



**Illinois  
Emergency Medical Services  
for Children**



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# Annual EMSC Report and Profile of Emergency Medical Services Regions

## Region 8

January 2007

*Illinois Emergency Medical Services for Children  
is a collaborative program between the  
Illinois Department of Public Health and  
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[www.luhs.org/emsc](http://www.luhs.org/emsc)

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# Illinois Emergency Medical Services for Children Annual Report

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## **Section I. Introduction**

### **A. Purpose**

The purpose of this report is to inform EMS regions about childhood illness and injury trends in their respective regions, particularly as these trends compare with statewide information. Also the report provides an overview of the effectiveness of emergency care for children that will assist the EMSC facility recognition program and other activities.

### **B. Description**

A distinct report has been developed for each of the eleven EMS regions. In each report, we compare data for the region under study to statewide data for a number of measures. This approach results in relatively brief reports for each region. All of the eleven EMS regional reports are publicly available on the EMSC web site (<http://www.luhs.org/depts/emsc/data.htm>).

### **C. Databases**

Four statewide databases were used in the development of this report. Descriptions and limitations of each of these data sources are outlined in this section.

#### **1) Hospital Discharge Database, 1994-2005**

##### ***Database Description***

This database is collected by the Illinois Hospital Association (IHA). The hospital discharge data provide uniform information on virtually all hospitalizations within the state. It contains demographic characteristics of patients as well as principal conditions associated with hospitalization, major medical procedures, hospitalization outcomes and charges. IHA also obtains data for Illinois residents who have been hospitalized in the bordering states of Indiana, Iowa, and Missouri.

##### ***Database Limitations***

The diagnosis information may be subject to variations in medical practice and diagnostic labeling. The database does not include Emergency Department (ED) or other outpatient information.

#### **2) Trauma Registry, 1994-2004**

##### ***Database Description***

Currently, there are 63 hospitals within Illinois designated as either a Level I (18)<sup>1</sup> or Level II (45) trauma center. These hospitals must submit data to IDPH on patients who (a) sustain traumatic injuries that require treatment at a trauma center and are then admitted to a trauma center; (b) are transferred to a trauma center; or (c) are dead-on-arrival or die in the emergency department. One of the strengths of the Trauma Registry is that it captures information on the external causes of injury (E-codes).

The following are **not** included in the Trauma Registry:

- Patients admitted to a hospital that is not designated as a trauma center
- Those who die at the scene of a traumatic injury but are not transported to a trauma center
- Patients treated in the emergency department of a designated trauma center for less than twelve hours

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<sup>1</sup> Note: Two of the Level I Trauma Centers are designated as both Adult and Pediatric Trauma Centers, and two others are designated as only a Pediatric Trauma Center.

### ***Database Limitations***

It is important to emphasize (as noted above) that the Trauma Registry does not contain all fatal and non-fatal injury occurrences within the state of Illinois. The database maintains information on those fatally injured cases brought to a trauma center or those whose injuries required inpatient admission to a trauma center.

It is also important to note that, although there are currently 63 trauma centers, this number as well as Level I and Level II designations have varied during the years covered by this report.

A Trauma Registry record is generated by trauma centers on patients who meet the defined criteria as described above. Therefore, duplicate records will exist for those patients transferred from one trauma center to another during the course of their injury management (approximately 8 percent to 10 percent of cases). For the purposes of this report, analysis was limited to records from receiving facilities only.

## **3) Mortality Data, 1999-2003**

### ***Database Description***

Illinois state law mandates that all death certificates be filed with the Illinois Department of Public Health. Funeral home directors typically file these records with pertinent medical information completed by the attending physician. Death certificates are sent to the local registrar who then forwards them to the Illinois Department of Public Health, Division of Vital Records.

The death certificate data provide information on the frequency of deaths to Illinois residents, demographic characteristics of the deceased, and the conditions leading to mortality. These deaths may have occurred outside of the state of Illinois.

Illinois mortality data are provided to the Centers for Disease Control and Prevention (CDC). This report utilizes CDC aggregated data. The CDC places aggregate reports on-line for researchers at CDC Wonder (<http://wonder.cdc.gov/>). The total number of deaths recorded by CDC may vary slightly from IDPH reports, particularly relating to cut-off dates used for record inclusion and exchange agreements with other states and Canada.

### ***Database Limitations***

If the decedent is known to the certifying physician or if an autopsy was performed, further detail related to the cause of death will be present in the death certificate. Therefore, the cause of death information may be subject to some variations in medical practice and diagnostic labeling.

## **4) Traffic Crash Report Database, 2000-2003**

### ***Database Description***

The Illinois Traffic Crash Report Form is used to report traffic crashes that occur within Illinois. The officer at the scene of the crash incident completes the report. The investigating police agency is then required to forward a copy of the completed report to the Illinois Department of Transportation if the crash involved death, injury and/or more than \$500 damage to any vehicle or property. The traffic crash database captures information on the frequency and severity of

crashes within the state, demographic characteristics of individuals involved in crashes, and scene characteristics such as weather and roadway conditions.

## **D. Measures Associated with Facility Recognition**

### **1) The Illinois EMSC Facility Recognition Program**

Since 1998, over 100 hospitals in Illinois have received recognition by the Illinois Department of Public Health and Illinois Emergency Medical Services for Children (EMSC) for having the essential resources and capabilities in place to meet the emergency needs of seriously ill and injured children. Illinois Administrative Code 77, Subpart J, Sections 515.4000 and 515.4010, define specifically the criteria associated with facility recognition.

Hospitals can apply for one of three levels of voluntary recognition. Hospitals with a dedicated pediatric intensive care unit and pediatric inpatient specialties and capabilities can apply for the Pediatric Critical Care Center (PCCC) level. Facilities that provide comprehensive emergency services can seek recognition as an Emergency Department Approved for Pediatrics (EDAP). The Standby Emergency Department for Pediatrics (SEDP) recognition is available for hospitals that provide stabilization measures and that have transfer guidelines in place when more definitive care is needed. Note that facilities applying for the PCCC level must also meet EDAP standards.

Hospitals seeking this voluntary designation receive a site visit by the EMSC program staff to verify that the emergency department is capable of meeting the following key pediatric emergency care standards:

- Professionals specially trained in pediatric emergency care;
- Adequate staffing and provisions for pediatric consultation and backup to support provision of pediatric emergency care services;
- Availability of essential pediatric equipment, supplies and medication;
- Implementation of protocols addressing treatment of the abused child, of critically ill and injured children and of those children requiring transfer to a specialized care center; and
- Inclusion of pediatrics into emergency services quality improvement activities.

### **2) Related Measures of Effectiveness**

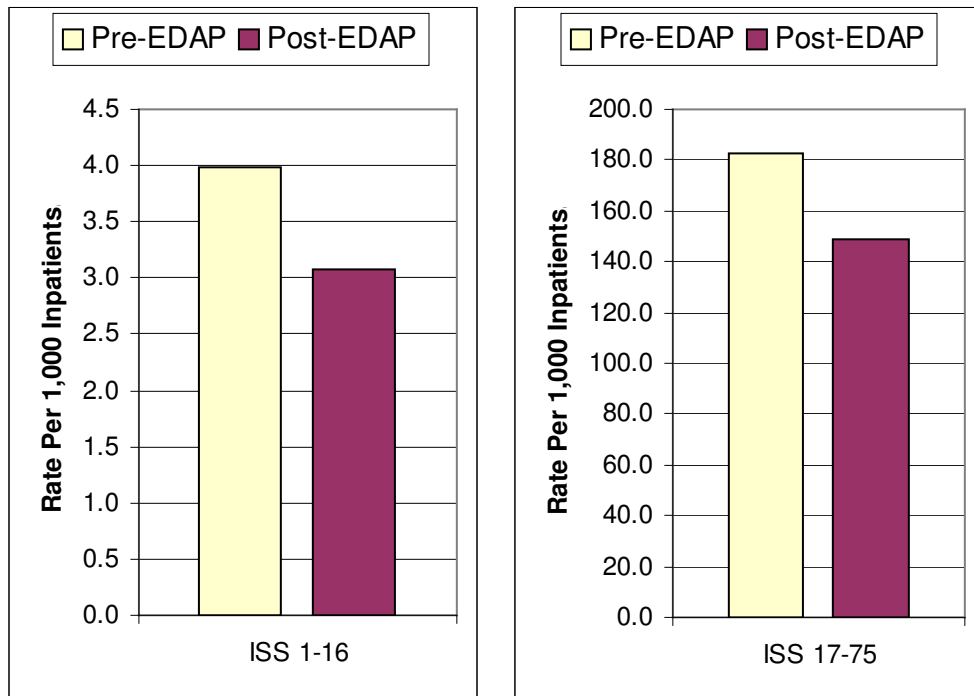
In an effort to evaluate effectiveness associated with the facility recognition program, mortality rates per 1,000 inpatients were calculated for 0-15 year olds who were admitted from the Emergency Department for injury. To conduct a pre- and post-EDAP comparison, records were restricted to facilities that obtained recognition as an EDAP facility between the years of 1994 and 2005. (This includes PCCC facilities because they meet EDAP standards.)

In addition, in order to control for severity, the software ICDMAP90<sup>®</sup> (The Johns Hopkins University and Tri-Analytics, Inc.) was used to calculate standardized injury severity scores (ISS) from diagnosis codes.

Using this approach, the injury mortality rates for hospitalized patients were compared for two groups, those with low to moderate severity (ISS 1-16) and those with high severity (ISS 17-75).

For both groups, post-EDAP mortality rates were lower (Figure 1). For the low to moderate severity group the rate declined from 4.0 deaths per 1,000 inpatients to 3.1 per 1,000 inpatients. For the high severity group the rate declined from 182.4 deaths per 1,000 inpatients to 148.9 deaths per 1,000 inpatients. Also, for the high severity group, the difference was statistically significant ( $p < 0.05$ , Pearson Chi-Square). Decreases in mortality can likely be attributed to multiple factors, one of which may be the increased awareness and attention to pediatric emergency care needs emphasized through the facility recognition process.

**Figure 1. Mortality Rates per 1,000 Inpatient Injury-Related Admissions from the ED, 0-15 Year Olds, 1994-2005**  
(Note: Records were restricted to facilities participating as EDAP)



Severity Group	Pre-EDAP			Post-EDAP		
	Patients	Deaths	Rate	Patients	Deaths	Rate
ISS 1-16	18,571	74	4.0	17,546	54	3.1
ISS 17-75	1,124	205	182.4	1,142	170	148.9

Data Source: Illinois Hospital Association

\* Notes: Severity Groups were created using Injury Severity Scores (ISS) obtained using the software ICDMAP90. (Please see text for description.)

Records for all available years (1994-2005) were used, restricted to facilities participating in facility recognition at the EDAP level.

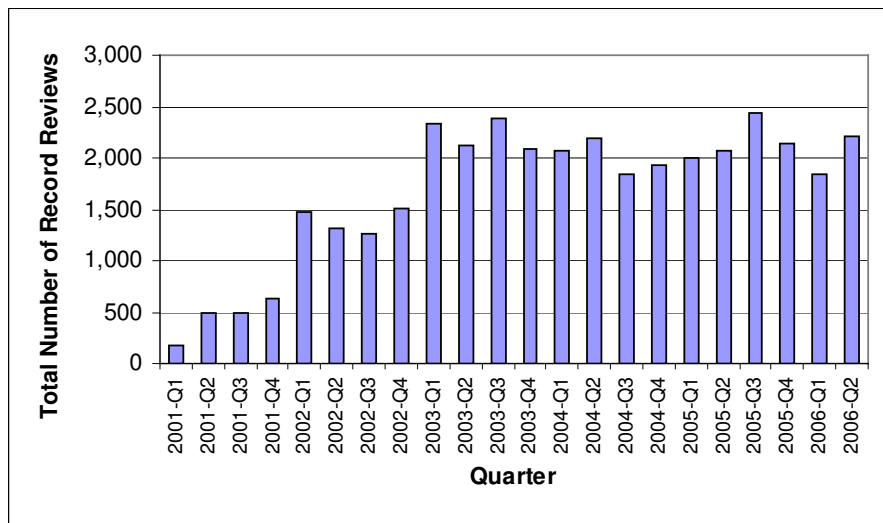
### 3) Regional Continuous Quality Improvement (CQI) Program

Each hospital participating in facility recognition is required to designate a Pediatric CQI Liaison. Liaisons meet quarterly in one of eleven EMS regional CQI committees. Facilities that have not received EDAP/SEDP recognition are welcome to send representatives to these meetings. The committees develop quality indicators of interest to their region. Each facility then conducts quarterly medical record reviews related to this indicator and submits data to either a committee data coordinator or to the EMSC central office for processing. Reports are

generated that allow each hospital to compare their facility's responses to the aggregate responses of the region. Confidentiality of the patient and facility are maintained throughout.

As of the second quarter of 2006, over 37,000 medical record reviews have been conducted through this process (Figure 2). Improvements were found by Regions 1, 2, 3, 4, 6, 7, 8, 9, 10 and 11 in pain management indicators; by Regions 2, 5 and 7 in an asthma/respiratory distress indicators; and by Region 9 in a seizure indicator. EMSC has distributed reports summarizing the activities associated with these improvements (see Appendix A for an example report).

**Figure 2. Monitoring Activity for Illinois EMSC CQI Program by Topic and Quarter**



Quarter	Pain Management Records	Transfers	Respiratory Distress/ Asthma	Specific Clinical Conditions	Quarterly Totals
2001-Q1		184			184
2001-Q2	322	174			496
2001-Q3	289	206			495
2001-Q4	350	285			635
2002-Q1	1,038	290	107	40	1,475
2002-Q2	807	293	164	51	1,315
2002-Q3	625	359	217	67	1,268
2002-Q4	841	333	232	98	1,504
2003-Q1	1,582	340	221	193	2,336
2003-Q2	1,444	330	155	197	2,126
2003-Q3	1,547	342	156	335	2,380
2003-Q4	1,203	323	249	315	2,090
2004-Q1	1,500	141	203	227	2,071
2004-Q2	1,418	170	324	278	2,190
2004-Q3	1,422	107	181	140	1,850
2004-Q4	1,343	108	372	115	1,938
2005-Q1	698	33	1,088	175	1,994
2005-Q2	961	0	948	169	2,078
2005-Q3	1,130	0	1,078	229	2,437
2005-Q4	897	0	1,063	179	2,139
2006-Q1	1,111	0	683	46	1,840
2006-Q2	1,052	0	594	560	2,206
<b>Grand Totals</b>	<b>21,580</b>	<b>4,018</b>	<b>8,035</b>	<b>3,414</b>	<b>37,047</b>

Data Source: EMSC Regional CQI Committees

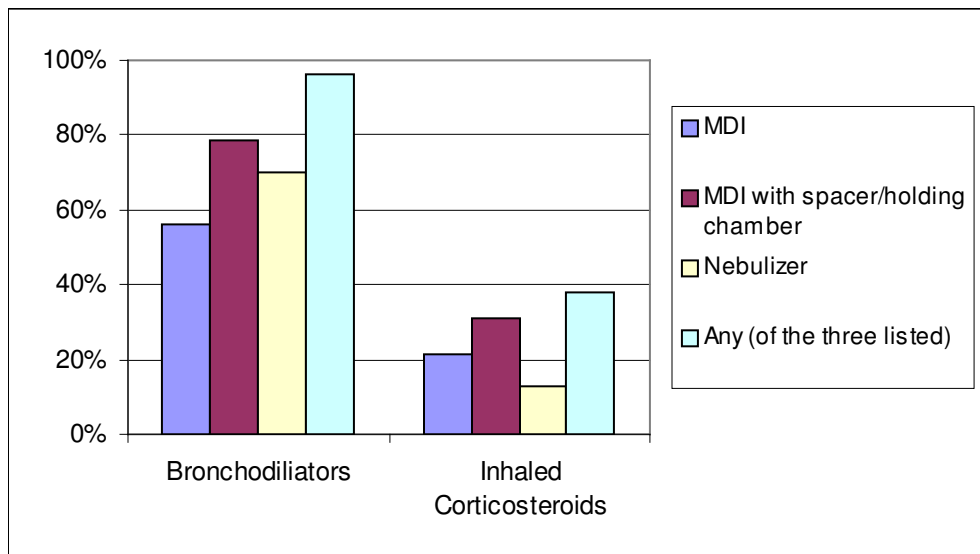
#### 4) Pediatric Asthma Assessment and Discharge Planning in the Emergency Department, 2006

In 2006, 118 emergency departments (EDs) actively participated in the EMSC regional CQI program (of these, 108 were recognized as PCCC, EDAP or SEDP facilities). These EDs were surveyed regarding asthma assessment and discharge planning using a Web-based application. Of the 118 facilities, 85 (72%) completed the survey. After data submission, participants were provided with Web-based reports that allowed comparison of their results to their region, to similar sized facilities, and to the rest of the state. Responses were also aggregated for facilities in the Chicago and suburban areas (regions 7 through 11) and compared with those for the rest of the state (regions 1 through 6). Finally, responses were aggregated for facilities with greater than 7,000 pediatric ED visits in 2005 and compared with facilities with 7,000 or less pediatric ED visits in 2005.

Findings from the survey included the following:

- 63% of EDs have reviewed the NIH/NHLBI Guidelines for the Diagnosis and Management of Asthma. Differences were found by location (78% for regions 7-11 vs 50% for regions 1-6,  $p<0.01$ ) and size of facility (77% for facilities with >7000 pediatric ED visits per year vs 48% for facilities with  $\leq 7,000$  visits,  $p<0.01$ ).
- 38% of EDs have formal asthma protocols/standing orders. Differences were again found by location (49% for regions 7-11 vs 27% for regions 1-6,  $p<0.01$ ) and size of facility (48% for facilities with >7000 pediatric ED visits per year vs 27% for facilities with  $\leq 7,000$  visits,  $p<0.01$ ).
- Although current literature emphasizes inhaled corticosteroids, only 38% of EDs routinely prescribe or discharge their patients home with these medications compared with 96% for bronchodilators (Figure 3).

**Figure 3. Routinely Prescribed Treatments and Delivery Mechanism for Pediatric Patients with Asthma Symptoms**



- Larger facilities with more than 7,000 visits used MDI with spacer/holding chamber as the delivery mechanism for bronchodilators more frequently than smaller facilities (91% vs 66%,  $p < 0.01$ ).
- Larger facilities with more than 7,000 visits also routinely prescribe oral corticosteroids more frequently than smaller facilities (98% vs 83%,  $p < 0.05$ ).
- Overall, 54% of EDs reported that they have sent home pediatric patients with asthma symptoms on Albuterol syrup. This was reported more frequently in regions 1-6 than in regions 7-11 (66% vs 41%,  $p < 0.05$ ).
- Although EDs have taken on the role of primary care provider in many settings, a relatively low percentage offered patient education for maintenance activities such as peak flow technique (38%) and asthma control fact sheets (32%).
- 71% of EDs track return visits of asthma patients with similar symptoms, and of these 78% conduct peer reviews regarding the adequacy of care.
- 74% of EDs provide a specific patient care provider (PCP) and/or physician referral service for underinsured patients.
- A referral list of local PCPs was provided more frequently upon discharge in regions 1-6 relative to regions 7-11 (57% vs 30%,  $p < 0.05$ ) and also more frequently in smaller facilities with 7,000 or less visits relative to larger facilities (71% vs 19%,  $p < 0.01$ ).

## E. Statewide Findings from the Traffic Crash Database

*Note: This section is divided into two sub-sections. First data are presented regarding occupants of motor vehicles involved in crashes. Separately, data are presented regarding pedestrians and pedalcyclists.*

### 1) Demographics for Motor Vehicle Crash Occupants

For 2003, the Illinois Department of Transportation recorded 73,479 children between the ages of 0 and 15 as occupants of vehicles in motor vehicle crashes. The age and gender distribution for these children was similar to the distributions from 2000 through 2002 (Tables 1, 2).

**Table 1. Motor Vehicle Crash Victims by Age for 0-15 Year Olds in Illinois, 2000-2003**

Age	2000 - 2002		2003	
	Count	Percent	Count	Percent
0-3 Years	45,769	22.7%	17,883	24.3%
4-5 Years	25,712	12.7%	8,970	12.2%
6-9 Years	45,834	22.7%	16,280	22.2%
10-14 Years	60,725	30.1%	21,991	29.9%
15 Years	23,744	11.8%	8,355	11.4%
<b>Total</b>	<b>201,784</b>	<b>100.0%</b>	<b>73,479</b>	<b>100.0%</b>

Data Source: IDOT Motor Vehicle Crash Database

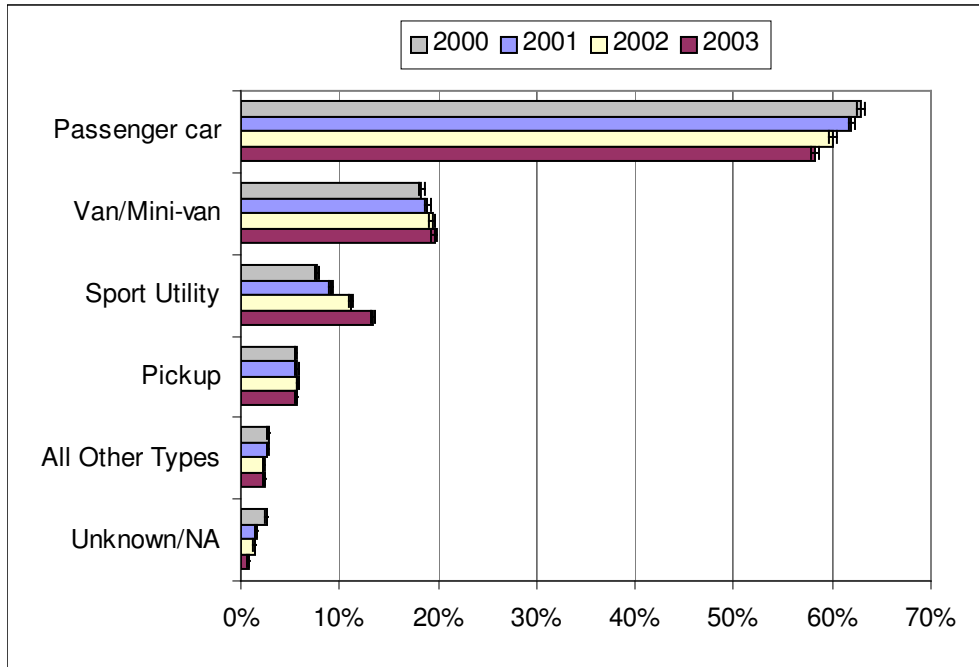
**Table 2. Motor Vehicle Crash Victims By Gender in Illinois, 2000-2003**

Gender	2000 - 2002		2003	
	Count	%	Count	%
F	102,350	50.7%	37,228	50.7%
M	99,094	49.1%	36,172	49.2%
N/A	340	0.2%	79	0.1%
<b>Total</b>	<b>201,784</b>	<b>100.0%</b>	<b>73,479</b>	<b>100.0%</b>

Data Source: IDOT Motor Vehicle Crash Database

In the four-year comparison of 2000-2003, the vehicle type associated with crashes for 0-15 year olds changed slightly but consistently. The percentage of sports utility vehicles increased each year (7.8% in 2000, 9.1% in 2001, 11.1% in 2002, and 13.4% in 2003) as did the percentage of vans/mini-vans (18.3% in 2000, 18.9% in 2001, 19.4% in 2002, and 19.6% in 2003), while the percentage of passenger cars decreased (63.0% in 2000, 62.0% in 2001, 60.1% in 2002, and 58.3% in 2003). Percentages for “pick-up” and “other” type vehicles remained very similar throughout (Figure 4).

**Figure 4. Motor Vehicle Crash Victims By Vehicle Type in Illinois, 2000-2003<sup>2</sup>**



Vehicle Type	2000		2001		2002		2003	
	Count	%	Count	%	Count	%	Count	%
Passenger car	42,380	63.0%	39,026	62.0%	42,956	60.1%	42,802	58.3%
Van/Mini-van	12,318	18.3%	11,931	18.9%	13,873	19.4%	14,431	19.6%
Sport Utility	5,223	7.8%	5,761	9.1%	7,929	11.1%	9,833	13.4%
Pickup	3,751	5.6%	3,595	5.7%	4,120	5.8%	4,117	5.6%
All Other Types	1,891	2.8%	1,695	2.7%	1,643	2.3%	1,754	2.4%
Unknown/NA	1,753	2.6%	971	1.5%	968	1.4%	542	0.7%
<b>Total</b>	<b>67,316</b>	<b>100.0%</b>	<b>62,979</b>	<b>100.0%</b>	<b>71,489</b>	<b>100.0%</b>	<b>73,479</b>	<b>100.0%</b>

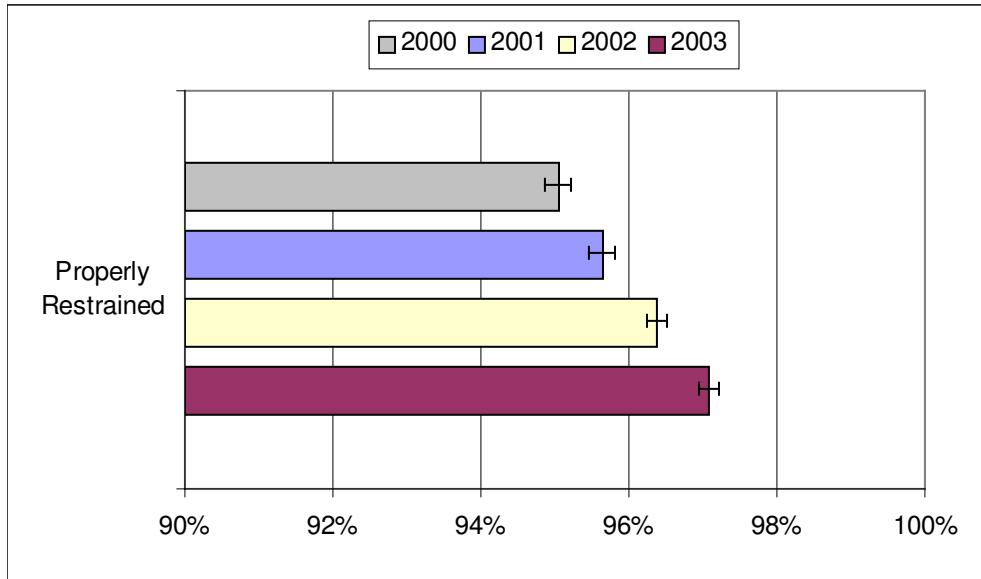
Data Source: IDOT Motor Vehicle Crash Database

<sup>2</sup> In working with these and other data in the following sections of this report, confidence intervals (CI) were used. These are displayed as error bars in the charts. For a discussion of confidence intervals, please see Appendix B, Section 5.

## 2) Safety Equipment

For 0-15 year olds, the percentage of properly restrained victims in crashes increased slightly throughout the period of 2000-2003 (95.0% in 2000, 95.6% in 2001, 96.4% in 2002, and 97.1% in 2003; Figure 5). Although the change in percentage is slight, the high volume of records shows these differences to be statistically significant from year to year ( $p < 0.001$ , Pearson Chi-Square).

**Figure 5. Motor Vehicle Crash Victims Safety Equipment Use in Illinois, 2000-2003**



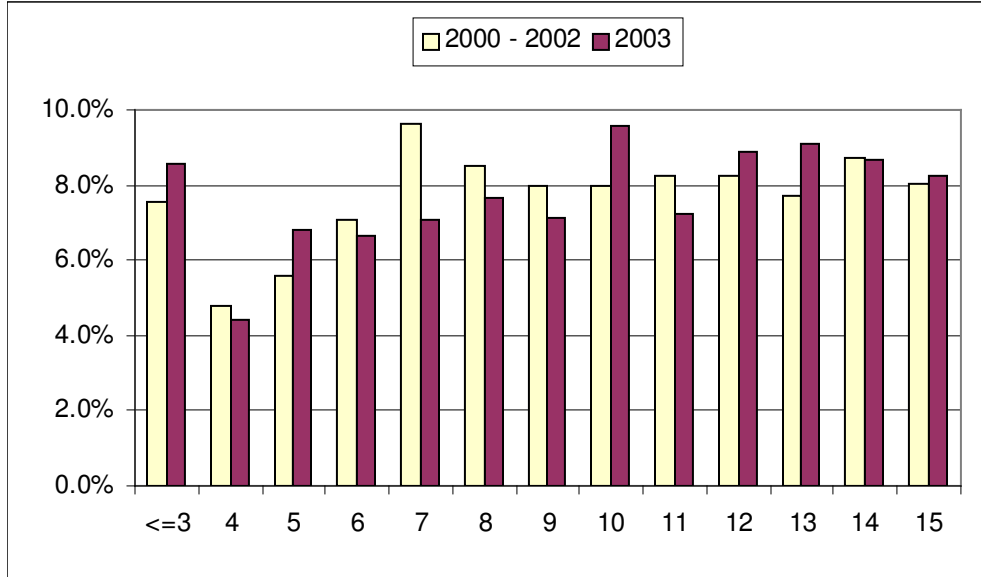
Restraint Use	2000		2001		2002		2003	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Properly Restrained	56,917	95.0%	53,544	95.6%	61,375	96.4%	63,817	97.1%
Improperly Restrained	2,966	5.0%	2,442	4.4%	2,306	3.6%	1,920	2.9%
Total with Available Info	59,883		55,986		63,681		65,737	

Note: Only crash victims with safety equipment recorded are presented in this figure  
Data Source: IDOT Motor Vehicle Crash Database

### 3) Demographics for Pedestrian and Pedalcyclist Victims

In the 0-15 year old age group, there were 1,758 pedestrian victims and 1,324 pedalcyclist victims involved in crash incidents in 2003. For both of these groups, the percentage of older victims was higher than in the period of 2000-2002 (Figures 6, 7).

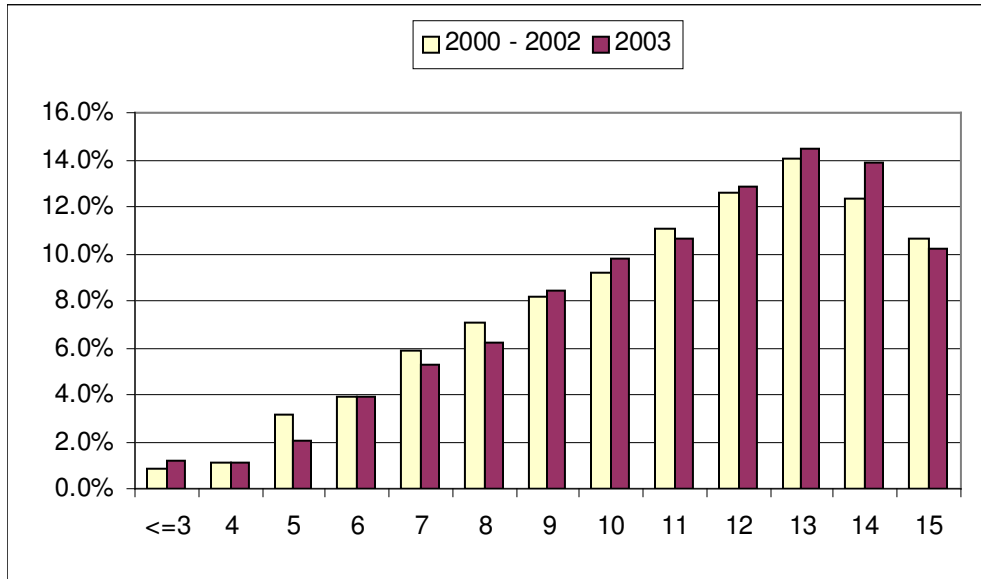
**Figure 6. Pedestrian Victims by Age for 0-15 Year Olds in Illinois, 2000-2003**



Age	2000 - 2002		2003	
	Count	%	Count	%
<=3	448	7.6%	151	8.6%
4	283	4.8%	78	4.4%
5	331	5.6%	120	6.8%
6	419	7.1%	117	6.7%
7	570	9.6%	124	7.1%
8	504	8.5%	135	7.7%
9	472	8.0%	125	7.1%
10	473	8.0%	168	9.6%
11	488	8.2%	127	7.2%
12	490	8.3%	156	8.9%
13	458	7.7%	160	9.1%
14	518	8.7%	152	8.6%
15	476	8.0%	145	8.2%
Total	5,930	100.0%	1,758	100.0%

Data Source: IDOT Motor Vehicle Crash Database

**Figure 7. Pedalcyclist Victims by Age for 0-15 Year Olds in Illinois, 2000-2003**



Age	2000 - 2002		2003	
	Count	%	Count	%
<=3	35	0.8%	16	1.2%
4	48	1.1%	15	1.1%
5	133	3.2%	27	2.0%
6	165	3.9%	52	3.9%
7	247	5.9%	70	5.3%
8	297	7.1%	82	6.2%
9	344	8.2%	111	8.4%
10	387	9.2%	130	9.8%
11	466	11.1%	141	10.6%
12	529	12.6%	170	12.8%
13	590	14.0%	191	14.4%
14	520	12.4%	184	13.9%
15	449	10.7%	135	10.2%
Total	4,210	100.0%	1,324	100.0%

Data Source: IDOT Motor Vehicle Crash Database

There was little change in the distribution of these cases by gender in 2003 (Table 3). Males predominated as both pedestrian (62.3%) and pedalcyclist (77.8%) victims.

**Table 3. Pedestrian and Pedalcyclist Victims by Sex for 0-15 Year Olds in Illinois, 2000-2001**

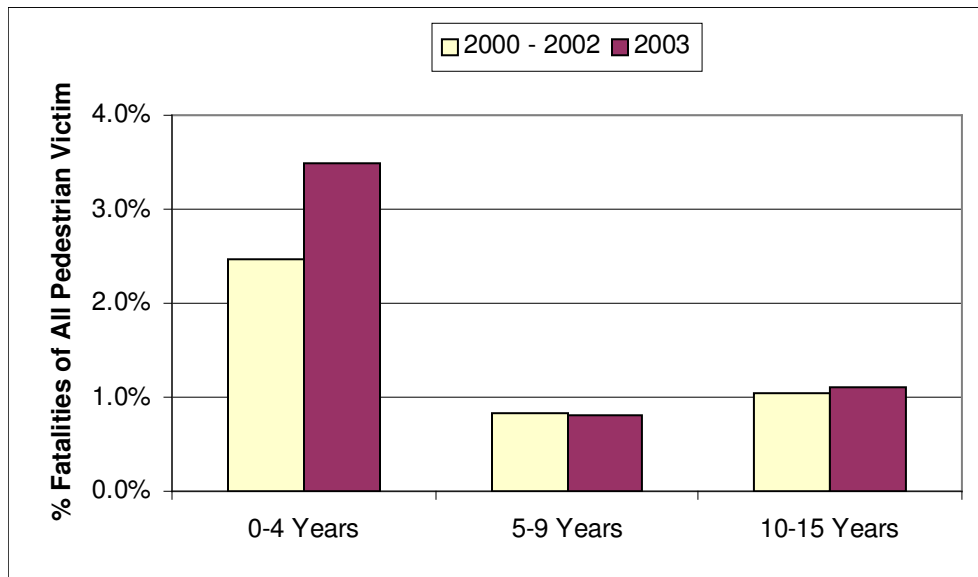
Sex	Pedestrian				Pedalcyclist			
	2000 - 2002		2003		2000 - 2002		2003	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
F	2,227	37.6%	659	37.5%	989	23.5%	291	22.0%
M	3,693	62.3%	1,095	62.3%	3,217	76.4%	1,030	77.8%
N/A	10	0.2%	4	0.2%	4	0.1%	3	0.2%
Total	5,930	100.0%	1,758	100.0%	4,210	100.0%	1,324	100.0%

Data Source: IDOT Motor Vehicle Crash Database

#### 4) Pedestrian Fatalities by Age Group

Consistent with pedestrian records in previous years, a higher percentage of fatalities occurred for pedestrian victims in the youngest age group in 2003. For 0-4 year olds, 3.5 percent of victims were fatally injured, compared with 0.8 percent of 5-9 year olds and 1.1 percent of 10-15 year olds (Figure 8).

**Figure 8. Percentage of Fatalities for Pedestrian Victims by Age Group for 0-15 Year Olds in Illinois, 2000-2003**



	2000 - 2002			2003		
	Victims	Fatalities	% Fatal	Victims	Fatalities	% Fatal
0-4 Years	731	18	2.5%	229	8	3.5%
5-9 Years	2,296	19	0.8%	621	5	0.8%
10-15 Years	2,903	30	1.0%	908	10	1.1%

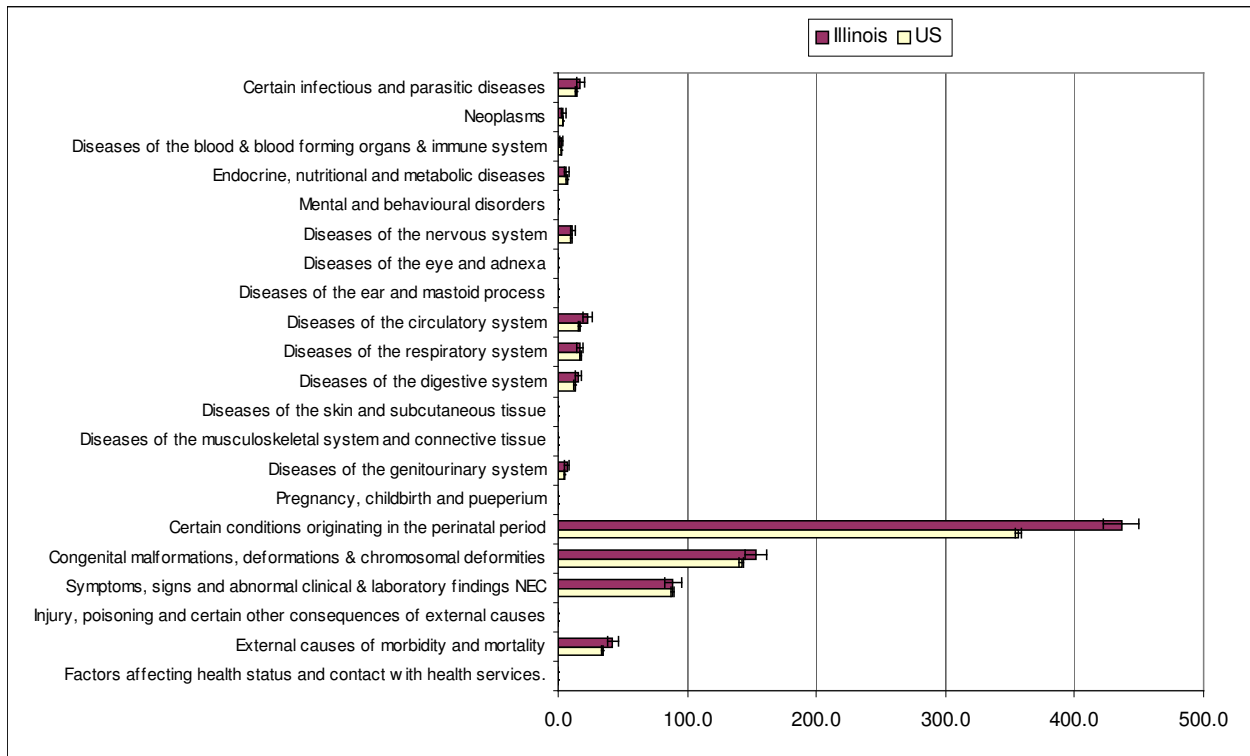
Data Source: IDOT Motor Vehicle Crash Database

## **F. Statewide Findings from the Mortality Database**

In 1999-2003, Illinois childhood mortality rates per 100,000 residents were similar to U.S. rates with the following exceptions (Figures 9-12):

- A higher mortality rate in Illinois for less-than-1 year olds from conditions originating in the perinatal period (436.2 per 100,000 residents, CI 422.6, 450.2) compared to the U.S. (356.3 per 100,000 residents, CI 353.7, 359.0)
- A higher mortality rate in Illinois for all less-than-1 year olds (821.8 per 100,000 residents, CI 803.2, 840.9) compared to the U.S. (709.6 per 100,000 residents, CI 705.9, 713.3)
- A lower mortality rate in Illinois from external causes of morbidity and mortality for 5-9 years olds (5.5 per 100,000 residents, CI 4.8, 6.2) compared to the US (7.2 per 100,000 residents, CI 7.1, 7.4)
- A higher mortality rate in Illinois for 10-14 year olds from diseases of the respiratory system (1.6 per 100,000 residents, CI 1.3, 2.1) compared to the U.S. (0.9 per 100,000 residents, CI 0.8, 1.0)

**Figure 9. Mortality Per 100,000 Residents for <1 Year Olds by ICD10 Category, 1999-2003**

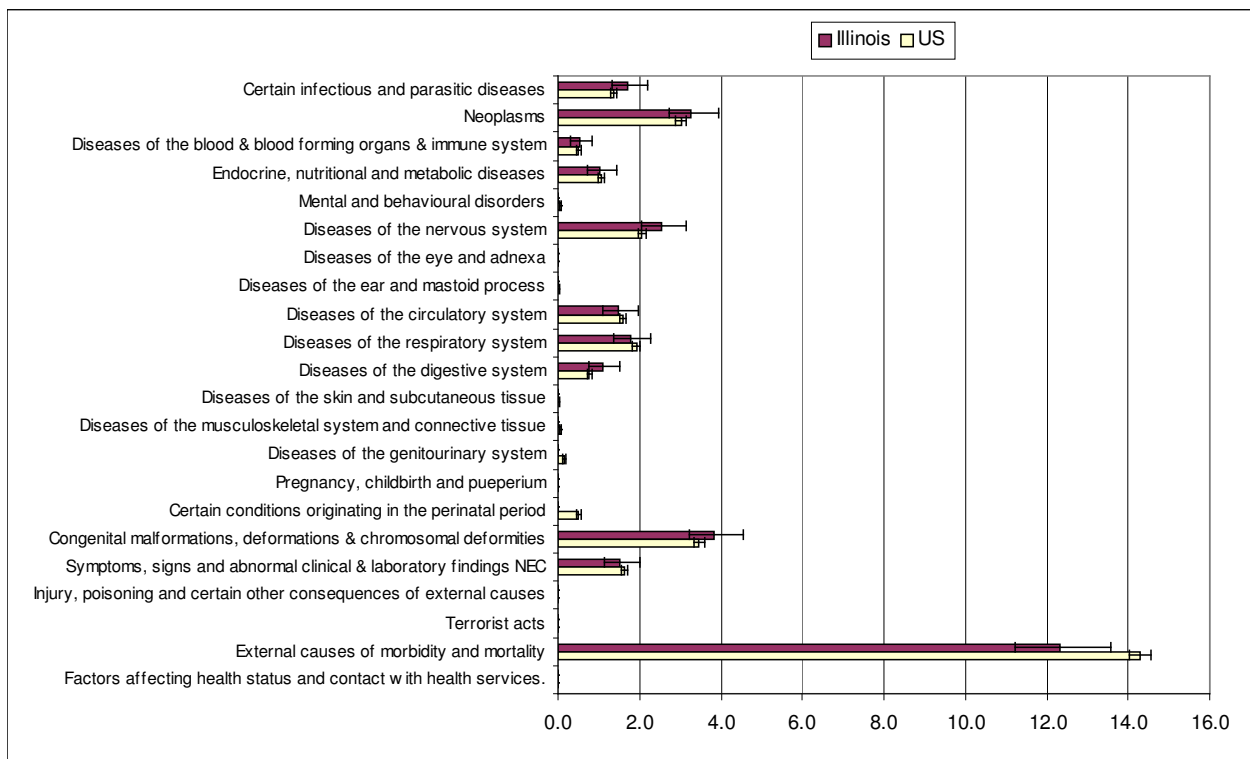


ICD10 Categories	Illinois				US			
	Count	Rate	95% CI		Count	Rate	95% CI	
Certain infectious and parasitic diseases	149	16.8	14.3	19.8	2,711	13.8	13.3	14.3
Neoplasms	35	4.0	2.8	5.6	675	3.4	3.2	3.7
Diseases of the blood & blood forming organs & immune system	21	2.4	1.5	3.7	457	2.3	2.1	2.5
Endocrine, nutritional and metabolic diseases	53	6.0	4.5	7.9	1,327	6.7	6.4	7.1
Mental and behavioural disorders	3				40	0.2	0.1	0.3
Diseases of the nervous system	99	11.2	9.1	13.7	1,972	10.0	9.6	10.5
Diseases of the eye and adnexa	2				5			
Diseases of the ear and mastoid process	0				27	0.1	0.1	0.2
Diseases of the circulatory system	199	22.5	19.5	25.9	3,210	16.3	15.8	16.9
Diseases of the respiratory system	147	16.6	14.1	19.6	3,369	17.1	16.6	17.7
Diseases of the digestive system	134	15.1	12.7	18.0	2,537	12.9	12.4	13.4
Diseases of the skin and subcutaneous tissue	0				10	0.1	0.0	0.1
Diseases of the musculoskeletal system and connective tissue	1				58	0.3	0.2	0.4
Diseases of the genitourinary system	61	6.9	5.3	8.9	933	4.7	4.4	5.1
Pregnancy, childbirth and puerperium	0				0			
Certain conditions originating in the perinatal period	3,865	436.2	422.6	450.2	70,096	356.3	353.7	359.0
Congenital malformations, deformations & chromosomal deformities	1,352	152.6	144.6	161.0	27,973	142.2	140.5	143.9
Symptoms, signs and abnormal clinical & laboratory findings NEC	789	89.0	83.0	95.5	17,442	88.7	87.4	90.0
Injury, poisoning and certain other consequences of external causes	0				0			
External causes of morbidity and mortality	372	42.0	37.9	46.5	6,757	34.3	33.5	35.2
Total	7,282	821.8	803.2	840.9	139,599	709.6	705.9	713.3

Note: Rates for counts of less than 10 are considered unreliable. For these values, rates were neither calculated nor displayed graphically.

Data Source: CDC Wonder (<http://wonder.cdc.gov>)

**Figure 10. Mortality Per 100,000 Residents for 1-4 Year Olds by ICD10 Category, 1999-2003**

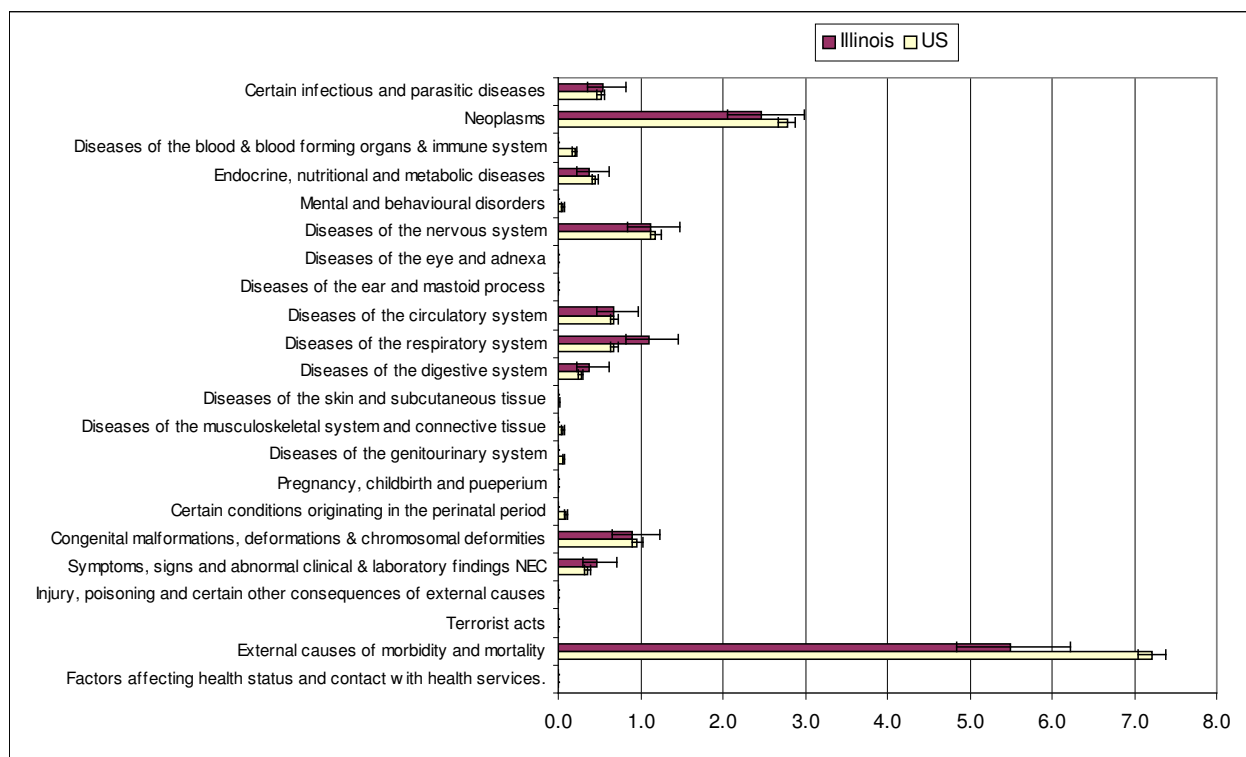


ICD10 Categories	Illinois				US			
	Count	Rate	Lower	Upper	Count	Rate	Lower	Upper
Certain infectious and parasitic diseases	60	1.7	1.3	2.2	1,050	1.4	1.3	1.4
Neoplasms	115	3.3	2.7	3.9	2,337	3.0	2.9	3.1
Diseases of the blood & blood forming organs & immune system	18	0.5	0.3	0.8	387	0.5	0.5	0.6
Endocrine, nutritional and metabolic diseases	36	1.0	0.7	1.4	831	1.1	1.0	1.2
Mental and behavioural disorders	3				52	0.1	0.1	0.1
Diseases of the nervous system	89	2.5	2.0	3.1	1,594	2.1	2.0	2.2
Diseases of the eye and adnexa	0				2			
Diseases of the ear and mastoid process	0				18	0.0	0.0	0.0
Diseases of the circulatory system	52	1.5	1.1	2.0	1,228	1.6	1.5	1.7
Diseases of the respiratory system	62	1.8	1.4	2.3	1,491	1.9	1.8	2.0
Diseases of the digestive system	38	1.1	0.8	1.5	599	0.8	0.7	0.8
Diseases of the skin and subcutaneous tissue	0				18	0.0	0.0	0.0
Diseases of the musculoskeletal system and connective tissue	3				46	0.1	0.0	0.1
Diseases of the genitourinary system	7				111	0.1	0.1	0.2
Pregnancy, childbirth and puerperium	0				0			
Certain conditions originating in the perinatal period	7				387	0.5	0.5	0.6
Congenital malformations, deformations & chromosomal deformities	134	3.8	3.2	4.5	2,672	3.5	3.3	3.6
Symptoms, signs and abnormal clinical & laboratory findings NEC	53	1.5	1.1	2.0	1,260	1.6	1.5	1.7
Injury, poisoning and certain other consequences of external causes	0				0			
Terrorist acts	0				3			
External causes of morbidity and mortality	433	12.3	11.2	13.6	11,072	14.3	14.0	14.6
Total	1,110	31.6	29.8	33.6	25,158	32.5	32.1	32.9

Note: Rates for counts of less than 10 are considered unreliable. For these values, rates were neither calculated nor displayed graphically.

Data Source: CDC Wonder (<http://wonder.cdc.gov>)

**Figure 11. Mortality Per 100,000 Residents for 5-9 Year Olds by ICD10 Category, 1999-2003**

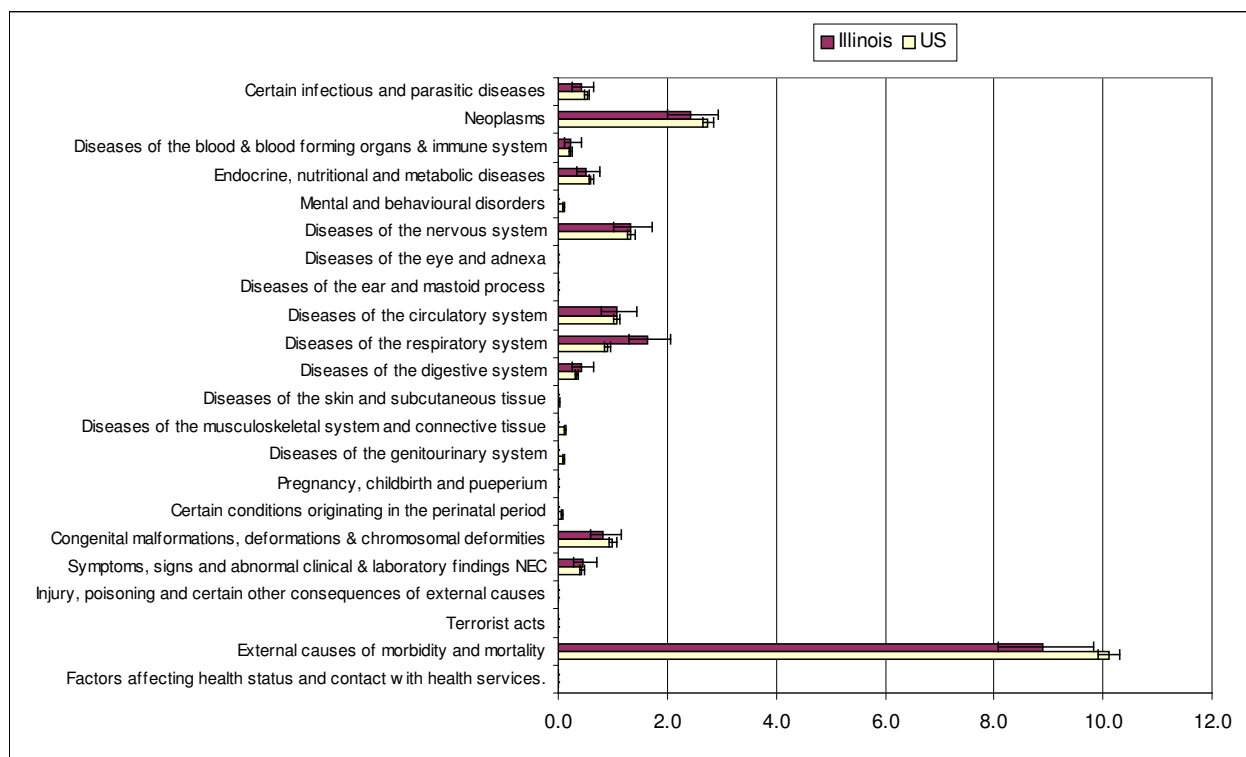


ICD10 Categories	Illinois				US			
	Count	Rate	Lower	Upper	Count	Rate	Lower	Upper
Certain infectious and parasitic diseases	25	0.5	0.4	0.8	524	0.5	0.5	0.6
Neoplasms	113	2.5	2.0	3.0	2,804	2.8	2.7	2.9
Diseases of the blood & blood forming organs & immune system	8				205	0.2	0.2	0.2
Endocrine, nutritional and metabolic diseases	17	0.4	0.2	0.6	450	0.4	0.4	0.5
Mental and behavioural disorders	2				57	0.1	0.0	0.1
Diseases of the nervous system	51	1.1	0.8	1.5	1,192	1.2	1.1	1.2
Diseases of the eye and adnexa	0				3			
Diseases of the ear and mastoid process	0				3			
Diseases of the circulatory system	31	0.7	0.5	1.0	688	0.7	0.6	0.7
Diseases of the respiratory system	50	1.1	0.8	1.5	684	0.7	0.6	0.7
Diseases of the digestive system	17	0.4	0.2	0.6	275	0.3	0.2	0.3
Diseases of the skin and subcutaneous tissue	0				14	0.0	0.0	0.0
Diseases of the musculoskeletal system and connective tissue	2				50	0.0	0.0	0.1
Diseases of the genitourinary system	4				65	0.1	0.1	0.1
Pregnancy, childbirth and puerperium	0				0			
Certain conditions originating in the perinatal period	2				97	0.1	0.1	0.1
Congenital malformations, deformations & chromosomal deformities	41	0.9	0.7	1.2	966	1.0	0.9	1.0
Symptoms, signs and abnormal clinical & laboratory findings NEC	21	0.5	0.3	0.7	365	0.4	0.3	0.4
Injury, poisoning and certain other consequences of external causes	0				0			
Terrorist acts	0				1			
External causes of morbidity and mortality	251	5.5	4.8	6.2	7,293	7.2	7.1	7.4
Total	635	13.9	12.9	15.0	15,736	15.6	15.3	15.8

Note: Rates for counts of less than 10 are considered unreliable. For these values, rates were neither calculated nor displayed graphically.

Data Source: CDC Wonder (<http://wonder.cdc.gov>)

**Figure 12. Mortality Per 100,000 Residents for 10-14 Year Olds by ICD10 Category, 1999-2003**



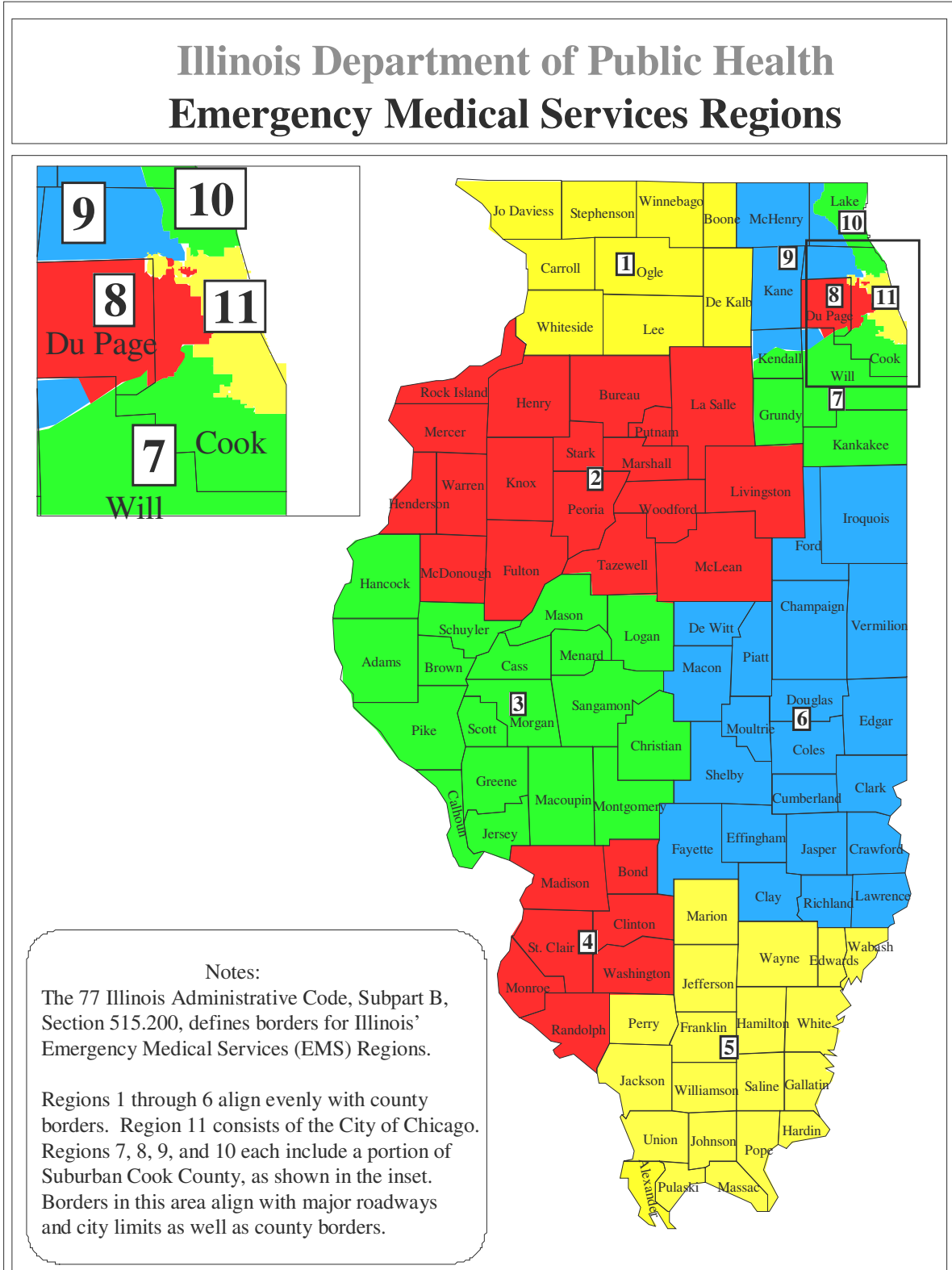
ICD10 Categories	Illinois				US			
	Count	Rate	Lower	Upper	Count	Rate	Lower	Upper
Certain infectious and parasitic diseases	19	0.4	0.3	0.7	553	0.5	0.5	0.6
Neoplasms	111	2.4	2.0	2.9	2,851	2.7	2.6	2.8
Diseases of the blood & blood forming organs & immune system	10	0.2	0.1	0.4	243	0.2	0.2	0.3
Endocrine, nutritional and metabolic diseases	23	0.5	0.3	0.8	626	0.6	0.6	0.7
Mental and behavioural disorders	1				97	0.1	0.1	0.1
Diseases of the nervous system	61	1.3	1.0	1.7	1,380	1.3	1.3	1.4
Diseases of the eye and adnexa	0				2			
Diseases of the ear and mastoid process	0				7			
Diseases of the circulatory system	49	1.1	0.8	1.4	1,118	1.1	1.0	1.1
Diseases of the respiratory system	75	1.6	1.3	2.1	939	0.9	0.8	1.0
Diseases of the digestive system	19	0.4	0.3	0.7	348	0.3	0.3	0.4
Diseases of the skin and subcutaneous tissue	1				15	0.0	0.0	0.0
Diseases of the musculoskeletal system and connective tissue	4				129	0.1	0.1	0.1
Diseases of the genitourinary system	2				95	0.1	0.1	0.1
Pregnancy, childbirth and puerperium	0				5			
Certain conditions originating in the perinatal period	0				73	0.1	0.1	0.1
Congenital malformations, deformations & chromosomal deformities	38	0.8	0.6	1.2	1,040	1.0	0.9	1.1
Symptoms, signs and abnormal clinical & laboratory findings NEC	21	0.5	0.3	0.7	447	0.4	0.4	0.5
Injury, poisoning and certain other consequences of external causes	0				0			
Terrorist acts	0				3			
External causes of morbidity and mortality	407	8.9	8.1	9.8	10,500	10.1	9.9	10.3
Total	841	18.4	17.2	19.7	20,471	19.7	19.4	20.0

Note: Rates for counts of less than 10 are considered unreliable. For these values, rates were neither calculated nor displayed graphically.

Data Source: CDC Wonder (<http://wonder.cdc.gov>)

## G. Map of Emergency Medical Services Regions in Illinois

For the next portion of this report, Section II, data for one of the Emergency Medical Services regions in Illinois are presented. The map below shows the location of these eleven regions.



## Section II. Region 8 Report

### Notes Regarding Interpretation of Regional Section

- **Location by Place of Treatment or Place of Residence**

In this regional report section, hospitalization and trauma cases (Sections A, B, C, and D below) are evaluated by **location of treatment**. This approach creates a bias of higher incidence for regions with tertiary care and specialty treatment centers, since serious cases are more likely to be treated at such centers.

- **Out-of-State Location of Treatment**

Discussion regarding Illinois residents that received treatment out-of-state is noted (Section E) because some regions experience a large number of such cases.

Note: Hospitalization data were available through 2005 for treatment by Illinois hospitals, but these data were available only through 2004 for treatment of Illinois residents by out-of-state hospitals in Indiana, Iowa, and Missouri. Because of this limitation, Section B (distribution of diagnoses for hospitalized inpatients) and Section D (analysis of transfer patients) are restricted to data through 2004. In this way a comparison can be made between in-state and out-of-state treatment.

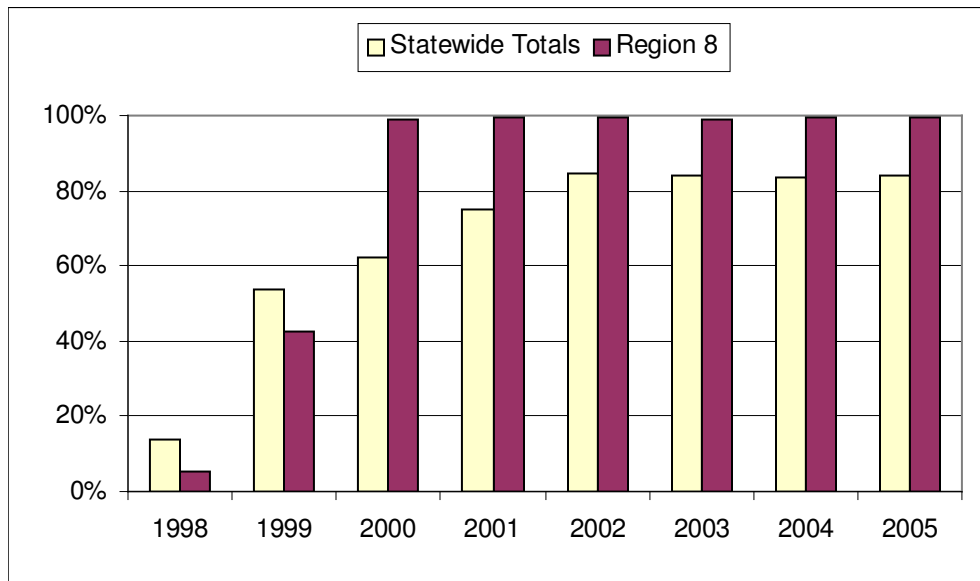
- **Aggregation of Five Years for Current Report**

EMSC receives data annually regarding hospitalization and trauma. However, for many regions, the numbers of hospitalized and/or trauma cases that occur in one year are too few to provide meaningful frequencies when categorized by diagnoses, causes of injury, etc. (Counts of ten or less are considered unreliable). As a result, many tables and graphs display aggregated data for the most recent five years available (2000-2004).

## A. Development of Recognized Facilities

For Region 8, one facility completed recognition as an Emergency Department Approved for Pediatrics (EDAP) in October 1998 in a pilot initiative. Facility recognition was extended to facilities in Region 8 as of October 1999. In 2005, 99.6 percent of all admissions from the emergency department for 0-15 year olds took place in Emergency Department Approved for Pediatric (EDAP) or Pediatric Critical Care Center (PCCC) facilities. By contrast, statewide in 2004, 84.1 percent of such admissions took place in EDAP or PCCC facilities (Figure 13).

**Figure 13. Hospital Inpatient Admissions from the ED for 0-15 Year Olds By Percent of Cases Treated at EDAP or PCCC Facilities, 1998-2005 (Newborns Excluded)**



Year	Region 8				Statewide Totals			
	Total Admissions	Admissions to EDAP	Admissions to Non-EDAP	Percent EDAP	Total Admissions	Admissions to EDAP	Admissions to Non-EDAP	Percent EDAP
1998	2,878	157	2,721	5.5%	37,974	5,306	32,668	14.0%
1999	3,561	1,508	2,053	42.3%	37,846	20,432	17,414	54.0%
2000	4,117	4,084	33	99.2%	37,734	23,581	14,153	62.5%
2001	4,673	4,641	32	99.3%	40,074	30,094	9,980	75.1%
2002	4,546	4,512	34	99.3%	38,610	32,643	5,967	84.5%
2003	4,377	4,339	38	99.1%	37,767	31,749	6,018	84.1%
2004	4,444	4,421	23	99.5%	36,753	30,752	6,001	83.7%
2005	4,576	4,556	20	99.6%	37,659	31,655	6,004	84.1%

Data Sources: Illinois Hospital Association, Illinois Department of Public Health

Notes: EDAP status was extended to facilities in Region 8 as of October 1999.

Newborns, identified by admission type or by Diagnosis Related Group (DRG), were excluded.

## **B. Diagnoses for Hospital Inpatients Admitted from the Emergency Department<sup>3</sup>**

### Region-to-State Comparison

For the period of 2000-2004, Region 8 inpatients admitted from the Emergency Department (ED) compared with statewide admissions as follows (Figures 14, 15, and 16):

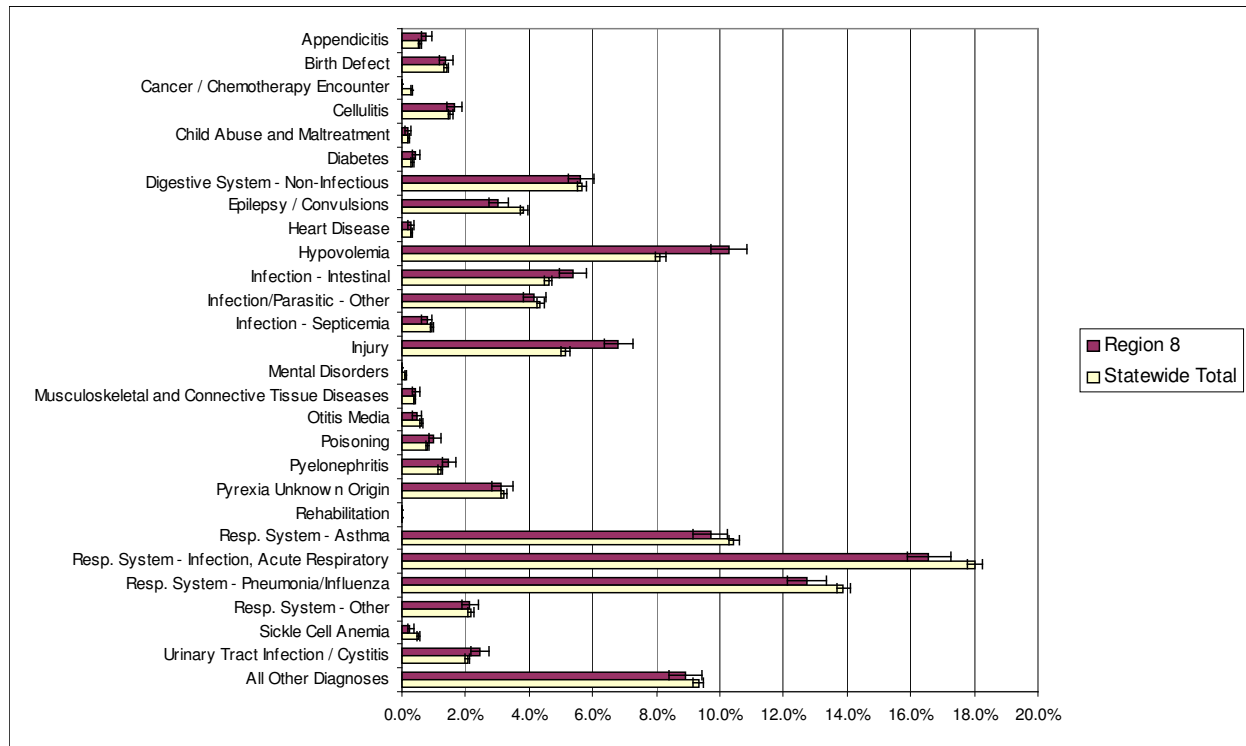
- ❑ A higher percentage of injury patients than appeared statewide for 0-4 year olds (6.8% vs 5.1%), 5-9 year olds (16.3% vs 14.6%), and 10-15 year olds (15.8% vs 14.1%)
- ❑ A higher percentage of appendicitis patients than appeared statewide for 5-9 year olds (11.0% vs 8.9%) and for 10-15 year olds (14.4% vs 10.6%)
- ❑ A higher percentage of hypovolemia patients than appeared statewide for 0-4 year olds (10.3% vs 8.1%)
- ❑ A lower percentage of mental disorder patients than appeared statewide for 5-9 year olds (0.6% vs 4.1%) and for 10-15 year olds (17.5% vs 22.5%)
- ❑ A higher percentage of poisoning patients than appeared statewide for 10-15 year olds (5.5% vs 3.7%)
- ❑ A lower percentage of asthma patients than appeared statewide for 0-4 year olds (9.7% vs 10.4%)
- ❑ A lower percentage of patients with acute respiratory infection for 0-4 year olds (16.6% vs 18.0% statewide)
- ❑ A lower percentage of patients with pneumonia/influenza for 0-4 year olds (12.7% vs 13.9% statewide)

(Note: Modified diagnosis groupings were used for this report. Please see Appendix B, Section 1a.)

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<sup>3</sup> The distribution of diagnoses is reported as percentages and compares the region to the state. Rates require information by location of patient's residence and therefore are not available.

**Figure 14. Hospital Admissions from the ED for 0-4 Year-Olds by EMS Region of Facility, Excluding Newborns, 2000-2004**



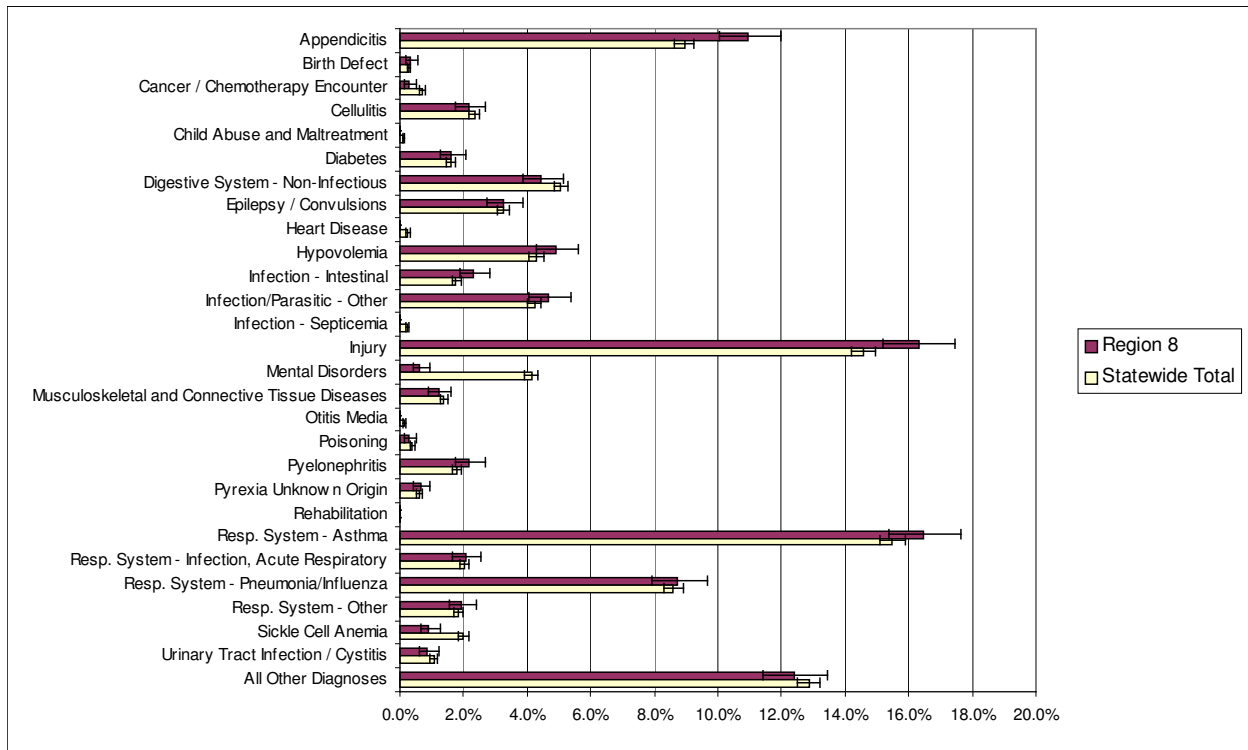
Diagnosis Group	Region 8		95% CI		Statewide Total		95% CI	
	Number	Percent	Lower	Upper	Number	Percent	Lower	Upper
Appendicitis	91	0.8%	0.6%	1.0%	564	0.5%	0.5%	0.6%
Birth Defect	160	1.4%	1.2%	1.6%	1,437	1.4%	1.3%	1.5%
Cancer / Chemotherapy Encounter	7	*			315	0.3%	0.3%	0.3%
Cellulitis	195	1.7%	1.4%	1.9%	1,555	1.5%	1.4%	1.6%
Child Abuse and Maltreatment	20	0.2%	0.1%	0.3%	210	0.2%	0.2%	0.2%
Diabetes	49	0.4%	0.3%	0.6%	338	0.3%	0.3%	0.4%
Digestive System - Non-Infectious	662	5.6%	5.2%	6.1%	5,802	5.7%	5.5%	5.8%
Epilepsy / Convulsions	357	3.0%	2.7%	3.4%	3,932	3.8%	3.7%	4.0%
Heart Disease	32	0.3%	0.2%	0.4%	305	0.3%	0.3%	0.3%
Hypovolemia	1,210	10.3%	9.7%	10.8%	8,334	8.1%	8.0%	8.3%
Infection - Intestinal	632	5.4%	5.0%	5.8%	4,725	4.6%	4.5%	4.7%
Infection/Parasitic - Other	489	4.2%	3.8%	4.5%	4,471	4.4%	4.2%	4.5%
Infection - Septicemia	92	0.8%	0.6%	1.0%	969	0.9%	0.9%	1.0%
Injury	801	6.8%	6.4%	7.3%	5,270	5.1%	5.0%	5.3%
Mental Disorders	6	*			106	0.1%	0.1%	0.1%
Musculoskeletal and Connective Tissue Diseases	51	0.4%	0.3%	0.6%	401	0.4%	0.4%	0.4%
Otitis Media	53	0.5%	0.3%	0.6%	633	0.6%	0.6%	0.7%
Poisoning	118	1.0%	0.8%	1.2%	809	0.8%	0.7%	0.8%
Pyelonephritis	172	1.5%	1.3%	1.7%	1,252	1.2%	1.2%	1.3%
Pyrexia Unknown Origin	369	3.1%	2.8%	3.5%	3,291	3.2%	3.1%	3.3%
Rehabilitation	0	*			2	*		
Resp. System - Asthma	1,142	9.7%	9.2%	10.3%	10,712	10.4%	10.3%	10.6%
Resp. System - Infection, Acute Respiratory	1,952	16.6%	15.9%	17.3%	18,470	18.0%	17.8%	18.2%
Resp. System - Pneumonia/Influenza	1,497	12.7%	12.1%	13.3%	14,238	13.9%	13.7%	14.1%
Resp. System - Other	249	2.1%	1.9%	2.4%	2,209	2.2%	2.1%	2.2%
Sickle Cell Anemia	30	0.3%	0.2%	0.4%	532	0.5%	0.5%	0.6%
Urinary Tract Infection / Cystitis	288	2.4%	2.2%	2.7%	2,108	2.1%	2.0%	2.1%
All Other Diagnoses	1,050	8.9%	8.4%	9.5%	9,556	9.3%	9.1%	9.5%
<b>Total for All Diagnoses</b>	<b>11,774</b>	<b>100.0%</b>			<b>102,546</b>	<b>100.0%</b>		

Data Source: Illinois Hospital Association

Notes: Newborns, identified by admission type or by Diagnosis Related Group (DRG), were excluded.

\*For counts of less than 10, percentages are considered unreliable and so were neither noted nor displayed graphically.

**Figure 15. Hospital Admissions from the ED for 5-9 Year-Olds by EMS Region of Facility, 2000-2004**

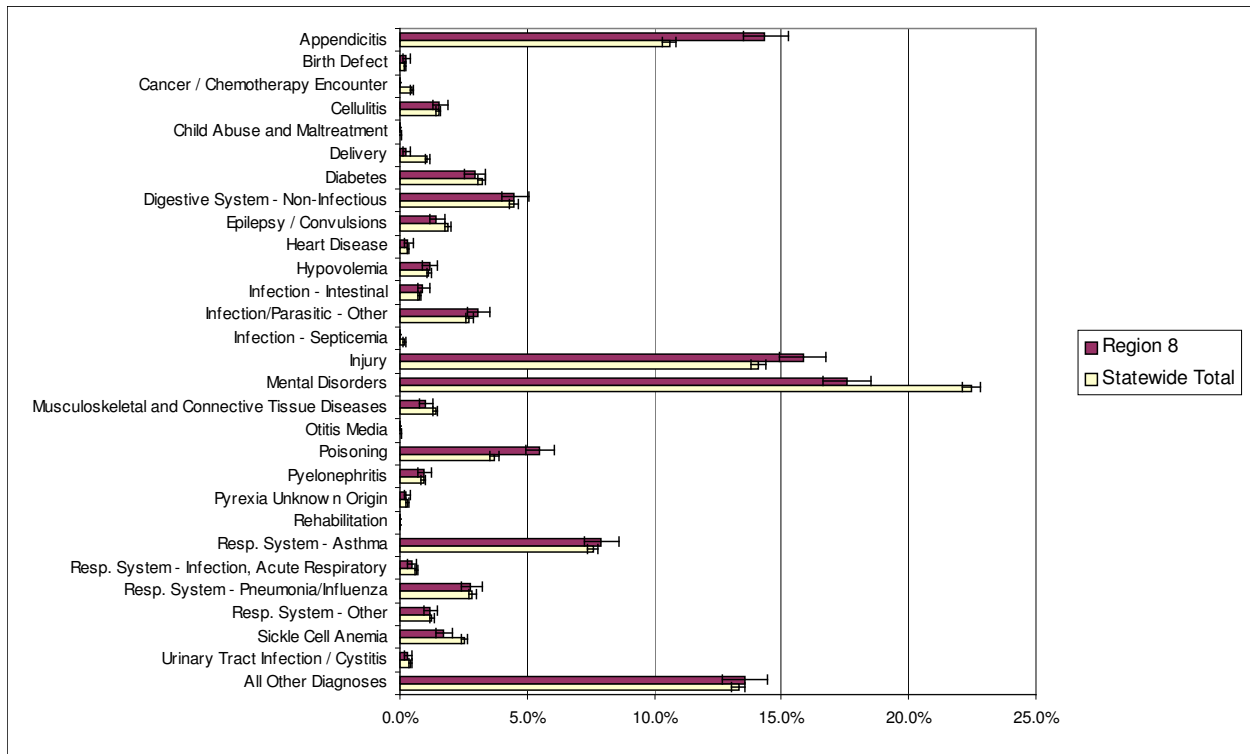


Diagnosis Group	Region 8		95% CI		Statewide Total		95% CI	
	Number	Percent	Lower	Upper	Number	Percent	Lower	Upper
Appendicitis	455	11.0%	10.0%	12.0%	3,079	8.9%	8.6%	9.2%
Birth Defect	13	0.3%	0.2%	0.6%	97	0.3%	0.2%	0.3%
Cancer / Chemotherapy Encounter	12	0.3%	0.2%	0.5%	248	0.7%	0.6%	0.8%
Cellulitis	90	2.2%	1.8%	2.7%	807	2.3%	2.2%	2.5%
Child Abuse and Maltreatment	6	*			37	0.1%	0.1%	0.1%
Diabetes	67	1.6%	1.3%	2.1%	554	1.6%	1.5%	1.7%
Digestive System - Non-Infectious	185	4.5%	3.9%	5.1%	1,744	5.1%	4.8%	5.3%
Epilepsy / Convulsions	135	3.3%	2.7%	3.8%	1,126	3.3%	3.1%	3.5%
Heart Disease	7	*			85	0.2%	0.2%	0.3%
Hypovolemia	204	4.9%	4.3%	5.6%	1,477	4.3%	4.1%	4.5%
Infection - Intestinal	96	2.3%	1.9%	2.8%	609	1.8%	1.6%	1.9%
Infection/Parasitic - Other	194	4.7%	4.1%	5.4%	1,459	4.2%	4.0%	4.5%
Infection - Septicemia	2	*			81	0.2%	0.2%	0.3%
Injury	677	16.3%	15.2%	17.5%	5,016	14.6%	14.2%	14.9%
Mental Disorders	26	0.6%	0.4%	0.9%	1,424	4.1%	3.9%	4.4%
Musculoskeletal and Connective Tissue Diseases	50	1.2%	0.9%	1.6%	474	1.4%	1.3%	1.5%
Otitis Media	2	*			51	0.1%	0.1%	0.2%
Poisoning	12	0.3%	0.2%	0.5%	138	0.4%	0.3%	0.5%
Pyelonephritis	90	2.2%	1.8%	2.7%	617	1.8%	1.7%	1.9%
Pyrexia Unknown Origin	27	0.7%	0.4%	1.0%	213	0.6%	0.5%	0.7%
Rehabilitation	0	*			2	*		
Resp. System - Asthma	684	16.5%	15.4%	17.6%	5,334	15.5%	15.1%	15.9%
Resp. System - Infection, Acute Respiratory	86	2.1%	1.7%	2.6%	692	2.0%	1.9%	2.2%
Resp. System - Pneumonia/Influenza	363	8.7%	7.9%	9.7%	2,961	8.6%	8.3%	8.9%
Resp. System - Other	80	1.9%	1.5%	2.4%	634	1.8%	1.7%	2.0%
Sickle Cell Anemia	38	0.9%	0.7%	1.3%	688	2.0%	1.9%	2.2%
Urinary Tract Infection / Cystitis	36	0.9%	0.6%	1.2%	368	1.1%	1.0%	1.2%
All Other Diagnoses	515	12.4%	11.4%	13.5%	4,428	12.9%	12.5%	13.2%
<b>Total for All Diagnoses</b>	<b>4,152</b>	<b>100.0%</b>			<b>34,443</b>	<b>100.0%</b>		

Data Source: Illinois Hospital Association

Notes: For counts of less than 10, percentages are considered unreliable and so were neither noted nor displayed graphically.

**Figure 16. Hospital Admissions from the ED for 10-15 Year-Olds by EMS Region of Facility, 2000-2004**



Diagnosis Group	Region 8		95% CI		Statewide Total		95% CI	
	Number	Percent	Lower	Upper	Number	Percent	Lower	Upper
Appendicitis	895	14.4%	13.5%	15.3%	5,716	10.6%	10.3%	10.9%
Birth Defect	14	0.2%	0.1%	0.4%	106	0.2%	0.2%	0.2%
Cancer / Chemotherapy Encounter	8	*			249	0.5%	0.4%	0.5%
Cellulitis	97	1.6%	1.3%	1.9%	812	1.5%	1.4%	1.6%
Child Abuse and Maltreatment	4	*			28	0.1%	0.0%	0.1%
Delivery	15	0.2%	0.1%	0.4%	581	1.1%	1.0%	1.2%
Diabetes	182	2.9%	2.5%	3.4%	1,736	3.2%	3.1%	3.4%
Digestive System - Non-Infectious	280	4.5%	4.0%	5.0%	2,405	4.5%	4.3%	4.6%
Epilepsy / Convulsions	90	1.4%	1.2%	1.8%	1,013	1.9%	1.8%	2.0%
Heart Disease	20	0.3%	0.2%	0.5%	171	0.3%	0.3%	0.4%
Hypovolemia	72	1.2%	0.9%	1.5%	605	1.1%	1.0%	1.2%
Infection - Intestinal	56	0.9%	0.7%	1.2%	404	0.7%	0.7%	0.8%
Infection/Parasitic - Other	192	3.1%	2.7%	3.5%	1,475	2.7%	2.6%	2.9%
Infection - Septicemia	7	*			96	0.2%	0.1%	0.2%
Injury	987	15.8%	14.9%	16.8%	7,601	14.1%	13.8%	14.4%
Mental Disorders	1,094	17.5%	16.6%	18.5%	12,117	22.5%	22.1%	22.8%
Musculoskeletal and Connective Tissue Diseases	62	1.0%	0.8%	1.3%	749	1.4%	1.3%	1.5%
Otitis Media	7	*			31	0.1%	0.0%	0.1%
Poisoning	341	5.5%	4.9%	6.1%	2,005	3.7%	3.6%	3.9%
Pyelonephritis	58	0.9%	0.7%	1.2%	495	0.9%	0.8%	1.0%
Pyrexia Unknown Origin	16	0.3%	0.2%	0.4%	158	0.3%	0.2%	0.3%
Rehabilitation	0	*			2	*		
Resp. System - Asthma	492	7.9%	7.2%	8.6%	4,093	7.6%	7.4%	7.8%
Resp. System - Infection, Acute Respiratory	28	0.4%	0.3%	0.7%	353	0.7%	0.6%	0.7%
Resp. System - Pneumonia/Influenza	174	2.8%	2.4%	3.2%	1,531	2.8%	2.7%	3.0%
Resp. System - Other	74	1.2%	0.9%	1.5%	678	1.3%	1.2%	1.4%
Sickle Cell Anemia	106	1.7%	1.4%	2.1%	1,365	2.5%	2.4%	2.7%
Urinary Tract Infection / Cystitis	19	0.3%	0.2%	0.5%	212	0.4%	0.3%	0.5%
All Other Diagnoses	844	13.5%	12.7%	14.4%	7,176	13.3%	13.0%	13.6%
<b>Total for All Diagnoses</b>	<b>6,234</b>	<b>100.0%</b>			<b>53,963</b>	<b>100.0%</b>		

Data Source: Illinois Hospital Association

Notes: \*Percentages for counts of less than 10 are considered unreliable. For these values, percents were neither noted nor displayed graphically.

## C. Trauma<sup>4</sup>

### a) Causes of Injury for Trauma Registry Patients

#### Region-State Comparison

Using E-Codes for 0-15 year old patients recorded in the trauma registry from 2000-2004, Region 8 trauma centers compared with statewide trauma centers as follows (Figure 17):

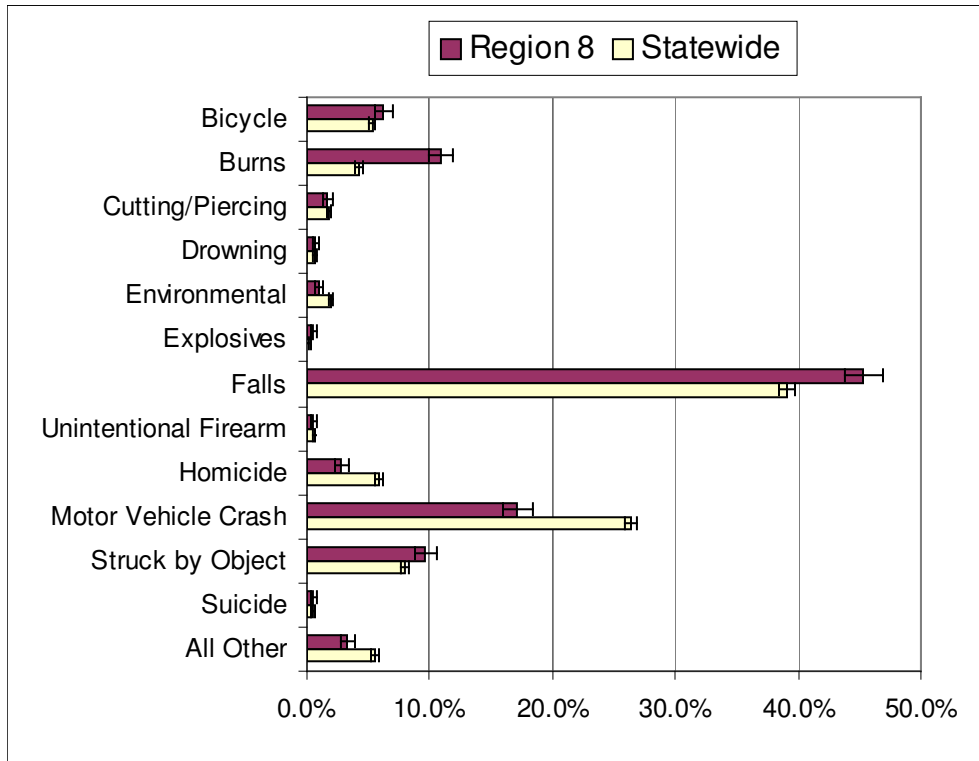
- ❑ A higher percentage of burns than appeared statewide (10.9% vs 4.2%)
- ❑ A higher percentage of falls than appeared statewide (45.3% vs 39.1%)
- ❑ A lower percentage of homicides than appeared statewide (2.8% vs 5.9%)
- ❑ A lower percentage of motor vehicle crash victims than appeared statewide (17.2% vs 26.4%)

(Notes: These data used region of treatment, not location of occurrence. Also, for the evaluation of causes of trauma injury, patients transferred out to another trauma center were not counted in order to avoid duplication.)

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<sup>4</sup> The distribution of trauma cases is reported as percentages and compares the region to the state. Rates require information by location of patient's residence and therefore are not available.

**Figure 17. Causes of Injury for Children 0-15 Years Old by Location of Treatment for Cases Reported to the Trauma Registry, 2000-2004**



Cause of Injury (E-Code Group)	Region 8		95% CI		Statewide		95% CI	
	Count	Percent	Lower	Upper	Count	Percent	Lower	Upper
Bicycle	252	6.3%	5.5%	7.1%	1,370	5.3%	5.0%	5.6%
Burns	441	10.9%	10.0%	12.0%	1,091	4.2%	4.0%	4.5%
Cutting/Piercing	64	1.6%	1.2%	2.0%	456	1.8%	1.6%	1.9%
Drowning	25	0.6%	0.4%	0.9%	166	0.6%	0.6%	0.8%
Environmental	37	0.9%	0.7%	1.3%	492	1.9%	1.7%	2.1%
Explosives	20	0.5%	0.3%	0.8%	63	0.2%	0.2%	0.3%
Falls	1,825	45.3%	43.8%	46.8%	10,089	39.1%	38.5%	39.7%
Unintentional Firearm	22	0.5%	0.4%	0.8%	158	0.6%	0.5%	0.7%
Homicide	112	2.8%	2.3%	3.3%	1,518	5.9%	5.6%	6.2%
Motor Vehicle Crash	692	17.2%	16.0%	18.4%	6,808	26.4%	25.9%	26.9%
Struck by Object	388	9.6%	8.7%	10.6%	2,038	7.9%	7.6%	8.2%
Suicide	19	0.5%	0.3%	0.8%	124	0.5%	0.4%	0.6%
All Other	132	3.3%	2.8%	3.9%	1,423	5.5%	5.2%	5.8%
<b>Totals</b>	<b>4,029</b>	<b>100.0%</b>			<b>25,796</b>	<b>100.0%</b>		

Data Source: IDPH Illinois Trauma Registry

Notes: Transfers to superseding trauma centers were counted only for the receiving facility.

\*Percentages for counts of less than 10 are considered unreliable. For these values, percents were neither noted nor displayed graphically.

The EMS region in which the patient was treated, not the location of occurrence, reports cases.

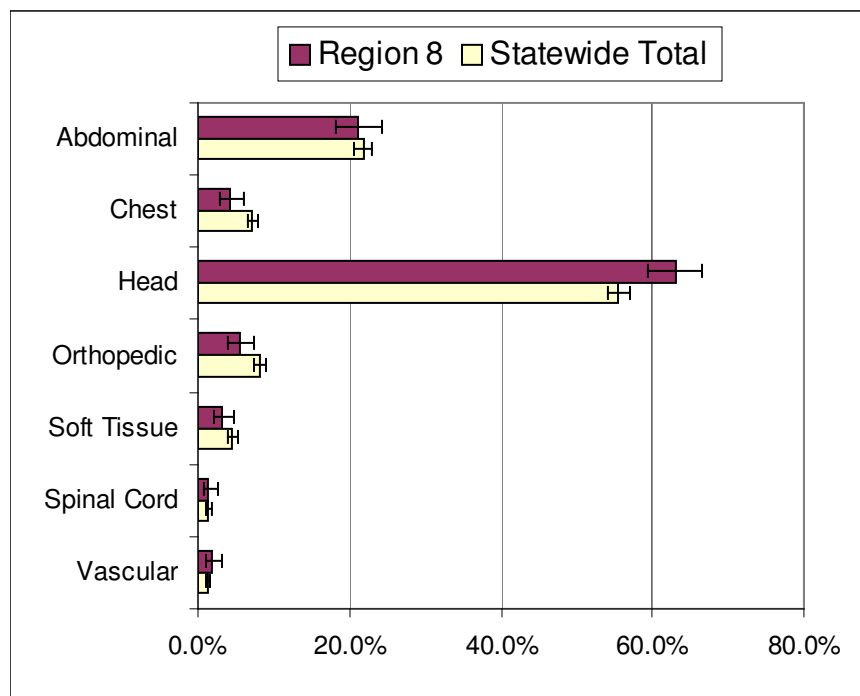
b) Types of Injury

Region-State Comparison

A small set of diagnosis codes representative of a seriously injured trauma population were used to categorize trauma injury type (see Appendix B, Section 2). Checking for these codes as the principal diagnosis for all 0-15 year old inpatients admitted from the ED between 2000-2004, all hospitals in Region 8 compared with all hospitals statewide as follows (Figure 18):

- A higher percentage of head injury cases than appeared statewide (63.0% vs 55.5%)

**Figure 18. Trauma Injury Types for Children 0-15 Years Old Admitted From the ED, Using Selected Diagnoses, by EMS Region of Facility, 2000-2004**



Trauma Type for Selected Diagnoses	Region 8		95% CI		Statewide Total		95% CI	
	Count	Percent	Lower	Upper	Count	Percent	Lower	Upper
Abdominal	147	21.1%	18.1%	24.3%	1,070	21.9%	20.7%	23.0%
Chest	29	4.2%	2.8%	6.0%	354	7.2%	6.5%	8.0%
Head	440	63.0%	59.3%	66.6%	2,718	55.5%	54.1%	56.9%
Orthopedic	38	5.4%	3.9%	7.5%	404	8.3%	7.5%	9.1%
Soft Tissue	22	3.2%	2.0%	4.8%	224	4.6%	4.0%	5.2%
Spinal Cord	10	1.4%	0.7%	2.7%	66	1.3%	1.1%	1.7%
Vascular	12	1.7%	0.9%	3.1%	60	1.2%	0.9%	1.6%
<b>Total</b>	<b>698</b>	<b>100.0%</b>			<b>4,896</b>	<b>100.0%</b>		

Data Source: Illinois Hospital Association

Notes: \*Percentages for counts of less than 10 are considered unreliable. For these values, percents were neither noted nor displayed graphically.

## **D. High Severity Injury Survival Comparison with National Data**

In association with the National EMSC program, the outcomes for severely injured pediatric patients treated by Illinois EDAP facilities were compared with national data. In particular, mortality rates for 0-10 years old with ISS of 16-75 were evaluated. National EMSC considered this group of patients to be those most likely affected by EMSC program efforts according to physiology and medical condition.

National data were obtained from the Agency for Healthcare Research and Quality (AHRQ). AHRQ sponsors a set of databases in its Healthcare Cost and Utilization Project. Among these is the National Inpatient Sample (<http://www.hcup-us.ahrq.gov/nisoverview.jsp> - Data), a data set of six million to eight million records obtained annually from hospitals throughout the U.S. The records are weighted to represent the full inpatient experience for all U.S. hospitals. AHRQ data were available through 2003 at the time of this report.

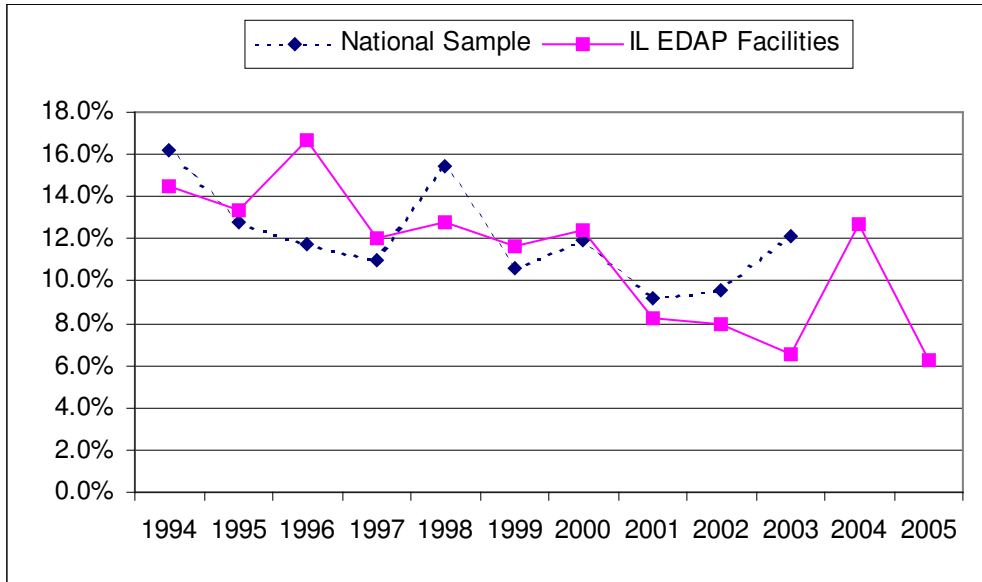
AHRQ and Illinois data (obtained from the Illinois Hospital Association) were processed in the same manner:

- 0-10 year old hospital inpatients who were admitted via the ED were selected
- Diagnoses codes for these patients were processed using ICDMAP90<sup>®</sup>, an artificial intelligence software, to obtain ISS
- Patients with an ISS of  $\geq 16$  and  $\leq 75$  were selected for further analysis

In addition, for AHRQ data, the weight values for each patient were summed to create a nationally representative sample. This step followed instructions provided by AHRQ with its datasets.

Over time, both the national and the Illinois EDAP facility mortality rates decreased (Figure 19). Although the Illinois decrease appears slightly greater, the numbers become very small annually for Illinois (e.g. 9 mortalities in 144 cases in 2005) and so must be interpreted cautiously.

**Figure 19. Mortality Rates for Severe Injury for 0-10 Year Old Hospital Inpatients Admitted from the ED, 1994-2005\***



Year	National Sample			Illinois EDAP Facilities		
	Patients	Mortalities	% Mortality	Patients	Mortalities	% Mortality
1994	4081	661	16.2%	166	24	14.5%
1995	3846	492	12.8%	194	26	13.4%
1996	3765	441	11.7%	174	29	16.7%
1997	3682	404	11.0%	150	18	12.0%
1998	3738	576	15.4%	187	24	12.8%
1999	4561	485	10.6%	155	18	11.6%
2000	3088	368	11.9%	169	21	12.4%
2001	3520	323	9.2%	146	12	8.2%
2002	3649	351	9.6%	164	13	7.9%
2003	4081	497	12.2%	152	10	6.6%
2004	N/A	N/A	N/A	158	20	12.7%
2005	N/A	N/A	N/A	144	9	6.3%

Data Sources: AHRQ, Illinois Hospital Association, Illinois EMSC

\* Note: For the national sample, data were only available through 2003

## **E. Out-Of-State Hospitalization**

For some EMS regions in Illinois, a considerable proportion of patients may be admitted to out-of-state hospitals. Using hospital discharge records that the Illinois Hospital Association obtained from Indiana, Iowa, and Missouri for 2000-2004, the percentage of such cases for 0-15 year olds was calculated.

When that value exceeded five percent, the diagnoses of in-state hospitalizations were compared with diagnoses from all hospitalizations (including out-of-state) for residents of that region. In this way we looked for biases in this report.

For the period of 2000-2004, admissions from the emergency department experienced by residents of Region 8 (excluding newborns) occurred in out-of-state hospitals at percentages lower than 5 percent for all three age groups used in this report (0.1% for 0-4 year olds, 0.2% for 5-9 year olds, and 0.3% for 10-15 year olds). As a result, no out-of-state bias was found for Region 8.

## References

1. Washington State Hospital Commission, *Trauma Incidence and Care: A Retrospective Assessment*. 1989, Olympia, WA: State of Washington Hospital Commission.
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5. Porell FW., A Comparison of Ambulatory Care-Sensitive Hospital Discharge Rates for Medicaid HMO Enrollees and Nonenrollees. *Medical Care Research and Review*, 2001. 58(4) p. 404-24; discussion p. 425-9.
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# Appendix A. CQI Program Improvement for EMS Region 5

## Illinois EMS for Children Quality Improvement and Indicator Monitoring Report

Title of Project: **Respiratory Symptoms Assessment**  
 Date of Report: January 10, 2007  
 EMSC Region: Region 5  
 Facility: All Participating Facilities in the Regional CQI Effort

### 1. Opportunity / Issue / Problem Identification (PLAN)

- Opportunity: Assessment of respiratory symptoms in the ED
- Problem: Less than adequate reassessment of breath sounds (37%), respiratory rate (63%) and SpO2 (57%)
- Goals: Improved reassessment

### 2. Most Likely Causes

- Lack of staff awareness of expectations
- Lack of existing guidelines, protocols
- Lack of pediatric reassessment knowledge

### 3. Solution(s) Implemented (DO)

- Educational presentations
- Support of leadership teams
- Collaboration amongst CQI liaisons

### 4. Data Elements Collected for Evaluation

- Age
- Weight
- Initial assessment documented
- Reassessment documented
- Each hospital evaluates 30 charts per quarter for pediatric patients presenting with any form of respiratory symptoms such as cough, congestion, wheezing, trouble breathing, asthma, etc.

### 5. Results and Data Analysis (STUDY)

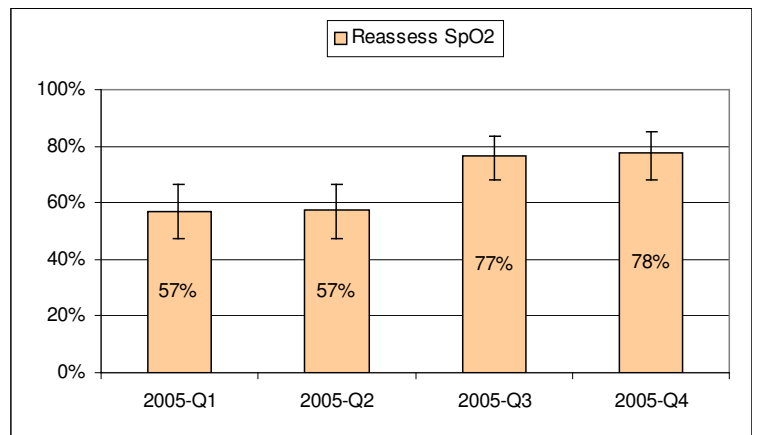
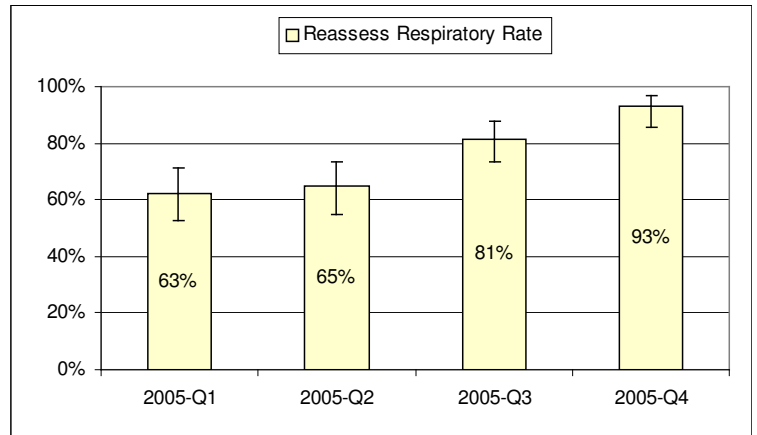
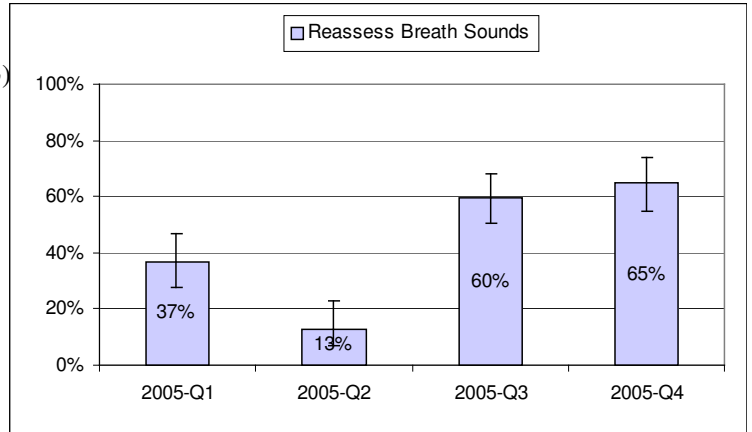
- Reassessment of breath sounds: 28% improvement
- Reassessment of respiratory rate: 30% improvement
- Reassessment of SpO2: 21% improvement

### 6. Conclusions and Recommendations (ACT)

- Conclusion: The emergency departments in Illinois EMSC Region 5 have shown progress toward the goals of improving reassessment for children presenting with respiratory symptoms. This improvement follows educational efforts. This improvement follows educational efforts.
- Recommendations: Continue on-going efforts to maintain positive clinical outcomes in pediatric respiratory symptom reassessment. Attempt to further identify barriers. On-going data analysis.

### Region 5 EMSC CQI – Respiratory Symptoms Assessment Regional Totals for 2005

Note: Error bars represent 95% confidence intervals.



## Appendix B: Methods

### 1. Recodes

The code groups used in this report to categorize diagnoses and causes of injury are based on established sources for persons of all ages. However, a focus on children resulted at times in small numbers for some of these groups and/or an excessive number in the catchall “other” categories. As a result slight modifications were made in the group coding for these sets of data.

**a. ICD-9-CM Diagnosis Groups.** The diagnosis groups are based on groupings used in the EMS Reporting System, a Web-based tool available on the IDPH Web site (<http://app.idph.state.il.us/emrpt/index.htm>). This categorization was modified from the Community Health Information System (CHIS), a data set originally developed by the Illinois Hospital Association. The categories were modified to identify diagnosis groups found for children, as shown in Table A-1.

**Table A-1. Diagnosis Categories Used in Report**

Modified Groups for Report	Codes
Appendicitis	540-543
Birth Defect	740-759
Cancer / Chemotherapy Encounter	140-208, 235-239, V581
Cellulitis	681-682
Child Abuse and Maltreatment	995.5, V61.21
Delivery	D370-375
Diabetes	250
Digestive System - Non-Infectious	529-537, 550-579
Epilepsy / Convulsions	345, 7803
Heart Disease	393-398, 402, 404-429
Hypovolemia	2765
Infection – Intestinal	001-009
Infection/Parasitic – Other	010-139 (excludes 038)
Infection – Septicemia	038
Injury	800-959
Mental Disorders	290-319
Musculoskeletal & Connective Tissue Diseases	710-739
Newborn	D385-391
Otitis Media	381-382
Poisoning	960-989
Pyelonephritis	590
Pyrexia Unknown Origin	7806
Rehabilitation	D462
Resp. System – Asthma	493
Resp. System - Infection, Acute Respiratory	460-466
Resp. System - Pneumonia/Influenza	480-487
Resp. System – Other	470-478, 490-492, 494-519
Sickle Cell Anemia	282.6
Urinary Tract Infection / Cystitis	595, 5990
All Other Diagnoses	

**b. Cause of Injury Groups.** The groups for cause of injury are based on the EMS Reporting System, a Web-based tool available on the IDPH Web site (<http://app.idph.state.il.us/emsrpt/index.htm>). This categorization was based on groups of selected ICD-9-CM codes for external cause of injury (E-Codes). Further modifications helped identify cause of injury categories for children, as shown in Table A-2.

**Table A-2. Cause-of-Injury Categories Used in Report**

<b>Modified Groups for Report</b>	<b>Codes</b>
Bicycle	E826
Burns	E890-E899, E924
Cutting/Piercing	E920
Drowning	E910
Environmental	E900-E909
Explosives	E921-E923
Falls	E880-E888
Unintentional Firearm	E922-E922.9
Foreign Body	E914-E915
Homicide	E960-E969
Motor Vehicle Crash	E810-E825
Struck by Object	E916-E918
Suicide	E950-E959
All Other	

## 2. Trauma Injury Types

A small set of diagnosis codes representative of a trauma population have been used to categorize trauma injury type (the Washington State Hospital Commission's report, *Trauma Incidence and Care: A Retrospective Assessment*, September 8, 1989, Olympia, WA). These codes and the related type are presented in Table A-3. For this report, we examined records for these codes as the principal diagnosis.

**Table A-3. ICD-9-CM Codes Representative of a Trauma Population by Injury Type**

Injury Type	ICD-9-CM Code	Description
Abdominal	863	Injury to gastrointestinal tract
	864	Injury to liver
	865	Injury to spleen
	866	Injury to kidney
	867	Injury to pelvic organs
	868	Injury to other intra-abdominal organs
	869	Internal injury to unspecified organs in chest, abdominal, and pelvic areas
	902	Injury to blood vessels of abdomen and pelvis
Chest	807	Fracture of rib(s), sternum, larynx and trachea
	860	Traumatic pneumothorax and hemothorax
	861	Injury to heart and lung
	862	Injury to other intrathoracic organs
	875	Open wound of chest (wall)
	901	Injury to blood vessels of thorax
	926	Crushing injury of trunk
Head	800	Fracture of the vault of the skull
	801	Fracture of the base of the skull
	803	Other skull fractures
	804	Multiple fractures involving skull or face with other bones
	850.3	Concussion - with prolonged loss of consciousness and return to pre-existing consciousness level
	850.4	Concussion - with prolonged loss of consciousness without return to pre-existing consciousness level
	851	Cerebral laceration and contusion
	852	Subarachnoid, subdural, and extradural hemorrhage, following injury
	853	Other intracranial hemorrhage following injury
	854	Intracranial injury, unspecified
Orthopedic	805	Fracture of the vertebral column without mention of spinal cord injury
	808	Fracture of the pelvis
	819	Multiple fractures involving both upper limbs, and upper limb with rib(s) and sternum
	828	Multiple fractures involving both lower limbs, lower with upper limb, lower limb(s) with rib(s) and sternum
	839	Other lower limb fracture, multiple, and ill-defined locations
	887	Traumatic amputation of arm and hand (complete) (partial)
	896	Traumatic amputation of foot (complete) (partial)
	897	Traumatic amputation of leg(s) (complete) (partial)
	928	Crushing injury of lower limb
	929	Crushing injury of multiple and unspecified sites
Soft Tissue	874	Open wound of neck
	876	Open wound of back
	879	Open wound of unspecified sites, except limbs
	890	Open wound of hip and thigh
Spinal Cord	806	Fracture of the vertebral column with spinal cord injury
	952	Spinal cord injury without evidence of spinal bone injury
Vascular	900	Injury to blood vessels of head and neck
	903	Injury to blood vessels of upper extremity
	904	Injury to blood vessels of lower extremity and unspecified sites

Source: Washington State Hospital Commission, Olympia, WA, September 1989

### 3. Census Estimates

Actual census data for the years 1990 and 2000 and census estimates for the years 1991-1999 and 2001 were downloaded from the U.S. Census Bureau Web site (<http://www.census.gov>). These were used throughout this report except for one set of values. This set consisted of information for Region 11 (Chicago) and the related values for Suburban Cook County.

Annual estimates for Chicago for the age group of 0-15 years were not available on the Census Web site. The Illinois Center for Health Statistics (ICHS) suggested an alternative approach, under certain assumptions of migration and fertility for the age groups of interest (personal communications, January 2002 and September 2003). The approach used two ICHS estimates for Chicago for the period 1991-1999 and 2001 – those for 0-14 year olds and for 15-19 year olds – and performed a calculation to estimate 15 year olds. The calculation was to average the proportion of 15 year olds among 15-19 year olds from actual census data for the years 1990 and 2000, and apply that average proportion to the 1991-1999 estimates for this group. For 2001 estimates, a similar process was applied, but using the proportion from 2000 only. The results are shown in Table A-4.

**Table A-4. Actual and Estimated Populations for 0-15 Year Olds for the City of Chicago, 1990-2001**

Type	Year	Population
<i>Actual</i>	<i>1990</i>	<i>644,784</i>
Estimate	1991	656,788
Estimate	1992	680,425
Estimate	1993	693,527
Estimate	1994	700,122
Estimate	1995	708,650
Estimate	1996	701,091
Estimate	1997	696,182
Estimate	1998	696,196
Estimate	1999	696,966
<i>Actual</i>	<i>2000</i>	<i>681,847</i>
Estimate	2001	679,384

Data Source: U.S. Census Bureau for actual populations in 1990 and 2000

Further, because of Chicago's location within Cook County, Suburban Cook County population estimates were derived by subtracting the Chicago estimates from the census estimates for all of Cook County.

### 4. Mortality Rates

Mortality rate calculations and presentation were performed in a style consistent with the Illinois Department of Public Health's *Vital Statistics Illinois 1999* (Illinois Center for Health Statistics, Springfield, IL, October 2001). In particular, crude death rates and cause-specific death rates were calculated as noted in that publication's Appendix 2 (page IV-14). Also the repression of unreliable rates for values less than 10 is described in Appendix 1 (pages IV-4 and IV-5). This appendix is also available on the Web (<http://www.idph.state.il.us/vital/pdf/appendices.pdf>).

## 5. Confidence Intervals

Confidence intervals were used in the same manner as in the publication *Vital Statistics Illinois 1999* (Illinois Center for Health Statistics, Springfield, IL: Illinois Department of Public Health, March 2003, page IV-5). To quote from that source:

In general, vital rates should be thought of and treated as estimations of “true” underlying rates. When the number of events is very large, the calculated rate will approach the value of the underlying rate. However, the opposite happens as the number of events becomes small and thus the rates are subject to greater chance fluctuations. Commonly, 90 or 95 percent confidence intervals or probability ranges can be calculated for rates. A 95 percent interval means that the true rate has a 19 in 20 chance of lying within the specified rate (which is normally distributed, meaning there is a central tendency within the range). See the Illinois Center for Health Statistics’ *Vital Statistics Basic Research Series* articles “The Pros and Cons of Standardized Rates” (Vol. 2, No. 1) and “The Interpolation and Practical Limitations of Mortality Measures” (Vol. 2, No. 4) for further discussion of confidence intervals and their calculation.

For this report, confidence intervals were calculated according to Joseph L. Fleiss’ *Statistical Methods for Rates and Proportions, Second Edition* (John Wiley & Sons, Inc., New York, 1981). In particular, the upper and lower limits are described in two equations in section 1.4, “Inferences About a Single Proportion” (page 14). These equations were used for both rate and percentage confidence intervals. The same approach for rates was used by the Illinois Department of Public Health in its publication *Adverse Pregnancy Outcomes in Illinois: County-Specific Prevalence and Related Infant Mortality, 1989-1998* (Epidemiologic Report Series 2000:4, Division of Epidemiologic Studies, Springfield, IL: Illinois Department of Public Health, May 2000).