

Ohio  
Trauma  
Registry

2009

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Annual Data  
Report

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## Introduction

This annual report from the Ohio Trauma Registry (OTR) presents an overview of the data about traumatic injuries in Ohio in 2009. The purpose of this report is to provide information to healthcare professionals as well as to the public about the current state of care for seriously injured patients treated at hospitals throughout Ohio.

The OTR is operated and maintained by the Ohio Department of Public Safety, Division of Emergency Medical Services. The State of Ohio's Emergency Medical Services (EMS) Board has statutory authority over the OTR and supervises its operation via the EMS Board's Trauma Committee and the Trauma Registry Advisory Subcommittee.

This report was produced by the Ohio Department of Public Safety, Division of Emergency Medical Services, Office of Research and Analysis. Questions or comments concerning the report should be directed to the Office of Research and Analysis at 800-233-0785 (toll free) or [EMSData@dps.state.oh.us](mailto:EMSData@dps.state.oh.us).

## Executive Summary

The Ohio Trauma Registry (OTR) began collecting data on January 1, 1999. This report represents data from the year 2009. This report is intended to give the reader a strong sense of the type and amount of data available in the OTR. The Ohio Revised Code and the Ohio Administrative Code prohibit the release of data that would identify or tend to identify a provider or recipient of trauma care.

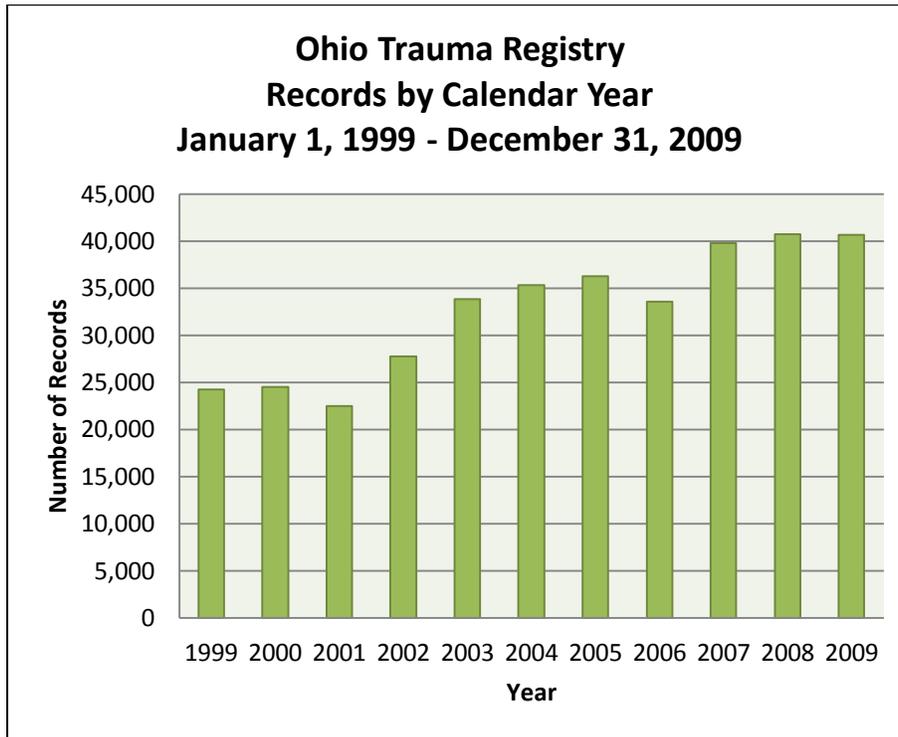
- The data in the OTR are prescribed by the Patient Inclusion Criteria (Appendix A). To be included in the OTR, patients must be admitted to the hospital for at least 48 hours or transferred into the hospital, with an injury-related ICD-9 code. Patients that die after receiving any evaluation or treatment while on hospital premises, as well as patients who are transferred out of the hospital, are also included.
- Between January 1, 1999 and December 31, 2009, a total of 359,226 records were submitted to the OTR. This report includes the 40,650 records that were submitted in 2009. Because patients who are transferred between hospitals generate multiple records, the number of records submitted to the OTR is greater than the number of individual patients.
- Of the 31,791 patients included in this report, 96% survived to discharge.
- 32% of the patients included in this report were geriatric patients (age 70 or older), while 12% of the patients were pediatric patients (age 15 or younger).
- 55% of the total trauma patients in 2009 were males while 45% were females.
- Except for the 5-9 year old age range, males had a higher case fatality rate than females of the same age.
- 91% of the injuries reported to the OTR in 2009 were the result of blunt trauma.
- 52% of the injuries reported to the OTR in 2009 were caused by falls, while an additional 16% were caused by motor vehicle collisions. Of the injuries reported to the OTR that resulted in in-hospital death in 2009, 40% were caused by falls, 15% were caused by motor vehicle collisions, and 14% were caused by assault.
- Injuries caused by drowning/submersion or firearms had the highest case fatality rate of 32.3% and 32.0% respectively.
- 89% of the injuries reported to the OTR in 2009 were unintentional. Self-inflicted injuries had the highest case fatality rate at 26%.
- Over time, the overall mortality for patients included in the OTR has remained steady around 4%. After a small drop from 6% in 2003, mortality among patients treated in a trauma center in Ohio has since remained steady around 5%. Mortality among patients treated at non-trauma centers in Ohio has been steadily trending downward from approximately 4% in 1999 to 1.62% in 2009.

## Caveats

There are a number of issues that need to be considered when reading this report. These are listed here in no specific order.

- **48-Hour Rule:** To be included in the OTR, patients must be admitted to the hospital for at least 48 hours or transferred into the hospital with an injury-related ICD-9 code. Patients that die after receiving any evaluation or treatment while on hospital premises, as well as patients who transfer out of the hospital, are also included.
- **Accuracy:** External validation of the data in OTR has not been performed; therefore, the accuracy of the data contained in this report is limited to the accuracy of the data submitted to OTR by the individual hospitals.
- **Age:** Patient date of birth is reported to OTR, age is not. Age is calculated by the Office of Research and Analysis using the difference between date of birth and date of arrival at the hospital. A very small number of records (n=7) do not have a date of birth recorded. Age is therefore not calculable on these records. Date of arrival at hospital is chosen for this calculation as a substantially larger number of records (n = 86) do not have a date of injury recorded.
- **Death Data:** In OTR, data on patients who die as a result of their injuries is limited to in-hospital deaths. Persons pronounced dead at the scene and not transported to the hospital are not reported to OTR.
- **OTR participation:** Submission of trauma patient data to OTR is statutorily required by Ohio Revised Code §4765.06. However, a small number of hospitals did not contribute data to this report. A list of contributing hospitals can be found in Appendix F.
- **Out-of-state patients:** OTR data includes patients who were injured in neighboring states and transported to an Ohio hospital. These records do not include county of injury data.
- **Records vs. Patients:** Because patients who are transferred between hospitals generate a separate trauma record at each hospital in which they receive treatment, the number of records submitted to the OTR will be greater than the number of individual trauma patients. To account for some patients having multiple records for the same incident, care has been taken to note whether a graph or table is using records or patients as the population.
- **Rounding:** Because of rounding, percentages displayed in graphs and tables will not always total 100%.
- **Trauma Center vs. Non-Trauma Center Data:** This report contains data submitted by all hospitals, regardless of whether or not the hospital is a trauma center. Because they employ specially trained trauma registry personnel, trauma center data tends to be more detailed and precise. However, the data from non-trauma centers gives a broader view of trauma care in Ohio and adds richness and depth to this report. This additional data is something many other states lack; therefore, comparisons with other states should be undertaken with caution.

## Records by Calendar Year: 1999 - 2009



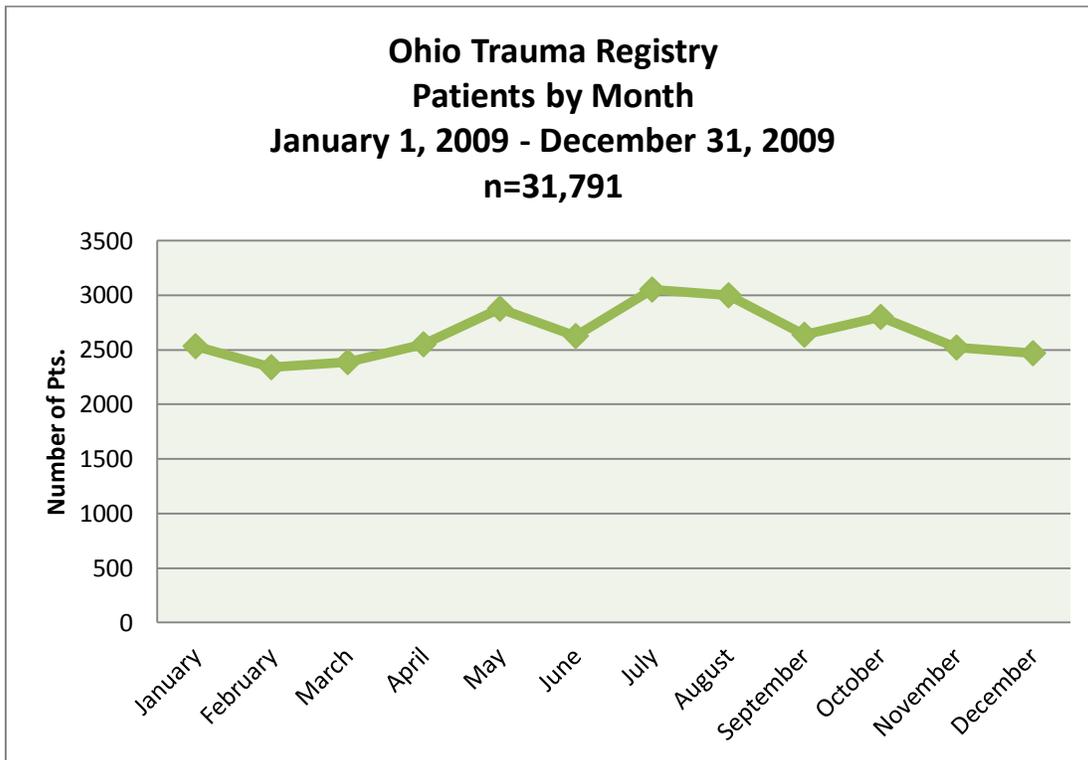
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
<b>Records</b>	24,220	24,490	22,516	27,733	33,844	35,347	36,296	33,587	39,816	40,727	40,650	<b>359,226</b>

### Trauma Records by Year

The total number of records reported to the Ohio Trauma Registry (OTR) has increased over time from 24,220 records in 1999 to 40,650 records in 2009. As of December 31, 2009, a total of 359,226 records had been submitted to the OTR.

The overall annual increase in records submitted to OTR is thought to be a result of system maturation, increased hospital participation, as well as increasing computerization of hospital medical records. Such computerization allows for easier and more accurate identification of eligible patients. This supposition has not been verified and requires further study.

## Patients by Month: 2009



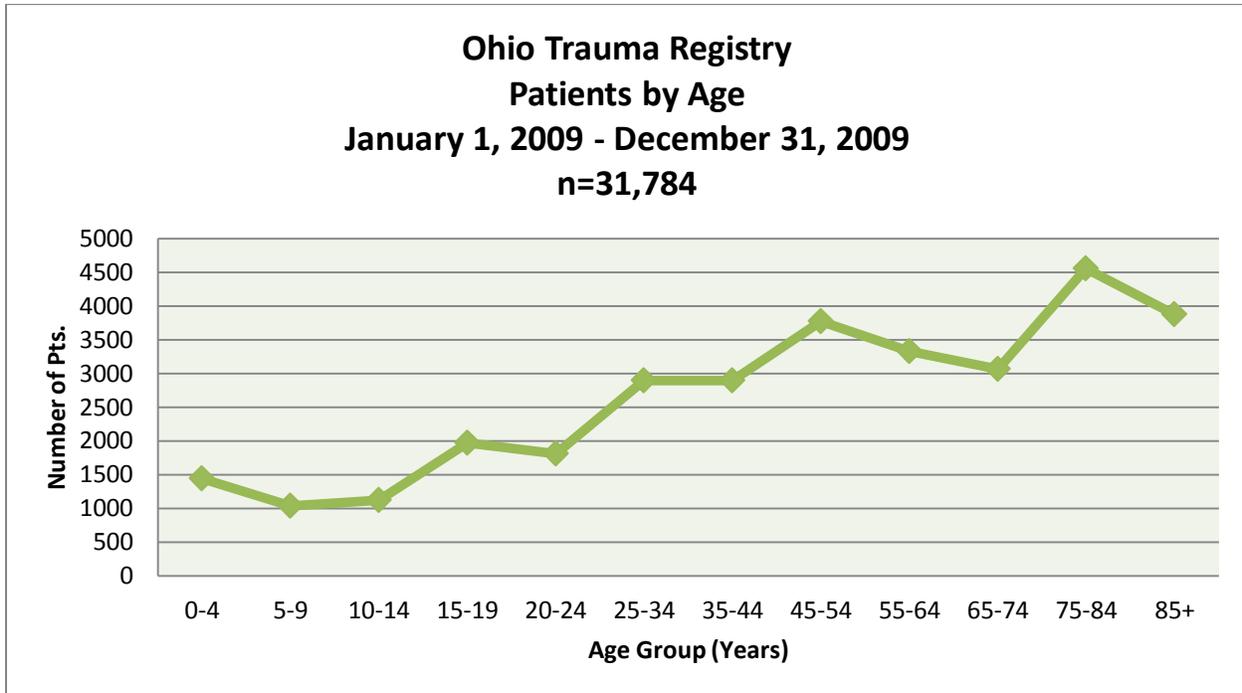
2009		
Month	# of Patients	% of Patients
January	2,534	8.0%
February	2,343	7.4%
March	2,385	7.5%
April	2,549	8.0%
May	2,875	9.0%
June	2,628	8.3%
July	3,052	9.6%
August	2,999	9.4%
September	2,637	8.3%
October	2,800	8.8%
November	2,522	7.9%
December	2,467	7.8%
Total	31,791	100%

### Patients by Month:

The month listed in this chart reflects the month that the patient arrived at the hospital and not necessarily the month during which the injury occurred. The number of patients admitted to the hospital in 2009 peaked in July and was lowest in February. The number of patients was calculated by subtracting the number of records with the following two classifications from the total number of records submitted:

1. "ED Disposition" equal to "Transfer to another Ohio hospital" or "Transfer to an out-of-state hospital"
2. "Discharge Disposition" equal to "Transfer to another Ohio hospital" or "Transfer to an out-of-state hospital"

## Patients by Age: 2009



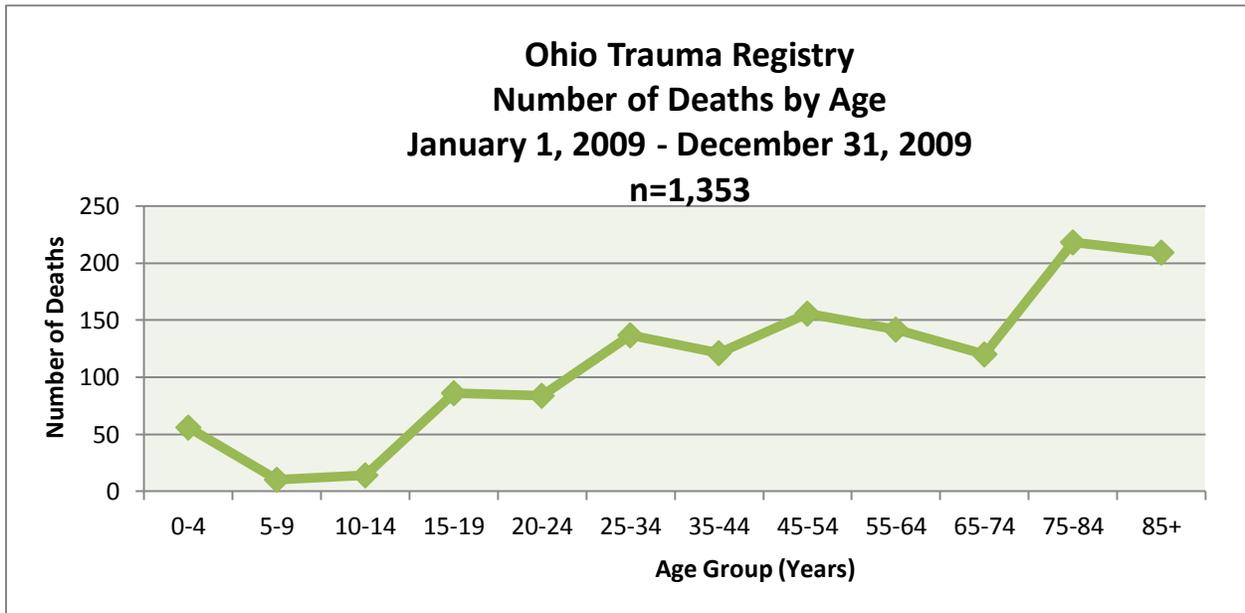
*\*7 patients were excluded due to lack of calculable age*

2009		
Age Range	# of Patients	% of All Patients
0-4	1,445	4.6%
5-9	1,038	3.3%
10-14	1,124	3.5%
15-19	1,973	6.2%
20-24	1,809	5.7%
25-34	2,897	9.1%
35-44	2,894	9.1%
45-54	3,773	11.9%
55-64	3,326	10.5%
65-74	3,068	9.7%
75-84	4,557	14.3%
85+	3,880	12.2%
Unknown	7	0.02%
<b>Total</b>	<b>31,791</b>	<b>100%</b>

### Number of Patients by Age

The 75-84 year old age group, which included 4,557 patients (14.3%), had the most patients reported. As a group, pediatric patients, 0-15 years of age, accounted for 3,927 (12.4%) of the overall patients reported.

## Number of Deaths by Age: 2009



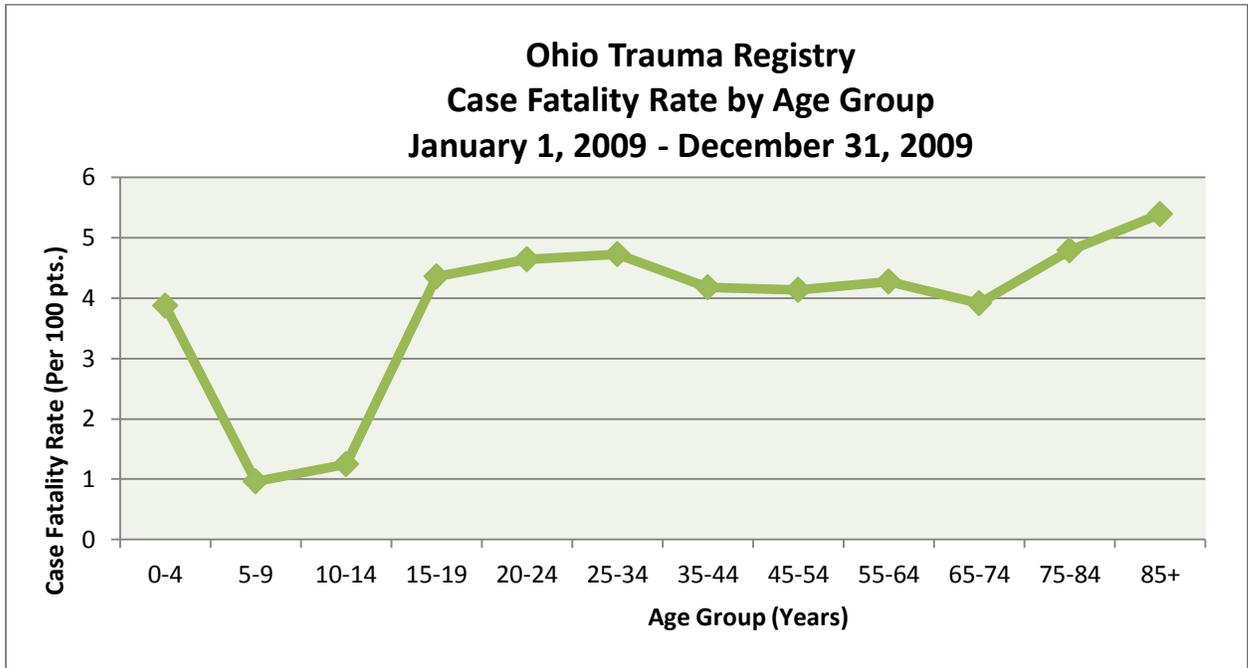
*\*7 patients were excluded due to lack of a calculable age*

2009		
Age Group (Years)	# of Deaths	Total # Patients
0-4	56	1,445
5-9	10	1,038
10-14	14	1,124
15-19	86	1,973
20-24	84	1,809
25-34	137	2,897
35-44	121	2,894
45-54	156	3,773
55-64	142	3,326
65-74	120	3,068
75-84	218	4,557
85+	209	3,880
Unknown	3	7
Total	1,356	31,791

### Deaths by Age

More patients (218) died in the 75-84 year old age group than in any other group. This represents 16.08% of all deaths reported. It should be noted that this data reflects deaths occurring in the hospital setting (ED or inpatient). Trauma patients that die at the scene of an injury or following discharge from the hospital are not included in this report.

## Case Fatality Rate by Age: 2009



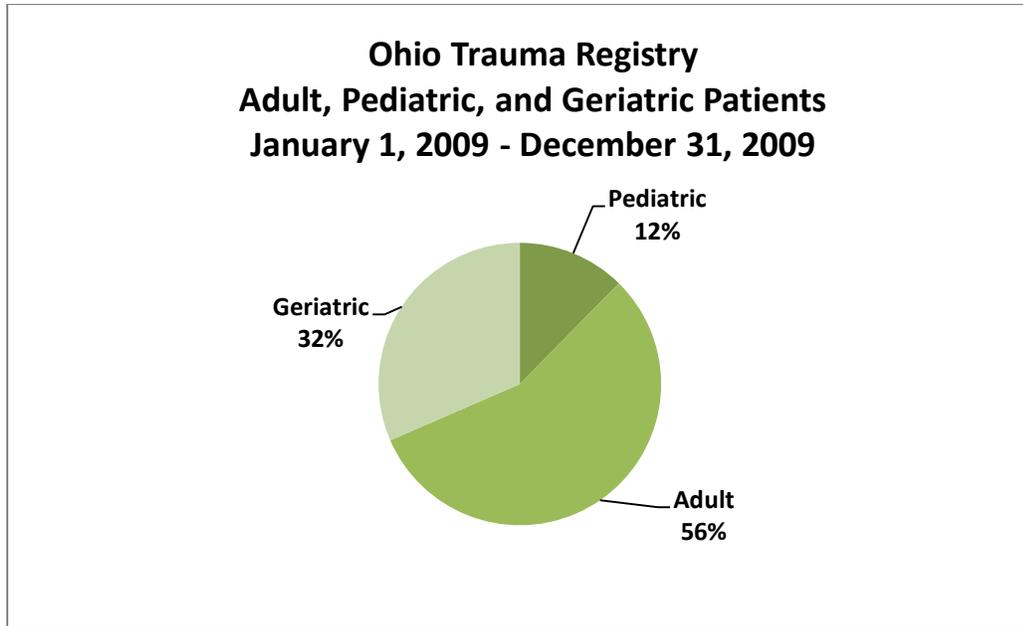
*\*7 patients were excluded due to lack of a calculable age*

2009			
Age Group (Years)	# of Deaths	Total # Patients	Case Fatality Rate
0-4	56	1,445	3.9
5-9	10	1,038	1.0
10-14	14	1,124	1.2
15-19	86	1,973	4.4
20-24	84	1,809	4.6
25-34	137	2,897	4.7
35-44	121	2,894	4.2
45-54	156	3,773	4.1
55-64	142	3,326	4.3
65-74	120	3,068	3.9
75-84	218	4,557	4.8
85+	209	3,880	5.4
Unknown	3	7	42.9
Total	1,356	31,791	4.3

### **Case Fatality Rate:**

The case fatality rate is calculated as the number of deaths in each age group divided by the total number of patients in each age group, and then multiplied by 100. The case fatality rate represents the number of deaths for every 100 patients. The 5-9 year old age group had the lowest case fatality rate (1.0) while the 85 year and older age group had the highest case fatality rate (5.4).

## Adult, Pediatric, and Geriatric Count: 2009



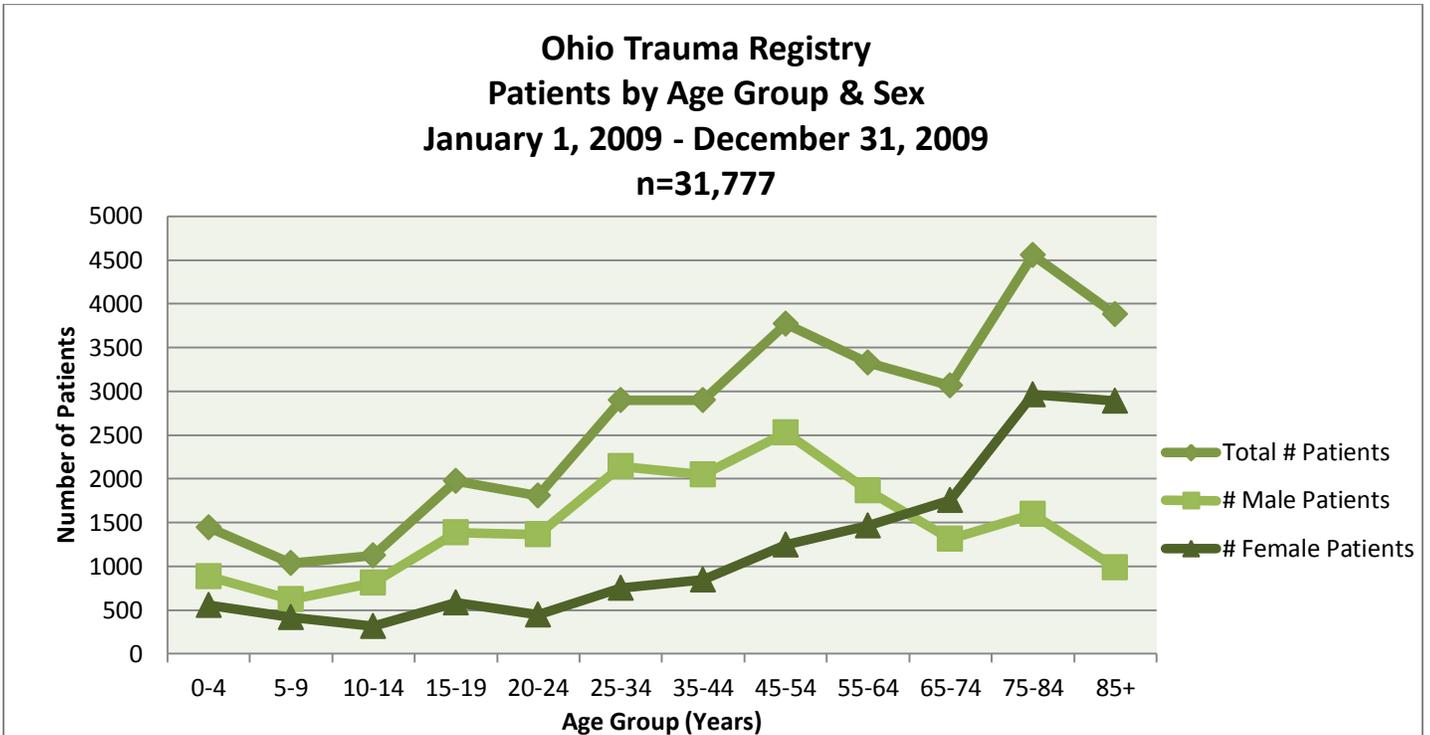
*\*7 patients were excluded due to lack of a calculable age*

2009		
Age Group	# of Patients	% of Patients
Pediatric	3,927	12.4%
Adult	17,835	56.1%
Geriatric	10,022	31.5%
Unknown	7	0.02%
Total	31,791	100%

### **Adult vs Pediatric vs Geriatric Patients**

The Ohio Revised Code has established that pediatric trauma patients are those age 15 or younger and that geriatric patients are those age 70 and older. Trauma patients age 16-69 are considered adults. In 2009, 12.4% of the patients reported were age 15 or younger and 31.5% were age 70 and older.

## Patients by Age & Sex: 2009



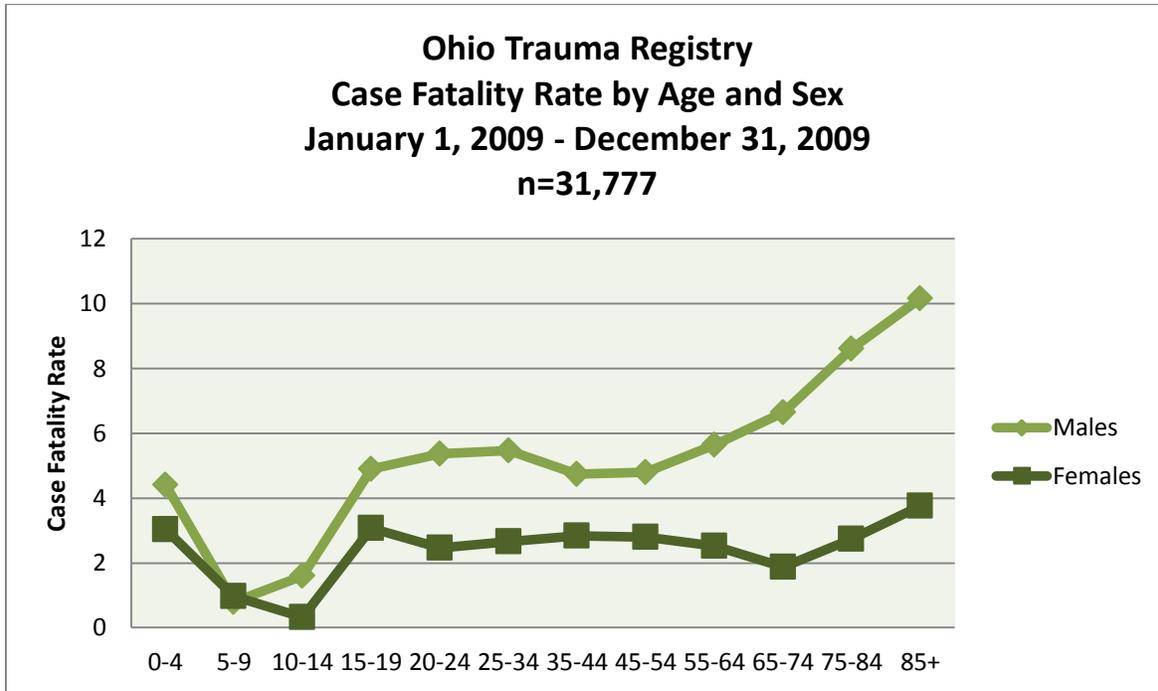
*\*14 patients were excluded due to unknown age and/or sex*

2009						
Age Group (Years)	# of Male Patients	# of Female Patients	% of Age Group Male	% of Age Group Female	Sex Unknown	Total # of Patients
0-4	886	559	61%	39%	0	1,445
5-9	622	415	60%	40%	1	1,038
10-14	810	314	72%	28%	0	1,124
15-19	1,386	587	70%	30%	0	1,973
20-24	1,362	447	75%	25%	0	1,809
25-34	2,143	754	74%	26%	0	2,897
35-44	2,049	844	71%	29%	1	2,894
45-54	2,524	1,249	67%	33%	0	3,773
55-64	1,862	1,464	56%	44%	0	3,326
65-74	1,310	1,757	43%	57%	1	3,068
75-84	1,592	2,963	35%	65%	2	4,557
85+	985	2,893	25%	75%	2	3,880
Unknown	7	0	100%	0%	0	7
<b>Total</b>	<b>17,538</b>	<b>14,246</b>	<b>55%</b>	<b>45%</b>	<b>7</b>	<b>31,791</b>

### Patients by Age and Sex

Overall, 55.2% of the patients reported were male, while 44.8% were female. Males accounted for more than 50% of the patients reported up until age 65. At ages greater than 65, females accounted for the majority of the patient population.

## Case Fatality Rate by Age and Sex: 2009



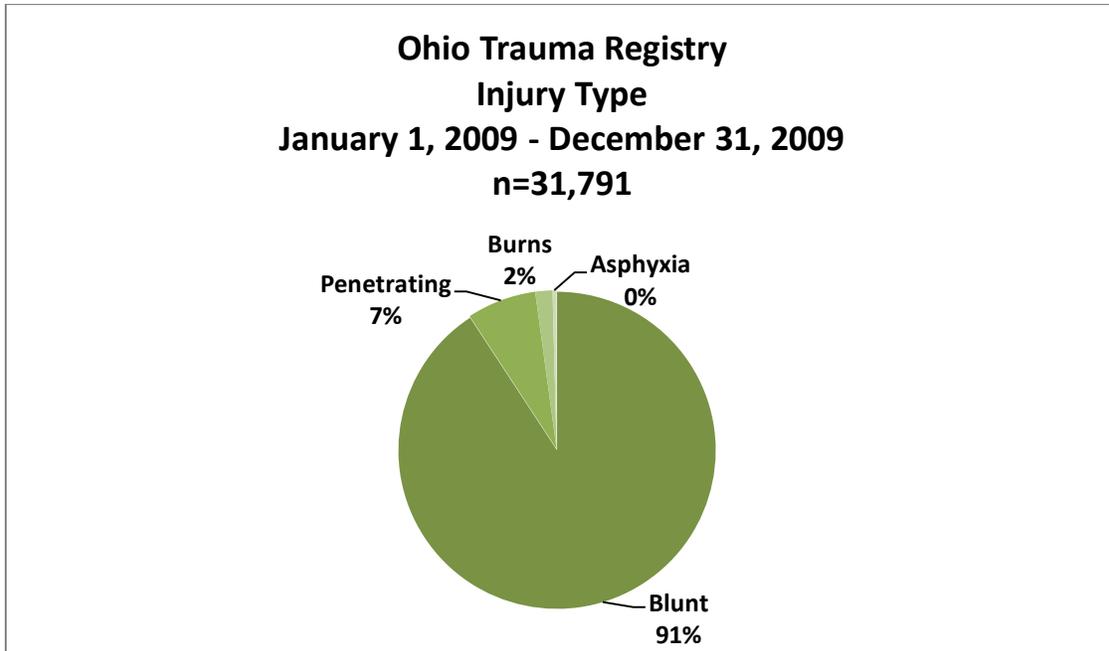
\*14 patients were excluded due to unknown age and/or sex

2009											
Age	Males			Females			Unknown Sex		Total		
	Lived	Died	Case Fatality Rate	Lived	Died	Case Fatality Rate	Lived	Died	Lived	Died	Case Fatality Rate
0-4	847	39	4.4	542	17	3.0	0	0	1,389	56	3.9
5-9	617	5	0.8	411	4	1.0	0	1	1,028	10	1.0
10-14	797	13	1.6	313	1	0.3	0	0	1,110	14	1.2
15-19	1,318	68	4.9	569	18	3.1	0	0	1,887	86	4.4
20-24	1,289	73	5.4	436	11	2.5	0	0	1,725	84	4.6
25-34	2,026	117	5.5	734	20	2.7	0	0	2,760	137	4.7
35-44	1,952	97	4.7	820	24	2.8	1	0	2,773	121	4.2
45-54	2,403	121	4.8	1,214	35	2.8	0	0	3,617	156	4.1
55-64	1,757	105	5.6	1,427	37	2.5	0	0	3,184	142	4.3
65-74	1,223	87	6.6	1,724	33	1.9	1	0	2,948	120	3.9
75-84	1,455	137	8.6	2,882	81	2.7	2	0	4,339	218	4.8
85+	885	100	10.2	2,784	109	3.8	2	0	3,671	209	5.4
Unknown	4	3	42.9	0	0	0	0	0	4	3	42.9
Total	16,573	965	5.5	13,856	390	2.7	6	1	30,435	1,356	4.3

### Case Fatality Rate:

After age 5-9, males tend to have a higher case fatality rate, which increases sharply starting at age 45. Women tend to have a lower case fatality rate which remains static until age 65, after which it increases sharply. The case fatality rate presented is a crude rate and does not adjust for any other factors such as injury severity or type.

## Injury Type: 2009

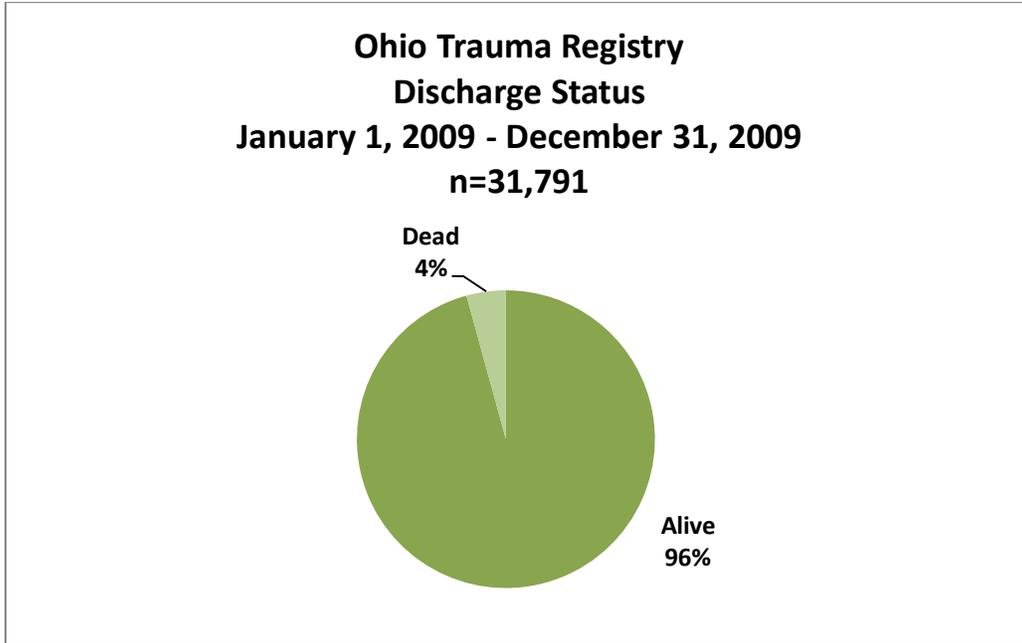


2009		
Injury Type	# of Patients	% of Patients
Blunt	28,856	90.8%
Penetrating	2,249	7.1%
Burns	556	1.7%
Asphyxia	130	0.41%
Total	31,791	100%

### Injury Type

Blunt injuries accounted for the vast majority of injuries reported to the OTR in 2009 (90.8%), while penetrating injuries only accounted for 7.1% of all injuries and burns accounted for an additional 1.7%.

## Patient Outcome: 2009

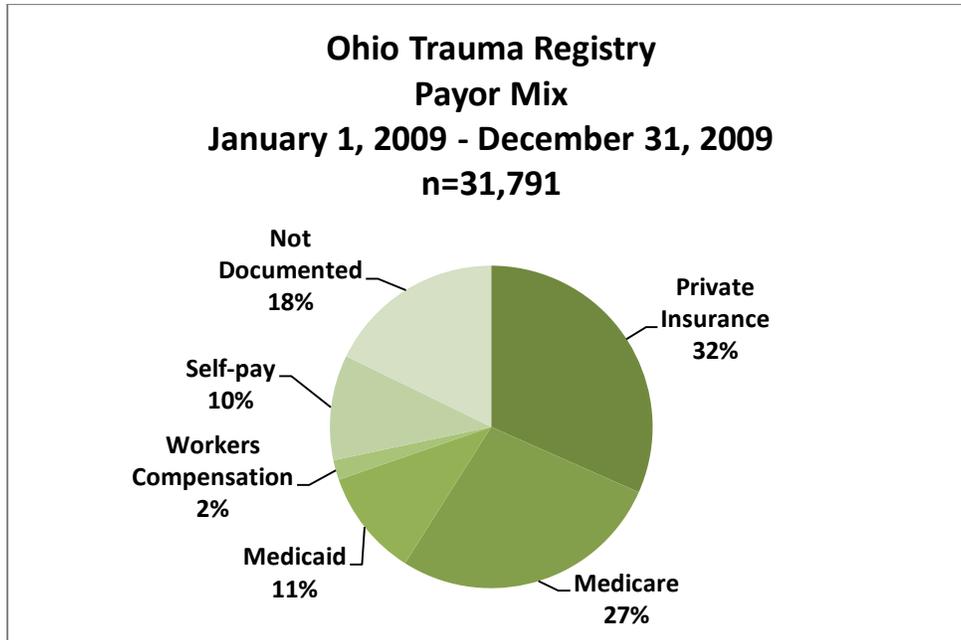


2009		
Discharge Status	# of Patients	% of Patients
Alive	30,435	95.7%
Dead	1,356	4.3%
Total	31,791	100%

### Outcome

In 2009, 4.3% of the patients reported to the OTR died. Please note that these data only reflect patients treated in the hospital; deaths occurring outside a medical facility are not included in this analysis.

## Payment Source: 2009

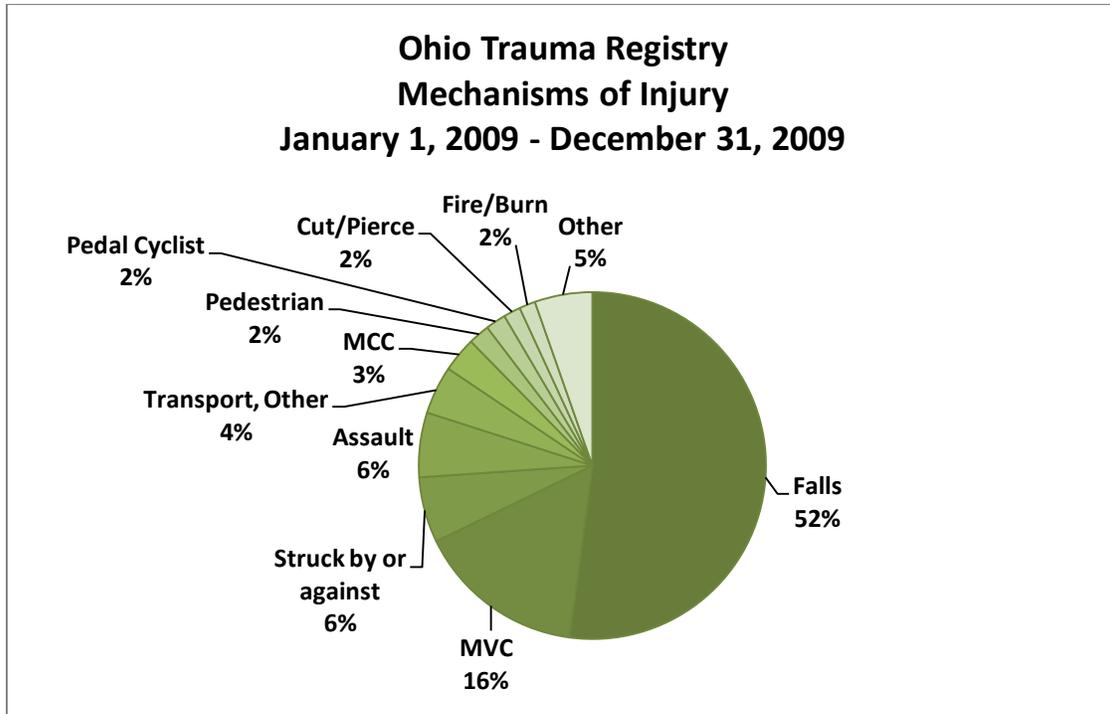


2009		
Payment Source	# of Patients	% of Patients
Private Insurance	10,059	31.6%
Medicare	8,688	27.3%
Medicaid	3,408	10.7%
Workers Compensation	631	2.0%
Self-pay	3,353	10.6%
Not Documented	5,652	17.8%
Total	31,791	100%

### Payor Mix

Payor mix is reported as the primary source of payment documented during the patient's hospitalization. It can give a rough estimate of how trauma care is reimbursed, but it does not reflect the final source of revenue to the hospital, as this is sometimes not known for many months post-discharge. Of the total number of records reported to the OTR, 31.6% had commercial insurance coverage. In terms of anticipated reimbursement, 40% of the hospitals expected payment from Medicare, Medicaid, or Worker's Compensation, with the vast majority of these reported as Medicare.

## Mechanisms of Injury: 2009

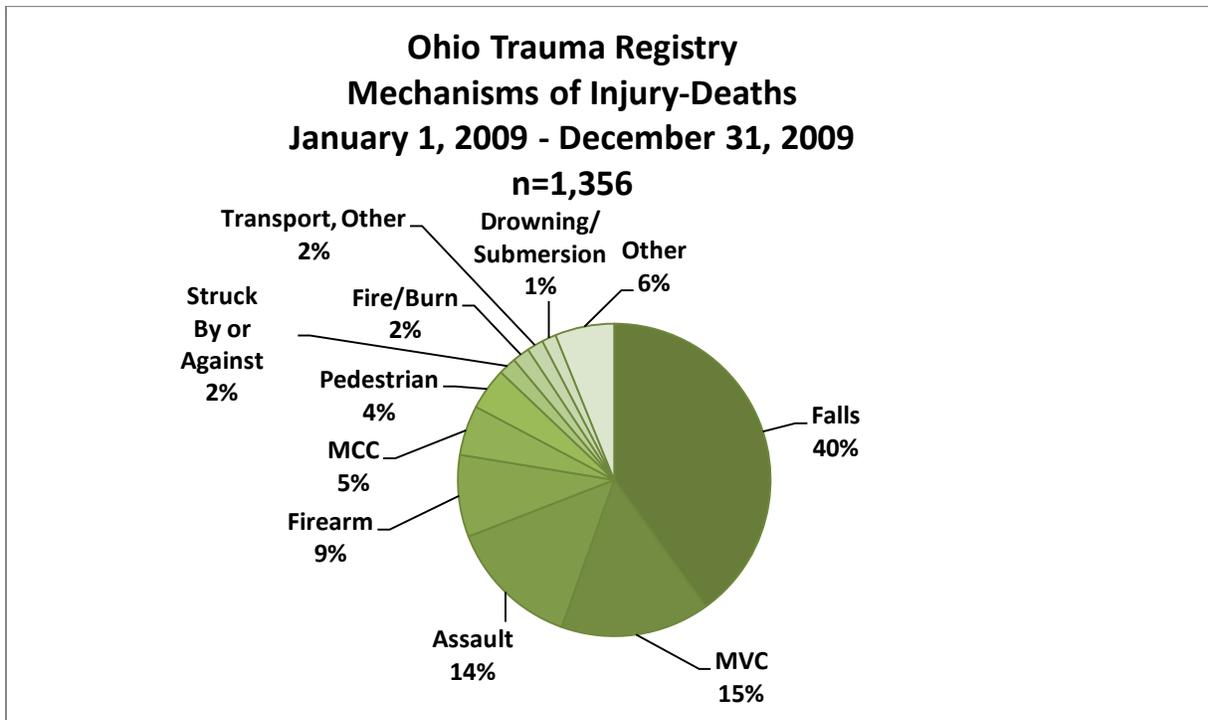


2009		
Mechanism of Injury	# of Patients	% of Patients
Falls	16,569	52.1%
MVC	4,988	15.7%
Struck by or against	1,941	6.1%
Assault	1,917	6.0%
Transport, Other	1,426	4.5%
MCC	1,032	3.2%
Pedestrian	627	2.0%
Pedal Cyclist	602	1.9%
Cut/Pierce	504	1.6%
Fire/Burn	477	1.5%
Other	1,708	5.4%
Total	31,791	100%

### Mechanism of Injury

Of the patient records submitted, 52% of all patients suffered injury due to a fall and 16% were injured as a result of a motor vehicle collision. In this graph, the mechanism of injury is reported as the External Cause of Injury code or E-code. The Centers for Disease Control and Prevention place E-codes into groupings reflective of similar causes of injury. More information about E-codes and E-code groupings can be found in Appendix C. The “Other” category consists of a large number of E-codes, including such things as injuries sustained on a train and boating injuries.

## Mechanisms of Injury for Deaths: 2009

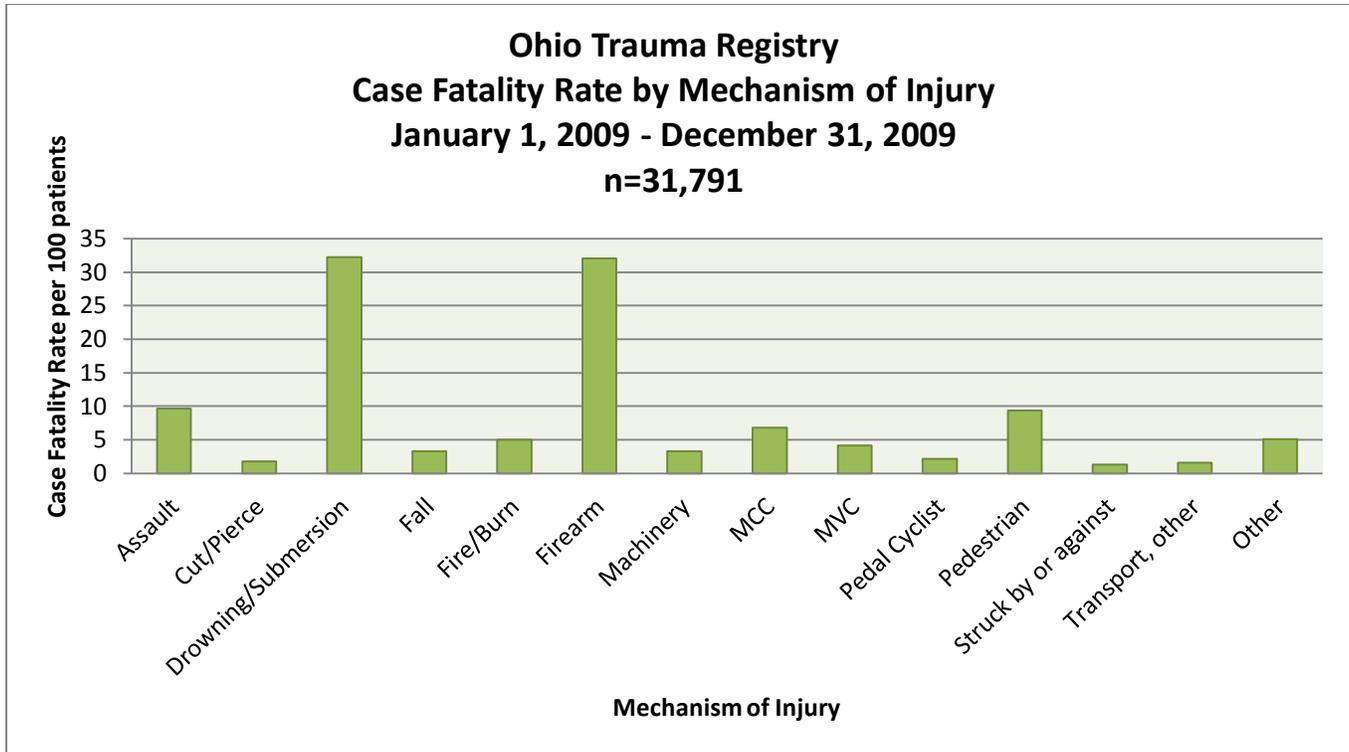


2009		
Top 10 Mechanisms of Injury-Deaths	# of Patients	% of Patients
Falls	543	40.0%
MVC	209	15.4%
Assault	185	13.6%
Firearm	115	8.5%
MCC	70	5.2%
Pedestrian	59	4.4%
Struck By or Against	25	1.8%
Fire/Burn	24	1.8%
Transport, Other	23	1.7%
Drowning/Submersion	20	1.5%
Other	83	6.1%
Total	1,356	100%

### Deaths by Mechanism of Injury

Analysis of the patients who died in the hospital in 2009 shows that falls were responsible for 40.0% of in-hospital mortality. Motor vehicle collisions were responsible for 15.4% of in-hospital deaths, and 13.6% of in-hospital mortality was due to assault. It is important to recognize that patients who die at the scene are not reported by the hospitals. These data reflect only patients who died in the hospital.

## Case Fatality Rate by Mechanism of Injury: 2009

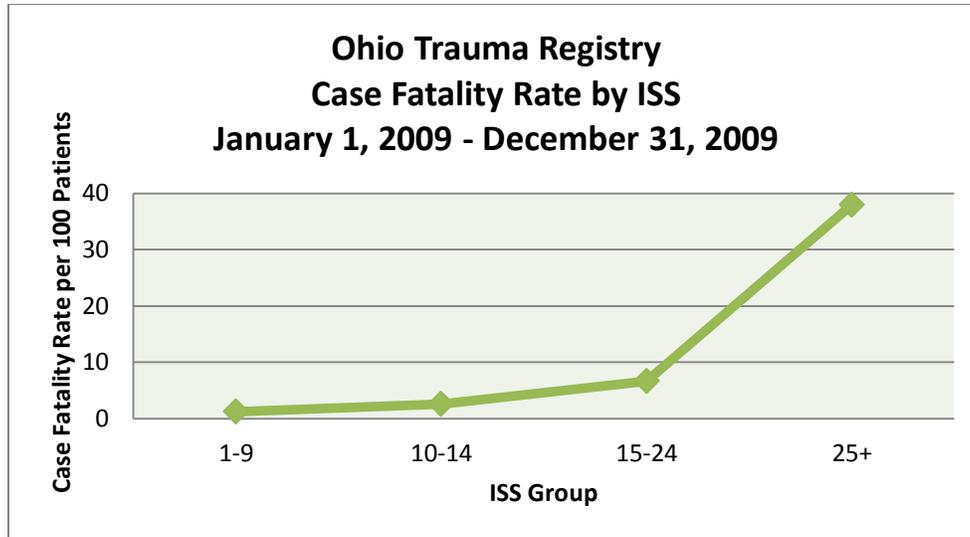


2009				
Mechanism of Injury	Lived	Died	Total	Case Fatality Rate
Assault	1,732	185	1,917	9.7
Cut/Pierce	495	9	504	1.8
Drowning/Submersion	42	20	62	32.3
Fall	16,026	543	16,569	3.3
Fire/Burn	453	24	477	5.0
Firearm	244	115	359	32.0
Machinery	233	8	241	3.3
MCC	962	70	1,032	6.8
MVC	4,779	209	4,988	4.2
Pedal Cyclist	589	13	602	2.2
Pedestrian	568	59	627	9.4
Struck by or against	1,916	25	1,941	1.3
Transport, other	1,403	23	1,426	1.6
Other	993	53	1,045	5.1
Total	30,435	1,356	31,791	4.3

### **Case Fatality Rate:**

Firearm injuries and injuries due to drowning/submersion had the highest case fatality rates (32.0 per 100 patients and 32.3 per 100 patients respectively). Assault and pedestrian injuries had the next highest case fatality rates (9.7 per 100 patients and 9.4 per 100 patients respectively).

## Case Fatality Rate by Injury Severity Score: 2009



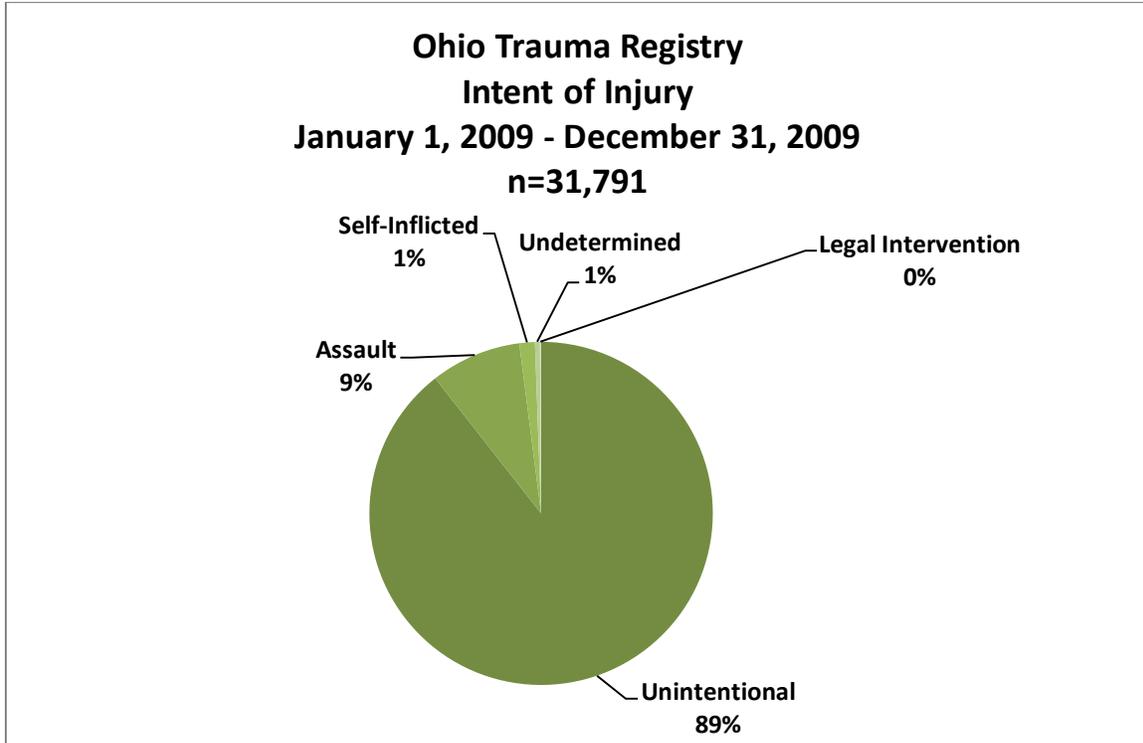
*\*1865 patients without a reported ISS were excluded*

2009				
ISS	Lived	Died	Total	Case Fatality Rate
1-9	20,565	250	20,815	1.2
10-14	4,198	109	4,307	2.5
15-24	2,629	188	2,817	6.7
25+	1,233	754	1,987	37.9
Unknown	1,810	55	1,865	2.9
Total	30,435	1,356	31,791	4.3

### **Case Fatality Rate by Injury Severity Score:**

This graph primarily reflects patients treated at a trauma center because non-trauma center facilities generally do not report an ISS. As expected, the case fatality rate increases as the severity of the injury increases.

## Intent of Injury: 2009

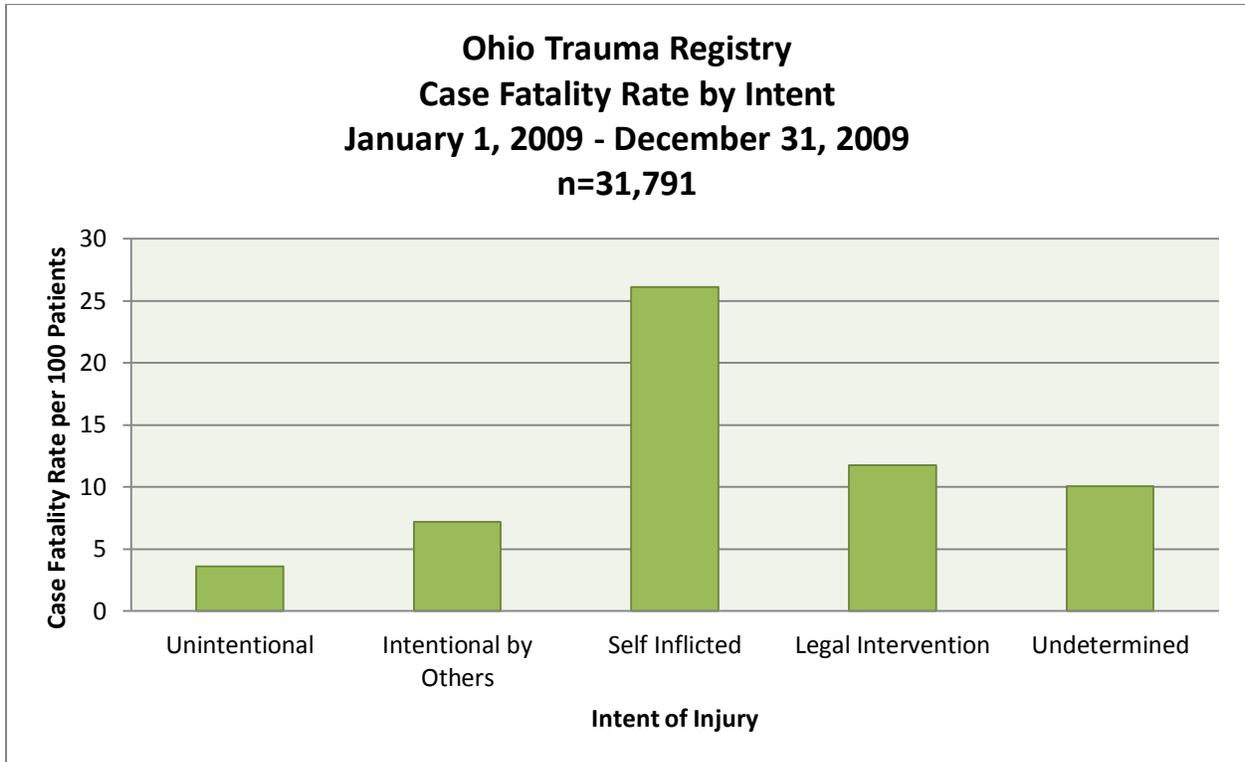


2009		
Intent	# of Patients	% of Patients
Unintentional	28,428	89.4%
Assault	2,717	8.6%
Self-Inflicted	463	1.5%
Undetermined	149	0.5%
Legal Intervention	34	0.1%
Total	31,791	100.00%

### Intent of Injury

The intent by which the injury was sustained is derived from the ICD-9-CM *External Cause of Injury Codes* (E-codes) (see Appendix C). Within the total number of patients reported to the OTR in 2009, 89.4% were injured unintentionally.

## Case Fatality Rate by Intent of Injury: 2009

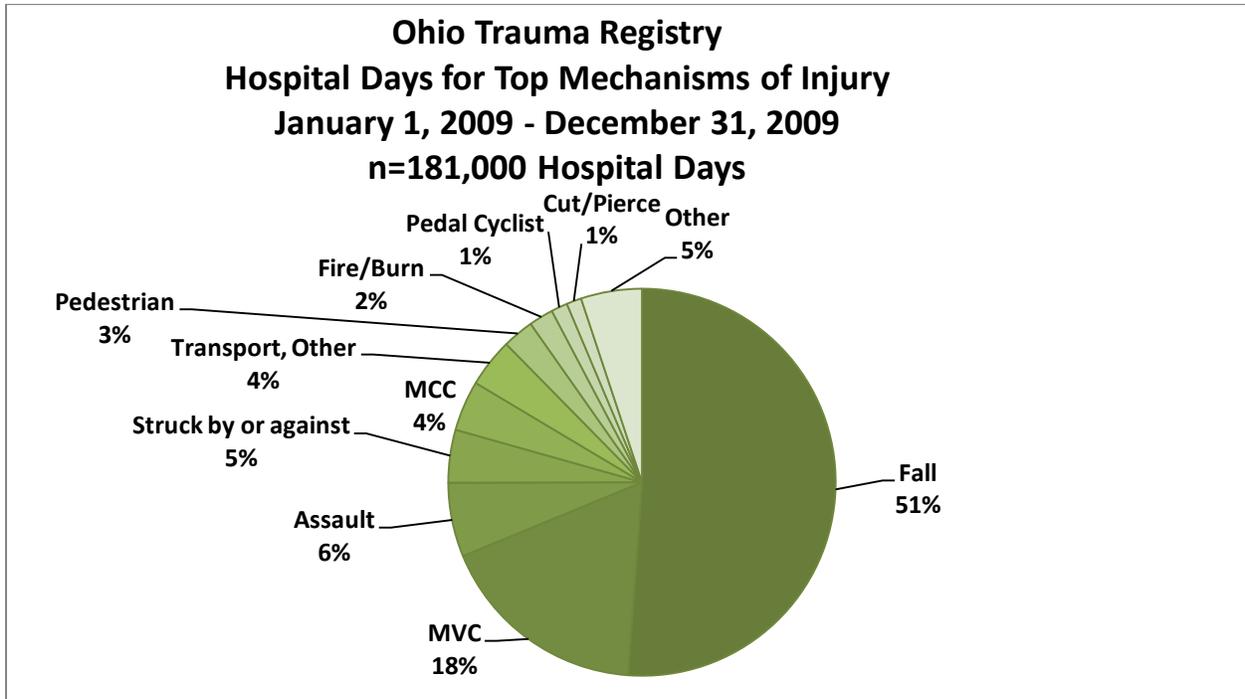


2009				
Intent	Lived	Died	Total	Case Fatality Rate
Unintentional	27,408	1,020	28,428	3.6
Intentional by Others	2,521	196	2,717	7.2
Self-Inflicted	342	121	463	26.1
Legal Intervention	30	4	34	11.8
Undetermined	134	15	149	10.1
Total	30,435	1,356	31,791	4.3

### **Case Fatality Rate by Intent of Injury:**

Self-inflicted injuries had the highest case fatality rate (26.1 per 100 patients) while unintentional injuries had the lowest case fatality rate (3.6 per 100 patients).

## Hospital Days by Mechanism of Injury: 2009

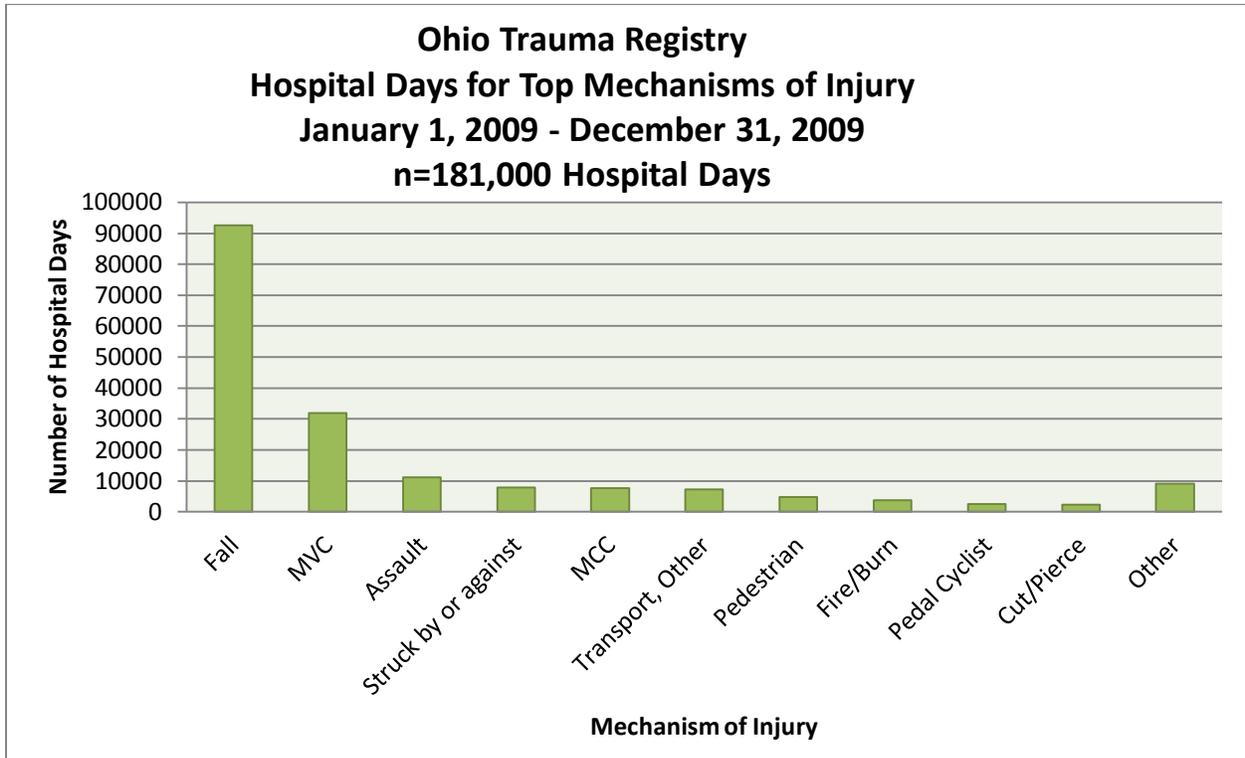


2009		
Mechanism of Injury	# of Hospital Days	% of Total Hospital Days
Fall	92,592	51.2%
MVC	31,895	17.6%
Assault	11,190	6.2%
Struck by or against	7,991	4.4%
MCC	7,597	4.2%
Transport, Other	7,369	4.1%
Pedestrian	4,726	2.6%
Fire/Burn	3,694	2.0%
Pedal Cyclist	2,471	1.4%
Cut/Pierce	2,256	1.2%
Other	9,219	5.1%
Total	181,000	100%

### Hospital Days by Mechanism of Injury

The total number of hospital days reported for patients in 2009 was 181,000. Falls accounted for 51.2% of hospital days reported to the OTR and motor vehicle collisions accounted for 17.6%. There were 9,219 hospital days attributed to patient records that were coded with a variety of other Mechanism of Injury codes, which are aggregated here as “Other”.

## Hospital Days by Mechanism of Injury: 2009

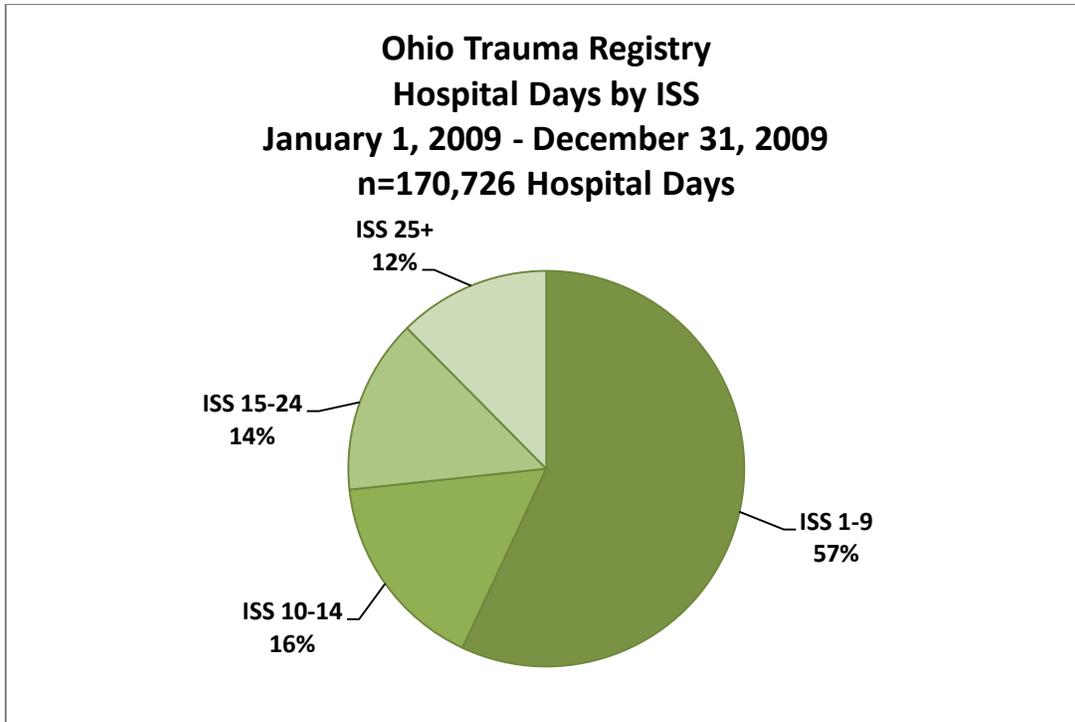


2009		
Mechanism of Injury	# of Hospital Days	% of Total Hospital Days
Fall	92,592	51.2%
MVC	31,895	17.6%
Assault	11,190	6.2%
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Fire/Burn	3,694	2.0%
Pedal Cyclist	2,471	1.4%
Cut/Pierce	2,256	1.2%
Other	9,219	5.1%
Total	181,000	100%

### **Hospital Days by Mechanism of Injury:**

Falls accounted for the highest percentage of hospital days (51.2%), while motor vehicle collisions accounted for the second highest percentage of hospital days (17.6%).

## Hospital Days by Injury Severity Score: 2009



*\*1865 patients without a reported ISS were excluded*

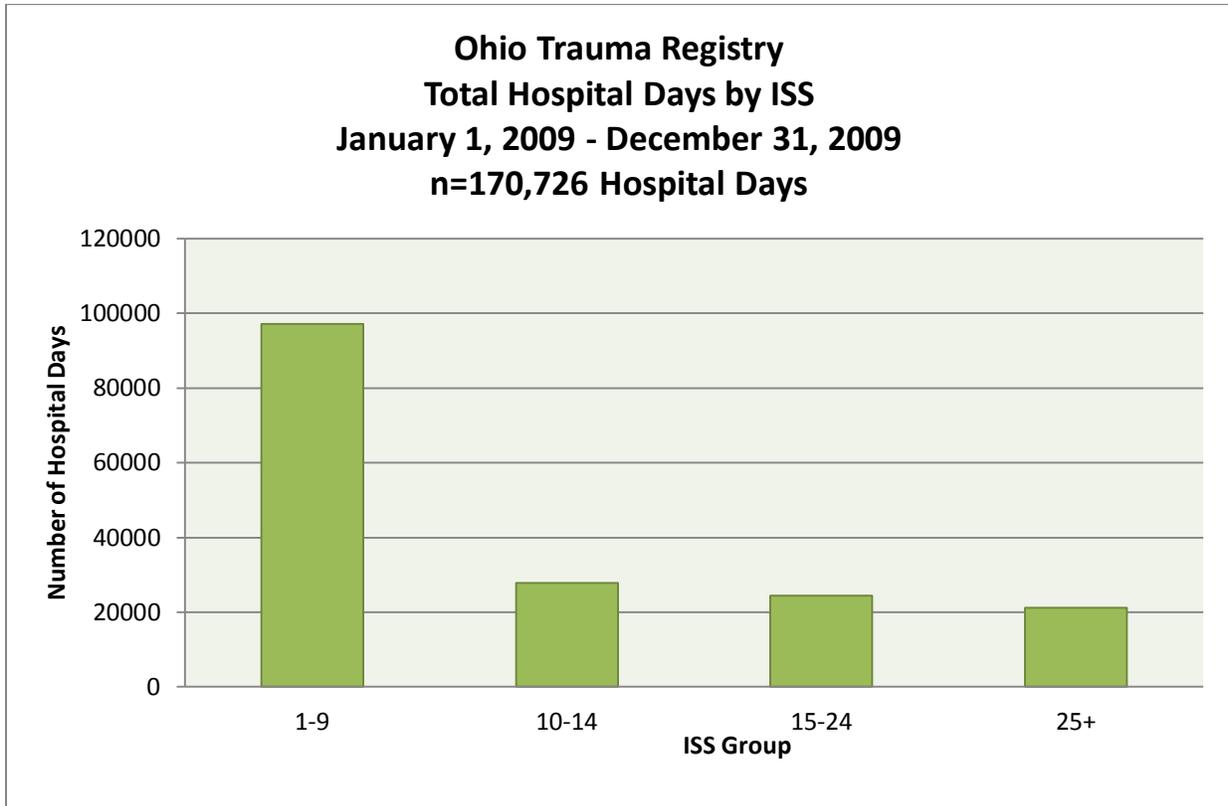
*\*Percentages do not add up to 100% due to rounding*

2009		
ISS	Hospital Days	% of Total Hospital Days
1-9	97,249	57.0%
10-14	27,912	16.3%
15-24	24,373	14.3%
25+	21,192	12.4%
Total	170,726	100%

### **Hospital Days by Injury Severity Score:**

Minor injuries accounted for the majority of all hospital days. As the ISS increased, the proportion of total hospital days decreased. There were 1,865 patients for whom an ISS was not recorded, and this accounted for 10,274 hospital days.

## Total Hospital Days by Injury Severity Score: 2009



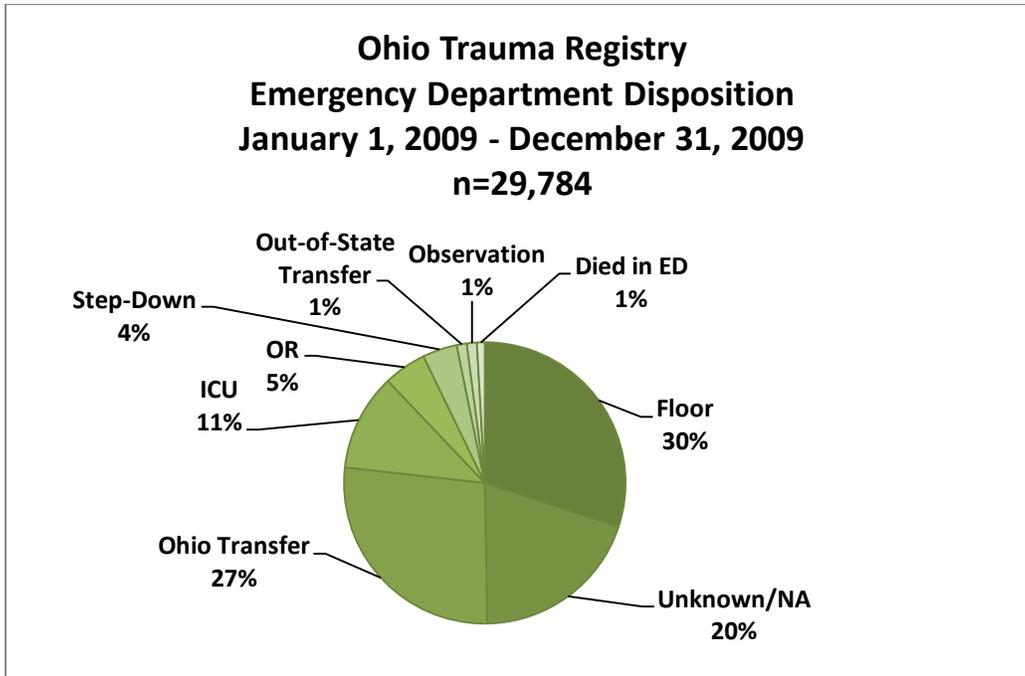
*\*1865 patients without a reported ISS were excluded*

2009	
ISS	Hospital Days
1-9	97,249
10-14	27,912
15-24	24,373
25+	21,192
Unknown	10,274
Total	181,000

### **Hospital Length of Stay by Injury Severity Score:**

Minor injuries accounted for the majority of all hospital days. As the ISS increased, the proportion of total hospital days decreased.

## Emergency Department Disposition: 2009

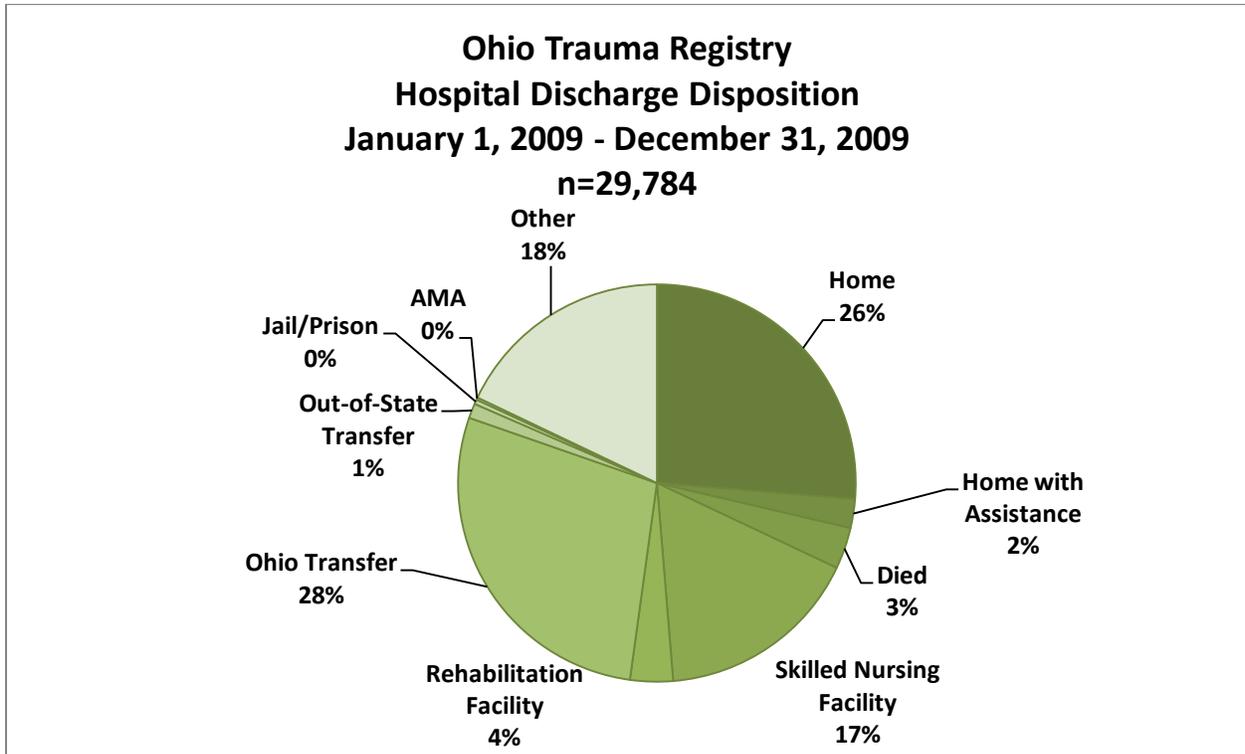


2009		
Disposition	# of Patients	% of Patients
Floor	8,961	30.1%
Unknown/NA	5,850	19.6%
Transfer to Another Ohio Hospital	8,054	27.0%
ICU	3,321	11.2%
OR	1,461	4.9%
Step-Down	1,181	4.0%
Transfer to an Out-of-State Hospital	346	1.2%
Observation	341	1.1%
Morgue/Coroner/Funeral Home	269	0.90%
Total	29,784	100%

### Emergency Department Disposition

This graph only includes data for patients who arrived directly from the scene of the injury. It shows the first patient care area to which the patient was sent after they were discharged from the emergency department in the first hospital in which they received treatment. Of the total number of patients, 30.1% were admitted to the floor (i.e. a regular medical/surgical hospital room), 16.1% were sent directly to the operating room or an intensive care unit, and 28.2% were transferred to another hospital. The OTR data reflects that 19.6% were reported as not applicable, indicating that the initial care was not in the emergency department (e.g. a direct admission).

## Hospital Discharge Disposition: 2009



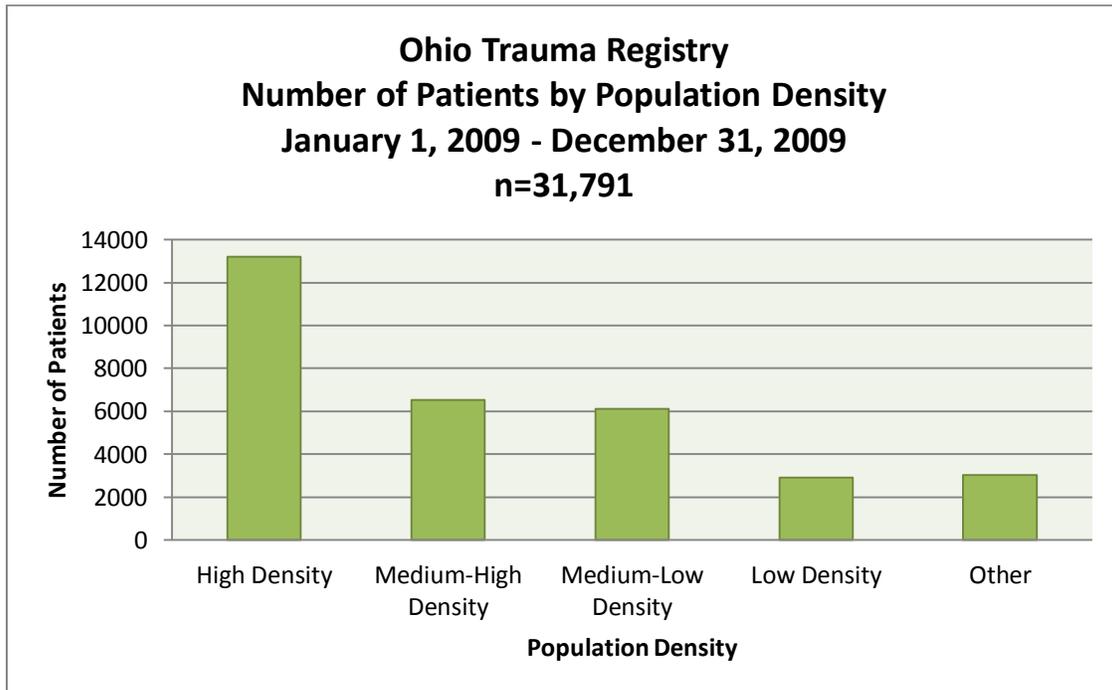
*\*Percentages do not add up to 100% due to rounding*

2009		
Disposition	# of Patients	% of Patients
Home	7,833	26.3%
Home with Assistance	699	2.3%
Died	1,005	3.4%
Skilled Nursing Facility	4,966	16.7%
Rehabilitation Facility	1,036	3.5%
Ohio Transfer	8,385	28.2%
Out-of-State Transfer	358	1.2%
Jail/Prison	111	0.4%
AMA	55	0.2%
Other	5,336	17.9%
Total	29,784	100%

### Hospital Disposition

This reflects hospital disposition from the first hospital that provided treatment to the patient. According to the OTR data, 26.3% of patients were discharged home and 29.4% of patients were transferred to another facility. This data reflects where patients were discharged after being admitted to the hospital, in contrast to the previous page, which reflected where patients were discharged from the emergency department.

## Number of Patients by Population Density: 2009



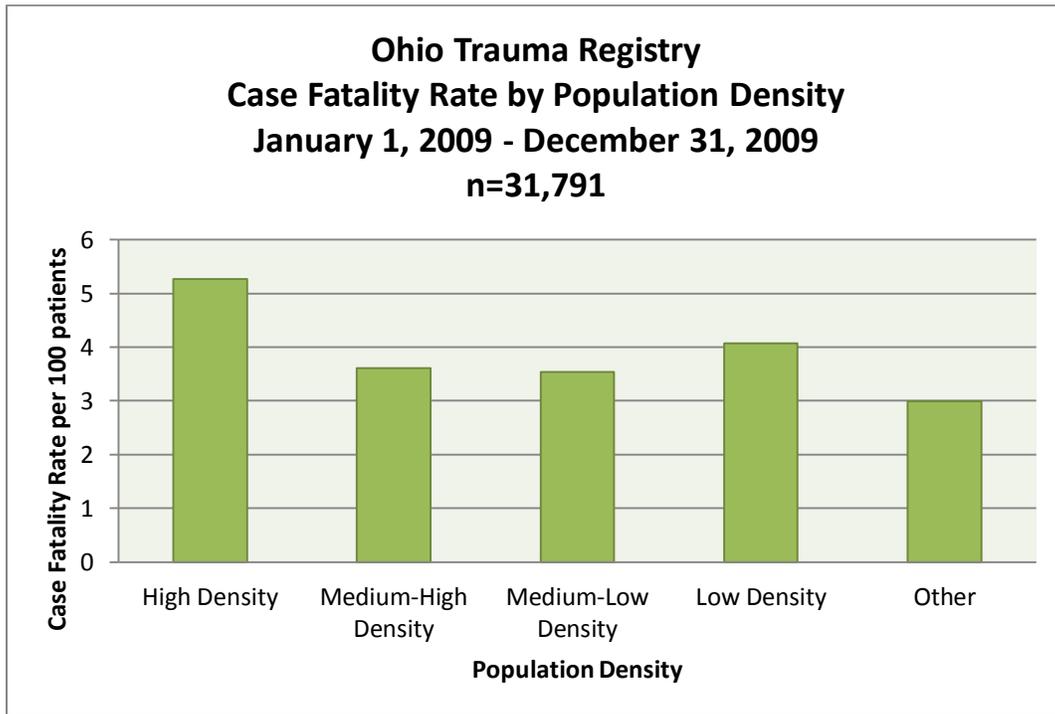
2009	
Population Density	Number of Patients
High Density	13,204
Medium-High Density	6,519
Medium-Low Density	6,130
Low Density	2,903
Other	3,035
Total	31,791

### **Patients by Population Density:**

Counties with a population density >1000 people per square mile were considered “High Density.” Counties with a population density between 300 and 999 people per square mile were considered “Medium-High Density.” Counties with a population density between 100 and 299 people per square mile were considered “Medium-Low Density.” Counties with a population density <100 people per square mile were considered “Low Density.” The “Other” category includes any records with missing county data or out-of-state county data. As expected, the majority of patients come from highly populated counties, while more sparsely populated counties contribute relatively few patients.

The list of counties by population density can be found in Appendix J.

## Case Fatality Rate by Population Density: 2009



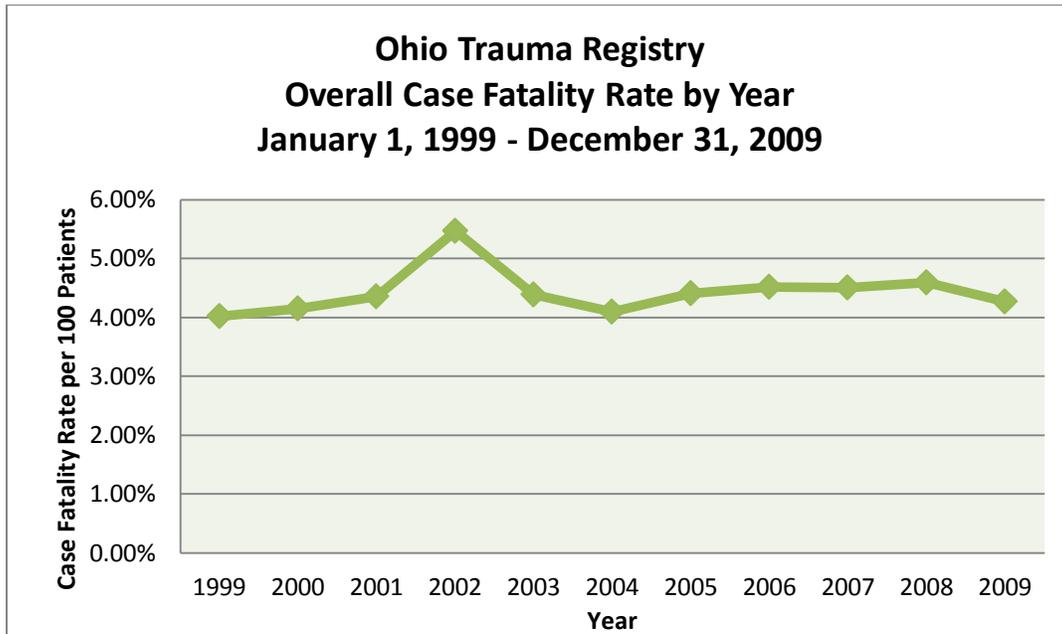
2009			
Population Density	Lived	Died	Total
High Density	12,509	695	13,204
Medium-High Density	6,284	235	6,519
Medium-Low Density	5,913	217	6,130
Low Density	2,785	118	2,903
Other	2,944	91	3,035
Total	30,435	1,356	31,791

### **Case Fatality Rate by Population Density:**

Patients coming from counties with high population density had the highest case fatality rate (5.26%). Patients coming from counties with low population density had the second highest case fatality rate (4.06%). This chart reflects crude case fatality rates and is unadjusted for severity or any other variables.

The list of counties by population density can be found in Appendix J.

## Overall Case Fatality Rate by Year: 1999-2009

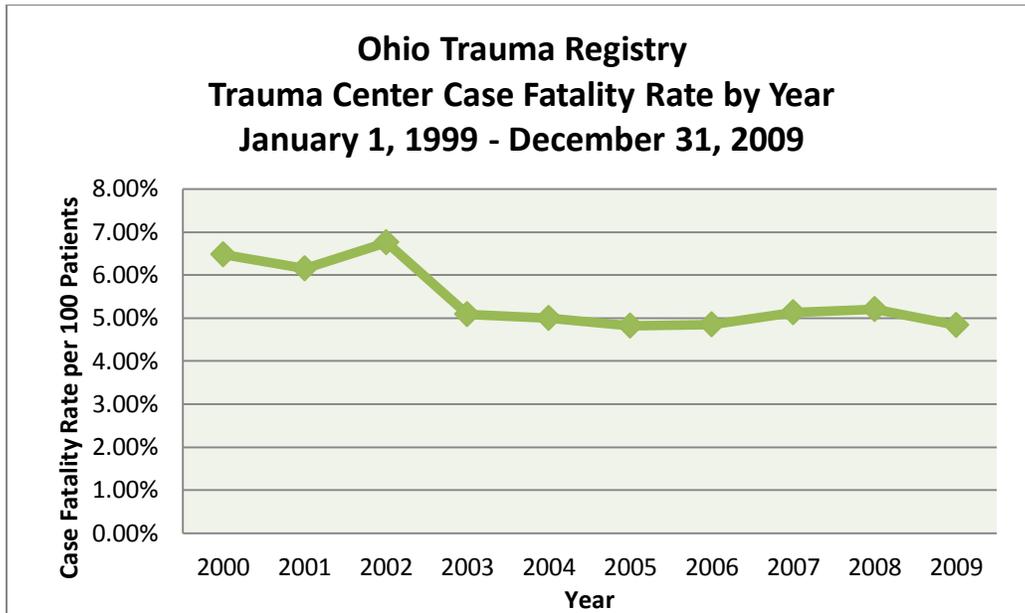


Year	Lived	Died	Total	Case Fatality Rate
1999	18,750	784	19,534	4.0
2000	19,448	842	20,290	4.1
2001	16,914	770	17,684	4.4
2002	20,860	1,207	22,067	5.5
2003	26,253	1,203	27,456	4.4
2004	26,776	1,143	27,919	4.1
2005	27,151	1,251	28,402	4.4
2006	24,245	1,148	25,393	4.5
2007	29,685	1,401	31,086	4.5
2008	30,603	1,473	32,076	4.6
2009	30,435	1,356	31,791	4.3
Total	295,095	13,597	308,692	4.4

### **Overall Case Fatality Rate by Year:**

This graph shows the overall crude case fatality rate by year for patient records contained in the OTR. With the exception of a small escalation in 2002, the case fatality rate for trauma patients in Ohio has remained relatively steady.

## Trauma Center Case Fatality Rate by Year: 2000-2009

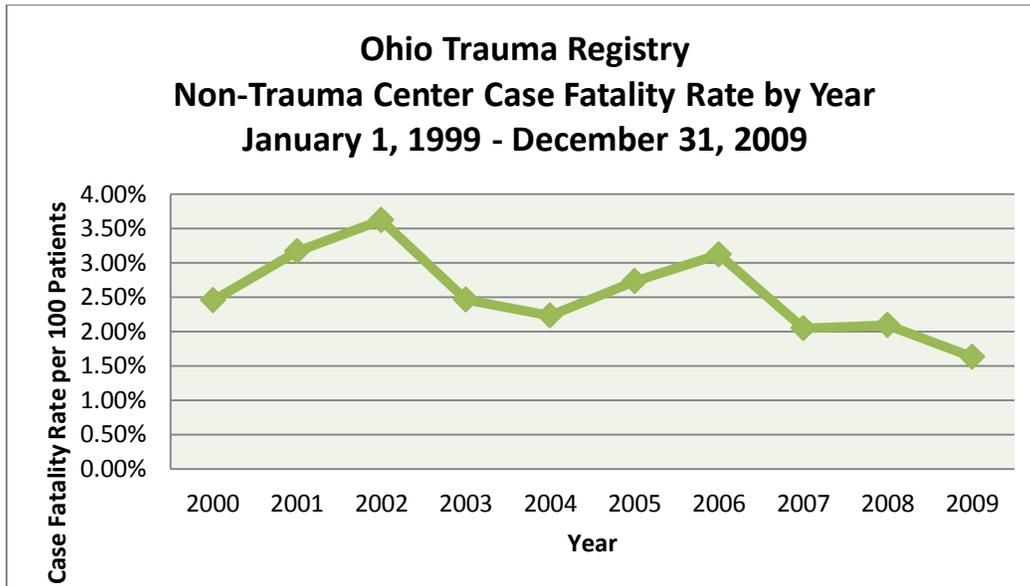


Year	Lived	Died	Total	Case Fatality Rate
2000	8,008	554	8,562	6.5
2001	6,613	433	7,046	6.1
2002	12,122	879	13,001	6.8
2003	19,071	1,022	20,093	5.1
2004	17,906	941	18,847	5.0
2005	21,597	1,095	22,692	4.8
2006	19,557	997	20,554	4.9
2007	23,592	1,274	24,866	5.1
2008	24,427	1,341	25,768	5.2
2009	24,920	1,265	26,185	4.8
Total	177,813	9,801	187,614	5.2

### Trauma Center Case Fatality Rate by Year:

This graph reflects the crude case fatality rate for all trauma patients seen at a trauma center between 2000 and 2009. The case fatality rate remained steady from 2000-2002 at slightly above 6 per 100 patients. In 2003 there was a drop to approximately 5 per 100 patients and that rate remained steady through 2009.

## Non-Trauma Center Case Fatality Rate by Year: 2000-2009



Year	Lived	Died	Total	Case Fatality Rate
2000	11,440	288	11,728	2.5
2001	10,301	337	10,638	3.2
2002	8,738	328	9,066	3.6
2003	7,182	181	7,363	2.5
2004	8,870	202	9,072	2.2
2005	5,554	156	5,710	2.7
2006	4,688	151	4,839	3.1
2007	6,093	127	6,220	2.0
2008	6,176	132	6,308	2.1
2009	5,515	91	5,606	1.6
Total	74,557	1,993	76,550	2.6

### **Non-Trauma Center Case Fatality Rate by Year:**

This graph reflects the crude case fatality rate for all trauma patients treated at a non-trauma center from 2000-2009. Over time, the mortality rate for non-trauma centers has declined from 2.5 per 100 patients in 1999 to 1.6 per 100 patients in 2009.

## Appendix A: Patient Inclusion/Exclusion Criteria

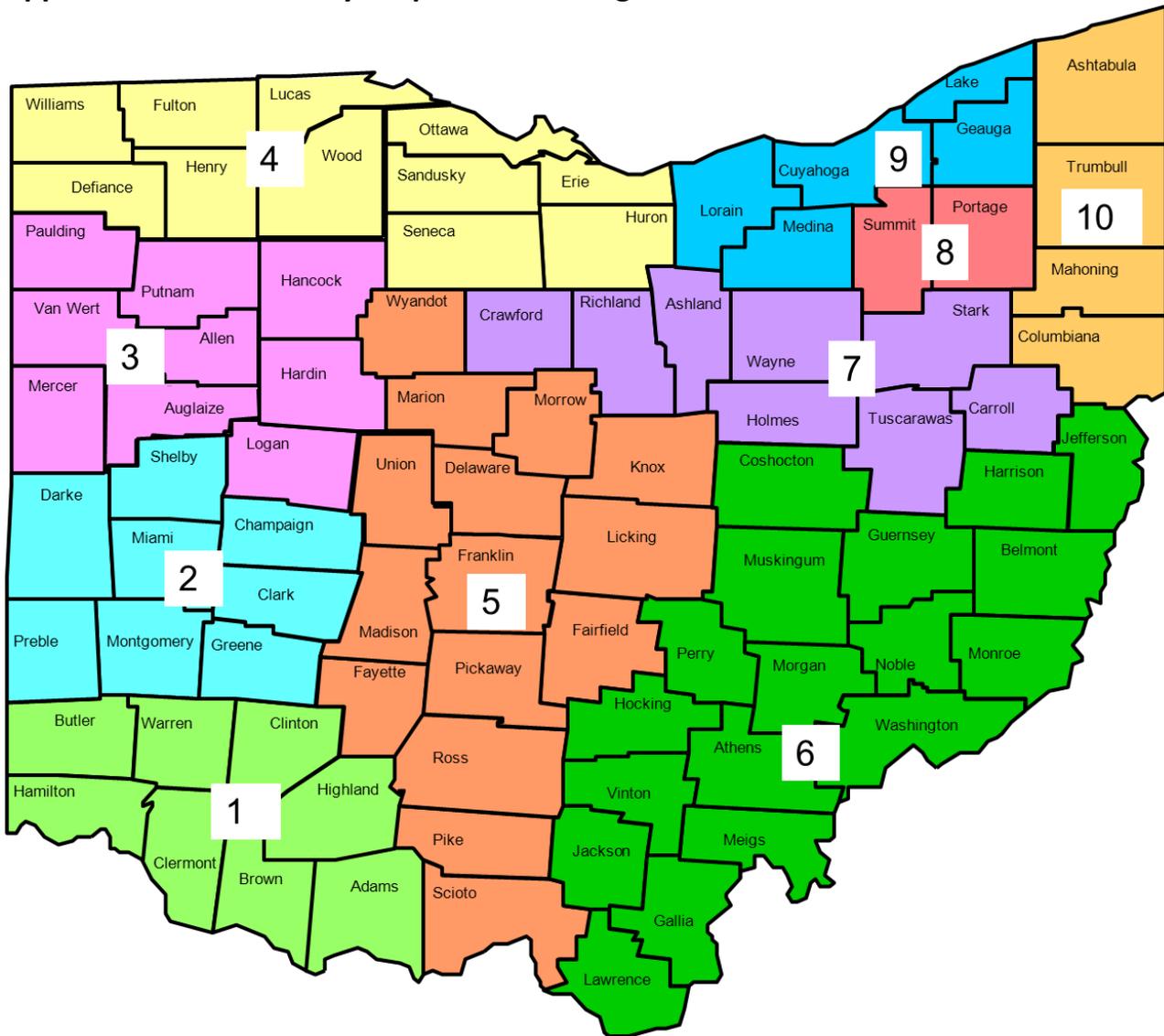
The State Board of EMS has established these criteria for inclusion of records in the OTR:

1. Patient's first or initial admission for at least 48 hours, and who meet one of the following inclusion criteria; **or**
2. Patients who transfer into or out of any hospital, regardless of their length of stay, and who meet one of the following inclusion criteria; **or**
3. Patients that arrive dead on arrival (DOA) and who meet one of the following inclusion criteria; **or**
4. Patients that die after receiving any evaluation or treatment while on hospital premises, **and** who meet one of the following inclusion criteria:

### Inclusion Criteria

ICD-9-CM Diagnosis Codes on discharge from acute care hospital			
ICD-9-CM Diagnosis Codes		ICD-9-CM Diagnoses Descriptions	
800.00 – 819.1		Fractures	
821.00 – 904.9		Fractures, dislocations/sprains, intracranial injury, internal injury of thorax, abdomen and pelvis, open wounds, injury to blood vessels	
911.0, 911.1, 912.0, 912.1		Abrasions/friction burns to trunk, shoulder and upper arm	
916.0, 916.1, 919.0, 919.1		Abrasions / friction burns hip, thigh, leg, ankle, other or multiple sites	
920 – 929.9		Contusions and crush injury	
940.0 – 959.9		Burns, injury to nerves and spinal cord, traumatic complications and unspecified injury	
987.9		Smoke inhalation	
991.0 – 991.6		Frostbite, hypothermia and external effects of cold	
994.0, 994.1, 994.7, 994.8		Asphyxiation, strangulation, drowning, and electrocution	
995.50 – 995.59		Child maltreatment and abuse	
***OR***			
ICD-9-CM Diagnoses		AND WITH ANY OF THE FOLLOWING External Cause Codes (E-Codes)	E-CODE
348.1	Anoxic Brain Injury		E800 – E848.8
348.4	Uncal herniation		E878 – E905.0
348.5,	Cerebral Edema		E906.0 – E928.8
348.8	Pneumocephalus		E950.0 – E998.9
372.72	Subconjunctival hemorrhage		
518.5	Traumatic ARDS		
784.7	Epistaxis		
ICD-9-CM Diagnoses Codes EXCLUDED			
820.00 – 820.9		Isolated hip fracture	
905.0 – 909.9		Late effects of injury	
910.0 – 910.9, 911.2 – 911.7, 912.2 - 912.9, 913.0 - 913.9, 914.0 - 914.9, 915.0 - 915.9, 916.2 - 916.9, 917.0 - 917.9, 918.0 - 918.9, 919.2 - 919.9		Blisters, insect bites	
930 – 939		Foreign bodies	
External Cause Codes EXCLUDED			
E849.0 – E849.9		Place of occurrence	
E850.0 – E869.9		Poisonings	
E870.0 – E879.9		Misadventures during surgical and medical care	
E905.1 – E905.9		Venomous animals and plants (except snakes)	
E929.0 – E929.9		Late effects of Accidental Injury	
E930.0 – E949.9		Drugs, medicinal and biological substances causing adverse effects in therapeutic use	
Codes separated by a hyphen indicate a range of codes including both codes AND all codes in between. Example 800.0 – 801.5 Codes separated by a comma indicate a single code. Example 901.1, 901.2, 901.8			

## Appendix B: Ohio County Map with EMS Regions



# Appendix C: E-Code Groupings

MECHANISM / CAUSE	MANNER / INTENT				Other <sup>1</sup>
	Unintentional	Self-inflicted	Assault	Undetermined	
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 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)				
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/stings <sup>3</sup>	E905.0-6., 9 E906.0-4., 5., 9				
Overexertion	E927				
Poisoning	E850.0-869.9	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, classifiable <sup>4</sup>	E846-E848, E914-E915, E918, E921.0-9, E922.4, E923.0-9, E925.0-E926.9, E928.3, E929.0-5	E955.5., 6., 9, E958.0., 4	E960.1, E965.5.-9, E967.0-9, E968.4., 6., 7	E985.5., 6, E988.0., 4	E971, E978, E990-E994, E996, E997.0-2
Other specified, NEC	E928.8, E929.8	E958.8, E959	E968.8, E969	E988.8, E989	E997, 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	E980-E989	E970-E978, E990-E999

<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> E968.5 (assault by transport vehicle), E906.5 (bite from unspecified animal), E922.4 (unintentional injury [gunshot wound] with BB/pellet) with BB/pellet), 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.  
<sup>4</sup> E849 (place of occurrence) has been excluded from the matrix. For mortality 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.

E-Code groupings from the Centers for Disease Control and Prevention’s National Center for Health Statistics

## Appendix D: Barell Injury Diagnosis Matrix

The Barell Injury Diagnosis Matrix (complete name: Barell Injury Diagnosis Matrix, Classification by Body Region and Nature of the Injury) standardizes data selection and reports, using a two dimensional array (matrix) that includes all *International Classification of Diseases (ICD)-9-CM* codes describing trauma. It serves as a basic tool in epidemiological and clinical analyses of injury data.

The matrix displays nature of injury in columns and body region in rows placing each ICD-9-CM code in the range from 800-995 in a unique cell location in the matrix. Each cell includes the codes associated with a given injury. The matrix rows and columns can be easily collapsed to get broader groupings or expanded if more specific sites are required.

The full matrix is too complex to reprint here legibly. It can be found at the website of the Centers for Disease Control and Prevention's National Center for Health Statistics in the section on the International Collaborative Effort on Injury Statistics.

## Appendix E: Members of the EMS Board, Trauma Committee, and Trauma Registry Advisory Subcommittee (TRAS)

### Ohio State Board of Emergency Medical Services – 2009

Pamela L. Bradshaw	*Mark G. Burgess
Dr. Thomas E. Collins, Jr.	Dr. Deanna L. Dahl-Grove
**James E. Davis	David B. Fiffick
Joyce Fischer	Vickie Graymire
James E. Holcomb	John A. Kubincanek
William Mallory, Jr.	Mark L. Marchetta
Daryl McNutt	Dr. John A. Pakiela
Dr. Wendy J. Pomerantz	William E. Quinn, Jr.
Mark N. Resanovich	Craig Self
William F. Vedra, Jr.	

### Trauma Committee of the EMS Board – 2009

Nancie Bechtel	*Dr. John Crow	William Crum
David Degnan	Gary Englehart	Dr. Todd Glass
Vickie Graymire	**Kathy Haley	Brian Kuntz
Dr. Edward A. Michelson	Dr. Sidney Miller	Debra Myers
Dr. Gregory Nemunaitis	Jennifer Piccione	David Pohlman
Dr. Kevin J. Pugh	John D. Ross	Dr. Jonathan M. Saxe
Dr. Michael Shannon	Diane Simon	Dr. Howard Werman
	Dr. Richard Ziegler	

### Trauma Registry Advisory Subcommittee – 2009

Dr. James Begley  
Sally Betz  
Roxanna Giambri  
Vickie Graymire  
Rena Kable  
\*Dr. F. Barry Knotts  
Debra Myers  
Dr. Wendy Pomerantz  
Mike Smeltzer  
Dr. Richard Treat  
Dr. Mike Zorko

\*Chair

\*\* Vice-Chair

## Appendix F: Participating Facilities for 2009

Adams County Hospital	Doctor's Hospital West-Columbus	Lodi Community Hospital	Pomerene Hospital
Adena Regional Medical Center	Dunlap Memorial Hospital	Madison County Hospital	Richmond Heights Hospital
Akron Children's Hospital Medical Center	East Liverpool City Hospital	Marietta Memorial Hospital	Riverside Methodist Hospital
Akron City Hospital	East Ohio Regional Hospital	Marion General Hospital	Robinson Memorial Hospital
Akron General Medical Center	EMH Regional Medical Center	Marymount Hospital	Salem Community Hospital
Alliance Community Hospital	Euclid Hospital	Massillon Community Hospital	Samaritan Regional Health System
Amherst Hospital	Fairfield Medical Center	McCullough-Hyde Memorial Hospital	Southeastern Ohio Regional Medical Center
Aultman Hospital	Fairview Hospital	Medical College of Ohio Hospital	Southern Ohio Medical Center
Barberton Citizen's Hospital	Firelands Regional Medical Center	Medina General Hospital	Southview Hospital and Family Health Center
Barnesville Hospital Association	Fisher-Titus Medical Center	Memorial Hospital-Fremont	Southwest General Health Center
Bay Park Community Hospital	Flower Hospital	Memorial Hospital-Geneva	St. Anne Mercy Hospital
Belmont Community Hospital	Fort Hamilton-Hughes Memorial Hospital	Memorial Hospital-Union County	St. Charles Hospital
Berger Hospital	Fostoria Community Hospital	Mercer County Joint Twp. Community Hospital	St. Elizabeth's Health Center
Bethesda North-Cincinnati	Fulton County Health Center	Mercy Franciscan Hospital-Mt. Airy	St. John West Shore Hospital
Blanchard Valley Regional Health Center	Galion Community Hospital	Mercy Franciscan Hospital-Western Hills	St. Joseph Health Center
Blanchard Valley Regional Health Center-Bluffton	Genesis Good Samaritan Hospital-Zanesville	Mercy Hospital-Anderson	St. Luke's Hospital-Toledo
Brown County General Hospital	Good Samaritan Hospital-Dayton	Mercy Hospital-Clermont	St. Rita's Medical Center
Brown Memorial Hospital	Grady Memorial Hospital	Mercy Hospital-Fairfield	St. Thomas Hospital
Bucyrus Community Hospital	Grandview Hospital	Mercy Hospital-Willard	St. Vincent Charity
Cincinnati Children's Hospital Medical Center	Grant Medical Center	Mercy Medical Center-Canton	St. Vincent Mercy Medical Center
Cleveland Clinic Foundation	Greene Memorial Hospital	Mercy Medical Center-Springfield	Sycamore Hospital
Clinton Memorial Hospital	Hardin Memorial Hospital	Mercy Memorial Hospital	The Bellevue Hospital
Community Health Partners	Henry County Hospital	MetroHealth Medical Center	The Toledo Hospital
Community Hospitals and Wellness Centers-Archbold	Highland District Hospital	Miami Valley Hospital	The University Hospital-Cincinnati
Community Hospitals and Wellness Centers-Bryan	Hillcrest Hospital	Middletown Regional Hospital	Tri-Health Good Samaritan Hospital-Cincinnati
Community Hospitals and Wellness Centers-Montpelier	Holzer Medical Center	Morrow County Hospital	Trinity Medical Center-West
Community Hospital of Springfield	Huron Hospital	Mount Carmel East Hospital	Trumbull Memorial Hospital
Community Memorial Hospital	Jewish Hospital-Kenwood	Mount Carmel West Hospital	Twin City Hospital
Coshocton County Memorial Hospital	Joint Township District Memorial Hospital	Mount Carmel-St. Ann's Hospital	UHHS-Bedford Medical Center
Cuyahoga Falls General Hospital	Kettering Memorial Medical Center	Nationwide Children's Hospital	UHHS-Geauga Regional Hospital
Dayton Children's Medical Center	Knox Community Hospital	O'Bleness Memorial Hospital	UHHS-University Hospital and Rainbow Babies/Children's Hospital
Deaconess Hospital-Cincinnati	Lake Hospital - East	Ohio State University Medical Center	Upper Valley Medical Center
Defiance Regional Medical Center	Lake Hospital - West	Ohio State University Medical Center-East	Wayne Hospital
Doctor's Hospital of Stark County	Lakewood Hospital	Parma Community General Hospital	Wilson Hospital
	Licking Memorial Hospital	Paulding County Hospital	Wood County Hospital
		Pike Community Hospital	Wyandot Memorial Hospital

## Appendix G: Ohio Trauma Registry Data Element List

- Demographics
  - Hospital Code
  - Unique Patient Admission Number
  - Date Exported
  - Zip Code of Residence
  - Patient's Date of Birth
  - Gender
  - Race/Ethnicity
  - Work Relatedness of Injury
  - Safety Equipment
  - Site at Which Injury Occurred
  - E-Code (Description of Injury)
  - Date Injury Occurred
  - State in Which Injury Occurred
  - County in Which Injury Occurred
- Pre-Hospital
  - Glasgow Eye Component at Scene
  - Glasgow Verbal Component at Scene
  - Glasgow Motor Component at Scene
  - GCS Assessment Qualifier at Scene
  - Intubated-Scene
  - CPR-Scene
  - MAST-Scene
  - Fluids-Scene
  - Chest Decompression-Scene
  - Thoracentesis/Thoracostomy-Scene
  - Spinal Immobilization-Scene
- Emergency Department
  - ED Arrival Date
  - ED Arrival Time
  - Systolic Blood Pressure (First)
  - Respiratory Rate (Unassisted)
  - Injury Type
  - Glasgow Eye Component in ED
  - Glasgow Verbal Component in ED
  - Glasgow Motor Component in ED
  - GCS Assessment Qualifier in ED
  - Was Alcohol Present?
  - Alcohol Level Range
  - Were Drugs Present?
  - Drug Category
  - ED Disposition
  - ED Transfer to Hospital
  - ED Transfer Date
  - ED Transfer Time
  - First Temperature in ED
  - Intubated in ED
  - CPR-ED
  - MAST-ED
  - Fluids-ED
  - Chest Decompression-ED
  - Thoracentesis/Thoracostomy-ED
  - Spinal Immobilization-ED
  - Head CT Results-ED
  - Abdominal Evaluation-ED

- Inpatient Course
  - Admitting Specialty
  - Total Days in ICU
  - Ventilator Support Days
  - ICD-9-CM Diagnosis Code/Description for Injuries
  - Complications
  - Pre-existing Comorbidity Factors
- OR Visits
  - OR Date
  - OR Time
  - ICD-9 Codes for OR Visit
- Disability Assessment / Discharge
  - Disability Assessment - Self-Feeding
  - Disability Assessment - Locomotion
  - Disability Assessment - Expression
  - Discharge Disposition
  - Transfer to Other Hospital
  - Date of Discharge or Death
  - Discharge Status
  - Billed Hospital Charges
  - Principal Payment Source
  - Length of Stay in Hospital
  - Organs/Tissue Requested
  - Organs/Tissue Granted
  - Organs/Tissue Taken
  - Was an Autopsy Performed?

## Appendix H: Glossary

**Barell Matrix:** A system of classification of injury by body region and the nature of the injury.

**CDC:** Centers for Disease Control and Prevention

**E-Code:** External cause of injury code

**ED:** Emergency Department

**EMS:** Emergency Medical Services

**Floor:** A general medical-surgical room or bed in a hospital. Generally advanced patient monitoring is not performed on a floor bed.

**GSW:** Gunshot Wound

**ICD-9-CM:** International Classification of Disease, 9<sup>th</sup> Revision, Clinical Modification.

**ICU:** Intensive Care Unit

**ISS:** Injury Severity Score. A system for scoring the overall severity of injuries. Ranging from 1-75, an ISS of greater than 15 is generally considered a severe injury.

**LOS:** Length of Stay

**MCC:** Motorcycle Collision

**MOI:** Mechanism of Injury

**MVC:** Motor Vehicle Collision

**Observation:** A level of hospital care most frequently utilized for lower acuity, short stays, or during an intermediate period while a decision is being made to admit or release the patient.

**OR:** Operating Room.

**OTR:** Ohio Trauma Registry

**Outcome:** Used to describe the patient’s outcome; alive or dead.

**Step-Down:** An intermediate level of care between the “floor” and the ICU.

## Appendix I: Ohio Revised Code

### §4765.06: Emergency medical services incidence reporting system—state trauma registry.

(B) The board shall establish a state trauma registry to be used for the collection of information regarding the care of adult and pediatric trauma victims in this state. The registry shall provide for the reporting of adult and pediatric trauma-related deaths, identification of adult and pediatric trauma patients, monitoring of adult and pediatric trauma patient care data, determination of the total amount of uncompensated adult and pediatric trauma care provided annually by each facility that provides care to trauma victims, and collection of any other information specified by the board. All persons designated by the board shall submit to the board any information it determines is necessary for maintaining the state trauma registry. At the request of the board any state agency possessing information regarding adult or pediatric trauma care shall provide the information to the board. The board shall maintain the state trauma registry in accordance with rules adopted under section 4765.11 of the Revised Code. Rules relating to the state trauma registry adopted under this section and section 4765.11 of the Revised Code shall not prohibit the operation of other trauma registries and may provide for the reporting of information to the state trauma registry by or through other trauma registries in a manner consistent with information otherwise reported to the state trauma registry. Other trauma registries may report aggregate information to the state trauma registry, provided the information can be matched to the person that reported it. Information maintained by another trauma registry and reported to the state trauma registry in lieu of being reported directly to the state trauma registry is a public record and shall be maintained, made available to the public, held in confidence, risk adjusted, and not subject to discovery or introduction into evidence in a civil action as provided in section 149.43 of the Revised Code and this section. Any person who provides, maintains, or risk adjusts such information shall comply with this section and rules adopted under it in performing that function and has the same immunities with respect to that function as a person who performs that function with respect to the state trauma registry.

(C) The board and any employee or contractor of the board or the department of public safety shall not make public information it receives under Chapter 4765. of the Revised Code that identifies or would tend to identify a specific recipient of emergency medical services or adult or pediatric trauma care.

(D) Not later than two years after the effective date of this amendment, the board shall adopt and implement rules under section 4765.11 of the Revised Code that provide written standards and procedures for risk adjustment of information received by the board under Chapter 4765. of the Revised Code. The rules shall be developed in consultation with appropriate medical, hospital, and emergency medical service organizations and may provide for risk adjustment by a contractor of the board. Before risk adjustment standards and procedures are implemented, no member of the board and no employee or contractor of the board or the department of public safety shall make public information received by the board under Chapter 4765. of the Revised Code that identifies or would tend to identify a specific provider of emergency medical services or adult or pediatric trauma care. After risk adjustment standards and procedures are implemented, the board shall make public such information only on a risk adjusted basis.

(E) The board shall adopt rules under section 4765.11 of the Revised Code that specify procedures for ensuring the confidentiality of information that is not to be made public under this section. The rules shall specify the circumstances in which deliberations of the persons performing risk adjustment functions under this section are not open to the public and records of those deliberations are maintained in confidence. Nothing in this section prohibits the board from making public statistical information that does not identify or tend to identify a specific recipient or provider of emergency medical services or adult or pediatric trauma care.

(F) No provider that furnishes information to the board with respect to any patient the provider examined or treated shall, because of this furnishing, be deemed liable in damages to any person or be held to answer for betrayal of a professional confidence in the absence of willful or wanton misconduct. No such information shall be subject to introduction in evidence in any civil action against the provider. No provider that furnishes information to the board shall be liable for the misuse or improper release of the information by the board or any other person. No person who performs risk adjustment functions under this section shall, because of performing such functions, be held liable in a civil action for betrayal of professional confidence or otherwise in the absence of willful or wanton misconduct.

Effective Date: 11-03-2000

## Appendix J: Counties by Population Density Designation

High Density (>1000 people per square mile)	Medium-High Density (300-999 people per square mile)	Medium-Low Density (100-299 people per square mile)	Low Density (<100 people per square mile)
Cuyahoga	Lake	Allen	Preble
Franklin	Butler	Richland	Washington
Hamilton	Stark	Delaware	Clinton
Lucas	Mahoning	Fairfield	Defiance
Montgomery	Lorain	Miami	Union
Summit	Warren	Geauga	Williams
	Clermont	Licking	Holmes
	Trumbull	Columbiana	Champaign
	Clark	Wayne	Darke
	Medina	Wood	Mercer
	Greene	Jefferson	Madison
	Erie	Marion	Brown
	Portage	Ottawa	Perry
		Tuscarawas	Guernsey
		Sandusky	Morrow
		Ashtabula	Jackson
		Lawrence	Highland
		Hancock	Carroll
		Belmont	Van Wert
		Scioto	Putnam
		Muskingum	Henry
		Ashland	Fayette
		Athens	Hardin
		Huron	Hocking
		Shelby	Gallia
		Crawford	Coshocton
		Auglaize	Pike
		Ross	Wyandot
		Seneca	Meigs
		Pickaway	Paulding
		Knox	Adams
		Fulton	Harrison
		Logan	Morgan
			Noble
			Monroe
			Vinton

Population density data from the US Census Bureau, 2000 census  
Density designations by the EMS Office of Research and Analysis

