



## *Summary of Reportable Injuries in Oklahoma*

### *Traumatic Brain Injuries in Oklahoma, 1992-2003*

Tracy Wendling, M.P.H.  
Epidemiologist  
Injury Prevention Service  
Oklahoma State Department of Health

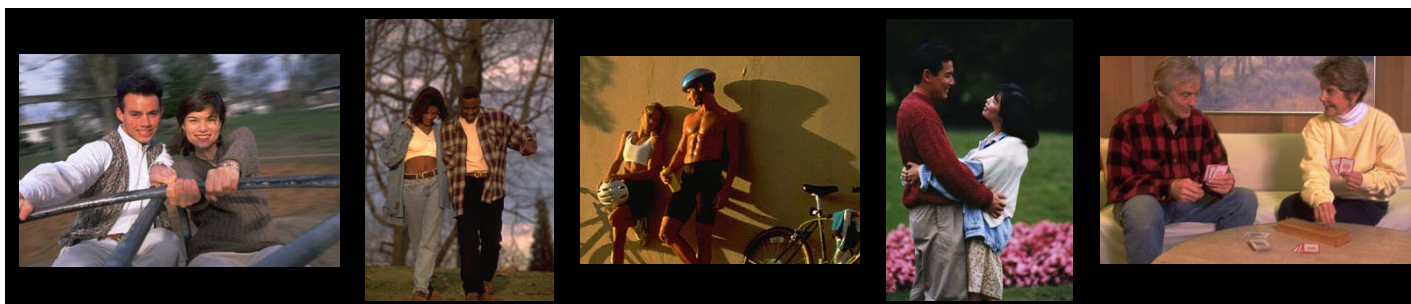
Shelli Stephens-Stidham  
Interim Chief, Injury Prevention Service

Pam Archer, M.P.H.  
Deputy Chief, Injury Prevention Service

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For more information or copies of summary reports on other injuries, please contact:

Injury Prevention Service  
Oklahoma State Department of Health  
1000 N.E. 10<sup>th</sup> Street • Oklahoma City, Oklahoma 73117-1299 • (405) 271-3430  
<http://ips.health.ok.gov>

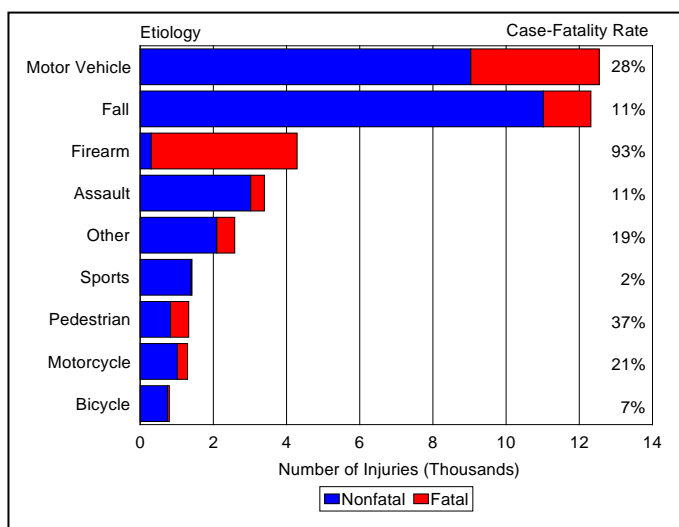


# Traumatic Brain Injuries in Oklahoma, 1992-2003

## Background

Statewide surveillance for hospitalized and fatal traumatic brain injuries (TBI) has been conducted in Oklahoma through hospital medical records departments and the Office of the Chief Medical Examiner since 1992. Supplemental data have also been collected from the Department of Public Safety. Persons discharged with the following ICD-9-CM codes were included in surveillance: 800.0-801.9, 803.0-804.9, and 850.0-854.1. In addition, reporting of persons discharged with 959.01 was added in 1998; 950.1-950.3 and 995.55 were added in 2001. All TBI cases were reviewed each year; however, beginning in 1999, some variable fields were not collected on all hospitalized cases. Basic data (demographic data, length of stay, outcome, and how the injury occurred) were collected for all cases, but details on the specific circumstances of the injury (intentionality, use of safety equipment, etc.) and on medical information (severity/occurrence of amnesia, etc.) were not collected after 1998. Cases with incomplete information were excluded from analysis of variables not collected. Average annual rates were calculated using bridged-race population estimates summed for all 12 years of data.

**Figure 1. Traumatic Brain Injuries by Etiology and Outcome, Oklahoma, 1992-2003**



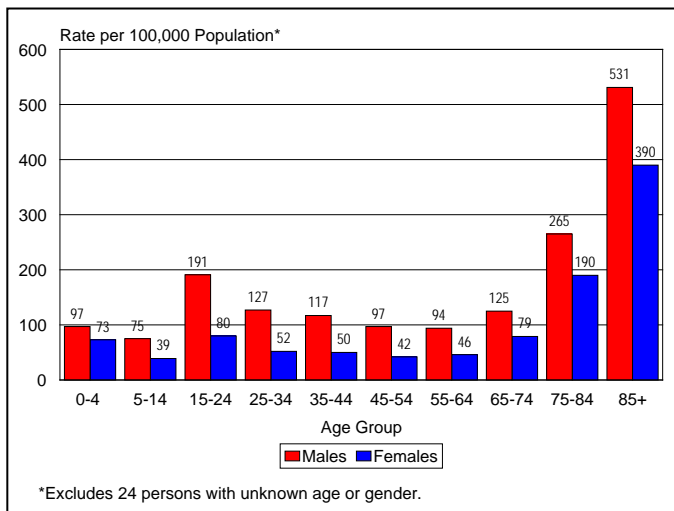
- A total of 39,967 persons suffered a TBI between 1992 and 2003.
- An average of 875 persons died from a TBI each year during the 12-year time period.
- The highest fatality rates for TBIs resulted from gunshot wounds, followed by pedestrian injuries, and motor vehicle crashes.
- Gunshot wounds and motor vehicle crashes combined accounted for 71% of TBI deaths, with 3985 and 3508 deaths, respectively.

**Table 1. Traumatic Brain Injuries by Etiology and Year of Injury, Oklahoma, 1992-2003**

Etiology	Year of Injury												Total
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
Motor Vehicle	1,026	1,056	1,049	998	1,054	1,025	1,013	1,013	1,122	1,005	1,143	1,040	12,544
Fall	764	800	811	804	886	862	927	1,121	1,222	1,302	1,362	1,456	12,317
Firearm	371	415	377	395	357	380	306	361	322	363	335	308	4,290
Assault	313	328	303	269	264	238	243	277	268	295	297	300	3,395
Other/Unknown	212	206	179	318	159	164	169	225	202	249	249	252	2,584
Sports	122	120	114	131	95	104	103	114	119	145	124	126	1,417
Pedestrian	145	119	120	99	105	117	119	89	104	116	92	102	1,327
Motorcycle	104	104	123	111	87	83	74	85	108	122	126	168	1,295
Bicycle	91	75	70	66	61	54	53	73	65	74	60	56	798
Total	3,148	3,223	3,146	3,191	3,068	3,027	3,007	3,358	3,532	3,671	3,788	3,808	39,967

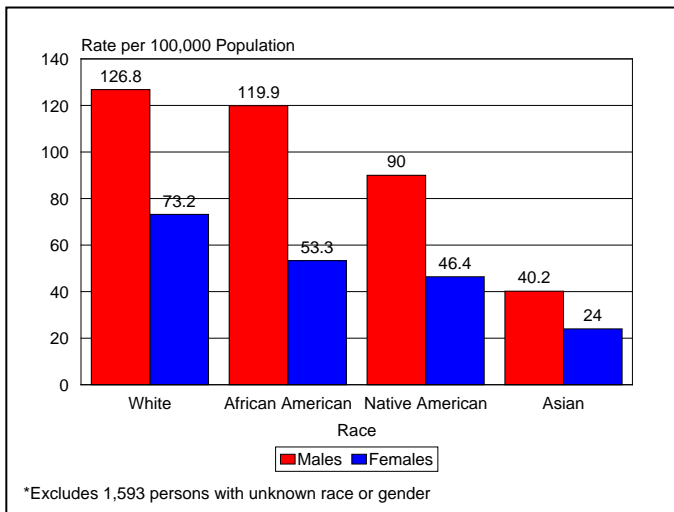
- The number of TBIs declined from 1995 through 1998; new hospital discharge codes were added in 1998 and in 2001.
- The number of falls increased steadily from 1997-2003; falls were the leading cause of TBIs in 1999-2003.
- Motorcycle-related TBIs decreased from 1994-1998, but increased steadily after 1998.

**Figure 2. Traumatic Brain Injury Rates by Age\* and Gender, Oklahoma, 1992-2003**



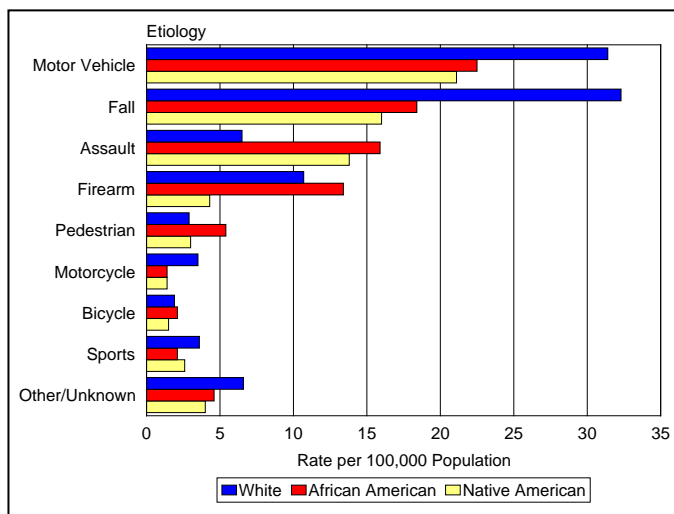
- The age range of persons who suffered a TBI was less than 1 year to 108 years, with an average age of 42 years.
- The injury rate was highest for persons 85 years and older, followed by persons 75-84 years and 15-24 years.
- Males were nearly 2 times more likely to be injured than females.

**Figure 3. Traumatic Brain Injury Rates by Gender and Race,\* Oklahoma, 1992-2003**



- Whites had the highest rate of TBI (99.5), followed by African Americans (85.9), Native Americans (67.8), and Asians (31.9).
- TBI rates were highest among white males, followed closely by African American males.
- Rates were 2.2 times higher for African American males than for African American females.
- Among both males and females, rates were lowest for Asians.

**Figure 4. Traumatic Brain Injury Rates by Etiology and Race, Oklahoma, 1992-2003**



- TBI rates were highest for whites for motor vehicle crashes, falls, motorcycle crashes, and sports.
- African Americans had the highest TBI rates for assaults, firearm-related injuries, pedestrian-related injuries, and bicycle-related injuries.
- Native Americans had the second highest rates of injury for assaults, pedestrian injuries, and sports.

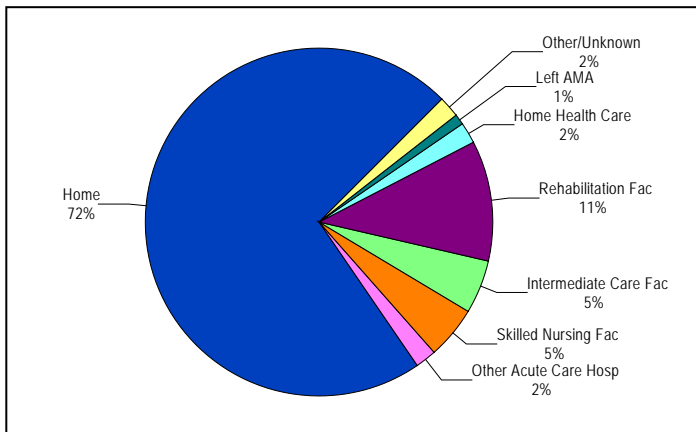
**Table 2. Nonfatal Traumatic Brain Injuries by Etiology and Severity, Oklahoma, 1992-2000\***

Etiology	Survivors Abbreviated Injury Scale (AIS)					Total
	2 Moderate No. (%)	3 Serious No. (%)	4 Severe No. (%)	5 Critical No. (%)	Unknown No. (%)	
Motor Vehicle	3,701 (63%)	1,031 (17%)	837 (14%)	268 ( 5%)	72 (1%)	5,909
Fall	3,554 (57%)	786 (13%)	1,470 (23%)	349 ( 6%)	102 (2%)	6,261
Assault	966 (49%)	458 (23%)	441 (22%)	96 ( 5%)	23 (1%)	1,984
Other	716 (57%)	242 (19%)	228 (18%)	62 ( 5%)	18 (1%)	1,266
Sports	584 (65%)	163 (18%)	121 (14%)	25 ( 3%)	3 (0%)	896
Motorcycle	263 (44%)	154 (26%)	131 (22%)	47 ( 8%)	8 (1%)	603
Pedestrian	300 (52%)	116 (20%)	121 (21%)	34 ( 6%)	6 (1%)	577
Bicycle	295 (59%)	99 (20%)	95 (19%)	10 ( 2%)	3 (1%)	502
Firearm	19 ( 9%)	50 (23%)	83 (38%)	61 (28%)	3 (1%)	216
Total	10,398 (57%)	3,099 (17%)	3,527 (19%)	952 ( 5%)	238 (1%)	18,214

\*Includes all cases 1992-1998 and sampled cases in 1999 and 2000; information on AIS was not collected in 2001-2003.

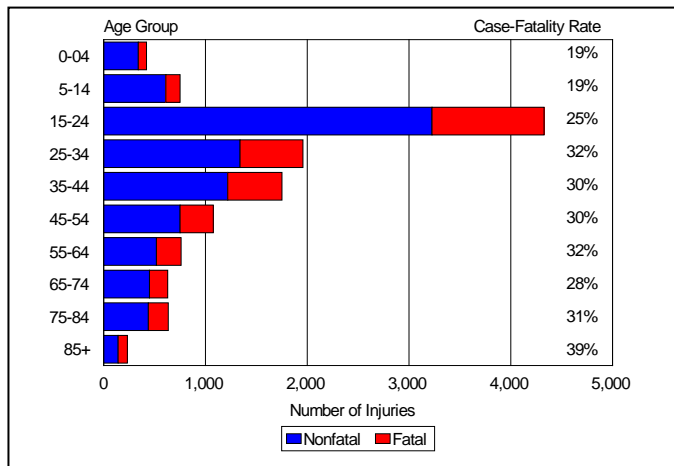
- Higher Abbreviated Injury Scale (AIS) scores indicate more severe brain injury; among survivors, the most severe TBIs resulted from firearm and motorcycle-related incidents.
- More than half of TBIs were of moderate severity (AIS of 2).

**Figure 5. Traumatic Brain Injury Survivors by Hospital Discharge Status, Oklahoma, 1992-2003**



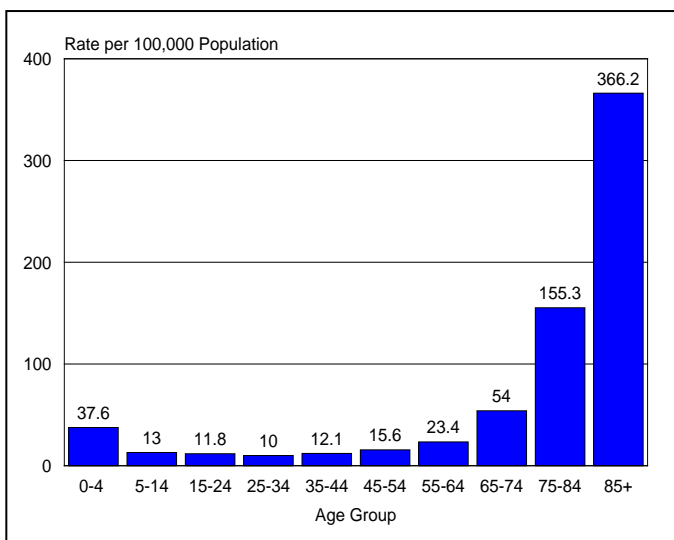
- Of the 39,967 persons who suffered a TBI between 1992 and 2003, 74% survived.
- The majority of TBI survivors (72%) were discharged home after their hospital stay.
- 11% of survivors went to an inpatient rehabilitation facility upon discharge.

**Figure 6. Motor Vehicle Crash-Related Traumatic Brain Injuries by Age and Outcome, 1992-2003**



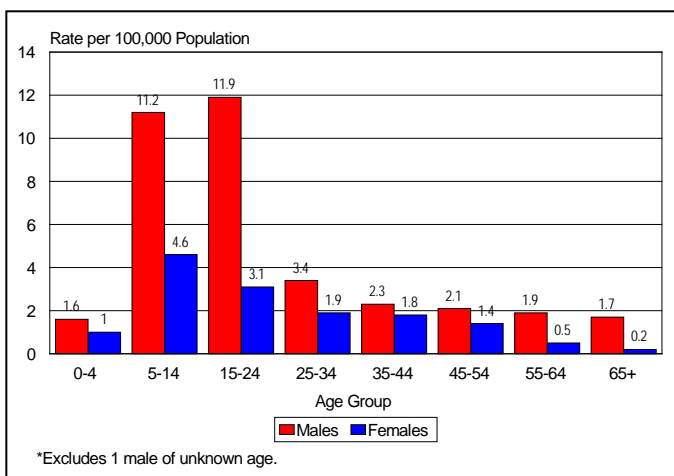
- A total of 12,544 persons suffered a TBI in a motor vehicle crash.
- The number of motor vehicle crash-related TBIs peaked in the 15-24 year age group; 34% of injuries and 31% of fatalities occurred in this group.
- Nearly 100 children under 15 years of age sustained a TBI in a motor vehicle crash each year.
- The case-fatality rate was highest among persons 85 years of age and older.

**Figure 7. Rates of Traumatic Brain Injuries Due to Falls by Age, Oklahoma, 1992-2003**



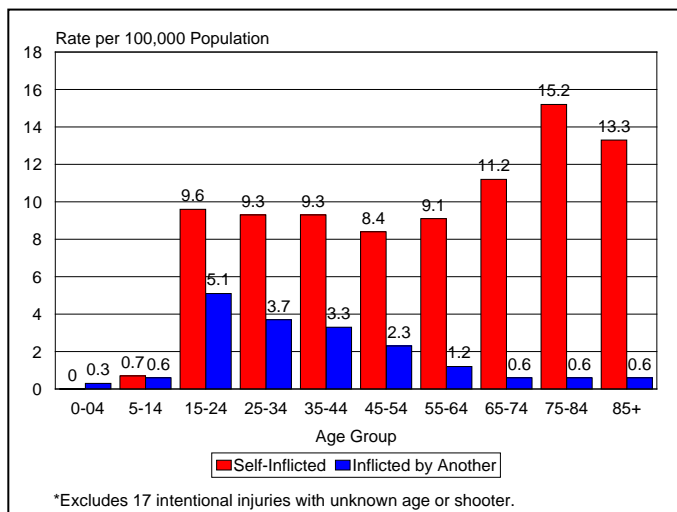
- A total of 12,317 persons suffered a TBI due to a fall.
- The rate of falls was highest among persons 65 years and older, followed by children 0-4 years of age.
- 71% of persons who died were over 65 years of age.
- Falls among persons 65 years and older increased steadily over the 12 year period (from 313 in 1992 to 894 in 2003).
- Males accounted for 65% of falls among persons less than 65 years of age; females accounted for 62% of falls among persons 65 years and older.

**Figure 8. Rates of Traumatic Brain Injuries Due to Sports by Age\* and Gender, Oklahoma, 1992-2003**



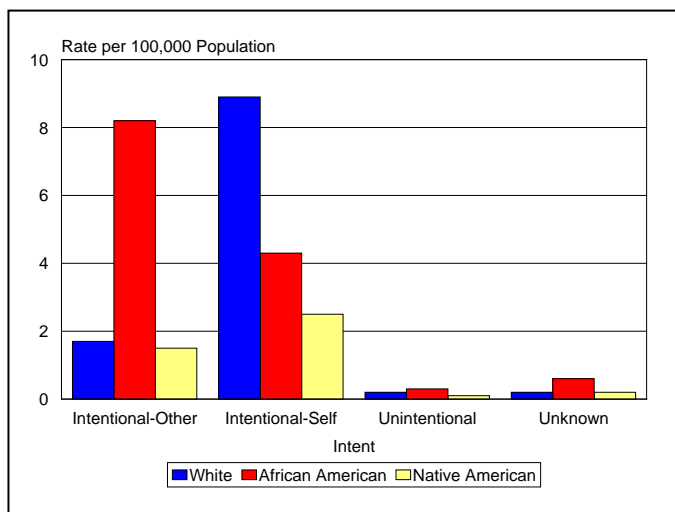
- A total 1,417 persons suffered a sports-related TBI, which averages to nearly 120 injuries each year.
- Males were 2.5 times more likely to be injured than females, accounting for 72% of the injuries.
- The rate of sports-related TBIs was highest among persons 5-24 years of age.
- Over 98% of the injuries were nonfatal.

**Figure 9. Traumatic Brain Injury Rates Due to Intentional\* Firearm Injuries by Age and Shooter, Oklahoma, 1992-2003**



- An average of 358 firearm-related TBIs occurred each year; 96% were known to be intentional.
- 77% of intentionally inflicted firearm-related TBIs were self-inflicted and 23% were inflicted by another person.
- 96% of intentional firearm injuries among persons 65 years and older were self-inflicted.
- The highest rate of injury inflicted by another person occurred among 15-24 year olds.

**Figure 10. Firearm-Related Traumatic Brain Injury Rates by Intent and Race, Oklahoma, 1992-2003**



- A total of 4290 TBIs were firearm-related.
- African Americans had the highest rate for firearm-related TBIs that were intentionally inflicted by another person.
- Whites had the highest rate for firearm-related TBIs that were self-inflicted.
- The rate of unintentional firearm-related TBIs was highest among African Americans.





**Table 3. Traumatic Brain Injury Rates by County of Residence, Oklahoma, 1992-2003**

County	Average Annual Population	Number of Cases 1992-2003	Average Annual Rate*
Harper	3,644	114	260.7
Ellis	4,134	94	189.5
Adair	20,491	434	176.5
Garvin	26,939	480	148.5
Pawnee	16,208	287	147.6
Dewey	4,918	86	145.7
Pontotoc	34,797	588	140.8
Mayes	36,991	609	137.2
McClain	26,412	432	136.3
Beckham	19,315	314	135.5
Caddo	30,129	483	133.6
Muskogee	69,396	1,085	130.3
Harmon	3,395	53	130.1
Haskell	11,547	180	129.9
Blaine	11,784	183	129.4
Kiowa	10,504	160	126.9
Roger Mills	3,557	54	126.5
Coal	5,942	90	126.2
Hughes	13,612	206	126.1
Kingfisher	13,698	207	125.9
Pushmataha	11,512	173	125.2
McIntosh	18,775	282	125.2
Jefferson	6,877	103	124.8
Seminole	24,928	365	122.0
Choctaw	15,370	221	119.8
Grant	5,289	74	116.6
Craig	14,661	205	116.5
Washita	11,480	160	116.1
Bryan	35,334	487	114.9
Latimer	10,545	145	114.6
Creek	65,722	901	114.2
Okfuskee	11,625	157	112.5
Cherokee	40,276	542	112.1
Noble	11,339	152	111.7
Jackson	28,738	384	111.4
Marshall	12,633	165	108.8
Alfalfa	6,172	80	108.0
Ottawa	32,235	416	107.5
Atoka	13,680	176	107.2

County	Average Annual Population	Number of Cases 1992-2003	Average Annual Rate*
Pottawatomie	63,543	810	106.2
Carter	44,994	570	105.6
McCurtain	34,075	426	104.2
Greer	6,144	76	103.1
Major	7,599	94	103.1
Oklahoma	647,681	8,001	102.9
Okmulgee	38,826	477	102.4
Murray	12,458	153	102.3
Stephens	43,123	518	100.1
<b>State of Oklahoma</b>	<b>3,378,313</b>	<b>39,967</b>	<b>98.6</b>
Custer	26,130	307	97.9
Garfield	57,502	670	97.1
Love	8,606	100	96.8
Johnston	10,359	120	96.5
Tulsa	548,219	6,350	96.5
Kay	48,259	548	94.6
Lincoln	31,082	351	94.1
Grady	44,589	503	94.0
Comanche	116,173	1,283	92.0
Woodward	18,646	202	90.3
Pittsburg	43,500	466	89.3
Woods	8,996	96	88.9
Tillman	9,496	101	88.6
Beaver	5,837	62	88.5
Rogers	66,501	694	87.0
Payne	66,765	693	86.5
Osage	43,863	428	81.3
Canadian	84,793	789	77.5
Nowata	10,322	92	74.3
Logan	32,763	292	74.3
Cimarron	3,148	27	71.5
Washington	48,699	406	69.5
Delaware	34,820	285	68.2
Texas	18,697	149	66.4
Cotton	6,572	51	64.7
Wagoner	55,297	401	60.4
Sequoyah	37,619	267	59.1
Cleveland	201,048	1,372	56.9
LeFlore	46,969	243	43.1

\*Average annual rates per 100,000 population were computed using bridged-race population estimates summed for all 12 years of data.

County of residence was unknown for 167 persons.