Tobacco Use Among American Indians in Oklahoma: An Epidemiologic View

June E. Eichner, PhD^a
Kymberly Cravatt, MPH^b
Laura A. Beebe, PhD^a
Kathleen S. Blevins, PhD^c
Martha L. Stoddart, MS^c
Zoran Bursac, PhD^d
Fawn Yeh, PhD^c
Elisa T. Lee, PhD^c
William E. Moore, PhD^a

SYNOPSIS

Objectives. With the exception of national surveys that sample the entire U.S. population, little information exists on tobacco habits among American Indians. This study is a comparison of tobacco use findings in the 1990s among American Indians in Oklahoma, a state with a large and diverse American Indian population (39 tribes).

Methods. Data on current tobacco use are presented from two statewide surveys, the Oklahoma Youth Tobacco Survey and the Native American Behavioral Risk Factor Survey, as well as two large epidemiologic studies of chronic disease among American Indians—the Cherokee Diabetes Study and the Strong Heart Study. Three of these four sources of data involve research/surveys exclusively about American Indians.

Results. Nontraditional use of tobacco by American Indians occurs frequently, according to each instrument. Initiation to this habit begins in middle school and increases dramatically during high school. After age 50, reporting by individuals that they currently smoke declines steadily.

Conclusions. Despite sampling different individuals for the surveys and different tribes for the epidemiologic research, results were comparable in age groups that overlapped. These findings support national data indicating that American Indians have higher prevalence rates of smoking than other racial/ethnic groups. American Indians report smoking on average about a half a pack of cigarettes per day. Individuals reporting using tobacco solely for ceremonial purposes were far fewer than habitual users. Buying tobacco products in American Indian smoke shops helps tribal economies; this fact needs to be considered for prevention programs to succeed.

Address correspondence to: June E. Eichner, PhD, University of Oklahoma Prevention Research Center, University of Oklahoma Health Sciences Center, P.O. Box 26901, Oklahoma City, OK 73190; fax 405-271-6285; e-mail <june-eichner@ouhsc.edu>. ©2005 Association of Schools of Public Health

^aUniversity of Oklahoma Prevention Research Center, University of Oklahoma Health Sciences Center, Oklahoma City, OK

^bCherokee Nation, Tahlequah, OK; at the time of this study, Ms. Cravatt was with the University of Oklahoma Prevention Research Center, University of Oklahoma Health Sciences Center, Oklahoma City, OK.

^cCenter for American Indian Health Research, University of Oklahoma Health Sciences Center, College of Public Health, Oklahoma City, OK

^dUniversity of Arkansas for Medical Sciences College of Public Health, Little Rock, AK; at the time of this study, Dr. Bursac was with the Chronic Disease Service of the Oklahoma State Department of Health, Oklahoma City, OK.

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American Indians take up habitual tobacco use with greater frequency than other racial/ethnic groups.¹⁻² Several national and local surveys have reported rates of smoking among American Indians to be substantially higher than those of other subgroups in the United States.¹⁻⁴ In the late 1990s, the prevalence of current cigarette smoking among both American Indian men and women was highest in the northern plains (48% for men and 40% for women) and lowest in the southwest (26% for men and 17% for women). 5 Smoking rates among American Indian women of reproductive age have remained alarmingly high, while declines have been observed for this demographic in other population groups.^{2,6} Efforts to understand and deal with the effects of tobacco abuse are especially important for American Indians. Although not completely understood, the acceptance of tobacco and its frequent use by American Indians may be partly due to its traditional and ceremonial role, and more recently, the influence of family and peers, and the perceived functional value of recreational tobacco use.7 Furthermore, using tobacco may be seen as helping to support tribal nations since smoke shops provide tribes with revenue.

American Indians in Oklahoma do not live on reservations as they do in other plains or western states such as North Dakota, South Dakota, and Arizona. They generally live in both urban and rural areas mixed with other racial/ethnic groups. Many are enrolled with the tribe of their heritage; Oklahoma's 39 tribes cluster geographically within the state.

Relatively little information on smoking habits among American Indians exists except for data obtained from national surveys such as the Behavioral Risk Factor Surveillance Survey or the National Survey on Drug Use and Health. The four sources of data used for the present study provide a more focused and comprehensive description of tobacco use by American Indians living in Oklahoma. Data from three of the sources were exclusively collected for research/surveys on American Indians.

METHODS

The present study is a comparison of tobacco use findings in the 1990s among American Indians in Oklahoma, a state without reservations but with a large and diverse Indian population. It is based on four sources of data: two surveys and two epidemiologic studies. All data were collected from 1992 through 1999 in Oklahoma. The Oklahoma Youth Tobacco Survey took place in March 1999 and provides information on middle and high school students in 95 schools in 37 counties, of whom 10% (n=399) were American Indian.8 The second survey instrument, a telephone questionnaire, was modeled on the national Behavioral Risk Factor Surveillance System (BRFSS), which conducts phone interviews of the non-institutionalized adult U.S. population. This modified survey, the Native American Behavioral Risk Factor Survey, was designed specifically to assess behavioral risk factors among American Indians in Oklahoma.9 This effort took place from 1994 through 1997. The other two sources of data are epidemiologic studies that collected information on tobacco habits as part of their behavioral health assessments. In the Cherokee Diabetes Study, which took place

from 1995 through 1999, data were collected on 5- to 40-year-old members of the Cherokee Nation. The purpose of this epidemiologic study was to evaluate the prevalence of a number of potential risk factors for type 2 diabetes mellitus among members of this tribe. The Strong Heart Study, the fourth data source, involved 48- to 80-year-old members of the Seven Tribes of Southwest Oklahoma (Apache, Caddo, Comanche, Delaware, Fort Sill Apache, Kiowa, and Wichita). These individuals were participating in the second exam of a longitudinal study of cardiovascular disease and its risk factors. Data were collected from 1993 through 1995. The latter two studies focused on tribes residing in two separate areas of Oklahoma, the northeast (Cherokees) and southwest (Seven Tribes), while the former two surveys are random samples of American Indians living in Oklahoma.

Prevalence rates have been computed based on data gathered from each of these four sources. Each of the rates has limitations due to constraints of focus or methodology. In particular, specific questions dealing with tobacco habits differed among the instruments though still addressing current tobacco use. Table 1 provides a description of the four sources of data.

The Oklahoma Youth Tobacco Survey was conducted by the Oklahoma State Department of Health, in cooperation with the Centers for Disease Control and Prevention (CDC), the Oklahoma State Department of Education, and numerous partners from local health agencies and school districts. This survey was administered throughout 37 counties to 2,169 middle school students (grades six through eight) in 47 schools and 1,941 high school students (grades nine through 12) in 48 schools. Of the total, 10% (n=399) identified themselves as American Indian, of which 209 were male and 190 female. Within schools, which were selected with a probability proportional to enrollment, second period classes were randomly sampled. All selected schools agreed to participate. Eighty-four percent of eligible middle school students, and 82% of eligible high school students were surveyed.8 The survey consisted of 72 questions covering the following: tobacco use behaviors, attitudes and knowledge; exposure to environmental tobacco smoke; access to tobacco products and use at school; and media advertising and awareness. Current users of tobacco products were defined as using tobacco one or more of the 30 days preceding the administration of the survey.

The Native American Behavioral Risk Factor Survey, conducted through the University of Oklahoma Prevention Research Center and the Oklahoma State Department of Health, obtained information from a random sample of adults aged ≥18 years. This survey questionnaire was conducted over the telephone. Such surveys, naturally, exclude individuals without phones. The survey had 3,307 respondents. Inquiries included questions on general health status, weight, exercise, tobacco use, alcohol use, immunizations, mammography and pap smears, hypertension, cholesterol, and diabetes. Interviewees were also asked whether they were enrolled in their tribe or had a Certificate of Degree of Indian Blood. Current smokers were defined as individuals who reported smoking 100 or more cigarettes in their lifetime and who also currently smoked either every day or some days.

Table 1. Descr	iption of the four sour	es of data on tobacco u	se among American Indians in Oklahoma

Characteristic	Oklahoma Youth Tobacco Survey	Native American Behavioral Risk Factor Survey	Cherokee Diabetes Study	Strong Heart Study	
Study type Self-administered written survey		Telephone survey	Epidemiologic study of diabetes	Epidemiologic study of cardiovascular disease	
Sample 95 Oklahoma schools and randomly selected classrooms		Random sample of American Indian households with telephones in Oklahoma	Northeastern Oklahoma	Southwest Oklahoma	
Age group	12–18 years	18–65+ years	15–40 years	48–80 years	
Data collection period	1999	1994–1997	1995–1999	1993–1995	
Number of American Indian participants	399	3,307	1,497	1,226	
Definition of "current users"	"Yes" to 1 or more cigarettes in the last 30 days	"Yes" to 100 or more cigarettes in your lifetime and current use	"Yes" to current use of tobacco and "yes" to cigarettes	"Yes" to smoking cigarettes now	

The other two sources of data on tobacco use came from epidemiologic studies conducted by the Center for American Indian Health Research at the University of Oklahoma College of Public Health: the Cherokee Diabetes Study and the Strong Heart Study. The Cherokee Diabetes Study, an epidemiologic study of potential risk factors for type 2 diabetes mellitus among members of the Cherokee Nation, took place in and around Tahlequah, Oklahoma.¹⁰ Tobacco use data were collected secondarily to the primary goal of determining the prevalence of type 2 diabetes and its potential risk factors. This information is available on 1,497 participants ages 15-40 years. The tobacco use questions were not included on the questionnaire for ages 5-9 years, and the 10to 14-year olds had limited data. If the participant answered "yes" to currently using any kind of tobacco product other than for ceremonial purposes, further questions were asked concerning kind of tobacco used, average amount per day, and starting and quitting ages. Individuals who did not report having quit were coded as current smokers.

The Strong Heart Study is a multicenter study of cardio-vascular disease risk factors among American Indians who were ages 45–74 years in 1988. The study, which takes place at three sites in the United States, Oklahoma, Arizona, and North/South Dakota, began in 1988 and involves multiple tribes. The Seven Tribes of Southwest Oklahoma (Apache, Caddo, Comanche, Delaware, Fort Sill Apache, Kiowa, and Wichita) participated at the Oklahoma site. Collected on 1,226 Oklahoma participants, the present data were part of the second exam of the Strong Heart Study. *Current smokers* were defined by "yes" responses to the question, "Do you smoke cigarettes now?" Table 2 presents the numbers of participating individuals by age groups for the Strong Heart Study, as well as for the Native American Behavioral Risk Factor Survey and the Cherokee Diabetes Study.

The two surveys, the Oklahoma Youth Tobacco Survey and the Native American Behavioral Risk Factor Survey, were considered to be public health practice under the guide-

lines and sponsorship of the CDC. The Cherokee Diabetes Study was approved by the Institutional Review Board (IRB) of the Cherokee Nation and the University of Oklahoma Health Sciences Center IRB. The Strong Heart Study was approved by the Seven Tribes of the Southwest, the Indian Health Service IRB, and the University of Oklahoma Health Sciences Center IRB. Informed consent was obtained from each adult participant in the latter two studies. Parental consent was obtained in the Cherokee Diabetes Study for those participants aged <18 years.

RESULTS

Oklahoma Youth Tobacco Survey

Among the major racial/ethnic groups (American Indian, white, black, and Hispanic) surveyed in the Oklahoma Youth Tobacco Survey Report, American Indians in middle and high school constituted the highest proportion of current users of cigarettes: 23% (n=59) of middle school students, 42% (n=60) of high school students. The prevalence of use of smokeless tobacco among American Indian boys in middle school was 17% (n=23) and in high school, 25% (n=19). American Indian youth also reported using pipes and cigars. Figure 1 presents the prevalence of current tobacco use, both smoked and smokeless, among American Indian youth attending middle and high school in Oklahoma in 1999. Most children in the survey started experimenting with cigarettes at a very young age. Among American Indian students, 18% (n=46) of middle school students and 11%(n=16) of high school students smoked their first cigarette before their 11th birthday. Approximately one-third (34%, n=136) of American Indian middle school students were at risk for starting to smoke cigarettes compared to 24% (n=314) of white students. The likelihood of starting to smoke was a combined measure based on both personal potential and peer pressure.

Table 2. Number of participants by age range responding to guestions on tobacco use for three guestionnaires

	Native American Behavioral Risk Factor Survey		Cherokee Diabetes Study		Strong Heart Study	
Age range	Males	Females	Males	Females	Males	Females
15–19	42ª	77 ª	137	168	_	_
20-24	99	144	103	164	_	_
25-29	94	166	120	159	_	_
30-34	124	229	117	192	_	_
35–39	143	193	142	175	_	_
40-44	123	182	8°	12°	_	_
45-49	116	184	_	_	44 ^d	61 ^d
50-54	115	160	_	_	134	149
55–59	97	115	_	_	100	140
60–64	78	134	_	_	81	138
65–69	255 ^b	437 ^b	_	_	66	116
70–74	_	_	_	_	47	87
75–79	_	_	_	_	24	39

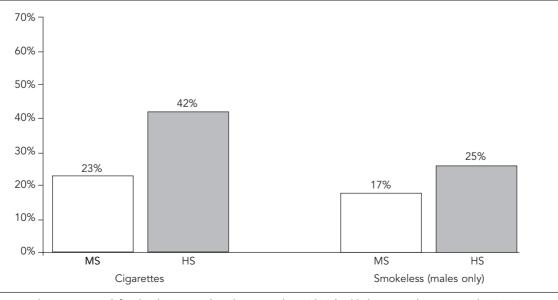
^aThese numbers refer to males and females who indicated belonging in the 18-19 age group.

Native American Behavioral Risk Factor Survey

The Behavioral Risk Factor Survey, designed specifically for American Indians in Oklahoma, had 3,307 individuals who responded to the queries needed for analysis, of which 1,286 were males and 2,021 females. The data showed that the rate of current smoking for men aged \geq 18 years was 43% (n=558) and for women, 38% (n=766). Standardization to the age and sex mix of American Indians in Oklahoma changed the male rate to 42% and did not alter the female rate of 38%.

These rates are considerably higher than the Year 2000 Goal of 15% for the country. Also, these smoking rates are higher than other southwest tribes in New Mexico and Arizona (26% for males and 17% for females) and lower than the northern plains American Indians (48% for males and 40% for females). In addition, a high rate of current smokeless tobacco use among Oklahoma American Indian men was found: 14% (n=180). Age and sex specific rates for current smoking prevalence are provided in Figure 2.

Figure 1. Prevalence of current tobacco use among Oklahoma American Indian youth in middle (MS) and high (HS) school according to the Oklahoma Youth Tobacco Survey, 1999 (N=399)



NOTE: Current tobacco use was defined as having used a tobacco product within the 30 days preceding survey administration.

^bThese numbers refer to males and females who indicated 65+ as their age group.

^cThese numbers refer to males and females who indicated that they were 40 years old.

^dThese numbers refer to males and females who indicated belonging in 48–49 age group.

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70% 60% 54% 52% 49% 50% 47% 43% 42%40% 41% 41% 41% 36% - 38% 38%39% 39% 40% 349 30% 20% 10% 0% 14 A DAA N 14 de 35. AD AA

Age groups

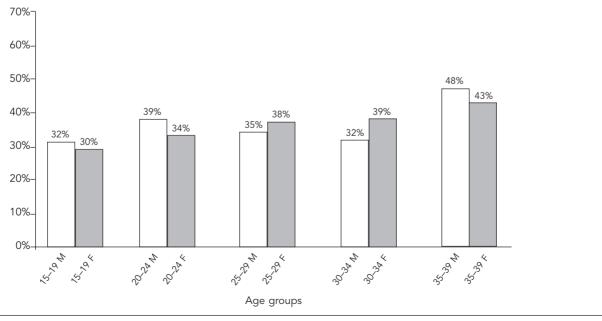
Figure 2. Age-specific smoking rates among Oklahoma American Indian males (M) and females (F) according to the Native American Behavioral Risk Factor Survey, 1994-1997 (N=2,496)

NOTE: Smoking was defined as smoking 100 or more cigarettes in a lifetime and currently smoking at least some days.

Cherokee Diabetes Study

Figure 3 shows the percentages of current smoking among young members of the Cherokee Nation. Among 552 (232 male and 320 female) current smokers, the mean number of cigarettes smoked per day was 12.1, with women smoking a mean of 11.1 and men smoking a mean of 13.5. The median was 10 for both groups. This is about a half a pack of cigarettes per day. These figures, although from a younger age group, correspond to those reported in the Strong Heart Study (overall mean=11.5, median=10). Among females ages 15–40 years, 15% (n=131) reported being former smokers while 9% (n=54) of males from the same age group

Figure 3. Age-specific smoking rates among Oklahoma Cherokee males (M) and females (F) according to the Cherokee Diabetes Study, 1995-1999 (N=1,477)



NOTE: Smoking was defined as ever using tobacco products, regardless of the number of cigarettes smoked per day, and not reporting having quit.

reported being former smokers. The highest percentage of current smokers among Cherokees occurred in the 35–40 year age range for both males (46%, n=69) and females (43%, n=80). Use of smokeless tobacco was much more common among males than females. Only 13 of 880 Cherokee females ranging in age from 15 to 40 years reported current smokeless tobacco use. In males, percentages of current users of smokeless tobacco ran between 14% (n=14) and 23% (n=27) for individuals in the 15-34 age range (n=472) and then dropped to 11% (n=16) among 35- to 40-year olds (n=150).

Two covariates of tobacco use in the Cherokee cohort were income and education. For both genders, percentages of individuals ages 20-40 years who smoke were highest among those with less than 12 years of education (58% females, n=73; 62% males, n=66) and lowest in those with more than 12 years of education (29% females, n=76; 22% males, n=34). Also in this age group, percentages of smokers were highest in those whose annual household income was less than \$20,000 (45% females, n=145; 41% males, n=84) and lowest in those whose annual household income was more than \$50,000 (24% females, n=8; 11% males, n=3). The number of people in the household was not factored into this value. A gradient by education or income was not seen with respect to smokeless tobacco use in males ages 20-40 years, of which 12% (n=18) to 20% (n=45) reported use of smokeless tobacco for all levels of education and income. Among the individuals ages 15-40 years who considered themselves to be non-smokers, 35 males (9%) and 16 females (3%) did use tobacco for ceremonial purposes.

Strong Heart Study

Figure 4 shows data from the second exam of the Strong Heart Study for the Seven Tribes of Southwest Oklahoma. Initially, the study recruited individuals ranging in age from 45 to 74 years. Participants in this study were several years older when they were re-examined. The highest rate of current smoking occurred in males ages 48 and 49 (data not shown in Figure 4; 50%, n=22) and in females ages 50-54years (40%, n=59) with a fairly steady decline through older ages for both genders. Among males ranging in age from 55 to 59 years, 35% (n=35) reported being former smokers compared to 71% (n=17) among those in the 75–79 year age range. The decrease in current smokers in the older age ranges is striking, especially among females (Figure 4). The mean number of cigarettes smoked per day among current male smokers was 13.1, and the median was 10. For female smokers, the mean number of cigarettes smoked per day was 10.2, and the median was 8. About 10% of current smokers smoked less than one cigarette per day. There were seven males (1%) and three females (0.4%) who reported smoking tobacco only during Native ceremonies.

DISCUSSION

These two surveys and two studies provide a reliable cross-sectional picture of tobacco use among Oklahoma American Indians in the 1990s. Data were available on samples including all ages and both genders at risk for having a tobacco habit among American Indian people in Oklahoma. The survey questions were not identical, nor were the age groups sampled for each of these surveys/studies. Differences

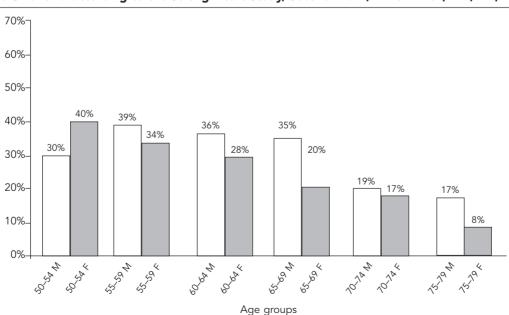


Figure 4. Age-specific smoking rates for males (M) and females (F) from the Seven Tribes of Southwest Oklahoma according to the Strong Heart Study, Second Exam, 1993–1995 (N=1,121)

NOTE: Smoking was defined as a "yes" response to the question, "Do you smoke cigarettes now?"

in questions introduce a potential bias when comparing studies; however, all questions for this report focus on current tobacco use. Each study provides unique data assessing current tobacco use; together, they provide a reliable and comprehensive view of tobacco use by American Indians in Oklahoma, a view which offers both general and regional/tribal-specific findings. It should be noted that only two studies, the Cherokee Diabetes Study and the Strong Heart Study, distinguished between ceremonial use of tobacco and use of commercial tobacco.

With respect to telephone surveys, only those with telephones are included in the sampling frame. Individuals without phones may have a high likelihood of using tobacco products, and this would result in an under-reporting of overall prevalence of tobacco use. Poverty and irregular access to working phones may influence response rates. To better understand how this might influence the prevalence rates based on phone surveys, an identical survey of 507 American Indians without residential phones was conducted. In this survey, there were 153 male participants, 60.8% of whom currently smoked, and 354 female participants, 45.5% of whom currently smoked. These rates ate substantially higher than the rates for those with phones. 12

Smoking rates are high for American Indians compared to other racial/ethnic groups. 1-3 The CDC has reported that while the smoking rates for all other racial/ethnic groups have dropped since 1993, those for American Indians/Alaska Natives have not.5 The Oklahoma REACH 2010 Native American Behavioral Risk Factor Survey, conducted in 2000 as part of a large national REACH initiative, reported the prevalence rate of current cigarette smoking to be higher among American Indian adults in Oklahoma (33%) than in Oklahoma's general adult population (23%), and higher than the U.S. median rate (also 23%). It was also greater than smoking rates for other racial/ethnic groups in Oklahoma.³ Smoking prevalence rates among American Indian women remain high and unchanged relative to other population groups. Exceptionally high rates of smokeless tobacco use among Oklahoma American Indian males were also noted in all Oklahoma surveys/studies in which it was measured. While higher education reduces the rate of smoking among most population groups, including American Indians, data from the Oklahoma BRFSS over a three year period (2001 through 2003) indicate that among college educated individuals, higher smoking rates occur for American Indians than for African Americans or whites.¹³

Cigarette smoking is a major risk factor for both lung cancer and cardiovascular disease, while chewing tobacco is a major risk factor for mouth, throat, and esophageal cancers. American Indians, despite their long association with use of ceremonial tobacco, are not immune from these risks. While, in general, cancer occurs less frequently in American Indian populations compared with the U.S. white population, specific cancers do occur with greater or equal frequency among tribal groups with the highest risk factor rates. ^{14–16} For example, northern plains American Indians (Aberdeen, Bermidji, and Billings areas) had higher ageadjusted lung cancer mortality rates (50.6–78.4 per 100,000) than southwest American Indians (6.8–13.7 per 100,000) from 1994 through 1996, and this has been linked to the higher prevalence of cigarette smoking in these groups. ^{16–17}

As for Oklahoma, the cancer registry report for 1997–2000, which linked Oklahoma cancer incidence with Indian Health Service data, showed 48.1% of Oklahoma American Indians were misclassified as another race. Taking this into account, American Indians moved from generally lower incidence rates of cancer of the lung and bronchus to higher incidence rates compared with the total population of Oklahoma. With respect to cardiovascular disease, cigarette smoking has been implicated as a leading risk factor in white populations, although its importance as a risk factor for cardiovascular disease among American Indian people is less well-established. 19-21

The tobacco problem is more than a public health issue for American Indians. For thousands of years, tobacco has had an integral role in some American Indian traditions. Considered to be a gift from the Creator, tobacco serves as a sacred substance in many ceremonies, prayers, and offerings and plays a key role in many creation stories. In some traditions, it is believed to have healing power. During traditional ceremonies, however, not everyone present always uses tobacco. In some cases, tobacco use is reserved for particular individuals. Tribal cultures differ, and the method and use of ceremonial tobacco is one of the ways they differ.

With the special status given to tobacco by some traditions, it is not easy to "just say no." Those involved in prevention efforts need to understand these circumstances: the problem is with abuse of tobacco, not with its medical-religious-sacramental use. The Native American Tobacco Coalition of Oklahoma (NATCO) recognizes this and uses the slogan, "Traditional Use—Not Abuse" in its educational efforts.

Further, prevention efforts sometimes compete with the reality of economics. In many tribal jurisdictions in Oklahoma, there is an existing smoke shop. The shops sell tobacco that is cheaper because it is taxed differently, providing income in rural areas that need financial boosts. Gaming establishments, also important economically, frequently expose employees, guests, and customers to environmental tobacco smoke.²² Despite this economic dependence on tobacco products, most tribal council chambers, once heavily smoke-filled, are now smoke free.

Tobacco use, as the leading preventable cause of morbidity and mortality, is a major public health concern worldwide. ^{23–24} Despite widespread counter-marketing educational efforts and negative publicity during the states' multibillion dollar settlement with the tobacco industry, smoked and smokeless tobacco continues to attract users. Thousands of U.S. children start these habits every day. ²⁵ Unfortunately, most tobacco users began to smoke or chew before the age of 18. ²⁶

It is disheartening that youth of all races/ethnicities continue to take up the tobacco habit despite public health efforts to discourage it. About 50% of Oklahoma middle and high school students, both American Indian and non-American Indian, who smoke report they would like to quit.⁸ It is interesting that the smoking issues of children and youth mimic those of adult tobacco users—not only in using tobacco products but in the desire not to use tobacco products. Efforts to discourage tobacco use among American Indian youth have had some modest success; however, efforts to provide sustainable, long-term results must continue to

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be explored.²⁶⁻²⁷ A number of tobacco prevention projects and smoking cessation programs are underway in Oklahoma, including efforts sponsored by tribes, the Indian Health Service, and American Legacy Foundation.

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