

Kentucky Injury Prevention and Research Center

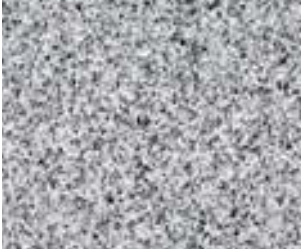
KENTUCKY TRAUMA REGISTRY REPORT 2008

July 2011

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Kentucky Trauma Registry 2008

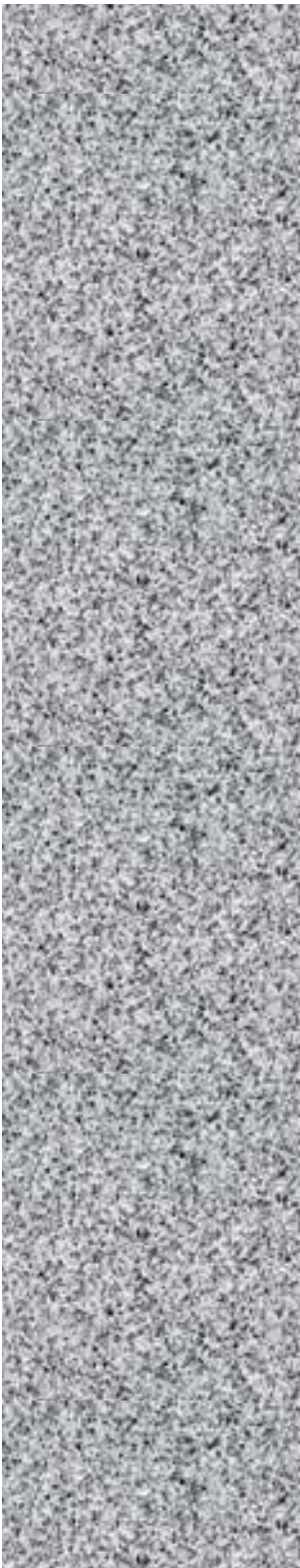
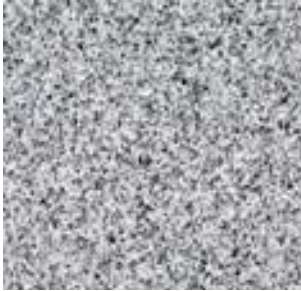
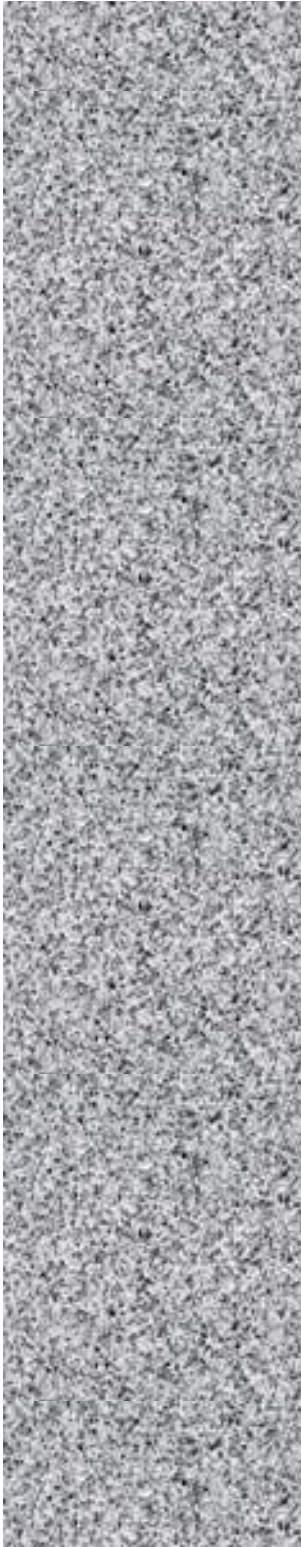


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Kentucky Trauma Registry 2008



Forward

The Kentucky Trauma Registry (KTR) Report 2008 is a publication of the Kentucky Injury Prevention and Research Center (KIPRC) at the University Of Kentucky College of Public Health. This report presents trauma data collected by the state's Level I trauma facilities, the University of Kentucky Hospital (UK) and the University of Louisville Hospital (UL), and the freestanding Kosair Children's Hospital (KO). This information was gathered by each hospital and submitted to KIPRC, where it has been analyzed as a whole. This report of 2008 Kentucky Trauma Registry data is intended to provide a baseline for assessment of the input from newly verified facilities in subsequent years. Unlike earlier KTR reports, which assessed cumulative data beginning in 1998, analysis here is limited to a single reporting year.

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Kentucky Trauma Registry 2008



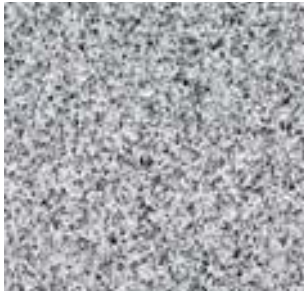
Introduction

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.

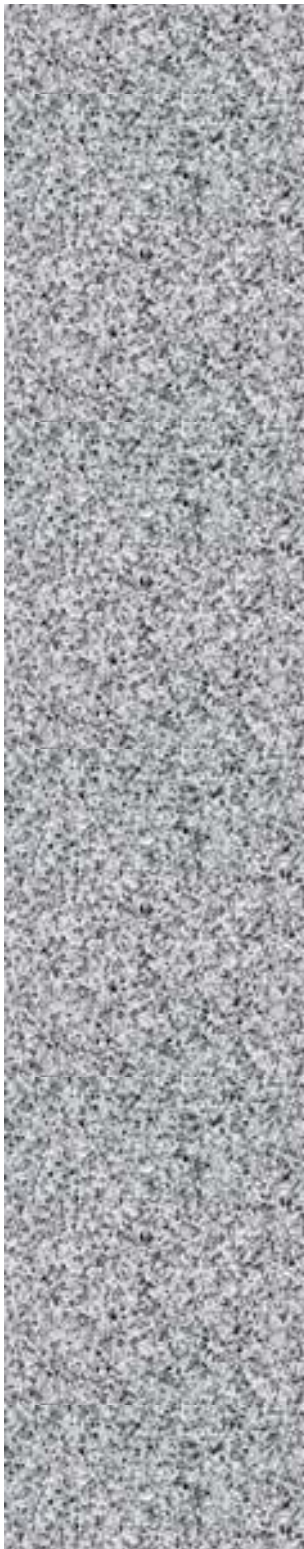
The body of this report is the summary of 2008 data for trauma cases seen only at the three Kentucky trauma centers in 2008. The registry does not include any trauma data from other Kentucky hospitals unless individuals were transferred from another hospital to one of the trauma centers. It is important to note that this data thus represents only the most serious survivable injuries and not all traumatic injuries in the state. Trauma cases leading to death at the scene of the event are obviously not part of the reported data. Data for trauma sustained in Kentucky but treated in out-of-state facilities are not available. 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 is provided in the Kentucky Inpatient and Emergency Department Traumatic Injury Data Report available at www.kiprc.uky.edu.

Kentucky’s Regional Trauma Centers:

- Kosair Children’s Hospital - Louisville
- University of Louisville Hospital - Louisville
- University of Kentucky Chandler Medical Center - Lexington



Kentucky Trauma Registry 2008



Research Findings

In 2008, a total of 6,568 patients were reported in the KTR. UL reported 2,709 trauma patients or 41.25% of the total, while UK reported 2,799 (42.62%), including both pediatric and adult cases, and KO saw 1,060 (16.14%) (Table 1).

Demographic information included gender, age, state and county of residence, and race or ethnicity. Males comprised 69.3% of KTR patients, reflecting the predominance of males in the injury categories classified by the American College of Surgeons as trauma (Table 2). It is important to note the distinction between this classification and the range of traumatic injuries as a whole. Significantly, the ACS trauma classification excludes hip fractures, the most common traumatic injury in older adults, a category that is in turn predominantly female. Thus, KTR demographics are strikingly different from those of the related report on traumatic injuries as a whole, in which males and females are roughly equally represented.

The same issue of inclusion criteria influences the distribution of trauma cases by age group. Whereas the statewide hospitalization data for traumatic injury (including hip fractures) is skewed towards older age groups, the KTR data is concentrated in working-age adults (Table 3), with over half (54.1%) aged 21-60.

Data regarding state and county of residence (Table 4) demonstrate that a large majority (87.7%) of those treated for major trauma in Kentucky trauma centers are in-state residents. County-specific data must be read with the caveat that we are only reporting on Kentucky facilities, so patients from the northern and southern tiers of counties, who often receive trauma care in Ohio and Tennessee respectively, are underrepresented in the current data (Tables 5 and 6). While Fayette and Jefferson counties had the highest absolute numbers of patients, this result simply reflects their positions as the most populous counties (Table 5). Rural Appalachian counties make up most of the top ten when the rate of injury per 1,000 population is addressed (Table 6)

The distribution of trauma patients by race and ethnicity reflects the local service area of the two major trauma centers: Louisville has a much higher proportion of African-American residents than the rest of Kentucky, so UL's trauma population is strikingly more diverse than that of UK (18.3% versus 4%) (Table 7).

Trauma is to some extent a seasonal phenomenon, with higher incidence (10-12%) in each of the summer months (Table 8 and Figures 1, 2).

It will not surprise readers that motor vehicle crashes are the leading cause of traumatic injury in Kentucky at 36.45%, followed by falls at 23.38% (Table 9, Figures 3, 4, 5). Data on age of children and adolescents admitted for motor vehicle crash-related injuries are presented in greater detail in



Kentucky Trauma Registry 2008



Table 17. There are 87 trauma registry entries for children injured in all-terrain vehicle crashes; detailed data by age is presented in Table 18. In comparing the two Level I centers, a notable difference emerges with regard to intentional injury: 15.4% of the UL trauma hospitalizations (Figure 4) are classified as intentional (assault or self-inflicted) compared with 10.4% at UK (Figure 3). This discrepancy is attributable in part to the separate reporting of children in the Louisville-area facilities: when Kosair Children's Hospital and UL data are combined, the proportion of intentional injuries drops to 13.0%. Falls were the most common cause of injury in children from infancy through age 10, followed by motor vehicle crashes (Table 9).

The Glasgow coma score (GCS) rates patients with regard to the severity of symptoms associated with brain injury. Of the 6,210 patients for whom GCS was reported, 15.5% had scores of 13 or lower, indicating some degree of brain involvement. The proportion at the lowest reported level (3) was slightly higher at UK (9.7%, or 254 out of 2,626 UK patients with reported GCS) than at UL and KO combined (6%, or 215 patients out of 3,584 with reported GCS) (Table 10).

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 minor, 10-15 as moderate, 16-24 as severe, and over 24 as very severe. Using this metric, 52.6% of trauma registry injuries were mild, 15.5% moderate, 17.9% severe, and 14.1% very severe (Table 11). Notably, 96.2% of KO's patients were classified as having mild injuries.

Admission shift is a metric that provides evidence for planning prevention initiatives and staffing trauma care facilities. About half (49%) of trauma admissions were in the late afternoon or evening, while about 28% took place on the 11 pm-7 am shift (Table 12).

Most trauma patients (73%) were discharged in less than a week (Tables 13, 14). Motor vehicle traffic crashes were responsible for by far the largest number of aggregate inpatient days (19,268) followed by falls (8,223) (Figure 6).

The large majority of patients were discharged home, with or without home health assistance: 74% at UK, 72% at UL, and 91.3% at KO. Death rates were 6.3% for UK, 5.5% for UL, and 0.8% for KO (Table 15). The most common cause of fatal injury was a motor vehicle crash at 36%, followed by falls at 24% and firearms at 16% (Figure 7).

The three facilities differed regarding the proportion of patients who arrived as transfers from other hospitals: UK had the highest transfer admission rate at 55.3%, followed by KO at 41.7% and UL at 36.6% (Table 16). This finding is consistent with previous trauma registry reports and is likely to reflect UK's geographically larger service area.

Tables and Figures

Table 1: KY Trauma Registry patient distribution by hospital, 2008

Hospital	Frequency	Percent
KO	1,060	16.1%
UK	2,799	42.6%
UL	2,709	41.3%
Total	6,568	100.0%

Table 2: KY Trauma Registry patient distribution by gender, 2008

Gender	Frequency	Percent
Female	2,016	30.7%
Male	4,550	69.3%
Missing	2	0.0%

Table 3: KY Trauma Registry patient distribution by age group, 2008

Age Group	Hospital					
	KO		UK		UL	
	N	%	N	%	N	%
<1 yr	150	16.5%	23	0.8%	*	0.1%
1-10 yrs	556	61.1%	249	9.0%	.	
11-20 yrs	354	38.9%	392	14.1%	290	10.7%
21-30 yrs	.		507	18.3%	559	20.7%
31-40 yrs	.		404	14.6%	414	15.3%
41-50 yrs	.		440	15.9%	507	18.7%
51-60 yrs	.		350	12.6%	378	14.0%
61-70 yrs	.		205	7.4%	256	9.5%
71-80 yrs	.		135	4.9%	158	5.8%
80+ yrs	.		91	3.3%	145	5.4%
Total	910	100.0%	2,773	100.0%	2,707	100.0%

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

Table 4: KY Trauma Registry patient distribution by state of residence, 2008

Patient State	Hospital						Total*
	KO		UK		UL		
	N	%	N	%	N	%	N
IN	178	16.8%	.		498	18.4%	676
KY	855	80.7%	2616	100.0%	2125	78.4%	5,596
OH	*		.		14	0.5%	16
TN	*		.		13	0.5%	17
Other	20	1.9%	0		59	2.2%	79
Total	1059	100.0%	2616	100.0%	2709	100.0%	6,384

*State of residence missing for 184 patients

Table 5: Top 10 KY counties by number of resident patients in KY Trauma Registry, 2008

#	Patient County	Cases	% of KTR cases	Rate per 1,000 population
1	Jefferson	1,577	28.19%	2.2
2	Fayette	405	7.24%	1.4
3	Hardin	200	3.57%	2.0
4	Bullitt	150	2.68%	2.0
5	Madison	116	2.07%	1.4
6	Nelson	101	1.81%	2.3
7	Laurel	96	1.72%	1.7
8	Pulaski	86	1.54%	1.4
9	Jessamine	83	1.48%	1.8
10	Clark	77	1.38%	2.2

Table 6: Top 10 KY counties by rate of resident patients in KY Trauma Registry, 2008

	Patient County	Cases	% of KY cases	Rate per 1,000 population
1	Bath	44	0.79%	3.7
2	Wolfe	26	0.46%	3.7
3	Nicholas	23	0.41%	3.4
4	Clay	77	1.38%	3.2
5	Jackson	43	0.77%	3.2
6	Mercer	67	1.20%	3.1
7	Clinton	29	0.52%	3.0
8	Trimble	27	0.48%	3.0
9	Lee	22	0.39%	3.0
10	Fleming	42	0.75%	2.9

Table 7: KY Trauma Registry patient distribution by race/ethnicity and hospital, 2008

Hospital	Race/Ethnicity				
Frequency Row Pct	White	Black	Hispanic	Other	Total
KO	833 78.6	179 16.9	36 3.4	12 1.1	1,060
UK	2686 96.0	86 3.1	7 0.2	19 0.7	2,798
UL	2,210 81.7	365 13.5	79 2.9	49 1.8	2,707
Total	5,279	630	122	68	6,565

*Race/ethnicity missing for 3 patients

Table 8: KY Trauma Registry patient distribution by month of arrival, 2008

Hospital	Arrival Month												
Frequency	1	2	3	4	5	6	7	8	9	10	11	12	Total
KO	54	49	74	84	101	109	128	106	127	87	60	81	1,060
UK	185	154	201	197	255	284	268	297	249	249	246	214	2,799
UL	193	211	209	219	244	239	251	316	205	214	217	191	2,709
Total	432	414	484	500	600	632	647	719	581	550	523	486	6,568

Figure 1: KY Trauma Registry percent of patients by hospital and arrival month, 2008

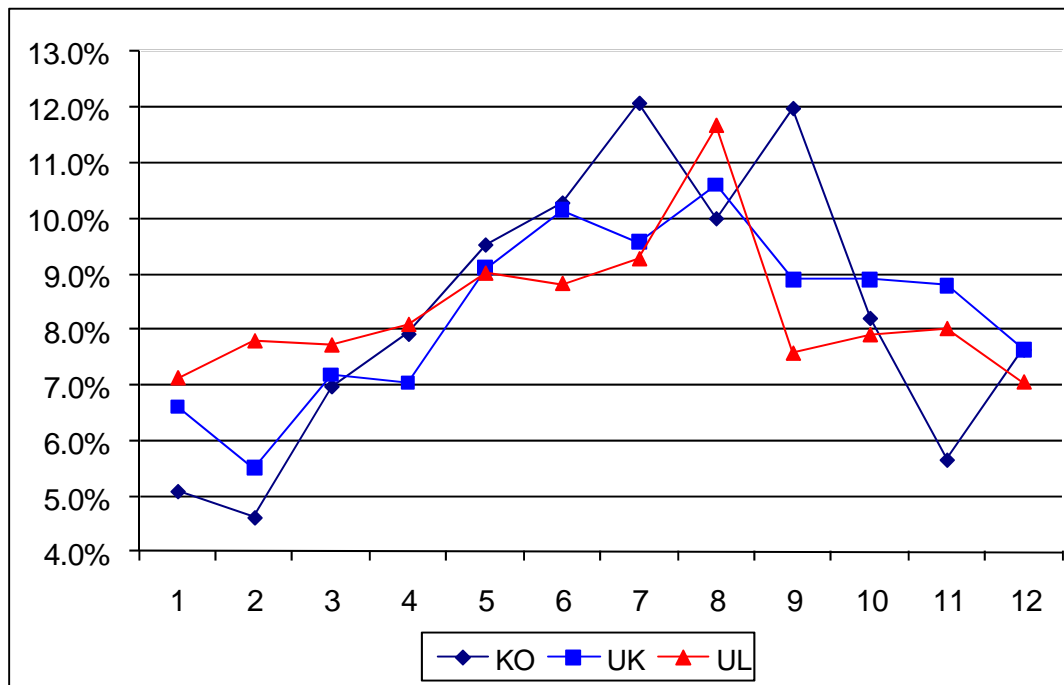


Figure 2: KY Trauma Registry number of patients by hospital and arrival month, 2008

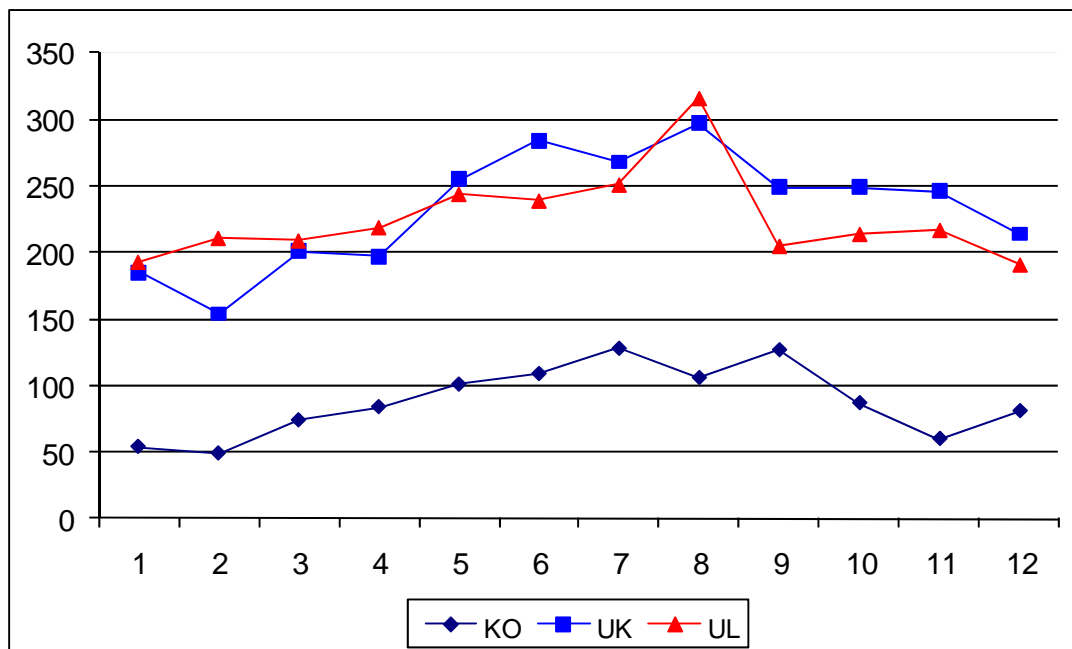


Table 9: KY Trauma Registry patient distribution by cause of injury and age, 2008

Age Group	Falls		MVTC		Other Transport.		Struck By/ Against		Assault		All Other		Total	
	N		N		N		N		N		N		N	
<1 yr	79	5.2%	7	0.3%	.		7	2.9%	37	5.9%	45	4.1%	175	2.7%
1-10 yrs	314	20.6%	157	6.6%	52	7.5%	65	26.5%	19	3.0%	198	18.1%	805	12.3%
11-20 yrs	144	9.5%	422	17.6%	157	22.8%	62	25.3%	90	14.4%	161	14.7%	1036	15.8%
21-30 yrs	91	6.0%	475	19.8%	137	19.9%	29	11.8%	181	29.0%	153	14.0%	1066	16.2%
31-40 yrs	86	5.7%	347	14.5%	108	15.7%	14	5.7%	112	17.9%	151	13.8%	818	12.5%
41-50 yrs	155	10.2%	384	16.0%	108	15.7%	31	12.7%	126	20.2%	143	13.1%	947	14.4%
51-60 yrs	186	12.2%	282	11.8%	72	10.4%	22	9.0%	43	6.9%	123	11.3%	728	11.1%
61-70 yrs	151	9.9%	191	8.0%	37	5.4%	9	3.7%	12	1.9%	61	5.6%	461	7.0%
71-80 yrs	165	10.8%	74	3.1%	12	1.7%	*		*	0.5%	37	3.4%	293	4.5%
80+ yrs	150	9.9%	54	2.3%	7	1.0%	*		*	0.2%	20	1.8%	236	3.6%
Total	1,521	100.0%	2,393	100.0%	690	100.0%	245	100.0%	624	100.0%	1,092	100.0%	6,565	100.0%

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

Figure 3: KY Trauma Registry patient distribution by cause of injury, UK 2008

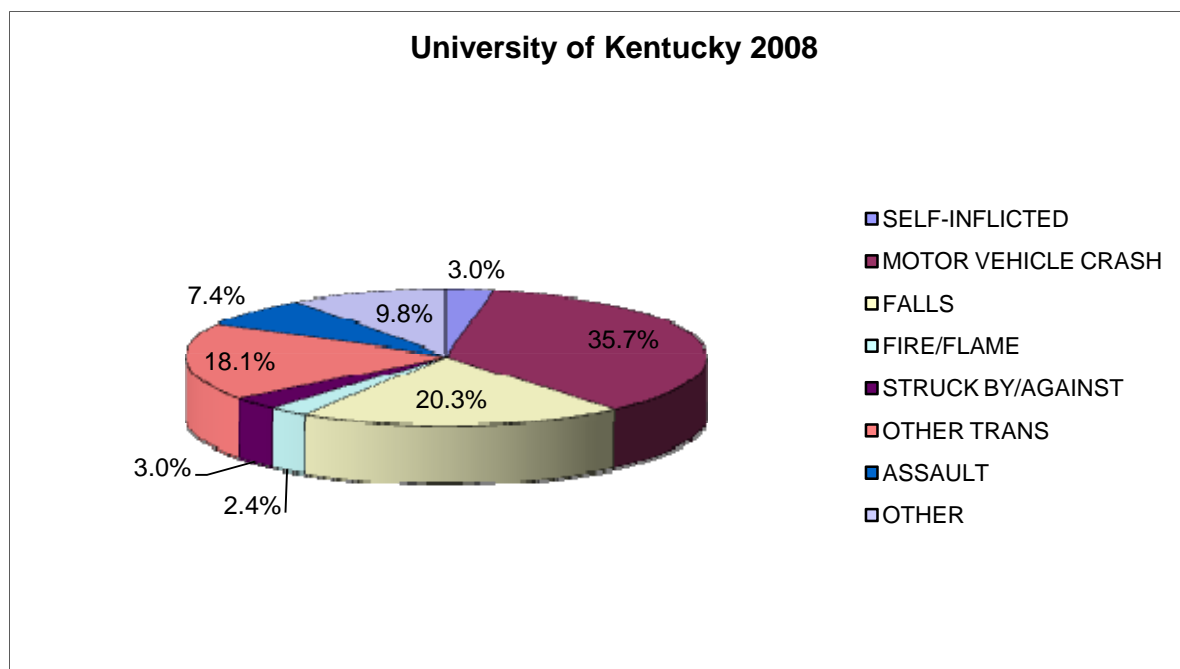


Figure 4: KY Trauma Registry patient distribution by cause of injury, UL 2008

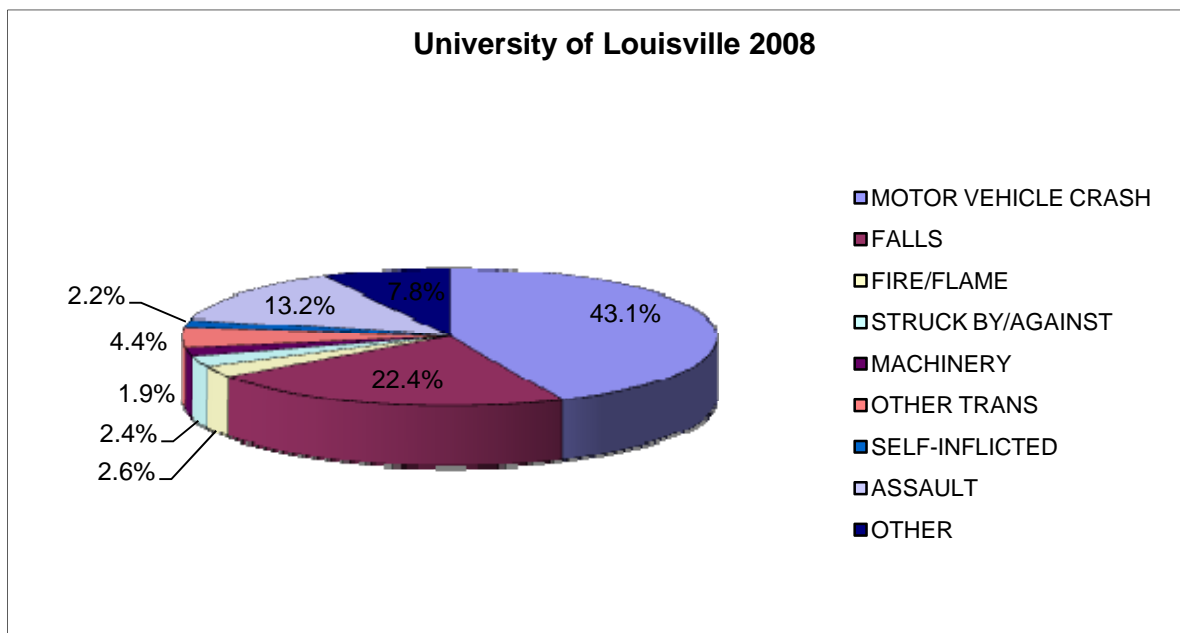


Figure 5: KY Trauma Registry patient distribution by cause of injury, KO 2008

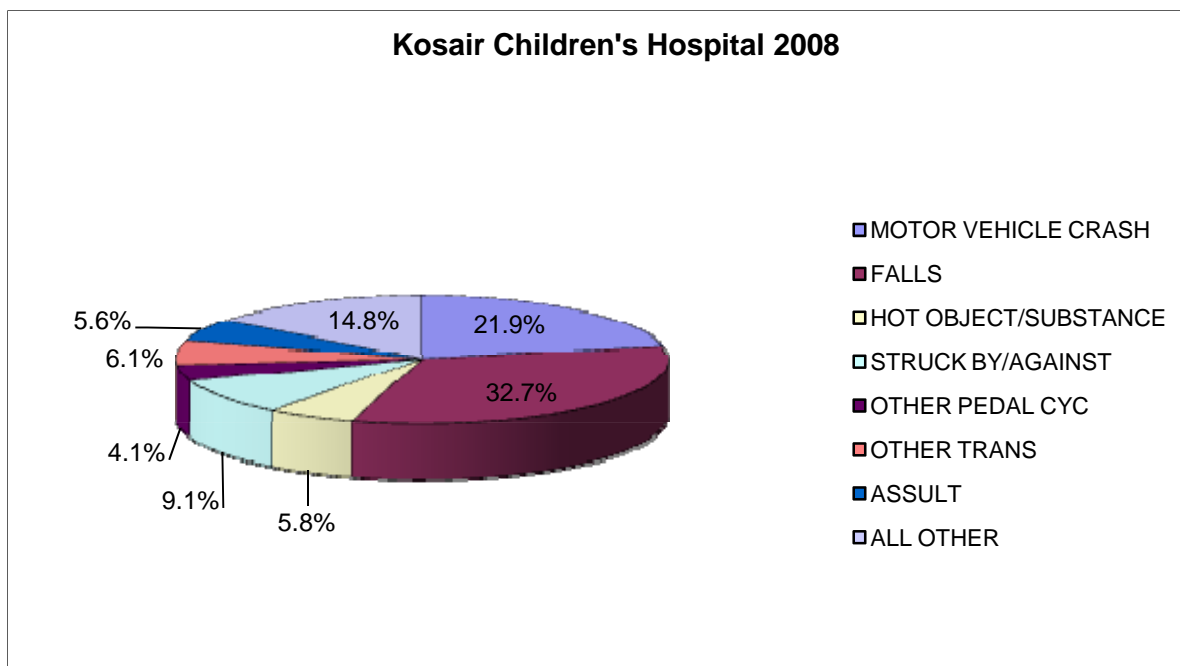


Table 10: KY Trauma Registry patient distribution by Glasgow Coma Score (GCS), 2008

GCS	Hospital						Total
	KO		UK		UL		
3	34	3.2%	254	9.1%	181	6.7%	469
4	*		11	0.4%	11	0.4%	23
5	*		9	0.3%	5	0.2%	15
6	*		22	0.8%	36	1.3%	59
7	*		32	1.1%	34	1.3%	68
8	8	0.8%	12	0.4%	13	0.5%	33
9	*		9	0.3%	18	0.7%	31
10	14	1.3%	15	0.5%	23	0.8%	52
11	21	2.0%	19	0.7%	25	0.9%	65
12	14	1.3%	20	0.7%	13	0.5%	47
13	9	0.8%	60	2.1%	30	1.1%	99
14	54	5.1%	242	8.6%	158	5.8%	454
15	889	83.9%	1,921	68.6%	1,985	73.3%	4,795
No information	8	0.8%	173	6.2%	177	6.5%	358
Total	1,060	100.0%	2,799	100.0%	2,709	100.0%	6,568

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

Table 11: KY Trauma Registry patient distribution by ISS, 2008

ISS	Hospital							Total
	KO		UK		UL			
1-9	1,020	96.2%	1,358	48.5%	1,076	39.7%	3,454	52.6%
10-15	21	2.0%	483	17.3%	515	19.0%	1,019	15.5%
16-24	8	0.8%	556	19.9%	610	22.5%	1,174	17.9%
25-34	7	0.7%	300	10.7%	360	13.3%	667	10.2%
35-44	*		57	2.0%	90	3.3%	148	2.3%
45-75	*		18	0.6%	39	1.4%	59	0.9%
Missing	1	0.1%	27	1.0%	19	0.7%	47	0.7%
Total	1,060	100.0%	2,799	100.0%	2,709	100.0%	6,568	100.0%

Table 12: KY Trauma Registry patient distribution by shift of arrival, 2008

Shift of Arrival	Hospital			
	KO	UK	UL	Total
7am - 3pm	18.2%	22.0%	25.7%	22.9%
3pm - 11pm	62.2%	51.5%	41.2%	49.0%
11pm - 7am	19.6%	26.1%	32.4%	27.7%
No information	0%	0.4%	0.7%	0.5%

Table 13: KY Trauma Registry patient distribution by length of stay, 2008

Length of Stay	Hospital			
	KO	UK	UL	Total
Up to one week	93.5%	72.9%	65.0%	73.0%
One week to one month	5.9%	23.0%	30.2%	23.2%
More than one month	0.6%	3.4%	3.8%	3.1%
No information	0.1%	0.8%	1.0%	0.7%

Table 14: KY Trauma Registry patient length of hospital stay statistics, 2008

Length of Stay (in days)	Hospital		
	KO	UK	UL
Mean	2.8	6.7	8.2
Median	1.6	3.2	4.8
Std. Deviation	4.9	10.3	10.5
Range	0-93	0-126	0-133

Figure 6: KY Trauma Registry patients - total length of hospital stay by cause of injury, 2008

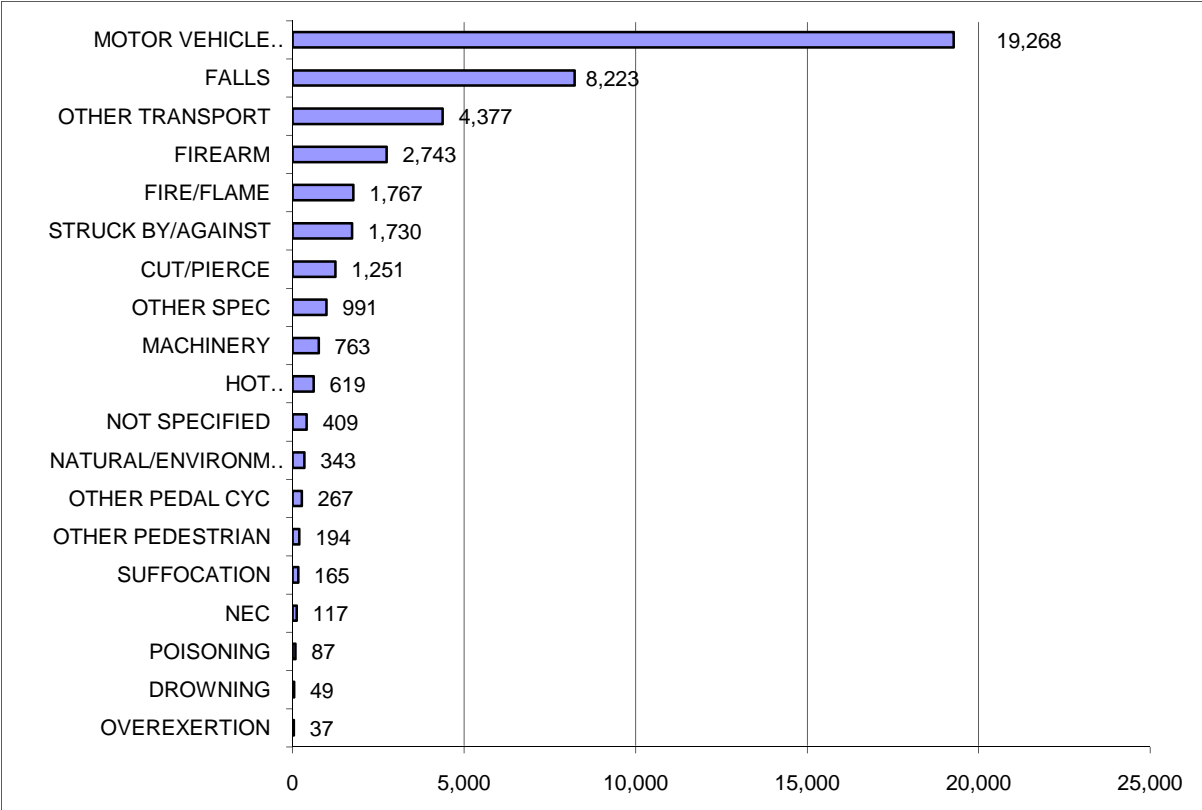


Table 15: Percent of KY Trauma Registry patients by discharge status, 2008

Discharge Status*	Hospital		
	KO	UK	UL
Missing Discharge Status	0.0%	0.3%	0.0%
Against Medical Advice	0.0%	0.0%	0.4%
Death	0.8%	6.3%	5.5%
Foster Care	4.2%	0.0%	0.0%
Home	91.3%	74.0%	64.3%
Home Health	0.0%	0.0%	7.7%
Hospice	0.0%	0.1%	0.0%
Hospital Tran	0.0%	0.0%	0.2%
Jail/Prison	0.0%	0.4%	1.1%
Long Term Care	0.0%	0.7%	0.0%
NA	0.1%	4.3%	0.1%
Nursing Home	0.0%	0.0%	2.9%
Other	0.7%	1.2%	3.1%
Psychiatric Facility	0.4%	0.3%	0.5%
Rehab	1.9%	11.4%	14.0%
Skilled Nursing Facility	0.0%	1.0%	0.0%
Transfer	0.7%	0.0%	0.1%

*there are coding differences between the hospitals

Figure 7: KY Trauma Registry fatalities by cause of injury, 2008

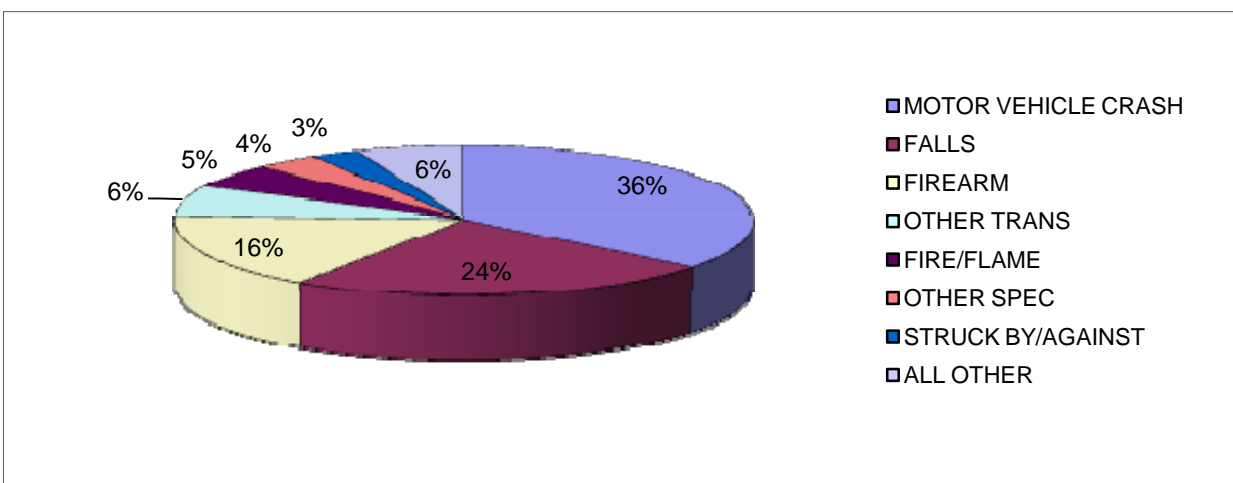


Table 16: Proportion of patients who arrived as transfers from other hospitals, 2008

Patient admission	Hospital		
	KO	UK	UL
Non-transfer	58.3%	44.7%	63.4%
Transfer from other hospital	41.7%	55.3%	36.6%

Table 17: Pediatric KY Trauma Registry patients in motor vehicle crashes by age, 2008

Age in years	Number of patients in MVC	Percent of all pediatric MVC cases	Percent of all registry cases for this age
0	7	1.8	4.0
1	17	4.4	18.1
2	9	2.3	10.5
3	24	6.2	25.5
4	15	3.8	19.0
5	14	3.6	17.5
6	20	5.1	22.0
7	15	3.8	17.2
8	12	3.1	17.6
9	18	4.6	24.7
10	13	3.3	24.5
11	9	2.3	13.4
12	19	4.9	28.4
13	18	4.6	25.7
14	27	6.9	32.5
15	30	7.7	32.6
16	51	13.1	41.1
17	72	18.5	52.9

Table 18: Pediatric ATV patients by age, 2008

Age	ATV cases	Percent of pediatric ATV cases	Percent of all registry cases for this age
0	0	0.0	0.0
1	*		
2	0	0.0	0.0
3	*		
4	*		
5	*		
6	6	6.9	6.6
7	5	5.7	5.7
8	*		
9	7	8.0	9.6
10	*		
11	*		
12	7	8.0	10.4
13	6	6.9	8.6
14	13	14.9	15.7
15	9	10.3	9.8
16	9	10.3	7.3
17	7	8.0	5.1

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