

KENTUCKY TRAUMA REGISTRY

2013 ANNUAL REPORT

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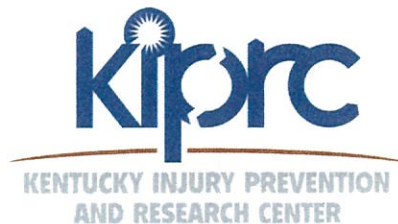


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Forward

Under state administrative regulation (902 KAR 28:040), the Kentucky Department for Public Health established a single statewide Kentucky Trauma Registry (KTR) through the Kentucky Injury Prevention Research Center (KIPRC) to be the statewide repository for trauma data. All trauma centers designated by the Commissioner of Public Health in the Kentucky Trauma Care System maintain a trauma registry that is compatible with the National Trauma Data Bank (NTDB) standards established in the National Trauma Data Standard Data Dictionary. The trauma centers upload their trauma data electronically at least quarterly to the KTR. Clinical Data Management, Inc. (CDM) is the vendor that manages the downloading and compilation of data from participating trauma centers, including unverified facilities that report to the repository, and supplies the injury data to the Kentucky Injury Prevention and Research Center.

With support from the National Highway Traffic Safety Administration in cooperation with the Kentucky Transportation Cabinet, KIPRC analyzes the statewide trauma registry data and provides a detailed profile of the traumatic injuries treated in the Kentucky trauma facilities.

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This report and previous trauma reports are posted on KIPRC website:

<http://www.mc.uky.edu/kiprc/projects/trauma/index.html>

Introduction

The body of this report summarizes data on trauma* patients cared for during 2013 at Kentucky trauma centers, both verified and in applicant status, and reported to the Kentucky Trauma Registry as of July 31, 2014. A list of these facilities appears on the next page. It is important to note several characteristics of the data reported here.

a. In order to protect patient privacy, KTR data do not allow identification of individual patients. Patients transferred between hospitals have separate records for treatment at each reporting facility that cannot be merged due to the lack of personal identifiers. Therefore the number of records in KTR reflects total episodes of care in reporting facilities and is greater than the number of distinct patients treated. The rest of this report refers to each episode of trauma care as a “case”.

b. These data represent the most serious injuries rather than all traumatic injuries in the state.

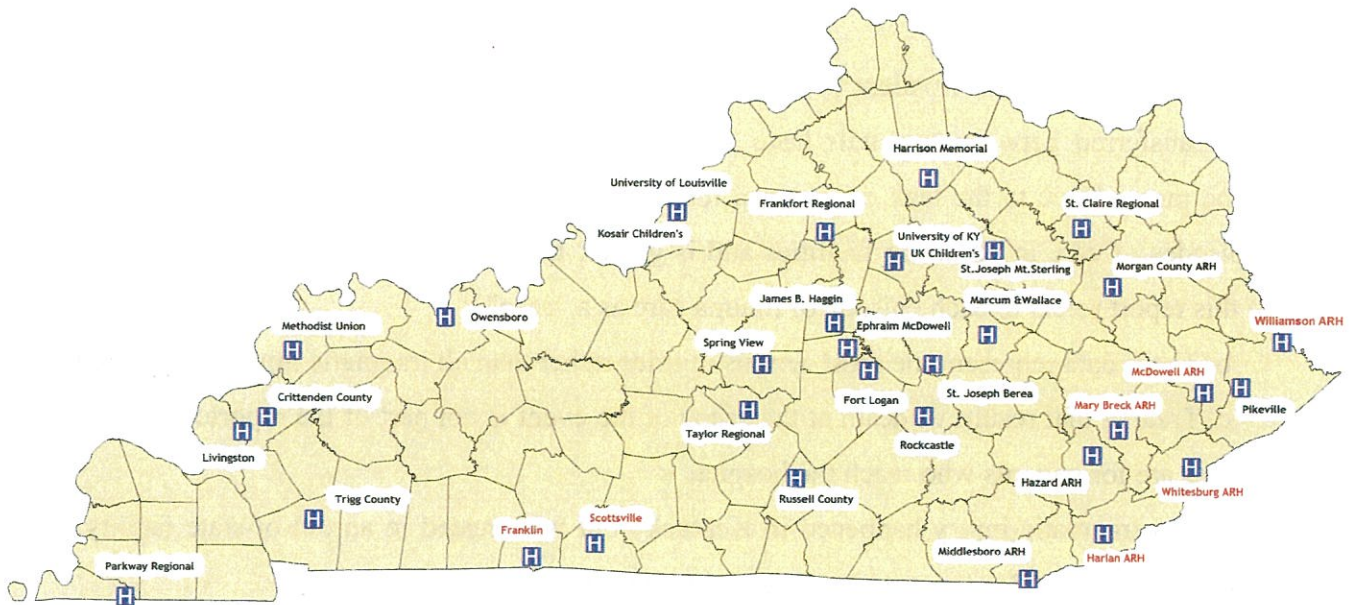
c. Trauma that results in death at the scene of the event is not part of the reported data because KTR data entries are for patients who reach the hospital.

d. If a traumatic injury happened in Kentucky but was treated in an out-of-state facility, it was not included in KTR data. Border areas are thus under-represented in this report.

A broad overview of the hospital care provided to Kentucky residents whose primary diagnosis was some form of physical trauma appears in the Kentucky Inpatient and Emergency Department Traumatic Injury Data Report, available at <http://www.kiprc.uky.edu/projects/trauma/index.html>.

*Kentucky law (KRS 311A.010) defines “trauma” as a single or multi-system life-threatening or limb-threatening injury requiring immediate medical or surgical intervention or treatment to prevent death or permanent disability.

Kentucky Trauma Registry Map



Legend: Trauma Centers submitting data to the Kentucky Trauma Registry as of October 1, 2014.

Trauma Centers in preparation for reporting to the Kentucky Trauma Registry as of October 1, 2014.

Kentucky Trauma Centers that Submitted 2013 Data to KTR

Trauma Center	Designation/Status
1. Crittenden County Hospital	Level IV in progress
2. Ephraim McDowell Regional Medical Center	Level III
3. Fort Logan Hospital	Level IV
4. Frankfort Regional Medical Center	Level III
5. Harrison Memorial Hospital	Level IV in progress
6. Hazard ARH	Level III in progress
7. James B. Haggin Memorial Hospital	Level IV
8. Kosair Children's Hospital	Level I Pediatric
9. Livingston Hospital	Level IV
10. Marcum Wallace Memorial Hospital	Level IV
11. Methodist Hospital Union County	Level IV in progress
12. Owensboro Medical Center	Level II in progress
13. Parkway Regional Hospital	Level IV in progress
14. Pikeville Medical Center	Level II in progress
15. St. Joseph Berea	Level IV in progress
16. St. Joseph Hospital Mt. Sterling	Level IV in progress
17. Taylor Regional Medical Center	Level III
18. Trigg County Hospital	Level IV in progress
19. University of Kentucky Children's Hospital	Level I Pediatric
20. University of Kentucky Medical Center	Level I
21. University of Louisville Hospital	Level I

Definitions (per 902 KAR 28:010):

- (18) "Level I trauma center" means a regional trauma center that:
 - (a) Provides total care of every aspect of injury from prevention through rehabilitation; and
 - (b) Meets the requirements established in 902 KAR 28:020.
- (19) "Level II trauma center" means a regional trauma center that:
 - (a) Provides screening and initial trauma care of the injured patient regardless of the severity of injury; and
 - (b) Meets the requirements established in 902 KAR 28:020.
- (20) "Level III trauma center" means a regional trauma center that:
 - (a) Provides prompt assessment, resuscitation, emergency operations and stabilization;
 - (b) Arranges for transfer to a facility that can provide trauma care at a higher level;
 - (c) Serves communities that do not have immediate access to a Level I or Level II trauma center; and
 - (d) Meets the requirements established in 902 KAR 28:020.
- (21) "Level IV trauma center" means a regional trauma center that:
 - (a) Provides advanced trauma life support before a patient is transferred to a higher level of care;
 - (b) Is located in a hospital emergency department; and
 - (c) Meets the requirements established in 902 KAR 28:030

KTR Records 2008-2013

The Kentucky Trauma Registry has grown from 5 reporting facilities in 2008 to 21 reporting facilities in 2013. A total of 10,289 records were reported to the Kentucky Trauma Registry in 2013, an increase of 55% (3,646 additional records) compared with year 2008 (Figure 1).

Figure 1: KTR records, 2008-2013

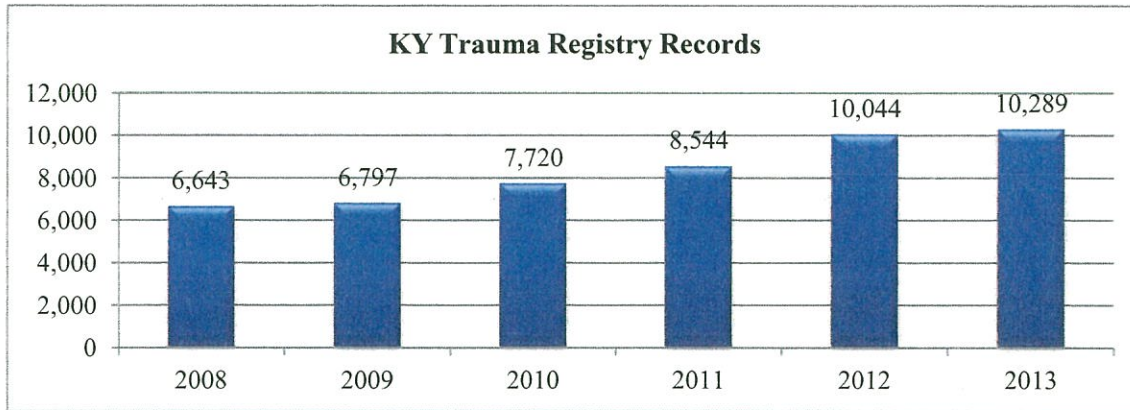


Table1: KTR records by trauma centers, 2013

Facility	Number of cases	%
Crittenden County Hospital	23	0.22
Ephraim McDowell Regional Medical Center	420	4.08
Fort Logan Hospital	62	0.6
Frankfort Regional Medical Center	318	3.09
Harrison Memorial Hospital	79	0.77
Hazard ARH	283	2.75
James B. Haggin Memorial Hospital	108	1.05
Kosair Children's Hospital	833	8.1
Livingston Hospital	45	0.44
Marcum Wallace Memorial Hospital	119	1.16
Methodist Hospital Union County	61	0.59
Owensboro Medical Center	345	3.35
Parkway Regional Hospital	12	0.12
Pikeville Medical Center	815	7.92
St. Joseph Berea	22	0.21
St. Joseph Hospital (Mt. Sterling)	330	3.21
Taylor Regional Medical Center	158	1.54
Trigg County Hospital	29	0.28
University of Kentucky Children's Hospital	420	4.08
University of Kentucky Medical Center	2,884	28.03
University of Louisville Hospital	2,923	28.41
Total	10,289	100

Demographic Information

Gender

Males comprised 61.76% of KTR records (Table 2). The ACS trauma classification excludes hip fractures, the most common traumatic injury in older adults, and a category that is therefore predominantly female. Thus, KTR demographics are significantly different from those of the related report on traumatic injuries as a whole, in which males and females are roughly equally represented (see Kentucky Inpatient and Emergency Department Traumatic Injury Data Reports,

<http://www.mc.uky.edu/kiprc/projects/trauma/index.html>).

Table 2: KTR records by gender, 2013

Gender	Number	%
Female	3931	38.21
Male	6355	61.76
Total	10,286	100.00

Note: 3 records were excluded due to missing information on gender

Race/Ethnicity

91% of the records indicated treatment for white patients, 7% for black patients (Table 4). While less than 1% of the records do not list the patient's race, about 9% of the records are missing information on ethnicity.

Table 3: KTR records by race and ethnicity, 2013

Race	Ethnicity			
	Hispanic or Latino	Not Hispanic or Latino	Missing	Total
Asian	0	31	*	32
Native Hawaiian or Other Pacific Islander	*	12	*	19
Other Race	132	26	*	161
American Indian	0	*	0	*
Black or African American	0	667	19	686
White	29	8,445	851	9,325
Missing	8	16	41	65
Total	172	9,198	919	10,289

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

Age

The same issue of inclusion criteria influences the distribution of trauma records by age group. Whereas the statewide hospitalization data for traumatic injury is skewed towards older age groups (due to inclusion of hip fractures), the KTR records are mainly for working-age adults (Figure 2 and Table 3).

Table 4: KTR records by age group, 2013

Facility	Age Groups											
	NA	<1yr	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+
Crittenden County Hospital	0	0	*	*	*	0	*	*	*	7	*	*
Ephraim McDowell Regional Medical Center	0	*	6	14	32	20	22	36	43	69	78	98
Fort Logan Hospital	0	*	*	7	8	6	6	5	7	6	5	7
Frankfort Regional Medical Center	0	*	9	17	21	27	23	39	33	33	60	55
Harrison Memorial Hospital	0	0	*	5	7	*	*	11	10	10	17	10
Hazard ARH	0	*	6	19	23	23	32	41	46	34	36	22
James B. Haggin Memorial Hospital	0	0	5	12	22	19	10	17	8	5	7	*
Kosair Children's Hospital	6	83	211	402	131	0	0	0	0	0	0	0
Livingston Hospital	0	0	*	0	6	*	*	*	*	9	5	9
Marcum Wallace Memorial Hospital	0	0	*	9	12	18	19	13	13	7	14	10
Methodist Hospital Union County	0	0	*	6	6	9	*	5	6	7	11	6
Owensboro Medical Center	*	*	5	13	28	32	30	38	42	43	60	48
Parkway Regional Hospital	0	0	0	0	*	0	0	*	*	*	*	*
Pikeville Medical Center	*	0	5	45	88	92	98	95	107	106	98	80
St. Joseph Berea	0	0	0	0	*	7	6	*	*	*	*	0
St. Joseph Hospital (Mt. Sterling)	0	*	12	43	40	46	40	38	34	40	19	17
Taylor Regional Medical Center	0	*	7	11	29	18	7	21	18	12	15	19
Trigg County Hospital	0	*	0	*	*	*	*	6	*	*	*	5
University of Kentucky - Childrens	0	60	112	248	0	0	0	0	0	0	0	0
University of Kentucky Medical Center	0	0	*	0	508	435	419	496	434	297	198	96
University of Louisville Hospital	0	0	0	*	467	492	411	526	444	254	206	121
Total	10	154	397	858	1,434	1,251	1,139	1,395	1,255	948	839	609

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

Figure 2: KTR records by age group, 2013

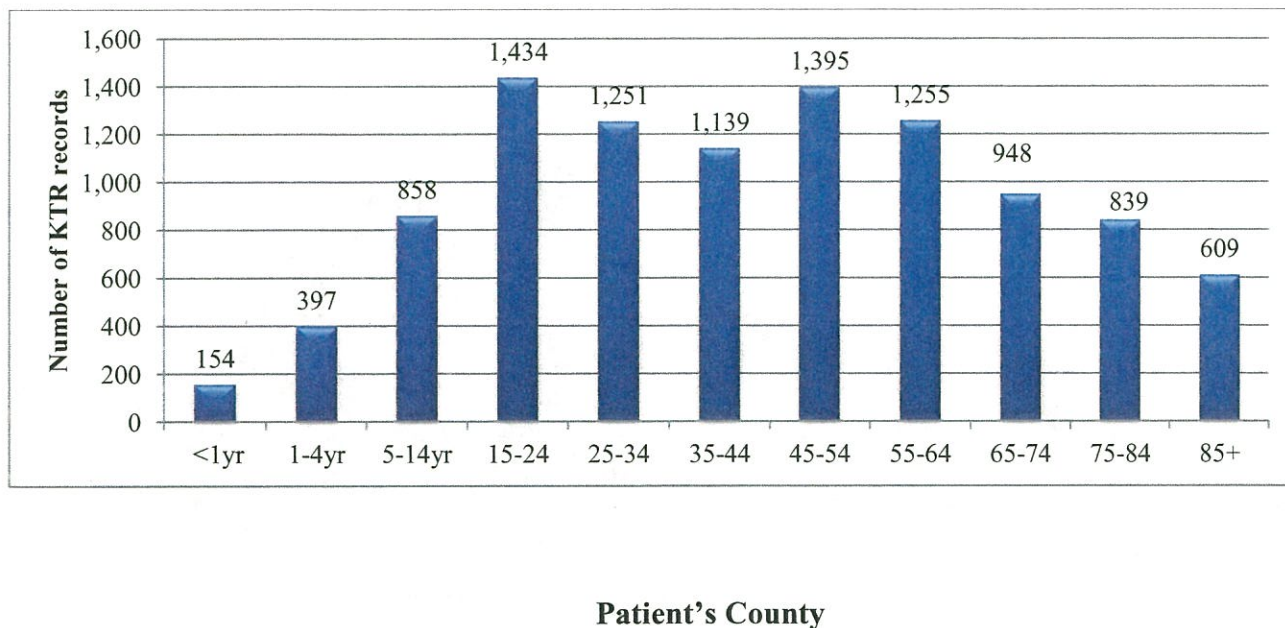


Figure 3 visually describes the rate of KTR records per 1,000 population by county of residence. The low rates in the counties in the south-west and north part of the state likely reflect the lack of KY acute care hospitals reporting to the KTR. It is also possible that the residents of these counties are treated in out-of-state trauma centers like the University Hospital in Cincinnati, Cincinnati Children's Hospital, or the Vanderbilt University Hospital's Trauma Center.

About one fifth of the records were for patients residing in Jefferson or Fayette counties, which is expected as these are the counties representing the two biggest cities in the state - Louisville and Lexington respectively. About 11% of the total KTR records were for out-of-state patients (Table 5).

Figure 3: Rate of KTR records per 1,000 population by county of residence, 2013

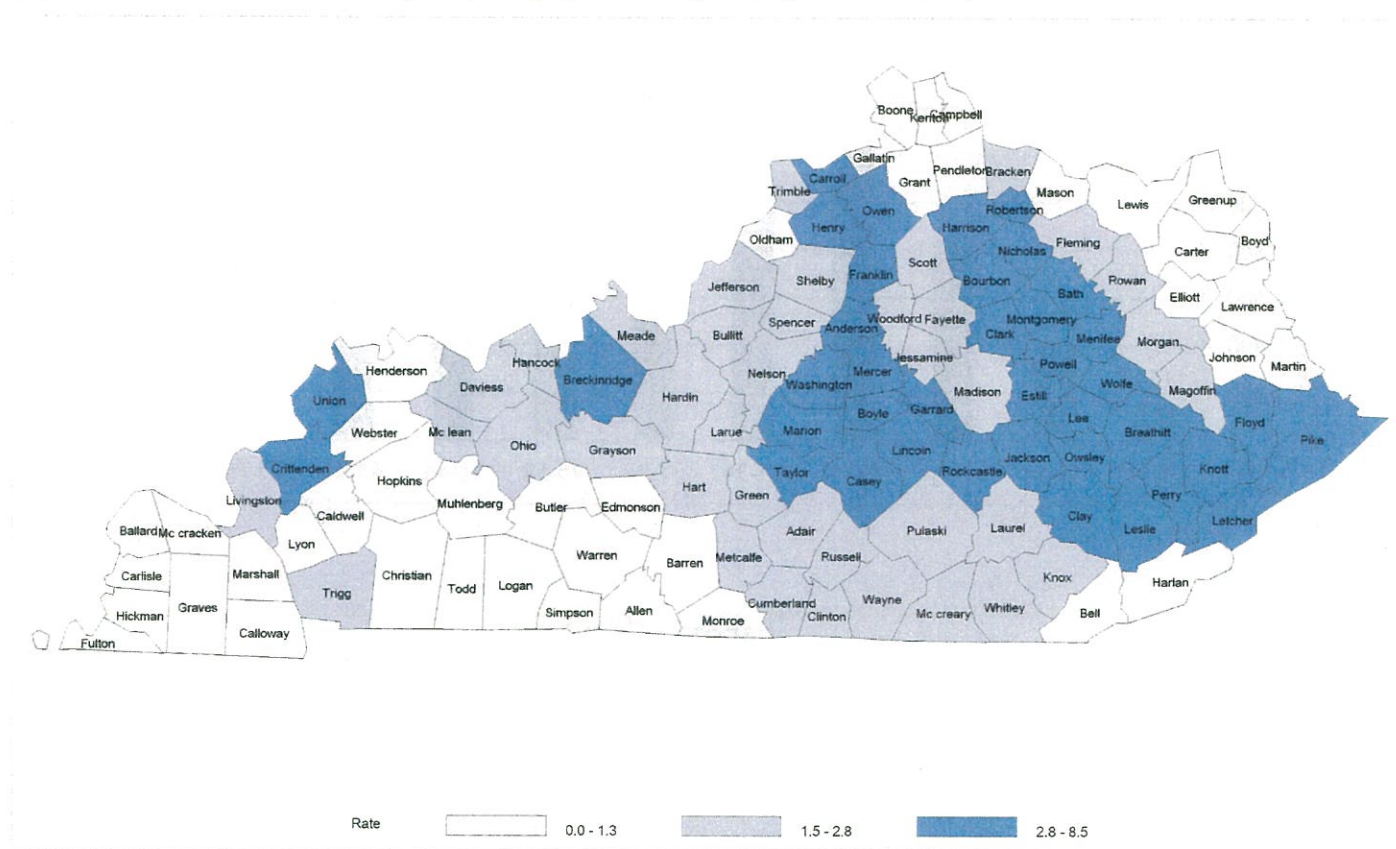


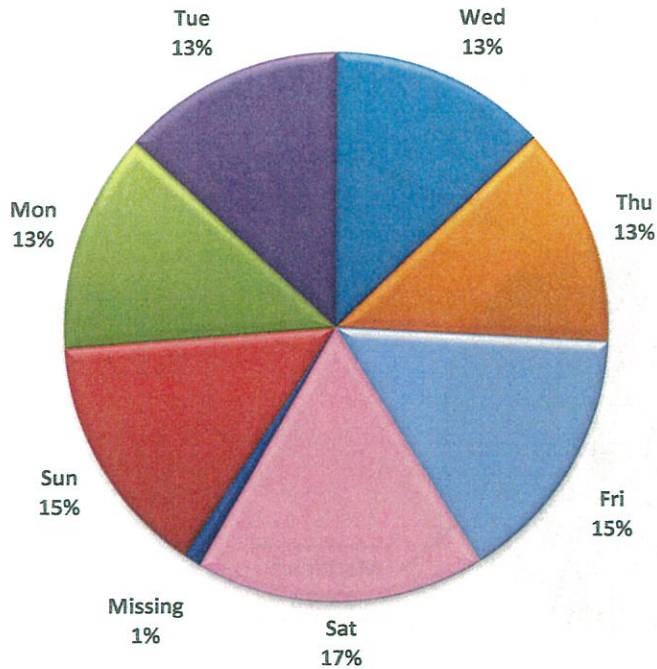
Table 5: KTR records by county of residence, 2013

Top 10 KY counties based on volume	Number	%
Jefferson	1,673	16.26
Fayette	663	6.44
Pike	470	4.57
Franklin	304	2.95
Daviess	257	2.5
Montgomery	225	2.19
Perry	217	2.11
Taylor	210	2.04
Boyle	209	2.03
Lincoln	198	1.92
All other KY counties combined	4,684	45.53
Out-of-state residents	1,179	11.46

Injury Information

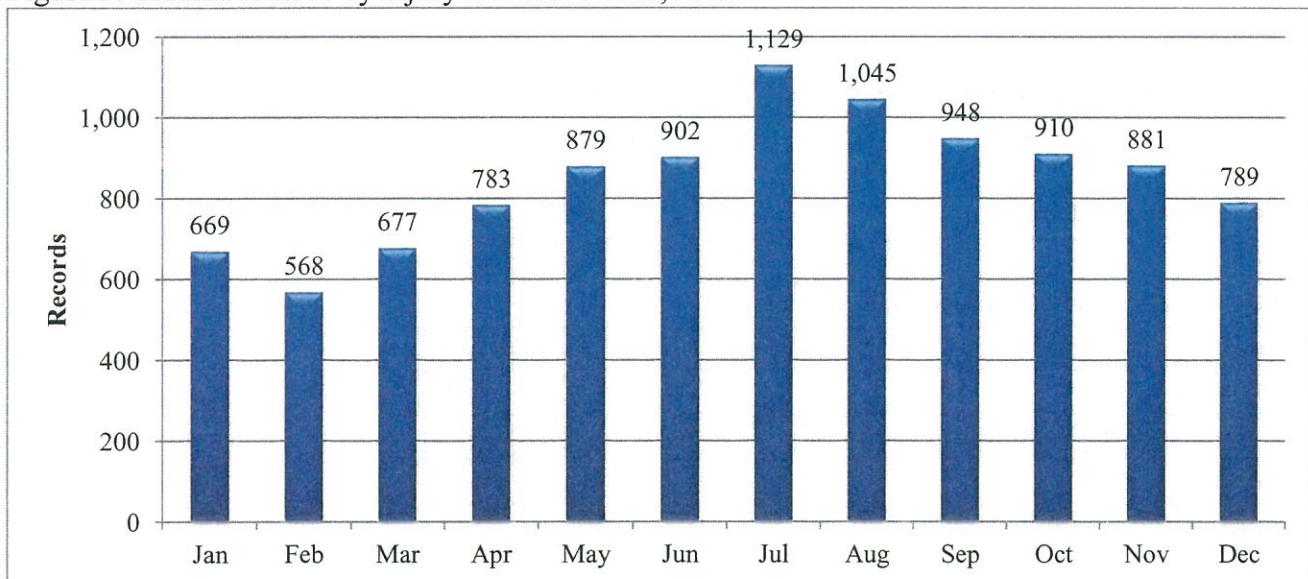
Injury Incident Day of the Week

Figure 4: Trauma records by injury incident day of the week, 2013



Injury Incident Month

Figure 5: Trauma records by injury incident month, 2013



Note: injury month was not available for 109 records.

Work-related Cases

Work-related trauma is defined as injury that occurs during paid employment. A total of 366 work-related trauma cases were recorded in the KTR dataset in 2013. One-third of the injuries were due to falls (Figure 6).

Figure 6: Work-related trauma cases by cause of injury, 2013

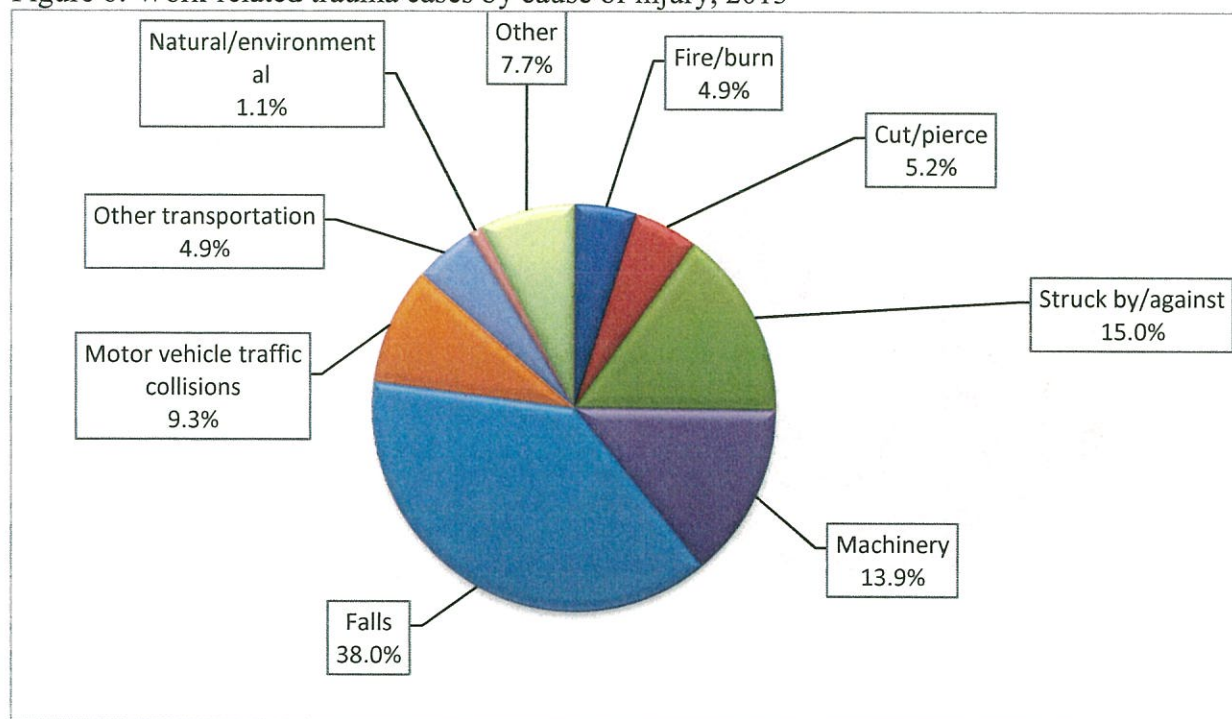


Table 6 shows the industry associated with patient's work environment for the work-related trauma records.

Table 6: KTR work related trauma records by industry, 2013

Industry	Number	%
Agriculture, Forestry, Fishing	20	5.46
Construction	65	17.76
Education, Health Services, Information Services	7	1.91
Government	9	2.46
Manufacturing	15	4.10
Natural Resources and Mining	15	4.10
Other Services	91	24.86
Professional and Business Services	16	4.37
Retail Trade	12	3.28
Transportation and Public Utilities	18	4.92
Missing/ not available	98	26.78
Total	366	100.00

Cause and Intent of Injury

E-codes indicating mechanism and intent were provided for about 99.4% of the records. Unintentional falls (n=3,724) and unintentional motor vehicle traffic collisions (n=3,042) were the leading causes of injuries reported to KTR (Table 7).

Table 7: KTR records by cause and intent of injury, 2013

Cause	Unintentional	Intentional	Other/Undetermined
Motor vehicle traffic collisions	3,042	<5	<5
Firearm	102	281	19
Poisoning	5	<5	<5
Falls	3,724	16	44
Suffocation	<5	<5	<5
Drowning	<5	0	0
Fire/burn	288	10	<5
Cut/pierce	201	239	7
Struck by/against	331	212	<5
Machinery	139	0	0
Other pedal cycle	130	0	0
Other pedestrian	24	0	0
Other transportation	872	0	0
Natural/environmental	80	0	0
Overexertion	34	0	0
Other specified	138	95	0
Not elsewhere classified (NEC)	40	19	6
Not specified	39	40	24
Total	9,195	923	114

Note: Missing information on cause and intent for 57 records

Cause/Intent of Injury by Age Group

Patients aged 15-24 accounted for 21.5% of the MVTC-related trauma, followed by those ages 25-34 (16%). The trend is similar to those of previous years. Falls among those 75-84 years old accounted for 17% of all unintentional falls treated in trauma centers. More than one-fifth (70 records) of the injuries attributed to being unintentionally struck by or against an object were experienced by patients 15-24 years of age. The review of the struck by/against injuries in this group showed that more than half of these injuries were sport-related. About half (45.6%) of the assault injuries were among young adults ages 15-34 (Table 8).

Table 8: KTR records by age and major causes of injury, 2013

Age	Unintentional Injuries										Intentional Injuries			
	Motor vehicle traffic collisions		Other transport. Injuries		Falls		Struck by/against		All other unintentional		Assault		Self-harm	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
NA	0	0	0	0	*	0.05	0	0	5	0.36	*	0.42	0	0
<1yr	8	0.26	*	0.11	74	1.99	7	2.11	20	1.43	44	6.14	0	0
1-4yr	42	1.38	16	1.83	180	4.83	20	6.04	116	8.3	22	3.07	*	0.49
5-14yr	153	5.03	87	9.98	324	8.7	57	17.22	214	15.32	15	2.09	8	3.88
15-24	655	21.53	217	24.89	140	3.76	70	21.15	173	12.38	146	20.36	33	16.02
25-34	501	16.47	124	14.22	176	4.73	40	12.08	187	13.39	181	25.24	42	20.39
35-44	430	14.14	135	15.48	219	5.88	32	9.67	167	11.95	125	17.43	31	15.05
45-54	489	16.07	130	14.91	368	9.88	48	14.5	192	13.74	127	17.71	41	19.9
55-64	378	12.43	87	9.98	528	14.18	33	9.97	163	11.67	32	4.46	34	16.5
65-74	213	7	49	5.62	545	14.63	15	4.53	101	7.23	18	2.51	7	3.4
75-84	137	4.5	23	2.64	628	16.86	5	1.51	35	2.51	*	0.42	8	3.88
85+	36	1.18	*	0.34	540	14.5	*	1.21	24	1.72	*	0.14	*	0.49

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

Motor Vehicle Traffic Collision Participants

Among the unintentional motor vehicle traffic collision (MVTC) records, 73.01% were coded as vehicle occupants, 15.84% as motorcyclists, and 6.87% as pedestrians (Table 9).

Table 9: Role in motor vehicle collisions, 2013

Role in motor vehicle traffic collision	Number	%
Motor vehicle occupant	2,221	73.01
Motorcyclist	482	15.84
Pedal cyclist	56	1.84
Pedestrian	209	6.87
Unknown	53	1.74
Other	21	0.69
Total	3,042	100.00

Protective Devices

There were 2,221 records for vehicle occupants injured in motor vehicle traffic collision. Protective devices were not present in 27.10% of the cases. Information on the use of protective devices was not available to the registrars in 14.32% of the cases (Table 10). There were 56 cases of children occupants under seven years of age; child restraint was reported in 39.29% of these cases.

Table 10: Use of occupant protective device in motor vehicle traffic collision, KTR records, 2013

Protective device	Use of protective devices by occupants in unintentional MVTC (n=2,221)	
	Number	%
Shoulder and Lap belt	831	37.42
Shoulder belt only	9	0.41
Lap belt only	431	19.41
Child restraint	25	1.13
Airbag	64	2.88
Available but not used	602	27.10
Missing information on protective device use	318	14.32

Note: In some records two or more protective devices were listed; therefore, counts do not add up to the total number of MVTC cases

Pre-Hospital Information

Transportation Mode

The mode of transportation by inter-facility transfer is presented in Table 11. Inter-facility transfer indicated whether the patient was transferred to the reporting facility from another acute care facility. Helicopter ambulance was used in 595 (19.47%) of the 3,056 inter-facility transfers and in 1,062 (14.68%) of the 7,233 non-transfer records. Ground ambulance was listed in 6,582 (63.97%) of all KTR cases.

Table 11: Transportation mode, 2013

Transportation mode	Inter Facility Transfer		
	Yes	No	Total
Missing information	6	77	83
Ground Ambulance	2,315	4,267	6,582
Helicopter Ambulance	595	1,062	1,657
Fixed-wing Ambulance	5	<5	
Private/Public Vehicle/Walk-in	133	1,794	1,927
Police	0	24	24
Other	<5	8	
Total	3,056	7,233	10,289

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

EMS Information

EMS notification, departure, or arrival times are not applicable data elements for patients who arrived to the trauma facility by private vehicle; may not be known for patients transferred from another acute care facility. It is reasonable to expect however that the EMS information will be available for the patients who were not interactivity transferees and were transported to the trauma facility by ground ambulance (n=4,267) or helicopter ambulance (n=1,062)(Table 11). About 55% of these record didn't list information on EMS notification, arrival, and leaving the scene dates and times.

With regard to patient status, EMS pulse rate and respiratory rate were reported for about 90% of the cases transported by ground ambulance and more (97%) of the cases transported by helicopter ambulance.

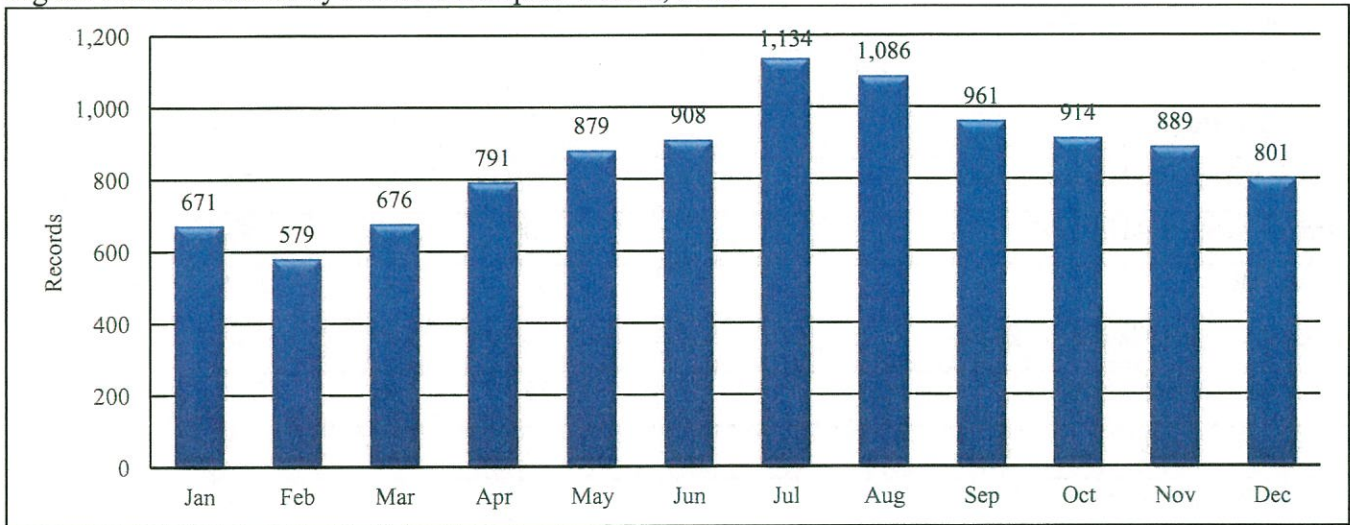
EMS pulse oximetry readings and Glasgow Coma Scale scores were listed for 89% of the transported by ground ambulance; for helicopter transport, they were available in 97% of records.

Emergency Department Information

Month of Arrival to ED/Hospital

Trauma volume varies by season, with higher volume of trauma registry records during summer months (Figure 7), mainly due to the increased number of motor vehicle traffic collision injuries and falls.

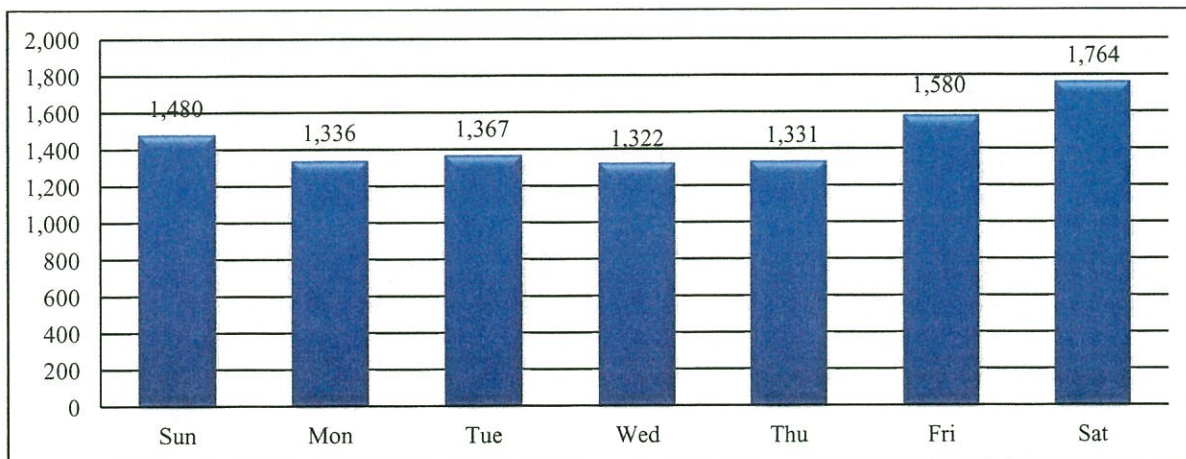
Figure 7: KTR records by month of hospital arrival, 2013



Weekday of Arrival to ED/Hospital

Higher volume of trauma cases was recorded during the weekends (Figure 8).

Figure 8: KTR records by weekday of hospital arrival, 2013



Time of ED/Hospital Admission

Admission shift is a metric that provides evidence for planning prevention initiatives and staffing trauma care facilities. The busiest time of the day is the 3pm to 11pm shift (Table 13).

Table 12: KTR records by facility and admission shift, 2013

Facility	Shift		
	11pm-7am	7am-3pm	3pm-11pm
Crittenden County Hospital	5	7	11
Ephraim McDowell Regional Medical Center	82	155	183
Fort Logan Hospital	7	18	37
Frankfort Regional Medical Center	52	113	153
Harrison Memorial Hospital	10	25	44
Hazard ARH	61	100	122
James B. Haggin Memorial Hospital	11	36	61
Kosair Children's Hospital	175	148	510
Livingston Hospital	5	23	17
Marcum Wallace Memorial Hospital	20	45	54
Methodist Hospital Union County	5	31	25
Owensboro Medical Center	52	139	154
Parkway Regional Hospital	<5	7	<5
Pikeville Medical Center	177	232	405
St. Joseph Berea	5	2	15
St. Joseph Hospital (Mt. Sterling)	36	128	165
Taylor Regional Medical Center	23	56	79
Trigg County Hospital	5	14	10
University of Kentucky – Children's	90	70	260
University of Kentucky Medical Center	700	751	1,432
University of Louisville Hospital	810	862	1,249
All	2,332	2,962	4,990

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

Time to ED/Hospital Arrival

The distribution of KTR records by time to hospital arrival and inter-facility transfer status is presented in Table 13. A patient is considered an inter-facility transfer if the patient was transferred to the current facility from another acute care facility. Due to the lack of personal identifiers in the trauma registry data collection, we cannot track patients from one trauma facility to another.

Table 13: KTR records by time to hospital arrival, 2013

Time to hospital	Inter Facility Transfer	
	Yes	No
<1 hour	15	1,376
[1-2) hr	93	1,393
[2-5) hr	889	444
[5-12) hr	685	179
[12-24) hr	77	99
24+ hr	197	256
Same day (exact incident time unknown)	832	3,114
Next day or later (exact incident time unknown)	258	197
Incorrect (negative, zero, missing)	10	175
Total	3,056	7,233

Initial ED or Hospital Glasgow Coma Scale Assessment

The Glasgow Coma Score (GCS) rates patients with regard to the severity of symptoms associated with brain injury. Detailed information on the first recorded eye, verbal, and motor GCS in the ED or hospital is presented in Table 14 for pediatric patients under age of 2 years and in Table 15 for patients older than 2 years.

Table 14: First recorded Glasgow Coma Score in the ED/hospital (ages \leq years)

Pediatric patients, age \leq years	Number	%
Glasgow Coma Score (Eye)		
1 (No eye movement when assessed)	18	4.63
2 (Opens eyes in response to painful stimulation)	<5	
3 (Opens eyes in response to verbal stimulation)	<5	
4 (Opens eyes spontaneously)	281	72.24
Glasgow Coma Score (Verbal)		
1 (No vocal response)	20	5.14
2 (Inconsolable, agitated)	<5	
3 (Inconsistently consolable, moaning)	<5	
4 (Cries but is consolable, inappropriate interactions)	18	4.63
5 (Smiles, oriented to sounds, follows objects, Interacts)	261	67.10
Glasgow Coma Score (Motor)		
1 (No motor response)	11	2.83
2 (Extension to pain)	<5	
3 (Flexion to pain)	<5	
4 (Withdrawal from pain)	<5	
5 (Localizing pain)	11	2.83
6 (Appropriate response to stimulation)	273	70.18

*Totals less than 5 were suppressed by state data management policy;
85 records for patients in this age group didn't have GCS scores listed.

Table 15: First recorded Glasgow Coma Score in the ED/hospital (ages >2years)

Patients, age>2 years	Number	%
Glasgow Coma Score (Eye)		
1 (No eye movement when assessed)	598	6.04
2 (Opens eyes in response to painful stimulation)	44	0.44
3 (Opens eyes in response to verbal stimulation)	198	2.00
4 (Opens eyes spontaneously)	8,440	85.25
Glasgow Coma Score (Verbal)		
1 (No verbal response)	674	6.81
2 (Incomprehensible sounds)	67	0.68
3 (Inappropriate words)	44	0.44
4 (Confused)	633	6.39
5 (Oriented)	7,858	79.37
Glasgow Coma Score (Motor)		
1 (No motor response)	459	4.64
2 (Extension to pain)	22	0.22
3 (Flexion to pain)	21	0.21
4 (Withdrawal from pain)	78	0.79
5 (Localizing pain)	224	2.26
6 (Obeys commands)	8,468	85.54

Note: 624 records for patients in this age group didn't have GCS scores listed.

Alcohol Use Indicator

Alcohol use beyond legal limits was confirmed by test for 759 (7.4%) of all records (Table 16).

Table 16: KTR records by alcohol use indicator, 2013

Alcohol Use Indicators	Number	%
No (not tested)	5,963	57.96
No (confirmed by test)	2,078	20.20
Yes (confirmed by test [trace levels])	367	3.57
Yes (confirmed by test [beyond legal limit])	759	7.38
Not Applicable	675	6.56
Not documented	80	0.78
Missing	367	3.57
Total	10,289	100.00

Drug Use Indicator

Illegal drug use was confirmed in 772 (7.5%) of the records (Table 17). The category “illegal drug use” includes use of illicit drugs or illegal use of a prescription drug according to the National Trauma Data Standard Data Dictionary.

Table 17: KTR records by drug use indicator, 2013

Drug Use Indicator	Number	%
No (not tested)	6,144	59.71
No (confirmed by test)	1,094	10.63
Yes (confirmed by test [prescription drug])	1,341	13.03
Yes (confirmed by test [prescription drug][illegal use drug])	66	0.64
Yes (confirmed by test [illegal use drug])	706	6.86
Not Applicable	25	0.24
Not documented	913	8.87
Total	10,289	100.00

ED Discharge Information

Table 18: KTR records by discharge status, 2013

Facility	Discharged from ED	Inpatient Discharge
	Number % of the row total	Number % of the row total
Crittenden County Hospital	17 (73.91%)	6 (26.09%)
Ephraim McDowell Regional Medical Center	146 (34.76%)	274 (65.24%)
Fort Logan Hospital	60 (96.77%)	<5
Frankfort Regional Medical Center	134 (42.14%)	184 (57.86%)
Harrison Memorial Hospital	45 (56.96%)	34 (43.04%)
Hazard ARH	56 (19.79%)	227 (80.21%)
James B. Haggin Memorial Hospital	101 (93.52%)	7 (6.48)
Kosair Children's Hospital	<5	831 (99.76%)
Livingston Hospital	15 (33.33%)	30 (66.67%)
Marcum Wallace Memorial Hospital	114 (95.80%)	5 (4.20%)
Methodist Hospital Union County	49 (80.33%)	12 (19.67%)
Owensboro Medical Center	21 (6.09%)	275 (79.71%)
Parkway Regional Hospital	7 (58.33%)	5 (41.67)
Pikeville Medical Center	190 (23.31%)	625 (76.69%)
St. Joseph Berea	22 (100.00%)	0
St. Joseph Hospital (Mt. Sterling)	206 (62.42%)	<5
Taylor Regional Medical Center	86 (54.43%)	72 (45.57%)
Trigg County Hospital	29 (100.00%)	0
University of Kentucky Children's Hospital	15 (3.57%)	405 (96.43%)
University of Kentucky Medical Center	512 (17.75%)	2,372 (82.25%)
University of Louisville Hospital	48 (1.64%)	2,875 (98.36%)
Total	1,874 (18.21%)	8,245 (80.13%)

Almost half (42.8%) of the records indicated discharge from ED to inpatient bed, about 4% of the cases were discharged from ED to intensive care unit (ICU), 13% were discharged to operating rooms, and 9% were transferred to another hospital. There were 104 (1.0%) patients who died according to the ED discharge record (Table 19).

Table 19: ED discharge disposition, 2013

ED discharge disposition	Number	%
Floor bed (general admission, non-specialty unit bed)	4,407	42.83
Observation unit (unit that provides < 24 hour stays)	159	1.55
Telemetry/step-down unit (less acuity than ICU)	423	4.11
Died	104	1.01
Other (jail, institutional care, mental health, etc.)	19	0.18
Operating Room	1,339	13.01
Intensive Care Unit (ICU)	1,779	17.29
Home without services	807	7.84
Left against medical advice	16	0.16
Transferred to another hospital	928	9.02
Missing	170	1.65
Not Applicable	138	1.34
Total	10,289	100.00

Diagnosis Information

Injuries by Nature or Body Region (Based on First Diagnosis Code)

Tables 20 and 21 summarize the injuries by nature and body region, based on the Barell Matrix (http://www.cdc.gov/nchs/data/ice/final_matrix_post_ice.pdf). Head injuries are labeled as Type 1 TBI if the first diagnosis code is for an intracranial injury, moderate/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 TBI includes records for patients with no intracranial injury and no loss of consciousness coded. Injuries to the lower extremity accounted for 23% of all trauma registry records, followed by TBI (20%), torso (19%), upper extremity (16%), and others (Table 21). More than half of the injuries (57%) were fractures (Table 20).

Table 20: KTR records by nature of injury, 2013

Nature of Injury	Number	%
Fractures	5,871	57.06
Internal Organ	2,297	22.32
Open Wounds	930	9.04
Burns	362	3.52
Unspecified	228	2.22
Sprains & Strains	127	1.23
Dislocation	147	1.43
Blood Vessels	118	1.15
Amputations	89	0.87
Crushing	24	0.23
Nerves	25	0.24
System Wide & Late Effects	22	0.21
Total	10,240	100.00

Note: Diagnosis codes were missing for 49 records

Table 21: KTR records by body region, 2013

Injuries by Body Region ^a			Number	%
Head and Neck	Traumatic Brain Injury (TBI)	Type 1 TBI	1,308	12.77
		Type 2 TBI	618	6.04
		Type 3 TBI	144	1.41
	Other head, face and neck	Other Head	236	2.30
		Face	562	5.49
		Eye	51	0.50
		Neck	55	0.54
		Head, Face and Neck Unspecified	83	0.81
Spine and back	Spinal Cord (SCI)	Cervical SCI	80	0.78
		Thoracic/ Dorsal SCI	30	0.29
		Lumbar SCI	7	0.07
		Sacrum Coccyx SCI	*	*
		Spine+ Back unspecified SCI	*	*
	Vertebral Column (VCI)	Cervical VCI	341	3.33
		Thoracic /Dorsal VCI	201	1.96
		Lumbar VCI	272	2.66
		Sacrum Coccyx VCI	25	0.24
		Spine+ Back unspecified SCI	8	0.08
Torso	Torso	Chest (Thorax)	1,120	10.94
		Abdomen	422	4.12
		Pelvis and Urogenital	332	3.24
		Trunk	52	0.51
		Back and Buttock	24	0.23
Extremities	Upper	Shoulder and upper arm	637	6.22
		Forearm and elbow	510	4.98
		Wrist, hand and fingers	369	3.60
		Other and unspecified	84	0.82
	Lower	Hip	691	6.75
		Upper leg and thigh	438	4.28
		Knee	41	0.40
		Lower leg and ankle	796	7.77
		Foot and toes	231	2.26
		Other and unspecified	164	1.60
Unclassifiable by site	Other and un-specified	Other/multiple	*	*
		Unspecified site	277	2.71
	Sys-tem wide	System-wide & late effects	22	0.21

^aBased on the first listed diagnosis code

Note: Diagnosis codes were missing for 50 records;

*Totals < 5 were suppressed by state data management policy

Locally Calculated Injury Severity Scores

The Injury Severity Score (ISS) is an anatomical rating system that provides numerical values for patients with multiple and varying injuries. The National Trauma Data Bank characterizes ISS scores of 1-9 as mild, 10-15 as moderate, 16-24 as severe, and over 24 as very severe. Using this metric, 66.3% of trauma registry injuries were mild, 14.5% moderate, 11.6% severe and 6.4% very severe. ISS was missing for 1.2% of the records (Table 22).

Table 22: KTR records by ISS, 2013

Injury Severity Score Range	Category	Number	%
1-9	mild	6,822	66.30
10-15	moderate	1,492	14.50
16-24	severe	1,188	11.55
25-75	very severe	661	6.43
missing	missing	126	1.22
Total		10,289	100.00

*Injury Severity Scores were missing for 126 records

Outcome Information

Hospital Discharge

The hospital discharge disposition identified 315 records where hospitalized patients died and 104 patients who died in the ED (Table 23).

Table 23: Hospital discharge disposition by ED discharge disposition – Part I

Table of hospital discharge disposition by ED discharge disposition – Part I							
Hospital discharge disposition	ED discharge disposition						
	Missing	Floor bed (general admission, non-specialty unit bed)	Observation unit (unit that provides < 24 hour stays)	Telemetry/step-down unit (less acuity than ICU)	Died	Other (jail, institutional care, mental health, etc.)	Operating Room
Not Available	33	174	*	*	135	31	29
Discharged/Transferred to an Intermediate Care Facility (ICF)	*	24	0	*	0	0	7
Discharge/Transferred to home under care of organized home health service	20	272	0	48	0	0	118
Left against medical advice or discontinued care	0	21	0	0	0	0	*
Expired	6	31	0	15	0	0	78
Discharged home with no home services	130	3,258	6	292	0	0	885
Discharged/Transferred to Skilled Nursing Facility	32	390	0	15	0	0	27
Discharged/ Transferred to hospice care	0	*	0	0	0	0	*
Discharged/Transferred to another type of rehabilitation or long-term care facility	52	250	*	53	0	0	157
Discharged/Transferred to another acute care hospital using EMS	*	29	*	0	*	0	9
Missing	37	7	*	*	5	5	*
Not Documented/Unknown	77	*	0	0	0	*	*
Unknown	0	*	*	0	0	0	*
Total	170	4,407	159	423	104	19	1,339

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

Table 23: Hospital discharge disposition by ED discharge disposition – Part II

Table of hospital discharge disposition by ED discharge disposition – Part II						
Hospital discharge disposition	ED discharge disposition					
	Intensive Care Unit (ICU)	Home without services	Left against medical advice	Transfere d to another hospital	Not Applic able	Total
Not Available	*	637	14	532	0	1,409
Discharged/Transferred to an Intermediate Care Facility (ICF)	14	0	0	0	0	41
Discharge/Transferred to home under care of organized home health service	98	0	0	0	14	582
Left against medical advice or discontinued care	12	0	0	0	0	33
Expired	191	0	0	0	*	315
Discharged home with no home services	970	*	0	0	92	5,557
Discharged/Transferred to Skilled Nursing Facility	56	0	0	0	5	535
Discharged/ Transferred to hospice care	6	0	0	0	0	19
Discharged/Transferred to another type of rehabilitation or long-term care facility	403	0	0	*	22	1,014
Discharged/Transferred to another acute care hospital using EMS	22	13	*	20	0	100
Missing	*	137	*	347	*	544
Not Documented/Unknown	0	16	0	26	0	128
Unknown	*	0	0	0	0	12
Total	1,779	807	16	928	138	10,289

Total Intensive Care Unit (ICU) Length of Stay

The total ICU length of stay is the cumulative amount of time spent in the ICU. In keeping with the NTDB data dictionary, each partial or full day is measured as one calendar day. The total days in ICU by facility are shown in Table 24.

Table 24: Total ICU length of stay

Facility	Total ICU Length of Stay
	Number of Days
Crittenden County Hospital	<5
Ephraim McDowell Regional Medical Center	25
Fort Logan Hospital	0
Frankfort Regional Medical Center	152
Harrison Memorial Hospital	19
Hazard ARH	98
James B. Haggin Memorial Hospital	0
Kosair Children's Hospital	501
Livingston Hospital	9
Marcum Wallace Memorial Hospital	0
Methodist Hospital Union County	0
Owensboro Medical Center	92
Parkway Regional Hospital	0
Pikeville Medical Center	711
St. Joseph Berea	0
St. Joseph Hospital (Mt. Sterling)	<5
Taylor Regional Medical Center	31
Trigg County Hospital	0
University of Kentucky – Children's	292
University of Kentucky Medical Center	4,679
University of Louisville Hospital	8,418
All	15,032

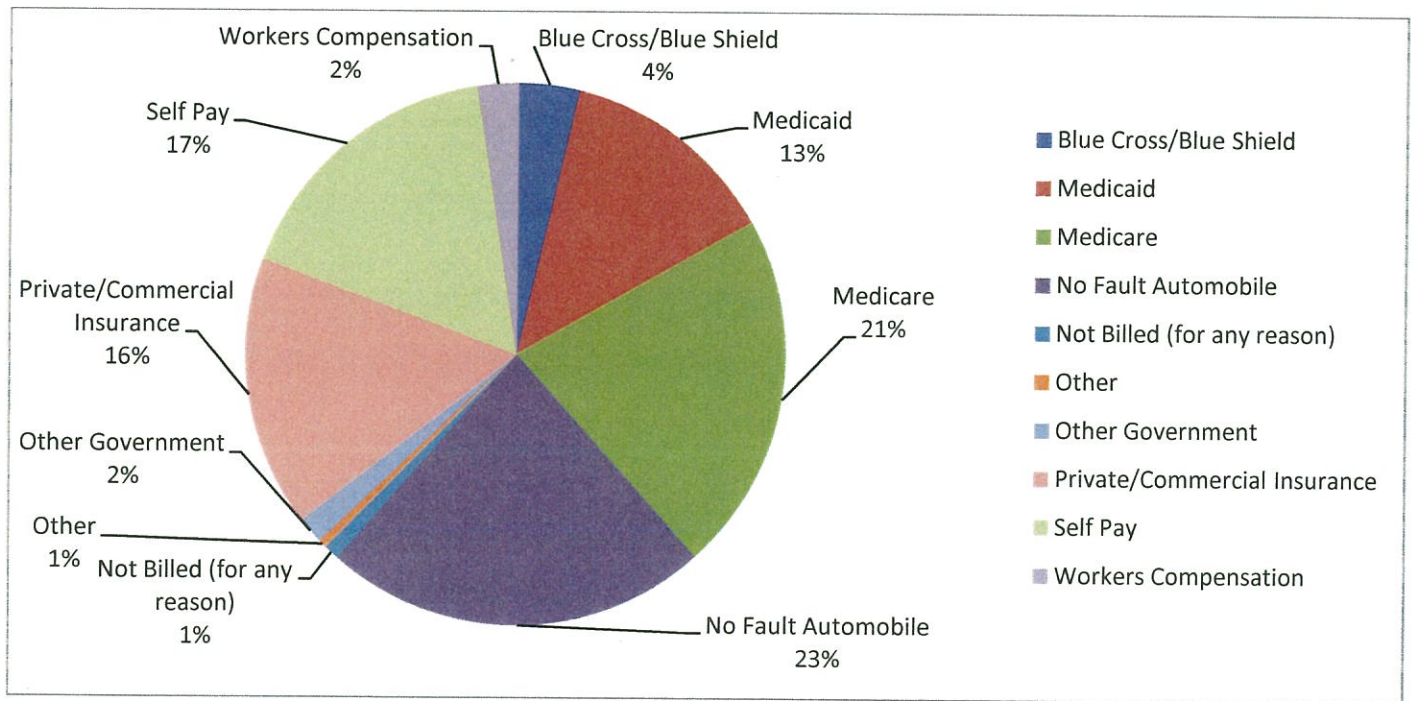
*Totals less than 5 were suppressed by state data management policy

Financial Information

Primary Method of Payment

The primary expected source of payment was not reported for 501 records, about 5% of the total KTR volume of records. Among the encounters with listed expected payer source, no fault automobile insurance was the leader (22%), followed by Medicare (20%); 16% of the records indicated expected “self-pay”, which typically ends with little or no compensation to the hospital and physicians providing trauma care. For more details on primary method of payment see Figure 9.

Figure 9: Primary method of payment, 2013



Conclusion

The Kentucky Trauma Registry continues to grow steadily and has added reporting facilities that serve rural and small municipal areas over the past year. As the proportion of Kentucky hospitals in the KTR grows, it will become more representative of major trauma in the state as a whole. The state Trauma Advisory Council continues to work closely with candidate facilities as they progress towards state or national verification, and funding from the National Highway Traffic Safety Administration through the Kentucky Office of Highway Safety supports software or portal activation costs for their first year in the KTR. We look forward to increasing the value of KTR data for system-wide and facility-specific quality improvement initiatives through the addition of new variables in the 2014 reporting year.

The progress made by Kentucky's trauma system is particularly noteworthy because the system has no state funding and would not exist without the professionalism and dedication of clinical and support staff. The sustainability of statewide trauma care on this tenuous basis is a constant concern that has been brought before state policy makers repeatedly. The value added by the state's trauma system--saving lives and avoiding catastrophic trauma-related disability--must be recognized and given proportionate support if the state trauma system is to continue its record of growth and effectiveness.

Acknowledgements:

In addition to our invaluable support from Trauma Advisory Council leadership and our grant funders, KTR facilities' trauma registrars have worked diligently to assure continuous quality improvement for KTR data as well as trauma care across the state.