NATIONAL TRAUMA DATA BANK®

National Trauma Data Bank 2010

Annual Report

Acknowledgments

THE AMERICAN COLLEGE OF SURGEONS COMMITTEE ON TRAUMA
WISHES TO THANK THE CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC)
FOR THEIR SUPPORT OF THE NTDB.

NTDB Annual Report 2010

EDITORS

Avery B. Nathens, MD, PhD, FACS, Chair
National Trauma Data Bank Subcommittee

AMERICAN COLLEGE OF SURGEONS COMMITTEE ON TRAUMA LEADERSHIP

Michael Rotondo, MD, FACS
Chair, Committee on Trauma

John J. Fildes, MD, FACS
Medical Director, Trauma Office
Division of Research and Optimal Patient Care

NATIONAL TRAUMA DATA BANK SUBCOMMITTEE

Karen J. Brasel
W. Bryan Gamble
Richard J. Kagan
Mark A. Malangoni
Allen F. Morey
Michael L. Nance
Glen H. Tinkoff
Wendy L. Wahl
Joseph Cuschieri
Charles E. Morrow, Jr.
Manoj R. Shah

N. Clay Mann, PhD, MS, Consultant

NATIONAL TRAUMA DATA BANK STAFF

Melanie Neal, Manager
Sandra Goble, Statistician
Lynn Zhou, Statistician
Chrystal Price, Data Analyst
Julia McMurray, NTDB Coordinator
Christopher Hoeft, TQIP Coordinator

Editors' Note

The Annual Report of the National Trauma Data Bank® (NTDB) is an updated analysis of the largest aggregation of U.S./Canadian trauma registry data ever assembled. In total, the NTDB now contains over 4 million records. The 2010 Annual Report is based on 681,990 2009 admission year records from 682 facilities.

For the second year, we are including an expanded section on facility information. In addition to the usual information on hospital characteristics such as bed size and trauma level, we have now included information on registry inclusion criteria for participating hospitals. This information allows the reader to consider differences in case mix across hospitals while reading the report. We have not included a table on complications in the report because this field is too incomplete to provide an accurate record of complications in NTDB participating centers.

Please note that Appendix C contains an analysis of data from the NTDB National Sample Program (NSP). The NSP is a nationally representative sample of 100 level I and II trauma centers, based on NTDB. The NSP allows for weighted national estimates about patients treated at US trauma centers.

The mission of the American College of Surgeons (ACS) Committee on Trauma (COT) is to develop and implement meaningful programs for trauma care. In keeping with this mission, the NTDB is committed to being the principal national repository for trauma center registry data. The purpose of this report is to inform the medical community, the public, and decision makers about a wide variety of issues that characterize the current state of care for injured persons. It has implications in many areas including epidemiology, injury control, research, education, acute care, and resource allocation.

The NTDB Committee would like to thank all of the trauma centers that contributed data and hope that this report will attract new participants. The National Trauma Data Bank Annual Report is available on the ACS Web site as a PDF file and a PowerPoint presentation at http://www.ntdb.org. In addition, information is available on our Web site about how to obtain NTDB data for more detailed study.

Many dedicated individuals on the ACS COT, as well as at trauma centers, have contributed to the early development of the NTDB and its rapid growth in recent years. Building on these achievements, our goals in the coming years include improving data quality, updating analytic methods, and enabling more useful inter-hospital comparisons. These efforts will be reflected in future NTDB reports to participating hospitals as well as in the Annual Reports.

Avery B. Nathens, MD, PhD, FACS, Chair
National Trauma Data Bank Subcommittee

Executive Summary

The National Trauma Data Bank (NTDB) is the largest aggregation of U.S. trauma registry data ever assembled. It contains over 4 million records. The 2010 Annual Report reviews 2009 admissions submitted in the 2010 call for data, totaling 681,990 records with valid trauma diagnoses. The goal of the NTDB is to inform the medical community, the public, and decision makers about a wide variety of issues that characterize the current state of care for injured persons in our country. It has implications in many areas including epidemiology, injury control, research, education, acute care, and resource allocation.

This endeavor is in keeping with the mission of the American College of Surgeons (ACS) Committee on Trauma (COT) which is "To improve the care of the injured through systematic efforts in prevention, care, and rehabilitation."

NTDB HOSPITALS*

- 682 hospitals submitted data to the NTDB in 2010.
- 210 are Level I centers.
- 220 are Level II centers.
- 198 are as Level III or IV centers.
- 153 centers are verified/designated as Level I or II pediatric centers.
- 64.2% of participating trauma centers reported using the NTDB ICD9 inclusion criteria for their registries.
- 52.5% of participating centers reported including all hip fractures (in accordance with NTDB inclusion criteria).
- 87.5% reported including DOA's in their registries.
- 88.7% include all transfers in, and 97.5% include all transfers out of their hospitals in their registries.

AGE

- The age distribution of patients in NTDB peaks from ages 14 to 29, primarily representing patients injured in MVT related incidents.
- There is a second peak between the ages of 40 and 50, when Falls begin to increase and MVT incidences are still high.
- Fall related injuries spike in children under 7 and adults over the age of 75.
- Up to age 71, men account for 70% of incidents. After age 70, most patients are women.

MECHANISM OF INJURY

- Falls account for 37% of cases in the NTDB, with high incident rates for patients under age ten and age 75 and over.
- Motor Vehicle Traffic related injuries account for 30% of cases in the NTDB, with a dramatic rise between age 15 and 33, peaking around age 19.
- Firearm injuries peak around 19 years of age, and then steadily decrease.
- Firearm, MVT, and Fall injuries have the highest case fatality rates, with Firearm at 15.8%, MVT at 4.5% and Fall at 3.5%.

INJURY SEVERITY SCORE

The Injury Severity Score (ISS) is a system for numerically stratifying injury severity. The ISS system has a range of 1–75 and risk of death increases with a higher score. This report categorizes ISS 1–8 as Minor; 9–15 as Moderate; 16–24 as Severe; and greater than 24 as Very Severe. ISS used in the report analysis are based on scores derived through the ICD 90 mapping program.

- Almost half (49.6%) of patients suffer Minor injuries and about one-fourth (24.8%) have Moderate injuries.
- Case fatality rates increase with injury severity, with the most severe group experiencing a case fatality rate of 30.2.
- Case fatality for all severity levels is higher for patients age 75 and over.
- Median length of stay (LOS) increases for each consecutive severity grouping.

PAYMENT

- Private/Commercial Insurance is the single largest payment source at 21%.
- Medicare is second at 17.5%.
- Self–Pay is the third largest payment category at 15.1%.

MORTALITY

- The largest number of deaths is caused by Fall related injuries, followed by Motor Vehicle Traffic and Struck by/against.
- Firearm, Motor Vehicles, and Fall injuries have the highest case fatality rates.
- Case fatality rates are highest in patients age 75 and over.
- Firearm injuries have the highest case fatality rates in every age group among the selected mechanisms shown in the report.

(continued on next page)

Executive Summary (continued)

OUTCOMES

- Median EMS total transport times are greatest for Natural, environmental, other injuries, followed by Transport, other, Hot object/substance, and Fire/flame.
- Median EMS total transport time is similar across injury severity scores, with Mild injuries having a slightly lower median transport time.
- Median length of hospital stay is greatest for Fall injuries.
- More severe injuries have a greater median length of hospital stay and more ICU and ventilator days.
- Fire/flame injuries have the highest median number of ventilator and ICU days.
- Most patients (43.2%) were discharged from the ED to a floor bed, followed in frequency by ICU at 19.3% and OR at 12.1%.
- Most patients (58.5%) were discharged from the hospital to home with no services. An additional 8.7% were discharged to a skilled nursing facility and 7% went to a rehab/long term care facility.
- 2.9 percent of patients died.

COMMENTS

We hope that this document has expanded your understanding of patients treated in trauma centers in the United States. We further hope that your opinions will be informed by these data, and that you will find ways to share these data with other audiences. Finally, we hope this report has increased your interest to look more deeply at specific topics in the field of injury using the NTDB as a resource. The full National Trauma Data Bank Report 2009 is available on the ACS Web site as a PDF file and a PowerPoint presentation at *http://www.ntdb.org.*

* Percentages of trauma centers at each level are based on the following:

Original Source (updated February 2009): MacKenzie EJ et. al. National Inventory of Hospital Trauma Centers. JAMA 2003 Mar 26; 289(12):1517. © American Medical Association

PLEASE NOTE:

The abbreviation NK/NR used on many tables denotes Not Known, Not Recorded, or Blank. If Not Applicable is not shown as a separate row on the table, then it is also included in the NK/NR category.

"Local ISS" denotes ISS scores submitted directly by hospitals regardless of the method of calculation. "ICD90 Derived" are scores derived by converting ICD9 codes to AIS using the ICD 90 Mapping program and then calculating ISS with the resulting AIS severity scores. "AIS Derived" are calculated from AIS submitted directly by hospitals. Analyses in this report use the ICD 90 Derived ISS..

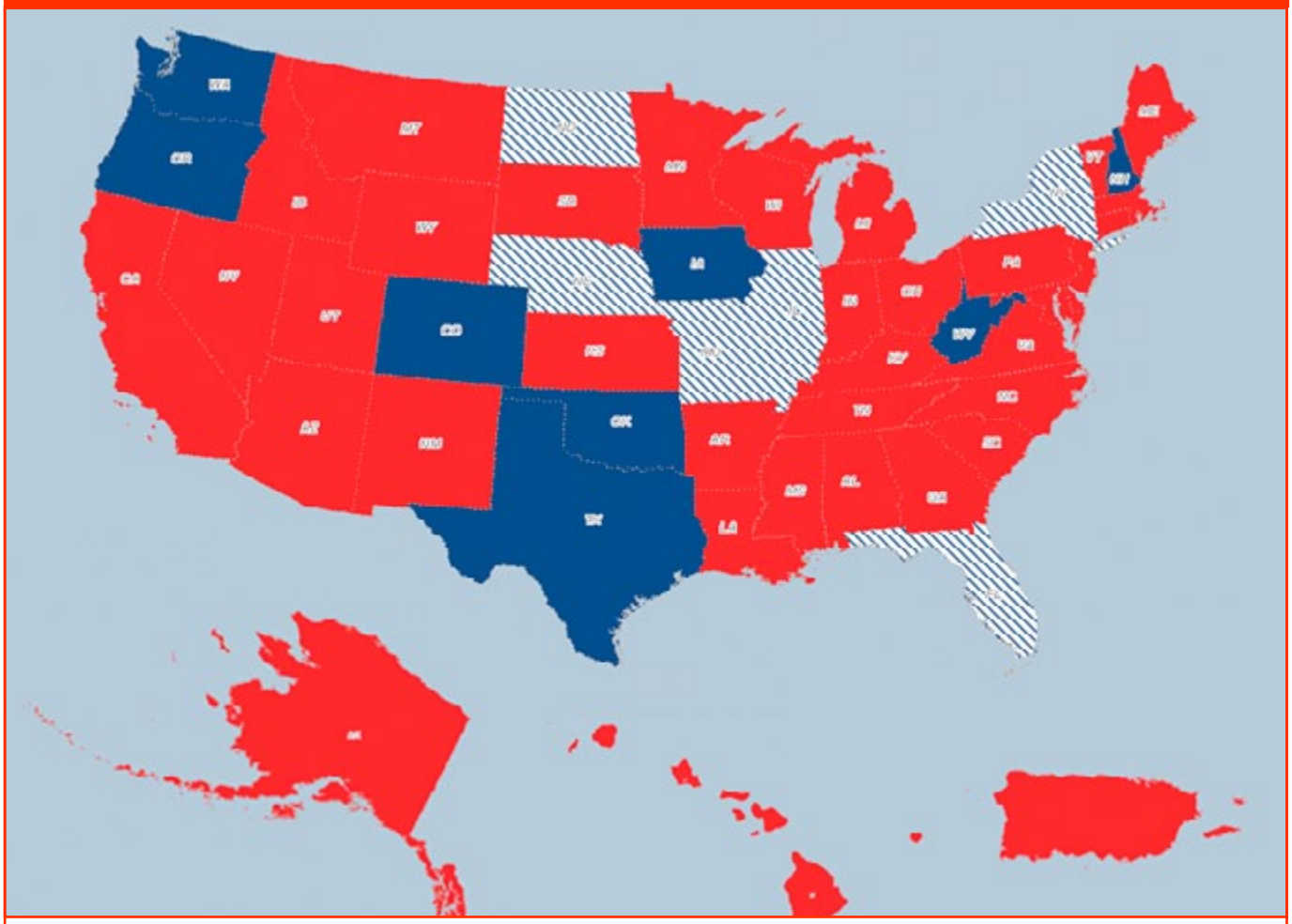
Table of Contents

(comparative analyses continued on next page)

Hospital Information

Figure 1

PERCENT OF HOSPITALS SUBMITTING TO THE NTDB BY STATE AND U.S. TERRITORY



Percent of hospitals=Number of hospitals in the state that have submitted to the NTDB divided by the number of hospitals identified by the Trauma Exchange Information Program (TIEP) as trauma centers designated by a state of local authority and/or verified by the American College of Surgeons.

- 67% or greater
- 34% to 66%
- 0% to 33%

Table 2

FACILITIES BY BED SIZE		
BED SIZE	NUMBER	PERCENT
≤200	191	28.01
201 - 400	229	33.58
401 - 600	149	21.85
> 600	113	16.57
Total	682	100.00

Figure 2

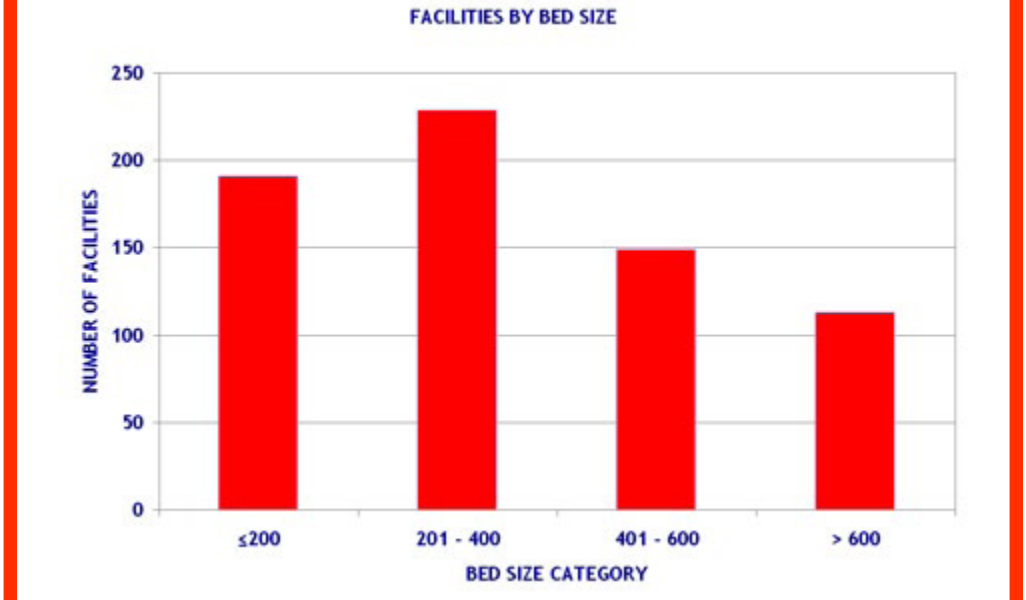


Table 3

FACILITIES BY TRAUMA LEVEL		
TRAUMA LEVEL	NUMBER	PERCENT
I	210	30.79
II	220	32.26
III	123	18.03
IV	75	11.00
NA	48	7.04
Other	6	0.88
Total	682	100.00

Figure 3

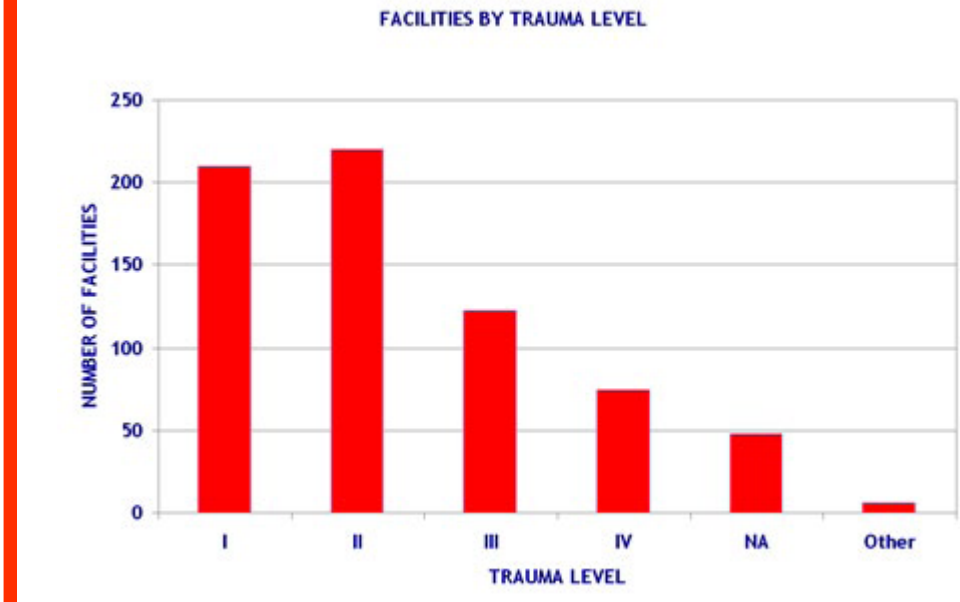


Table 4

FACILITIES BY REGION		
REGION	NUMBER	PERCENT
South	238	34.90
Midwest	214	31.38
West	131	19.21
Northeast	99	14.52
Total	682	100.00

Figure 4

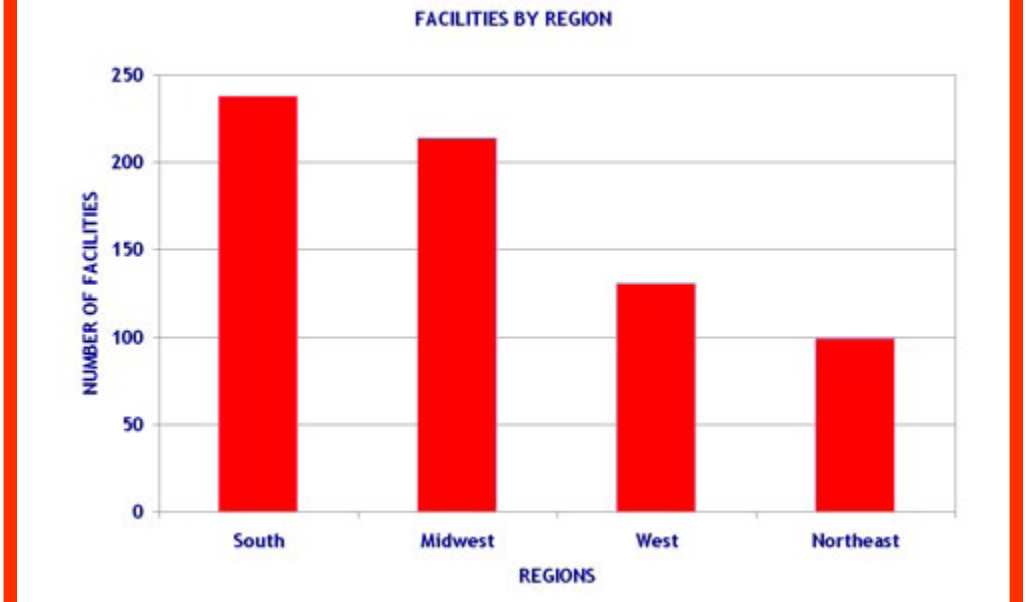


Table 5

FACILITIES BY ICD-9 INCLUSION CRITERIA		
ICD-9 INCLUSION SAME AS NTDB	NUMBER	PERCENT
NO	244	35.78
YES	438	64.22
Total	682	100.00

Figure 5

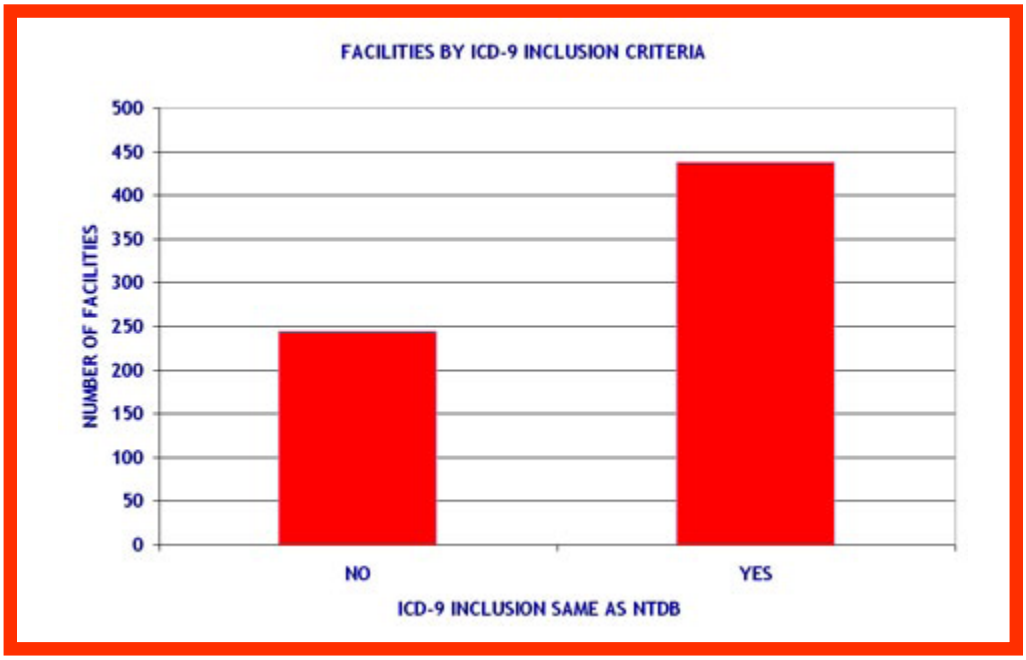


Table 6

FACILITIES BY LOS INCLUSION CRITERIA		
LOS	NUMBER	PERCENT
23 hour holds	31	4.55
> 24 hours	76	11.14
> 48 hours	54	7.92
> 72 hours	53	7.77
All Admissions	468	68.62
Total	682	100.00

Figure 6

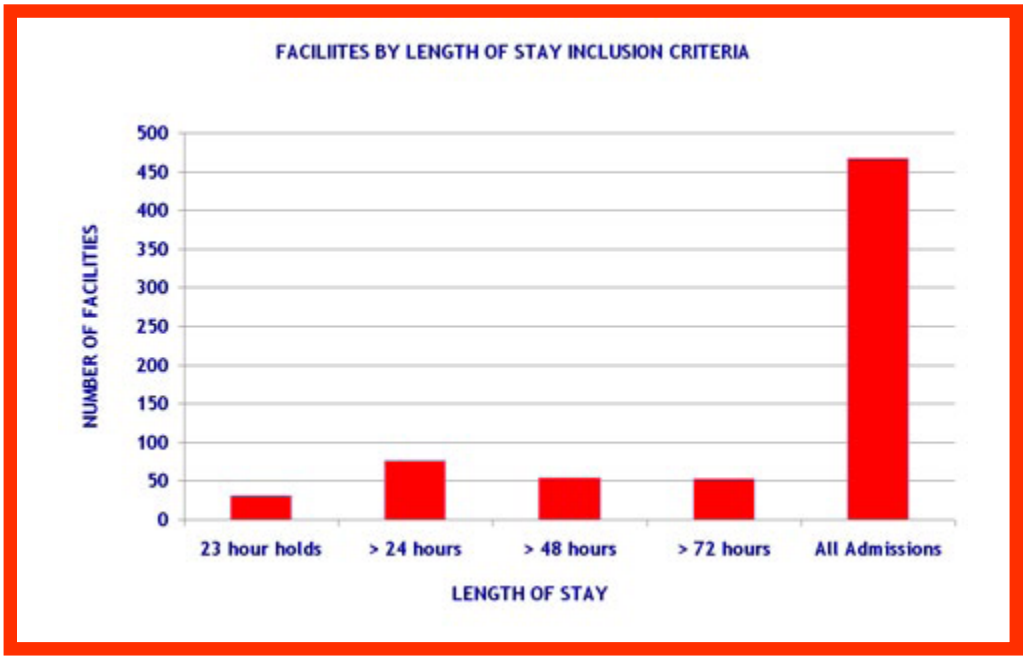


Table 7

FACILITIES BY ISOLATED HIP FRACTURE INCLUSION CRITERIA BY AGE		
HIP FRACTURE	NUMBER	PERCENT
All	358	52.49
None	157	23.02
Patients ≤ 18 years	22	3.23
Patients ≤ 50 years	5	0.73
Patients ≤ 55 years	13	1.91
Patients ≤ 60 years	6	0.88
Patients ≤ 65 years	114	16.72
Patients ≤ 70 years	7	1.03
Total	682	100.00

Figure 7

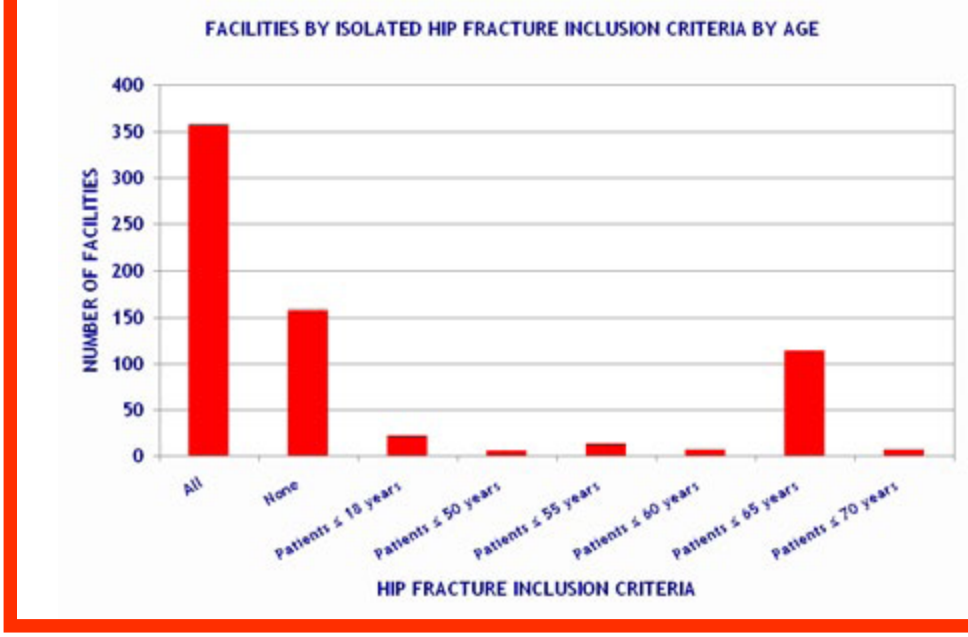


Table 8

FACILITIES BY DEATH ON ARRIVAL (DOA) INCLUSION CRITERIA		
DOA	NUMBER	PERCENT
NO	85	12.46
YES	597	87.54
Total	682	100.00

Figure 8

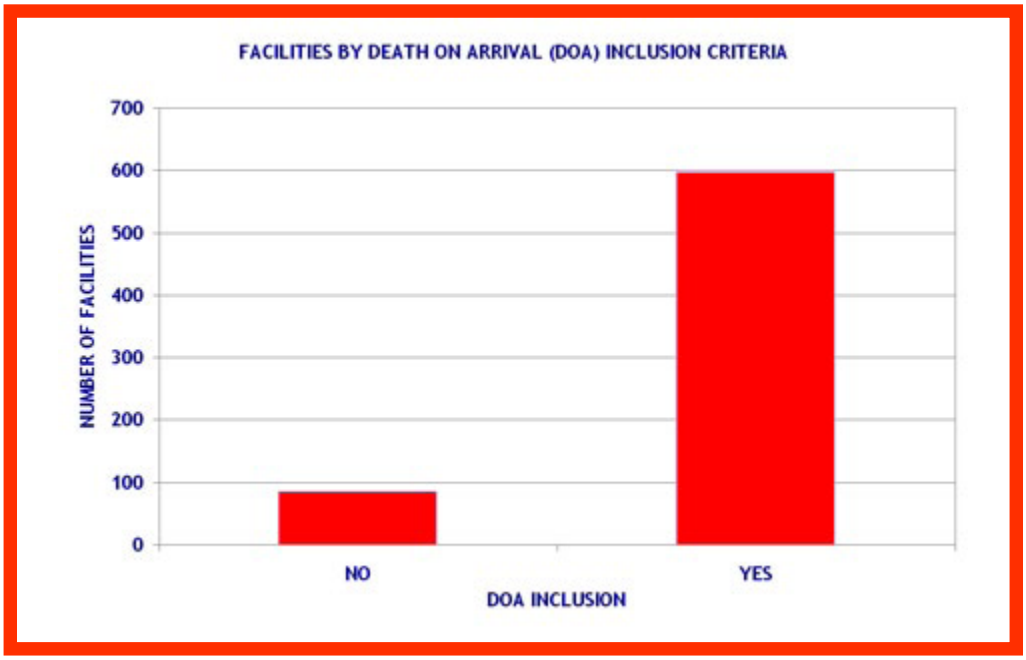


Table 9

FACILITIES BY TRANSFER-IN CRITERIA		
Transfer-In	NUMBER	PERCENT
All transfers	605	88.71
None	53	7.77
within 12 hours	2	0.29
within 24 hours	4	0.59
within 4 hours	3	0.44
within 48 hours	7	1.03
within 72 hours	4	0.59
within 8 hours	4	0.59

Table 10

FACILITIES BY TRANSFER-OUT CRITERIA		
TRANSFER-OUT	NUMBER	PERCENT
NO	17	2.49
YES	665	97.51
Total	682	100.00

Demographic Information

Table 11

INCIDENTS AND CASE FATALITY RATE BY AGE				
AGE	NUMBER	PERCENT	DEATHS	CASE FATALITY RATE
<1 year	8,724	1.28	248	2.84
1-4	23,700	3.48	387	1.63
5-9	23,096	3.39	199	0.86
10-14	26,296	3.86	290	1.10
15-19	57,660	8.45	1,747	3.03
20-24	63,204	9.27	2,308	3.65
25-34	89,925	13.19	3,120	3.47
35-44	77,484	11.36	2,560	3.30
45-54	87,655	12.85	3,052	3.48
55-64	67,036	9.83	2,803	4.18
65-74	48,556	7.12	2,538	5.23
75-84	58,623	8.60	4,002	6.83
≥85	47,214	6.92	3,567	7.55
NK/NR	2,817	0.41	345	12.25
Total	681,990	100.00	27,166	

Figure 11A

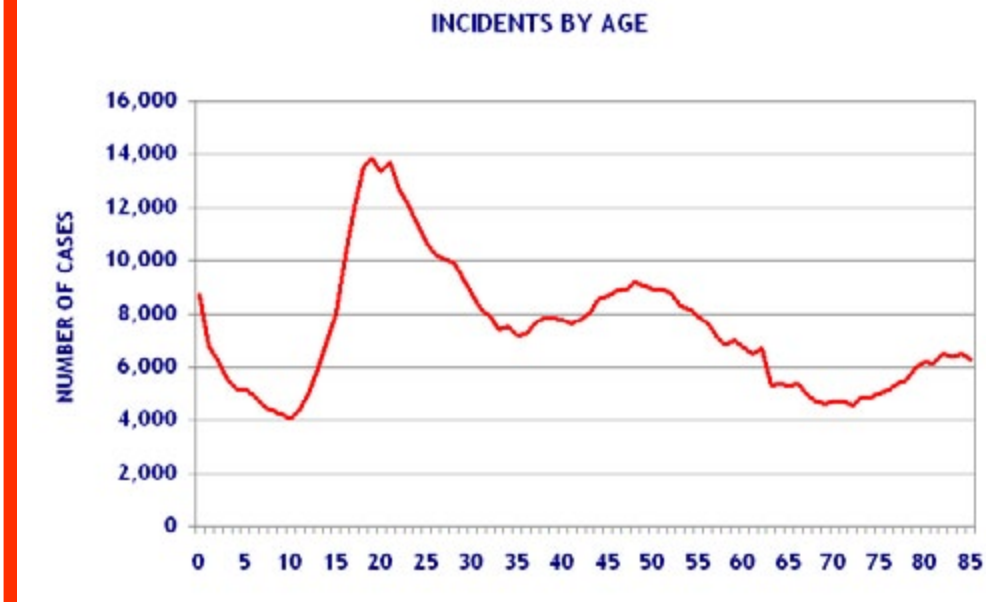


Figure 11B

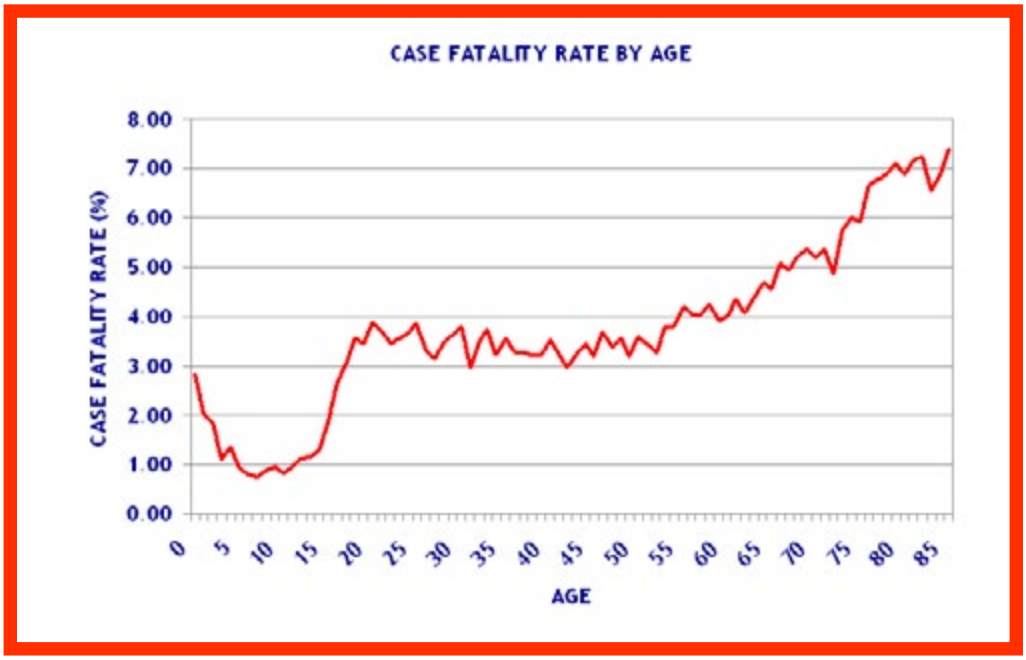


Table 12

INCIDENTS AND CASE FATALITY RATE BY AGE AND GENDER									
AGE	NUMBER (FEMALE)	NUMBER (MALE)	NUMBER (NK/NR)	DEATHS (FEMALE)	DEATHS (MALE)	DEATHS (NK/NR)	CASE FATALITY RATE (FEMALE)	CASE FATALITY RATE (MALE)	CASE FATALITY RATE (NK/NR)
<1 year	3,658	5,060	6	99	149	0	2.71	2.94	0.00
1-4	9,579	14,115	6	167	220	0	1.74	1.56	0.00
5-9	8,955	14,134	7	82	117	0	0.92	0.83	0.00
10-14	7,424	18,860	12	79	211	0	1.06	1.12	0.00
15-19	15,989	41,631	40	387	1,360	0	2.42	3.27	0.00
20-24	15,491	47,665	48	388	1,919	1	2.50	4.03	2.08
25-34	21,796	68,041	88	543	2,576	1	2.49	3.79	1.14
35-44	20,385	57,024	75	513	2,047	0	2.52	3.59	0.00
45-54	25,616	61,963	76	701	2,350	1	2.74	3.79	1.32
55-64	24,905	42,050	81	733	2,069	1	2.94	4.92	1.23
65-74	23,263	25,251	42	846	1,691	1	3.64	6.70	2.38
75-84	35,320	23,253	50	1,662	2,339	1	4.71	10.06	2.00
≥85	32,678	14,488	48	1,810	1,756	1	5.54	12.12	2.08
NK/NR	1,147	1,663	7	200	143	2	17.44	8.60	28.57
Total	246,206	435,198	586	8,210	18,947	9			

Figure 12A

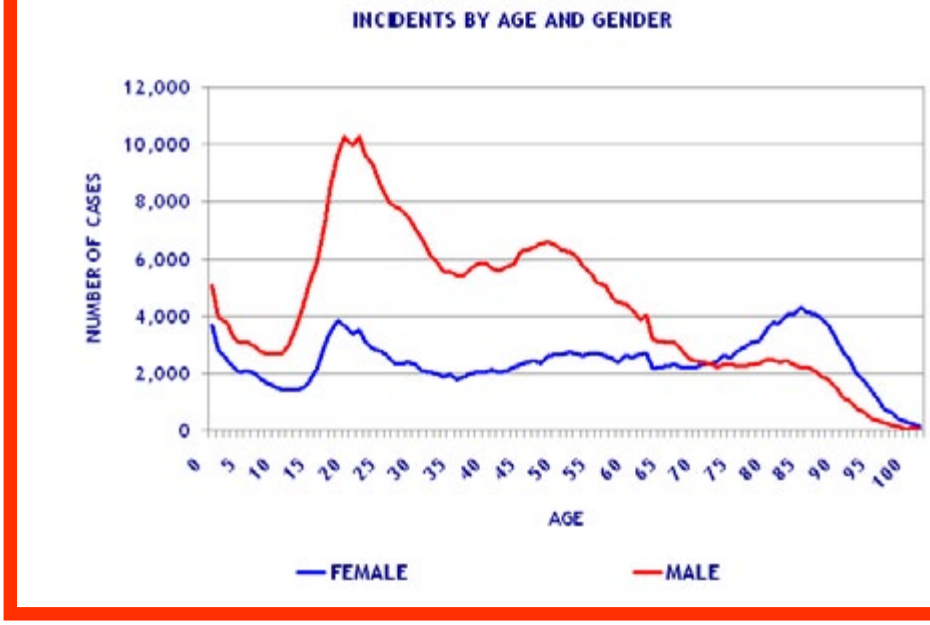


Figure 12B

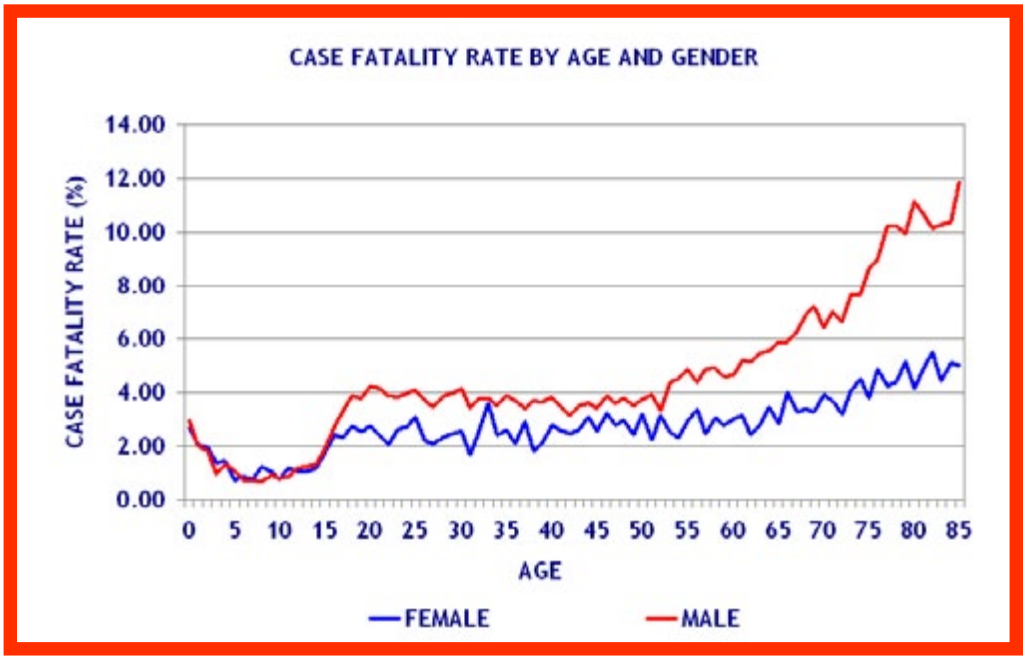


Table 13

ALCOHOL USE		
ALCOHOL USE	NUMBER	PERCENT
No (not tested)	296,761	43.51
No (confirmed by test)	154,264	22.62
Yes (confirmed by test [beyond legal limit])	68,168	10.00
Yes (confirmed by test [trace levels])	30,349	4.45
Not Applicable	31,132	4.56
NK/NR	101,316	14.86
Total	681,990	100.00

Figure 13

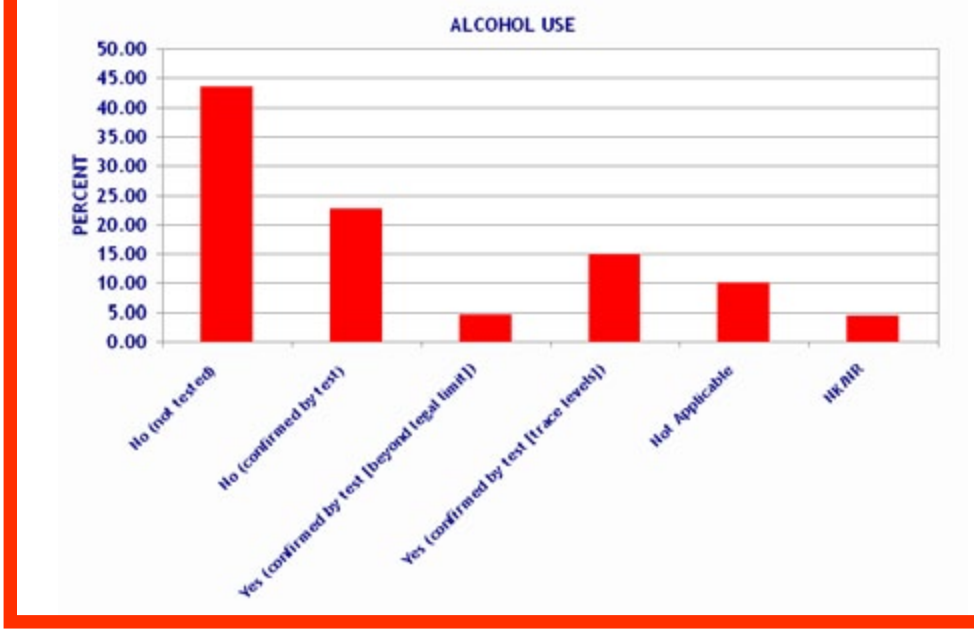


Table 14

DRUG USE		
DRUG USE	NUMBER	PERCENT
No (not tested)	312,413	45.81
No (confirmed by test)	75,890	11.13
Yes (confirmed by test [illegal use drug])	65,247	9.57
Yes (confirmed by test [prescription drug])	13,902	2.04
Not Applicable	91,769	13.46
NK/NR	122,769	18.00
Total	681,990	100.00

Figure 14

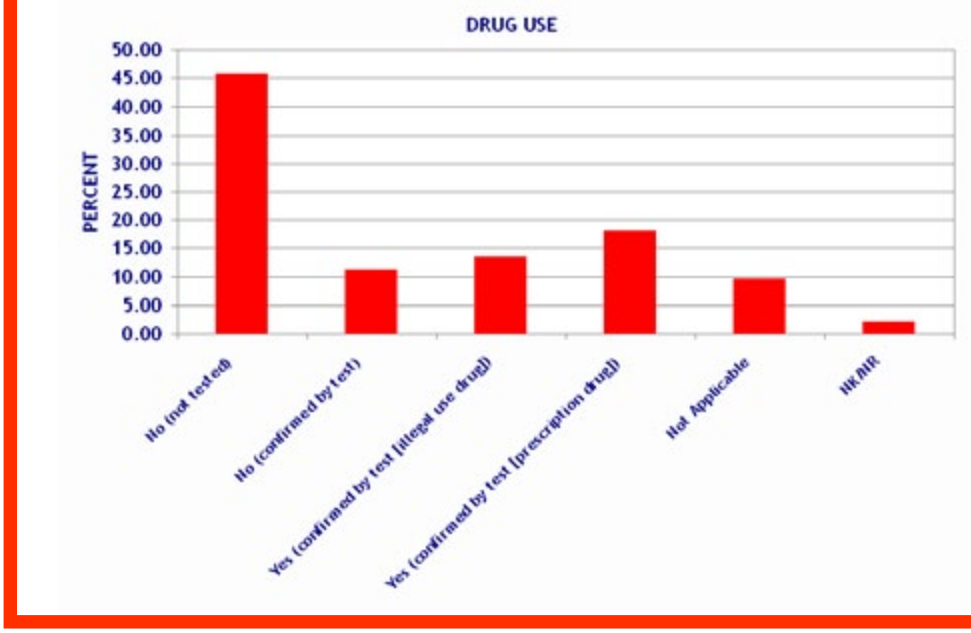
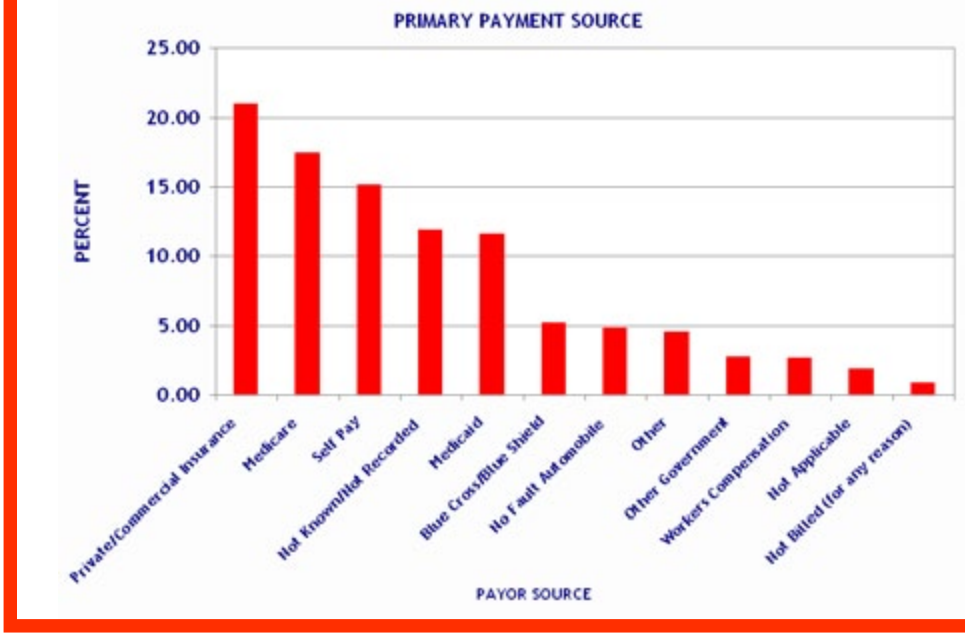


Table 15

PRIMARY PAYMENT SOURCE		
PRIMARY PAYMENT SOURCE	NUMBER	PERCENT
Private/Commercial Insurance	143,339	21.02
Medicare	119,308	17.49
Self Pay	103,131	15.12
Medicaid	79,171	11.61
Blue Cross/Blue Shield	35,768	5.24
No Fault Automobile	33,006	4.84
Other	31,318	4.59
Other Government	18,645	2.73
Workers Compensation	18,176	2.67
Not Applicable	12,793	1.88
Not Known/Not Recorded	81,320	11.92
Not Billed (for any reason)	6,015	0.88
Total	681,990	100.00

Figure 15



Injury Characteristics

Table 16

INCIDENTS AND CASE FATALITY RATE BY MECHANISM OF INJURY				
MECHANISM	COUNT	PERCENT	DEATHS	CASE FATALITY RATE
Fall	252,326	37.00	8,898	3.53
Motor Vehicle Traffic	204,312	29.96	9,147	4.48
Struck by, against	51,754	7.59	575	1.11
Transport, other	37,775	5.54	770	2.04
Cut/pierce	32,737	4.80	621	1.90
Firearm	32,097	4.71	5,083	15.84
Pedal cyclist, other	12587	1.85	120	0.95
Other specified and classifiable	10,988	1.61	447	4.07
Unspecified	8,338	1.22	302	3.62
Fire/flame	7,824	1.15	476	6.08
Hot object/substance	7448	1.09	32	0.43
Machinery	6883	1.01	97	1.41
Other specified, not elsewhere classifiable	3651	0.54	94	2.57
Natural/environmental, Bites and stings	3628	0.53	9	0.25
Pedestrian, other	2,447	0.36	126	5.15
Natural/environmental, Other	2099	0.31	37	1.76
Overexertion	1920	0.28	3	0.16
Suffocation	625	0.09	157	25.12
Drowning/submersion	373	0.05	51	13.67
Poisoning	321	0.05	18	5.61
NK/NR	1543	0.23	86	5.57
Total	681,990	99.95	27,166	

**Adverse effects have been removed from all mechanism tables, therefore percentages may not equal 100.*

Figure 16A

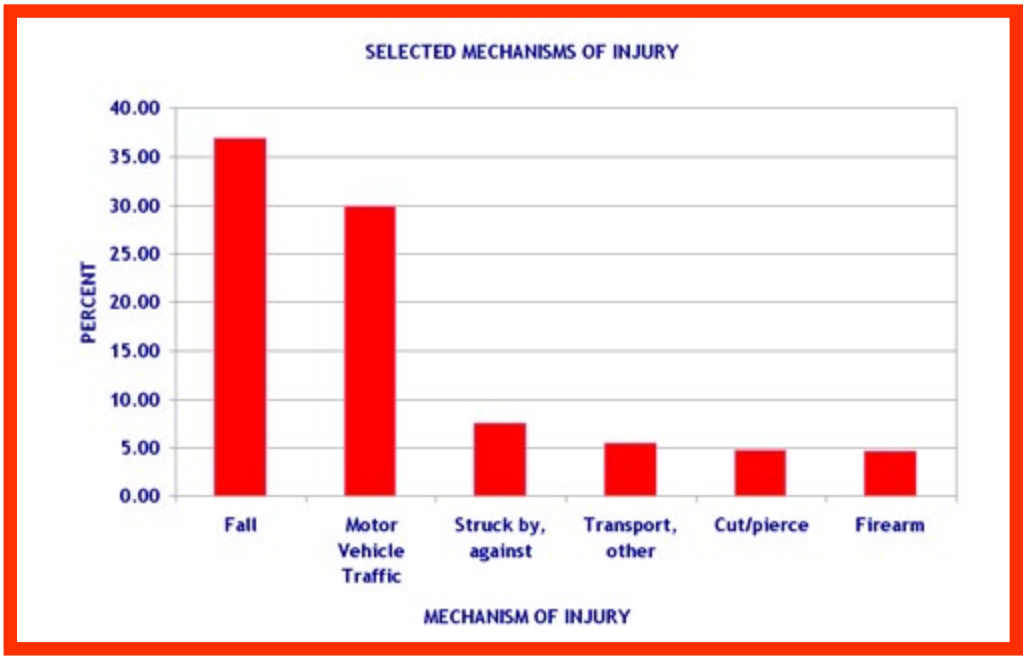


Figure 16B

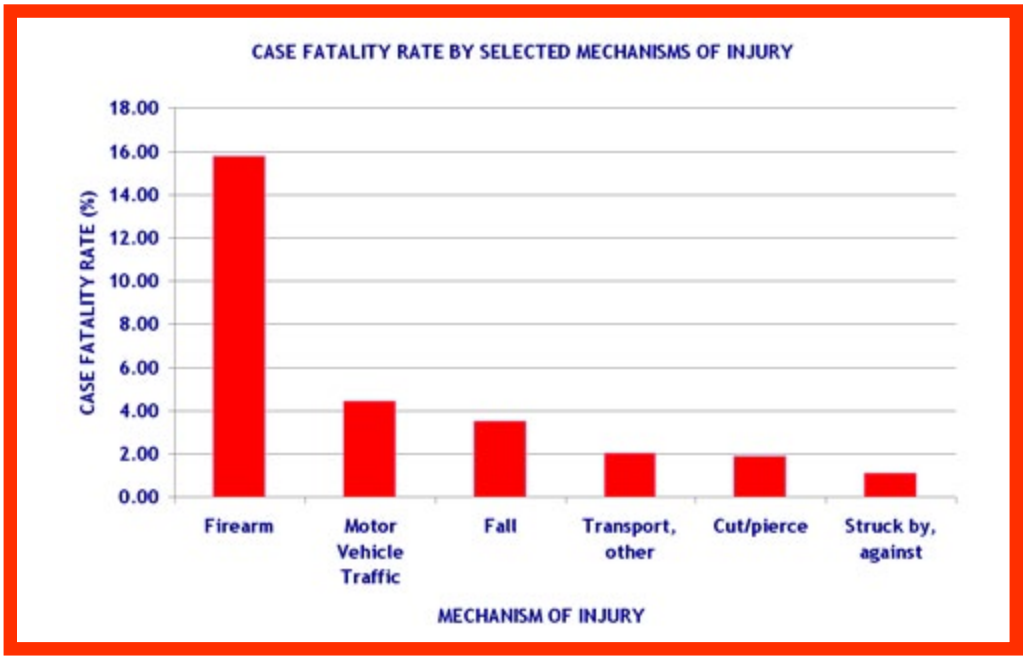


Table 17

SELECTED MECHANISMS OF INJURY BY AGE						
AGE	CUT/PIERCE	FALL	FIREARM	MOTOR VEHICLE TRAFFIC	STRUCK BY, AGAINST	TRANSPORT, OTHER
<1 year	58	4,650	29	515	412	57
1-4	505	11,450	123	3,175	1,850	561
5-9	468	10,530	149	4,428	1,880	1,574
10-14	646	7,558	618	5,582	3,863	3,566
15-19	3,848	6,868	6,236	23,803	7,020	4,972
20-24	5,787	6,646	7,442	27,348	6,392	4,138
25-34	8,379	12,732	8,556	35,390	9,561	5,959
35-44	5,830	15,667	4,192	29,267	7,631	5,507
45-54	4,497	26,686	2,673	30,246	7,532	5,316
55-64	1,699	30,058	1,191	21,001	3,131	3,117
65-74	587	30,020	458	11,403	1,227	1,511
75-84	255	46,248	233	8,251	675	853
≥85	114	42,056	136	3,114	422	350
NK/NR	64	1,157	61	789	158	294
Total	32,737	252,326	32,097	204,312	51,754	37,775

Figure 17

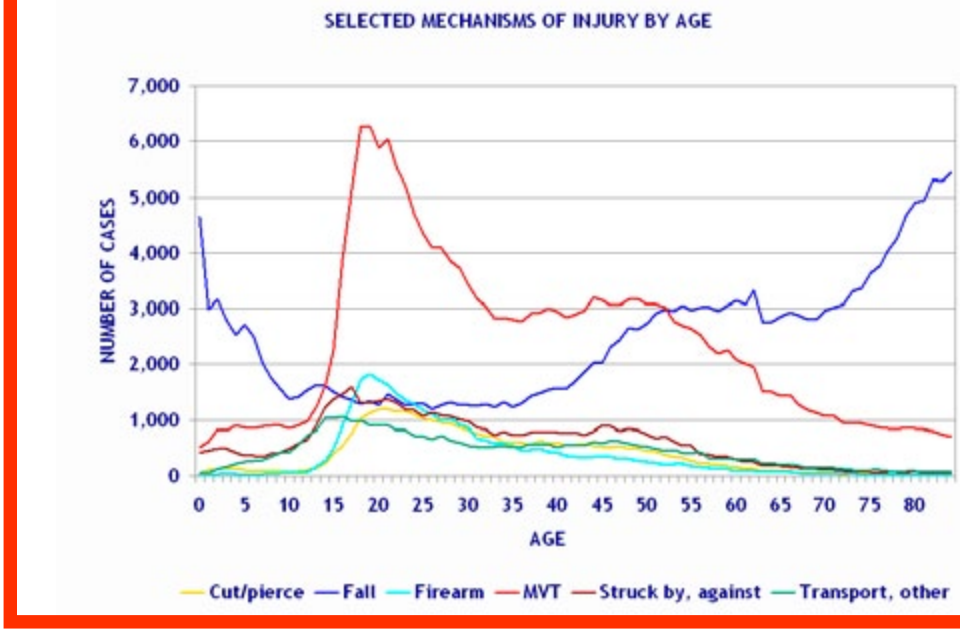


Table 18

CASE FATALITY RATE BY SELECTED MECHANISMS OF INJURY AND AGE						
AGE	CUT/PIERCE	FALL	FIREARM	MOTOR VEHICLE TRAFFIC	STRUCK BY, AGAINST	TRANSPORT, OTHER
<1 year	3.45	0.39	10.34	9.51	3.64	10.53
1-4	0.20	0.27	17.07	4.47	1.62	1.78
5-9	0.00	0.05	8.72	2.71	0.53	1.02
10-14	0.46	0.15	9.55	2.67	0.18	0.79
15-19	1.53	0.61	11.77	3.17	0.17	1.39
20-24	1.59	1.17	13.45	3.33	0.63	2.03
25-34	1.90	1.27	14.78	3.30	0.72	1.80
35-44	1.92	1.58	18.06	3.56	1.28	1.73
45-54	2.33	2.18	20.20	4.31	1.51	1.86
55-64	2.24	2.96	24.69	5.53	2.11	2.66
65-74	3.07	4.18	35.37	6.95	4.16	4.57
75-84	4.71	5.62	49.79	11.76	5.63	7.39
≥85	13.16	6.52	63.97	17.28	5.69	9.71
NK/NR	7.81	20.22	50.82	5.96	0.63	2.38

Figure 18

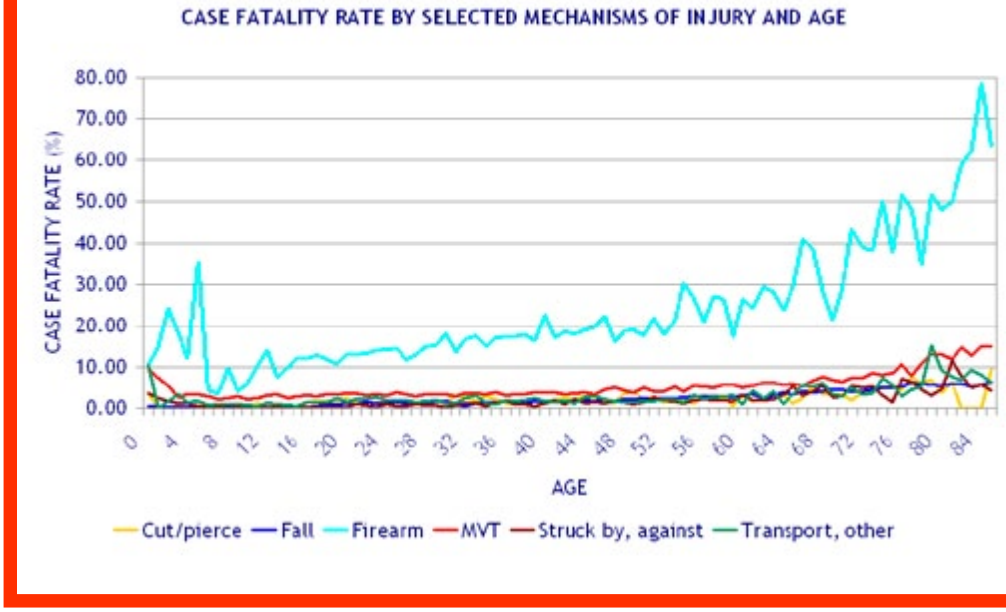


Table 19

INCIDENTS AND CASE FATALITY RATE BY MECHANISM OF INJURY AND GENDER				
MECHANISM	PERCENT (FEMALE)	PERCENT (MALE)	CASE FATALITY RATE (FEMALE)	CASE FATALITY RATE (MALE)
Fall	50.51	29.35	3.07	3.97
Motor Vehicle Traffic	30.67	29.56	3.84	4.86
Transport, Other	4.47	6.15	1.61	2.21
Struck By, Against	3.31	10.01	1.08	1.12
Cut/Pierce	1.96	6.40	2.07	1.87
Firearm	1.38	6.59	16.11	15.82
Other Specified And Classifiable	1.19	1.04	0.55	0.35
Hot Object/Substance	1.19	1.85	4.37	3.96
Pedal Cyclist, Other	1.11	2.26	0.59	1.06
Fire/Flame	0.79	1.35	9.11	5.10
Unspecified	0.76	1.48	4.31	3.43
Natural/Environmental, Bites And Stings	0.65	0.46	0.25	0.25
Other Specified, Not Elsewhere Classifiable	0.41	0.61	2.88	2.46
Natural/Environmental, Other	0.34	0.37	4.33	5.57
Pedestrian, Other	0.32	0.30	0.90	2.28
Overexertion	0.30	0.27	0.27	0.09
Machinery	0.24	1.45	0.86	1.46
Suffocation	0.21	0.23	5.35	5.70
Poisoning	0.06	0.11	21.83	25.99
Drowning/Submersion	0.05	0.05	2.52	7.43
NK/NR	0.04	0.06	15.63	13.00
Total	99.94	99.96		

**Adverse effects have been removed from all mechanism tables, therefore percentages may not equal 100.*

Figure 19A

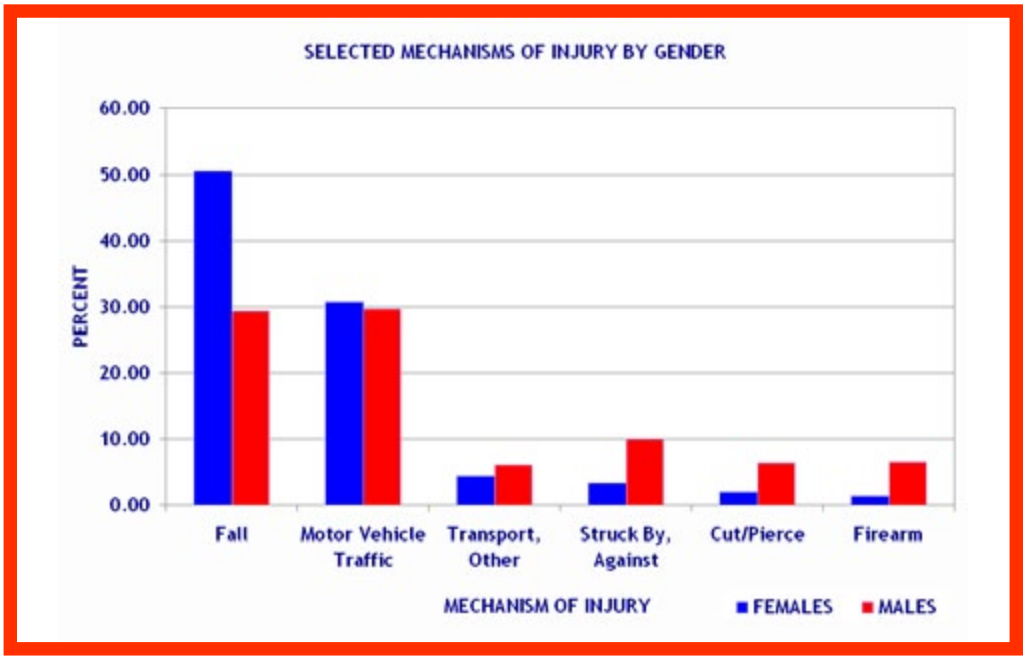


Figure 19B

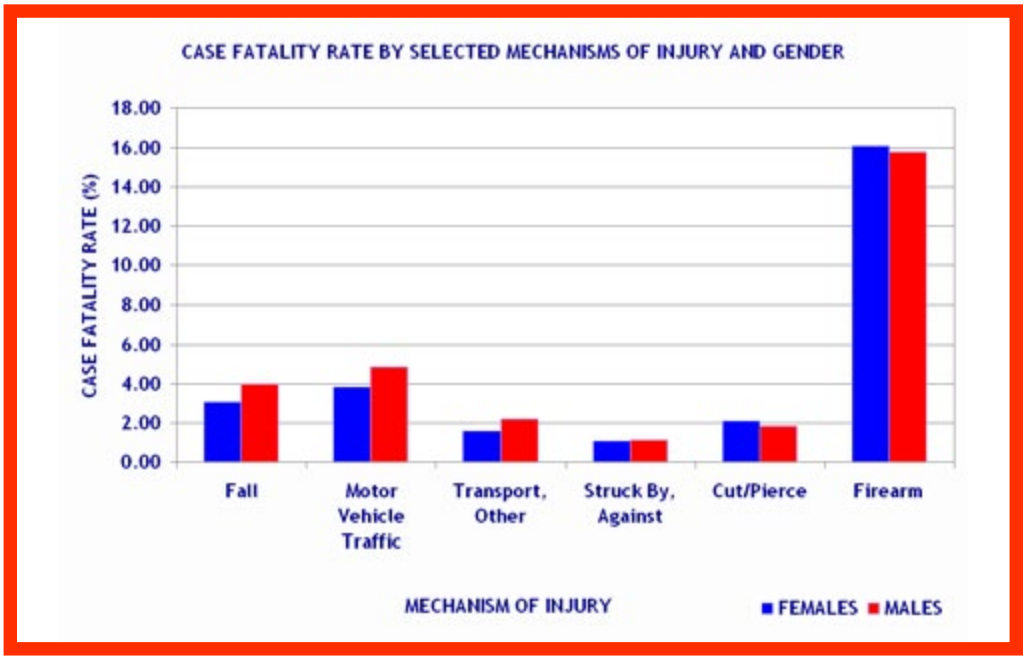


Table 20

INCIDENTS BY COMPARATIVE INJURY SEVERITY SCORES						
	LOCAL ISS		AIS SUBMITTED		ICD 9 DERIVED	
ISS	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
1-8	304,747	44.68	304,316	44.62	338,348	49.61
9-15	208,938	30.64	202,996	29.77	169,371	24.83
16-24	82,627	12.12	81,110	11.89	96,925	14.21
>24	53,864	7.90	52,413	7.69	34,260	5.02
NK/NR	31,814	4.66	41,155	6.03	43,086	6.32
Total	681,990	100.00	681,990	100.00	681,990	100.00

Figure 20

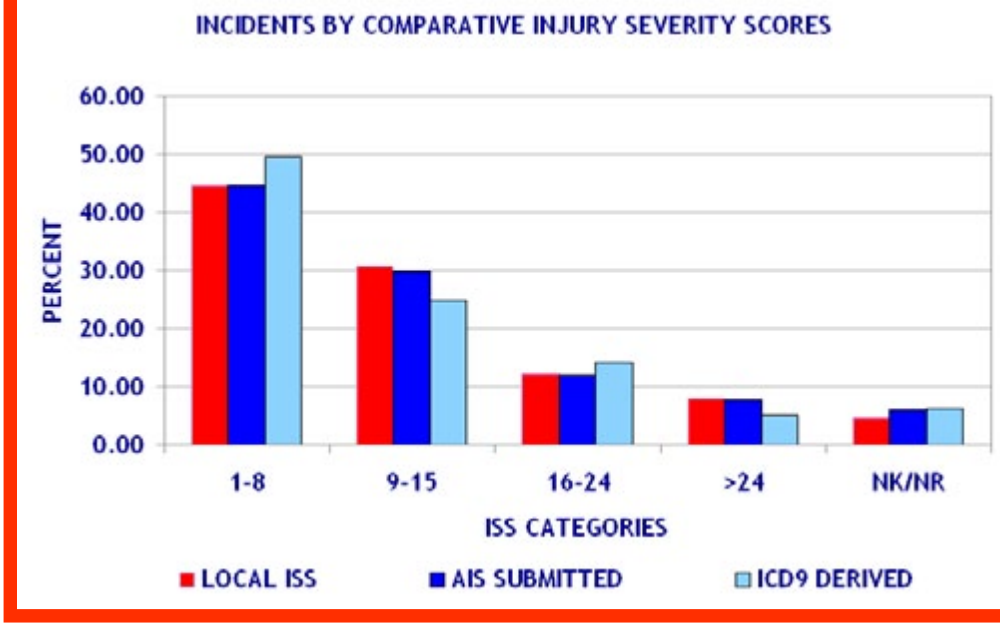


Table 21

INCIDENTS AND CASE FATALITY RATE BY INJURY SEVERITY SCORE				
ISS	NUMBER	PERCENT	DEATHS	CASE FATALITY RATE
1-8	338,348	49.61	2,885	0.85
9-15	169,371	24.83	4,010	2.37
16-24	96,925	14.21	6,392	6.59
>24	34,260	5.02	10,332	30.16
NK/NR	43,086	6.32	3,547	8.23
Total	681,990	100.00	27,166	

Figure 21

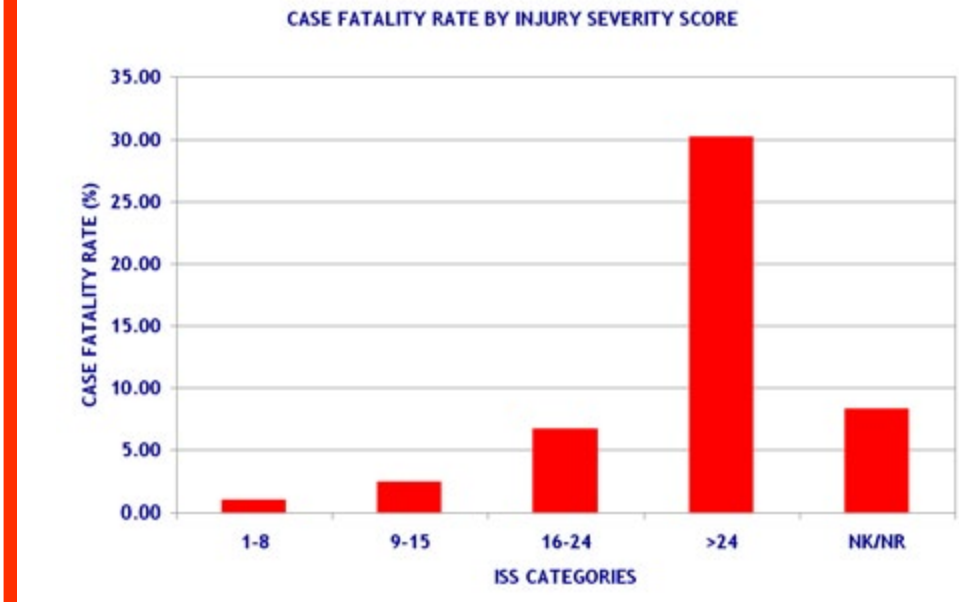


Table 22

INJURY SEVERITY SCORE BY AGE					
	ISS 1-8 NUMBER	ISS 9-15 NUMBER	ISS 16-24 NUMBER	ISS >24 NUMBER	ISS NK/NR NUMBER
<1 year	4,243	1,115	2,613	266	487
1-4	16,668	2,536	2,286	564	1,646
5-9	16,762	2,717	1,930	508	1,179
10-14	16,155	4,794	2,708	904	1,735
15-19	30,046	12,433	7,022	3,730	4,429
20-24	32,972	13,637	7,620	4,212	4,763
25-34	48,292	19,191	10,524	5,279	6,639
35-44	41,120	16,694	9,869	4,247	5,554
45-54	43,365	20,327	13,099	4,777	6,087
55-64	30,533	17,945	10,808	3,449	4,301
65-74	19,790	14,880	8,908	2,397	2,581
75-84	20,990	21,718	11,241	2,383	2,291
≥85	15,881	20,501	8,054	1,473	1,305
NK/NR	1,531	883	243	71	89
Total	338,348	169,371	96,925	34,260	43,086

Figure 22

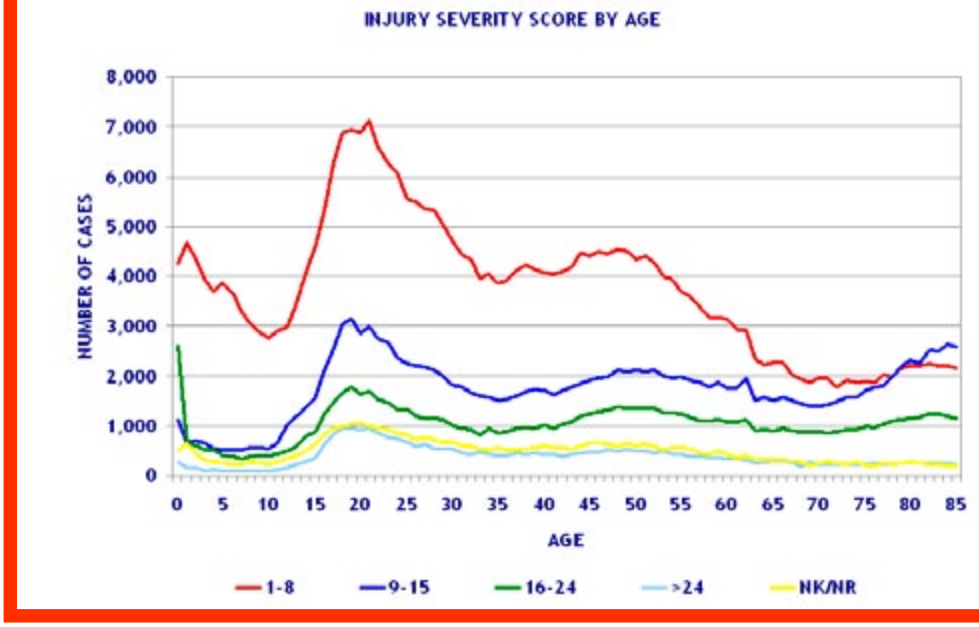


Table 23

CASE FATALITY RATE BY INJURY SEVERITY SCORE AND AGE										
AGE	ISS 1-8 DEATHS	ISS 1-8 CASE FATALITY RATE	ISS 9-15 DEATHS	ISS 9-15 CASE FATALITY RATE	ISS 16-24 DEATHS	ISS 16-24 CASE FATALITY RATE	ISS >24 DEATHS	ISS >24 CASE FATALITY RATE	ISS NK/NR DEATHS	ISS NK/NR CASE FATALITY RATE
<1 year	12	0.31	16	1.85	40	1.81	105	44.30	25	4.74
1-4	30	0.20	21	0.95	77	3.93	224	38.69	47	2.83
5-9	18	0.12	20	0.75	25	1.42	113	23.99	33	2.71
10-14	26	0.17	24	0.51	53	2.09	158	18.27	47	2.60
15-19	135	0.46	194	1.60	268	3.91	957	25.26	266	5.88
20-24	203	0.65	266	2.02	377	5.22	1,155	27.14	363	7.68
25-34	291	0.64	393	2.14	534	5.34	1,491	28.11	482	7.10
35-44	227	0.57	286	1.73	469	4.89	1,156	26.42	418	7.11
45-54	251	0.63	325	1.76	602	5.11	1,336	27.48	536	9.13
55-64	200	0.76	292	1.97	582	6.34	976	30.04	436	10.62
65-74	222	1.32	321	2.51	636	8.84	742	36.43	314	13.26
75-84	379	2.13	694	3.61	1,148	12.74	1,019	48.04	371	17.24
≥85	436	3.42	880	4.95	867	14.19	625	53.88	207	16.95
NK/NR	73	4.27	144	15.52	40	14.08	31	27.93	17	9.63
Total	2,503		3,876		5,718		10,088		3,562	

Figure 23

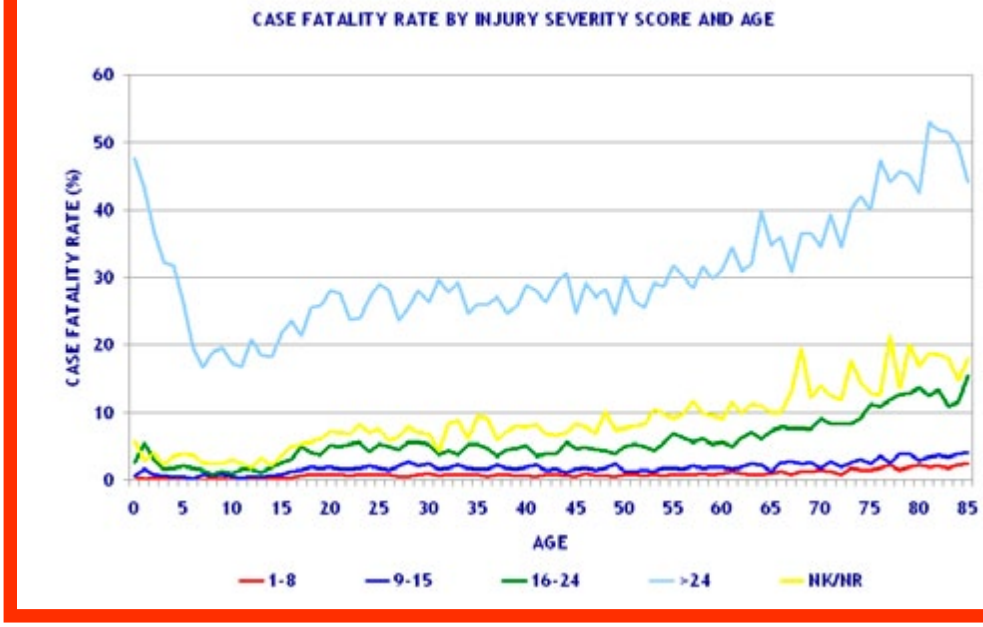


Table 24

INCIDENTS AND CASE FATALITY RATE BY WORK-RELATED INJURIES				
WORK-RELATED INJURY	NUMBER	PERCENT	DEATHS	CASE FATALITY RATE
No	555,294	81.42	22,220	4.00
Yes	25,898	3.80	588	2.27
NK/NR	55,263	8.10	2,743	4.96
Not Applicable	45,535	6.68	1,615	3.55
Total	681,990	100.00	27,166	

Figure 24A

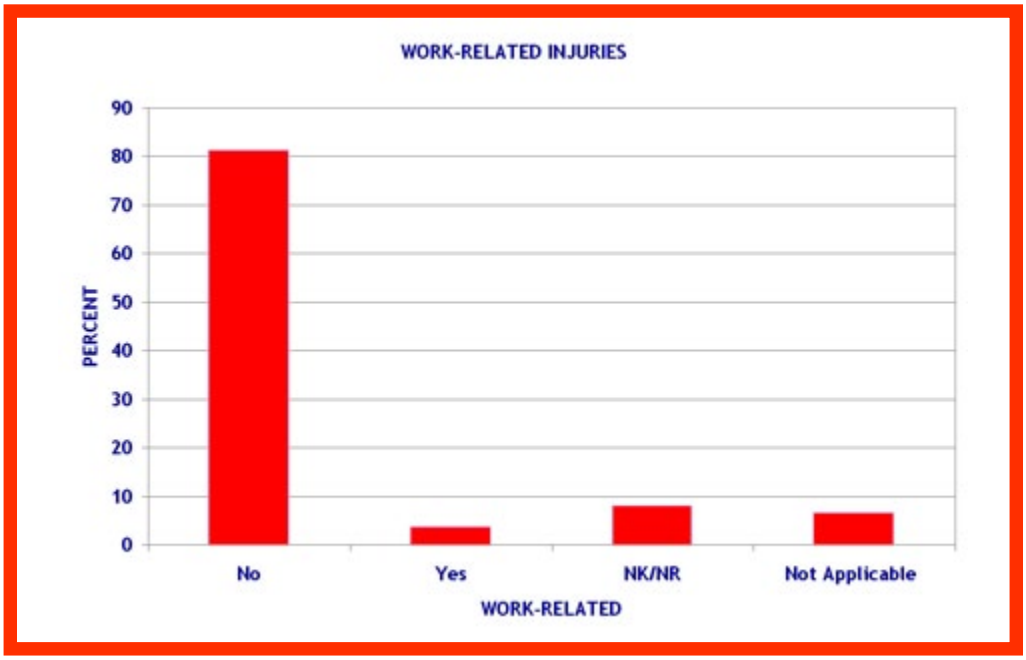


Figure 24B

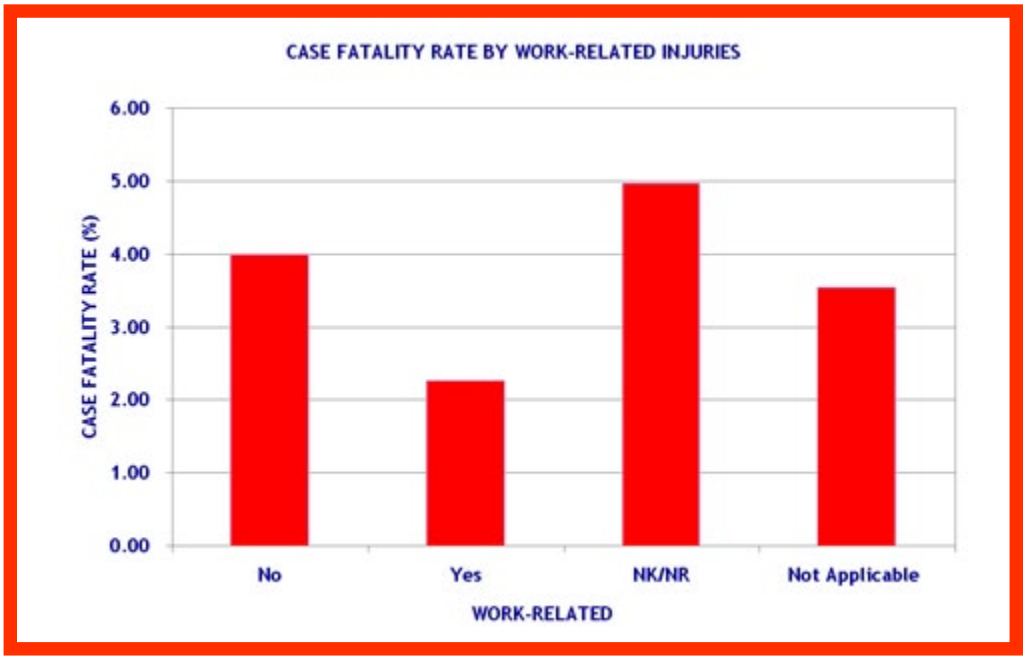


Table 25

INCIDENTS AND CASE FATALITY RATE BY INTENT				
INTENT	COUNT	PERCENT	DEATHS	CASE FATALITY RATE
Self-inflicted	10,104	1.48	1,824	18.05
Undetermined	3,261	0.48	363	11.13
Other	1,381	0.20	143	10.35
Assault	82,151	12.05	4,388	5.34
Unintentional	583,550	85.57	20,362	3.49
NK/NR	1,543	0.23	86	5.57
Total	681,990	100.00	27,166	

Figure 25

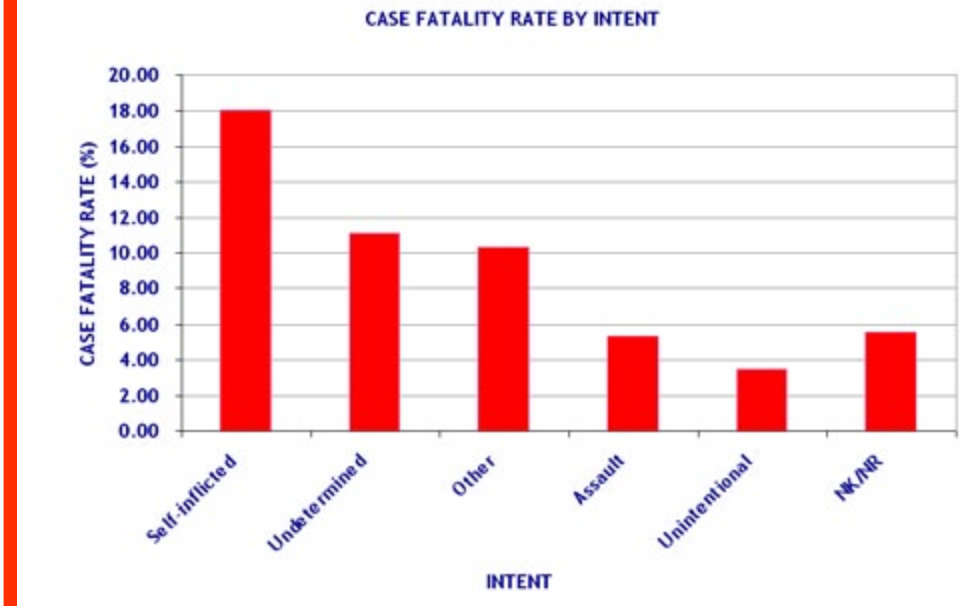


Table 26

CASE FATALITY RATE BY LOCATION E-CODE				
LOCATION OF INJURY	NUMBER	PERCENT	DEATHS	CASE FATALITY RATE
Residential Institution	20,941	3.07	1,154	5.51
Street	244,500	35.85	11,015	4.51
Home	208,658	30.60	8,982	4.30
Other	31,428	4.61	1,118	3.56
Public Building	30,748	4.51	946	3.08
Unspecified	57,582	8.44	1,741	3.02
Farm	4,843	0.71	109	2.25
Industry	15,346	2.25	305	1.99
Mine	343	0.05	4	1.17
Recreation	40,594	5.95	411	1.01
Not Applicable	963	0.14	32	3.32
NK/NR	26,044	3.82	1,349	5.18
Total	681,990	100	27,166	

Figure 26

Table 27

INCIDENTS BY AIS BODY REGION		
AIS BODY REGION	NUMBER	PERCENT
Lower Extremity	236,952	18.68
Head	223,650	17.63
Upper Extremity	189,600	14.95
Face	178,352	14.06
Thorax	135,733	10.7
Spine	115,516	9.11
Abdomen	86,978	6.86
External	73,330	5.78
Neck	6,925	0.55
NK/NR	21,480	1.69
Total Incidents	681,990	

**A patient can have injuries in multiple body regions*

Figure 27

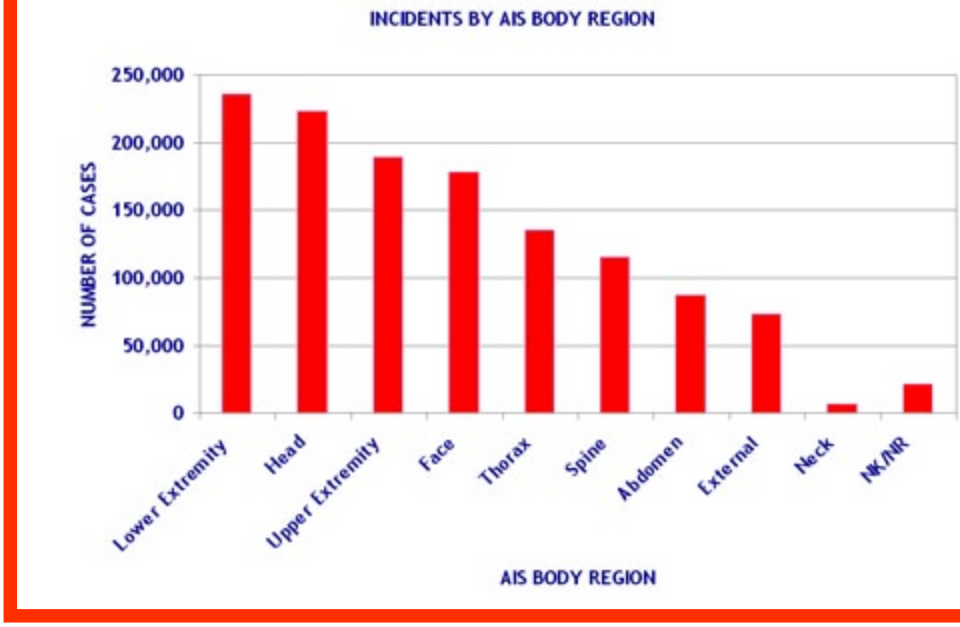


Table 28

INCIDENTS WITH AIS ≥ 3 BY AIS BODY REGION		
AIS BODY REGION	NUMBER	PERCENT
Head	123,321	35.04
Lower Extremity	92,045	26.16
Thorax	88,534	25.16
Abdomen	22,135	6.29
Upper Extremity	13,126	3.73
Spine	10,400	2.96
Neck	1,226	0.35
Face	693	0.20
External	426	0.12
Total Incidents	681,990	

**A patient can have injuries in multiple body regions.*

Figure 28

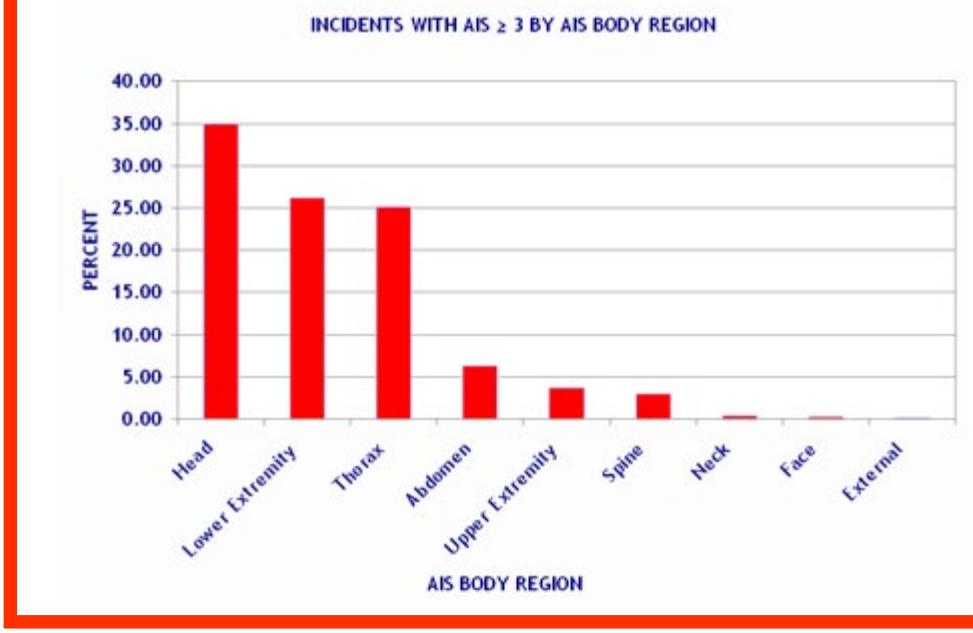


Table 29

INCIDENTS AND CASE FATALITY RATE BY AIS BODY REGION			
AIS BODY REGION	NUMBER	DEATHS	CASE FATALITY RATE
Abdomen	81,502	6,376	7.82
External	58,549	3,146	5.37
Face	155,848	7,930	5.09
Head	204,751	15,776	7.70
Lower Extremity	220,034	8,376	3.81
Neck	6,532	681	10.43
Spine	106,762	5,292	4.96
Thorax	126,219	10,794	8.55
Upper Extremity	172,597	6,355	3.68
NK/NR	18,481	1,304	7.06
Total Incidents/Deaths	681,990	27,166	

**A patient can have injuries in multiple body regions*

Figure 29

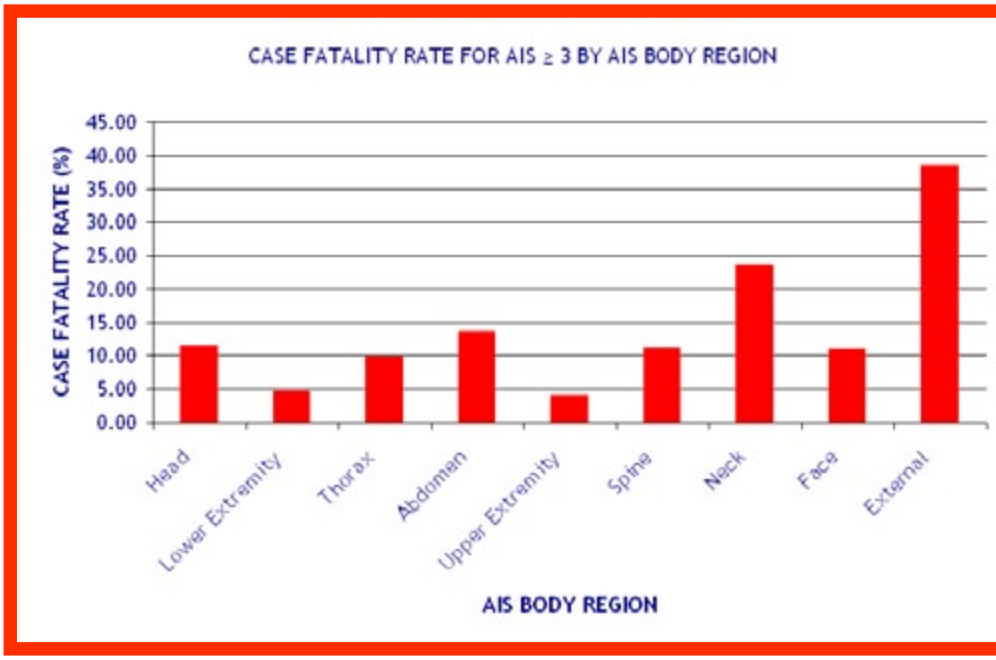
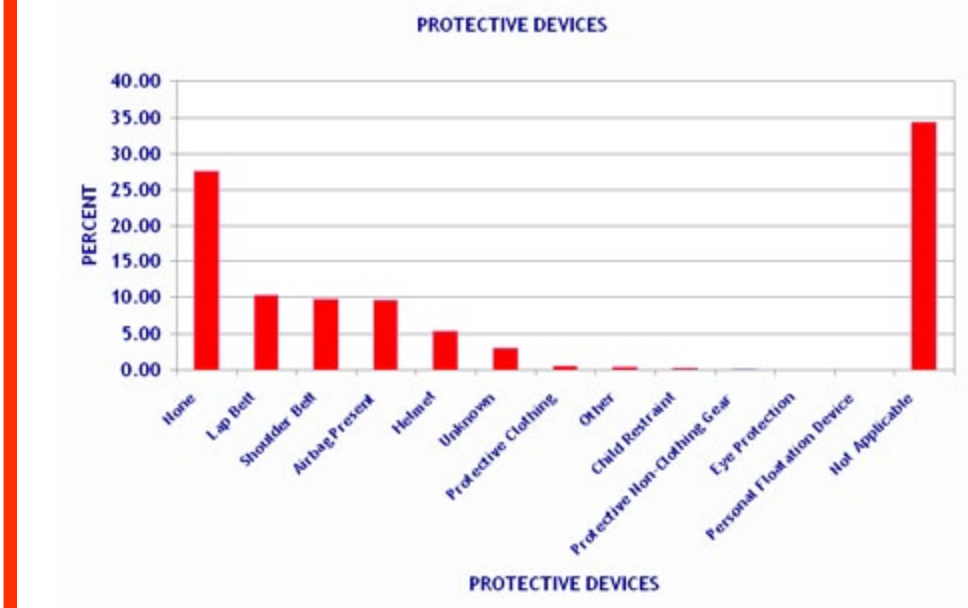


Table 30

INCIDENTS BY PROTECTIVE DEVICES		
PROTECTIVE DEVICES	NUMBER	PERCENT
None	188,537	27.65
Lap Belt	70,339	10.31
Shoulder Belt	66,500	9.75
Airbag Present	65,702	9.63
Helmet	36,715	5.38
Unknown	20,442	3.00
Protective Clothing	4,009	0.59
Other	3,149	0.46
Child Restraint	1,850	0.27
Protective Non-Clothing Gear	999	0.15
Eye Protection	258	0.04
Personal Floatation Device	182	0.03
Not Applicable	234,947	34.45
NK/NR	88,510	12.98
Total Incidents	681,990	

Figure 30



Outcomes

Table 31

MEDIAN TOTAL PREHOSPITAL TIME IN MINUTES BY MECHANISM OF INJURY		
MECHANISM	NUMBER	MEDIAN
Natural/environmental, Other	814	66
Transport, other	16,677	61
Hot object/substance	1,809	58
Fire/flame	2,714	55
Machinery	2,719	54
Other specified and classifiable	3,836	52
Drowning/submersion	161	50
Natural/environmental, bites & stings	883	49
Overexertion	507	49
Fall	108,547	48
Motor Vehicle Traffic	118,005	46
Struck by, against	20,324	44
Pedal cyclist, other	5,389	43
Pedestrian, other	1,284	42
Poisoning	161	42
Other specified, not elsewhere classifiable	1,433	41
Suffocation	347	41
Unspecified	3,726	40
NK/NR	708	38
Cut/pierce	15,275	35
Firearm	17,295	32

Figure 31

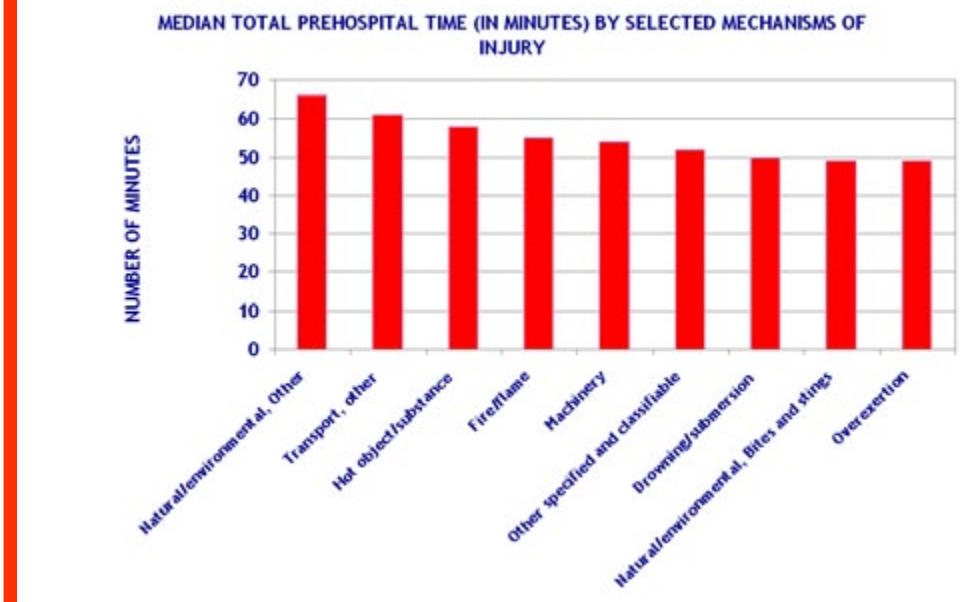


Table 32

MEDIAN TOTAL PREHOSPITAL TIME (IN MINS) BY INJURY SEVERITY SCORE		
ISS	NUMBER	MEDIAN
1-8	144,383	45
9-15	86,056	48
16-24	48,725	50
>24	20,373	47
NK/NR	23,204	44

Figure 32

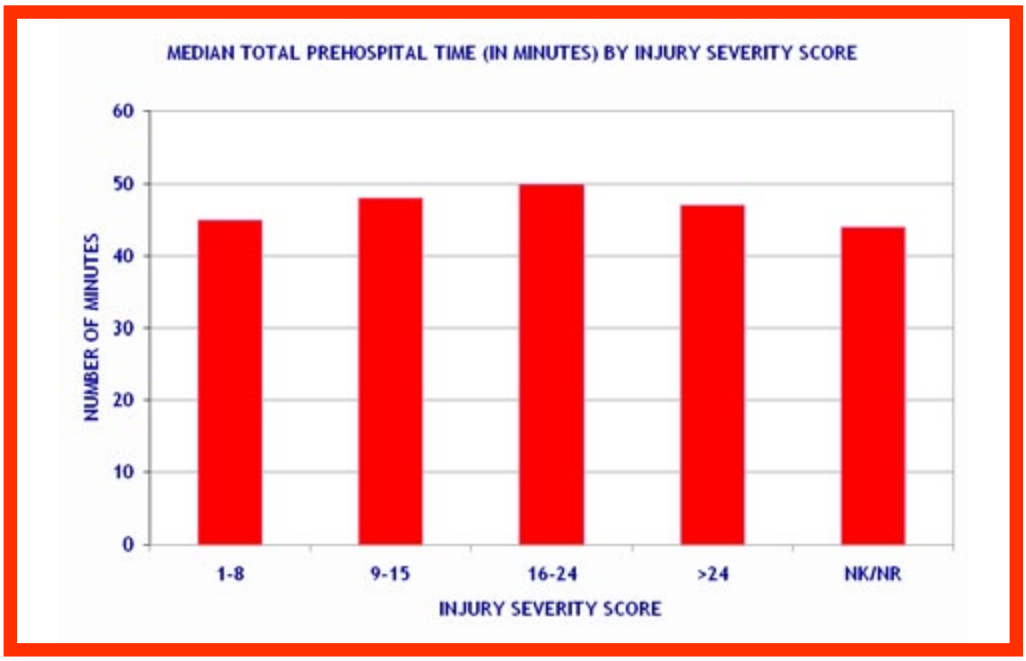


Table 33

MEDIAN LENGTH OF STAY (DAYS) BY MECHANISM OF INJURY		
MECHANISM	NUMBER	MEDIAN
Fall	251,905	4
Motor Vehicle Traffic	203,715	3
Struck by, against	51,650	2
Transport, other	37,632	3
Cut/pierce	32,680	2
Firearm	32,013	3
Pedal cyclist, other	12,563	2
Other specified and classifiable	10,955	2
Unspecified	8,324	3
Fire/flame	7,799	3
Hot object/substance	7,437	2
Machinery	6,867	2
Other specified, not elsewhere classifiable	3,641	2
Natural/environmental, Bites and stings	3,621	2
Pedestrian, other	2,440	3
Natural/environmental, Other	2,083	3
Overexertion	1,918	2
Suffocation	611	3
Drowning/submersion	371	2
Poisoning	320	2
NK/NR	1,496	1

Figure 33

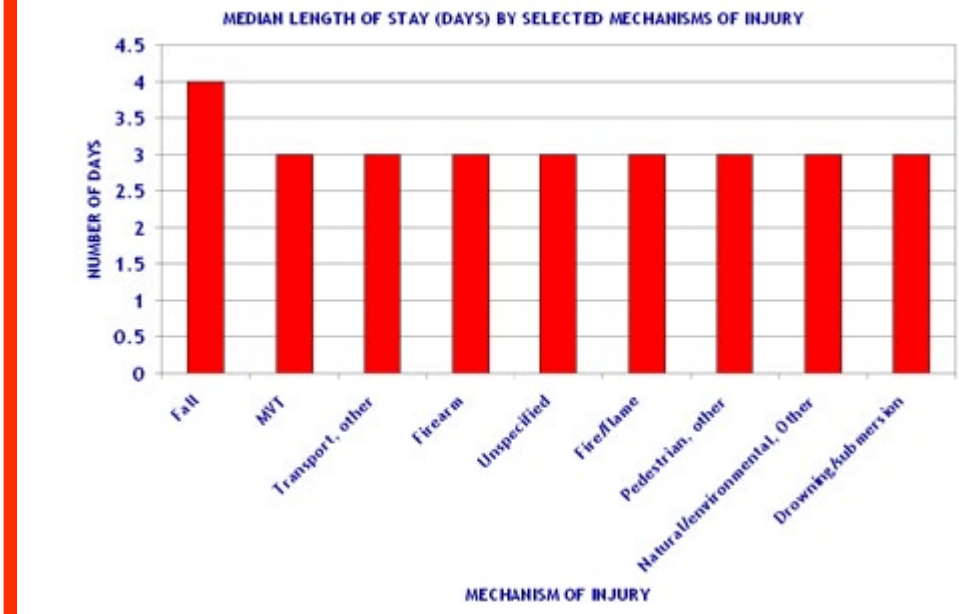


Table 34

MEDIAN LENGTH OF STAY (DAYS) BY INJURY SEVERITY SCORE		
ISS	NUMBER	MEDIAN
1-8	337,398	2
9-15	169,026	4
16-24	96,735	5
>24	34,188	7
NK/NR	43,004	3

Figure 34

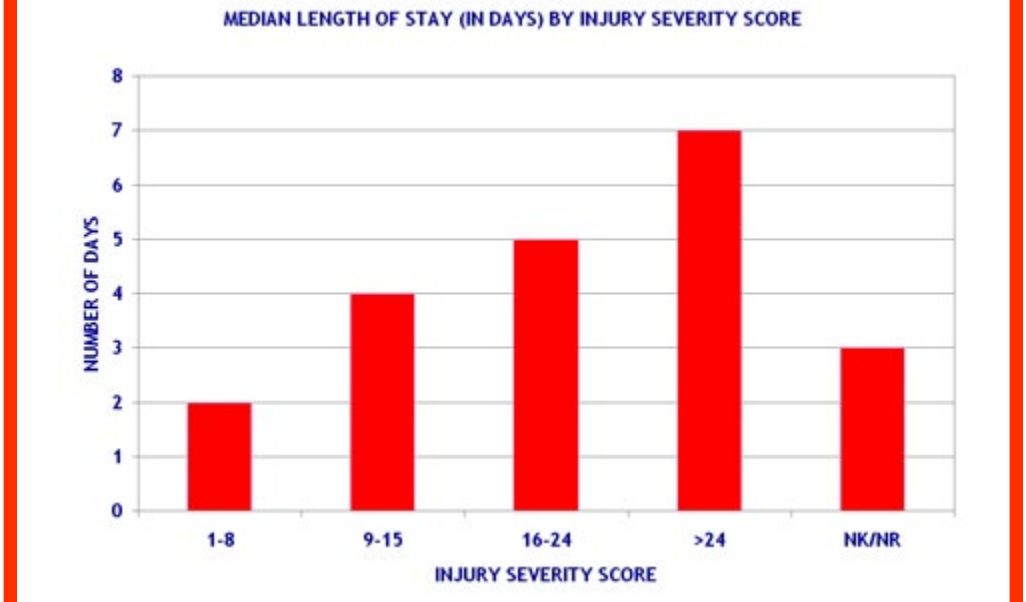


Table 35

MEDIAN VENTILATOR DAYS BY MECHANISM OF INJURY		
MECHANISM	NUMBER	MEDIAN
Fire/flame	961	8
Hot object/substance	128	7
Overexertion	7	7
Motor Vehicle Traffic	20,621	6
Pedestrian, other	221	6
Natural/environmental, Other	97	6
Drowning/submersion	54	6
Fall	10,673	5
Transport, other	2,310	5
Other specified and classifiable	795	5
Unspecified	772	5
Pedal cyclist, other	393	5
Machinery	229	5
Natural/environmental, Bites and stings	41	5
Poisoning	34	5
Firearm	4,092	4
Struck by, against	2,013	4
Other specified, not elsewhere classifiable	193	4
Suffocation	179	4
Cut/pierce	1,282	3
NK/NR	204	5

Figure 35

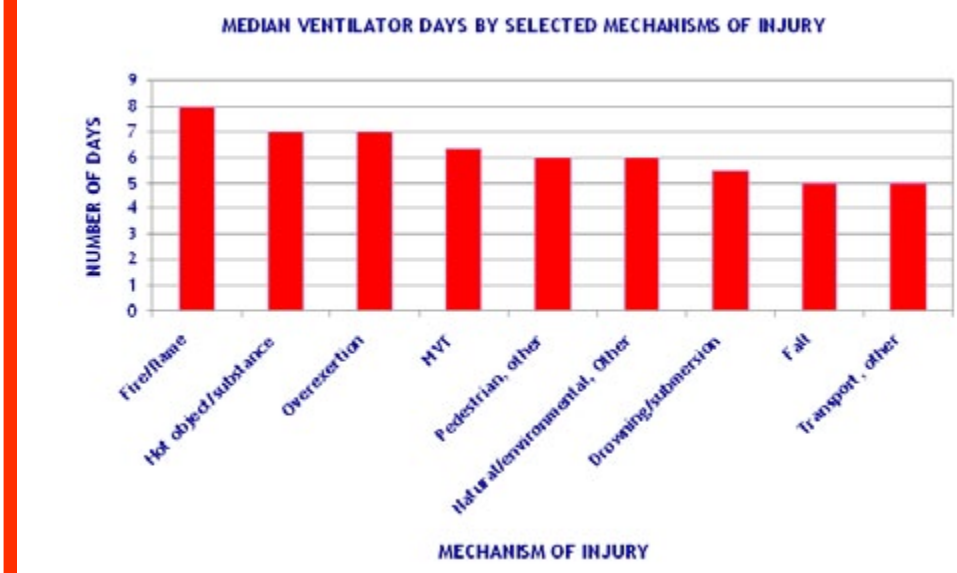


Table 36

MEDIAN VENTILATOR DAYS BY INJURY SEVERITY SCORE		
ISS	NUMBER	MEDIAN
1-8	4,722	3
9-15	7,050	4
16-24	13,776	5
>24	12,561	8
NK/NR	7,236	6

Figure 36

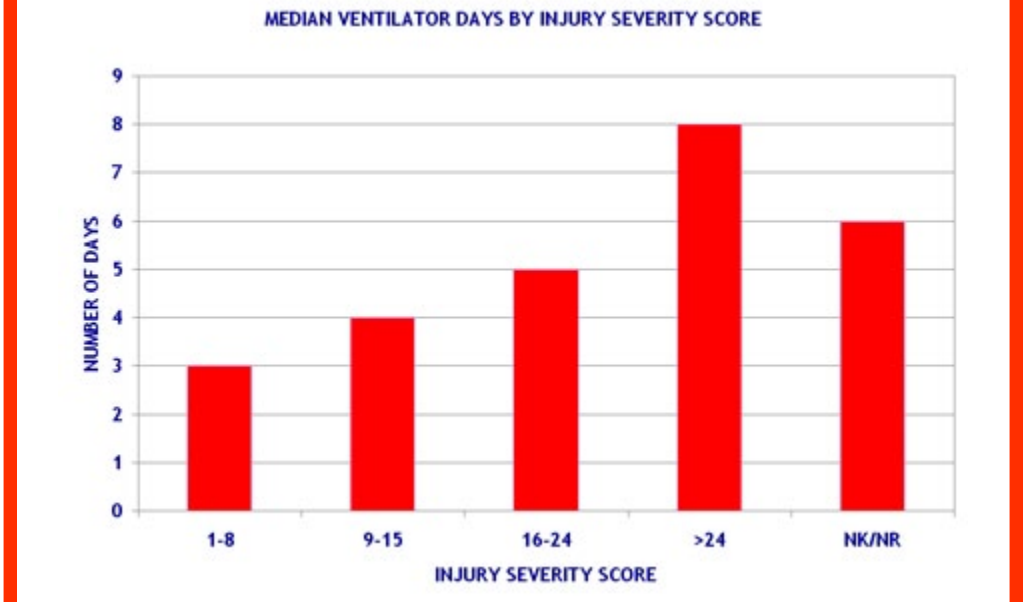


Table 37

MEDIAN ICU DAYS BY MECHANISM OF INURY		
MECHANISM	NUMBER	MEDIAN
Fire/flame	2,225	8
Hot object/substance	939	5
Drowning/submersion	104	5
MVT	47,435	4
Firearm	7,873	4
Other specified, classifiable	1,965	4
Unspecified	1,710	4
Machinery	704	4
Pedestrian, other	539	4
NK/NR	195	4
Fall	37,218	3
Transport, other	6,727	3
Struck by, against	6,357	3
Cut/pierce	3,527	3
Pedal cyclist, other	1,525	3
Other specified, not elsewhere classifiable	536	3
Natural/environmental, Other	368	3
Suffocation	253	3
Poisoning	68	3
Overexertion	44	3
Natural/environmental, Bites and stings	199	2

Figure 37

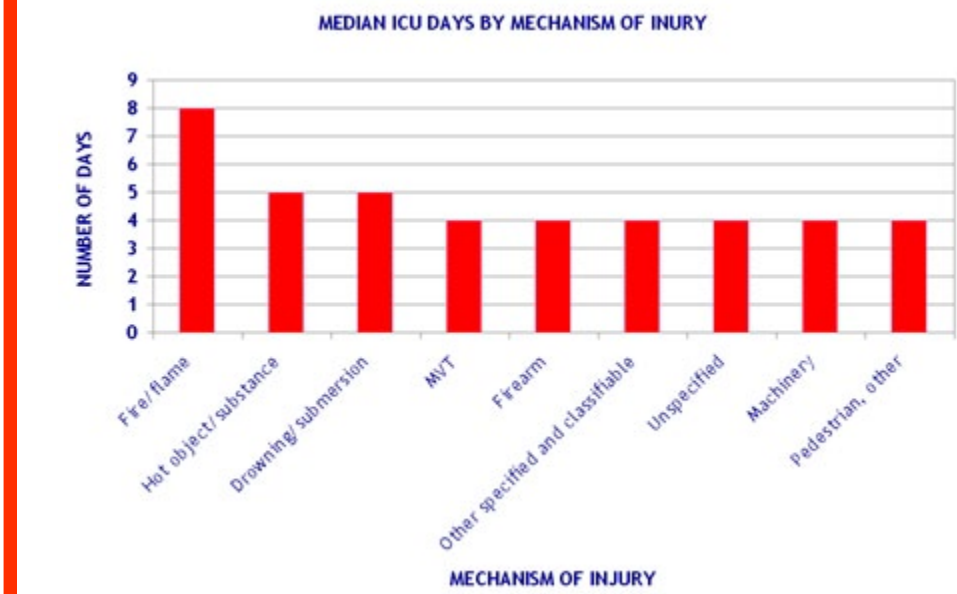


Table 38

MEDIAN ICU DAYS BY INJURY SEVERITY SCORE		
ISS	NUMBER	MEDIAN
1-8	18,808	3
9-15	25,899	3
16-24	41,038	4
>24	20,582	7
NK/NR	14,268	5

Figure 38

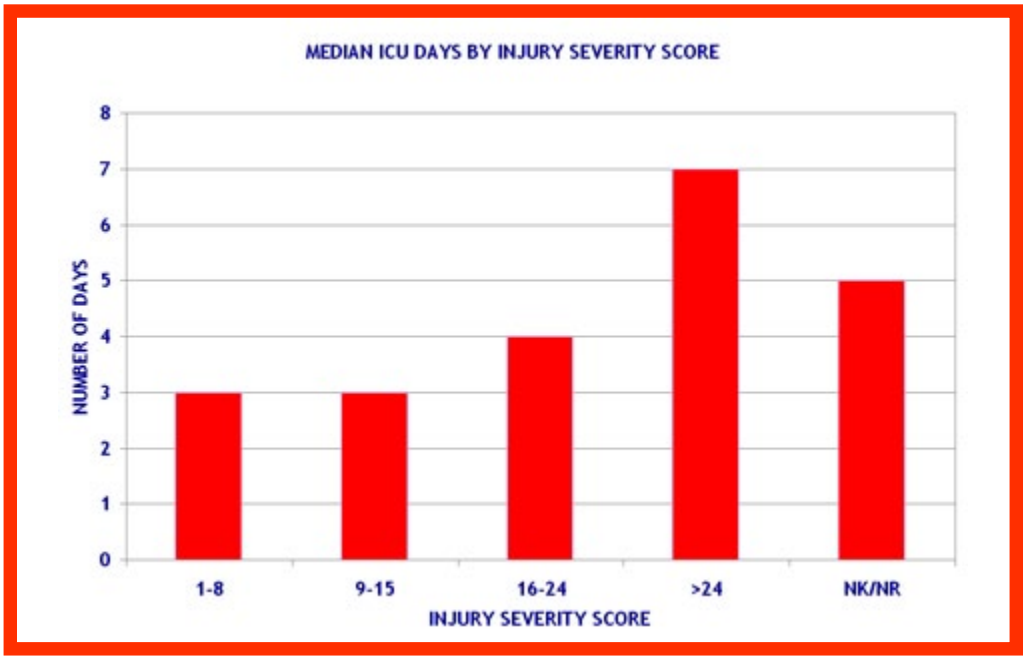


Table 39

ED DISCHARGE DISPOSITION		
ED DISCHARGE DISPOSITION	NUMBER	PERCENT
Floor bed	294,860	43.24
Intensive Care Unit	131,864	19.34
Operating Room	82,205	12.05
Home without services	58,646	8.60
Telemetry/step-down unit	42,376	6.21
Transferred to another hospital	23,745	3.48
Observation unit	11,065	1.62
Died	7,411	1.09
Other (jail, institutional care facility, etc)	3,960	0.58
Left against medical advice	1,361	0.20
Home with services	826	0.12
Not Applicable	16,130	2.37
NK/NR	7,541	1.11
Total	681,990	100.00

Figure 39

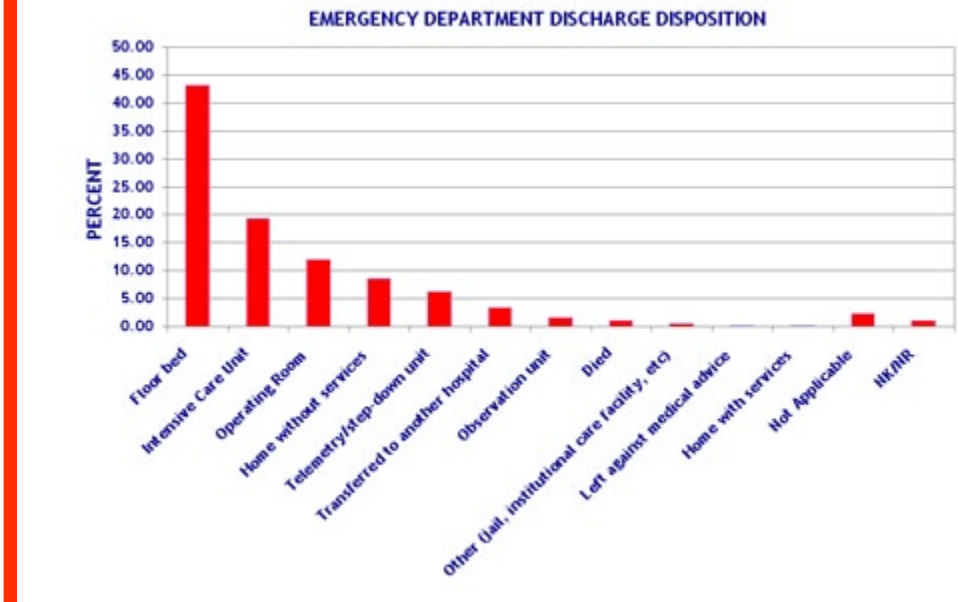


Table 40

REASONS FOR DEATH IN EMERGENCY DEPARTMENT		
Died in ED (other than failed resuscitation attempt)	NUMBER	PERCENT
Death after failed resuscitation attempt (failure to respond within 15 minutes)	1,337	4.92
DOA: Declared dead on arrival with minimal or no resuscitation attempt (no invasive procedures attempted)	1,469	5.41
Died in ED (other than failed resuscitation attempt)	4,528	16.67
Total Deaths	27,166	

Figure 40

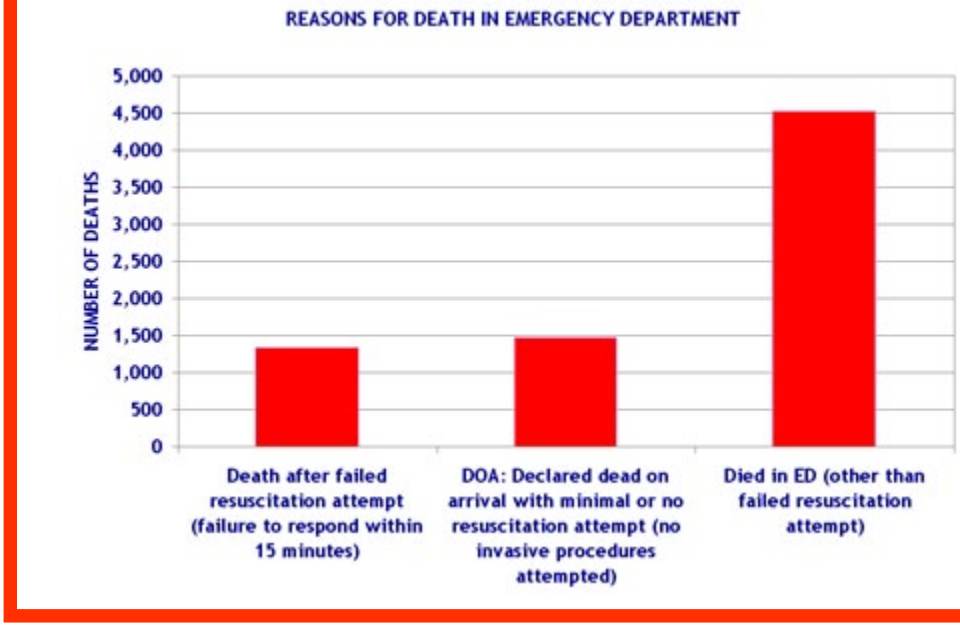
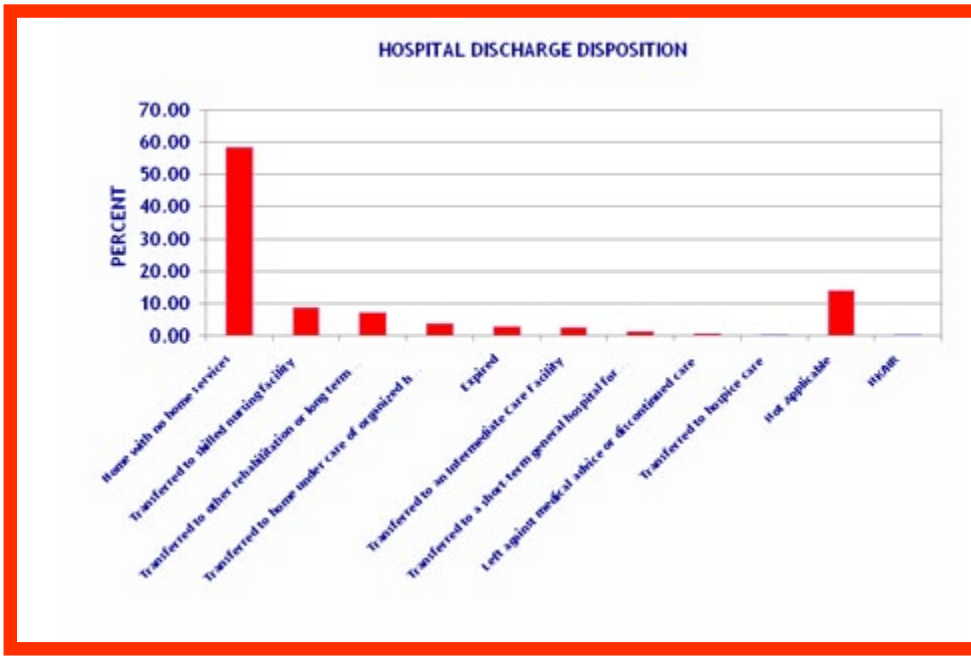


Table 41

HOSPITAL DISCHARGE DISPOSITION		
HOSPITAL DISCHARGE DISPOSITION	NUMBER	PERCENT
Home with no home services	399,088	58.52
Transferred to skilled nursing facility	59,373	8.71
Transferred to other rehabilitation or long term care	47,882	7.02
Transferred to home under care of organized home health service	25,835	3.79
Expired	19,755	2.90
Transferred to an Intermediate Care Facility	16,521	2.42
Transferred to a short-term general hospital for inpatient care	9,430	1.38
Left against medical advice or discontinued care	4,344	0.64
Transferred to hospice care	1,596	0.23
Not Applicable	95,949	14.07
NK/NR	2,217	0.33
Total	681,990	100.00

Figure 41



Regional Analyses

Table 42

INCIDENTS BY REGION		
REGION	NUMBER	PERCENT
SOUTH	237,033	34.76
MIDWEST	184,997	27.13
WEST	142,996	20.97
NORTHEAST	116,964	17.15
Total	681,990	100.00

Figure 42

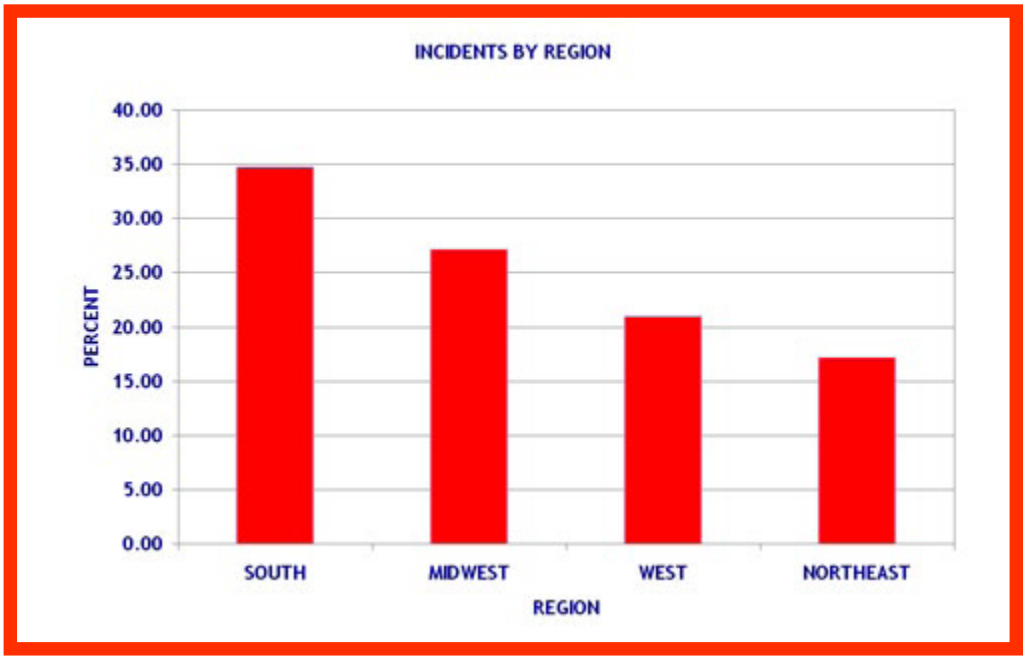


Table 43

CASE FATALITY RATE BY REGION			
REGION	NUMBER	DEATHS	CASE FATALITY RATE
SOUTH	237,033	10,070	4.25
NORTHEAST	116,964	4,884	4.18
WEST	142,996	5,437	3.80
MIDWEST	184,997	6,775	3.66
Total	681,990	27,166	

Figure 43

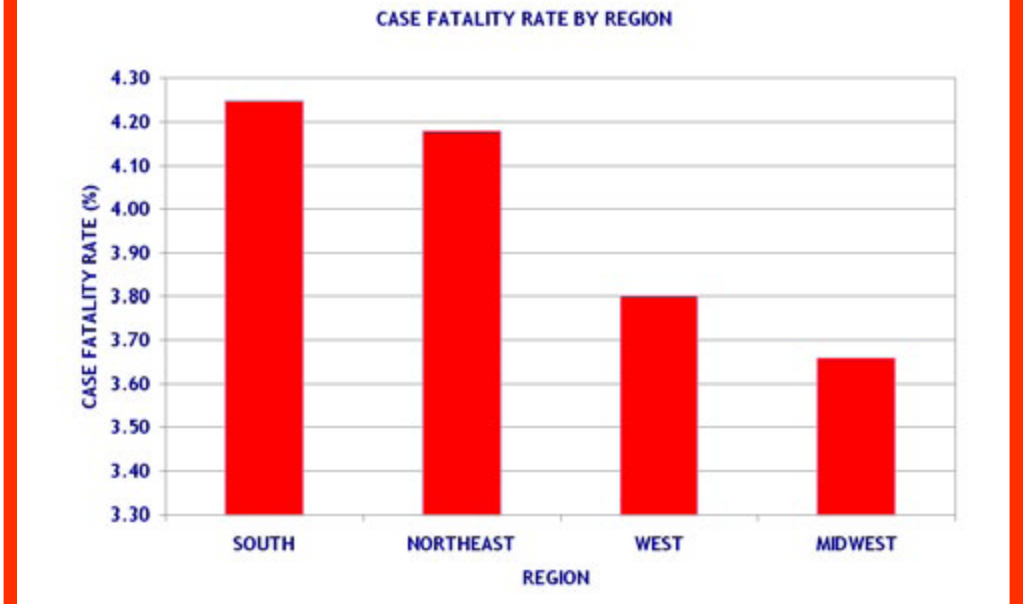


Table 44

MECHANISM OF INJURY BY REGION					
REGION	NUMBER	MIDWEST PERCENT	NORTHEAST PERCENT	SOUTH PERCENT	WEST PERCENT
Fall	252,326	43.35	44.84	31.29	31.83
Motor Vehicle Traffic	204,312	25.18	25.63	33.89	33.15
Struck By, Against	51,754	7.66	7.08	7.46	8.13
Transport, Other	37,775	5.03	4.46	5.83	6.59
Cut/pierce	32,737	3.73	4.46	5.21	5.79
Firearm	32,097	4.35	3.49	5.60	4.68
Pedal Cyclist, Other	12,587	1.80	1.81	1.26	2.90
Other Specified and Classifiable	10,988	1.55	1.37	1.91	1.38
Unspecified	8,338	1.27	1.30	1.12	1.28
Fire/Flame	7,824	1.28	0.98	1.43	0.64
Hot Object/Substance	7,448	1.14	1.14	1.35	0.58
Machinery	6,883	1.24	0.97	1.05	0.67
Other Specified, Not Elsewhere Classifiable	3,651	0.55	0.48	0.61	0.44
Natural/Environmental, Bites and Stings	3,628	0.56	0.38	0.69	0.36
Pedestrian, Other	2,447	0.31	0.48	0.33	0.37
Natural/Environmental, Other	2,099	0.33	0.22	0.33	0.32
Overexertion	1,920	0.32	0.34	0.32	0.13
NK/NR	1,543	0.10	0.29	0.10	0.55
Suffocation	625	0.10	0.07	0.09	0.09
Drown	373	0.04	0.05	0.06	0.06
Poisoning	321	0.07	0.04	0.03	0.04
Total	681,990	99.96	99.90	99.96	99.97

**Adverse effects have been removed from all mechanism tables, therefore percentages may not equal 100.*

Figure 44

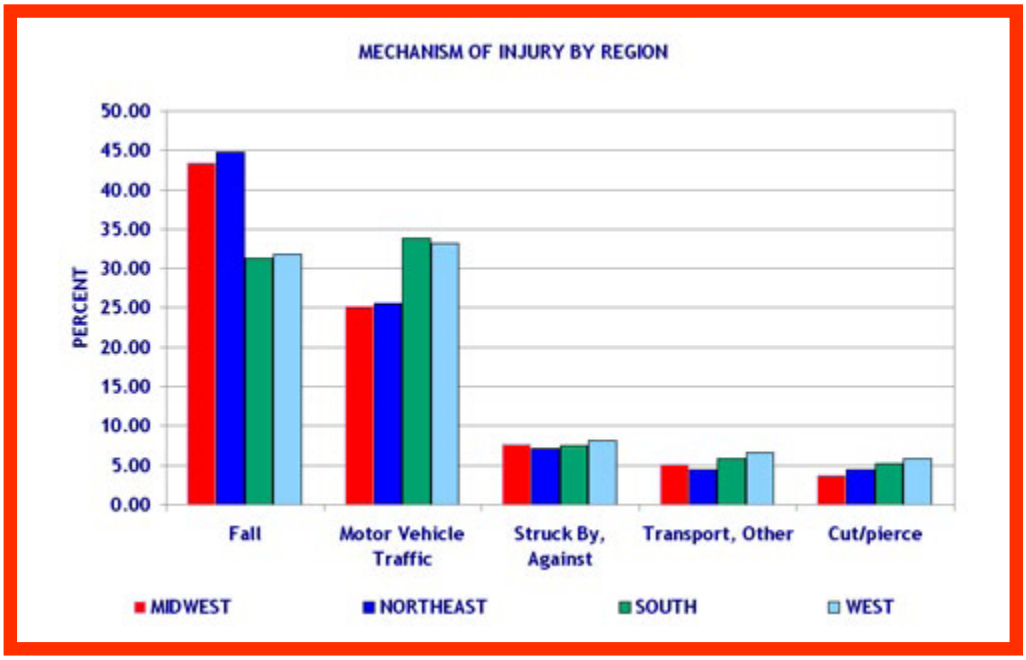


Table 45

INJURY SEVERITY SCORE BY REGION					
ISS	NUMBER	MIDWEST PERCENT	NORTHEAST PERCENT	SOUTH PERCENT	WEST PERCENT
1-8	338,348	50.30	48.27	50.40	48.51
9-15	169,371	25.47	25.72	24.62	23.65
16-24	96,925	13.36	16.37	14.16	13.64
>24	34,260	4.79	4.21	5.51	5.19
NK/NR	43,086	6.08	5.43	5.32	9.01
Total	681,990	100.00	100.00	100.00	100.00

Figure 45

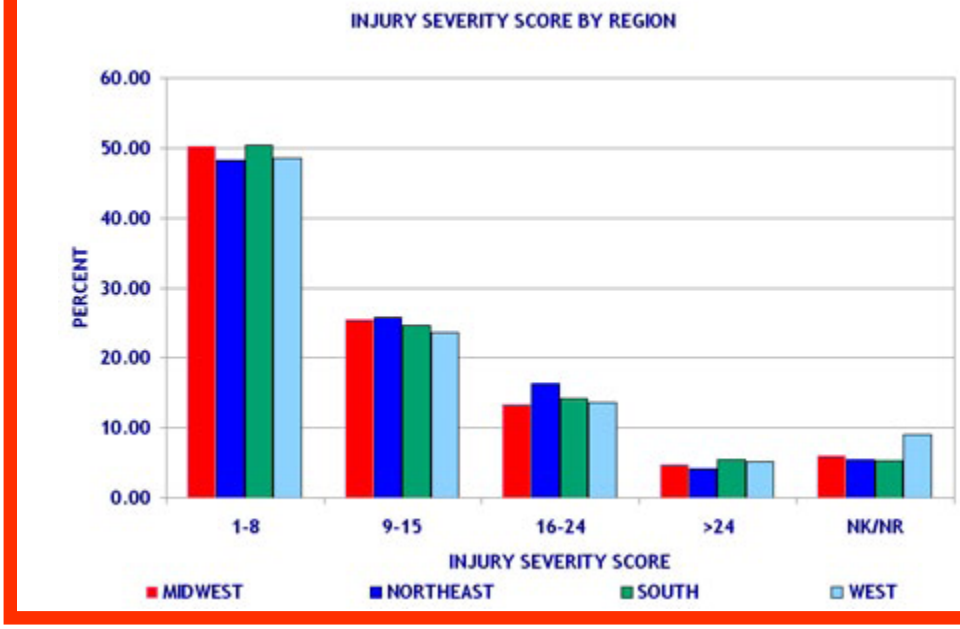


Table 46

INCIDENTS BY RURALITY		
URBAN CATEGORY	NUMBER	PERCENT
Urban	316,907	79.37
Rural	40,754	10.21
Suburban	30,248	7.58
Wilderness	11,372	2.85
Total	399,281	100.00

Figure 46

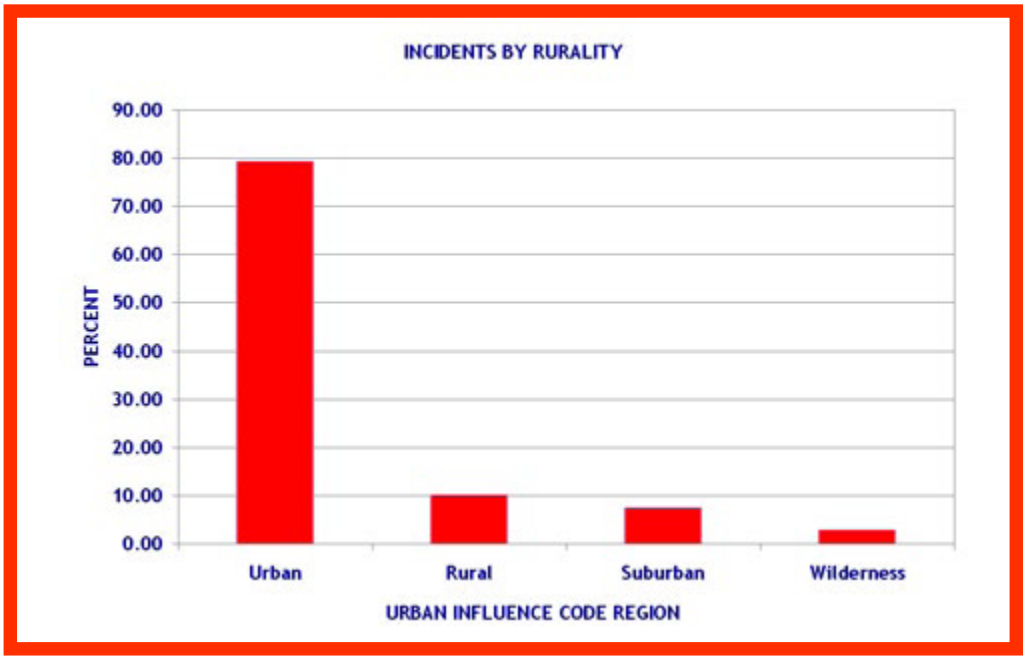


Table 47

CASE FATALITY RATE BY RURALITY			
URBAN CATEGORY	NUMBER	DEATHS	CASE FATALITY RATE
Suburban	30,248	1,264	4.18
Urban	316,907	13,022	4.11
Wilderness	11,372	441	3.88
Rural	40,754	1,560	3.83
Total	399,281	16,287	

Figure 47

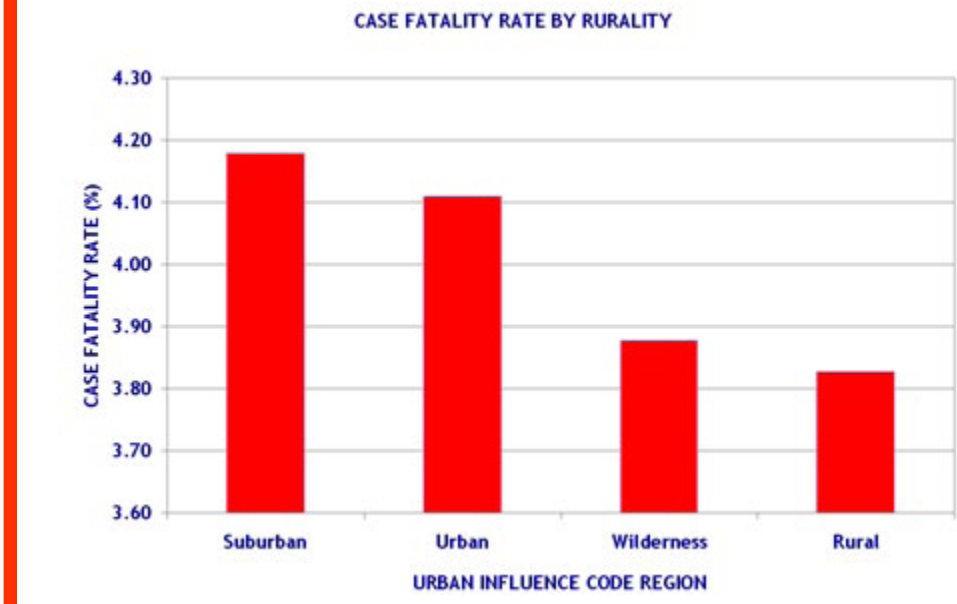


Table 48

MECHANISM OF INJURY BY RURALITY								
MECHANISM	NUMBER (URBAN)	PERCENT (URBAN)	NUMBER (SUBURBAN)	PERCENT (SUBURBAN)	NUMBER (RURAL)	PERCENT (RURAL)	NUMBER (WILDERNESS)	PERCENT (WILDERNESS)
Fall	116,943	36.92	10,551	34.89	13,294	32.63	3,699	32.54
Motor Vehicle Traffic	98,094	30.97	10,200	33.72	13,365	32.81	3,576	31.46
Struck by, against	23,850	7.53	2,022	6.69	2,795	6.86	705	6.20
Cut/pierce	16,632	5.25	921	3.05	1,656	4.07	346	3.04
Firearm	16,579	5.23	875	2.89	1,219	2.99	371	3.26
Transport, other	14,059	4.44	2,435	8.05	3,667	9.00	1,405	12.36
Pedal cyclist, other	5,396	1.70	359	1.19	432	1.06	110	0.97
Other specified and classifiable	4,625	1.46	552	1.83	910	2.23	220	1.94
Unspecified	3,589	1.13	220	0.73	363	0.89	79	0.69
Hot object/substance	3,452	1.09	399	1.32	444	1.09	119	1.05
Fire/flame	3,371	1.06	533	1.76	651	1.60	183	1.61
Machinery	2,619	0.83	474	1.57	713	1.75	224	1.97
Natural/environmental, Bites and stings	1,652	0.52	183	0.61	257	0.63	63	0.55
Other specified, not elsewhere classifiable	1,622	0.51	131	0.43	255	0.63	45	0.40
Pedestrian, other	1,289	0.41	104	0.34	126	0.31	56	0.49
NK/NR	856	0.27	18	0.06	56	0.14	6	0.05
Overexertion	827	0.26	68	0.22	183	0.45	33	0.29
Natural/environmental, Other	744	0.23	151	0.50	261	0.64	109	0.96
Suffocation	289	0.09	24	0.08	41	0.10	9	0.08
Drowning/submersion	149	0.05	13	0.04	31	0.08	7	0.06
Poisoning	113	0.04	12	0.04	18	0.04	2	0.02
Total	316,750	100.00	30,245	100.00	40,737	100.00	11,367	100.00

Figure 48

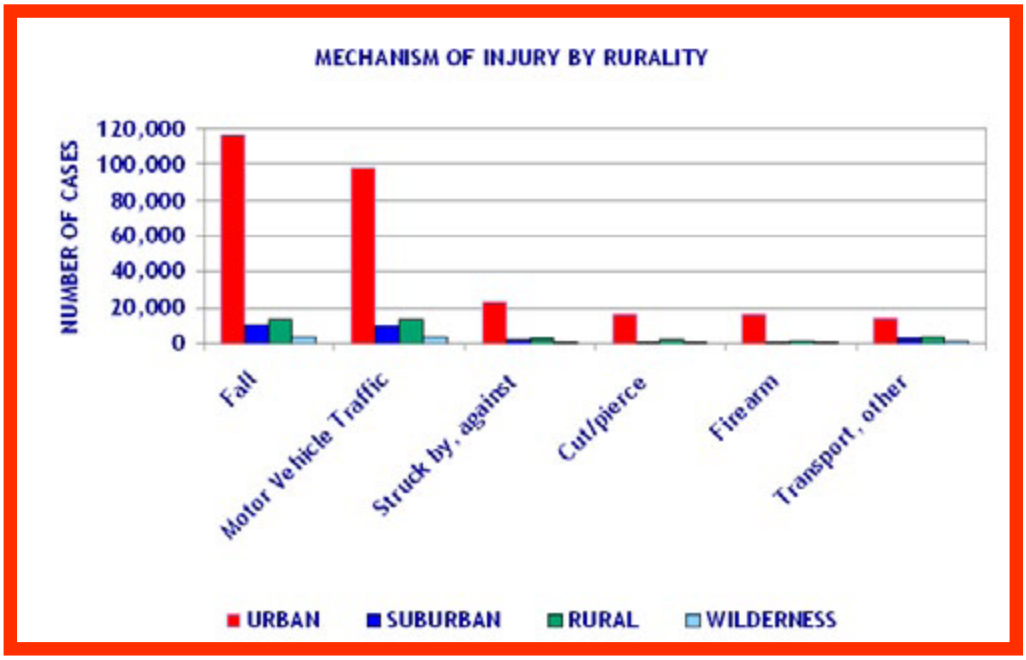
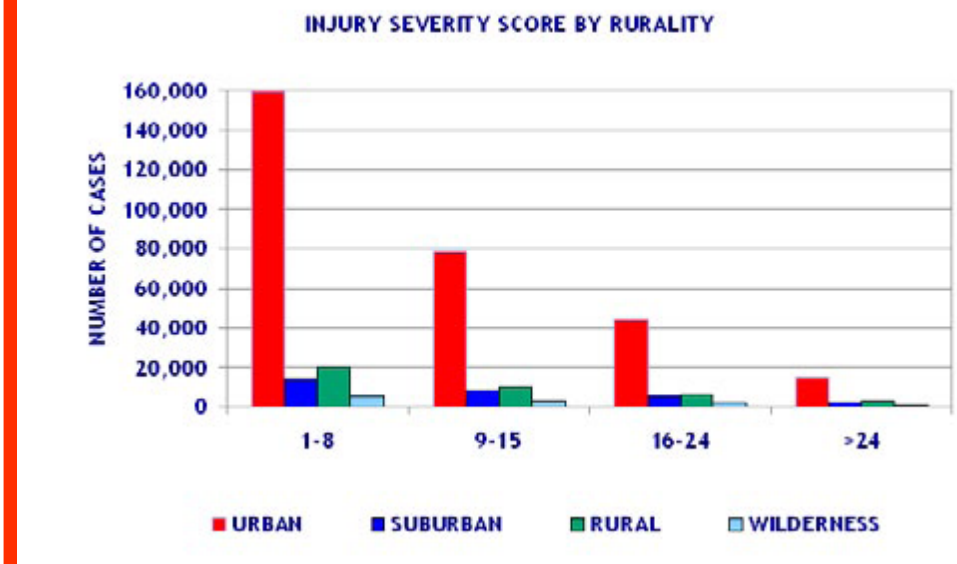


Table 49

INJURY SEVERITY SCORE BY RURALITY								
ISS	NUMBER (URBAN)	PERCENT (URBAN)	NUMBER (SUBURBAN)	PERCENT (SUBURBAN)	NUMBER (RURAL)	PERCENT (RURAL)	NUMBER (WILDERNESS)	PERCENT (WILDERNESS)
1-8	159,117	50.21	13,594	44.94	19,871	48.76	5,202	45.74
9-15	78,779	24.86	7,847	25.94	10,107	24.80	3,113	27.37
16-24	44,400	14.01	5,204	17.20	6,243	15.32	1,792	15.76
> 24	15,217	4.80	1,778	5.88	2,289	5.62	661	5.81
NK/NR	19,394	6.12	1,825	6.03	2,244	5.51	604	5.31
Total	316,907	100.00	30,248	100.00	40,754	100.00	11,372	100.00

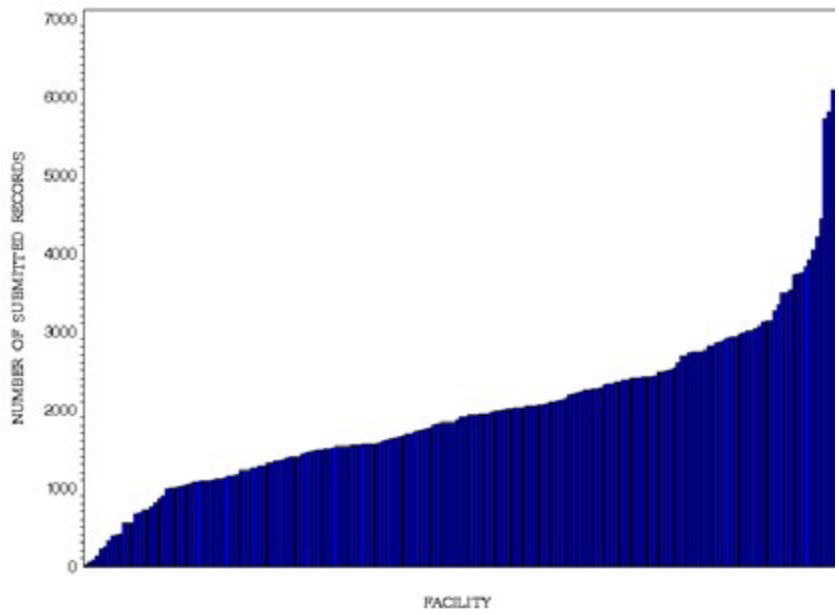
Figure 49



Comparative Analyses

Figure 50

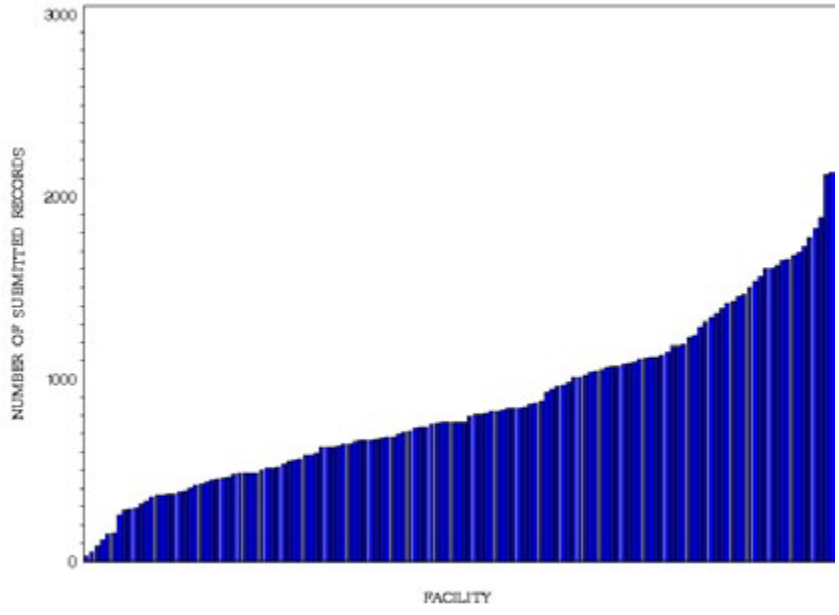
Number of Cases Submitted per Facility for Level I Facilities



Only cases with valid trauma diagnosis code per the NTDB criteria are included in the analysis. Trauma level is based upon ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

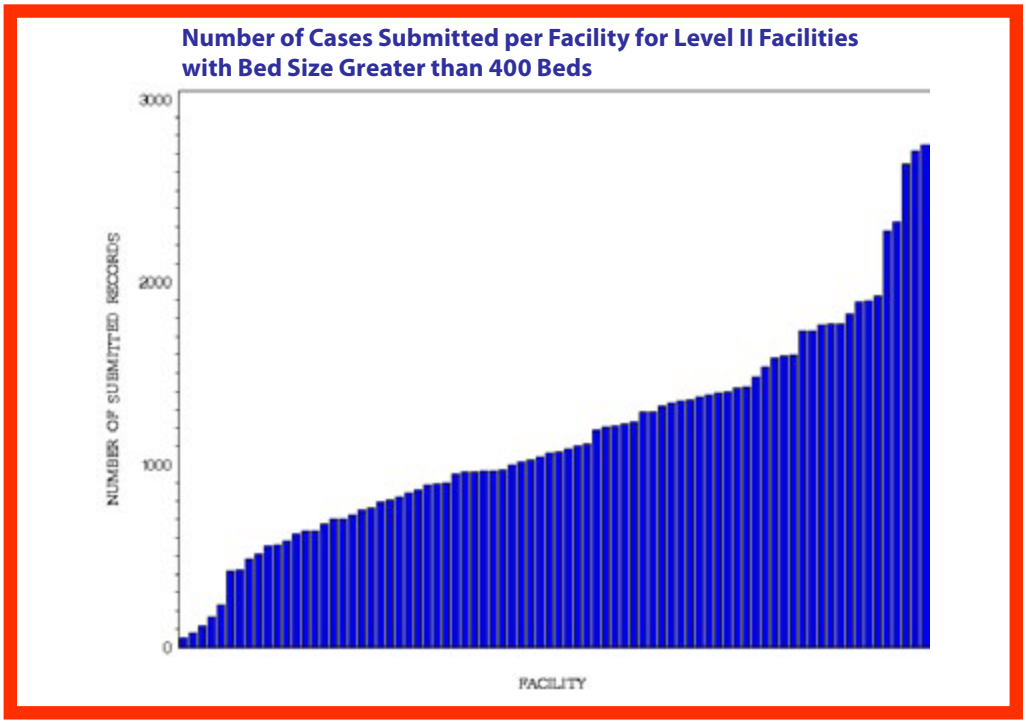
Figure 51

Number of Cases Submitted per Facility for Level II Facilities with Bed Size Less than or Equal to 400 Beds



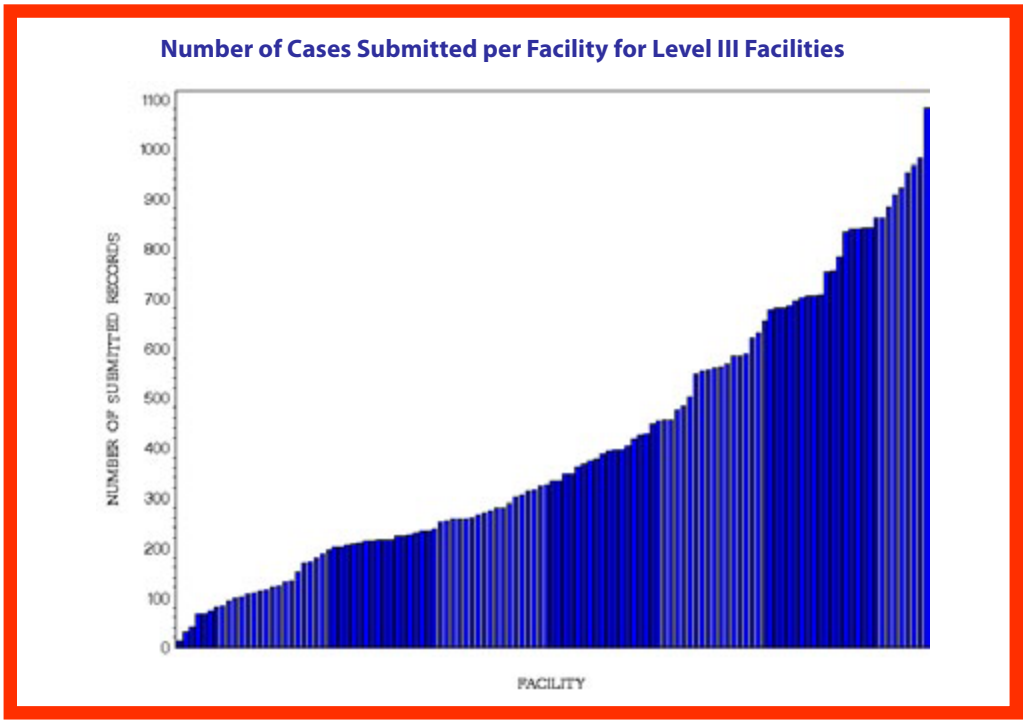
Only cases with valid trauma diagnosis code per the NTDB criteria are included in the analysis. Trauma level is based upon ACS verification and state designation; however, pediatric hospitals are not included in the analysis.

Figure 52



Only cases with valid trauma diagnosis code per the NTDB criteria are included in the analysis. Trauma level is based upon ACS verification and state designation; however, pediatric hospitals are not included in the analysis.

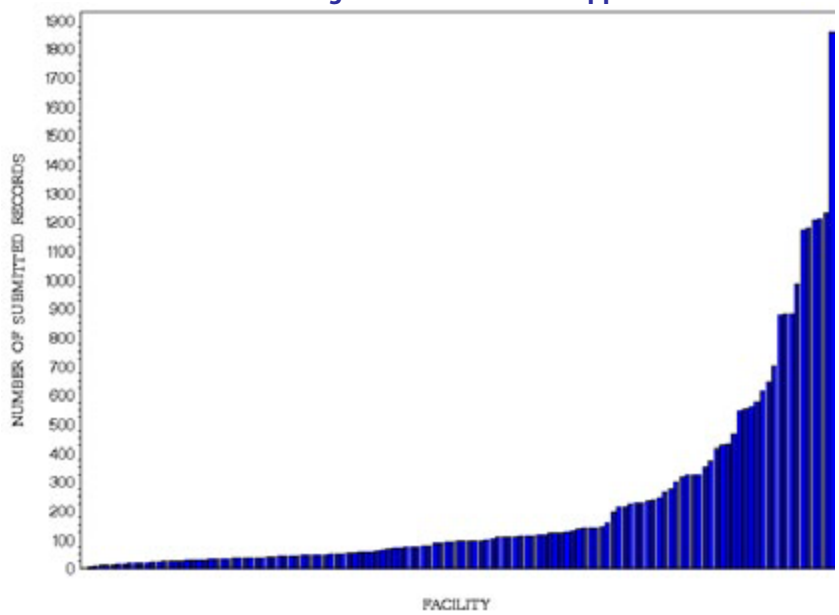
Figure 53



Only cases with valid trauma diagnosis code per the NTDB criteria are included in the analysis. Trauma level is based upon ACS verification and state designation.

Figure 54

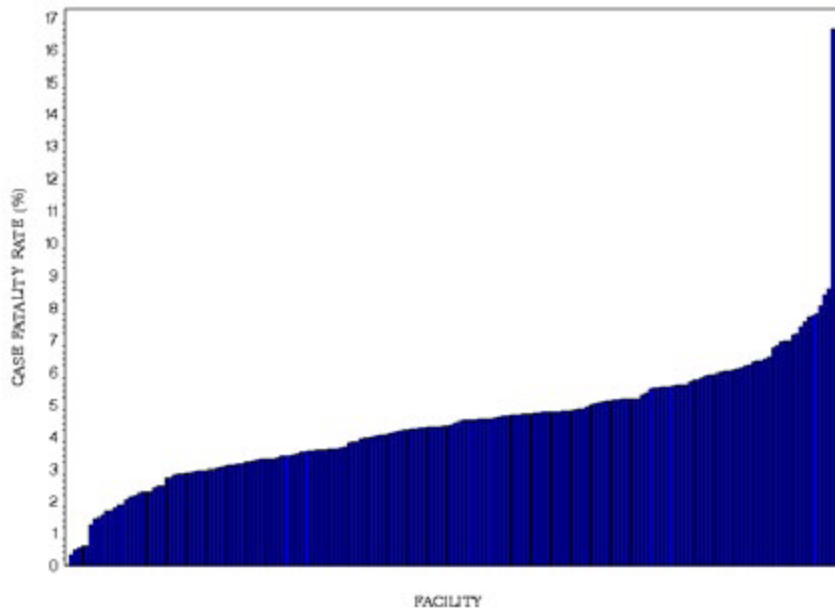
Number of Cases Submitted per Facility for Level IV Facilities and Facilities with Designation Other or Not Applicable



Only cases with valid trauma diagnosis code per the NTDB criteria are included in the analysis. Trauma level is based upon ACS verification and state designation.

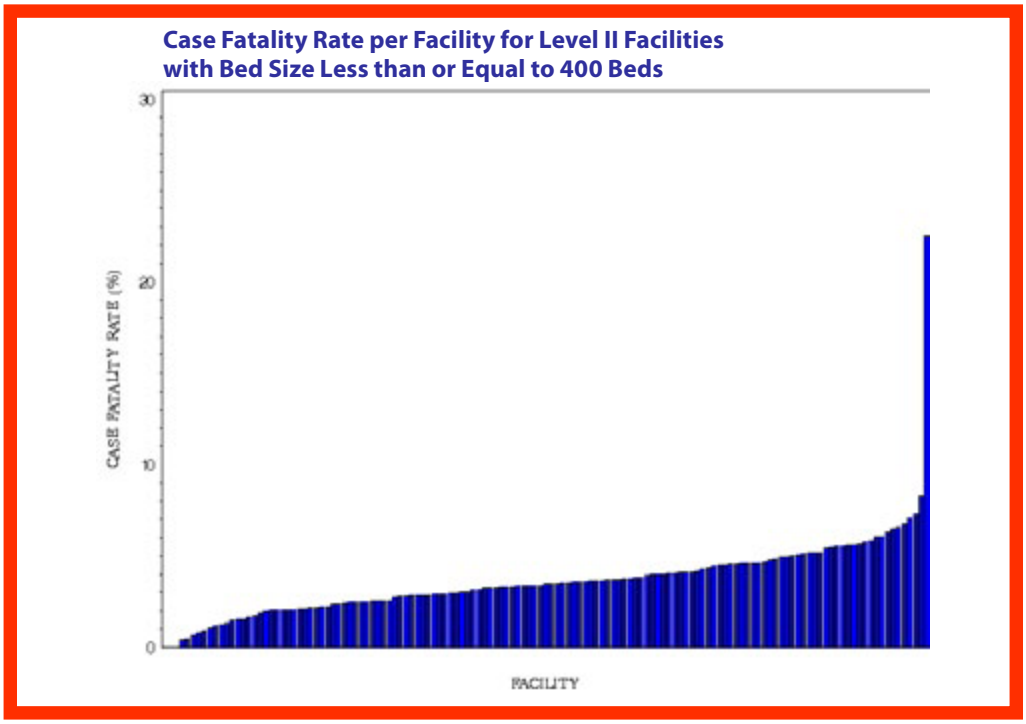
Figure 55

Case Fatality Rate per Facility for Level I Facilities



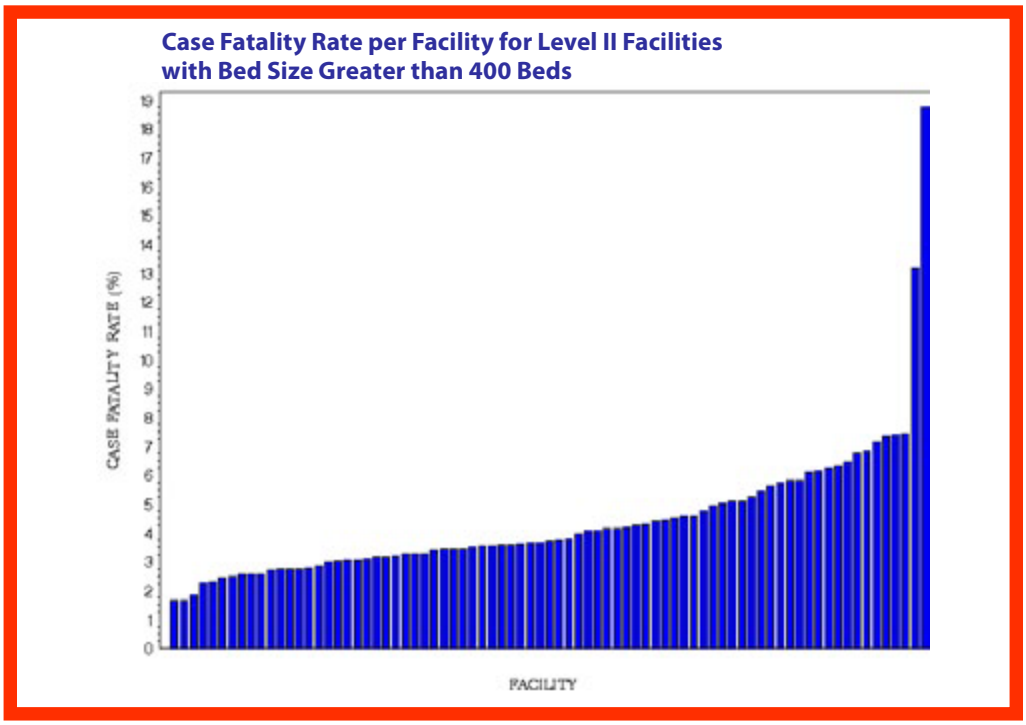
One facility out of the 194 level I facilities had a case fatality rate of 0% reported and is therefore not visible on the graph. All deaths including Dead on Arrival are included in the analysis. Trauma level is based upon ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

Figure 56



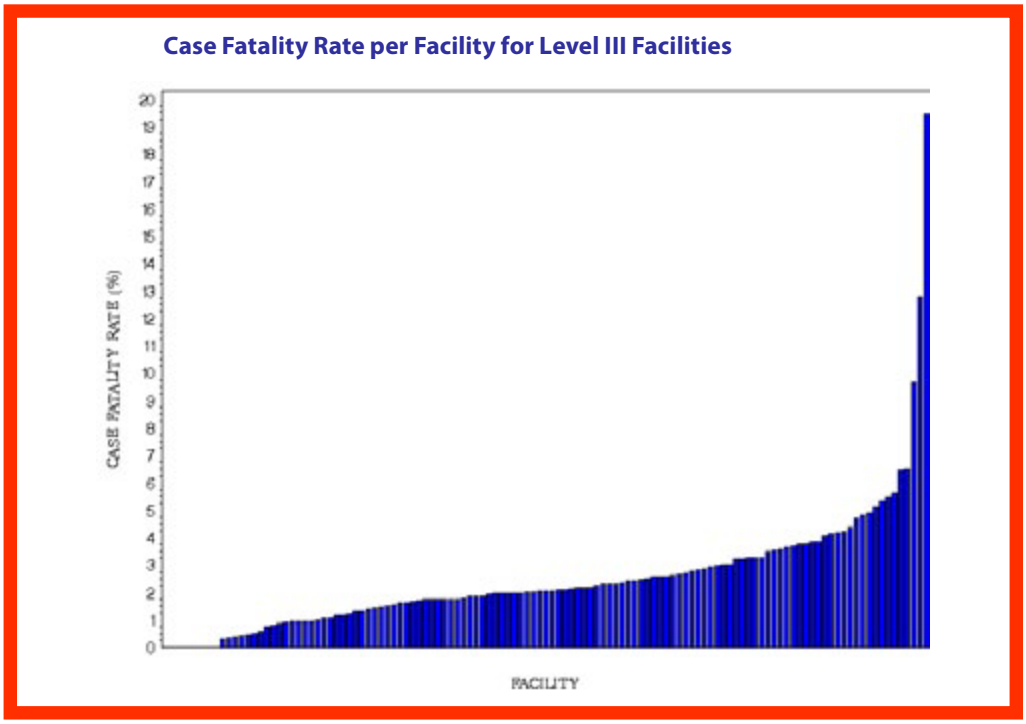
Three out of the 137 facilities had a case fatality rate of 0% reported and are therefore not visible on the graph. All deaths including Dead on Arrival are included in the analysis. Trauma level is based upon ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

Figure 57



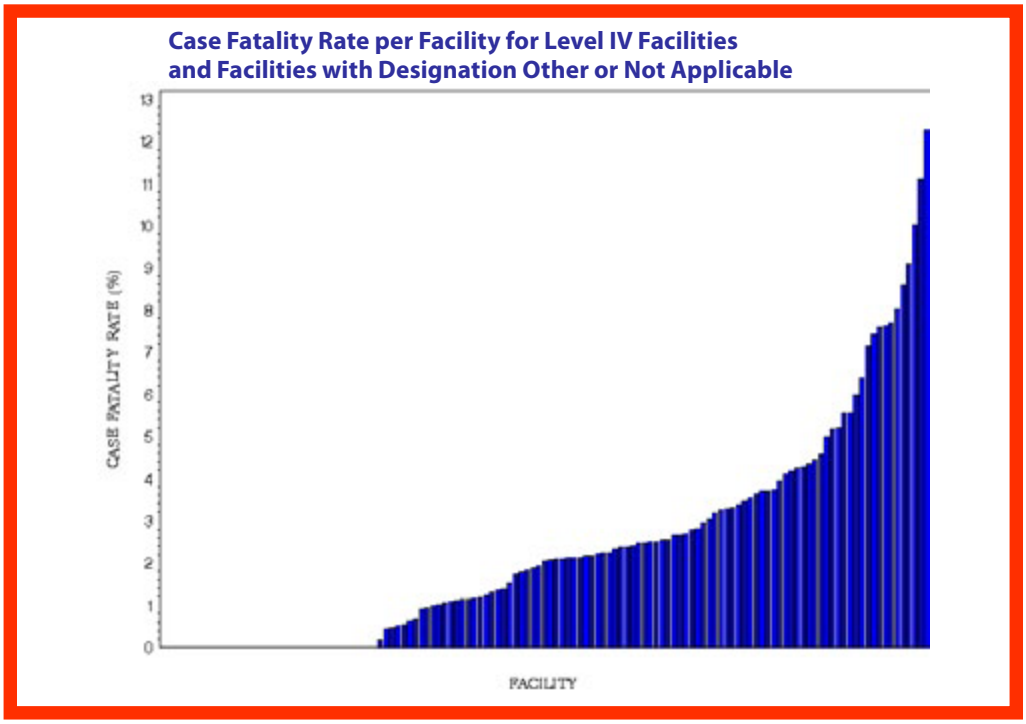
One facility out of the 80 level II facilities had a case fatality rate of 0% reported and is therefore not visible on the graph. All deaths including Dead on Arrival are included in the analysis. Trauma level is based upon ACS verification and state designation.

Figure 58



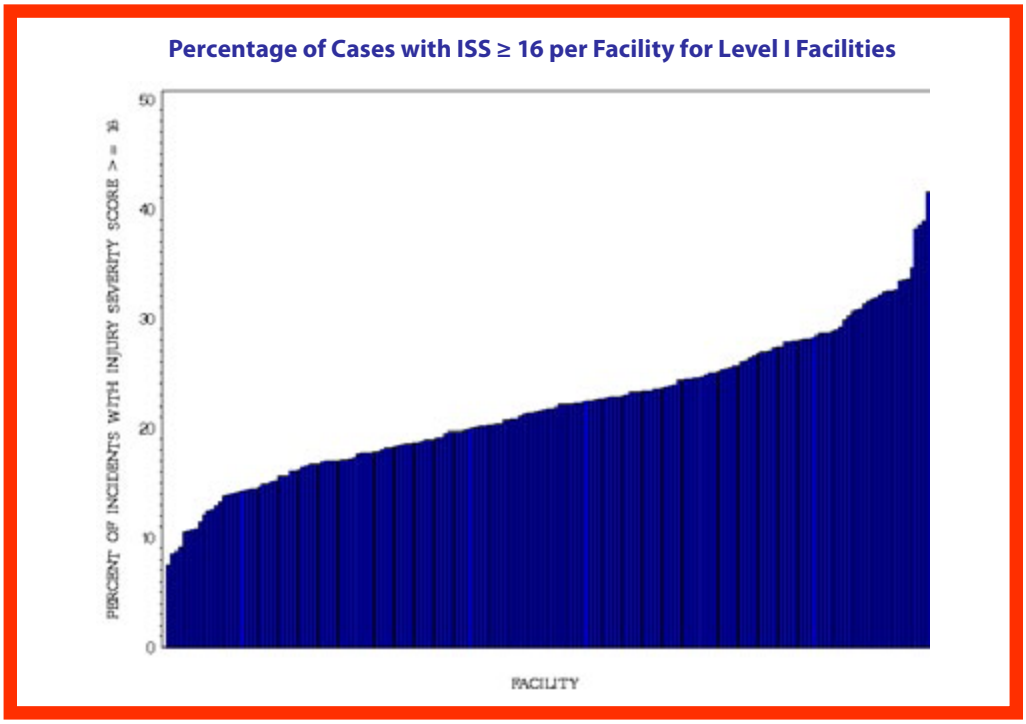
Four facilities out of the 121 level II facilities had a case fatality rate of 0% reported and is therefore not visible on the graph. All deaths including Dead on Arrival are included in the analysis. Trauma level is based upon ACS verification and state designation.

Figure 59



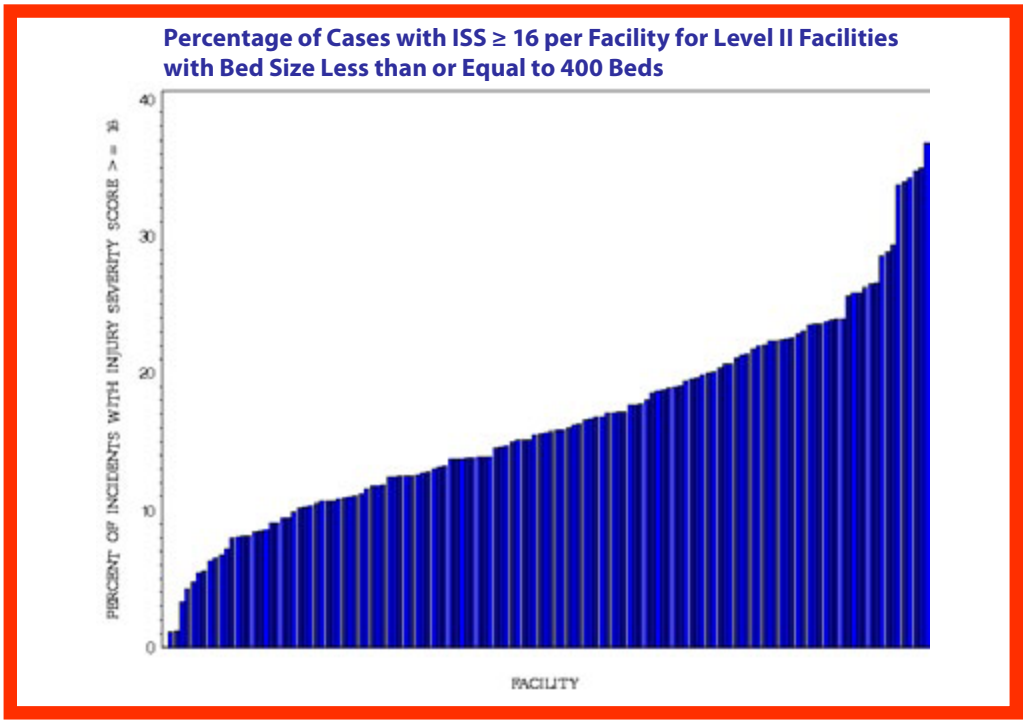
Thirty-seven facilities out of the 131 facilities had a case fatality rate of 0% reported and is therefore not visible on the graph. All deaths including Dead on Arrival are included in the analysis. Trauma level is based upon ACS verification and state designation.

Figure 60



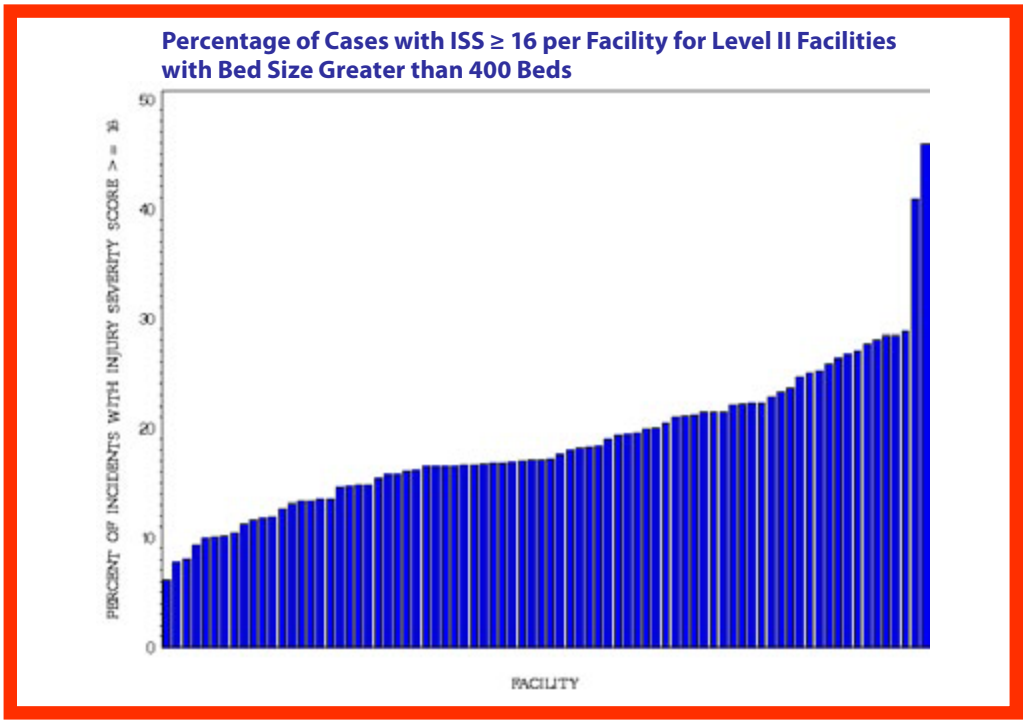
The ISS score calculated for all records are based on the ICD-90 map. Trauma level is based upon ACS verification and state designation; however, pediatric hospitals are not included in the analysis.

Figure 61



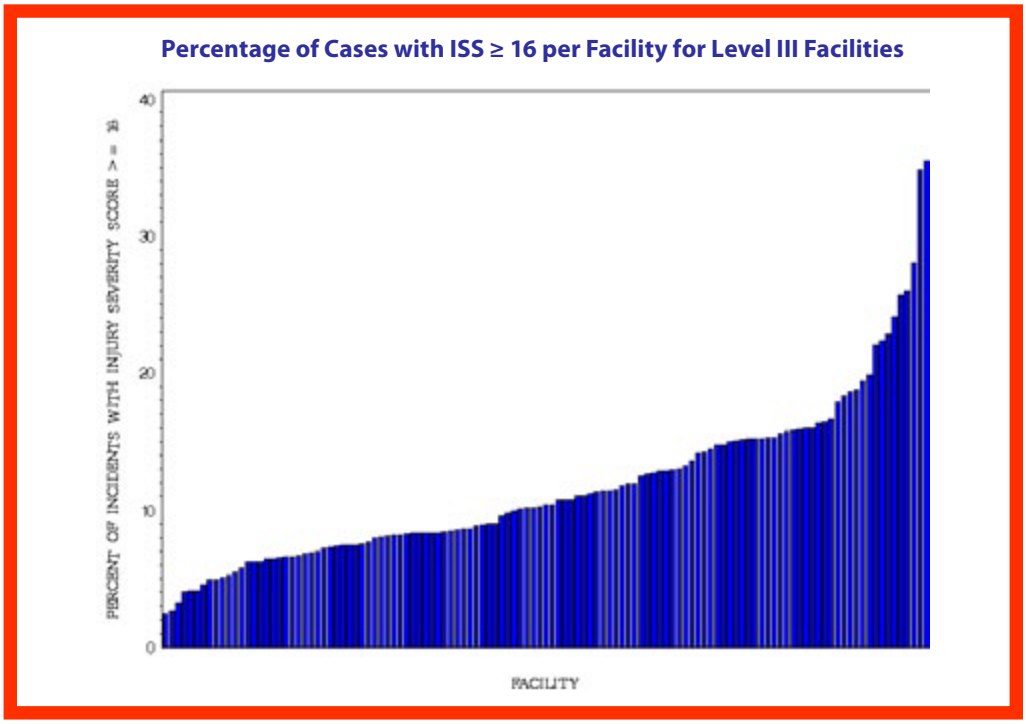
The ISS score calculated for all records are based on the ICD-90 map. Trauma level is based upon ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

Figure 62



The ISS score calculated for all records are based on the ICD-90 map. Trauma level is based upon ACS verification and state designation; however, pediatric hospitals are not included in the analysis.

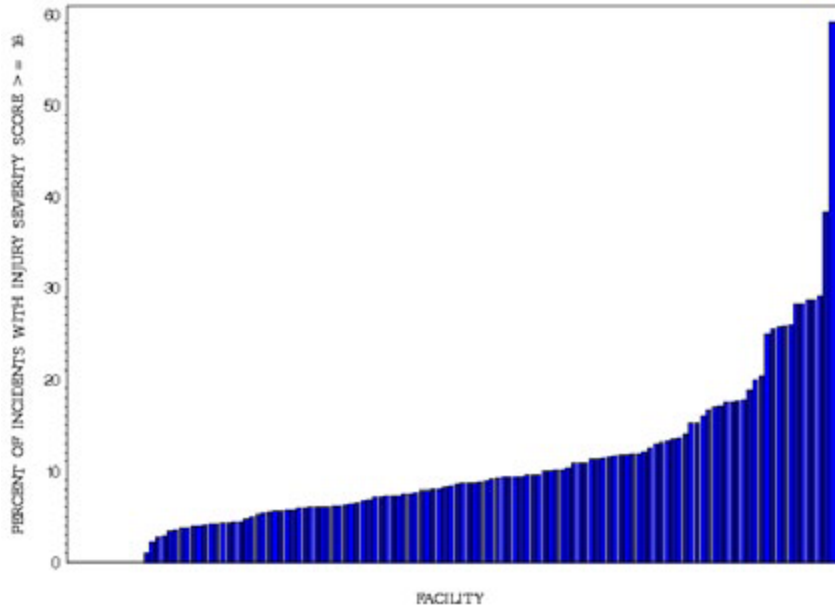
Figure 63



The ISS score calculated for all records are based on the ICD-90. Trauma level is based upon ACS verification and state designation.

Figure 64

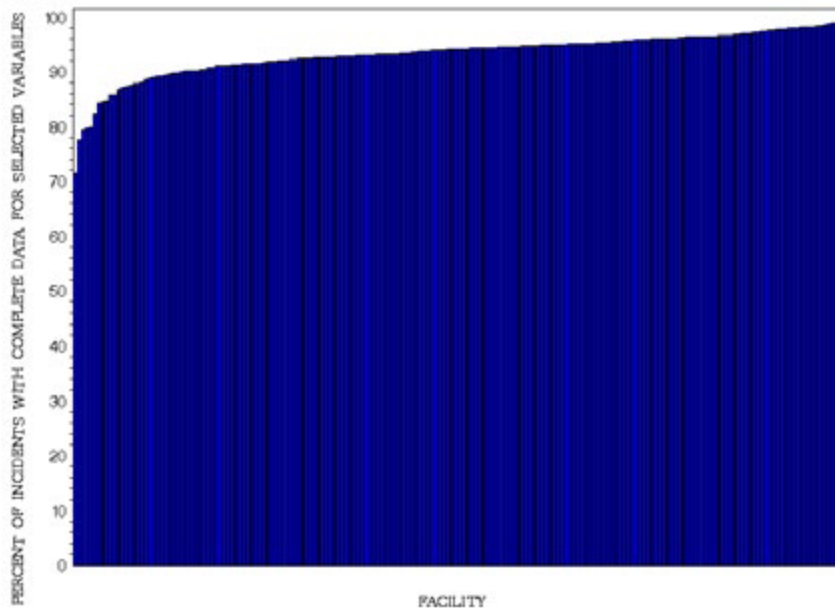
Percentage of Cases with ISS ≥ 16 per Facility for Level IV Facilities and Facilities with Designation Other or Not Applicable



Thirteen out of 131 facilities had no incidents with ISS ≥16, and are therefore not visible on the graph. The ISS score calculated for all records are based on the ICD-90. Trauma level is based upon ACS verification and state designation.

Figure 65

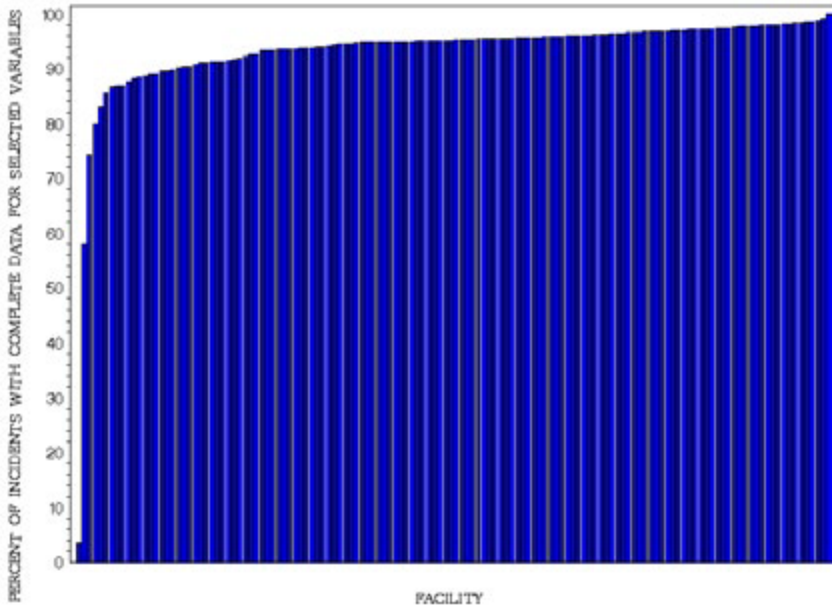
Data Completeness per Facility for Level I Facilities



An incident was classified as not complete if any of the following key variables were not known/ not documented: Age, Gender, Primary E-Code, Locally submitted Injury Severity Score, ED/Hospital Discharge Disposition, and Length of Stay. Trauma level is based upon ACS verification and state designation; however, pediatric hospitals are not included in the analysis.

Figure 66

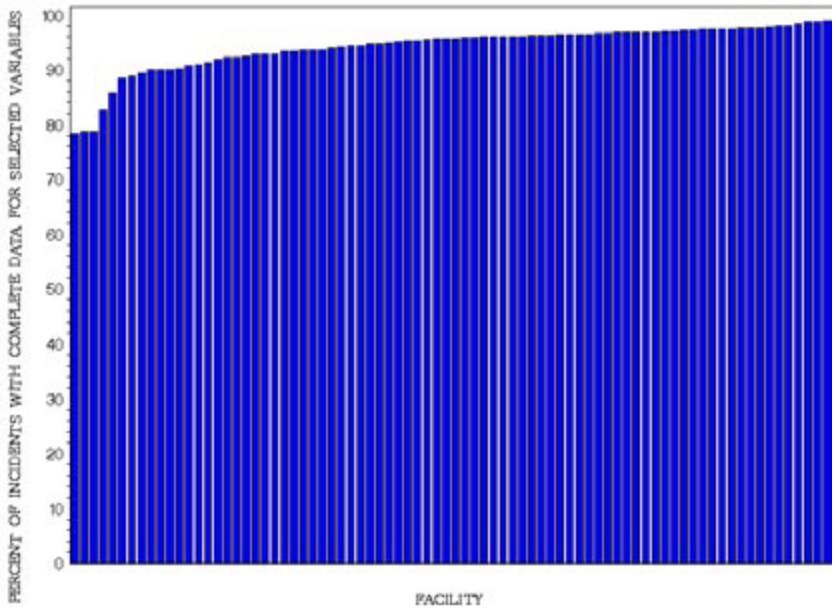
Data Completeness per Facility for Level II Facilities with Bed Size Less than or Equal to 400 Beds



One out of 137 facilities had 0% of the incidents complete, and are therefore not visible on the graph. An incident was classified as not complete if any of the following key variables were not known/ not documented: Age, Gender, Primary E-Code, Locally submitted Injury Severity Score, ED/Hospital Discharge Disposition, and Length of Stay. Trauma level is based upon ACS verification and state designation, however, pediatric hospitals are not included in the anlaysis.

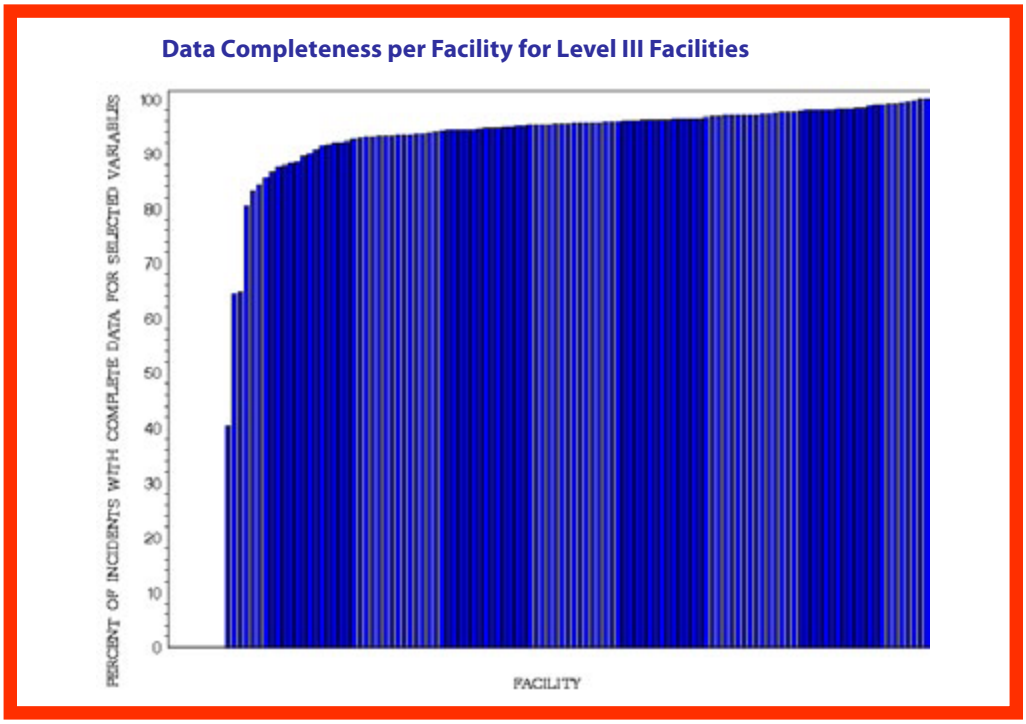
Figure 67

Data Completeness per Facility for Level II Facilities with Bed Size Greater than 400 Beds



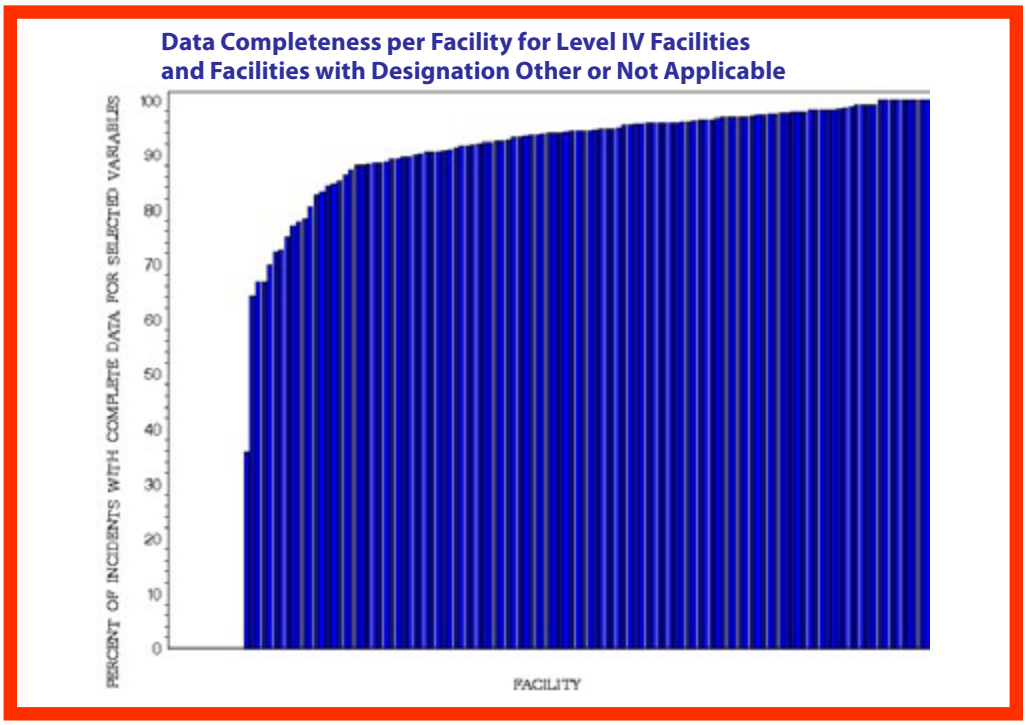
An incident was classified as not complete if any of the following key variables were not known/ not documented: Age, Gender, Primary E-Code, Locally submitted Injury Severity Score, ED/Hospital Discharge Disposition, and Length of Stay. Trauma level is based upon ACS verification and state designation; however, pediatric hospitals are not included in the analysis.

Figure 68



Nine out of 121 facilities had 0% of the incidents complete, and are therefore not visible on the graph. An incident was classified as not complete if any of the following key variables were not known/ not documented: Age, Gender, Primary E-Code, Locally submitted Injury Severity Score, ED/Hospital Discharge Disposition, and Length of Stay. Trauma level is based upon ACS verification and state designation.

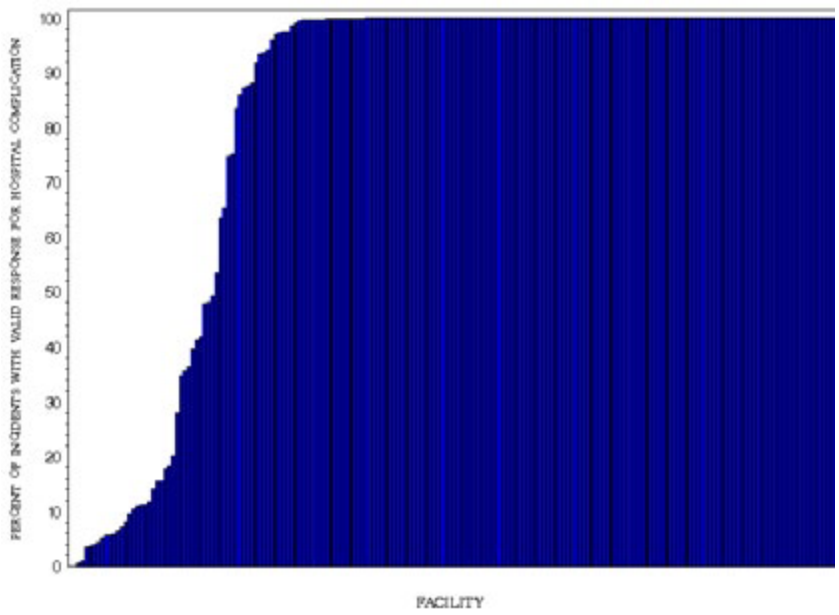
Figure 69



Thirteen out of 131 facilities had 0% of the incidents complete, and are therefore not visible on the graph. An incident was classified as not complete if any of the following key variables were not known/ not documented: Age, Gender, Primary E-Code, Locally submitted Injury Severity Score, ED/Hospital Discharge Disposition, and Length of Stay. Trauma level is based upon ACS verification and state designation.

Figure 70

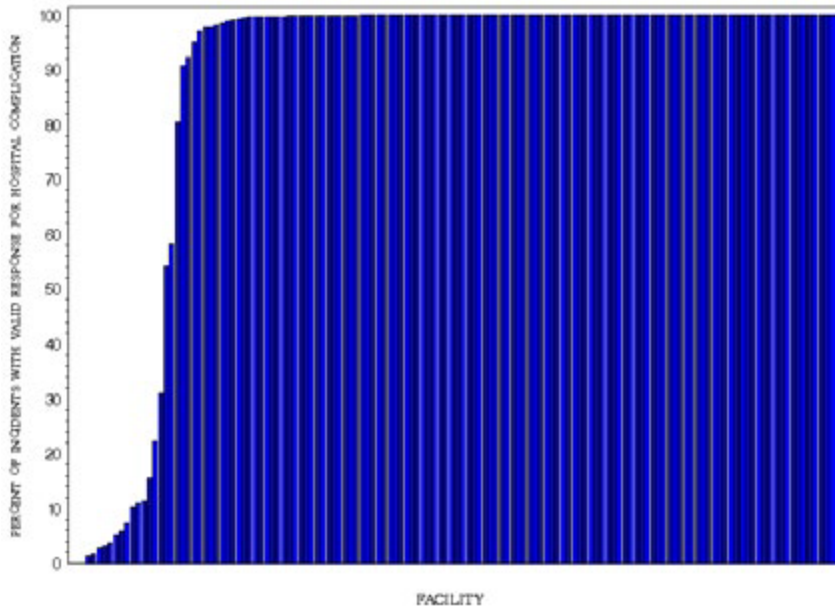
Complications Reported per Facility for Level I Facilities



Two out of 194 facilities had 0% of the incidents with valid response for hospital complications, including not applicable, and are therefore not visible on the graph. Trauma level is based upon ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

Figure 71

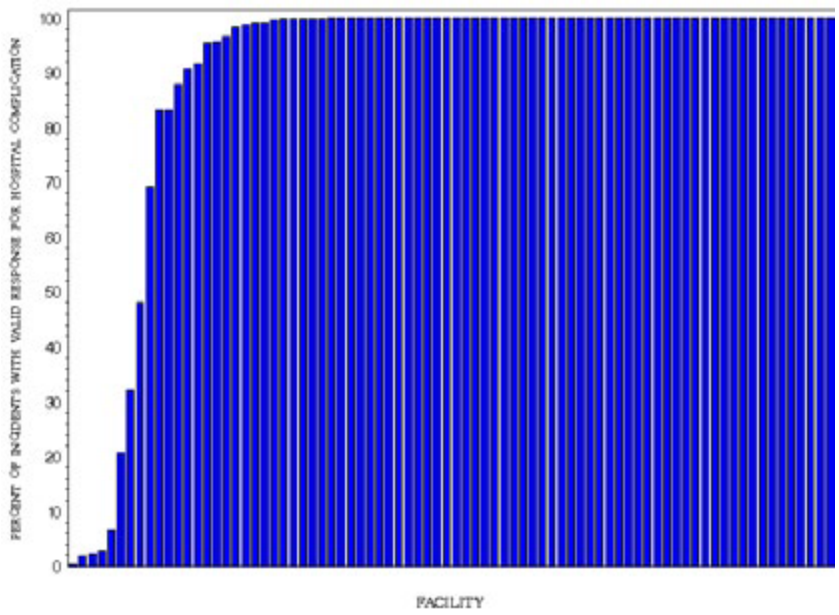
Complications Reported per Facility for Level II Facilities with Bed Size Less than or Equal to 400 Beds



Three out of 137 facilities had 0% of the incidents with valid response for hospital complications, including not applicable, and are therefore not visible on the graph. Trauma level is based upon ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

Figure 72

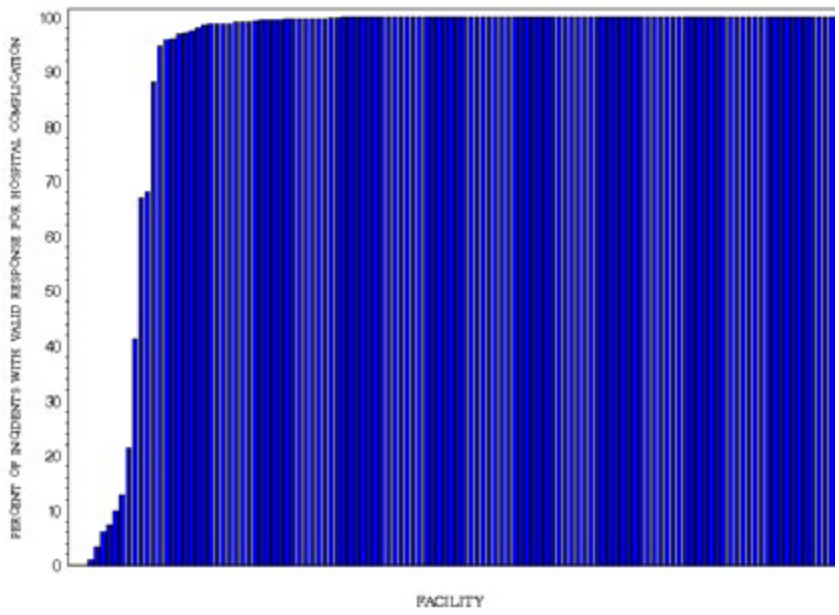
Complications Reported per Facility for Level II Facilities with Bed Size Greater than 400 Beds



Trauma level is based upon ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

Figure 73

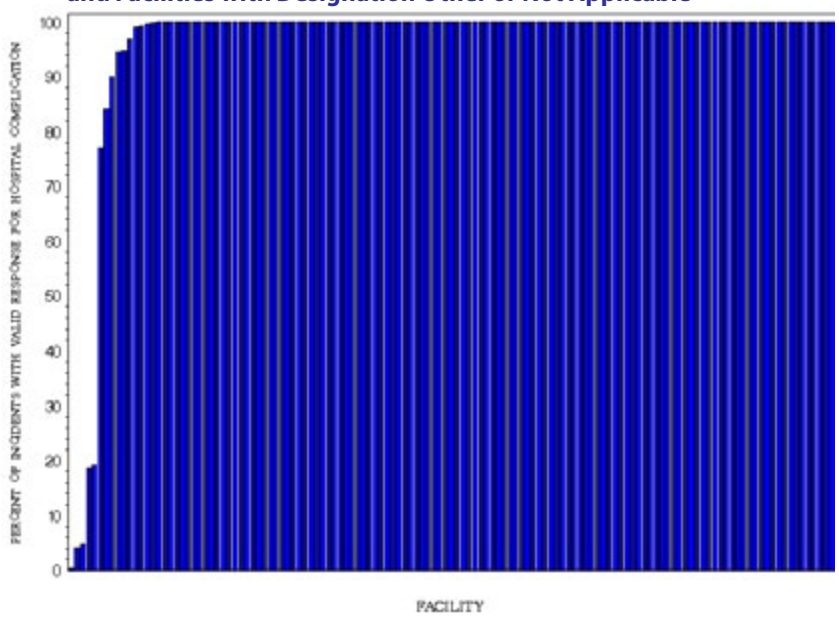
Complications Reported per Facility for Level III Facilities



Three out of 121 facilities had 0% of the incidents with valid response for hospital complications, including not applicable, and are therefore not visible on the graph. Trauma level is based upon ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

Figure 74

Complications Reported per Facility for Level IV Facilities and Facilities with Designation Other or Not Applicable



Trauma level is based upon ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

Appendices

Definition of Trauma Patient

Definition of Trauma Patient adopted by NATIONAL TRAUMA DATA BANK® (NTDB)

At least one of the following injury diagnostic codes defined in the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM): 800–959.9

Excluding the following isolated injuries:

- 905–909.9 (late effects of injury)
- 910–924.9 (superficial injuries, including blisters, contusions, abrasions, and insect bites)
- 930–939.9 (foreign bodies)

AND MUST INCLUDE ONE OF THE FOLLOWING IN ADDITION TO (ICD-9-CM 800–959.9):

- Hospital admission as defined by your trauma registry inclusion criteria; OR
- Patient transfer via EMS transport (including air ambulance) from one hospital to another hospital; OR
- Death resulting from the traumatic injury (independent of hospital admission or hospital transfer status)

E-Code Grouping

Recommended Framework for E-Code Groupings for Presenting Injury Mortality and Morbidity Data.
Reference MMWR 1997;46:1–30. Updated last time in 2009.

MECHANISM/CAUSE	MANNER/INTENT				
	UNINTENTIONAL	SELF-INFLICTED	ASSAULT	UNDETERMINED	OTHER[1]
CUT/PIERCE	E920.0–.9	E956	E966	E986	E974
DROWNING/SUBMERSION	E830.0–.9, E832.0–.9 E910.0–.9	E954	E964	E984	
FALL	E880.0–E886.9, E888	E957.0–.9	E968.1	E987.0–.9	
FIRE/BURN	E890.0–E899, E924.0–.9	E958.1,.2,.7	E961, E968.0,.3	E988.1,.2,.7	
FIRE/FLAME	E890.0–E899	E958.1	E968.0	E988.1	
HOT OBJECT/SUBSTANCE	E924.0–.9	E958.2,.7	E961, E968.3	E988.2,.7	
FIREARM	E922.0–.3,.8, .9	E955.0–.4	E965.0–.4	E985.0–.4	E970
MACHINERY	E919 (.0–.9)				
MOTOR VEHICLE TRAFFIC2,3	E810–E819 (.0–.9)	E958.5	E968.5	E988.5	
OCCUPANT	E810–E819 (.0,.1)				
MOTORCYCLIST	E810–E819 (.2,.3)				
PEDAL CYCLIST	E810–E819 (.6)				
PEDESTRIAN	E810–E819 (.7)				
UNSPECIFIED	E810–E819 (.9)				
PEDAL CYCLIST, OTHER	E800–E807 (.3) E820–E825 (.6), E826.1,.9 E827–E829(.1)				
PEDESTRIAN, OTHER	E800–807(.2) E820–E825(.7) E826–E829(.0)				
TRANSPORT, OTHER	E800–E807 (.0,.1,.8,.9) E820–E825 (.0–.5,.8,.9) E826.2–.8 E827–E829 (.2–.9), E831.0–.9, E833.0–E845.9	E958.6		E988.6	
NATURAL/ENVIRONMENTAL	E900.0–E909, E928.0–.2	E958.3		E988.3	
BITES AND STINGS3	E905.0–.6,.9 E906.0–.4,.5,.9				
OVEREXERTION	E927.0-..4,.8,.9				
POISONING	E850.0–E869.9	E950.0–E952.9	E962.0–.9	E980.0–E982.9	E972
STRUCK BY, AGAINST	E916–E917.9		E960.0; E968.2		E973, E975
SUFFOCATION	E911–E913.9	E953.0–.9	E963	E983.0–.9	
OTHER SPECIFIED AND CLASSIFIABLE4	E846–E848, E914–E915 E918, E921.0–.9, E922.4,5 E923.0–.9, E925.0–E926.9 E928.3, E929.0–.5	E955.5,.6,.7,.9 E958.0,.4	E960.1, E965.5–.9 E967.0–.9, E968.4,.6, .7 E979.0–.9	E985.5,.6,.7 E988.0,.4	E971, E978, E990–E994, E996 E997.0–.2
OTHER SPECIFIED, NOT ELSEWHERE CLASSIFIABLE	E928.8, E929.8	E958.8, E959	E968.8, E969	E988.8, E989	E977, E995, E997.8 E998, E999
UNSPECIFIED	E887, E928.9, E929.9	E958.9	E968.9	E988.9	E976, E997.9
ALL INJURY	E800–E869, E880–E929	E950–E959	E960–E969, E979	E980–E989	E970–E978, E990–E999
ADVERSE EFFECTS					E870–E879 E930.0–E949.9
MEDICAL CARE					E870–E879
DRUGS					E930.0–E949.9
ALL EXTERNAL CAUSES					E800–E999

[1] Includes legal intervention (E970–E978) and operations of war (E990–E999).

[2] Three 4th-digit codes (.4 [occupant of streetcar], .5 [rider of animal], .8 [other specified person]) are not presented separately because of small numbers. However, because they are included in the overall motor vehicle traffic category, the sum of these categories can be derived by subtraction.

[3] E968.5 (assault by transport vehicle), E906.5 (bite from unspecified animal), E922.4 (unintentional injury [gunshot wound] with BB/pellet), E955.6 (suicide attempt/intentionally Self-inflicted injury [gunshot wound] with BB/pellet gun), E968.6 (assault [gunshot wound] with BB/pellet gun), E985.6 (undetermined intent injury [gunshot wound] with BB/pellet gun), E928.3 (unintentional human bite), and E968.7 (assault by human bite), are specific to the ICD-9-CM and, therefore, only apply to morbidity coding.

[4] E849 (place of occurrence) has been excluded from the matrix. For mortality coding, an ICD-9 E849 code does not exist. For morbidity coding, an ICD-9-CM E849 code should never be first— the listed E- code and should only appear as an additional code to specify the place of occurrence of the injury incident.

Yearly Comparisons Based on the NTDB National Sample Program

THE NATIONAL TRAUMA DATA BANK (NTDB), managed by the American College of Surgeons (ACS) Committee on Trauma (COT), is the largest aggregation of trauma data in the U. S. The NTDB contains over three million patient records from trauma registries. Of the 453 U.S. hospitals identified by the Trauma Information Exchange Program (MacKenzie et al, 2003) as Level I or II centers, more than half have submitted data to the NTDB for at least one of the past five years. However, since the NTDB is not population–based but consists of centers that participate voluntarily, it is likely that their data will produce biased estimates and thus the inferences based on NTDB may not be valid at the national level.

Nationally representative administrative data on hospitalized patients are available in the National Hospital Discharge Survey (NHDS) or Nationwide Inpatient Sample (NIS). However, these lack the richness of trauma registry data, which contain detailed information on injury mechanisms, anatomic diagnoses, physiologic status, associated conditions, and hospital treatment.

The ACS was awarded a contract from the National Center for Injury Prevention and Control (NCIPC), Centers for Disease Control and Prevention (CDC) to develop the National Sample Program (NSP) to obtain a nationally representative sample of trauma patients treated in U.S. Level I and II trauma centers. The NSP is intended to enhance the NTDB by providing data from a probabilistic sample of trauma center hospitals nationwide to meet the broad range of trauma care assessment, clinical outcomes research, and injury surveillance needs. That is, the objective of the NSP is to provide annual estimates of patients treated at a Level I or II trauma centers in the U.S. In addition, the NSP can be used to develop yearly comparisons of trauma data, which is something that has been problematic to do with the NTDB.

The NSP is a stratified statistical sample based on NTDB data of 100 Level I and II trauma centers. Stratification was based on U.S. Census region (Northeast, Midwest, South, and West), level of trauma care designation (Level I and II), and NTDB participation status as of 2003 (NTDB and non–NTDB). Thus, there were 16 total strata: 8 NTDB strata and 8 non–NTDB strata. Of the 100 sample hospitals, 90 are NTDB–contributing hospitals and 10 are non–NTDB hospitals. The sample size of 100 hospitals was chosen on the basis of recent NTDB data that suggest that a sample of 100 hospitals would provide estimates having sufficient precision for most analyses at the national level. A probability–proportional–to–size method was used to randomly select the hospitals in the sample and calculate the weights, where the size measure was the annual number of emergency room visits. The final weights for each hospital were adjusted for non–response and for changes in ED admissions.

Weighted estimates from admission year 2003–2008 were computed based on the NSP data. The yearly comparison of number of incidents, gender, ISS scores and mechanism of injury, and percent deaths are displayed in this Appendix. The admission year 2009 data for NSP will be available later this year. For further information on the NSP please visit: ***http://www.facs.org/trauma/ntdb/nsp.html***

Table 1

WEIGHTED ESTIMATES OF NUMBER OF INCIDENTS BY ADMISSION YEAR		
ADMISSION YEAR	WEIGHTED NUMBER OF INCIDENTS N (95% CI)	PERCENT (95% CI)
2003	577,421 (445,693, 709,149)	15.80 (13.17, 18.43)
2004	524,267 (406,983, 641,550)	14.34 (11.72, 16.97)
2005	608,524 (499450, 717598)	16.65 (14.28, 19.02)
2006	673,991 (543427, 804555)	18.44 (15.79, 21.09)
2007	630,645 (543521, 717768)	17.26 (14.96, 19.55)
2008	640,116 (568229, 712004)	17.51 (15.63, 19.40)
Total	3,654,964 (3259130, 4050797)	

Figure 1

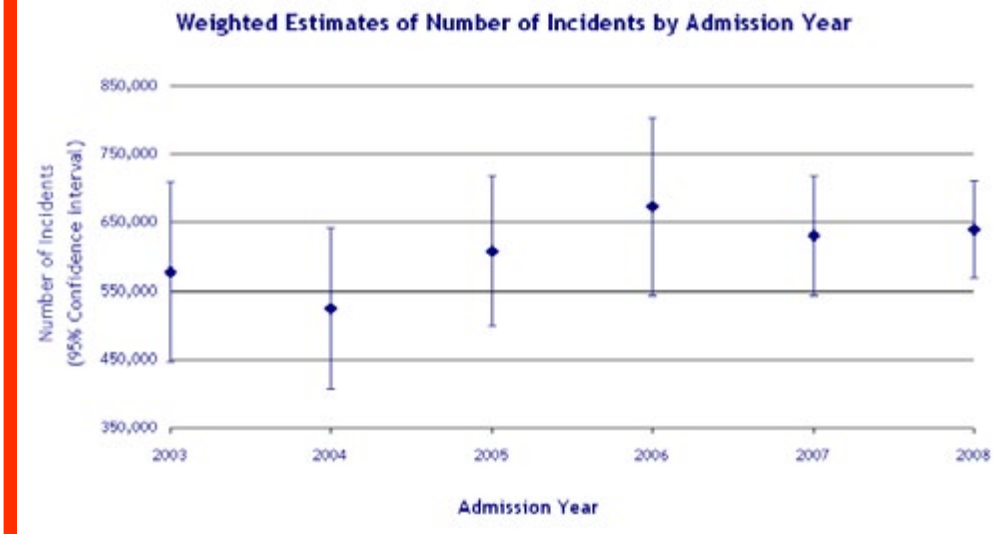


Table 2

WEIGHTED ESTIMATES OF NUMBER OF INCIDENTS BY GENDER AND ADMISSION YEAR				
ADMISSION YEAR	WEIGHTED NUMBER OF FEMALES	WEIGHTED NUMBER OF MALES	PERCENT FEMALES (95% CI)	PERCENT MALES (95% CI)
2003	189,654	384,843	33.01 (32.13, 33.89)	66.99 (66.11, 67.87)
2004	176,884	344,637	33.92 (31.90, 35.93)	66.08 (64.07, 68.09)
2005	206,469	399,889	33.98 (32.79, 35.16)	65.81 (64.62, 67.00)
2006	228,207	427,144	34.63 (33.26, 36.00)	64.81 (63.34, 66.29)
2007	209,939	410,662	33.29 (31.96, 34.62)	65.12 (63.52, 66.71)
2008	223,360	413,054	34.89 (33.67, 36.11)	64.53 (63.29, 65.77)

Figure 2

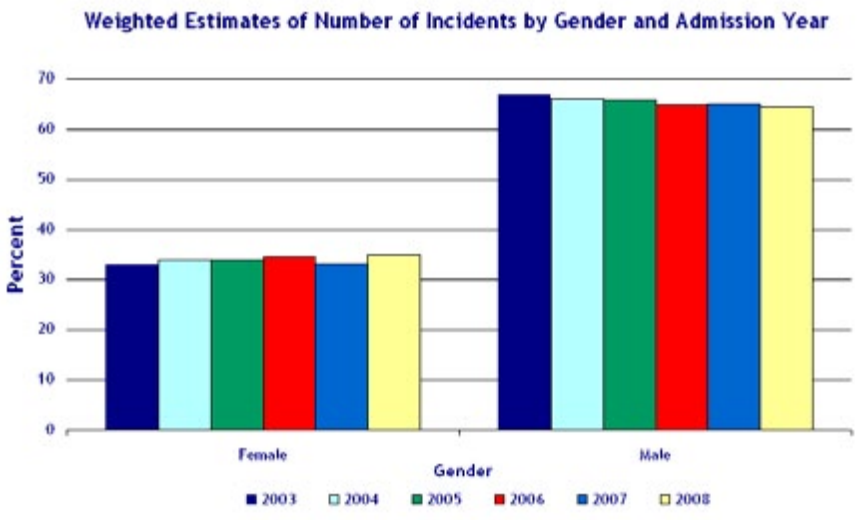


Table 3

WEIGHTED ESTIMATES OF PERCENT OF INCIDENTS BY AGE AND ADMISSION YEAR						
AGE	ADMISSION YEAR 2003 PERCENT (95% CI)	ADMISSION YEAR 2004 PERCENT (95% CI)	ADMISSION YEAR 2005 PERCENT (95% CI)	ADMISSION YEAR 2006 PERCENT (95% CI)	ADMISSION YEAR 2007 PERCENT (95% CI)	Admission Year 2008 Percent (95% CI)
≤14	9.24 (8.09,10.40)	8.94 (7.50,10.39)	8.20 (6.94,9.46)	8.21 (7.06,9.35)	8.00 (6.82,9.17)	7.65 (6.43,8.87)
15–19	10.25 (9.94,10.56)	10.21 (9.72,10.69)	10.42 (10.00,10.85)	10.58 (10.04,11.11)	9.31 (8.99,9.64)	8.58 (8.27,8.89)
20–24	12.45 (11.97, 12.93)	12.21 (11.45,12.96)	12.30 (11.82,12.78)	11.92 (11.41,12.44)	10.98 (10.54,11.43)	10.25 (9.85,10.65)
25–34	16.97 (16.41,17.52)	16.04 (14.88,17.21)	16.20 (15.40,17.00)	15.71 (14.91,16.51)	15.72 (15.13,16.30)	14.72 (14.05,15.38)
35–44	16.26 (15.59,16.93)	15.54 (14.74,16.33)	15.31 (14.62,15.99)	14.29 (13.74,14.84)	13.92 (13.51,14.33)	13.23 (12.74,13.72)
45–54	12.54 (12.08,12.99)	13.32 (12.74,13.89)	13.24 (12.81,13.66)	13.28 (12.93,13.63)	14.19 (13.90,14.48)	14.39 (14.07,14.72)
55–64	7.68 (7.43,7.93)	8.11 (7.65,8.57)	8.59 (8.31,8.78)	8.44 (8.16,8.73)	9.51 (9.22,9.80)	10.08 (9.77,10.40)
65-74	5.71 (5.39,6.03)	5.91 (5.26,6.58)	5.74 (5.33,6.14)	6.26 (5.77,6.74)	6.65 (6.29,7.01)	7.55 (7.17,7.93)
75–84	6.53 (5.93,7.12)	6.92 (5.77,8.08)	7.14 (6.36,7.93)	7.93 (6.96,8.90)	8.27 (7.60,8.94)	9.16 (8.38,9.94)
≥85	2.37 (2.08,2.67)	2.80 (2.17,3.42)	2.86 (2.37,3.36)	3.39 (2.83,3.96)	3.45 (3.04,3.86)	4.40 (3.88,4.92)

Figure 3

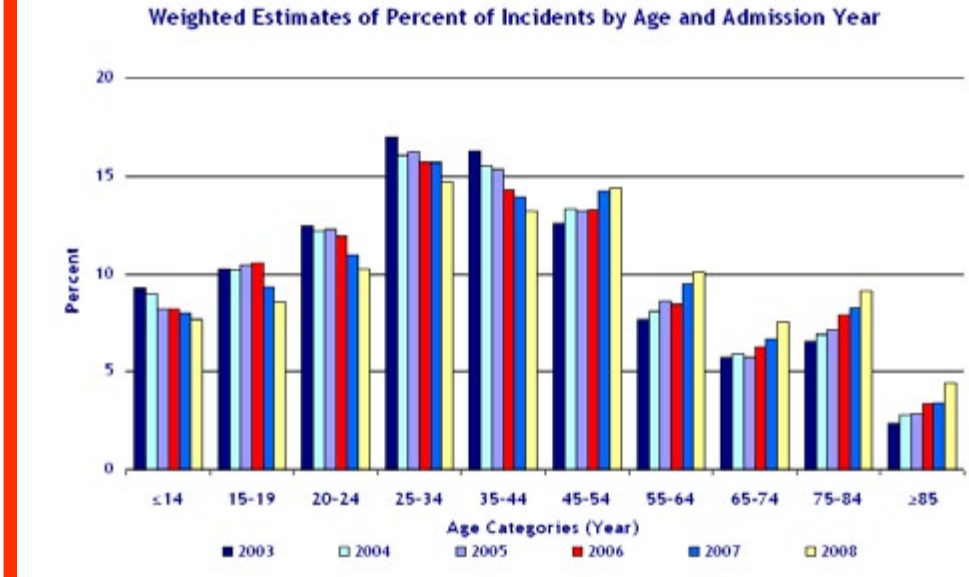


Table 4

WEIGHTED ESTIMATES OF PERCENT OF INCIDENTS BY ISS CATEGORY AND ADMISSION YEAR				
ADMISSION YEAR	ISS 1–8 PERCENT (95% CI)	ISS 9–15 PERCENT (95% CI)	ISS 16–24 PERCENT (95% CI)	ISS >24 PERCENT (95% CI)
2003	50.47 (47.81, 53.14)	29.58 (28.16, 31.00)	11.30 (10.59, 12.01)	8.65 (7.60, 9.70)
2004	47.61 (44.00, 51.22)	31.32 (29.70, 32.95)	12.31 (11.01, 13.61)	8.76 (7.46, 10.06)
2005	48.75 (46.13, 51.37)	30.07 (28.79, 31.35)	12.35 (11.58, 13.12)	8.83 (7.79, 9.87)
2006	49.91 (46.34, 53.47)	30.41 (27.97, 32.85)	11.54 (10.59, 12.50)	8.14 (6.98, 9.31)
2007	51.83 (49.85, 53.80)	26.98 (25.93, 28.03)	14.87 (14.01, 15.72)	6.32 (5.86, 6.80)
2008	49.02 (47.32, 50.72)	28.67 (27.69, 29.64)	16.11 (15.33, 16.89)	6.20 (5.73, 6.67)

Figure 4

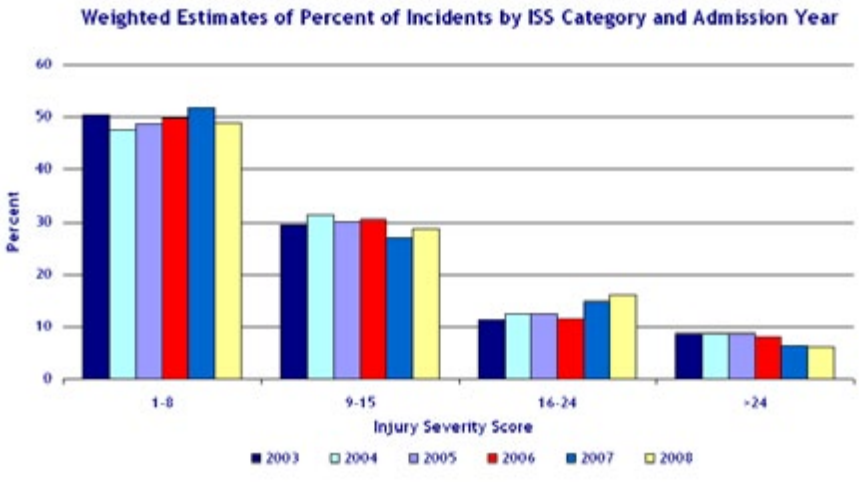


Table 5

WEIGHTED ESTIMATES OF PERCENT OF INCIDENTS BY MECHANISM OF INJURY CATEGORY AND ADMISSION YEAR				
ADMISSION YEAR	MOTOR VEHICLE TRAFFIC PERCENT (95% CI)	FALL PERCENT (95% CI)	CUT/PIERCE PERCENT (95% CI)	STRUCK BY, AGAINST PERCENT (95% CI)
2003	38.46 (35.35,41.57)	24.76 (22.49, 27.03)	5.58 (5.14, 6.03)	6.55 (5.95, 7.14)
2004	37.56 (33.84, 41.27)	28.34 (24.07, 32.61)	5.16 (4.59, 5.73)	6.90 (6.02, 7.78)
2005	35.71 (32.38, 39.04)	27.59 (24.84, 30.35)	4.77 (4.21, 5.34)	6.52 (5.93, 7.11)
2006	33.39 (29.87, 36.91)	28.88 (25.67, 32.09)	4.55 (3.83, 5.28)	6.45 (5.83, 7.07)
2007	34.19 (32.49, 35.89)	32.67 (30.45, 34.90)	5.36 (5.00, 5.72)	7.27 (6.59, 7.96)
2008	31.46 (29.96, 32.96)	35.62 (33.52, 37.71)	5.30 (4.91, 5.70)	7.52 (6.96, 8.07)

Figure 5

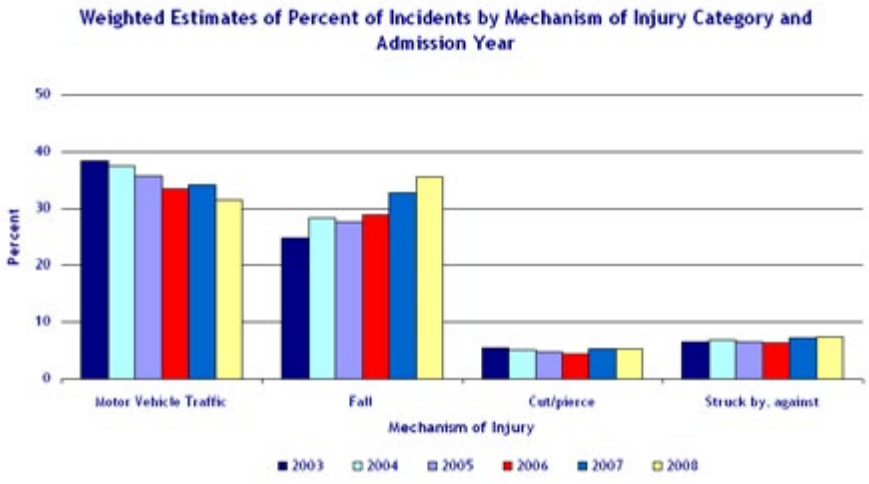


Table 6

WEIGHTED ESTIMATES OF PERCENT OF DEATHS BY ADMISSION YEAR		
ADMISSION YEAR	WEIGHTED NUMBER OF DEATHS	PERCENT DEATHS (95% CI)
2003	30,642	5.31 (4.07, 6.54)
2004	24,958	4.76 (3.96, 5.56)
2005	25,780	4.44 (4.06, 4.82)
2006	27,603	4.15 (3.79, 4.50)
2007	29,842	4.86 (4.28, 5.44)
2008	29,611	4.64 (4.27, 5.02)
Total	168,436	4.68 (4.26, 5.10)

Figure 6