



## *Traumatic Brain Injury Data Report, 2004-2008*

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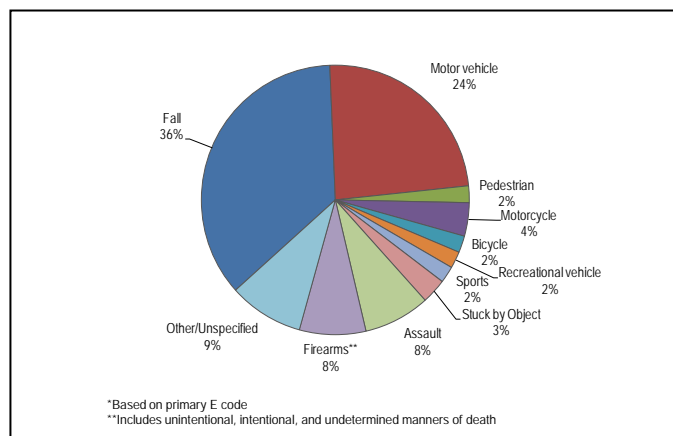
# Section 1: Traumatic Brain Injuries in Oklahoma, 2004-2008

## Background

Statewide surveillance for hospitalized and fatal traumatic brain injuries (TBI) was conducted in Oklahoma using 2004-2008 hospital discharge data and Vital Statistics (death certificate) data. Persons discharged from an Oklahoma acute care facility with one or more of the following *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) codes were included in surveillance: 800.0-801.9, 803.0-804.9, 850.0-854.1, 950.1-950.3, 959.01, and 995.55. Deaths were identified by death certificates coded with one or more of the following *International Classification of Diseases, Tenth Revision* (ICD-10) codes: S01.0-S01.9, S02.0, S02.1, S02.3, S02.7-S02.9, S04.0, S06.0-S06.9, S07.0, S07.1, S07.8, S07.9, S09.7-S09.9, T01.0, T02.0, T04.0, T06.0, T90.1, T90.2, T90.4, T90.5, T90.8, or T90.9. Only residents of Oklahoma were included. Oklahoma residents who died out of state were also included. In an attempt to reduce an artificial inflation of the number from readmissions and transfers, the following procedures were used. Discharges for the same person that occurred 2-10 days after the initial stay were removed from the database unless the external cause of injury code (E code) indicated a different type of injury (e.g., fall and motor vehicle crash). If subsequent discharges occurred 11 or more days later, the stays were considered to be related to separate injuries and were included in the database. Back-to-back stays (e.g., transfers where the discharge date at one hospital was the same or one day prior to the admission date at another) were combined into one distinct discharge record. Without a comprehensive review of all medical records, it is unknown exactly how many of the discharges were for follow-up care of a previous injury.

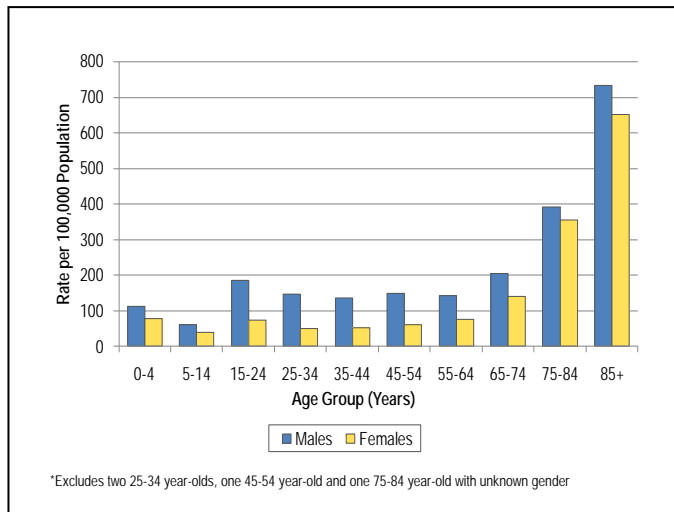
Basic demographic data were collected for all cases. In addition, a stratified random sample of cases was selected for medical record review and detailed information on the injury was collected (see page 7, Section 2). Residents hospitalized out of state or at a federal facility, who survived, were not included in analyses. Therefore, the burden of TBI on Oklahoma's population may be greater than what is presented in this document. Rates were calculated using 2004-2008 bridged-race population estimates.

Figure 1. Traumatic Brain Injuries by Etiology\*, Oklahoma, 2004-2008



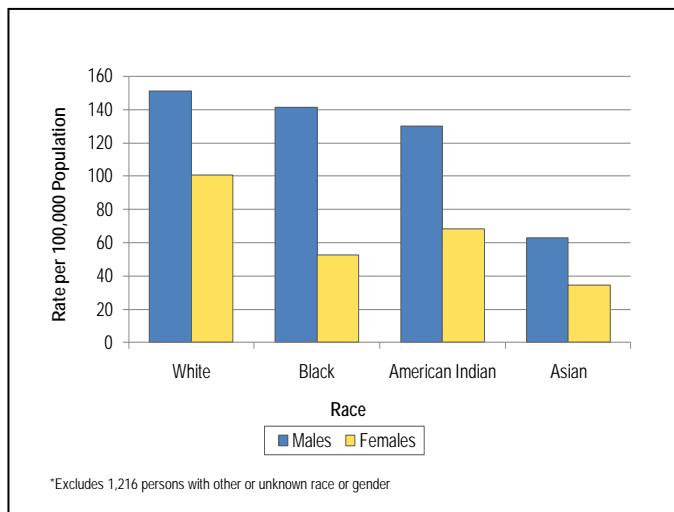
- A total of 22,544 TBIs resulted in hospitalization or death in 2004-2008 (4,386 in 2004; 4,395 in 2005; 4,593 in 2006; 4,516 in 2007; and 4,654 in 2008) among Oklahoma residents.
- Falls and motor vehicle crashes were the leading causes of all TBI.
- Gunshot wounds and motor vehicle crashes were the leading causes of TBI preadmission deaths.

**Figure 2. Traumatic Brain Injury Rates by Age Group\* and Gender, Oklahoma, 2004-2008**



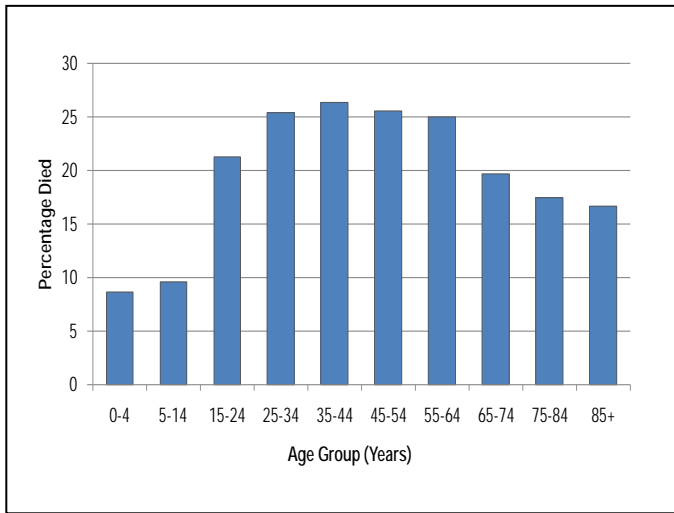
- The age range of persons who suffered a TBI was less than 1 year to 105 years, with an average age of 49 years.
- The injury rate was highest for persons 85 years and older, followed by persons 75-84 years, for both males and females.
- The third highest rate among males and females was in the 65-74 year age group.
- Males were over 1.5 times more likely to be injured than females (156.2 and 96.7 injuries per 100,000 population, respectively).

**Figure 3. Traumatic Brain Injury Rates by Gender and Race\*, Oklahoma, 2004-2008**



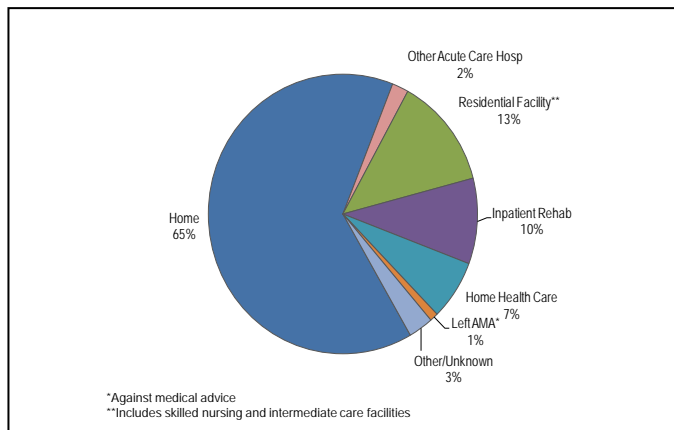
- Whites had the highest rate of TBI (125.6 injuries per 100,000 population), followed by American Indians (98.7), blacks (96.5), and Asians (48.4).
- TBI rates were highest among white males, followed closely by black and American Indian males.
- Rates were over 2.5 times higher for black males than for black females.
- Rates were lowest for Asian females; all females had lower rates than their male counterparts.
- In terms of ethnicity, Hispanic males had an injury rate 2.7 times higher than Hispanic females (data not shown; 101.9 and 37.2 injuries per 100,000 population, respectively).

**Figure 4. Traumatic Brain Injury Case Fatality Rates by Age Group, Oklahoma, 2004-2008**



- There was a total of 4,651 deaths (21%) from a TBI in 2004-2008.
- Persons 35-44 and 45-54 years had the highest fatality rates (26.4% and 25.6%, respectively), while children under 15 years had the lowest (9%).
- Males had a higher case fatality rate than females (24% compared to 15%).

**Figure 5. Nonfatal Traumatic Brain Injury Hospitalizations by Discharge Status, Oklahoma, 2004-2008**



- Of the 22,544 TBIs identified, 79% were nonfatal.
- The majority of TBI discharges (65%) were to home after inpatient acute care.
- Ten percent of survivors went to an inpatient rehabilitation facility upon discharge.
- Thirteen percent of injured patients were discharged to a skilled nursing facility or nursing home.



Table 1. Traumatic Brain Injury Rates\* by County of Residence, \*\* Oklahoma, 2004-2008

County	2004-2008 Population	Number of Cases	Annual Rate
Harmon	14,477	45	310.8
Major	35,943	93	258.7
Ellis	19,261	45	233.6
Pushmataha	57,839	134	231.7
Beckham	98,390	221	224.6
Adair	108,623	222	204.4
Dewey	22,063	44	199.4
Roger Mills	16,357	32	195.6
Craig	75,053	144	191.9
Pawnee	82,254	156	189.7
Choctaw	75,233	142	188.7
Blaine	63,218	119	188.2
Harper	16,662	31	186.1
Greer	28,968	52	179.5
Coal	28,465	50	175.7
Washita	57,284	98	171.1
Garvin	134,808	228	169.1
Kingfisher	70,685	119	168.4
Latimer	52,505	88	167.6
Haskell	60,333	99	164.1
Hughes	68,365	110	160.9
Johnston	51,753	83	160.4
Caddo	147,037	234	159.1
McCurtain	167,361	263	157.1
Lincoln	160,539	251	156.3
Ottawa	161,498	245	151.7
Jackson	130,968	196	149.7
McClain	154,244	230	149.1
Kiowa	47,600	70	147.1
Noble	55,285	81	146.5
Muskogee	351,980	512	145.5
Pittsburg	220,997	318	143.9
Jefferson	31,540	45	142.7
Grant	22,795	32	140.4
Seminole	120,543	166	137.7
Creek	342,762	472	137.7
Murray	63,184	87	137.7
McIntosh	97,592	134	137.3
Mayes	197,106	268	136.0

County	2004-2008 Population	Number of Cases	Annual Rate
Alfalfa	28,124	38	135.1
Atoka	71,912	96	133.5
Woodward	95,909	128	133.5
Tillman	41,240	55	133.4
Tulsa	2,892,830	3,849	133.1
Garfield	286,741	366	127.6
Pontotoc	179,753	227	126.3
<b>State of Oklahoma</b>	<b>17,877,763</b>	<b>22,544</b>	<b>126.1</b>
Stephens	214,240	270	126.0
Okmulgee	196,405	243	123.7
Washington	247,147	303	122.6
Bryan	193,918	236	121.7
Canadian	502,772	607	120.7
Pottawatomie	341,908	410	119.9
Carter	235,219	282	119.9
Oklahoma	3,464,430	4,151	119.8
Payne	388,988	461	118.5
Logan	181,877	215	118.2
Okfuskee	56,183	66	117.5
Custer	128,681	151	117.3
Rogers	407,362	477	117.1
Marshall	72,689	85	116.9
Cherokee	224,305	261	116.4
Osage	225,130	257	114.2
Cotton	31,870	36	113.0
Nowata	53,299	60	112.6
Comanche	564,541	588	104.2
Grady	248,449	244	98.2
Cleveland	1,157,061	1,125	97.2
Woods	42,346	41	96.8
Wagoner	326,431	316	96.8
Kay	230,270	221	96.0
Le Flore	246,101	211	85.7
Delaware	198,624	170	85.6
Cimarron	13,426	11	81.9
Love	45,178	37	81.9
Beaver	26,735	20	74.8
Sequoyah	203,060	144	70.9
Texas	101,039	45	44.5

\*Rates are calculated per 100,000 population.

\*\*County of residence was unknown for 82 persons.

**Table 2. Traumatic Brain Injury Rates\* and Proportions by Age Group, Race, Hispanic Ethnicity, Intent, Gender, and Year of Discharge/Death, Oklahoma, 2004-2008**

	2004		2005		2006		2007		2008	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
<b>Total</b>	154.4	95.3	156.7	92.3	157.4	100.0	155.3	95.1	156.3	99.9
<b>Age Group</b>										
0-4	118.4	88.1	118.4	72.0	114.8	94.3	109.0	66.8	100.8	70.0
5-14	79.8	49.4	59.7	42.1	64.3	36.4	57.5	38.3	48.9	32.8
15-24	212.8	75.9	188.4	76.7	196.1	89.4	181.3	72.0	168.7	64.7
25-34	138.4	56.1	148.6	46.5	143.6	50.3	134.2	50.2	152.5	48.1
35-44	130.0	49.7	142.0	56.8	135.3	57.0	128.1	50.7	135.9	51.3
45-54	141.7	60.6	138.8	61.3	158.0	63.1	152.2	56.8	154.4	62.7
55-64	125.3	65.8	147.4	71.0	143.1	75.7	144.9	75.9	149.9	90.8
65-74	177.1	133.6	205.8	129.6	198.7	144.0	232.6	149.3	214.9	142.6
75-84	348.7	351.5	402.4	318.4	379.4	362.3	429.7	372.5	420.6	383.7
85+	680.7	587.9	676.1	599.4	651.9	620.1	654.6	608.1	808.2	758.9
<b>Race</b>										
White	149.0	97.3	150.3	94.5	151.9	102.9	150.7	101.1	153.2	106.8
Black	132.2	41.1	145.8	49.2	143.9	63.4	133.9	53.1	145.6	52.4
American Indian	132.2	72.7	136.7	76.6	136.2	76.0	128.9	59.0	123.8	60.0
Asian	**	**	**	**	75.8	**	67.4	**	73.0	**
<b>Ethnicity</b>										
Hispanic	119.6	43.5	103.7	35.8	110.9	51.4	99.2	28.8	92.1	33.7
<b>Intent</b>										
Unintentional	74.7%	86.3%	72.8%	85.7%	76.1%	89.3%	76.0%	88.6%	74.1%	91.0%
Suicide/Attempt	8.2%	2.2%	8.0%	2.4%	8.8%	2.1%	8.3%	2.4%	9.7%	1.8%
Homicide/Assault	11.6%	5.2%	11.2%	4.8%	11.4%	4.5%	12.1%	4.9%	12.5%	3.9%
Legal Intervention/War	0.1%	0.0%	0.1%	0.0%	<0.1%	0.0%	0.1%	0.0%	0.2%	<0.1%
Undetermined	0.6%	0.5%	0.5%	0.2%	0.5%	0.2%	0.4%	0.5%	0.5%	0.4%
Unknown/Missing E Code	4.8%	5.8%	7.2%	6.9%	3.1%	3.9%	3.0%	3.7%	3.0%	2.8%

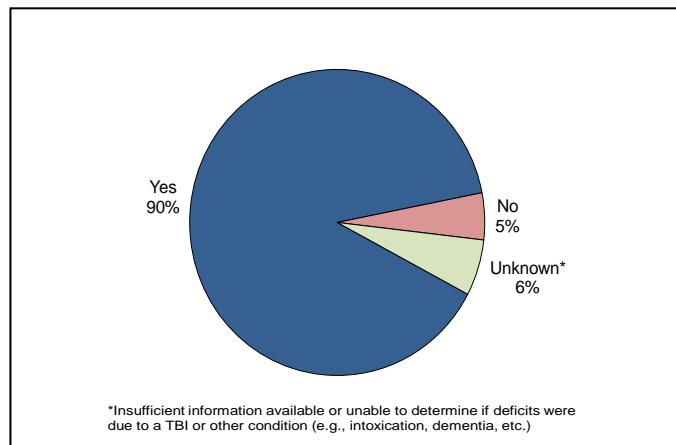
\*Rates are calculated per 100,000 population.

\*\*Case count is less than 20; rate not calculated

## Section 2: Sampled Hospitalized Traumatic Brain Injuries in Oklahoma, 2004-2008

In order to obtain detailed information on the circumstances and outcomes of traumatic brain injuries (TBI) in Oklahoma, a random sample of cases was selected based on hospital size. The medical records of sampled cases were reviewed by trained abstractors and detailed data were recorded and analyzed. Preadmission deaths and hospitalizations occurring at facilities outside of Oklahoma were not eligible to be selected in the sample. A random sample of 1,200 records was drawn using 2004 discharge data, which resulted in 1,191 successfully abstracted cases. From 2005 data, the random sample consisted of 1,051 records, producing 1,029 successful reviews. The 2006 discharge data produced a random sample of 1,050 records with 1,038 successful reviews. The 2007 discharge data yielded 1,036 successful reviews from a random sample of 1,050 records. Finally, from a sample of 1,050 records from 2008, there were 1,037 successful reviews. The most common reasons that a record could not be reviewed or did not qualify as a successful abstraction included that the medical record was not located by hospital staff, the patient was found not to be an Oklahoma resident, or the record was discovered to be an old injury or a subsequent visit for a previously abstracted injury (e.g., a prevalent case). Since these records were selected randomly stratified by hospital size, the samples are representative of all resident hospitalized TBI cases in Oklahoma.

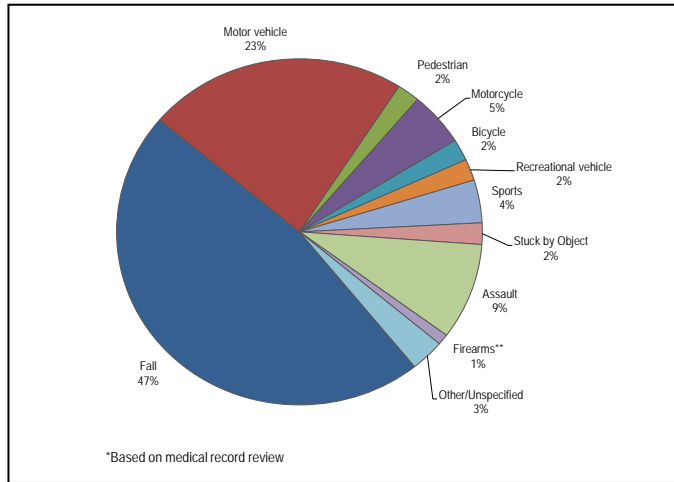
Figure 7. Sampled Hospitalized Traumatic Brain Injuries Meeting the Clinical Case Definition, Oklahoma, 2004-2008



- All sampled injuries met the case inclusion criteria, which are the code-based definitions provided in the Section 1 background.
- The Centers for Disease Control and Prevention has also published a clinical case definition for traumatic brain injuries.
- To meet the clinical case definition, one or more of the following conditions must be documented in the medical record and attributed to the head injury:
  - Decreased level of consciousness
  - Amnesia
  - Skull fracture
  - Intracranial lesion
  - Neurological or neuropsychological abnormality
- The majority of sampled records (90%) met the clinical case definition.
- Subsequent analyses, however, include all cases meeting the code-based inclusion criteria (n = 5,331).



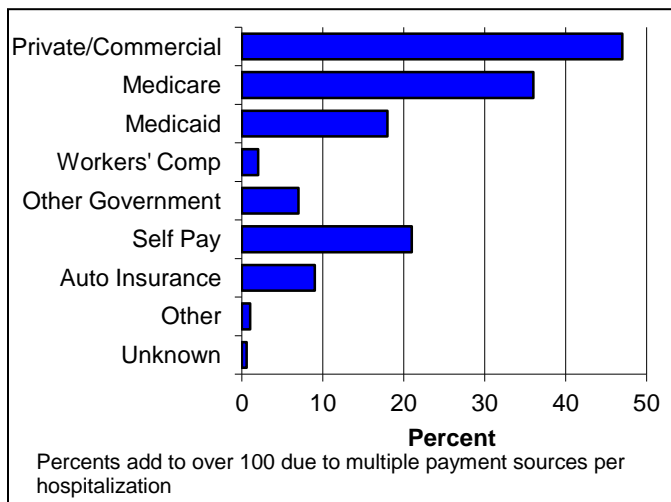
**Figure 8. Sampled Hospitalized Traumatic Brain Injuries by Etiology,\* Oklahoma, 2004-2008**



- Falls and motor vehicle crashes were the primary mechanisms of TBI.
- Of the motor vehicle crash-related injuries, 66% were drivers, 29% were passengers, and the remaining 5% had an unknown seating position. Forty-six percent of injured patients were reported to be using a safety belt or child safety seat.
- The majority of falls (59%) occurred in a home or yard, followed by 16% in a residential institution, such as a nursing home or hospital.
- Of the motorcycle injuries, 19% of patients were reported to be wearing a helmet. Eight percent of patients injured in bicycle-related incidents were reported to be wearing a helmet.

- Forty-seven percent of the sports-related injuries resulted from horseback riding.
- Of the assaults, 7% were the result of intimate partner violence and 6% were shaken babies. Overall, the most common methods of assault were blunt instruments (34%) and fists/kicks (27%).
- The majority of hospitalized TBIs (88%) occurred unintentionally; 10% were caused intentionally by another person; 1% were self-inflicted injuries; and 1% had an unknown intentionality.
- The total number of days in the hospital ranged from 1 to 148; the average stay was 7 days.

**Figure 9. Sampled Hospitalized Traumatic Brain Injuries by Payment Source, Oklahoma, 2004-2008**



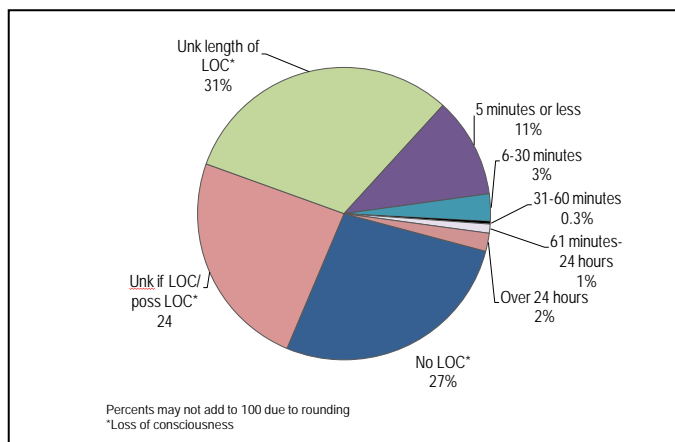
- Nearly one-half of all hospitalizations were paid at least in part by private or commercial insurance.
- Medicare, Medicaid, or other government programs paid at least a part of 60% of the hospitalizations.
- Just over 20% of the hospitalizations were self pay (uninsured).

**Table 3. Imaging Characteristics of Sampled Hospitalized Traumatic Brain Injuries, Oklahoma, 2004-2008**

Variable	Level	Percentage
CT*/MRI** of head performed	Yes	96%
	No/Unknown	4%
CT*/MRI** results	Abnormal (likely due to TBI)	54%
	Normal	44%
	Unknown	2%
Skull fracture	Diagnosed, with imaging/surgery	19%
	Diagnosed, not confirmed by imaging	1%
	No/Unknown	80%
Intracranial lesion	Lesion documented by imaging/surgery	47%
	No lesion found on imaging	47%
	No imaging/Unknown	5%
*Computed tomography scan		
**Magnetic resonance imaging		
Percents may not add to 100 due to rounding.		

- Nearly all of the sampled TBI cases had a CT scan or MRI of the head performed; over 50% had documented abnormalities likely due to the TBI.
- Nearly one-fifth of the sample suffered a skull fracture and 47% had an intracranial lesion.

**Figure 10. Sampled Hospitalized Traumatic Brain Injuries by Length of Time of Unconsciousness, Oklahoma, 2004-2008**



- Nearly one-half of the patients were documented to have lost consciousness for some length of time as a result of their injury, and another one-fourth had possible, questionable, or unknown unconsciousness.
- Just under 30% had no reported loss of consciousness.
- One-fourth of persons with a TBI experienced some form of amnesia and did not remember events preceding, during and/or after their injury.

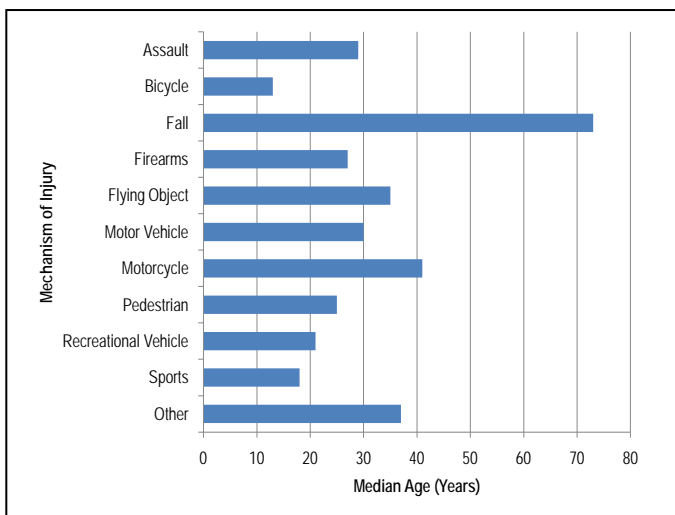
**Table 4. Sampled Hospitalized Traumatic Brain Injuries by Etiology and Glasgow Coma Scale Score, Oklahoma, 2004-2008**

Etiology	Glasgow Coma Scale (GCS)				
	≤8 Coma	9-12 Moderate Impairment	13-14 Minimal Impairment	15 No Impairment	Invalid or Unknown
Fall	5%	6%	17%	38%	34%
Motor Vehicle	15%	10%	25%	35%	16%
Assault	8%	8%	16%	30%	38%
Motorcycle	19%	10%	27%	31%	13%
Sports	5%	8%	23%	38%	26%
Recreational Vehicle	11%	7%	23%	40%	18%
Bicycle	11%	10%	13%	44%	23%
Flying Object	4%	1%	24%	54%	17%
Pedestrian	20%	8%	26%	33%	12%
Firearms	46%	3%	4%	29%	18%
Other	14%	7%	13%	30%	37%
TOTAL	10%	8%	19%	36%	27%

Percents may not add to 100 due to rounding.

- Lower Glasgow Coma Scale (GCS) scores indicate a lower level of consciousness. Scores are based on three elements: best eye response, best verbal response, and best motor response. Scores are invalid or not applicable in situations where each component cannot be accurately assessed (e.g., the patient is intubated, sedated, intoxicated, not fully resuscitated, mentally impaired, etc.).
- The lowest valid score assigned prior to or immediately upon hospital admission was abstracted and included in this analysis.
- Motorcycle, motor vehicle, pedestrian, and firearm injuries had the lowest proportions of invalid or unknown scores and also had the largest proportions of coma or severely impaired levels of consciousness.

**Figure 11. Sampled Hospitalized Traumatic Brain Injuries by Etiology and Median Age, Oklahoma, 2004-2008**



- The median age of all injuries combined was 49 years; all mechanisms of injury were below this overall median, except for falls.
- Bicycle and sports-related injuries occurred more often in younger ages (median ages 13 and 18 years, respectively).
- Falls were more likely to occur in the older population (median age 73 years).

**Table 5. Sampled Hospitalized Traumatic Brain Injuries by Etiology and Drug and Alcohol Use, Oklahoma, 2004-2008**

<b>Etiology</b>	<b>Definite/Likely Alcohol Use Prior to Injury</b>	<b>Definite/Likely Drug Use Prior to Injury</b>
Fall	7%	4%
Motor Vehicle	21%	14%
Assault	44%	26%
Motorcycle	31%	14%
Sports	5%	4%
Recreational Vehicle	18%	4%
Bicycle	6%	7%
Flying Object	2%	4%
Pedestrian	22%	11%
Firearms	32%	24%
Other	14%	17%
<b>TOTAL</b>	<b>16%</b>	<b>10%</b>

- There was a higher proportion of alcohol use among those injured in assaults or by firearms, while alcohol use was less prevalent in bicycle, sports, and fall-related injuries.
- Of those with a positive blood alcohol concentration, 83% tested above the legal limit of 0.08 g/dL; positive results ranged from 0.01 to 0.53 g/dL.
- Approximately one-fourth of all assaults and firearm-related injuries involved definite or likely illicit drug use prior to the injury.
- Motorcycle and motor vehicle crashes were the third highest mechanism of injury to involve drug use.

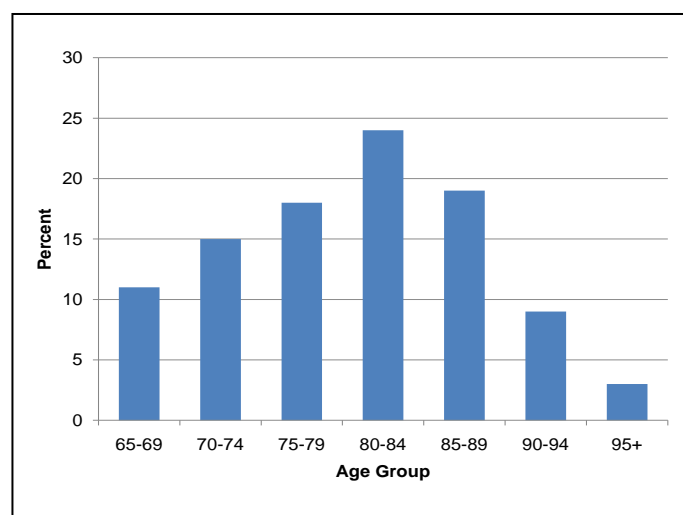
**Table 6. Characteristics of Sampled Hospitalized Traumatic Brain Injuries by Gender, Oklahoma, 2004-2008**

	Male	Female
Number of records sampled	3171	2190
Percent of total sampled	59.5%	41.1%
Median age (years)	41	64
Mean age (years)	42	56
Age range (years)	<1-98	<1-103
<b>Percent by age group (years)</b>		
0-4	6%	6%
5-14	7%	5%
15-24	19%	10%
25-34	11%	6%
35-44	10%	7%
45-54	12%	9%
55-64	10%	9%
65-74	9%	12%
75-84	9%	22%
85+	5%	16%
<b>Percent by etiology</b>		
Fall	36%	61%
Motor vehicle	22%	23%
Assault	13%	4%
Motorcycle	7%	2%
Sports	4%	3%
Recreational vehicle	3%	1%
Bicycle	3%	1%
Flying Object	3%	1%
Pedestrian	3%	1%
Firearms	2%	1%
Other	4%	3%
<b>Percent by Intent</b>		
Unintentional	83%	94%
Self-inflicted	1%	1%
Intentional by other	13%	4%
Unknown	2%	1%
<b>Percent definitely/likely using alcohol or drugs prior to injury</b>		
Alcohol	22%	7%
Illicit drugs	12%	6%
Percent of injuries work-related	7%	2%
Percent with a skull fracture	24%	13%
Percent with an intracranial lesion	49%	42%
Percent with amnesia	26%	24%
<b>Percent by Glasgow Coma Scale score</b>		
<= 8 (coma)	11%	8%
9-12 (moderate)	8%	7%
13-14 (minimal)	19%	19%
15 (no impairment)	34%	40%
Invalid/unknown	27%	27%
Median days in the hospital (acute care)	4	4
Mean days in the hospital (acute care)	7	6
Range of days in the hospital (acute care)	1-148	1-84

### *Section 3: Profile of Sampled Hospitalized Traumatic Brain Injuries Resulting from Falls among Persons 65 Years of Age and Older in Oklahoma, 2005-2008*

Falls among the older population, both nationally and in Oklahoma, are a growing public health problem. As the country's population ages, the problem will likely continue to worsen. Of the 18,158 TBIs in Oklahoma in 2005-2008, 5,962 (33%) occurred in persons 65 years of age or older. Seventy-five percent of these injuries were falls. In order to obtain more detailed information surrounding these incidents, supplemental data were abstracted from all 2005 through 2008 sampled records that involved a patient 65 years of age or older who was injured in a fall. Of the 1,029 successfully abstracted records from 2005, 290 (28%) met this fall criteria. Of the 1,038 successfully reviewed records from 2006, 280 (27%) met the criteria. In 2007, the criteria were met by 327 of the 1,036 successfully abstracted records (32%). Finally, in 2008, the 1,037 successful reviews yielded 364 fall-related records.

**Figure 12. Sampled Hospitalized Fall-Related Traumatic Brain Injuries by Age Group, 65 Years and Older, Oklahoma, 2005-2008**



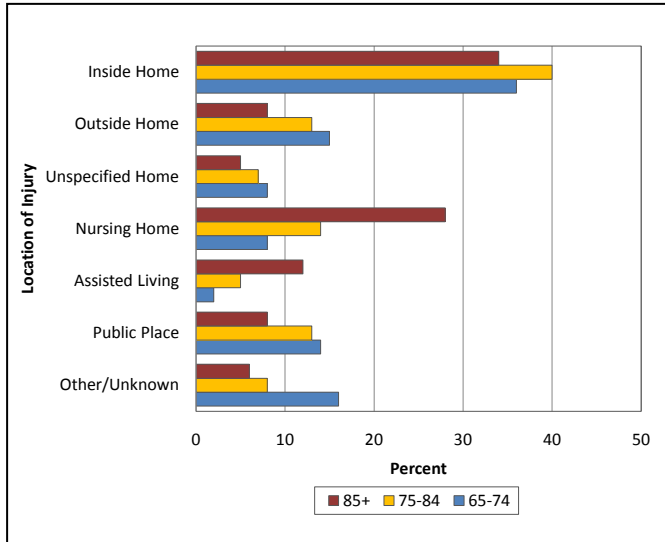
- The majority of fall-related injuries occurred among persons between the ages of 75 and 89 years.
- Fifty-nine percent of patients were female.
- The median age of males was 79 years and the median for females was 82 years.
- Eighty-six percent of patients had one or more of the following conditions documented in the record: skull fracture, intracranial lesion, amnesia, decreased level of consciousness, or neurological/neuropsychological abnormalities.
- Over fifty percent of patients had abnormal imaging results that were likely due to the TBI; 5% were diagnosed with a skull fracture, while 50% had an intracranial lesion.

**Table 7. Sampled Hospitalized Fall-Related Traumatic Brain Injuries by Health History, 65 Years and Older, Oklahoma, 2005-2008**

Health Condition	Percent of Patients with a Documented History of the Condition		
	Male	Female	Total
Alzheimer's disease/dementia	21%	35%	29%
Arthritis	28%	41%	36%
Atrial fibrillation/pacemaker	30%	19%	24%
Cerebrovascular accident/stroke	21%	23%	23%
Depression/bipolar disorder	15%	25%	21%
Diabetes	31%	26%	28%
Hypertension	66%	77%	73%
Osteoporosis	2%	19%	12%
Parkinson's disease	4%	4%	4%
Recent acute illness	19%	24%	22%
Vision problems	27%	30%	29%

- Four percent of the sampled records had no documentation of any of the listed health conditions; 96% had a history of one or more.
- Taking multiple medications has been shown to increase one's risk of falling. Eighty percent of patients were on four or more prescription medications at the time of the fall.
- The use of anticoagulant and antiplatelet medications may put TBI patients at increased risk of hemorrhagic complications. Over one-half (56%) of the sampled patients were on anticoagulant therapy at the time of the fall. Twenty-five percent were on aspirin only; 18% were on a prescription medication; and 13% were on both aspirin and a prescription medication.
- Forty-two percent of males and 41% of females had a documented history of one or more falls, which may or may not have required medical treatment.

**Figure 13. Sampled Hospitalized Fall-Related Traumatic Brain Injuries by Location of Injury and Age Group, 65 Years and Older, Oklahoma, 2005-2008**



- Most patients (74%) resided in a private home prior to hospital admission; 18% lived in a nursing home and 8% at an assisted living facility.
- More injuries occurred at home than any other location. The most common areas where injuries occurred inside the home were the bedroom, bathroom, and kitchen.
- Males were more likely to be injured outside their home than females (19% and 7%, respectively), while females were more likely to be injured in a nursing home than males (21% and 11%, respectively).
- Of those injured in a public area, the most common sites were hospitals (24%), parking lots (20%), retail stores (13%), and streets (8%).

- Of those injuries with a known time of occurrence, two-thirds occurred during the morning and afternoon hours; falls were least likely during the overnight hours (11%, midnight-5:59 a.m.).

**Table 8. Sampled Hospitalized Fall-Related Traumatic Brain Injuries by Body Position at the Time of the Fall and Gender, 65 Years and Older, Oklahoma, 2005-2008**

Body Position/ Mechanics	Male	Female	Total
Lying down	4%	3%	3%
Sitting	6%	6%	6%
Standing	16%	11%	13%
Walking	22%	30%	27%
Running	0.3%	0.1%	0.2%
Climbing	2%	1%	1%
Transitioning from lying down/sitting to standing	7%	6%	7%
Transitioning from standing to lying down/sitting	1%	1%	1%
Other/Unknown	41%	42%	42%

Percents may not add to 100 due to rounding.

- Forty percent of falls occurred while the patient was standing or walking. Slipping, tripping, and experiencing a syncopal episode were the factors most commonly associated with all falls.
- Thirty-one percent of falls were known to involve a loss of consciousness; of these cases, 31% had a time of unconsciousness of 5 minutes or less.
- Over one-third of all falls were known to involve some type of object and 5% had documented involvement of more than one object. The most common objects included beds, chairs, walkers, and wheelchairs.

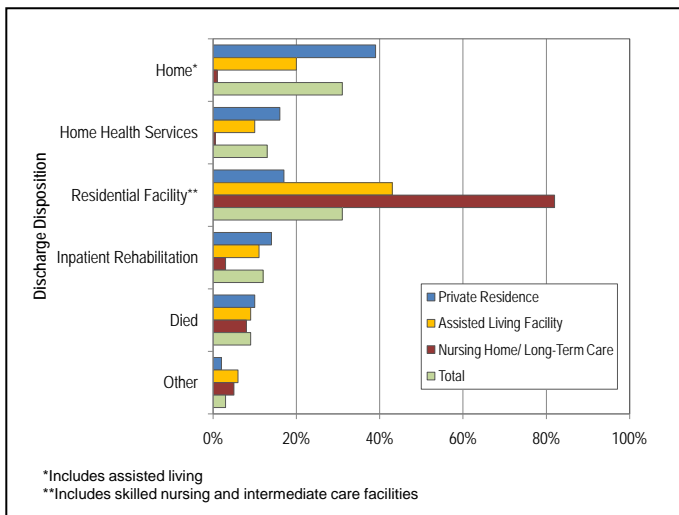


**Table 9. Characteristics of Sampled Hospitalized Fall-Related Traumatic Brain Injuries by History of Previous Falls, 65 Years and Older, Oklahoma, 2005-2008**

	History of Falls	No or Unknown History of Falls
Median age	81 years	80 years
Assisted living/nursing home residence prior to admission	30%	23%
GCS* ≤8	5%	5%
Acute intracranial lesion diagnosed***	55%	51%
Skull fracture diagnosed	4%	6%
Documented loss of consciousness	27%	35%
Amnesia occurred	21%	21%
Discharged home	25%	35%
Died in the hospital	8%	10%
*Initial lowest Glasgow Coma Scale score (≤8 indicates coma)		
** Of those with a CT scan or MRI of the head (96%)		

- Persons with a history of falls (with or without medical treatment) were slightly older and more likely to have resided in an assisted living facility or a nursing home than those with no fall history.
- Those with a history of falls were less likely to be discharged home than those without such a history.

**Figure 14. Sampled Hospitalized Fall-related Traumatic Brain Injuries by Patient's Residence at the Time of Admission and Disposition of the Patient at the Time of Acute Care Discharge, 65 Years and Older, Oklahoma, 2005-2008**



- The majority of nursing home residents returned to a residential facility upon discharge, while less than one-half of patients who had been living at home were able to return there independently.
- Nursing home residents were least likely to be discharged to an inpatient rehabilitation facility.
- Overall, and regardless of prior residence, about 10% of the sample died while in the hospital.