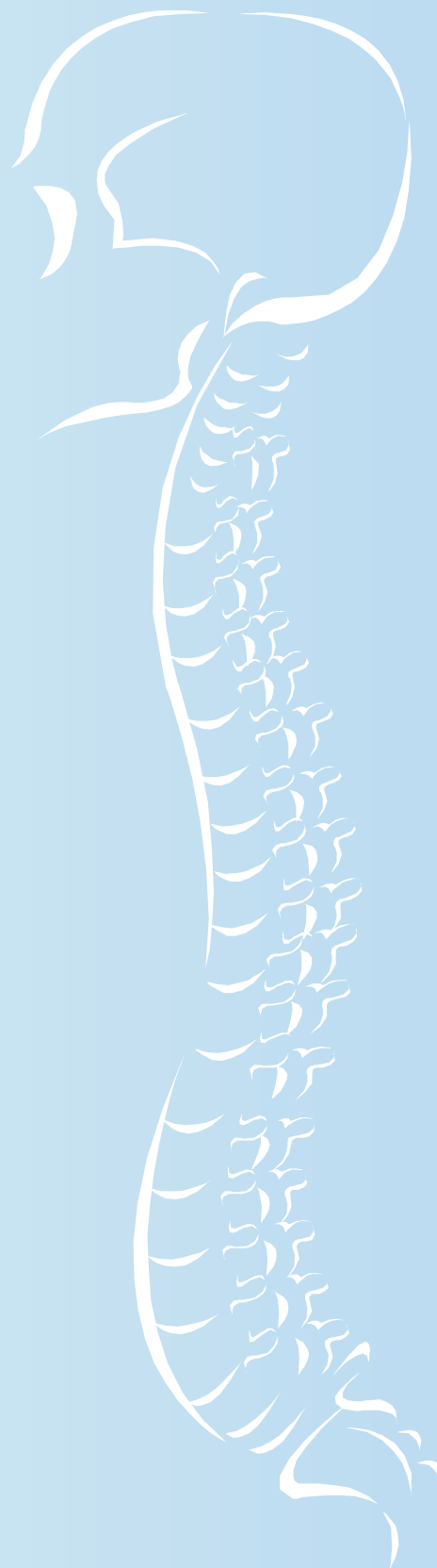


# Central Nervous System Injury

**New Jersey, 2000**

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## **INTRODUCTION**

Traumatic brain injury and spinal cord injury are both injuries of the central nervous system. They are among the most serious types of injuries in terms of survival probabilities, treatment and rehabilitation costs, and the likelihood of permanent disability. The direct and indirect cost of these injuries, measured by medical costs and treatments, as well as foregone income and ongoing need for services, is substantial.

Of these two injuries, traumatic brain injury (TBI) is by far the more common. There were nearly 8,000 traumatic brain injuries in New Jersey in 2000 resulting in death or inpatient hospitalization. Of these, nearly 1,000 were fatal. Many more traumatic brain injuries were treated in the emergency department or ambulatory care settings. There were approximately 260 spinal cord injuries (SCI) resulting in inpatient hospitalization in 2000. Leading causes of TBI and SCI are similar: motor vehicle crashes, unintentional falls, and intentional causes, namely self-inflicted injury and assault.

The Center for Health Statistics of the New Jersey Department of Health and Senior Services is funded by the Centers for Disease Control and Prevention (CDC) to conduct central nervous system injury surveillance. New Jersey is one of 12 states that supplies data to the CDC to comprise national estimates of the annual incidence of TBI and SCI. New Jersey's central nervous system injury surveillance system includes injuries to New Jersey residents that result in death or inpatient hospitalization in New Jersey. Specific details of the case definitions for TBI and SCI are provided in the technical notes. The 2000 CNS injury surveillance data is the first year of data prepared by New Jersey for submission to CDC. While these data have obvious value for those particularly concerned with TBI and SCI, they can also be viewed as valuable proxies for serious injuries in general. The leading causes of TBI and SCI are also the leading causes for serious injury overall. Injury prevention efforts should be focused on these major causes – motor vehicle crashes, unintentional falls, and intentional injuries.

## HIGHLIGHTS

- Central nervous system injury disproportionately affects the elderly. Rates of TBI and SCI rise with age, and the major cause of injury among the elderly is falls.
- TBIs are also more likely to be fatal among the elderly as compared with other age groups.
- Falls are also the leading cause of TBI and SCI among the very young.
- Blacks have heightened rates of TBI and SCI from assaults. In the case of SCI, this often results from assaults with firearms.
- Whites have the highest rates of self-inflicted TBI, usually suicide with a firearm. A very high proportion of these injuries are fatal.
- Motor vehicle injuries have declined steadily over the past several decades, in New Jersey as well as the nation as a whole. Yet motor vehicle crashes are nevertheless the leading cause of TBI and SCI.
- The majority of these injuries occur to occupants of motor vehicles, but Blacks have disproportionately high rates of TBIs from motor vehicle crashes in which they are pedestrians.
- The proportion of TBIs from motor vehicle crashes which is fatal is highest among Hispanics.
- Age-adjusted TBI rates are highest in Southern New Jersey. This is largely driven by higher rates of motor vehicle crashes in southern counties of the state.

## TECHNICAL NOTES

### 1. TBI case definition<sup>1</sup>

#### **Morbidity:**

TBI cases were identified from the UB-92 data file using the ICD-9-CM codes:

800.0-801.9:	Fracture of the vault or base of the skull
803.0-804.9:	Other and unqualified and multiple fractures of the skull
850.0-854.1:	Intracranial injury, including concussion, contusion, laceration, and hemorrhage
959.01:	Head injury, unspecified

#### **Mortality:**

The ICD-10 was implemented in 1999. The ICD-10 codes as recommended by CDC for inclusion at this time are:

S01.0-S01.9:	Open wound of the head
S02.0, S02.1, S02.3, S02.7-S02.9:	Fracture of Skull and Facial Bones
S06.0-S06.9:	Intracranial injury
S07.0, S07.1, S07.8, S07.9:	Crushing injury of head
S09.7-S09.9:	Other unspecified injuries of head
T01.0:	Open wounds involving head with neck
T02.0:	Fractures involving head with neck
T04.0:	Crushing injuries involving head with neck
T06.0:	Injuries of brain and cranial nerve with injuries of nerves and spinal cord at neck level
T90.1, T90.2, T90.4, T90.5, T90.8, T90.9:	Sequelae of injuries of head

### 2. SCI case definition<sup>1</sup>

#### **Morbidity:**

SCI cases were identified from the UB-92 data file using the ICD-9-CM codes:

806.0-806.9:	Fracture of the vertebral column with spinal cord injury
952.0-952.9:	Spinal cord injury without evidence of spinal bone injury

#### **Mortality:**

SCI cases are initially identified using ICD-9-CM definitions and each are then confirmed by medical records review.

### 3. Clinical Case Definitions<sup>1</sup>

TBI: An occurrence of injury to the head that is documented in a medical record, with one or more of the following conditions attributed to head injury: observed or self-reported decreased level of consciousness, amnesia, skull fracture, objective neurological or neuropsychological abnormality, diagnosed intracranial lesion OR an occurrence of death resulting from trauma, with head injury listed on the death certificate, autopsy report or medical examiner's report in the sequence of conditions that resulted in death.

SCI: A clinical case of spinal cord injury is defined as the occurrence of an acute traumatic lesion of neural elements in the spinal canal (spinal cord and/or cauda equina), resulting in temporary or permanent sensory deficit, motor deficit or bowel or bladder dysfunction.

### 4. Categories used to describe the external cause of injury (E code)

Description	ICD-9 Codes	ICD-10 codes
All transport	E800-E848	V01-V99
MV Traffic	E810-E819	
Occupant	E810-E819(.0, .1)	V30-V79, V83-V86.3
Motorcyclist	E810-E819(.2, .3)	V20-V28(.3-.9)
		V29(.4- .9)
Pedal Cyclist	E810-E819(.6)	V12-V14(.3-.9)
		V19(.4-.6)
Pedestrian	E810-E819(.7)	V02-V04(.1,.9), V09.2
Unintentional Falls	E880-E888	W00-W19
Other unintentional	E850-E949 excluding falls	W20-X59
Self-inflicted	E950-E959	X60-X84
Firearm	E955.0-E955.4	X72-X74
Poisoning	E950.0-E952.9	X60-X69
Cut/pierce	E956	X78
Assaults	E960-E969	X85-Y09
Firearm	E965.0-E965.4	X93-X95
Poisoning	E962.0-E962.9	X85-X90
Cut/pierce	E966	X99
Struck by, against	E960.00, E968.2	Y00, Y04
Undetermined	E980-E989	Y10-Y34
Other	E990-E999	Y35-Y89

\*No terrorism codes have been included above.

### 5. CNS Surveillance Data

CNS Surveillance data consists of deaths or hospitalizations where any hospital diagnosis or cause of death code falls within the case definition for TBI or SCI detailed below. Hospitalizations are unduplicated, and hospitalized fatalities are linked with death certificate data.

Data exclude out-of-state hospitalizations of NJ residents and out-of-state residents hospitalized in acute care facilities of New Jersey.

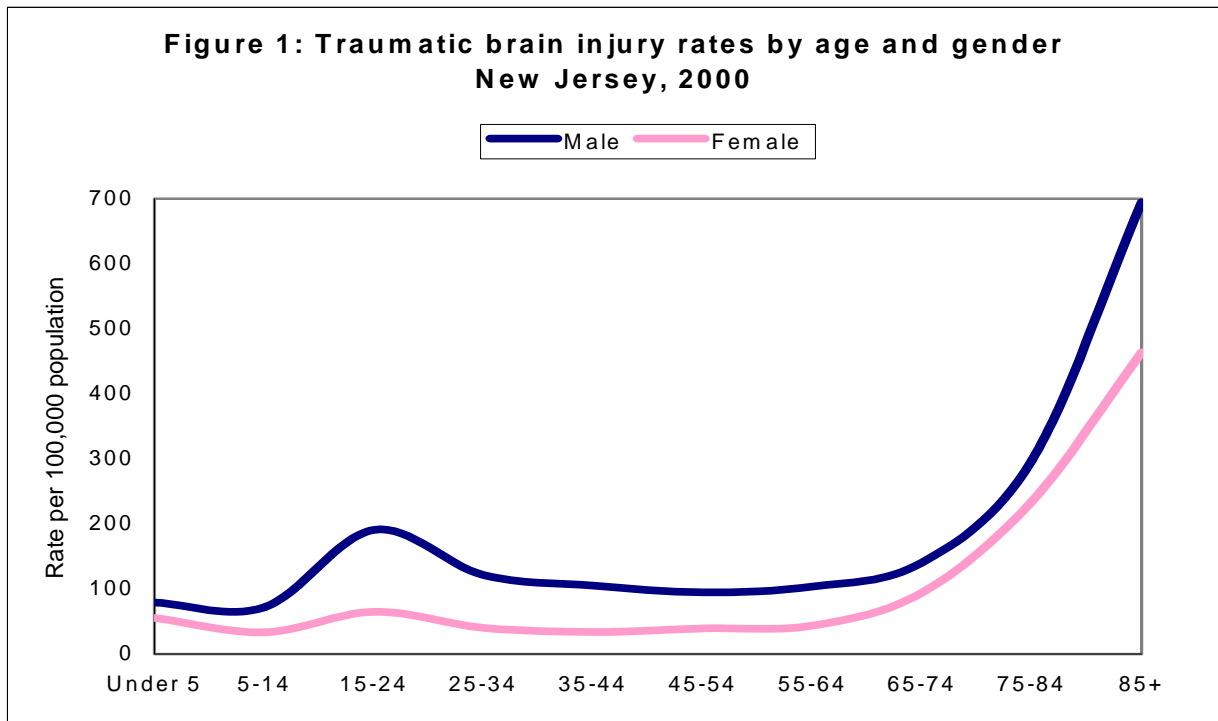
Data from the US Census (2000) were used to compute age-specific rates and year 2000 U.S. standard populations were used to compute age-adjusted rates. Rates are per 100,000 standard population unless otherwise specified.

## **REFERENCES**

1. Department of Health and Human Services, The Centers for Disease Control and Prevention. Annual Data Submission Standards. Central Nervous System Injury Surveillance 2000.

## CHAPTER 1: TRAUMATIC BRAIN INJURY (TBI)

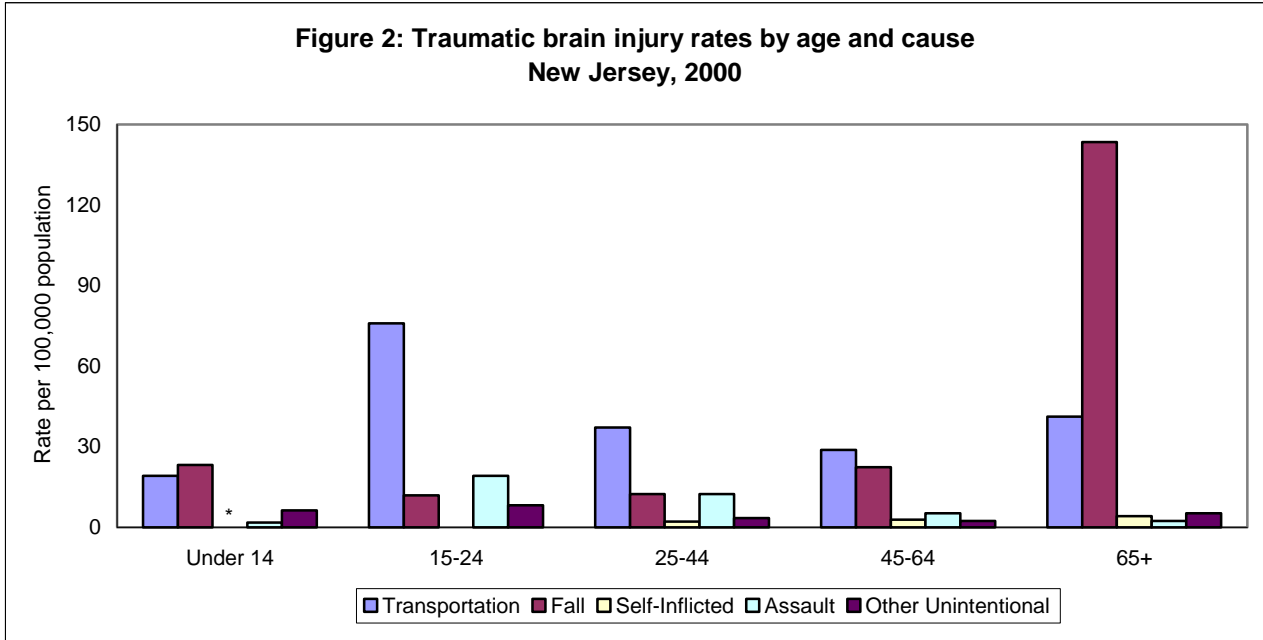
In 2000 there were 8,006 traumatic brain injuries (TBIs) among New Jersey residents, of which 990 were fatal. Leading causes of TBI are motor vehicle crashes, falls, assaults, and self-inflicted injuries.



- TBI rates for males exceed those for females at all ages.
- TBI rates rise sharply after age 65, primarily due to an increased incidence of falls.
- Particularly among males, TBI rates increase during young adult years, when the incidence of transportation-related crashes is especially high.

**Table 1. Traumatic brain injury by age and gender, New Jersey, 2000**

Age	Male		Female		Total	
	N	Rate	N	Rate	N	Rate
<b>Under 5</b>	228	79.1	153	55.5	381	67.6
<b>5-14</b>	441	72.0	194	33.3	635	53.1
<b>15-24</b>	984	190.8	317	64.7	1,301	129.4
<b>25-34</b>	719	121.5	242	40.5	961	80.8
<b>35-44</b>	745	105.2	248	34.1	993	69.2
<b>45-54</b>	532	94.8	236	39.5	768	66.3
<b>55-64</b>	373	104.0	173	43.8	546	72.4
<b>65-74</b>	358	140.8	302	94.2	660	114.8
<b>75-84</b>	458	297.7	583	234.5	1,041	258.7
<b>85+</b>	269	694.5	451	463.7	720	529.4
<b>Total</b>	5,107	190.0	2,889	110.4	8,006	144.2



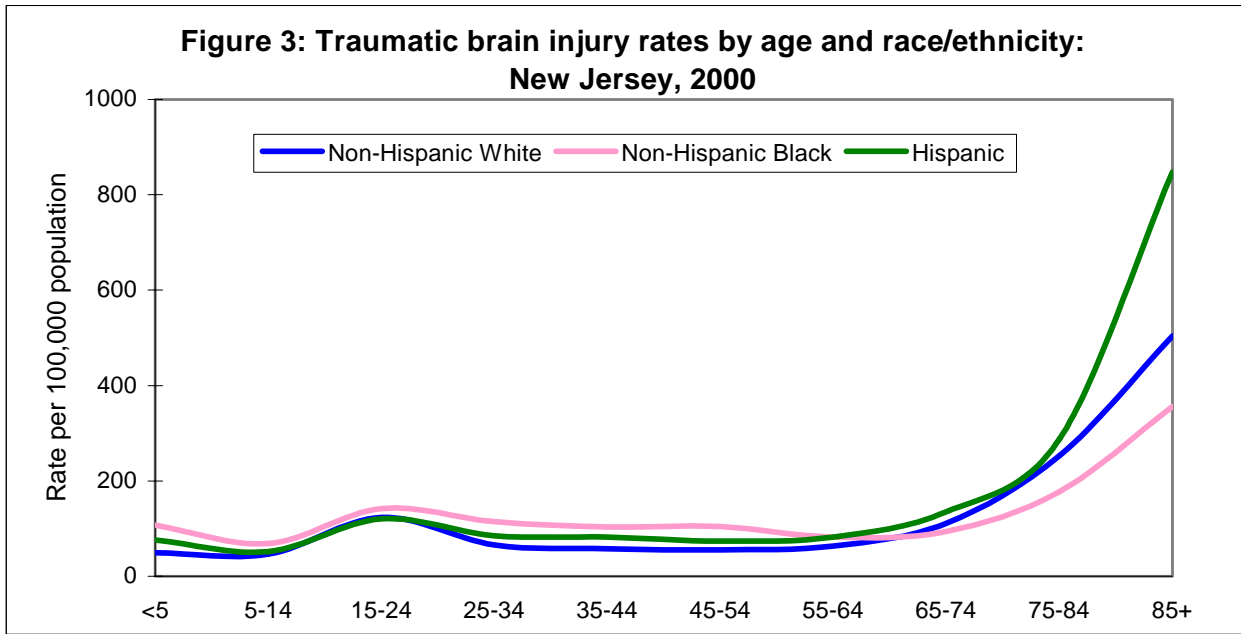
- Transportation injury is the leading cause of TBI for ages 15-64 years. The rate is highest at ages 15-24 years.
- The rate of TBI from falls is highest in the oldest age groups, although falls are also the leading cause of TBI for those aged under 15 years.
- TBI rates from assaults are highest among those aged 15-44. Rates of self-inflicted TBI are highest in the oldest age group.

**Table 2. Traumatic brain injury by age and cause, New Jersey, 2000**

Cause		Under 15	15-24	25-44	45-64	65+	Total
<b>Transportation</b>	N	338	763	974	551	459	3,085
	Rate	19.2	75.9	37.1	28.8	41.2	
<b>Fall</b>	N	408	120	324	429	1,597	2,878
	Rate	23.2	11.9	12.3	22.4	143.5	
<b>Self-Inflicted</b>	N	9	17	57	55	47	185
	Rate	--	--	2.2	2.9	4.2	
<b>Assault</b>	N	31	193	324	100	26	674
	Rate	1.8	19.2	12.3	5.2	2.3	
<b>Other Unintentional</b>	N	112	82	90	45	58	387
	Rate	6.4	8.2	3.4	2.4	5.2	
<b>Other</b>	N	118	126	185	134	234	797
	Rate	6.7	12.5	7.0	7.0	21.0	
<b>Total</b>	N	1,016	1,301	1,954	1,314	2,421	8,006
	Rate	57.8	129.4	74.5	68.7	217.5	

--Rate not calculated when N is less than 20.





- The age pattern of TBI is similar for all race and ethnicity groups.
- TBI rates are highest for Blacks at ages below 65, but are lowest for this group at ages over 65 years.

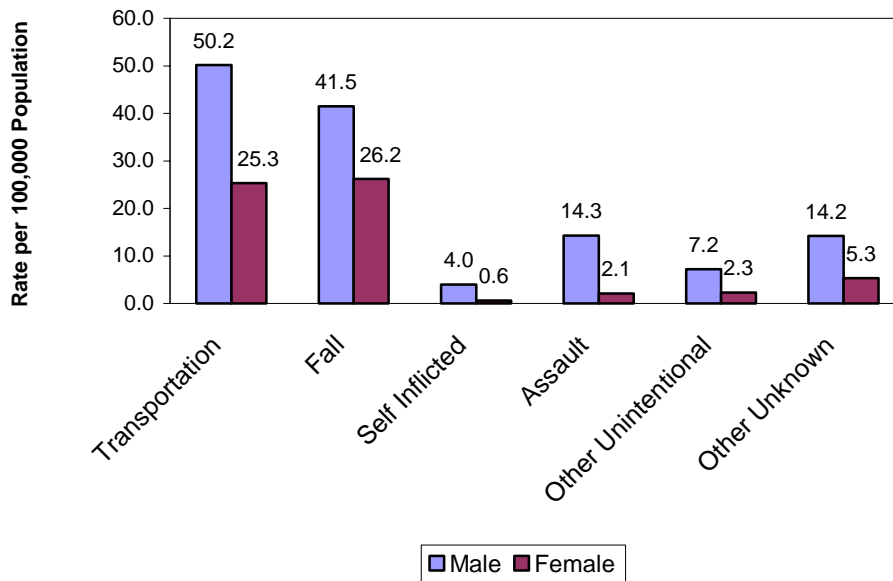
**Table 3. Traumatic brain injury by age and race/ethnicity, New Jersey, 2000**

Age Group	Non-Hispanic White		Non-Hispanic Black		Hispanic		Asian/Pacific Islander		Other/Unknown	All Races
	N	Rate	N	Rate	N	Rate	N	Rate	N	N
Under 5	165	49.3	96	107.5	76	76.5	12	--	32	381
5-14	342	46.6	137	68.7	97	51.9	12	--	47	635
15-24	710	123.2	238	142.4	234	120.3	15	--	104	1,301
25-34	460	65.8	202	114.8	181	84.9	21	--	97	961
35-44	560	58.1	194	103.3	152	82.2	8	--	79	993
45-54	467	55.6	141	104.5	85	74.1	16	--	59	768
55-64	357	64.0	74	81.9	55	82.3	12	--	48	546
65-74	512	110.9	54	94.2	50	135.3	10	--	34	660
75-84	888	253.1	51	177.9	44	288.1	13	--	45	1,041
85+	607	503.8	33	355.9	38	847.5	5	--	37	720
<b>Total</b>	<b>5,068</b>	<b>85.2*</b>	<b>1,220</b>	<b>110.5*</b>	<b>1,012</b>	<b>106.6*</b>	<b>124</b>	<b>34.4*</b>	<b>582</b>	<b>8,006</b>

-- The number of age-specific injuries to Asian/Pacific Islanders is too small to calculate reliable rates.

\*Rates are age-adjusted and are computed per 100,000 race/ethnicity-specific population based on the 2000 US standard population.

**Figure 4: Traumatic Brain Injury Incidence Rates by Cause and Gender: New Jersey, 2000**



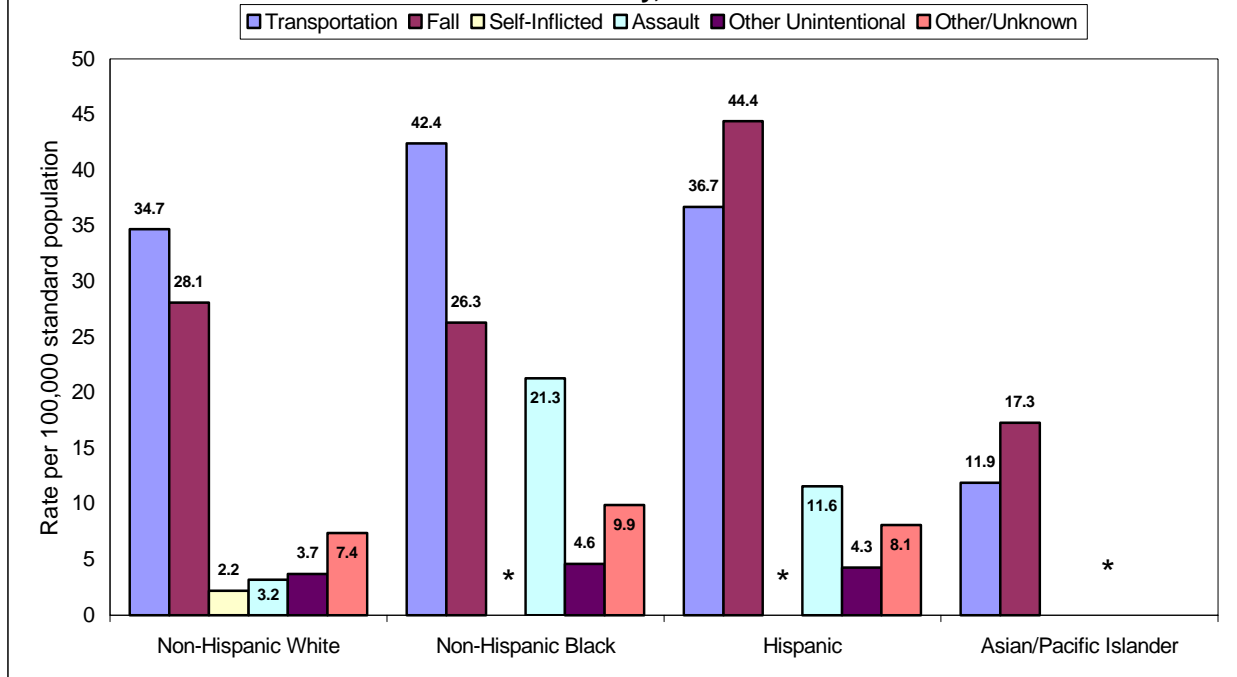
- TBI rates for males exceed those for females for all causes.
- The gender difference is greatest in the case of intentional causes and is least for falls.

**Table 4. Traumatic brain injury by cause and gender, New Jersey, 2000**

Cause	Male		Female		Total	
	N	Rate	N	Rate	N	Rate
Transportation	2,001	50.2	1,084	25.3	3,085	37.3
Fall	1,536	41.5	1,342	26.2	2,878	33.4
Self-Inflicted	158	4.0	27	0.6	185	2.2
Assault	583	14.3	91	2.1	674	8.2
Other/Unintentional	285	7.2	102	2.3	387	4.7
Other Unknown	544	14.2	253	5.3	797	9.5
<b>Total</b>	<b>5,107</b>	<b>131.3</b>	<b>2,899</b>	<b>61.8</b>	<b>8,006</b>	<b>95.2</b>

\* Rates are age-adjusted and are computed per 100,000 gender-specific population based on the 2000 US standard population.

**Figure 5: Age-adjusted rate of traumatic brain injury by race/ethnicity and cause:  
New Jersey, 2000**



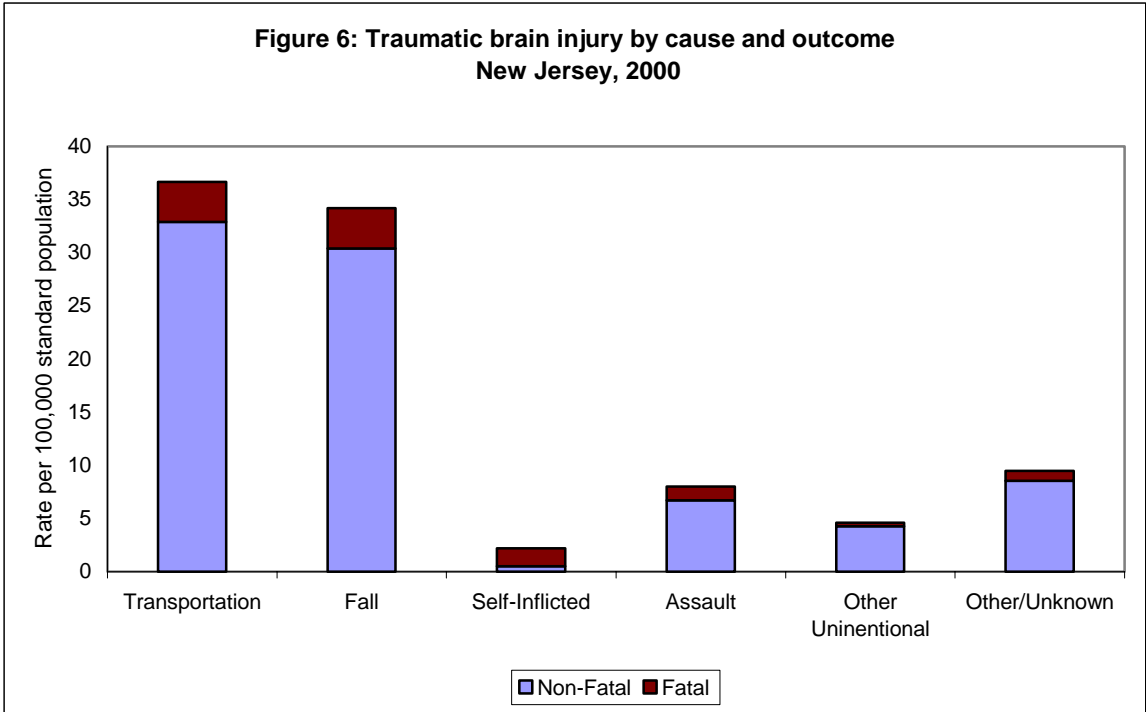
\*The number of race/ethnicity-specific injuries is too small to calculate reliable rates.

- Transportation injury is the leading cause for Whites and Blacks. Falls are the leading cause for Hispanics and Asian Pacific Islanders.
- Assaults are a more important cause of TBI for Blacks as compared with other groups.
- Self-inflicted injury is the least common cause of TBI for all racial and ethnic groups but rates are highest for Whites.

**Table 5. Traumatic brain injury by race/ethnicity and cause, New Jersey, 2000**

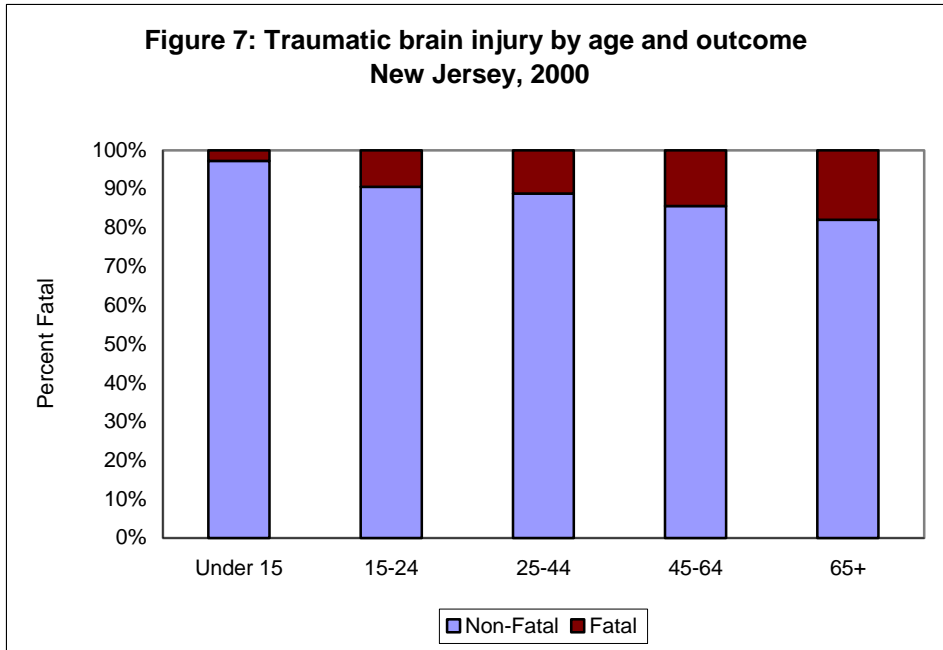
Cause		Non-Hispanic White	Non-Hispanic Black	Hispanic	Asian/Pacific Islander	Other	Unknown
<b>Transportation</b>	N	1,889	487	409	56	153	91
	Rate	34.7	42.4	36.7	11.9		
<b>Fall</b>	N	2,075	276	312	45	99	71
	Rate	31.1	28.1	44.4	17.6		
<b>Self-Inflicted</b>	N	152	13	14	1	1	4
	Rate	2.5	--	--	--		
<b>Assault</b>	N	207	275	142	10	29	11
	Rate	3.9	23.3	11.6	--		
<b>Other Unintentional</b>	N	240	56	52	4	26	9
	Rate	4.4	5.0	4.3	--		
<b>Other/Unknown</b>	N	505	113	83	8	68	20
	Rate	8.6	10.7	8.1	--		
<b>Total</b>	N	5,068	1,220	1,012	124	376	206

--The number of injuries is too small to calculate reliable rates.



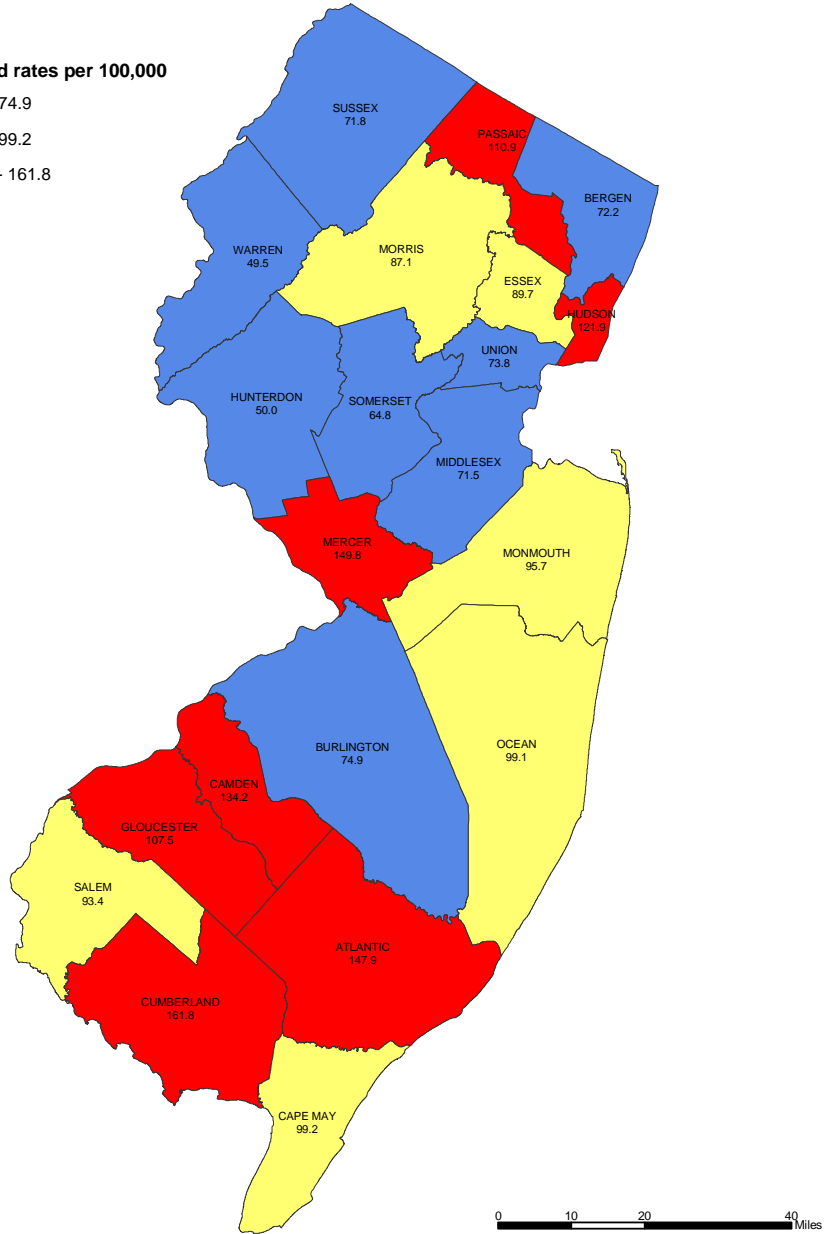
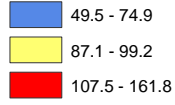
*Rates are age-adjusted and are computed per 100,000 race/ethnicity specific population based on the 2000 US standard population.*

- Self-inflicted brain injuries, which are usually gunshot wounds, are far more likely to be fatal than other causes of TBI.
- The share of traumatic brain injuries which are fatal rises with age.



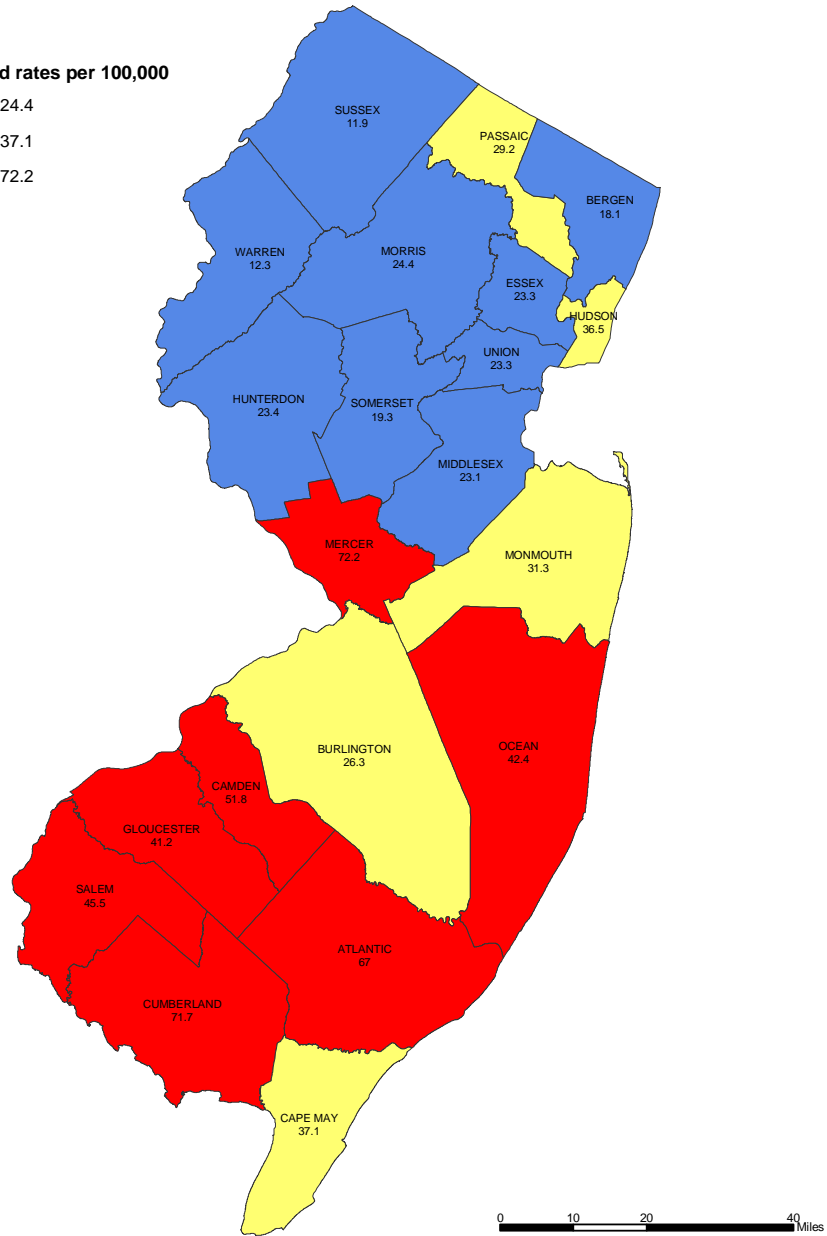
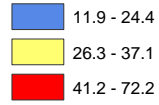
Map 1. Traumatic brain injury rates by county, New Jersey, 2000.

Age-adjusted rates per 100,000

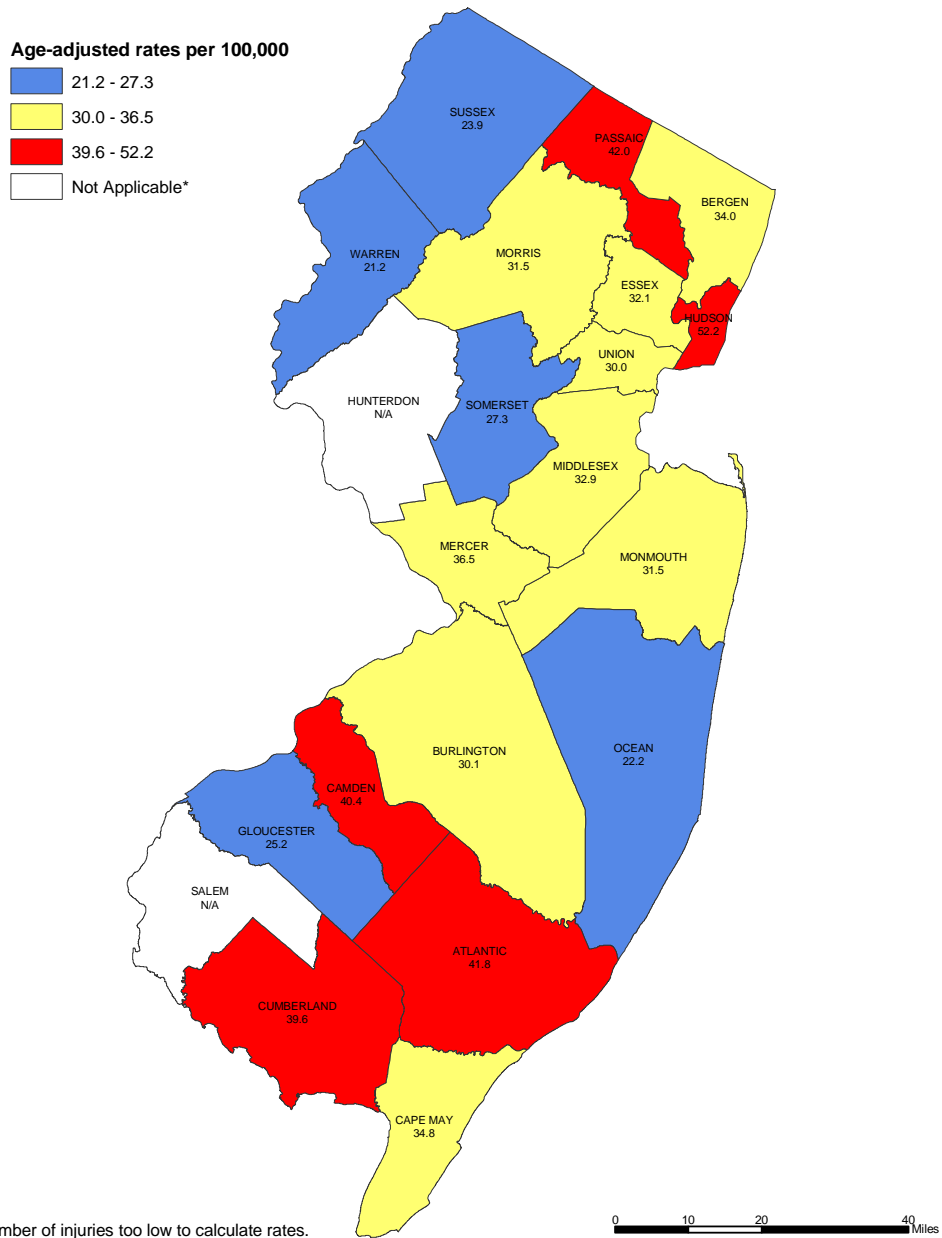


Map 2. Traumatic brain injury rates from motor vehicle crashes, by county, New Jersey, 2000.

Age-adjusted rates per 100,000

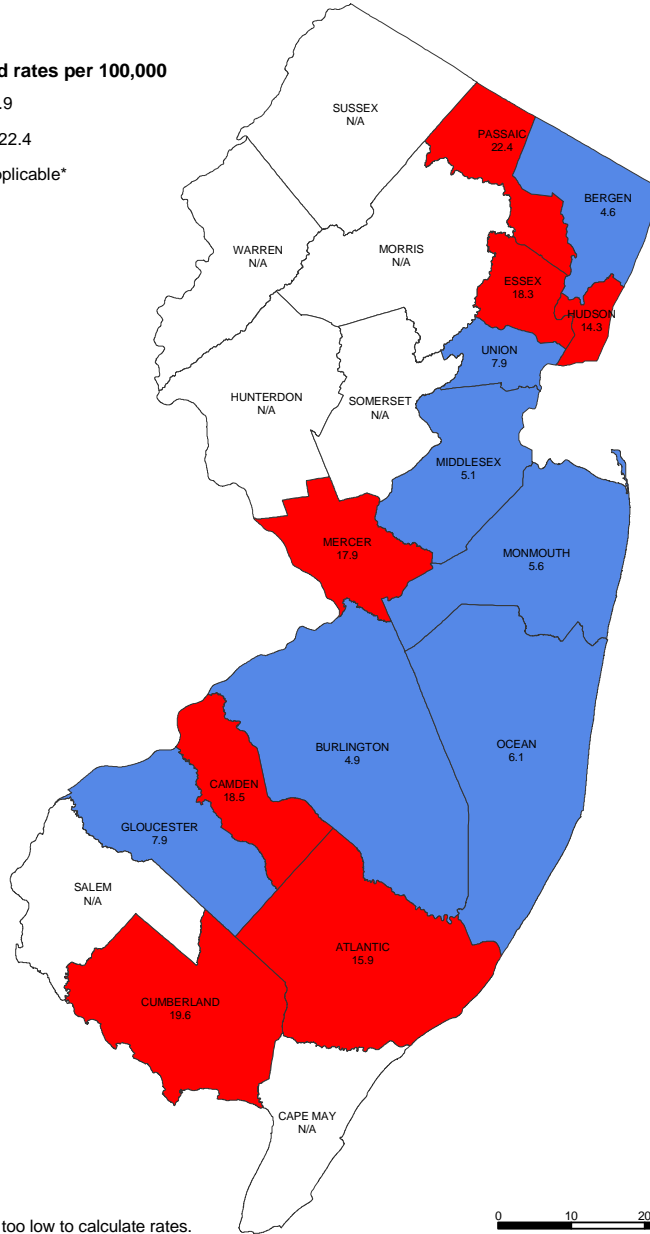
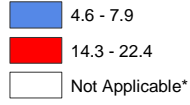


Map 3. Traumatic brain injury rates from falls, by county, New Jersey, 2000.

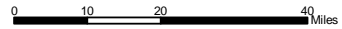


Map 4. Traumatic brain injury rates from intentional injuries, by county, New Jersey, 2000.

Age-adjusted rates per 100,000



\* Number of injuries too low to calculate rates.





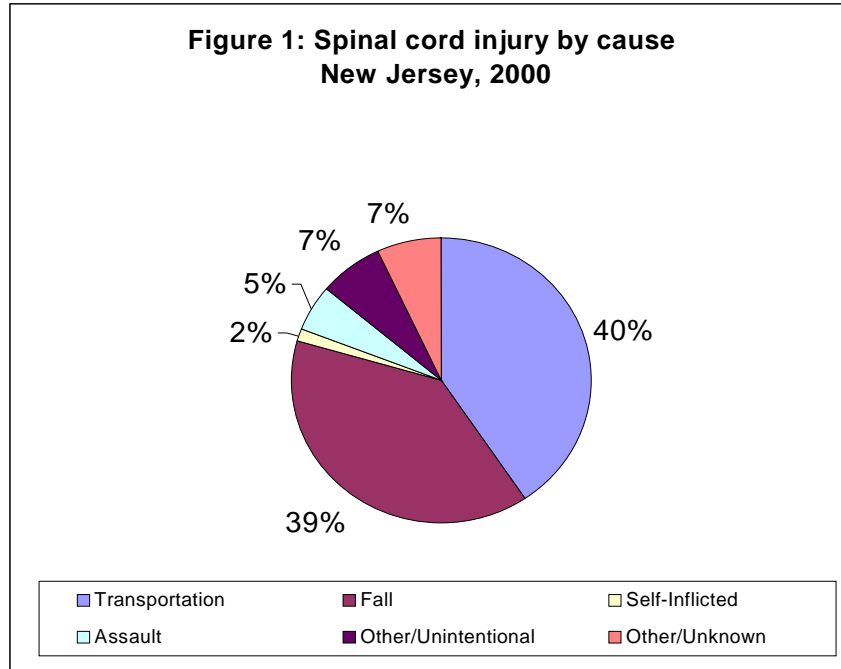
## CHAPTER 2: SPINAL CORD INJURY (SCI)

- In 2000, there were 257 spinal cord injuries in New Jersey.
- Of these, 69 were both spinal cord and traumatic brain injuries.

Age	Male	Female	N	Rate (per 100,000)
Under 15	8	3	11	--
15-24	33	7	40	4.0
25-44	71	16	77	2.9
45-64	38	13	51	2.7
65+	35	43	78	7.0
<b>Total</b>	<b>257</b>	<b>3.0*</b>	<b>257</b>	<b>3.0</b>

*\*Rate is age-adjusted based on 2000 standard population  
 --Rates not calculated if N is less than 20.*

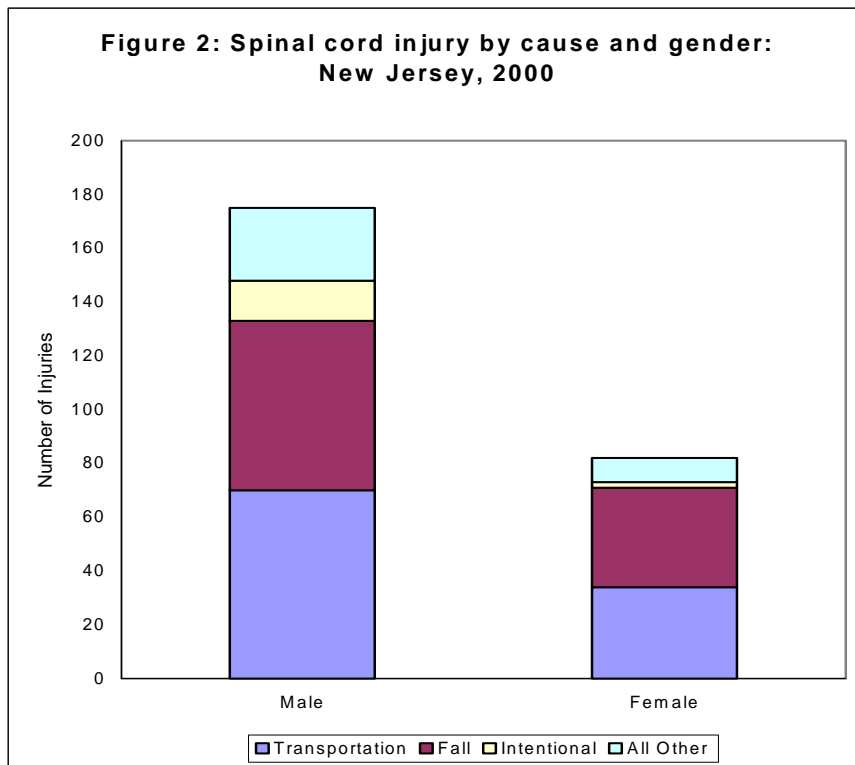
- The rate of spinal cord injury is highest for those aged 65 years and older.
- Male injuries exceed female injuries except in the oldest age group.



- Leading causes of SCI are transportation injuries, falls, and assaults.
- Falls and transportation injuries account for nearly 80 percent of SCIs.

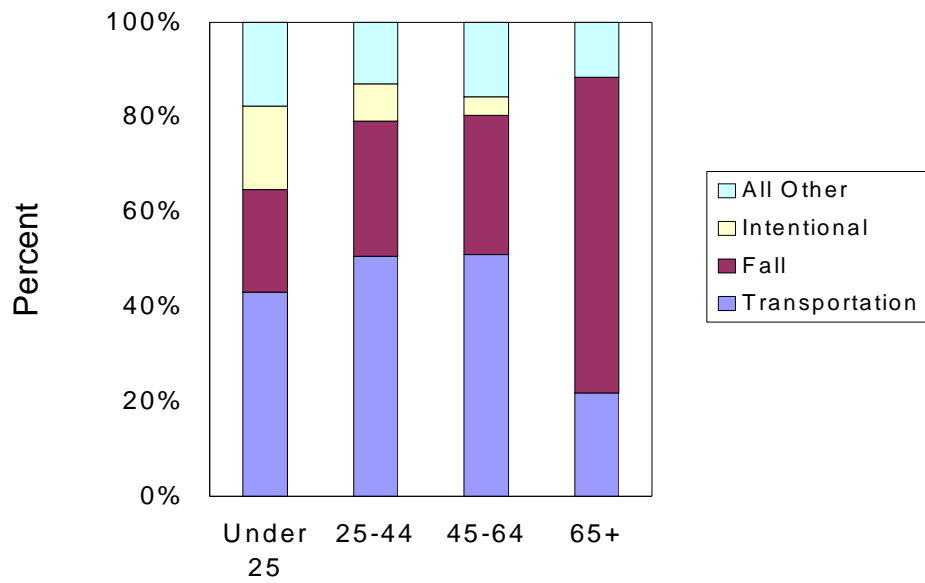
<b>Cause</b>	<b>N</b>	<b>%</b>
<b>Transportation</b>	104	40
<b>Fall</b>	100	39
<b>Self-Inflicted</b>	4	2
<b>Assault</b>	13	5
<b>Other/Unintentional</b>	18	7
<b>Other/Unknown</b>	18	7
<b>Total</b>	257	100

- Males sustain more SCIs than do females in all major cause categories. The gender gap is greatest for intentional injury.



<b>Cause</b>	<b>Male</b>		<b>Female</b>		<b>Total</b>	
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
<b>Transportation</b>	70	40.0	34	41.5	104	40.5
<b>Fall</b>	63	36.0	37	45.1	100	38.9
<b>Intentional</b>	15	8.6	2	2.4	17	6.6
<b>All Other</b>	27	15.4	9	11.0	36	14.0

**Figure 3: Spinal cord injury by age and cause New Jersey, 2000**



- Spinal cord injuries from falls increase with age, while those from intentional causes and transportation injuries decrease with age.

**Table 4. Spinal cord injury by age and cause, New Jersey, 2000**

Age Group	Transportation		Fall		Intentional		All Other		Total
	N	%	N	%	N	%	N	%	
<b>Under 25</b>	22	43.1	11	21.6	9	17.6	9	17.6	51
<b>25-44</b>	39	50.6	22	28.6	6	7.8	10	13.0	77
<b>45-64</b>	26	51.0	15	29.4	2	3.9	8	15.7	51
<b>65+</b>	17	21.8	52	66.7	0	0.0	9	11.5	78
<b>Total</b>	104	40.5	100	38.9	17	6.6	36	14.0	257

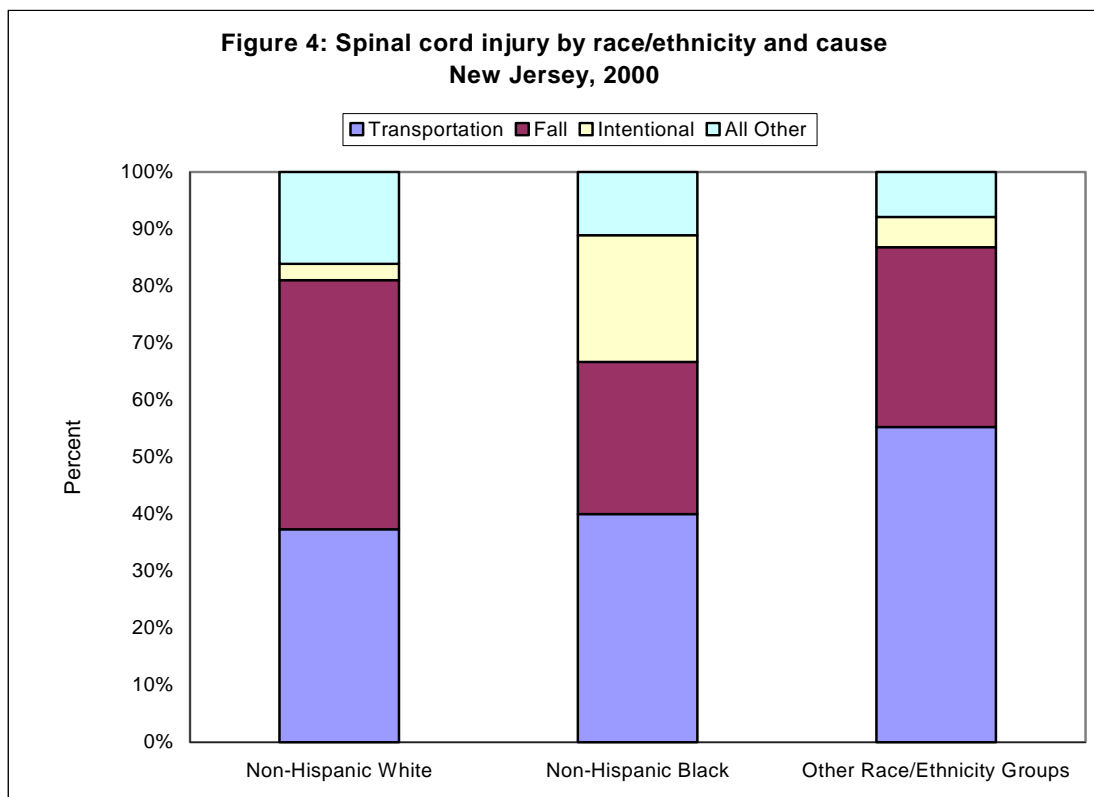
**Table 5. Spinal cord injury by race and ethnicity  
New Jersey, 2000**

Race/ethnicity	N	%
Non-Hispanic White	174	67.7
Non-Hispanic Black	45	17.5
Hispanic	12	4.7
Asian/Pacific Islander	7	2.7
Other	12	4.7
Unknown	7	2.7
<b>Total</b>	<b>257</b>	<b>100.0</b>

**Table 6. Spinal cord injury by race/ethnicity and cause, New Jersey, 2000**

Race/ethnicity	Transportation	Fall	Intentional	All Other	Total
Non-Hispanic White	65	76	5	28	174
Non-Hispanic Black	18	12	10	5	45
Other	21	12	2	3	38
<b>Total</b>	<b>104</b>	<b>100</b>	<b>17</b>	<b>36</b>	<b>257</b>

- Blacks have a disproportionate number of SCIs, largely due to an excess of intentional injuries. Many of these are assaults with firearms.

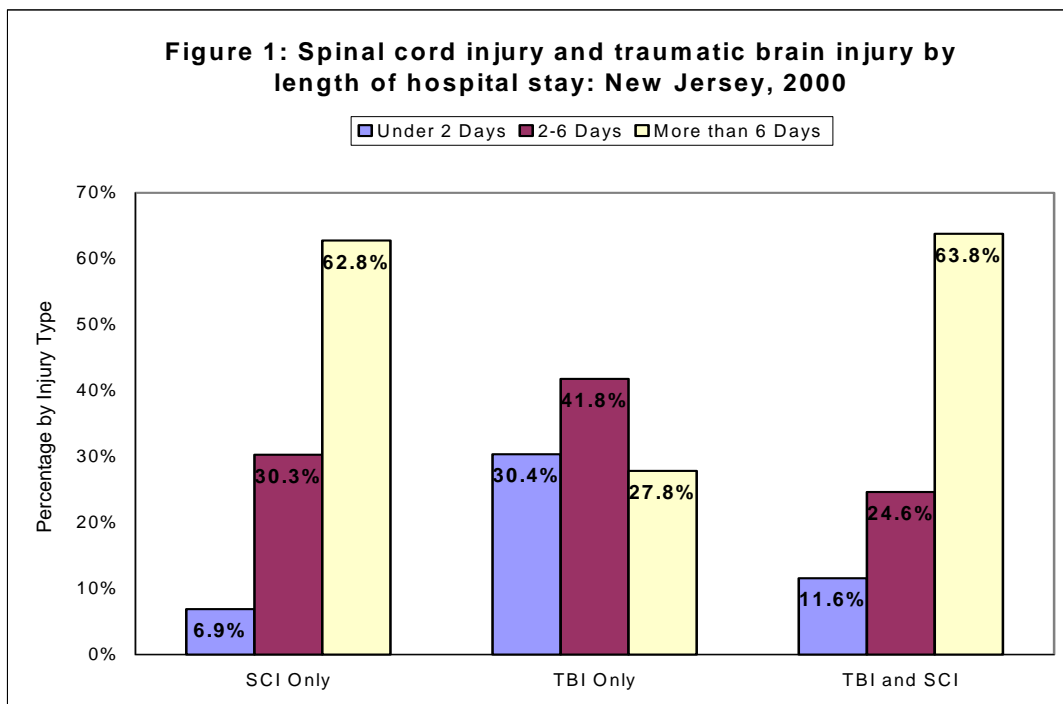


## COMBINED CENTRAL NERVOUS SYSTEM INJURIES

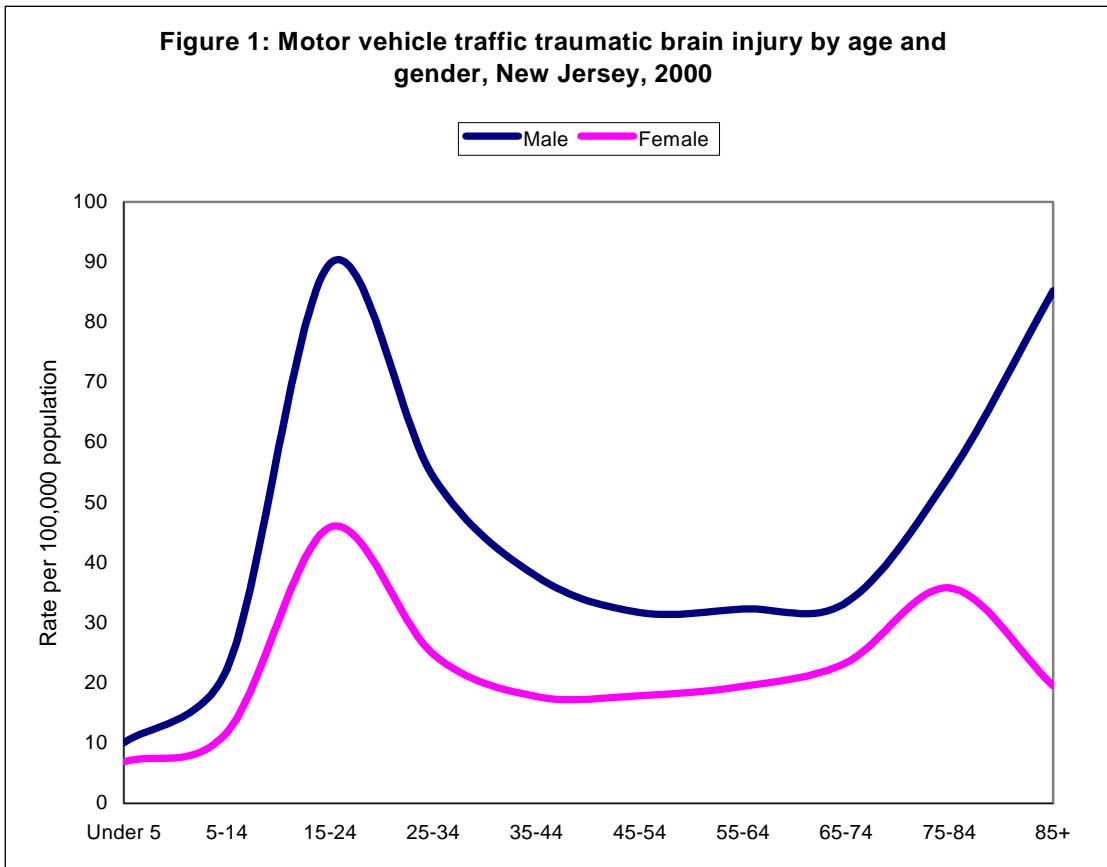
**Table 1. Spinal cord injury and traumatic brain injury by county New Jersey, 2000**

County	SCI	TBI	SCI & TBI	Total
Atlantic	7	362	6	375
Bergen	21	667	4	692
Burlington	3	301	7	311
Camden	12	671	5	688
Cape May	0	107	0	107
Cumberland	2	236	1	239
Essex	22	701	8	731
Gloucester	4	263	3	270
Hudson	12	721	5	738
Hunterdon	2	53	1	56
Mercer	6	524	3	533
Middlesex	8	520	6	534
Monmouth	15	565	8	588
Morris	20	386	3	409
Ocean	16	544	3	563
Passaic	5	537	2	544
Salem	1	58	2	61
Somerset	7	180	0	187
Sussex	1	95	0	96
Union	22	392	2	416
Warren	2	49	0	51
<b>New Jersey</b>	<b>188</b>	<b>7,932</b>	<b>69</b>	<b>8,189</b>

*Age Adjusted rates are computed per 100,000 county-specific population based on the 2000 US standard*



**CHAPTER 3: MOTOR VEHICLE TRAFFIC - Traumatic Brain Injury**



- Rates of motor vehicle traffic TBIs rise sharply at young adult ages (15-24 years), and again at ages over 65 years.

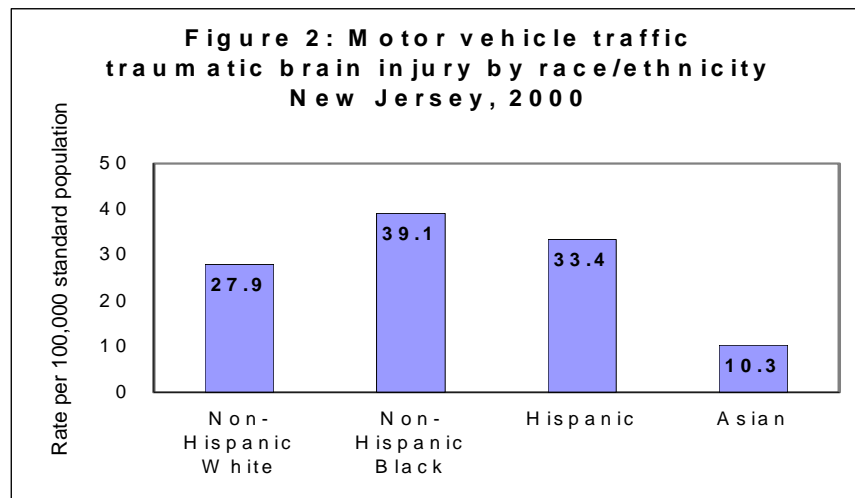
**Table 1. Motor vehicle traffic traumatic brain injury by age and gender, New Jersey, 2000**

Age Group	Male		Female		Total	
	N	Rate	N	Rate	N	Rate
Under 5	29	10.1	19	--	48	8.5
5-14	17	22.4	69	11.8	206	17.2
15-24	463	89.8	225	46.0	688	68.4
25-34	321	54.2	148	24.8	469	39.4
35-44	267	37.7	129	17.7	396	27.6
45-54	178	31.7	107	17.9	285	24.6
55-64	116	32.3	77	19.5	193	25.6
65-74	85	33.4	75	23.4	160	27.8
75-84	84	54.6	89	35.8	173	43.0
85+	33	85.2	19	--	52	38.2
<b>Total</b>	<b>1,713</b>	<b>43.0*</b>	<b>957</b>	<b>22.4*</b>	<b>2,670</b>	<b>32.3*</b>

\*Rates are age-adjusted based on year the 2000 US standard population  
 --Rate not calculated when N is less than 20.

	<b>N</b>	<b>Rate*</b>
<b>Non-Hispanic White</b>	1,575	29.0
<b>Non-Hispanic Black</b>	446	38.6
<b>Hispanic</b>	373	33.8
<b>Asian/Pacific Islander</b>	52	11.3
<b>Other</b>	145	---
<b>Unknown</b>	79	---
<b>Total</b>	2,670	32.3

\*Rates are age-adjusted based on the year 2000 US standard population



- The rate of TBI from motor vehicle crashes is highest among Blacks.

<b>Age Group</b>	<b>Fatal</b>		<b>Non-Fatal</b>		<b>Total</b>		<b>% Fatal</b>
	<b>N</b>	<b>Rate</b>	<b>N</b>	<b>Rate</b>	<b>N</b>	<b>Rate</b>	
<b>Under 5</b>	6	--	42	7.4	48	8.5	12.5
<b>5-14</b>	7	--	199	16.7	206	17.2	3.4
<b>15-24</b>	62	6.2	626	62.3	688	68.4	9.0
<b>25-34</b>	37	3.1	432	36.3	469	39.4	7.9
<b>35-44</b>	34	2.4	362	25.2	396	27.6	8.6
<b>45-54</b>	28	2.4	257	22.2	285	24.6	9.8
<b>55-64</b>	21	2.8	172	22.8	193	25.6	10.9
<b>65-74</b>	17	--	143	24.9	160	27.8	10.6
<b>75-84</b>	30	7.5	143	35.5	173	43.0	17.3
<b>85+</b>	14	--	38	27.9	52	38.2	26.9
<b>Total</b>	256	3.1*	2414	29.3*	2670	32.3*	9.6

\*Rates are age-adjusted based on a year the 2000 US standard population; --Rate not calculated when N is less than 20.

- The rate of non-fatal motor vehicle TBIs is highest among young adults. The proportion of TBIs, which are fatal, and the rate of fatal TBIs from motor vehicle incidents rise with age.

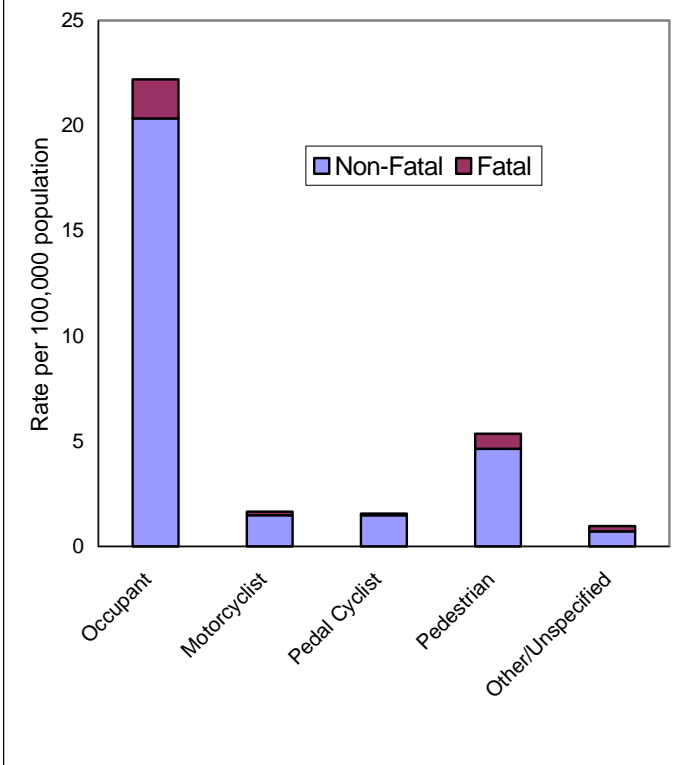
**Table 4. Motor vehicle traffic traumatic brain injury by outcome and position  
New Jersey, 2000**

Position	Non-Fatal		Fatal		Total	
	N	Rate	N	Rate	N	Rate
Occupant	1,712	20.3	156	1.9	1,868	22.2
Motorcyclist	125	1.5	13	--	138	1.6
Pedal Cyclist	125	1.5	6	--	131	1.6
Pedestrian	390	4.6	60	0.7	450	5.3
Other/Unspecified	60	0.7	21	0.2	83	1.0
<b>Total</b>	<b>2,412</b>	<b>28.7</b>	<b>256</b>	<b>3.0</b>	<b>2,670</b>	<b>32.3</b>

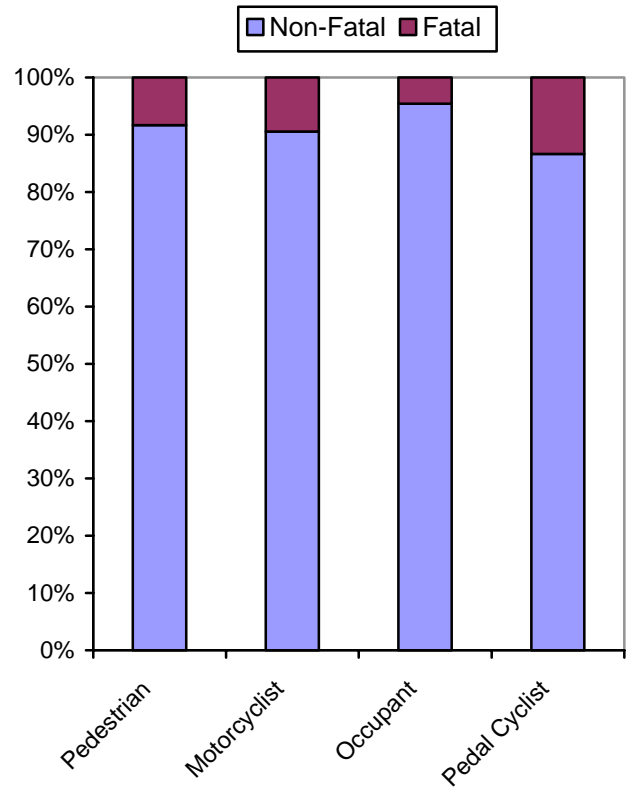
--Rate not calculated when N is less than 20.

- The great majority of those sustaining a motor vehicle traffic TBI were occupants of motor vehicles.
- However, pedestrians and motorcyclists were most likely to suffer fatal injuries.

**Figure 4A: Motor vehicle traffic traumatic brain injury by outcome and position  
New Jersey, 2000**



**Figure 4B: Motor vehicle traffic traumatic brain injury by outcome  
New Jersey, 2000**

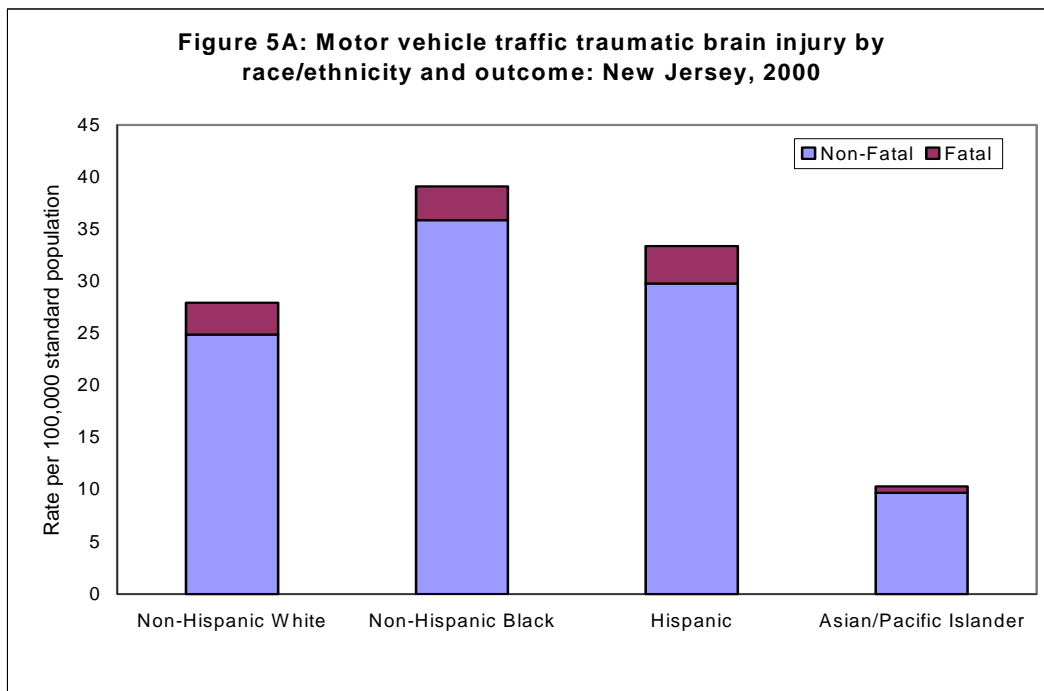




**Table 5. Motor vehicle traffic traumatic brain injury by race/ethnicity and outcome  
New Jersey, 2000**

Race/Ethnicity	Non-Fatal		Fatal	
	N	Rate*	N	Rate*
Non-Hispanic White	1,404	26.0	171	3.0
Non-Hispanic Black	409	35.1	37	3.5
Hispanic	333	29.9	40	3.9
Asian/Pacific Islander	49	10.7	3	---
Other	144	---	1	---
Unknown	75	---	4	---
<b>Total</b>	<b>2,414</b>	<b>29.3</b>	<b>256</b>	<b>3.1</b>

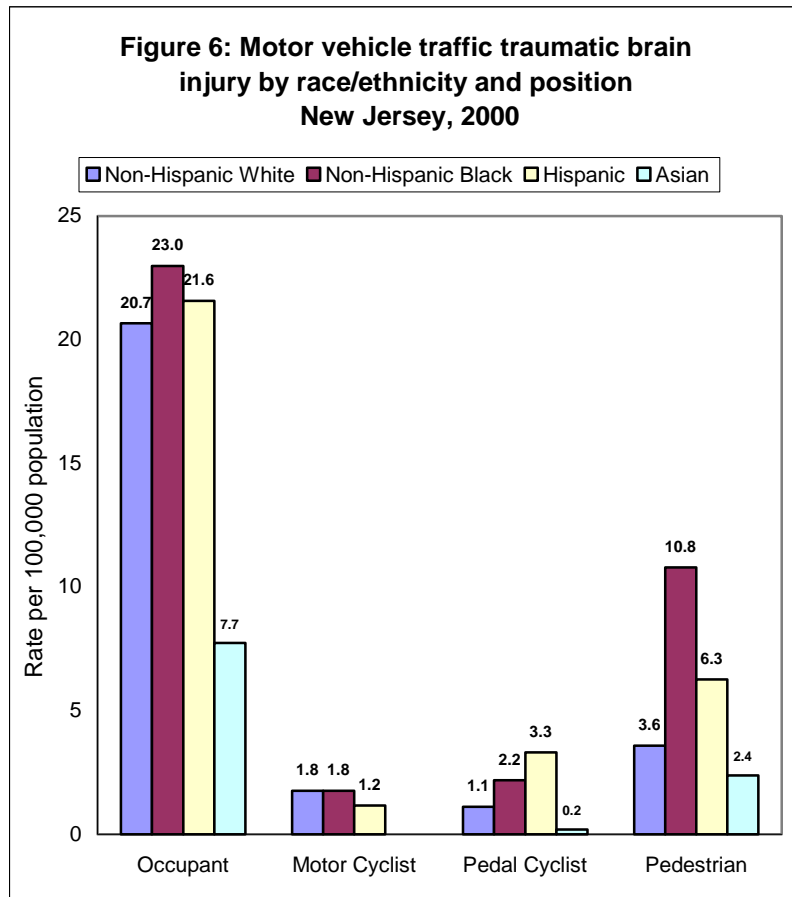
\* Rates are age-adjusted based on year the 2000 US standard population

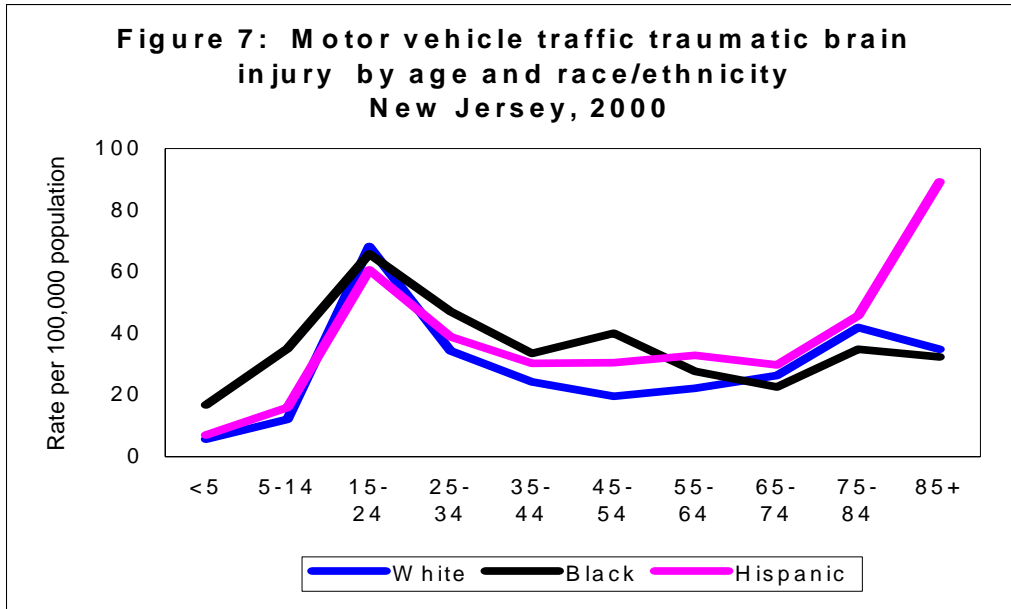


- The rate of TBIs from motor vehicles is highest among Blacks, who have a particularly high rate of TBIs as pedestrians.
- Rates of fatal TBIs from motor vehicles are highest among Hispanics. Hispanics also have the highest rate of TBI as pedal-cyclists.

Position	Non-Hispanic White		Non-Hispanic Black		Hispanic		Asian/Pacific Islander	
	N	Rate	N	Rate	N	Rate	N	Rate
<b>Occupant</b>	1,165	20.7	262	23.0	241	21.6	39	7.7
<b>Motor Cyclist</b>	99	1.8	20	1.8	13	--	0	--
<b>Pedal Cyclist</b>	63	1.1	25	2.2	37	3.3	1	--
<b>Pedestrian</b>	202	3.6	123	10.8	70	6.3	12	2.4
<b>Other/Unknown</b>	44	0.8	16	--	12	--	0	--
<b>Total</b>	1,573	29.0	446	38.6	373	33.8	52	11.3

--Rate not calculated when N is less than 20.



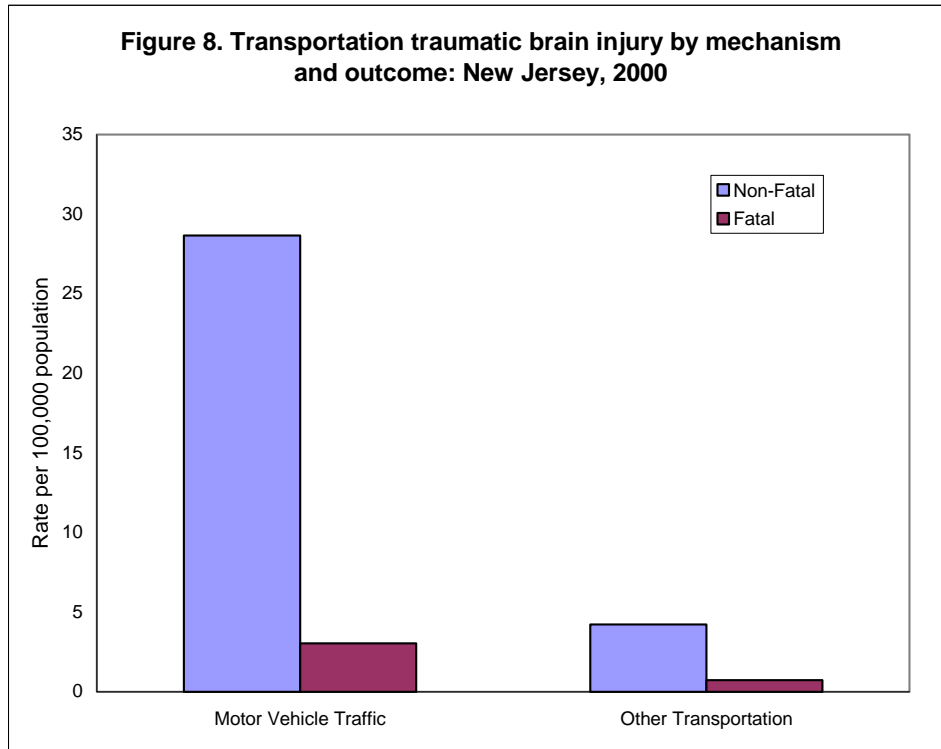


**Table 7. Motor vehicle traffic traumatic brain injury by age and race/ethnicity  
New Jersey, 2000**

	White		Black		Hispanic	
	N	Rate	N	Rate	N	Rate
<b>Under 5</b>	19	--	15	--	7	--
<b>5-14</b>	89	12.1	70	35.1	30	16.0
<b>15-24</b>	393	68.2	110	65.8	118	60.7
<b>25-34</b>	240	34.3	83	47.2	83	38.9
<b>35-44</b>	234	24.3	63	33.5	56	30.3
<b>45-54</b>	165	19.7	54	40.0	35	30.5
<b>55-64</b>	124	22.2	25	27.7	22	32.9
<b>65-74</b>	122	26.4	13	--	11	--
<b>75-84</b>	147	41.9	10	--	7	--
<b>85+</b>	42	34.9	3	--	4	--
<b>Total</b>	1,575	27.9	446	39.1	373	33.4
<b>Age-Adjusted Rate</b>	--	29.0	--	38.6	--	33.8

\*Age-adjusted rates are computed per 100,000 race/ethnicity-specific population based on the year 2000 US standard population.

--Rate not calculated when N is less than 20.



**Table 8. Transportation related traumatic brain injury by mechanism and outcome  
New Jersey, 2000**

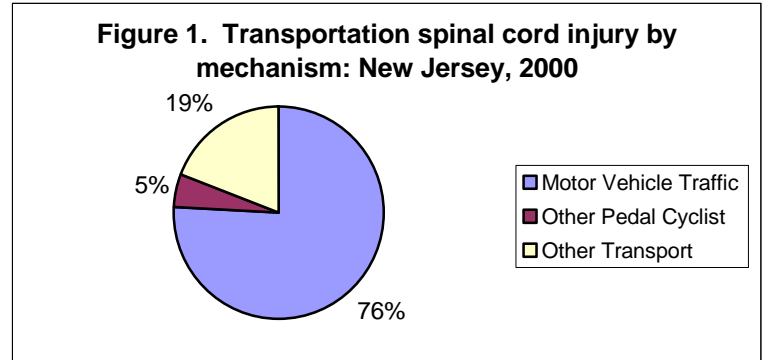
	Non-Fatal		Fatal	
	N	Rate	N	Rate
<b>Motor Vehicle Traffic</b>	2,412	28.7	256	3.0
<b>Other Transportation</b>	356	4.2	61	0.7
<b>Total</b>	2,768	32.9	317	3.8

- The majority of transportation related TBI occurs as the result of motor vehicle traffic incidents. Transportation injuries other than MVC include incidents involving MV which take place in non-traffic areas, such as driveways and parking lots, as well as incidents involving other modes of transport such as boats, trains and airplanes.

## SPINAL CORD INJURY

**Table 1. Transportation spinal cord injury by mechanism, New Jersey, 2000**

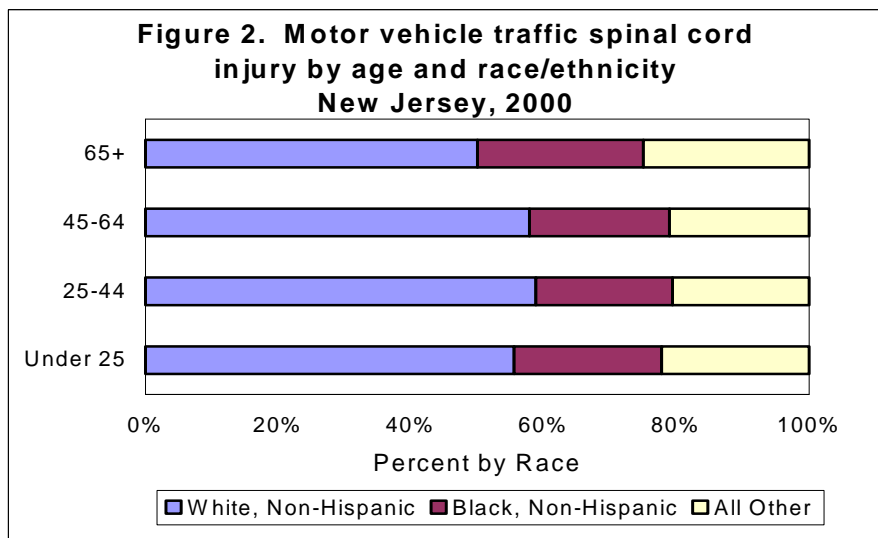
Mechanism	N	%
Motor Vehicle Traffic	79	76.0
Other Pedal Cyclist	5	4.8
Other Transport	20	19.2
<b>Total</b>	<b>104</b>	<b>100.0</b>



- Motor vehicle crashes are the leading cause of spinal cord injuries.

**Table 2. Motor vehicle traffic spinal cord injury by position New Jersey, 2000**

	Occupant	Motor Cyclist	Pedal Cyclist	Pedestrian	Other/ Unspecified	Total
Number	49	7	4	11	8	79
Percent (%)	62.0	8.9	5.1	13.9	10.1	100.0

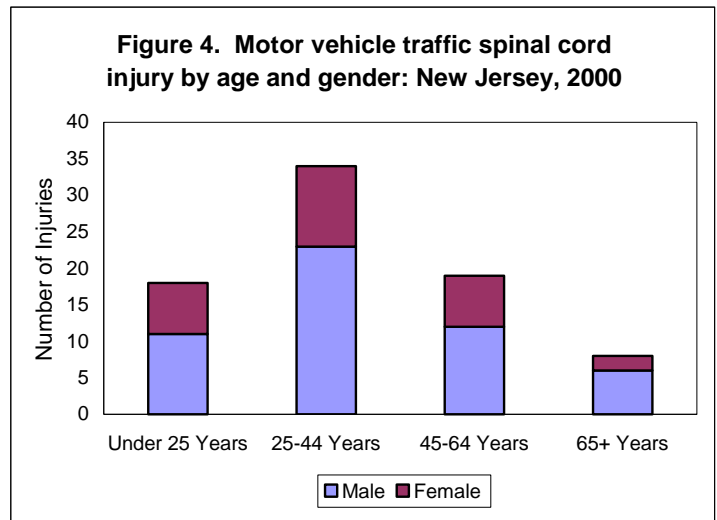


**Table 3. Motor vehicle traffic spinal cord injury by age and race/ethnicity New Jersey, 2000**

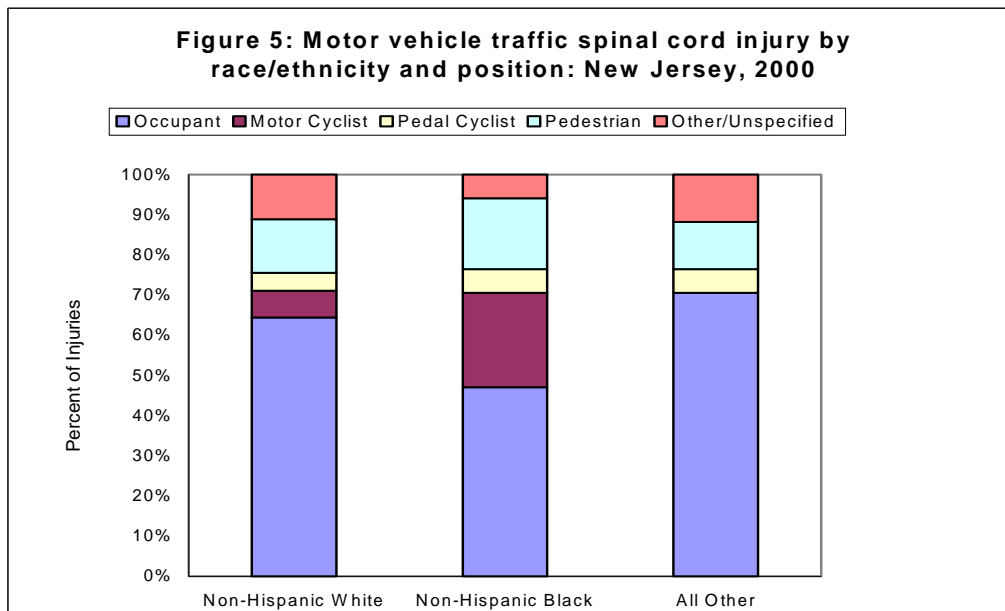
	Non-Hispanic White	Non-Hispanic Black	All Other	Total
Under 25	10	4	4	18
25-44	20	7	7	34
45-64	11	4	4	19
65+	4	2	2	8
<b>Total</b>	<b>45</b>	<b>17</b>	<b>17</b>	<b>79</b>

**Table 4. Motor vehicle traffic spinal cord injury by age and gender  
New Jersey, 2000**

	Male	Female	Total
<b>Under 25</b>	11	7	18
<b>25-44</b>	23	11	34
<b>45-64</b>	12	7	19
<b>65+</b>	6	2	8
<b>Total</b>	52	27	79



- Most motor vehicle traffic spinal cord injuries occur to the occupant of a motor vehicle.
- Blacks with motor vehicle related SCIs are far more likely to be motorcyclists than are other groups.



**Table 5. Motor vehicle traffic spinal cord injury by race/ethnicity and position  
New Jersey, 2000**

		Non-Hispanic White	Non-Hispanic Black	All Other	Total
<b>Occupant</b>	N	29	8	12	49
	%	64.4	47.1	70.6	62.0
<b>Motor Cyclist</b>	N	3	4	0	7
	%	6.7	23.5	0	8.9
<b>Pedal Cyclist</b>	N	2	1	1	4
	%	4.4	5.9	5.9	5.1
<b>Pedestrian</b>	N	6	3	2	11
	%	13.3	17.6	11.8	13.9
<b>Other/Unspecified</b>	N	5	1	2	8
	%	11.1	5.9	11.8	10.1
<b>Total</b>	N	45	17	17	79

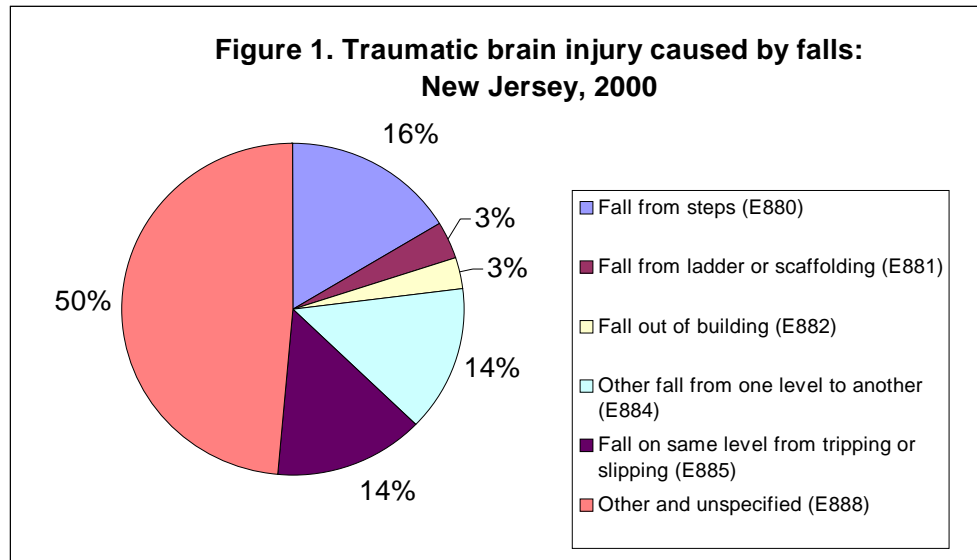
## TRAUMATIC BRAIN INJURY AND SPINAL CORD INJURY

**Table 1. Motor vehicle traffic spinal cord injury and traumatic brain injury by county & age-adjusted rates of motor vehicle-related traumatic brain injuries by county, New Jersey, 2000**

	SCI Only	TBI Only	SCI & TBI	Total	TBI Rate	Rank
<b>Mercer</b>	2	254	2	258	72.2	1
<b>Cumberland</b>	1	103	1	105	71.7	2
<b>Atlantic</b>	1	161	2	164	67.0	3
<b>Camden</b>	3	258	1	262	51.8	4
<b>Salem</b>	0	27	1	28	45.5	5
<b>Ocean</b>	2	207	1	210	42.4	6
<b>Gloucester</b>	1	103	2	106	41.2	7
<b>Cape May</b>	0	35	0	35	37.1	8
<b>Hudson</b>	6	220	4	230	36.5	9
<b>Monmouth</b>	3	177	5	185	31.3	10
<b>Passaic</b>	1	143	0	144	29.2	11
<b>Burlington</b>	1	105	4	110	26.3	12
<b>Morris</b>	8	106	2	116	24.4	13
<b>Hunterdon</b>	1	24	1	26	23.4	14
<b>Essex</b>	3	180	5	188	23.3	15
<b>Union</b>	5	118	2	125	23.3	15
<b>Middlesex</b>	1	174	1	176	23.1	17
<b>Somerset</b>	2	54	0	56	19.3	18
<b>Bergen</b>	4	157	0	161	18.1	19
<b>Warren</b>	0	12	0	12	12.3	20
<b>Sussex</b>	0	15	0	15	11.9	21
<b>New Jersey</b>	45	2,633	34	2,712	32.3	--

*\*Age-adjusted rates are computed per 100,000 county-specific population based on the 2000 US standard population.*

## CHAPTER 4: FALLS - Traumatic Brain Injury



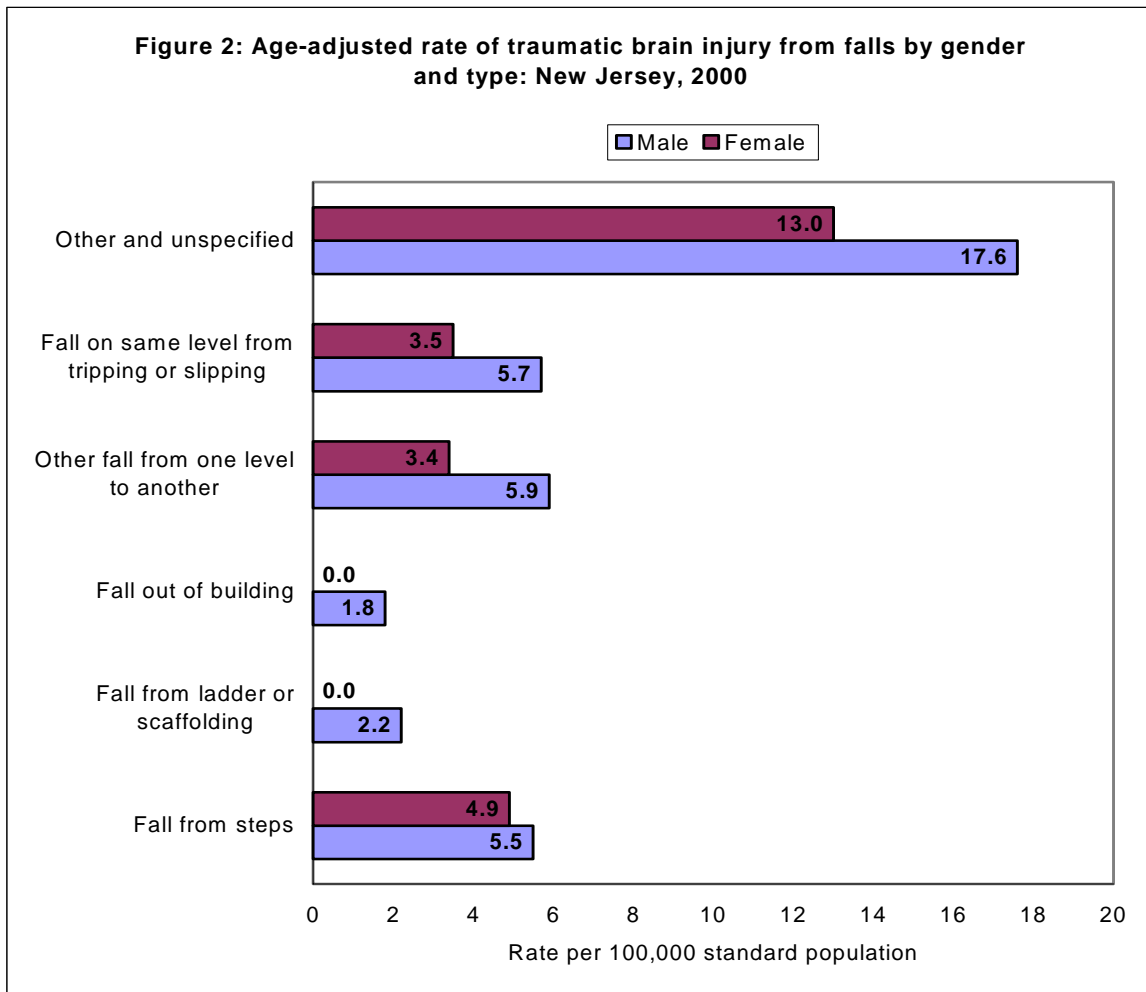
- In nearly half of TBIs from falls, the specific type of fall is not reported.
- Of the specified types of falls, the most common type is falls from steps.
- The category “other fall from one level to another” (E884) includes many common falls among the elderly, such as falling out of bed.

	N	%
<b>Fall from steps</b>	448	16.4
<b>Fall from ladder or scaffolding</b>	94	3.4
<b>Fall out of building</b>	84	3.1
<b>Other fall from one level to another</b>	389	14.3
<b>Fall on same level from tripping or slipping</b>	388	14.2
<b>Other and unspecified</b>	1,323	48.5
<b>Total</b>	2,726	100.0

\*There are 152 missing values

\*\* The E-codes used are E880, E881, E882, E884, E885 & E888, respectively.





- The rate of TBI from falls is higher among males for all types of falls.

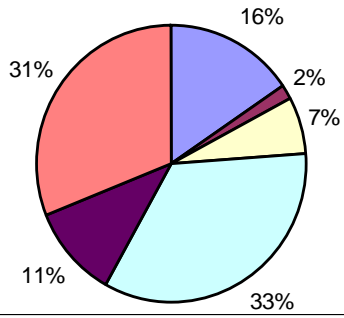
**Table 2. Traumatic brain injury from falls by gender and type, New Jersey, 2000**

	Male		Female		Total	
	N	Rate	N	Rate	N	Rate
<b>Fall from steps</b>	209	5.5	239	4.9	448	5.2
<b>Fall from ladder or scaffolding</b>	87	2.2	7	--	94	1.1
<b>Fall out of building</b>	73	1.8	11	--	84	1.0
<b>Other fall from one level to another</b>	231	5.9	158	3.4	389	4.6
<b>Fall on same level from tripping or slipping</b>	207	5.7	181	3.5	388	4.5
<b>Other and unspecified</b>	630	17.6	693	13.0	1,323	15.2
<b>Total</b>	1,437	38.7	1,289	25.2	2,726	31.6

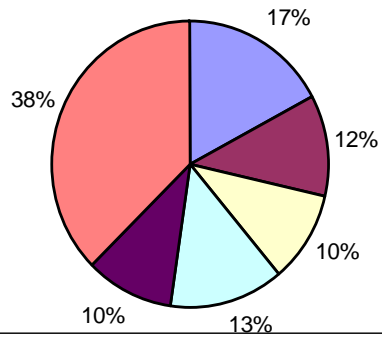
--Rate not calculated when N is less than 20.

\*Rates are age-adjusted based on the year 2000 US standard population

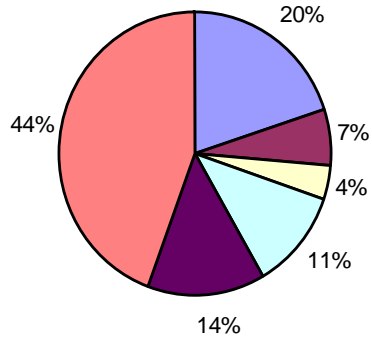
**Figure 3A. TBIs from falls < 25 years  
New Jersey, 2000**



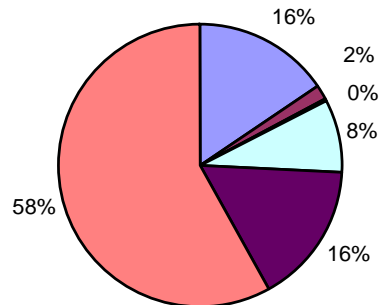
**Figure 3B. TBIs from falls 25-44 years**



**Figure 3C. TBIs from falls 45-64 years**

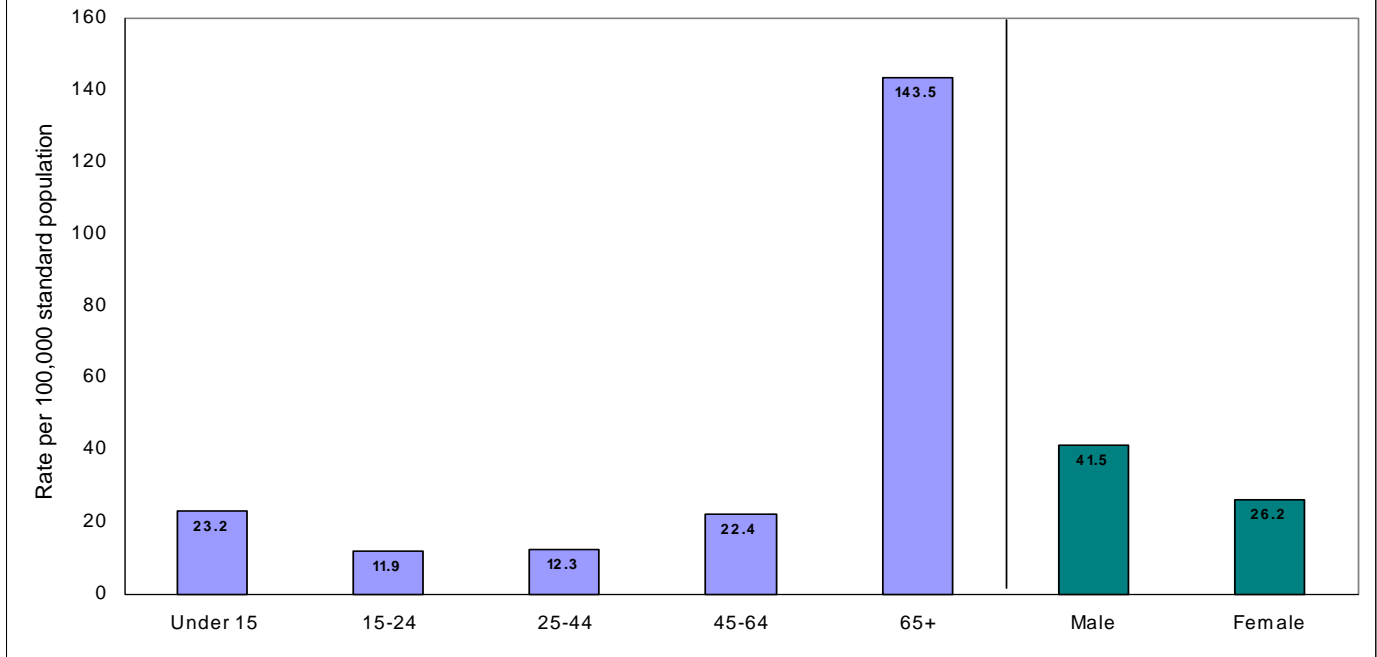


**Figure 3D. TBIs from falls 65+  
New Jersey, 2000**



- Fall from Steps
- Fall from ladder or scaffolding
- Fall out of building
- Other fall from one level to another
- Fall on same level from tripping or slipping
- Other and unspecified

**Figure 4:Rate of traumatic brain injury from falls by age and gender  
New Jersey, 2000**



*\*The rates for gender are age-adjusted per 100,000 gender-specific population based on the 2000 US standard*

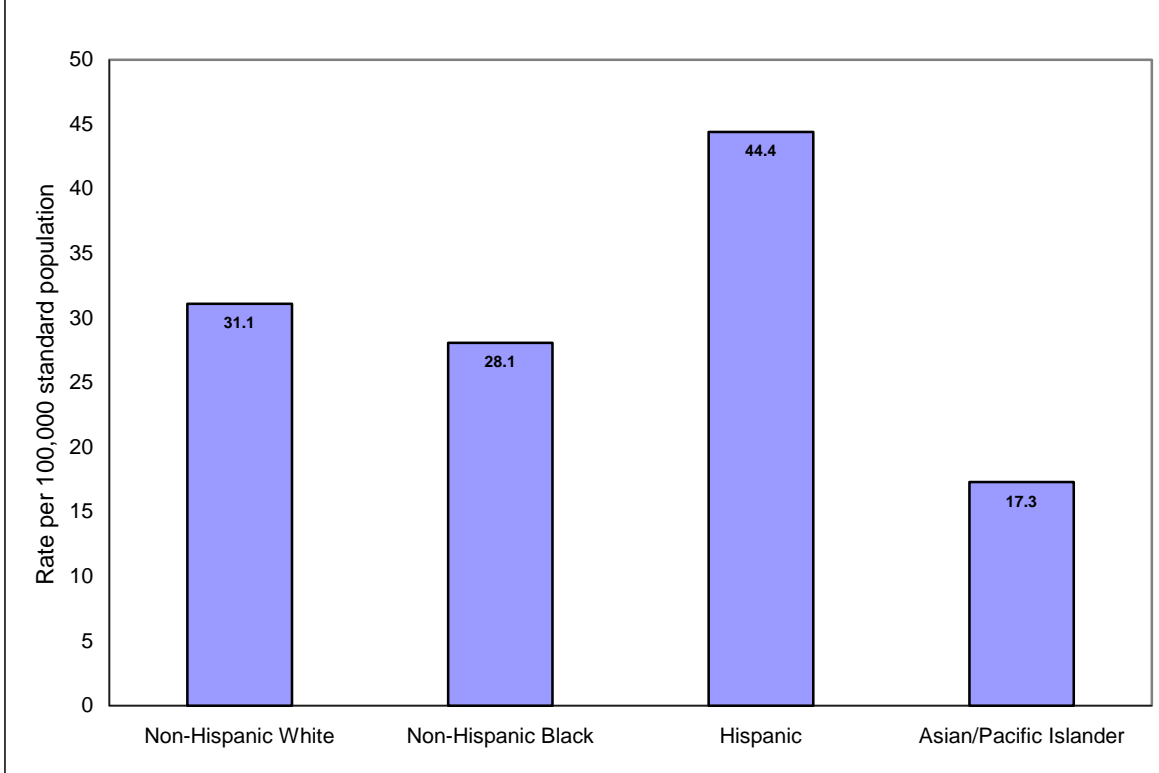
**Table 3. Traumatic brain injury from falls by age and gender,  
New Jersey, 2000**

	<b>N</b>	<b>Rate</b>	<b>Fatal N</b>	<b>% Fatal</b>
<b>Under 15</b>	408	23.2	4	1.0
<b>15-24</b>	120	11.9	2	1.7
<b>25-44</b>	324	12.3	23	7.1
<b>45-64</b>	429	22.4	45	10.5
<b>65+</b>	1,597	143.5	245	15.3
<b>Total</b>	2,878	33.4*	319	11.1
<b>Male</b>	1,536	41.5*	180	11.7
<b>Female</b>	1,342	26.2*	139	10.4

*\* Rates are age-adjusted rates based on year the 2000 US standard population*

- The rate of TBI from falls rises sharply with age, as does the percent of fall injuries which are fatal.

**Figure 5: Age-adjusted rate of traumatic brain injury from falls by race/ethnicity: New Jersey, 2000**



*Rates are age-adjusted based on the year 2000 US standard population*

- The rate of TBI from falls is highest for Hispanics.

**Table 4. Traumatic brain injury from falls by race, ethnicity, and outcome  
New Jersey, 2000**

	<b>N</b>	<b>% Fatal</b>	<b>Rate*</b>
<b>Non-Hispanic White</b>	2,075	12.9	31.1
<b>Non-Hispanic Black</b>	276	6.9	28.1
<b>Hispanic</b>	312	9.0	44.4
<b>Asian/Pacific Islander</b>	45	8.9	17.3
<b>Other/Unknown</b>	170	0.0	--
<b>Total</b>	2,878	11.1	33.4

*\* Rates are age-adjusted based on the year 2000 US standard population*

- TBIs from falls are most likely to be fatal among Whites.

**Table 5. Traumatic brain injury from falls by type and outcome  
New Jersey, 2000**

Type	Fatal		Non-Fatal		Total N
	N	%	N	%	
Fall from steps	27	6.0	421	94.0	448
Fall from ladder or scaffolding	3	3.2	91	96.8	94
Fall out of building	0	0.0	84	100.0	84
Other fall from one level to another	7	1.8	382	98.2	389
Fall on same level from tripping or slipping	15	3.9	373	96.1	388
Other and unspecified	115	8.7	1,208	91.3	1,323
<b>Total</b>	<b>167</b>	<b>6.1</b>	<b>2,559</b>	<b>93.9</b>	<b>2,726</b>

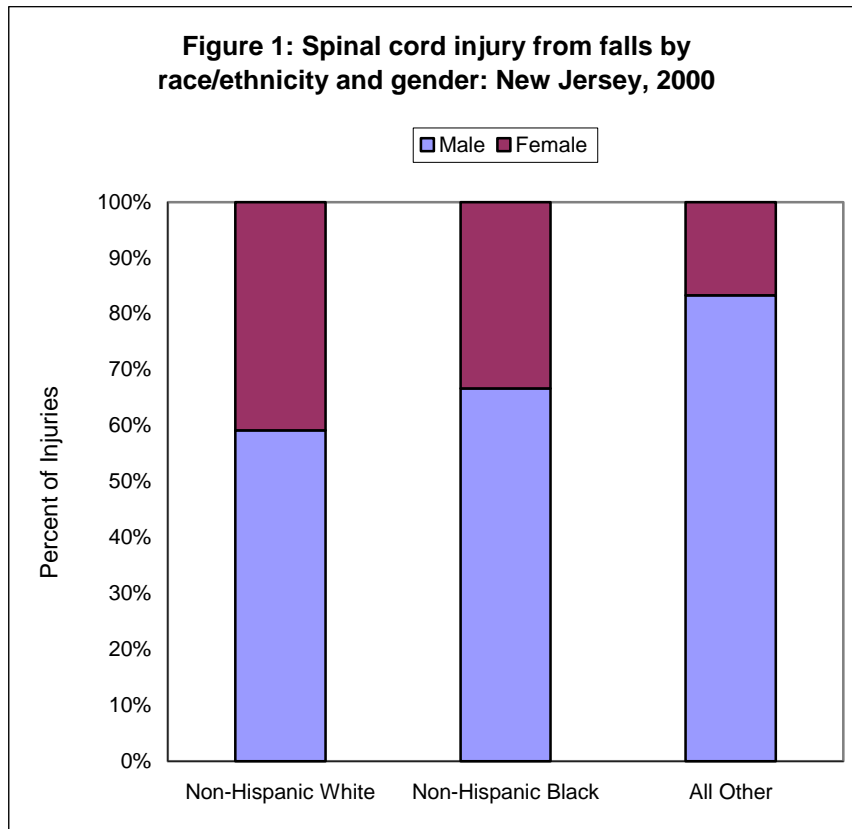
- Among specified types of falls, falls from steps are most likely to be fatal.

**Table 6. Traumatic brain injury from falls by age and county,  
New Jersey, 2000**

County	Under 15	15-24	25-44	45-64	65+	Total	Age- Adjusted Rate	Rank
Hudson	57	14	37	62	124	294	52.2	1
Passaic	30	16	27	31	99	203	42.0	2
Atlantic	11	11	19	10	57	108	41.8	3
Camden	29	5	32	33	106	205	40.4	4
Cumberland	6	4	8	9	32	59	39.6	5
Mercer	12	8	21	22	65	128	36.5	6
Cape May	2	3	5	7	29	46	34.8	7
Bergen	42	10	24	52	209	337	34.0	8
<b>New Jersey</b>	<b>408</b>	<b>120</b>	<b>324</b>	<b>429</b>	<b>1,597</b>	<b>2,878</b>	<b>33.4</b>	<b>---</b>
Middlesex	38	6	15	30	146	235	32.9	9
Essex	54	7	33	38	119	251	32.1	10
Monmouth	25	5	27	24	114	195	31.5	11
Morris	19	5	23	22	74	143	31.5	11
Burlington	12	11	15	15	70	123	30.1	13
Union	31	1	12	22	102	168	30.0	14
Somerset	9	0	4	14	49	76	27.3	15
Gloucester	1	4	7	11	36	59	25.2	16
Sussex	7	2	4	7	11	31	23.9	17
Ocean	17	7	7	13	117	161	22.2	18
Warren	3	1	1	3	14	22	21.2	19
Salem	1	0	3	2	13	19	---	---
Hunterdon	2	0	0	2	11	15	---	---

\*The number of injuries is too small to calculate reliable rates.

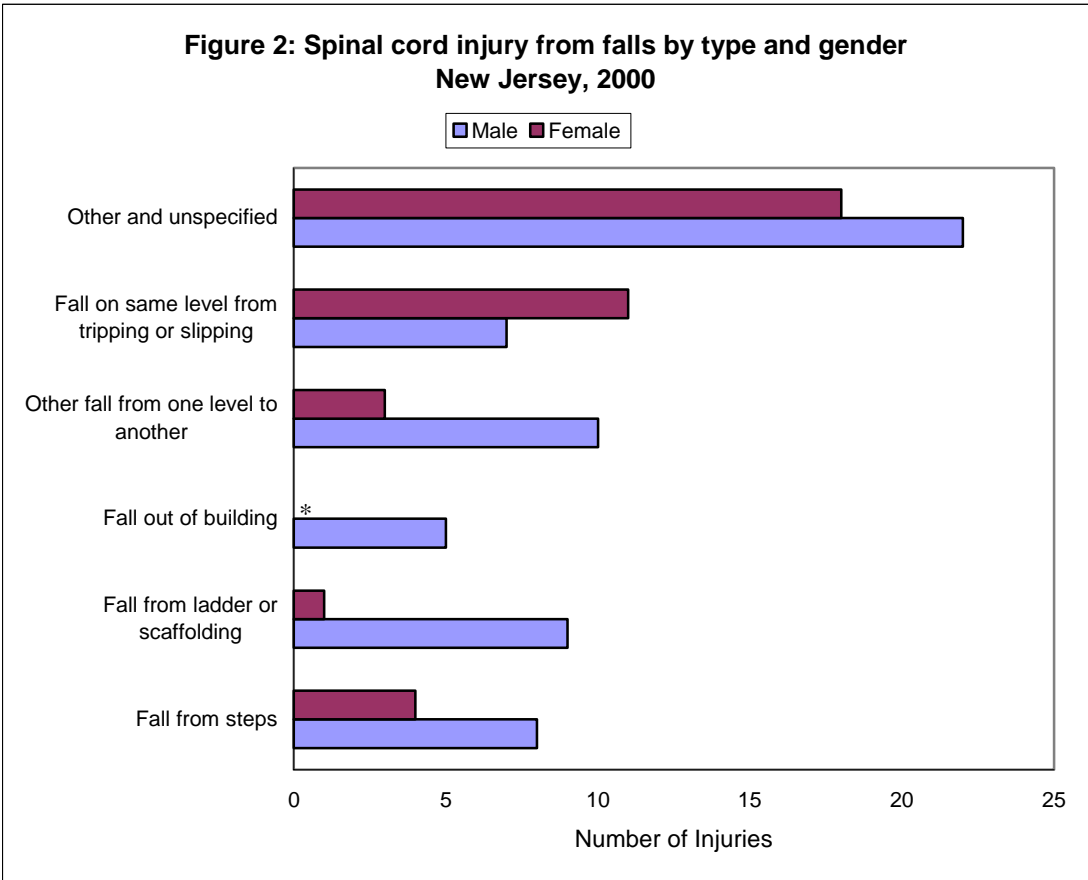
## FALLS - Spinal Cord Injury



**Table 1. Spinal cord injury from falls by race/ethnicity and gender  
New Jersey, 2000**

	Male	Female	Total
Non-Hispanic White	45	31	76
Non-Hispanic Black	8	4	12
All Other	10	2	12
<b>Total</b>	<b>63</b>	<b>37</b>	<b>100</b>

- Spinal cord injuries from falls are more common for males across all race/ethnicity groups.



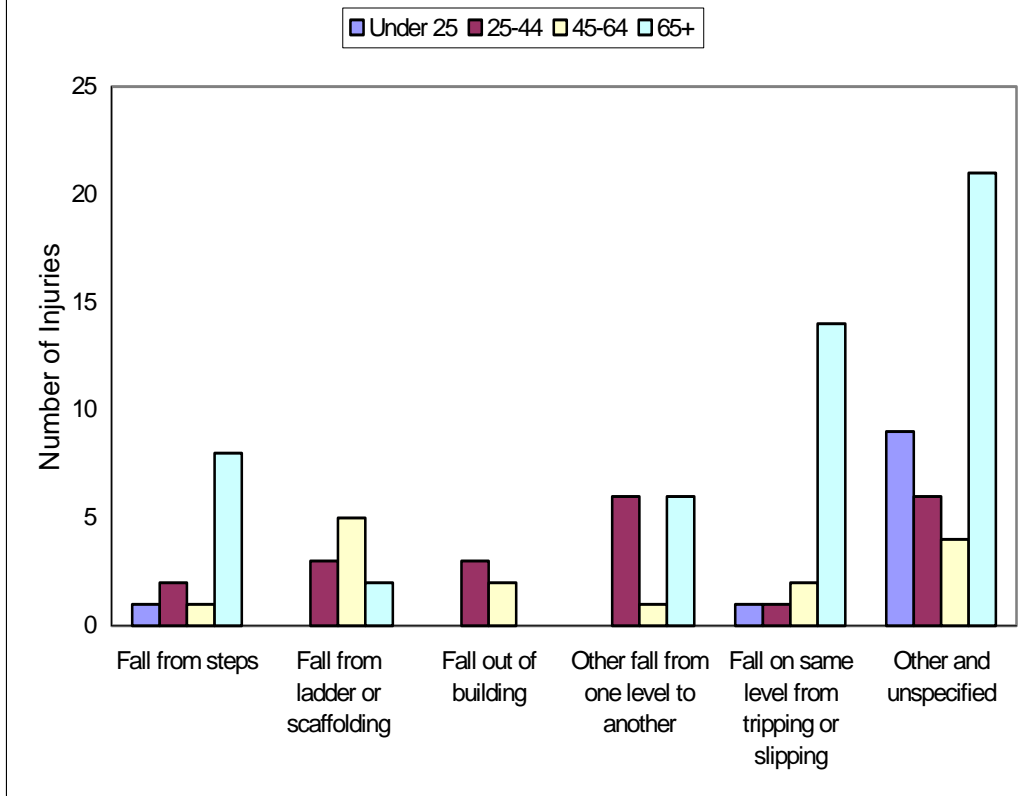
\*There are no incidents of a female falling out of a building.

**Table 2. Spinal cord injury from falls by type and gender  
New Jersey, 2000**

Type	Male	Female	Both
Fall from steps	8	4	12
Fall from ladder or scaffolding	9	1	10
Fall out of building	5	0	5
Other fall from one level to another	10	3	13
Fall on same level from tripping or slipping	7	11	18
Other and unspecified	22	18	40
Total	61	37	98

- The only type of fall more common among women than men is the fall on the same level from tripping or slipping, and these occur primarily among those 65 and over.

**Figure 3: Spinal cord injury from falls by age and type  
New Jersey, 2000**

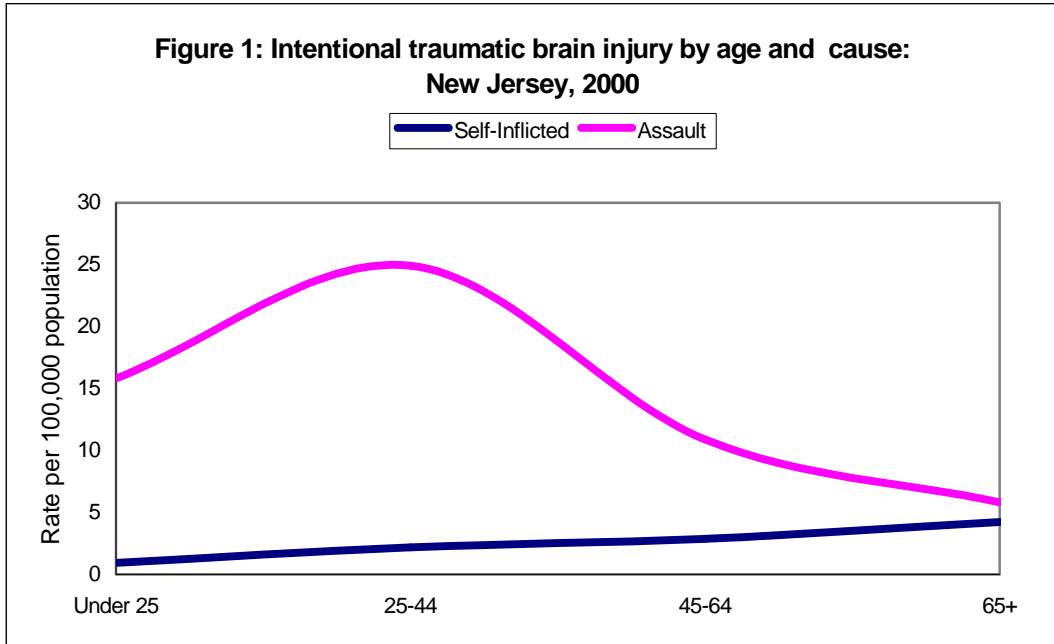


**Table 3. Spinal cord injury from falls by age and type,  
New Jersey, 2000**

Type	Under 25	25-44	45-64	65+	Total
Fall from steps	1	2	1	8	12
Fall from ladder or scaffolding	0	3	5	2	10
Fall out of building	0	3	2	0	5
Other fall from one level to another	0	6	1	6	13
Fall on same level from tripping or slipping	1	1	2	14	18
Other and unspecified	9	6	4	21	40
Total	11	21	15	51	98



**CHAPTER 5: INTENTIONAL INJURY - Traumatic Brain Injury**

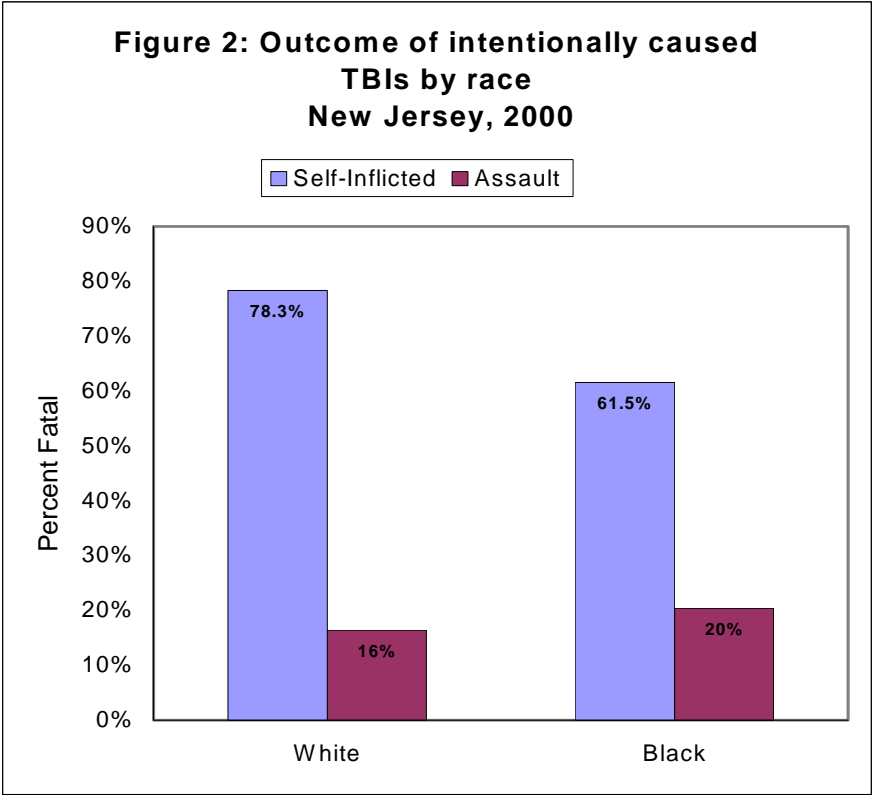


- Assault rates are highest in young adult years, while rates of self-inflicted injury rise with age.

**Table 1. Intentional traumatic brain injury by age, gender and cause, New Jersey, 2000**

		Self-Inflicted		Assault		Total	
		N	Rate	N	Rate	N	Rate
<b>Total</b>	<b>Under 25</b>	26	0.9	224	15.8	250	17.7
	<b>25-44</b>	57	2.2	324	24.9	381	29.3
	<b>45-64</b>	55	2.9	100	10.9	155	16.9
	<b>65+</b>	47	4.2	26	5.8	73	16.3
	<b>Total</b>	185	2.2	674	16.5	859	21.0
<b>Male</b>	<b>Under 25</b>	20	1.4	202	14.3	222	15.7
	<b>25-44</b>	52	4.0	281	21.6	333	25.6
	<b>45-64</b>	47	5.1	85	9.2	132	14.4
	<b>65+</b>	39	8.7	15	--*	54	12.1
	<b>Total</b>	158	3.9	583	14.3	741	18.1
<b>Female</b>	<b>Under 25</b>	6	--	22	1.6	28	2.0
	<b>25-44</b>	5	--	43	3.3	48	3.7
	<b>45-64</b>	8	--	15	--	23	2.5
	<b>65+</b>	8	--	11	--	19	--
	<b>Total</b>	27	0.6	91	2.2	118	2.9

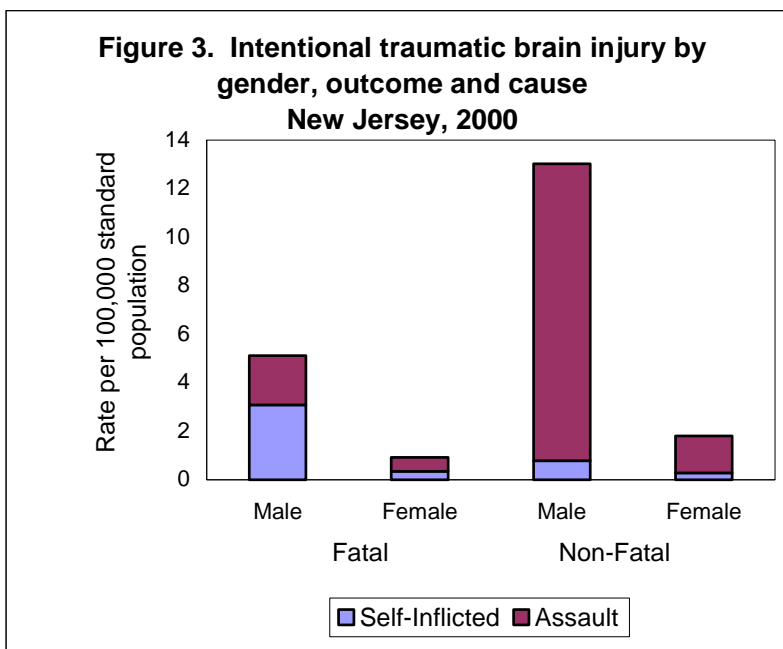
--The number of intentional injuries is too small to calculate reliable rates.



**Table 2. Outcome of intentionally caused traumatic brain injury by race and cause: New Jersey, 2000**

		Non-Fatal	Fatal	Total	% Fatal
<b>Total</b>	<b>All</b>	610	249	859	29.0
	<b>White</b>	206	153	359	42.6
	<b>Black</b>	224	64	288	22.2
	<b>Other</b>	180	32	212	15.1
<b>Self-Inflicted</b>	<b>All</b>	44	141	185	76.2
	<b>White</b>	33	119	152	78.3
	<b>Black</b>	5	8	13	61.5
	<b>Other</b>	6	14	20	70.0
<b>Assault</b>	<b>All</b>	566	108	674	16.0
	<b>White</b>	173	34	207	16.4
	<b>Black</b>	219	56	275	20.4
	<b>Other</b>	174	18	192	9.4

- Self-inflicted brain injuries are more likely to be fatal than are those resulting from assaults.



- The gender gap in intentional fatalities largely comes from self-inflicted injuries; the gap in non-fatal injuries is attributable to a large excess in non-fatal injuries among males.

**Table 3. Intentional traumatic brain injury by gender, outcome and cause  
New Jersey, 2000**

	Fatal		Non-Fatal		Total
	Male	Female	Male	Female	
<b>Self-Inflicted (N)</b>	126	15	32	12	185
<b>Rate</b>	3.1	--	0.8	--	2.2
<b>Assault (N)</b>	83	25	500	66	674
<b>Rate</b>	2.0	0.6	12.2	1.5	8.0
<b>Total</b>	209	40	532	78	859
<b>Rate</b>	5.1	0.9	13.0	1.8	10.2

--Rate not calculated when N is less than 20.

- The majority of intentional TBIs are non-fatal assaults on males. The most common cause of fatal intentional TBIs is self-inflicted injuries among males.

		<b>Firearm</b>	<b>Struck by/ Against</b>	<b>Other/ Unspecified</b>	<b>Total</b>
<b>Total</b>	<b>All</b>	209	356	294	859
	<b>Under 25</b>	49	116	85	250
	<b>25-44</b>	72	172	137	381
	<b>45-64</b>	50	61	44	155
	<b>65+</b>	38	7	28	73
<b>Self-Inflicted</b>	<b>All</b>	133	0	52	185
	<b>Under 25</b>	13	0	13	26
	<b>25-44</b>	41	0	16	57
	<b>45-64</b>	44	0	11	55
	<b>65+</b>	35	0	12	47
<b>Assault</b>	<b>All</b>	76	356	242	674
	<b>Under 25</b>	36	116	72	224
	<b>25-44</b>	31	172	121	324
	<b>45-64</b>	6	61	33	100
	<b>65+</b>	3	7	16	26

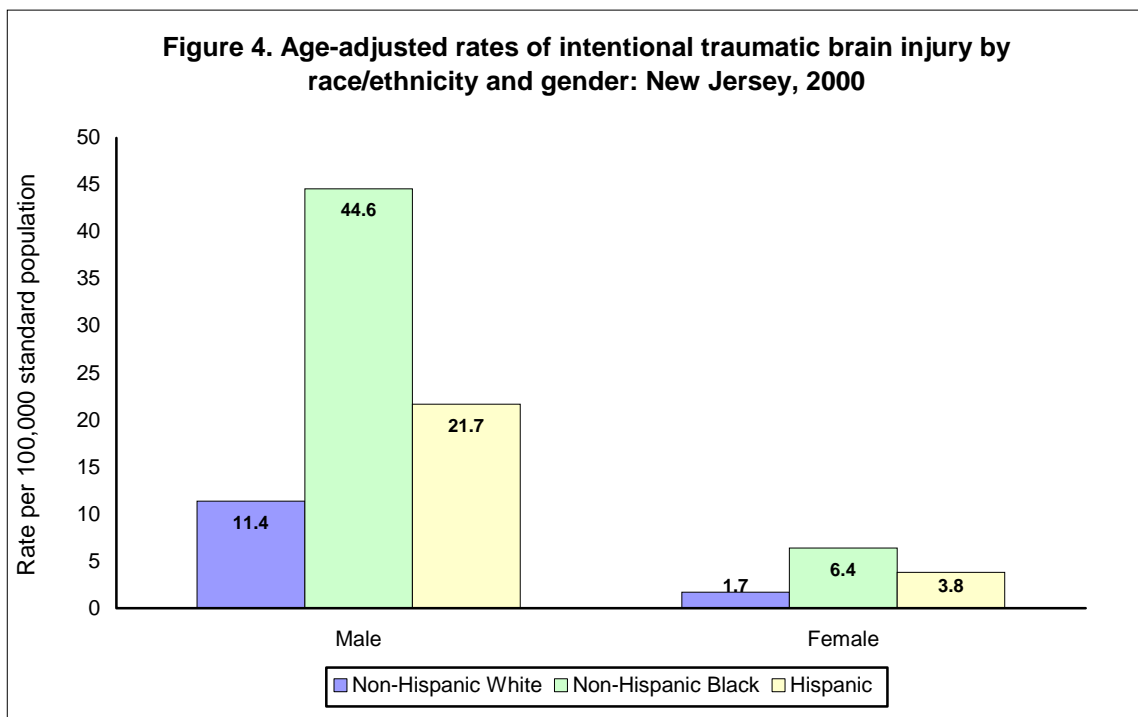
- Firearms are by far the most common mechanism used in self-inflicted TBIs.
- Assaults are usually the result of being “struck by or against” something hard, such as a blunt object or the ground.

	<b>Self-Inflicted</b>			<b>Assault</b>			<b>Total</b>		
	<b>TBI</b>	<b>SCI</b>	<b>Total</b>	<b>TBI</b>	<b>SCI</b>	<b>Total</b>	<b>TBI</b>	<b>SCI</b>	<b>Total</b>
<b>Firearm</b>	133	0	133	76	10	86	209	10	219
<b>Poisoning</b>	31	2*	33	0	0	0	31	2	33
<b>Cut/Pierce</b>	4	0	4	27	1	28	31	1	32
<b>Struck by/against</b>	0	0	0	356	1	357	356	1	357
<b>Other/Unspecified</b>	17	2	19	215	1	216	232	3	235
<b>Total</b>	185	4	189	674	13	687	859	17	876

\*Received both TBI and SCI

	Self-Inflicted		Assault		Total
	Male	Female	Male	Female	
<b>Non-Hispanic White</b>	130	22	176	31	359
<b>Non-Hispanic Black</b>	10	3	238	37	288
<b>Hispanic</b>	12	2	123	19	156
<b>Asian/Pacific Islander</b>	1	0	10	0	11
<b>Other/Unknown</b>	5	0	36	4	45
<b>Total</b>	158	27	583	91	859

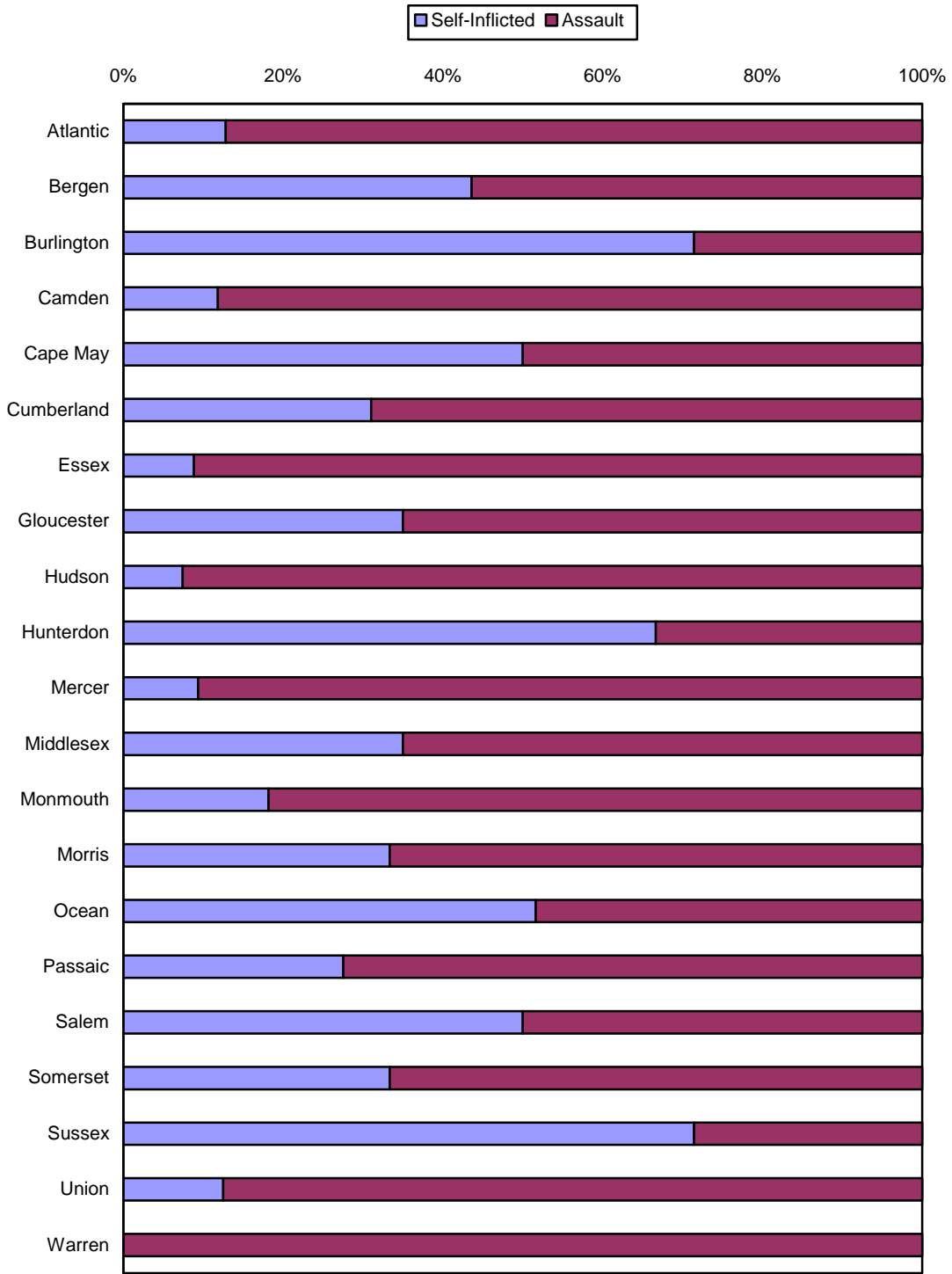
- The ratio of assaults to self-inflicted injury is lowest among Whites, and highest among Blacks.



*Rates are age-adjusted based on the US 2000 standard population.*

- Rates of TBI from assault are highest among Black males.

**Figure 5. Intentionally caused traumatic brain injury by county  
New Jersey, 2000**



**Table 7. Intentionally caused traumatic brain injury by county  
New Jersey, 2000**

	<b>Self-Inflicted</b>	<b>Assault</b>	<b>% Self-Inflicted</b>	<b>% Assault</b>	<b>Total</b>
Atlantic	5	34	12.8	87.2	39
Bergen	17	22	43.6	56.4	39
Burlington	15	6	71.4	28.6	21
Camden	11	82	11.8	88.2	93
Cape May	3	3	50.0	50.0	6
Cumberland	9	20	31.0	69.0	29
Essex	13	134	8.8	91.2	147
Gloucester	7	13	35.0	65.0	20
Hudson	7	87	7.4	92.6	94
Hunterdon	2	1	66.7	33.3	3
Mercer	6	58	9.4	90.6	64
Middlesex	14	26	35.0	65.0	40
Monmouth	6	27	18.2	81.8	33
Morris	6	12	33.3	66.7	18
Ocean	16	15	51.6	48.4	31
Passaic	30	79	27.5	72.5	109
Salem	2	2	50.0	50.0	4
Somerset	6	12	33.3	66.7	18
Sussex	5	2	71.4	28.6	7
Union	5	35	12.5	87.5	40
Warren	0	4	0.0	100.0	4
<b>New Jersey</b>	<b>185</b>	<b>674</b>	<b>21.5</b>	<b>78.5</b>	<b>859</b>