional to size sampling was used to select service units. Systematic PPS sampling from the sorted lists provides for implicit stratification on operational status and state, which ensures representation within Areas by these factors. Fifty-six service units were selected. If a service unit refused to participate, replacements were selected with a PPS random selection from within the same sampling interval as the refusing service unit. Of the 56 service units selected, 43 participated, 10 refused and were replaced by another service unit, and 3 refused but were not replaced. Refer to Appendix 2 for a list of participating service units. Ten service units that were not in the original sample also participated.

Screening Sites

We screened children at selected community-based sites including medical or well-child clinics, WIC, Early Head Start, Head Start, Tribal preschools, kindergarten, and community events. Children were screened from August 2010 through January 2011.

Sample Size

Each Area was asked to screen a minimum of 80 children in each age year cohort from 1 to 5 years, for a total of 400 children per Area. Within each Area, selected service units were asked to screen a number of children proportional to their IHS user population (i.e. larger service units were asked to screen more children than smaller service units). The actual number of children screened was 8,461.

Data Management and Analysis

Service unit staff collected data using paper forms, which were mailed to a central location for data entry. All statistical analyses were performed with SAS software (Version 9.2; SAS Institute Inc., Cary, NC). Age specific sample weights were used to produce population estimates based on selection probabilities and indicating the number of children in the sampling interval each screened child represents.

Survey Indicators

The following information was collected for each child: date of birth, gender, race, number of primary teeth present, number of primary teeth with untreated decay, number of primary teeth with restorations, number of primary teeth extracted because of decay, number of maxillary anterior teeth with decay experience, number of primary molars with sealants, and urgency of need for dental care (Appendix 1). We used the clinical indicator definitions and followed the data collection protocols outlined in the Association of State and Territorial Dental Directors' 2008 publication, *Basic Screening Surveys: an Approach to Monitoring Community Oral Health*.[6]

Race was recorded as AI/AN or "other". Any child with a recognized Tribal affiliation was considered to be AI/AN. No attempt was made to determine if a child was multi-racial. Only children classified as AI/AN were included in the analyses.

One service unit collected only prevalence data for decay experience, untreated decay, and treatment urgency. For this reason, the number of children with severity data is less than the number with prevalence data.

Examiner Training

All examiners were required to attend or view one of two examiner training webinars. The following information was included in the webinar: purpose of the survey, sampling and sample size, appropriate screening sites, survey protocol, and detailed information on clinical diagnostic criteria. We followed the examiner training protocol outlined in the Association of State and Territorial Dental Directors' 2008, publication *Basic Screening Surveys: an Approach to Monitoring Community Oral Health*.[6]

Having dental examiners watch a training video has been shown to be an effective way to "standardize" Basic Screening Survey examiners. A study which compared a nurse and hygienist who watched a 15-minute training video with a standard dental examiner found that validity was high for screening for caries and treatment needs (> 90% for sensitivity, specificity, and predictive values in a sample having 30% to 40% prevalence).[7]

Survey Limitations

The population of interest for this survey was children living in communities with IHS/Tribal service units; therefore, it is representative of those AI/AN children who live within a Contract Health Service Delivery Area (CHSDA). Children living within CHSDAs may not be representative of other AI/AN preschool children residing in the United States. It is estimated that AI/ANs residing in the service delivery areas comprise about 56% of all AI/AN people residing in the United States.

It should be noted that service units were not compensated for the time it required to participate in the survey. In some cases vacancies in dental clinic staffing, clinical workloads, or lack of service unit resources prevented some service units from participating. In addition, some service units were not able to screen the minimum number of children for a variety of reasons including workload and limited resources. This was especially true for 1-2 year olds, as well as 5 year olds (Appendix 2). This variation in sampled numbers of children by service unit is addressed through analysis weighting but could still impact survey results. Overall, approximately 6% of the FY 2010 IHS user population between 1-5 years of age participated in the survey. The percent varied by Area from just over 2% for Navajo to 26% for Billings (Appendix 3).

The number of surveys conducted in community settings, such as Head Start and WIC, was dependent on the availability of these programs in the community and their willingness to have dental staff conduct the surveys. Examiner variability across service units and Areas was also possible despite standardization activities.

The Oral Health of AI/AN Preschool Children

To describe the oral health of American Indian and Alaska Native (AI/AN) preschool children at both the national and Area level, the Indian Health Service (IHS) Division of Oral Health worked with Tribal and IHS dental programs to coordinate a national oral health survey. The IHS is composed of 12 regional administrative units called IHS Areas. Within each of the 12 IHS Areas, a probability sample of service units was selected to represent the diverse nature of Tribal and IHS dental programs. The AI/ANs residing in service delivery areas comprise about 56% of all AI/AN people residing in the United States. Dental screenings were conducted by trained dentists, dental hygienists, and dental therapists at medical and well-child clinics, WIC clinics, Early Head Start, Head Start, Tribal preschools, kindergartens, and community events. Overall, 8,461 AI/AN children 1-5 years of age were screened at 63 different Tribal and IHS sites, representing approximately 6% of the FY 2010 IHS user population between 1-5 years. Detailed information on the design of the oral health survey can be found in the Survey Methods section of this report. The survey was conducted in 2010.

Findings from this survey have been organized into five key findings. These findings highlight the current oral health of AI/AN preschool children living in IHS/Tribal service areas and describe disparities in oral health that continue to exist in the United States, particularly between the population as a whole and AI/AN children.

Key Findings

1. Tooth decay is a significant health problem for American Indian and Alaska Native preschool children.
2. Early prevention, before the age of two, is essential to reduce the prevalence of tooth decay in American Indian and Alaska Native preschool children.
3. Many American Indian and Alaska Native preschool children are not getting the dental care they need.
4. American Indian and Alaska Native children continue to have more dental disease than other minority populations in the United States.
5. There are significant oral health disparities among IHS Areas.

The Oral Health of AI/AN Preschool Children

1

Key Finding

Tooth decay is a significant health problem for American Indian and Alaska Native preschool children.

Dental caries (tooth decay) is a bacterial disease process affecting both children and adults. It is probably the most widespread disease known to man. We found tooth decay in about 54% of all children ages 1 to 5 years examined during this survey (Table 4). This prevalence of decay suggests that tooth decay is the most prevalent disease of childhood in this population.

Young Child with Advanced Decay

Tooth decay is largely perceived by the public as natural and minor occurrence that deserves little attention or dollars. If left untreated, however, it can cause needless pain, suffering, and infection. But the manifestations of tooth decay in young children go beyond pain and infection. If left untreated, dental decay may affect a child's ability to eat, communicate, and learn.[8] In extreme cases, tooth decay in early childhood and its treatment can lead to serious disability and even death.[9] In addition, research has shown that preschool children with advanced decay weigh significantly less than their counterparts and are more likely to weigh less than 80 percent of their ideal weight – a diagnostic criterion for failure to thrive.[10]

Key Finding

Early prevention, before the age of two, is essential to reduce the prevalence of tooth decay in American Indian and Alaska Native preschool children.

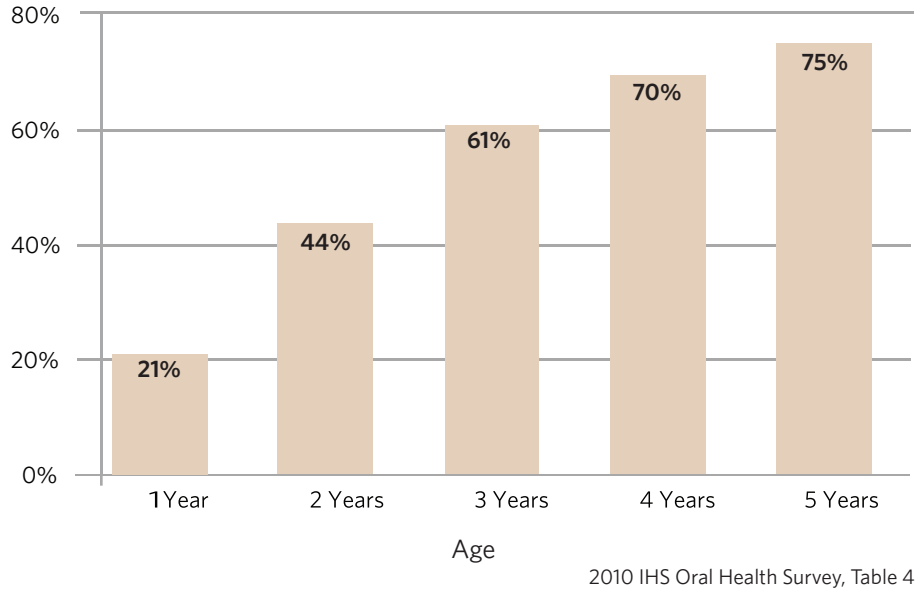
2

Early prevention efforts are critical for the eradication of dental disease in American Indian and Alaska Native (AI/AN) children. More than 20% of 1-year old AI/AN children already have decayed teeth and the percentage with decay rises significantly with age. To prevent this bacterial disease from occurring and spreading, it is important to start before the age at which children already have the disease.

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.

The American Academy of Pediatric Dentistry recommends several strategies that focus on the mother (or the primary caregiver) and the infant.[11] Mothers need to learn about: the use of fluoride in water and toothpaste; oral hygiene starting in infancy; proper diet; treatment of decay; and how cavity-causing bacteria may be transmitted from mother to child. For high-risk children, dental decay prevention strategies should be an integral part of health care messages given by physicians, particularly pediatricians, nurses, health department staff, teachers, health educators, and daycare providers.

Percent of AI/AN Children Screened with Tooth Decay by Age, 2010



2010 IHS Oral Health Survey, Table 4

The Oral Health of AI/AN Preschool Children

3

Key Finding

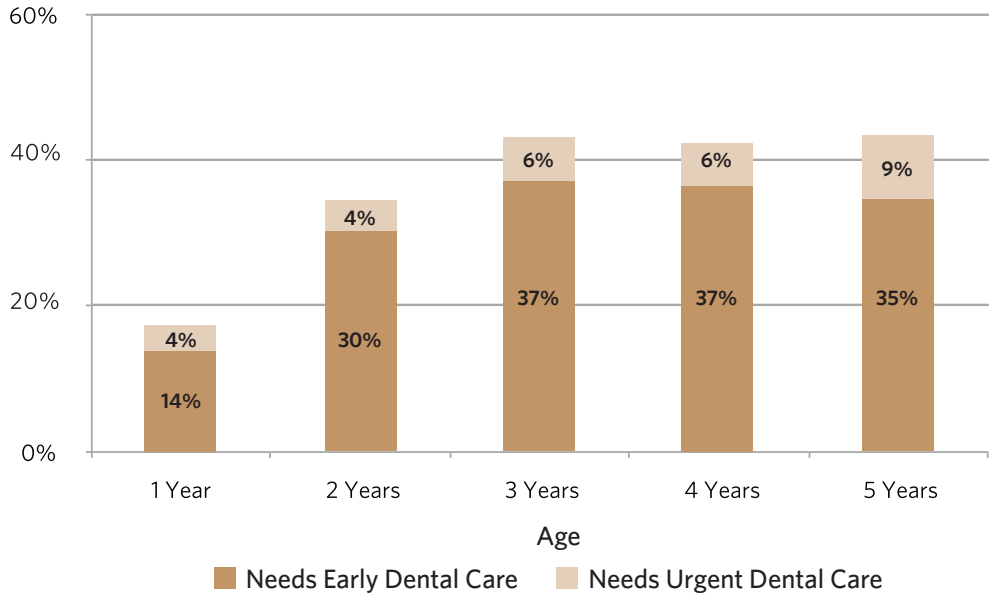
Many American Indian and Alaska Native preschool children are not getting the dental care they need.

More than 36% of the 1-5 year old children screened had a need for dental care, with about 6% needing urgent dental care because of pain or infection. Indian Health Service and tribal programs provide services to about 141,000 children 1-5 years of age. This means that more than 50,000 AI/AN preschool children served by IHS need dental care, of which about 8,400 may be in pain or have an oral infection.

Due to their young age, treatment of preschool children with decay is often provided in a hospital-based operating room under general anesthesia. Because of this, the cost of treatment can be enormous and the risk to the child can be substantial. On average, the total cost of treating a child's dental disease in the hospital under general anesthesia in 1994 was $2,000.[12] Anecdotal information suggests that the current cost of treating a child's dental disease in a hospital setting ranges from $6,000-$12,000 per child.

In this oral health survey, diagnostic dental examinations were not conducted. Dental screenings were performed which included a visual exam with a dental mirror. No x-rays were taken and none of the more advanced diagnostic tools were used. For these reasons, the findings underestimate the proportion of children needing dental care.

Percent of AI/AN Children Screened Needing Early or Urgent Dental Care, 2010



2010 IHS Oral Health Survey, Table 4

cont'd 3

The American Academy of Pediatrics and the American Academy of Pediatric Dentistry recommend that children have at least an annual dental visit starting at 1 year of age. In recent years, approximately 25% of those served by the IHS and Tribal health care system had a dental visit at an IHS or Tribal facility. For youngsters ages 0 to 5 years of age, the percent with a dental visit has likely been significantly lower than 25% in many locations.

There are probably two main reasons why such a low percent of AI/AN children have an annual dental visit. First, parents may not understand the benefits of early dental visits or the importance of the primary (baby) teeth. Second, the relative geographic isolation of Tribal populations and the inability to attract dentists to practice in IHS or Tribal health facilities may limit AI/AN children's access to dental care. Approximately 15-20% of the dentist positions at IHS and Tribal health facilities were vacant in 2010. Another way to look at this problem is the dentist-to-population ratio. In IHS, there is 1 dentist for every 2,800 AI/AN patients compared with 1 dentist for every 1,500 people in the general population.[1]

The Oral Health of AI/AN Preschool Children

4

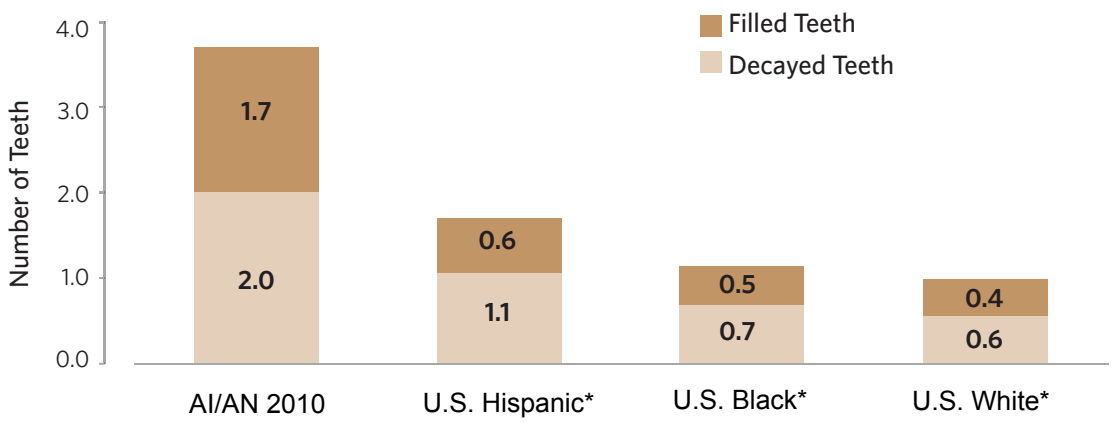
Key Finding

American Indian and Alaska Native children continue to have more dental disease than other minority populations in the United States.

Over the years, oral health has improved for most Americans, thanks in part to an increased focus on prevention. However, not all Americans have benefited equally. For many racial and ethnic minorities in the United States, good oral health is elusive, since appropriate preventive and restorative dental care is often associated with an individual's economic status. While Americans as a group are healthier, there are segments of the population with poor health.

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 3 times higher than white non-Hispanic children. 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.

Mean Number of Decayed and Filled Teeth Among 2-5 Year Old Children
AI/AN Children Compared to Other Racial/Ethnic Groups, 2010



* Source: National Health and Nutrition Examination Survey, 1999-2002 2010 IHS Oral Health Survey, Table 5
Note: This graph compares data from several different years and does not reflect a direct comparison with the IHS data from 2010 upon which this report is based.

Key Finding

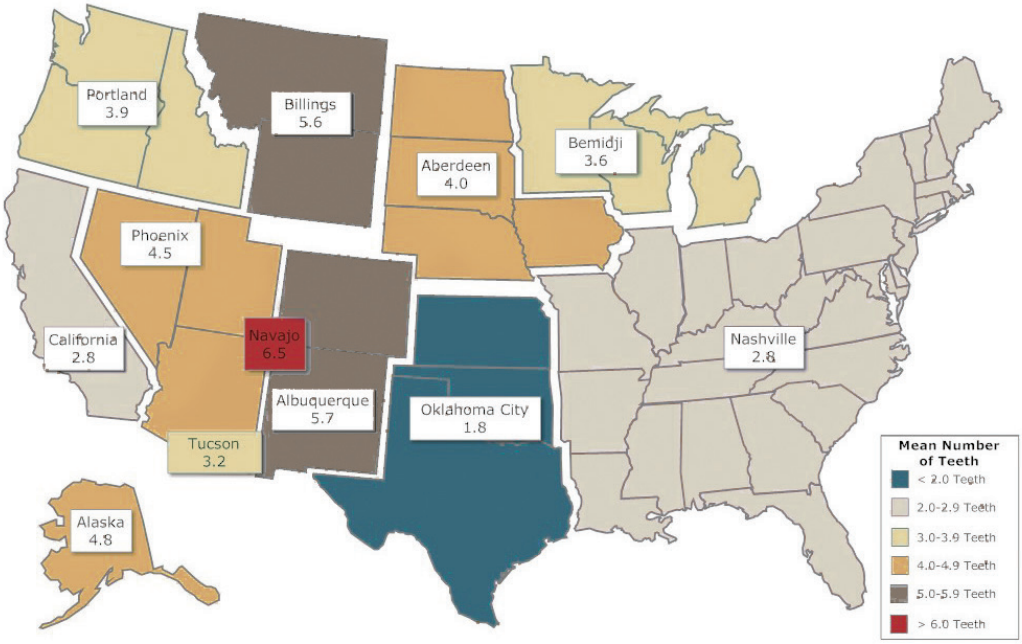
There are significant oral health disparities among IHS Areas.

5

The Surgeon General's Report on Oral Health points out the disparities in oral health that continue to exist in the United States, particularly between the population as a whole and minority groups within it.[3] Not only are there disparities among AI/AN children and the U.S. population as a whole, but there are disparities among AI/AN subpopulations. Even today, previously described Tribal and regional variations in the prevalence of oral disease persist.

By 2 years of age, most children have 20 teeth. This map displays the average number of teeth that have had cavities in the children screened. For example, the 2-5 year old children in the Portland Area have, on average, almost 4 teeth with cavities. Differences in oral health among IHS Areas may be partially due to differences in socioeconomic status. For example, 77% of the AI/AN population in the Oklahoma City Area have a high school diploma, compared to 60% of the Navajo Area population. Nine percent of males in the Oklahoma City Area are unemployed, compared to 25% of males in the Navajo Area and the percent of the population living in poverty is almost twice as high in the Navajo Area compared to the Oklahoma City Area (40% vs. 22%).[13]

Mean Number of Teeth with Tooth Decay in AI/AN Children Screened by IHS Area (ages 2-5), 2010



2010 IHS Oral Health Survey, Table 10

Recommendations

The results of the 2010 IHS Oral Health Survey of American Indian and Alaska Native Preschool Children indicate that very young AI/AN children experience high levels of tooth decay and do not have adequate access to preventive and restorative dental treatment. Because tooth decay begins early and is severe among young AI/AN children, it affects their oral health for a lifetime. Based on the findings of the 2010 survey and decades of experience attempting to effectively prevent this disease, the following recommendations were developed to improve the oral health of AI/AN preschool children.

Prevention Programs

- Develop methods to assure that all parents of young children receive ongoing anticipatory guidance on how to prevent early childhood tooth decay.
- Develop comprehensive decay prevention programs that include pregnant women, infants, toddlers and older children.
- Teach parents how to use the dental health care system and to advocate for oral health for themselves and their children in both individual and group settings (self-management support).
- Educate non-dental health care providers about the relationship of oral health and general health and their role in the prevention of oral disease (decision support).
- Encourage communities and Tribal utilities to fluoridate their water supplies in order to reduce the rates of dental disease among AI/AN populations.
- Develop and target preventive interventions for children beginning at approximately six months including, but not limited to, use of fluoridated toothpaste and fluoride varnishes.
- Encourage the use of dental sealants in preschool children.
- Redesign current prevention programs to assure efficiency and effectiveness of the care teams.

Access to Dental Care

- Encourage the first dental visit at 1 year of age.
- Incorporate caries risk assessments into all preventive as well as restorative treatment plans.
- Increase the number of dental providers who are comprehensively trained and comfortable treating very young children.
- Increase the number of dental providers who can provide preventive and restorative services.
- Increase enrollment of eligible families into publicly financed programs such as Medicaid and the Children's Health Insurance Program (CHIP), and use third party reimbursement to contract for more dental providers.

Collaboration with and Education of Health Care Providers

- Encourage health care providers who see young children to assess the oral health of infants and toddlers, provide education to the parents or caregivers, and refer those in need to the dental clinic.
- Provide training to health care providers on appropriate dental screening techniques, advanced access and referrals.
- Train health care providers to provide oral health educational messages and apply fluoride varnishes to high-risk children.
- Work with nutritionists and WIC program staff to help educate families and individuals about the relationship of dental decay and sugars.
- Collaborate with Head Start, Early Head Start, and other day care programs to educate families and staff about the importance of oral health, primary prevention, and access to care.

Caregivers and the Community

- Develop and implement education and intervention programs for mothers, beginning with prenatal care since the bacteria that cause tooth decay may be transmitted from the mother to the child.
- Educate community members, administrative and program staff, Tribal health boards, and other groups about the oral health of very young children.
- Teach parents and caregivers to brush their children's teeth daily with a fluoridated toothpaste.
- Encourage parents and caregivers to reduce or eliminate their child's sugar consumption in bottles, sippy cups, foods, and beverages.
- Teach parents and caregivers to be aware of early signs of dental decay and to seek dental care if decay is seen.
- Educate community members, Tribal health boards, and other policy groups about the prevention of dental disease in very young children.

Advocacy and Partnerships

- Share information widely about the tremendous oral health disparities that exist between Indian people and the general U.S. population.
- Develop partnerships to address these health disparities. Educate Tribal leaders about the oral health needs of AI/AN people.
- Encourage dental programs to work in partnership with Tribes to understand barriers to both preventive and restorative dental care and to develop effective strategies to address these barriers.

Research

- Identify characteristics of AI/AN preschool children that contribute to the high prevalence of tooth decay and test and evaluate programs to reduce the incidence and severity of tooth decay in this age group.
- Encourage research focused on the epidemiology and microbiology of dental caries in the AI/AN population.
- Recognize the limitations of extrapolating findings from research done with non-AI/AN populations to AI/AN patients and communities.

Data Tables

Table 1: Number of AI/AN children screened by IHS Area and age, 2010

Area	1 Year	2 Years	3 Years	4 Years	5 Years	TOTAL
Aberdeen	84	103	199	254	77	717
Alaska	42	81	193	198	69	583
Albuquerque	75	102	231	316	145	869
Bemidji	97	114	197	235	181	824
Billings	144	179	539	633	187	1682
California	55	78	187	168	47	535
Nashville	96	125	146	122	90	579
Navajo	61	67	108	129	107	472
Oklahoma City	83	111	190	175	115	674
Phoenix	73	77	148	210	63	571
Portland	75	62	148	222	87	594
Tucson	5	13	112	165	66	361
TOTAL	890	1,112	2,398	2,827	1,234	**8,461**

2010 IHS Oral Health Survey

Table 2: Percent of AI/AN children screened at each type of screening site by age, 2010

Screening Site	1 Year (n=890)	2 Years (n=1,112)	3 Years (n=2,398)	4 Years (n=2,827)	5 Years (n=1,234)	Total (n=8,461)
Medical/Well Child Clinic (%)	34.3	33.4	17.1	17.4	21.2	24.6
Early Head Start (%)	26.3	24.3	4.4	1.6	0.2	11.3
Head Start (%)	7.3	13.2	59.3	69.4	29.1	35.9
Other Preschool (%)	20.1	19.8	17.2	8.7	16.6	16.5
Kindergarten (%)	0.0	0.0	0.0	1.1	31.5	6.4
WIC (%)	9.8	6.3	1.4	1.0	0.3	3.7
Community Event (%)	2.0	3.0	0.5	0.7	1.0	1.4
Unknown (%)	0.2	0.0	0.0	0.0	0.0	0.1

2010 IHS Oral Health Survey

Table 3: Mean age in months and gender of AI/AN children screened by age, 2010

Variable	1 Year (n=890)	2 Years (n=1,112)	3 Years (n=2,398)	4 Years (n=2,827)	5 Years (n=1,234)	Total (n=8,461)
Mean Age in Months	17.2	29.7	41.5	53.4	64.5	41.3
Gender						
Male (%)	48.6	44.9	50.7	48.9	48.2	48.2
Female (%)	51.4	55.0	49.1	50.7	51.4	51.5
Unknown (%)	0.0	0.1	0.2	0.4	0.4	0.2

2010 IHS Oral Health Survey

Table 4: Percent of AI/AN children with decay experience, untreated decay, primary molar sealants, and urgency of need for dental care by age, 2010

Variable	1 Year (n=890)	2 Years (n=1,112)	3 Years (n=2,398)	4 Years (n=2,827)	5 Years (n=1,234)	1-5 Years (n=8,461)	2-5 Years (n=7,571)	3-5 Years (n=6,459)
Decay Experience (95% CI)	21.2 (14.9-27.4)	43.7 (36.6-50.7)	60.8 (55.0-66.6)	69.5 (64.3-74.8)	75.1 (67.1-83.1)	54.1 (49.3-59.0)	62.3 (57.1-67.4)	68.4 (63.2-73.6)
Untreated Decay (95% CI)	18.2 (12.9-23.5)	36.7 (30.7-42.8)	46.0 (39.4-52.7)	44.4 (39.5-49.4)	47.1 (39.0-55.2)	38.5 (33.7-43.4)	43.6 (38.4-48.8)	45.8 (40.3-51.4)
Primary Molar Sealants+ (95% CI)	1.2 (0.0-2.8)	3.5 (0.8-6.1)	6.0 (4.3-7.6)	11.7 (8.1-15.4)	12.8 (7.8-17.8)	7.1 (5.3-8.9)	8.5 (6.4-10.7)	10.2 (7.6-12.7)
Early or Urgent Care (95% CI)	17.5 (12.6-22.5)	34.6 (28.6-40.6)	43.3 (37.1-49.6)	42.4 (37.4-47.4)	43.5 (37.5-49.5)	36.3 (31.9-40.7)	41.0 (36.4-45.5)	43.1 (38.4-47.8)
Urgent Care (95% CI)	3.6 (1.6-5.5)	4.3 (1.9-6.7)	6.1 (3.4-8.7)	5.8 (3.8-7.9)	8.8 (4.5-13.1)	5.7 (3.8-7.6)	6.2 (4.0-8.5)	6.9 (4.2-9.5)

+ One service unit did not collect information on primary molar sealants

Decay Experience: The child had treated or untreated decay at the time of the screening.
Untreated Decay: The child had decay that was not treated at the time of the screening.
Primary Molar Sealants: Plastic-like coatings applied to the chewing surfaces of back teeth.
Early or Urgent Care: The child needed dental care at the time of the screening.
Urgent Care: The child had pain or an infection at the time of the screening.

2010 IHS Oral Health Survey

Data Tables

Table 5: Mean number of decayed, missing and filled teeth (DMFT) and mean percent of erupted teeth with decay experience among AI/AN children by age, 2010

Variable	1 Year (n=875)	2 Years (n=1,097)	3 Years (n=2,356)	4 Years (n=2,762)	5 Years (n=1,233)	1-5 Years (n=8,323)	2-5 Years (n=7,448)	3-5 Years (n=6,351)
Decayed Teeth (95% CI)	0.79 (0.50-1.08)	1.69 (1.34-2.04)	2.26 (1.84-2.69)	1.98 (1.65-2.32)	2.05 (1.58-2.51)	1.76 (1.46-2.05)	2.00 (1.68-2.32)	2.10 (1.76-2.44)
Missing Teeth (95% CI)	0.04 (0.00-0.08)	0.18 (0.10-0.25)	0.39 (0.29-0.49)	0.47 (0.35-0.58)	0.76 (0.53-0.99)	0.37 (0.28-0.46)	0.45 (0.33-0.56)	0.54 (0.40-0.67)
Filled Teeth (95% CI)	0.11 (0.02-0.19)	0.47 (0.27-0.66)	1.26 (0.96-1.57)	2.13 (1.80-2.46)	2.90 (2.37-3.42)	1.37 (1.16-1.59)	1.69 (1.42-1.96)	2.09 (1.75-2.42)
dmft (95% CI)	0.94 (0.61-1.26)	2.33 (1.95-2.72)	3.91 (3.36-4.47)	4.58 (4.07-5.08)	5.70 (4.87-6.52)	3.50 (3.07-3.93)	4.13 (3.64-4.62)	4.72 (4.17-5.28)
Percent of Teeth* (95% CI)	6.4 (4.2-8.6)	12.2 (10.1-14.3)	19.6 (16.8-22.4)	23.0 (20.5-25.5)	29.3 (25.0-33.6)	18.1 (15.9-20.4)	21.0 (18.5-23.5)	23.9 (21.1-26.8)

* Percent of erupted primary teeth (teeth present plus teeth extracted) with decay experience
Data not available for 138 children.

2010 IHS Oral Health Survey

Table 6: Percent of AI/AN children by dmft score and age, 2010

dmft Score	1 Year (n=875)	2 Years (n=1,097)	3 Years (n=2,356)	4 Years (n=2,762)	5 Years (n=1,233)
0	79.0	56.3	39.1	30.7	24.9
1	2.1	4.1	6.9	6.0	4.9
2	5.9	8.3	7.5	9.1	6.7
3	1.0	3.4	4.1	4.2	6.0
4	4.1	7.2	6.6	8.0	5.8
5	0.7	2.6	4.0	4.4	4.3
6	1.7	4.1	4.7	5.7	5.0
7	0.6	2.0	2.9	5.9	4.3
8	3.4	3.6	6.7	6.3	8.5
9	0.1	1.9	2.0	2.9	4.5
10	0.8	3.3	3.9	3.7	4.1
11	0.0	0.8	2.1	1.7	3.6
12	0.3	0.8	4.8	4.2	7.3
13	0.1	0.2	0.7	2.1	2.0
14	0.1	0.7	2.3	2.3	3.4
15	0.0	0.2	0.6	0.8	1.5
16	0.0	0.1	0.5	0.6	1.5
17	0.0	0.0	0.1	0.5	0.3
18	0.0	0.2	0.1	0.3	0.7
19	0.0	0.0	0.2	0.1	0.2
20	0.0	0.2	0.3	0.6	0.6

dmft: Number of teeth that are decayed, missing or filled because of tooth decay
Data not available for 138 children.

2010 IHS Oral Health Survey

Table 7: Percent of AI/AN children by percent of teeth that are decayed, missing or filled by age, 2010

Percent of Teeth Decayed, Missing or Filled	1 Year (n=875)	2 Years (n=1,097)	3 Years (n=2,356)	4 Years (n=2,762)	5 Years (n=1,233)
Caries Free (0%)	79.0	56.3	39.1	30.7	24.9
0.1% to 15.0% of Teeth	5.6	14.8	18.4	19.0	17.1
15.1% to 30.0% of Teeth	6.6	12.9	15.3	18.2	14.4
30.1% to 50.0% of Teeth	6.4	12.5	15.4	18.9	21.3
50.1% to 100% of Teeth	2.3	3.5	11.8	13.3	22.3

Data not available for 138 children.

2010 IHS Oral Health Survey

Data Tables

Table 8: Percent of AI/AN children *2-5 Years* with decay experience and untreated decay by IHS Area, 2010

IHS Area	Number Screened	Decay Experience	Untreated Decay
		Percent (95% Confidence Interval)	Percent (95% Confidence Interval)
Aberdeen	633	61.1 (49.4-72.7)	40.7 (26.7-54.7)
Alaska	541	68.2 (49.3-87.0)	46.7 (39.8-53.6)
Albuquerque	794	77.7 (68.8-86.6)	57.1 (51.4-62.7)
Bemidji	727	53.1 (35.9-70.2)	38.0 (28.5-47.4)
Billings	1,538	68.7 (60.2-77.2)	42.5 (37.6-47.4)
California	480	54.7 (45.1-64.2)	36.9 (24.2-49.6)
Nashville	483	50.5 (38.2-62.7)	34.5 (23.2-45.8)
Navajo	411	85.9 (79.8-92.0)	65.8 (50.9-80.7)
Oklahoma City	591	38.9 (28.1-49.7)	30.4 (12.8-48.1)
Phoenix	498	67.0 (57.9-76.0)	42.2 (33.1-51.4)
Portland	519	63.5 (50.0-76.9)	40.4 (29.1-51.7)
Tucson	356	67.7 (65.0-70.4)	58.7 (56.5-61.0)
IHS Total	7,571	62.3 (57.1-67.4)	43.6 (38.4-48.8)

NOTE: Tucson only screened 5 one year old children so Area comparisons are restricted to children 2-5 years

2010 IHS Oral Health Survey

Table 9: Percent of AI/AN children *2-5 Years* needing dental care by IHS Area, 2010

IHS Area	Number Screened	Early or Urgent Dental Care	Urgent Dental Care*
		Percent (95% Confidence Interval)	Percent (95% Confidence Interval)
Aberdeen	633	39.6 (23.5-55.8)	1.9 (0.8-3.1)
Alaska	541	46.0 (35.5-56.5)	3.9 (0.0-8.6)
Albuquerque	794	56.9 (50.9-62.8)	5.8 (1.2-10.3)
Bemidji	727	36.2 (28.2-44.2)	4.9 (1.8-8.0)
Billings	1,538	43.8 (37.9-49.8)	6.6 (0.6-12.5)
California	480	35.3 (22.9-47.7)	8.5 (1.9-15.1)
Nashville	483	35.6 (25.4-45.7)	3.5 (0.3-6.7)
Navajo	411	64.4 (53.1-75.7)	8.9 (0.0-18.2)
Oklahoma City	591	22.7 (7.9-37.5)	8.1 (0.4-15.7)
Phoenix	498	35.8 (25.2-46.3)	4.9 (2.4-7.5)
Portland	519	39.5 (28.4-50.6)	5.7 (2.0-9.5)
Tucson	356	48.8 (22.5-75.2)	2.9 (2.0-3.8)
IHS Total	7,571	41.0 (36.4-45.5)	6.2 (4.0-8.5)

* Urgent Care: The child had pain or an infection at the time of the screening.

2010 IHS Oral Health Survey

Table 10: Mean number of decayed, missing or filled teeth (DMFT) and mean percent of erupted teeth with decay experience among AI/AN children 2-5 Years by IHS Area, 2010

IHS Area	Number Screened	Decayed, missing or filled Teeth (dmft)	Percent of teeth with decay experience
		Mean (95% Confidence Interval)	Mean (95% Confidence Interval)
Aberdeen	633	3.96 (2.65-5.26)	20.1 (13.3-26.9)
Alaska	540	4.81 (1.98-7.64)	24.9 (10.4-39.4)
Albuquerque	794	5.71 (4.53-6.90)	29.2 (23.0-35.4)
Bemidji	727	3.60 (2.12-5.07)	18.2 (10.7-25.6)
Billings	1,417	5.64 (4.47-6.81)	28.7 (22.8-34.6)
California	480	2.75 (1.87-3.62)	13.8 (9.4-18.2)
Nashville	483	2.79 (1.77-3.81)	14.2 (8.9-19.4)
Navajo	411	6.52 (6.17-6.87)	33.2 (31.3-35.0)
Oklahoma City	591	1.84 (1.19-2.49)	9.4 (6.1-12.6)
Phoenix	498	4.48 (3.59-5.37)	22.6 (18.0-27.3)
Portland	519	3.91 (2.51-5.32)	19.8 (12.6-27.0)
Tucson	355	3.23 (2.75-3.71)	16.5 (13.9-19.0)
IHS Total	7,448	4.13 (3.64-4.62)	21.0 (18.5-23.5)

Data not available for 123 children.

2010 IHS Oral Health Survey

Table 11: Percent of AI/AN children 2-5 years by percent of teeth that are decayed, missing or filled by IHS Area, 2010

Area	Number Screened	0% Caries Free	0.1-15.0% of Teeth	15.1-30.0% of Teeth	30.1-50.0% of Teeth	50.1-100.0% of Teeth
Aberdeen	633	38.9	18.7	15.6	13.0	13.7
Alaska	541	31.8	19.2	14.6	15.9	18.5
Albuquerque	794	22.3	15.2	17.0	26.9	18.6
Bemidji	727	46.9	14.8	10.9	14.5	12.8
Billings	1,417	30.5	14.3	13.5	18.5	23.2
California	479	45.4	21.9	17.3	12.5	2.9
Nashville	483	49.5	16.4	13.2	15.9	4.9
Navajo	411	14.1	13.1	21.4	30.2	21.2
Oklahoma City	591	61.1	17.6	8.8	9.9	2.5
Phoenix	498	33.0	16.2	20.2	17.6	13.0
Portland	519	36.5	22.1	15.7	13.9	11.8
Tucson	355	32.4	29.5	19.3	14.8	4.0
IHS Total	7,448	37.7	17.3	15.2	17.0	12.7

Data not available for 123 children.

2010 IHS Oral Health Survey

Appendices

Appendix 1: Oral Health Screening Form

IHS Basic Screening Survey 2010: Data Collection Form for Children 1-5 Years of Age

ALL BOXES MUST HAVE AN ENTRY – DO NOT SKIP ANY BOX

Site Information

Screen Date: ___ ___ / ___ ___ / ___ ___	
Clinic Name:	Name of IHS Service Unit or Tribe/Clinic Name
IHS Area: ___ ___	1=Aberdeen 2=Alaska 3=Albuquerque 4=Bemidji 5=Billings 6=California 7=Nashville 8=Navajo 9=Oklahoma 10=Phoenix 11=Portland 12=Tucson
Type of Screening Site: ___	1=Medical / well-child clinic 2=Early Head Start 3=Head Start 4=Other preschool (not EHS/HS) 5=Kindergarten 6=WIC 7=Community events

Child Information

Date of Birth: ___ ___ / ___ ___ / ___ ___	Verify that year of birth is correct and matches child's age
Gender: ___	1=Male 2=Female
Race: ___	1=American Indian / Alaska Native 2=Other
Total # of Primary Teeth Present: ___ ___	Count the #of teeth with an entire incisal / occlusal surface showing including teeth that are just root tips. Do not include teeth that have been extracted or teeth just starting to erupt.
# Max. Ants with Caries History: ___	Count the number of maxillary anterior teeth (canine to canine) with untreated decay, fillings/crowns, or extracted because of decay. Do not include teeth that have exfoliated naturally.
# Primary Molars with Sealants: ___	Count all primary molar teeth with sealants regardless of whether or not they also have untreated decay or treated decay

dmft (primary teeth only-do not include permanent teeth)

# Teeth with Untreated Decay: ___ ___	Number of teeth with a cavitated carious lesion. If a tooth has a filling and untreated decay, count as untreated decay. Root tips are untreated decay.
# Teeth with Fillings/Crowns: ___ ___	Count only those teeth with fillings/crowns and no untreated decay. Teeth with just sealants and no other restorations are included in the sealant section.
# Extracted Teeth: ___ ___	Count the number of teeth that have been extracted due to caries. Do not count teeth that have exfoliated naturally.
Treatment Urgency: ___	0=No obvious problems 1=Early care needed 2=Urgent care needed (pain or infection)
COMMENTS:	

IMPORTANT: Do not "double count" teeth in the 3 dmft boxes. Untreated decay supersedes fillings/crowns.

Always use legible block numbers: **1 2 3 4 5 6 7 8 9 0**

Appendices

Appendix 2: Number of AI/AN Children Screened by Site and Age in Years, 2010

IHS Area	State	IHS/ Tribal	Site/Service Unit	1 Year	2 Years	3 Years	4 Years	5 Years	**TOTAL**
Aberdeen	ND	IHS	Standing Rock	14	24	87	88	11	**224**
Aberdeen	SD	IHS	Pine Ridge	19	22	37	50	31	**159**
Aberdeen	SD	IHS	Rapid City	22	22	21	38	28	**131**
Aberdeen	SD	IHS	Sisseton-Wahpeton	25	28	52	76	6	**187**
Aberdeen	SD	Tribal	Flandreau	4	7	2	2	1	**16**
Alaska	AK	Tribal	Anchorage	15	37	60	61	25	**198**
Alaska	AK	Tribal	Bristol Bay	3	9	22	22	14	**70**
Alaska	AK	Tribal	Interior Alaska	9	8	24	45	1	**87**
Alaska	AK	Tribal	Yukon-Kuskokwim Delta	15	27	87	70	29	**228**
Albuquerque	NM	IHS	Acoma-Canoncito-Laguna	16	49	111	128	89	**393**
Albuquerque	NM	IHS	Mescalero	17	18	36	39	22	**132**
Albuquerque	NM	IHS	Santa Fe	14	13	24	49	1	**101**
Albuquerque	NM	IHS	Zuni-Ramah	28	22	60	100	33	**243**
Bemidji	MI	Tribal	Eastern Michigan, Lambert Health Center	2	2	3	3	3	**13**
Bemidji	MI	Tribal	Sault Saint Marie	7	11	23	10	16	**67**
Bemidji	MI	Tribal	Western Michigan	9	15	17	18	4	**63**
Bemidji	MN	IHS	Greater Leech Lake (Cass Lake)	23	24	48	58	27	**180**
Bemidji	MN	IHS	Red Lake	3	8	48	86	92	**237**
Bemidji	MN	IHS	White Earth	19	21	27	28	16	**111**
Bemidji	MN	Tribal	Shakopee	3	5	8	4	3	**23**
Bemidji	WI	Tribal	Ho-Chunk Health Care Center	3	2	3	4	4	**16**
Bemidji	WI	Tribal	Menominee Indian Tribe of Wisconsin	18	17	11	15	6	**67**
Bemidji	WI	Tribal	Oneida Dental Clinic	10	9	9	9	10	**47**
Billings	MT	IHS	Blackfeet	27	36	105	130	4	**302**
Billings	MT	IHS	Crow	26	38	109	111	52	**336**
Billings	MT	IHS	Fort Belknap	2	2	44	49	4	**101**
Billings	MT	IHS	Fort Peck	24	22	71	88	84	**289**
Billings	MT	IHS	Northern Cheyenne	20	24	32	28	20	**124**
Billings	MT	Tribal	Flathead	7	17	59	96	4	**183**
Billings	MT	Tribal	Rocky Boy	15	15	42	64	0	**136**
Billings	WY	IHS	Wind River	23	25	77	67	19	**211**
California	CA	Tribal	Central Valley IHP	2	7	31	33	0	**73**
California	CA	Tribal	Colusa THP	2	5	4	2	2	**15**
California	CA	Tribal	Hoopa Health	10	13	25	23	23	**94**
California	CA	Tribal	Northern Valley	0	0	2	9	7	**18**
California	CA	Tribal	Pit River	7	5	9	10	1	**32**
California	CA	Tribal	Riverside-San Bernardino	10	5	26	22	11	**74**
California	CA	Tribal	Sonoma County	0	0	14	12	0	**26**
California	CA	Tribal	Southern IHP	13	29	38	14	2	**96**
California	CA	Tribal	United Indian Health Services	11	14	38	43	1	**107**

Appendix 2: cont'd

IHS Area	State	IHS/ Tribal	Site/Service Unit	1 Year	2 Years	3 Years	4 Years	5 Years	**TOTAL**
Nashville	FL	Tribal	Seminole	38	48	50	54	34	**224**
Nashville	MS	Tribal	Choctaw	14	23	22	19	20	**98**
Nashville	NC	IHS	Catawba	6	3	6	8	2	**25**
Nashville	NC	Tribal	Cherokee	22	33	31	26	18	**130**
Nashville	NY	Tribal	St. Regis Mohawk	16	18	37	15	16	**102**
Navajo	AZ	IHS	Chinle	7	9	18	7	52	**93**
Navajo	AZ	IHS	Shiprock	22	20	35	52	21	**150**
Navajo	AZ	Tribal	Tuba City	17	21	39	42	17	**136**
Navajo	NM	IHS	Crownpoint	15	17	16	28	17	**93**
Oklahoma City	OK	IHS	Claremore	15	15	19	29	15	**93**
Oklahoma City	OK	IHS	Lawton	9	4	29	28	7	**77**
Oklahoma City	OK	IHS	Pawnee	2	29	39	6	3	**79**
Oklahoma City	OK	Tribal	Tahlequah	57	63	103	112	90	**425**
Phoenix	AZ	IHS	Colorado River	15	9	27	28	13	**92**
Phoenix	AZ	IHS	Keams Canyon	18	18	46	81	18	**181**
Phoenix	AZ	IHS	Phoenix	20	29	37	43	13	**142**
Phoenix	AZ	IHS	San Carlos	16	15	16	17	14	**78**
Phoenix	NV	Tribal	Schurz	4	6	22	41	5	**78**
Portland	ID	Tribal	Northern Idaho	15	14	15	18	15	**77**
Portland	OR	Tribal	Umatilla	9	10	16	26	6	**67**
Portland	OR	Tribal	Western Oregon	1	7	16	15	0	**39**
Portland	WA	Tribal	Northwest Washington	19	10	25	48	19	**121**
Portland	WA	Tribal	Puyallup	0	0	0	0	16	**16**
Portland	WA	Tribal	Wellpinit	3	2	11	10	11	**37**
Portland	WA	Tribal	Yakama	28	19	65	105	20	**237**
Tucson	AZ	IHS	Sells	5	12	58	103	66	**244**
Tucson	AZ	Tribal	Pascua Yaqui	0	1	54	62	0	**117**
TOTAL				**890**	**1,112**	**2,398**	**2,827**	**1,234**	**8,461**

Appendices

Appendix 3: Estimated Percent of IHS User Population Screened by IHS Area and Age, 2010

IHS Area	1 Year	2 Years	3 Years	4 Years	5 Years	TOTAL
Aberdeen	3.2%	3.4%	6.4%	8.5%	2.7%	4.9%
Alaska	1.3%	2.6%	6.4%	6.6%	2.4%	3.8%
Albuquerque	6.0%	7.3%	15.8%	21.9%	10.0%	12.4%
Bemidji	5.3%	5.6%	8.8%	10.4%	8.4%	7.8%
Billings	9.9%	11.1%	33.8%	38.4%	12.0%	21.4%
California	4.9%	5.5%	12.5%	10.5%	3.0%	7.5%
Nashville	10.1%	13.0%	14.4%	11.3%	8.6%	11.5%
Navajo	1.5%	1.5%	2.4%	2.9%	2.4%	2.1%
Oklahoma City	1.8%	2.0%	3.2%	3.0%	1.9%	2.4%
Phoenix	2.3%	2.1%	4.1%	6.0%	1.9%	3.3%
Portland	4.8%	3.4%	7.6%	11.6%	4.8%	6.6%
Tucson	1.4%	3.2%	24.3%	35.1%	14.3%	16.7%
TOTALS	3.4%	3.8%	7.9%	9.3%	4.2%	5.8%

Numerator: Number of children screened
Denominator: FY 2010 user population

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