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**NTDB**<sup>®</sup>  
NATIONAL TRAUMA DATA BANK

# National Trauma Data Bank 2011

## Annual Report

## ACKNOWLEDGMENTS

The American College of Surgeons Committee on Trauma wishes to thank the Centers for Disease Control and Prevention (CDC) for its support of the NTDB.



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# NTDB ANNUAL REPORT 2011

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## EDITOR'S 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 more than 5 million records. The 2011 Annual Report is based on 722,824 2010 admission year records from 697 facilities.

For the third 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.

Please note that Appendix D 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 data. The NSP allows for weighted national estimates about patients treated at U.S. 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 hopes that this report will attract new participants. The National Trauma Data Bank Annual Report is available on the ACS website as a PowerPoint PDF at <http://www.ntdb.org>. In addition, information is available on our website 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.



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## EXECUTIVE SUMMARY

The National Trauma Data Bank is the largest aggregation of U.S. trauma registry data ever assembled.

It contains more than 5 million records. The 2011 Annual Report reviews 2010 admissions submitted in the 2011 call for data, totaling 722,824 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 Committee on Trauma (ACS COT) which is “To improve the care of the injured through systematic efforts in prevention, care, and rehabilitation.”

### 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 is calculated by using the AIS submitted by hospitals and then crosswalked to AIS98. If the hospital does not submit AIS, then ISS is based on AIS derived from ICDMAP-90.

- Almost half (46.89%) of patients suffer minor injuries and just under one-third (29.70%) have moderate injuries.
- Case fatality rates increase with injury severity, with the most severe group experiencing a case fatality rate of 27.61.
- 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 19.35%.
- Self-pay is the third largest payment category at 15.56%.

### Mortality

- The largest number of deaths is caused by Fall-related injuries, followed by Motor vehicle traffic and struck by/against.
- Firearm, suffocation, and drowning/submersion 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.



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# EXECUTIVE SUMMARY (CONT'D)

## NTDB Hospitals

- 697 hospitals submitted data to the NTDB in 2010.
- 219 are Level I centers.
- 239 are Level II centers.
- 192 are Level III or Level IV centers.
- 28 are Level I or Level II Pediatric-only centers
- 64.85% of participating trauma centers reported using the NTDB ICD-9 inclusion criteria for their registries.
- 52.22% of participating centers reported including all hip fractures (in accordance with NTDB inclusion criteria).
- 88.67% reported including DOAs 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 38% of cases in the NTDB, with high incident rates for patients under age 10 and age 75 and over.
- Motor vehicle traffic-related injuries account for 29% of cases in the NTDB, with a dramatic rise between age 15 and 33, peaking around age 19.
- Firearm injuries rise from 15-34 years of age, and then steadily decrease.
- Suffocation, firearm, and drowning/submersion injuries have the highest case fatality rates, with suffocation at 22.99%, firearm at 15.81% and drowning/submersion at 13.35%.



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# FACILITY INFORMATION

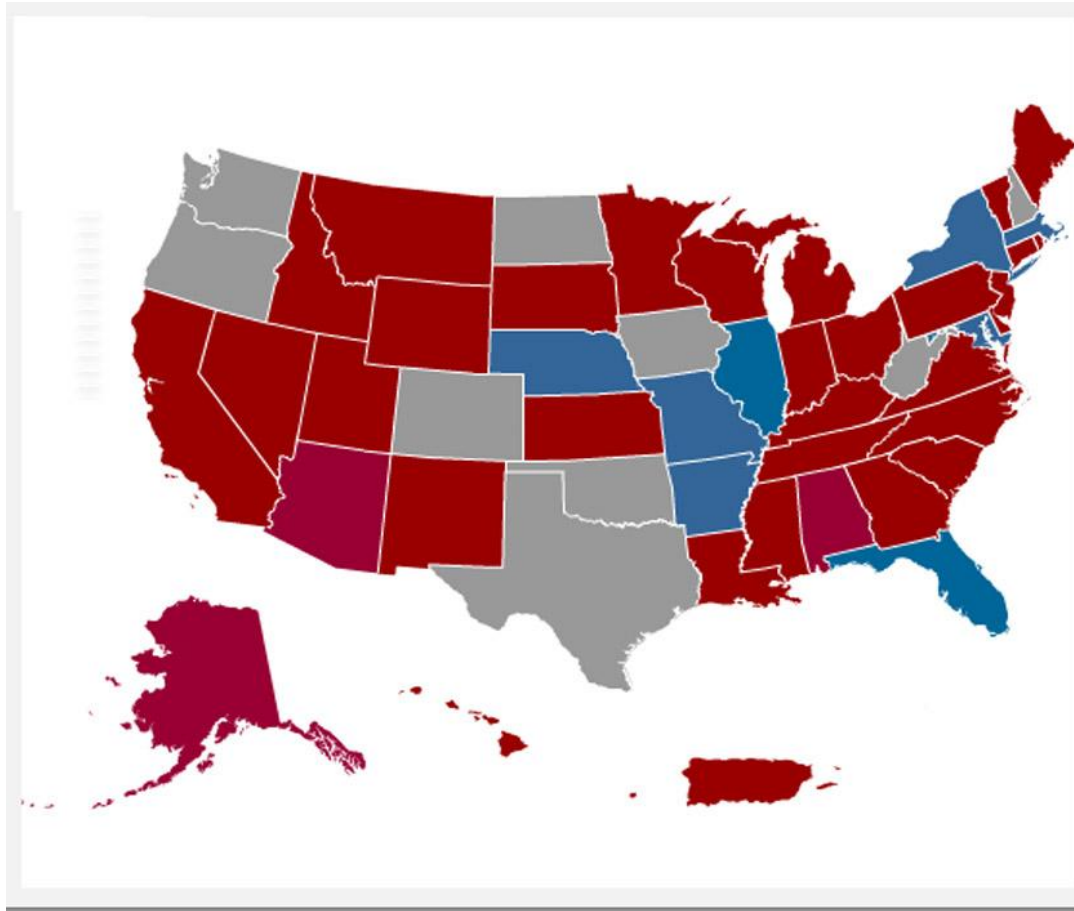


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Figure 1

## Percent of Hospitals Submitting Data to 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%



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Table  
2

## Facilities by Bed Size

BED SIZE	NUMBER	PERCENT
≤200	230	33.00
201 – 400	153	21.95
401 – 600	200	28.69
>600	114	16.36
Total	697	100.00

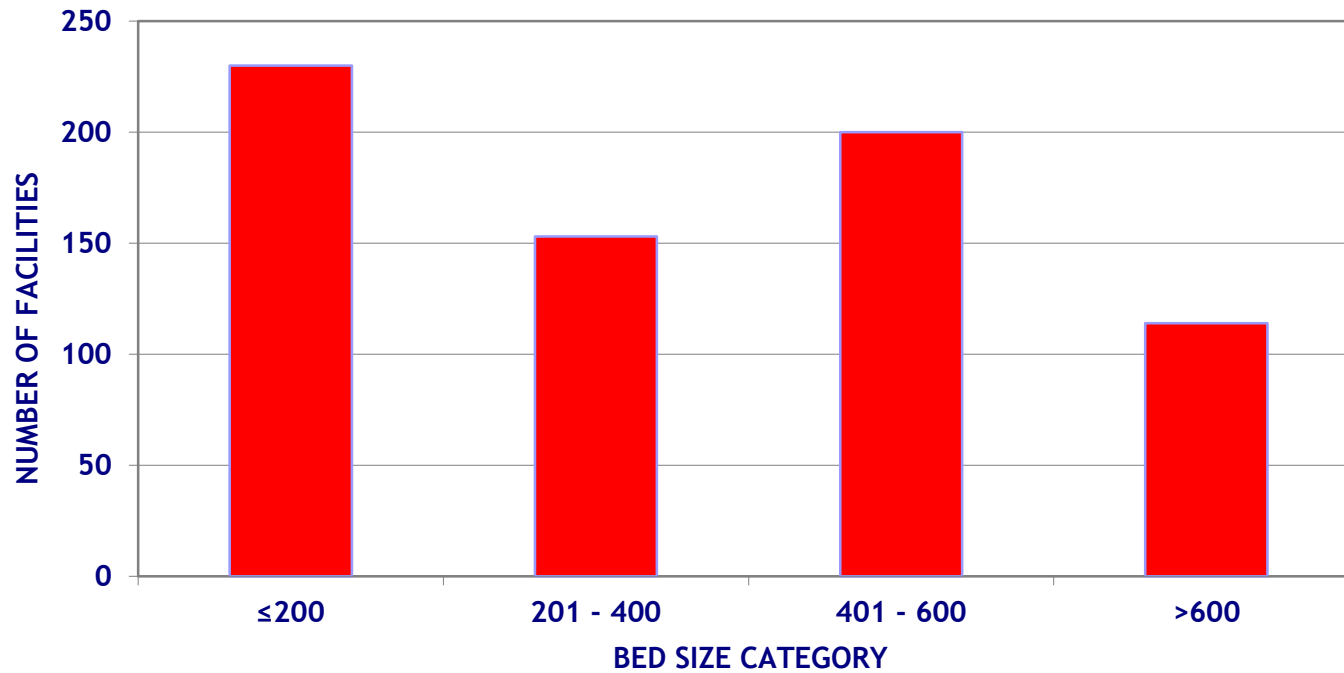


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Figure  
2

## Facilities by Bed Size



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Table  
3

## Facilities by Trauma Level

LEVEL	NUMBER	PERCENT
I	219	31.42
II	239	34.29
III	125	17.93
IV	67	9.61
NA	39	5.60
Other	8	1.15
Total	697	100.00



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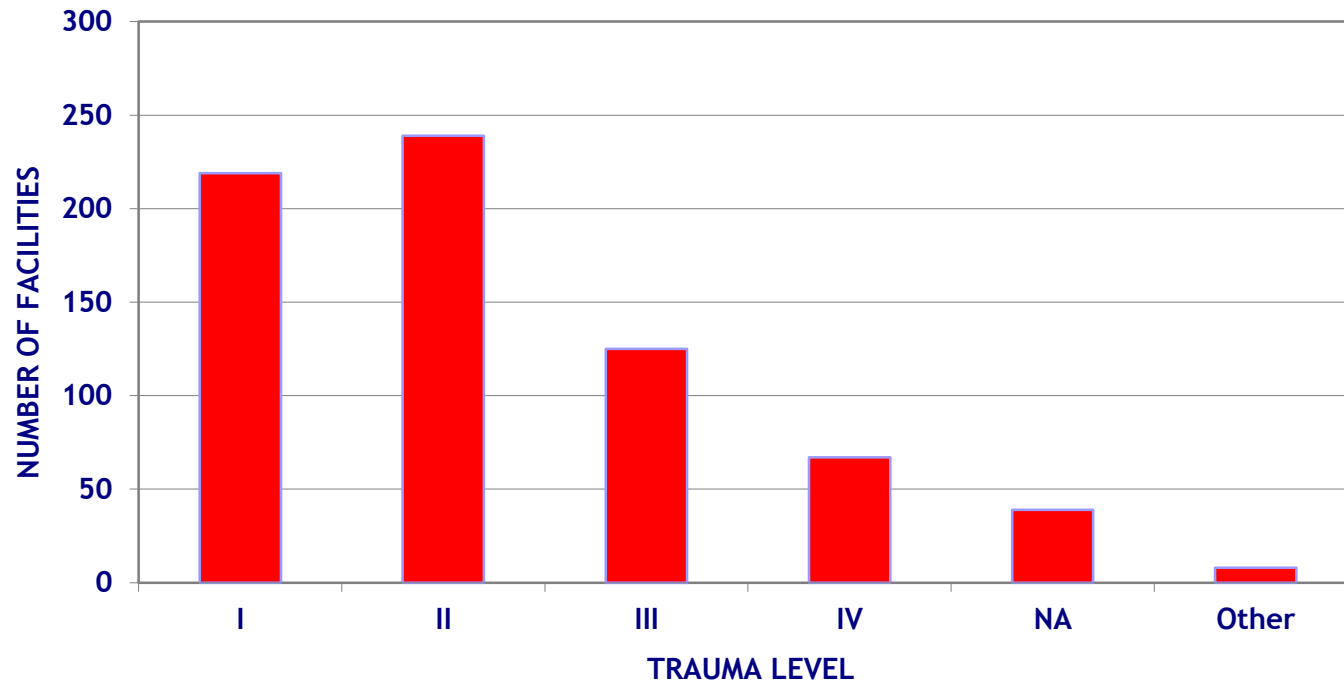
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This includes 28 Level I and Level II Pediatric–only centers  
Both ACS verified and state designated centers are included

Figure 3

## Facilities by Trauma Level



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Table  
4

## Facilities by Region

REGION	NUMBER	PERCENT
South	230	33.00
Midwest	223	31.99
West	143	20.52
Northeast	101	14.49
Total	697	100.00

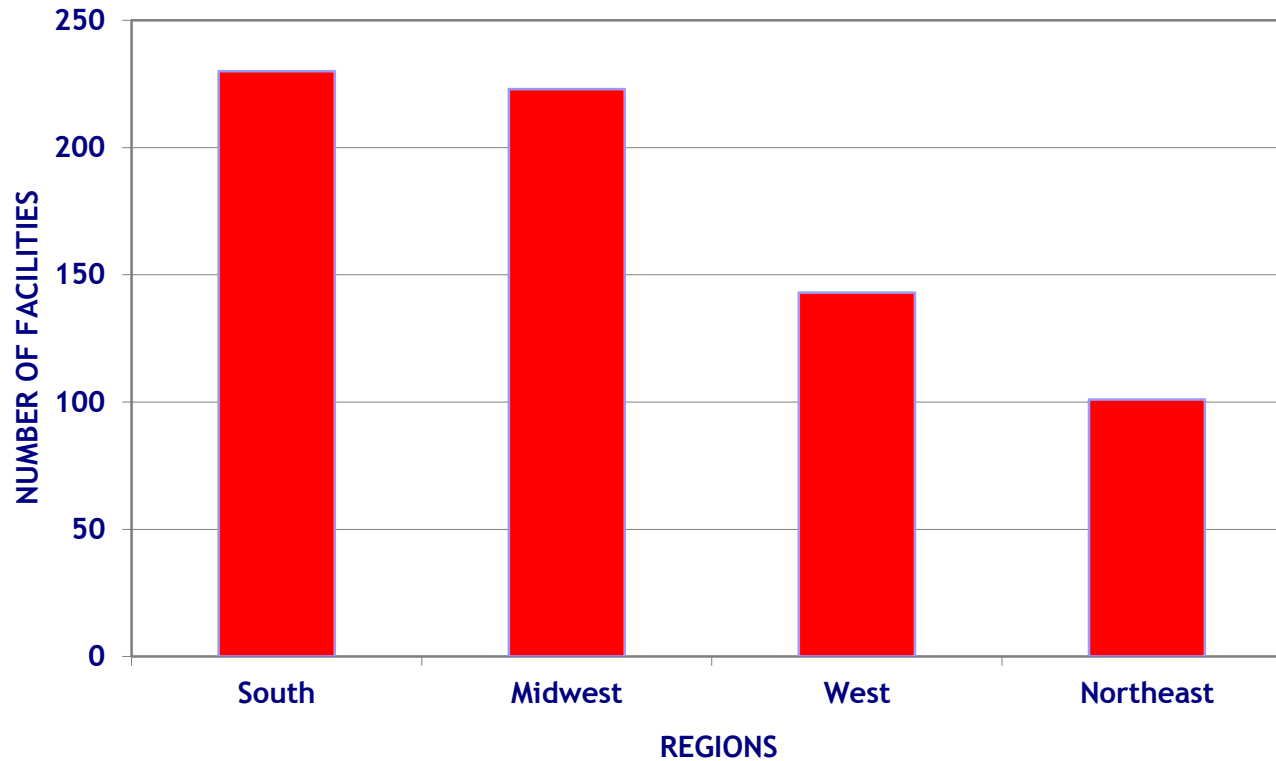


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Figure 4

## Facilities by Region



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Table  
5

## Facilities by ICD-9 Inclusion Criteria

ICD-9 INCLUSION SAME AS NTDB	NUMBER	PERCENT
NO	245	35.15
YES	452	64.85
Total	697	100.00

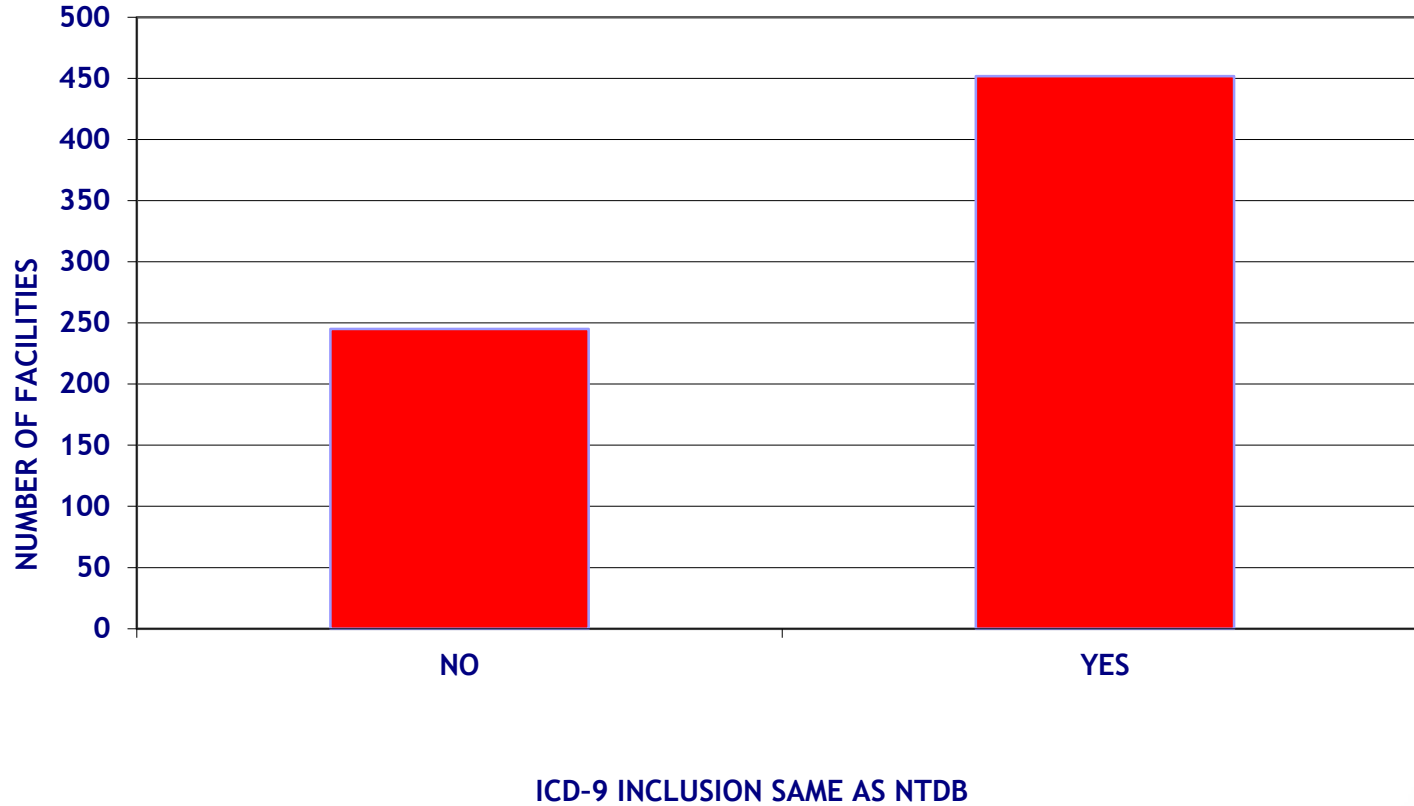


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Figure 5

## Facilities by ICD-9 Inclusion Criteria



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Table  
6

## Facilities by Length of Stay Inclusion Criteria

LOS	NUMBER	PERCENT
23 hour holds	34	4.88
≥ 24 hours	76	10.90
≥ 48 hours	57	8.18
≥ 72 hours	41	5.88
All Admissions	489	70.16
Total	697	100.00

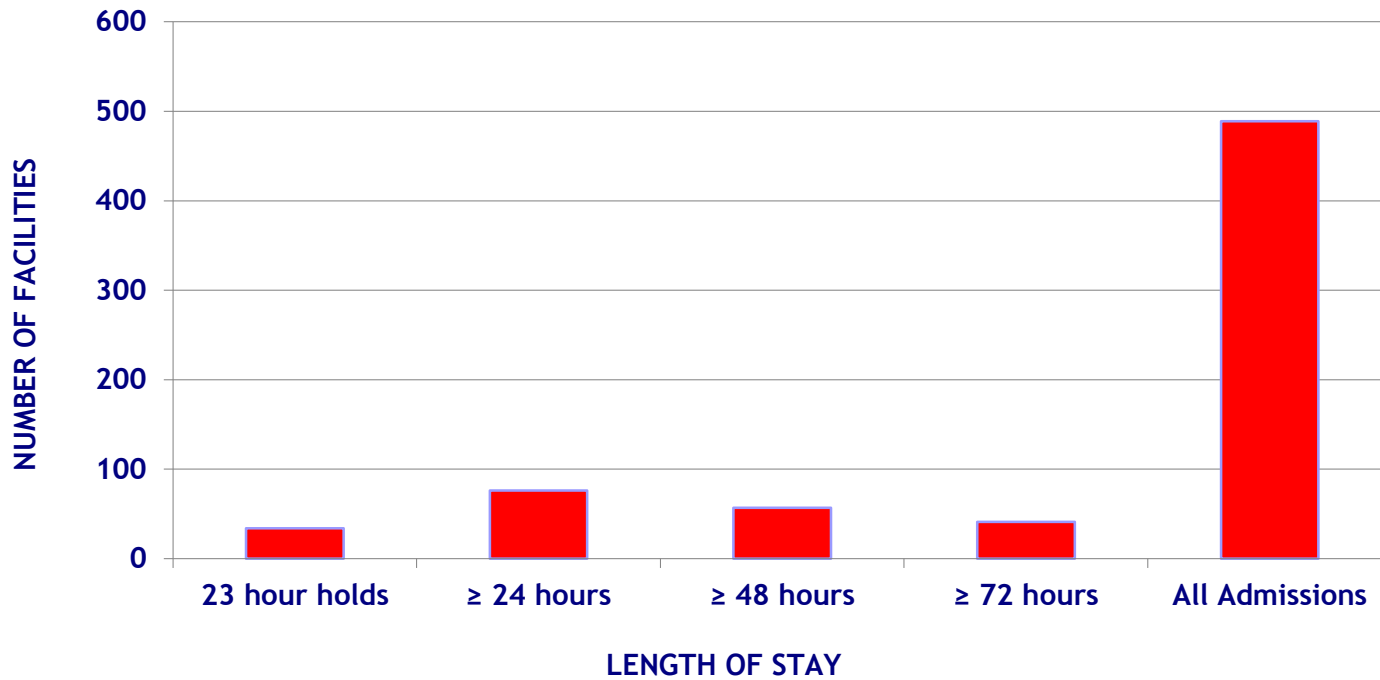


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Figure 6

## Facilities by Length of Stay Inclusion Criteria



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Table  
7

## Facilities by Isolated Hip Fracture Exclusion Criteria by Age

IHF Exclusion	NUMBER	PERCENT
All	364	52.22
None	162	23.24
Patients ≤ 18 years	28	4.02
Patients ≤ 50 years	3	0.43
Patients ≤ 55 years	12	1.72
Patients ≤ 60 years	6	0.86
Patients ≤ 65 years	114	16.36
Patients ≤ 70 years	8	1.15
Total	697	100.00

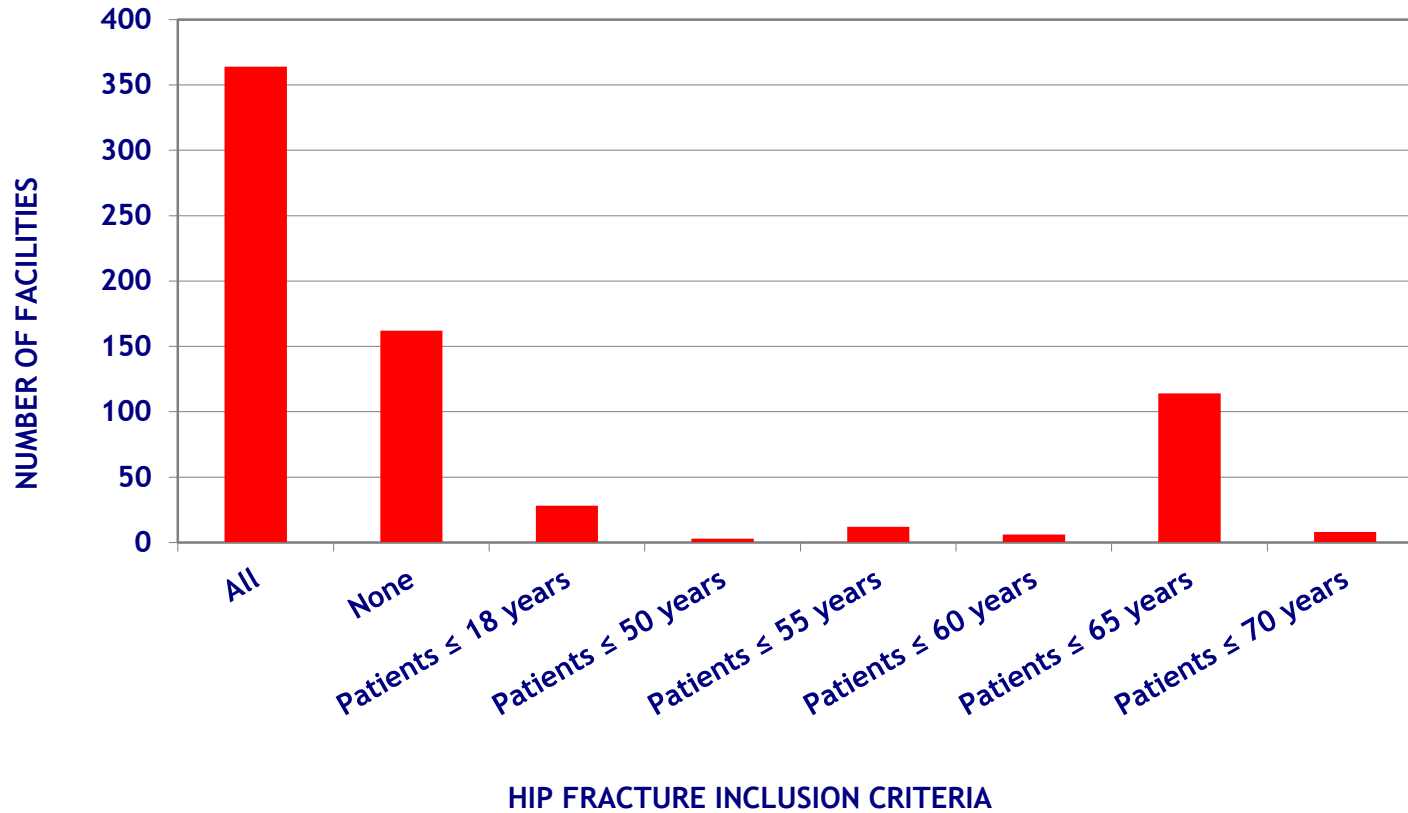


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Figure 7

## Facilities by Isolated Hip Fracture Inclusion Criteria by Age



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Table  
8

## Facilities by Death on Arrival (DOA) Inclusion Criteria

DOA INCLUDED	NUMBER	PERCENT
NO	79	11.33
YES	618	88.67
Total	697	100.00

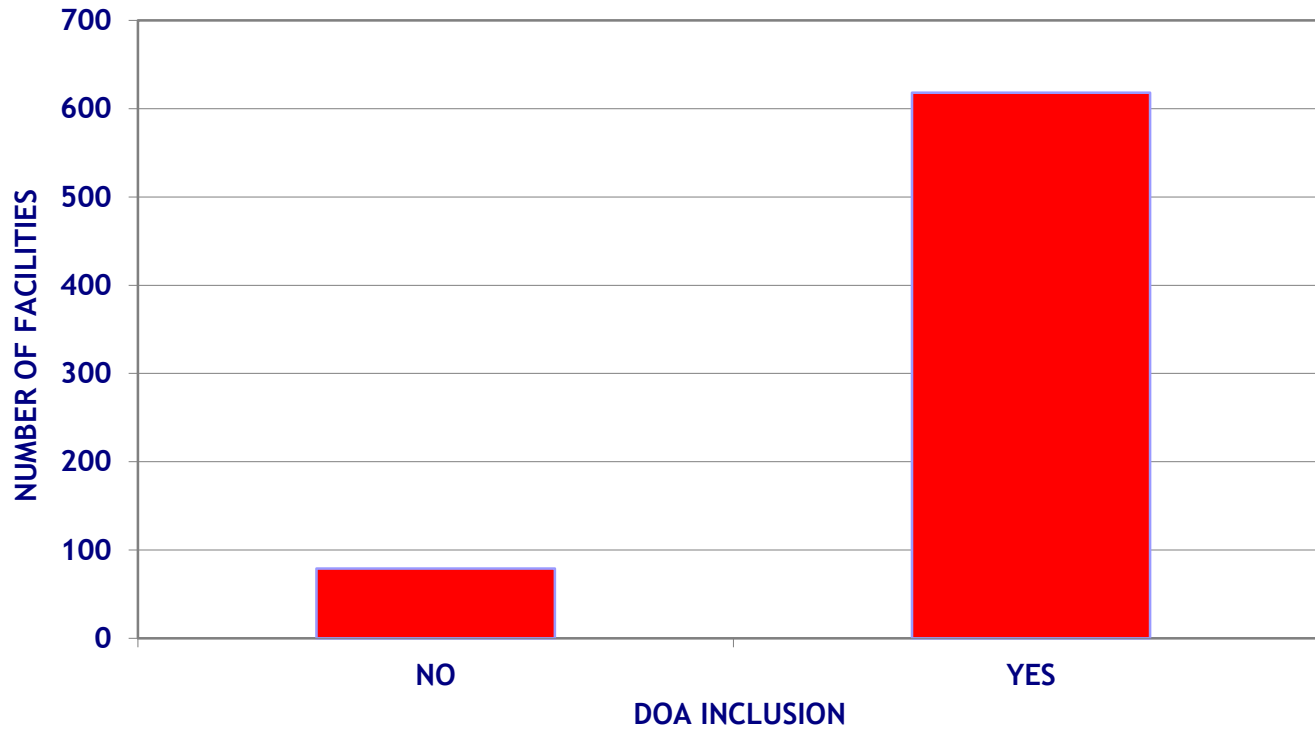


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Figure 8

## Facilities by Death on Arrival (DOA) Inclusion Criteria



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# DEMOGRAPHIC INFORMATION



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Table  
9

## Incidents by Age

AGE	NUMBER	PERCENT	DEATHS	CASE FATALITY RATE
<1 year	9,175	1.27	200	2.18
1-4	26,077	3.61	426	1.63
5-9	25,220	3.49	198	0.79
10-14	28,988	4.01	290	1.00
15-19	57,493	7.95	1,676	2.92
20-24	64,757	8.96	2,365	3.65
25-34	94,566	13.08	3,225	3.41
35-44	78,578	10.87	2,401	3.06
45-54	92,166	12.75	3,042	3.30
55-64	74,329	10.28	2,940	3.96
65-74	53,896	7.46	2,656	4.93
75-84	63,768	8.82	4,150	6.51
≥85	53,733	7.43	3,762	7.00
NK/NR	78	0.01	37	47.44
Total	722,824	100.00	27,368	



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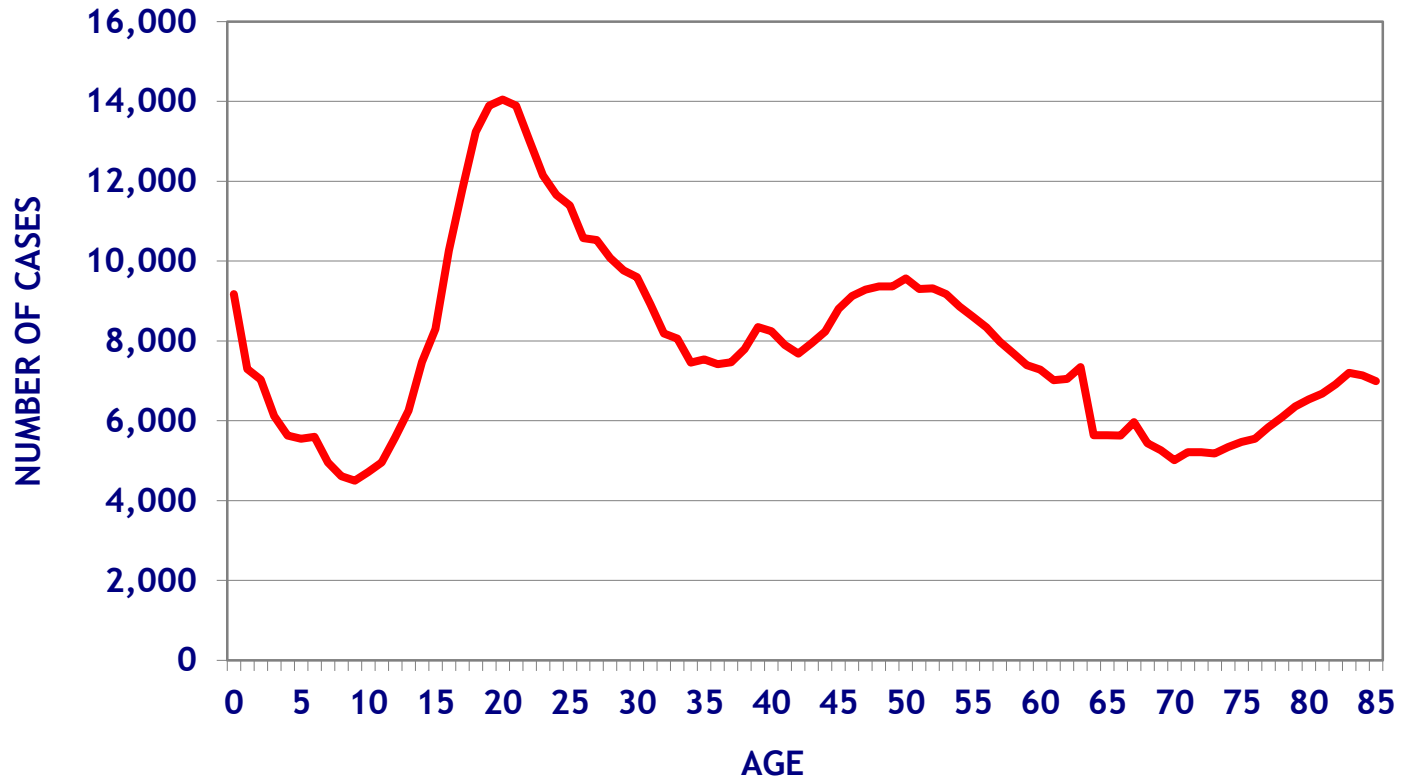
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NK/NR denotes "Not Known/Not Recorded" on all slides.



Figure 9

## Incidents by Age



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Table  
10

## Case Fatality Rate by Age

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	3,952	5,214	9	78	121	1	1.97	2.32	11.11
1-4	10,539	15,516	22	173	253	0	1.64	1.63	0.00
5-9	9,959	15,239	22	66	132	0	0.66	0.87	0.00
10-14	8,364	20,606	18	92	198	0	1.10	0.96	0.00
15-19	15,952	41,525	16	324	1,352	0	2.03	3.26	0.00
20-24	16,063	48,670	24	384	1,980	1	2.39	4.07	4.17
25-34	23,061	71,465	40	556	2,665	4	2.41	3.73	10.00
35-44	20,984	57,573	21	505	1,895	1	2.41	3.29	4.76
45-54	27,184	64,951	31	727	2,311	4	2.67	3.56	12.90
55-64	27,658	46,660	11	756	2,184	0	2.73	4.68	0.00
65-74	25,805	28,061	30	890	1,766	0	3.45	6.29	0.00
75-84	38,455	25,289	24	1,766	2,382	2	4.59	9.42	8.33
≥85	37,502	16,218	13	1,995	1,765	2	5.32	10.88	15.38
NK/NR	7	64	7	2	34	1	28.57	53.13	14.29
Total	265,485	457,051	288	8,314	19,038	16			

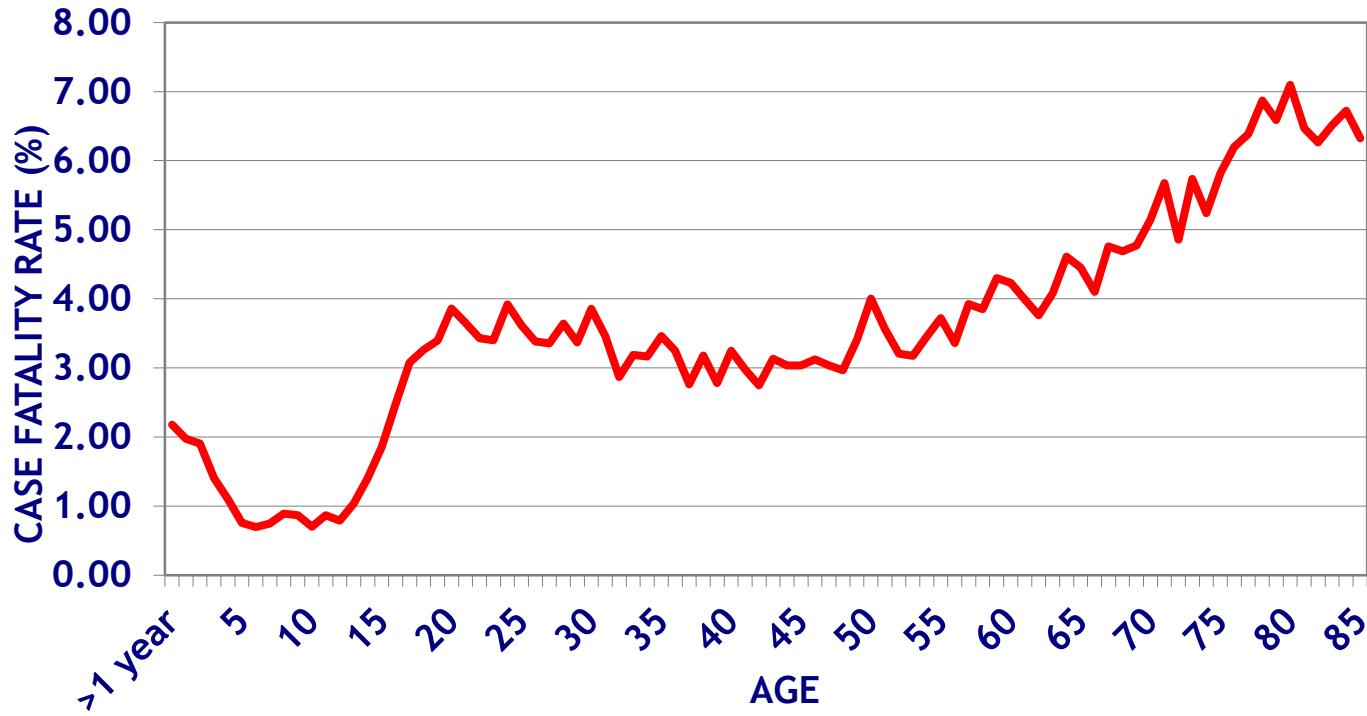


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Figure 10

## Case Fatality Rate by Age

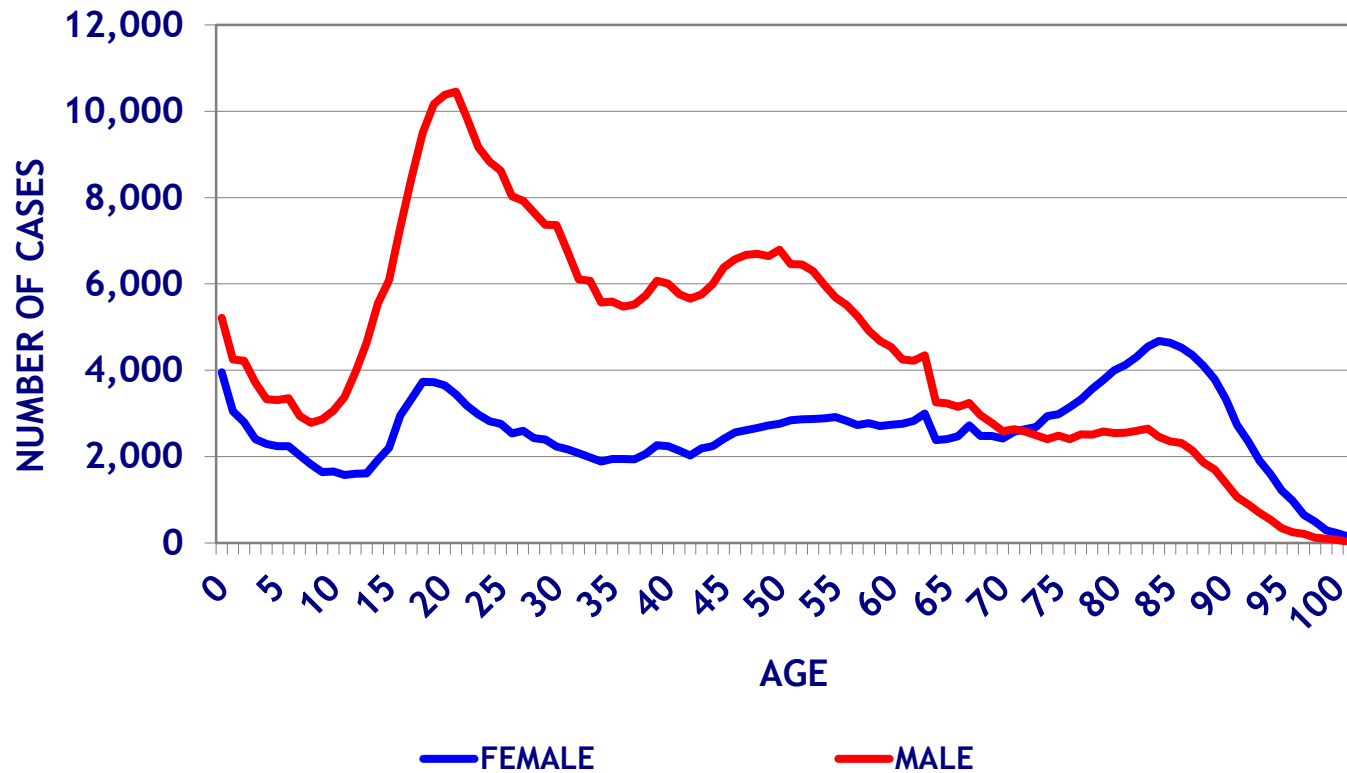


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Figure 11

## Incidents by Age and Gender

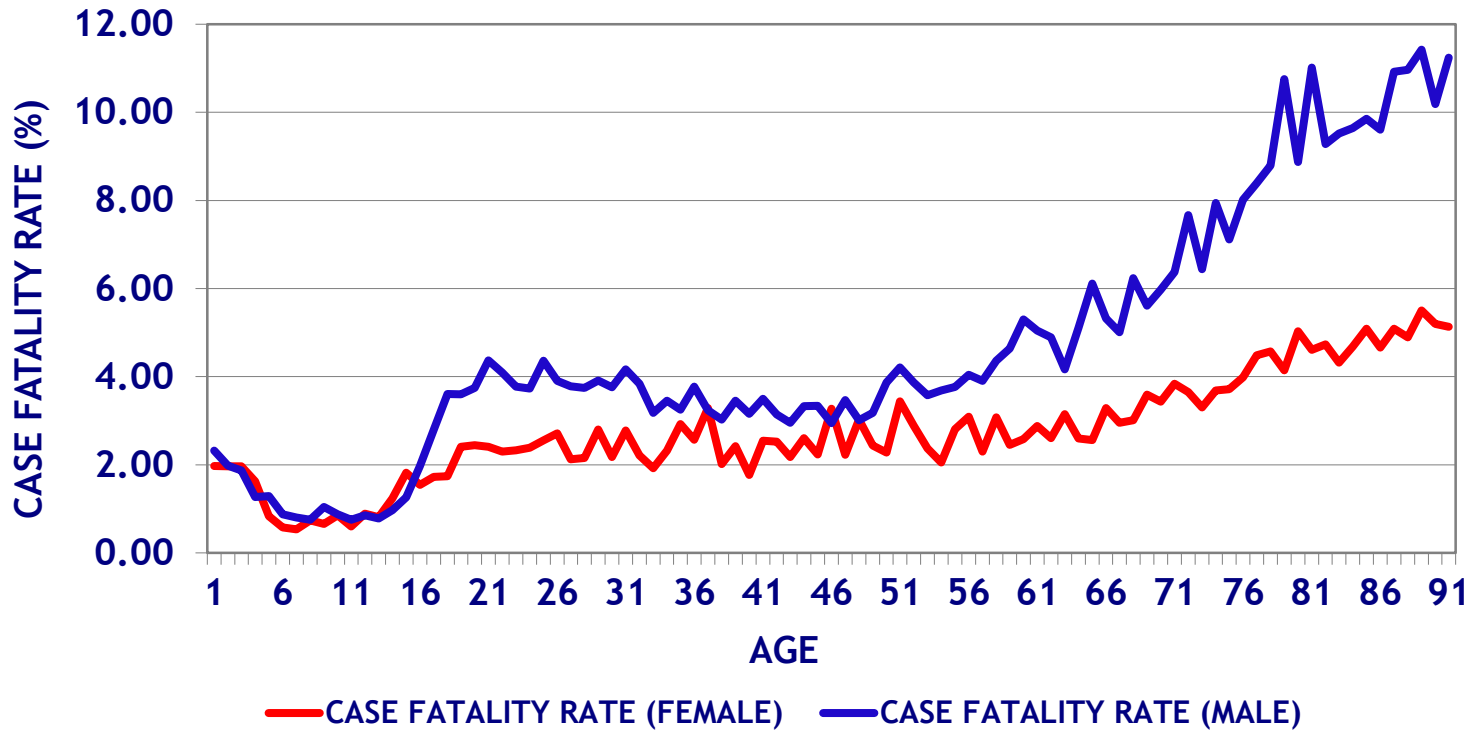


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Figure 12

## Case Fatality Rate by Age and Gender



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Table  
13

## Alcohol Use

ALCOHOL USE	NUMBER	PERCENT
No (not tested)	339,883	47.02
No (confirmed by test)	167,925	23.23
Yes (confirmed by test [beyond legal limit])	72,089	9.97
Yes (confirmed by test [trace levels])	32,598	4.51
Not Applicable	11,498	1.59
NK/NR	98,831	13.67
Total	722,824	100.00

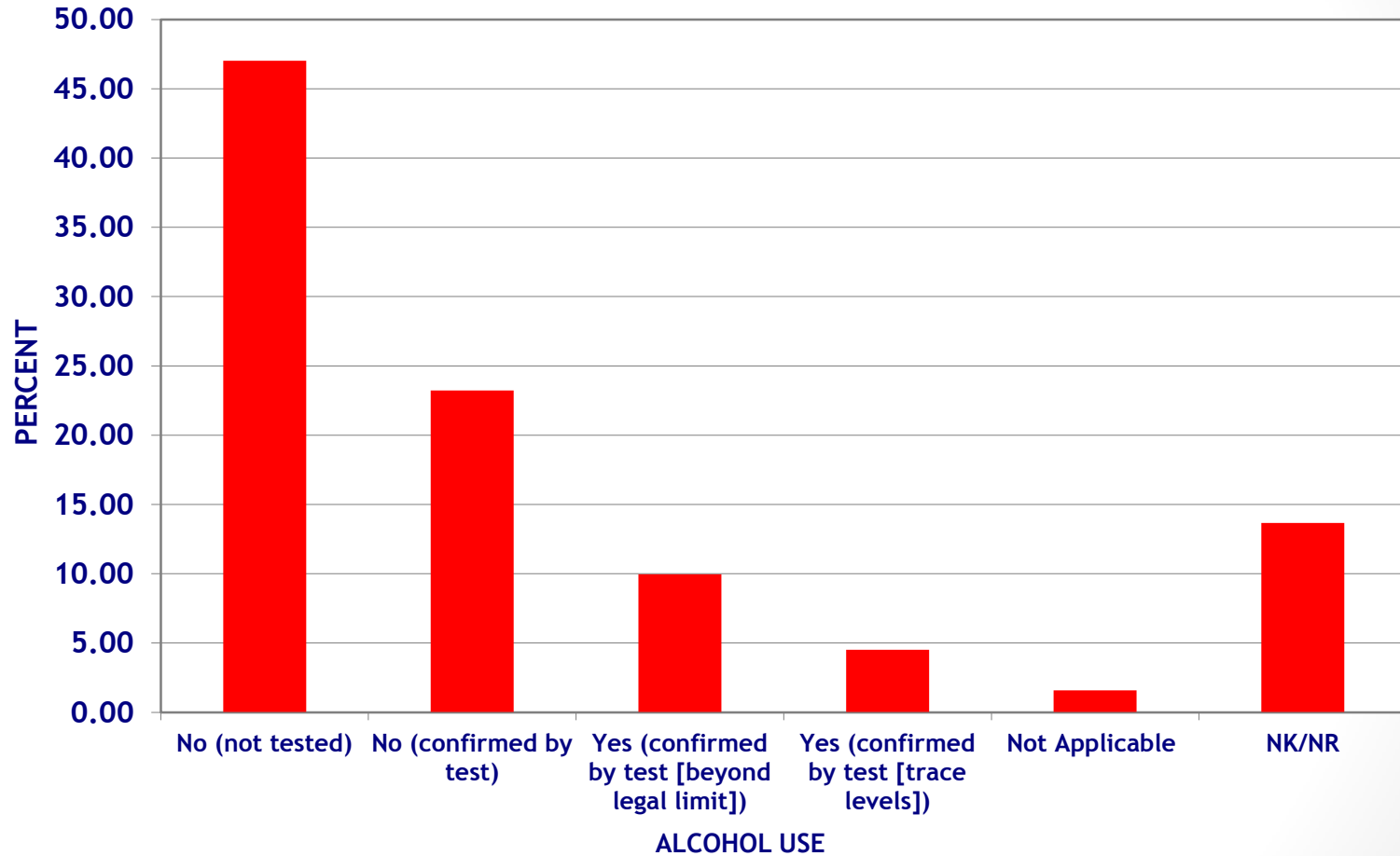


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Figure 13

## Alcohol Use



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Table  
14

## Drug Use

DRUG USE	NUMBER	PERCENT
No (not tested)	355,332	49.16
No (confirmed by test)	80,088	11.08
Yes (confirmed by test [illegal use drug])	65,829	9.11
Yes (confirmed by test [prescription drug])	16,407	2.27
Not Applicable	85,585	11.84
NK/NR	119,583	16.54
Total	722,824	100.00



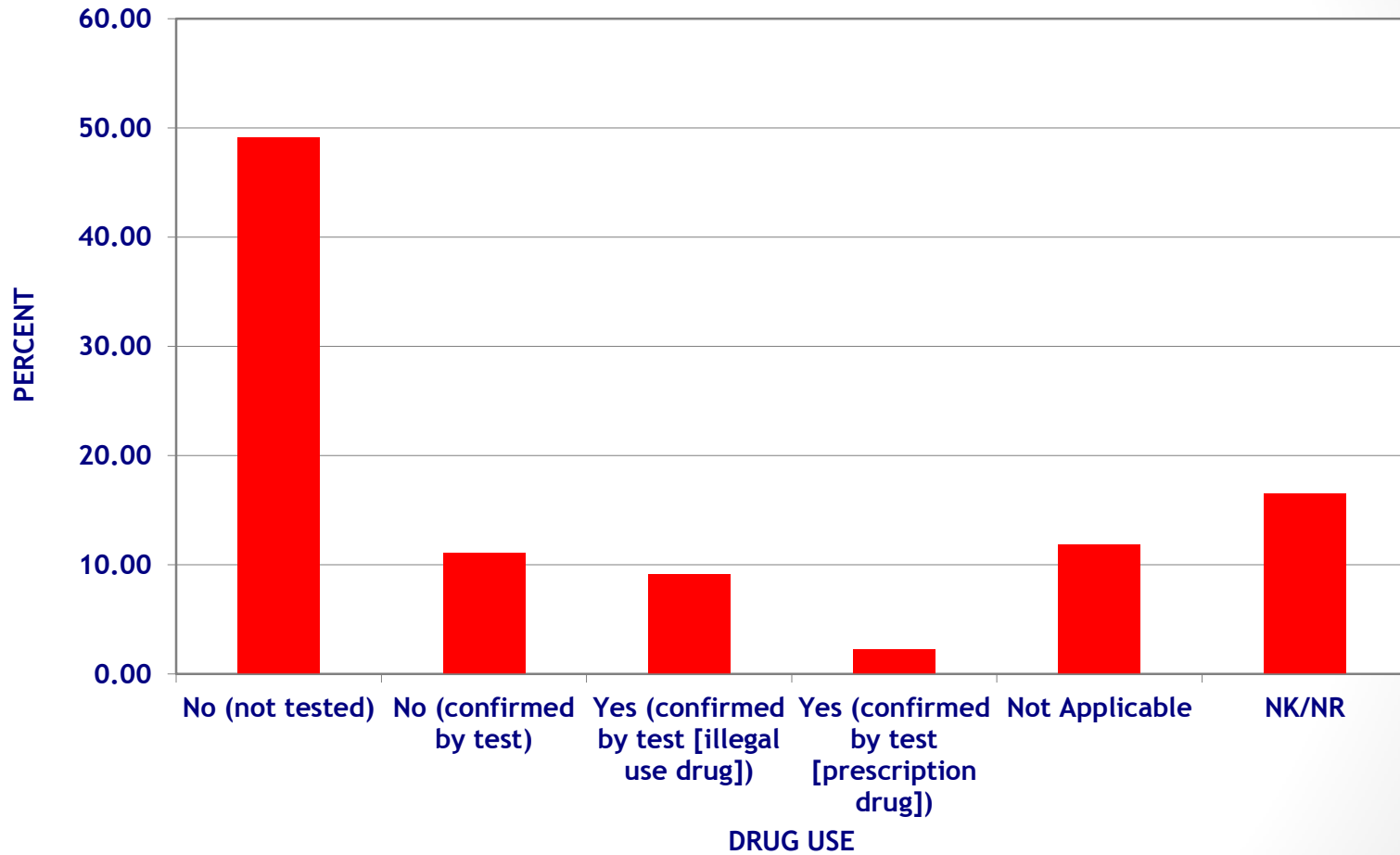
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Figure 14

## Drug Use



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Table  
15

## Primary Payment Source

PRIMARY PAYMENT SOURCE	NUMBER	PERCENT
Private/Commercial Insurance	154,362	21.36
Medicare	139,844	19.35
Self Pay	112,450	15.56
Medicaid	93,979	13.00
Blue Cross/Blue Shield	38,863	5.38
No Fault Automobile	38,409	5.31
Other	32,982	4.56
Other Government	19,321	2.67
Workers Compensation	19,133	2.65
Not Billed (for any reason)	5,599	0.77
Not Applicable	6,426	0.89
NK/NR	61,456	8.50
Total	722,824	100.00

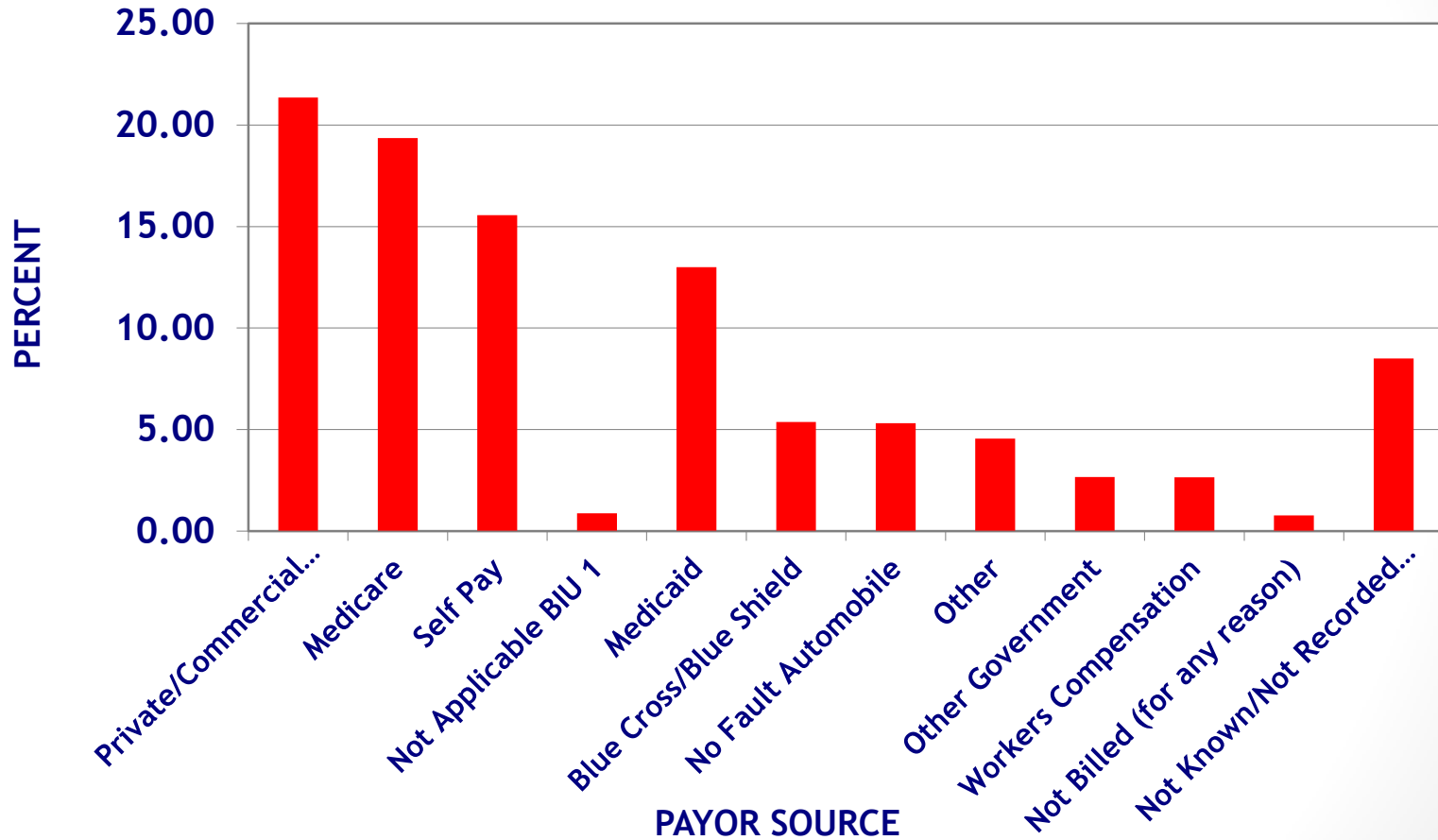


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Figure 15

## Primary Payment Source



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# INJURY CHARACTERISTICS



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Table  
16

## Incidents by Mechanism of Injury

MECHANISM	NUMBER	PERCENT	DEATHS	CASE FATALITY RATE
Fall	277,315	38.37	9,109	3.28
Motor Vehicle Traffic	209,148	28.93	9,038	4.32
Struck by, against	54,241	7.50	560	1.03
Transport, other	38,185	5.28	793	2.08
Cut/pierce	34,057	4.71	653	1.92
Firearm	32,419	4.49	5,125	15.81
Pedal cyclist, other	13,448	1.86	113	0.84
Other specified and classifiable	12,576	1.74	493	3.92
Fire/flame	8,413	1.16	451	5.36
Hot object/substance	8,312	1.15	33	0.40
Unspecified	8,183	1.13	313	3.83
Machinery	7,314	1.01	95	1.30
Natural/environmental, Bites and stings	4,039	0.56	13	0.32
Other specified, not elsewhere classifiable	3,819	0.53	78	2.04
Pedestrian, other	2,431	0.34	134	5.51
Natural/environmental, Other	2,425	0.34	34	1.40
Overexertion	2,212	0.31	3	0.14
Suffocation	670	0.09	154	22.99
Drowning/submersion	427	0.06	57	13.35
Poisoning	350	0.05	10	2.86
NK/NR	2,558	0.35	102	3.99
<b>Total Incidents/Deaths</b>	<b>722,824</b>	<b>99.96</b>	<b>27,368</b>	



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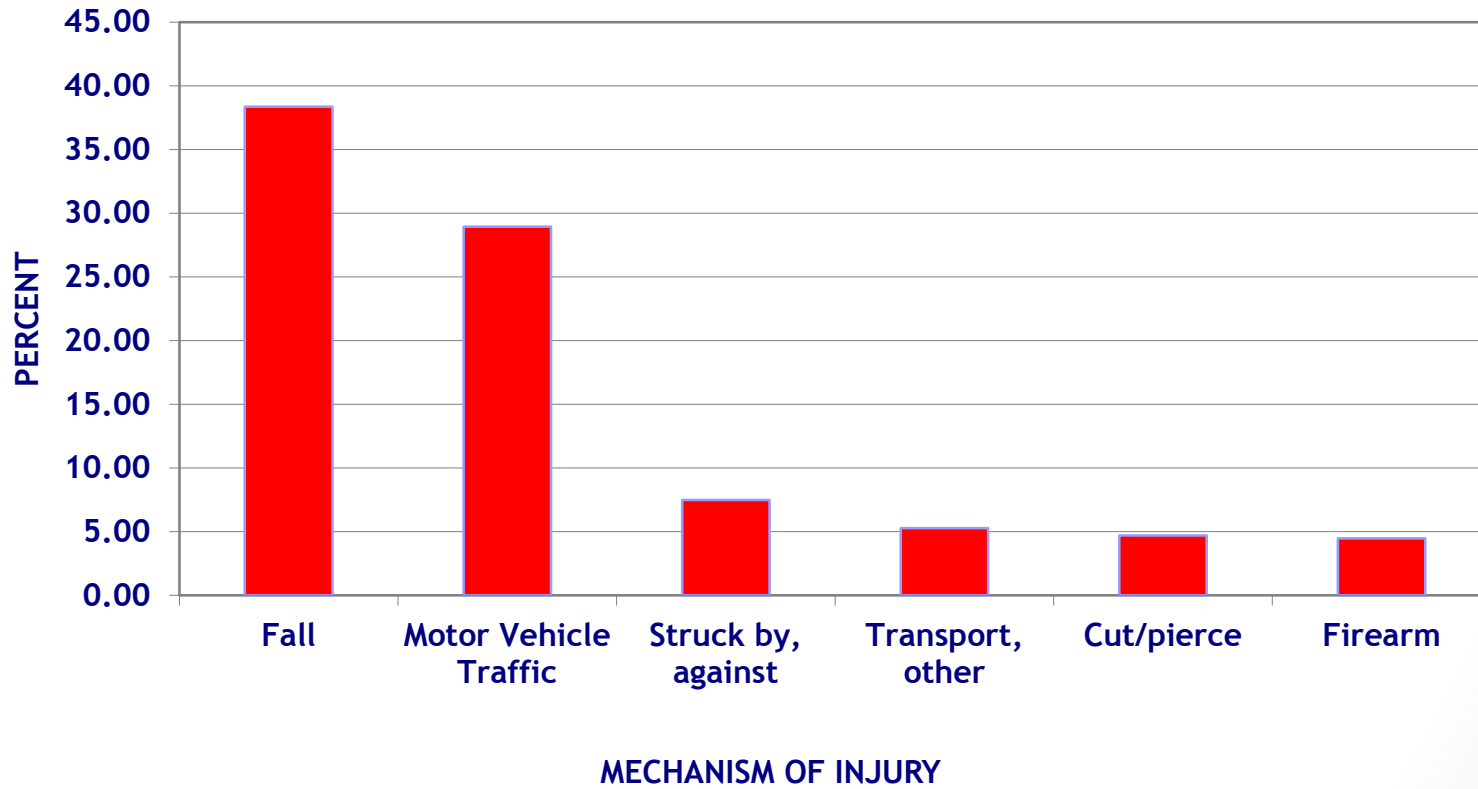
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Adverse effects have been removed from all mechanism tables, but are included in totals; therefore percentages do not equal 100.

Figure 16A

## Incidents by Selected Mechanism of Injury

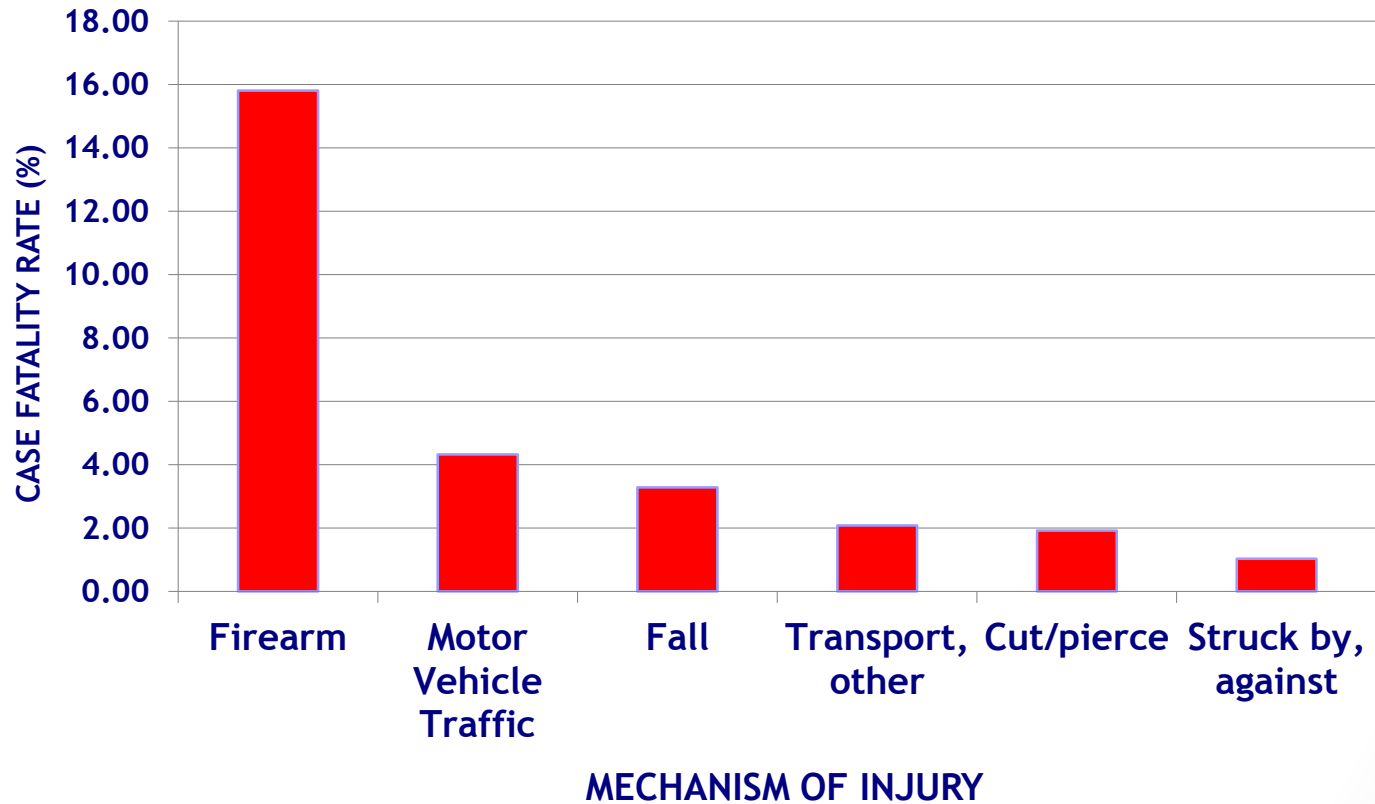


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Figure 16B

## Case Fatality Rate by Selected Mechanism of Injury



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Table  
17

## Incidents by Selected Mechanism of Injury and Age

Age	Fall	Motor Vehicle Traffic	Struck by, against	Transport, other	Cut/Pierce	Firearm
<1 year	5,093	451	382	37	46	33
1–4	12,735	3,349	1,997	566	505	138
5–9	12,009	4,484	2,083	1,691	499	173
10–14	8,952	6,037	4,345	3,596	731	614
15–19	7,523	23,000	7,138	4,963	3,769	5,949
20–24	7,060	27,442	6,795	4,042	5,941	7,654
25–34	13,800	36,683	9,923	5,956	8,920	8,832
35–44	16,248	29,322	7,815	5,375	5,926	4,152
45–54	28,105	31,339	7,767	5,548	4,721	2,651
55–64	33,687	22,590	3,495	3,437	1,959	1,258
65–74	33,718	12,233	1,268	1,673	654	518
75–84	50,361	8,770	785	916	273	278
≥85	48,013	3,427	443	384	110	144
NK/NR	11	21	5	1	3	25
Total	277,315	209,148	54,241	38,185	34,057	32,419



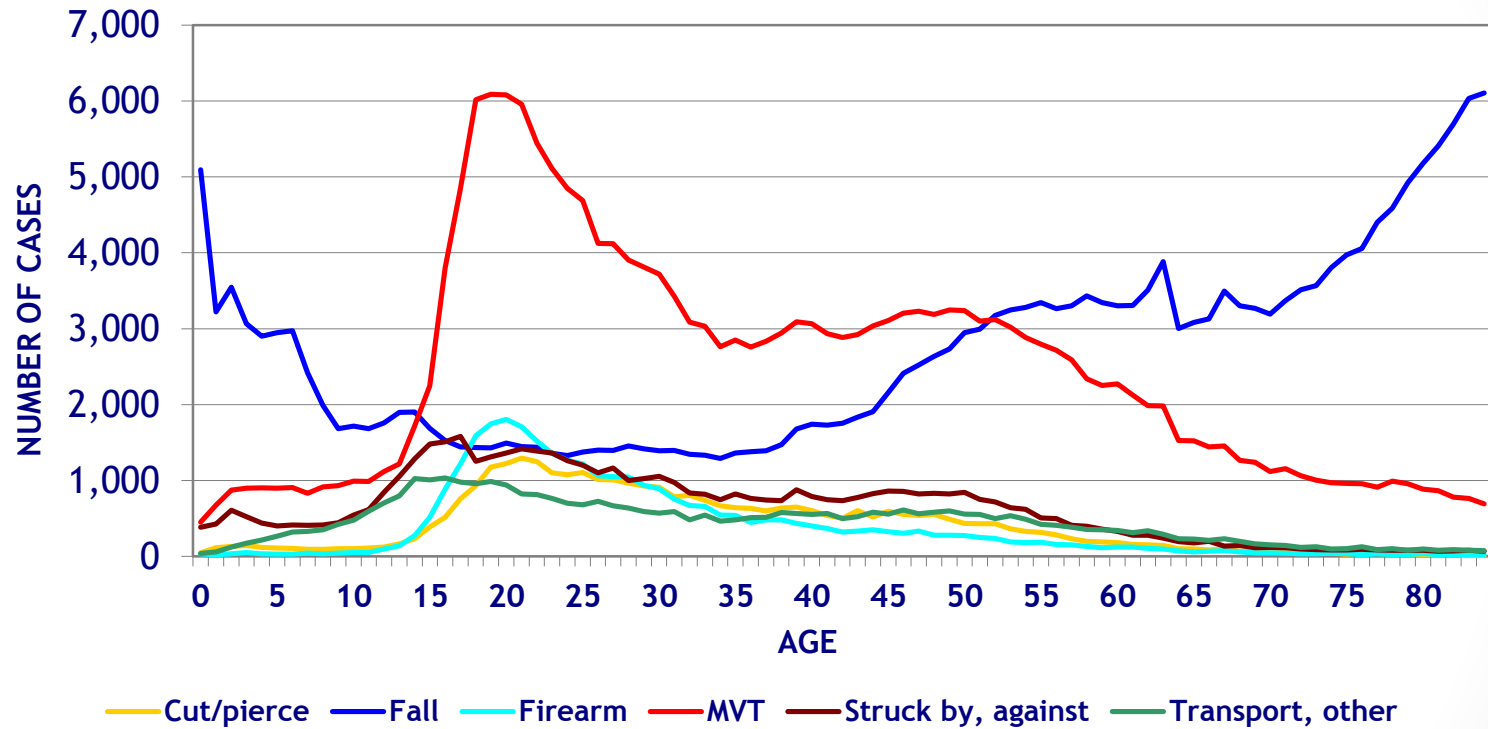
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Figure 17

## Incidents by Selected Mechanism of Injury and Age



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Table  
18

## Case Fatality Rate by Selected Mechanism of Injury and Age

Age	Cut/Pierce	Fall	Firearm	Motor Vehicle Traffic	Struck By, Against	Transport, Other
<1 year	2.17	0.24	21.21	9.31	1.31	2.70
1-4	0.40	0.24	16.67	4.84	1.45	0.71
5-9	0.60	0.07	10.98	2.52	0.43	0.83
10-14	0.41	0.15	10.91	2.20	0.23	0.89
15-19	1.57	0.49	11.58	3.16	0.21	1.57
20-24	1.83	1.08	13.84	3.32	0.56	1.58
25-34	1.94	1.22	14.96	3.22	0.80	1.90
35-44	1.92	1.35	16.67	3.44	0.97	1.64
45-54	1.95	2.05	20.26	4.14	1.47	1.87
55-64	2.65	2.84	25.20	5.06	2.40	3.08
65-74	3.67	3.90	32.82	6.73	3.23	4.30
75-84	3.66	5.52	44.60	10.57	4.59	7.64
≥85	8.18	6.07	54.17	16.46	5.19	12.24
NK/NR	66.67	0.00	88.00	33.33	20.00	0.00

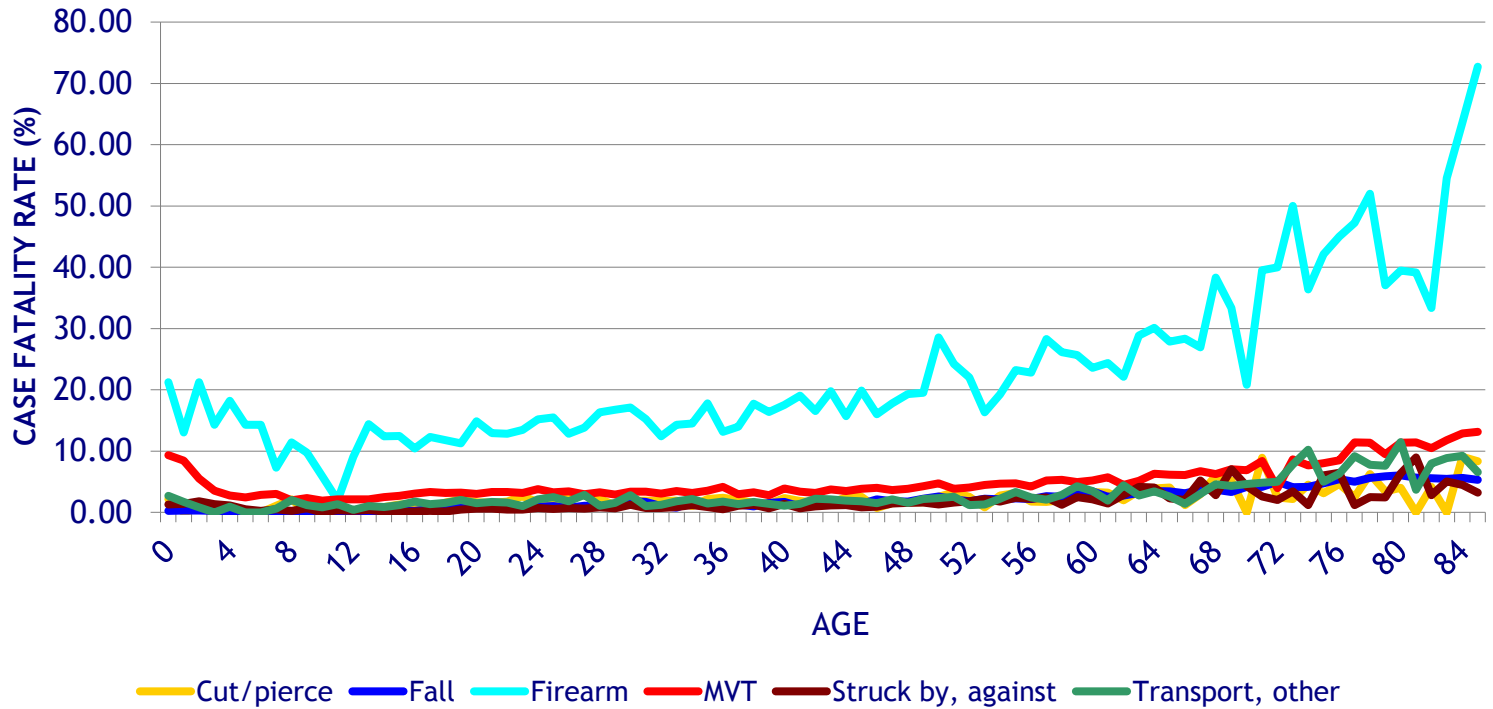


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Figure 18

## Case Fatality Rate by Selected Mechanism of Injury and Age



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Table  
19

## Incidents by Selected Mechanism of Injury and Gender

MECHANISM	PERCENT (FEMALE)	PERCENT (MALE)	CASE FATALITY RATE (FEMALE)	CASE FATALITY RATE (MALE)
Fall	51.85	30.53	2.86	3.71
Motor Vehicle Traffic	29.40	28.67	3.70	4.69
Transport, Other	4.30	5.85	1.79	2.19
Struck By, Against	3.31	9.94	1.01	1.04
Cut/Pierce	1.97	6.30	1.97	1.91
Firearm	1.35	6.31	15.67	15.82
Other Specified And Classifiable	1.28	2.00	3.58	4.04
Hot Object/Substance	1.24	1.10	0.40	0.40
Pedal Cyclist, Other	1.09	2.31	0.28	0.99
Fire/Flame	0.79	1.38	7.45	4.66
Natural/Environmental, Other	0.66	0.50	0.28	0.35
Unspecified	0.66	1.40	3.86	3.80
Other Specified, Not Elsewhere Classifiable	0.37	0.62	2.05	2.04
Natural/Environmental, Bites And Stings	0.34	0.33	1.09	1.59
Overexertion	0.33	0.29	0.12	0.15
Pedestrian, Other	0.32	0.34	4.78	5.92
Machinery	0.21	1.48	1.25	1.30
Suffocation	0.07	0.11	19.89	24.09
Poisoning	0.04	0.05	2.61	2.98
Drowning/Submersion	0.03	0.07	10.87	14.07
NK/NR	0.31	0.38	4.03	3.89
Total	99.94	99.97		



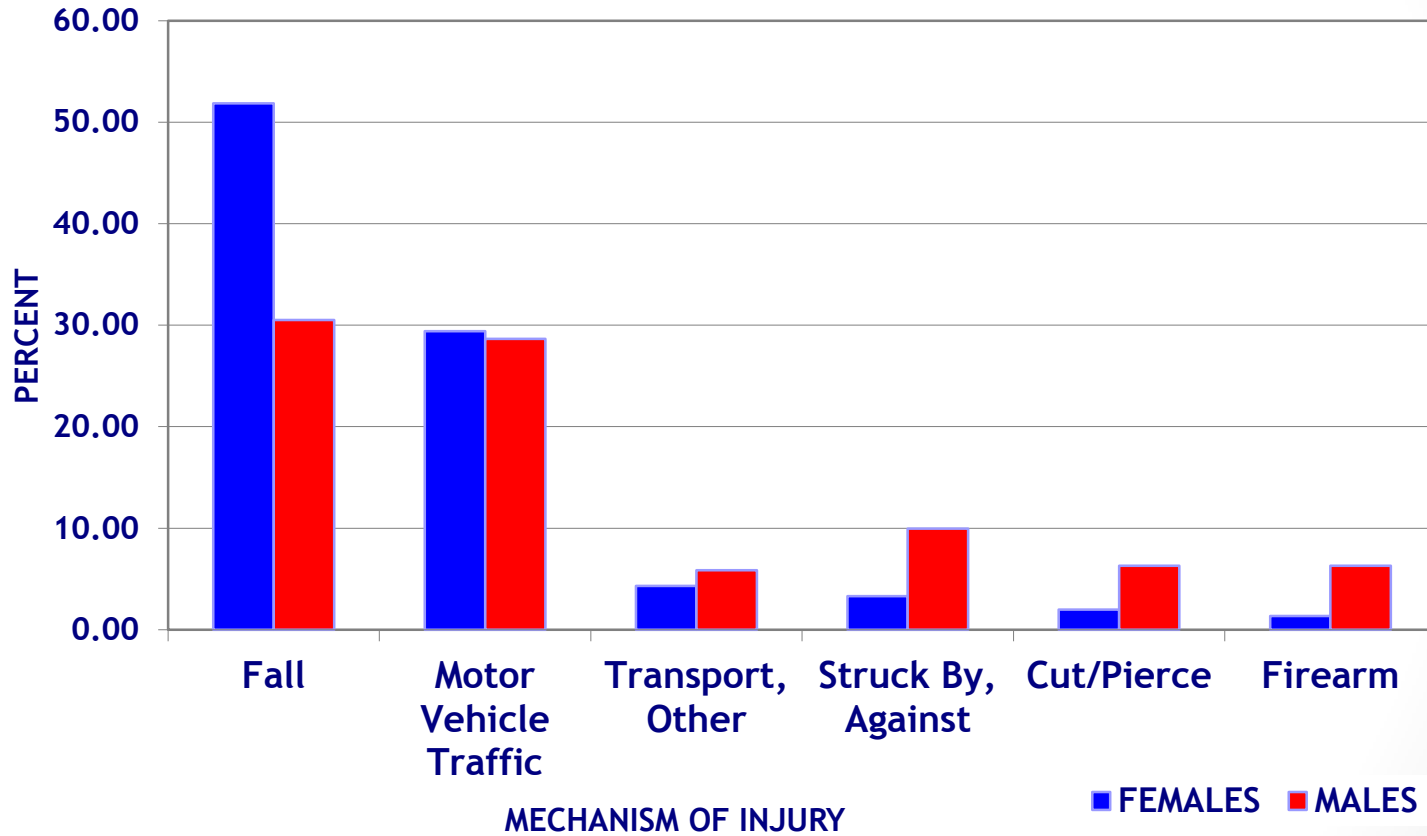
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Adverse effects have been removed from all mechanism tables, but are included in totals; therefore percentages do not equal 100.

Figure 19A

## Incidents by Selected Mechanism of Injury and Gender



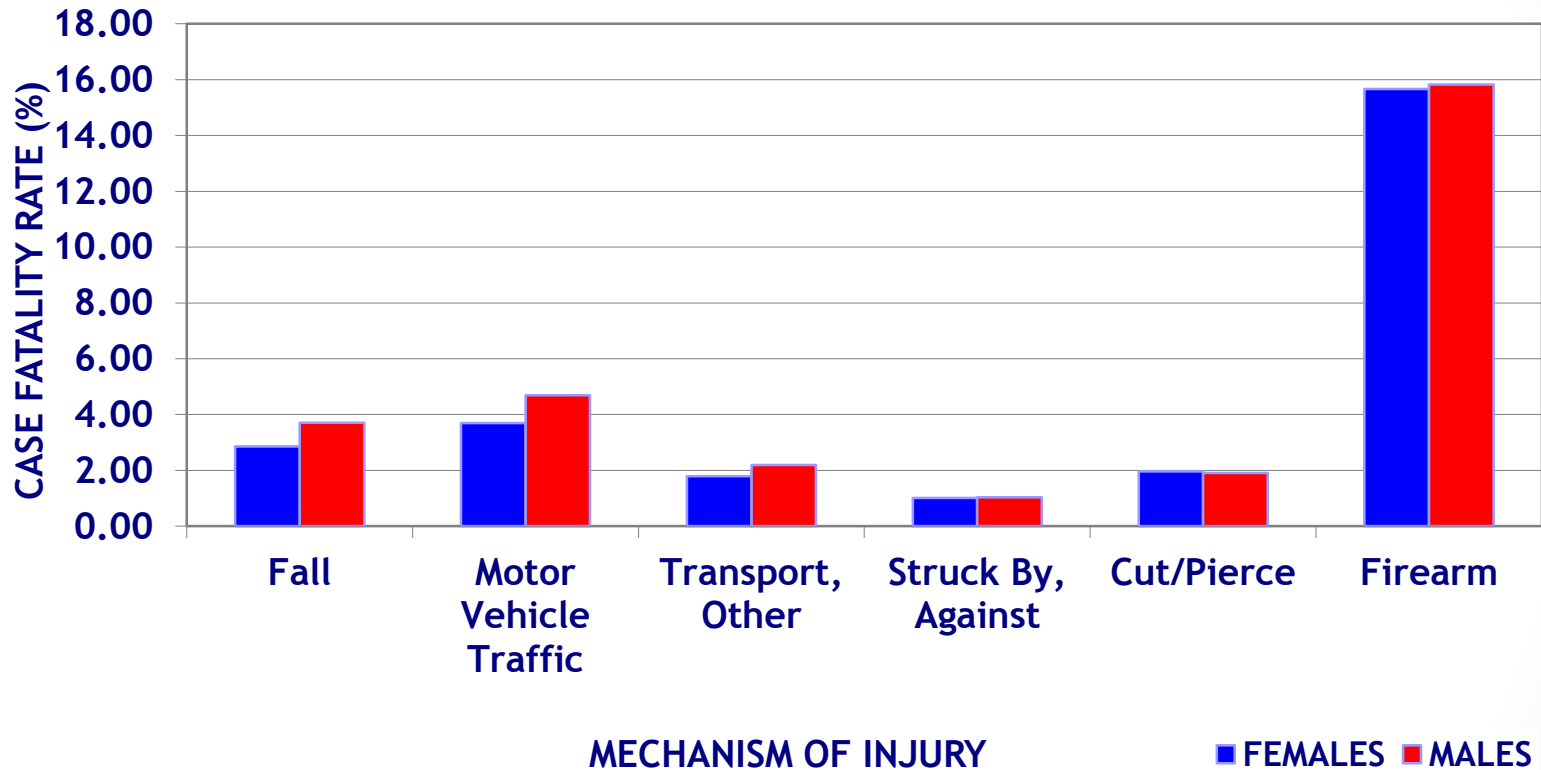
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Figure 19B

## Case Fatality Rate by Selected Mechanism of Injury and Gender



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Table  
20

## Incidents by Comparative Injury Severity Scores

ISS	LOCAL ISS	AIS SUBMITTED	AIS98 CROSSWALKED	AIS ICDMAP-90
1–8	48.22	46.69	46.89	50.38
9–15	30.63	29.87	29.70	24.45
16–24	11.68	10.81	13.57	14.05
>24	7.35	6.84	7.82	4.90
NK/NR	2.12	5.79	2.02	6.22



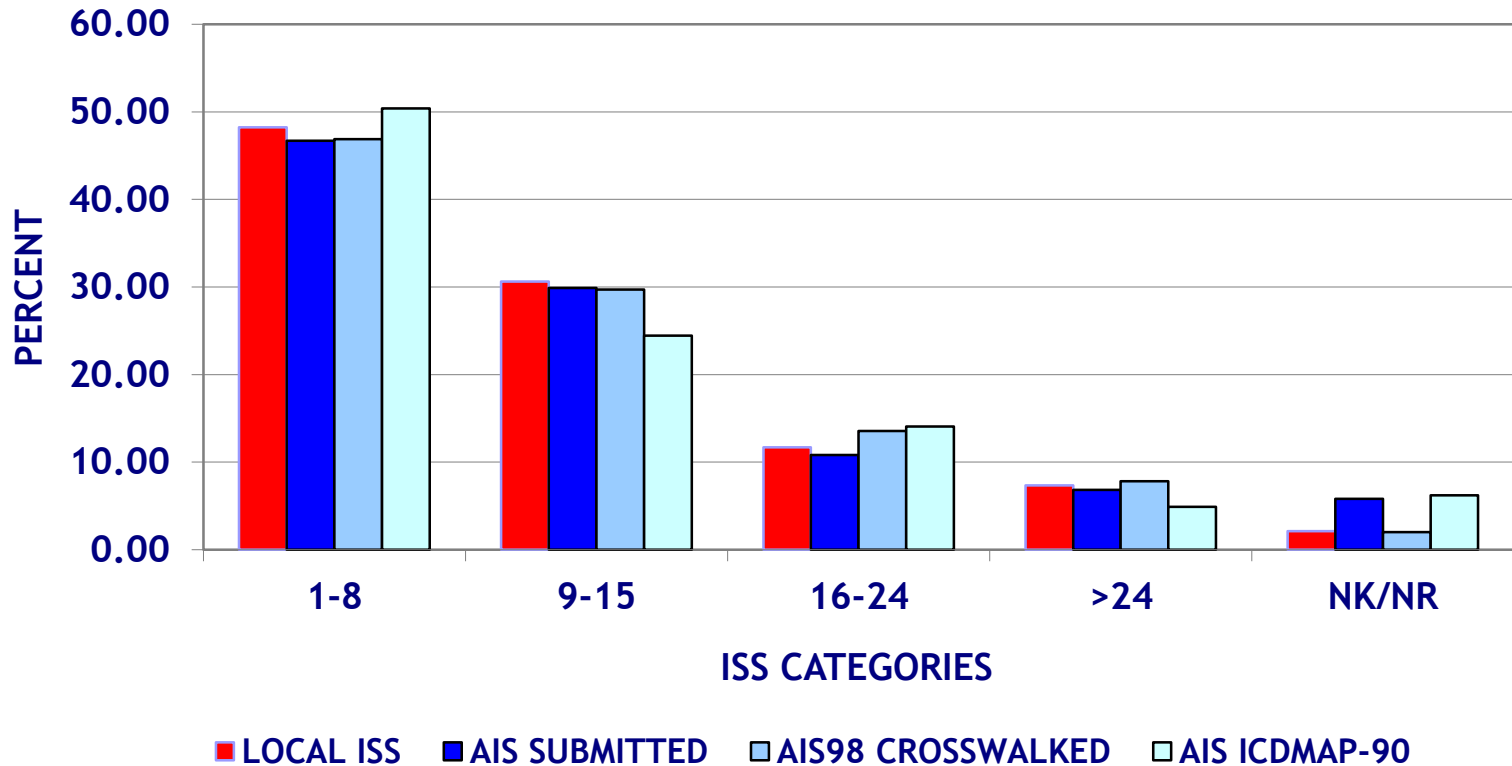
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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Comparative Injury Severity score definitions can be found in Appendix B.

Figure 20

## Incidents by Comparative Injury Severity Scores



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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90



Table  
21

## Case Fatality Rate by Injury Severity Score

ISS	NUMBER	PERCENT	DEATHS	CASE FATALITY RATE
1–8	338,929	46.89	2,379	0.70
9–15	214,686	29.70	4,156	1.94
16–24	98,071	13.57	4,704	4.80
>24	56,520	7.82	15,604	27.61
NK/NR	14,618	2.02	525	3.59
Total	722,824	100.00	27,368	



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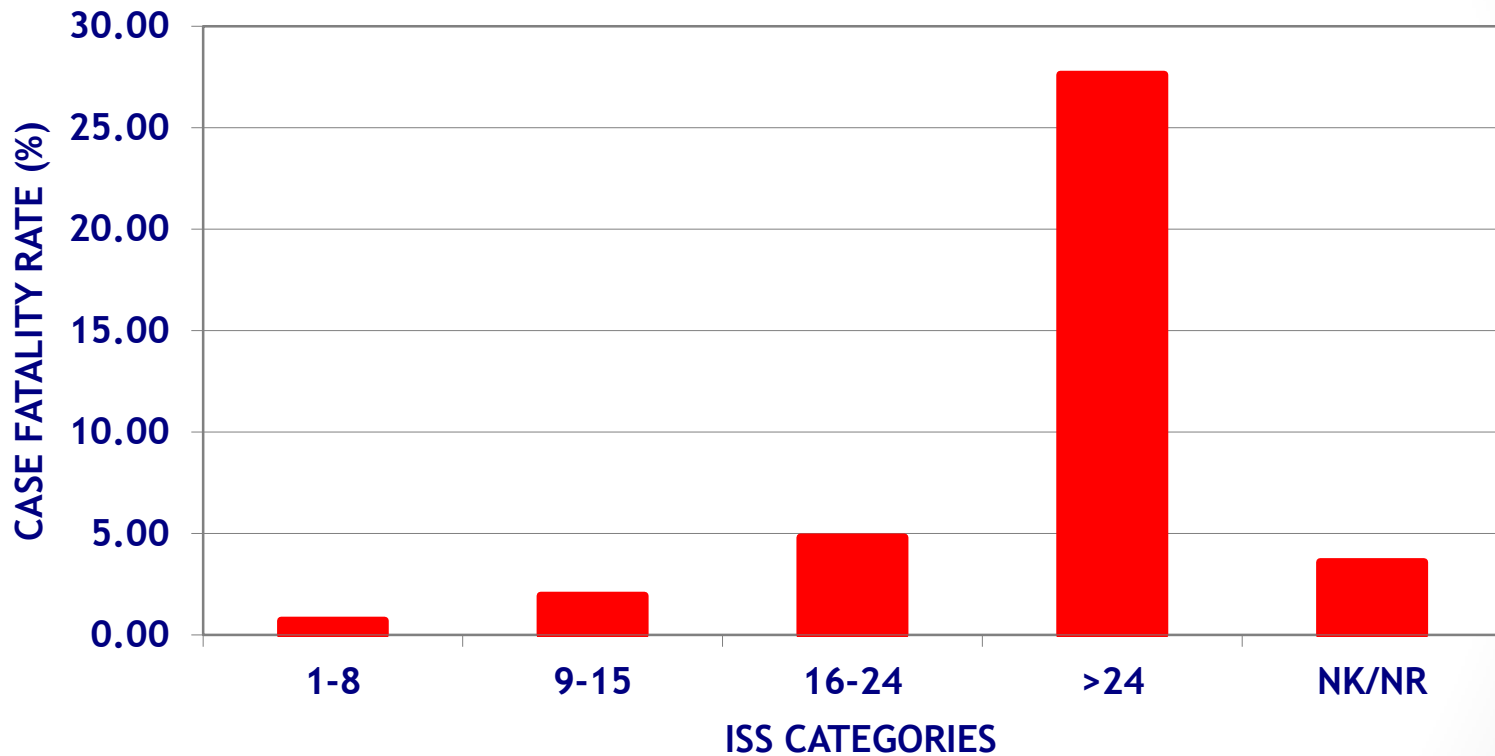
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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Figure 21

## Case Fatality Rate by Injury Severity Score



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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Table  
22

## Injury Severity Score by Age

AGE	ISS 1–8 NUMBER	ISS 9–15 NUMBER	ISS 16–24 NUMBER	ISS >24 NUMBER	ISS NK/NR NUMBER
<1 year	3,845	2,210	1,967	651	502
1–4	15,487	5,908	2,129	997	1,556
5–9	15,682	6,073	1,967	721	777
10–14	16,766	7,704	2,576	1,195	747
15–19	30,556	14,041	6,858	5,127	911
20–24	33,309	16,260	7,867	6,312	1,009
25–34	49,461	23,759	11,441	8,396	1,509
35–44	39,971	20,958	9,917	6,412	1,320
45–54	43,150	26,111	13,572	7,779	1,554
55–64	31,532	23,554	11,599	6,299	1,345
65–74	20,573	18,846	9,033	4,440	1,004
75–84	21,214	25,266	11,093	4,923	1,272
≥85	17,355	23,986	8,040	3,243	1,109
NK/NR	28	10	12	25	3
Total	338,929	214,686	98,071	56,520	14,618



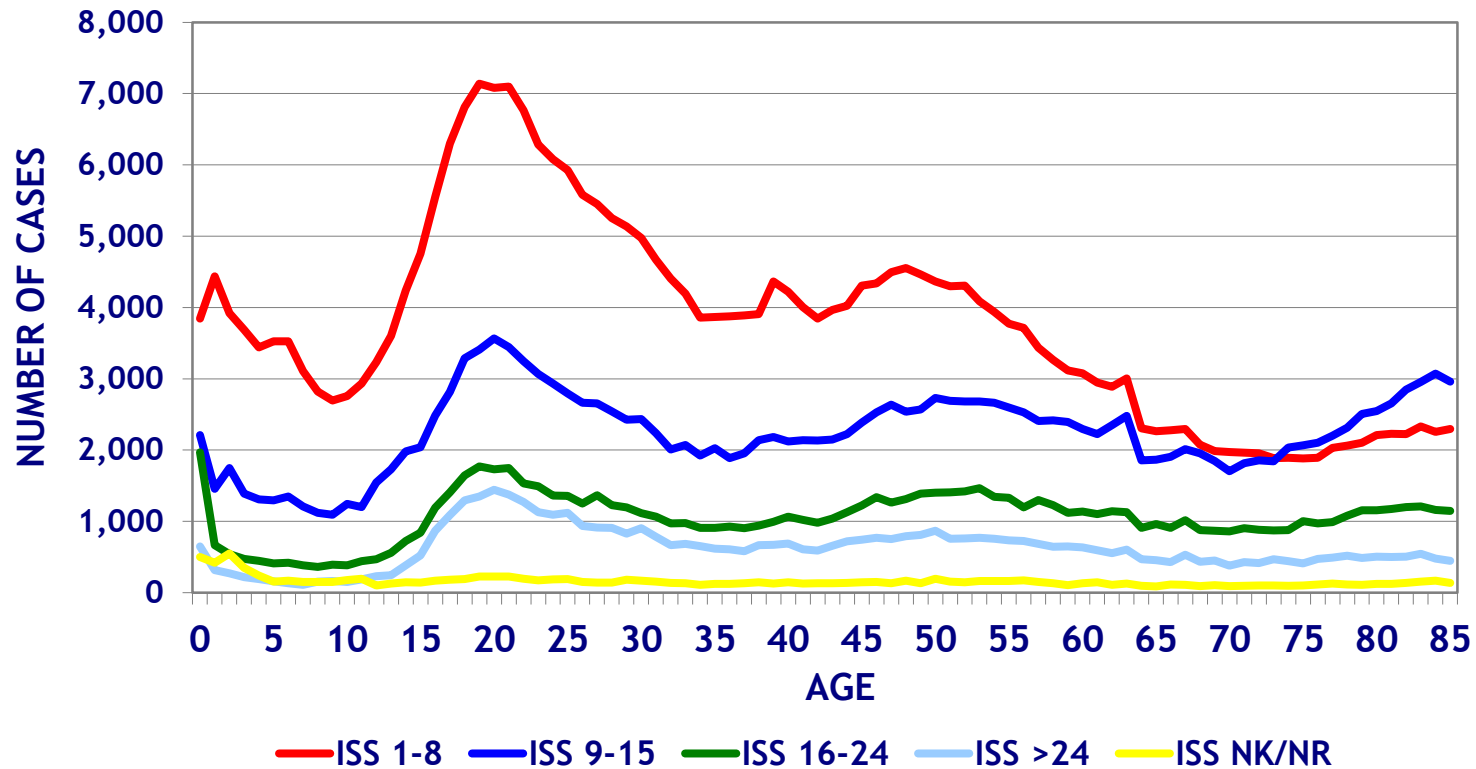
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Figure 22

## Injury Severity Score by Age



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Table  
23

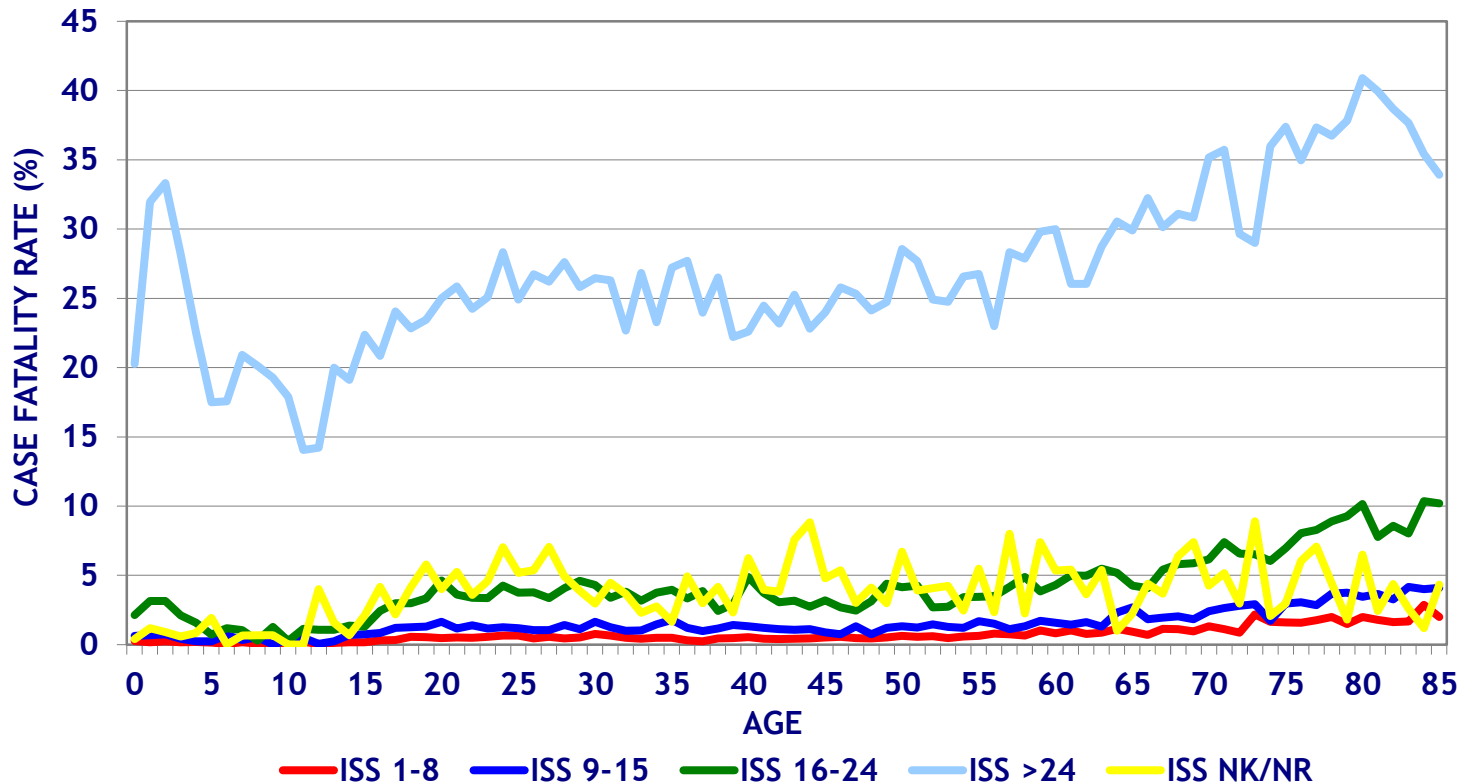
## Case Fatality Rate by Injury Severity Score and Age

AGE	ISS 1–8 CASE FATALITY RATE	ISS 9–15 CASE FATALITY RATE	ISS 16–24 CASE FATALITY RATE	ISS >24 CASE FATALITY RATE	ISS NK/NR CASE FATALITY RATE
<1 year	0.26	0.63	2.14	20.28	4.98
1–4	0.19	0.54	2.58	29.69	3.02
5–9	0.10	0.36	0.92	19.00	4.25
10–14	0.11	0.38	1.05	17.41	6.29
15–19	0.40	1.10	2.77	22.88	29.20
20–24	0.54	1.33	3.85	25.62	35.98
25–34	0.55	1.22	3.80	25.79	31.94
35–44	0.42	1.24	3.41	24.55	31.67
45–54	0.53	1.15	3.32	25.67	34.49
55–64	0.83	1.54	4.44	27.59	32.42
65–74	1.18	2.27	5.79	31.87	31.27
75–84	1.85	3.53	8.66	37.72	29.17
≥85	2.52	4.82	10.44	39.25	18.67
NK/NR	10.71	20.00	66.67	88.00	566.67



Figure 23

## Case Fatality Rate by Injury Severity Score and Age



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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Table  
24

## Incidents by Work-Related Injuries

WORK-RELATED INJURY	NUMBER	PERCENT	DEATHS	CASE FATALITY RATE
No	612,782	84.78	23,378	3.82
Yes	27,846	3.85	593	2.13
Not Applicable	24,388	3.37	789	3.24
NK/NR	57,808	8.00	2,608	4.51
Total	722,824	100.00	27,368	

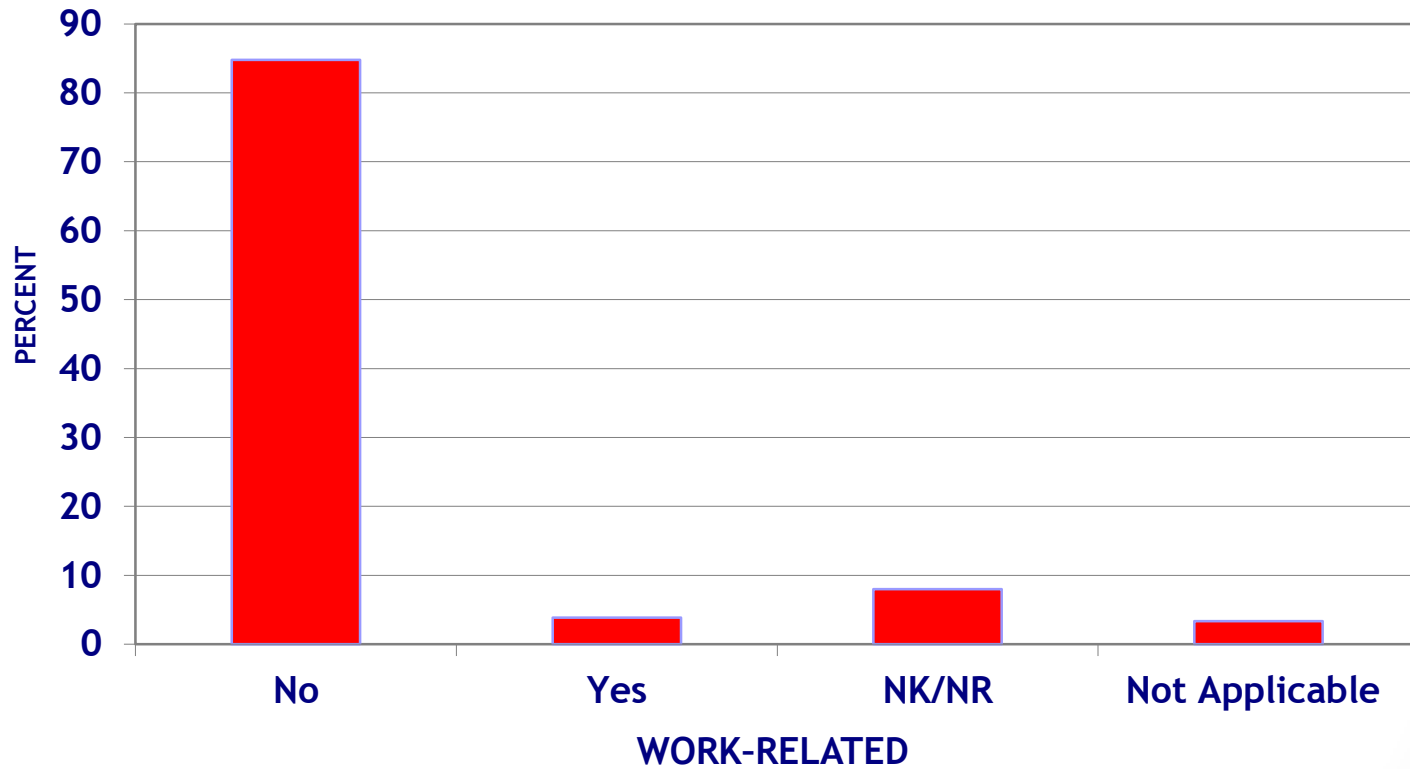


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Figure 24A

## Incidents by Work-Related Injuries



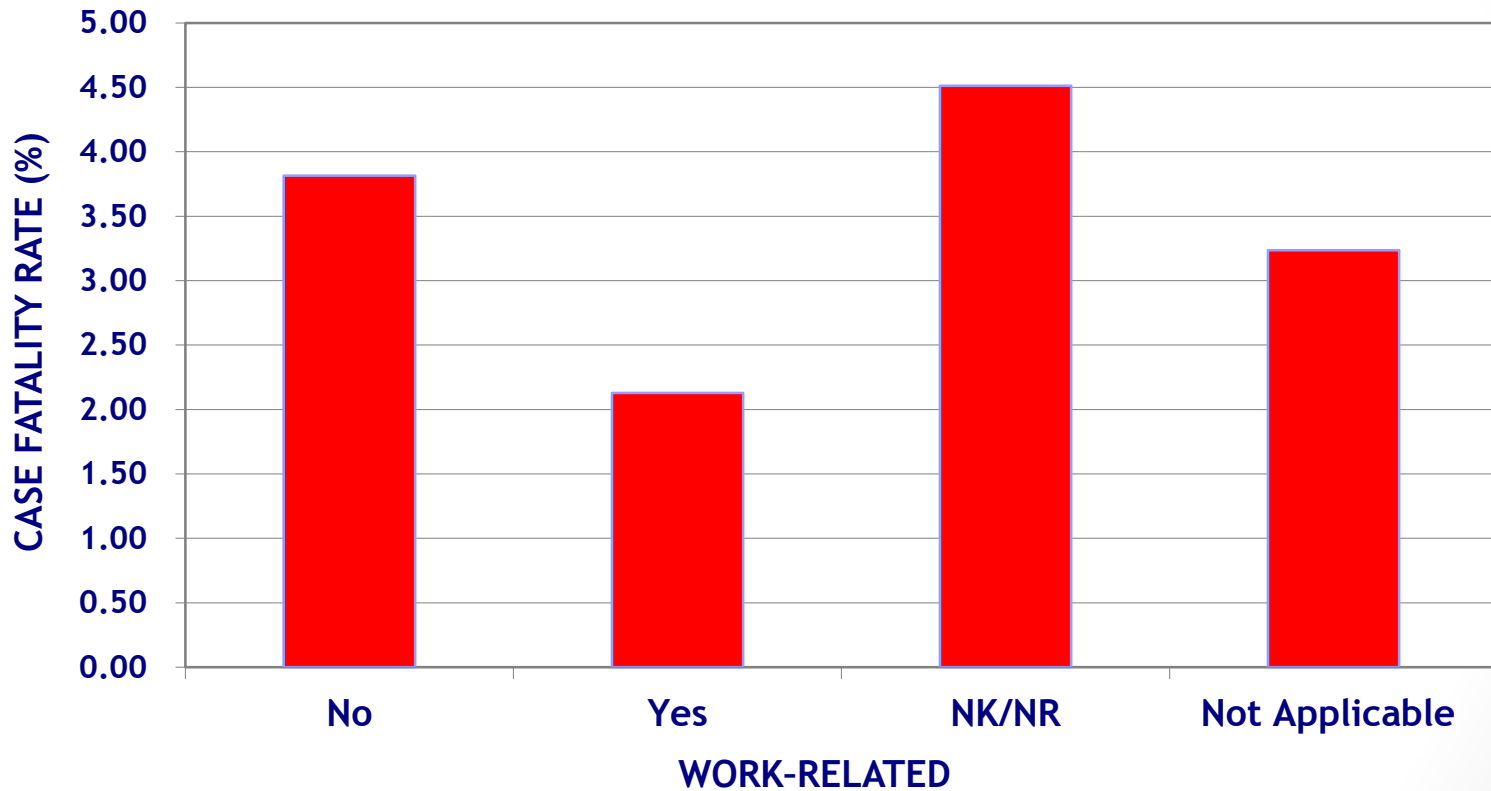
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Figure 24B

## Case Fatality Rate by Work-Related Injuries



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Table  
25

## Case Fatality Rate by Intent

INTENT	NUMBER	PERCENT	DEATHS	CASE FATALITY RATE
Unintentional	621,029	85.92	20,449	3.29
Assault	83,611	11.57	4,323	5.17
Self-inflicted	10,801	1.49	1,992	18.44
Undetermined	3,399	0.47	370	10.89
Other	1,426	0.20	132	9.26
NK/NR	2,558	0.35	102	3.99
Total	722,824	100.00	27,368	

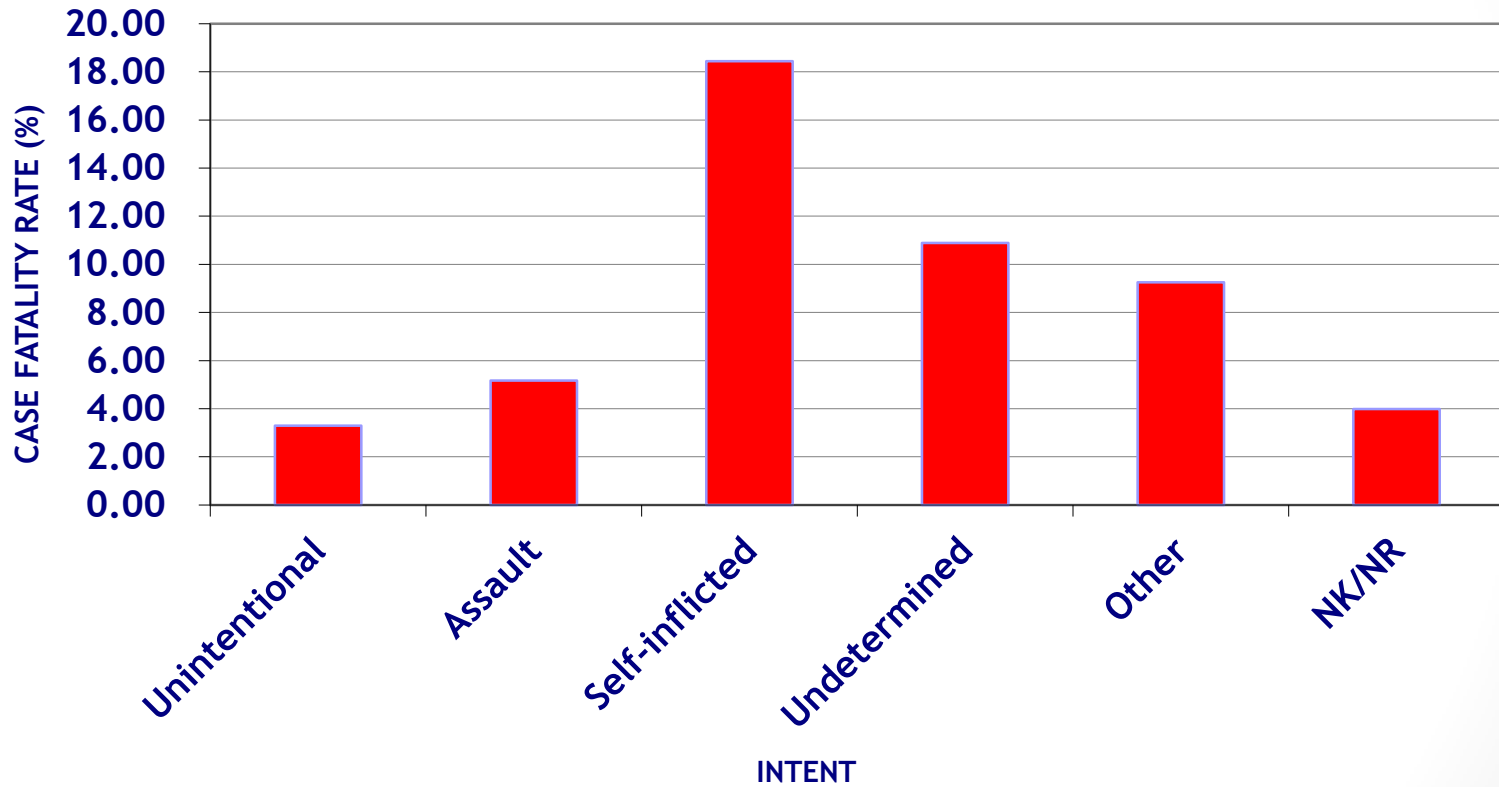


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Figure 25

## Case Fatality Rate by Intent



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Table  
26

## Case Fatality Rate by Location E-code

LOCATION OF INJURY	NUMBER	PERCENT	DEATHS	CASE FATALITY RATE
Street	254,381	35.19	11,053	4.35
Home	233,511	32.31	9,605	4.11
Unspecified	54,699	7.57	1,571	2.87
Recreation	42,850	5.93	393	0.92
Public Building	34,054	4.71	983	2.89
Other	33,792	4.67	1,149	3.40
Residential Institution	23,672	3.27	1,150	4.86
Industry	16,062	2.22	315	1.96
Farm	5,136	0.71	104	2.02
Mine	371	0.05	10	2.70
Not Applicable	497	0.07	17	3.42
NK/NR	23,799	3.29	1,018	4.28
Total	722,824	100	27,368	



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Figure 26

## Case Fatality Rate by Location E-code



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Table  
27

## Incidents by AIS Body Region

AIS BODY REGION	NUMBER	PERCENT
Head	260,914	36.10
Lower Extremity	250,996	34.72
Upper Extremity	206,172	28.52
Face	170,821	23.63
Thorax	149,938	20.74
Spine	121,514	16.81
Abdomen	87,450	12.10
External/Other	74,423	10.30
NK/NR	47,806	6.61
Total Incidents	722,824	



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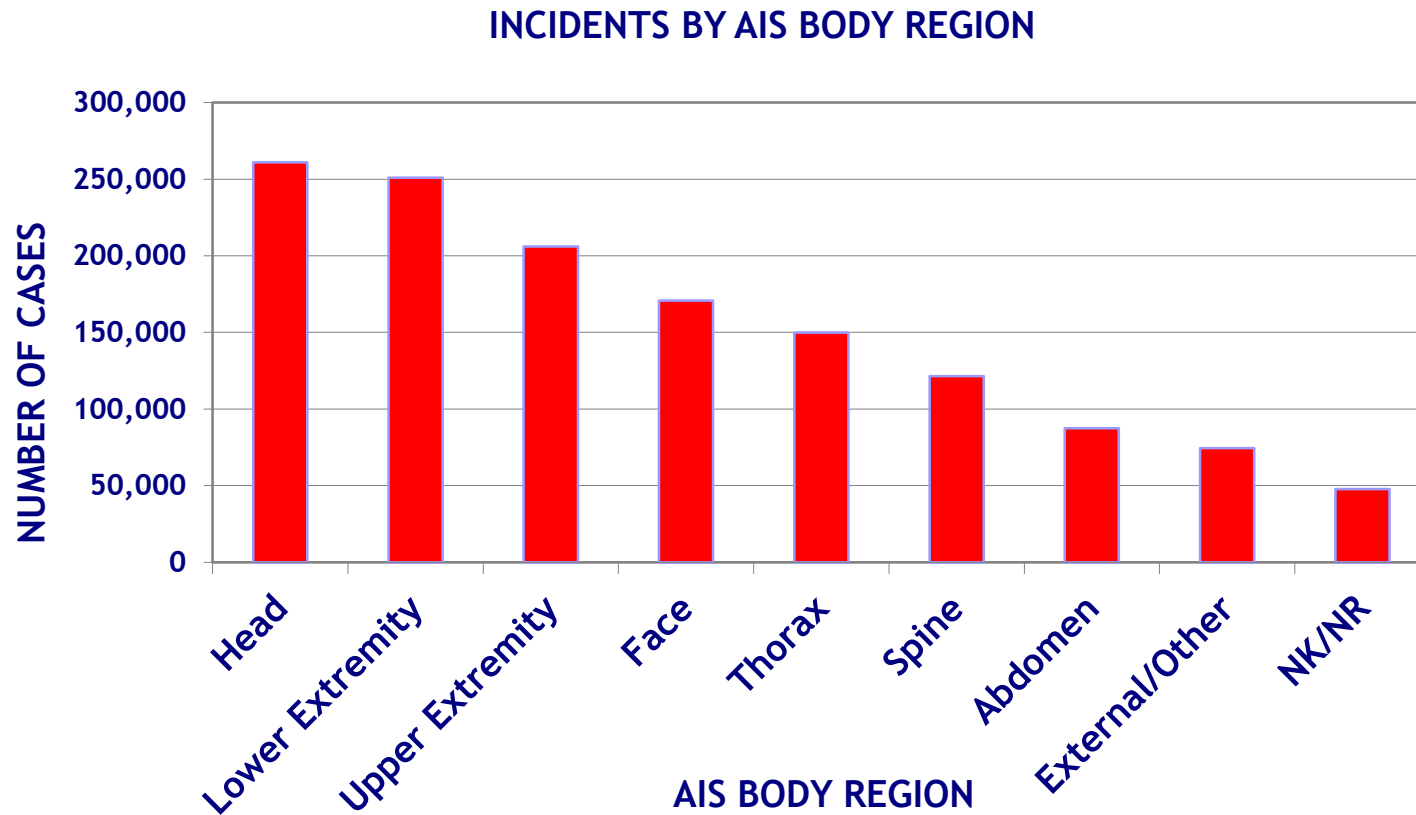
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A patient can have injuries in multiple body regions

Figure 27

## Incidents by AIS Body Region



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An incident may involve multiple organ systems and a patient will then be counted for each of the organ systems in which there is an injury.

Table  
28

## Incidents with AIS $\geq$ 3 by AIS Body Region

AIS BODY REGION	NUMBER	PERCENT
Head	128,887	36.96
Lower Extremity	103,939	29.81
Thorax	98,176	28.16
Abdomen	28,718	8.24
Upper Extremity	28,639	8.21
Spine	27,442	7.87
Neck	5,841	1.68
Face	3,320	0.95
External	2,274	0.65
Total Incidents	348,676	



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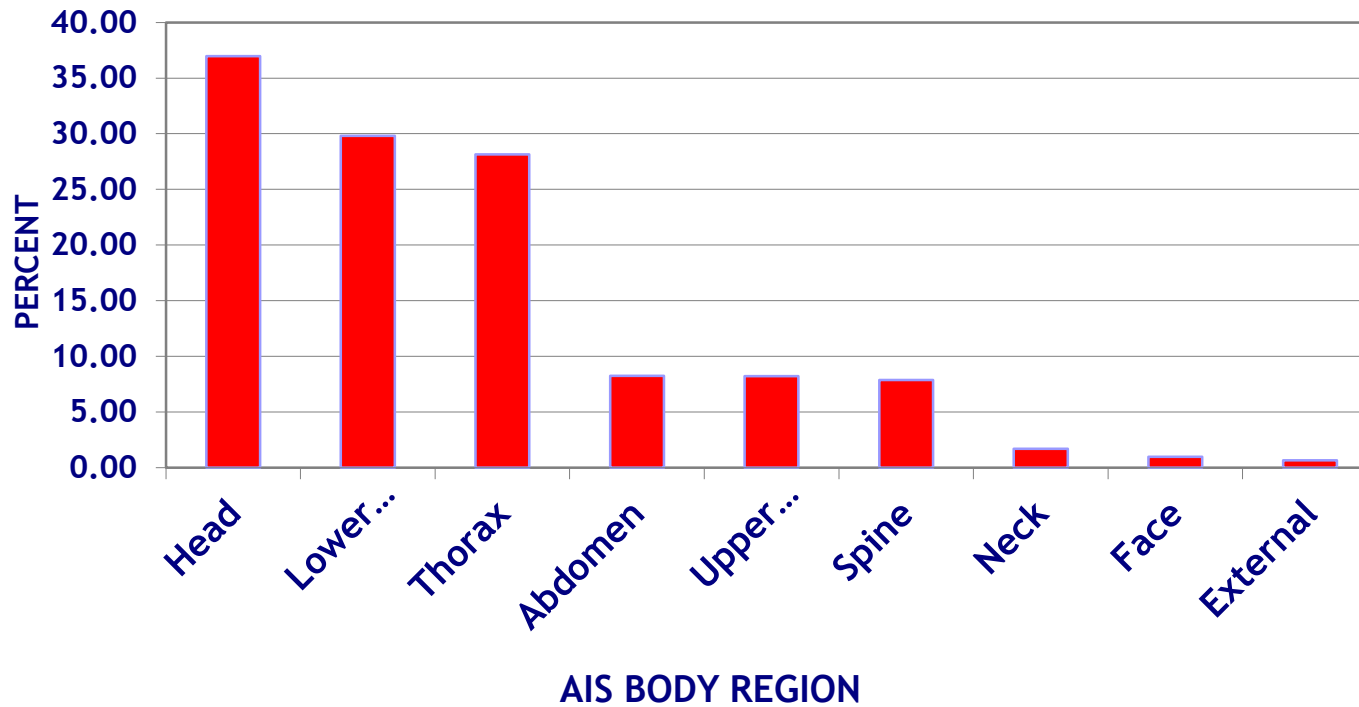
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An incident may involve multiple organ systems and a patient will then be counted for each of the organ systems in which there is an injury.



Figure 28

## Incidents with AIS $\geq 3$ by AIS Body Region



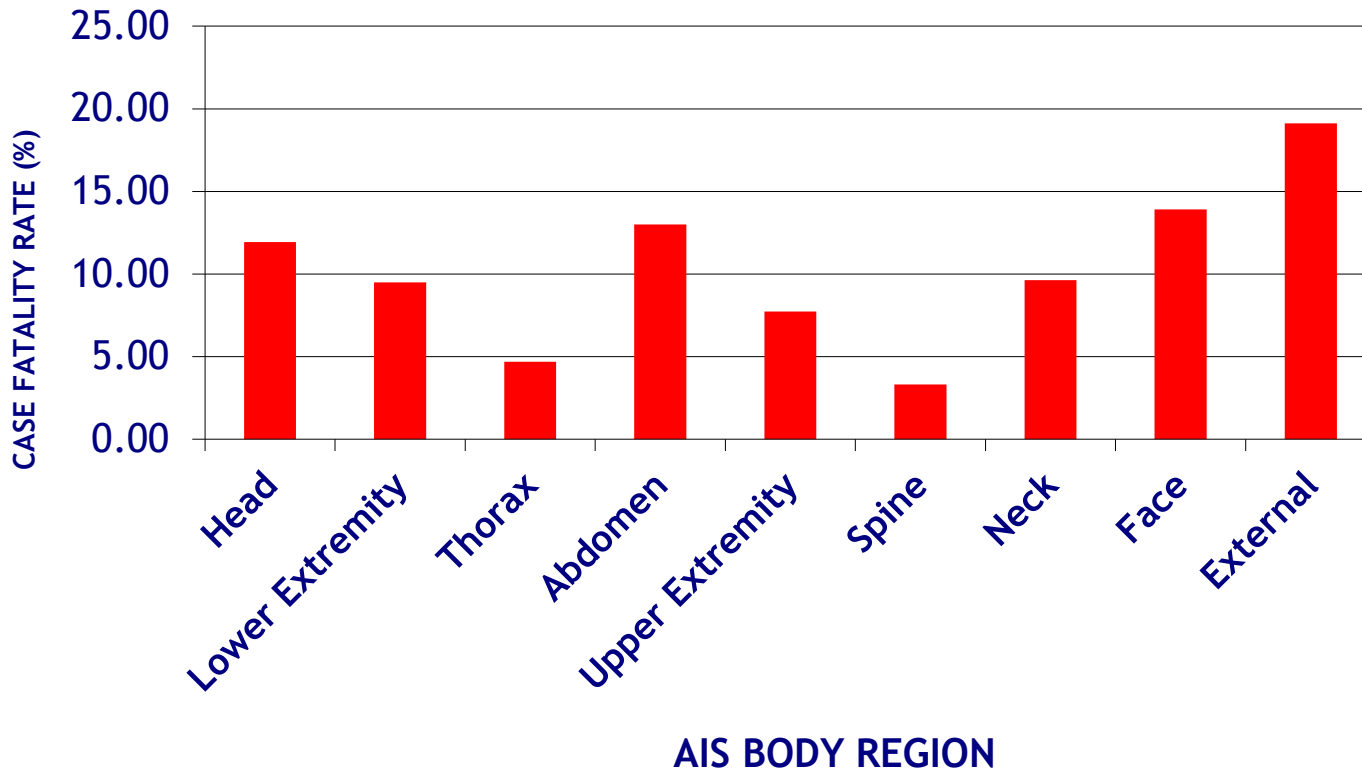
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An incident may involve multiple organ systems and a patient will then be counted for each of the organ systems in which there is an injury.

Figure 29

## Case Fatality Rate for AIS $\geq$ 3 AIS Body Region



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An incident may involve multiple organ systems and a patient will then be counted for each of the organ systems in which there is an injury.

Table  
29

## Incidents by Protective Devices

PROTECTIVE DEVICES	NUMBER	PERCENT
None	205,228	28.39
Lap Belt	75,720	10.48
Shoulder Belt	70,710	9.78
Airbag Present	58,264	8.06
Helmet	38,095	5.27
Unknown	6,772	0.94
Protective Clothing	4,471	0.62
Other	2,814	0.39
Child Restraint	2,299	0.32
Protective Non–Clothing Gear	1,306	0.18
Eye Protection	307	0.04
Personal Floatation Device	82	0.01
Not Applicable	266,916	36.93
NK/NR	98,198	13.59
Total Incidents	722,824	

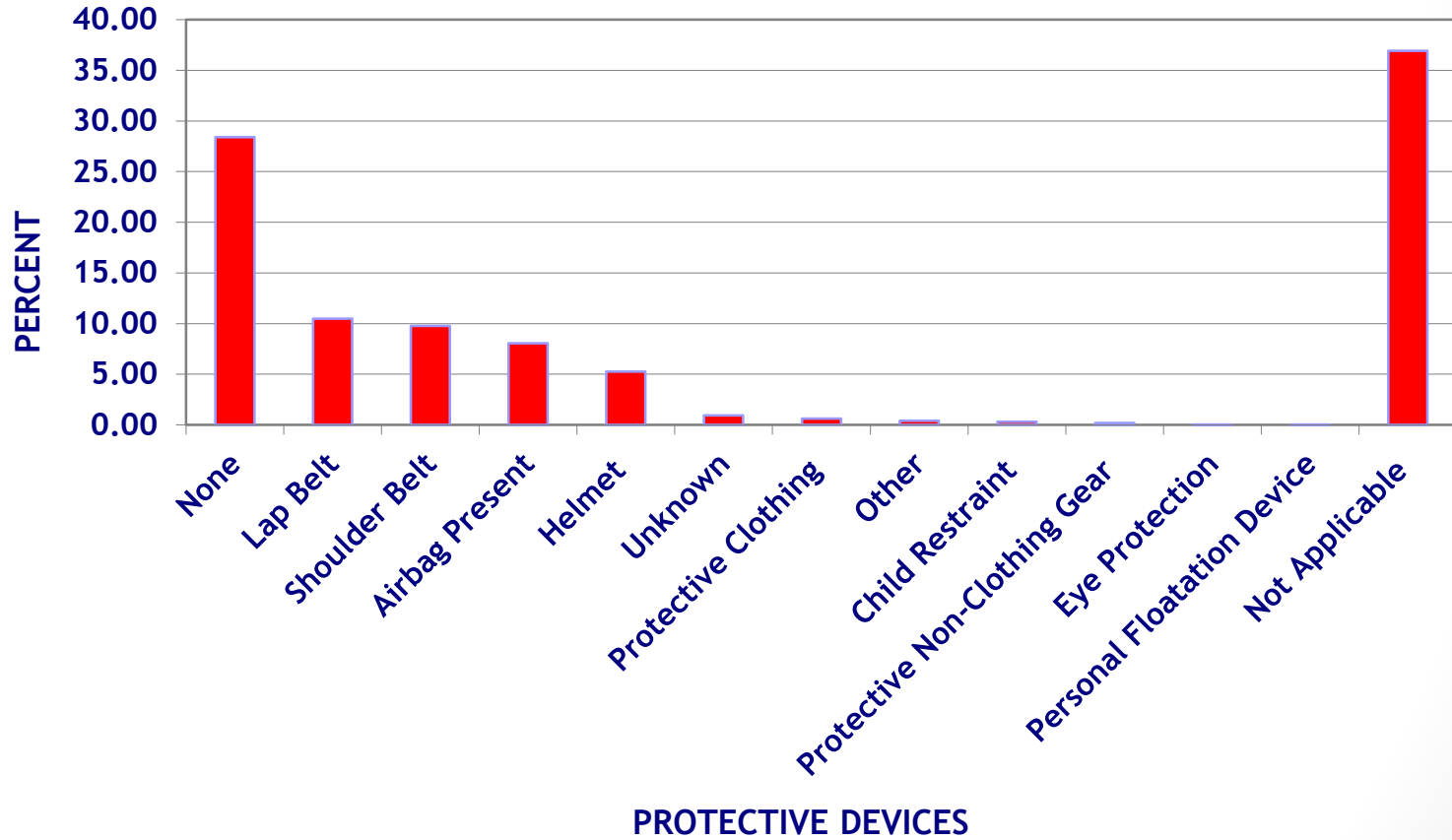


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Figure 30

## Incidents by Protective Devices



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# OUTCOMES INFORMATION



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Table  
31

## Median Total Prehospital Time (in Minutes) by Selected Mechanism of Injury

MECHANISM	NUMBER	MEDIAN
Natural/environmental, Other	967	67
Transport, other	18,697	61
Drowning/submersion	230	60
Hot object/substance	2,121	59
Fire/flame	3,000	57
Machinery	3,006	56
Other specified and classifiable	4,790	54
Natural/environmental, Bites and stings	1,104	52
Fall	129,708	49
Overexertion	693	48
Struck by, against	23,476	45
Pedal cyclist, other	6,298	44
Motor Vehicle Traffic	132,235	43
Other specified, not elsewhere classifiable	1,667	42
Pedestrian, other	1,357	42
Poisoning	169	42
Suffocation	424	42
Unspecified	3,880	41
Cut/pierce	17,044	35
Firearm	19,383	32
NK/NR	1,506	37



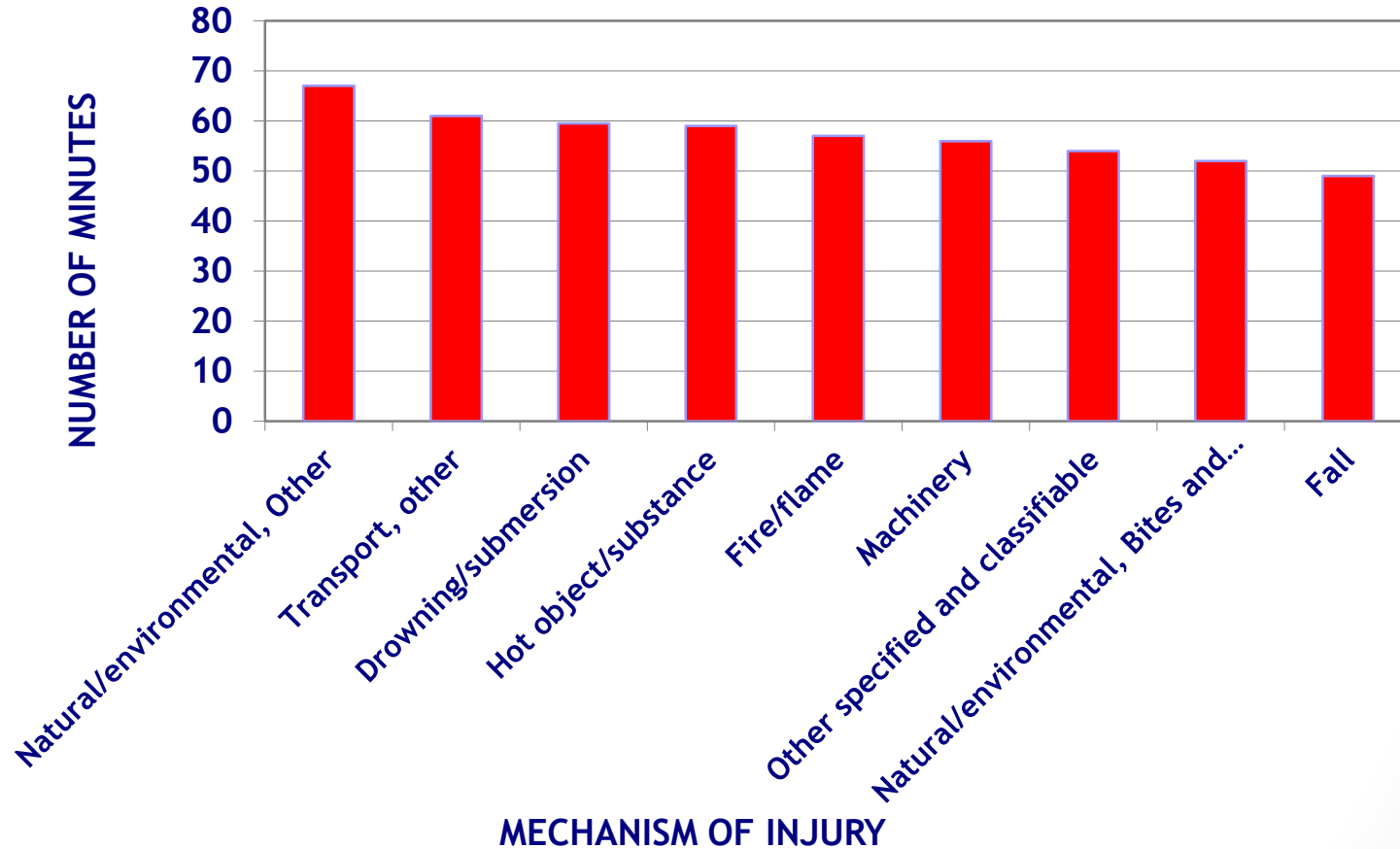
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Figure 31

## Median Total Prehospital Time (in Minutes) by Selected Mechanism of Injury



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Table  
32

## Median Total Prehospital Time (in Minutes) by Injury Severity Score

ISS	NUMBER	MEDIAN
1–8	160,190	44
9–15	113,941	48
16–24	54,379	50
>24	36,175	48
NK/NR	7,168	44



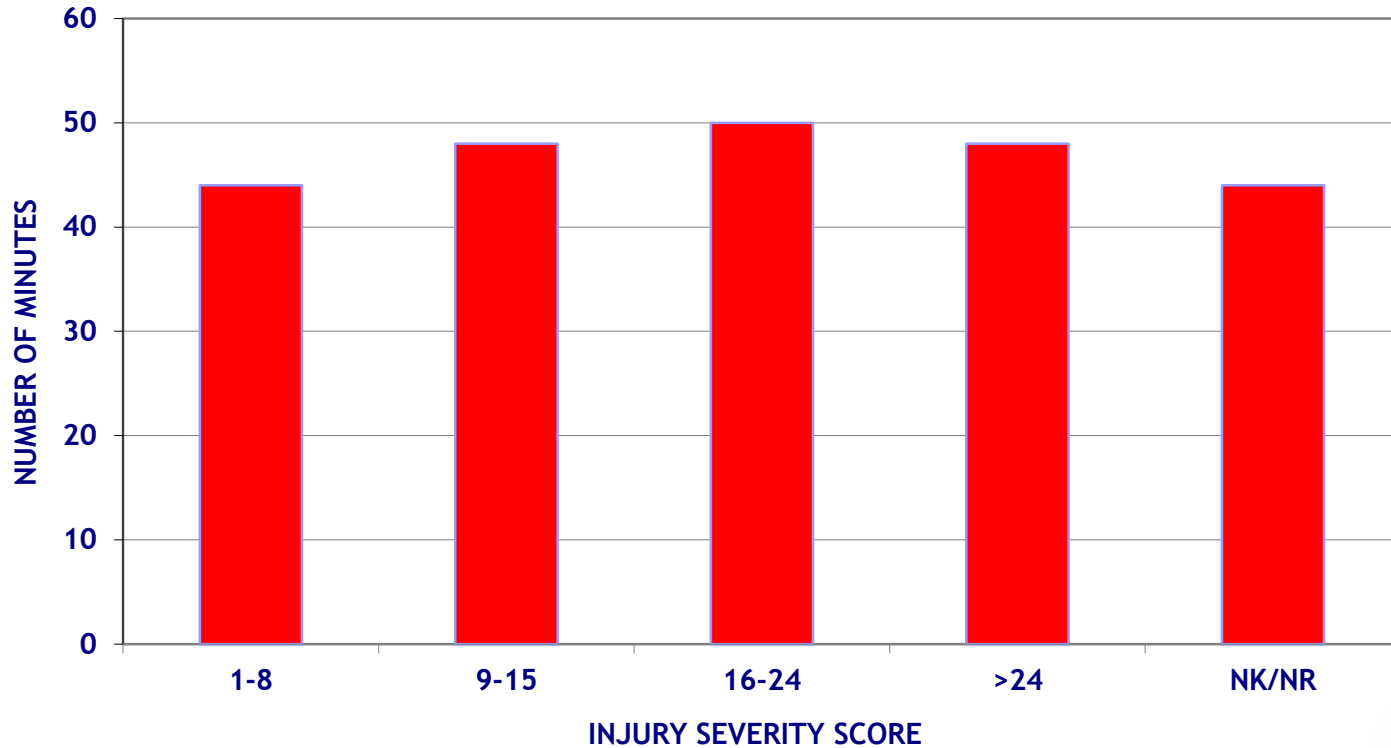
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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90



Figure 32

## Median Total Prehospital Time (in Minutes) by Injury Severity Score



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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Table  
33

## Median Length of Stay (in Days) by Selected Mechanism of Injury

MECHANISM	NUMBER	MEDIAN
Drowning/submersion	422	3
Fall	276,786	3
Fire/flame	8,378	3
Firearm	31,638	3
Motor Vehicle Traffic	208,166	3
Natural/environmental, Other	2,422	3
Pedestrian, other	2,419	3
Poisoning	350	3
Suffocation	658	3
Transport, other	38,099	3
Unspecified	8,156	3
Cut/pierce	33,920	2
Hot object/substance	8,300	2
Machinery	7,299	2
Natural/environmental, Bites and stings	4,034	2
Other specified and classifiable	12,528	2
Other specified, not elsewhere classifiable	3,809	2
Overexertion	2,205	2
Pedal cyclist, other	13,426	2
Struck by, against	54,120	2
NK/NR	2,523	2



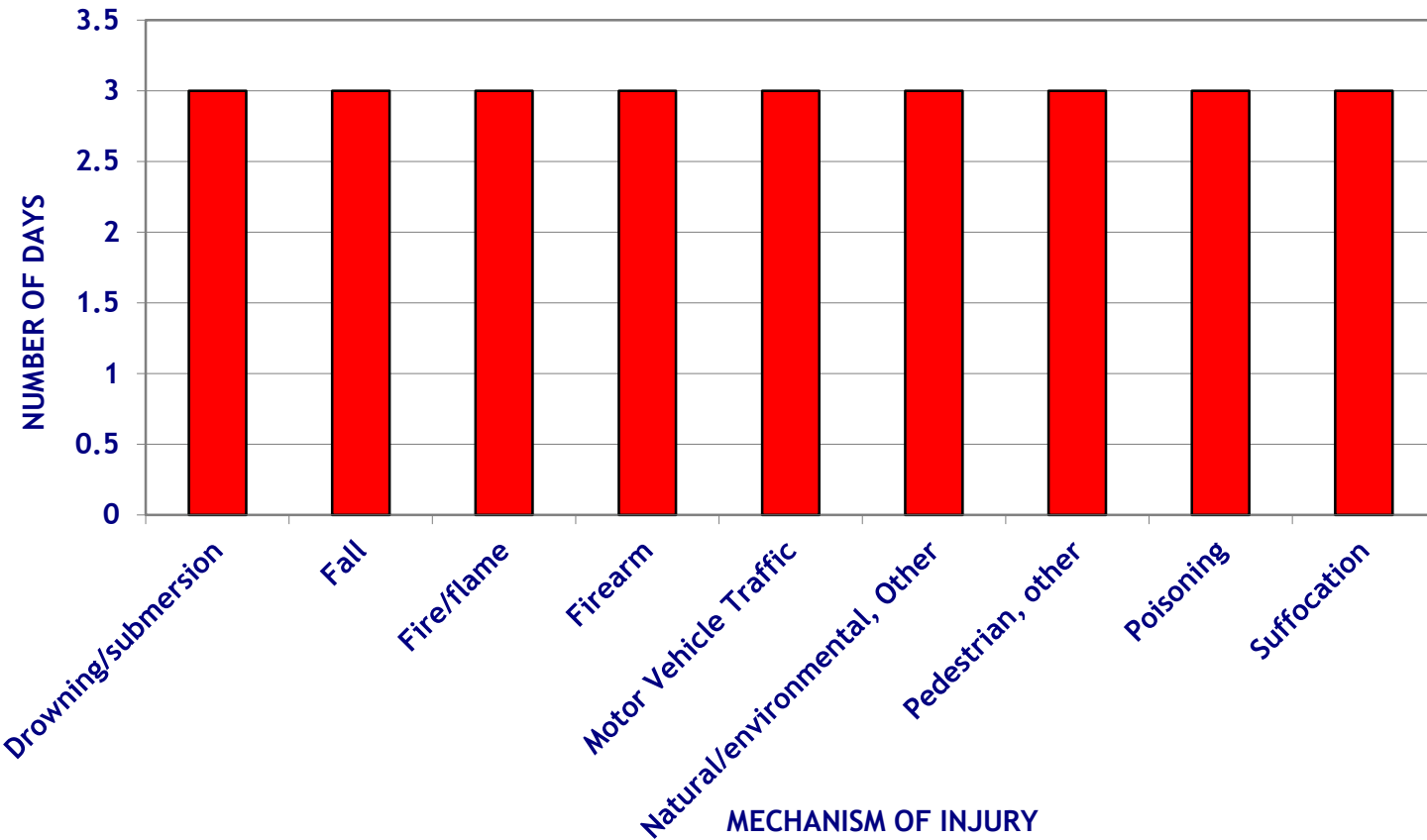
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Figure 33

## Median Length of Stay (in Days) by Selected Mechanism of Injury



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Table  
34

## Median Length of Stay (in Days) by Injury Severity Score

ISS	NUMBER	MEDIAN
1–8	337,860	2
9–15	214,233	4
16–24	97,771	5
>24	55,544	7
NK/NR	14,528	2



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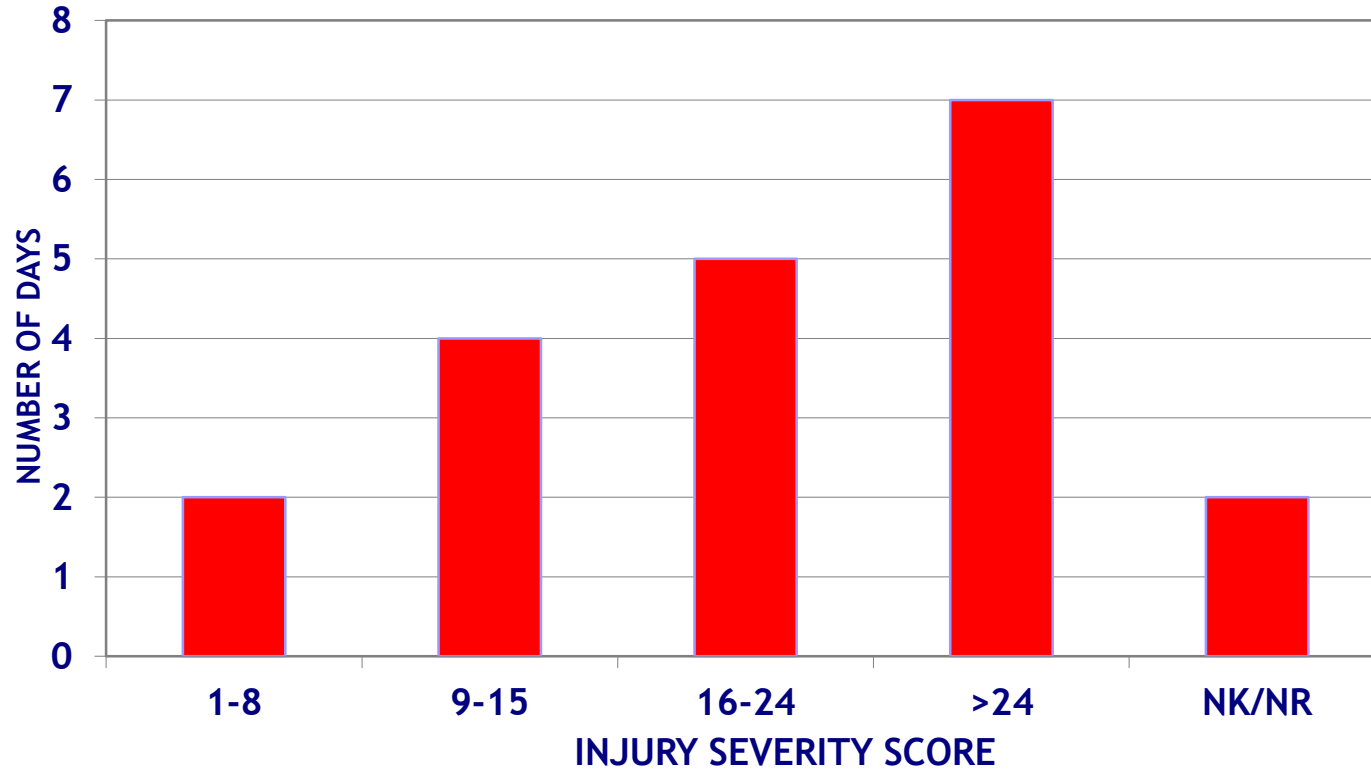
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Figure 34

## Median Length of Stay (in Days) by Injury Severity Score



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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Table  
35

## Median Ventilator Days by Selected Mechanism of Injury

MECHANISM	NUMBER	MEDIAN
Overexertion	4	8
Fire/flame	1,194	7
Motor Vehicle Traffic	20,861	6
Drowning/submersion	85	6
Pedestrian, other	244	6
Fall	11,776	5
Machinery	252	5
Other specified and classifiable	976	5
Transport, other	2,419	5
Firearm	4,131	4
Natural/environmental, Bites and stings	55	4
Natural/environmental, Other	142	4
Other specified, not elsewhere classifiable	162	4
Pedal cyclist, other	437	4
Struck by, against	2,003	4
Unspecified	793	4
Cut/pierce	1,288	3
Poisoning	50	3
Suffocation	203	3
Hot object/substance	269	2
NK/NR	827	5



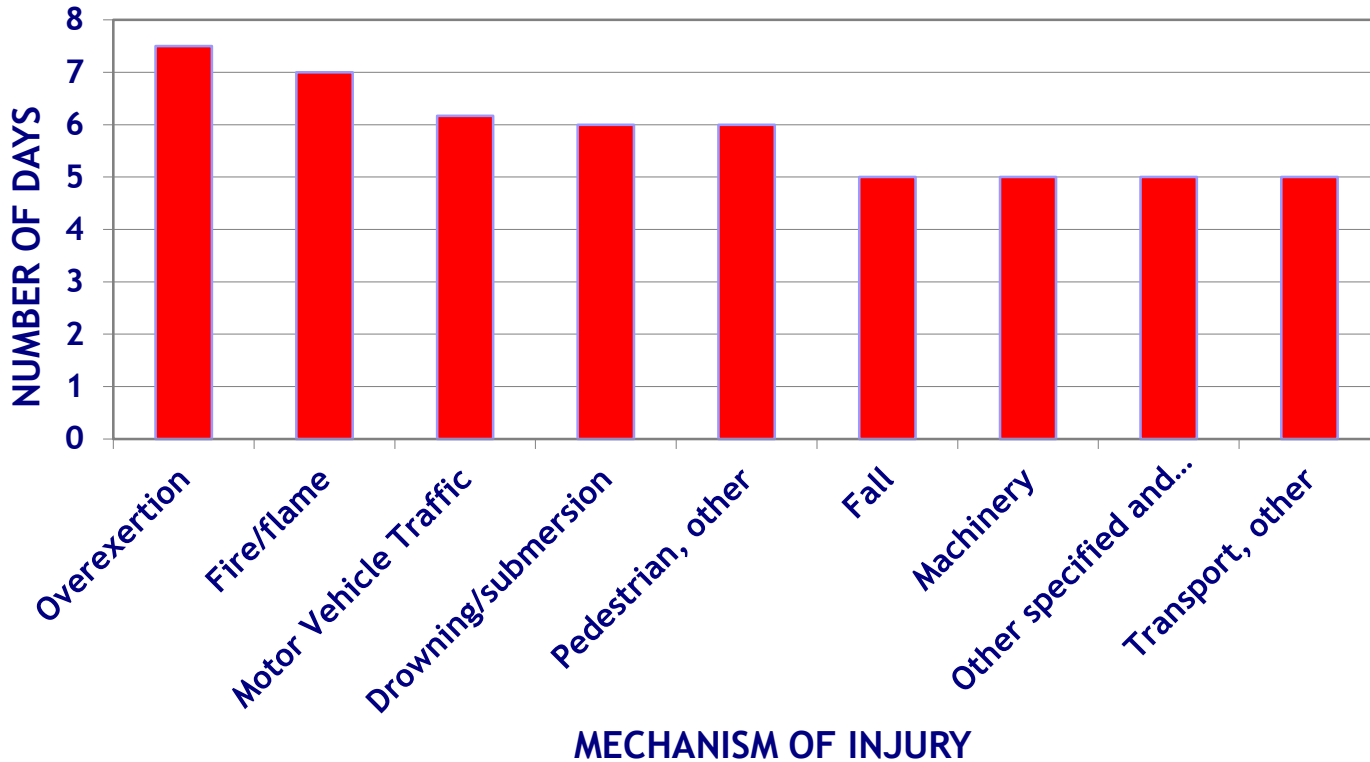
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Figure 35

## Median Ventilator Days by Selected Mechanism of Injury



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Table  
36

## Median Ventilator Days by Injury Severity Score

ISS	NUMBER	MEDIAN
1-8	5,060	3
9-15	8,477	4
16-24	13,266	5
>24	20,879	7
NK/NR	510	5.5



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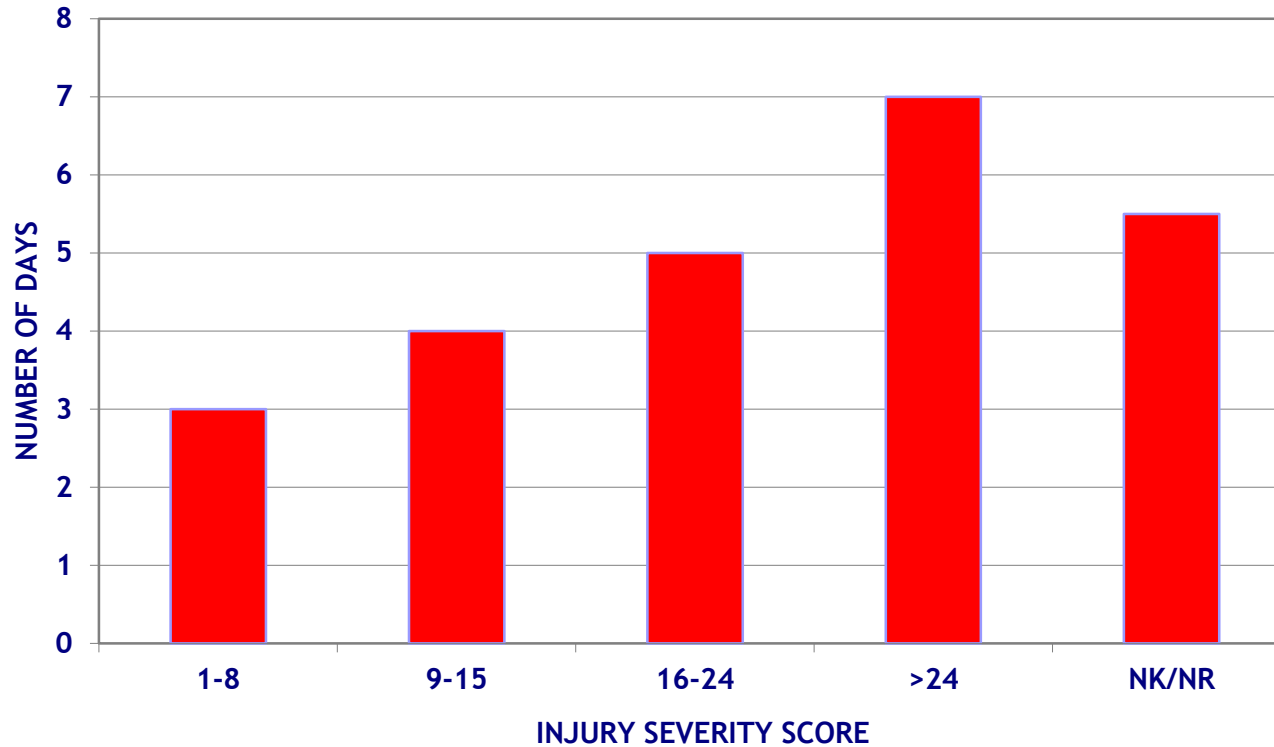
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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90



Figure 36

## Median Ventilator Days by Injury Severity Score



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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Table  
37

## Median ICU Days by Mechanism of Injury

MECHANISM	NUMBER	MEDIAN
Fire/flame	2,356	8
Drowning/submersion	135	5
Motor Vehicle Traffic	48,310	4
Firearm	7,947	4
Hot object/substance	1,047	4
Machinery	722	4
Other specified and classifiable	2,321	4
Overexertion	49	4
Pedestrian, other	567	4
Poisoning	86	4
Suffocation	263	4
Unspecified	1,761	4
Cut/pierce	3,665	3
Fall	41,887	3
Natural/environmental, Bites and stings	218	3
Natural/environmental, Other	484	3
Other specified, not elsewhere classifiable	483	3
Pedal cyclist, other	1,735	3
Struck by, against	6,496	3
Transport, other	6,941	3
NK/NR	576	3



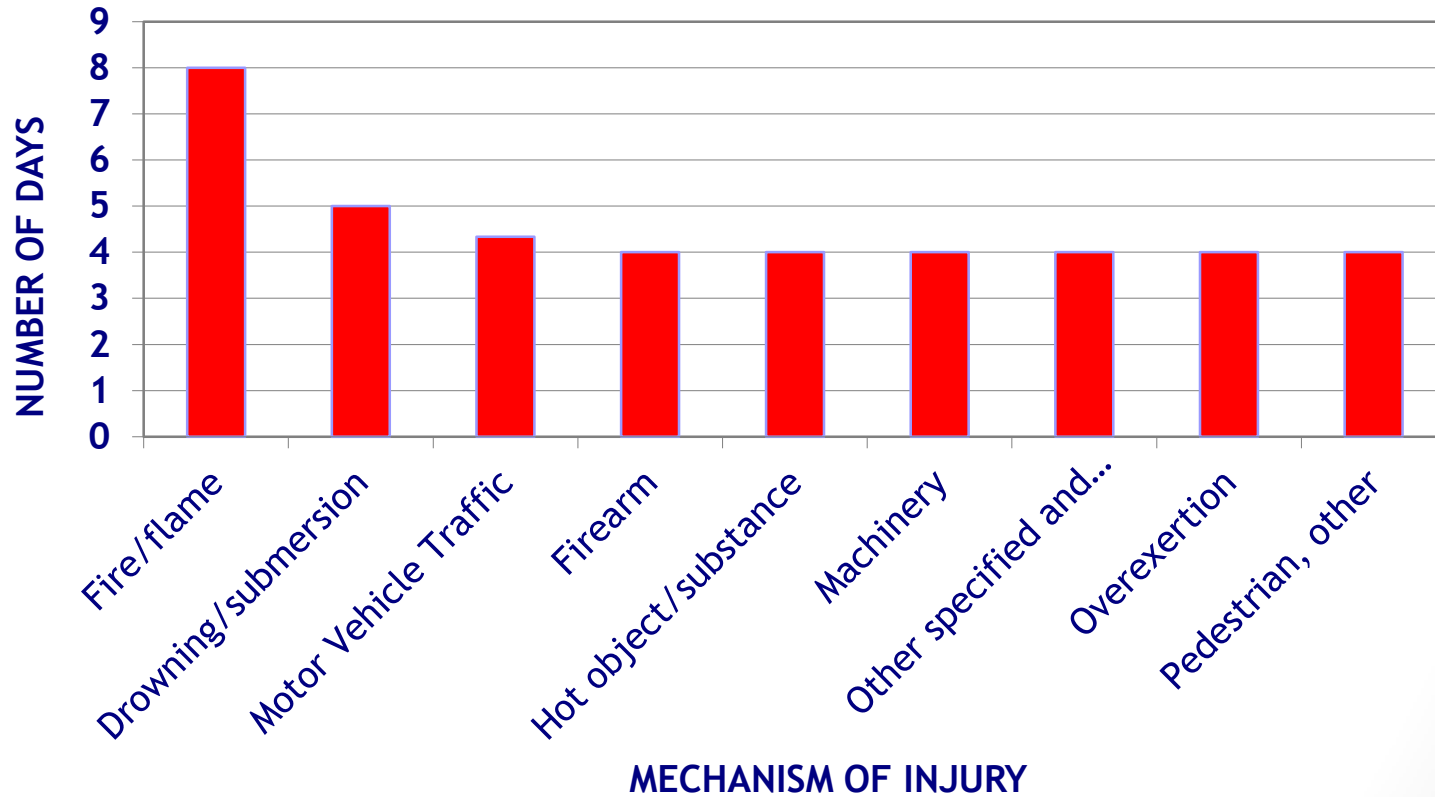
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Figure 37

## Median ICU Days by Mechanism of Injury



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Table  
38

## Median ICU Days by Injury Severity Score

ISS	NUMBER	MEDIAN
1–8	17,680	3
9–15	32,970	3
16–24	41,468	4
>24	34,896	6
NK/NR	1,111	4



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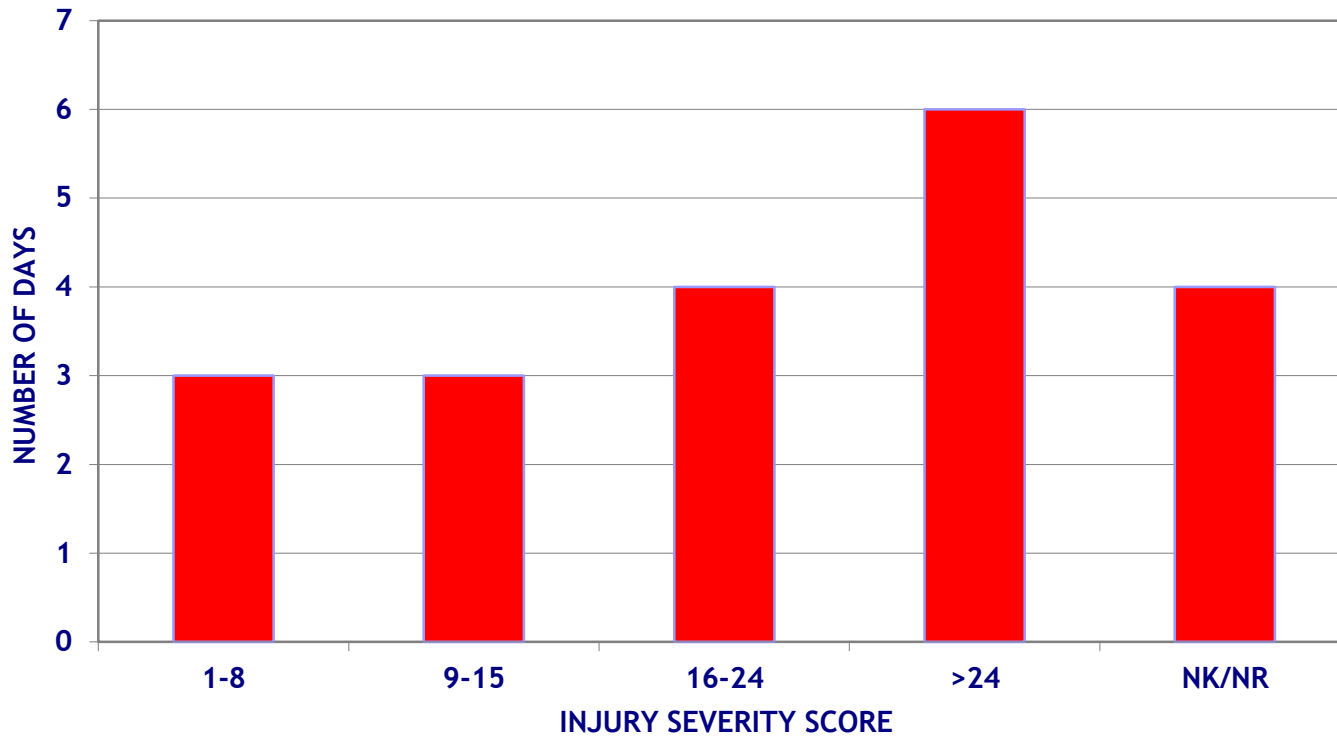
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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Figure 38

## Median ICU Days by Injury Severity Score



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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Table  
39

## Incidents by ED Discharge Disposition

ED DISCHARGE DISPOSITION	NUMBER	PERCENT
Floor bed (general admission, non specialty unit bed)	312,983	43.30
Intensive Care Unit (ICU)	139,389	19.28
Operating Room	83,490	11.55
Home without services	67,921	9.40
Telemetry/step-down unit (less acuity than ICU)	44,534	6.16
Transferred to another hospital	25,634	3.55
Observation unit (unit that provides <24 hour stays)	14,334	1.98
Died	7,710	1.07
Other (jail, institutional care facility, mental health, etc.)	2,805	0.39
Left against medical advice	1,422	0.20
Home with services	1,145	0.16
Not Applicable	13,881	1.92
NK/NR	7,576	1.05
Total	722,824	100.00

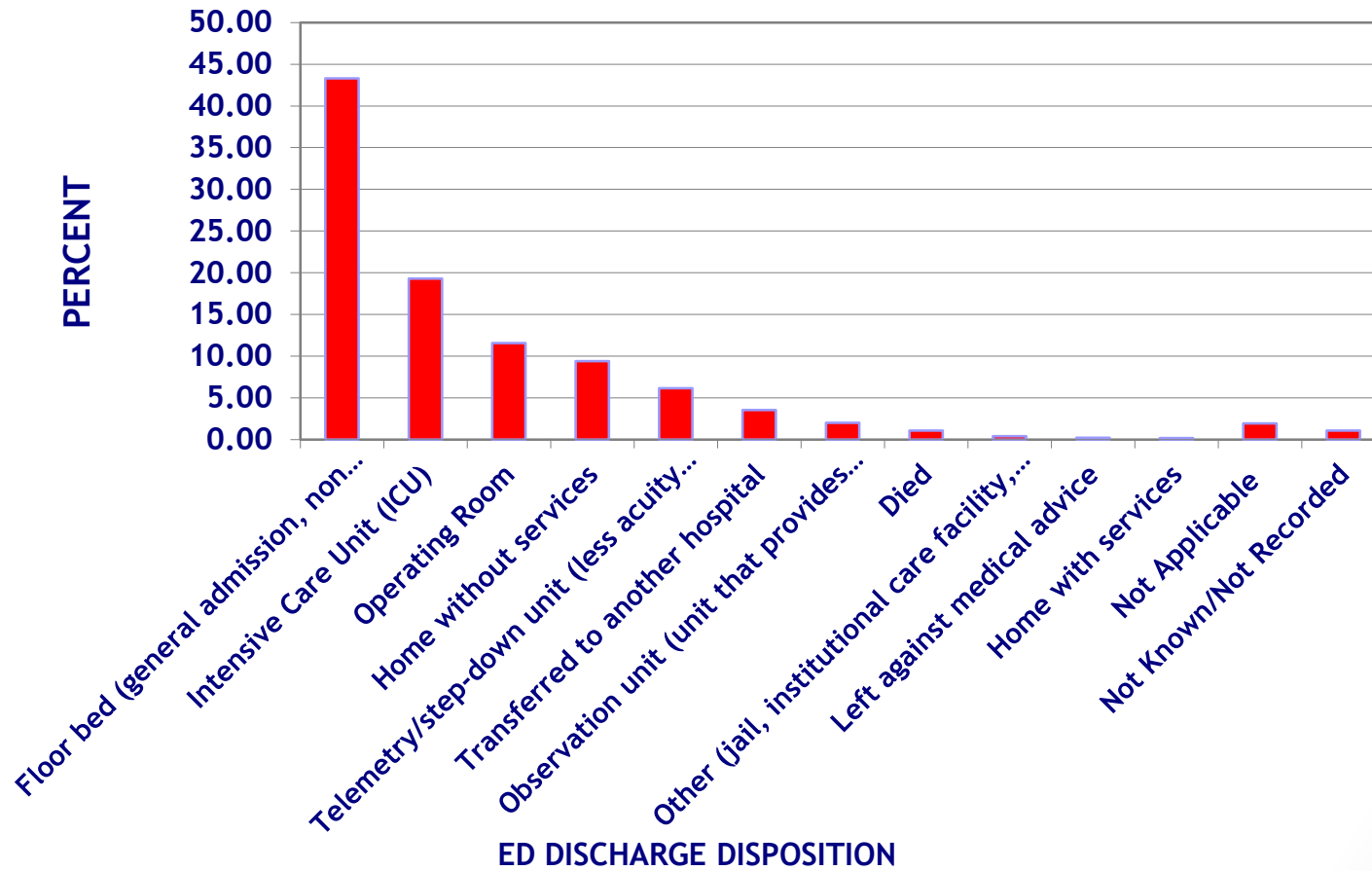


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Figure 39

## Incidents by ED Discharge Disposition



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Table  
40

## Reasons for Death in Emergency Department

DIED IN ED	NUMBER	PERCENT
Died in ED (other than failed resuscitation attempt)	4,052	14.81
Death after failed resuscitation attempt (failure to respond within 15 minutes)	1,961	7.17
DOA: Declared dead on arrival with minimal or no resuscitation attempt (no invasive procedures attempted)	1,686	6.16
All other in-hospital deaths	19,928	71.86
Total Deaths	27,368	100.00



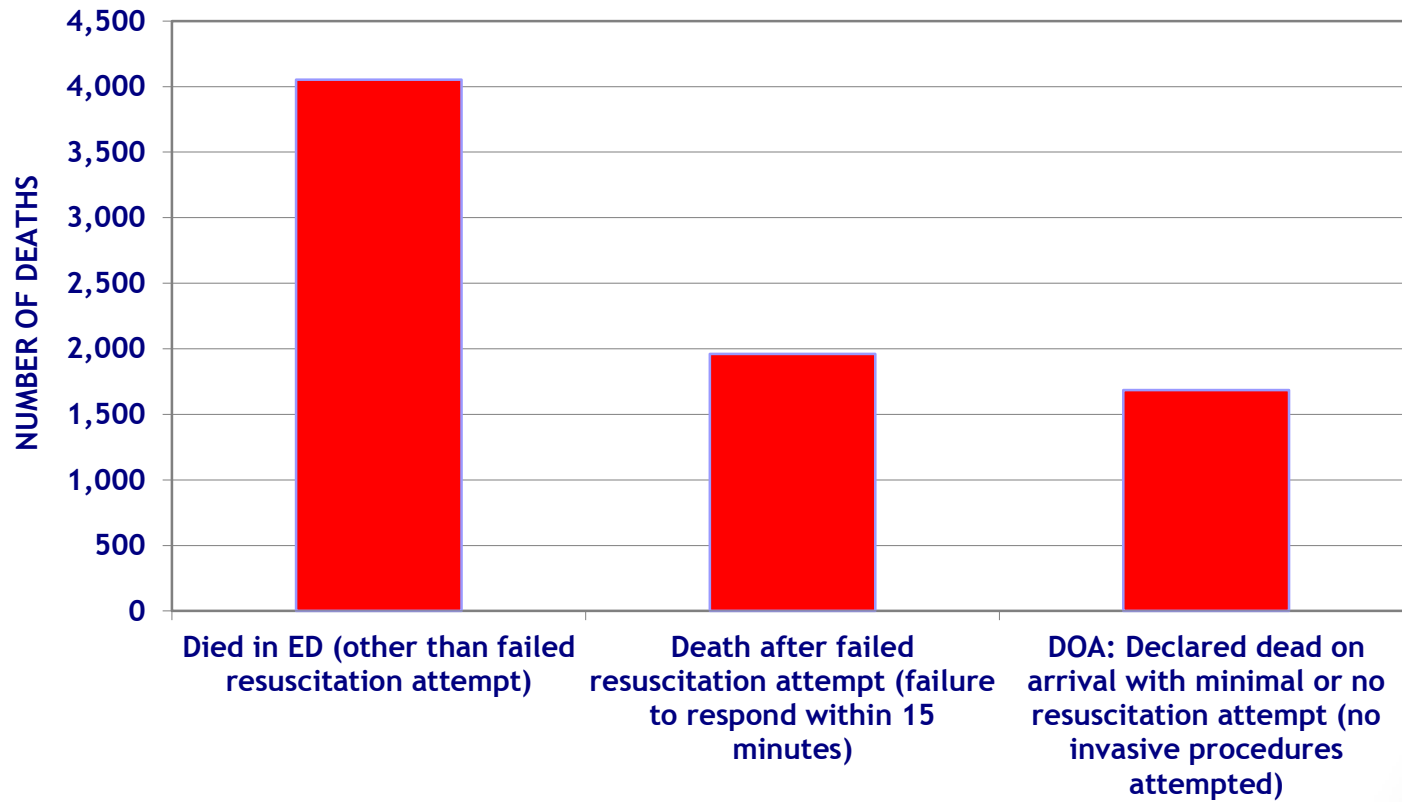
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Figure 40

## Reasons for Death in Emergency Department



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Table  
41

## Incidents by Hospital Discharge Disposition

HOSPITAL DISCHARGE DISPOSITION	NUMBER	PERCENT
Home with no home services	416,206	57.58
Skilled Nursing Facility	66,455	9.19
Another type of rehabilitation or long term care	52,107	7.21
Home under care of organized home health service	27,124	3.75
Expired	19,658	2.72
Intermediate Care Facility (ICF)	15,848	2.19
Short-term general hospital for inpatient care	10,125	1.40
Left AMA or discontinued care	4,591	0.64
Hospice care	2,081	0.29
Not Applicable	106,637	14.75
NK/NR	1,992	0.28
Total	722,824	100.00

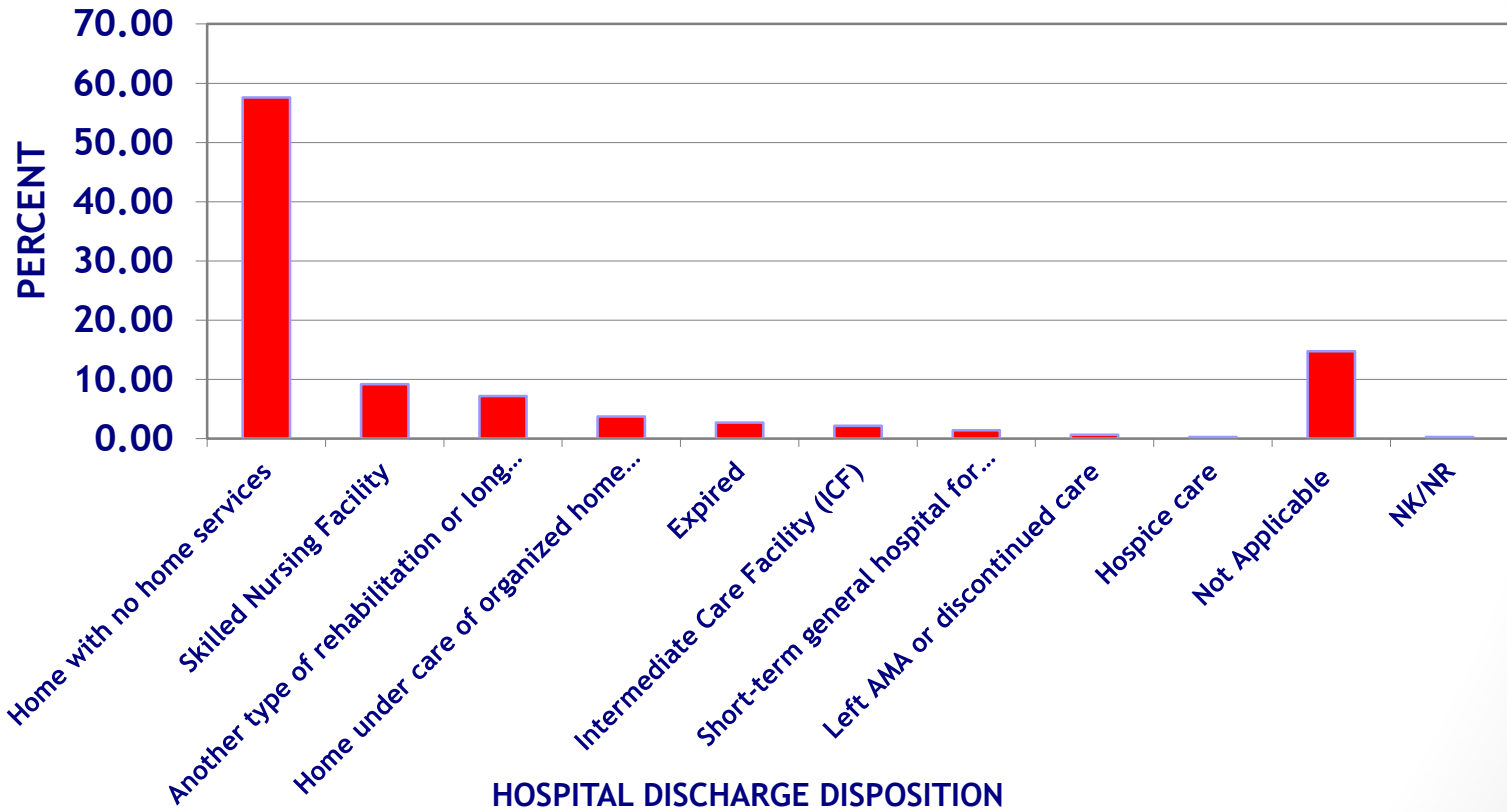


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Figure 41

## Incidents by Hospital Discharge Disposition



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Table  
42

## Top Ten Complications

COMPLICATIONS	NUMBER	PERCENT
No NTDS listed Medical Complications Occurred	271,789	37.60
Pneumonia	15,324	2.12
Acute respiratory distress syndrome (ARDS)	7,773	1.08
Base deficit	7,405	1.02
Acute renal failure	5,359	0.74
Deep Vein Thrombosis (DVT) / thrombophlebitis	5,214	0.72
Cardiac arrest with CPR	4,577	0.63
Drug or alcohol withdrawal syndrome	4,480	0.62
Systemic sepsis	3,975	0.55
Bleeding	3,777	0.52
Decubitus ulcer	3,304	0.46
Unplanned intubation	3,023	0.42
Coagulopathy	2,730	0.38
Pulmonary embolism	2,165	0.30
Organ/space surgical site infection	1,511	0.21
Myocardial infarction	1,469	0.20
Extremity compartment syndrome	1,394	0.19
Coma	1,255	0.17
Superficial surgical site infection	1,137	0.16
Stroke / CVA	1,019	0.14
Intracranial pressure	808	0.11
Abdominal compartment syndrome	740	0.10
Abdominal fascia left open	727	0.10
Wound disruption	636	0.09
Deep surgical site infection	544	0.08
Graft/prosthesis/flap failure	329	0.05
Not Applicable	336,247	46.52
Not Known/Not Recorded	75,650	10.47

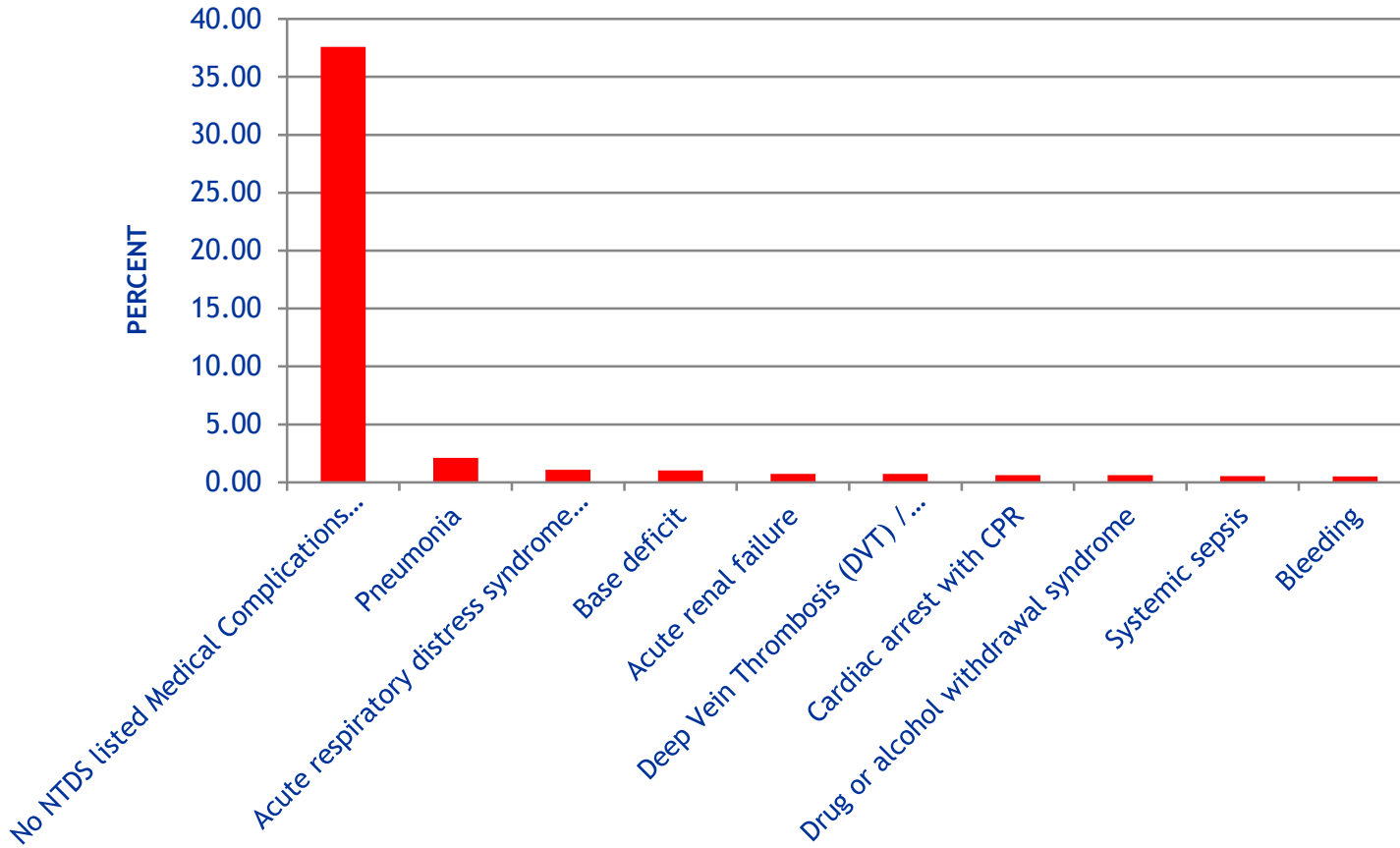


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Figure 42

## Top Ten Complications



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# REGIONAL ANALYSIS



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Table  
43

## Incidents by Region

REGION	NUMBER	PERCENT
South	250,355	34.64
Midwest	197,542	27.33
West	153,136	21.19
Northeast	121,791	16.85
Total	722,824	100.00

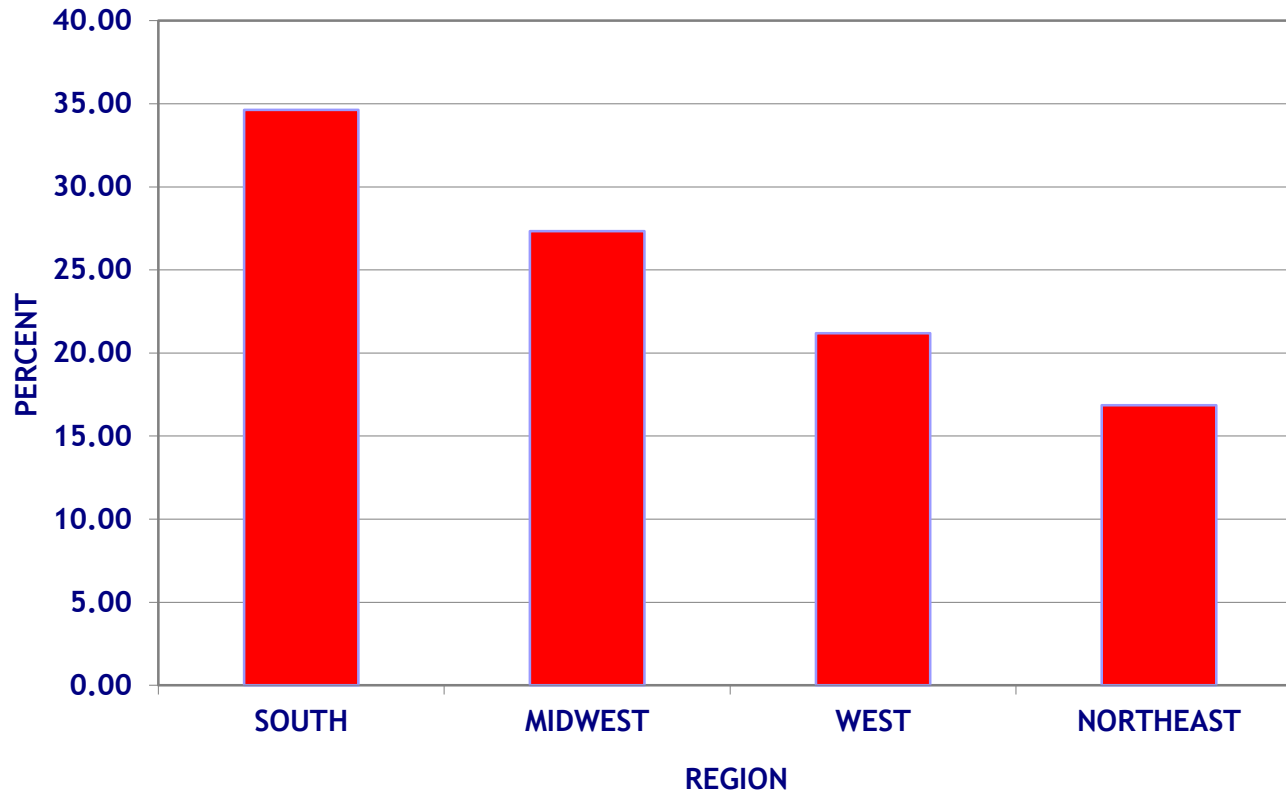


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Figure 43

## Incidents by Region



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Table  
44

## Case Fatality Rate by Region

REGION	NUMBER	DEATHS	CASE FATALITY RATE
SOUTH	250,355	10,291	4.11
NORTHEAST	197,542	4,915	2.49
WEST	153,136	5,378	3.51
MIDWEST	121,791	6,784	5.57
Total	722,824	27,368	

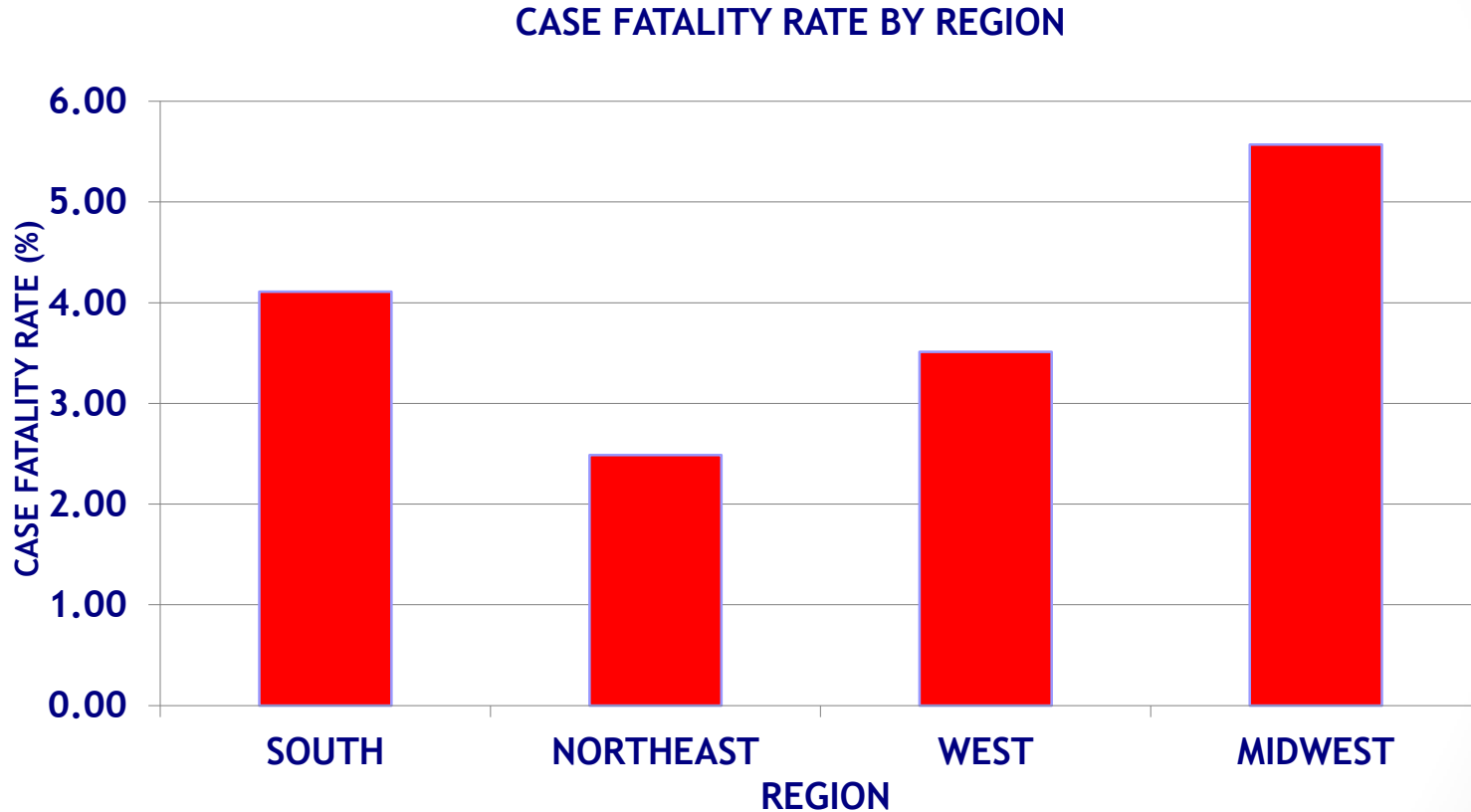


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Figure 44

## Case Fatality Rate by Region



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Table  
45

## Mechanism of Injury by Region

REGION	NUMBER	MIDWEST	NORTHEAST	SOUTH	WEST
Fall	277,315	44.61	45.25	33.38	32.99
Motor Vehicle Traffic	209,148	24.48	25.01	32.41	32.12
Struck By, Against	54,241	7.60	7.23	7.29	7.96
Transport, Other	38,185	4.76	4.21	5.59	6.30
Cut/pierce	34,057	3.72	4.40	5.15	5.52
Firearm	32,419	4.16	3.46	5.19	4.57
Pedal Cyclist, Other	13,448	1.75	1.94	1.24	2.96
Other Specified and Classifiable	12,576	1.71	1.37	2.10	1.49
Fire/Flame	8,413	1.26	1.07	1.47	0.61
Hot Object/Substance	8,312	1.17	1.23	1.41	0.64
Unspecified	8,183	1.04	1.29	1.03	1.29
Machinery	7,314	1.25	0.92	1.08	0.68
Natural/Environmental, Bites and Stings	4,039	0.57	0.37	0.75	0.37
Other Specified, Not Elsewhere Classifiable	3,819	0.52	0.52	0.57	0.49
Pedestrian, Other	2,431	0.29	0.38	0.35	0.34
Natural/Environmental, Other	2,425	0.36	0.23	0.38	0.31
Overexertion	2,212	0.35	0.37	0.34	0.16
Suffocation	670	0.11	0.07	0.09	0.10
Drown	427	0.06	0.05	0.07	0.05
Poisoning	350	0.08	0.03	0.04	0.04
NK/NR	2,558	0.10	0.55	0.07	1.00
Total Incidents	722,824	99.95	99.92	99.98	99.97



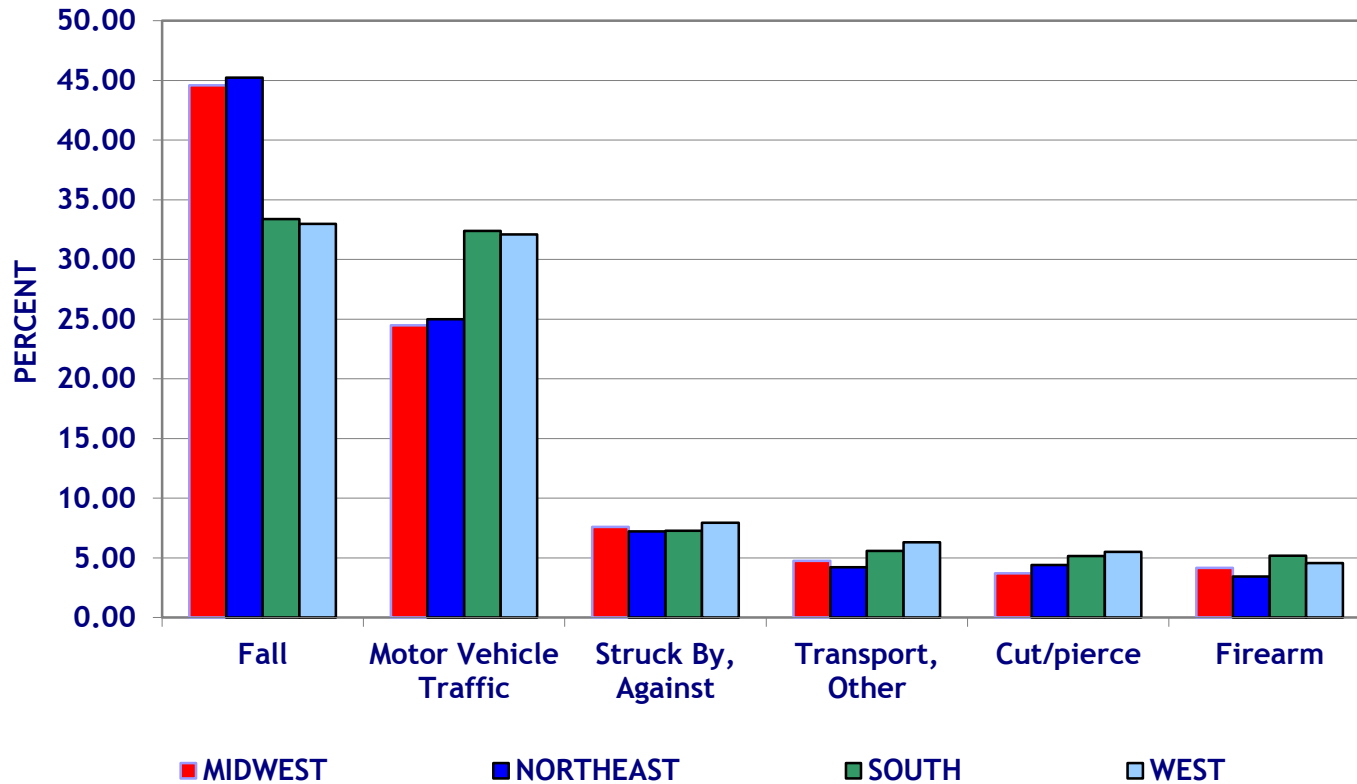
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Adverse effects have been removed from all mechanism tables, but are included in totals; therefore percentages do not equal 100.

Figure 45

## Selected Mechanism of Injury by Region



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Table  
46

## Injury Severity Score by Region

ISS	NUMBER	MIDWEST	NORTHEAST	SOUTH	WEST
1–8	338,929	49.27	42.26	46.39	48.32
9–15	214,686	29.55	31.20	30.61	27.23
16–24	98,071	12.04	15.27	13.72	13.93
>24	56,520	6.58	8.29	8.40	8.09
NK/NR	14,618	2.56	2.98	0.88	2.43
Total	722,824	100.00	100.00	100.00	100.00



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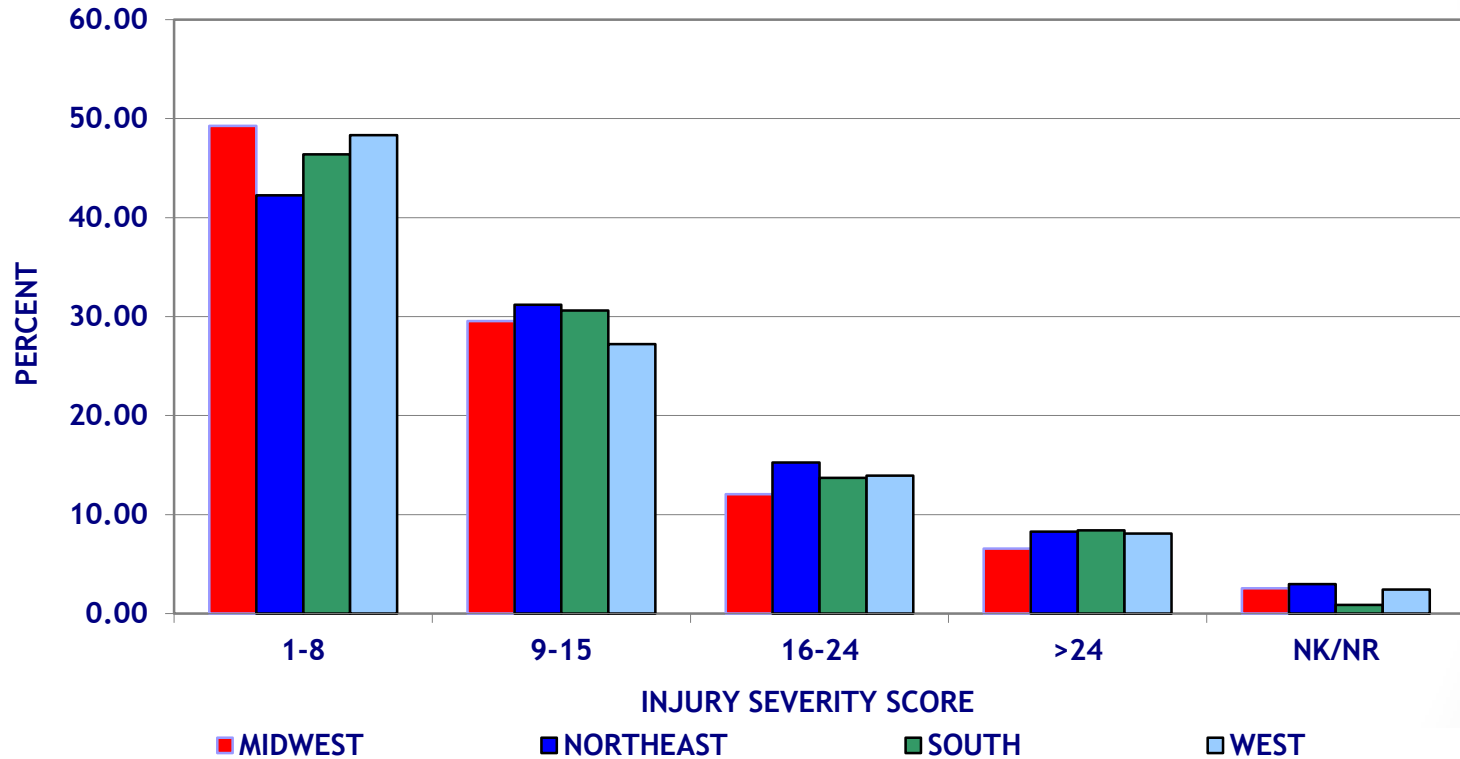
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Figure 46

## Injury Severity Score by Region



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Table  
47

## Incidents by Rurality

REGION	NUMBER	PERCENT
Urban	349,728	79.96
Rural	43,495	9.94
Suburban	31,601	7.23
Wilderness	12,537	2.87
Total	437,361	100.00

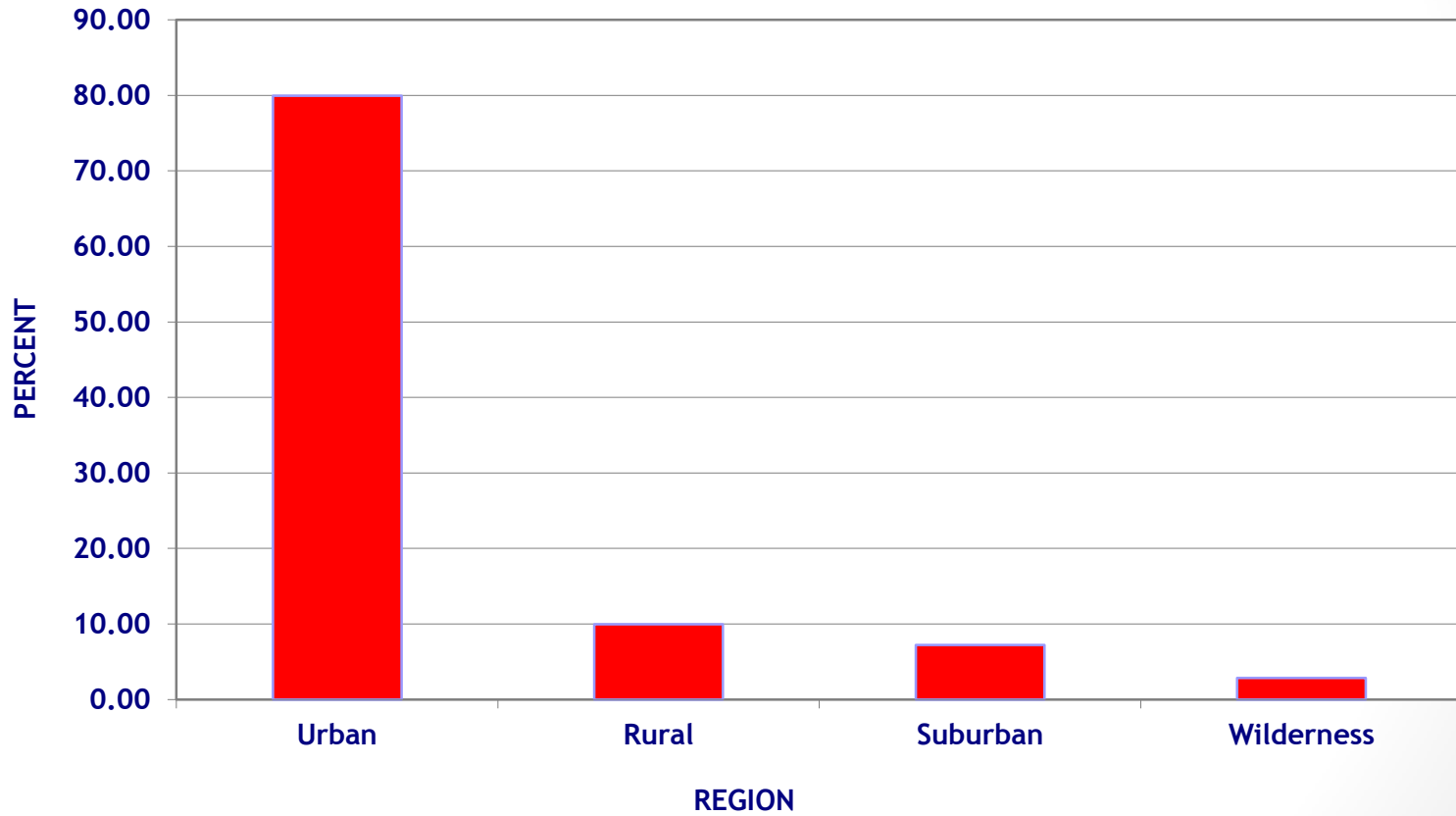


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Figure 47

## Incidents by Rurality



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Table  
48

## Case Fatality Rate by Rurality

REGION	NUMBER	DEATHS	CASE FATALITY RATE
Urban	349,728	13,900	3.97
Rural	43,495	1,461	3.36
Suburban	31,601	1,303	4.12
Wilderness	12,537	429	3.42
Total	437,361	17,093	

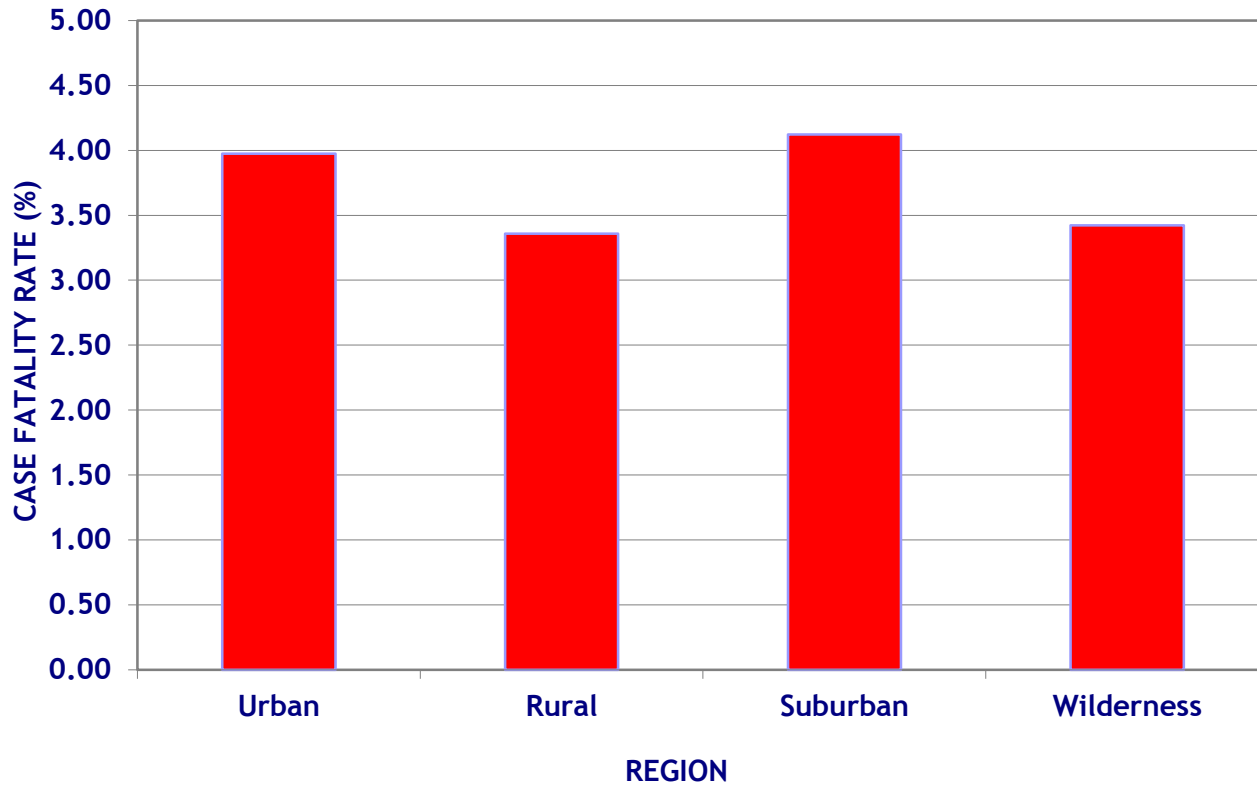


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Figure 48

## Case Fatality Rate by Rurality



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Figure  
49

## Mechanism of Injury by Rurality

MECHANISM	NUMBER (URBAN)	PERCENT (URBAN)	NUMBER (SUBURBAN)	PERCENT (SUBURBAN)	NUMBER (RURAL)	PERCENT (RURAL)	NUMBER (WILDERNESS)	PERCENT (WILDERNES S)
Fall	132,661	37.93	11,534	36.50	14,697	33.79	4,289	34.21
Motor Vehicle Traffic	104,412	29.86	10,232	32.38	13,654	31.39	3,719	29.66
Struck by, against	26,295	7.52	2,084	6.59	3,044	7.00	797	6.36
Cut/pierce	18,072	5.17	960	3.04	1,750	4.02	369	2.94
Firearm	17,407	4.98	844	2.67	1,199	2.76	335	2.67
Transport, other	14,534	4.16	2,420	7.66	3,985	9.16	1,535	12.24
Pedal cyclist, other	6,291	1.80	370	1.17	434	1.00	126	1.01
Other specified and classifiable	5,590	1.60	633	2.00	1,102	2.53	282	2.25
Hot object/substance	4,205	1.20	444	1.41	482	1.11	136	1.08
Unspecified	4,110	1.18	249	0.79	366	0.84	86	0.69
Fire/flame	3,823	1.09	630	1.99	724	1.66	192	1.53
Machinery	2,972	0.85	471	1.49	764	1.76	266	2.12
Other specified, not elsewhere classifiable	1,920	0.55	111	0.35	214	0.49	41	0.33
Natural/environmental, Bites and stings	1,860	0.53	176	0.56	290	0.67	86	0.69
Pedestrian, other	1,260	0.36	101	0.32	162	0.37	50	0.40
Overexertion	1,002	0.29	73	0.23	157	0.36	38	0.30
Natural/environmental, Other	816	0.23	179	0.57	295	0.68	132	1.05
Suffocation	339	0.10	31	0.10	33	0.08	12	0.10
Drowning/submersion	199	0.06	21	0.07	43	0.10	10	0.08
Poisoning	142	0.04	15	0.05	19	0.04	11	0.09
NK/NR	1,698	0.49	20	0.06	71	0.16	20	0.16
Total	349,728	99.97	31,601	99.99	43,495	99.98	12,537	99.96

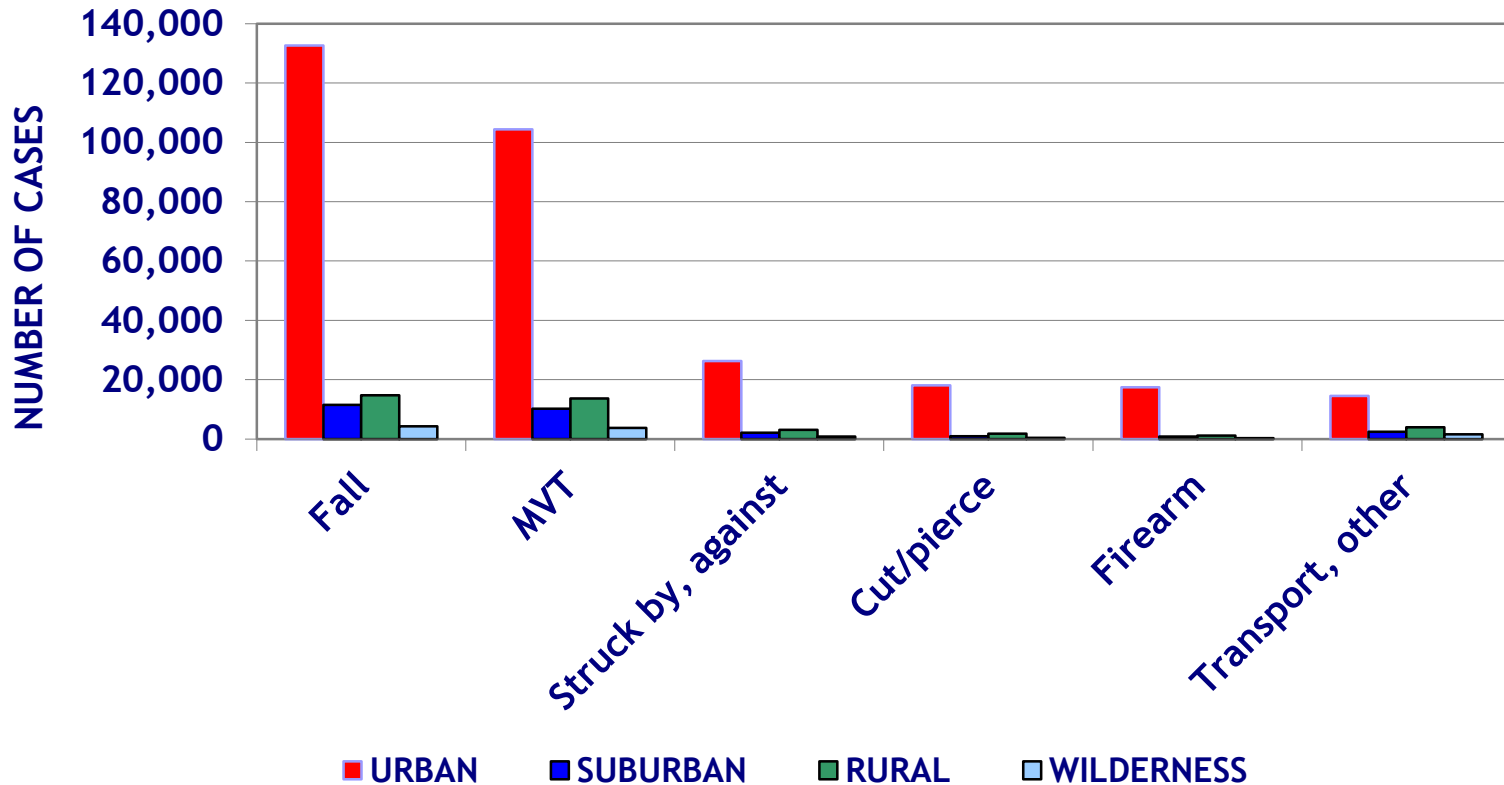


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Figure 49

## Selected Mechanism of Injury by Rurality



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Table  
50

## Injury Severity Score by Rurality

ISS	NUMBER (URBAN)	PERCENT (URBAN)	NUMBER (SUBURBAN)	PERCENT (SUBURBAN)	NUMBER (RURAL)	PERCENT (RURAL)	NUMBER (WILDERNESSES)	PERCENT (WILDERNESSES)
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



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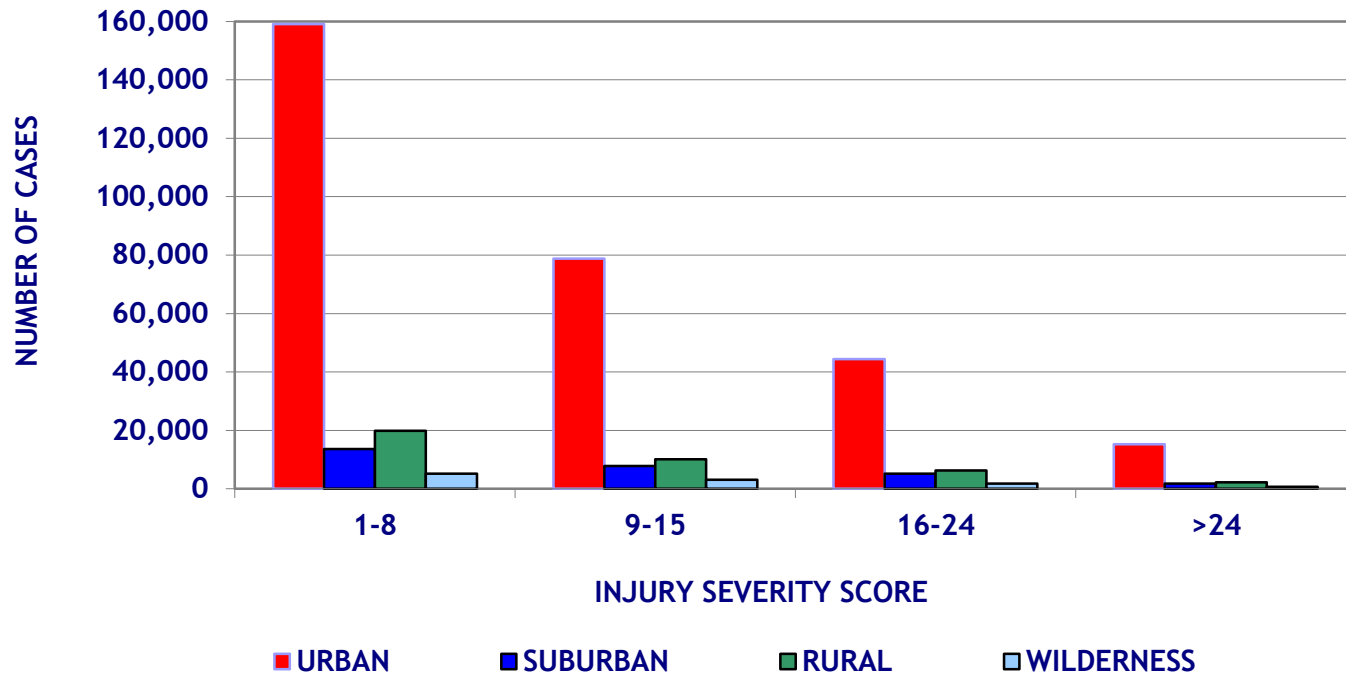
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Figure 50

## Injury Severity Score by Rurality



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# COMPARATIVE ANALYSIS

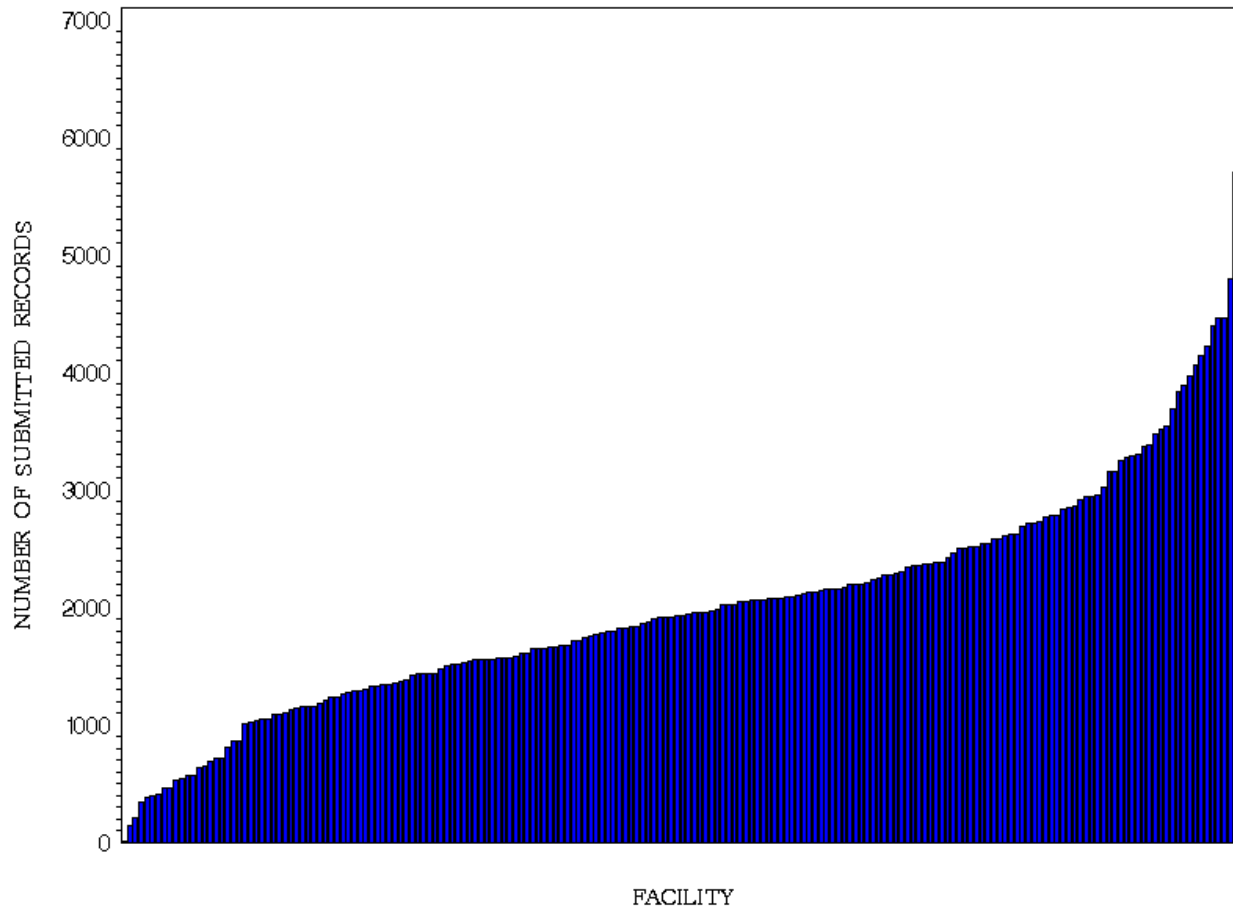


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Figure 51

## 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 on ACS verification and state designation; however, pediatric hospitals are not included in the analysis.



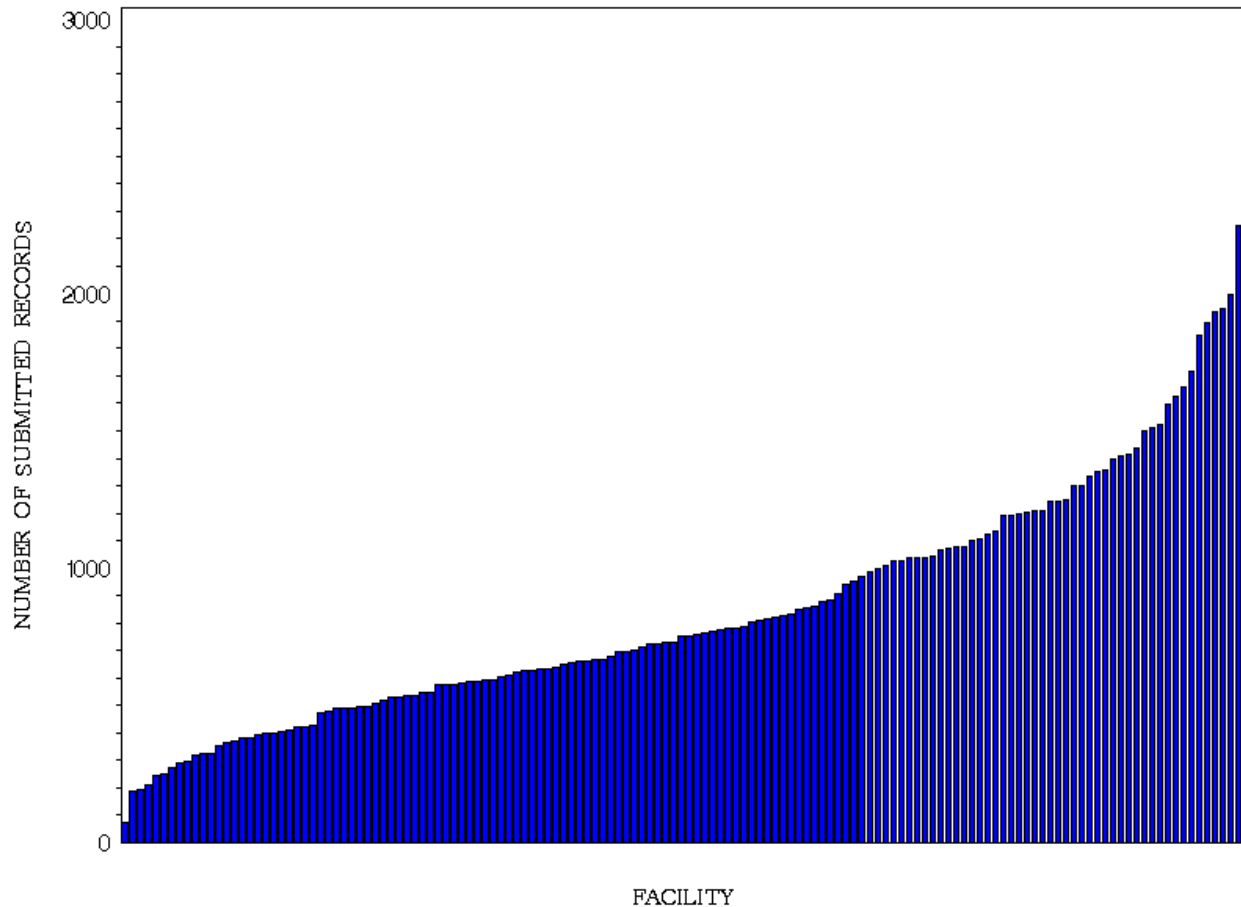
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Figure 52

## Number of Cases Submitted per Facility for Level II Facilities with Bed Size $\leq 400$ Beds



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

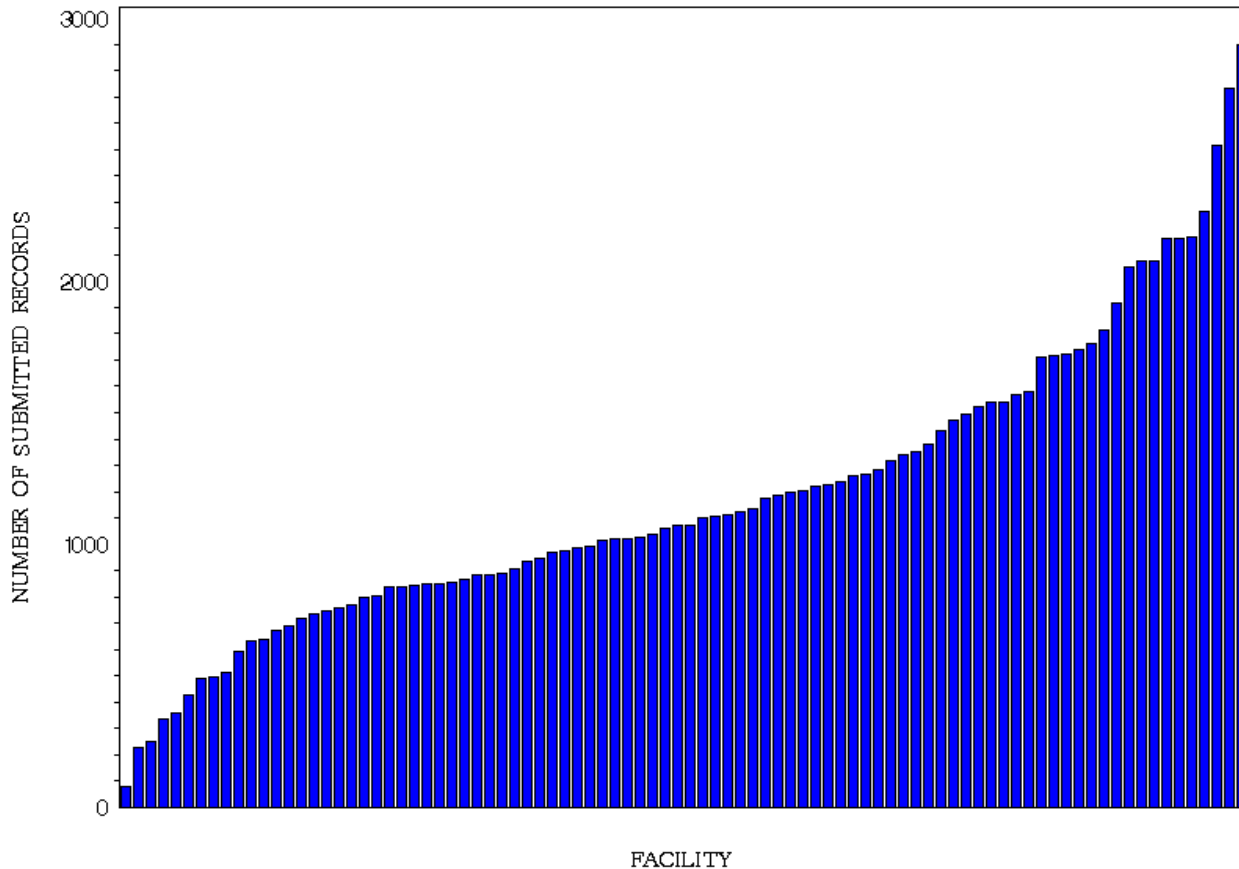


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Figure 53

## Number of Cases Submitted per Facility for Level II Facilities with Bed Size > 400 Beds



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

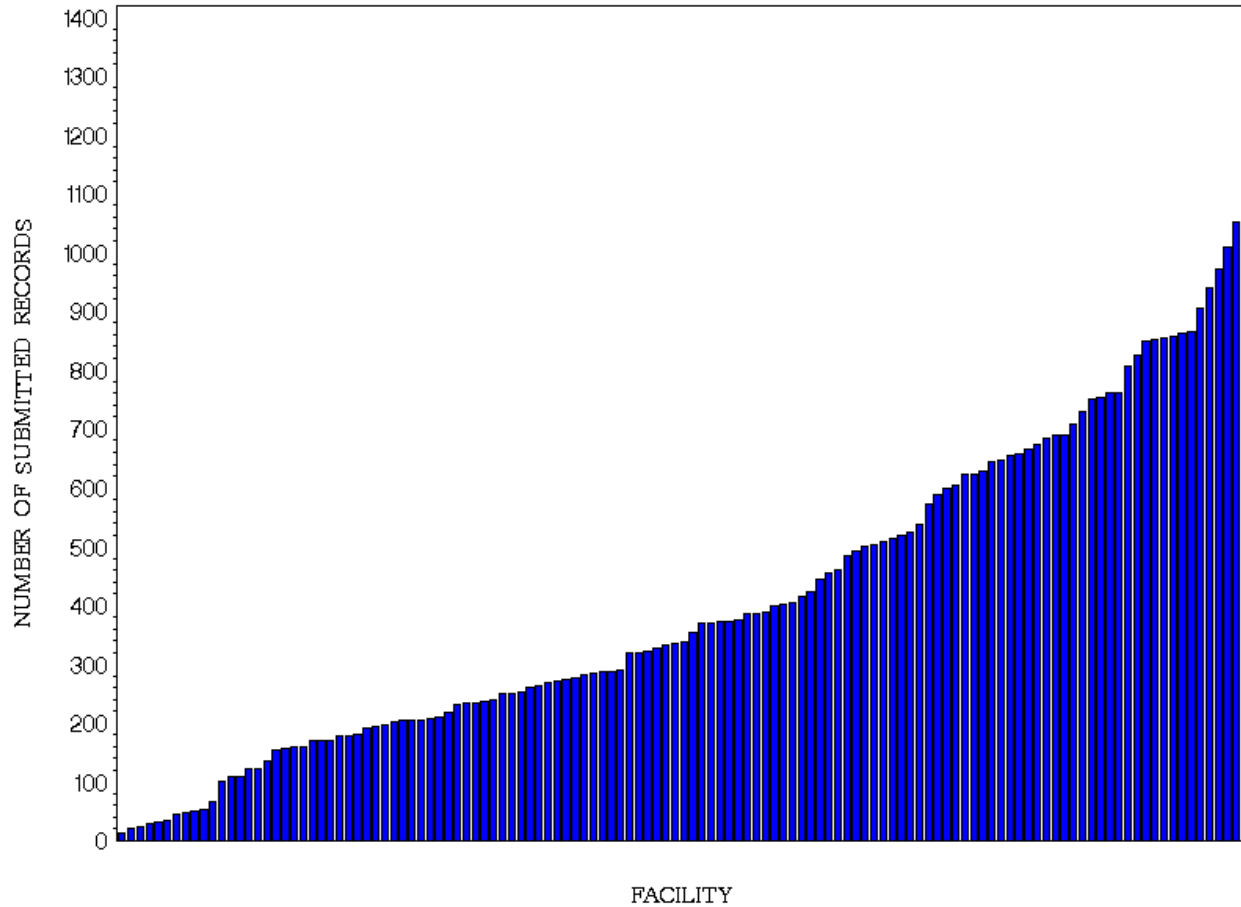


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Figure 54

## Number of Cases Submitted per Facility for Level III Facilities



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

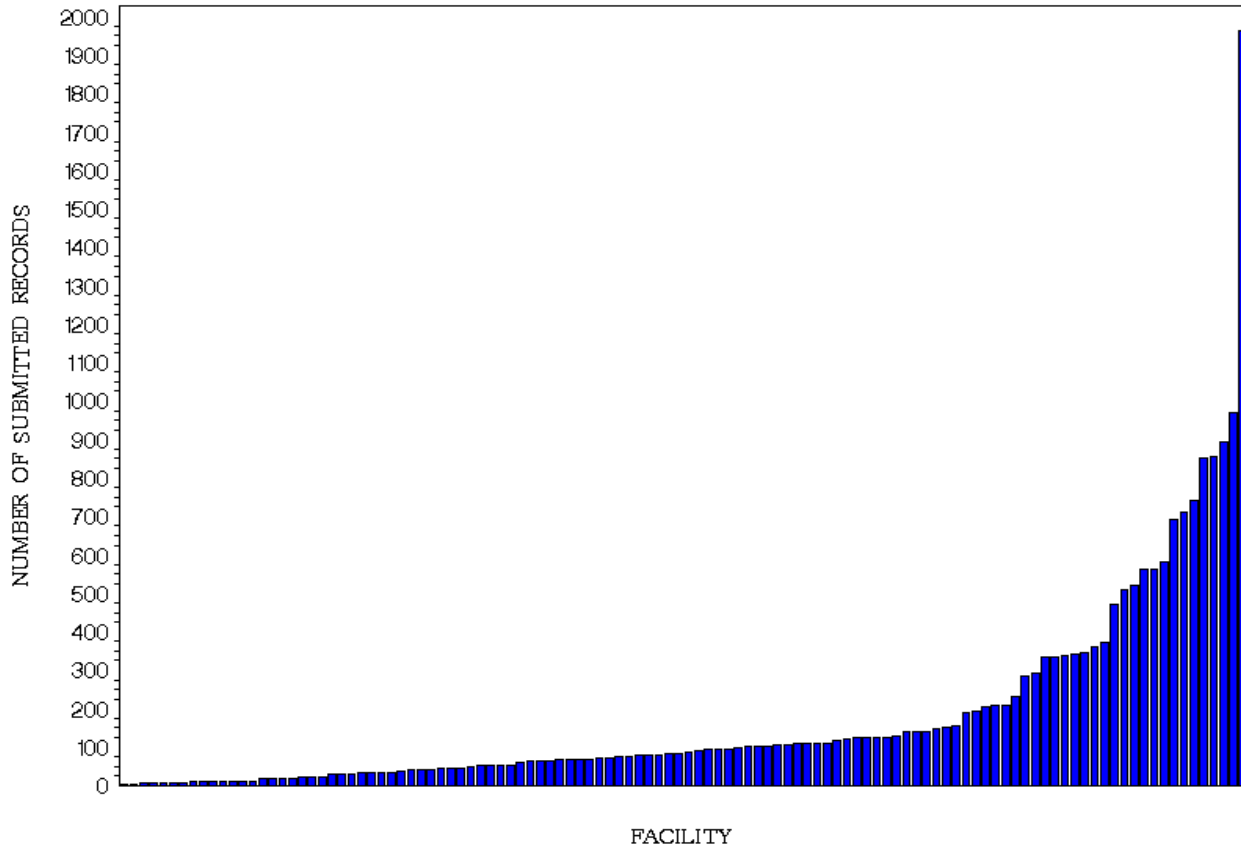


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Figure 55

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

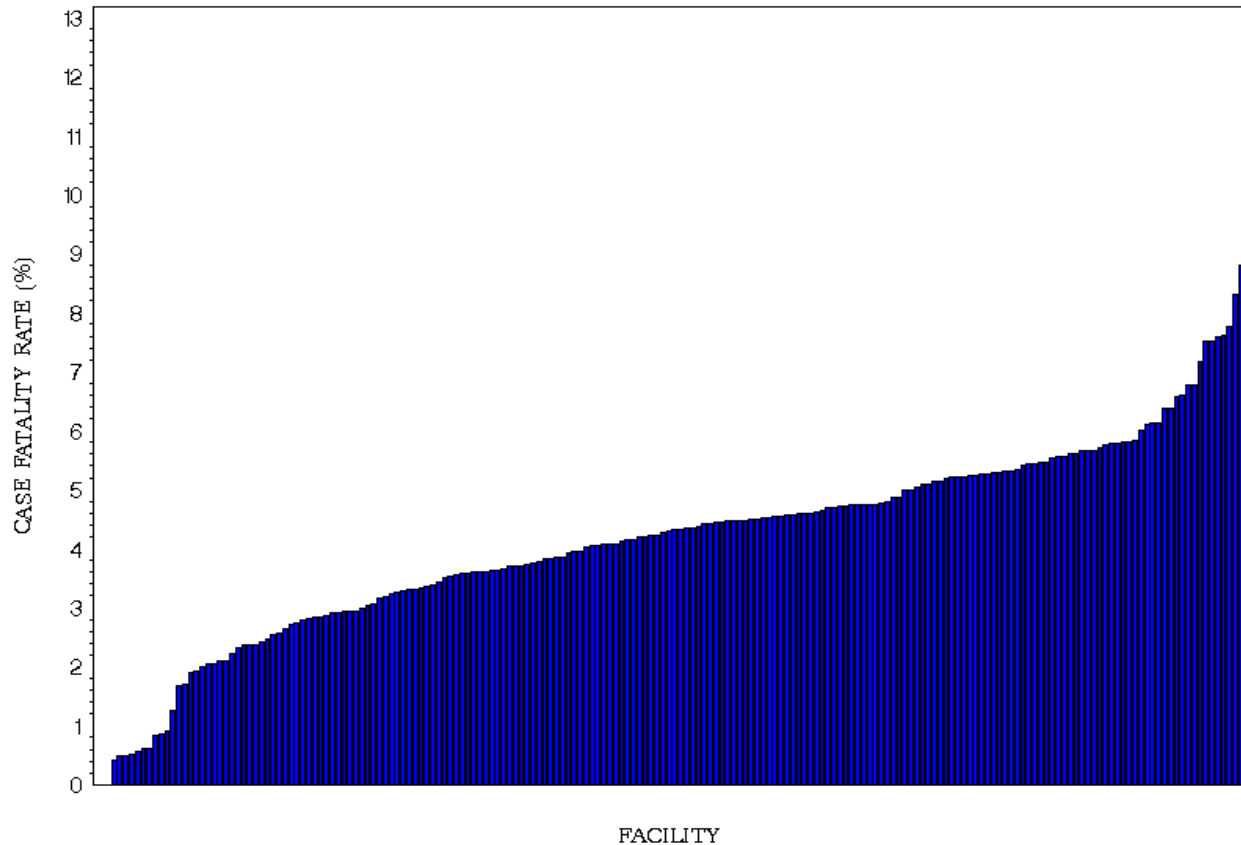


Only Cases with valid trauma diagnosis code per the NTDB criteria are included in the analysis. Trauma level is based on ACS verification and state designation.



Figure 56

## Case Fatality Rate per Facility for Level I Facilities



Three out of 196 hospitals did not have any patients who died and are therefore not visible on the graph. All deaths including Dead on Arrival are included in the analysis. Trauma level is based on ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

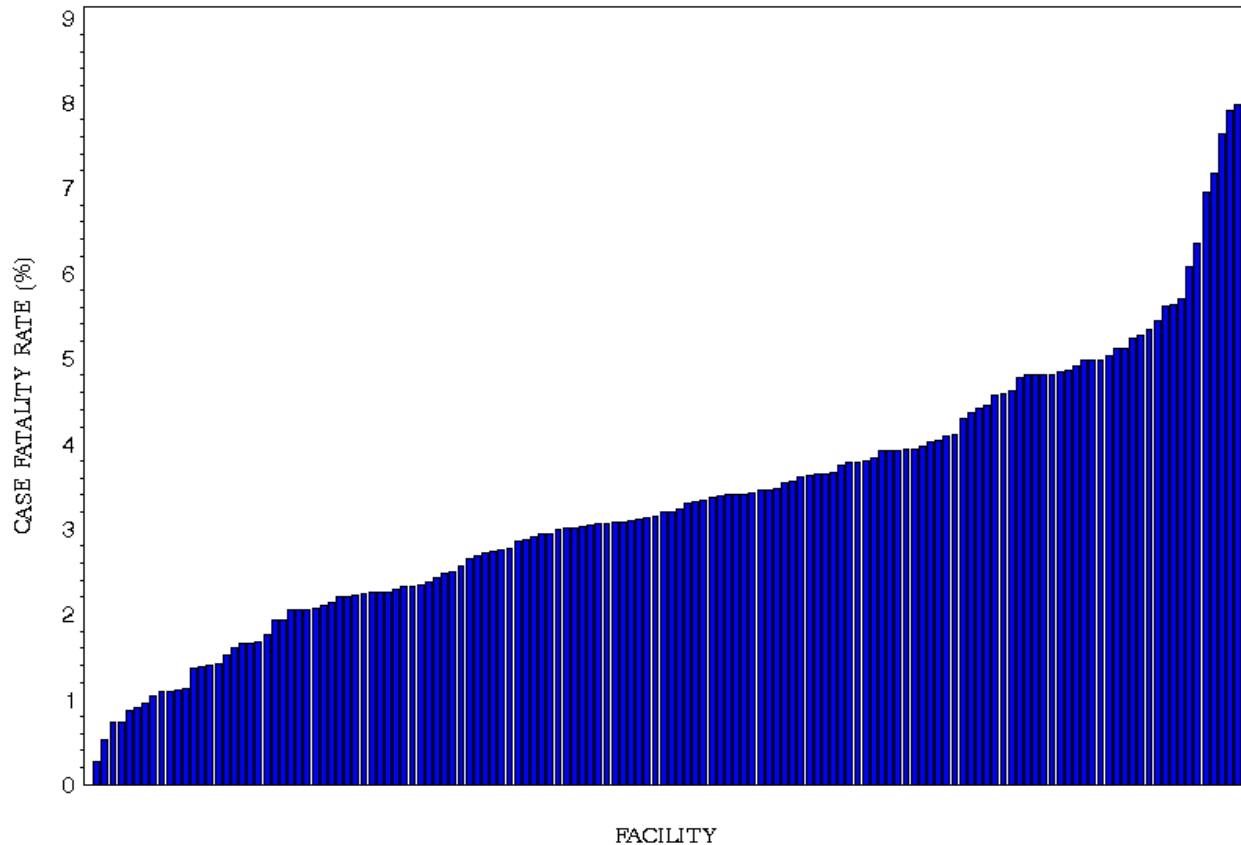


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Figure 57

## Case Fatality Rate per Facility for Level II Facilities with Bed Size $\leq 400$ Beds



One out of the 144 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 on ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

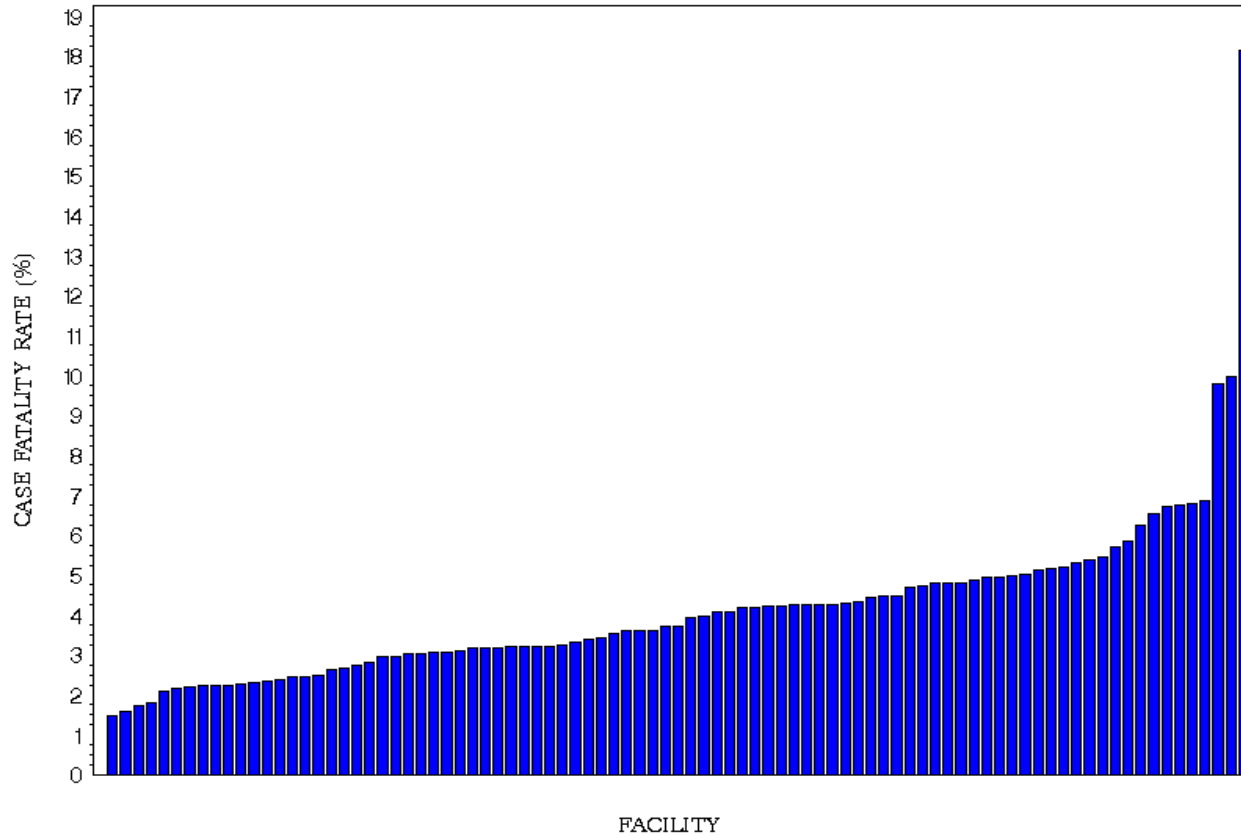


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Figure 58

## Case Fatality Rate per Facility for Level II Facilities with Bed Size > 400 Beds



One facility out of the 90 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 on ACS verification and state designation.

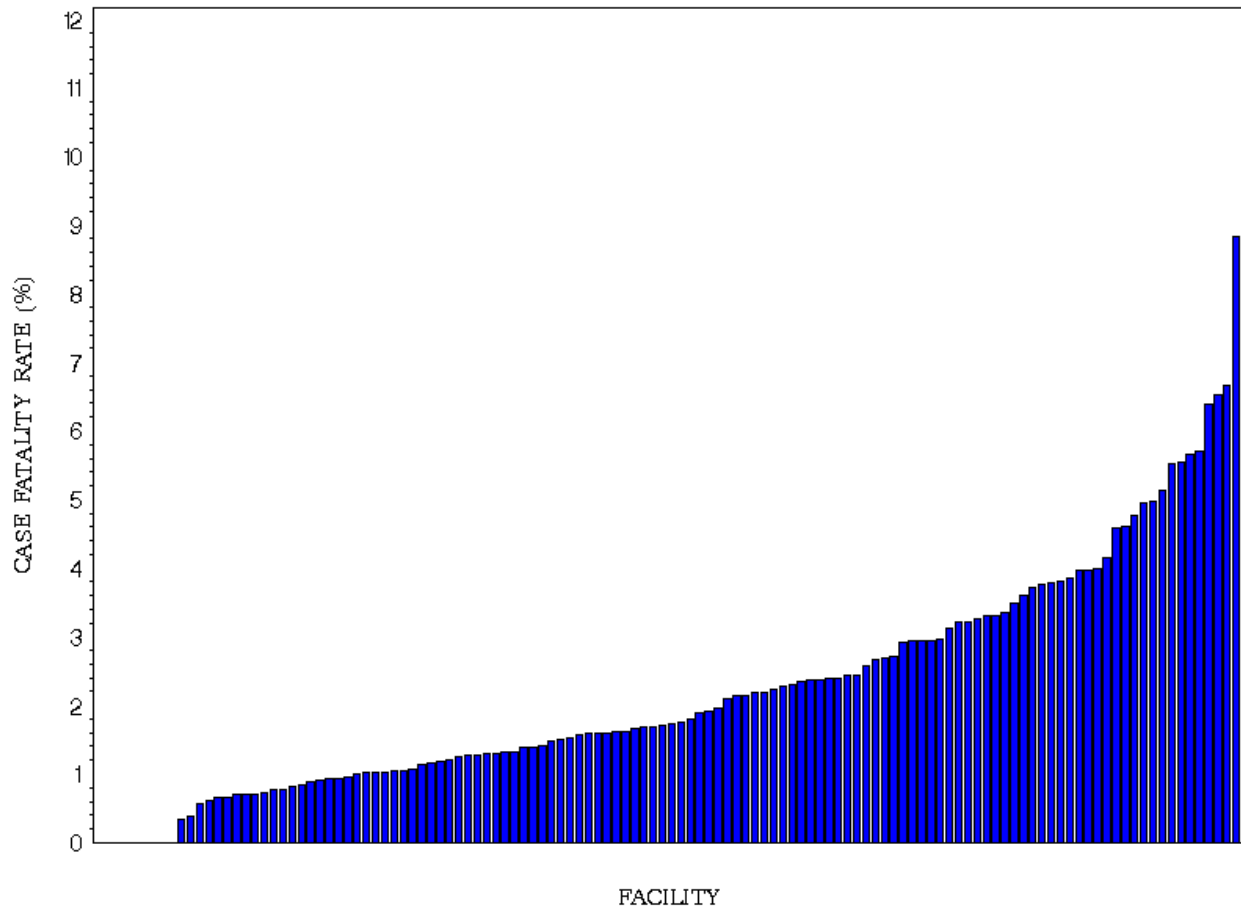


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Figure 59

## Case Fatality Rate per Facility for Level III Facilities



Nine facilities out of the 125 level III 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 on ACS verification and state designation.



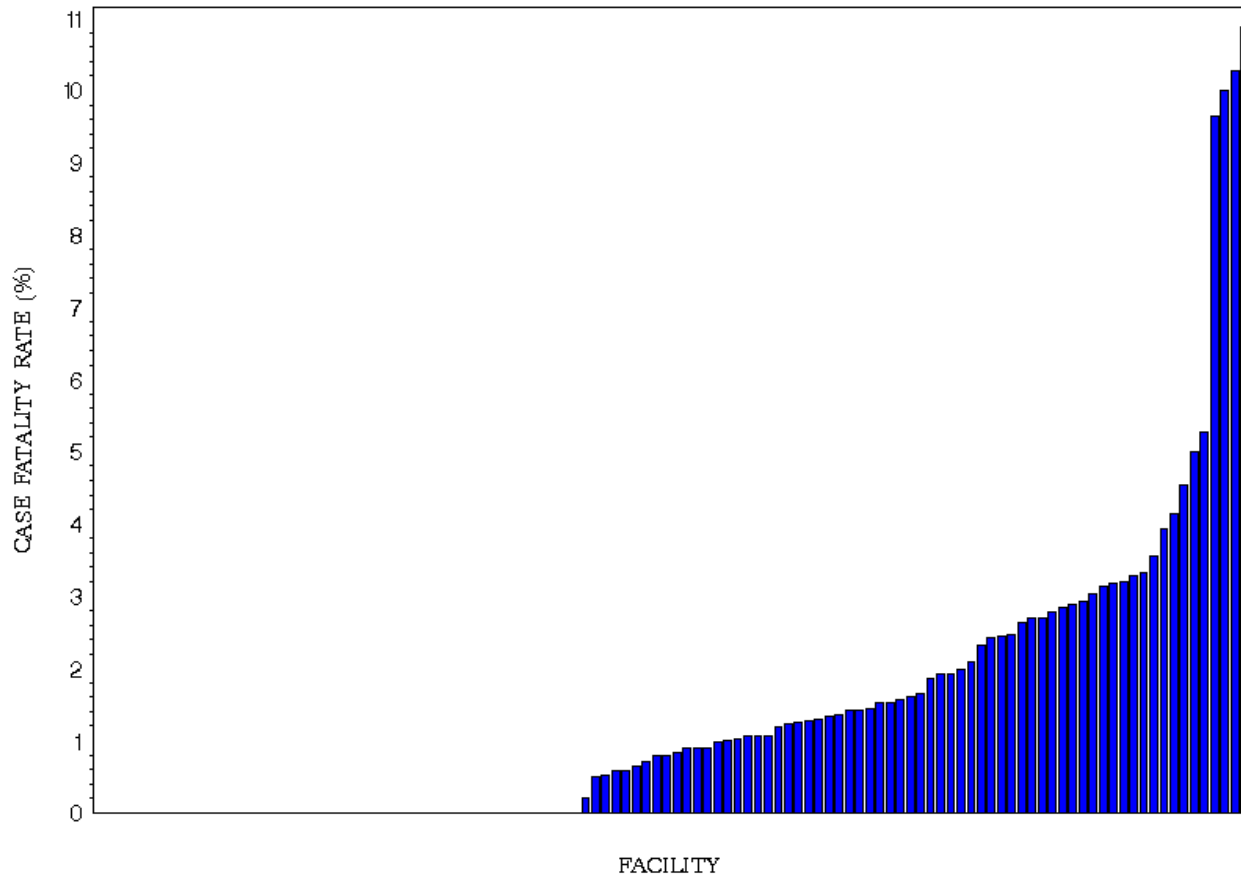
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Figure 60

## Case Fatality Rate per Facility for Level IV Facilities and Facilities with Designation Other or Not Applicable



Forty-eight facilities out of the 114 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 on ACS verification and state designation.

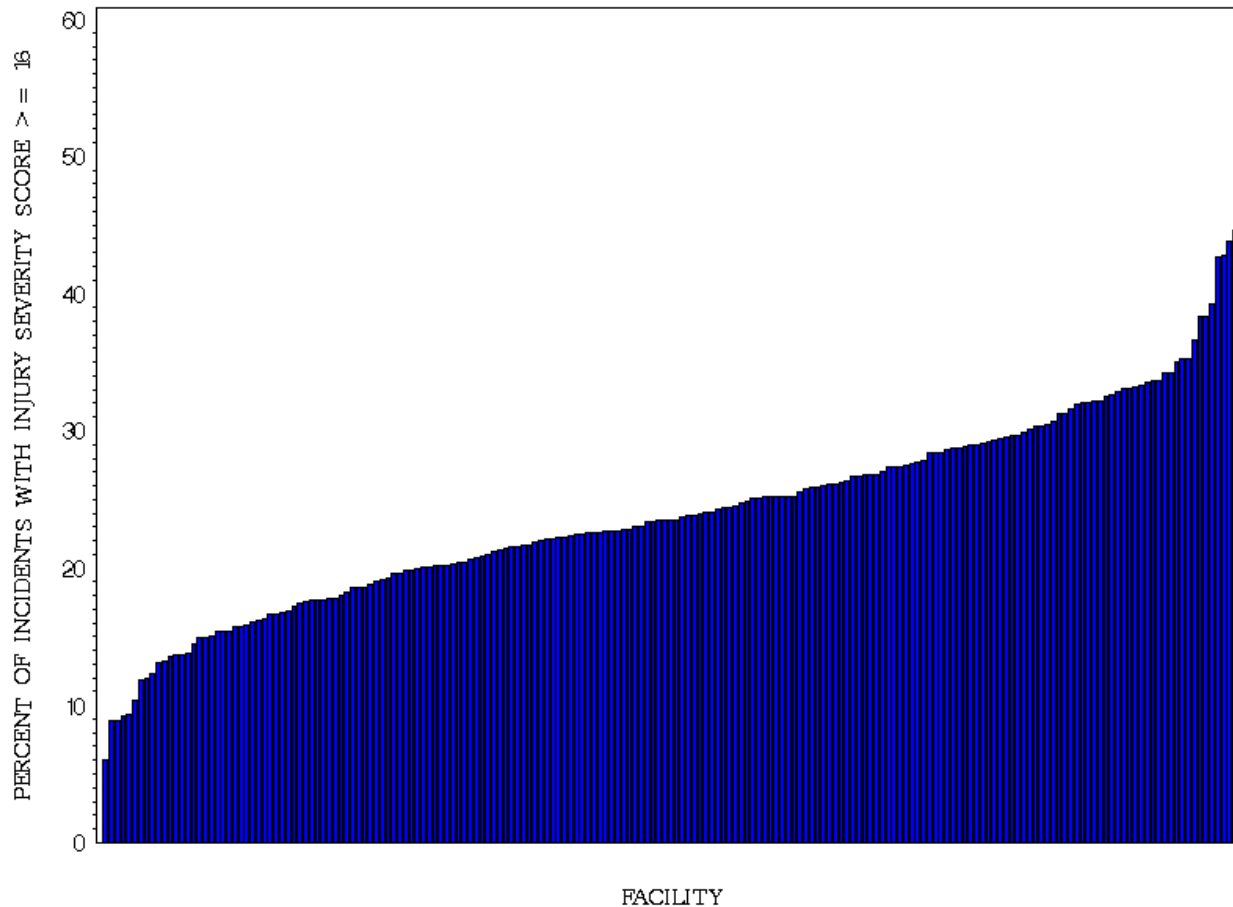


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Figure 61

## Percentage of Cases with ISS $\geq 16$ per Facility for Level I Facilities



One out of 196 hospitals had no records with ISS  $\geq 16$  and is therefore not visible on the graph. The ISS score calculated for all records are based on the ICD-90 map. Trauma level is based on ACS verification and state designation; however, pediatric hospitals are not included in the analysis.



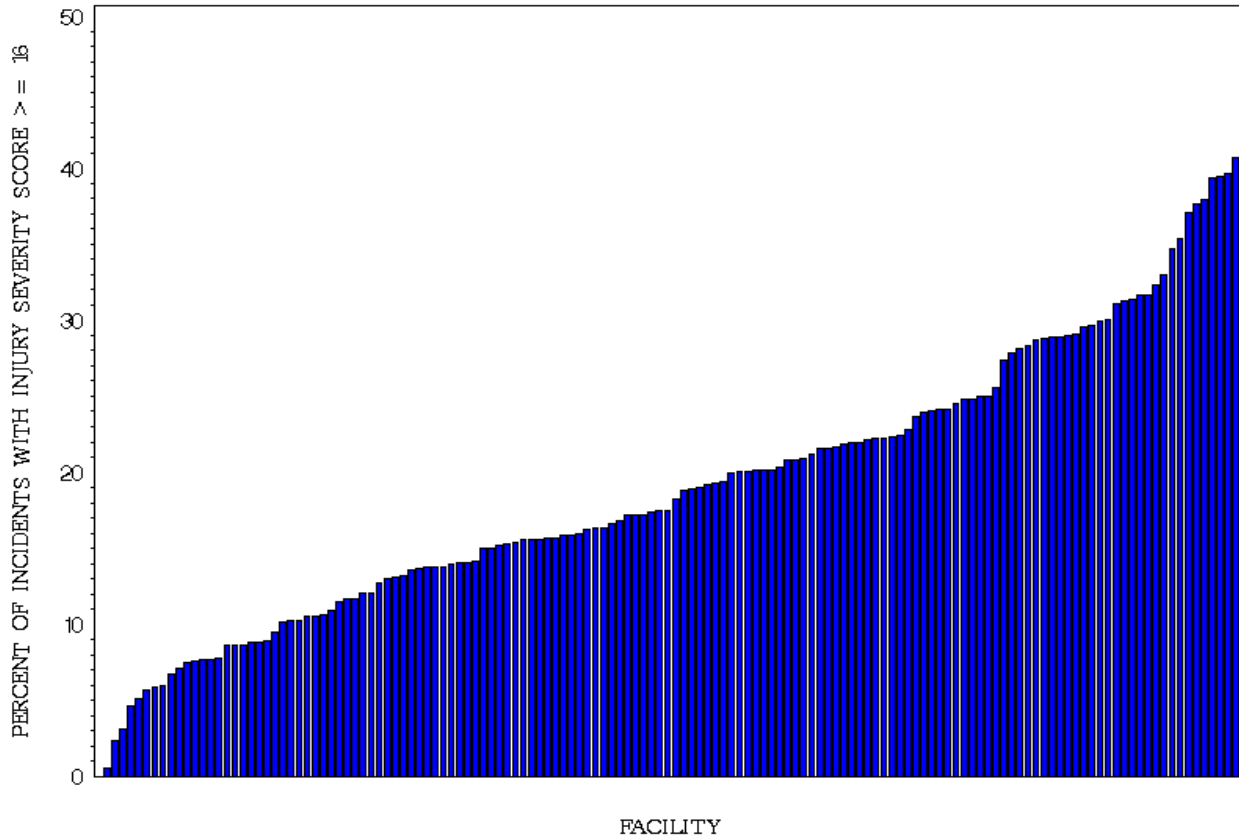
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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Figure 62

## Percentage of Cases with ISS $\geq 16$ per Facility for Level II Facilities with Bed Size $\leq 400$ Beds

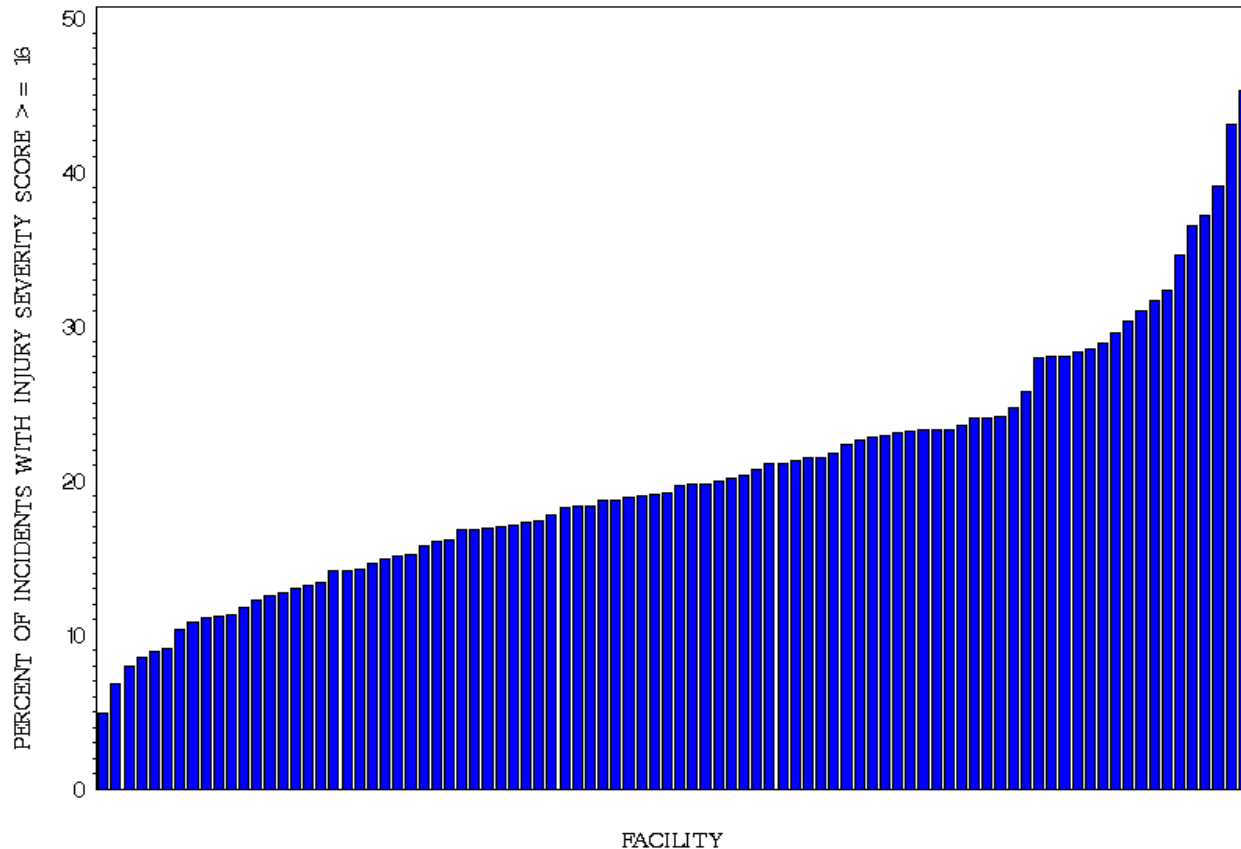


One out of 144 hospitals had no records with ISS  $\geq 16$  and is therefore not visible on the graph. The ISS score calculated for all records are based on the AIS98 Crosswalk. Trauma level is based on ACS verification and state designation, however, pediatric hospitals are not included in the analysis.



Figure 63

## Percentage of Cases with ISS $\geq 16$ per Facility for Level II Facilities with Bed Size > 400 Beds



The ISS score calculated for all records are based on the AIS98 Crosswalk. Trauma level is based on ACS verification and state designation, however, pediatric hospitals are not included in the analysis.



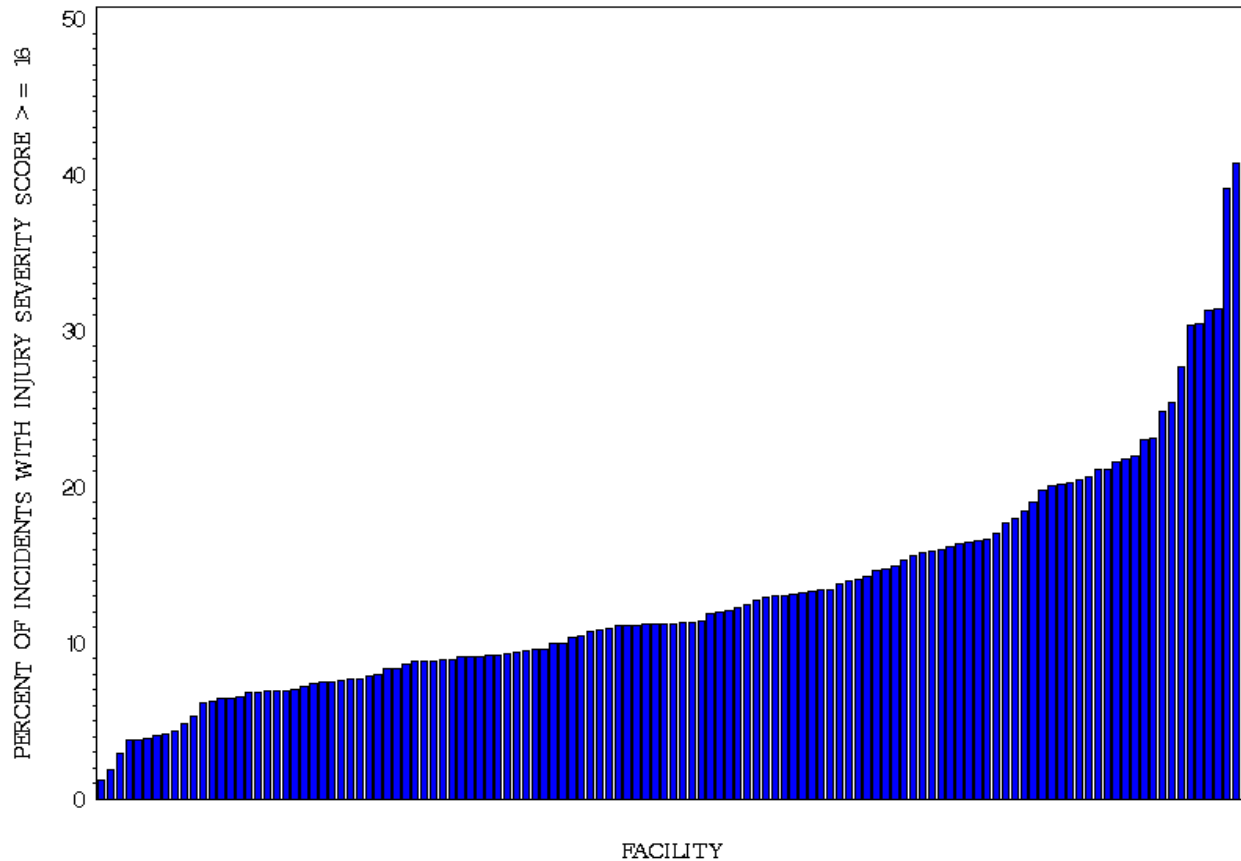
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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Figure 64

## Percentage of Cases with ISS $\geq 16$ per Facility for Level III Facilities



The ISS score calculated for all records are based on the AIS98 Crosswalk. Trauma level is based on ACS verification and state designation, however, pediatric hospitals are not included in the analysis.



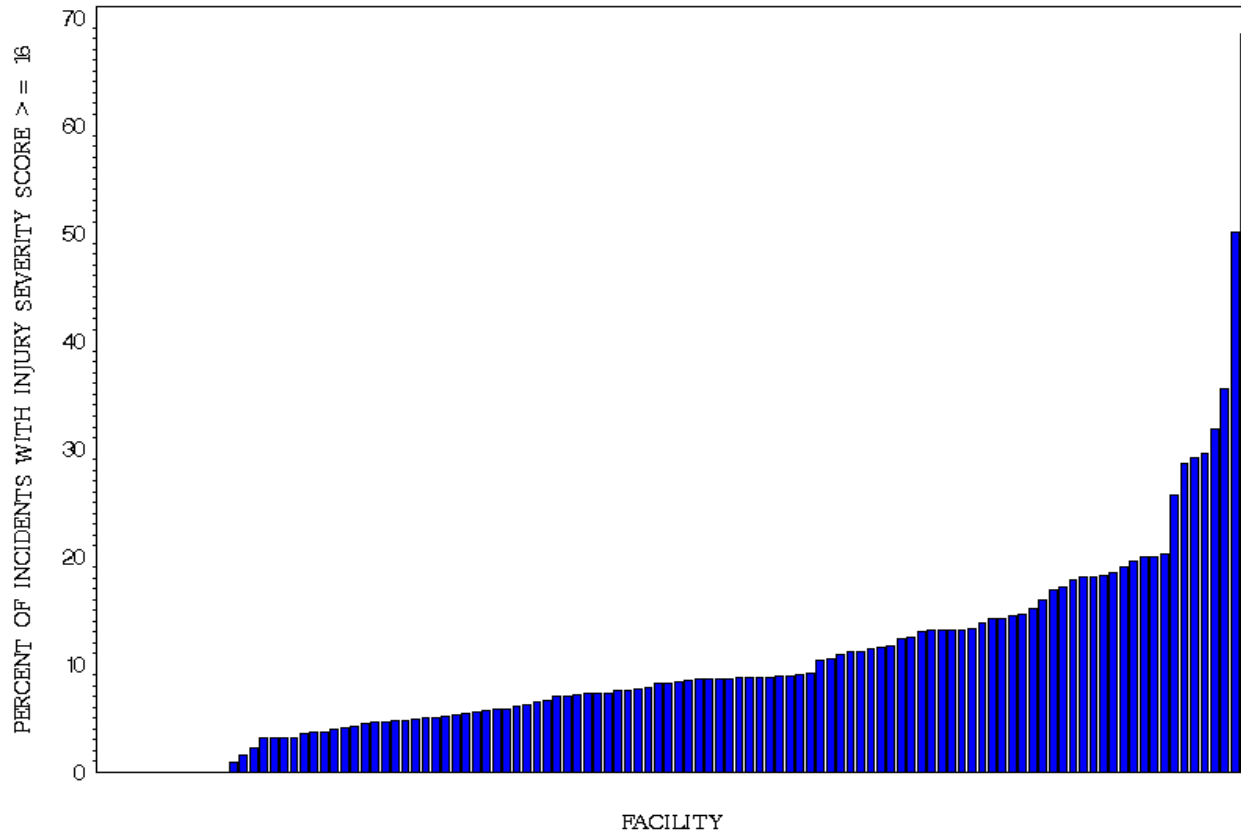
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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Figure 65

## Percentage of Cases with ISS $\geq 16$ per Facility for Level IV Facilities and Facilities with Designation Other or Not Applicable



Thirteen out of 114 facilities had no incidents with ISS  $\geq 16$ , and are therefore not visible on the graph. The ISS score calculated for all records are based on the AIS98 Crosswalk. Trauma level is based on ACS verification and state designation.



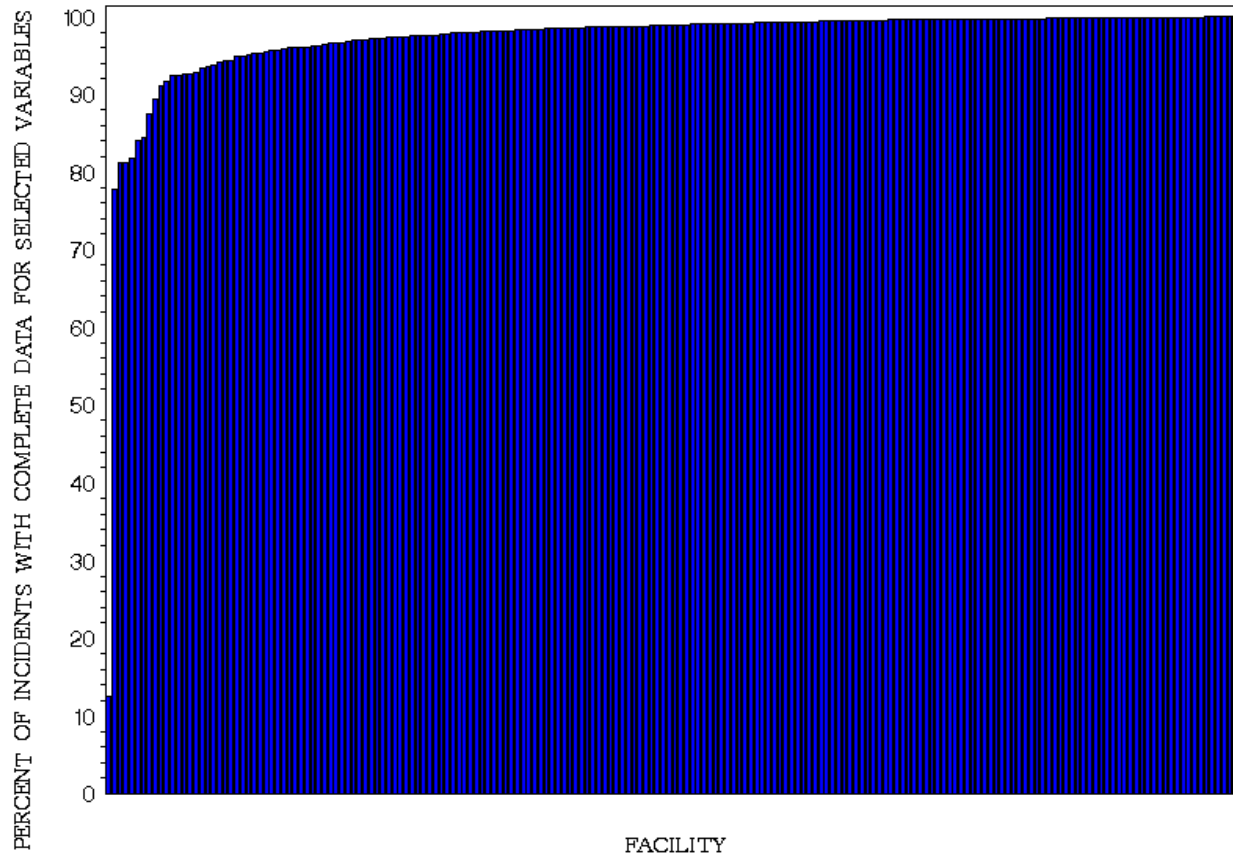
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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Figure 66

## 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 on ACS verification and state designation; however, pediatric hospitals are not included in the analysis.

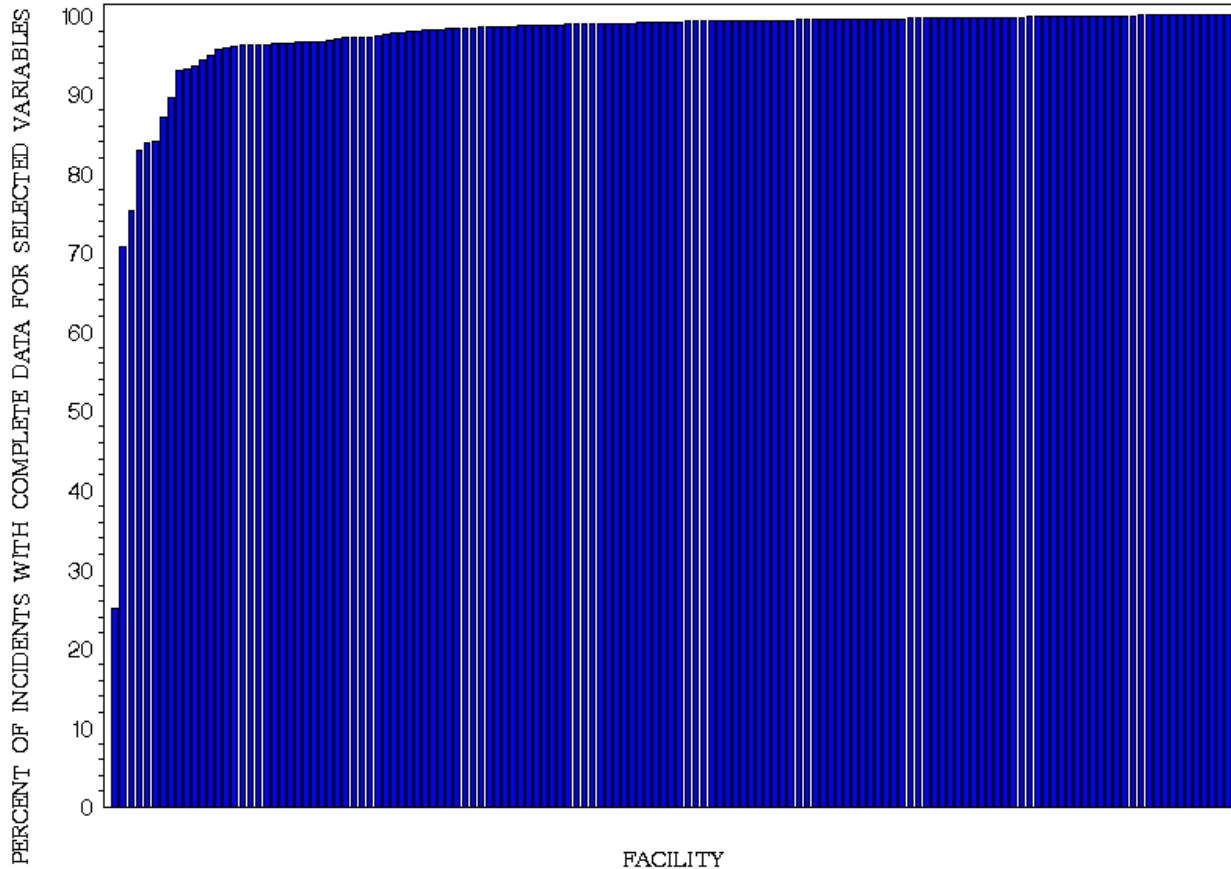


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Figure 67

## Data Completeness per Facility for Level II Facilities with Bed Size $\leq$ 400 Beds



One out of 144 facilities had 0% of the incidents complete, and is 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 on ACS verification and state designation, however, pediatric hospitals are not included in the analysis.



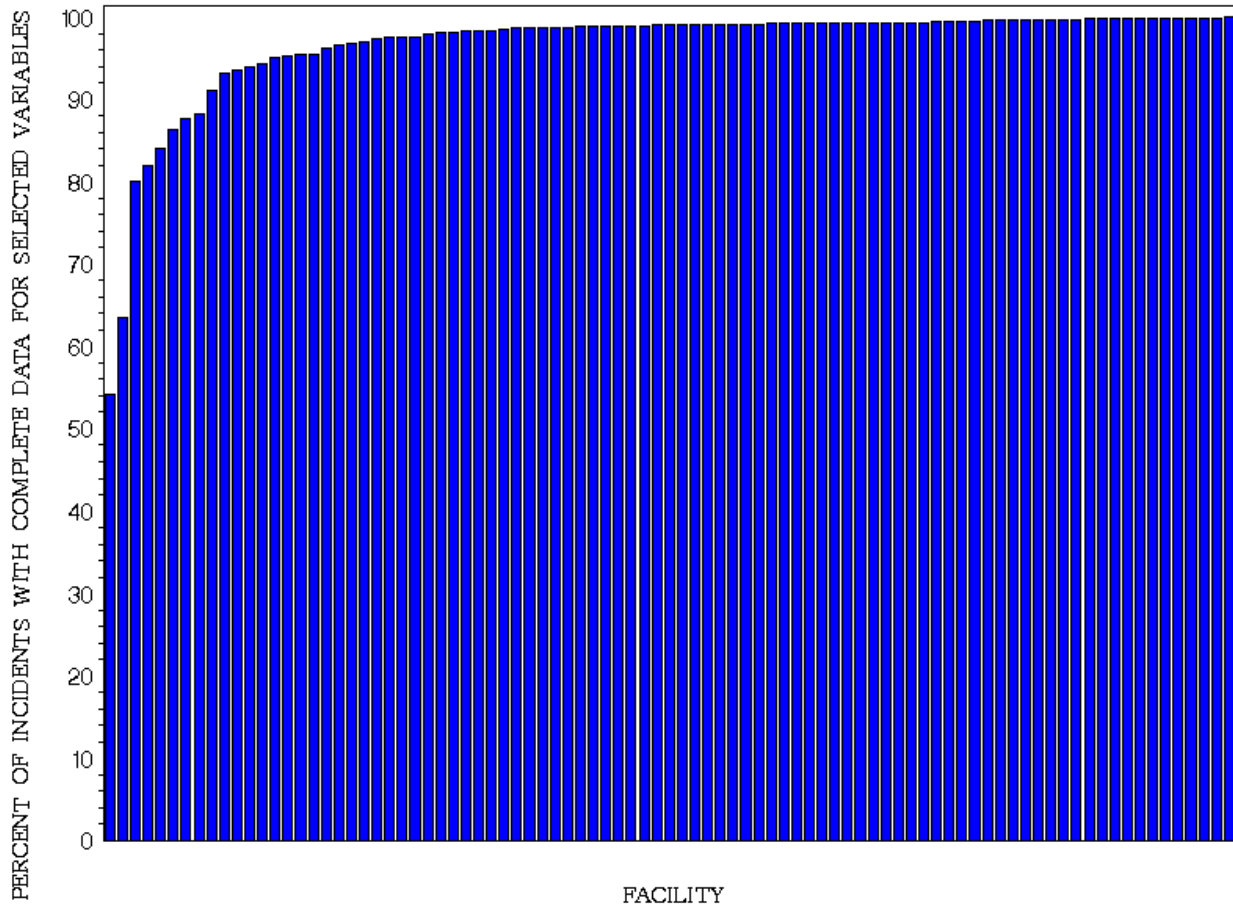
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Figure 68

## Data Completeness per Facility for Level II Facilities with Bed Size > 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 on ACS verification and state designation; however, pediatric hospitals are not included in the analysis.

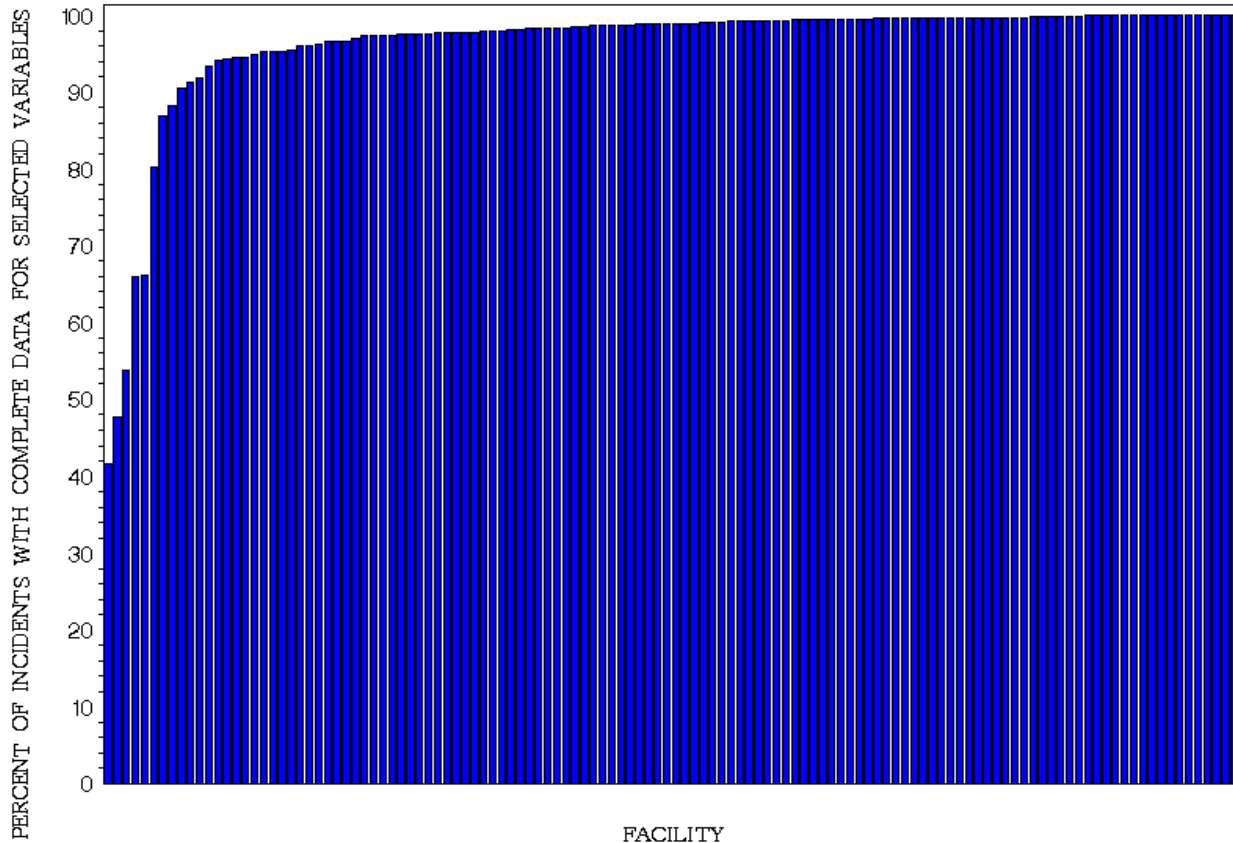


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Figure 69

## Data Completeness per Facility for Level III 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 on ACS verification and state designation.

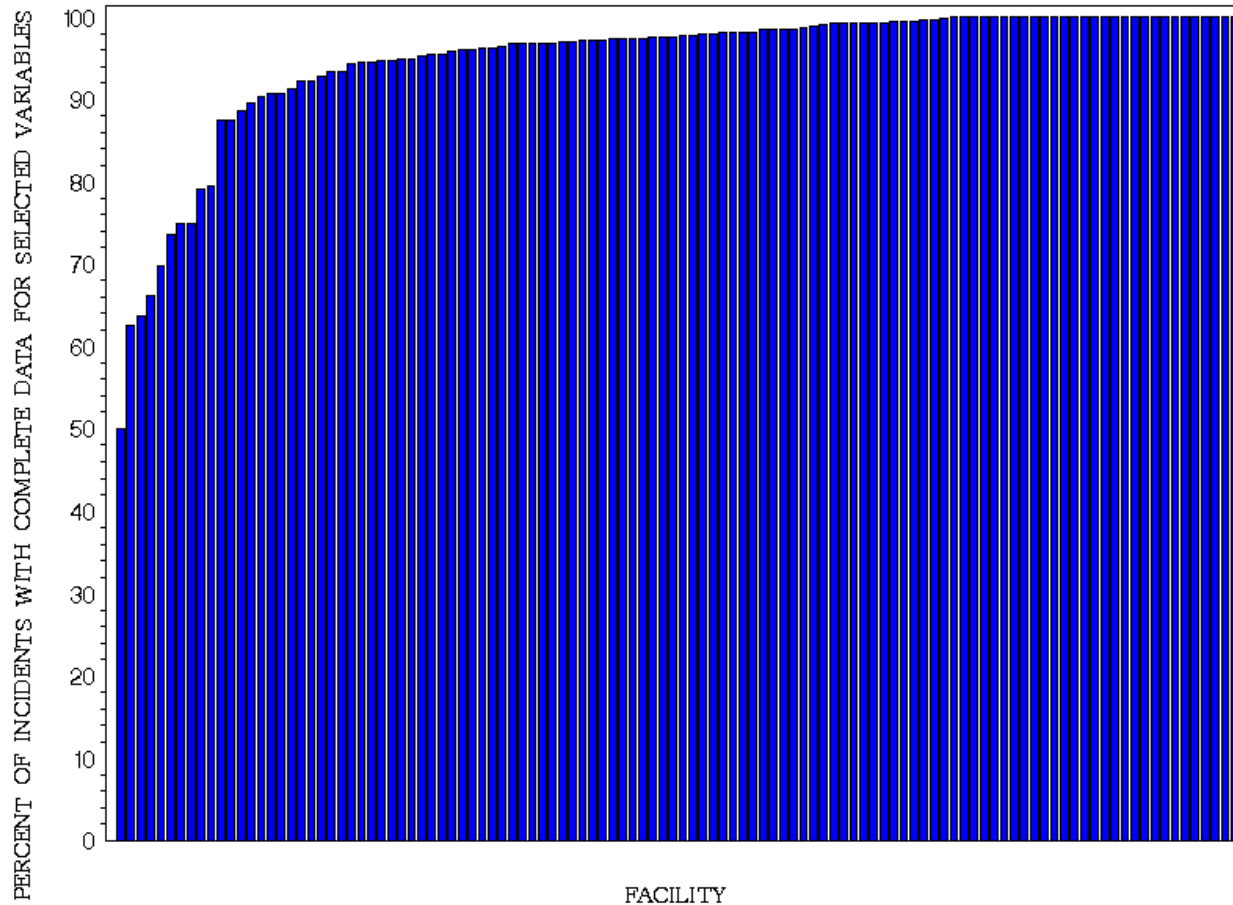


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Figure 70

## Data Completeness per Facility for Level IV Facilities and Facilities with Designation Other or Not Applicable



One out of 114 facilities had 0% of the incidents complete, and is 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 on ACS verification and state designation.

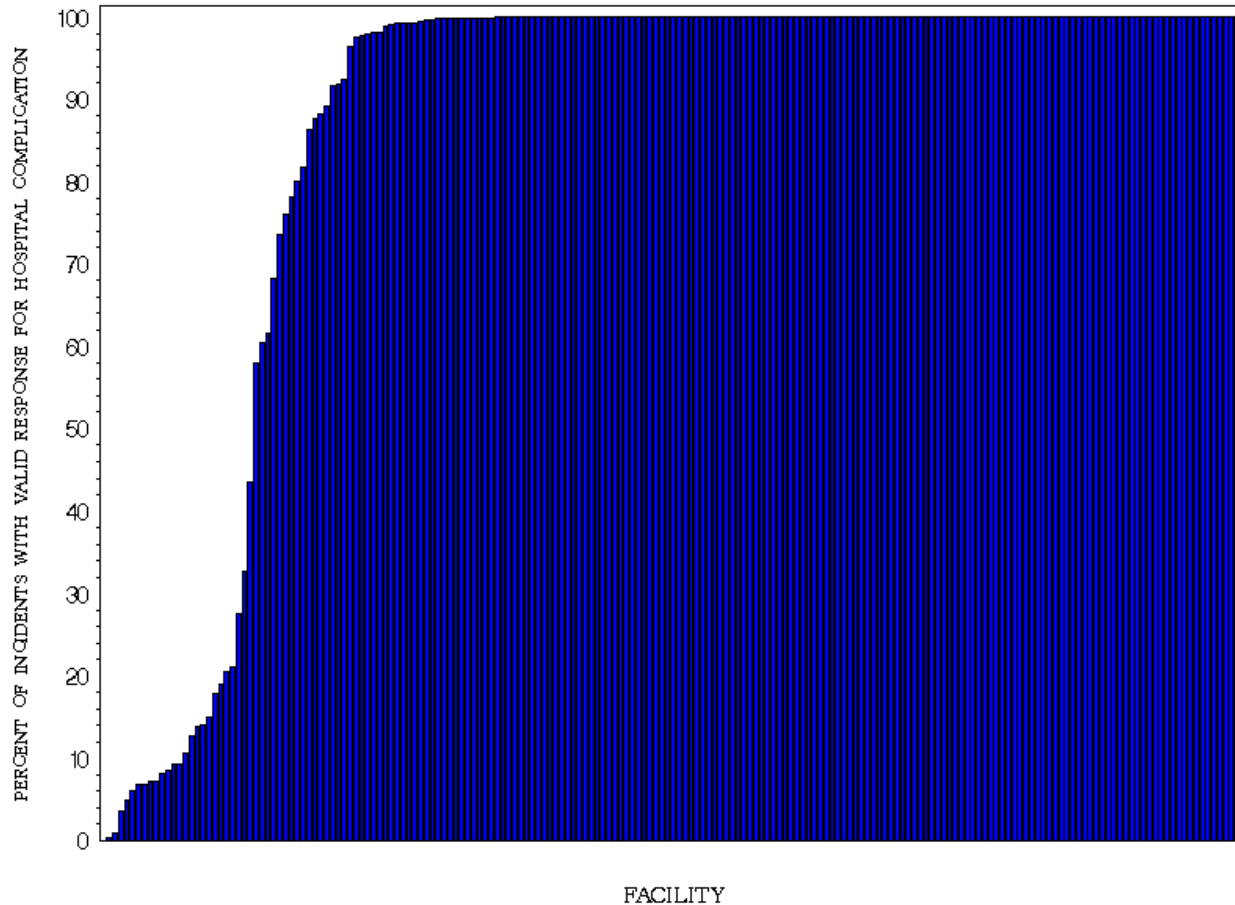


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Figure 71

## Complications Reported per Facility for Level I Facilities



One out of 196 facilities had 0% of the incidents with valid response for hospital complications, including not applicable, and is therefore not visible on the graph. Trauma level is based on ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

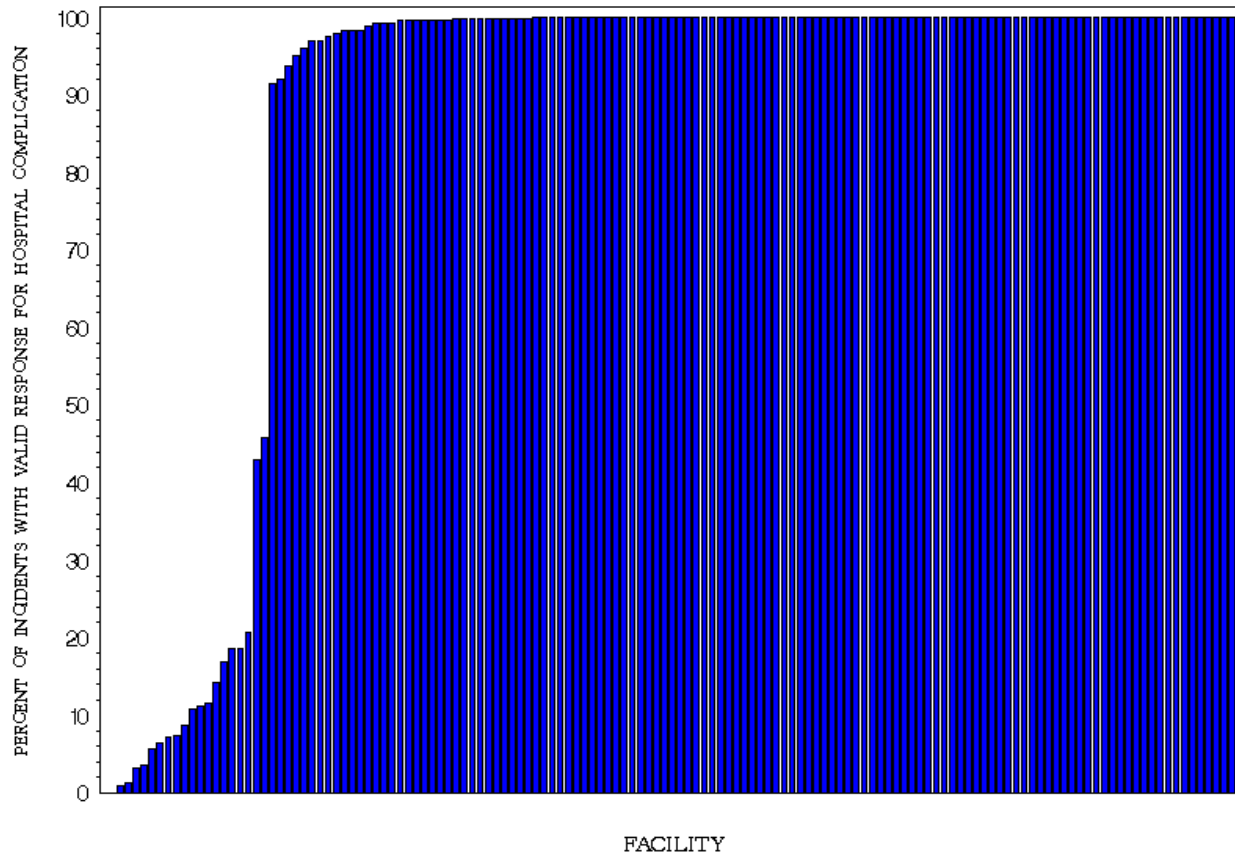


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Figure 72

## Complications Reported per Facility for Level II Facilities with Bed Size $\leq 400$ Beds



Two out of 144 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 on ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

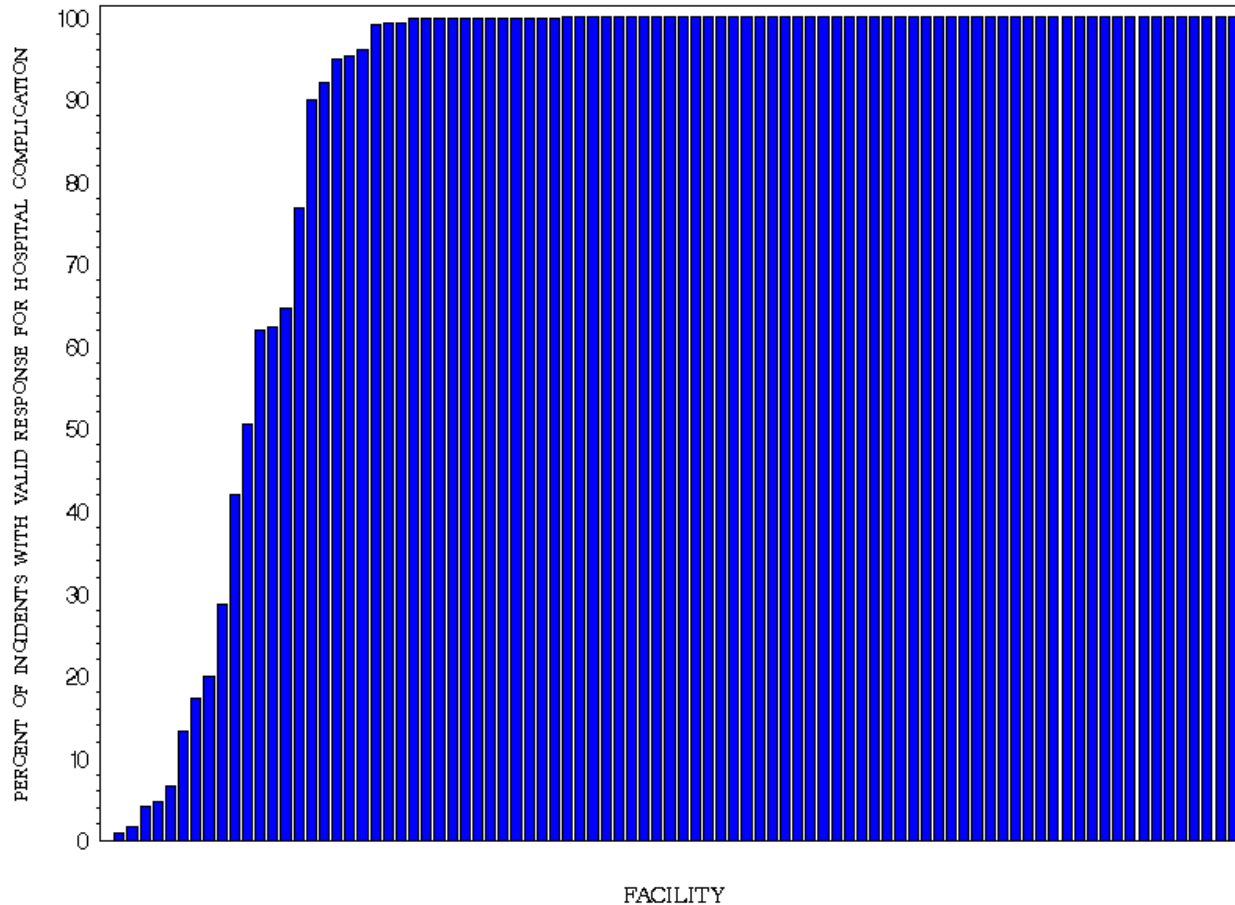


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Figure 73

## Complications Reported per Facility for Level II Facilities with Bed Size > 400 Beds



One out of 90 facilities had 0% of the incidents with valid response for hospital complications, including not applicable, and is therefore not visible on the graph. Trauma level is based on ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

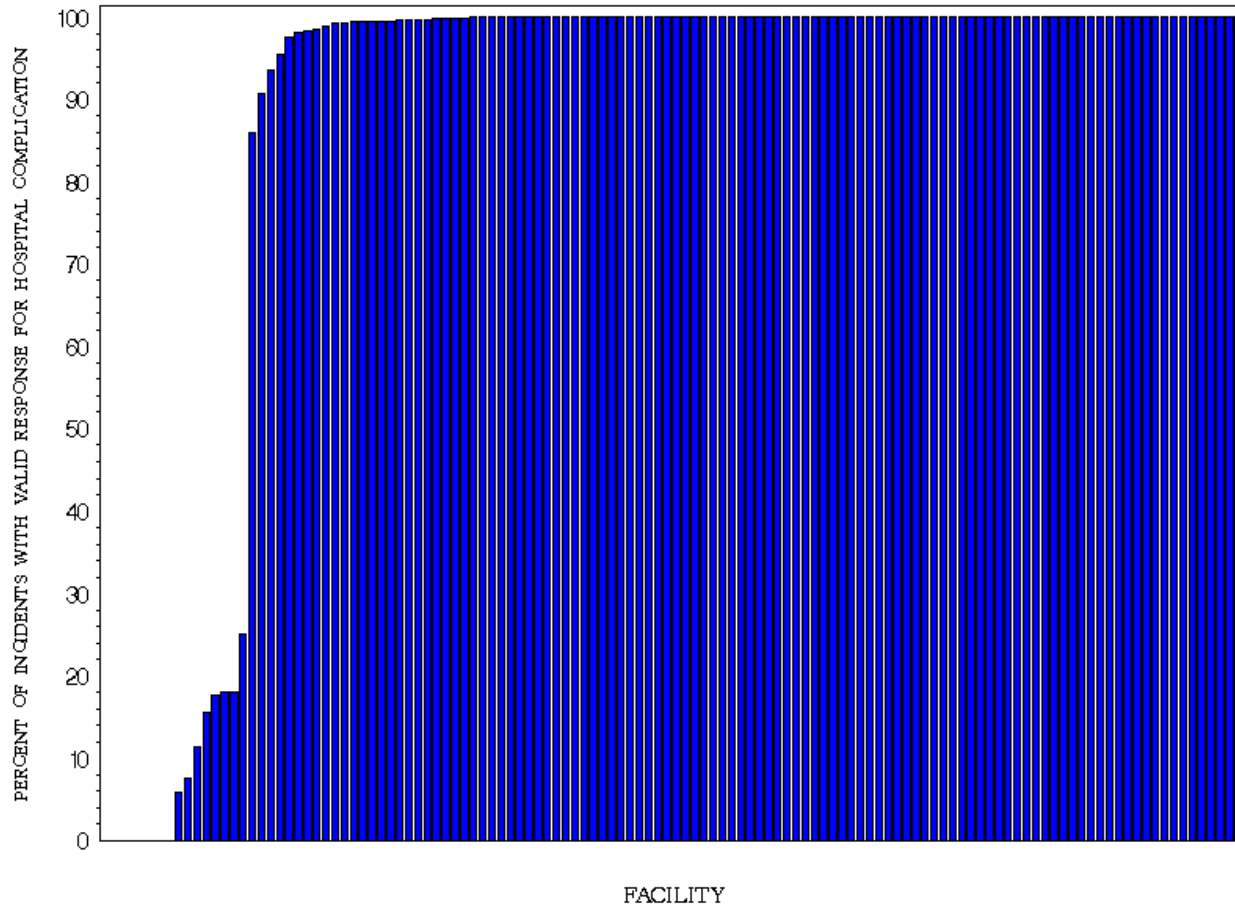


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Figure 74

## Complications Reported per Facility for Level III Facilities



Eight out of 125 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 on ACS verification and state designation, however, pediatric hospitals are not included in the analysis.

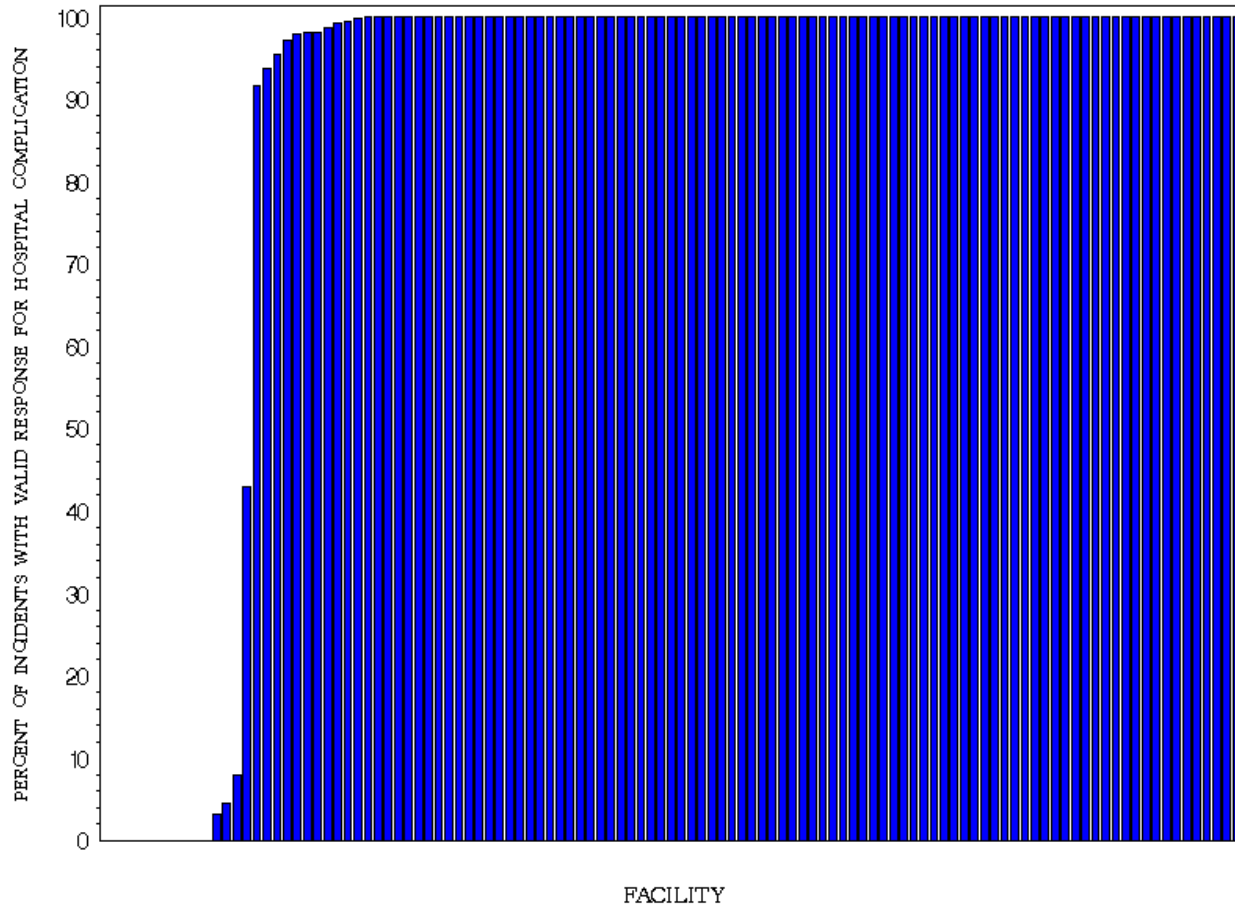


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Figure 75

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



Eleven out of 114 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 on ACS verification and state designation, however, pediatric hospitals are not included in the analysis.



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# APPENDICES



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# APPENDIX A

## Definition of a Trauma Patient

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Definition of a 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)



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## APPENDIX B

### Comparative Injury Severity Score (ISS) Definitions

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Local ISS: Injury Severity Scores as submitted by the facility.

AIS Submitted: Injury Severity Scores as calculated by the NTDB from AIS codes submitted by the facility.

AIS98 Crosswalked: Injury Severity Scores as calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

AIS ICDMAP-90: Injury Severity Scores as calculated by the NTDB using ICD-9-CM diagnosis codes that are mapped to AIS90 codes using ICDMAP-90 software



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## APPENDIX C

### E–Code Grouping: Recommended Framework for E–Code Groupings for Presenting Injury Mortality and Morbidity Data

Mechanism/Cause	Manner/Intent				
	Unintentional	Self–inflicted	Assault	Undetermined	Other
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 <sup>3</sup>	E890.0–E899, E924.0–.9	E958.1,.2,.7	E961, E968.0,.3, E979.3	E988.1,.2,.7	
Fire/flame <sup>3</sup>	E890.0–E899	E958.1	E968.0, E979.3	E988.1	
Hot object/substance	E924.0–.9	E958.2,.7	E961,E968.3	E988.2,37	
Firearm <sup>3</sup>	E922.0–.3,.8,.9	E955.0–.4	E965.0–4, E979.4	E985.0–.4	E970
Machinery	E919 (.0–.9)				
Motor vehicle traffic <sup>2,3</sup>	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–E807(.2) E820–E825(.7) E826–E829(.0)				



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## APPENDIX C

### E-Code Grouping: Recommended Framework for E-Code Groupings for Presenting Injury Mortality and Morbidity Data

Mechanism/Cause	Manner/Intent				
	Unintentional	Self-inflicted	Assault	Undetermined	Other
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	E900.00–E909, E928.0–.2	E958.3		E958.3	
Bites/stings <sup>3</sup>	E905.0–.6,.9 E906.0–.4,.5,.9				
Overexertion	E927				
Poisoning	E850.0–E869.9	E950.0–E952.9	E962.0–.9, E979.6,.7	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 classifiable <sup>3,4</sup>	E846–E848, E914–E915 E918, E921.0–39, E922.4,.5 E923.0–.9, E925.0–E926.9 E928(.3–.5), E929.0–.5	E9555,.6,.7,.9 E958.0,.4	E960.1,E965.5–.9 E967.0–.9, E968.4,.6,.7 E979 (.0–.2,.5,.8,.9)	E985.5,.6,.7 E988.0,.4	E971, E978 E990–E994, E996 E997.0–.2
Unspecified	E887. E928.9, E929.9	E958.9	E968.9	E988.9	E976, E997.9
All Injury <sup>3</sup>	E800–E869, E880–E929	E950–E959	E960–E969, E979, E999.1	E980–E989	E970–E978, E990– E999.0
Adverse effects					E870–E879 E930.0–E949.9
Medical care					E870–E879
Drugs					E930.0–E949.9
All external causes					E800–E999



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# APPENDIX C

## E–Code Grouping: Table Notes

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<sup>1</sup>Includes legal intervention (E970–E978) and operations of war (E990–E999).

<sup>2</sup>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.

<sup>3</sup>Codes in bold are for morbidity coding only. For details see table 2.

<sup>4</sup>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–listed E code and should only appear as an additional code to specify the place of occurrence of the injury incident.

**Note:** ICD–9 E codes for coding underlying cause of death apply to injury–related death data from 1979 through 1998. Then there is a new ICD–10 external cause of injury matrix that applies to death data from 1999 and after. This can be found on the National Center for Health Statistics website at <http://www.cdc.gov/nchs/about/otheract/ice/projects.htm>.

Reference MM WR 1997;46:1–30. Updated last time in 2009.



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# NATIONAL SAMPLE PROGRAM (NSP) INFORMATION



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# YEARLY COMPARISONS BASED ON THE NTDB NATIONAL SAMPLE PROGRAM

The National Trauma Data Bank (NTDB), managed by the American College of Surgeons (AC S) 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 AC S 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 2003–2009 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 2010 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>



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Table  
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## Weighted Estimates of Incidents by Admission Year

ADMISSION YEAR	WEIGHTED NUMBER OF INCIDENTS (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 (499,450, 717,598)	16.65 (14.28, 19.02)
2006	673,991 ( 543,427, 804,555)	18.44 (15.79, 21.09)
2007	630,645 (543,521, 717,768)	17.26 (14.96, 19.55)
2008	640,116 (568,229, 712,004)	17.51 (15.63, 19.40)
2009	630,134 (502,953, 757,316)	14.71 (12.82, 16.59)
Total	4,285,098 (3,793,265, 4,776,930)	

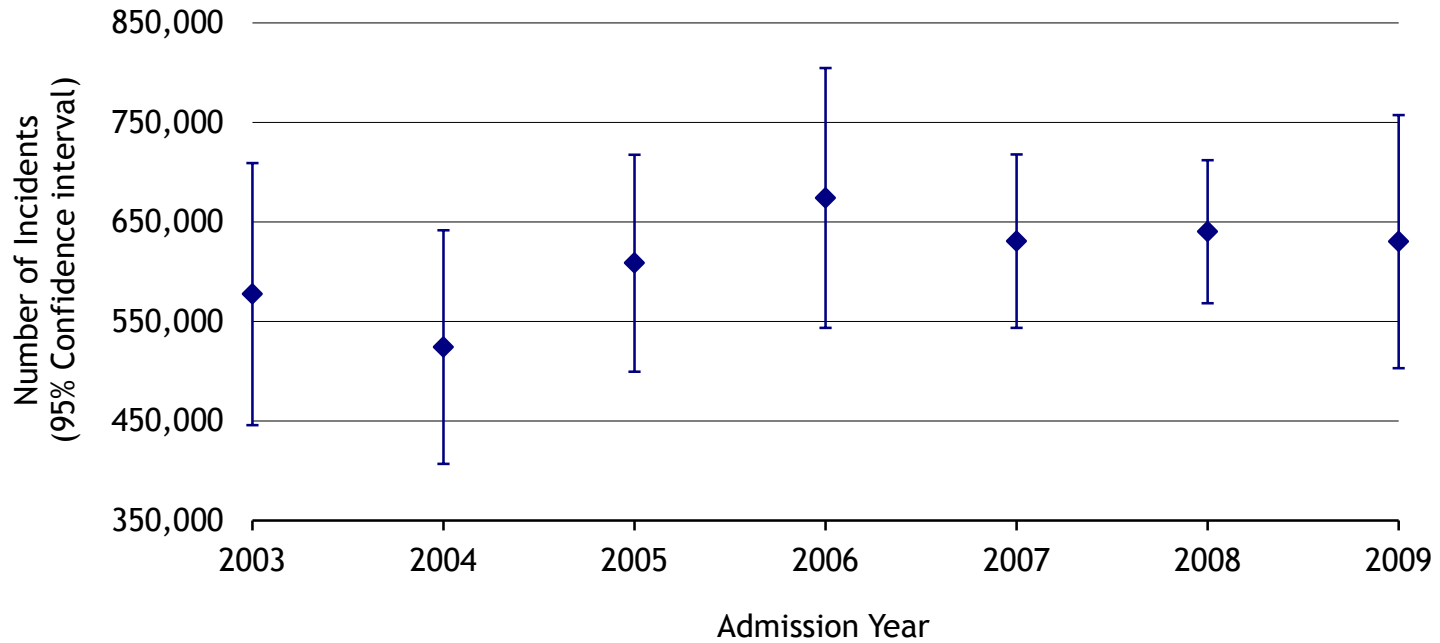


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Figure 76

## Weighted Estimates of Incidents by Admission Year



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Table  
77

## Weighted Estimates 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)
2009	221,877	408,069	35.21 (34.45, 35.97)	64.76 (64.00, 65.52)

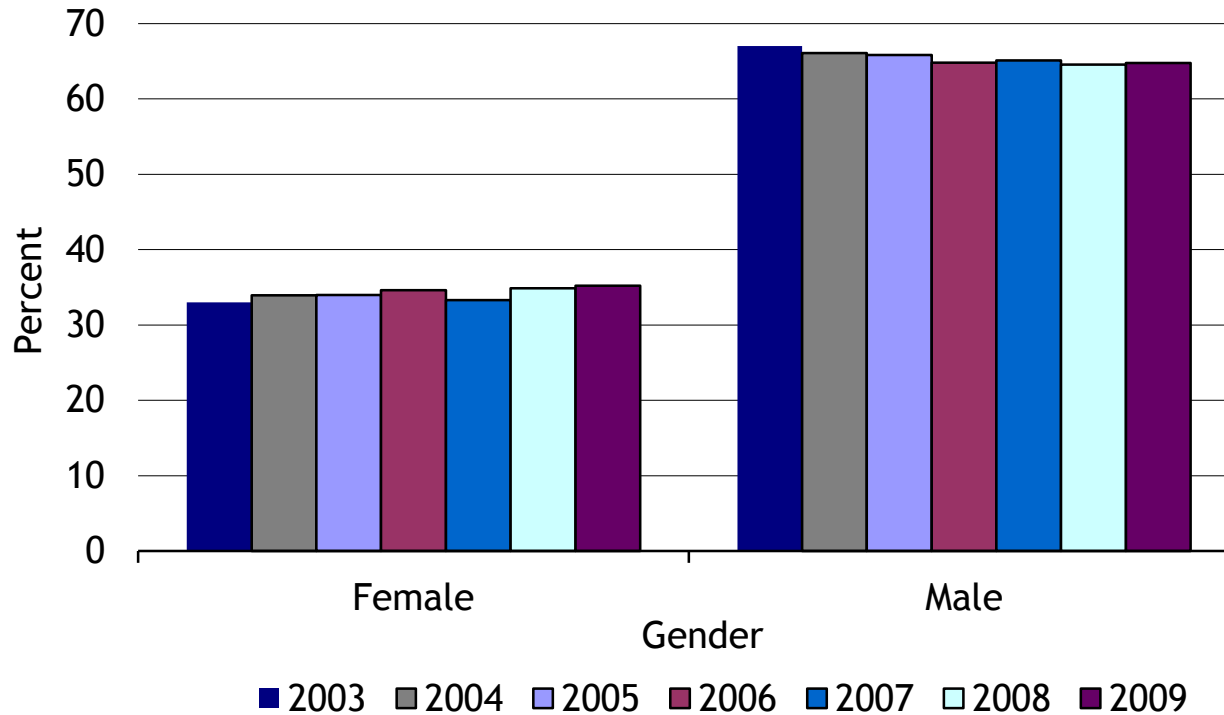


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Figure 77

## Weighted Estimates of Incidents by Gender and Admission Year



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Table  
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## Weighted Estimates of Incidents by Age and Admission Year

AGE	ADMISSION YEAR 2003 (95% CI)	ADMISSION YEAR 2004 (95% CI)	ADMISSION YEAR 2005 (95% CI)	ADMISSION YEAR 2006 (95% CI)	ADMISSION YEAR 2007 (95% CI)	ADMISSION YEAR 2008 (95% CI)	ADMISSION YEAR 2009 (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)	7.15 (5.90,8.40)
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)	8.33 (8.08,8.59)
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)	10.27 (9.82,10.72)
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)	14.94 (14.43,15.45)
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)	12.81 (12.48,13.13)
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)	14.59 (14.25,14.94)
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)	10.72 (10.44,11.00)
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)	7.62 (7.32,7.92)
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)	9.33 (8.51,10.15)
≥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)	4.23 (3.93,4.54)

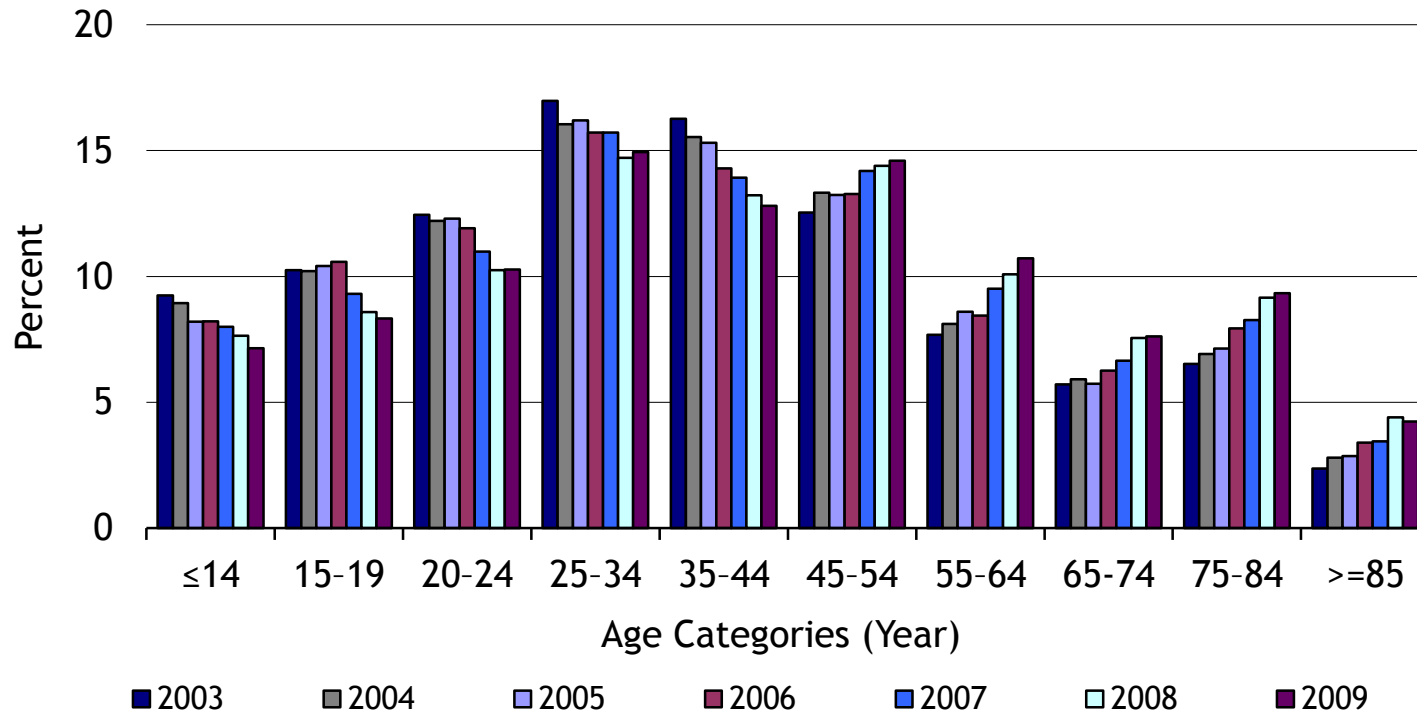


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Figure 78

## Weighted Estimates of Incidents by Age and Admission Year



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Table  
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## Weighted Estimates of Incidents by ISS Category and Admission Year

ADMISSION YEAR	ISS 1–8 (95% CI)	ISS 9–15 (95% CI)	ISS 16–24 (95% CI)	ISS >24 (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)
2009	50.53 (48.23, 52.83)	27.56 (26.44, 28.68)	16.06 (15.00, 17.12)	5.85 (5.28, 6.42)



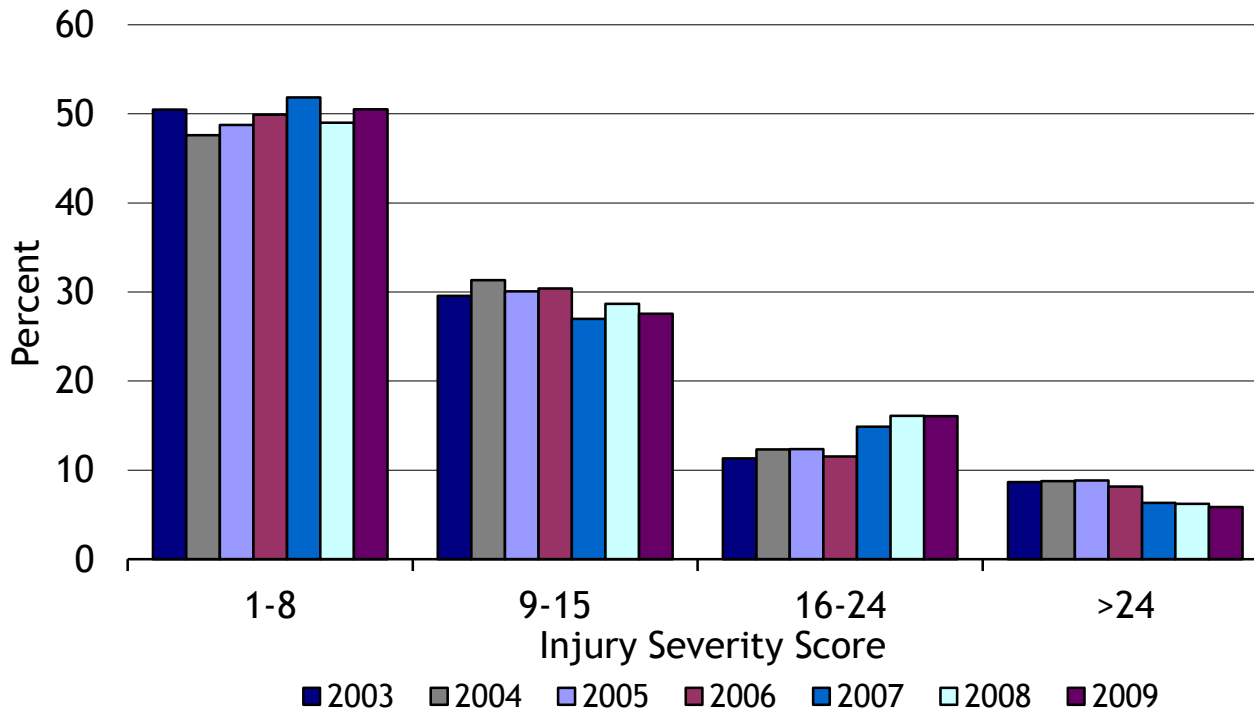
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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90

Figure 79

## Weighted Estimates of Incidents by ISS Category and Admission Year



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ISS is calculated using AIS submitted by hospitals and then crosswalked to AIS98. If hospital does not submit AIS98 then ISS is based on AIS derived from ICDMAP-90



Table  
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## Weighted Estimates of Incidents by Mechanism of Injury Category and Admission Year

ADMISSION YEAR	MOTOR VEHICLE TRAFFIC (95% CI)	FALL (95% CI)	CUT/PIERCE (95% CI)	STRUCK BY, AGAINST (95% CI)
2003	40.59 (38.37,42.82)	24.14 (23.91, 28.36)	5.89 (5.54, 6.25)	6.91 (6.41, 7.41)
2004	38.81 (35.23, 42.39)	28.29 (25.05, 33.52)	5.33 (4.77, 5.89)	7.13 (6.30, 7.96)
2005	37.78 (35.34, 40.23)	29.19 (26.74, 31.64)	5.05 (4.56, 5.53)	6.90 (6.51, 7.30)
2006	35.39 (32.34, 38.41)	30.60 (27.55, 33.64)	4.82 (4.09, 5.56)	6.83 (6.29, 7.38)
2007	34.31 (32.57, 36.04)	32.78 (30.57, 35.00)	5.38 (5.01, 5.73)	7.30 (6.61, 7.98)
2008	31.51 (29.99, 33.03)	35.67 (33.58, 37.77)	5.31 (4.92, 5.71)	7.53 (6.97, 8.07)
2009	31.24 (29.95, 32.54)	35.84 (34.15, 37.54)	5.24 (4.82, 5.67)	7.93 (7.42, 8.44)

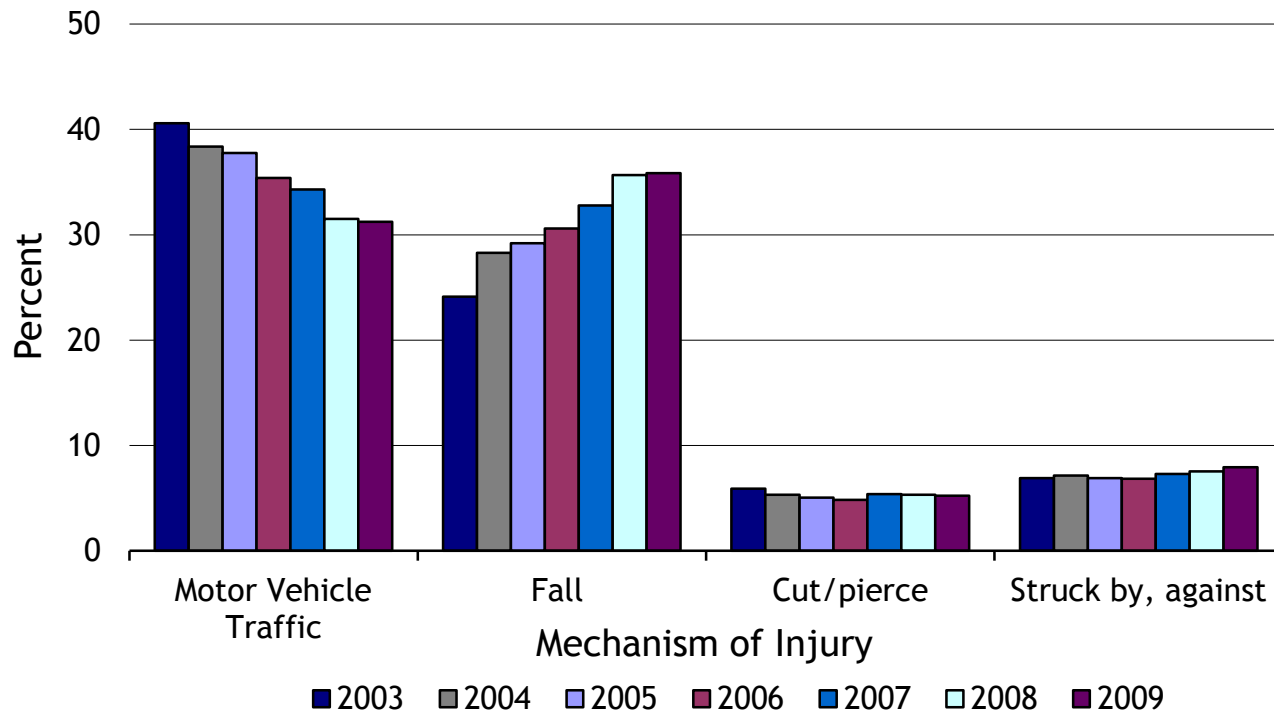


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Figure 80

## Weighted Estimates of Incidents by Mechanism of Injury Category and Admission Year



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Table  
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## Weighted Estimates 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)
2009	27,410	4.35 (4.04, 4.66)
Total	195,846	4.63 (4.25, 5.02)

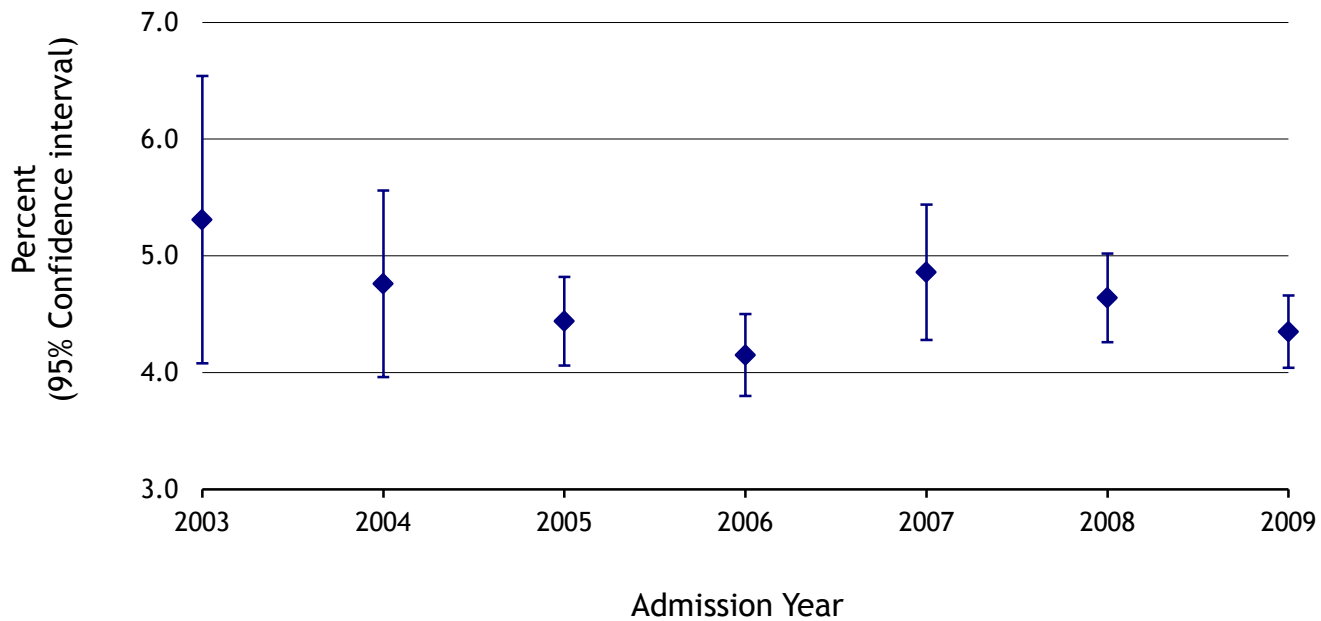


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Figure 81

## Weighted Estimates of Deaths by Admission Year



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## Resources

- [www.ntdb.org](http://www.ntdb.org) for more information about NTDB
- [www.ntdbdatacenter.com](http://www.ntdbdatacenter.com) to submit data to NTDB
- [www.ntdsdictionary.org](http://www.ntdsdictionary.org) for information on the data standard



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