Illinois
Emergency Medical Services
for Children

Annual EMSC Report and Profile of Emergency Medical Services Regions

Region 1

November 2005

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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, 1994-2004

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 some 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 some variations in medical practice and diagnostic labeling. The database does not include Emergency Department (ED) or other outpatient information. At the time that this report was prepared, not all IHA border state data were available for 2004.

2) Trauma Registry, 1994-2003

Database Description

Currently, there are 67 hospitals within Illinois designated as either a Level I (20)[1] or Level II (47) 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

[1] 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 67 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, 1999-2002

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 1999-2002 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 as well as weather, lighting or other related conditions associated with the crash incident.

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.

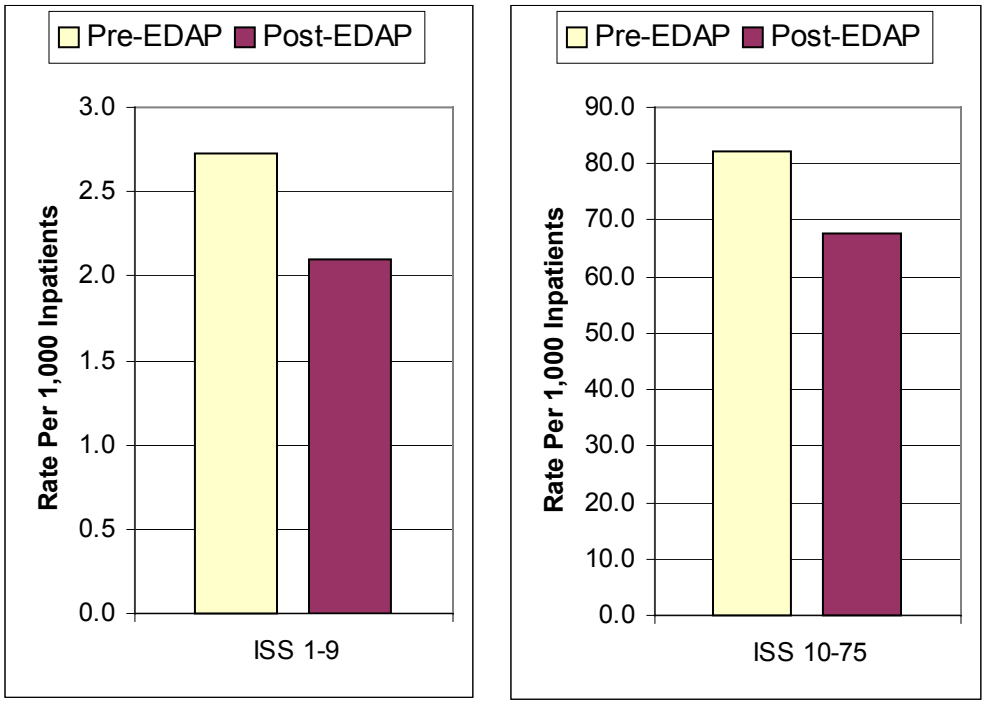
2) Related Measures of Effectiveness

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 2004. (This includes PCCC facilities because they meet EDAP standards.)

In addition, in order to control for severity, the software ICDMAP90© (The Johns Hopkins University and Tri-Analytics, Inc.) was used to calculate standardized injury severity scores (ISS) from diagnosis codes. Using this information, the injury mortality rates for hospitalized patients were compared for two groups, those with low severity (ISS 1-9) and those with moderate to high severity (ISS 10-75). For both groups, post-EDAP mortality rates were lower.

For the low severity group the rate declined from 2.7 deaths per 1,000 inpatients to 2.1 per 1,000 inpatients. For the moderate to high severity group the rate declined from 82.4 deaths per 1,000 inpatients to 67.6 deaths per 1,000 inpatients (Figure 1). Also, for the moderate to high severity group, this 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, 1994-2004
(Note: Records were restricted to facilities participating as EDAP)



Severity Group	Pre-EDAP			Post-EDAP		
	Patients	Deaths	Rate	Patients	Deaths	Rate
ISS 1-9	16,471	45	2.7	13,342	28	2.1
ISS 10-75	2,841	234	82.4	2,560	173	67.6

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 (1994-2004) were used, restricted to facilities participating in facility recognition at the EDAP level.

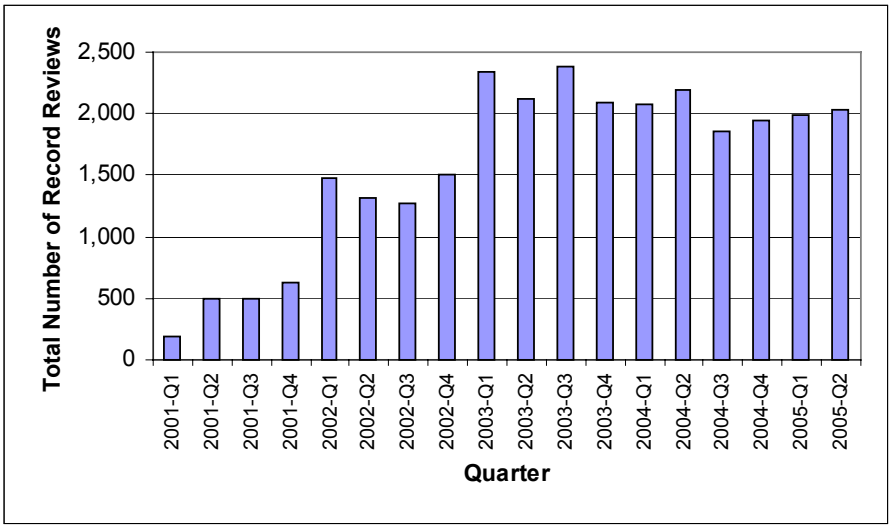
3) Regional Continuous Quality Improvement (CQI) Program

Each hospital participating in facility recognition is required to designate a Pediatric CQI Liaison. This individual participates in a region-wide CQI committee. 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 EMS region. Each facility conducts quarterly medical record reviews and submits completed monitor tools to either a committee data

coordinator or to the EMSC central office for data entry. Facility reports are then generated, allowing each hospital to compare their facility's responses to the aggregate responses of the region. Confidentiality of the patient and facility are maintained throughout this process.

As of the second quarter of 2005, over 28,000 medical record reviews have been conducted through this process (Figure 2). Statistically significant improvements were recorded by Regions 1, 2, 4, 6, 7, 8, 9, and 11 in pain management indicators, by Region 7 in an asthma indicator, 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	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	147	*1,475*
2002-Q2	807	293	215	*1,315*
2002-Q3	625	359	284	*1,268*
2002-Q4	841	333	330	*1,504*
2003-Q1	1,582	340	414	*2,336*
2003-Q2	1,444	330	352	*2,126*
2003-Q3	1,547	342	491	*2,380*
2003-Q4	1,203	323	564	*2,090*
2004-Q1	1,500	141	430	*2,071*
2004-Q2	1,418	170	602	*2,190*
2004-Q3	1,422	107	321	*1,850*
2004-Q4	1,343	108	487	*1,938*
2005-Q1	698	33	1,263	*1,994*
2005-Q2	922	0	1,117	*2,039*
Grand Totals	***17,351***	***4,018***	***7,017***	***28,386***

Data Source: EMSC Regional CQI Committees

4) Pediatric Pain Management in the Emergency Department Survey and Chart Review, 2005

In 2005, 121 emergency departments actively participated in the EMSC regional CQI program (of these, 98 are recognized as PCCC, EDAP or SEDP facilities). These emergency departments were surveyed regarding pediatric pain management using a Web-based application. Of the 121 facilities, 93 (77%) completed the survey. In addition, the respondents conducted 792 medical record reviews on pediatric patients age 0-15 years who presented to the ED with extremity fracture(s). 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. For this summary of findings, responses from 2005 for these facilities were compared to their responses to paper-based surveys from 2002 and 2003.

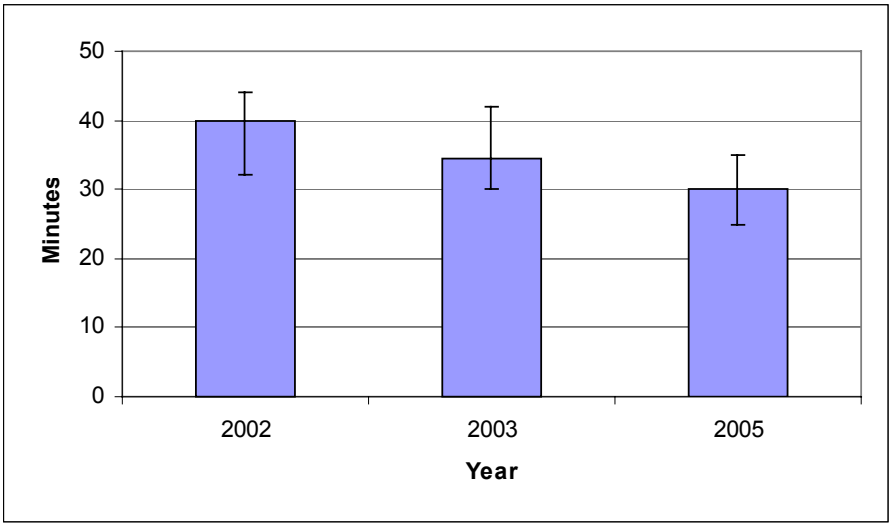
Findings from the survey included the following:

- To assess pain in infants, 75% of emergency departments use the Faces, Legs, Activity, Cry, Consolability (FLACC) scale, which was a statistically significant increase from 34% in 2002 and 51% in 2003.
- 27% have standing orders for pediatric pain management, which is a statistically significant increase from 9% in 2002.
- 84% include a specific parameter on their ED chart for documenting pain in pediatric patients, a statistically significant increase from 46% in 2002.
- Current literature indicates that Meperidine (Demerol) is not recommended for use in children due to the potential for seizures, and the offer of this medication decreased for all age groups between 2002 and 2005.
    - For 0-1 year olds, the percentage decreased from 14% in 2002 to 6% in 2005
    - For the 2-5 year olds, the percentage decreased from 43% in 2002 to 18% in 2005
    - For the 6-15 year olds, there was a statistically significant decrease from 65% in 2002 to 26% in 2005.

Findings from the medical records review included the following:

- 86% of records documented use of a pain scale in the initial assessment, an increase from 61% in 2002.
- 89% of records documented a reduction in pain based on the initial measurement used compared to 52% in 2002 (this may be related to improved documentation).
- The median time between assessment and treatment was 30 minutes, a decrease from median times of 40 minutes in 2002 and 34.5 minutes in 2003 (Figure 3).

Figure 3. Median Times Between Assessment and Treatment by Year of Survey



Year	Records	Median Time	95% CI Lower	95% CI Upper
2002	285	40	32	44
2003	308	34.5	30	42
2005	412	30	25	35

(Figure 3. Note: for the 2005 study, times were restricted to cases reporting analgesic treatment and to values of 0 to 180 minutes from assessment to treatment. The median was determined to be a better measure than the mean because of how these values were distributed.)

Use of survey materials:

The decrease in time between assessment and treatment between 2002 and 2005 coincided with the increase in use of standing orders noted in the survey findings (from 9% of facilities in 2002 to 27% in 2005). This is consistent with the data because the median time to treatment was far less when standing orders were used (5 minutes) compared to when they were not used (35 minutes). In follow-up to this finding, facilities that implemented standing orders between 2002 and 2005 were contacted regarding this change as it related to the EMSC program. These facilities reported that the 2002 and 2003 survey information was useful in supporting ongoing hospital committee work in this development, and that in one case the related discussion at an EMSC meeting served as a starting point to share protocols with other facilities and implement standing orders.

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

	2000 - 2002		2003	
Age	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%
Total	**201,784**	**100.0%**	**73,479**	**100.0%**

Data Source: IDOT Motor Vehicle Crash Database

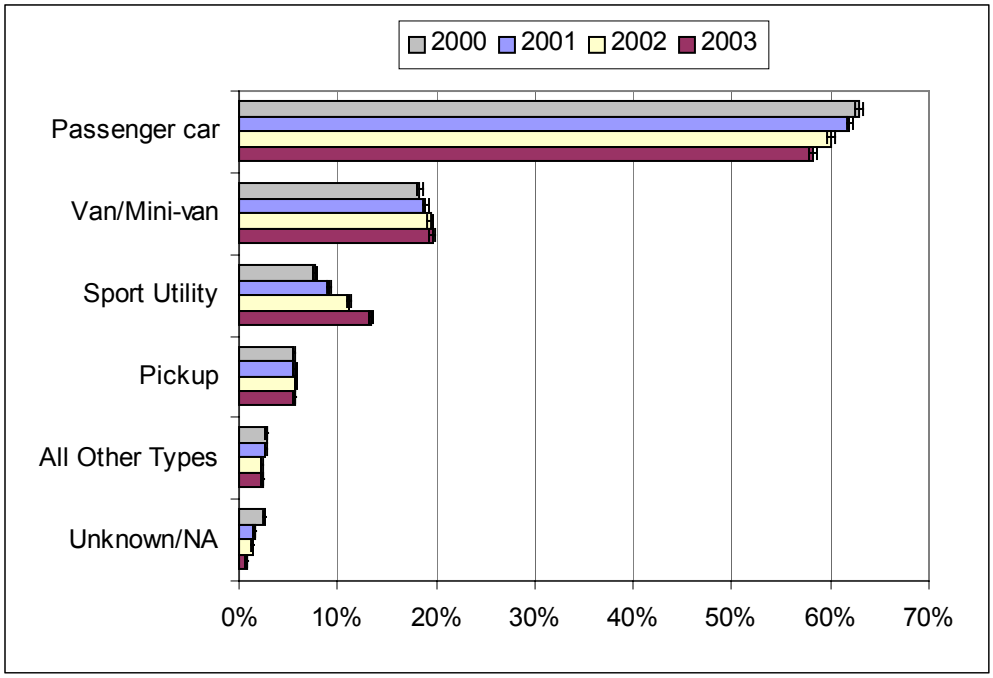
Table 2. Motor Vehicle Crash Victims By Gender in Illinois, 2000-2003

	2000 - 2002		2003	
Gender	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%
Total	**201,784**	**100.0%**	**73,479**	**100.0%**

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[2]



	2000		2001		2002		2003	
Vehicle Type	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%
Total	**67,316**	**100.0%**	**62,979**	**100.0%**	**71,489**	**100.0%**	**73,479**	**100.0%**

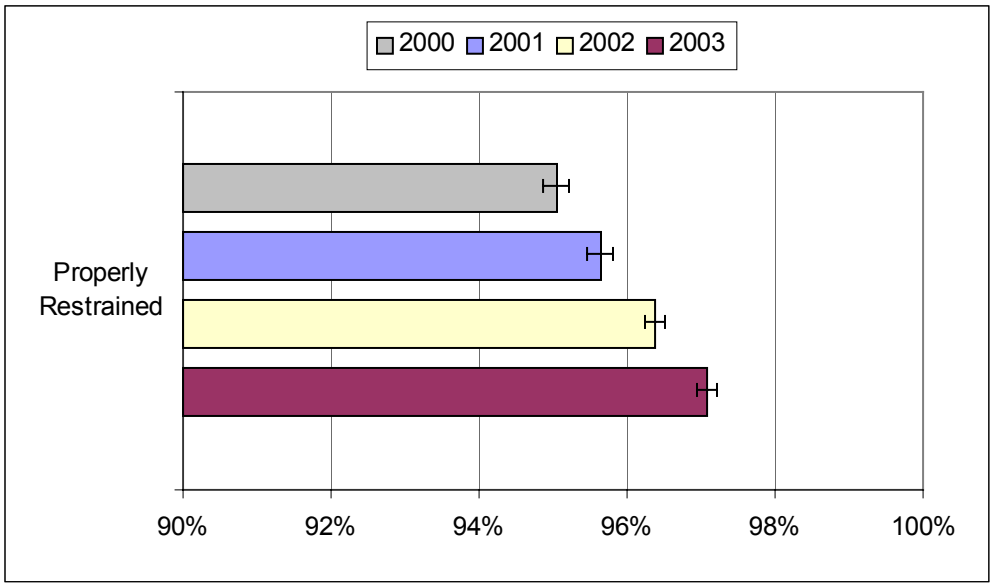
Data Source: IDOT Motor Vehicle Crash Database

[2] 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



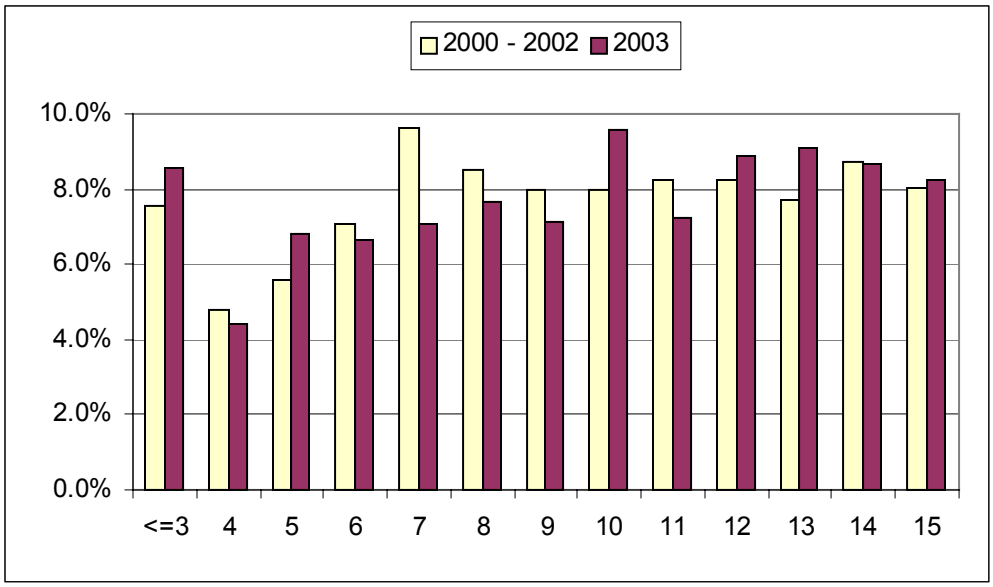
Restraint Use	2000		2001		2002		2003	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Properly Restrained	56,917	95.0%	53,544	95.6%	61,375	96.4%	63,817	97.1%
Improperly Restrained	2,966	5.0%	2,442	4.4%	2,306	3.6%	1,920	2.9%
Total with Available Info	59,883		55,986		63,681		65,737	

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).

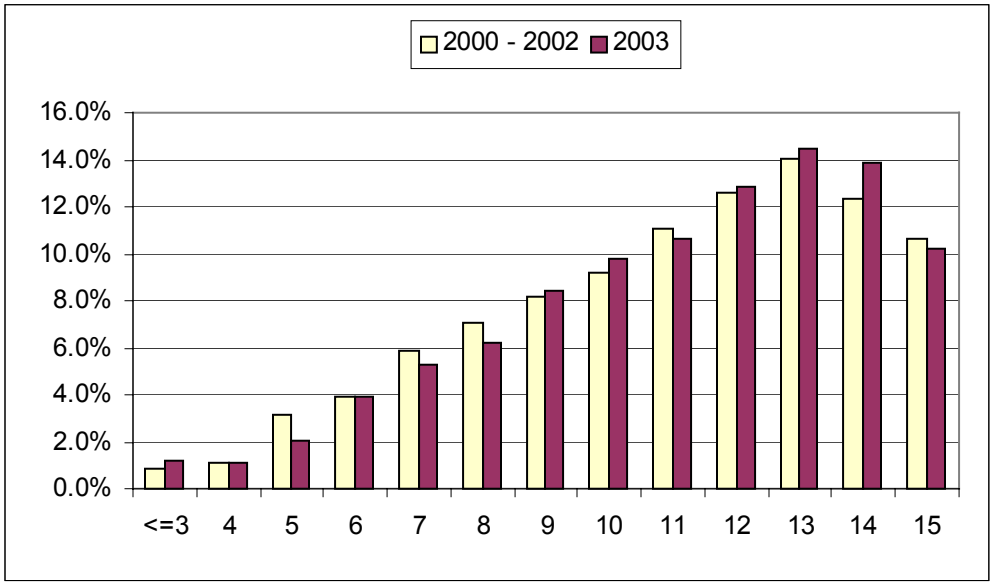
Figure 6. Pedestrian Victims by Age for 0-15 Year Olds in Illinois, 2000-2003



Age	2000 - 2002 Count	2000 - 2002 %	2003 Count	2003 %
<=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 Count	2000 - 2002 %	2003 Count	2003 %
<=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 pedalcylist (77.8%) victims.

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

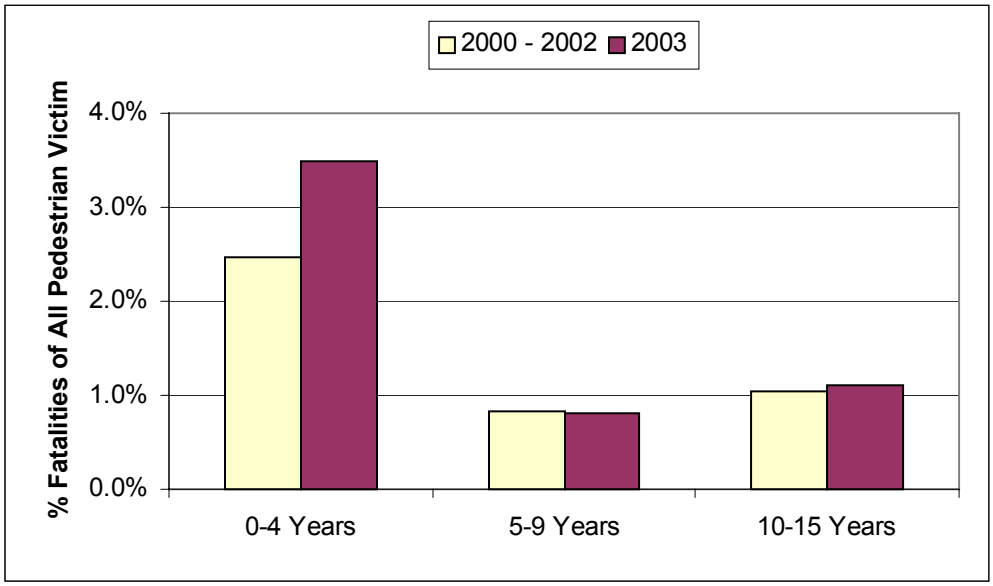
	Pedestrian				Pedalcyclist			
	2000 - 2002		2003		2000 - 2002		2003	
Sex	Count	Percent	Count	Percent	Count	Percent	Count	Percent
F	2,227	37.6%	659	37.5%	989	23.5%	291	22.0%
M	3,693	62.3%	1,095	62.3%	3,217	76.4%	1,030	77.8%
N/A	10	0.2%	4	0.2%	4	0.1%	3	0.2%
Total	5,930	100.0%	1,758	100.0%	4,210	100.0%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

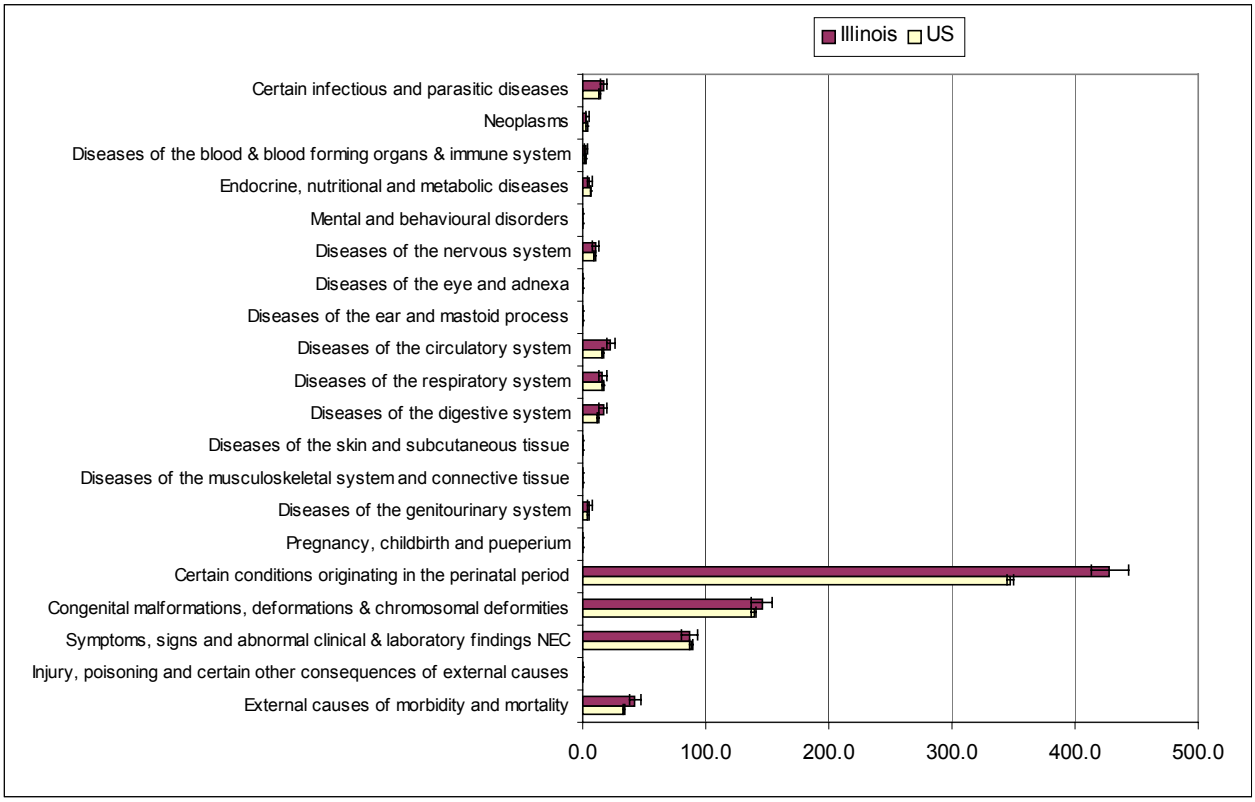
Data Source: IDOT Motor Vehicle Crash Database

G. Statewide Findings from the Mortality Database

In 1999-2002, 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 (427.9 per 100,000 residents, CI 413.1, 443.1) compared to the U.S. (347.6 per 100,000 residents, CI 344.7, 350.5)
- A higher mortality rate in Illinois for all less-than-1 year olds (802.1 per 100,000 residents, CI 781.9, 822.9) compared to the U.S. (694.5 per 100,000 residents, CI 690.4, 698.6)
- A lower mortality rate in Illinois from external causes of morbidity and mortality for 5-9 years olds (5.7 per 100,000 residents, CI 5.0, 6.5) compared to the US (7.4 per 100,000 residents, CI 7.3, 7.6)
- A higher mortality rate in Illinois for 10-14 year olds from diseases of the respiratory system (1.7 per 100,000 residents, CI 1.3, 2.2) compared to the U.S. (0.9 per 100,000 residents, CI 0.8, 1.0)

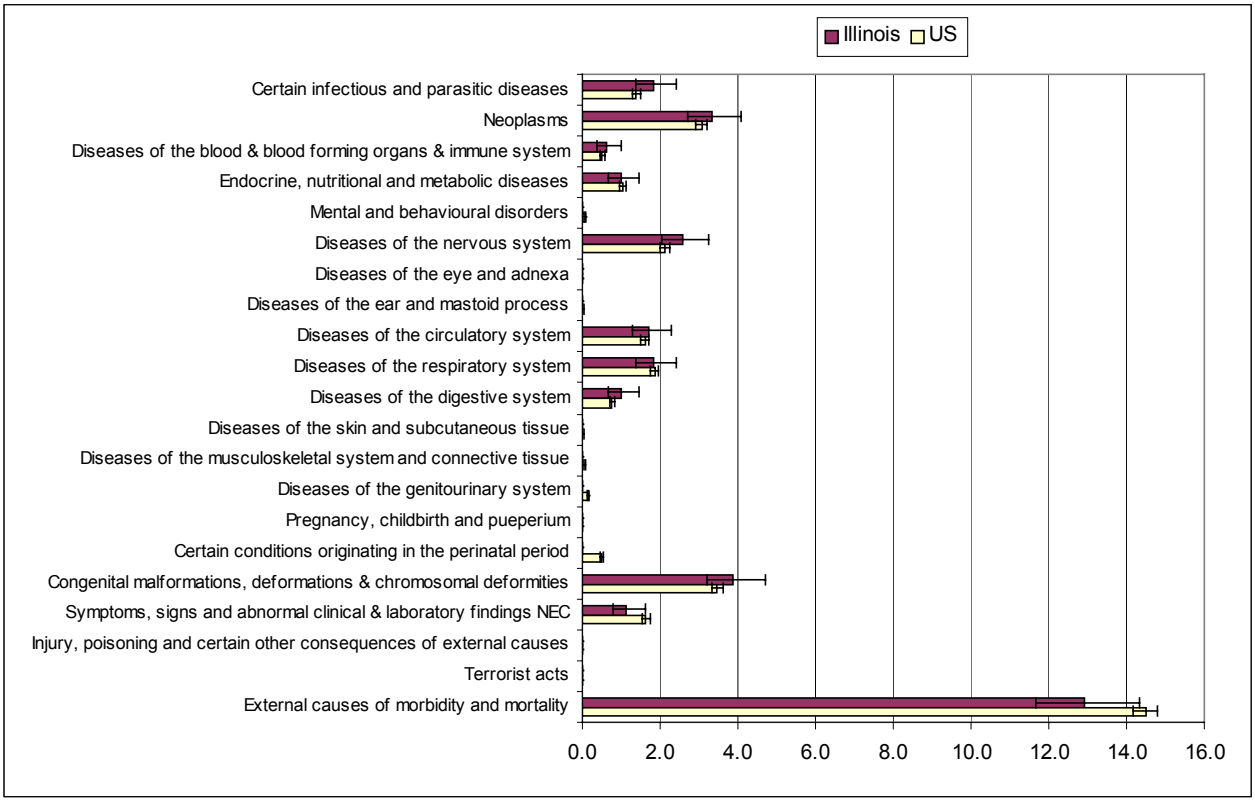
Figure 9. Mortality Per 100,000 Residents for <1 Year Olds by ICD10 Category, 1999-2002



	Illinois				US			
			95% CI				95% CI	
ICD10 Categories	Count	Rate	Lower	Upper	Count	Rate	Lower	Upper
Certain infectious and parasitic diseases	122	16.7	13.9	20.0	2,217	13.8	13.2	14.4
Neoplasms	23	3.1	2.0	4.8	538	3.3	3.1	3.6
Diseases of the blood & blood forming organs & immune system	17	2.3	1.4	3.8	352	2.2	2.0	2.4
Endocrine, nutritional and metabolic diseases	40	5.5	4.0	7.5	1,079	6.7	6.3	7.1
Mental and behavioural disorders	3				39	0.2	0.2	0.3
Diseases of the nervous system	77	10.5	8.4	13.2	1,572	9.8	9.3	10.3
Diseases of the eye and adnexa	1				4			
Diseases of the ear and mastoid process	0				19	0.1	0.1	0.2
Diseases of the circulatory system	165	22.5	19.3	26.3	2,619	16.3	15.7	16.9
Diseases of the respiratory system	118	16.1	13.4	19.4	2,670	16.6	16.0	17.3
Diseases of the digestive system	121	16.5	13.8	19.8	1,986	12.4	11.8	12.9
Diseases of the skin and subcutaneous tissue	0				8			
Diseases of the musculoskeletal system and connective tissue	1				45	0.3	0.2	0.4
Diseases of the genitourinary system	43	5.9	4.3	8.0	727	4.5	4.2	4.9
Pregnancy, childbirth and pueperium	0				0			
Certain conditions originating in the perinatal period	3,131	427.9	413.1	443.1	55,842	347.6	344.7	350.5
Congenital malformations, deformations & chromosomal deformities	1,064	145.4	136.9	154.5	22,352	139.1	137.3	141.0
Symptoms, signs and abnormal clinical & laboratory findings NEC	635	86.8	80.2	93.9	14,124	87.9	86.5	89.4
Injury, poisoning and certain other consequences of external causes	0				0			
External causes of morbidity and mortality	309	42.2	37.7	47.3	5,381	33.5	32.6	34.4
Total	5,870	802.1	781.9	822.9	111,574	694.5	690.4	698.6

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)

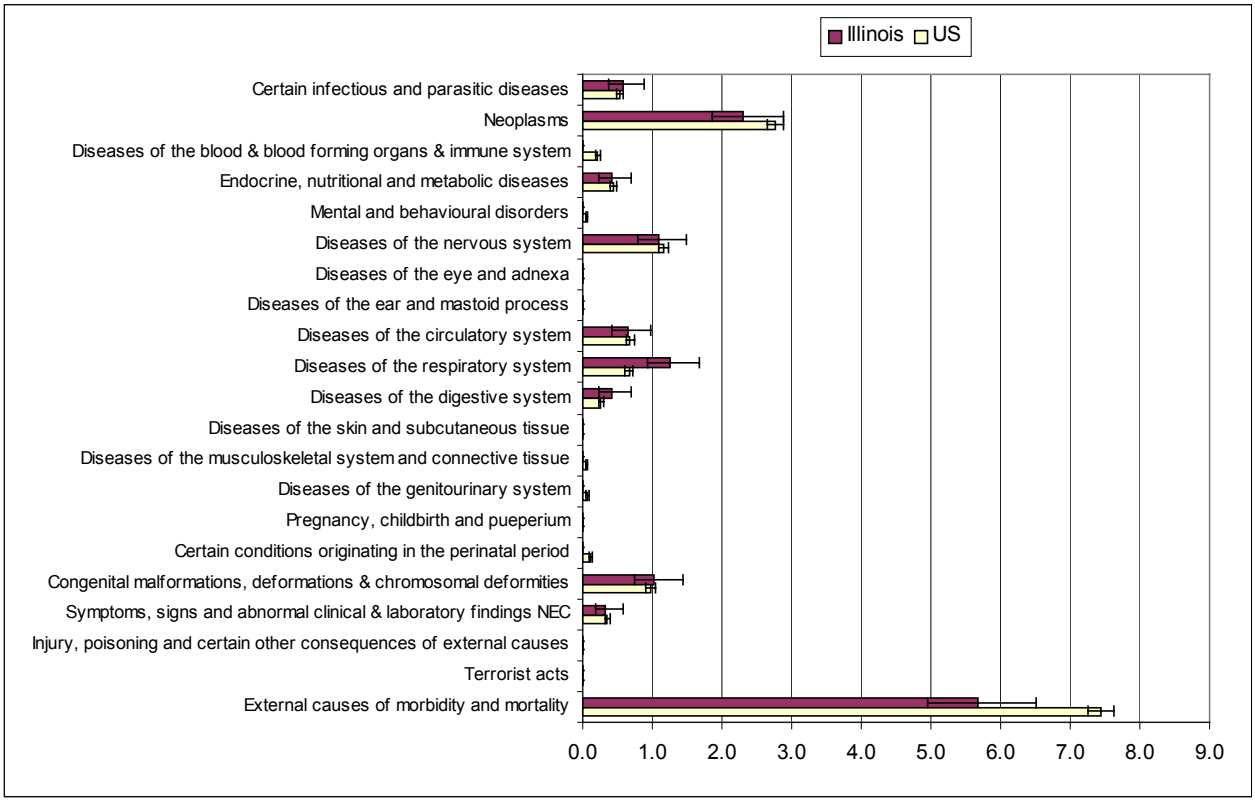
Figure 10. Mortality Per 100,000 Residents for 1-4 Year Olds by ICD10 Category, 1999-2002



	Illinois				US			
			95% CI				95% CI	
ICD10 Categories	Count	Rate	Lower	Upper	Count	Rate	Lower	Upper
Certain infectious and parasitic diseases	51	1.8	1.4	2.4	853	1.4	1.3	1.5
Neoplasms	93	3.3	2.7	4.1	1,894	3.1	2.9	3.2
Diseases of the blood & blood forming organs & immune system	17	0.6	0.4	1.0	314	0.5	0.5	0.6
Endocrine, nutritional and metabolic diseases	28	1.0	0.7	1.5	641	1.0	1.0	1.1
Mental and behavioural disorders	2				42	0.1	0.0	0.1
Diseases of the nervous system	72	2.6	2.0	3.2	1,314	2.1	2.0	2.3
Diseases of the eye and adnexa	0				2			
Diseases of the ear and mastoid process	0				17	0.0	0.0	0.0
Diseases of the circulatory system	48	1.7	1.3	2.3	990	1.6	1.5	1.7
Diseases of the respiratory system	51	1.8	1.4	2.4	1,149	1.9	1.8	2.0
Diseases of the digestive system	28	1.0	0.7	1.5	469	0.8	0.7	0.8
Diseases of the skin and subcutaneous tissue	0				12	0.0	0.0	0.0
Diseases of the musculoskeletal system and connective tissue	2				36	0.1	0.0	0.1
Diseases of the genitourinary system	6				90	0.1	0.1	0.2
Pregnancy, childbirth and pueperium	0				0			
Certain conditions originating in the perinatal period	6				308	0.5	0.4	0.6
Congenital malformations, deformations & chromosomal deformities	109	3.9	3.2	4.7	2,131	3.5	3.3	3.6
Symptoms, signs and abnormal clinical & laboratory findings NEC	32	1.1	0.8	1.6	1,004	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	363	12.9	11.7	14.4	8,924	14.5	14.2	14.8
Total	908	32.3	30.3	34.5	20,193	32.8	32.3	33.2

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)

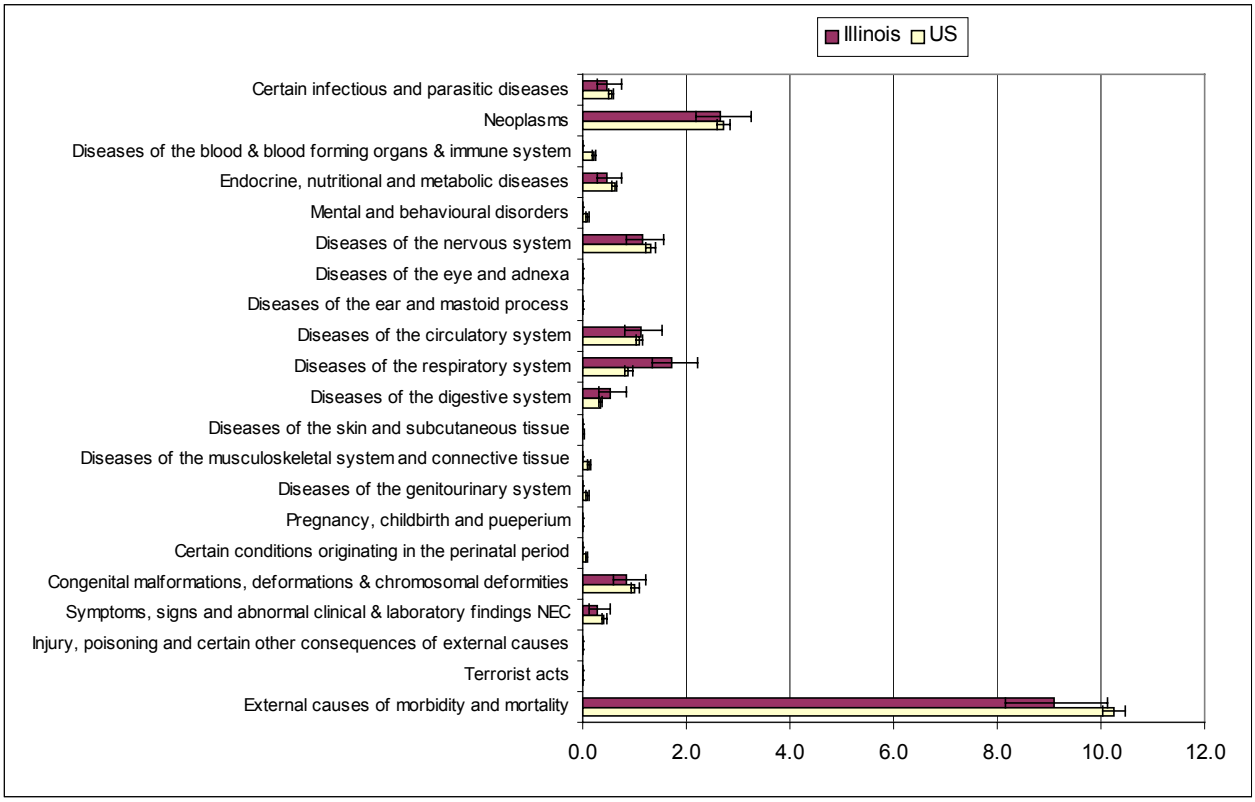
Figure 11. Mortality Per 100,000 Residents for 5-9 Year Olds by ICD10 Category, 1999-2002



	Illinois				US			
			95% CI				95% CI	
ICD10 Categories	Count	Rate	Lower	Upper	Count	Rate	Lower	Upper
Certain infectious and parasitic diseases	21	0.6	0.4	0.9	434	0.5	0.5	0.6
Neoplasms	85	2.3	1.9	2.9	2,250	2.8	2.7	2.9
Diseases of the blood & blood forming organs & immune system	6				173	0.2	0.2	0.2
Endocrine, nutritional and metabolic diseases	15	0.4	0.2	0.7	359	0.4	0.4	0.5
Mental and behavioural disorders	2				46	0.1	0.0	0.1
Diseases of the nervous system	40	1.1	0.8	1.5	941	1.2	1.1	1.2
Diseases of the eye and adnexa	0				2			
Diseases of the ear and mastoid process	0				3			
Diseases of the circulatory system	24	0.7	0.4	1.0	553	0.7	0.6	0.7
Diseases of the respiratory system	46	1.3	0.9	1.7	540	0.7	0.6	0.7
Diseases of the digestive system	15	0.4	0.2	0.7	217	0.3	0.2	0.3
Diseases of the skin and subcutaneous tissue	0				9			
Diseases of the musculoskeletal system and connective tissue	2				44	0.1	0.0	0.1
Diseases of the genitourinary system	3				56	0.1	0.1	0.1
Pregnancy, childbirth and pueperium	0				0			
Certain conditions originating in the perinatal period	2				87	0.1	0.1	0.1
Congenital malformations, deformations & chromosomal deformities	38	1.0	0.7	1.4	786	1.0	0.9	1.0
Symptoms, signs and abnormal clinical & laboratory findings NEC	12	0.3	0.2	0.6	290	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	209	5.7	5.0	6.5	6,047	7.4	7.3	7.6
Total	520	14.1	13.0	15.4	12,838	15.8	15.5	16.1

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, 1999-2002

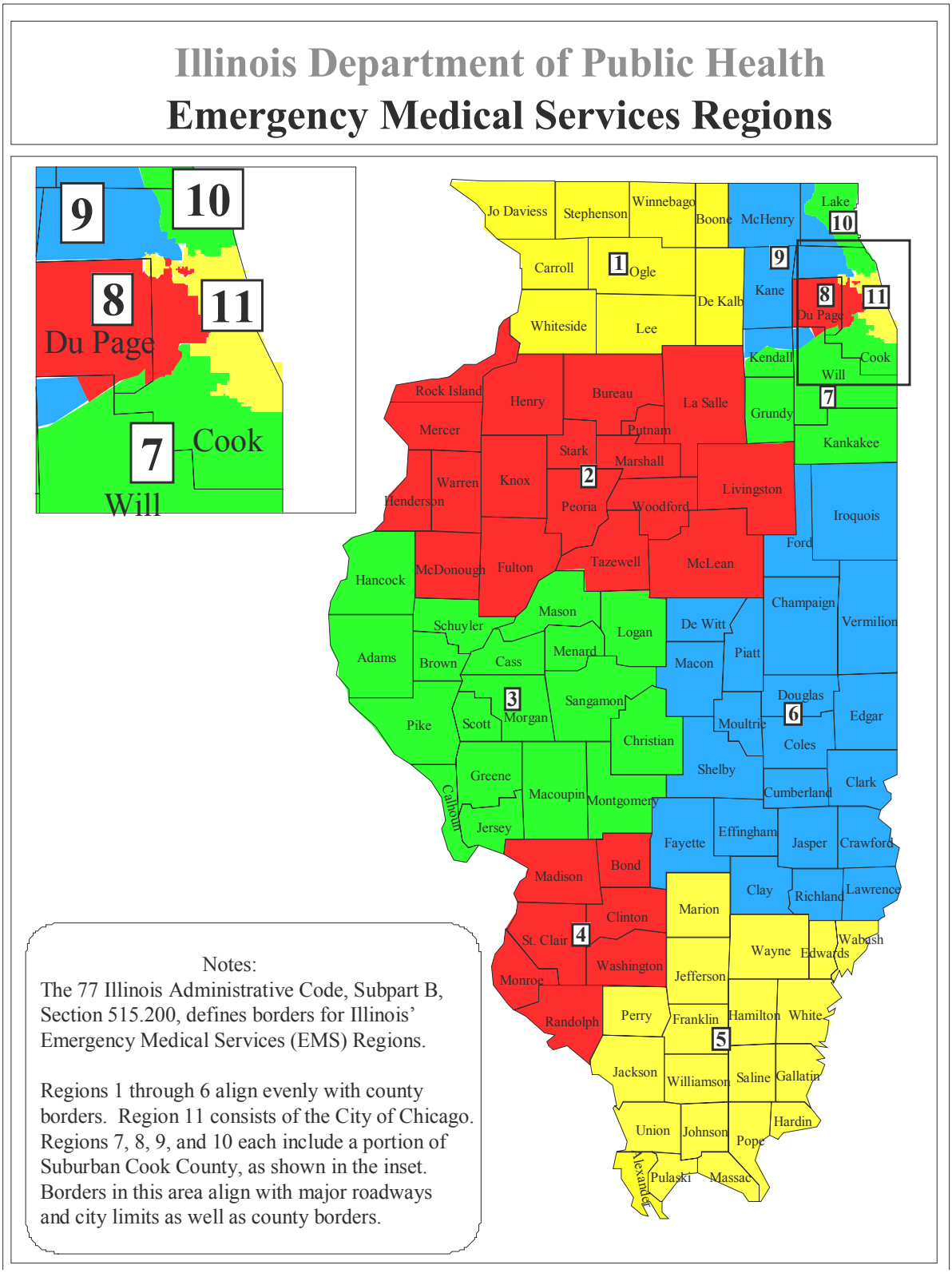


	Illinois				US			
			95% CI				95% CI	
ICD10 Categories	Count	Rate	Lower	Upper	Count	Rate	Lower	Upper
Certain infectious and parasitic diseases	17	0.5	0.3	0.8	457	0.6	0.5	0.6
Neoplasms	97	2.7	2.2	3.3	2,250	2.7	2.6	2.8
Diseases of the blood & blood forming organs & immune system	9				183	0.2	0.2	0.3
Endocrine, nutritional and metabolic diseases	17	0.5	0.3	0.8	507	0.6	0.6	0.7
Mental and behavioural disorders	1				80	0.1	0.1	0.1
Diseases of the nervous system	42	1.2	0.8	1.6	1,084	1.3	1.2	1.4
Diseases of the eye and adnexa	0				2			
Diseases of the ear and mastoid process	0				6			
Diseases of the circulatory system	41	1.1	0.8	1.5	902	1.1	1.0	1.2
Diseases of the respiratory system	63	1.7	1.3	2.2	736	0.9	0.8	1.0
Diseases of the digestive system	19	0.5	0.3	0.8	284	0.3	0.3	0.4
Diseases of the skin and subcutaneous tissue	1				13	0.0	0.0	0.0
Diseases of the musculoskeletal system and connective tissue	4				104	0.1	0.1	0.2
Diseases of the genitourinary system	1				73	0.1	0.1	0.1
Pregnancy, childbirth and pueperium	0				4			
Certain conditions originating in the perinatal period	0				64	0.1	0.1	0.1
Congenital malformations, deformations & chromosomal deformities	31	0.9	0.6	1.2	834	1.0	0.9	1.1
Symptoms, signs and abnormal clinical & laboratory findings NEC	10	0.3	0.1	0.5	344	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	331	9.1	8.2	10.1	8,485	10.3	10.0	10.5
Total	684	18.8	17.4	20.3	16,415	19.8	19.5	20.1

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)

H. 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 1 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 2004 for treatment by Illinois hospitals, but these data were available only through 2003 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 2003. In this way a fair comparison can be made between in-state and out-of-state treatment.

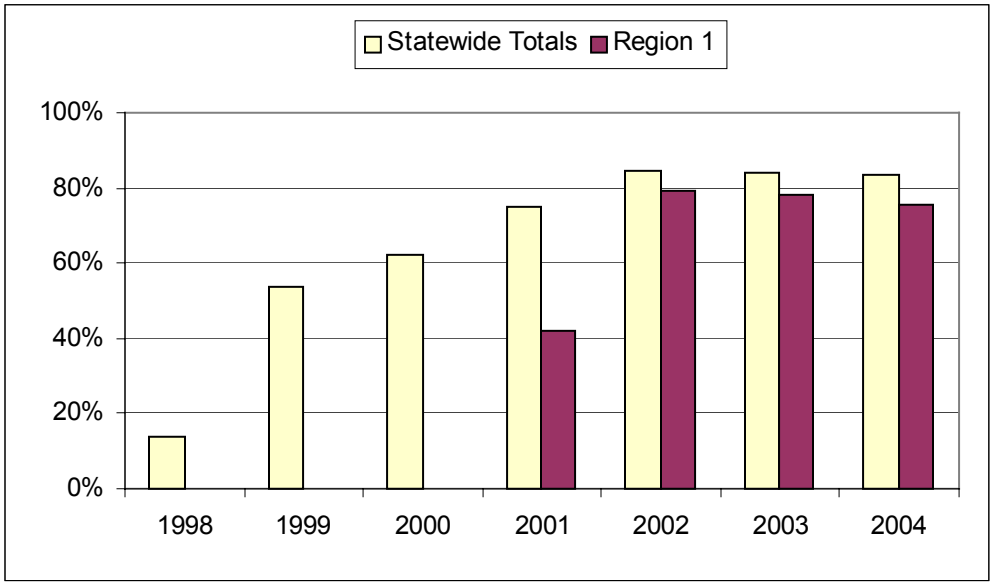
- **Aggregation of Five Years for Current Report**

  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 (1999-2003).

A. Development of Recognized Facilities

Facility recognition was extended to facilities in Region 1 as of May 2001. In 2004, 75.6 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, 83.7 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, 1998-2004 (Newborns Excluded)



	Region 1				Statewide Totals			
Year	Total Admissions	Admissions to EDAP	Admissions to Non-EDAP	Percent EDAP	Total Admissions	Admissions to EDAP	Admissions to Non-EDAP	Percent EDAP
1998	1,556	0	1,556	0.0%	37,974	5,306	32,668	14.0%
1999	1,723	0	1,723	0.0%	37,846	20,432	17,414	54.0%
2000	1,630	0	1,630	0.0%	37,734	23,581	14,153	62.5%
2001	1,801	754	1,047	41.9%	40,074	30,094	9,980	75.1%
2002	1,973	1,562	411	79.2%	38,610	32,643	5,967	84.5%
2003	1,818	1,419	399	78.1%	37,767	31,748	6,019	84.1%
2004	1,653	1,249	404	75.6%	36,753	30,746	6,007	83.7%

Data Sources: Illinois Hospital Association, Illinois Department of Public Health
Notes: EDAP status was extended to facilities in Region 1 as of May 2001.
Newborns, identified by admission type or by Diagnosis Related Group (DRG), were excluded.
These figures exclude two facilities located in Iowa that participate in the facility recognition program as EDAPs. Hospitalization data from Iowa were not available for this analysis.

B. Diagnoses for Hospital Inpatients Admitted from the Emergency Department[3]

Region-to-State Comparison

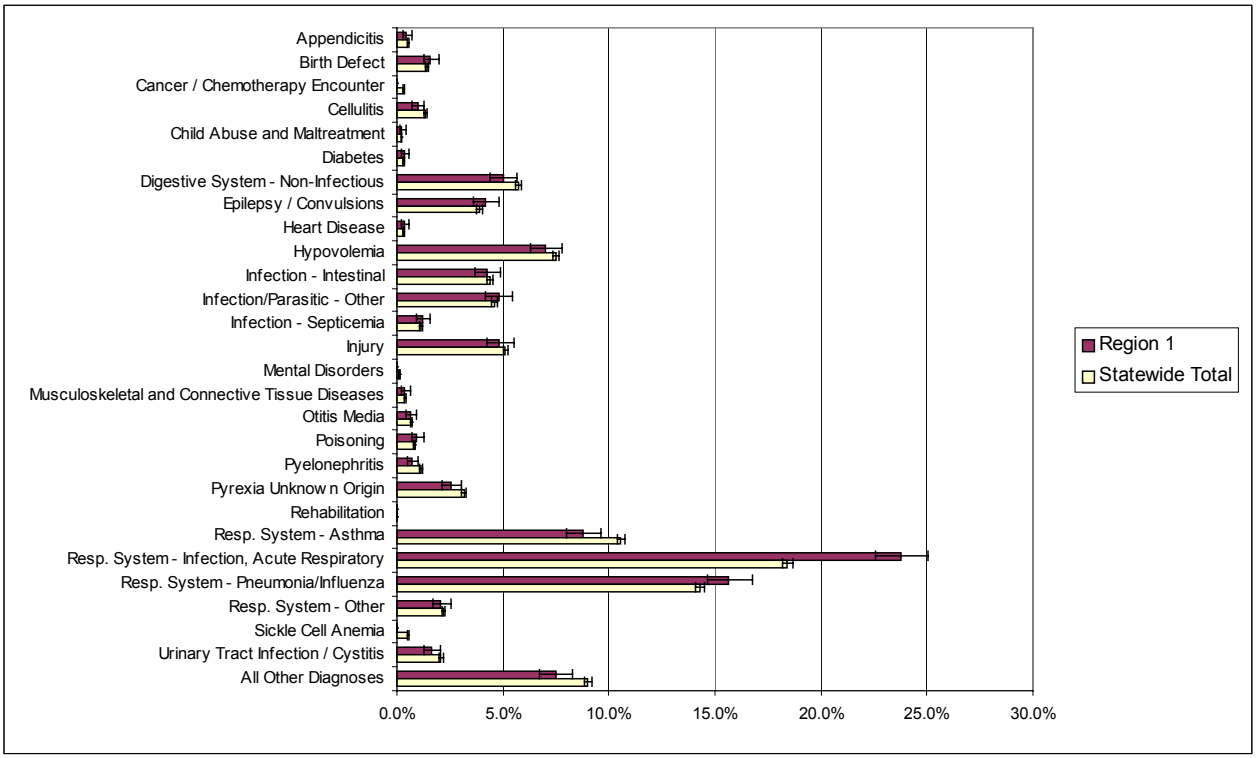
For the period of 1999-2003, Region 1 inpatients admitted from the Emergency Department (ED) compared with statewide admissions as follows (Figures 14, 15, and 16):

- A higher percentage of injury patients than appeared statewide for 10-15 year olds (16.5% vs 14.2%)
- A higher percentage of appendicitis patients than appeared statewide for 5-9 year olds (10.6% vs 8.4%) and for 10-15 year olds (12.9% vs 10.2%)
- A higher percentage of mental disorder patients than appeared statewide for 10-15 year olds (27.9% vs 22.1%)
- A higher percentage of patients with acute respiratory infection for 0-4 year olds (23.8% vs 18.4% statewide)
- A lower percentage of asthma patients than appeared statewide for 0-4 year olds (8.8% vs 10.6%)

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

[3] 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, 1999-2003



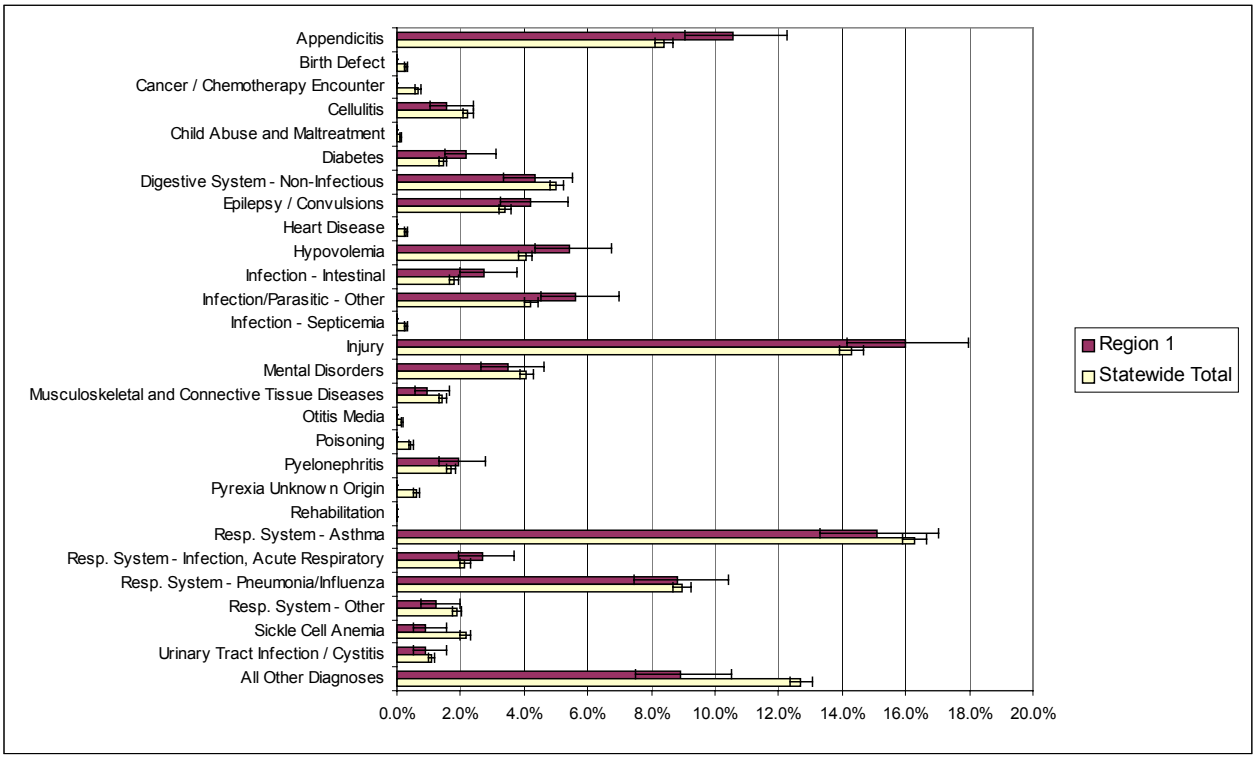
Diagnosis Group	Region 1		95% CI		Statewide Total		95% CI	
	Number	Percent	Lower	Upper	Number	Percent	Lower	Upper
Appendicitis	21	0.4%	0.3%	0.7%	525	0.5%	0.5%	0.5%
Birth Defect	74	1.6%	1.3%	2.0%	1,444	1.4%	1.3%	1.5%
Cancer / Chemotherapy Encounter	4	*			310	0.3%	0.3%	0.3%
Cellulitis	45	1.0%	0.7%	1.3%	1,404	1.3%	1.3%	1.4%
Child Abuse and Maltreatment	11	0.2%	0.1%	0.4%	221	0.2%	0.2%	0.2%
Diabetes	16	0.3%	0.2%	0.6%	324	0.3%	0.3%	0.3%
Digestive System - Non-Infectious	235	5.0%	4.4%	5.7%	5,977	5.7%	5.6%	5.9%
Epilepsy / Convulsions	196	4.2%	3.6%	4.8%	4,053	3.9%	3.8%	4.0%
Heart Disease	17	0.4%	0.2%	0.6%	322	0.3%	0.3%	0.3%
Hypovolemia	327	7.0%	6.3%	7.8%	7,840	7.5%	7.3%	7.7%
Infection - Intestinal	199	4.2%	3.7%	4.9%	4,588	4.4%	4.3%	4.5%
Infection/Parasitic - Other	224	4.8%	4.2%	5.4%	4,823	4.6%	4.5%	4.7%
Infection - Septicemia	55	1.2%	0.9%	1.5%	1,153	1.1%	1.0%	1.2%
Injury	227	4.8%	4.3%	5.5%	5,354	5.1%	5.0%	5.3%
Mental Disorders	3	*			120	0.1%	0.1%	0.1%
Musculoskeletal and Connective Tissue Diseases	18	0.4%	0.2%	0.6%	396	0.4%	0.3%	0.4%
Otitis Media	31	0.7%	0.5%	0.9%	705	0.7%	0.6%	0.7%
Poisoning	43	0.9%	0.7%	1.2%	864	0.8%	0.8%	0.9%
Pyelonephritis	33	0.7%	0.5%	1.0%	1,158	1.1%	1.0%	1.2%
Pyrexia Unknown Origin	118	2.5%	2.1%	3.0%	3,311	3.2%	3.1%	3.3%
Rehabilitation	0	*			0	*		
Resp. System - Asthma	412	8.8%	8.0%	9.6%	11,034	10.6%	10.4%	10.7%
Resp. System - Infection, Acute Respiratory	1,115	23.8%	22.6%	25.0%	19,244	18.4%	18.2%	18.7%
Resp. System - Pneumonia/Influenza	734	15.7%	14.6%	16.7%	14,912	14.3%	14.1%	14.5%
Resp. System - Other	97	2.1%	1.7%	2.5%	2,273	2.2%	2.1%	2.3%
Sickle Cell Anemia	5	*			534	0.5%	0.5%	0.6%
Urinary Tract Infection / Cystitis	76	1.6%	1.3%	2.0%	2,176	2.1%	2.0%	2.2%
All Other Diagnoses	350	7.5%	6.7%	8.3%	9,410	9.0%	8.8%	9.2%
Total for All Diagnoses	**4,686**	**100.0%**			**104,475**	**100.0%**		

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.

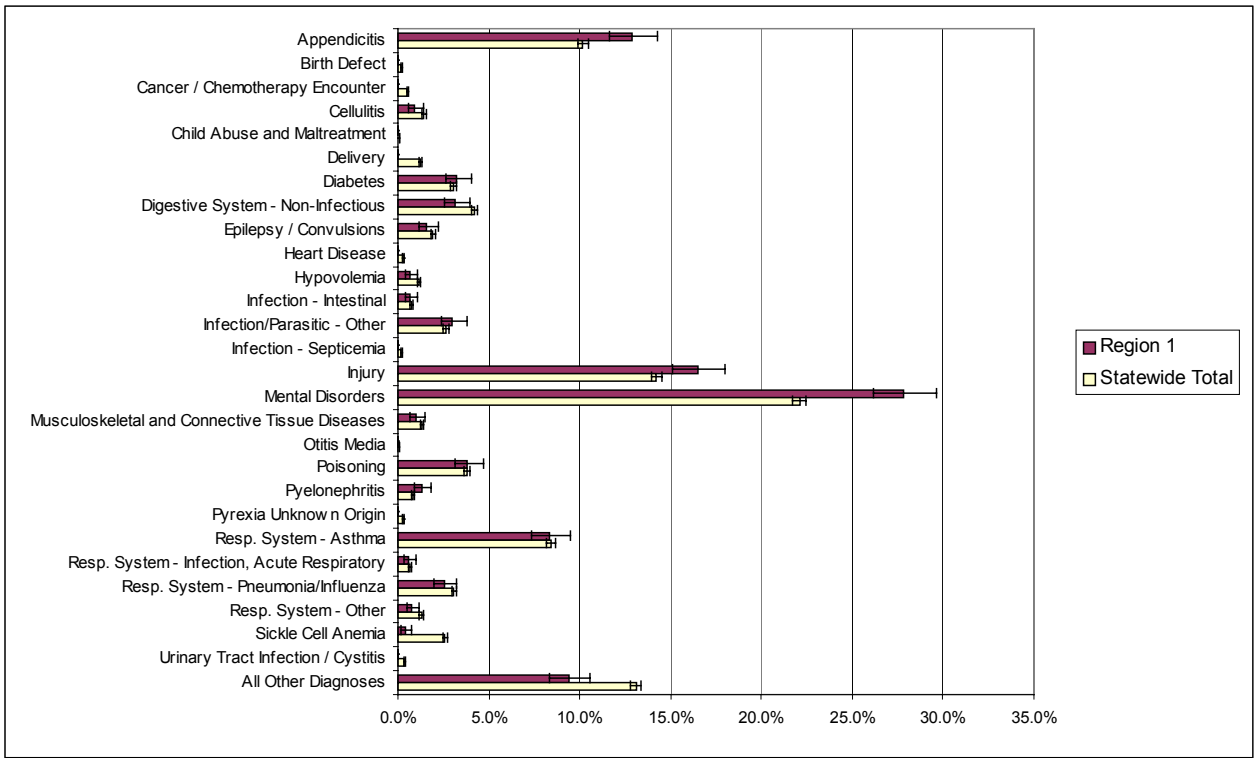
Figure 15. Hospital Admissions from the ED for 5-9 Year-Olds by EMS Region of Facility, 1999-2003



Diagnosis Group	Region 1 Number	Region 1 Percent	95% CI Lower	95% CI Upper	Statewide Total Number	Statewide Total Percent	95% CI Lower	95% CI Upper
Appendicitis	154	10.6%	9.0%	12.3%	2,928	8.4%	8.1%	8.7%
Birth Defect	7	*			98	0.3%	0.2%	0.3%
Cancer / Chemotherapy Encounter	6	*			232	0.7%	0.6%	0.8%
Cellulitis	23	1.6%	1.0%	2.4%	781	2.2%	2.1%	2.4%
Child Abuse and Maltreatment	1	*			39	0.1%	0.1%	0.2%
Diabetes	32	2.2%	1.5%	3.1%	504	1.4%	1.3%	1.6%
Digestive System - Non-Infectious	63	4.3%	3.4%	5.5%	1,750	5.0%	4.8%	5.3%
Epilepsy / Convulsions	61	4.2%	3.2%	5.4%	1,183	3.4%	3.2%	3.6%
Heart Disease	1	*			94	0.3%	0.2%	0.3%
Hypovolemia	79	5.4%	4.3%	6.7%	1,408	4.0%	3.8%	4.3%
Infection - Intestinal	40	2.7%	2.0%	3.8%	629	1.8%	1.7%	2.0%
Infection/Parasitic - Other	82	5.6%	4.5%	7.0%	1,467	4.2%	4.0%	4.4%
Infection - Septicemia	6	*			97	0.3%	0.2%	0.3%
Injury	233	16.0%	14.1%	18.0%	4,978	14.3%	13.9%	14.7%
Mental Disorders	51	3.5%	2.6%	4.6%	1,422	4.1%	3.9%	4.3%
Musculoskeletal and Connective Tissue Diseases	14	1.0%	0.5%	1.6%	496	1.4%	1.3%	1.6%
Otitis Media	1	*			55	0.2%	0.1%	0.2%
Poisoning	7	*			152	0.4%	0.4%	0.5%
Pyelonephritis	28	1.9%	1.3%	2.8%	584	1.7%	1.5%	1.8%
Pyrexia Unknown Origin	8	*			214	0.6%	0.5%	0.7%
Rehabilitation	0	*			1	*		
Resp. System - Asthma	220	15.1%	13.3%	17.0%	5,672	16.3%	15.9%	16.7%
Resp. System - Infection, Acute Respiratory	39	2.7%	1.9%	3.7%	745	2.1%	2.0%	2.3%
Resp. System - Pneumonia/Influenza	129	8.8%	7.5%	10.4%	3,123	9.0%	8.7%	9.3%
Resp. System - Other	18	1.2%	0.8%	2.0%	657	1.9%	1.7%	2.0%
Sickle Cell Anemia	13	0.9%	0.5%	1.6%	749	2.1%	2.0%	2.3%
Urinary Tract Infection / Cystitis	13	0.9%	0.5%	1.6%	376	1.1%	1.0%	1.2%
All Other Diagnoses	130	8.9%	7.5%	10.5%	4,430	12.7%	12.4%	13.1%
Total for All Diagnoses	**1,459**	**100.0%**			**34,864**	**100.0%**		

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, 1999-2003



Diagnosis Group	Region 1		95% CI		Statewide Total		95% CI	
	Number	Percent	Lower	Upper	Number	Percent	Lower	Upper
Appendicitis	329	12.9%	11.6%	14.2%	5,371	10.2%	9.9%	10.5%
Birth Defect	1	*			104	0.2%	0.2%	0.2%
Cancer / Chemotherapy Encounter	5	*			273	0.5%	0.5%	0.6%
Cellulitis	24	0.9%	0.6%	1.4%	761	1.4%	1.3%	1.6%
Child Abuse and Maltreatment	1	*			38	0.1%	0.1%	0.1%
Delivery	5	*			639	1.2%	1.1%	1.3%
Diabetes	83	3.2%	2.6%	4.0%	1,606	3.0%	2.9%	3.2%
Digestive System - Non-Infectious	81	3.2%	2.5%	3.9%	2,227	4.2%	4.1%	4.4%
Epilepsy / Convulsions	41	1.6%	1.2%	2.2%	1,013	1.9%	1.8%	2.0%
Heart Disease	6	*			162	0.3%	0.3%	0.4%
Hypovolemia	17	0.7%	0.4%	1.1%	599	1.1%	1.0%	1.2%
Infection - Intestinal	17	0.7%	0.4%	1.1%	403	0.8%	0.7%	0.8%
Infection/Parasitic - Other	77	3.0%	2.4%	3.8%	1,392	2.6%	2.5%	2.8%
Infection - Septicemia	5	*			102	0.2%	0.2%	0.2%
Injury	422	16.5%	15.1%	18.0%	7,495	14.2%	13.9%	14.5%
Mental Disorders	712	27.9%	26.1%	29.6%	11,642	22.1%	21.7%	22.4%
Musculoskeletal and Connective Tissue Diseases	26	1.0%	0.7%	1.5%	693	1.3%	1.2%	1.4%
Otitis Media	3	*			29	0.1%	0.0%	0.1%
Poisoning	98	3.8%	3.1%	4.7%	1,998	3.8%	3.6%	4.0%
Pyelonephritis	33	1.3%	0.9%	1.8%	450	0.9%	0.8%	0.9%
Pyrexia Unknown Origin	4	*			155	0.3%	0.3%	0.3%
Resp. System - Asthma	214	8.4%	7.3%	9.5%	4,433	8.4%	8.2%	8.7%
Resp. System - Infection, Acute Respiratory	15	0.6%	0.3%	1.0%	358	0.7%	0.6%	0.8%
Resp. System - Pneumonia/Influenza	65	2.5%	2.0%	3.3%	1,625	3.1%	2.9%	3.2%
Resp. System - Other	19	0.7%	0.5%	1.2%	677	1.3%	1.2%	1.4%
Sickle Cell Anemia	10	0.4%	0.2%	0.7%	1,356	2.6%	2.4%	2.7%
Urinary Tract Infection / Cystitis	3	*			192	0.4%	0.3%	0.4%
All Other Diagnoses	240	9.4%	8.3%	10.6%	6,913	13.1%	12.8%	13.4%
Total for All Diagnoses	**2,556**	**100.0%**			**52,706**	**100.0%**		

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[4]

a) Causes of Injury for Trauma Registry Patients

Region-State Comparison

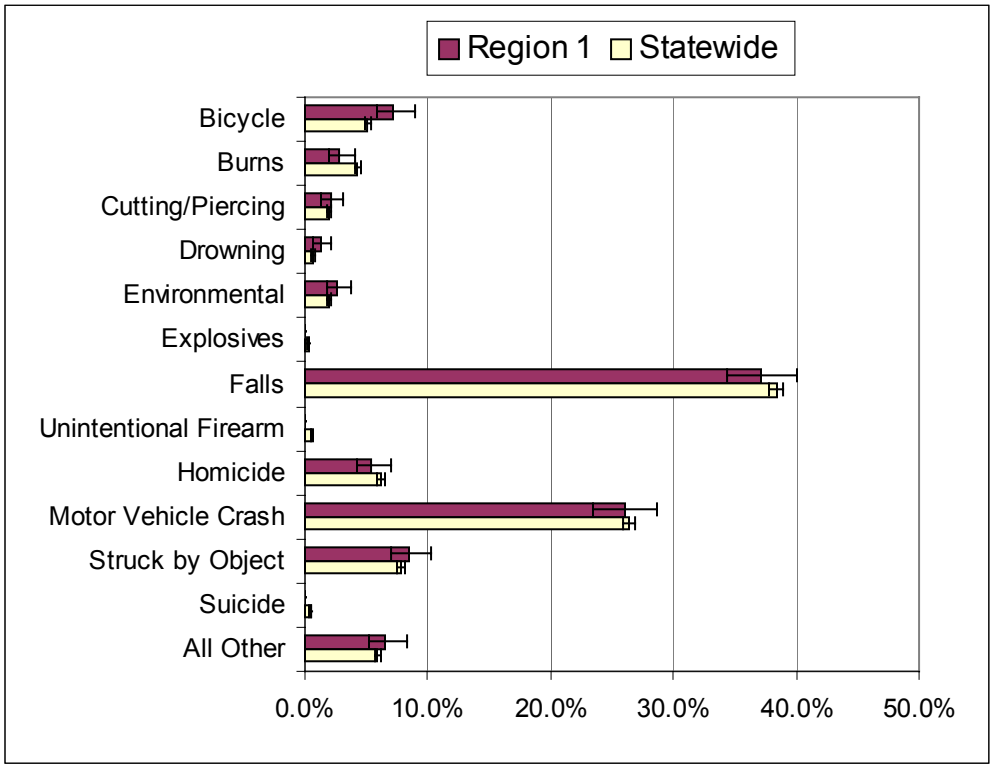
Using E-Codes for 0-15 year old patients recorded in the trauma registry from 1999-2003, Region 1 trauma centers compared with statewide trauma centers as follows (Figure 17):

- A higher percentage of bicycle injuries than appeared statewide (7.2% vs 5.1%)

(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.)

[4] 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, 1999-2003



Cause of Injury	Region 1		95% CI		Statewide		95% CI	
(E-Code Group)	Count	Percent	Lower	Upper	Count	Percent	Lower	Upper
Bicycle	80	7.2%	5.8%	8.9%	1,281	5.1%	4.8%	5.4%
Burns	31	2.8%	1.9%	4.0%	1,083	4.3%	4.0%	4.5%
Cutting/Piercing	23	2.1%	1.4%	3.1%	489	1.9%	1.8%	2.1%
Drowning	14	1.3%	0.7%	2.2%	167	0.7%	0.6%	0.8%
Environmental	28	2.5%	1.7%	3.7%	504	2.0%	1.8%	2.2%
Explosives	2	*			68	0.3%	0.2%	0.3%
Falls	412	37.2%	34.3%	40.1%	9,693	38.4%	37.8%	39.0%
Unintentional Firearm	2	*			134	0.5%	0.4%	0.6%
Homicide	60	5.4%	4.2%	7.0%	1,574	6.2%	5.9%	6.5%
Motor Vehicle Crash	288	26.0%	23.5%	28.7%	6,663	26.4%	25.8%	26.9%
Struck by Object	94	8.5%	6.9%	10.3%	1,977	7.8%	7.5%	8.2%
Suicide	1	*			120	0.5%	0.4%	0.6%
All Other	73	6.6%	5.2%	8.3%	1,501	5.9%	5.7%	6.2%
Totals	**1,108**	**99.5%**			**25,254**	**100.0%**		

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.

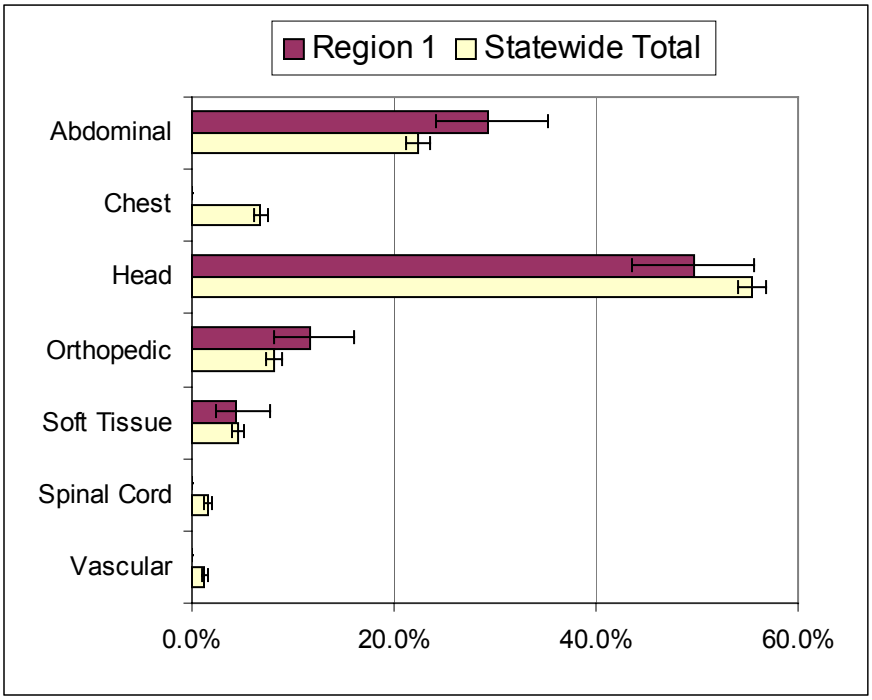
b) Types of Injury

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 1999-2003, all hospitals in Region 1 compared with all hospitals statewide as follows (Figure 18):

- A higher percentage of abdominal injuries than appeared statewide (29.3% vs 22.3%)

Figure 18. Trauma Injury Types for Children 0-15 Years Old Admitted From the ED, Using Selected Diagnoses, by EMS Region of Facility, 1999-2003



Trauma Type for Selected Diagnoses	Region 1 Count	Region 1 Percent	95% CI Lower	95% CI Upper	Statewide Total Count	Statewide Total Percent	95% CI Lower	95% CI Upper
Abdominal	81	29.3%	24.1%	35.2%	1,082	22.3%	21.2%	23.6%
Chest	9	*			328	6.8%	6.1%	7.5%
Head	137	49.6%	43.6%	55.7%	2,687	55.5%	54.1%	56.9%
Orthopedic	32	11.6%	8.2%	16.1%	390	8.1%	7.3%	8.9%
Soft Tissue	12	4.3%	2.4%	7.7%	222	4.6%	4.0%	5.2%
Spinal Cord	3	*			76	1.6%	1.2%	2.0%
Vascular	2	*			57	1.2%	0.9%	1.5%
Total	**276**	**100.0%**			**4,842**	**100.0%**		

Data Source: Illinois Hospital Association

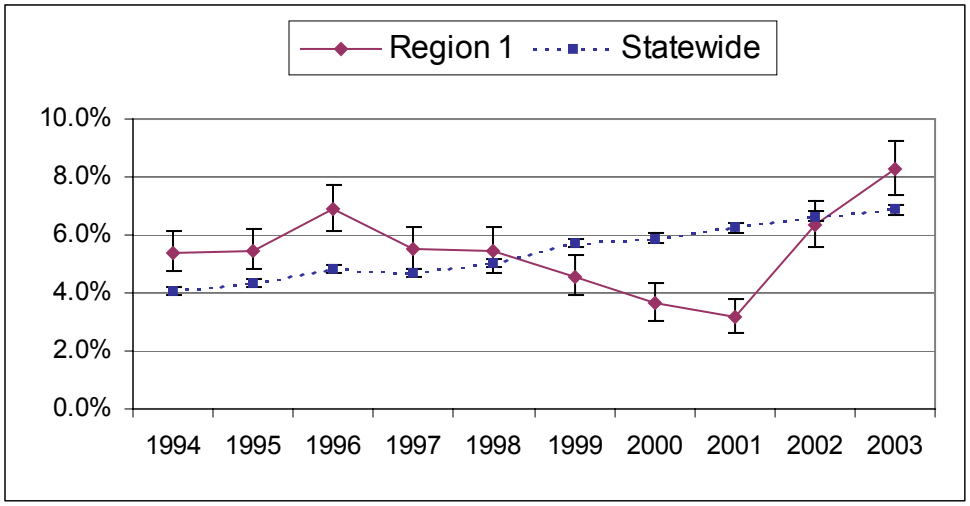
Notes: *Percentages for counts of less than 10 are considered unreliable. For these values, percents were neither noted nor displayed graphically.

D. Transfer Admissions and Discharges

Region-State Comparison

From 1994 through 2003, the percentage of Region 1 hospital ***admissions*** by transfer from another hospital declined (1996-2001) then rose sharply (2001-2003) for 0-15 year-olds, excluding newborns (Figure 19). In 2003, this value was at its highest through this period at 8.3 percent, a relatively high value compared to other regions (Figure 21). Over this same period, the statewide percentages rose gradually from 4.1 percent in 1994 to 6.9 percent in 2003.

Figure 19. Inpatient Hospitalizations Admitted by Transfer from Another Hospital, 0-15 Year Olds, 1994-2003

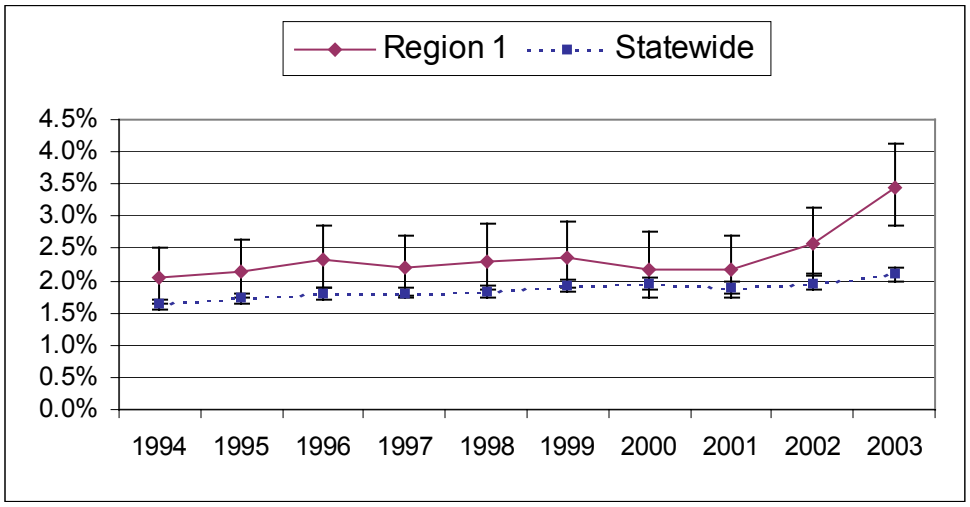


	Region 1					Statewide				
	Transfer	All	Percent	95% CI		Transfer	All	Percent	95% CI	
Year	Admissions	Admissions	Transferred	Lower	Upper	Admissions	Admissions	Transferred	Lower	Upper
1994	230	4,278	5.4%	4.7%	6.1%	4,169	102,645	4.1%	3.9%	4.2%
1995	228	4,168	5.5%	4.8%	6.2%	4,512	104,373	4.3%	4.2%	4.4%
1996	266	3,868	6.9%	6.1%	7.7%	4,547	93,709	4.9%	4.7%	5.0%
1997	223	4,063	5.5%	4.8%	6.2%	4,300	91,963	4.7%	4.5%	4.8%
1998	188	3,463	5.4%	4.7%	6.2%	4,346	86,561	5.0%	4.9%	5.2%
1999	165	3,618	4.6%	3.9%	5.3%	4,835	84,532	5.7%	5.6%	5.9%
2000	122	3,342	3.7%	3.1%	4.4%	4,818	81,980	5.9%	5.7%	6.0%
2001	115	3,609	3.2%	2.6%	3.8%	5,420	86,671	6.3%	6.1%	6.4%
2002	238	3,764	6.3%	5.6%	7.2%	5,486	82,533	6.6%	6.5%	6.8%
2003	272	3,295	8.3%	7.3%	9.3%	5,396	78,410	6.9%	6.7%	7.1%

Data source: Illinois Hospital Association
Note: Newborns were excluded.

Regarding the percentage of hospital ***discharges*** that consisted of transfers to another hospital, Region 1 changed little from 2.0 percent in 1994 until an increase to 3.4 percent occurred in 2003 (Figure 20). This was also a relatively high value compared to other regions (Figure 21). Over this same period, the statewide percentages rose gradually from 1.6 percent in 1994 to 2.1 percent in 2003.

Figure 20. Inpatient Hospitalizations Discharged by Transfer to Another Hospital, 0-15 Year Olds, 1994-2003

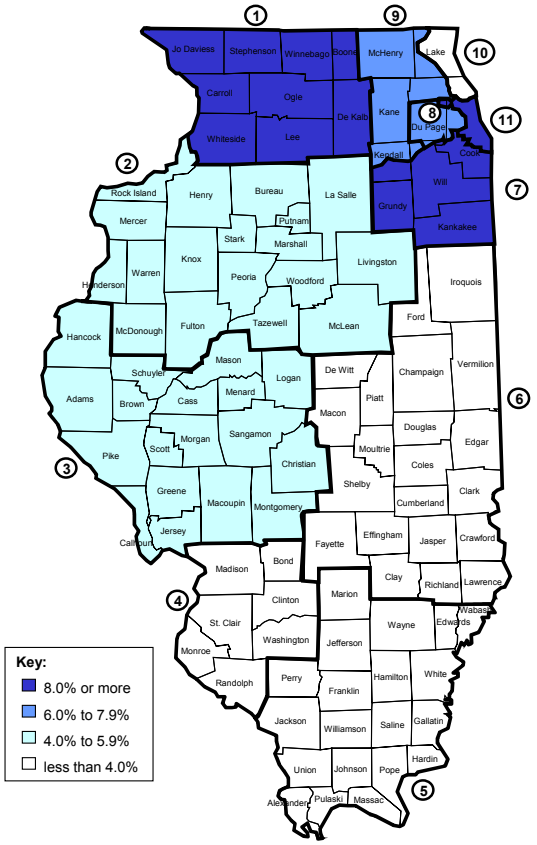


	Region 1					Statewide				
	Transfer	All	Percent	95% CI		Transfer	All	Percent	95% CI	
Year	Discharges	Discharges	Transferred	Lower	Upper	Discharges	Discharges	Transferred	Lower	Upper
1994	87	4,278	2.0%	1.6%	2.5%	1,684	102,645	1.6%	1.6%	1.7%
1995	89	4,168	2.1%	1.7%	2.6%	1,807	104,373	1.7%	1.7%	1.8%
1996	90	3,868	2.3%	1.9%	2.9%	1,678	93,709	1.8%	1.7%	1.9%
1997	89	4,063	2.2%	1.8%	2.7%	1,669	91,963	1.8%	1.7%	1.9%
1998	80	3,463	2.3%	1.8%	2.9%	1,592	86,561	1.8%	1.8%	1.9%
1999	85	3,618	2.3%	1.9%	2.9%	1,620	84,532	1.9%	1.8%	2.0%
2000	73	3,342	2.2%	1.7%	2.8%	1,600	81,980	2.0%	1.9%	2.0%
2001	78	3,609	2.2%	1.7%	2.7%	1,648	86,671	1.9%	1.8%	2.0%
2002	97	3,764	2.6%	2.1%	3.1%	1,626	82,533	2.0%	1.9%	2.1%
2003	113	3,295	3.4%	2.8%	4.1%	1,646	78,410	2.1%	2.0%	2.2%

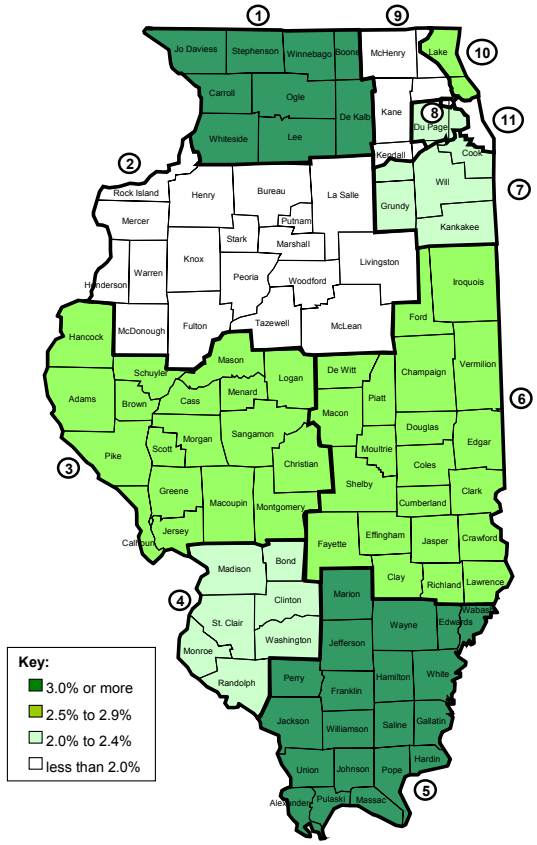
Data source: Illinois Hospital Association
Note: Newborns were excluded.

Figure 21. Percentage of Transfers by Admission and Discharge, 2003

Percentage of Inpatient Hospitalizations Admitted by Transfer from Another Hospital Age 0-15 Years, 2003



Percentage of Inpatient Hospitalizations Discharged by Transfer to an Acute Care Hospital Age 0-15 Years, 2003



	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8	Region 9	Region 10	Region 11	Statewide
Transfer Admissions	8.3%	4.9%	5.2%	1.5%	0.2%	0.6%	8.5%	7.7%	6.1%	0.9%	9.6%	6.9%
Transfer Discharges	3.4%	1.9%	2.8%	2.1%	3.3%	2.9%	2.0%	2.2%	1.8%	2.9%	1.7%	2.1%

Data source: Illinois Hospital Association Note: Newborns were excluded.

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 1999-2003, 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 1999-2003, admissions from the emergency department experienced by residents of Region 1 (excluding newborns) occurred in out-of-state hospitals at percentages lower than 5 percent for all three age groups used in this report (2.7% for 0-4 year olds, 3.3% for 5-9 year olds, and 3.2% for 10-15 year olds). As a result, no out-of-state bias was found for Region 1.

It should be noted that out-of-state data were not available from Wisconsin for this period. As a result, any bias associated with Wisconsin admissions of Region 1 residents could not be evaluated.

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Appendix A. CQI Program Improvement for EMS Region 11

Illinois EMS for Children Quality Improvement and Indicator Monitoring Report

Title of Project:	**Pediatric Pain Management**
Date of Report:	September 29, 2005
EMSC Region:	Region 11
Facility:	All Participating Facilities in the Regional CQI Effort

1. Opportunity / Issue / Problem Identification (PLAN)

- Opportunity: Pediatric pain management in the ED
- Problem: Less than optimal initial intervention including pharmaceutical interventions (55%), reassessment prior to discharge (50%), and decrease in pain (38%)
- Goals: intervention, reassessment, decrease in pain

2. Most Likely Causes

- Lack of staff awareness
- Lack of staff following guidelines
- Understaffing issues

3. Solution(s) Implemented (DO)

- MD & RN Educational presentations
- Inservice training
- Reminder materials
- Development of standing orders/forms
- Development of hospital -wide pain management policy

4. Data Elements Collected for Evaluation

- Diagnosis
- Initial assessment documented
- Interventions and times documented
- Reassessment documented
- Use of pain scales documented
- Decrease in pain documented
- Each hospital evaluates 30 charts per quarter of patients age 0-15 presenting with orthopedic injury

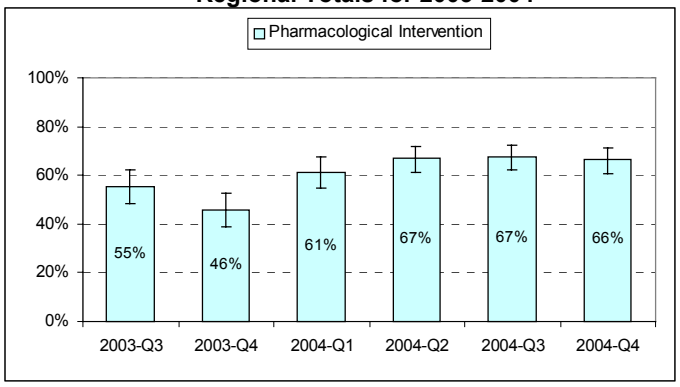
5. Results and Data Analysis (STUDY)

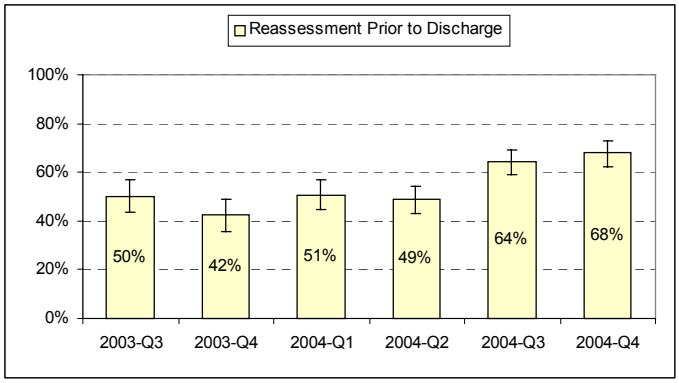
- Pharmacological Intervention: 11% improvement
- Reassessment Prior to Discharge: 18% improvement
- Decrease in Pain: 23% improvement

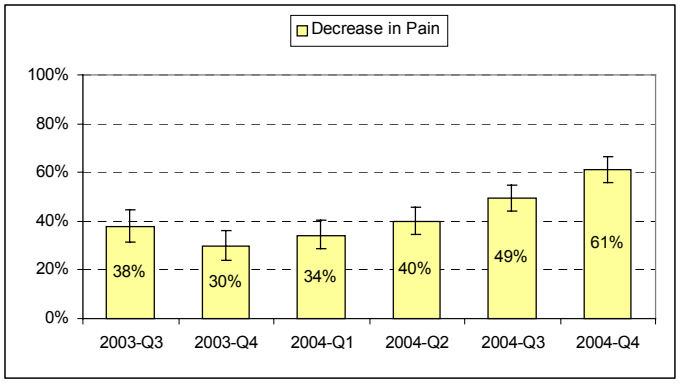
6. Conclusions and Recommendations (ACT)

- Conclusion: The EDs in Illinois EMSC Region 11 have shown progress toward meeting the goal of improving at least 10% in areas including: pharmacological intervention, reassessment prior to discharge, and decrease in pain for children presenting in the ED with orthopedic injury. This improvement follows specific educational efforts.
- Recommendations: Continue on-going efforts to maintain and promote awareness of pediatric pain management. Attempt to further identify barriers to assessments and interventions.

Region 11 EMSC CQI – Pain Management Indicator Regional Totals for 2003-2004







Solutions Implemented by Region 11:

Time	Solution	Target Audience
1st Qtr 2003	• Draft of the Pain Data Collection Tool for Region 11 was reviewed and minor revisions were made. • Decision had been made to review 30 charts/quarter of pediatric patients with either ear or orthopedic pain. • First data collection interval scheduled. • General announcement of pain management indicators were made at ED administrative and staff meetings.	EMSC CQI Liaisons ED Leadership ED Nursing staff ED Medical staff
2nd Qtr 2003	• Most, but not all, facilities completed data collection for 1st quarter 2003. • Feedback on data collection process resulted in identification of minor problems and need for clearer definitions of indicator parameters. Data collection tool was revised and distributed to all liaisons. • Many hospitals utilized the EMSC Pediatric Pain Management Educational Module to help educate their staff (both nurses and physicians) on the importance of evaluating and treating pediatric pain. • A few hospitals decided to make pain management a hospital – wide initiative, working to change the culture globally. • Promotion of the pain monitor continued by CQI liaisons through ED staff meetings, ED newsletters, staff email, and signage in the ED. • On-going data collection.	EMSC CQI liaisons ED Leadership ED Nursing staff ED Medical staff
3rd Qtr 2003	• CQI Liaisons reviewed variability of data from the past 2 quarters. The decision was made to revise the data collection tool and data dictionary to include orthopedic injuries only. • All liaisons reminded ED nursing staff that non-pharmacologic interventions must also be documented on the medical record. Reminders were on going, both formal and informal. • A few hospitals enacted routine chart	EMSC CQI liaisons ED Leadership ED Nursing staff IT services

	reviews of individual staff members to identify compliance issues with pain management standards in their department. When issues were identified, the record was reviewed with treating physician and/or nurse. • Many hospitals revised their charting systems (both computer and paper – based) to include a field for initial pain assessment. • On-going data collection.	
4th Qtr 2003	• CQI Liaisons reviewed the current pain management monitor tool and accepted it with no changes at this time. • Use of pain scale for reassessment was identified as a region wide issue. Liaisons discussed strategies to improve in this area such as easy access to age – appropriate pain scales in triage and patient rooms. • Liaisons discussed methods to implement standing orders in triage. • On-going data collection.	EMSC CQI liaisons ED Leadership ED Nursing staff
1st Qtr. 2004	• CQI Liaisons reviewed the current pain management monitor tool and accepted it with no changes at this time. • Many hospitals posted age – appropriate pain scales and educated staff on proper use for different age groups. • Liaisons continued to post and discuss CQI results in ED staff and administrative meetings. • One hospital actively encouraged nursing staff to request pain medication be ordered prior to diagnostic testing (such as an x-ray for orthopedic injury) • A few hospitals redesigned nursing orientation to more heavily stress pain management research and practices. • On-going data collection.	EMSC CQI liaisons ED Leadership ED Nursing staff
2nd Qtr 2004	• CQI Liaisons continued to review the current pain management monitor tool for clarity and usability. Liaisons decided to clarify how to track time interval from assessment to intervention.	EMSC CQI liaisons ED Leadership ED Nursing staff

	Data collection tool was revised and distributed to all liaisons. • Two hospitals began to stock pain management items in triage area (e.g. Motrin, ice packs, slings, etc.) • One hospital enacted standing orders to give pain medication at triage. • Many hospitals continued to promote thorough pain assessment in nursing orientation and at regular ED staff meetings. • On-going data collection.	
3rd Qtr 2004	• Data collection tool underwent some minor clarification of reassessment indicator. Data collection tool was revised and distributed to all liaisons • Liaisons discussed struggle with documentation of pain scale for reassessment. QI suggestions included: putting pain scale field next to nurse's signature, add pain scale field to triage note and/or add pain scale field to discharge note area. • On-going data collection.	EMSC CQI liaisons ED Leadership ED Nursing staff IT services
4th Qtr 2004	• CQI Liaisons agreed to continue with pain management initiative until the end of calendar year. • One hospital encouraged new ED Physician group to change former conservative practices based on new research advocating timely pain management intervention. • On-going data collection.	EMSC CQI liaisons ED Leadership ED Nursing staff ED Medical staff

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/emsrpt/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

Modified Groups for Report	Codes
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 throrax
	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
Actual	*1990*	*644,784*
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
Actual	*2000*	*681,847*
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).