

Alabama Head and Spinal Cord Injury Report

January 1, 2013 – December 31, 2013

Alabama Department of Public Health

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Background

According to the National Center for Health Statistics (NCHS), traumatic injuries are the leading cause of death among children and young adults. The Alabama Center for Health Statistics (ACHS) reports that, during the year 2013, accidental injury alone ranks fourth overall among causes of death in the state. Moreover, when the components of traumatic injury, i.e. accidental, suicide, and homicide, are added together, they represent the third leading cause of mortality in the state. In fact, traumatic injuries result in the loss of more potential years of life than any other cause.

The Alabama Department of Rehabilitation Services (ADRS) is charged with offering rehabilitation services to patients with moderate to severe brain, spinal cord, or other debilitating injury. At times, patients are unaware of, or have difficulty understanding, state supported rehabilitation services – the result of which leads to inadequate rehabilitation, disability management, and work force re-entry assistance. Patients who have sustained debilitating injuries are identified and linked with ADRS via the Alabama Head and Spinal Cord Injury Registry (AHSCIR), a registry mandated by Alabama Act 98-611. This law, which requires all hospitals in Alabama to submit data related to head and/or spinal cord injury cases to the Alabama Department of Public Health (ADPH), was passed in May of 1998. The Alabama Trauma Registry (ATR), established shortly after AHSCIR data collection began in 1999, strives to broaden collection efforts to include data related to all types of trauma. Since the trauma registry program began providing data to the ADRS in the year 2000, patients with moderate to severe traumatic brain injury and/or spinal cord injury have been identified and contacted. Detailed analysis of 2013 data submitted to the ATR is ongoing, since new cases from 2013 are still being submitted. However, enough data is contained in the ATR to perform a preliminary analysis of 2013 cases. Those requesting services have been provided appropriate, need-based, referral information.

More specifically, development of the ATR component pertains to an expansion of the head and spinal cord injury registry into a larger, more comprehensive program. Trauma registry personnel in the Office of Emergency Medical Services (EMS) of the ADPH collect statewide data by working with hospitals at all levels of trauma care (acute and ancillary). The ATR is beginning to capture data that will allow for more accurate evaluations regarding traumatic injury incidence and patterns. Data are received from hospitals that devote significant resources to trauma care as well as those hospitals that function to treat less severe traumatic injuries but stabilize and transfer more severe traumatic injuries. Ultimately, registry data analysis and injury pattern evaluations will permit researchers and policy makers to identify better ways of reducing injury mortality and morbidity in Alabama.

It is important to provide the public with mortality and morbidity statistics associated with motor vehicle crashes in order to accurately illustrate the impact injuries have on individuals, families, and society. Additionally, the information assists with efforts related to increasing protective equipment usage rates. Trauma registry data are used by a variety of organizations. Emergency management agencies and emergency medical services providers use the registry information for community trauma prevention education. As previously described, the ADRS uses the AHSCIR data to locate patients suffering from

head and/or spinal cord injuries in an effort to make them aware of state supported services and perform follow-up treatment.

Historically, the Alabama Traffic Injury Registry (ATIR), which collected data from 1991 through 1998 from 18 hospital emergency departments, was able to generate and convey similar information; however, due to the small sample size and other limitations, it was not possible to draw broad conclusions with respect to statewide mortality and morbidity. *ATIR* data collection was labor intensive, required frequent travel to hospital emergency departments and was unable to capture all trauma cases treated at the 18 participating hospitals. The demographic characteristics of patients treated at hospitals from which the ATIR collected data were, simply put, not representative of the state as a whole. Therefore, it was not possible to accurately assess the extent of disparity in Glasgow Coma Scale (GCS) scores, the Abbreviated Injury Scale (AIS) scores, Injury Severity Scores (ISS), and functional ability at discharge of persons whose injuries were severe enough for admittance to the hospital and among different segments of Alabama's population. For obvious reasons, if hospital participation for the general trauma registry (ATR) is broad enough, more representative samples will be available which, in turn, will allow for more accurate information regarding statewide injury – especially motor vehicle crash related injury.

The Alabama Statewide Cancer Registry (ASCR), located in the Bureau of Family Health Services, has provided the ATR/AHSCIR staff with a successful example regarding registry operation and management. Collaboration between the ATR/AHSCIR and cancer registry staff has contributed greatly to the development and operation of the trauma registry program. Also, the ATR/AHSCIR staff has consulted with the staffs and websites of other successful state registries. The ATR/AHSCIR has been modeled after these successful programs and proposes, in cooperation with a statewide emergency response program, to establish one of the most comprehensive trauma surveillance systems in the country.

Methods

The case definition for inclusion in the ATR program denotes any patient with at least one injury ICD-9-CM diagnosis code between 800.00 and 959.9, excluding 905–909 (late effects of injury), 910-924 (blisters, contusions, abrasions, and insect bites), and 930-939 (foreign bodies). The patient must also have been admitted to the hospital for at least 24 hours, transferred into and/or out of the hospital, or died after receiving any evaluation or treatment at the hospital or were dead upon arrival. Reportable diagnoses for the AHSCIR include all confirmed cases of head and spinal cord injury with at least one of the following ICD-9-CM diagnoses:

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
806.0 - 806.9	Fracture of vertebral column with spinal cord lesion
950.1 - 950.3	Injury to the optic chiasm, optic pathways, and visual cortex
952.0 - 952.9	Spinal cord lesion without evidence of spinal bone injury
959.01	Head Injury, unspecified
995.55	Shaken infant syndrome

Data Use and Comparability

All data contained in this report must be interpreted with careful judgment. It is important to note that the information presented in this report is based on data from the ATR which were submitted as of September 30, 2014. The data in this report is not comparable to state or federal data from other sources due to variations in collection and analytical techniques.

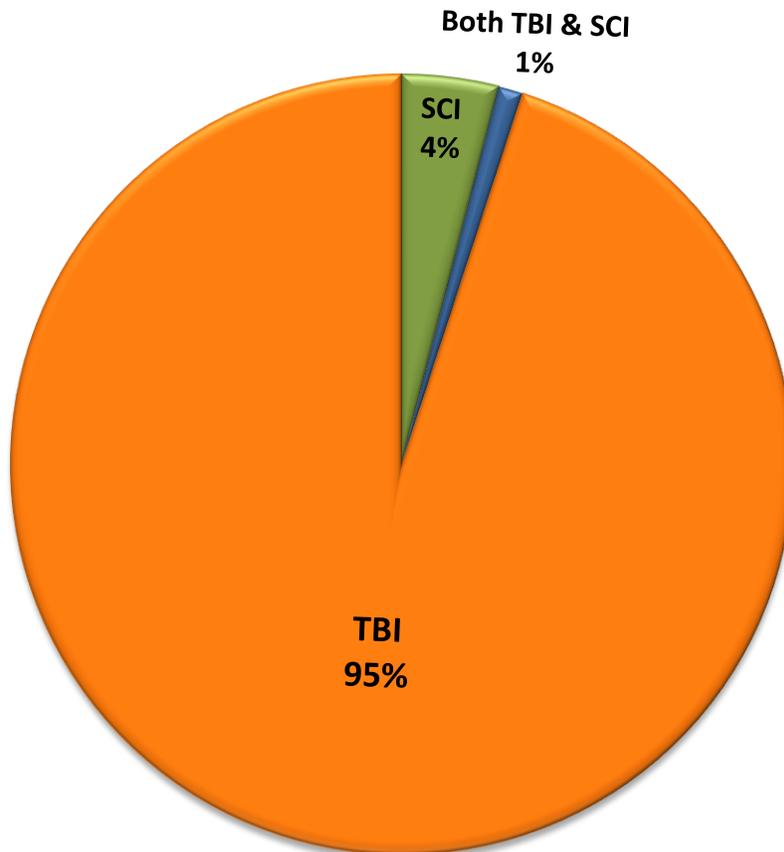
Changes in reporting requirements by the U.S. Census Bureau have affected 2013 traumatic head and spinal cord injury totals for Hispanics. As a consequence, some ATR/AHSCIR reporting institutions characterize “Hispanic” as a race and others characterize it as an ethnic group. These changes affect the accuracy of the head and spinal cord injury profile for Hispanics. Adjustments to data collection procedures for traumatic injury data that will limit the impact of this inconsistency on future reports are being considered by registry staff at this time.

Less severe head and spinal cord injuries are underrepresented in this analysis by design. Consequently, some less severe injuries are not included in the AHSCIR case definition thereby permitting registrars to omit reporting them. Additionally, mortality may be underestimated because of cases in which persons expired at the scene and bypassed hospitals. The statistical significance of the summary data for the Spinal Cord Injuries (SCI) and combined Traumatic Brain Injuries (TBI) and SCI cases is also limited by the small population size regarding some respective data subgroups. Cases admitted to a given hospital and then transferred to another hospital during the course of their treatment are counted twice in this report.

RESULTS

The ATR received reports of 4,823 head and spinal cord injury cases that were admitted to Alabama hospitals during calendar year 2013. Head injuries (TBI) constituted 95 percent (n=4,504) of the reported cases and spinal cord injuries, exclusively (SCI) constituted 4 percent (n=249). There were 70 cases (1 percent) in the registry that had both head and spinal cord injuries together. Separate analyses are presented for each of the three categories. This document will use the term traumatic brain injury (TBI) when referring to head injuries.

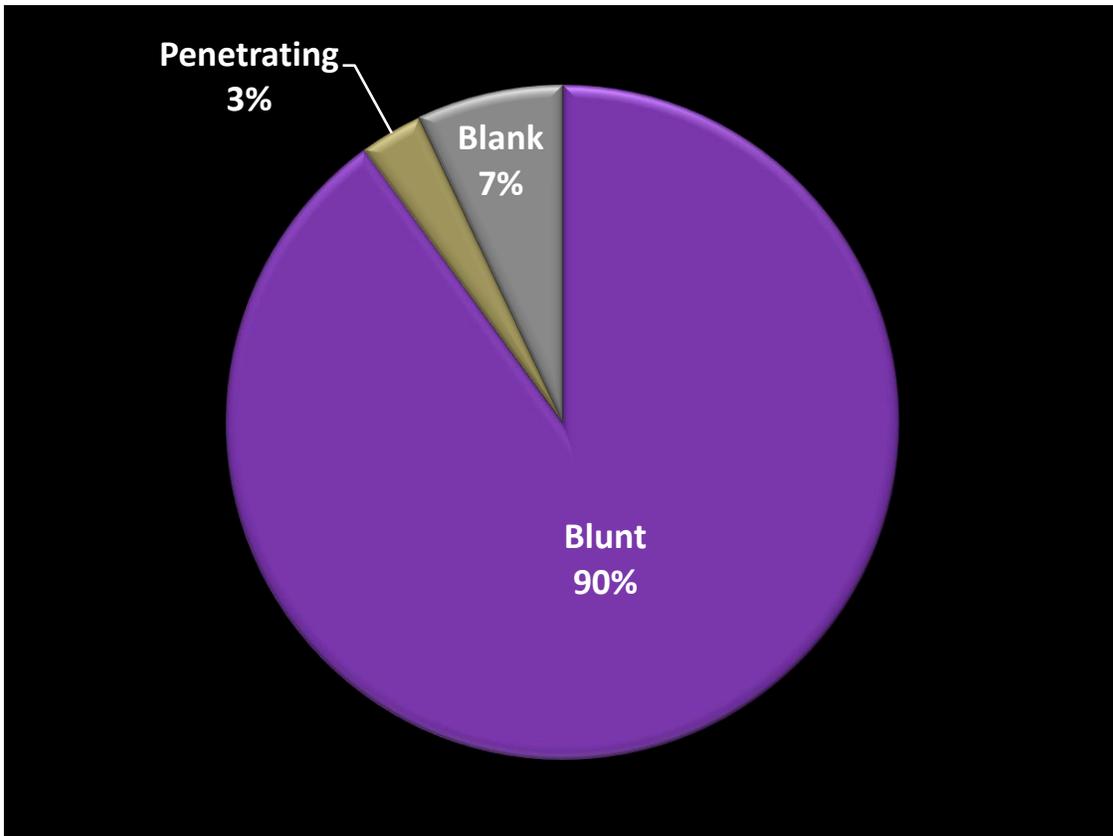
Figure 1
Type of Injury
Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(N=4,823)



Population size of each category will be noted in the caption for each graphic illustration.

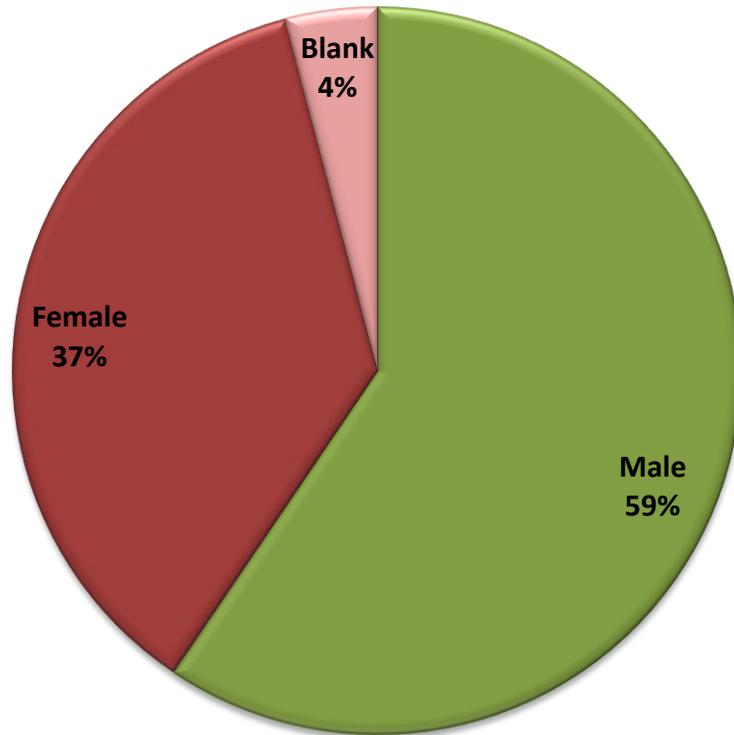
Traumatic Brain Injury

Figure 2
Proportion of TBI Cases by Mechanism of Injury
Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(n=4,504)



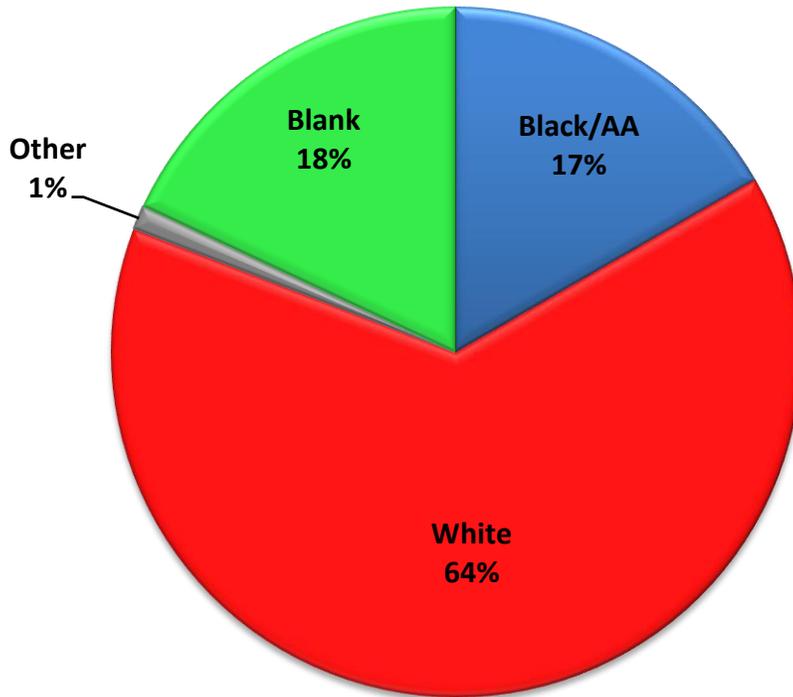
Ninety percent (n=4,054) of the TBI cases were injuries due to blunt trauma. Penetrating injuries accounted for 3 percent (n=135) of the TBI cases for 2013.

Figure 3
Proportion of TBI Cases by Gender
Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(n=4,504)



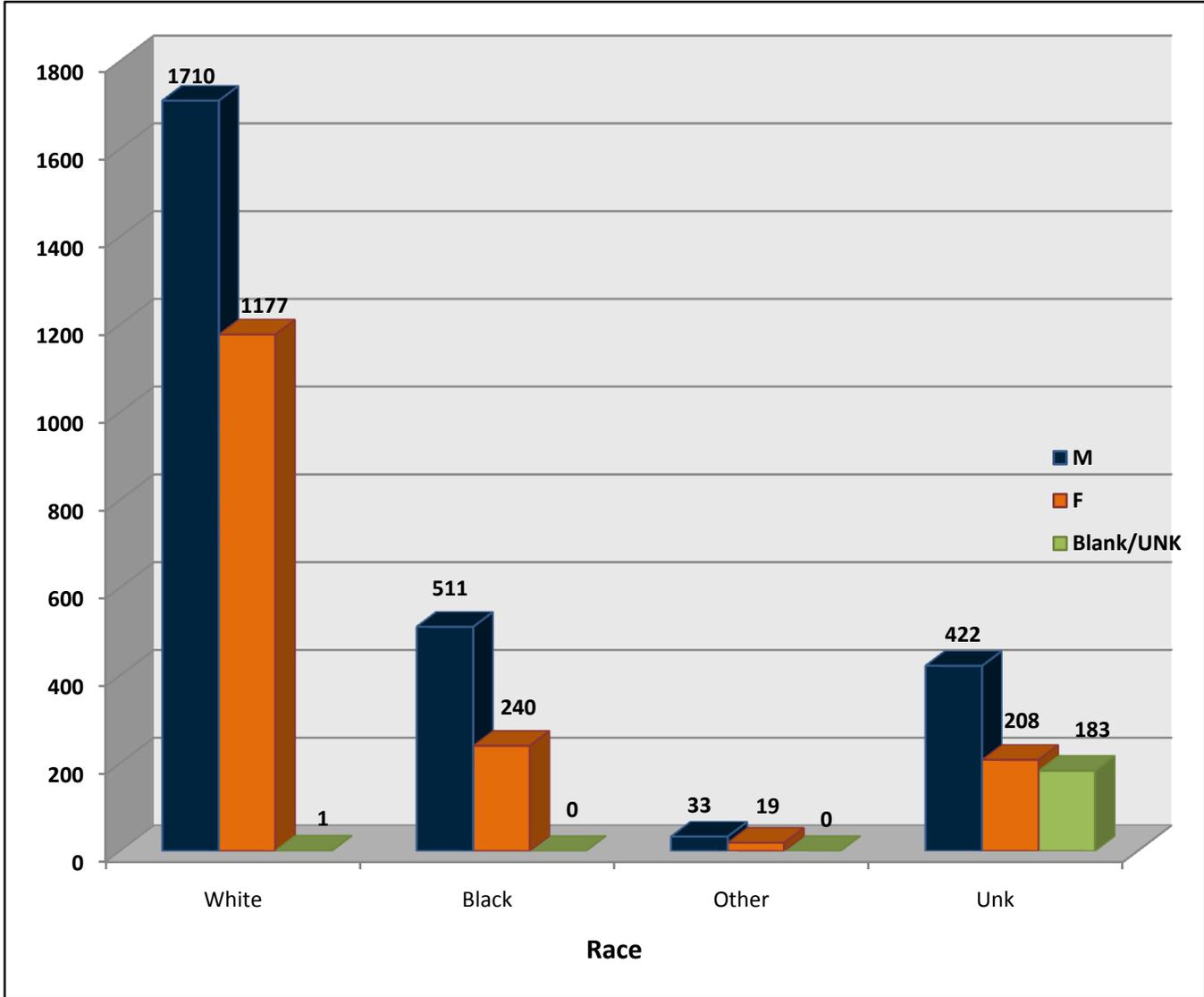
Fifty-nine percent (n=2,676) of the TBI cases for the year 2013 were male. Thirty-seven percent (n=1,644) of the cases were female. In 4 percent of the TBI cases, the gender information was unanswered.

Figure 4
Proportion of TBI Cases by Race
Alabama Head and Spinal Cord Registry (AHSCIR)
January 1, 2013– December 31, 2013
(n=4,504)



Whites constitute 64 percent (n=2,883) of the cases, Blacks/African Americans 17 percent (n=766), other race 1 percent (n=45), and in 18 percent of the reported cases (n=810) race information was unknown or unavailable at the time of this report.

Figure 5
Number of TBI Cases by Gender and Race
 Alabama Head and Spinal Cord Injury Registry (AHSCIR)
 January 1, 2013 – December 31, 2013
 (n=4,504)



Thirty-eight percent (n=1,710) of TBI cases in whites were male, 11 percent (n=511) of Black/African-American cases were male, and 1 percent (n=33) of “Others” were male. This category includes those of Asian, American Indian, and Hispanic descent. There were 183 cases where both race and gender were unknown or unavailable. The overall percentages in this injury type were 59 percent male, 37 percent female, and 4 percent unknown or the data was not available. (See Figure 3).

Table 1
2013 TBI Cases by Age, Gender and Race

Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(n=4,504)

Age	White Male	White Female	Black Male	Black Female	Other Male	Other Female	No Data	Total	% Total
<5	57	45	31	30	4	1	29	197	4.4%
5 - 14	120	76	52	22	0	2	59	331	7.3%
15-24	305	160	107	53	7	6	198	836	18.6%
25-34	237	103	96	36	3	1	131	607	13.5%
35-44	193	99	62	24	4	1	99	482	10.7%
45-54	197	105	73	15	7	0	88	485	10.8%
55-64	184	89	54	31	3	2	92	455	10.1%
65-74	190	143	22	9	3	2	44	413	9.2%
75-84	143	208	9	12	1	3	47	423	9.4%
>84	81	146	5	8	1	1	24	266	5.9%
No Data	3	3	0	0	0	0	3	9	0.2%
Total	1710	1177	511	240	33	19	814	4504	100.0%
% Total	37.97%	26.13%	11.35%	5.33%	0.73%	0.42%	18.07%	100.0%	

The 15-24 year old age group sustained the largest percentage of TBI cases both in 2012, with 19.8 percent (n=977), and in 2013, with 18.6 percent (n=836) The “Other” category in the data includes Asians, Hispanics, and others.

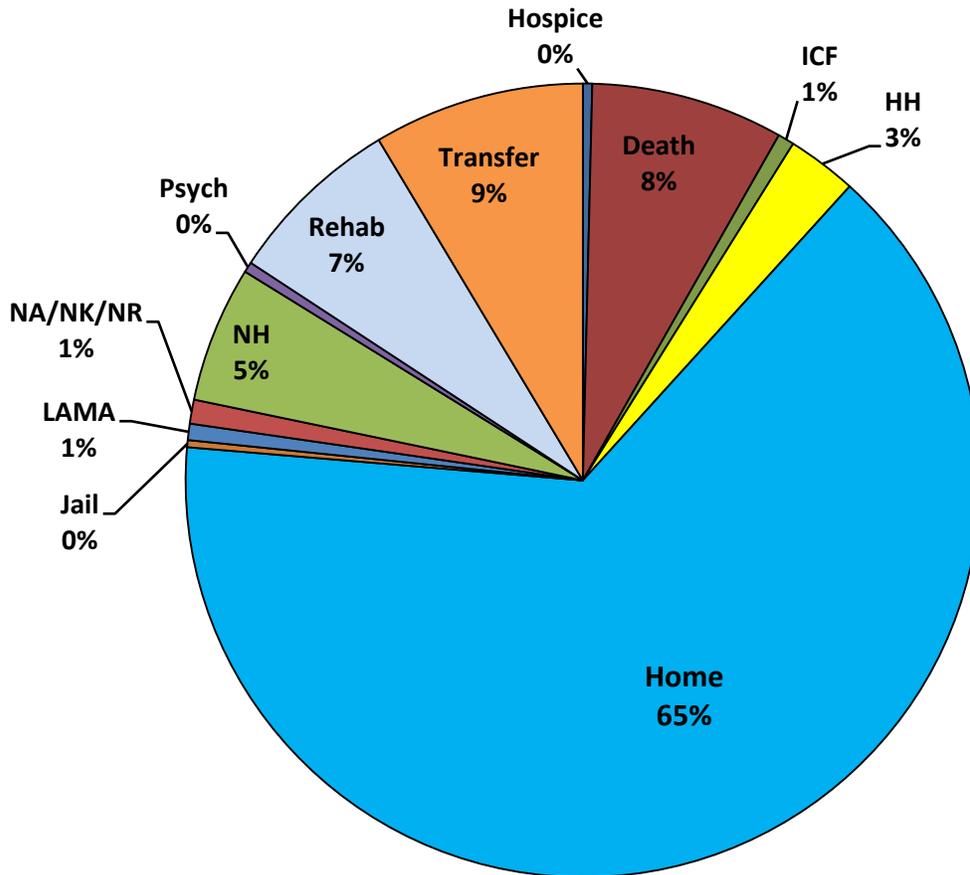
Table 2
2012 TBI Cases by Age, Gender and Race

Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2012 – December 31, 2012
(n=4,936)

Age	White Male	White Female	Black Male	Black Female	Other Male	Other Female	No Data	Total	% Total
<5	48	51	19	29	9	16	94	266	5.4%
5 - 14	137	74	40	14	11	21	113	410	8.3%
15-24	372	162	118	46	32	82	165	977	19.8%
25-34	229	120	94	29	25	57	75	629	12.7%
35-44	177	104	38	33	21	36	70	479	9.7%
45-54	212	103	82	26	9	43	55	530	10.7%
55-64	195	111	53	13	17	27	66	482	9.8%
65-74	148	119	14	7	9	18	55	370	7.5%
75-84	184	207	11	16	8	15	37	478	9.7%
>84	77	155	3	15	8	7	25	290	5.9%
No Data	5	6	0	0	0	2	12	25	0.5%
Total	1784	1212	472	228	149	324	767	4936	100%
% Total	36.1%	24.6%	9.6%	4.6%	3.0%	6.6%	15.5%	100.0%	

Figure 6
Discharge Disposition Following TBI Cases

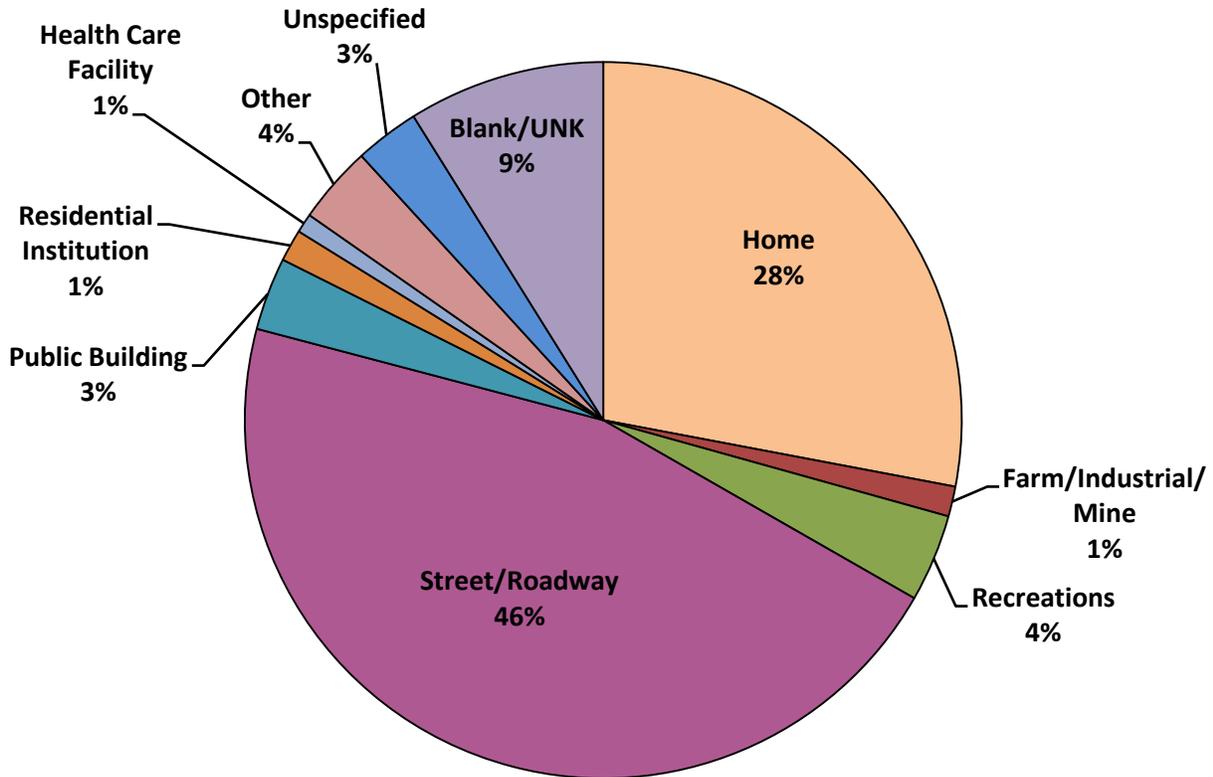
Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(n=4,504)



The greatest portion, 65 percent (n=2,910), were discharged home. From the data it cannot be determined how many of these were referred to outpatient rehab facilities.

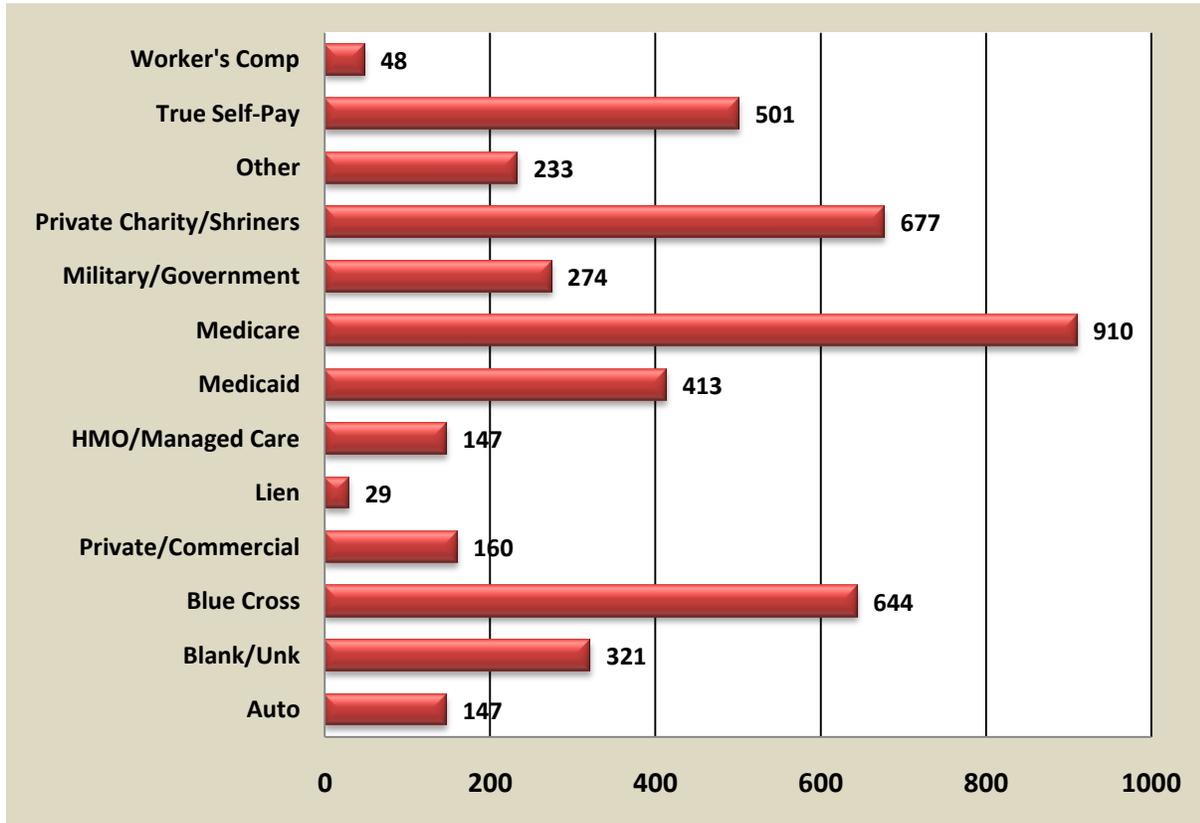
*LAMA=left against medical advice
NH=nursing home
ICF=immediate care facility
HH=home health

Figure 7
Site of Injury Occurrence in TBI Cases
 Alabama Head and Spinal Cord Injury Registry (AHSCIR)
 January 1, 2013 – December 31, 2013
 (n=4,504)



Most traumatic brain injuries, 46 percent (n=2,064), reported to the AHSCIR occurred on roads, streets and highways, 28 percent (n=1,260) occurred in the home. Three percent (n=131) reported an unspecified site of injury occurrence, while in 9 percent of cases (n=400) of data was unreported or unknown for TBI.

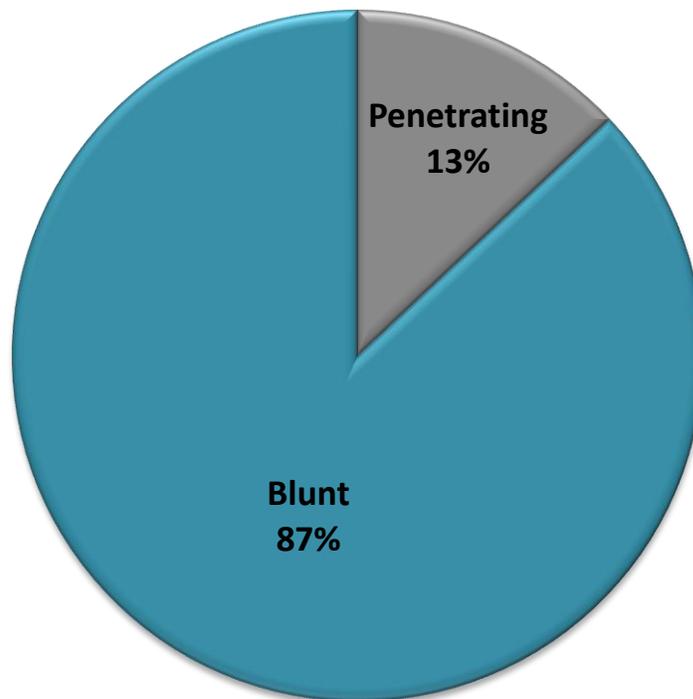
Figure 8
Payer Source for TBI Cases
 Alabama Head and Spinal Cord Injury Registry (AHSCIR)
 January 1, 2013 – December 31, 2013
 (n=4,504)



Individuals paid for their own care in 11 percent (n=501) of cases according to information sent to the AHSCIR. Fourteen percent (n=644) were paid for by various Blue Cross/Blue Shield plans. Medicare and Medicaid paid 20 percent (n=910) and 9 percent (n=413), respectively. Various commercial insurance companies (n=160) and health maintenance organizations (HMOs)/managed care (n=147) were primary payers in a total of 7 percent of TBI cases reported to the registry. Military and other government insurance plans paid in 6 percent (n=274), workman's compensation was the primary payer in 1 percent (n=48), and hospital liens were held in 1 percent (n=29). Payment source was indicated as "Other" in 5 percent (n=233) of these cases. The source of payment data sent to the AHSCIR is subject to misclassification for various reasons, e.g. the Self Pay group might include Liens in some cases or the primary payment source may not be properly submitted when there are multiple sources of payment.

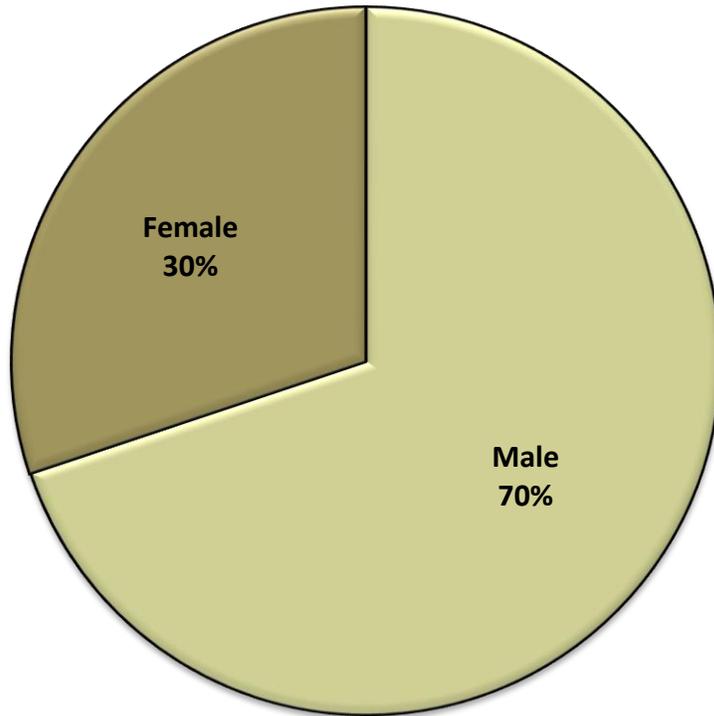
Spinal Cord Injury

Figure 9
Proportion of TBI Cases by Mechanism of Injury
Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(n=249)



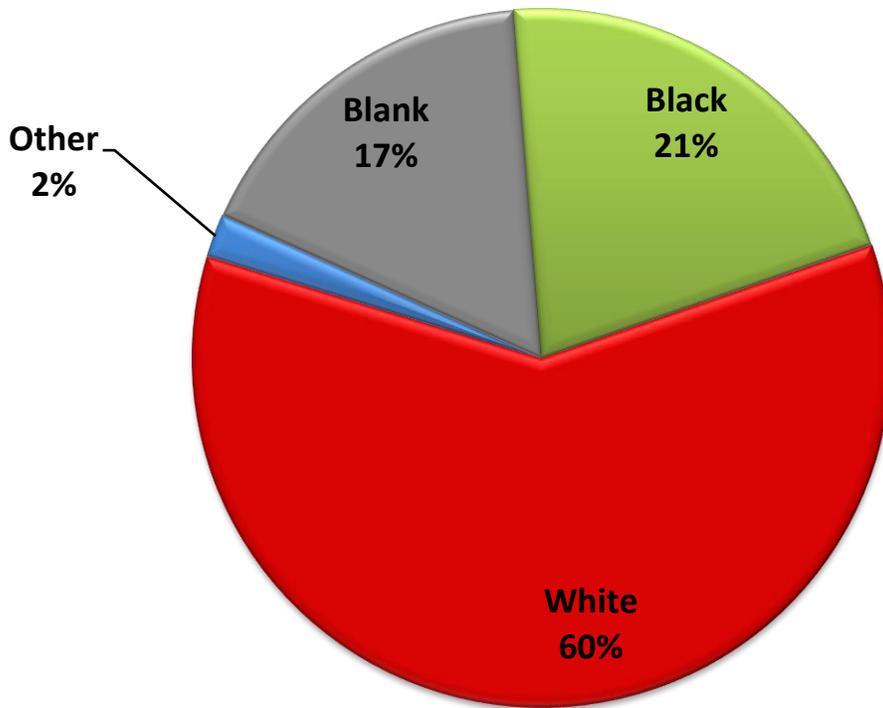
Eighty-seven percent (n=217) of the TBI cases were injuries due to blunt trauma. Penetrating injuries accounted for 13 percent (n=32) of the SCI cases for 2013.

Figure 10
Proportion of SCI Cases by Gender
Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(n=249)



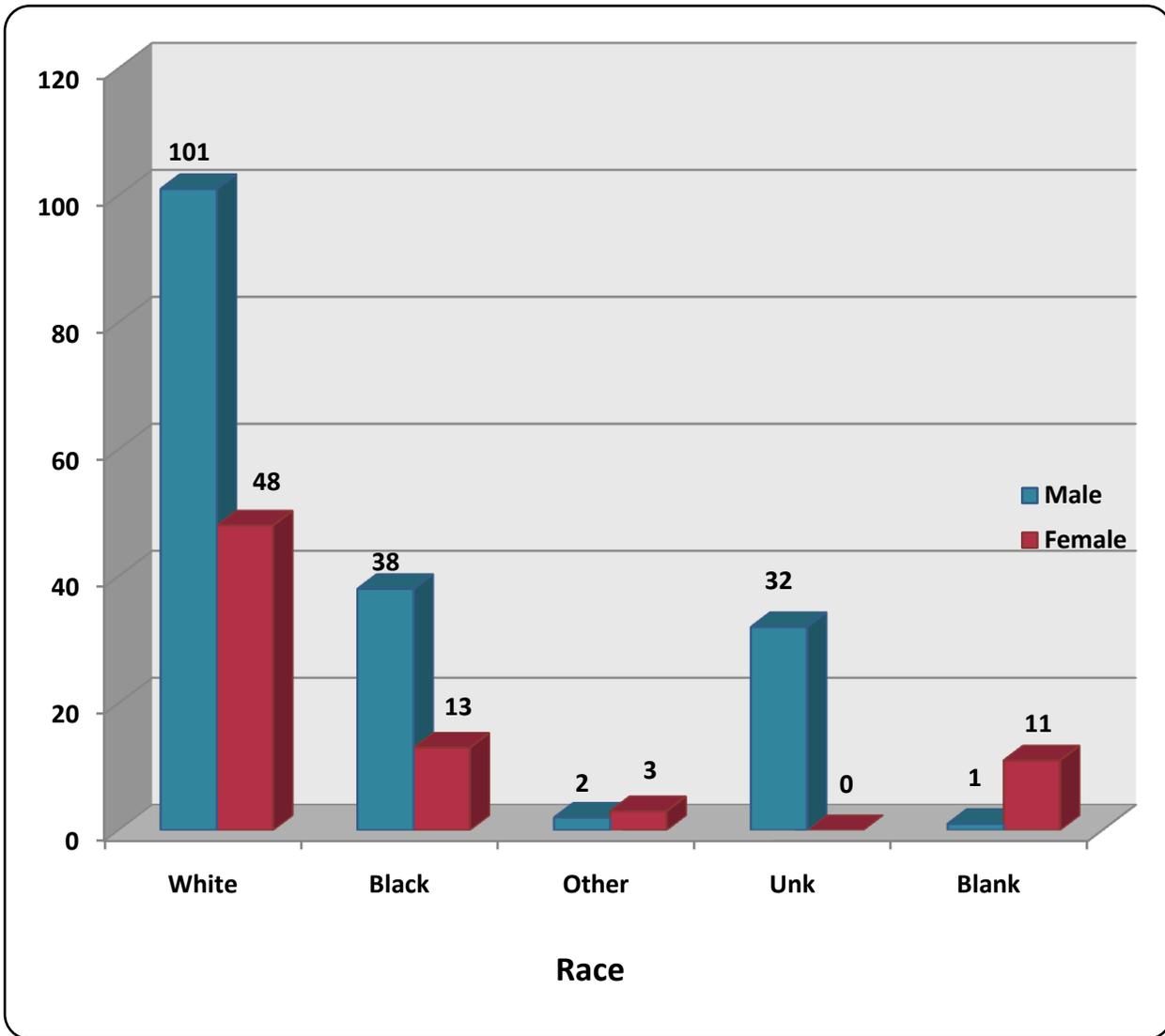
Males make up 70 percent (n=174) of the SCI cases reported in the year 2013, while females make up 30 percent (n=75) of the cases reported to the Alabama Head and Spinal Cord Injury Registry.

Figure 11
Proportion of SCI Cases by Race
Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(n=249)



Whites constituted 60 percent (n=149) of the SCI cases, Blacks/African-Americans 21 percent (n=51), and other represented 2 percent (n=6) in calendar year 2013. In 17 percent (n=43) of the 2013 cases, race was unknown or unavailable.

Figure 12
Number of SCI Cases by Race and Gender
 Alabama Head and Spinal Cord Injury Registry (AHSCIR)
 January 1, 2013 – December 31, 2013
 (n=249)



Forty-one percent (n=101) of SCI cases in Whites were male and 15 percent (n=38) in Blacks/African-Americans were male. The race was unknown in 32 percent of the male SCI. The overall percentages in this injury type were 70 percent male and 30 percent female (see Figure 10).

Table 3
2013 SCI Cases by Age, Gender and Race

Alabama Head and Spinal Cord Injury Registry (AHSCIR)
 January 1, 2013 – December 31, 2013
 (n=249)

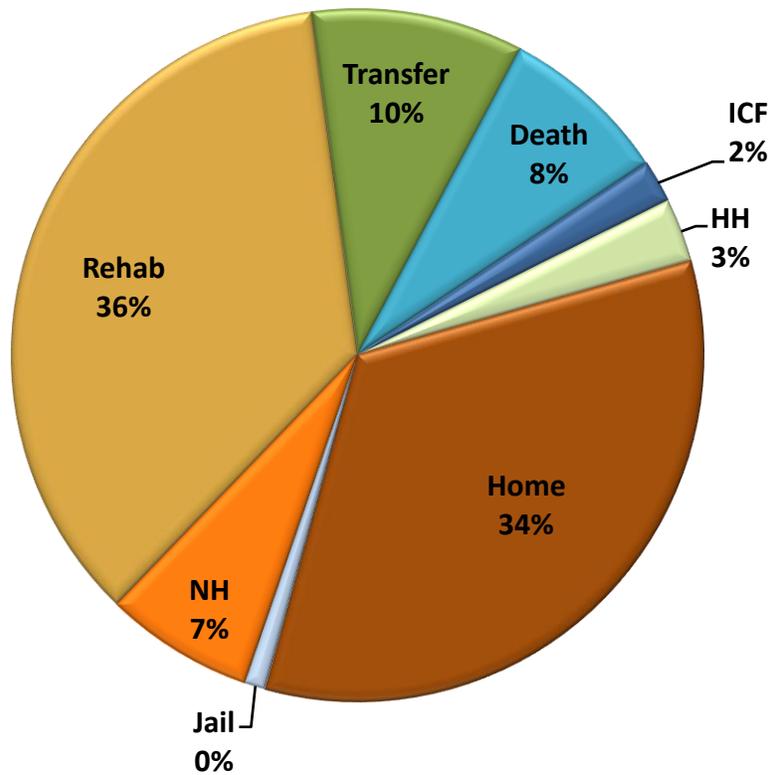
Age	White Male	White Female	Black Male	Black Female	Other Male	Other Female	No Data	Total	% Total
<5	1	0	0	1	0	0	0	2	0.8%
5 - 14	1	3	1	0	0	0	0	5	2.0%
15-24	17	5	9	4	0	1	6	42	16.9%
25-34	11	6	11	2	1	1	3	35	14.1%
35-44	22	7	5	0	0	0	11	45	18.1%
45-54	19	5	2	0	1	1	8	36	14.5%
55-64	14	9	9	4	0	0	10	46	18.5%
65-74	10	4	0	1	0	0	4	19	7.6%
75-84	4	8	1	1	0	0	1	15	6.0%
>84	2	1	0	0	0	0	0	3	1.2%
No Data	0	0	0	0	1	0	0	1	0.4%
Total	101	48	38	13	3	3	43	249	100.0%
% Total	40.6%	19.3%	15.3%	5.2%	1.2%	1.2%	17.3%	100.0%	

Table 4
2012 SCI Cases by Age, Gender and Race

Alabama Head and Spinal Cord Injury Registry (AHSCIR)
 January 1, 2012 – December 31, 2012
 (n=154)

Age	White Male	White Female	Black Male	Black Female	Other Male	Other Female	No Data	Total	% Total
<5	0	0	0	0	0	0	0	0	0.0%
5 - 14	1	2	1	0	0	0	0	4	2.6%
15-24	6	11	1	1	9	1	0	29	18.8%
25-34	9	1	2	0	6	2	0	20	13.0%
35-44	11	2	1	1	4	0	0	19	12.3%
45-54	13	1	3	0	11	0	0	28	18.2%
55-64	10	1	5	3	1	1	0	21	13.6%
65-74	4	6	2	0	0	0	0	12	7.8%
75-84	3	10	1	0	0	0	0	14	9.1%
>84	3	0	0	0	1	0	0	4	2.6%
No Data	0	0	0	0	0	0	3	3	1.9%
Total	60	34	16	5	32	4	3	154	100.0%
% Total	39%	22%	10%	3%	21%	3%	2%	100.0%	

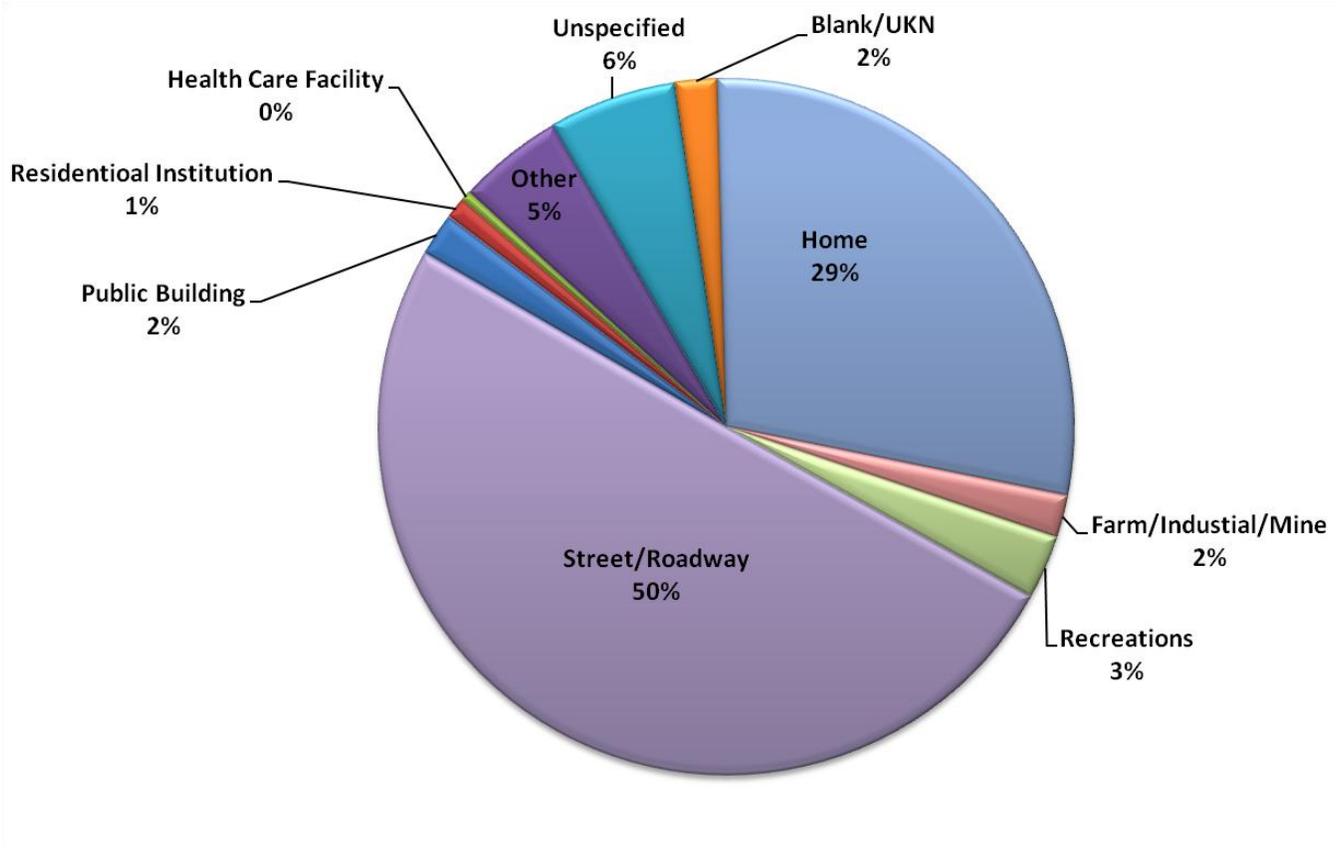
Figure 13
Discharge Disposition Following SCI Cases
 Alabama Head and Spinal Cord Injury Registry (AHSCIR)
 January 1, 2013 – December 31, 2013
 (n=249)



Thirty-four percent (n=85) of SCI cases were sent home without any home services, 36 percent (n=89) were discharged to residential rehabilitation, 10 percent (n=26) were transferred to another facility, 7 percent (n=17) were discharged to nursing homes, and in 8 percent of the cases of SCI (n=20) the patient expired.

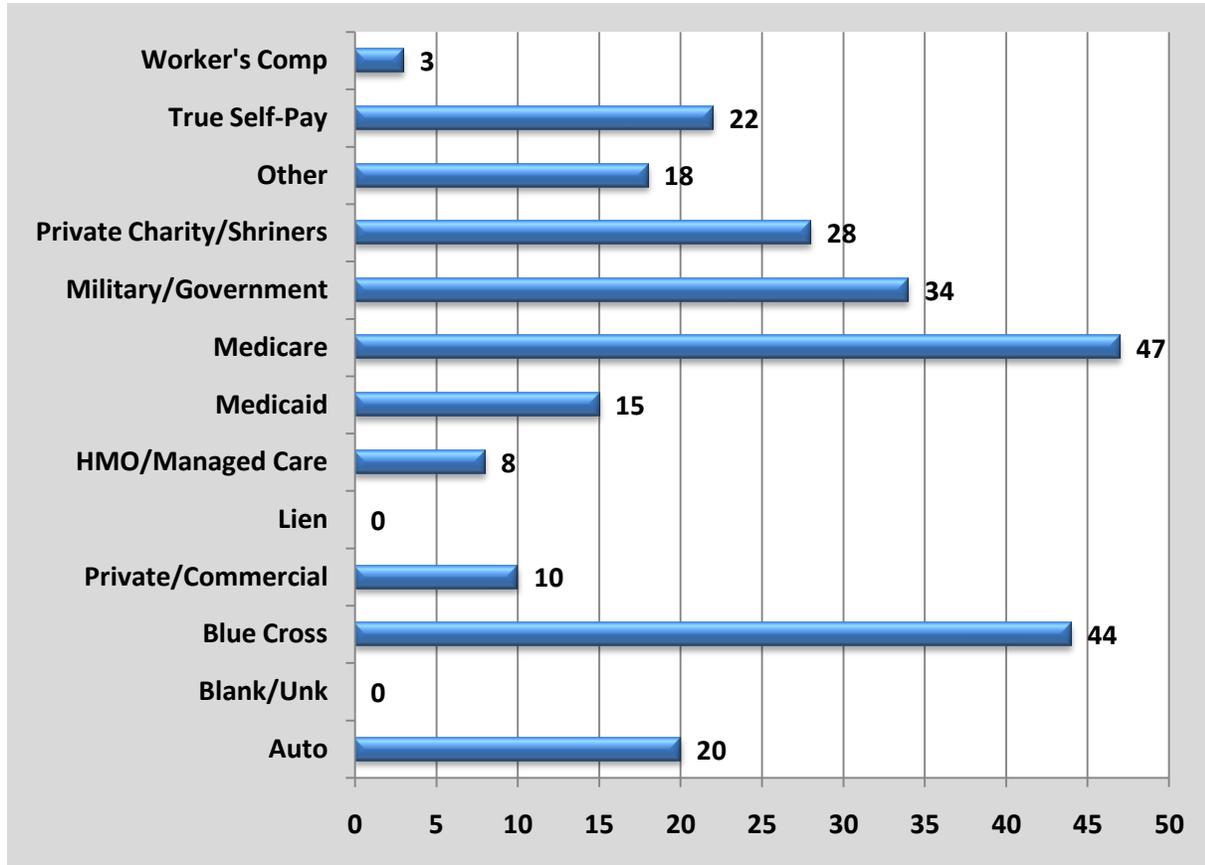
*NH=nursing home
 ICF=immediate care facility
 HH=home health

Figure 14
Site of Injury Occurrence in SCI Cases
Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(n=249)



Most spinal cord injuries reported occurred on roadways, 50 percent (n=127) or in private residences, 29 percent (n=71). In 6 percent of the cases, (n=14) data on site of injury occurrence was unspecified.

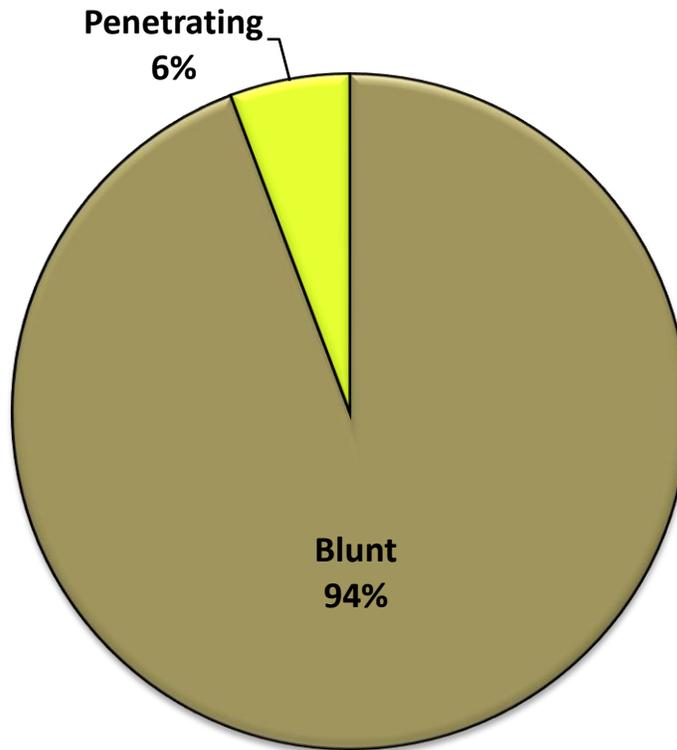
Figure 15
Payer Source for SCI Cases
 Alabama Head and Spinal Cord Injury Registry (AHSCIR)
 January 1, 2013 – December 31, 2013
 (n=249)



Individuals paid for their own care in 9 percent (n=22) of cases according to information sent to the AHSCIR. Eighteen percent (n=44) were paid for by various Blue Cross/Blue Shield plans. Medicare and Medicaid paid 19 percent (n=47) and 6 percent (n=15), respectively. Various commercial insurance companies (n=10) and health maintenance organizations (HMOs)/managed care (n=8) were primary payers in a total of 7 percent of SCI cases reported to the registry. Military and other government insurance plans paid in 14 percent (n=34), and workman’s compensation was the primary payer in 1 percent (n=3). Payment source was indicated as “Other” in 7 percent (n=18) of these cases. The source of payment data sent to the AHSCIR is subject to misclassification for various reasons, e.g. the Self Pay group might include Liens in some cases or the primary payment source may not be properly submitted when there are multiple sources of payment.

Cases with Both Head and Spinal Cord Injuries

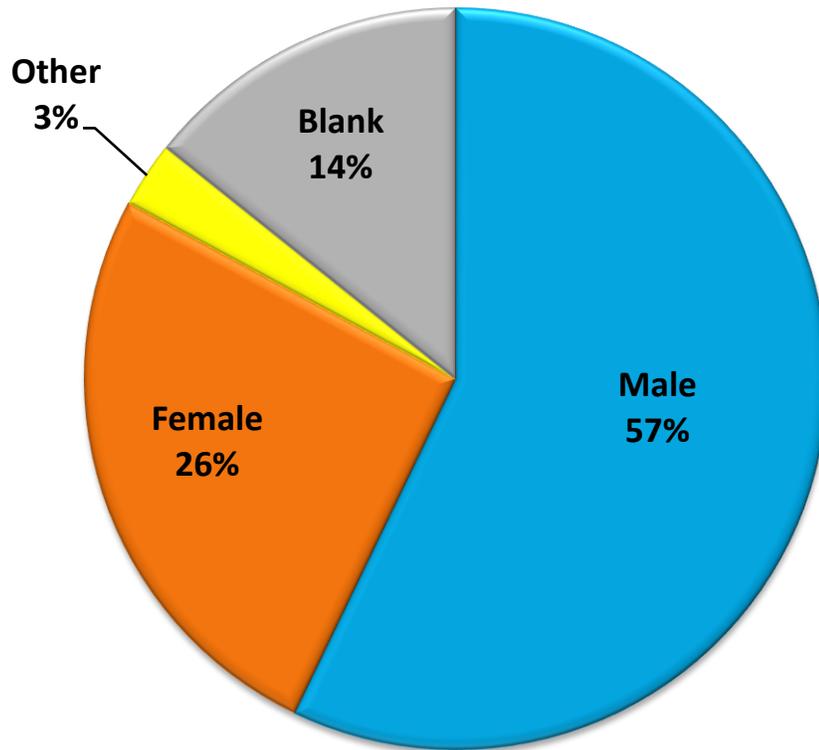
Figure 16
**Proportion of Cases with Both Traumatic Brain
and Spinal Cord Injuries by Mechanism of Injury**
Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(n=70)



Ninety-four percent (n=66) of the TBI and SCI cases were injuries due to blunt trauma. Penetrating injuries accounted for 6 percent (n=4) of the TBI and SCI cases for 2013.

Figure 17
**Proportion of Cases with Both Traumatic Brain
and Spinal Cord Injuries by Gender**

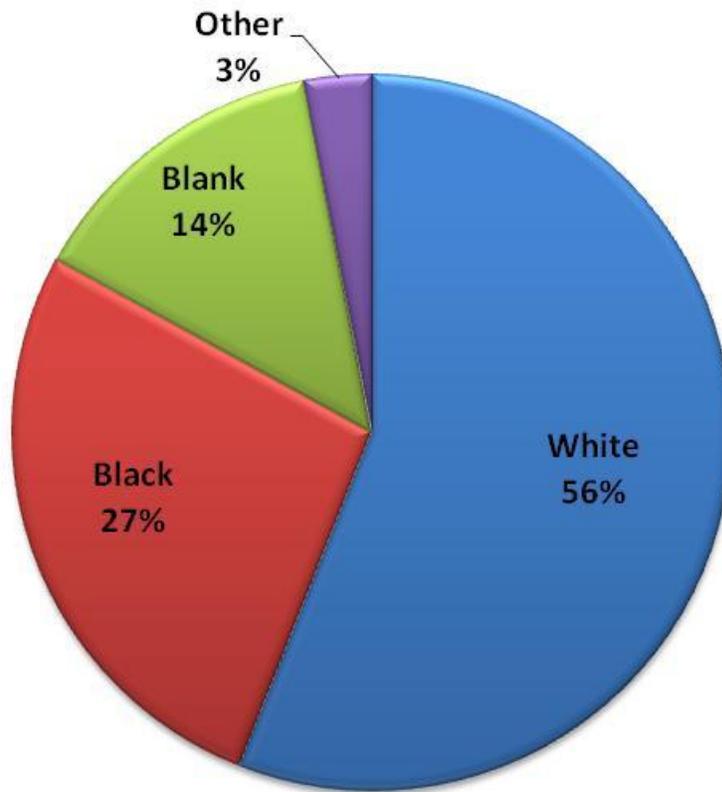
Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(n=70)



For the TBI and SCI cases reported to the AHSCIR, 57 percent (n=40) were males and 26 percent (n=18) were females. In 14 percent (n=10) gender unknown or left blank, while 3 percent (n=2) indicated the gender as “other” for the 2013 calendar year.

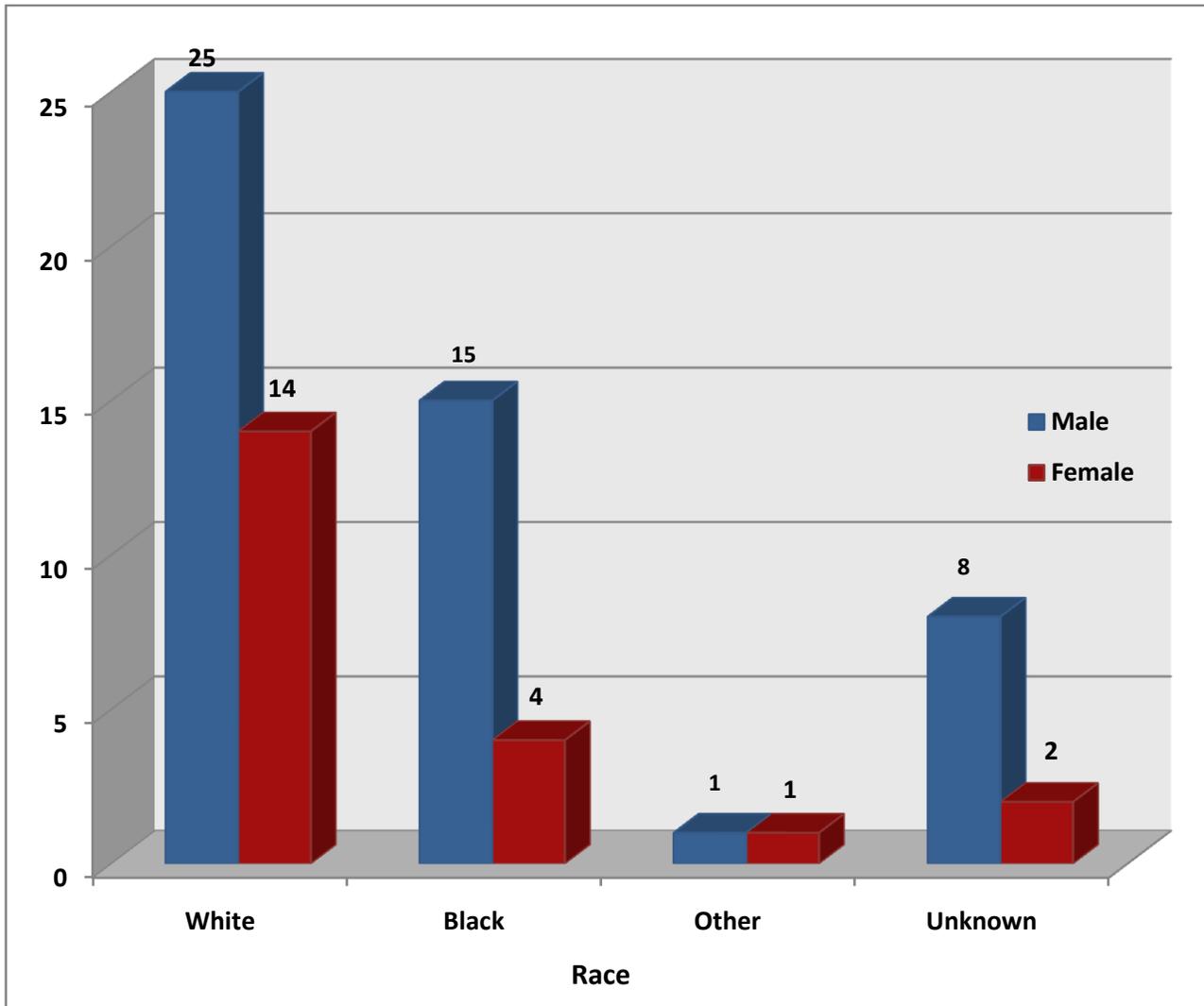
Figure 18
**Proportion of Cases with Both Traumatic Brain
and Spinal Cord Injuries by Race**

Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(n=70)



Whites constituted 56 percent (n=39) of the SCI cases, Blacks/African-Americans 27 percent (n=19), and in 14 percent (n=10) of the cases, the race of the patient was left blank in calendar year 2013.

Figure 19
Number of Cases with Both TBI
and SCI by Gender and Race
 Alabama Head and Spinal Cord Injury Registry (AHSCIR)
 January 1, 2013 – December 31, 2013
 (n=70)



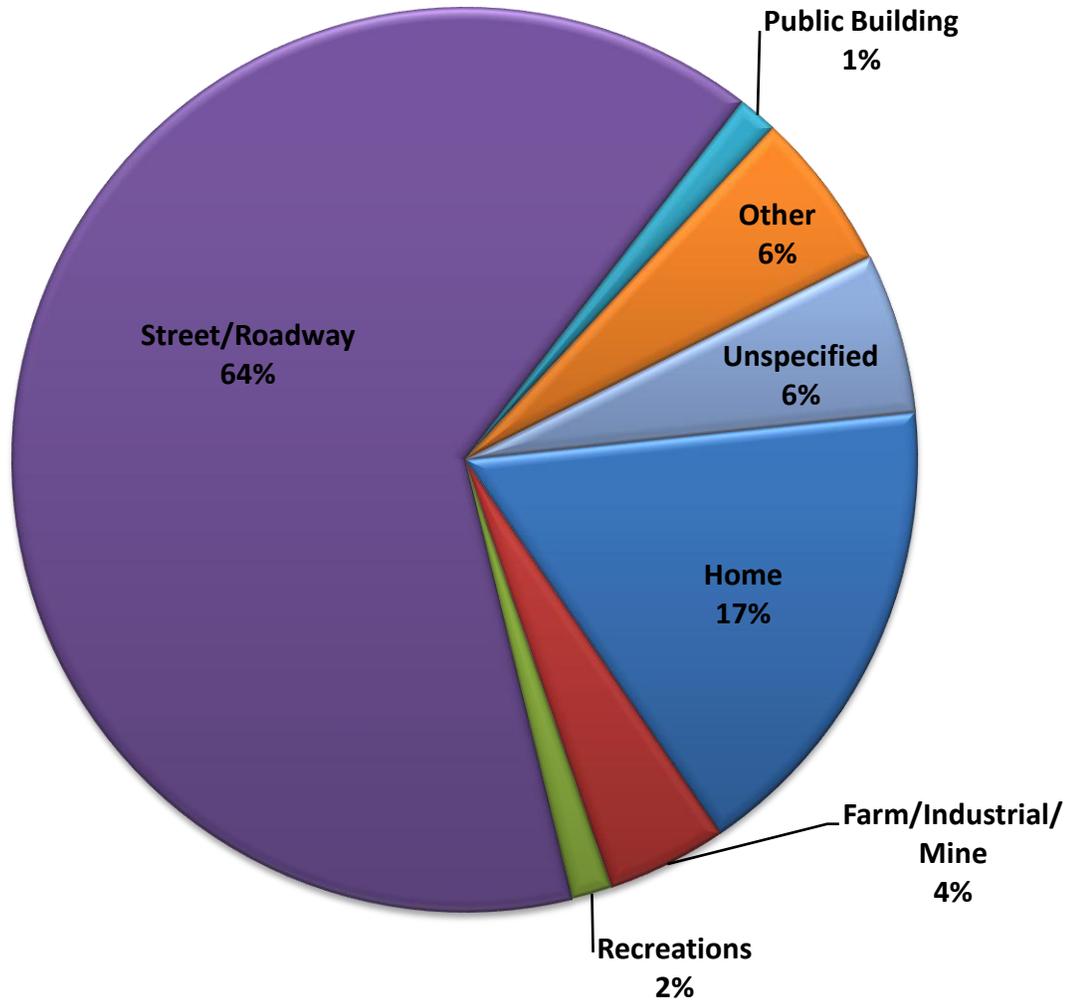
Thirty-six percent (n=25) of SCI cases in Whites were male and 20 percent (n=15) in Blacks/African-Americans were male. The overall percentages in this injury type were 57 percent male and 26 percent female (see Figure 17).

Table 5
2013 Both TBI and SCI Cases by Age, Gender and Race
 Alabama Head and Spinal Cord Injury Registry (AHSCIR)
 January 1, 2013 – December 31, 2013
 (n=70)

Age	White Male	White Female	Black Male	Black Female	Other Male	Other Female	No Data	Total	% Total
<5	0	1	0	1	0	0	0	2	2.9%
5 - 14	0	2	1	0	0	0	0	3	4.3%
15-24	4	1	2	2	0	1	1	11	15.7%
25-34	2	1	1	0	1	0	1	6	8.6%
35-44	6	2	3	0	0	0	2	13	18.6%
45-54	6	1	2	1	0	0	1	11	15.7%
55-64	2	3	6	0	0	0	3	14	20.0%
65-74	1	1	0	0	0	0	2	4	5.7%
75-84	2	2	0	0	0	0	0	4	5.7%
>84	2	0	0	0	0	0	0	2	2.9%
No Data	0	0	0	0	0	0	0	0	0.0%
Total	25	14	15	4	1	1	10	70	100.0%
% Total	35.7%	20.0%	21.4%	5.7%	1.4%	1.4%	14.3%	100.0%	

Figure 20
**Site of Injury Occurrence in Cases
with Both TBI and SCI**

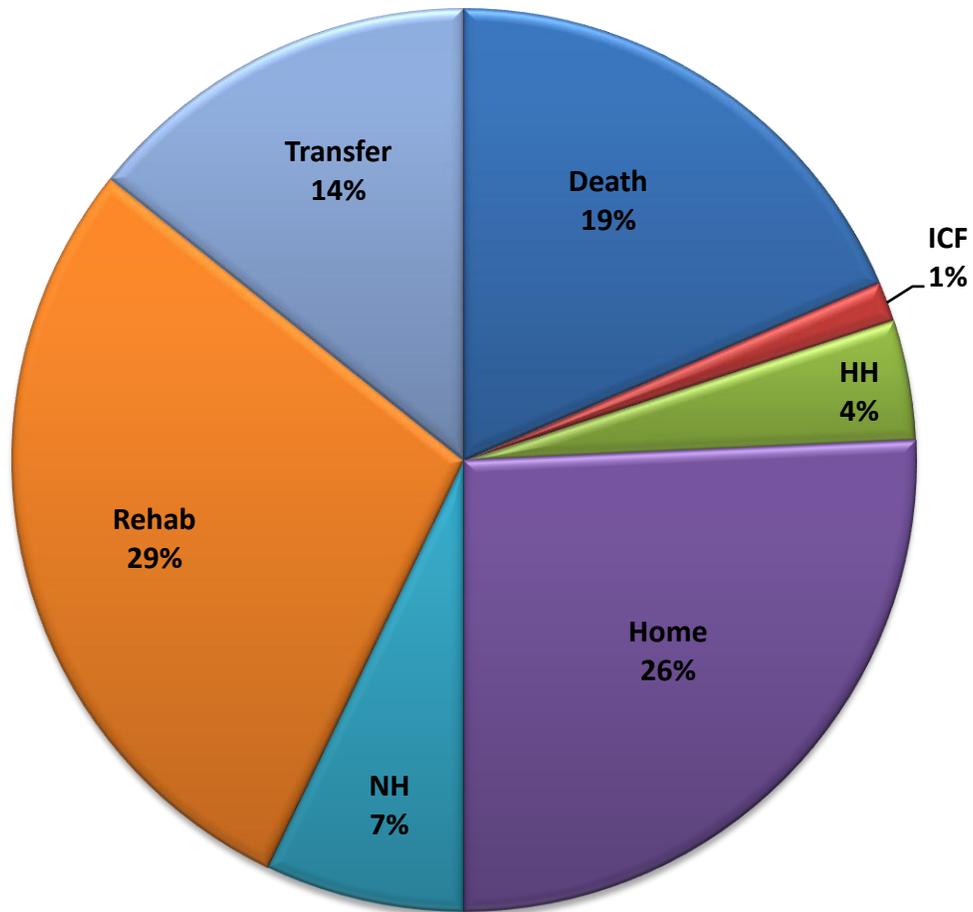
Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(n=70)



Sixty-four percent (n=45) of AHSCIR cases that had both TBI and SCI occurred on roadways. Seventeen percent (n=12) occurred in the home.

Figure 21
**Discharge Disposition Following Cases
with Both TBI and SCI**

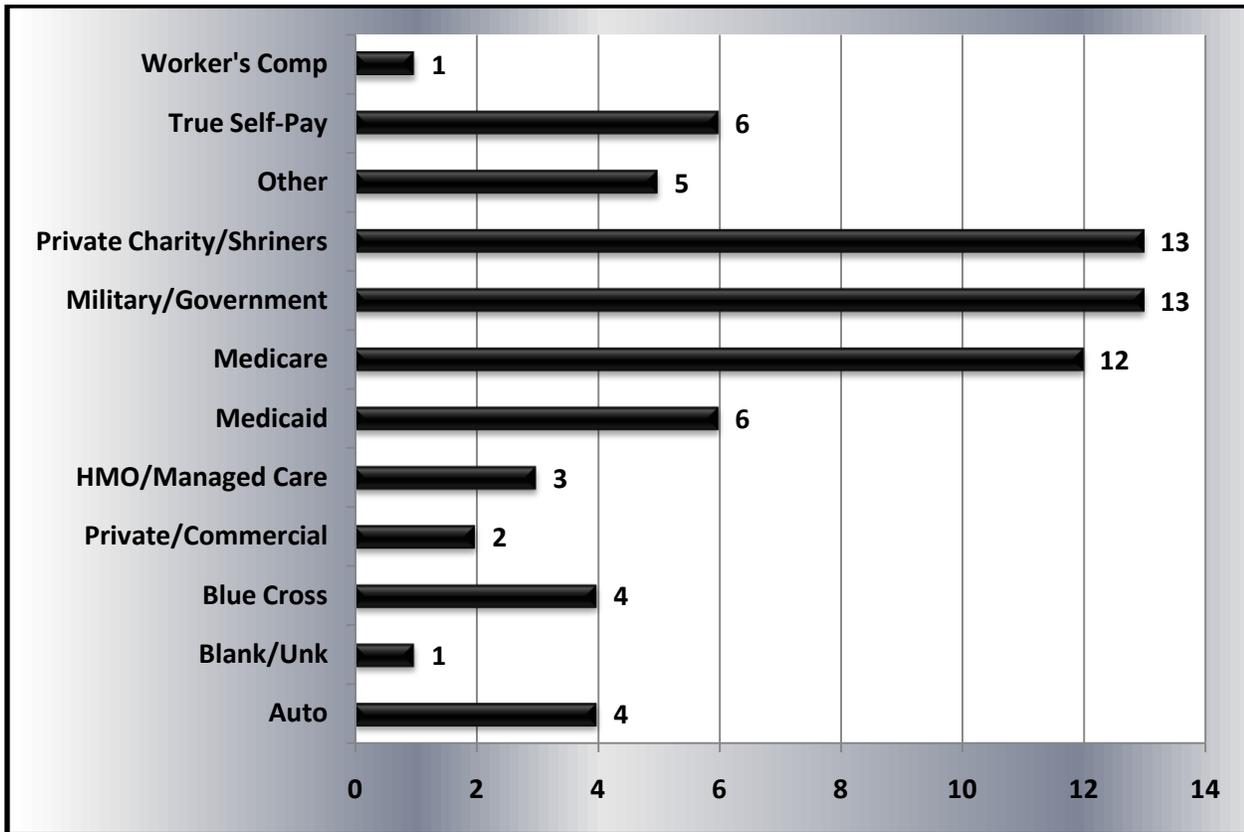
Alabama Head and Spinal Cord Injury Registry (AHSCIR)
January 1, 2013 – December 31, 2013
(n=70)



Twenty-six percent (n=18) were discharged to either home with no home services or home with home services. Twenty-nine percent (n=20) of cases of both TBI and SCI were discharged to rehabilitation services. Nineteen percent of the patients (n=13) expired.

Figure 22
Payer Sources for Cases
with Both TBI and SCI

Alabama Head and Spinal Cord Injury Registry (AHSCIR)
 January 1, 2013 – December 31, 2013
 (n=70)



Both military/government and private charity/Shriners each paid 19 percent (n=13) of the cases that had both head and spinal cord injuries. “Other” was the method of payment for 7 percent (n=5) of the cases. Individuals or their families paid for their own medical care in 9 percent (n=6). The source of payment under Medicare and Medicaid was 17 percent (n=12) and 9 percent (n=6), respectively. Automobile insurance was the primary payer in 6 percent (n=4) of cases. Commercial insurance paid 3 percent (n=2) and managed care companies paid in 4 percent (n=3) of the TBI/SCI cases for calendar year 2013.