

Kentucky Injury Prevention and Research Center

**2013 Kentucky Inpatient
Traumatic Injury Data Report**

Svetla Slavova, Ph.D.

Wei Gao, M.Sc.

Julia F. Costich, J.D., Ph.D.

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Introduction

This report gives an overview of 2013 hospital care provided to Kentucky residents whose primary diagnosis was some form of physical trauma. The data source is inpatient claims from all Kentucky non-federal general acute-care hospitals. In contrast, the Kentucky Trauma Registry (KTR) Report collects data only from Kentucky hospitals that have been verified by the American College of Surgeons (ACS) or the Kentucky Department for Public Health as trauma facilities, or have voluntarily reported their trauma cases according to the National Trauma Data Bank standard. As Kentucky moves toward a broader and deeper network for trauma care, review of the full statewide hospital discharge data gives a comprehensive account of trauma-related hospitalizations across the full range of facilities in the state.

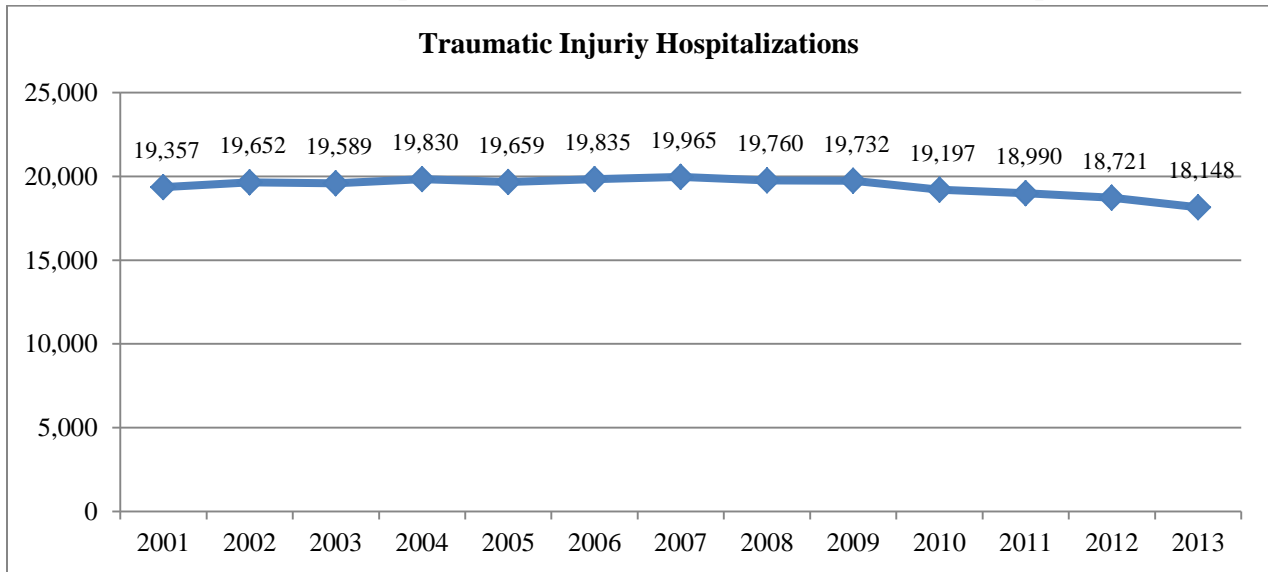
The data presented in the report reflects instances of inpatient care, hospital admissions, rather than discrete patient information. State data management policy requires the removal of all personal identifiers from the data sets before we receive them. Thus, our counts do not necessarily correspond to the number of injured persons, because follow-up hospitalizations or ED visits for an earlier injury could not be identified and removed from the datasets.

The hospital discharge data is coded according to the International Classification of Diseases, Clinical Modification, ninth revision (ICD-9-CM). The ICD system describes an injury using diagnosis codes and E-codes. An injury diagnosis code is a single code that describes the nature of the injury (e.g., fracture, open wound, etc.) and the body region (head, arm, skull, etc.). The first coded diagnosis is the principal diagnosis and reflects the primary reason for the patient's hospital stay based on clinical findings. For the purpose of this report, a case was selected as a traumatic injury case if the principal diagnosis was in the following range of codes: 800-897, 900, 901, 902, 903, 904, 925, 926, 927, 928, 929, 940-949, 950-959.

Injury diagnoses should be supplemented (when circumstances of an injury are known) with E-codes, which specify external cause of injury, place of injury, and activity. The external cause of injury E-code is a single code that describes the mechanism of injury (e.g., fall, motor vehicle collision, firearm, etc.) and the intent of injury (e.g., unintentional, assault, self-inflicted, or undetermined). The completeness and accuracy of the E-codes is very important for successful injury surveillance, to identify and target priority areas and populations at higher risk.

In 2013, there were 18,148 hospitalizations for Kentucky residents in non-federal, acute care Kentucky hospitals due to traumatic injuries. This is about a three percent decrease from the 18,721 hospitalizations for traumatic injuries in 2012. A decrease of about one percent was observed in the 2012 traumatic injury hospitalizations (from 18,990 in 2011 to 18,721 in 2012).

Figure 1: Traumatic injury hospitalizations for KY residents in KY acute care hospitals, 2001-2013



About 14% of all hospital discharge records (2,502 records) with a principal diagnosis of traumatic injury did not have an external cause of injury code (E-code) that described the injury mechanism and intent (Table 1). Among the remaining 15,646 hospitalizations, 14,920 (95%) were unintentional, 3% were due to assaults, and 1% followed intentional self-harm. The large majority of the unintentional injuries, 71%, were due to falls. There were 2,219 hospitalizations for traumatic injuries from motor vehicle traffic collisions, 15% of all unintentional injuries. The majority of hospitalized assault injuries were caused by firearms (n=148, 27%) or being struck by or against an object or person (n=140, 26%). Among the intentional self-harms, 61 (43%) were due to cuts and 45 (31%) to firearms.

Table 1: Traumatic injury hospitalizations by cause and intent, 2013

| Cause | Un-intentional | Self-harm | Assault | Other | Undetermined | Missing E-code | Total |
|--------------------------|----------------|------------|------------|-----------|--------------|----------------|---------------|
| MV Traffic | 2,219 | * | * | 0 | 0 | 0 | 2,224 |
| Firearm | 80 | 45 | 148 | * | 7 | 0 | 283 |
| Poisoning | 11 | 3 | 0 | 0 | * | 0 | 17 |
| Falls | 10,650 | 11 | * | 0 | * | 0 | 10,665 |
| Suffocation | 6 | 0 | 0 | 0 | 0 | 0 | 6 |
| Drowning | * | 0 | 0 | 0 | 0 | 0 | * |
| Fire/Burn | 250 | * | * | 0 | 5 | 0 | 262 |
| Cut/Pierce | 124 | 61 | 132 | 0 | * | 0 | 318 |
| Struck by/against | 277 | 0 | 140 | 8 | 0 | 0 | 425 |
| Machinery | 102 | 0 | 0 | 0 | 0 | 0 | 102 |
| Other Pedal Cycle | 86 | 0 | 0 | 0 | 0 | 0 | 86 |
| Other Pedestrian | 14 | 0 | 0 | 0 | 0 | 0 | 14 |
| Other Transportation | 457 | 0 | 0 | 0 | 0 | 0 | 457 |
| Natural/Environmental | 103 | 0 | 0 | 0 | 0 | 0 | 103 |
| Overexertion | 150 | 0 | 0 | 0 | 0 | 0 | 150 |
| Other Specified | 138 | 9 | 32 | 0 | 0 | 0 | 179 |
| Not elsewhere classified | 61 | 6 | 32 | 0 | * | 0 | 102 |
| Not specified | 191 | * | 54 | 0 | 5 | 0 | 252 |
| Missing E-code | 0 | 0 | 0 | 0 | 0 | 2,502 | 2,502 |
| TOTAL | 14,920 | 143 | 546 | 11 | 26 | 3,952 | 18,148 |

*Counts less than 5 were suppressed by state data management policy

Patients 85 and older accounted for the largest proportion of trauma-related hospitalizations, 2,952 hospitalizations (19%). Overall, the number of hospitalizations increased with age (Figure 2). This age distribution is quite different from that of the patients treated in Kentucky trauma centers^a, where the majority of patients are in the 18-55 age range and the number of cases in KTR decreases with increasing age. The difference is primarily because this report includes fall-related fractures, the leading cause of inpatient stays in those 65 and older. Isolated hip fractures, the most common cause of hospitalization following serious falls in older adults, are not included in the diagnostic categories reported to the Kentucky state trauma registry because such admissions do not require trauma team activation.

^ahttp://www.mc.uky.edu/kiprc/projects/trauma/reports/Trauma_Registry_Report-2013-posted.pdf

Figure 2: Traumatic injury hospitalizations by age group, 2013

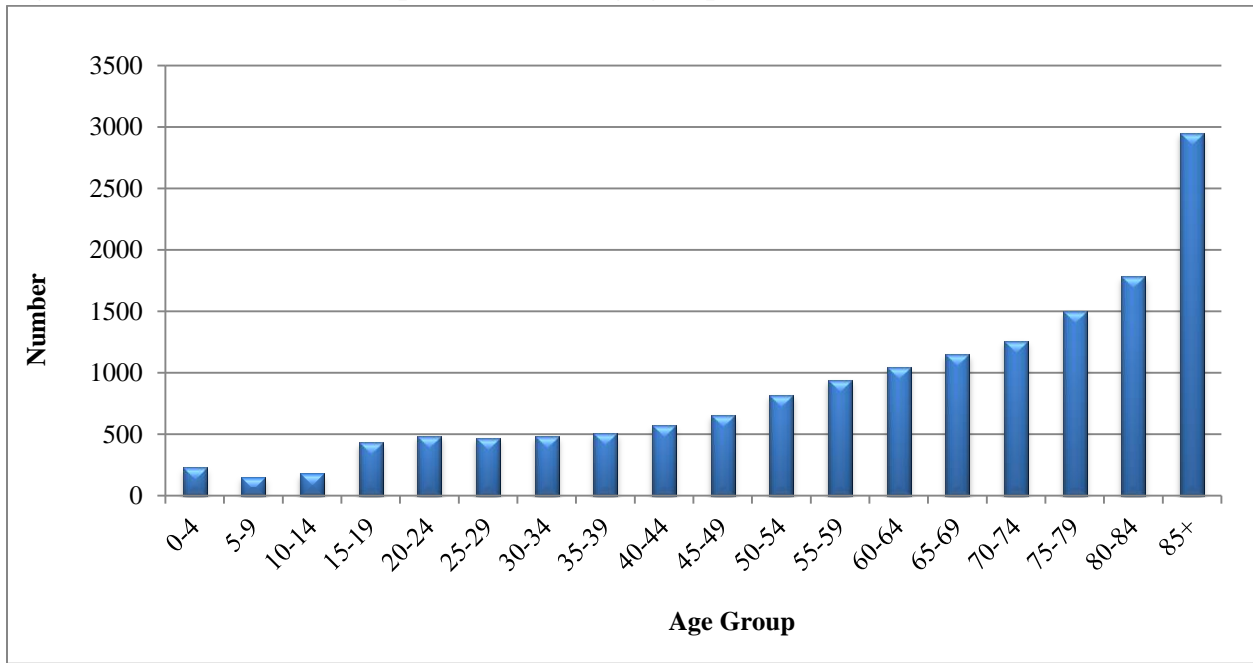


Figure 3 shows the three leading causes of traumatic injury hospitalizations, motor vehicle traffic collisions (MVTC), falls, and being struck by or against an object or person.

Figure 3: Leading causes for traumatic injury hospitalizations by age group, 2013

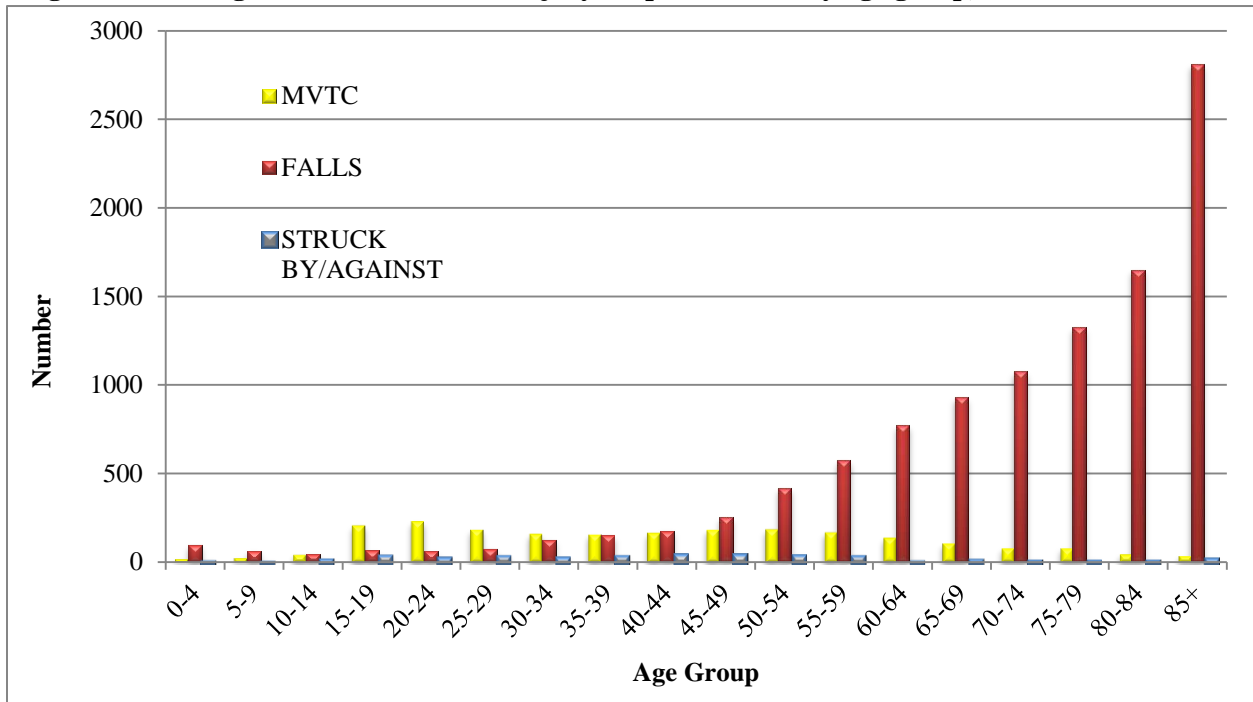


Table 2: Traumatic injury hospitalizations, by body region, 2013

| Injuries by Body Region | | | N | % |
|--------------------------------|-------------------------------------|---------------------------------|----------------|----------|
| Head and Neck | Traumatic Brain Injury (TBI) | Type 1 TBI | 1,918 | 10.57 |
| | | Type 2 TBI | 255 | 1.41 |
| | | Type 3 TBI | 78 | 0.43 |
| | Other head, face and neck | Other head | 110 | 0.61 |
| | | Face | 310 | 1.71 |
| | | Eye | 16 | 0.09 |
| | | Neck | 45 | 0.25 |
| | | Head, face and neck unspecified | 55 | 0.30 |
| Spine and back | Spinal Cord (SCI) | Cervical SCI | 83 | 0.46 |
| | | Thoracic/Dorsal SCI | 33 | 0.18 |
| | | Lumbar SCI | 16 | 0.09 |
| | | Sacrum coccyx SCI | 0 | 0 |
| | | Spine + back unspecified SCI | 2 | 0.01 |
| | Vertebral Column (VCI) | Cervical VCI | 374 | 2.06 |
| | | Thoracic/Dorsal VCI | 404 | 2.23 |
| | | Lumbar VCI | 594 | 3.27 |
| | | Sacrum coccyx VCI | 90 | 0.50 |
| | | Spine + back unspecified VCI | 7 | 0.04 |
| Torso | Torso | Chest (Thorax) | 1,222 | 6.73 |
| | | Abdomen | 590 | 3.25 |
| | | Pelvis and urogenital | 846 | 4.66 |
| | | Trunk | 45 | 0.25 |
| | | Back and buttock | 26 | 0.14 |
| Extremities | Upper | Shoulder and upper arm | 1,231 | 6.78 |
| | | Forearm and elbow | 726 | 4.00 |
| | | Wrist, hand and fingers | 255 | 1.41 |
| | | Other and unspecified | 51 | 0.28 |
| | Lower | Hip | 4,806 | 26.48 |
| | | Upper leg and thigh | 832 | 4.58 |
| | | Knee | 184 | 1.01 |
| | | Lower leg and ankle | 2,211 | 12.18 |
| | | Foot and toes | 328 | 1.81 |
| | | Other and unspecified | 274 | 1.51 |
| | Unclassifiable by site | Other and un-specified | Other/multiple | 5 |
| Unspecified site | | | 34 | 0.19 |
| Sys-tem wide specified | | System-wide & late effects | 92 | 0.51 |

Hip fractures accounted for more than one in four (26.5%) traumatic injury hospitalizations (Table 2). Lower leg and ankle injuries accounted for 12.2%. Almost half of the hospitalizations involved a lower extremity injury. Traumatic brain injuries (TBI) accounted for a total of 12.4%, the majority of which were Type I TBI. Head injuries are labeled as Type 1 TBI if the first diagnosis code is for an intracranial injury, there is moderate or prolonged loss of consciousness, shaken infant syndrome, or injuries to the optic nerve pathways. Type 2 TBI includes head injuries with no intracranial injury coded, and coded with loss of consciousness of less than 1 hour or unknown duration, or unspecified level. Type 3 TBIs have neither intracranial injury nor loss of consciousness

Using the principal diagnosis code, injuries are described by nature in Table 3. Three-quarters of the hospitalizations involved fractures and 15.3% involved internal organs.

Table 3: Traumatic injury hospitalizations by nature, 2013

| Injuries by Nature | Number | Percent |
|---------------------------------------|---------------|----------------|
| Fractures | 13,643 | 75.18 |
| Dislocation | 119 | 0.66 |
| Sprains and strains | 252 | 1.39 |
| Internal organ | 2,778 | 15.31 |
| Open wounds | 587 | 3.23 |
| Amputations | 66 | 0.36 |
| Blood vessels | 72 | 0.40 |
| Crushing | 53 | 0.29 |
| Burns | 339 | 1.87 |
| Nerves | 19 | 0.10 |
| Unspecified | 128 | 0.71 |
| System wide & late effects | 92 | 0.51 |
| Total | 18,148 | 100.00 |

The majority (55.7%) of those hospitalized for traumatic injuries were women (Table 4).

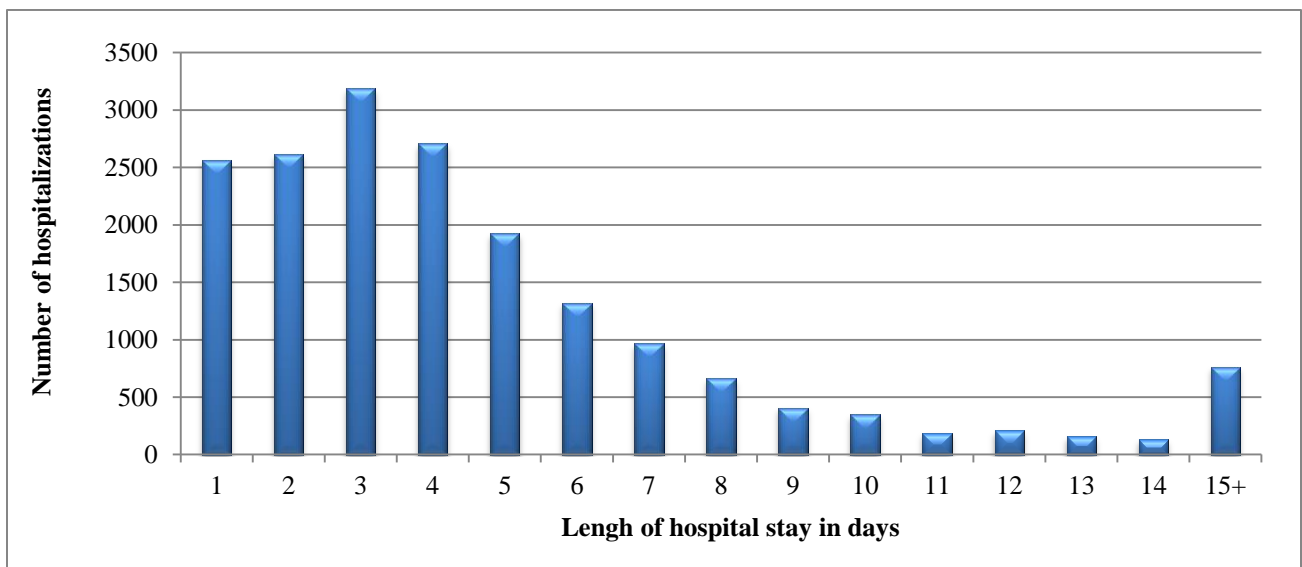
Trauma accounted for a total of 92,030 inpatient days in 2013, a decrease of 3% from the 94,729 total days in 2012, that parallels the similar decrease in total trauma hospitalizations. The mean length of stay in 2013 was 5.1 days, the same as in 2012 and 2011, while the median stay was 4 days. About 74%

of the patients with one or two day stays were discharged to self-care at home (routine discharge). Figure 4 shows the length of stay distribution.

Table 4: Traumatic injury hospitalizations by gender, 2013

| Gender | N | % |
|--------|--------|-------|
| Female | 10,112 | 55.72 |
| Male | 8,036 | 44.28 |

Figure 4: Number of hospitalizations by length of hospital stay, 2013



For statewide trauma system planning, the inclusion of the large group of older adults hospitalized for injuries has important implications, because it identifies a substantial group that can usually be managed safely at community facilities. The overrepresentation of older adults accounted for the high proportion of discharges to skilled nursing facilities (n=5,226, 29%), home health (n=1,797, 10%), or inpatient rehabilitation (n=2,056, 11.3%) (Table 5). Less than half (n=7,278, 40%) of discharges were routine discharges to home/self-care. This finding is particularly important because it indicates an ongoing cost of post-discharge care: nearly half of Kentuckians hospitalized for traumatic injury in 2013 required additional formal health services in the period immediately following discharge. While the proportion who died was relatively small (2.6%), it nonetheless reflects the deaths of 474 Kentuckians who survived traumatic injury to the point of hospitalization.

Table 5: Traumatic injury hospitalizations by discharge status, 2013

| Discharge Status | Age Group | | | | | | | | | | Total |
|--|-----------|------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| | 0-4 | 5-14 | 15-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65-74 | 75-84 | 85+ | |
| Routine discharge (home/self-care) | 251 | 363 | 887 | 898 | 977 | 1,229 | 1,141 | 771 | 534 | 227 | 7,278 |
| Inpatient-other short-term hospital | 0 | 0 | 20 | 13 | 13 | 23 | 43 | 52 | 56 | 48 | 268 |
| Skilled nursing facility (SNF) | 0 | * | 9 | 7 | 33 | 96 | 350 | 954 | 1,804 | 1,972 | 5,226 |
| Intermediate care facility (ICF) | 0 | 0 | 0 | * | * | * | 10 | 12 | 26 | 40 | 92 |
| Designated Cancer Center or Children's Hospital | * | * | * | * | * | * | 10 | * | 7 | 10 | 41 |
| Home health | 5 | 12 | 59 | 74 | 118 | 195 | 366 | 395 | 366 | 207 | 1,797 |
| Left/discontinued care AMA | 0 | 0 | 7 | 14 | 11 | 20 | 7 | * | * | * | 65 |
| Expired/Did not recover | * | * | 23 | 21 | 17 | 30 | 51 | 74 | 119 | 131 | 474 |
| Discharge/transfer to court/law enforcement | * | 0 | 12 | 27 | 22 | 16 | 12 | * | * | 0 | 95 |
| Expired in a medical facility (Medicare, CHAMPUS claims only for hospice care) | 0 | 0 | 0 | 0 | 0 | 0 | * | * | 0 | 0 | * |
| Discharged/transferred to a federal hospital | 0 | 0 | 0 | * | * | * | 6 | 6 | 5 | 7 | 28 |
| Hospice-home | 0 | 0 | 0 | 0 | 0 | * | 7 | 6 | 20 | 26 | 61 |
| Hospice-medical facility | 0 | 0 | 0 | 0 | 0 | * | 10 | 10 | 36 | 64 | 122 |
| Transfer w/in institution to Medicare swing bed | 0 | 0 | 0 | 0 | 0 | 9 | 24 | 72 | 149 | 148 | 402 |
| Discharge/transfer to rehabilitation facility or hospital unit | * | 12 | 79 | 55 | 76 | 137 | 283 | 414 | 570 | 428 | 2,056 |
| Discharge/transfer to long-term care hospital | 0 | 0 | * | * | * | 7 | 14 | 22 | 13 | 10 | 73 |
| Discharge/transfer to nursing facility certified under Medicaid -not Medicare | 0 | 0 | 0 | 0 | 0 | 0 | * | * | * | 5 | 12 |
| Discharge/transfer to psychiatric hospital or psychiatric distinct part unit of a hospital | 0 | * | * | 6 | 7 | 7 | * | * | * | * | 34 |
| Discharge/transfer to critical access hospital (CAH) | 0 | 0 | 0 | 0 | 0 | 0 | * | 0 | * | 0 | * |
| Discharged/transferred to another type of healthcare institution not otherwise defined | 0 | 0 | 0 | * | * | * | * | 0 | * | * | 12 |
| Discharged/transferred to a SNF with Medicare certification with a planned acute care hospital inpatient readmission | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | 0 | * |
| Discharged/transferred to home under care of organized home health organization with a planned acute care hospital inpatient readmission | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | * |
| Discharged/transferred to an IRF including rehabilitation distinct part of a hospital with a planned acute care hospital inpatient readmission | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | * | * | * |
| Discharged/transferred to a Medicare Certified Long Term Care Hospital (LTCH) with a planned acute care hospital inpatient readmission | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | 0 | 0 | * |
| Total | 265 | 394 | 1,106 | 1,122 | 1,282 | 1,778 | 2,344 | 2,805 | 3,722 | 3,330 | 18,148 |

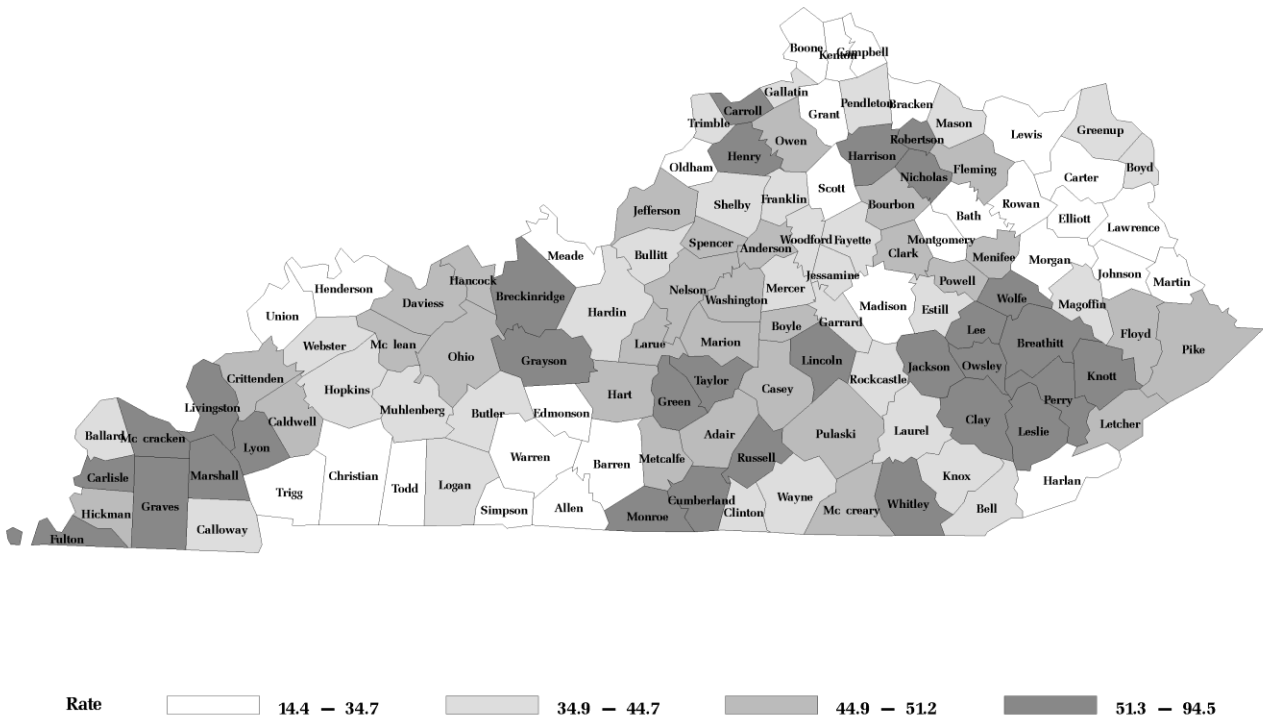
*cells with less than 5 counts were suppressed by the state data management policy

The hospital discharge data includes information on total charges billed for the hospital stay. We report the total charges as a proxy for the actual cost of the hospital stay and treatment, with the caveat that reimbursement is substantially lower than charges for most payers. Medicare alone accounted for 54% of the number of hospitalizations and 45% (\$435,591,771) of the total charges billed (Table 6). About 8% of all traumatic injury hospitalizations in 2013 were coded as self-pay or charity, accounting for 9% of the total charges billed. Given the large enrollment in Kentucky’s Medicaid expansion program, we would expect this proportion to decline in 2014 and future years.

Table 6: Traumatic injury hospitalizations by primary payer and total charges, 2013

| Primary expected source of payment | Hospitalizations | | Total Charges | |
|------------------------------------|------------------|--------|-----------------|------------------------------|
| | N | % | Amount billed | % of the total amount billed |
| Auto Insurance | 887 | 4.9% | \$87,460,861.9 | 9.1% |
| CHAMPUS | 115 | 0.6% | \$8,334,194.8 | 0.9% |
| Commercial Insurance | 3,724 | 20.5% | \$211,497,861.1 | 22.0% |
| Medicaid/Passport | 1,552 | 8.6% | \$98,119,012 | 10.2% |
| Medicare | 9,838 | 54.2% | \$435,591,770.5 | 45.2% |
| Other | 206 | 1.1% | \$15,471,213 | 1.6% |
| Self-Pay or Charity | 1,414 | 7.8% | \$83,102,137 | 8.6% |
| Workers Compensation | 412 | 2.3% | \$23,450,392.5 | 2.4% |
| Total | 18,148 | 100.0% | \$963,027,442 | 100.0% |

Figure 5: County rates of traumatic injury hospitalizations per 10,000 residents, 2013



Conclusion

The number of trauma-related hospitalizations in Kentucky’s non-federal acute care facilities continues a pattern of slight decline, which may reflect one or more trends, such as increased use of non-hospital outpatient care, increased out-of-state hospitalizations for residents of border counties, or an actual reduction in the incidence of traumatic injury. Fall-related injuries sustained by older Kentuckians represent the largest single factor in the state’s burden of traumatic injury, as is the case throughout the developed world. While falls do not typically require trauma team activation, their aggregate impact dwarfs all other causes of injury. The mean age of Kentuckians and the proportion of the population over 65 continue to increase, so this problem will only increase unless more effective preventive interventions are identified and implemented.

A related trend with important policy implications is the large proportion of injury patients who require additional institutional or home health care after hospital discharge. Because older adults are more likely to have comorbidities and care needs beyond the capacity of informal caregivers, they make up the majority of those needing post-acute care. The social and economic cost of injury is borne disproportionately by these patients and their families, again primarily attributable to fall-related injury.

Finally, it is clear that many Kentucky hospitals are providing substantial proportions of the state’s aggregate trauma care but do not participate in the state’s trauma system. As participation increases, the more nuanced data from the Kentucky Trauma Registry will shed more light on issues arising from traumatic injury across the state.