



**Behavioral Risk  
Factors Among  
American Indians  
In Oklahoma**

**Oklahoma State  
Department of  
Health**

**Chronic Disease  
Service**



## About the artist: Artist Darran Cooper

of Cherokee and Choctaw descent is enrolled member of the Echota Cherokee Tribe.

Cooper was born in 1962 in South East Oklahoma, where he now resides and runs an art studio.

Cooper's career as a Native American artist began in 1988. Over the past 13 years his art has won many awards and has shown in the Capitol, Washington D.C., France Exhibit, the Oklahoma State Capitol, and the Red Earth Art Exhibition, Oklahoma City.



"Through my art, I try to portray the unique beauty of the Native American spirit, their reverent bond with nature, and their ceremonial approach to life and God, the Creator."

# **Oklahoma REACH 2010 Steering Committee**

**Absentee Shawnee Tribe of Oklahoma**

**Cherokee Nation**

**Cheyenne-Arapaho Tribes of Oklahoma**

**Chickasaw Nation**

**Choctaw Nation of Oklahoma**

**Indian Health Care Resource Center of Tulsa**

**Pawnee Nation of Oklahoma**

**Seminole Nation of Oklahoma**

**Wichita and Affiliated Tribes**

**Oklahoma State Department of Health**

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**The Oklahoma REACH 2010 Native American Project** to Address Diabetes and Cardiovascular Disease is guided by a coalition consisting of eight tribes/nations, one urban Indian health care resource center and the Oklahoma State Department of Health. The project is designed to reduce disparities in cardiovascular disease, diabetes and their risk factors for the American Indian population in Oklahoma through increased availability and promotion of physical activity on a community level through primary and secondary prevention efforts in the areas of 1) environmental change factors, 2) health care access, and 3) nutrition.

**Authors' notes:** The opinions expressed in this paper are those of the authors and do not necessarily reflect the views of the Tribes or Nations that participated. Because the name of the project and the survey were named "Oklahoma REACH 2010 Native American Project to Address Diabetes and Cardiovascular Disease" and "Native American Behavioral Risk Factor Survey", "Native American" will be used in conjunction with these two titles, otherwise "American Indian" will be used.



# Introduction

**The Racial and Ethnic Approaches** to Community Health 2010 Initiative (REACH 2010), is part of the Department of Health and Human Services (DHHS) response to the President's Race Initiative for year 2010 to eliminate disparities in health status experienced by racial and ethnic minority populations in the following six priority areas: infant mortality, breast and cervical cancer, cardiovascular disease, diabetes, HIV infections and AIDS, and child and adult immunizations. For phase I of the project, 35 nationwide sites were funded to carry out activities related to planning, data collection, forming partnerships and coalitions. Competitive phase II funding was awarded to 24 projects for implementation of planned interventions for each of the priority areas above.

**The Oklahoma Native American REACH 2010** coalition was formed in May of 1999. Oklahoma was funded for phase I in 1999 and phase II in 2000. The Oklahoma project is one of two American Indian projects funded for phase II. The Choctaw Nation of Oklahoma and the Association of American Indian Physicians have received the REACH 2010 Core Capacity funding targeting cardiovascular disease and HIV/AIDS, respectively.

**The project goal** is to use physical activity interventions to reduce disparities in diabetes and cardiovascular disease for the American Indian population in Oklahoma. The REACH 2010 Coalition Steering Committee includes members from Absentee Shawnee Tribe of Oklahoma, Chickasaw Nation, Choctaw Nation of Oklahoma, Cherokee Nation, Cheyenne-Arapaho Tribes of Oklahoma, Pawnee Nation of Oklahoma, Seminole Nation of Oklahoma, Wichita and Affiliated Tribes, Indian Health Care Resource Center of Tulsa, and the Oklahoma State Department of Health. While the statewide REACH 2010 project is coordinated through the Oklahoma State Department of Health each of the nine community interventions are implemented and managed within tribal or community settings (1).

**During the planning phase** of the project, a Native American specific Behavioral Risk Factor Survey (NABRFS) was implemented to collect the cross-sectional information on risk factors related to diabetes and cardiovascular disease among American Indians in Oklahoma.

**The estimated percent** of phone coverage among American Indians in Oklahoma in 1990 was 85% and the coverage in some small American Indian communities is estimated to be 50%. Because of this, a phone survey was conducted among American Indians without phone coverage (see methods) in order to validate the phone survey and evaluate the lack of phone coverage on the larger NABRFS.

**The first objective of this report** is to describe some of the results of the larger NABRFS phone survey including the distribution of risk factors, intermediate outcomes and chronic diseases among the American Indian population of Oklahoma. These data will be presented by demographic characteristics as well as geographical location and tribal belonging. Data are reported only for those Tribes/Nations that had adequate sample representation to provide accurate estimates. Tribal belonging was self-reported and it did not require having Tribal ID card or CDIB (Certificate of the Degree of Indian Blood) card. The second objective of this report is to describe some of the results of the Non-phone BRFs including distribution of risk factors, intermediate outcomes, and chronic diseases by demographic characteristics as well as by recruiting REACH 2010 Partner (refers to tribe/nation/health care resource center which was responsible for recruiting survey participants; see Figure 1); therefore this subgroup may include tribal members from other tribes/nations in addition to the tribe/nation which was actually responsible for recruitment. In this report, comparisons will not be made between the NABRFS and the Non-phone BRFs as this will require more complex analyses and will be reported in a subsequent report.

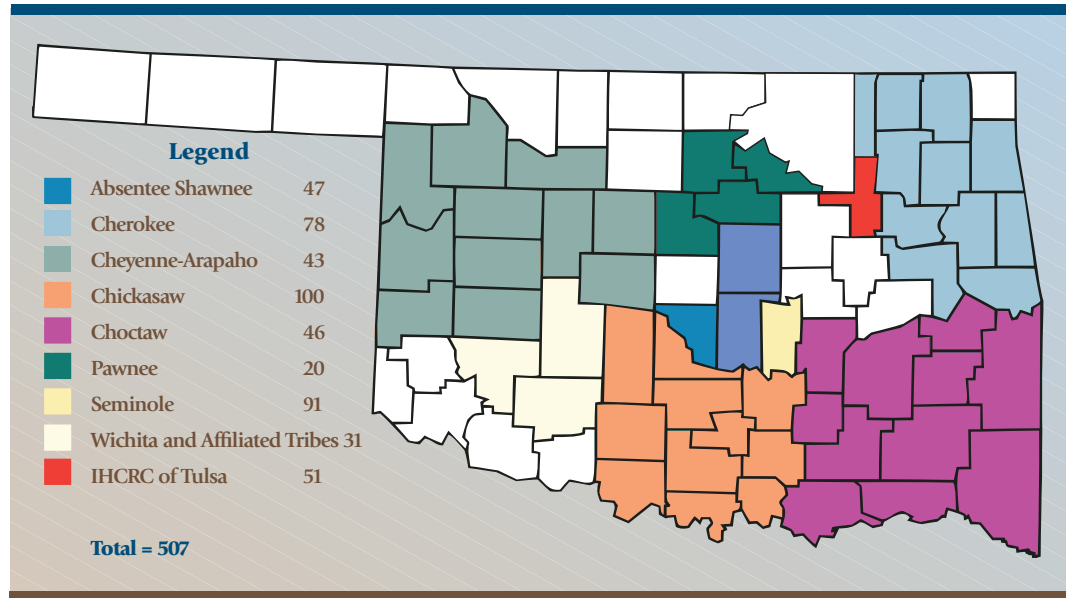
# Data Sources Methods

## The 2000 Oklahoma REACH 2010 NABRFS

collected 3,732 surveys from seven strata using a disproportionate stratified sampling scheme with screening. The seven strata were determined based on historical tribal locations and REACH 2010 project community locations. Screening questions were used to determine self-identified race and eligibility for the survey. It was conducted from January 2000 through January of 2001 with an estimated response rate of 82%. The 2000 Oklahoma REACH 2010 NABRFS used selected questions from the year 2000 Behavioral Risk Factor Surveillance System (BRFSS) questionnaire.

**The data** were weighted to create statewide estimates for American Indians in Oklahoma. In order to estimate prevalence accurately, we weighted the data by proportion of the American Indian 1990 population living in Oklahoma (Census Bureau, 1990). Prevalence rates were weighted by sex and age categories using the age groups: 18-24, 25-64

**Figure 1.** Distribution of Oklahoma REACH 2010 Non-phone BRFS participants by recruiting REACH Partner.



by intervals of 10 years, over 64, as well as the different sampling rates from our seven strata. Neither the number of telephones in a household nor the numbers of adults were used since both are unreliable. The former does not adequately probe the distinct number of telephone numbers and may primarily reflect the number of instruments. The latter includes all races and is unreliable without more detailed information about whether adults are American Indians or not, particularly in Oklahoma with many American Indians residing in mixed race households (1).

**For the Non-phone BRFS**, each REACH 2010 partner was contracted to recruit a certain number of American Indians in their areas without phones (Figure 1) from a variety of settings such as clinics, health fairs, schools, Pow-Wows, etc. The participants were given cell phones or were allowed to call from clinics or in the homes of neighbors and given a toll-free number to call into OSDH staff and a questionnaire identical to the larger NABRFS was administered. The Indian Health Care Resource Center of Tulsa facilitated recruitment of participants from their service-delivery area; but not all were clinic patients and could be members of any tribe.

## Limitations

**Limitations of the phone survey** include lack of representation from those who do not live in a household or do not have a telephone in their household. Limitations of both the NABRFS and the Non-phone BRFS include lack of representation from those under 18 years of age or institutionalized. Some of these limitations can be adjusted for through statistical methods, however they can never be completely eliminated. In addition, the data collected is self-reported and cannot be verified by physical measurement or visual means. Another limitation of both surveys is that the sample size was too small for some subgroups to allow for appropriate estimates to be made.

## Current Smoking

**American Indians** in Oklahoma are more likely to currently smoke cigarettes than the general population in Oklahoma or the US. In addition, they are also more likely to smoke cigarettes than other racial and ethnic groups in Oklahoma (1).

**American Indian** men and women did not differ significantly in rates of current cigarette smoking. Smoking rates seem to be declining with age. Rates were highest among those from 18 to 44 years of age, and lowest among the 65 and older age group. Rates of current smoking declined with increased educational level. Furthermore, five of the tribes/nations shown had higher than average (33%) prevalence of smoking. (Table 1).

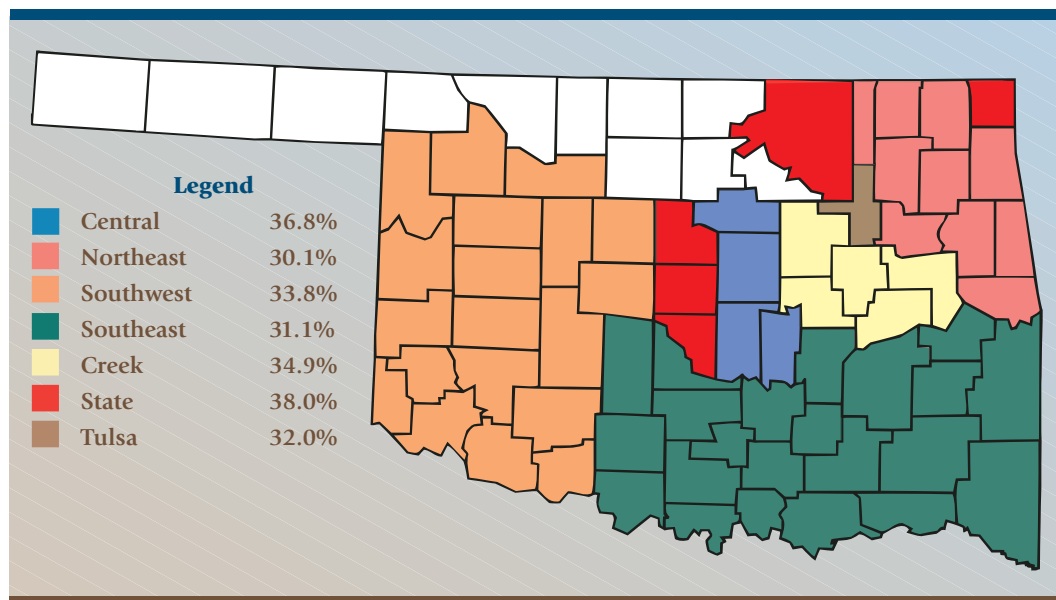
**Table 1. Weighted percentages and standard errors of current cigarette smoking among American Indians in Oklahoma, by demographic characteristics 2000 Oklahoma REACH 2010 NABRFS**

		%	SE
<b>Gender</b>	<b>Male</b>	34.3	1.85
	<b>Female</b>	32.4	1.27
<b>Age</b>	<b>18-24</b>	36.8	3.81
	<b>25-34</b>	34.8	2.36
	<b>35-44</b>	39.6	2.41
	<b>45-54</b>	33.9	2.24
	<b>55-64</b>	31.3	2.66
	<b>65+</b>	16.4	1.94
<b>Education</b>	<b>&lt; High School</b>	42.2	2.95
	<b>HS/GED</b>	38.5	1.92
	<b>Some College</b>	30.5	1.95
	<b>College grad.</b>	20.3	2.05
<b>Tribe/Nation</b>	<b>Cherokee</b>	32.5	1.85
	<b>Choctaw</b>	29.6	2.37
	<b>Chickasaw</b>	29.9	4.23
	<b>Creek</b>	29.1	4.00
	<b>Seminole</b>	41.2	9.76
	<b>Comanche</b>	38.6	8.44
	<b>Kiowa</b>	29.5	7.90
	<b>Osage</b>	38.9*	9.14
	<b>Cheyenne-Arapaho</b>	53.9	7.84
	<b>Pawnee</b>	66.1*	5.08

\*Cell size less than 20, use with caution

**Figure 2. Weighted percentage of current cigarette smoking, by sampling strata  
2000 Oklahoma REACH 2010 NABRFS**

**There was not** much variation exhibited in prevalence of smoking regionally (Figure 2).



**In the Non-phone BRFs** males had a significantly higher prevalence rate of smoking than females. Those participants recruited by the Indian Health Care Resource Center of Tulsa had the highest prevalence of smoking while those recruited from Cherokee Nation had the lowest (Table 2).

**Table 2. Percentage of current cigarette smoking among survey respondents in Oklahoma, by gender, age, and recruiting REACH 2010 Partner 2000 Oklahoma Non-phone BRFs**

	%	SE
<b>Gender</b>		
Male	60.8	3.96
Female	45.5	2.65
<b>Age Category</b>		
18-34	52.5	3.56
35-64	50.5	3.01
65+	31.3*	8.32
<b>REACH 2010 Partner</b>		
Absentee Shawnee Tribe of Oklahoma	55.3	7.33
Cherokee Nation	34.6	5.42
Choctaw Nation of Oklahoma	50.0	7.45
Cheyenne-Arapaho Tribes of Oklahoma	58.1	7.61
Chickasaw Nation	51.0	5.02
Indian Health Care Resource Center of Tulsa	62.8	6.84
Pawnee Nation of Oklahoma	**	
Seminole Nation of Oklahoma	46.2	5.25
Wichita and Affiliated Tribes	58.1*	9.01

\*Cell size less than 20

\*\* Insufficient sample size

## Overweight Status

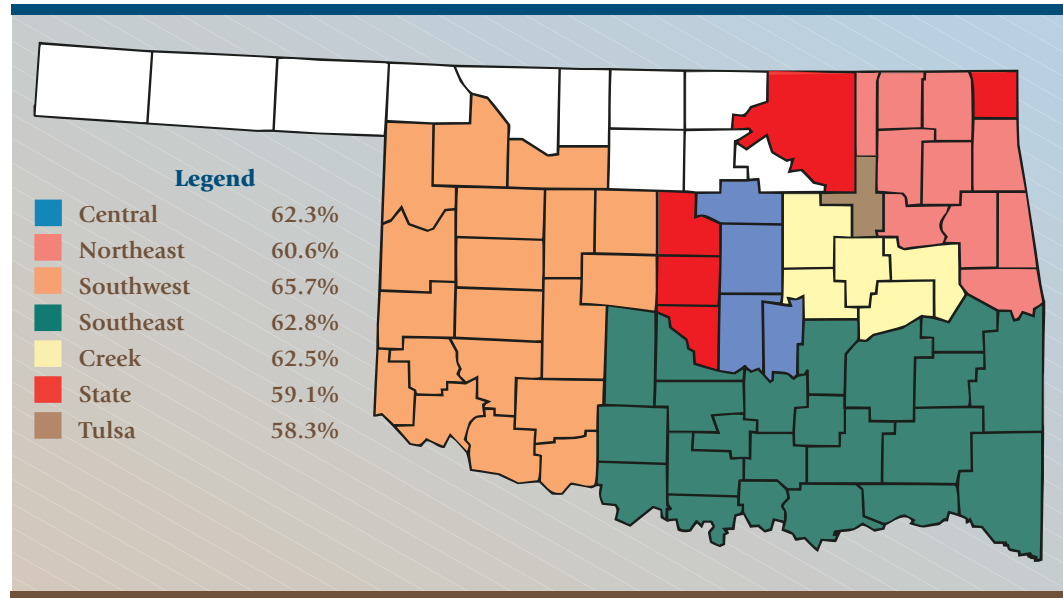
### Body Mass Index

**(BMI)** is a common measure expressing the relationship (or ratio) of weight-to-height. BMI is a mathematical formula in which a person's body weight in kilograms is divided by the square of his or her height in meters (i.e.,  $wt/(ht)^2$ ). The BMI is more highly correlated with body fat than any other indicator of height and weight. Individuals with a BMI greater than or equal to 25 are considered overweight, while individuals with a BMI of 30 or more are considered obese. Males and persons in the age range of 35-64 were more likely to be overweight. The Comanche Nation and Kiowa Tribe had prevalence rates of being overweight higher than the rest of the tribes/nations presented (Table 3).

**Table 3.** Weighted percentages and standard errors of being overweight among American Indians in Oklahoma, by demographic characteristics 2000 Oklahoma REACH 2010 NABRFS

	%	SE
<b>Gender</b>		
Male	71.1	1.92
Female	57.3	1.39
<b>Age</b>		
18-24	49.3	3.86
25-34	61.1	2.46
35-44	71.1	2.30
45-54	73.9	2.10
55-64	72.1	2.69
65+	58.9	2.59
<b>Education</b>		
< High School	61.2	3.16
HS/GED	64.6	1.97
Some College	66.6	2.08
College grad.	61.7	2.59
<b>Tribe/Nation</b>		
Cherokee	62.0	1.62
Choctaw	69.5	2.32
Chickasaw	63.2	4.59
Creek	63.5	5.79
Seminole	53.6	9.96
Comanche	75.5	4.18
Kiowa	81.5	3.89
Osage	76.7	6.74
Cheyenne-Arapaho	61.9	10.75
Pawnee	59.4	15.23

**Figure 3. Weighted percentage of being overweight, by sampling strata  
2000 Oklahoma REACH 2010 NABRFS**



**When looking** at the estimates from a regional perspective there are no significant differences seen among the seven strata even though the southwest strata had the highest percent of overweight adults (Figure 3).

**Those participants** recruited by the Cheyenne-Arapaho Tribes, Chickasaw Nation, and Choctaw Nation had the highest rates of being overweight while those recruited from the Indian Health Care Resource Center of Tulsa had the lowest rate (Table 4).

**Table 4. Percentage of being overweight among survey respondents in Oklahoma, by gender, age, and recruiting REACH 2010 Partner 2000 Oklahoma Non-phone BRFSS**

	%	SE
<b>Gender</b>		
Male	78.8	3.34
Female	74.3	2.34
<b>Age Category</b>		
18-34	68.1	3.41
35-64	81.6	2.35
65+	70.0	8.51
<b>REACH 2010 Partner</b>		
Absentee Shawnee Tribe of Oklahoma	71.7	6.71
Cherokee Nation	72.6	5.26
Cheyenne-Arapaho Tribes of Oklahoma	81.4	6.00
Chickasaw Nation	80.1	3.98
Choctaw Nation of Oklahoma	80.4	5.91
Indian Health Care Resource Center of Tulsa	64.0	6.86
Pawnee Nation of Oklahoma	**	
Seminole Nation of Oklahoma	76.2	4.68
Wichita and Affiliated Tribes	69.0	8.74

\*\*Insufficient sample size

## Obesity

As already mentioned obesity is a subset of being overweight, and those individuals with a BMI of 30 or higher are considered obese. Obesity is an important risk factor for cardiovascular disease and diabetes which are chronic diseases that affect American Indians today in a disproportionate manner (2).

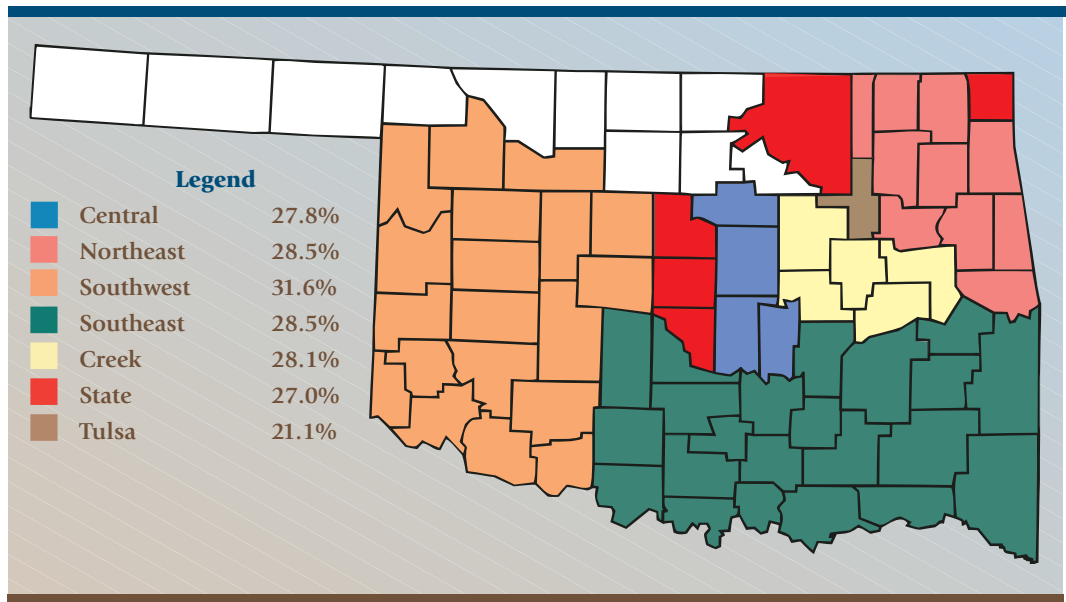
**Obesity prevalence rates** increase with decreasing educational level. The highest rates of obesity were present among Comanche Nation and Kiowa Tribe that are located in southwestern Oklahoma (Table 5). Those rates were 2-2.5 times higher than for several other groups presented.

**Table 5. Weighted percentages and standard errors of obesity among American Indians in Oklahoma, by demographic characteristics 2000 Oklahoma REACH 2010 NABRFS**

	%	SE
<b>Gender</b>		
Male	29.9	1.69
Female	28.0	1.25
<b>Age</b>		
18-24	19.1	2.80
25-34	30.4	2.34
35-44	34.9	2.41
45-54	34.3	2.31
55-64	32.2	2.71
65+	19.1	1.84
<b>Education</b>		
< High School	31.7	2.76
HS/GED	27.6	1.65
Some College	36.9	2.05
College grad.	26.1	2.23
<b>Tribe/Nation</b>		
Cherokee	28.0	1.45
Choctaw	29.2	2.36
Chickasaw	34.2	4.57
Creek	28.8	4.25
Seminole	16.5*	5.17
Comanche	39.8	8.48
Kiowa	50.8	5.37
Osage	35.5*	9.42
Cheyenne-Arapaho	19.3*	6.46
Pawnee	32.2*	14.65

\*Cell size less than 20, use with caution

**Figure 4. Weighted percentage of obesity, by sampling strata  
2000 Oklahoma REACH 2010 NABRFS**



**Similar to** regional prevalence of being overweight, obesity did not show much variation. However, the southwest strata had the highest estimate of obesity (over 31%) and the Tulsa strata had the lowest estimate at 21% (Figure 4).

**Those participants** recruited from the Cheyenne-Arapaho Tribes had the highest rate of obesity while those recruited from Cherokee Nation had the lowest (Table 6).

**Table 6. Percentage of obesity among survey respondents in Oklahoma, by gender, age, and recruiting REACH 2010 Partner 2000 Oklahoma Non-phone BRFS**

	%	SE
<b>Gender</b>		
Male	41.1	4.02
Female	46.3	2.71
<b>Age Category</b>		
18-34	44.7	3.64
35-64	48.2	3.04
65+	13.3	6.31
<b>REACH 2010 Partner</b>		
Absentee Shawnee Tribe of Oklahoma	45.7	7.42
Cherokee Nation	35.6	5.64
Cheyenne-Arapaho Tribes of Oklahoma	53.5	7.70
Chickasaw Nation	49.5	5.05
Choctaw Nation of Oklahoma	43.5	7.39
Indian Health Care Resource Center of Tulsa	38.0*	6.93
Pawnee Nation of Oklahoma	**	
Seminole Nation of Oklahoma	45.2	4.46
Wichita and Affiliated Tribes	37.0*	9.17

\* Cell size less than 20, use with caution

\*\* Insufficient sample size



## Lack of Leisure Time Physical Activity

**Data presented** here are generalized to persons who do not engage in any leisure time physical activity, or in other words, adults who are completely inactive.

**Females, elder** individuals and those of lower educational level were significantly more likely not to engage in any leisure time physical activity. Pawnee Nation had the highest prevalence of adults who did not engage in any leisure time physical activity (Table 7).

**Table 7.** Weighted percentages and standard errors of no leisure time physical activity among American Indians in Oklahoma, by demographic characteristics 2000 Oklahoma REACH 2010 NABRFS

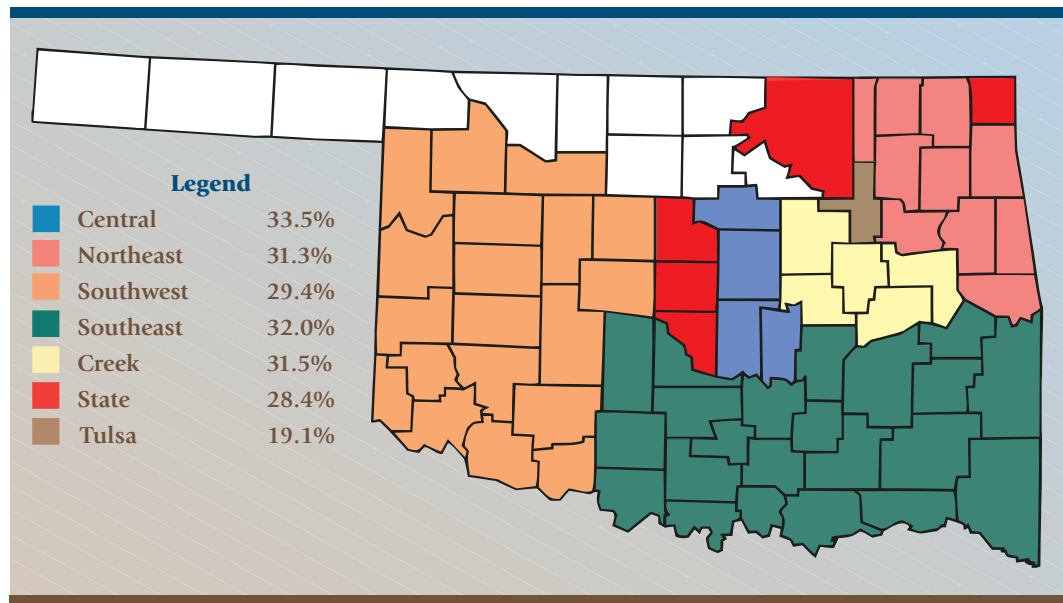
	%	SE
<b>Gender</b>		
Male	26.6	1.55
Female	32.1	1.23
<b>Age</b>		
18-24	20.3	2.78
25-34	20.3	1.87
35-44	28.4	2.24
45-54	33.6	2.06
55-64	40.2	2.75
65+	47.3	2.55
<b>Education</b>		
< High School	46.1	2.88
HS/GED	31.9	1.69
Some College	24.9	1.77
College grad.	17.6	1.77
<b>Tribe/Nation</b>		
Cherokee	29.8	1.35
Choctaw	32.3	2.40
Chickasaw	33.7	4.23
Creek	28.4	4.67
Seminole	22.7*	6.30
Comanche	27.1	6.30
Kiowa	36.8	8.41
Osage	32.2*	8.25
Cheyenne-Arapaho	27.6*	9.24
Pawnee	47.2*	5.29

\* Cell size less than 20, use with caution

\*\* Insufficient sample size

**Figure 5. Weighted percentage of no leisure time physical activity, by sampling strata  
2000 Oklahoma REACH 2010 NABRFS**

While no region had a noticeably higher percent of adults not participating in any leisure time physical activity, Tulsa strata had the lowest proportion of such individuals (Figure 5).



Those participants recruited from the Seminole Nation had the highest rates of not participating in any leisure time physical activity in the past month (Table 8).

**Table 8. Percentage of no leisure time physical activity among survey respondents in Oklahoma, by gender, age and recruiting REACH 2010 Partner 2000 Oklahoma Non-phone BRFS**

	%	SE
<b>Gender</b>		
Male	28.1	3.65
Female	35.3	2.54
<b>Age Category</b>		
18-34	23.2	3.01
35-64	36.8	2.90
65+	37.5*	8.70
<b>REACH 2010 Partner</b>		
Absentee Shawnee Tribe of Oklahoma	29.8*	6.74
Cherokee Nation	30.8	5.26
Cheyenne-Arapaho Tribes of Oklahoma	39.5*	7.54
Chickasaw Nation	28.0	4.51
Choctaw Nation of Oklahoma	32.6*	6.99
Indian Health Care Resource Center of Tulsa	13.7*	4.87
Pawnee Nation of Oklahoma	**	
Seminole Nation of Oklahoma	50.6	5.27
Wichita and Affiliated Tribes	32.3*	8.53

\* Cell size less than 20, use with caution

\*\* Insufficient sample size

## Asthma

Asthma continues to be a growing problem in American Indian communities (6).

Prevalence presented here is based on self-reported physician diagnosis.

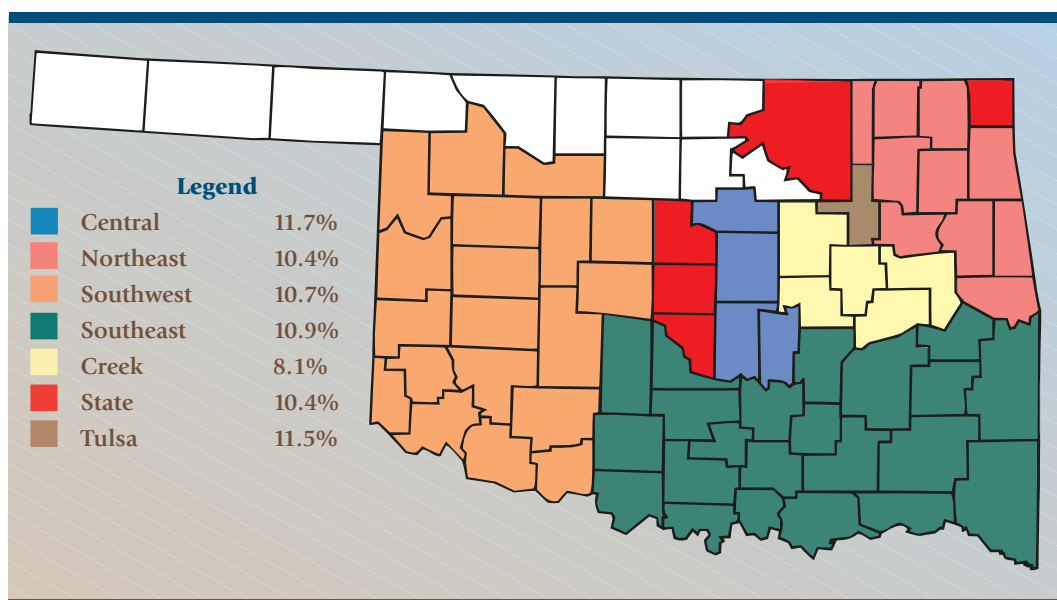
**The data** show that while the overall prevalence of asthma is 10.6%, females are disproportionately affected by asthma in a significant manner. The prevalence rates of asthma were higher among the large southeast and northeast Nations, namely Chickasaw, Choctaw and Cherokee (Table 9).

**Table 9. Weighted percentages and standard errors of asthma among American Indians in Oklahoma, by demographic characteristics 2000 Oklahoma REACH 2010 NABRFS**

	%	SE
<b>Gender</b>		
Male	7.3	1.02
Female	13.6	0.94
<b>Age</b>		
18-24	9.9	1.84
25-34	9.9	1.54
35-44	11.4	1.69
45-54	12.6	1.58
55-64	12.1	1.84
65+	7.8	1.25
<b>Education</b>		
< High School	12.4	1.67
HS/GED	9.5	1.02
Some College	9.5	1.37
College grad.	12.7	1.81
<b>Tribe/Nation</b>		
Cherokee	11.5	1.07
Choctaw	10.9	1.56
Chickasaw	13.1	2.61
Seminole	6.1*	6.12
Comanche	5.4*	1.92
Kiowa	6.3*	2.29
Osage	9.4*	5.10*
Cheyenne-Arapaho	3.3*	1.17
Pawnee	6.3*	3.49

\*Cell size less than 20, use with caution

**Figure 6. Weighted percentage of asthma, by sampling strata  
2000 Oklahoma REACH 2010 NABRFS**



There was not much variation exhibited in prevalence of smoking regionally (Figure 2).

In the Non-phone BRFs males had a significantly higher prevalence rate of smoking than females. Those participants recruited by the Indian Health Care Resource Center of Tulsa had the highest prevalence of smoking while those recruited from Cherokee Nation had the lowest (Table 2).

**Table 10. Percentage of asthma among survey respondents in Oklahoma, by gender, age, and recruiting REACH 2010Partner 2000 Oklahoma Non-phone BRFs**

	%	SE
<b>Gender</b>		
Male	9.4*	2.40
Female	12.3	1.80
<b>Age Category</b>		
18-34	11.8	2.36
35-64	12.1	2.01
65+	33.3*	3.33
<b>REACH 2010 Partner</b>		
Absentee Shawnee Tribe of Oklahoma	9.1*	4.38
Cherokee Nation	10.5*	3.54
Cheyenne-Arapaho Tribes of Oklahoma	7.3*	4.12
Chickasaw Nation	15.1*	3.73
Choctaw Nation of Oklahoma	16.3*	5.70
Indian Health Care Resource Center of Tulsa	16.3*	5.44
Pawnee Nation of Oklahoma	10.0*	6.88
Seminole Nation of Oklahoma	9.3*	3.15
Wichita and Affiliated Tribes	3.2*	3.20

\*Cell size less than 20

\*\* Insufficient sample size

## Diabetes

The burden that diabetes has put on American Indian communities has been well documented (3-5). Diabetes prevalence reported here is self-reported based on physician diagnosis.

According to this data the prevalence of diabetes significantly increases with age and lower educational level. In addition, the prevalence of diabetes among tribes/nations varied substantially, from Pawnee, Kiowa and Comanche with the highest to the Osage and Seminole with the lowest (Table 11).

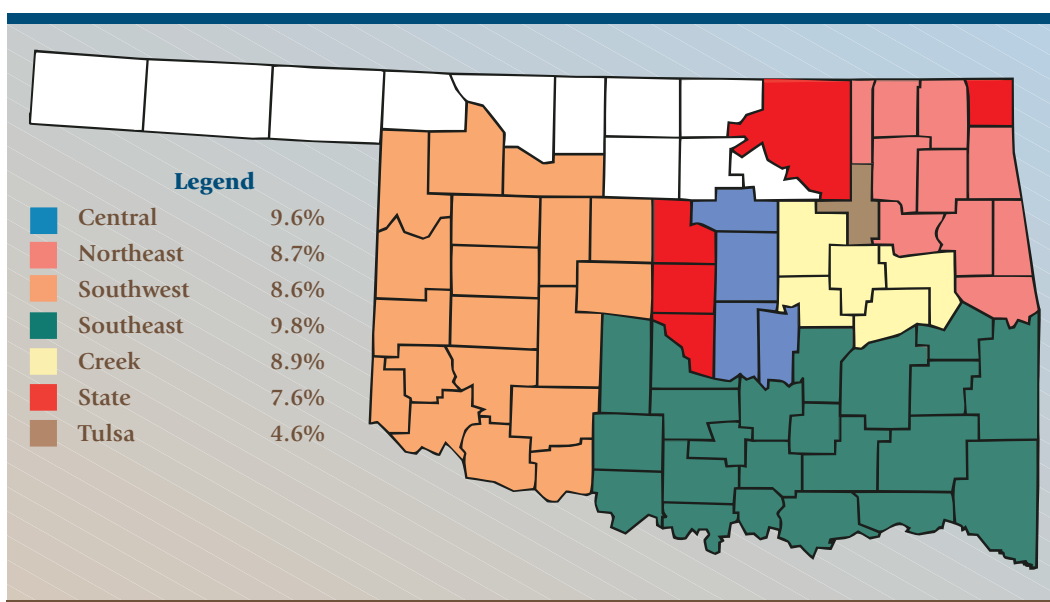
**Table 11.** Weighted percentages and standard errors of diabetes among American Indians in Oklahoma, by demographic characteristics 2000 Oklahoma REACH 2010 NABRFS

	%	SE
<b>Gender</b>		
Male	7.6	0.79
Female	8.9	0.69
<b>Age</b>		
18-24	1.3	0.59
25-34	1.9	0.85
35-44	8.1	1.21
45-54	12.1	1.44
55-64	17.2	2.25
65+	17.3	1.88
<b>Education</b>		
< High School	13.3	1.66
HS/GED	7.5	0.83
Some College	8.3	1.00
College grad.	5.3	0.99
<b>Tribe/Nation</b>		
Cherokee	7.8	0.74
Choctaw	8.6	1.25
Chickasaw	10.1	2.29
Creek	7.4	1.54
Seminole	5.5*	1.78
Comanche	11.7*	5.40
Kiowa	12.6*	7.23
Osage	4.6*	3.12
Cheyenne-Arapaho	9.7*	5.64
Pawnee	12.6*	5.11

\*Cell size less than 20, use with caution

Figure 7. Weighted percentage of diabetes, by sampling strata  
2000 Oklahoma REACH 2010 NABRFS

**Tulsa strata** had the lowest prevalence of diabetes at 4.6%. Other regional strata did not show any significant variation (Figure 7).



**Those participants** recruited from the Seminole and Chickasaw Nations had the highest prevalence rates of diabetes (Table 12).

Table 12. Percentage of diabetes among survey respondents in Oklahoma, by gender, age, and recruiting REACH 2010 Partner 2000 Oklahoma Non-phone BRFS

	%	SE
<b>Gender</b>		
Male	23.5	3.44
Female	23.2	2.25
<b>Age Category</b>		
18-34	8.6*	2.00
35-64	30.7	2.78
65+	50.0*	8.98
<b>REACH 2010 Partner</b>		
Absentee Shawnee Tribe of Oklahoma	23.4*	6.24
Cherokee Nation	15.4*	4.11
Cheyenne-Arapaho Tribes of Oklahoma	25.6*	6.73
Chickasaw Nation	29.0	4.56
Choctaw Nation of Oklahoma	28.3*	6.71
Indian Health Care Resource Center of Tulsa	5.9*	3.33
Pawnee Nation of Oklahoma	**	
Seminole Nation of Oklahoma	30.8	4.87
Wichita and Affiliated Tribes	22.6*	7.64

\*Cell size less than 20, use with caution

\*\*Insufficient sample size

## High Blood Pressure

### High blood

pressure or hypertension is one of the major risk factors for stroke, congestive heart failure, atherosclerosis and kidney disease.

### While there

are virtually no gender differences, hypertension increases with age, and is more prevalent among those with less education. Besides Kiowa Tribe and Seminole Nation, who had the lowest prevalence of hypertension, other groups did not significantly vary from each other (Table 13).

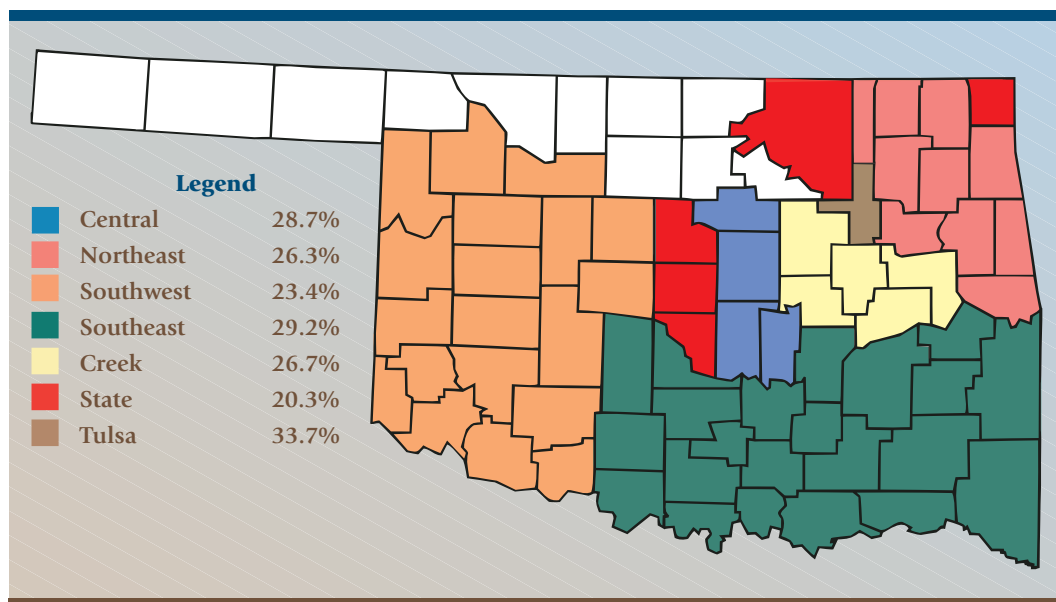
**Table 13.** Weighted percentages and standard errors of high blood pressure among American Indians in Oklahoma, by demographic characteristics 2000 Oklahoma REACH 2010 NABRFS

		%	SE
Gender	Male	26.2	1.59
	Female	26.3	1.15
Age	18-24	9.5	1.94
	25-34	16.9	2.01
	35-44	26.9	2.19
	45-54	36.9	2.32
	55-64	39.1	2.81
	65+	41.8	2.44
Education	< High School	33.3	2.65
	HS/GED	28.1	1.67
	Some College	24.9	1.87
	College grad.	18.9	1.77
Tribe/Nation	Cherokee	26.9	1.41
	Choctaw	26.4	2.00
	Chickasaw	25.4	3.50
	Creek	29.6	4.83
	Seminole	21.2*	7.48
	Comanche	25.9	6.17
	Kiowa	18.9	3.77
	Osage	23.0*	6.77
	Cheyenne-Arapaho	24.6	7.76
	Pawnee	21.5	3.92

\*Cell size less than 20, use with caution

**Unlike with** diabetes, Tulsa strata had the highest prevalence of hypertension. On the other hand, State strata, which predominantly covers Oklahoma, Cleveland, Osage and Ottawa counties had the lowest prevalence at 20% (Figure 8).

**Figure 8. Weighted percentage of high blood pressure, by sampling strata 2000 Oklahoma REACH 2010 NABRFS**



**In the Non-phone BRFS** males, older individuals, and those recruited from the Cheyenne-Arapaho Tribes had the highest prevalence rate of high blood pressure (Table 14).

**Table 14. Percentage of high blood pressure among survey respondents in Oklahoma, by gender, age, and recruiting REACH 2010 Partner 2000 Oklahoma Non-phone BRFS**

	%	SE
<b>Gender</b>		
Male	41.2	3.99
Female	34.6	2.53
<b>Age Category</b>		
18-34	20.7	2.89
35-64	44.9	3.00
65+	62.5	8.70
<b>REACH 2010 Partner</b>		
Absentee Shawnee Tribe of Oklahoma	19.2*	5.80
Cherokee Nation	34.6	5.42
Cheyenne-Arapaho Tribes of Oklahoma	53.5	7.70
Chickasaw Nation	45.0	5.00
Choctaw Nation of Oklahoma	32.6*	7.00
Indian Health Care Resource Center of Tulsa	23.5*	6.00
Pawnee Nation of Oklahoma	**	
Seminole Nation of Oklahoma	45.1	5.28
Wichita and Affiliated Tribes	29.0*	8.29

\*Cell size less than 20, use with caution

\*\* Insufficient sample size



## High Cholesterol

High levels of cholesterol in the bloodstream are an extremely important cause of atherosclerosis. People with high cholesterol levels thus eventually become more susceptible to coronary heart disease.

Similar to high blood pressure, increased levels of blood cholesterol are associated with the aging process and with lower educational level. The Cheyenne-Arapaho Tribes showed the highest prevalence of high cholesterol, while the Kiowa Tribe had the lowest (Table 15).

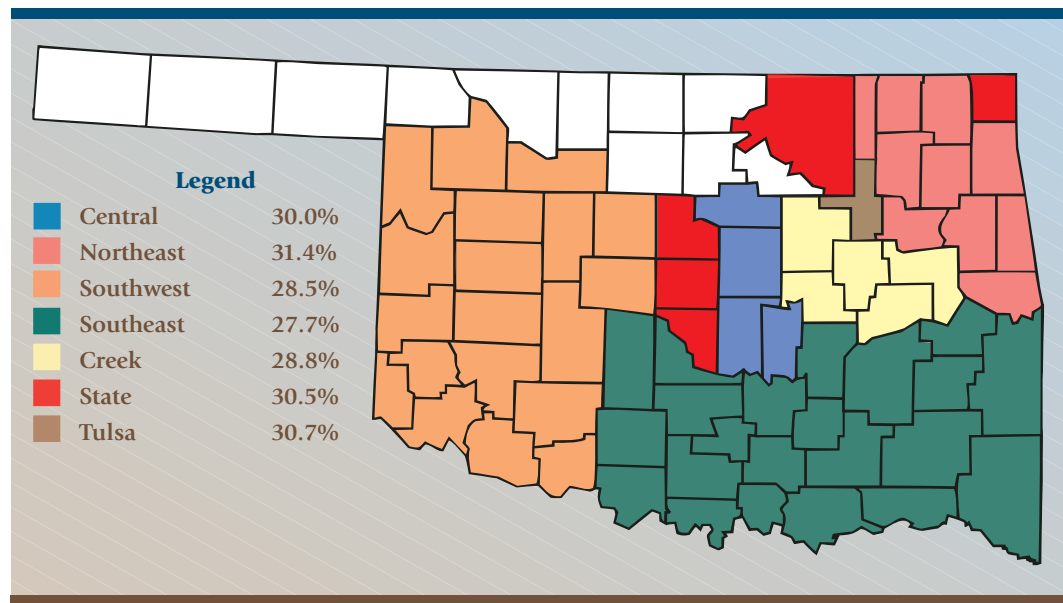
**Table 15. Weighted percentages and standard errors of high cholesterol among American Indians in Oklahoma, by demographic characteristics 2000 Oklahoma REACH 2010 NABRFS**

	%	SE
<b>Gender</b>		
Male	30.4	1.97
Female	29.6	1.43
<b>Age</b>		
18-24	14.5	4.41
25-34	16.2	2.58
35-44	28.4	2.51
45-54	37.3	2.57
55-64	43.4	3.07
65+	35.7	2.57
<b>Education</b>		
< High School	35.1	2.99
HS/GED	28.9	1.96
Some College	30.2	2.29
College grad.	27.8	2.51
<b>Tribe/Nation</b>		
Cherokee	31.4	1.70
Choctaw	26.0	2.34
Chickasaw	27.2	4.69
Creek	23.2	3.35
Seminole	24.4*	13.60
Comanche	28.5	7.44
Kiowa	16.7*	4.03
Osage	31.3*	10.33
Cheyenne-Arapaho	36.2*	13.26
Pawnee	15.6*	8.55

\*Cell size less than 20, use with caution

**Figure 9.** Weighted percentage of high cholesterol, by sampling strata  
2000 Oklahoma REACH 2010 NABRFS

There were no major variations among regional strata with respect to prevalence of high cholesterol (Figure 9).



In the Non-phone BRFS, males had a higher prevalence rate of high cholesterol than females (Table 16).

**Table 16.** Percentages of high cholesterol among survey respondents in Oklahoma, by gender, age group, and recruiting REACH 2010 Partner 2000 Oklahoma Non-phone BRFS

	%	SE
<b>Gender</b>		
Male	32.6	4.84
Female	22.2	2.90
<b>Age Category</b>		
18-34	8.1*	2.85
35-64	34.4	3.44
65+	24.0*	8.72
<b>REACH 2010 Partner</b>		
Absentee Shawnee Tribe of Oklahoma	12.5*	6.90
Cherokee Nation	27.1*	6.48
Cheyenne-Arapaho Tribes of Oklahoma	43.3*	9.20
Chickasaw Nation	20.6*	4.94
Choctaw Nation of Oklahoma	29.7*	7.62
Indian Health Care Resource Center of Tulsa	12.0*	6.63
Pawnee Nation of Oklahoma	**	
Seminole Nation of Oklahoma	21.4*	5.53
Wichita and Affiliated Tribes	38.5*	14.04

\* Cell size less than 20, use with caution

\*\* Insufficient sample size

## General Health Status

Self-reported fair or poor health status was more prevalent among females, older individuals, and among those with less education (Table 17).

**Table 17. Weighted percentages and standard errors of self-reported fair or poor general health status among American Indians in Oklahoma, by demographic characteristics 2000 Oklahoma REACH 2010 NABRFS**

	%	SE
<b>Gender</b>		
Male	17.9	1.21
Female	23.2	1.09
<b>Age</b>		
18-24	7.9	1.83
25-34	8.6	1.08
35-44	19.2	1.82
45-54	28.0	2.06
55-64	34.5	2.72
65+	43.8	2.53
<b>Education</b>		
< High School	37.6	2.64
HS/GED	21.2	1.42
Some College	17.3	1.41
College grad.	10.2	1.39
<b>Tribe/Nation</b>		
Cherokee	21.6	1.18
Choctaw	20.7	1.92
Chickasaw	20.1	3.15
Creek	16.9	2.75
Seminole	17.2*	7.75
Comanche	23.3	6.12
Kiowa	28.6*	7.93
Osage	20.9*	7.11
Cheyenne-Arapaho	23.8*	8.79
Pawnee	29.9*	4.24

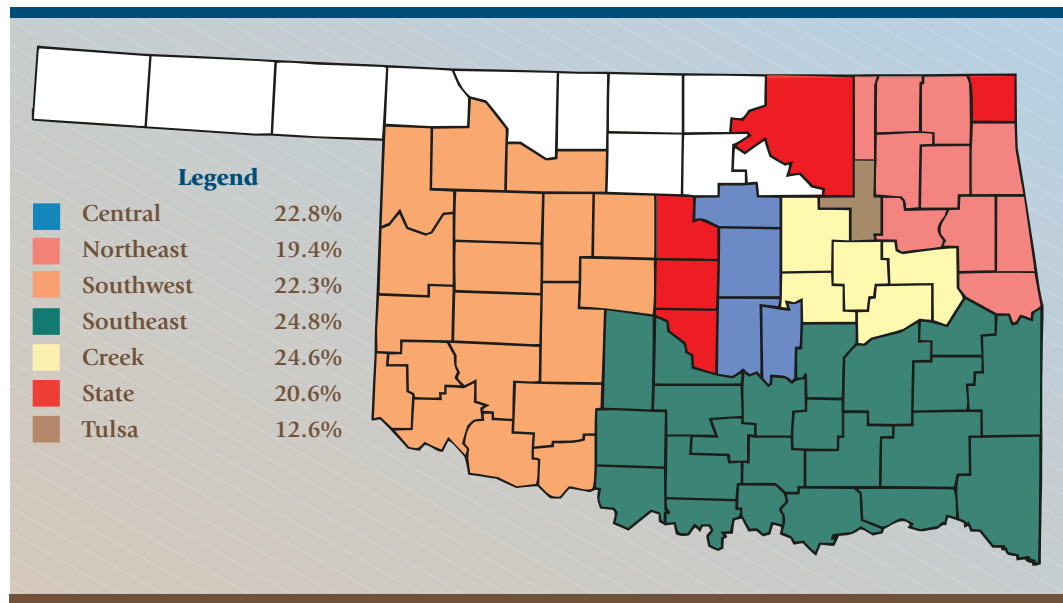
\* Cell size less than 20, use with caution

\*\* Insufficient sample size

**Figure 10.** Weighted percentages of self-reported fair or poor general health status, by sampling strata 2000 Oklahoma REACH 2010 NABRFS

**Tulsa strata**

had the lowest percentage of adults reporting fair or poor health status. For other regions it ranged from one in four to one in five adults (Figure 10).



**Older persons and those**

re-recruited from the Seminole Nation were more likely to report fair or poor general health status (Table 18).

**Table 18.** Percentage of self-reported fair or poor general health status among survey respondents in Oklahoma, by gender, age, and recruiting REACH 2010 Partner 2000 Oklahoma Non-phone BRFS

	%	SE
<b>Gender</b>		
Male	37.3	3.92
Female	35.3	2.54
<b>Age Category</b>		
18-34	25.3	3.10
35-64	40.4	2.95
65+	62.5	8.70
<b>REACH 2010 Partner</b>		
Absentee Shawnee Tribe of Oklahoma	40.4*	7.24
Cherokee Nation	34.6	5.42
Cheyenne-Arapaho Tribes of Oklahoma	34.9*	7.35
Chickasaw Nation	34.0	4.76
Choctaw Nation of Oklahoma	37.0*	7.20
Indian Health Care Resource Center of Tulsa	27.5*	6.31
Pawnee Nation of Oklahoma	**	
Seminole Nation of Oklahoma	45.1	5.24
Wichita and Affiliated Tribes	29.0*	8.29

\* Cell size less than 20, use with caution

\*\* Insufficient sample size

# Discussion

**Besides increasing** age, educational level seems to be the strongest indicator of risk factors and chronic outcomes. Many of the presented behaviors, risk factors and outcomes were higher among those of lower educational levels.

**Geographically there** were not many variations in the measures presented, indicating that no region stands out as a critical one. However, the Tulsa region showed lower prevalence in a few measures as compared to other regions, in particular obesity, lack of leisure time physical activity and diabetes.

**Even though** regional differences were minimal, when comparisons were based on tribal belonging there were several variations. These variations may be partially a result of the relatively small samples from some tribes.

**To our knowledge,** the Oklahoma Reach 2010 Non-phone BRFSS is the only one of it's kind. Results presented in this report indicate variations among the recruiting REACH 2010 Partner subgroups that seem to vary somewhat depending on which variable is being looked at. Future plans include using these data to determine and report differences in prevalence of chronic disease and their risk factors based on lack of phone coverage.