

Kentucky Injury Prevention and Research Center

**2011 Kentucky Inpatient and
Emergency Department
Traumatic Injury Data Report**

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Introduction

The Kentucky Inpatient and Emergency Department Trauma Data Report provides an overview of 2011 hospital care provided to Kentucky residents whose primary diagnosis was some form of physical trauma. It is important to note that the data sources for these tables are the hospital discharge and emergency department (ED) datasets for 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) as trauma facilities or volunteered to report 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 and ED datasets gives a comprehensive account of trauma-related hospitalizations across the full range of facilities in the state.

The 2010 version of this report was a comprehensive review of the trauma care provided in the Kentucky acute care hospitals 2001 – 2010. It could be beneficial to the reader of the current report to use the Kentucky Inpatient and Emergency Department Trauma Data Report 2010 as a reference (<http://www.kiprc.uky.edu/projects/trauma/index.html>).

The data sources for this report are the Kentucky inpatient hospital discharge (HD) uniform billing electronic records from all Kentucky general acute care hospitals and the electronic emergency department (ED) visit records for 2011. Data on Kentuckians who received care out of state, such as those treated at Cincinnati or Nashville facilities, were not included. The report is focused only on Kentucky residents and does not include non-Kentuckians who received injury-related care at Kentucky facilities.

The data presented in the report reflects instances of care-hospital admissions or ED visits - 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 injuries 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

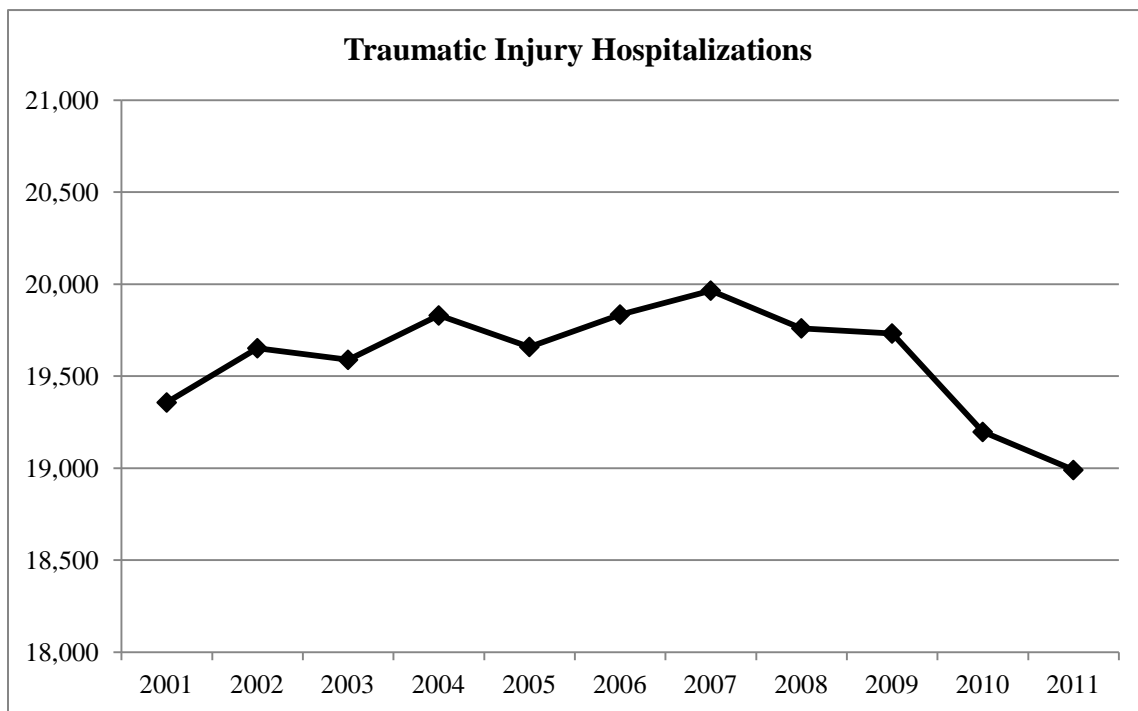
diagnosis was in the following range of codes: 800-897, 900, 901, 902, 903, 904, 925, 926, 927, 928, 929, 940-949, 950-959.

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 state HD and ED electronic record systems currently support up to three E-codes. On average, about 85 percent of the HD and ED cases with principal diagnoses of injury are supplemented with valid external cause of injury E-codes. The completeness and validity of E-codes is very important for successful injury surveillance, to identify priority areas and populations at higher risk to be targeted by injury prevention programs.

Inpatient Data

In 2011 there were 18,990 traumatic injury-related hospitalizations for Kentucky residents in non-federal acute care Kentucky hospitals, a decrease of about one percent from the 19,197 such hospitalizations in 2010. About 3.3% of all 2011 hospitalizations were due to traumatic injuries. Hospitalizations for trauma have varied by about 4% over the past decade, reaching a high of 19,965 in 2007 and dropping to the decade's lowest level in 2011 (Figure 1). This finding is plausible in light of two related facts: the striking decrease in Kentucky motor vehicle fatalities and the health care trend toward outpatient settings.

Figure 1: Traumatic injury hospitalizations for KY residents in KY acute care hospitals, 2001-2011



As in previous years, nearly four-fifths (76.7%) of hospitalizations were for unintentional injuries, that is, injuries not a result of an interpersonal or self-directed intention to cause harm. It is likely that this proportion would be even higher if we had complete information for the 19.6% of trauma hospitalizations for which a cause was not noted (Table 1). With regard to cause, falls accounted for 56.1% of all traumatic injury-related hospitalizations.

Table 1: Traumatic injury hospitalizations by cause and intent, 2011

Cause	Unintentional	Self-harm	Assault	Other	Undetermined	Missing E-code
MV Traffic	1,695	5	*	0	*	0
Firearm	59	42	131	*	8	0
Poisoning	*	*	0	0	*	0
Falls	10,653	5	0	0	*	0
Suffocation	*	0	0	0	0	0
Fire/Burn	211	*	*	0	*	0
Cut/Pierce	148	63	87	0	*	0
Struck by/against	318	0	209	*	0	0
Machinery	110	0	0	0	0	0
Other Pedal Cycle	80	0	0	0	0	0
Other Pedestrian	12	0	0	0	0	0
Other Trans.	451	0	0	0	0	0
Natural/Environ.	126	0	0	0	0	0
Overexertion	182	0	0	0	0	0
Other Specified	185	9	34	0	0	0
Not elsewhere classified or not specified	320	0	91	0	6	0
Missing E-code	*	0	0	0	0	3,719

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

Patients aged 65 and older accounted for over half (53%) of all trauma hospitalizations (Table 2). This age distribution is quite different from that of the Kentucky Trauma Registry (KTR), 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, which are the leading cause of inpatient stays in those 65 and older. Isolated hip fracture, the most common cause of hospitalization following serious falls in older adults, is not included in the diagnostic categories reported in state trauma registries because such admissions do not require trauma team activation.

Table 2: Traumatic injury hospitalizations by age and intent, 2011

Age category	Unintentional	Intentional	Other/ Undetermined	Missing E-code
0 yr	54	7	5	10
1-4	178	8	*	10
5-9	200	*	0	18
10-14	215	5	*	24
15-19	355	53	*	157
20-24	344	97	*	187
25-29	392	89	*	187
30-34	388	73	*	172
35-39	403	72	*	152
40-44	473	79	*	197
45-49	632	65	*	237
50-54	748	50	*	256
55-59	780	42	*	244
60-64	996	18	*	242
65-69	954	9	0	244
70-74	1,238	6	0	251
75-79	1,439	5	0	291
80-84	1,789	5	0	354
85+	2,979	*	0	486

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

This distinction also affects the distribution by gender (Table 3), which includes more women (56.7%) than men. In contrast, KTR data typically show a ratio of about 2 male patients for every female patient.

Table 3: Traumatic injury hospitalizations by gender, 2011

Gender	N	%
Female	10,757	56.65
Male	8,233	43.35

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 is also likely to account for the high proportion of discharges to skilled nursing facilities or long-term care, 30.32%, home health, 9.87%, and inpatient rehabilitation, 10.49% (Table 4). Less than half (42.38%) of discharges were classified as 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 2011 required additional formal health services in the period immediately following discharge. While the proportion who died was relatively small (2.36%), it nonetheless reflects the deaths of 448 Kentuckians who survived traumatic injury to the point of hospitalization.

Table 4: Traumatic injury hospitalizations by discharge status, 2011

Discharge status	N	%
Home, self-care	8,237	43.38
Another hospital	532	2.80
Skilled nursing facility or long-term care	5,757	30.32
Home health	1,875	9.87
Hospice	149	0.78
Rehab facility or unit	1,992	10.49
Expired	448	2.36
Total	18,990	100.00

Trauma accounted for a total of 96,840 inpatient days in 2011, a decrease of 1.3% from the 98,077 total days of hospital stay in 2010 that reflects the decrease in the total number of trauma hospitalizations in 2011. The average length of stay in 2011, 5.1 days, was the same as in 2010.

Table 5: Traumatic injury hospitalizations by length of stay, 2011

Length of hospital stay in days	Number of hospitalizations	%
1	2,810	14.8
2	2,793	14.71
3	3,166	16.67
4	2,673	14.08
5	2,023	10.65
6	1,464	7.71
7	965	5.08
8	653	3.44
9	504	2.65

Length of hospital stay in days	Number of hospitalizations	%
10	356	1.87
11	289	1.52
12	202	1.06
13	161	0.85
14	128	0.67
More than 14 days	803	4.23

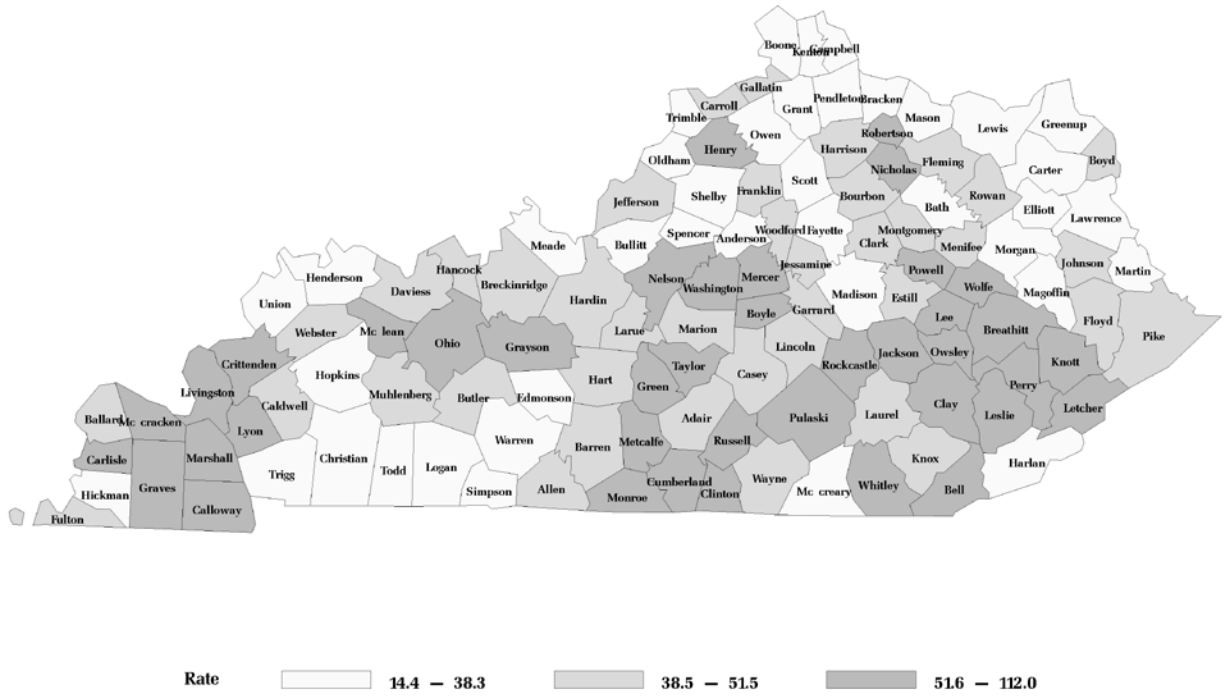
Table 6: Traumatic injury hospitalizations by primary payer and total charges, 2011

Primary expected source of payment	Total Charges	
	Number of hospitalization	Amount billed
Auto Insurance	201	\$14,689,138
CHAMPUS	93	\$4,404,210
Commercial Insurance	4,314	\$219,074,614
Medicaid/Passport	1,671	\$79,690,664
Medicare	10,493	\$383,011,936
Other	65	\$4,076,903
Self Pay and Charity	1,687	\$81,794,787
Workers Compensation	466	\$21,327,249
Total	18,990	\$808,069,501

The hospital discharge data contains information for the 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 some payers. Medicare and Medicaid covered 63% of hospitalizations and about 57% of the total charges billed. Nearly 9% of all traumatic injury hospitalizations in 2011 were coded as self-pay or charity.

The five counties with highest rates of hospitalization for traumatic injuries were Owsley, Breathitt, Perry, Livingston, and Whitley (Figure 2 and Appendix A). Again, it is important to note that out-of-state hospitalizations are not included, so data for border counties may understate the number of hospitalizations.

Figure 2: County rates of hospitalization for traumatic injuries per 10,000 residents, 2011



Emergency Department Visits

Traumatic injuries were responsible for 302,889 emergency department (ED) visits for Kentucky residents in 2011, or 16% of all ED visits for Kentucky residents treated in Kentucky ED facilities. Unintentional injuries (Table 7) accounted for the large majority (80.6%) of encounters and would undoubtedly be even greater if intent-of-injury (E-code) data were available for all ED visits. With regard to the manner of intentional injury, self-inflicted traumatic injuries are a much smaller factor than assaults by others (674 versus 8,150).

Table 7: Traumatic injury ED visits by intent, 2011

Intent of injury	N	%
Unintentional	244,183	80.62
Self-harm	674	0.22
Assault	8,150	2.69
Other	122	0.04
Undetermined	171	0.06
Missing data on intent	49,589	16.37

As with the inpatient data, falls are the most commonly reported cause of unintentional injury in 2011 at 27.6% of the total (Table 8). Overexertion, the second most common cause of injury (11.9%), refers to excessive physical effort and injuries due to lifting, pulling, pushing, carrying or throwing. The proportion of missing information regarding the cause of injury is higher in the ED dataset than for inpatient data, with 49,638 (16.4%) of ED visits missing E-codes. The completeness of E-codes for the traumatic injury ED visits improved from 2010, when 18.6% of the injury-related entries did not include E-codes.

Table 8: Traumatic injury ED visits by cause and intent, 2011

Cause	Unintentional	Intentional	Other/Undetermined	Missing information on intent
MV Traffic	30,415	17	*	0
Firearm	344	165	15	0
Poisoning	46	7	6	0
Falls	83,398	12	46	0
Suffocation	*	27	*	0
Drowning	23	*	0	0
Fire/Burn	4,166	21	33	0
Cut/Pierce	26,038	1,001	11	0
Struck by/against	29,626	3,891	98	0
Machinery	1,142	0	0	0
Other Pedal Cycle	2,407	0	0	0
Other Pedestrian	134	0	0	0
Other Trans.	4,100	0	0	0
Natural/Environ.	5,230	0	0	0
Overexertion	36,145	0	0	0
Other Specified	5,519	508	5	0
Not elsewhere classified	5,021	1,692	45	0
Not specified	10,378	1,482	32	0
Missing information on cause	49	0	0	49,589

The ED distribution is roughly equal with regard to gender (47.2% female: 52.8% male, Table 9), in contrast with the Kentucky Trauma Registry's typical 60-70% male composition (see Kentucky Trauma Registry reports at <http://www.kiprc.uky.edu/projects/trauma/index.html>).

Table 9: Traumatic injury ED visits by gender, 2011

Gender	N	%
Female	142,826	47.15
Male	160,059	52.84
Missing	*	0.00

Teens and young adults had the largest proportion of ED visits, with nearly half (45%) falling in the 10 to 34-year-old range (Table 10). The difference between this finding and the predominance of

older adults in the inpatient dataset may reflect the relative underlying health status of these two age groups. Chronic conditions that complicate recovery from traumatic injuries are more common in older age groups and they are thus more likely to need inpatient care.

Table 10: Traumatic injury ED visits by age group, 2011

Age group	N	%
0 yr	1,664	0.55
1-4	18,607	6.14
5-9	18,178	6.00
10-14	25,092	8.28
15-19	28,082	9.27
20-24	28,190	9.31
25-29	27,802	9.18
30-34	27,238	8.99
35-39	22,548	7.44
40-44	20,457	6.75
45-49	19,057	6.29
50-54	16,408	5.42
55-59	12,310	4.06
60-64	9,333	3.08
65-69	6,946	2.29
70-74	5,750	1.90
75-79	4,847	1.60
80-84	4,736	1.56
85+	5,644	1.86

Payment source data reflects a very different mix for ED trauma visits than for inpatient stays (Table 11). One-fifth (22.53%) of ED visits were classified as either self-pay or charity, categories indicating that the patient had no health insurance. These patients are often covered by either state Disproportionate Share Hospital funding through Medicaid, or by the facility itself, potentially shifting the cost to other payers. Another 25.48% were billed to Medicaid. The total for these categories, 48%, is an important indicator of trauma's financial burden on state and local payers.

Conclusion

The Kentucky Hospital Discharge and Emergency Department datasets provide a broad and detailed perspective on traumatic injury across the state. A comprehensive statewide trauma network will help address injury care in a more systematic manner, but a stronger emphasis on injury prevention in policy and practice will be essential if Kentucky is to reduce the toll of injury on its residents and its economy.

Appendices

Appendix A: Traumatic injury hospitalizations by county, 2011

County of patient's residence	Number of traumatic injury hospitalizations, 2011	Rate of traumatic injury hospitalizations per 10,000 population
Adair	96	51.4
Allen	81	40.2
Anderson	80	37.0
Ballard	34	41.2
Barren	174	41.2
Bath	41	34.9
Bell	151	52.6
Boone	249	20.5
Bourbon	82	41.0
Boyd	197	39.8
Boyle	165	57.8
Bracken	17	20.0
Breathitt	124	89.6
Breckinridge	89	43.9
Bullitt	247	32.9
Butler	63	49.1
Caldwell	63	48.6
Calloway	206	54.9
Campbell	257	28.3
Carlisle	36	71.3
Carroll	55	49.9
Carter	85	30.8
Casey	82	51.5
Christian	123	16.7
Clark	158	44.5
Clay	146	67.2
Clinton	60	58.8
Crittenden	66	70.7
Cumberland	43	62.9
Daviess	435	44.7
Edmonson	40	33.1
Elliott	20	26.0
Estill	73	49.8
Fayette	1121	37.2
Fleming	65	44.8
Floyd	178	45.4
Franklin	207	41.9
Fulton	26	38.5

County of patient's residence	Number of traumatic injury hospitalizations, 2011	Rate of traumatic injury hospitalizations per 10,000 population
Gallatin	34	39.5
Garrard	71	42.0
Grant	88	35.5
Graves	204	54.4
Grayson	136	52.4
Green	61	54.4
Greenup	122	33.1
Hancock	35	40.8
Hardin	430	40.0
Harlan	101	34.8
Harrison	89	47.4
Hart	76	41.7
Henderson	137	29.5
Henry	110	71.2
Hickman	17	35.5
Hopkins	171	36.5
Jackson	71	52.8
Jefferson	3723	49.8
Jessamine	201	41.0
Johnson	103	44.0
Kenton	483	30.1
Knott	110	67.5
Knox	142	44.5
Larue	66	46.1
Laurel	282	47.5
Lawrence	61	38.0
Lee	55	70.4
Leslie	77	68.5
Letcher	137	56.0
Lewis	30	21.6
Lincoln	127	51.4
Livingston	74	77.6
Logan	92	34.3
Lyon	52	62.5
Madison	300	35.6
Magoffin	46	34.8
Marion	97	48.5
Marshall	209	66.8
Martin	27	21.2
Mason	43	24.4
McCracken	469	71.2
McCreary	70	38.3

County of patient's residence	Number of traumatic injury hospitalizations, 2011	Rate of traumatic injury hospitalizations per 10,000 population
McLean	50	52.5
Meade	85	28.8
Menifee	30	47.5
Mercer	112	52.6
Metcalfe	61	60.6
Monroe	74	67.7
Montgomery	110	41.1
Morgan	46	33.0
Muhlenberg	140	44.8
Nelson	242	55.0
Nicholas	42	59.4
Ohio	136	56.4
Oldham	209	34.5
Owen	41	37.8
Owsley	54	112.0
Pendleton	41	27.9
Perry	243	84.5
Pike	258	39.8
Powell	77	60.9
Pulaski	391	61.4
Robertson	14	62.8
Rockcastle	88	51.6
Rowan	98	41.6
Russell	120	68.1
Scott	169	35.1
Shelby	147	34.1
Simpson	52	29.9
Spencer	66	38.0
Taylor	158	63.9
Todd	18	14.4
Trigg	47	32.9
Trimble	33	37.8
Union	50	33.2
Warren	384	33.2
Washington	63	53.2
Wayne	103	49.1
Webster	58	42.4
Whitley	260	72.6
Wolfe	45	61.3
Woodford	111	44.5

Appendix B: Traumatic injury ED visits by county, 2011

County name	Number of ED visits	Rate per 10,000 residents
Adair	1,419	759
Allen	1,238	615
Anderson	1,341	620
Ballard	383	464
Barren	2,972	703
Bath	1,141	972
Bell	3,376	1,175
Boone	7,029	577
Bourbon	1,776	888
Boyd	4,180	845
Boyle	1,832	642
Bracken	748	879
Breathitt	1,683	1,216
Breckinridge	1,364	673
Bullitt	3,565	475
Butler	561	437
Caldwell	1,103	850
Calloway	1,752	467
Campbell	6,108	672
Carlisle	343	679
Carroll	1,321	1,199
Carter	1,351	490
Casey	1,058	665
Christian	2,774	377
Clark	3,053	859
Clay	2,943	1,355
Clinton	833	817
Crittenden	695	744
Cumberland	674	987
Daviess	5,023	517
Edmonson	508	420
Elliott	303	393
Estill	1,703	1,161
Fayette	16,678	553
Fleming	1,298	894
Floyd	4,322	1,102

County name	Number of ED visits	Rate per 10,000 residents
Franklin	3,414	691
Fulton	473	700
Gallatin	752	873
Garrard	1,253	742
Grant	3,147	1,268
Graves	3,392	904
Grayson	2,703	1,041
Green	1,012	902
Greenup	2,195	595
Hancock	219	255
Hardin	5,633	524
Harlan	2,411	830
Harrison	2,128	1,133
Hart	1,212	665
Henderson	2,922	630
Henry	1,216	787
Hickman	215	449
Hopkins	3,276	698
Jackson	1,109	825
Jefferson	46,746	626
Jessamine	5,250	1,070
Johnson	2,911	1,244
Kenton	12,129	756
Knott	940	577
Knox	2,984	936
Larue	781	546
Laurel	5,361	903
Lawrence	1,560	973
Lee	729	933
Leslie	1,068	951
Letcher	2,184	893
Lewis	573	413
Lincoln	2,030	821
Livingston	737	773
Logan	1,682	628
Lyon	447	537

County name	Number of ED visits	Rate per 10,000 residents
McCracken	4,685	711
McCreary	523	286
McLean	557	585
Madison	7,067	839
Magoffin	1,019	771
Marion	1,533	767
Marshall	2,071	661
Martin	1,054	827
Mason	1,344	761
Meade	641	217
Menifee	554	877
Mercer	1,866	877
Metcalfe	777	771
Monroe	964	881
Montgomery	2,686	1,004
Morgan	1,082	776
Muhlenberg	2,775	887
Nelson	1,402	319
Nicholas	689	974
Ohio	1,976	820
Oldham	2,711	447
Owen	734	676
Owsley	572	1,187
Pendleton	1,107	753
Perry	2,017	702
Pike	5,998	924
Powell	1,390	1,099
Pulaski	4,091	643
Robertson	158	709
Rockcastle	1,558	913
Rowan	1,982	840
Russell	1,404	797
Scott	3,355	697
Shelby	1,954	454
Simpson	1,085	624
Spencer	805	463

County name	Number of ED visits	Rate per 10,000 residents
Taylor	2,106	852
Todd	412	331
Trigg	882	617
Trimble	413	473
Union	1,219	809
Warren	6,855	593
Washington	631	533
Wayne	1,403	669
Webster	949	694
Whitley	3,988	1,113
Wolfe	832	1,133
Woodford	1,768	709