

CENTRAL NERVOUS SYSTEM INJURY IN KENTUCKY

Emergency Department Visits and Hospitalizations 2011

Prepared by: the Kentucky Injury Prevention and Research Center, University of Kentucky
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FOR MORE INFORMATION

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This report presents basic data about emergency department (ED) visits, hospitalizations, and hospital deaths for the calendar year 2011 for central nervous system injuries (CNSI) that include traumatic brain injuries (TBI), acquired brain injuries (ABI) and spinal cord injuries (SCI). ED visits represent approximately 87% of all TBIs. This report will illustrate the leading causes of central nervous system injuries in Kentucky, what age groups are affected, and who pays for care received. The report is intended as a reference for policy makers, service providers, educators, researchers, advocates, and others interested in knowing more about the impact of central nervous system injuries with a focus on TBI.

Introduction

Awareness of traumatic brain injury (TBI) is fairly limited in the general public because the complications and issues related to TBI are often not visible to others. Symptoms of brain injury cover a wide range of issues and can include:

Mild TBI

- Fatigue
- Headaches
- Seizures
- Emotional disturbances
- Balance issues
- Memory loss
- Impulsive Behavior

Severe TBI

- Amnesia
- Paralysis
- Loss of limb, bladder and/or bowel control
- Aggressiveness
- Speech, language and/or vision problems
- Respiratory issues
- Mood, personality, or behavioral changes

These issues very often are not physically visible yet can have a devastating impact on day to day life of the injured person as well as their family, friends and colleagues. Even minor TBI may have serious, long term consequences.

Understanding how and who brain and spinal cord injuries affect is crucial to understanding the resources need to educate, prevent, and respond as a society to those with brain and spinal cord injuries.

Major sections of this report include:

- Non-Fatal TBI, ABI and SCI demographics, causes and outcomes
- TBI and ABI frequencies and rates at the county level
- SCI demographics, causes and outcomes

Later reports will include trends.

Also, this report does not include TBIs from federal, military, or Veterans' Administration hospitals. Data regarding deaths due to TBI, ABI, and SCI only include deaths treated or seen in an ED or admitted as an inpatient to an acute care hospital. Deaths that occur due to BI or SCI outside of the hospital environment are not included in this analysis due to unavailable data. Deaths that occur in the hospital setting will be noted when included in analysis in this report.

Purpose of the Report

This report answers a wide range of important questions about how many CNSIs occur each year in the Commonwealth, who is affected, and how these CNSIs occur. This report is intended as a reference for policy makers, service providers, educators, researchers, advocates, and others interested in knowing more about the impact of CNSI in Kentucky. This information can be used to document the need for prevention, to identify priorities for research, and to support the need for services among those living with CNSI-related impairment and disability.

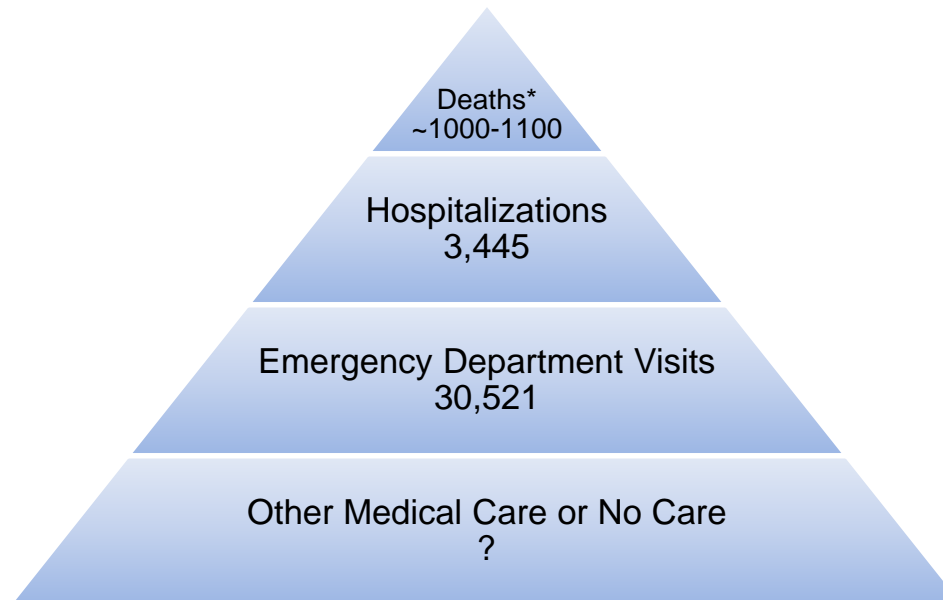
Contents and Organization

This report describes CNSI-related ED visits and hospitalizations in Kentucky for the calendar year 2011. The numbers show the magnitude of the problem, but the rates are also important. Rates show how a certain group is affected by CNSI by relating the number of CNSIs to the size of the population. For example, a relatively small number of TBIs occurring in a small population (e.g., persons ages 65 years or older) would result in a higher TBI rate than if the same number of TBIs occurred in a larger population (e.g., persons ages 25 to 44 years). The report findings are organized into two main sections. The Overview summarizes and interprets some key findings. The Appendices present more detailed data tables, along with a description of the methods and limitations.

Overview of TBI in Kentucky

In Kentucky, it is estimated that over 30,000 traumatic brain injuries and deaths occur each year. In 2011, 30,521 (89.9%) ED discharges (non-fatal) and 3,445 (10.1%) hospitalization discharges were recorded in Kentucky hospitals. Due to mortality data being several years behind available hospital discharge data, the number of deaths is only an estimate at this time and expected to be in the 1,100 range. The following figure is a pyramid depicting the estimated average annual number of TBI-related ED visits, hospitalizations, and estimated deaths in Kentucky for 2011. The number of individuals with a TBI that treat themselves at home (estimated to be close to 25% of all mild to moderate TBIs) or by seeking other means of medical care are unknown and will not be included in this report.

Figure 1: Number of Traumatic Brain Injury-Related Emergency Department Visits, Hospitalizations, and Estimated Deaths*, Kentucky, 2011



*Data not currently available, will update

TBI in Kentucky, 2011:

- Approximately 33,966 people sustained a TBI. Of those, 30,521 were treated and released from an ED, 3,445 were hospitalized, and an estimated 1,100 died.
- 8,933 TBIs occurred among children ages 0 to 14 years; ED visits accounted for more than 97% of the TBIs in this age group.
- Falls were the leading cause of TBI for both ED visits as well as hospitalizations. Rates were highest for children ages 0 to 4 years and for adults 65 years or older.
- Falls resulted in the greatest number of TBI-related hospitalizations with a rate almost three times motor vehicle traffic crashes.
- Adults ages 65 years or older had the highest rates of TBI-related hospitalization with a rate higher than all other ages combined.
- Falls accounted for over twice as many TBI injuries as motor vehicle traffic crashes (MVTC).
- Data indicates that TBIs led to over 93 state residents per day being treated in Kentucky hospitals (ED and hospitalization).

Our results indicate a need to focus prevention efforts on the following causes and target populations:

- Motor vehicle traffic crashes (TBI and SCI), especially among ages 15-24
- Falls (TBI and SCI), especially among ages 0-14 and 65 and older
- Anoxia (ABI), especially among ages 45 and older
- Exposure to toxic substances (ABI), especially among ages 0-4

The following table, **Table A**, depicts the estimated annual average number of ED visits, hospitalizations, and hospital deaths for injuries in Kentucky for 2011. Included in this table are TBI as a sub-set of all injuries. For 2011, TBI comprised 6.2% of all injuries seen in EDs and 13.9% of all injury hospitalizations. Of all injury-related deaths in Kentucky, TBI was a contributing factor in one out of five hospital injury deaths.

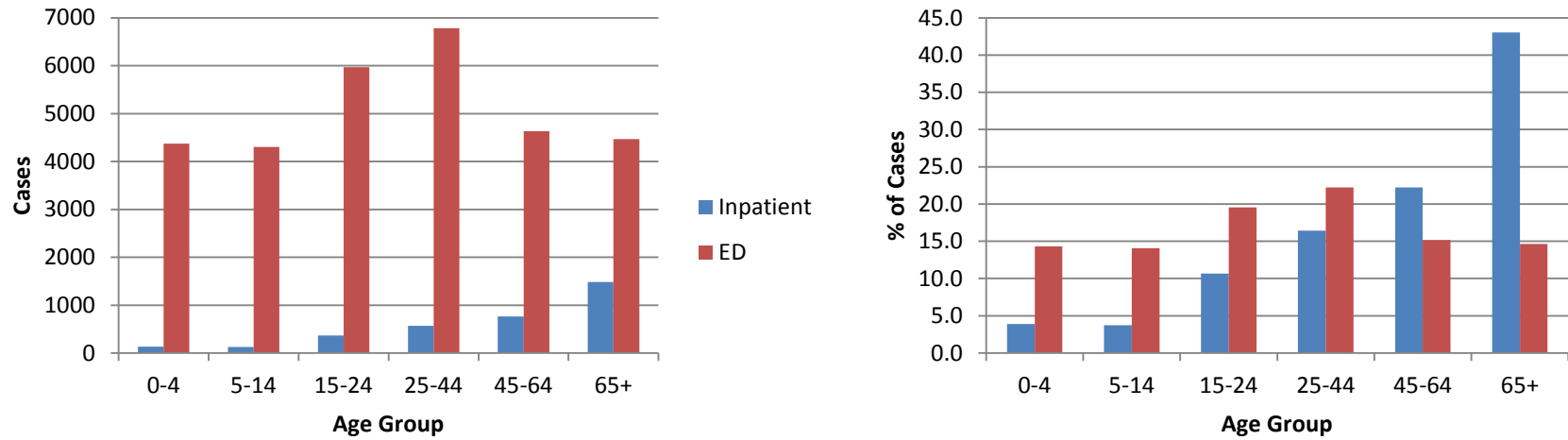
Table A: Percentage of All Injuries, and Traumatic Brain Injury-Related Emergency Department Visits, Hospitalizations, and Hospital Deaths, Kentucky, 2011

Category	All Discharge Records			Traumatic Brain Injuries		
	All Visits	Injuries	% of All Visits	Number	% of All Injuries	% of All Visits
ED Visits	1,871,941	491,760	26.3	30,522	6.2	1.6
Hospitalizations	575,802	24,797	4.3	3,445	13.9	0.6
Hospital Deaths	17,105	1,630	9.5	333	20.4	2.0
Total	2,464,848	518,187	21.0	34,300	6.6	1.4

Notes regarding the data in **Table A**: For the category ED Visits, persons who died in the ED or were admitted to the hospital from the ED were excluded. For the category Hospitalizations, in-hospital deaths were excluded. The category of Deaths only includes those who died in the ED or were admitted as inpatients and then died.

TBI by Age: Comparing the Numbers

Figure 2: Numbers of Non-Fatal Traumatic Brain Injury-Related Emergency Department Visits, and Hospitalizations, by Age Group, Kentucky, 2011

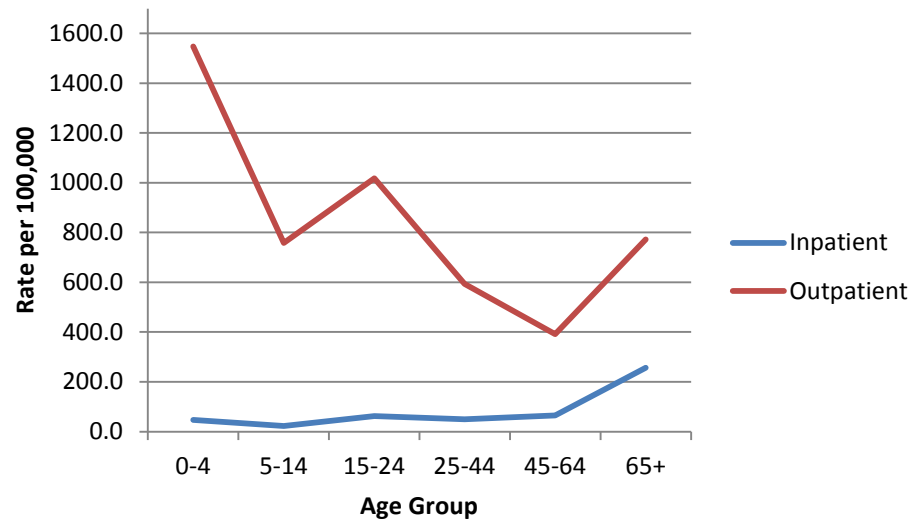


A non-fatal TBI related injury treated at a Kentucky hospital results in an *inpatient* admission for nearly a quarter (24.9%) of older adults (65 and older) while 97.1% of TBI related injuries in children (under the age of 15) are treated and released in the ED.

TBI by Age: Comparing the Rates

The following figure, **Figure 3**, is a graph depicting the annual rate of TBI-related ED visits and hospitalizations by age groups in Kentucky for 2011. The y axis represents the rate per 100,000 population. During 2011, very young children ages 0 to 4 years had the highest rate of non-fatal TBI-related ED visits, 1,547 per 100,000 population, followed by older adolescents ages 15 to 24 years, 1,017 per 100,000. From age 25 to age 64 the rates for ED visits steadily decline, then begin to rise again for those ages 65 and over. The highest rates of non-fatal TBI-related hospitalization occurred among adults age 65 years or older (256 per 100,000).

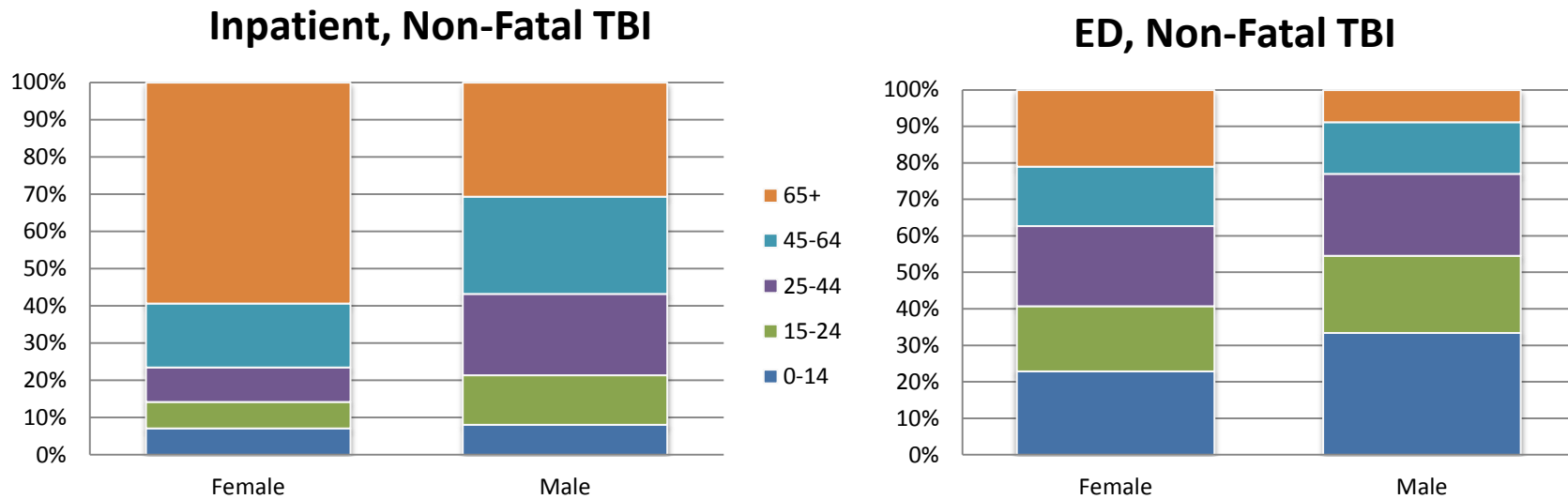
Figure 3: Rates of Traumatic Brain Injury-Related Emergency Department Visits and Hospitalizations, by Age Group, Kentucky, 2011



TBI by Gender: Comparing the Numbers

The following figure represents the estimated average annual numbers of TBI-related ED visits and hospitalizations, by gender and age, in the Commonwealth for 2011. Overall 17,912 non-fatal TBIs occurred among males compared with 16,054 among females.

Figure 4: Traumatic Brain Injury-Related Emergency Department Visits and Hospitalizations, by Age Group and Gender, Kentucky, 2011



Over half of female, non-fatal TBI related inpatient admissions were over the age of 64 while men over 64 made up less than one third of non-fatal inpatient admissions for males.

TBI by Sex: Comparing the Rates

The following figure, **Figure 5**, is a graph depicting the rates of TBI-related ED visits and hospitalizations by sex. The y axis represents the rate per 100,000 population. Males from 0 to 4 years of age had the highest rates for TBI-related ED visits, 1,390 per 100,000. Rates were also high for females from 0 to 4 years of age, 1,749 per 100,000. Both males and females had high rates for ages 65 and older inpatient visits, 242 per 100,000 for males and 266 per 100,000 for females.

Figure 5: Rates of Non-Fatal Traumatic Brain Injury-Related Emergency Department Visits and Hospitalizations, by Sex, Kentucky, 2011

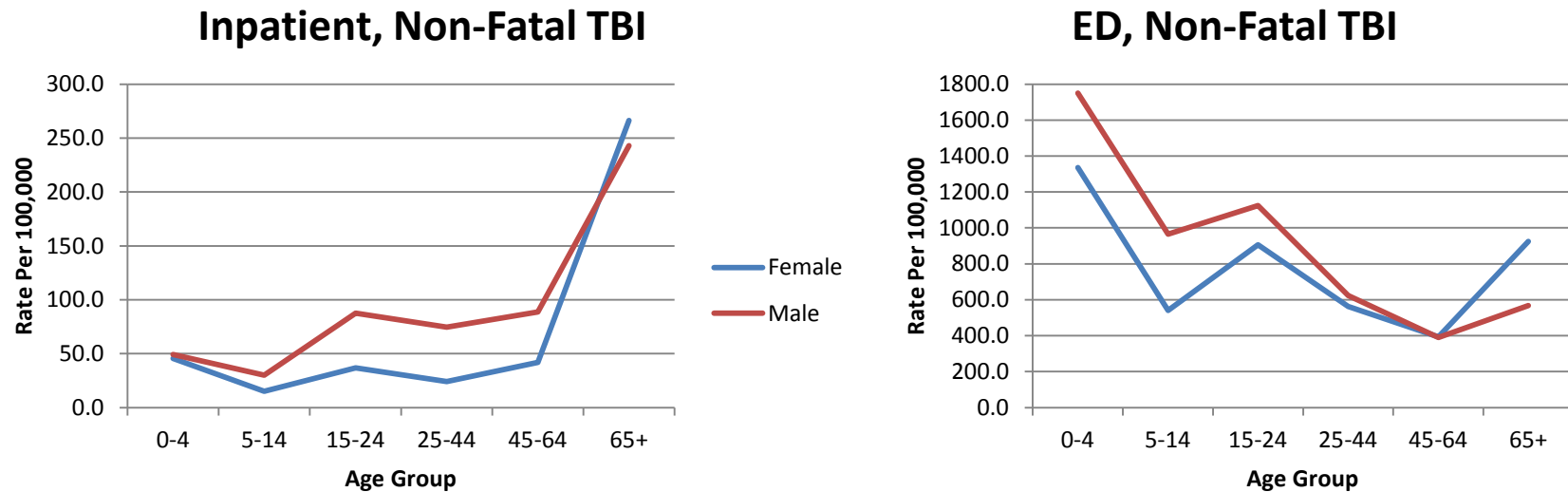
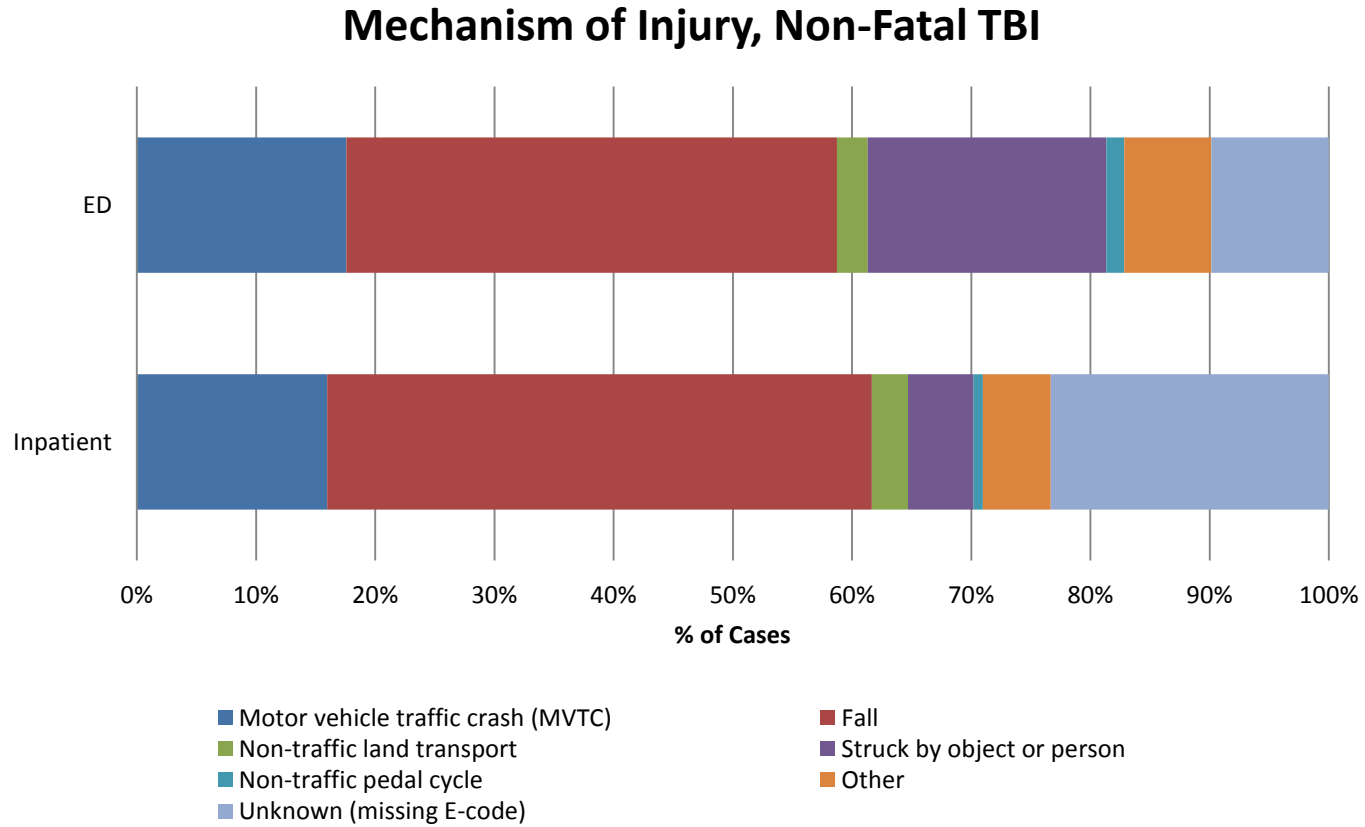


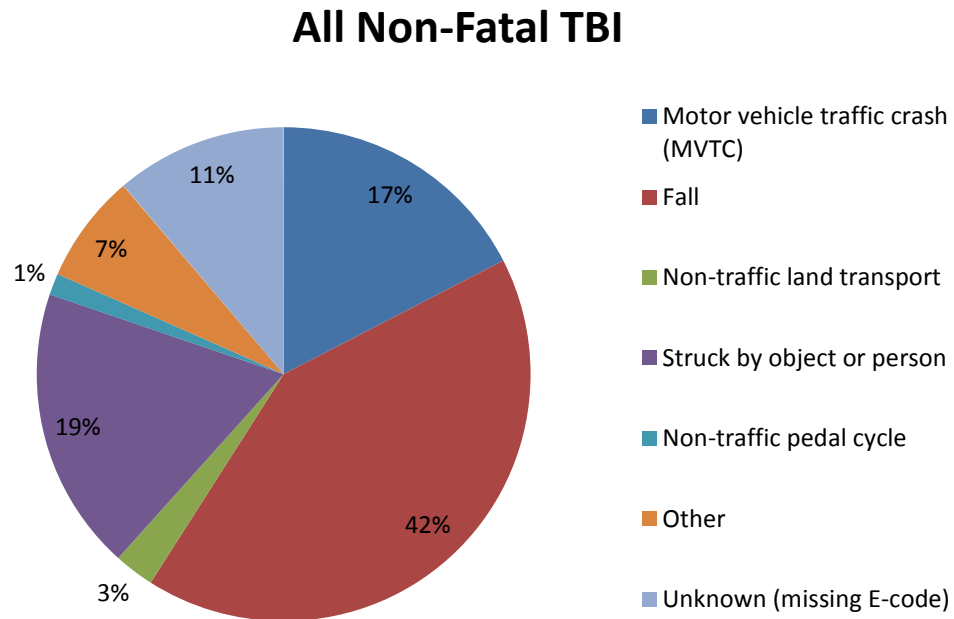
Figure 6: Non-Fatal Traumatic Brain Injury-Related Emergency Department Visits and Hospitalizations, Kentucky, 2011



TBI by External Cause: Comparing the Percentages

Following is a pie chart depicting the percentage of TBI-related ED visits and hospitalizations, combined, by external cause of injury. Falls were the leading known cause of TBI covering over 40% of all non-fatal TBI in Kentucky in 2011. The second leading known cause was Struck by/Against contributing 19% of all non-fatal TBI. The third leading known cause was Motor Vehicle Traffic Crash (MVTC), and this slice is 17%. In past years, and while looking only at inpatient data, MVTC were the leading cause of TBI with Falls being a close second. In 2007, MVTC numbers were first noticed to drop below Falls as leading cause of TBI. This drop and continued lower rates are thought to be a direct result of the primary seat belt law enacted towards the end of 2006.

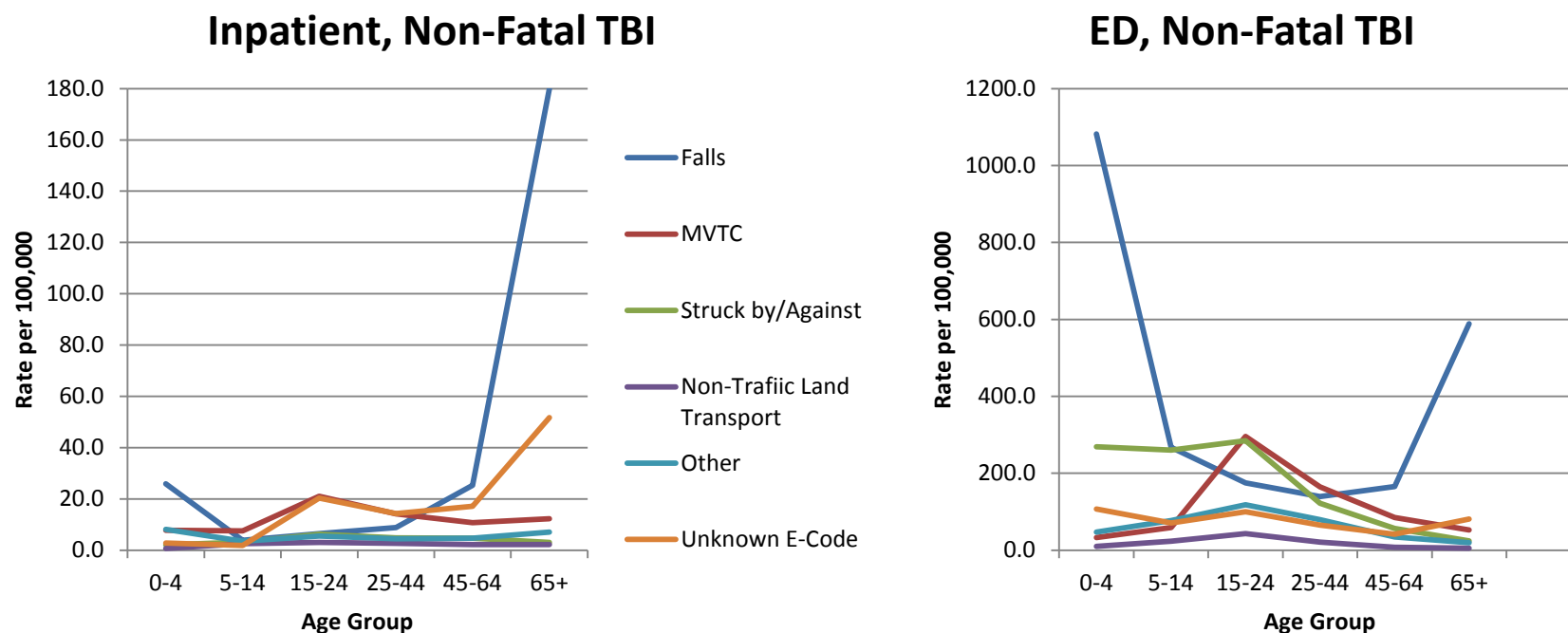
Figure 7: Percentage of Traumatic Brain Injury-Combined Emergency Department Visits and Hospitalizations, by External Cause, Kentucky, 2011



The following figure, **Figure 8**, is a graph depicting the rates of TBI-related ED visits and hospitalizations by external cause. The y axis represents the rate per 100,000 population.

The data indicate that Falls were the leading cause of TBI in Kentucky. Rates were highest among ages 0-4 years and 65 years and older. The rate of fall-related TBI was highest among children 0 to 4 years and adults ages 65 years or older in both ED visits as well as inpatient admissions. The rates for motor vehicle crash related TBI were highest among young adults ages 15 to 24 years with MVTC causing the largest proportion of TBI in this age group.

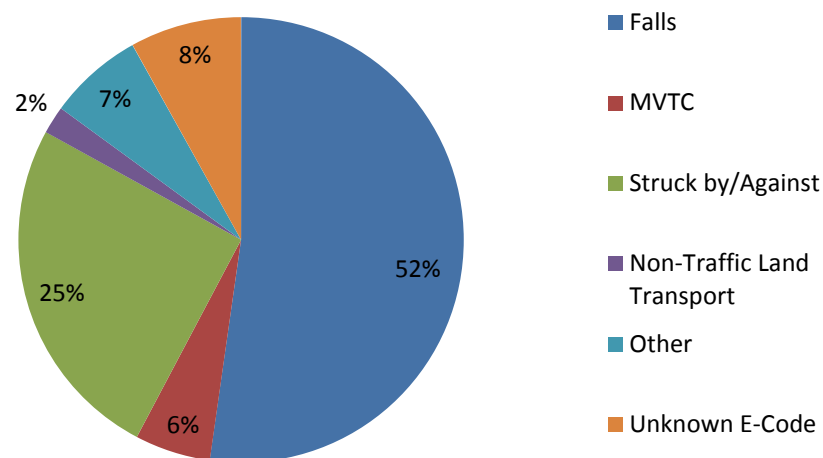
Figure 8: Rates of Non-Fatal Traumatic Brain Injury-Related Emergency Department Visits and Hospitalizations, by External Cause, Kentucky, 2011



TBI by External Cause: Comparing the Percentages by Age Groups

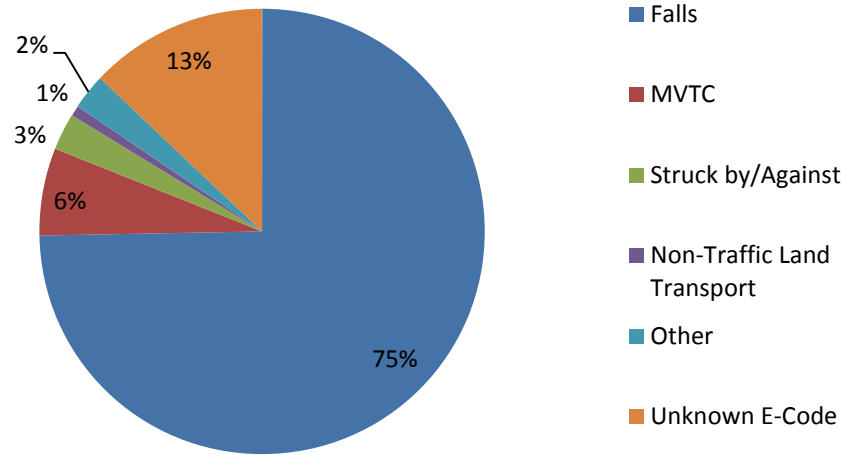
The following two figures depict the percentage of non-fatal TBI-related ED visits and hospitalizations by external cause for specific age groups. Figure 9 presents data for children ages 0 to 14 years. Figure 10 presents data for adults age 65 or older.

Figure 9: Percentage of Traumatic Brain Injury-Combined Emergency Department Visits and Hospitalizations Among Children 0 to 14 Years, by External Cause, Kentucky, 2011



For children ages 0 to 14 years, falls were the leading known external cause of non-fatal TBI, contributing to over half of all TBIs in this age group. The second leading known external cause was struck by or against events which accounted for a quarter of injuries.

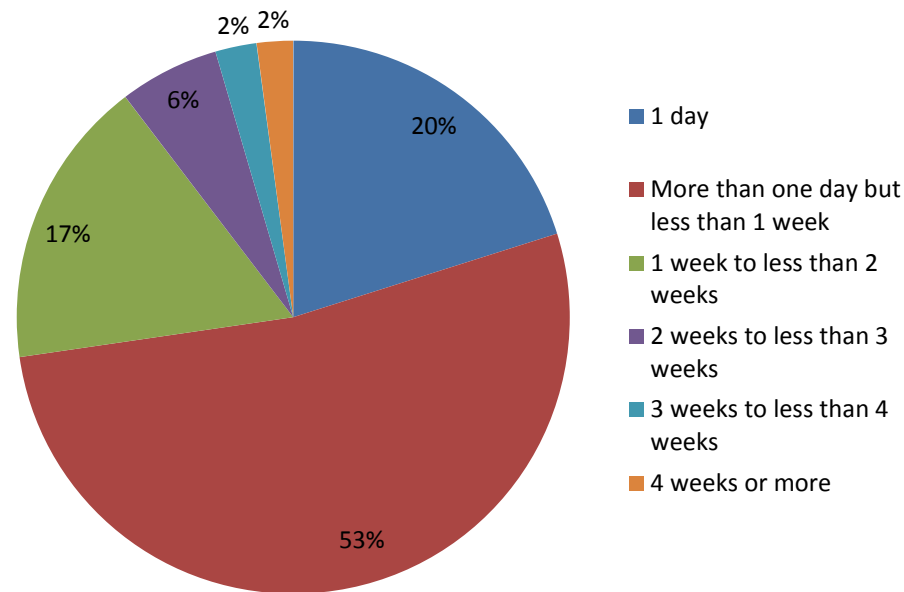
Figure 10: Percentage of Non-Fatal Traumatic Brain Injury-Combined Emergency Department Visits and Hospitalizations Among Older Adults 65 Years or Older, by External Cause, Kentucky, 2011



Falls were also the leading cause of non-fatal TBI for adults age 65 years or older and contributed to every 3 out of 4 non-fatal TBI injuries.

The length of stay (LOS) for hospitalized, non-fatal TBI (n=3,445) ranged from 1 day to 213 days. The mean LOS was 6.1 days with a median LOS of 3 days. Figure 11 shows the distribution of stays for those hospitalized with a TBI. Almost three quarters of admitted TBI injuries stayed for less than 1 week.

Figure 11: Non-Fatal Traumatic Brain Injury-Hospitalization Length of Stay, Kentucky, 2011



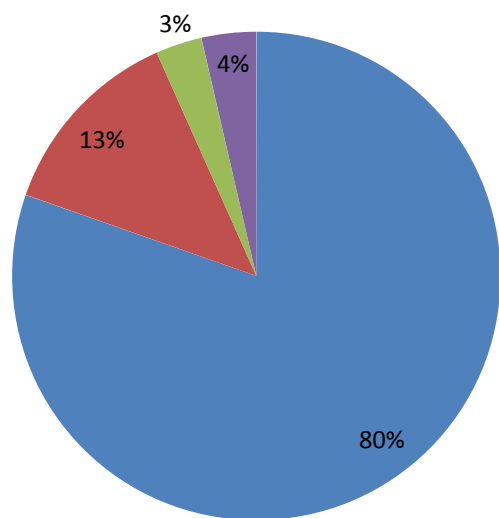
For non-fatal inpatient TBIs, 1,436 (42%) had a disposition other than “routine”. The three most frequent non-routine discharges were “skilled nursing facility”, “home health”, and “rehabilitation”. A total of 1,163 inpatient discharges had one of these three dispositions. ED discharges were nearly always (93%) to home or self care (routine) with “inpatient – other short term hospital” being the most frequent non-routine discharge.

Figure 12 presents an analysis of TBI in terms defined by the Barell Injury Diagnosis Matrix (Barell et al 2002). The definitions are as follows:

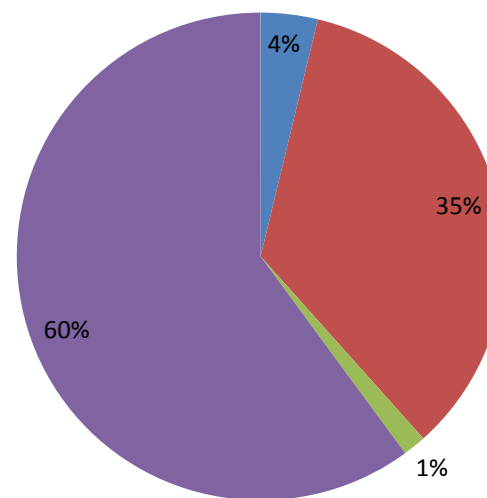
- A Type I TBI is one in which there is “recorded evidence of an intracranial injury or a moderate or a prolonged loss of consciousness (LOC), Shaken Infant Syndrome, or injuries to the optic nerve pathways.”
- A Type 2 TBI is one in which there is “no recorded evidence of intracranial injury, and LOC of less than one hour, or LOC of unknown duration, or unspecified level of consciousness.”
- A Type 3 TBI is one in which there is “no evidence of intracranial injury and no LOC.”

Figure 12: Non-Fatal Traumatic Brain Injury-Emergency Department and Hospitalizations, TBI Type, Kentucky, 2011

Type of TBI, Inpatient, Non-Fatal TBI



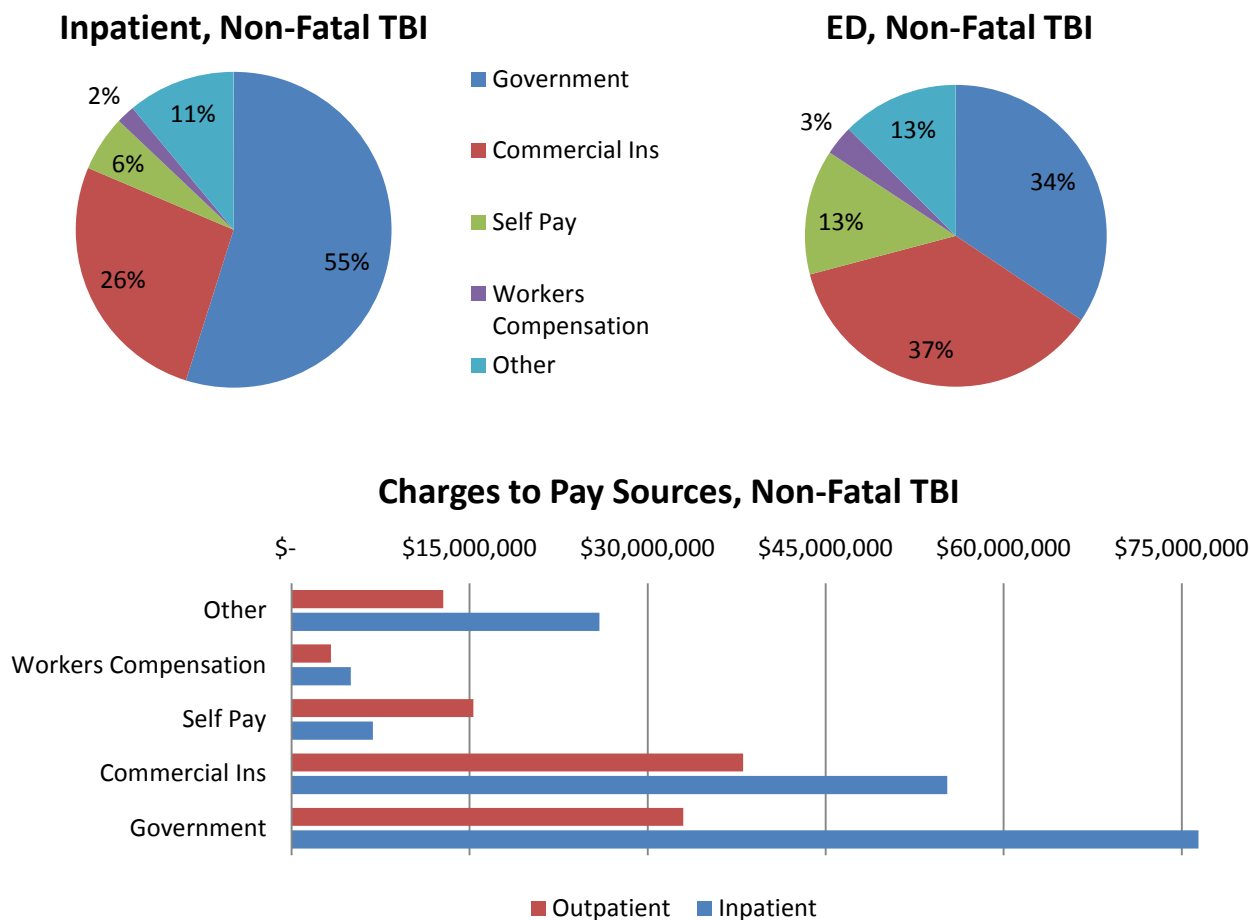
Type of TBI, Outpatient, Non-Fatal TBI



■ Type I
 ■ Type II
 ■ Type III
 ■ Other

Government sources were the primary payers billed for inpatient care charges in 55% of non-fatal TBI. Commercial payers (37%) were the leading payers for non-fatal ED visits. Please note that the amount billed by the hospital will generally be larger than the amount actually paid after adjudication of the claim.

Figure 13: Non-Fatal Traumatic Brain Injury-Emergency Department and Hospitalizations, Payer Source and Charges, Kentucky, 2011



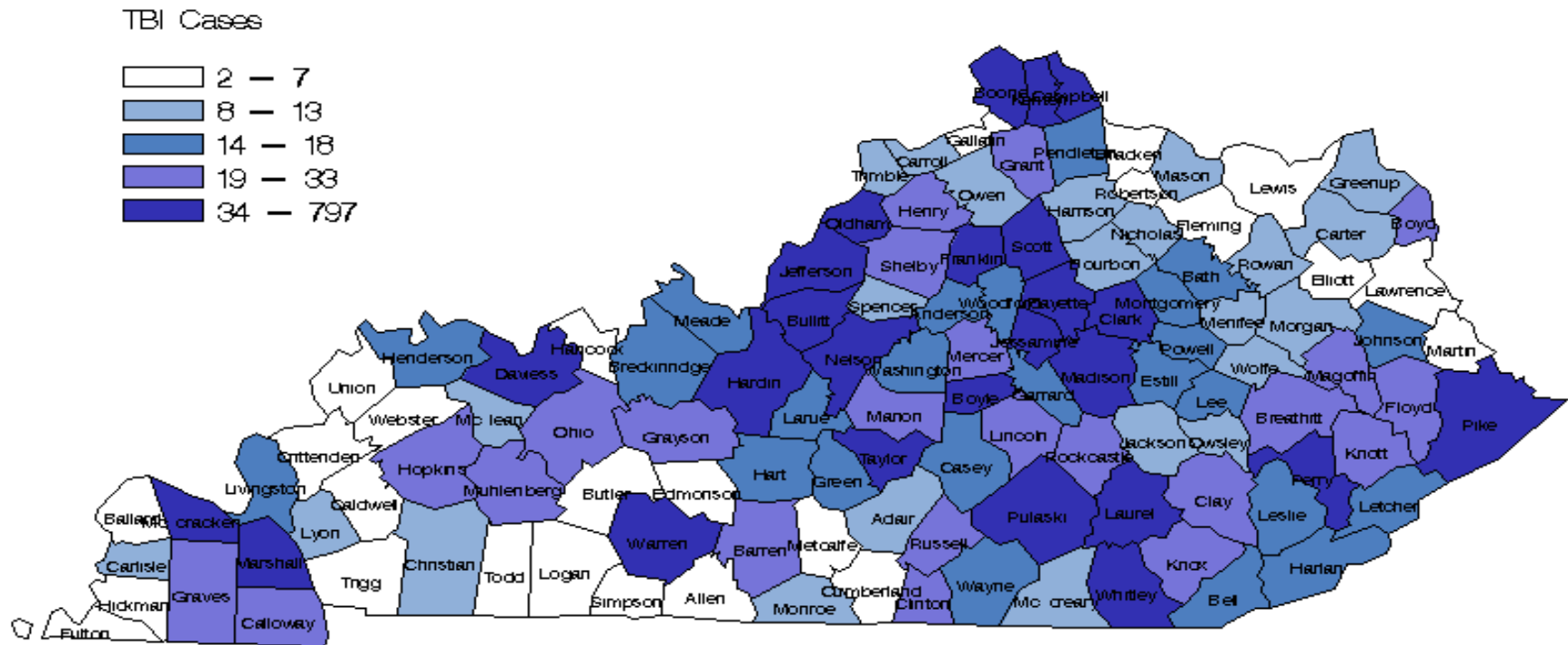
As one would expect, the incidence of TBI was highest in the larger counties. The top four in overall (inpatient and ED combined) TBI incidence (Jefferson, Fayette, Kenton and Boone) are the top four most populous counties in Kentucky. A notable exception was Boyd county, which was 6th in TBI incidence but 17th in population. Unsurprisingly, Boyd County had the highest age-adjusted rate in the state. Clay also stood out with an age-adjusted rate that was second in the state while being the 50th in population. Clay has consistently been one of the highest rated counties in Kentucky since 2001. In the past when data was available, it was noted that several southern border counties have significant numbers of residents treated in Tennessee hospitals. Prominent examples include Christian, Whitley, Warren, Bell, Harlan, Graves, Logan, and McCracken. This illustrates an important point: *if this report shows a county to have a high rate of TBI, we can be confident that this is a county in need. Conversely, however, if a county is shown to have a low rate we cannot conclude that there is not a significant problem in that county, particularly if it is located on or near the state border.*

The following illustrations map both the frequency of TBI in Kentucky counties (Figures 14 and 15) as well as the age adjusted rate of TBI in each county (Figures 16 and 17) for inpatient and outpatient TBIs. It should be noted that these mappings include ALL inpatient TBI cases (Figures 14 and 16) as well as ALL ED TBI cases (Figures 15 and 17) – including those that died at the hospital. Fatalities are not included in other analysis in this report unless noted but are included here to capture a visual representation of the magnitude of the problem of TBI in each county. These numbers DO NOT include those that died before admission to an acute care hospital. Due to mortality data being several years behind available hospital discharge data, accurate numbers of deaths outside those within the hospital system can only be estimated and are not included in the mapping of actual data.

Multiple tables can be found in the Appendix detailing specific rates and frequencies by county, frequency, and age adjusted rates for both inpatient and ED TBIs.

Figure 14:

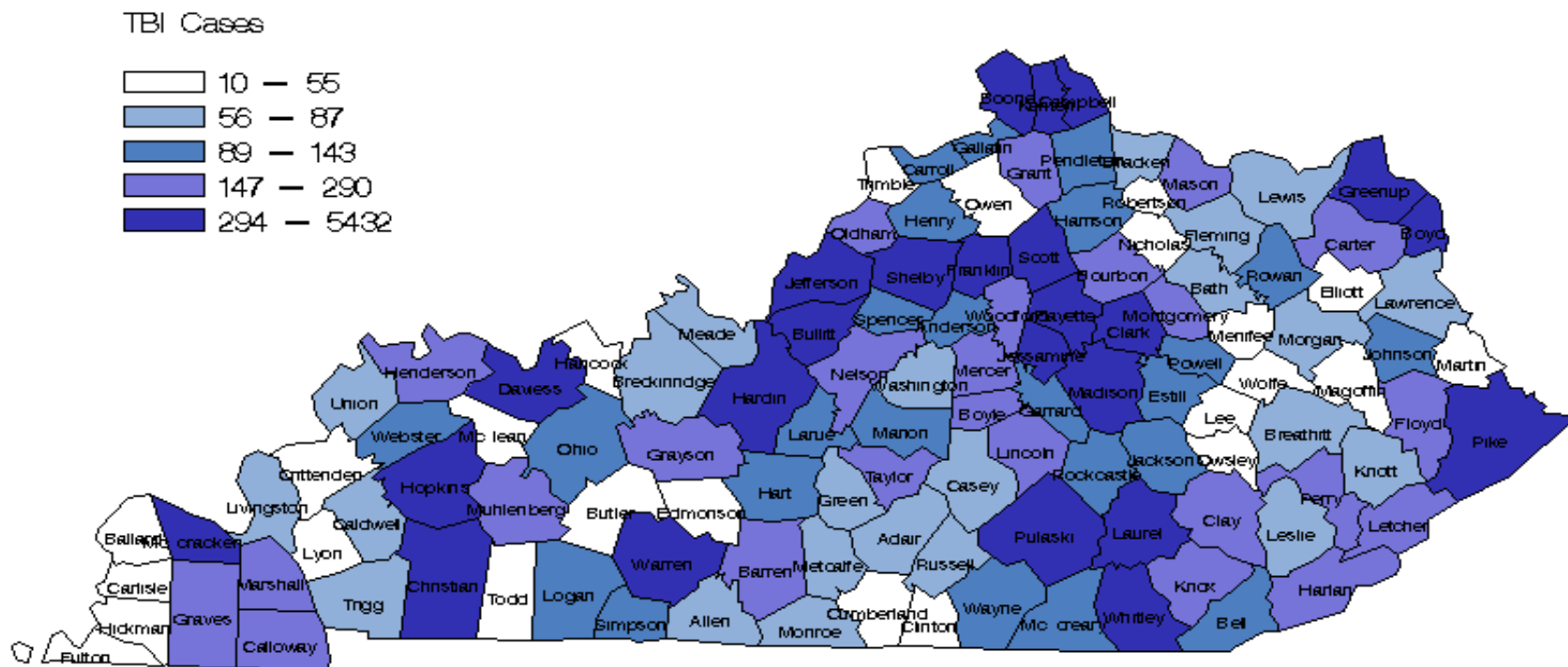
TBI Inpatient Cases by County, Kentucky 2011



Source: Kentucky TBI Surveillance Project 2011.

Figure 15:

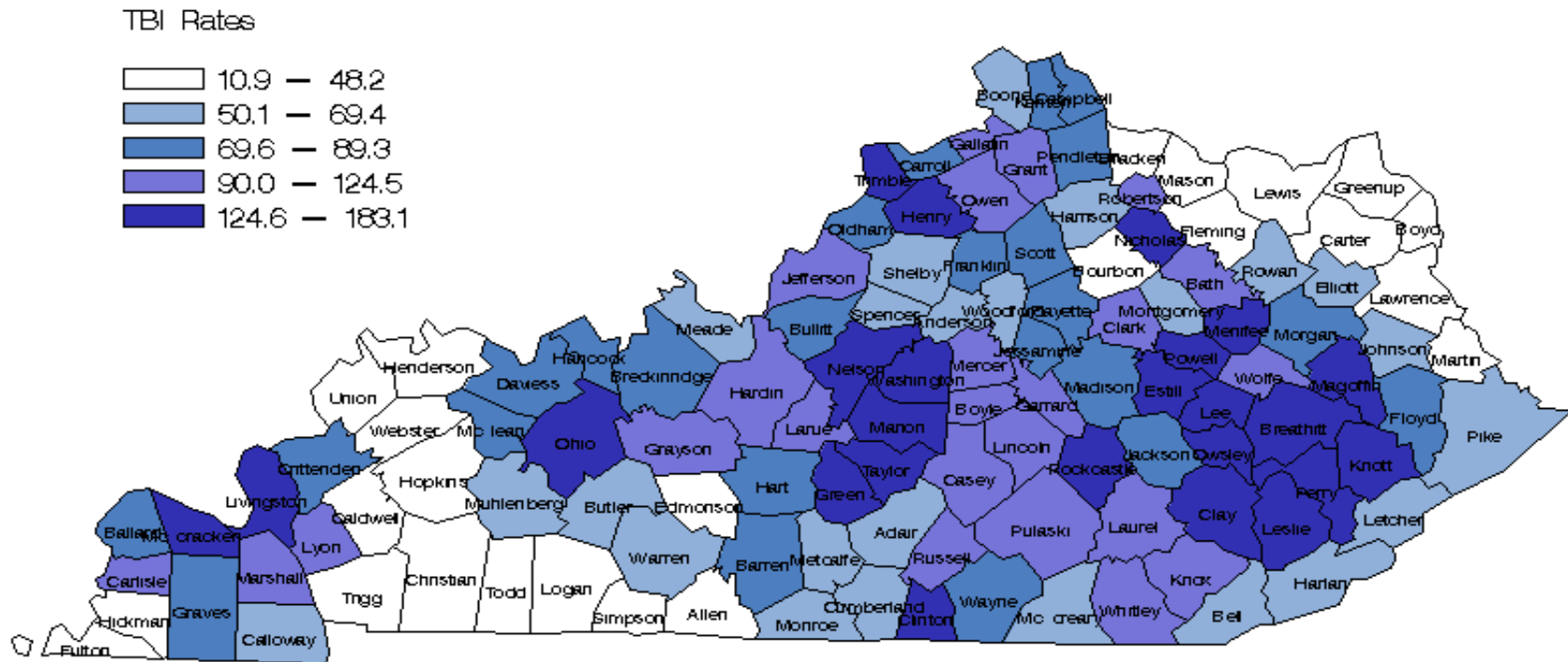
TBI ED Cases by County, Kentucky 2011



Source: Kentucky TBI Surveillance Project 2011.

Figure 16:

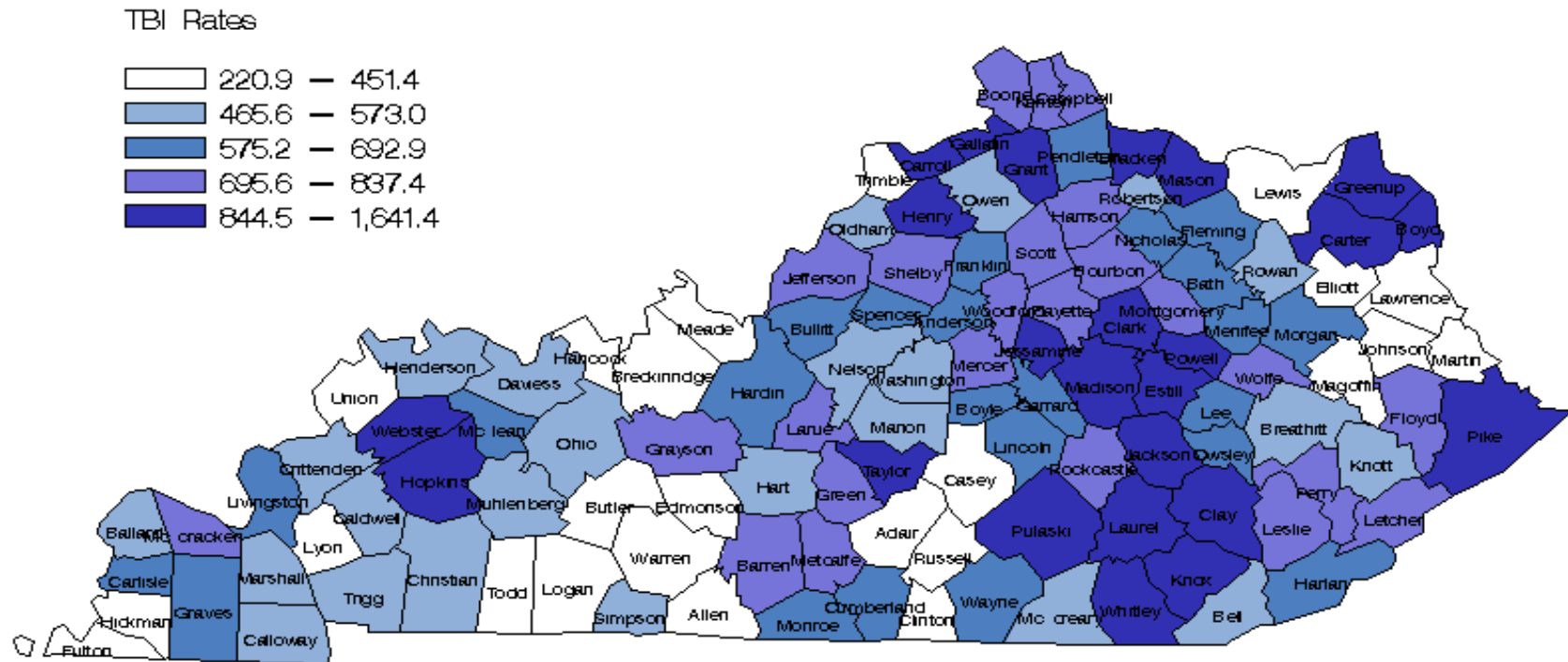
Age-Adjusted TBI Inpatient Rates by County, Kentucky 2011



Source: Kentucky TBI Surveillance Project 2011.

Figure 17:

Age-Adjusted TBI ED Rates by County, Kentucky 2011



Source: Kentucky TBI Surveillance Project 2011.

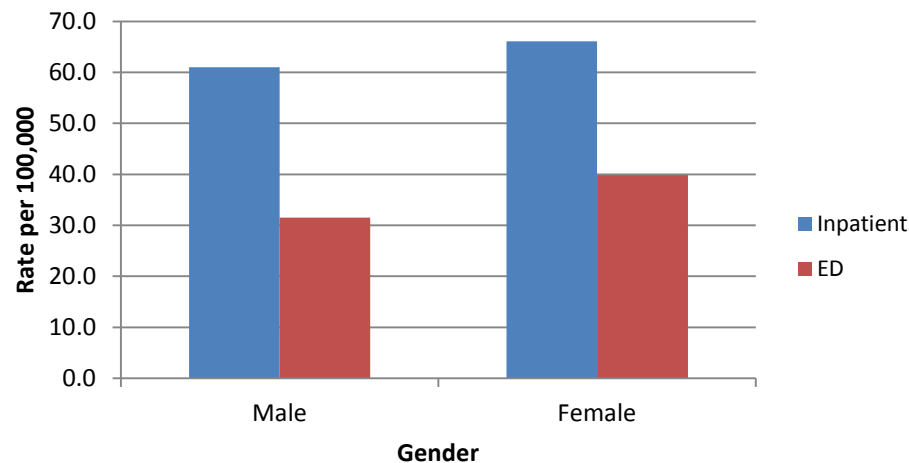
Acquired Brain Injury in Kentucky

In addition to CDC-defined TBI, there are many brain injuries that have non-traumatic etiologies. These we have classified as ABI. (See Appendix for diagnosis codes.) Because these diagnoses are not included in the CDC definition of TBI, they have been analyzed separately. There were 4,310 non-fatal ABI cases for Kentucky residents identified in 2011. This includes both inpatient (2,759) and ED (1,551) cases. The crude incidence rate for 2011 was 99.3 per 100,000 population.

ABI by Sex: Comparing the Rates

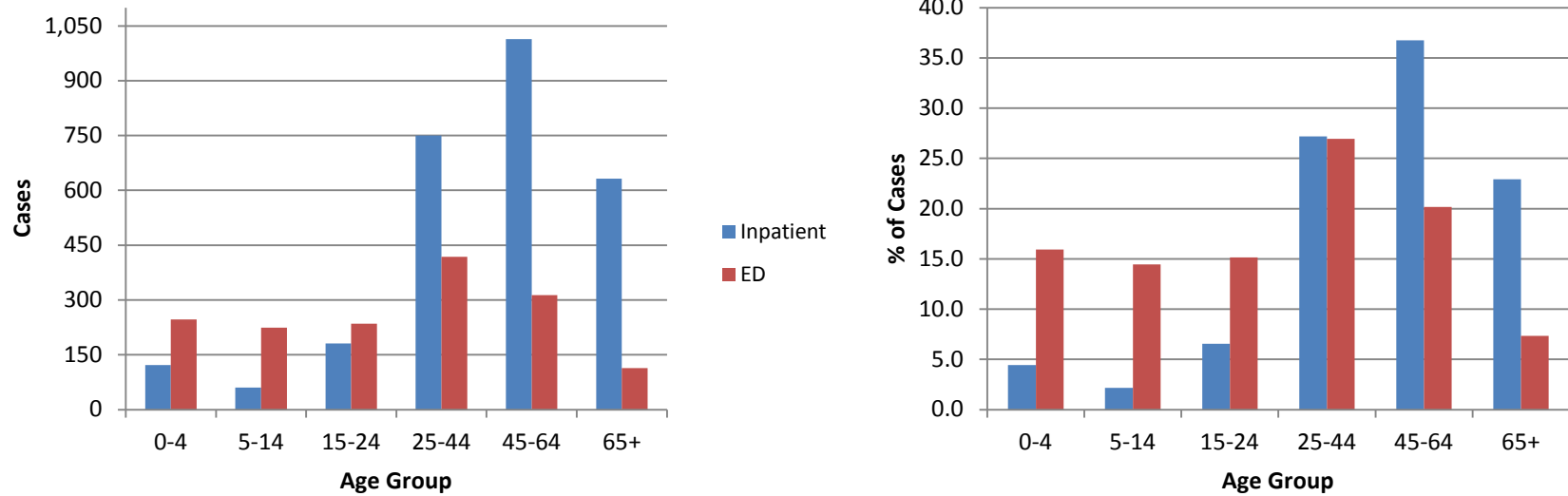
The following figure, **Figure 18**, is a graph depicting the rates of non-fatal ABI-related ED visits and hospitalizations by sex. The y axis represents the rate per 100,000 population. Rates were slightly higher for females in both ED and inpatient ABI cases.

Figure 18: Rates of Non-Fatal Acquired Brain Injury-Related Emergency Department Visits and Hospitalizations, by Gender, Kentucky, 2011



ABI by Age: Comparing the Numbers

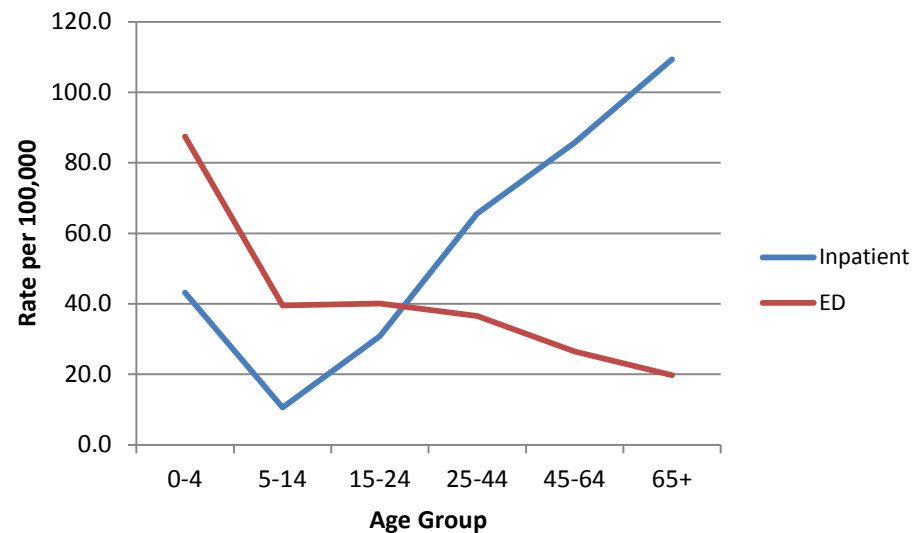
Figure 19: Numbers of Non-Fatal Acquired Brain Injury-Related Emergency Department Visits, and Hospitalizations, by Age Group, Kentucky, 2011



ABI by Age: Comparing the Rates

The following figure, **Figure 20**, is a graph depicting the annual rate of ABI-related ED visits and hospitalizations by age groups in Kentucky for 2011. The y axis represents the rate per 100,000 population. During 2011, very young children ages 0 to 4 years had the highest rate of non-fatal ABI-related ED visits, 87 per 100,000 population, followed by older adolescents ages 15 to 24 years. The highest rates of non-fatal ABI-related hospitalization occurred among adults age 65 years or older (109 per 100,000).

Figure 20: Rates of Acquired Brain Injury-Related Emergency Department Visits and Hospitalizations, by Age Group, Kentucky, 2011



ABI by Age and Type: Comparing the Rates

Nearly all ABI (97% of inpatient and 83% of ED) were a result of either exposure to toxic substances (ETS) or anoxia. Over 6 out of 10 ETS cases included poisoning by sedatives, hypnotics, central nervous system depressants/anesthetics and toxic effects of alcohol. Over half of all anoxia cases were due to anoxic brain damage related to hereditary and degenerative disease of the central nervous system. In non-fatal ABI inpatient visits, anoxia tends to affect older people (ages 45 and over) considerably more often than younger people, whereas ETS affects persons 15 and older. Very young children, 0-4, have the highest rates of non-fatal ABI related ED visits.

Figure 21: Rates of Non-Fatal Acquired Brain Injury-Related Emergency Department Visits, and Hospitalizations, by Age Group and Type, Kentucky, 2011

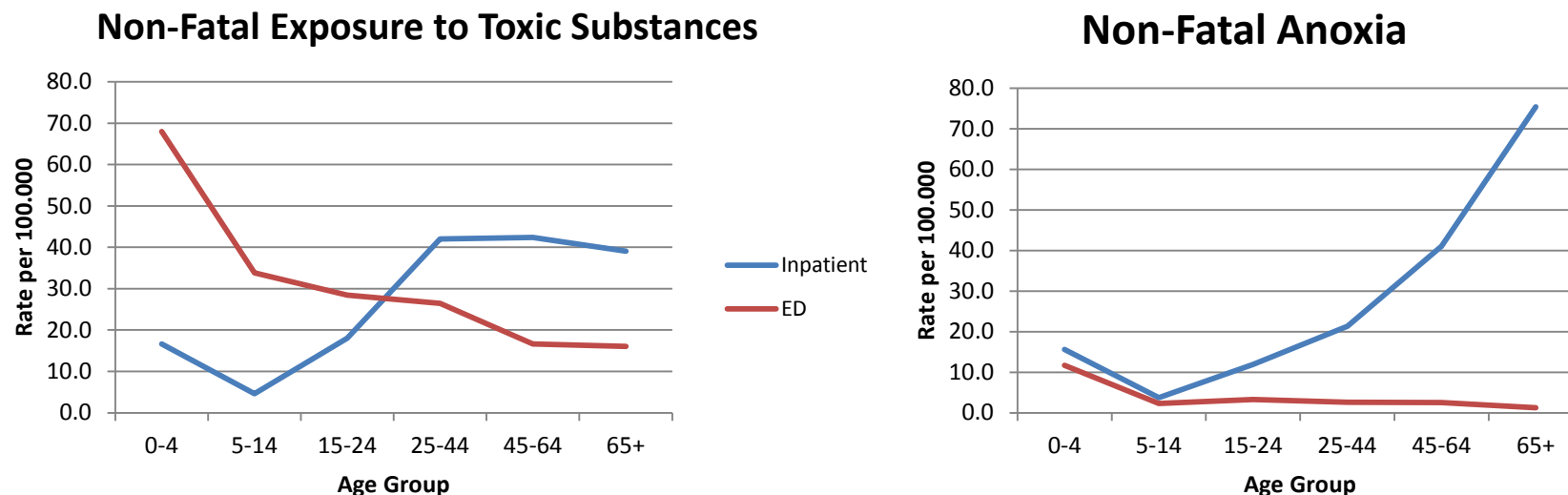
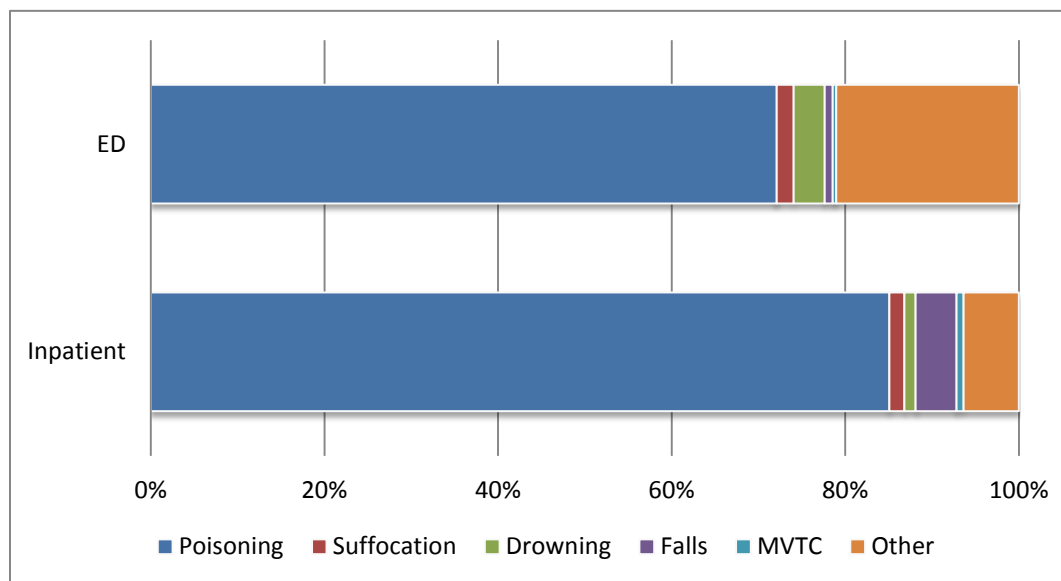


Figure 22: Non-Fatal Acquired Brain Injury-Related Emergency Department Visits and Hospitalizations by External Cause*, Kentucky, 2011



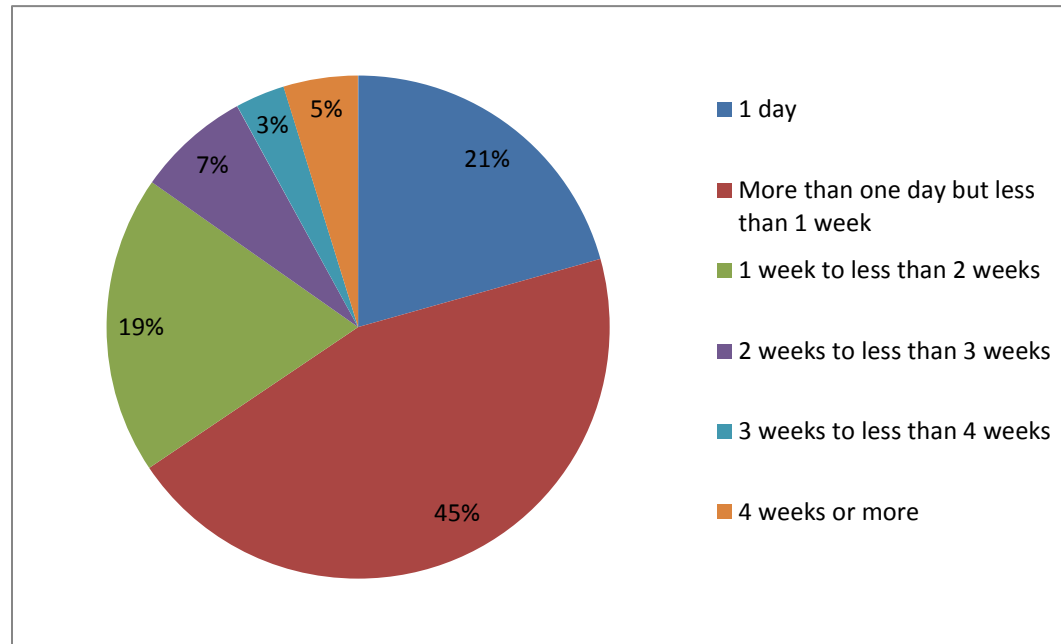
Among those ABI discharges that were reported to have some relationship with an injury (i.e. included an external cause of injury code), 85% of inpatient and 72% of ED cases were related to poisonings.

ABI is, by the statutory definition, non-traumatic, and many ABI cases do not include an external cause of injury code. Note that we are making a distinction between “injury-related” and “traumatic”, with trauma being considered one of several forms of injury. 59% of inpatient cases and 31% of ED cases did not include an external cause of injury code.

*Where external cause was reported.

The length of stay (LOS) for hospitalized, non-fatal ABI (n=2,759) ranged from 1 day to 208 days. The mean LOS was 7.7 days with a median LOS of 4 days. Figure 23 shows the distribution of stays for those hospitalized with ABI. One third of admitted (inpatient) ABI injuries stayed for 1 week or longer.

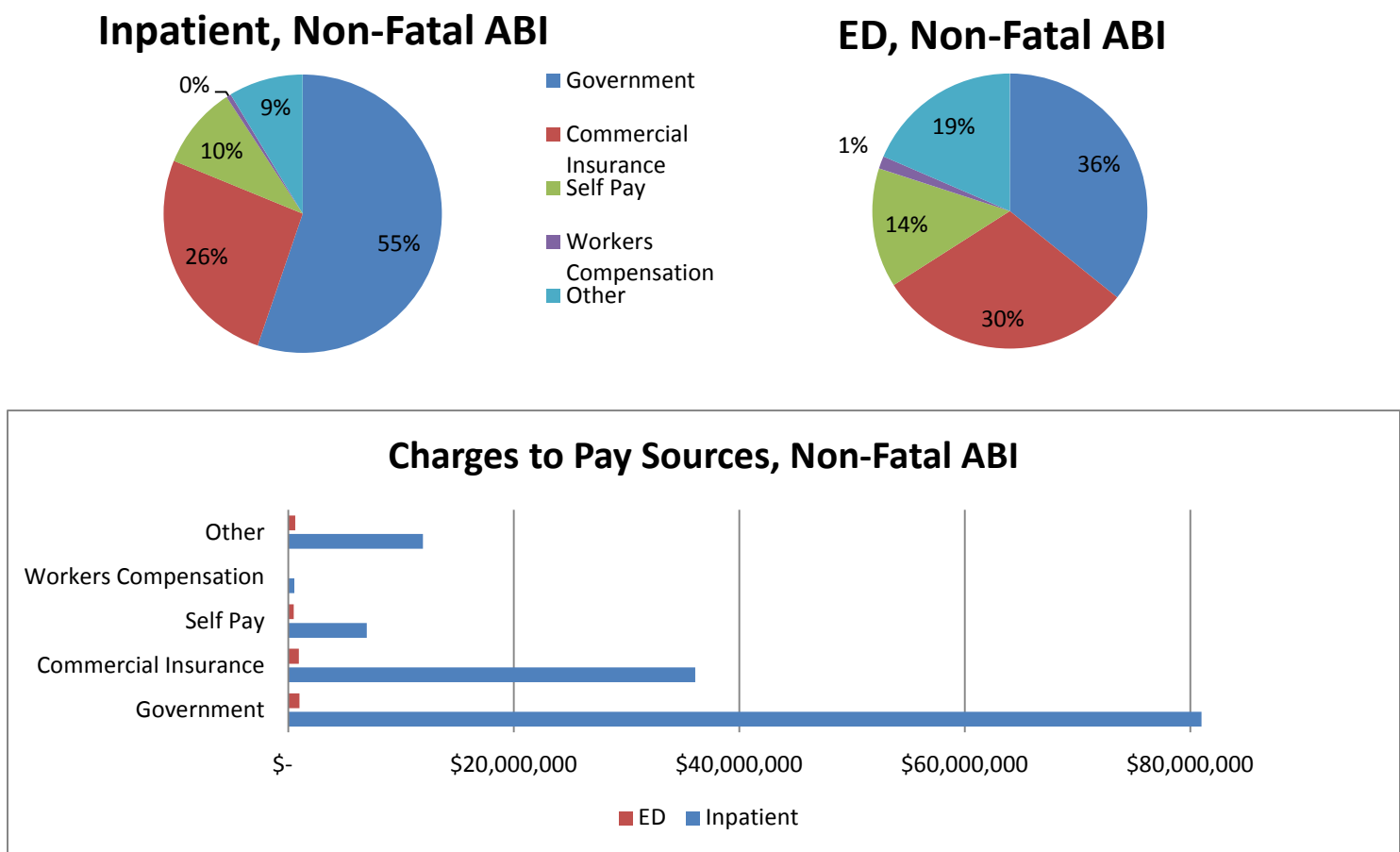
Figure 23: Non-Fatal Acquired Brain Injury-Hospitalization Length of Stay, Kentucky, 2011



For non-fatal inpatient ABIs, 1,260 (46%) had a disposition other than “routine”. The three most frequent non-routine discharges were “skilled nursing facility”, “home health”, and “inpatient – other short term hospital”. A total of 633 inpatient discharges had one of these three dispositions. ED discharges were most likely (84%) routinely discharged to home or self care (routine) with “inpatient – other short term hospital” being the most frequent non-routine discharge.

Government sources were the most often primary payers billed for both inpatient (57%) and ED (42%) care charges of non-fatal ABI. Please note that the amount billed by the hospital will generally be larger than the amount actually paid after adjudication of the claim.

Figure 24: Non-Fatal Acquired Brain Injury-Emergency Department and Hospitalizations, Payer Source and Charges, Kentucky, 2011



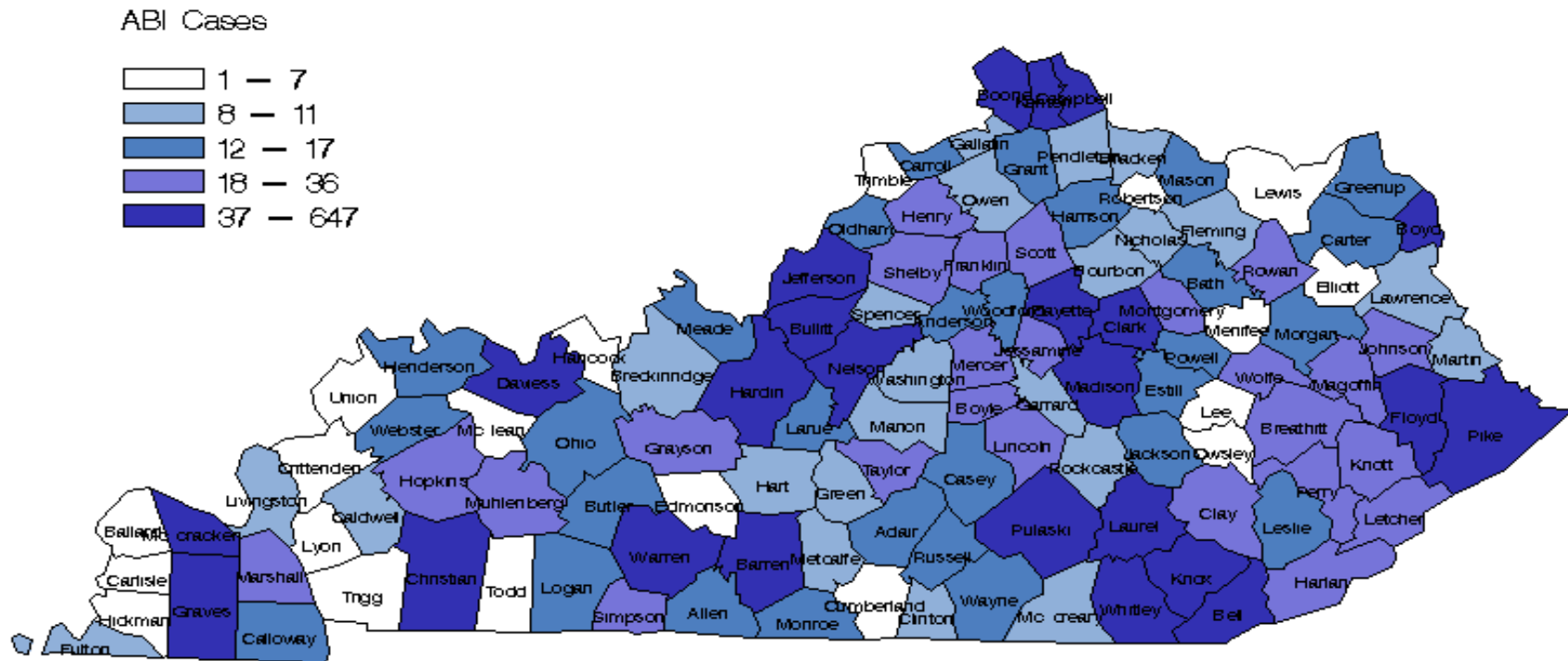
In general, as with TBI, the more populous counties had high numbers of ABI. However, the ten most populous counties did not appear in the top thirty counties when ranked by age-adjusted rate for either inpatient or ED cases. Owsley, which ranks 119th with respect to county population, had the third highest age adjusted rate of inpatient ABI in the state. Leading the state for age adjusted rate for ED cases was Morgan county, the 80th county when ranked by population size. The counties with the highest inpatient rates were concentrated in eastern Kentucky with another cluster showing in the western region (Figure 27).

The following figures map both the frequency of ABI in Kentucky counties (Figures 25 and 26) as well as the age adjusted rate of ABI in each county (Figures 27 and 28) for inpatient and outpatient ABIs. It should be noted that these mappings include ALL inpatient ABI cases (Figures 25 and 27) as well as ALL ED ABI cases (Figures 26 and 28) – including those that died at the hospital. Fatalities are not included in other analysis in this report unless noted but are included here to capture a visual representation of the magnitude of the problem of ABI in each county. These numbers DO NOT include those that died before admission to an acute care hospital. Due to mortality data being several years behind available hospital discharge data, accurate numbers of deaths outside those within the hospital system can only be estimated and are not included in the mapping of actual data.

Multiple tables can be found in the Appendix detailing specific rates and frequencies by county, frequency, and age adjusted rates for both inpatient and ED ABIs.

Figure 25.

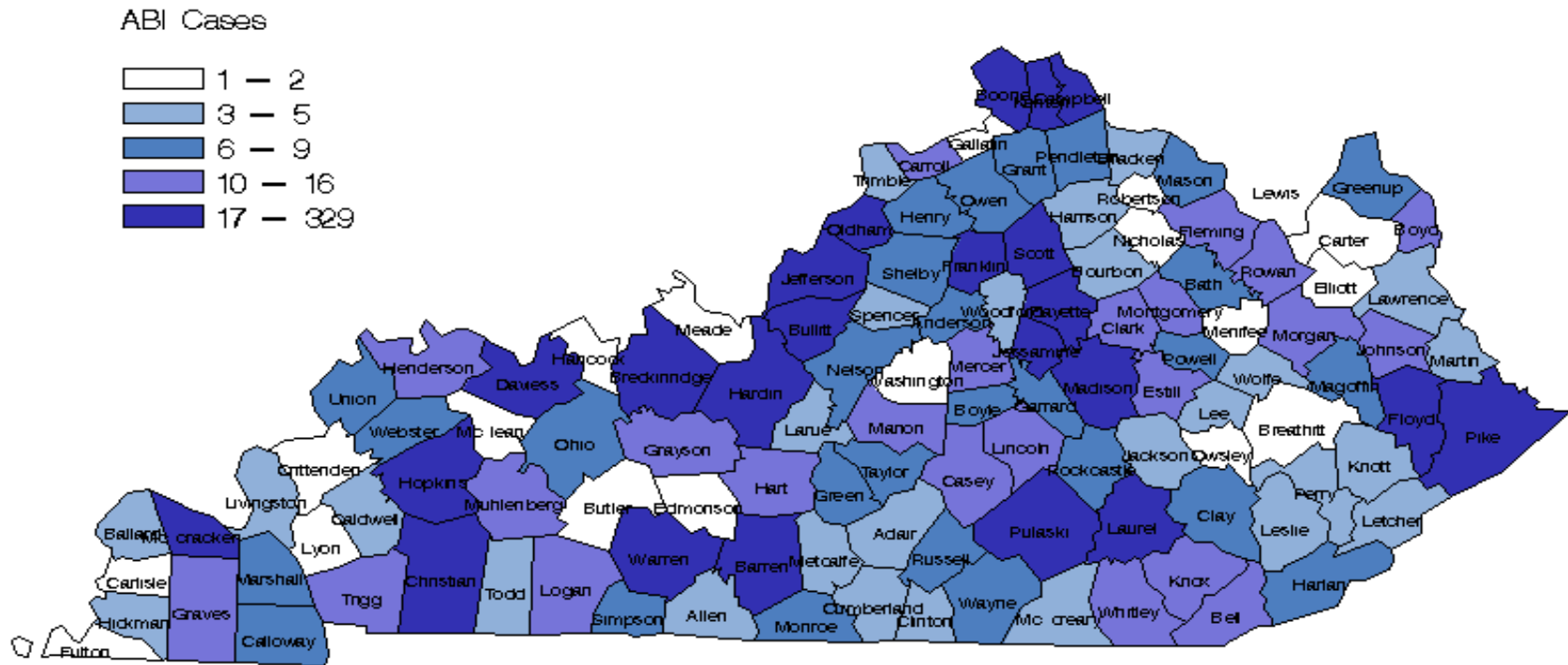
ABI Inpatient Cases by County, Kentucky 2011



Source: Kentucky TBI Surveillance Project 2011.

Figure 26.

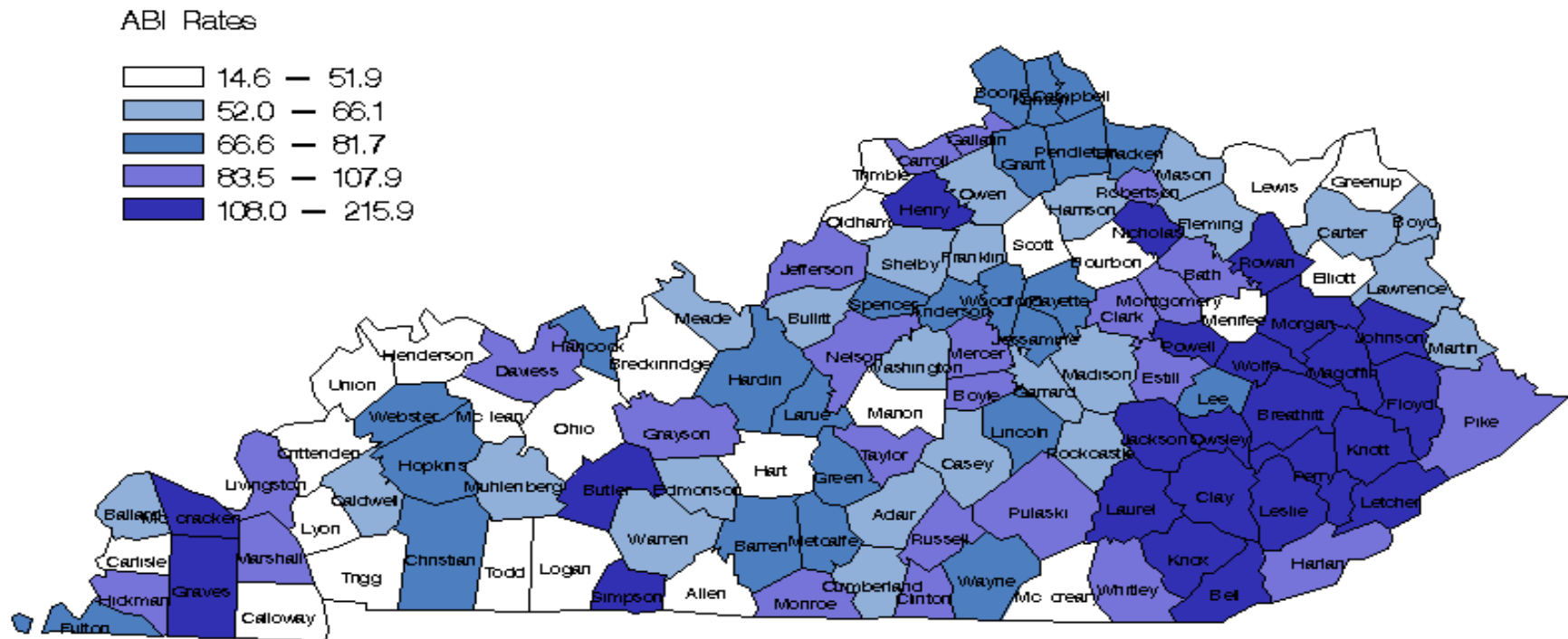
ABI ED Cases by County, Kentucky 2011



Source: Kentucky TBI Surveillance Project 2011.

Figure 27.

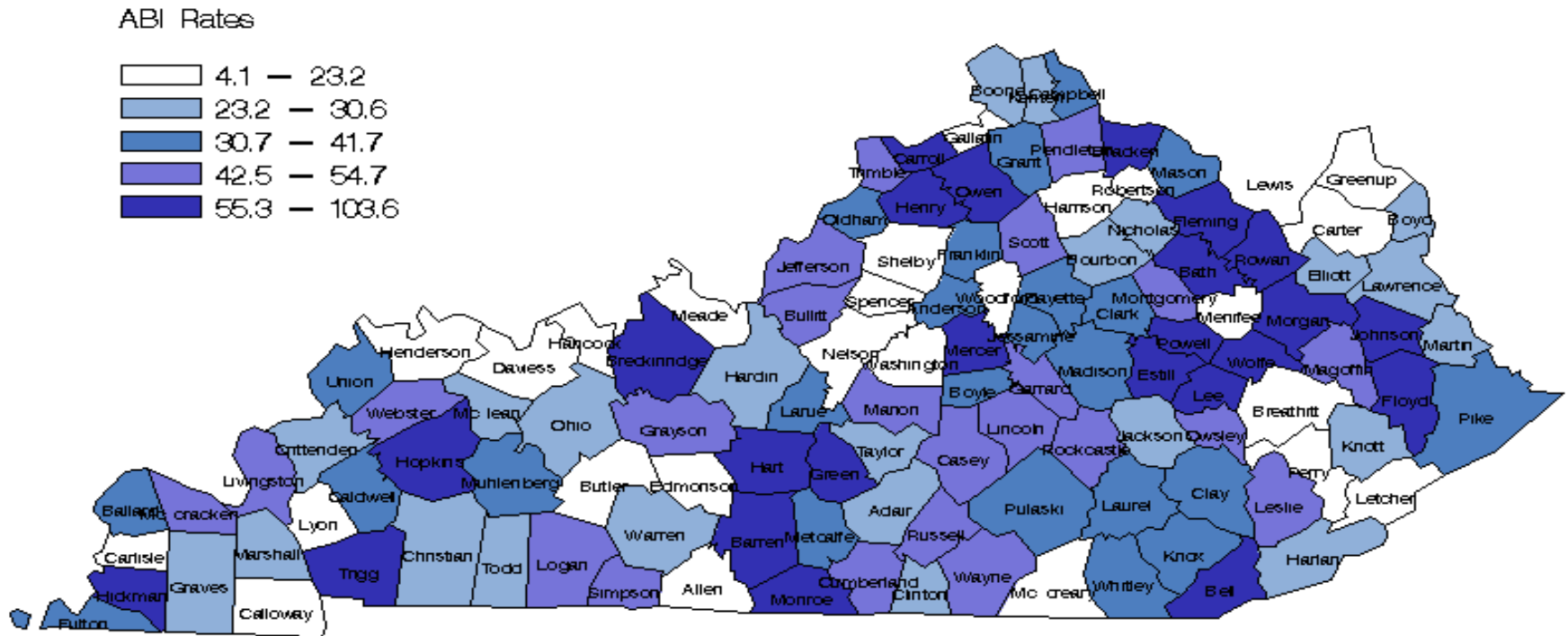
Age-Adjusted ABI Inpatient Rates by County, Kentucky 2011



Source: Kentucky TBI Surveillance Project 2011.

Figure 28.

Age—Adjusted ABI ED Rates by County, Kentucky 2011



Source: Kentucky TBI Surveillance Project 2011.

Spinal Cord Injury in Kentucky

SCI patients often are readmitted for problems stemming from the original injury. In an effort to avoid double counting in such cases, for SCI we looked only at the first three listed diagnosis codes. There were 200 non-fatal inpatient SCI cases for Kentucky residents identified in 2011 as well as 86 non-fatal ED cases. The crude incidence rate of any non-fatal SCI was 6.6 per 100,000 population.

ABI by Sex: Comparing the Rates

Figure 29: Rates of Non-Fatal Spinal Cord Injury-Related Emergency Department Visits and Hospitalizations, by Gender, Kentucky, 2011

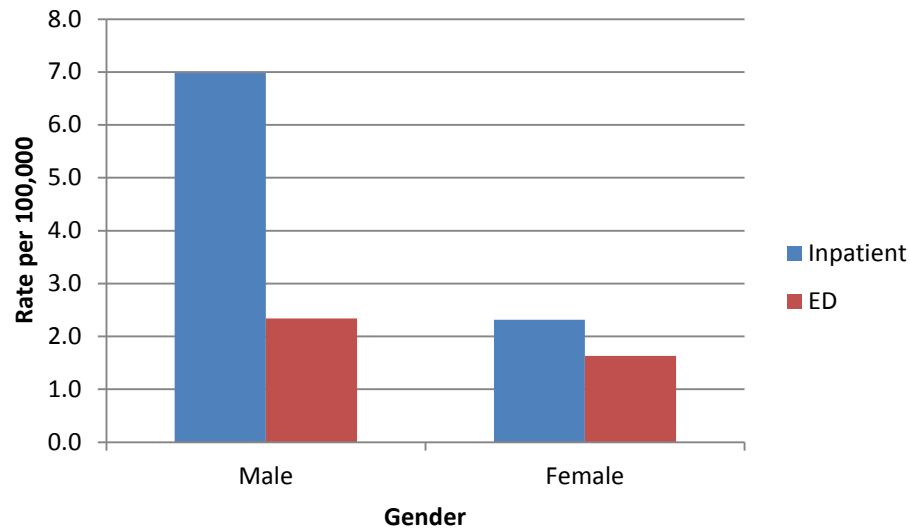
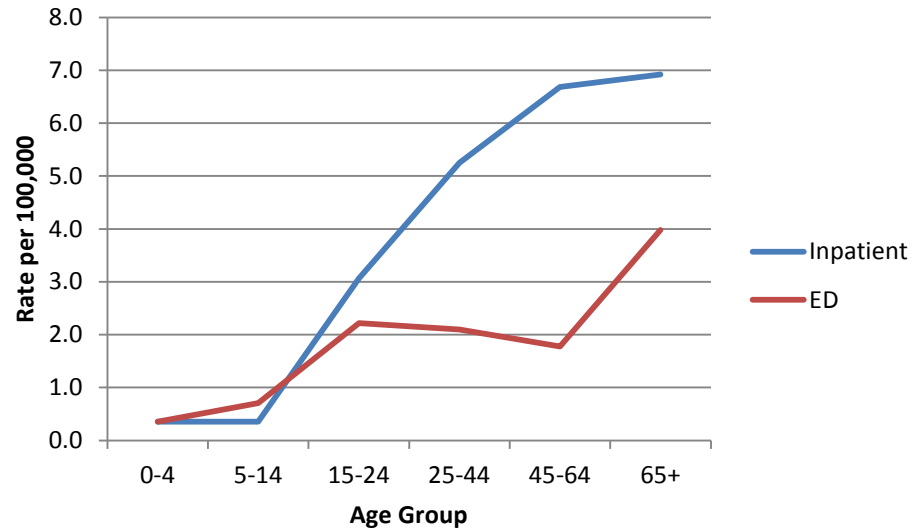
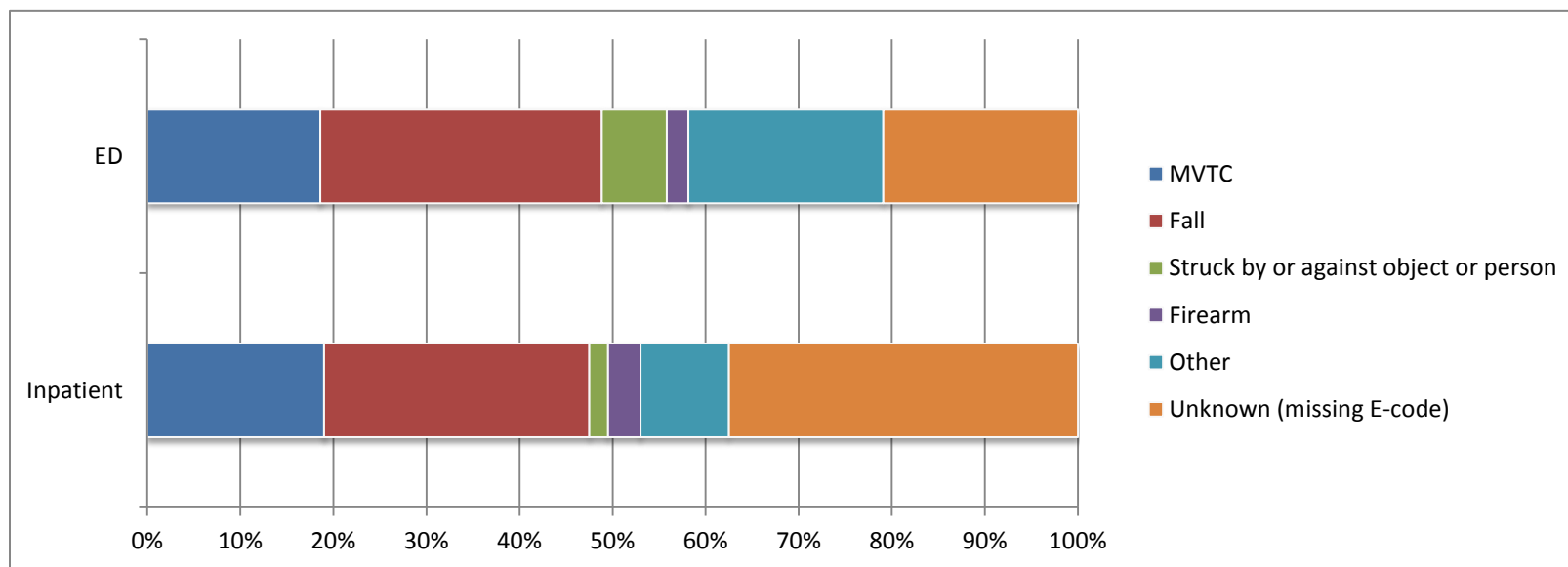


Figure 30: Rates of Spinal Cord Injury-Related Emergency Department Visits and Hospitalizations, by Age Group, Kentucky, 2011



The highest age-specific rates were found in the 65 or older age group for both non-fatal inpatient and ED SCI.

Figure 31: Non-Fatal Spinal Cord Injury-Related Emergency Department Visits and Hospitalizations by External Cause, Kentucky, 2011

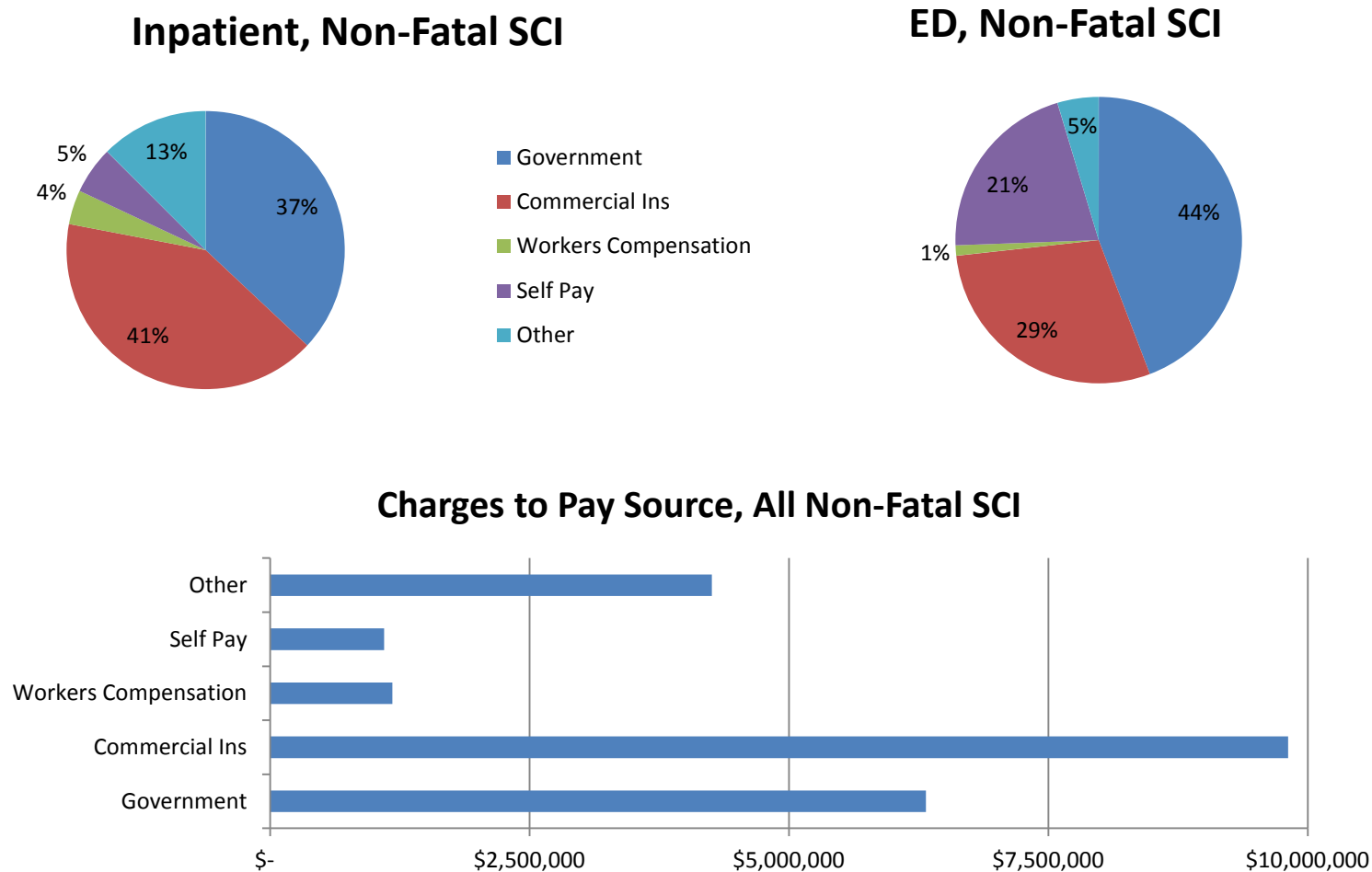


Among non-fatal SCI's for which an E-code was reported, falls were the leading mechanisms of injury for both inpatient and ED SCI visits. Unfortunately, over one out of three of the inpatient SCI discharges had no E-code reported.

Hospitalized SCI patients had a length of stay (LOS) varying from 1 day to 51 days. The mean LOS was 11.5 days with a median of 8 days. Over 6 out of 10 (61%) of the non-fatal inpatient SCI discharges had dispositions other than “routine”, while 52% of ED discharges were non-routine. In total, 58% of SCI non-fatal discharges went on to receive further care. In comparison, non-fatal TBI inpatient visits were routinely discharged almost 60% of the time and TBI visits to the ED were routinely discharged over 90% of the time. Overall, almost 9 out of 10 non-fatal TBI discharges were discharged to home or self care (routine).

Government sources were the primary payer billed for acute care charges in almost half of all non-fatal SCI. Government payers were billed over \$6 million in 2011, and commercial payers almost \$10 million.

Figure 33: Non-Fatal Spinal Cord Injury-Emergency Department and Hospitalizations, Payer Source and Charges, Kentucky, 2011



Conclusion

Over 38,000 non-fatal central nervous system injury-related ED visits and hospitalizations occurred in Kentucky in 2011. This number is larger than what had been previously estimated. The findings show the importance of including ED visits because of the large number of TBIs seen only in that setting, especially among children. Although this report provides data on a wide range of CNSI occurring in Kentucky, it still does not capture all of them. It does not include those treated by emergency medical services that refused transport to a hospital, or those hospitalized outside of Kentucky nor does it include those seen by non-hospital medical services or who sought no care at all. Many people recover from their injuries, but in 2011 alone, over 105 Kentuckians per day received either inpatient or ED care for a CNSI, many of which will result in some long term disability. Thus, brain and spinal cord injury prevention, improved acute care and rehabilitation to reduce the likelihood of injury-related disability, and also increased access to services for those who do not fully recover are critical to improving quality of life of persons following a CNSI.

Appendix A: Tables and Figures

For the following tables: Unless otherwise noted, persons who were hospitalized or died were excluded from the data for ED Visits. For Hospitalizations, in-hospital deaths were excluded. The average annual rate is per 100,000 population. Rates calculated using the most recent available Kentucky population estimates (2010).

Table 1: Non-Fatal TBI ED Visits and Hospitalizations by Age Group, Kentucky, 2011

Age	Inpatient			Outpatient			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
0-4	134	3.0	47.5	4370	97.0	1547.6	4,504	100.0	1595.1
5-14	129	2.9	22.7	4300	97.1	758.3	4,429	100.0	781.1
15-24	368	5.8	62.7	5971	94.2	1017.6	6,339	100.0	1080.3
25-44	566	7.7	49.5	6784	92.3	593.6	7,350	100.0	643.1
45-64	766	14.2	64.8	4631	85.8	391.8	5,397	100.0	456.6
65+	1482	24.9	256.3	4466	75.1	772.4	5,948	100.0	1028.7
Total	3,445	10.1	79.4	30,522	89.9	703.4	33,967	100.0	782.8

Table 2: Non-Fatal TBI ED Visits and Hospitalizations by Gender, Kentucky, 2011

Age	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
Male	1963	11.0	91.9	15,949	89.0	747.0	17,912	100.0	839.0
Female	1482	9.2	67.2	14,572	90.8	661.0	16,054	100.0	728.3
Total	3,445	10.1	79.4	30,521	89.9	703.4	33,966	100.0	782.7

Table 3: Non-Fatal TBI ED Visits and Hospitalizations by External Cause of Injury, Kentucky, 2011

Mechanism of Injury	Inpatient			ED			Total		
	Number	Pct.	Rate	Number	Pct.	Rate	Number	Pct.	Rate
Motor vehicle traffic crash	550	9.3	12.7	5,363	90.7	123.6	5,913	100.0	136.3
Fall	1,574	11.1	36.3	12,565	88.9	289.6	14,139	100.0	325.8
Firearm	23	60.5	0.5	15	39.5	0.3	38	100.0	0.9
Non-traffic land transport	105	11.8	2.4	784	88.2	18.1	889	100.0	20.5
Struck by object or person	189	3.0	4.4	6,117	97.0	141.0	6,306	100.0	145.3
Non-traffic pedal cycle	27	5.6	0.6	454	94.4	10.5	481	100.0	11.1
Machinery	12	24.0	0.3	38	76.0	0.9	50	100.0	1.2
Other	161	6.9	3.7	2,180	93.1	50.2	2,341	100.0	53.9
Unknown (missing E-code)	804	21.1	18.5	3,006	78.9	69.3	3,810	100.0	87.8
Total	3,445	10.1	79.4	30,522	89.9	703.4	33,967	100.0	782.8

Table 4: Leading Causes of Non-Fatal TBI ED Visits and Hospitalizations for Ages 00-04, Kentucky, 2011

Mechanism of Injury	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
Fall	73	54.5	25.9	3,055	69.9	1081.9	3,128	69.4	1107.8
Motor vehicle traffic crash	22	16.4	7.8	93	2.1	32.9	115	2.6	40.7
Struck by or against object or person	6	4.5	2.1	759	17.4	268.8	765	17.0	270.9
Non-traffic land transportation	2	1.5	0.7	28	0.6	9.9	30	0.7	10.6
Other (including non-specific codes)	23	17.2	8.1	133	3.0	47.1	156	3.5	55.2
Unknown (missing E-code)	8	6.0	2.8	302	6.9	107.0	310	6.9	109.8
Total	134	100.0	47.5	4,370	100.0	1547.6	4,504	100.0	1595.1

Table 5: Leading Causes of Non-Fatal TBI ED Visits and Hospitalizations for Ages 05-14, Kentucky, 2011

Mechanism of Injury	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
Motor vehicle traffic crash	43	33.3	7.6	333	7.7	58.7	376	8.5	66.3
Fall	22	17.1	3.9	1,517	35.3	267.5	1,539	34.7	271.4
Non-traffic land transportation	15	11.6	2.6	135	3.1	23.8	150	3.4	26.5
Other pedal cycle	13	10.1	2.3	261	6.1	46.0	274	6.2	48.3
Struck by or against object or person	18	14.0	3.2	1,475	34.3	260.1	1,493	33.7	263.3
Other (including non-specific codes)	7	5.4	1.2	177	4.1	31.2	184	4.2	32.4
Unknown (missing E-code)	11	8.5	1.9	402	9.3	70.9	413	9.3	72.8
Total	129	100.0	22.7	4,300	100.0	758.3	4,429	100.0	781.1

Table 6: Leading Causes of Non-Fatal TBI ED Visits and Hospitalizations for Ages 15-24, Kentucky, 2011

Mechanism of Injury	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
Motor vehicle traffic crash	124	33.7	21.1	1,738	29.1	296.2	1,862	29.4	317.3
Firearm	7	1.9	1.2	4	0.1	0.7	11	0.2	1.9
Non-traffic land transportation	18	4.9	3.1	256	4.3	43.6	274	4.3	46.7
Fall	38	10.3	6.5	1,029	17.2	175.4	1,067	16.8	181.8
Struck by or against object or person	37	10.1	6.3	1,670	28.0	284.6	1,707	26.9	290.9
Other (including non-specific codes)	25	6.8	4.3	688	11.5	117.3	713	11.2	121.5
Unknown (missing E-code)	119	32.3	20.3	586	9.8	99.9	705	11.1	120.2
Total	368	100.0	62.7	5,971	100.0	1017.6	6,339	100.0	1080.3

Table 7: Leading Causes of Non-Fatal TBI ED Visits and Hospitalizations for Ages 25-44, Kentucky, 2011

Mechanism of Injury	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
Motor vehicle traffic crash	162	28.6	14.2	1,884	27.8	164.8	2,046	27.8	179.0
Firearm	11	1.9	1.0	8	0.1	0.7	19	0.3	1.7
Fall	102	18.0	8.9	1,595	23.5	139.6	1,697	23.1	148.5
Struck by or against object or person	55	9.7	4.8	1,399	20.6	122.4	1,454	19.8	127.2
Non-traffic land transportation	31	5.5	2.7	243	3.6	21.3	274	3.7	24.0
Machinery	4	0.7	0.3	17	0.3	1.5	21	0.3	1.8
Other (including non-specific codes)	37	6.5	3.2	888	13.1	77.7	925	12.6	80.9
Unknown (missing E-code)	164	29.0	14.3	750	11.1	65.6	914	12.4	80.0
Total	566	100.0	49.5	6,784	100.0	593.6	7,350	100.0	643.1

Table 8: Leading Causes of Non-Fatal TBI ED Visits and Hospitalizations for Ages 45-64, Kentucky, 2011

Mechanism of Injury	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
Fall	299	39.0	25.3	1,956	42.2	165.5	2,255	41.8	190.8
Motor vehicle traffic crash	128	16.7	10.8	1,009	21.8	85.4	1,137	21.1	96.2
Firearm	5	0.7	0.4	1	0.0	0.1	6	0.1	0.5
Struck by or against object or person	55	7.2	4.7	673	14.5	56.9	728	13.5	61.6
Non-traffic land transportation	26	3.4	2.2	90	1.9	7.6	116	2.1	9.8
Other (including non-specific codes)	50	6.5	4.2	407	8.8	34.4	457	8.5	38.7
Unknown (missing E-code)	203	26.5	17.2	495	10.7	41.9	698	12.9	59.0
Total	766	100.0	64.8	4,631	100.0	391.8	5,397	100.0	456.6

Table 9: Leading Causes of Non-Fatal TBI ED Visits and Hospitalizations for Ages 65 or Over, Kentucky, 2011

Mechanism of Injury	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
Fall	1,040	70.2	179.9	3,404	76.2	588.7	4,444	74.7	768.6
Motor vehicle traffic crash	71	4.8	12.3	306	6.9	52.9	377	6.3	65.2
Firearm	0	0.0	0.0	1	0.0	0.2	1	0.0	0.2
Struck by or against object or person	18	1.2	3.1	141	3.2	24.4	159	2.7	27.5
Non-traffic land transportation	13	0.9	2.2	32	0.7	5.5	45	0.8	7.8
Other (including non-specific codes)	41	2.8	7.1	111	2.5	19.2	152	2.6	26.3
Unknown (missing E-code)	299	20.2	51.7	471	10.5	81.5	770	12.9	133.2
Total	1,482	100.0	256.3	4,466	100.0	772.4	5,948	100.0	1028.7

Table 10: Hospital Discharges by Disposition for Non-Fatal TBI ED Visits and Hospitalizations, Kentucky, 2011

Discharge Disposition	Inpatient		ED	
	Number	Percent	Number	Percent
Routine discharge (home/self-care)	2,009	58.3	28420	93.1
Skilled nursing facility (SNF)	526	15.3	272	0.9
Home health	290	8.4	11	0.0
Inpatient-other short-term hospital	75	2.2	1245	4.1
Intermediate care facility (ICF)	12	0.3	48	0.2
Rehab	347	10.1	29	0.1
Other	186	5.4	497	1.6
Total	3,445	100.0	30,522	100.0

Table 11: Incidence of All Inpatient TBI* by County, Sorted by County, Kentucky, 2011

*Includes inpatient deaths as well as non-fatal inpatient cases

County	Freq	Percent	Age-Adjusted Rate	Crude Rate	County	Freq	Percent	Age-Adjusted Rate	Crude Rate	County	Freq	Percent	Age-Adjusted Rate	Crude Rate
Adair	13	0.4	68.4	69.7	Grant	20	0.5	93.4	81.1	McLean	8	0.2	74.4	83.9
Allen	5	0.1	25.6	25.1	Graves	32	0.9	73.2	86.2	Meade	17	0.5	60.2	59.4
Anderson	14	0.4	68.4	65.4	Grayson	28	0.8	104.2	108.8	Menifee	8	0.2	130.5	126.9
Ballard	7	0.2	71.4	84.9	Green	16	0.4	132.1	142.1	Mercer	25	0.7	111.6	117.2
Barren	33	0.9	71.6	78.2	Greenup	13	0.4	28.2	35.2	Metcalfe	7	0.2	64.5	69.3
Bath	14	0.4	116.2	120.8	Hancock	6	0.2	75.8	70.1	Monroe	9	0.2	65.3	82.1
Bell	16	0.4	58.0	55.8	Hardin	108	2.9	108.7	102.3	Montgomery	16	0.4	63.1	60.4
Boone	63	1.7	61.7	53.0	Harlan	18	0.5	58.7	61.5	Morgan	10	0.3	70.6	71.8
Bourbon	10	0.3	45.2	50.0	Harrison	10	0.3	58.5	53.1	Muhlenberg	19	0.5	52.0	60.3
Boyd	25	0.7	43.9	50.5	Hart	14	0.4	73.0	76.9	Nelson	55	1.5	130.7	126.6
Boyle	34	0.9	116.2	119.6	Henderson	14	0.4	29.7	30.3	Nicholas	10	0.3	146.0	140.2
Bracken	*	-	-	-	Henry	20	0.5	131.1	129.7	Ohio	32	0.9	128.5	134.2
Breathitt	23	0.6	167.3	165.7	Hickman	*	-	-	-	Oldham	41	1.1	85.2	68.0
Breckinridge	14	0.4	77.0	69.8	Hopkins	22	0.6	40.5	46.9	Owen	10	0.3	95.0	92.2
Bullitt	52	1.4	79.5	70.0	Jackson	10	0.3	73.8	74.1	Owsley	9	0.2	182.9	189.3
Butler	7	0.2	56.7	55.2	Jefferson	797	21.8	101.5	107.5	Pendleton	15	0.4	89.3	100.8
Caldwell	7	0.2	43.5	53.9	Jessamine	40	1.1	84.4	82.3	Perry	52	1.4	183.1	181.1
Calloway	23	0.6	52.9	61.8	Johnson	16	0.4	68.3	68.5	Pike	47	1.3	68.5	72.3
Campbell	80	2.2	82.3	88.6	Kenton	115	3.1	74.4	72.0	Powell	17	0.5	132.7	134.8
Carlisle	8	0.2	123.1	156.7	Knott	25	0.7	162.0	152.9	Pulaski	73	2.0	111.2	115.8
Carroll	9	0.2	77.4	83.2	Knox	31	0.8	101.3	97.2	Robertson	*	-	-	-
Carter	11	0.3	38.7	39.7	Larue	17	0.5	120.9	119.8	Rockcastle	23	0.6	128.2	134.9
Casey	18	0.5	114.8	112.8	Laurel	64	1.7	112.6	108.8	Rowan	13	0.4	52.4	55.7
Christian	12	0.3	17.3	16.2	Lawrence	6	0.2	36.6	37.8	Russell	19	0.5	102.7	108.2
Clark	37	1.0	98.3	103.9	Lee	14	0.4	176.6	177.5	Scott	34	0.9	76.4	72.1
Clay	33	0.9	165.8	151.9	Leslie	16	0.4	138.2	141.5	Shelby	20	0.5	50.6	47.5
Clinton	19	0.5	174.5	185.0	Letcher	14	0.4	54.7	57.1	Simpson	7	0.2	38.0	40.4
Crittenden	7	0.2	71.2	75.1	Lewis	*	-	-	-	Spencer	9	0.2	69.4	52.8
Cumberland	6	0.2	69.2	87.5	Lincoln	29	0.8	117.1	117.2	Taylor	34	0.9	125.3	138.7
Daviess	84	2.3	80.3	86.9	Livingston	18	0.5	177.4	189.1	Todd	*	-	-	-
Edmonson	7	0.2	48.2	57.6	Logan	6	0.2	19.2	22.4	Trigg	6	0.2	35.1	41.8
Elliott	5	0.1	67.1	63.7	Lyon	11	0.3	102.9	132.3	Trimble	11	0.3	129.6	124.9
Estill	18	0.5	127.8	122.7	Madison	58	1.6	73.9	70.0	Union	*	-	-	-
Fayette	205	5.6	72.5	69.3	Magoffin	19	0.5	141.2	142.5	Warren	51	1.4	50.1	44.8
Fleming	7	0.2	46.0	48.8	Marion	25	0.7	128.2	126.1	Washington	15	0.4	124.6	128.0
Floyd	27	0.7	69.6	68.4	Marshall	48	1.3	124.5	152.6	Wayne	18	0.5	87.7	86.5
Franklin	40	1.1	77.5	81.2	Martin	*	-	-	-	Webster	*	-	-	-
Fulton	*	-	-	-	Mason	8	0.2	37.9	45.7	Whitley	35	1.0	100.8	98.2
Gallatin	7	0.2	101.4	81.5	McCracken	103	2.8	142.3	157.1	Wolfe	9	0.2	107.5	122.4
Garrard	16	0.4	92.9	94.6	McCreary	10	0.3	53.5	54.6	Woodford	16	0.4	69.4	64.2

* At least one but fewer than five

- Percentage or rate suppressed to prevent disclosure of the value on which it was based

Table 12: Incidence of All ED TBI* by County, Sorted by County, Kentucky, 2011

*Includes ED deaths as well as non-fatal ED cases

County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**
Adair	71	0.2	369.5	380.6	Grant	275	0.9	1119.8	1115.1	McLean	55	0.2	626.1	577.1
Allen	75	0.2	381.4	375.8	Graves	205	0.7	575.2	552.3	Meade	80	0.3	284.4	279.7
Anderson	120	0.4	587.8	560.2	Grayson	172	0.6	696.9	668.1	Menifee	33	0.1	582.2	523.3
Ballard	41	0.1	507.9	497.0	Green	81	0.3	760.2	719.5	Mercer	147	0.5	717.5	689.1
Barren	282	0.9	695.6	668.7	Greenup	386	1.3	1081.6	1045.8	Metcalfe	81	0.3	825.5	802.1
Bath	74	0.2	691.8	638.4	Hancock	24	0.1	311.1	280.2	Monroe	60	0.2	593.2	547.3
Bell	127	0.4	465.6	442.7	Hardin	653	2.1	623.3	618.7	Montgomery	184	0.6	722.1	694.4
Boone	916	3.0	814.0	771.0	Harlan	168	0.5	597.0	573.8	Morgan	81	0.3	623.9	581.8
Bourbon	150	0.5	797.3	750.6	Harrison	132	0.4	749.5	700.4	Muhlenberg	147	0.5	484.5	466.7
Boyd	789	2.6	1641.4	1592.6	Hart	93	0.3	524.7	511.0	Nelson	237	0.8	565.2	545.6
Boyle	177	0.6	656.4	622.5	Henderson	243	0.8	547.5	525.4	Nicholas	41	0.1	591.7	574.6
Bracken	80	0.3	993.8	942.5	Henry	131	0.4	902.3	849.8	Ohio	113	0.4	491.0	474.0
Breathitt	69	0.2	521.1	497.2	Hickman	10	0.0	220.9	204.0	Oldham	290	0.9	523.1	480.8
Breckinridge	73	0.2	386.4	363.9	Hopkins	483	1.6	1065.4	1029.4	Owen	55	0.2	543.9	507.3
Bullitt	441	1.4	632.6	593.4	Jackson	116	0.4	913.7	859.6	Owsley	27	0.1	633.3	567.8
Butler	42	0.1	346.1	331.0	Jefferson	5432	17.7	748.7	733.0	Pendleton	97	0.3	690.6	652.0
Caldwell	59	0.2	484.5	454.4	Jessamine	569	1.9	1178.7	1171.1	Perry	227	0.7	831.4	790.6
Calloway	196	0.6	543.1	527.0	Johnson	90	0.3	415.2	385.3	Pike	678	2.2	1110.8	1042.7
Campbell	721	2.4	804.2	798.1	Kenton	1314	4.3	837.4	822.7	Powell	136	0.4	1129.6	1078.3
Carlisle	27	0.1	587.6	529.0	Knott	87	0.3	570.2	532.2	Pulaski	534	1.7	905.7	846.8
Carroll	89	0.3	844.5	823.2	Knox	287	0.9	928.3	900.2	Robertson	11	0.0	469.5	482.0
Carter	248	0.8	928.1	894.7	Larue	101	0.3	754.6	711.6	Rockcastle	122	0.4	733.5	715.3
Casey	62	0.2	412.2	388.6	Laurel	706	2.3	1250.3	1199.7	Rowan	111	0.4	500.8	475.7
Christian	386	1.3	494.7	521.9	Lawrence	64	0.2	427.0	403.5	Russell	56	0.2	341.3	318.8
Clark	400	1.3	1183.8	1123.2	Lee	47	0.2	652.6	595.9	Scott	366	1.2	791.7	775.9
Clay	276	0.9	1298.3	1270.1	Leslie	85	0.3	781.5	751.6	Shelby	294	1.0	744.7	698.8
Clinton	24	0.1	245.8	233.6	Letcher	189	0.6	825.7	770.8	Simpson	89	0.3	520.3	513.7
Crittenden	49	0.2	552.1	526.0	Lewis	56	0.2	430.3	403.8	Spencer	108	0.4	666.7	633.0
Cumberland	40	0.1	644.2	583.4	Lincoln	165	0.5	692.9	666.9	Taylor	220	0.7	899.6	897.5
Daviess	514	1.7	554.1	531.8	Livingston	59	0.2	682.6	619.8	Todd	51	0.2	421.9	409.3
Edmonson	35	0.1	313.7	287.8	Logan	115	0.4	451.4	428.5	Trigg	65	0.2	478.0	453.3
Elliott	32	0.1	444.2	407.5	Lyon	34	0.1	448.7	409.0	Trimble	34	0.1	423.3	386.0
Estill	143	0.5	1033.4	974.7	Madison	826	2.7	1035.3	996.2	Union	59	0.2	399.3	393.2
Fayette	2014	6.6	699.6	680.9	Magoffin	43	0.1	345.4	322.5	Warren	479	1.6	423.6	420.9
Fleming	83	0.3	592.5	578.5	Marion	93	0.3	482.7	469.2	Washington	59	0.2	510.1	503.5
Floyd	283	0.9	757.6	717.4	Marshall	172	0.6	573.0	546.9	Wayne	121	0.4	623.6	581.4
Franklin	314	1.0	667.5	637.1	Martin	49	0.2	386.9	379.0	Webster	133	0.4	1017.8	976.4
Fulton	20	0.1	277.5	293.6	Mason	156	0.5	936.0	891.9	Whitley	473	1.5	1350.4	1327.3
Gallatin	93	0.3	1138.1	1082.8	McCracken	509	1.7	788.5	776.3	Wolfe	54	0.2	779.8	734.2
Garrard	103	0.3	647.3	609.0	McCreary	94	0.3	536.0	513.5	Woodford	178	0.6	763.1	713.7

**Rate per 100,000

Table 13: Incidence of All Inpatient TBI* by County, Sorted by Frequency, Kentucky, 2011

*Includes inpatient deaths as well as non-fatal inpatient cases

County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**
Jefferson	797	21.8	101.5	107.5	Hopkins	22	0.6	40.5	46.9	Harrison	10	0.3	58.5	53.1
Fayette	205	5.6	72.5	69.3	Grant	20	0.5	93.4	81.1	Jackson	10	0.3	73.8	74.1
Kenton	115	3.1	74.4	72.0	Henry	20	0.5	131.1	129.7	McCreary	10	0.3	53.5	54.6
Hardin	108	2.9	108.7	102.3	Shelby	20	0.5	50.6	47.5	Morgan	10	0.3	70.6	71.8
McCracken	103	2.8	142.3	157.1	Clinton	19	0.5	174.5	185.0	Nicholas	10	0.3	146.0	140.2
Daviess	84	2.3	80.3	86.9	Magoffin	19	0.5	141.2	142.5	Owen	10	0.3	95.0	92.2
Campbell	80	2.2	82.3	88.6	Muhlenberg	19	0.5	52.0	60.3	Carroll	9	0.2	77.4	83.2
Pulaski	73	2.0	111.2	115.8	Russell	19	0.5	102.7	108.2	Monroe	9	0.2	65.3	82.1
Laurel	64	1.7	112.6	108.8	Casey	18	0.5	114.8	112.8	Owsley	9	0.2	182.9	189.3
Boone	63	1.7	61.7	53.0	Estill	18	0.5	127.8	122.7	Spencer	9	0.2	69.4	52.8
Madison	58	1.6	73.9	70.0	Harlan	18	0.5	58.7	61.5	Wolfe	9	0.2	107.5	122.4
Nelson	55	1.5	130.7	126.6	Livingston	18	0.5	177.4	189.1	Carlisle	8	0.2	123.1	156.7
Bullitt	52	1.4	79.5	70.0	Wayne	18	0.5	87.7	86.5	Mason	8	0.2	37.9	45.7
Perry	52	1.4	183.1	181.1	Larue	17	0.5	120.9	119.8	McLean	8	0.2	74.4	83.9
Warren	51	1.4	50.1	44.8	Meade	17	0.5	60.2	59.4	Menifee	8	0.2	130.5	126.9
Marshall	48	1.3	124.5	152.6	Powell	17	0.5	132.7	134.8	Ballard	7	0.2	71.4	84.9
Pike	47	1.3	68.5	72.3	Bell	16	0.4	58.0	55.8	Butler	7	0.2	56.7	55.2
Oldham	41	1.1	85.2	68.0	Garrard	16	0.4	92.9	94.6	Caldwell	7	0.2	43.5	53.9
Franklin	40	1.1	77.5	81.2	Green	16	0.4	132.1	142.1	Crittenden	7	0.2	71.2	75.1
Jessamine	40	1.1	84.4	82.3	Johnson	16	0.4	68.3	68.5	Edmonson	7	0.2	48.2	57.6
Clark	37	1.0	98.3	103.9	Leslie	16	0.4	138.2	141.5	Fleming	7	0.2	46.0	48.8
Whitley	35	1.0	100.8	98.2	Montgomery	16	0.4	63.1	60.4	Gallatin	7	0.2	101.4	81.5
Boyle	34	0.9	116.2	119.6	Woodford	16	0.4	69.4	64.2	Metcalfe	7	0.2	64.5	69.3
Scott	34	0.9	76.4	72.1	Pendleton	15	0.4	89.3	100.8	Simpson	7	0.2	38.0	40.4
Taylor	34	0.9	125.3	138.7	Washington	15	0.4	124.6	128.0	Cumberland	6	0.2	69.2	87.5
Barren	33	0.9	71.6	78.2	Anderson	14	0.4	68.4	65.4	Hancock	6	0.2	75.8	70.1
Clay	33	0.9	165.8	151.9	Bath	14	0.4	116.2	120.8	Lawrence	6	0.2	36.6	37.8
Graves	32	0.9	73.2	86.2	Breckinridge	14	0.4	77.0	69.8	Logan	6	0.2	19.2	22.4
Ohio	32	0.9	128.5	134.2	Hart	14	0.4	73.0	76.9	Trigg	6	0.2	35.1	41.8
Knox	31	0.8	101.3	97.2	Henderson	14	0.4	29.7	30.3	Allen	5	0.1	25.6	25.1
Lincoln	29	0.8	117.1	117.2	Lee	14	0.4	176.6	177.5	Elliott	5	0.1	67.1	63.7
Grayson	28	0.8	104.2	108.8	Letcher	14	0.4	54.7	57.1	Todd	*	-	-	-
Floyd	27	0.7	69.6	68.4	Adair	13	0.4	68.4	69.7	Fulton	*	-	-	-
Boyd	25	0.7	43.9	50.5	Greenup	13	0.4	28.2	35.2	Lewis	*	-	-	-
Knott	25	0.7	162.0	152.9	Rowan	13	0.4	52.4	55.7	Martin	*	-	-	-
Marion	25	0.7	128.2	126.1	Christian	12	0.3	17.3	16.2	Robertson	*	-	-	-
Mercer	25	0.7	111.6	117.2	Carter	11	0.3	38.7	39.7	Webster	*	-	-	-
Breathitt	23	0.6	167.3	165.7	Lyon	11	0.3	102.9	132.3	Bracken	*	-	-	-
Calloway	23	0.6	52.9	61.8	Trimble	11	0.3	129.6	124.9	Hickman	*	-	-	-
Rockcastle	23	0.6	128.2	134.9	Bourbon	10	0.3	45.2	50.0	Union	*	-	-	-

* At least one but fewer than five

- Percentage or rate suppressed to prevent disclosure of the value on which it was based

**Rate per 100,000

Table 14: Incidence of All ED TBI* by County, Sorted by Frequency, Kentucky, 2011

*Includes ED deaths as well as non-fatal ED cases

County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**
Jefferson	5432	17.7	748.7	733.0	Boyle	177	0.6	656.4	622.5	Meade	80	0.3	284.4	279.7
Fayette	2014	6.6	699.6	680.9	Grayson	172	0.6	696.9	668.1	Allen	75	0.2	381.4	375.8
Kenton	1314	4.3	837.4	822.7	Marshall	172	0.6	573.0	546.9	Bath	74	0.2	691.8	638.4
Boone	916	3.0	814.0	771.0	Harlan	168	0.5	597.0	573.8	Breckinridge	73	0.2	386.4	363.9
Madison	826	2.7	1035.3	996.2	Lincoln	165	0.5	692.9	666.9	Adair	71	0.2	369.5	380.6
Boyd	789	2.6	1641.4	1592.6	Mason	156	0.5	936.0	891.9	Breathitt	69	0.2	521.1	497.2
Campbell	721	2.4	804.2	798.1	Bourbon	150	0.5	797.3	750.6	Trigg	65	0.2	478.0	453.3
Laurel	706	2.3	1250.3	1199.7	Mercer	147	0.5	717.5	689.1	Lawrence	64	0.2	427.0	403.5
Pike	678	2.2	1110.8	1042.7	Muhlenberg	147	0.5	484.5	466.7	Casey	62	0.2	412.2	388.6
Hardin	653	2.1	623.3	618.7	Estill	143	0.5	1033.4	974.7	Monroe	60	0.2	593.2	547.3
Jessamine	569	1.9	1178.7	1171.1	Powell	136	0.4	1129.6	1078.3	Caldwell	59	0.2	484.5	454.4
Pulaski	534	1.7	905.7	846.8	Webster	133	0.4	1017.8	976.4	Livingston	59	0.2	682.6	619.8
Daviess	514	1.7	554.1	531.8	Harrison	132	0.4	749.5	700.4	Union	59	0.2	399.3	393.2
McCracken	509	1.7	788.5	776.3	Henry	131	0.4	902.3	849.8	Washington	59	0.2	510.1	503.5
Hopkins	483	1.6	1065.4	1029.4	Bell	127	0.4	465.6	442.7	Lewis	56	0.2	430.3	403.8
Warren	479	1.6	423.6	420.9	Rockcastle	122	0.4	733.5	715.3	Russell	56	0.2	341.3	318.8
Whitley	473	1.5	1350.4	1327.3	Wayne	121	0.4	623.6	581.4	McLean	55	0.2	626.1	577.1
Bullitt	441	1.4	632.6	593.4	Anderson	120	0.4	587.8	560.2	Owen	55	0.2	543.9	507.3
Clark	400	1.3	1183.8	1123.2	Jackson	116	0.4	913.7	859.6	Wolfe	54	0.2	779.8	734.2
Christian	386	1.3	494.7	521.9	Logan	115	0.4	451.4	428.5	Todd	51	0.2	421.9	409.3
Greenup	386	1.3	1081.6	1045.8	Ohio	113	0.4	491.0	474.0	Crittenden	49	0.2	552.1	526.0
Scott	366	1.2	791.7	775.9	Rowan	111	0.4	500.8	475.7	Martin	49	0.2	386.9	379.0
Franklin	314	1.0	667.5	637.1	Spencer	108	0.4	666.7	633.0	Lee	47	0.2	652.6	595.9
Shelby	294	1.0	744.7	698.8	Garrard	103	0.3	647.3	609.0	Magoffin	43	0.1	345.4	322.5
Oldham	290	0.9	523.1	480.8	Larue	101	0.3	754.6	711.6	Butler	42	0.1	346.1	331.0
Knox	287	0.9	928.3	900.2	Pendleton	97	0.3	690.6	652.0	Ballard	41	0.1	507.9	497.0
Floyd	283	0.9	757.6	717.4	McCreary	94	0.3	536.0	513.5	Nicholas	41	0.1	591.7	574.6
Barren	282	0.9	695.6	668.7	Gallatin	93	0.3	1138.1	1082.8	Cumberland	40	0.1	644.2	583.4
Clay	276	0.9	1298.3	1270.1	Hart	93	0.3	524.7	511.0	Edmonson	35	0.1	313.7	287.8
Grant	275	0.9	1119.8	1115.1	Marion	93	0.3	482.7	469.2	Lyon	34	0.1	448.7	409.0
Carter	248	0.8	928.1	894.7	Johnson	90	0.3	415.2	385.3	Trimble	34	0.1	423.3	386.0
Henderson	243	0.8	547.5	525.4	Carroll	89	0.3	844.5	823.2	Menifee	33	0.1	582.2	523.3
Nelson	237	0.8	565.2	545.6	Simpson	89	0.3	520.3	513.7	Elliott	32	0.1	444.2	407.5
Perry	227	0.7	831.4	790.6	Knott	87	0.3	570.2	532.2	Carlisle	27	0.1	587.6	529.0
Taylor	220	0.7	899.6	897.5	Leslie	85	0.3	781.5	751.6	Owsley	27	0.1	633.3	567.8
Graves	205	0.7	575.2	552.3	Fleming	83	0.3	592.5	578.5	Clinton	24	0.1	245.8	233.6
Calloway	196	0.6	543.1	527.0	Green	81	0.3	760.2	719.5	Hancock	24	0.1	311.1	280.2
Letcher	189	0.6	825.7	770.8	Metcalfe	81	0.3	825.5	802.1	Fulton	20	0.1	277.5	293.6
Montgomery	184	0.6	722.1	694.4	Morgan	81	0.3	623.9	581.8	Robertson	11	0.0	469.5	482.0
Woodford	178	0.6	763.1	713.7	Bracken	80	0.3	993.8	942.5	Hickman	10	0.0	220.9	204.0

**Rate per 100,000

Table 15: Incidence of All Inpatient TBI* by County, Sorted by Age Adjusted Rate, Kentucky, 2011

*Includes inpatient deaths as well as non-fatal inpatient cases

County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**
Perry	52	1.4	183.1	181.1	Gallatin	7	0.2	101.4	81.5	Monroe	9	0.2	65.3	82.1
Owsley	9	0.2	182.9	189.3	Knox	31	0.8	101.3	97.2	Metcalfe	7	0.2	64.5	69.3
Livingston	18	0.5	177.4	189.1	Whitley	35	1.0	100.8	98.2	Montgomery	16	0.4	63.1	60.4
Lee	14	0.4	176.6	177.5	Clark	37	1.0	98.3	103.9	Boone	63	1.7	61.7	53.0
Clinton	19	0.5	174.5	185.0	Owen	10	0.3	95.0	92.2	Meade	17	0.5	60.2	59.4
Breathitt	23	0.6	167.3	165.7	Grant	20	0.5	93.4	81.1	Harlan	18	0.5	58.7	61.5
Clay	33	0.9	165.8	151.9	Garrard	16	0.4	92.9	94.6	Harrison	10	0.3	58.5	53.1
Knott	25	0.7	162.0	152.9	Robertson	*	-	-	-	Bell	16	0.4	58.0	55.8
Nicholas	10	0.3	146.0	140.2	Pendleton	15	0.4	89.3	100.8	Butler	7	0.2	56.7	55.2
McCracken	103	2.8	142.3	157.1	Wayne	18	0.5	87.7	86.5	Letcher	14	0.4	54.7	57.1
Magoffin	19	0.5	141.2	142.5	Oldham	41	1.1	85.2	68.0	McCreary	10	0.3	53.5	54.6
Leslie	16	0.4	138.2	141.5	Jessamine	40	1.1	84.4	82.3	Calloway	23	0.6	52.9	61.8
Powell	17	0.5	132.7	134.8	Campbell	80	2.2	82.3	88.6	Rowan	13	0.4	52.4	55.7
Green	16	0.4	132.1	142.1	Daviess	84	2.3	80.3	86.9	Muhlenberg	19	0.5	52.0	60.3
Henry	20	0.5	131.1	129.7	Bullitt	52	1.4	79.5	70.0	Shelby	20	0.5	50.6	47.5
Nelson	55	1.5	130.7	126.6	Franklin	40	1.1	77.5	81.2	Warren	51	1.4	50.1	44.8
Menifee	8	0.2	130.5	126.9	Carroll	9	0.2	77.4	83.2	Edmonson	7	0.2	48.2	57.6
Trimble	11	0.3	129.6	124.9	Breckinridge	14	0.4	77.0	69.8	Fleming	7	0.2	46.0	48.8
Ohio	32	0.9	128.5	134.2	Scott	34	0.9	76.4	72.1	Bourbon	10	0.3	45.2	50.0
Marion	25	0.7	128.2	126.1	Hancock	6	0.2	75.8	70.1	Boyd	25	0.7	43.9	50.5
Rockcastle	23	0.6	128.2	134.9	McLean	8	0.2	74.4	83.9	Caldwell	7	0.2	43.5	53.9
Estill	18	0.5	127.8	122.7	Kenton	115	3.1	74.4	72.0	Hopkins	22	0.6	40.5	46.9
Taylor	34	0.9	125.3	138.7	Madison	58	1.6	73.9	70.0	Fulton	*	-	-	-
Washington	15	0.4	124.6	128.0	Jackson	10	0.3	73.8	74.1	Carter	11	0.3	38.7	39.7
Marshall	48	1.3	124.5	152.6	Graves	32	0.9	73.2	86.2	Simpson	7	0.2	38.0	40.4
Carlisle	8	0.2	123.1	156.7	Hart	14	0.4	73.0	76.9	Mason	8	0.2	37.9	45.7
Larue	17	0.5	120.9	119.8	Fayette	205	5.6	72.5	69.3	Lawrence	6	0.2	36.6	37.8
Lincoln	29	0.8	117.1	117.2	Barren	33	0.9	71.6	78.2	Trigg	6	0.2	35.1	41.8
Bath	14	0.4	116.2	120.8	Ballard	7	0.2	71.4	84.9	Todd	*	-	-	-
Boyle	34	0.9	116.2	119.6	Crittenden	7	0.2	71.2	75.1	Henderson	14	0.4	29.7	30.3
Casey	18	0.5	114.8	112.8	Morgan	10	0.3	70.6	71.8	Greenup	13	0.4	28.2	35.2
Laurel	64	1.7	112.6	108.8	Floyd	27	0.7	69.6	68.4	Allen	5	0.1	25.6	25.1
Mercer	25	0.7	111.6	117.2	Spencer	9	0.2	69.4	52.8	Bracken	*	-	-	-
Pulaski	73	2.0	111.2	115.8	Woodford	16	0.4	69.4	64.2	Hickman	*	-	-	-
Hardin	108	2.9	108.7	102.3	Cumberland	6	0.2	69.2	87.5	Martin	*	-	-	-
Wolfe	9	0.2	107.5	122.4	Pike	47	1.3	68.5	72.3	Webster	*	-	-	-
Grayson	28	0.8	104.2	108.8	Anderson	14	0.4	68.4	65.4	Lewis	*	-	-	-
Lyon	11	0.3	102.9	132.3	Adair	13	0.4	68.4	69.7	Logan	6	0.2	19.2	22.4
Russell	19	0.5	102.7	108.2	Johnson	16	0.4	68.3	68.5	Christian	12	0.3	17.3	16.2
Jefferson	797	21.8	101.5	107.5	Elliott	5	0.1	67.1	63.7	Union	*	-	-	-

* At least one but fewer than five

- Percentage or rate suppressed to prevent disclosure of the value on which it was based

**Rate per 100,000

Table 16: Incidence of All ED TBI* by County, Sorted by Age Adjusted Rate, Kentucky, 2011

*Includes ED deaths as well as non-fatal ED cases

County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**
Boyd	789	2.6	1641.4	1592.6	Jefferson	5432	17.7	748.7	733.0	McCreary	94	0.3	536.0	513.5
Whitley	473	1.5	1350.4	1327.3	Shelby	294	1.0	744.7	698.8	Hart	93	0.3	524.7	511.0
Clay	276	0.9	1298.3	1270.1	Rockcastle	122	0.4	733.5	715.3	Oldham	290	0.9	523.1	480.8
Laurel	706	2.3	1250.3	1199.7	Montgomery	184	0.6	722.1	694.4	Breathitt	69	0.2	521.1	497.2
Clark	400	1.3	1183.8	1123.2	Mercer	147	0.5	717.5	689.1	Simpson	89	0.3	520.3	513.7
Jessamine	569	1.9	1178.7	1171.1	Fayette	2014	6.6	699.6	680.9	Washington	59	0.2	510.1	503.5
Gallatin	93	0.3	1138.1	1082.8	Grayson	172	0.6	696.9	668.1	Ballard	41	0.1	507.9	497.0
Powell	136	0.4	1129.6	1078.3	Barren	282	0.9	695.6	668.7	Rowan	111	0.4	500.8	475.7
Grant	275	0.9	1119.8	1115.1	Lincoln	165	0.5	692.9	666.9	Christian	386	1.3	494.7	521.9
Pike	678	2.2	1110.8	1042.7	Bath	74	0.2	691.8	638.4	Ohio	113	0.4	491.0	474.0
Greenup	386	1.3	1081.6	1045.8	Pendleton	97	0.3	690.6	652.0	Muhlenberg	147	0.5	484.5	466.7
Hopkins	483	1.6	1065.4	1029.4	Livingston	59	0.2	682.6	619.8	Caldwell	59	0.2	484.5	454.4
Madison	826	2.7	1035.3	996.2	Franklin	314	1.0	667.5	637.1	Marion	93	0.3	482.7	469.2
Estill	143	0.5	1033.4	974.7	Spencer	108	0.4	666.7	633.0	Trigg	65	0.2	478.0	453.3
Webster	133	0.4	1017.8	976.4	Boyle	177	0.6	656.4	622.5	Robertson	11	0.0	469.5	482.0
Bracken	80	0.3	993.8	942.5	Lee	47	0.2	652.6	595.9	Bell	127	0.4	465.6	442.7
Mason	156	0.5	936.0	891.9	Garrard	103	0.3	647.3	609.0	Logan	115	0.4	451.4	428.5
Knox	287	0.9	928.3	900.2	Cumberland	40	0.1	644.2	583.4	Lyon	34	0.1	448.7	409.0
Carter	248	0.8	928.1	894.7	Owsley	27	0.1	633.3	567.8	Elliott	32	0.1	444.2	407.5
Jackson	116	0.4	913.7	859.6	Bullitt	441	1.4	632.6	593.4	Lewis	56	0.2	430.3	403.8
Pulaski	534	1.7	905.7	846.8	McLean	55	0.2	626.1	577.1	Lawrence	64	0.2	427.0	403.5
Henry	131	0.4	902.3	849.8	Morgan	81	0.3	623.9	581.8	Warren	479	1.6	423.6	420.9
Taylor	220	0.7	899.6	897.5	Wayne	121	0.4	623.6	581.4	Trimble	34	0.1	423.3	386.0
Carroll	89	0.3	844.5	823.2	Hardin	653	2.1	623.3	618.7	Todd	51	0.2	421.9	409.3
Kenton	1314	4.3	837.4	822.7	Harlan	168	0.5	597.0	573.8	Johnson	90	0.3	415.2	385.3
Perry	227	0.7	831.4	790.6	Monroe	60	0.2	593.2	547.3	Casey	62	0.2	412.2	388.6
Letcher	189	0.6	825.7	770.8	Fleming	83	0.3	592.5	578.5	Union	59	0.2	399.3	393.2
Metcalfe	81	0.3	825.5	802.1	Nicholas	41	0.1	591.7	574.6	Martin	49	0.2	386.9	379.0
Boone	916	3.0	814.0	771.0	Anderson	120	0.4	587.8	560.2	Breckinridge	73	0.2	386.4	363.9
Campbell	721	2.4	804.2	798.1	Carlisle	27	0.1	587.6	529.0	Allen	75	0.2	381.4	375.8
Bourbon	150	0.5	797.3	750.6	Menifee	33	0.1	582.2	523.3	Adair	71	0.2	369.5	380.6
Scott	366	1.2	791.7	775.9	Graves	205	0.7	575.2	552.3	Butler	42	0.1	346.1	331.0
McCracken	509	1.7	788.5	776.3	Marshall	172	0.6	573.0	546.9	Magoffin	43	0.1	345.4	322.5
Leslie	85	0.3	781.5	751.6	Knott	87	0.3	570.2	532.2	Russell	56	0.2	341.3	318.8
Wolfe	54	0.2	779.8	734.2	Nelson	237	0.8	565.2	545.6	Edmonson	35	0.1	313.7	287.8
Woodford	178	0.6	763.1	713.7	Daviess	514	1.7	554.1	531.8	Hancock	24	0.1	311.1	280.2
Green	81	0.3	760.2	719.5	Crittenden	49	0.2	552.1	526.0	Meade	80	0.3	284.4	279.7
Floyd	283	0.9	757.6	717.4	Henderson	243	0.8	547.5	525.4	Fulton	20	0.1	277.5	293.6
Larue	101	0.3	754.6	711.6	Owen	55	0.2	543.9	507.3	Clinton	24	0.1	245.8	233.6
Harrison	132	0.4	749.5	700.4	Calloway	196	0.6	543.1	527.0	Hickman	10	0.0	220.9	204.0

**Rate per 100,000

Table 17: Barrell Matrix TBI Type I/II/III by Mechanism for Non-Fatal Inpatient TBI, Kentucky, 2011

Injury Mechanism	Type of TBI								Total
	Type I		Type II		Type III		Other		
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Motor vehicle traffic crash	219	12.6	83	29.7	12	18.2	11	14.1	325
Falls	922	53.2	88	31.5	28	42.4	47	60.3	1,085
Non-traffic land transportation	55	3.2	17	6.1	1	1.5	0	0.0	73
Struck by or against object or person	112	6.5	21	7.5	4	6.1	3	3.8	140
Non-traffic pedal cycle	12	0.7	5	1.8	0	0.0	0	0.0	17
Firearm	11	0.6	2	0.7	2	3.0	0	0.0	15
Other	86	5.0	13	4.7	6	9.1	4	5.1	109
Unknown	316	18.2	50	17.9	13	19.7	13	16.7	392
Total	1,733	100.0	279	100.0	66	100.0	78	100.0	2,156

Table 18: Barrell Matrix TBI Type I/II/III by Mechanism for Non-Fatal ED TBI, Kentucky, 2011

Injury Mechanism	Type of TBI								Total
	Type I		Type II		Type III		Other		
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Motor vehicle traffic crash	132	16.4	1,553	21.0	30	9.2	1,794	14.0	3,509
Falls	346	42.9	2,492	33.8	154	47.4	5,983	46.7	8,975
Non-traffic land transportation	36	4.5	235	3.2	13	4.0	254	2.0	538
Struck by or against object or person	106	13.2	1,891	25.6	65	20.0	2,588	20.2	4,650
Non-traffic pedal cycle	16	2.0	140	1.9	10	3.1	145	1.1	311
Firearm	5	0.6	6	0.1	0	0.0	2	0.0	13
Other	73	9.1	532	7.2	35	10.8	758	5.9	1,398
Unknown	92	11.4	531	7.2	18	5.5	1,286	10.0	1,927
Total	806	100.0	7,380	100.0	325	100.0	12,810	100.0	21,321

Table 19: Length of Stay for Non-Fatal Inpatient TBI, Kentucky, 2011

Length of Stay	Number	Percent*
1 day	693	20.1
More than one day but less than 1 week	1811	52.6
1 week to less than 2 weeks	584	17.0
2 weeks to less than 3 weeks	201	5.8
3 weeks to less than 4 weeks	83	2.4
4 weeks or more	73	2.1
Total	3445	100.0

Table 20: Work Related Non-Fatal TBI, Kentucky 2011

Inpatient Work TBI	LOS Days	Cost
Mean	10.1	\$75,998
Median	3	\$29,686
Min, Max	1 - 213	\$4,035, \$494,799
Sum of Charges		\$5,015,866

ED Work TBI	Cost
Mean	\$3,405
Median	\$2,697
Min, Max	\$111, \$48,287
Sum of Charges	\$3,367,271

Table 21: Primary Payer and Charges for Non-Fatal Inpatient TBI, Kentucky, 2011

Payer	Number of Discharges	Percent of Discharges	Total Hospital Charges
Government	1,890	54.9	\$ 76,419,004
Commercial Ins	913	26.5	\$ 55,233,489
Self Pay	196	5.7	\$ 6,842,916
Workers Compensation	65	1.9	\$ 4,985,315
Other	380	11.0	\$ 25,936,927
Total	3,444	100.0	\$ 169,417,651

Table 22: Primary Payer and Charges for Non-Fatal ED TBI, Kentucky, 2011

Payer	Number of Discharges	Percent of Discharges	Total Hospital Charges
Government	10,500	34.4	\$ 33,010,341
Commercial Ins	11,134	36.5	\$ 38,043,049
Self Pay	4,085	13.4	\$ 15,315,296
Workers Compensation	973	3.2	\$ 3,312,989
Other	3,827	12.5	\$ 12,794,129
Total	30,519	100.0	\$ 102,475,804

Table 23: Non-Fatal ABI by Age Group, Kentucky, 2011

Age	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
0-4	122	33.1	43.2	247	66.9	87.5	369	100.0	130.7
5-14	60	21.1	10.6	224	78.9	39.5	284	100.0	50.1
15-24	181	43.5	30.8	235	56.5	40.1	416	100.0	70.9
25-44	750	64.2	65.6	418	35.8	36.6	1,168	100.0	102.2
45-64	1,014	76.4	85.8	313	23.6	26.5	1,327	100.0	112.3
65+	632	84.7	109.3	114	15.3	19.7	746	100.0	129.0
Total	2,759	64.0	63.6	1,551	36.0	35.7	4,310	100.0	99.3

Table 24: Non-Fatal ABI by Gender, Kentucky, 2011

Age	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
Male	1,302	65.9	61.0	673	34.1	31.5	1,975	100.0	92.5
Female	1,457	62.4	66.1	878	37.6	39.8	2,335	100.0	105.9
Total	2,759	64.0	63.6	1,551	36.0	35.7	4,310	100.0	99.3

Table 25: Incidence of All Inpatient ABI* by County, Sorted by County, Kentucky, 2011

*Includes inpatient deaths as well as non-fatal inpatient cases

County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**
Adair	13	0.4	66.1	69.7	Grant	16	0.5	67.9	64.9	McLean	6	0.2	47.0	63.0
Allen	12	0.3	50.7	60.1	Graves	45	1.3	114.6	121.2	Meade	17	0.5	61.3	59.4
Anderson	16	0.5	79.4	74.7	Grayson	24	0.7	90.6	93.2	Menifee	*	-	-	-
Ballard	5	0.1	56.8	60.6	Green	11	0.3	77.7	97.7	Mercer	25	0.7	98.6	117.2
Barren	37	1.0	81.7	87.7	Greenup	14	0.4	34.9	37.9	Metcalfe	9	0.3	74.5	89.1
Bath	12	0.3	101.0	103.5	Hancock	7	0.2	77.0	81.7	Monroe	12	0.3	86.0	109.5
Bell	37	1.0	121.1	129.0	Hardin	78	2.2	72.4	73.9	Montgomery	25	0.7	85.7	94.3
Boone	82	2.3	71.4	69.0	Harlan	29	0.8	103.3	99.1	Morgan	15	0.4	114.3	107.7
Bourbon	9	0.3	40.0	45.0	Harrison	12	0.3	56.7	63.7	Muhlenberg	26	0.7	63.8	82.5
Boyd	37	1.0	64.6	74.7	Hart	9	0.3	48.5	49.5	Nelson	45	1.3	97.3	103.6
Boyle	30	0.8	95.9	105.5	Henderson	17	0.5	33.3	36.8	Nicholas	9	0.3	124.8	126.1
Bracken	8	0.2	80.7	94.3	Henry	18	0.5	112.0	116.8	Ohio	12	0.3	50.1	50.3
Breathitt	19	0.5	132.3	136.9	Hickman	6	0.2	89.4	122.4	Oldham	17	0.5	34.3	28.2
Breckinridge	11	0.3	51.8	54.8	Hopkins	32	0.9	66.6	68.2	Owen	8	0.2	64.8	73.8
Bullitt	44	1.2	57.1	59.2	Jackson	15	0.4	109.3	111.2	Owsley	7	0.2	143.4	147.2
Butler	16	0.5	113.4	126.1	Jefferson	647	18.3	83.7	87.3	Pendleton	11	0.3	74.6	73.9
Caldwell	9	0.3	59.1	69.3	Jessamine	35	1.0	72.0	72.0	Perry	36	1.0	117.9	125.4
Calloway	12	0.3	31.5	32.3	Johnson	34	1.0	139.0	145.6	Pike	66	1.9	96.8	101.5
Campbell	74	2.1	78.2	81.9	Kenton	131	3.7	81.7	82.0	Powell	17	0.5	128.2	134.8
Carlisle	*	-	-	-	Knott	21	0.6	127.3	128.5	Pulaski	56	1.6	83.5	88.8
Carroll	12	0.3	105.5	111.0	Knox	39	1.1	110.5	122.3	Robertson	*	-	-	-
Carter	15	0.4	53.3	54.1	Larue	13	0.4	77.9	91.6	Rockcastle	10	0.3	52.0	58.6
Casey	12	0.3	55.1	75.2	Laurel	69	2.0	113.9	117.2	Rowan	25	0.7	115.3	107.1
Christian	44	1.2	69.3	59.5	Lawrence	9	0.3	57.6	56.7	Russell	16	0.5	84.6	91.1
Clark	39	1.1	102.7	109.5	Lee	7	0.2	69.1	88.8	Scott	21	0.6	43.5	44.5
Clay	30	0.8	134.7	138.1	Leslie	14	0.4	114.1	123.8	Shelby	26	0.7	58.5	61.8
Clinton	10	0.3	84.0	97.4	Letcher	29	0.8	109.3	118.3	Simpson	21	0.6	108.0	121.2
Crittenden	5	0.1	45.6	53.7	Lewis	*	-	-	-	Spencer	10	0.3	68.0	58.6
Cumberland	*	-	-	-	Lincoln	21	0.6	79.0	84.9	Taylor	21	0.6	83.9	85.7
Daviess	85	2.4	83.6	87.9	Livingston	11	0.3	101.1	115.6	Todd	*	-	-	-
Edmonson	7	0.2	56.4	57.6	Logan	15	0.4	51.9	55.9	Trigg	7	0.2	34.4	48.8
Elliott	*	-	-	-	Lyon	*	-	-	-	Trimble	*	-	-	-
Estill	17	0.5	91.1	115.9	Madison	54	1.5	65.1	65.1	Union	6	0.2	41.3	40.0
Fayette	226	6.4	79.3	76.4	Magoffin	23	0.7	175.8	172.5	Warren	67	1.9	62.0	58.9
Fleming	8	0.2	53.6	55.8	Marion	10	0.3	47.9	50.5	Washington	9	0.3	61.9	76.8
Floyd	47	1.3	113.5	119.1	Marshall	31	0.9	93.9	98.6	Wayne	14	0.4	71.1	67.3
Franklin	32	0.9	64.5	64.9	Martin	8	0.2	63.1	61.9	Webster	13	0.4	77.9	95.4
Fulton	8	0.2	77.6	117.4	Mason	12	0.3	59.0	68.6	Whitley	40	1.1	106.3	112.2
Gallatin	8	0.2	107.9	93.1	McCracken	76	2.2	109.8	115.9	Wolfe	18	0.5	215.9	244.7
Garrard	10	0.3	57.6	59.1	McCreary	9	0.3	44.8	49.2	Woodford	15	0.4	67.0	60.1

* At least one but fewer than five

- Percentage or rate suppressed to prevent disclosure of the value on which it was based

**Rate per 100,000

Table 26: Incidence of All ED ABI* by County, Sorted by County, Kentucky, 2011

*Includes ED deaths as well as non-fatal ED cases

County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**
Adair	5	0.3	24.5	26.8	Grant	9	0.6	34.6	36.5	McLean	*	-	-	-
Allen	*	-	-	-	Graves	10	0.6	30.6	26.9	Meade	*	-	-	-
Anderson	8	0.5	40.8	37.3	Grayson	13	0.8	54.7	50.5	Menifee	*	-	-	-
Ballard	*	-	-	-	Green	9	0.6	67.1	79.9	Mercer	10	0.6	56.1	46.9
Barren	28	1.8	68.2	66.4	Greenup	6	0.4	17.2	16.3	Metcalfe	*	-	-	-
Bath	7	0.4	56.9	60.4	Hancock	*	-	-	-	Monroe	8	0.5	69.9	73.0
Bell	16	1.0	59.0	55.8	Hardin	26	1.6	25.1	24.6	Montgomery	14	0.9	53.4	52.8
Boone	29	1.8	25.1	24.4	Harlan	7	0.4	26.1	23.9	Morgan	14	0.9	103.6	100.6
Bourbon	5	0.3	23.3	25.0	Harrison	*	-	-	-	Muhlenberg	10	0.6	33.3	31.7
Boyd	11	0.7	24.0	22.2	Hart	10	0.6	59.1	54.9	Nelson	7	0.4	15.3	16.1
Boyle	9	0.6	31.6	31.7	Henderson	10	0.6	22.4	21.6	Nicholas	*	-	-	-
Bracken	*	-	-	-	Henry	8	0.5	55.3	51.9	Ohio	7	0.4	28.1	29.4
Breathitt	*	-	-	-	Hickman	*	-	-	-	Oldham	19	1.2	31.4	31.5
Breckinridge	17	1.1	84.5	84.8	Hopkins	33	2.1	76.7	70.3	Owen	7	0.4	70.0	64.6
Bullitt	30	1.9	43.1	40.4	Jackson	*	-	-	-	Owsley	*	-	-	-
Butler	*	-	-	-	Jefferson	329	20.8	45.9	44.4	Pendleton	8	0.5	53.4	53.8
Caldwell	*	-	-	-	Jessamine	18	1.1	36.3	37.0	Perry	*	-	-	-
Calloway	8	0.5	22.5	21.5	Johnson	12	0.8	57.4	51.4	Pike	21	1.3	36.0	32.3
Campbell	32	2.0	35.6	35.4	Kenton	42	2.7	26.1	26.3	Powell	7	0.4	59.3	55.5
Carlisle	*	-	-	-	Knott	*	-	-	-	Pulaski	20	1.3	34.5	31.7
Carroll	10	0.6	97.9	92.5	Knox	13	0.8	38.0	40.8	Robertson	0	0.0	0.0	0.0
Carter	*	-	-	-	Larue	5	0.3	38.9	35.2	Rockcastle	7	0.4	43.4	41.0
Casey	10	0.6	53.4	62.7	Laurel	20	1.3	34.5	34.0	Rowan	16	1.0	78.0	68.6
Christian	19	1.2	23.5	25.7	Lawrence	*	-	-	-	Russell	9	0.6	51.9	51.2
Clark	13	0.8	39.1	36.5	Lee	5	0.3	66.1	63.4	Scott	25	1.6	50.9	53.0
Clay	8	0.5	38.7	36.8	Leslie	5	0.3	47.7	44.2	Shelby	9	0.6	21.8	21.4
Clinton	*	-	-	-	Letcher	5	0.3	20.2	20.4	Simpson	9	0.6	53.1	51.9
Crittenden	*	-	-	-	Lewis	0	0.0	0.0	0.0	Spencer	*	-	-	-
Cumberland	*	-	-	-	Lincoln	12	0.8	50.1	48.5	Taylor	6	0.4	26.3	24.5
Daviess	20	1.3	20.1	20.7	Livingston	5	0.3	54.0	52.5	Todd	*	-	-	-
Edmonson	0	0.0	0.0	0.0	Logan	11	0.7	43.7	41.0	Trigg	10	0.6	79.6	69.7
Elliott	*	-	-	-	Lyon	*	-	-	-	Trimble	*	-	-	-
Estill	11	0.7	73.9	75.0	Madison	32	2.0	41.7	38.6	Union	6	0.4	41.7	40.0
Fayette	107	6.8	34.9	36.2	Magoffin	6	0.4	48.4	45.0	Warren	30	1.9	27.0	26.4
Fleming	10	0.6	63.4	69.7	Marion	10	0.6	53.2	50.5	Washington	*	-	-	-
Floyd	23	1.5	63.4	58.3	Marshall	9	0.6	30.1	28.6	Wayne	9	0.6	50.7	43.2
Franklin	20	1.3	39.2	40.6	Martin	*	-	-	-	Webster	7	0.4	54.0	51.4
Fulton	*	-	-	-	Mason	6	0.4	36.3	34.3	Whitley	15	0.9	41.4	42.1
Gallatin	*	-	-	-	McCracken	25	1.6	42.5	38.1	Wolfe	5	0.3	82.1	68.0
Garrard	8	0.5	50.3	47.3	McCreary	*	-	-	-	Woodford	*	-	-	-

* At least one but fewer than five

- Percentage or rate suppressed to prevent disclosure of the value on which it was based

**Rate per 100,000

Table 27: Incidence of All Inpatient ABI* by County, Sorted by Frequency, Kentucky, 2011

*Includes inpatient deaths as well as non-fatal inpatient cases

County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**
Jefferson	647	18.3	83.7	87.3	Magoffin	23	0.7	175.8	172.5	Livingston	11	0.3	101.1	115.6
Fayette	226	6.4	79.3	76.4	Knott	21	0.6	127.3	128.5	Pendleton	11	0.3	74.6	73.9
Kenton	131	3.7	81.7	82.0	Lincoln	21	0.6	79.0	84.9	Clinton	10	0.3	84.0	97.4
Daviess	85	2.4	83.6	87.9	Scott	21	0.6	43.5	44.5	Garrard	10	0.3	57.6	59.1
Boone	82	2.3	71.4	69.0	Simpson	21	0.6	108.0	121.2	Marion	10	0.3	47.9	50.5
Hardin	78	2.2	72.4	73.9	Taylor	21	0.6	83.9	85.7	Rockcastle	10	0.3	52.0	58.6
McCracken	76	2.2	109.8	115.9	Breathitt	19	0.5	132.3	136.9	Spencer	10	0.3	68.0	58.6
Campbell	74	2.1	78.2	81.9	Henry	18	0.5	112.0	116.8	Bourbon	9	0.3	40.0	45.0
Laurel	69	2.0	113.9	117.2	Wolfe	18	0.5	215.9	244.7	Caldwell	9	0.3	59.1	69.3
Warren	67	1.9	62.0	58.9	Estill	17	0.5	91.1	115.9	Hart	9	0.3	48.5	49.5
Pike	66	1.9	96.8	101.5	Henderson	17	0.5	33.3	36.8	Lawrence	9	0.3	57.6	56.7
Pulaski	56	1.6	83.5	88.8	Meade	17	0.5	61.3	59.4	McCreary	9	0.3	44.8	49.2
Madison	54	1.5	65.1	65.1	Oldham	17	0.5	34.3	28.2	Metcalfe	9	0.3	74.5	89.1
Floyd	47	1.3	113.5	119.1	Powell	17	0.5	128.2	134.8	Nicholas	9	0.3	124.8	126.1
Graves	45	1.3	114.6	121.2	Anderson	16	0.5	79.4	74.7	Washington	9	0.3	61.9	76.8
Nelson	45	1.3	97.3	103.6	Butler	16	0.5	113.4	126.1	Bracken	8	0.2	80.7	94.3
Bullitt	44	1.2	57.1	59.2	Grant	16	0.5	67.9	64.9	Fleming	8	0.2	53.6	55.8
Christian	44	1.2	69.3	59.5	Russell	16	0.5	84.6	91.1	Fulton	8	0.2	77.6	117.4
Whitley	40	1.1	106.3	112.2	Carter	15	0.4	53.3	54.1	Gallatin	8	0.2	107.9	93.1
Clark	39	1.1	102.7	109.5	Jackson	15	0.4	109.3	111.2	Martin	8	0.2	63.1	61.9
Knox	39	1.1	110.5	122.3	Logan	15	0.4	51.9	55.9	Owen	8	0.2	64.8	73.8
Barren	37	1.0	81.7	87.7	Morgan	15	0.4	114.3	107.7	Edmonson	7	0.2	56.4	57.6
Bell	37	1.0	121.1	129.0	Woodford	15	0.4	67.0	60.1	Hancock	7	0.2	77.0	81.7
Boyd	37	1.0	64.6	74.7	Greenup	14	0.4	34.9	37.9	Lee	7	0.2	69.1	88.8
Perry	36	1.0	117.9	125.4	Leslie	14	0.4	114.1	123.8	Owsley	7	0.2	143.4	147.2
Jessamine	35	1.0	72.0	72.0	Wayne	14	0.4	71.1	67.3	Trigg	7	0.2	34.4	48.8
Johnson	34	1.0	139.0	145.6	Adair	13	0.4	66.1	69.7	Hickman	6	0.2	89.4	122.4
Franklin	32	0.9	64.5	64.9	Larue	13	0.4	77.9	91.6	McLean	6	0.2	47.0	63.0
Hopkins	32	0.9	66.6	68.2	Webster	13	0.4	77.9	95.4	Union	6	0.2	41.3	40.0
Marshall	31	0.9	93.9	98.6	Allen	12	0.3	50.7	60.1	Ballard	5	0.1	56.8	60.6
Boyle	30	0.8	95.9	105.5	Bath	12	0.3	101.0	103.5	Crittenden	5	0.1	45.6	53.7
Clay	30	0.8	134.7	138.1	Calloway	12	0.3	31.5	32.3	Cumberland	*	-	-	-
Harlan	29	0.8	103.3	99.1	Carroll	12	0.3	105.5	111.0	Lewis	*	-	-	-
Letcher	29	0.8	109.3	118.3	Casey	12	0.3	55.1	75.2	Todd	*	-	-	-
Muhlenberg	26	0.7	63.8	82.5	Harrison	12	0.3	56.7	63.7	Lyon	*	-	-	-
Shelby	26	0.7	58.5	61.8	Mason	12	0.3	59.0	68.6	Carlisle	*	-	-	-
Mercer	25	0.7	98.6	117.2	Monroe	12	0.3	86.0	109.5	Elliott	*	-	-	-
Montgomery	25	0.7	85.7	94.3	Ohio	12	0.3	50.1	50.3	Robertson	*	-	-	-
Rowan	25	0.7	115.3	107.1	Breckinridge	11	0.3	51.8	54.8	Trimble	*	-	-	-
Grayson	24	0.7	90.6	93.2	Green	11	0.3	77.7	97.7	Menifee	*	-	-	-

* At least one but fewer than five

- Percentage or rate suppressed to prevent disclosure of the value on which it was based

**Rate per 100,000

Table 28: Incidence of All ED ABI* by County, Sorted by Frequency, Kentucky, 2011

*Includes ED deaths as well as non-fatal ED cases

County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**
Jefferson	329	20.8	45.9	44.4	Hart	10	0.6	59.1	54.9	Livingston	5	0.3	54.0	52.5
Fayette	107	6.8	34.9	36.2	Henderson	10	0.6	22.4	21.6	Wolfe	5	0.3	82.1	68.0
Kenton	42	2.7	26.1	26.3	Marion	10	0.6	53.2	50.5	Bracken	*	-	-	-
Hopkins	33	2.1	76.7	70.3	Mercer	10	0.6	56.1	46.9	Caldwell	*	-	-	-
Campbell	32	2.0	35.6	35.4	Muhlenberg	10	0.6	33.3	31.7	Harrison	*	-	-	-
Madison	32	2.0	41.7	38.6	Trigg	10	0.6	79.6	69.7	Knott	*	-	-	-
Bullitt	30	1.9	43.1	40.4	Boyle	9	0.6	31.6	31.7	Lawrence	*	-	-	-
Warren	30	1.9	27.0	26.4	Grant	9	0.6	34.6	36.5	Martin	*	-	-	-
Boone	29	1.8	25.1	24.4	Green	9	0.6	67.1	79.9	Spencer	*	-	-	-
Barren	28	1.8	68.2	66.4	Marshall	9	0.6	30.1	28.6	Trimble	*	-	-	-
Hardin	26	1.6	25.1	24.6	Russell	9	0.6	51.9	51.2	Allen	*	-	-	-
McCracken	25	1.6	42.5	38.1	Shelby	9	0.6	21.8	21.4	Ballard	*	-	-	-
Scott	25	1.6	50.9	53.0	Simpson	9	0.6	53.1	51.9	Clinton	*	-	-	-
Floyd	23	1.5	63.4	58.3	Wayne	9	0.6	50.7	43.2	Cumberland	*	-	-	-
Pike	21	1.3	36.0	32.3	Anderson	8	0.5	40.8	37.3	Hickman	*	-	-	-
Daviess	20	1.3	20.1	20.7	Calloway	8	0.5	22.5	21.5	Jackson	*	-	-	-
Franklin	20	1.3	39.2	40.6	Clay	8	0.5	38.7	36.8	McCreary	*	-	-	-
Laurel	20	1.3	34.5	34.0	Garrard	8	0.5	50.3	47.3	Metcalfe	*	-	-	-
Pulaski	20	1.3	34.5	31.7	Henry	8	0.5	55.3	51.9	Perry	*	-	-	-
Christian	19	1.2	23.5	25.7	Monroe	8	0.5	69.9	73.0	Todd	*	-	-	-
Oldham	19	1.2	31.4	31.5	Pendleton	8	0.5	53.4	53.8	Woodford	*	-	-	-
Jessamine	18	1.1	36.3	37.0	Bath	7	0.4	56.9	60.4	Breathitt	*	-	-	-
Breckinridge	17	1.1	84.5	84.8	Harlan	7	0.4	26.1	23.9	Butler	*	-	-	-
Bell	16	1.0	59.0	55.8	Nelson	7	0.4	15.3	16.1	Crittenden	*	-	-	-
Rowan	16	1.0	78.0	68.6	Ohio	7	0.4	28.1	29.4	Elliott	*	-	-	-
Whitley	15	0.9	41.4	42.1	Owen	7	0.4	70.0	64.6	Fulton	*	-	-	-
Montgomery	14	0.9	53.4	52.8	Powell	7	0.4	59.3	55.5	Gallatin	*	-	-	-
Morgan	14	0.9	103.6	100.6	Rockcastle	7	0.4	43.4	41.0	Lyon	*	-	-	-
Clark	13	0.8	39.1	36.5	Webster	7	0.4	54.0	51.4	McLean	*	-	-	-
Grayson	13	0.8	54.7	50.5	Greenup	6	0.4	17.2	16.3	Meade	*	-	-	-
Knox	13	0.8	38.0	40.8	Magoffin	6	0.4	48.4	45.0	Nicholas	*	-	-	-
Johnson	12	0.8	57.4	51.4	Mason	6	0.4	36.3	34.3	Owsley	*	-	-	-
Lincoln	12	0.8	50.1	48.5	Taylor	6	0.4	26.3	24.5	Washington	*	-	-	-
Boyd	11	0.7	24.0	22.2	Union	6	0.4	41.7	40.0	Carlisle	*	-	-	-
Estill	11	0.7	73.9	75.0	Adair	5	0.3	24.5	26.8	Carter	*	-	-	-
Logan	11	0.7	43.7	41.0	Bourbon	5	0.3	23.3	25.0	Hancock	*	-	-	-
Carroll	10	0.6	97.9	92.5	Larue	5	0.3	38.9	35.2	Menifee	*	-	-	-
Casey	10	0.6	53.4	62.7	Lee	5	0.3	66.1	63.4	Edmonson	*	-	-	-
Fleming	10	0.6	63.4	69.7	Leslie	5	0.3	47.7	44.2	Lewis	*	-	-	-
Graves	10	0.6	30.6	26.9	Letcher	5	0.3	20.2	20.4	Robertson	*	-	-	-

* At least one but fewer than five

- Percentage or rate suppressed to prevent disclosure of the value on which it was based

**Rate per 100,000

Table 29: Incidence of All Inpatient ABI* by County, Sorted by Age Adjusted Rate, Kentucky, 201

*Includes inpatient deaths as well as non-fatal inpatient cases

County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**	County	Freq	Percent	Age-Adjusted Rate**	Crude Rate**
Wolfe	18	0.5	215.9	244.7	Monroe	12	0.3	86.0	109.5	Washington	9	0.3	61.9	76.8
Magoffin	23	0.7	175.8	172.5	Montgomery	25	0.7	85.7	94.3	Meade	17	0.5	61.3	59.4
Owsley	7	0.2	143.4	147.2	Russell	16	0.5	84.6	91.1	Caldwell	9	0.3	59.1	69.3
Johnson	34	1.0	139.0	145.6	Clinton	10	0.3	84.0	97.4	Mason	12	0.3	59.0	68.6
Clay	30	0.8	134.7	138.1	Taylor	21	0.6	83.9	85.7	Shelby	26	0.7	58.5	61.8
Breathitt	19	0.5	132.3	136.9	Jefferson	647	18.3	83.7	87.3	Lawrence	9	0.3	57.6	56.7
Powell	17	0.5	128.2	134.8	Daviess	85	2.4	83.6	87.9	Garrard	10	0.3	57.6	59.1
Knott	21	0.6	127.3	128.5	Pulaski	56	1.6	83.5	88.8	Bullitt	44	1.2	57.1	59.2
Nicholas	9	0.3	124.8	126.1	Barren	37	1.0	81.7	87.7	Ballard	5	0.1	56.8	60.6
Bell	37	1.0	121.1	129.0	Kenton	131	3.7	81.7	82.0	Harrison	12	0.3	56.7	63.7
Perry	36	1.0	117.9	125.4	Bracken	8	0.2	80.7	94.3	Edmonson	7	0.2	56.4	57.6
Rowan	25	0.7	115.3	107.1	Anderson	16	0.5	79.4	74.7	Casey	12	0.3	55.1	75.2
Graves	45	1.3	114.6	121.2	Fayette	226	6.4	79.3	76.4	Fleming	8	0.2	53.6	55.8
Morgan	15	0.4	114.3	107.7	Lincoln	21	0.6	79.0	84.9	Carter	15	0.4	53.3	54.1
Leslie	14	0.4	114.1	123.8	Campbell	74	2.1	78.2	81.9	Cumberland	*	-	-	-
Laurel	69	2.0	113.9	117.2	Larue	13	0.4	77.9	91.6	Rockcastle	10	0.3	52.0	58.6
Floyd	47	1.3	113.5	119.1	Webster	13	0.4	77.9	95.4	Logan	15	0.4	51.9	55.9
Butler	16	0.5	113.4	126.1	Green	11	0.3	77.7	97.7	Breckinridge	11	0.3	51.8	54.8
Henry	18	0.5	112.0	116.8	Fulton	8	0.2	77.6	117.4	Allen	12	0.3	50.7	60.1
Knox	39	1.1	110.5	122.3	Hancock	7	0.2	77.0	81.7	Ohio	12	0.3	50.1	50.3
McCracken	76	2.2	109.8	115.9	Pendleton	11	0.3	74.6	73.9	Hart	9	0.3	48.5	49.5
Jackson	15	0.4	109.3	111.2	Metcalfe	9	0.3	74.5	89.1	Marion	10	0.3	47.9	50.5
Letcher	29	0.8	109.3	118.3	Hardin	78	2.2	72.4	73.9	McLean	6	0.2	47.0	63.0
Simpson	21	0.6	108.0	121.2	Jessamine	35	1.0	72.0	72.0	Crittenden	5	0.1	45.6	53.7
Gallatin	8	0.2	107.9	93.1	Boone	82	2.3	71.4	69.0	McCreary	9	0.3	44.8	49.2
Whitley	40	1.1	106.3	112.2	Wayne	14	0.4	71.1	67.3	Scott	21	0.6	43.5	44.5
Carroll	12	0.3	105.5	111.0	Christian	44	1.2	69.3	59.5	Union	6	0.2	41.3	40.0
Harlan	29	0.8	103.3	99.1	Lee	7	0.2	69.1	88.8	Bourbon	9	0.3	40.0	45.0
Clark	39	1.1	102.7	109.5	Spencer	10	0.3	68.0	58.6	Carlisle	*	-	-	-
Livingston	11	0.3	101.1	115.6	Grant	16	0.5	67.9	64.9	Greenup	14	0.4	34.9	37.9
Bath	12	0.3	101.0	103.5	Woodford	15	0.4	67.0	60.1	Trigg	7	0.2	34.4	48.8
Mercer	25	0.7	98.6	117.2	Hopkins	32	0.9	66.6	68.2	Oldham	17	0.5	34.3	28.2
Nelson	45	1.3	97.3	103.6	Adair	13	0.4	66.1	69.7	Henderson	17	0.5	33.3	36.8
Robertson	*	-	-	-	Madison	54	1.5	65.1	65.1	Calloway	12	0.3	31.5	32.3
Pike	66	1.9	96.8	101.5	Owen	8	0.2	64.8	73.8	Todd	*	-	-	-
Boyle	30	0.8	95.9	105.5	Boyd	37	1.0	64.6	74.7	Lyon	*	-	-	-
Marshall	31	0.9	93.9	98.6	Franklin	32	0.9	64.5	64.9	Elliott	*	-	-	-
Estill	17	0.5	91.1	115.9	Muhlenberg	26	0.7	63.8	82.5	Lewis	*	-	-	-
Grayson	24	0.7	90.6	93.2	Martin	8	0.2	63.1	61.9	Trimble	*	-	-	-
Hickman	6	0.2	89.4	122.4	Warren	67	1.9	62.0	58.9	Menifee	*	-	-	-

* At least one but fewer than five

- Percentage or rate suppressed to prevent disclosure of the value on which it was based

**Rate per 100,000

Table 30: Causes of Non-Fatal ABI, Kentucky, 2011

ABI Category	Inpatient		ED	
	Number	Percent	Number	Percent
Anoxia	1300	41.9	132	8.5
Exposure to toxic substances	1386	44.7	1149	73.9
Allergy/anaphylaxis	192	6.2	266	17.1
Acute medical clinical incidents	221	7.1	8	0.5

* Because there are multiple diagnoses and/or causes of death listed for each individual, it is possible for the same case to fall into more than one ABI category. Therefore, the column sums in this table are slightly higher than the total number of ABI cases shown in previous tables.

Table 31: Injury-Related Causes of Non-Fatal ABI, Kentucky, 2011

Mechanism of Injury	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
Poisoning	974	55.9	22.4	767	44.1	17.7	1,741	100.0	40.1
Suffocation	20	48.8	0.5	21	51.2	0.5	41	100.0	0.9
Drowning	15	28.3	0.3	38	71.7	0.9	53	100.0	1.2
Falls	54	84.4	1.2	10	15.6	0.2	64	100.0	1.5
Motor vehicle traffic crash	9	69.2	0.2	4	30.8	0.1	13	100.0	0.3
Fire/burn	5	38.5	0.1	8	61.5	0.2	13	100.0	0.3
Other	68	23.9	1.6	216	76.1	5.0	284	100.0	6.5
Unknown	1,614	76.8	37.2	487	23.2	11.2	2,101	100.0	48.4
Total	2,759	64.0	63.6	1,551	36.0	35.7	4,310	100.0	99.3

Table 32: Non-Fatal Anoxia by Age Group, Kentucky, 2011

Age	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
0-4	44	57.1	15.6	33	42.9	11.7	77	100.0	27.3
5-14	21	61.8	3.7	13	38.2	2.3	34	100.0	6.0
15-24	70	78.7	11.9	19	21.3	3.2	89	100.0	15.2
25-44	244	89.1	21.3	30	10.9	2.6	274	100.0	24.0
45-64	485	94.2	41.0	30	5.8	2.5	515	100.0	43.6
65+	436	98.4	75.4	7	1.6	1.2	443	100.0	76.6
Total	1,300	90.8	30.0	132	9.2	3.0	1,432	100.0	33.0

Table 33: Diagnosis Distribution for Non-Fatal Anoxia, Kentucky, 2011

Diagnosis	Description	Inpatient		ED	
		Number	Percent	Number	Percent
348.1	Anoxic brain damage (related to hereditary and degenerative diseases of the central nervous system)	706	54.3	42	31.8
997.0	Nervous system complications (related to medical care)	451	34.7	14	10.6
	- Anoxic brain damage				0.0
	- Cerebral hypoxia				0.0
	- Postoperative stroke				0.0
	- Other				0.0
669.4	Cerebral anoxia following cesarean	87	6.7	2	1.5
994.1	Drowning and nonfatal submersion	35	2.7	71	53.8
768					
(.1,.5,.6,.9)	Birth asphyxia	13	1.0	0	0.0
799.0	Asphyxia	8	0.6	3	2.3
Total		1,300	100.0	132	100.0

Table 34: Non-Fatal Exposure to Toxic Substances by Age Group, Kentucky, 2011

Age	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
0-4	47	19.7	16.6	192	80.3	68.0	239	100.0	84.6
5-14	26	11.9	4.6	192	88.1	33.9	218	100.0	38.4
15-24	106	38.8	18.1	167	61.2	28.5	273	100.0	46.5
25-44	480	61.4	42.0	302	38.6	26.4	782	100.0	68.4
45-64	501	71.8	42.4	197	28.2	16.7	698	100.0	59.0
65+	226	70.8	39.1	93	29.2	16.1	319	100.0	55.2
Total	1,386	54.8	31.9	1,143	45.2	26.3	2,529	100.0	58.3

Table 35 Diagnosis Distribution for Non-Fatal Exposure to Toxic Substances, Kentucky, 2011

Diagnosis	Description	Inpatient		ED	
		Number	Percent	Number	Percent
967	Poisoning by sedatives and hypnotics	534	38.5	331	28.8
980	Toxic effect of alcohol	322	23.2	153	13.3
968	Poisoning by other central nervous system depressants and anesthetics	135	9.7	102	8.9
964.2	Poisoning by anticoagulants	74	5.3	57	5.0
998	Post-operative shock	171	12.3	2	0.2
995.5	Child Maltreatment Syndrome	66	4.8	288	25.1
986	Toxic effect of carbon monoxide	60	4.3	168	14.6
985	Toxic effect of other metals	15	1.1	12	1.0
988.0-988.2	Toxic effect of noxious substances eaten as food	2	0.1	35	3.0
995.4	Shock due to anesthesia	7	0.5	1	0.1
Total		1386	100.0	1149	100.0

Table 36: Length of Stay for Non-Fatal Inpatient ABI, Kentucky, 2011

Length of Stay	Number	Percent*
1 day	569	20.6
More than one day but less than 1 week	1240	44.9
1 week to less than 2 weeks	529	19.2
2 weeks to less than 3 weeks	201	7.3
3 weeks to less than 4 weeks	88	3.2
4 weeks or more	132	4.8
Total	2759	100.0

*Percent of hospitalized ABI

Table 37: Discharge Disposition for Non-Fatal ABI, Kentucky, 2011

Discharge Disposition	Inpatient		ED	
	Number	Percent	Number	Percent
Routine discharge (home/self care)	1,499	54.3	1,302	83.9
Skilled nursing facility (SNF)	285	10.3	7	0.5
Home health	236	8.6	0	0.0
Inpatient-other type facility	28	1.0	32	2.1
Inpatient-other short-term hospital	112	4.1	104	6.7
Intermediate care facility (ICF)	19	0.7	3	0.2
Other	580	21.0	103	6.6
Total	2,759	100.0	1,551	100.0

Table 38: Primary Payer and Charges for Non-Fatal Inpatient ABI, Kentucky, 2011

Payer	Number of Discharges	Percent of Discharges	Total Hospital Charges
Government	1,524	55.2	\$ 81,006,414
Commercial Insurance	716	26.0	\$ 36,092,635
Self Pay	265	9.6	\$ 6,964,460
Workers Compensation	15	0.5	\$ 542,212
Other	239	8.7	\$ 11,952,850
Total	2,759	100.0	\$ 136,558,570

Table 39: Primary Payer and Charges for Non-Fatal ED ABI, Kentucky, 2011

Payer	Number of Discharges	Percent of Discharges	Total Hospital Charges
Government	555	35.8	\$ 1,008,308
Commercial Insurance	468	30.2	\$ 942,599
Self Pay	218	14.1	\$ 503,096
Workers Compensation	23	1.5	\$ 34,470
Other	287	18.5	\$ 619,885
Total	1,551	100.0	\$ 3,108,358

Table 40: Non-Fatal SCI by Age Group, Kentucky, 2011

Age	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
0-4	1	0.0	0.4	1	0.0	0.4	2	100.0	0.7
5-14	2	50.0	0.4	4	66.7	0.7	6	100.0	1.1
15-24	18	58.1	3.1	13	41.9	2.2	31	100.0	5.3
25-44	60	71.4	5.2	24	28.6	2.1	84	100.0	7.3
45-64	79	79.0	6.7	21	21.0	1.8	100	100.0	8.5
65+	40	63.5	6.9	23	36.5	4.0	63	100.0	10.9
Total	200	69.9	4.6	86	30.1	2.0	286	100.0	6.6

Table 41: Non-Fatal SCI by Gender, Kentucky, 2011

Age	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
Male	149	74.9	7.0	50	25.1	2.3	199	100.0	9.3
Female	51	58.6	2.3	36	41.4	1.6	87	100.0	3.9
Total	200	69.9	4.6	86	30.1	2.0	286	100.0	6.6

Table 42: Leading Causes of Non-Fatal SCI, Kentucky, 2011

Mechanism of Injury	Inpatient			ED			Total		
	Number	Percent	Rate	Number	Percent	Rate	Number	Percent	Rate
Motor vehicle traffic crash	38	70.4	0.9	16	29.6	0.4	54	100.0	1.2
Fall	57	68.7	1.3	26	31.3	0.6	83	100.0	1.9
Non-traffic land transportation	8	66.7	0.2	4	33.3	0.1	12	100.0	0.3
Struck by or against object or person	4	40.0	0.1	6	60.0	0.1	10	100.0	0.2
Firearm	7	77.8	0.2	2	22.2	0.0	9	100.0	0.2
Other	11	44.0	0.3	14	56.0	0.3	25	100.0	0.6
Unknown (missing E-code)	75	80.6	1.7	18	19.4	0.4	93	100.0	2.1
Total	200	69.9	4.6	86	30.1	2.0	286	100.0	6.6

Table 43: Length of Stay for Non-Fatal Inpatient SCI, Kentucky, 2011

Length of Stay	Number	Percent*
1 day	22	11.0
More than one day but less than 1 week	61	30.5
1 week to less than 2 weeks	57	28.5
2 weeks to less than 3 weeks	24	12.0
3 weeks to less than 4 weeks	19	9.5
4 weeks or more	17	8.5
Total	200	100.0

*Percent of hospitalized SCI

Table 44: Discharge Disposition for Non-Fatal SCI, Kentucky, 2011

Discharge Disposition	Inpatient		ED	
	Number	Percent	Number	Percent
Routine discharge (home/self care)	79	39.5	41	55.6
Home health	18	9.0	0	0.0
Skilled nursing facility (SNF)	16	8.0	0	0.0
Inpatient-other short-term hospital	6	3.0	40	38.3
Inpatient-other type facility	1	0.5	1	2.5
Other (includes Rehab)	80	40.0	4	3.7
Total	200	100.0	86	100.0

Table 45: Primary Payer and Charges for Non-Fatal Inpatient SCI, Kentucky, 2011

Payer	Number of Discharges	Percent of Discharges	Total Hospital Discharges
Government	74	37.0	\$ 6,155,524
Commercial Ins	82	41.0	\$ 9,674,839
Workers Compensation	8	4.0	\$ 1,168,925
Self Pay	11	5.5	\$ 1,041,025
Other	25	12.5	\$ 4,218,534
Total	200	100.0	\$22,258,847

Table 46: Primary Payer and Charges for Non-Fatal ED SCI, Kentucky, 2011

Payer	Number of Discharges	Percent of Discharges	Total Hospital Discharges
Government	38	44.2	\$ 165,311
Commercial Ins	25	29.1	\$ 136,464
Workers Compensation	1	1.2	\$ 9,488
Self Pay	18	20.9	\$ 58,606
Other	4	4.7	\$ 39,236
Total	86	100.0	\$409,105

Appendix B: Methods, Abbreviations, Definitions and Data

Methods

Data used for surveillance were received electronically. Hospital Discharge Data (HDD) files from the Kentucky Office of Health Policy are routinely received by the Kentucky Injury Prevention and Research Center (KIPRC) for surveillance purposes. These files now include both emergency department billing data as well as inpatient hospitalization billing data.

Crude incidence rates were calculated for each injury type by dividing the number of injuries by 4,314,113, the most recent estimated population of Kentucky according to the Kentucky State Data Center, and then multiplying by 100,000. This figure represents the number of TBI, ABI, or SCI that occurred per 100,000 residents of Kentucky. Age-adjusted rates were calculated using the Year 2000 Standard Population. Data analysis, including mapping, was performed using SAS Version 9.2.

Abbreviations

- TBI – Traumatic Brain Injury
- ABI – Acquired Brain Injury
- SCI – Spinal Cord Injury
- CNSI – Central Nervous System Injury
- MVTC – Motor Vehicle Traffic Crash
- ETS – Exposure to Toxic Substances
- KIPRC – Kentucky Injury Prevention and Research Center

Identification of Cases

Traumatic brain injury case definition

The Centers for Disease Control and Prevention (CDC) have established standards for TBI case identification (CDC, 1995). Hospitals commonly use ICD-9 codes for injury coding. For death certificates, state and federal authorities use ICD-10 codes. The following ICD-9 diagnosis codes (n-codes) were used for identifying TBI in HDD:

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

If one or more of these codes was found in any of the diagnosis code fields in the HDD, the record was determined to be a TBI.

Acquired brain injury case definition

In addition to CDC-defined TBI, there are many brain injuries that have non-traumatic etiologies. These we have classified as ABI. Because these diagnoses are not included in the CDC definition of TBI, they have been linked and analyzed separately. These conditions were also identified by ICD-9 diagnosis codes, as follows:

- Anoxia: 348.1, 668.2, 669.4, 768.1, 768.5, 768.6, 768.9, 799.01, 994.1, 994.7, 997.0
- Allergy/Anaphylaxis: 995.0, 999.4, 999.5
- Acute Medical Clinical Incidents: 320.0-320.9, 321.0-321.8
- Toxic Substances: 964.2, 967.0-967.9, 968.0-968.9, 980.0-980.9, 985, 986, 988.0-988.2, 989.0, 995.4, 995.55, 998.0

Anoxia includes but is not limited to:

- brain damage related to hereditary and degenerative diseases of the central nervous system
- nervous system complications (related to medical care)
- drowning and nonfatal submersion
- asphyxia
-

If one or more of these codes was found in any of the diagnosis code fields in the HDD, the record was classified as an ABI.

Spinal cord injury case definition

The CDC defines SCI by the following ICD-9 diagnosis codes (CDC, 1995):

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

For this report, SCI records had to contain one of these codes in one of the first three diagnosis code fields in the HDD.

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