

OKLAHOMA MAJOR TRAUMA

SUMMARY REPORT

2004 - 2005



Oklahoma
State
Department
of Health

Trauma
Division



Oklahoma State Trauma Registry

*The Trauma Division
wishes to thank all
Hospital Trauma
Registrars for their
dedication
to data entry and
submission, which made
this report possible.*

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Foreword

This document is the result of countless hours of work on the part of many persons involved in the delivery of trauma care and Trauma System Development in Oklahoma. It is a compilation of quality data reporting, collection and analysis, providing us with valuable information about the life-saving efforts of trauma care providers, pre-hospital and hospital care, discharge to higher/other levels of care. This data was reported by Hospital Trauma Registrars to the Trauma Epidemiologists of the Oklahoma State Department of Health.

This tremendous effort in “describing” trauma in Oklahoma in terms such as average age at the time of the traumatic event, gender, leading cause(s) of major trauma, length/location of hospital stay, type of injury, and deaths, provides valuable information on utilization of our Oklahoma trauma resources such as trauma-care availability/capabilities, focus areas for improvement and injury prevention, and the cost of trauma. Utilizing the knowledge gained by describing trauma, enables us to develop targeted strategies to improve our trauma system by maximizing our resources throughout the continuum of trauma care- from prevention, pre-hospital care, hospital care, rehabilitation, through integration back into society at the highest possible level of productivity- and identification of areas for further research.

Data collection is the cornerstone of trauma system development in Oklahoma, as it creates a road map for system improvement efforts and measurement of our success in system development. Through the continued leadership by the Oklahoma State Department of Health and the work of trauma care providers, Hospital Trauma Registrars, and the OSDH Trauma Division Staff, we will achieve our mission: “To create a statewide system of optimal care for all trauma patient to ensure the right patient goes to the right place in the right amount of time.”

Patrice Greenawalt, RN, MS
Director, Trauma Division
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Glossary

AIS – Abbreviated Injury Scale – a scale for scoring individual injuries; ranges from 1 (minor) to 6 (non-survivable).

ISS – Injury Severity Score- a means for combining individual AIS scores into a summary score for a multiple-injured patient; score ranges from 1 (minor) to 75 (maximum score).

GCS – Glasgow Coma Scale- Quick assessment of neurologic status based upon eye, verbal and motor responses; ranges from 3 (worst) to 15 (Best).

RTS – Revised Trauma Score-a score indicating physiologic status of a patient upon arrival at ED; based on initial systolic blood pressure, unassisted respiratory rate, and total Glasgow Coma Scale. Scores range from one (unstable physiologic status) to 7.84 (stable physiologic status).

TRISS – Trauma Injury Severity Score - A survival probability score calculated from the age, primary injury type (blunt/penetrating), ISS and RTS scores. Score range is between 0 and 1: below 0.50 'expected' to die; above 0.50 'expected' to live.

SBP – Systolic Blood Pressure.

RR – Respiratory Rate.

“All Reported Trauma” – includes minor trauma transfers and 'duplicate' patients from the transferring and receiving facilities.

“Major Trauma” – cases that meet the statutory major trauma criteria and are unduplicated (not counted more than once in the database).

“Source of Trauma System Inclusion” – relates to patient's means of arrival at the reporting facility by EMS transport from the scene, privately owned vehicle, or transfer from another acute care hospital.

“Incident case” – Patient only counted once even if reported by two or more facilities.

“Definitive Care Facility” – A hospital with the capacity and capability to provide all of the appropriate diagnostic/treatment/patient care services required by the patient.

Executive Summary

The Oklahoma State Trauma Registry (“Registry”) collects data from all state-licensed acute care facilities in the state of Oklahoma. All Oklahoma-licensed hospitals are required to report cases meeting the major trauma criteria (see Case Definition) and all trauma transfers regardless of severity, as long as the cases do not meet the exclusion criteria. The Registry currently contains about 64,000 cases collected since 1999. During the 2003-2004 period, aggressive efforts were made to improve the quality of the data. This report summarizes major trauma and all reported inter-facility transfers from 103 hospitals for the period 2004-2005. The goal of this report is to inform stakeholders in trauma systems development, decision makers, and the public on various topics that characterize the state of care for injured patients in our state. This report has implications in many areas including regional trauma planning, epidemiology, injury prevention, acute care, and resource allocation. This report is descriptive and therefore serves to initiate further questions and discussions. Further detailed studies may be required.

Reporting and Participation

- ◆ 103 hospitals submitted data, including:
 - 70 classified as Level IV trauma centers;
 - 30 classified as Level III trauma centers;
 - 2 classified as Level II trauma centers; and
 - 1 classified as a Level 1 trauma center.
- ◆ From 2004 to 2005, major trauma reporting increased by 13% overall.
 - Reporting in the ISS 9-15 group increased by 18.4%.

Selected Demographics

- ◆ The age distribution of patients (in terms of frequencies) peaked in the 15-24 year age group representing predominantly males and in the 65 years and older representing predominantly females.
- ◆ Age-specific injury rates of patients peaked in the 15-24 year age group and again in the 65 years and older, representing predominantly males in both age groups.
- ◆ For ages 0-64, males outnumber females by 2.5:1.
- ◆ For ages 65 years and older, females outnumber males by 1.3:1.

Mechanism of Injury

- ◆ Traffic-related injuries (motor vehicle crashes, motorcycle crashes, pedestrian-related, etc.) accounted for 45% of major trauma.
- ◆ Motor vehicle crashes (MVC) accounted for 35% of cases.
- ◆ MVCs were the leading cause of major trauma for ages 15-64.
 - Over half (51.5%) of injuries in the 15-24 age group were involved in MVCs.
 - 42% of injuries among patients aged 25-34 were MVC-related.
- ◆ Falls accounted for 28% of patients with major trauma and were the leading cause of major trauma in the 0-14 and 65 years and older age groups.
 - Falls accounted for 67% of injuries in patients aged 65 years and older and 35% in patients aged 0-14 years.
- ◆ Highest case-fatality rates were observed for gunshot wounds (31.8%) and pedestrian-related injuries (17.6%).
- ◆ MVCs were the leading cause of major trauma in the NW, East Central, SE, Tulsa, and OKC Regions while falls were the leading cause of major trauma in the NE, SW, and Central Regions.

ED and Hospital Disposition

- ◆ 50% of major trauma patients went to the Intensive Care Unit (ICU) or Operating Room (OR) from the ED.
- ◆ 4% of ED admissions resulted in death.
 - Compared to other regions, Regions 5 (SE) and 4 (East Central) had disproportionately high ED mortality rates at 32% and 19%, respectively.
- ◆ 73% of surviving major trauma patients were discharged home from the hospital.
- ◆ 16% of major trauma patients were discharged to a rehabilitation facility.
 - Regions 1 (NW), 6 (Central), and 8 (OKC) had at least 20% of surviving patients discharged to a rehabilitation facility.

ICU and Hospital Length of Stay

- ◆ Total number of hospital days was highest for persons with MVC injuries at almost 30,000 days.
- ◆ Highest mean length of stay was 8 days for pedestrian injuries and lowest at 4.8 days for persons stabbed.
- ◆ For patients with ICU stays, MVCs had the highest total ICU days at 12,000 days and highest mean ICU days was for motorcycle injuries.

- ◆ Mean length of hospital and ICU stay increased significantly with increasing injury severity.
- ◆ Oklahoma City and Tulsa region hospitals accounted for 89% of the total length of stay days and 94% of the total ICU days.
- ◆ Patients in the Oklahoma City and Tulsa regions also had the highest mean, hospital and ICU length of stay length of stay and ICU stay at about 7 days and 6 days, respectively.

Mortality

- ◆ Major trauma mortality decreased 10% from 2004 to 2005 (10.7% to 9.7%).
- ◆ The age-adjusted mortality rate for 2004 was 14.3/100,000 while in 2005 it was 15/100,000 population, an increase of 5%.
 - From 2004 to 2005, the mortality rate in the 15-24 year age group decreased by 11.5% and increased by 13% in the 65 years and older age group.
- ◆ MVCs were attributable to 36% of all reported trauma deaths, followed by falls at 17.5% and gunshot wounds at 16.5%.
 - MVCs were the leading cause of major trauma death in all age groups except for the 65 years and older group where falls predominated.
 - 50% of major trauma deaths in the 15-24 year age group were MVC-related.
- ◆ 45% of deaths in the 65 years and older age group were attributable to falls.
- ◆ The 0-14 age group had the highest proportion of pedestrian-related deaths.
- ◆ Compared to other regions, Regions 5 (SE) and the 4 (East Central) had the highest mortality proportions at 35.2% and 21.5%, respectively.

Payor Mix

- ◆ Overall, 35% of major trauma patients were insured.
- ◆ Over one-third of major trauma patients (39%) were Medicaid/self-pay funded.
 - Highest proportions of self-pay patients were ages 15-44 years with a peak in the 25-34 year age group (48%).
 - A disproportionately high Medicaid coverage (42%) was observed in the 0-14 year age group.
- ◆ 40% of patients in Regions 8 (OKC), 7 (Tulsa) and 5 (SE) were either self-pay or Medicaid funded.
- ◆ Region 3 (SW) had the highest proportion of Medicare funded patients (27%).

Inter-facility Transfers

- ◆ 30.6 % of major trauma patients were transferred from the initial treating hospital to another hospital for definitive care.
 - Transferred major trauma patients were significantly younger than patients transported directly from scene and were predominantly male.
 - Compared to directly transported patients, transferred cases had a higher incidence of head and neck injuries.
 - Highest proportion of transferred cases was observed on Sunday and between 9 p.m. and Monday 6 a.m.
- ◆ Directly transported cases generally have higher Injury Severity Score (ISS), lower initial ED systolic blood pressure (SBP), and Glasgow Coma Scale (GCS) scores.

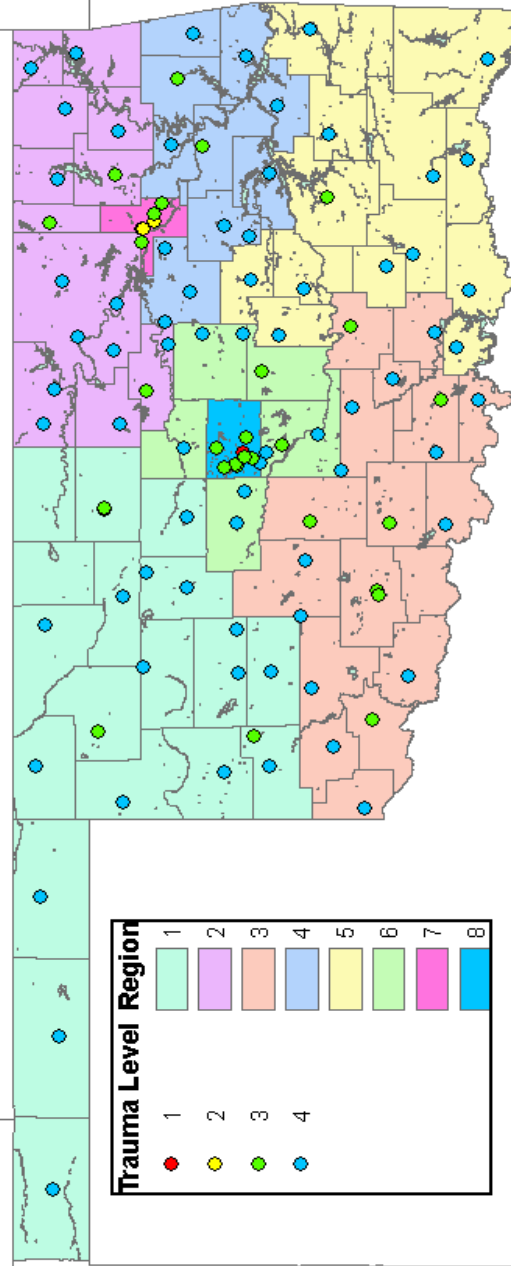
Oklahoma Major Trauma Case Definition

The Oklahoma State Trauma Registry (“Registry”) collects data from all state-licensed acute care facilities in the state of Oklahoma. All Oklahoma-licensed hospitals are required to report cases meeting the major trauma criteria (see below) and all trauma transfers regardless of severity, as long as the cases do not meet the exclusion criteria.

Inclusion Criteria (Must meet at least one criteria in each category)	
1.	International Classification of Disease 9 th Revision Clinical Modification code of 800.00 - 959.9
2.	<ul style="list-style-type: none"> • Abbreviated Injury Scale value of 3 or higher; or • Injury Severity Score of 9 or higher; or • TRISS Survival Probability less than .90
3.	<ul style="list-style-type: none"> • Length of hospital stay > 48 hours; or • Dead on arrival or died while in hospital; or • Transferred from a lower level to a higher level trauma center with <i>major</i> trauma; or • Admitted to intensive care unit; or • Admitted for major surgery (head, chest, abdomen, vascular); or • Hospital “Trauma Team” activated.
Exclusion Criteria	
1.	Persons who died at the scene, or
2.	Excluded injuries <ul style="list-style-type: none"> • Isolated orthopedic injury to the extremities; • Overexertion injuries; • Submersions; • Poisonings; • Asphyxiation; • Injuries caused by a pre-existing condition (e.g., osteoporosis, etc).

The location of Oklahoma acute care hospitals by level of trauma classification is shown in the following map.

Trauma Classification for State Licensed Acute Care and Critical Access Hospitals by Trauma Region



Hospital Participation and Reporting

The following tables show the number of cases (both major trauma and all trauma transfers regardless of severity criteria) reported by each specific hospital for 2004-2005 as of June 2006.

Region 1 (NW)	
FACILITY	N
Woodward Hospital and Health Center	127
St Marys Regional Medical Center	259
Integriss Bass Baptist Health Center	181
Integriss Clinton Regional Hospital	151
Great Plains Regional Medical Center	168
Okeene Municipal Hospital	36
Newman Memorial Hospital	56
Memorial Hospital of Texas County	69
Seiling Municipal Hospital Authority	73
Harper County Community Hospital	26
Fairview Hospital	111
Cordell Memorial Hospital	43
Beaver County Memorial Hospital	68
Sayre Memorial Hospital	59
Southwestern Memorial Hospital	118
Share Memorial Hospital	150
Roger Mills Memorial Hospital	15
Kingfisher Regional Hospital	31
Cimarron Memorial Hospital	22
Watonga Municipal Hospital	51

Region 3 (SE)	
FACILITY	N
Mercy Memorial Health Center Inc	372
Southwestern Medical Center	21
Valley View Regional Hospital	37
Comanche County Memorial Hospital	431
Duncan Regional Hospital	225
Grady Memorial Hospital	117
Jackson County Memorial Hospital	177
Pauls Valley General Hospital	144
Memorial Hospital & PG-Frederick	18
Mangum City Hospital	9
Elkview General Hospital	47
Carnegie Tri-county Municipal Hospital	41
Arbuckle Memorial Hospital	36
Healdton Municipal Hospital	41
Harmon Memorial Hospital	15
Mercy Health Love County	11
Anadarko Municipal Hospital	46
Jefferson County Hospital	39

Region 2 (NE)	
FACILITY	N
Via Christi	290
Stillwater Medical Center	57
Integriss Mayes County Medical Center	240
Claremore Regional Hospital	45
Cushing Regional Hospital	71
Integriss Grove General Hospital	123
Jane Phillips Medical Center	386
Perry Memorial Hospital	49
Cleveland Area Hospital Inc	75
Craig General Hospital	108
Integriss Baptist Regional Health Center	93
Pawnee Municipal Hospital	20
Integriss Blackwell Regional Hospital	102
Jane Phillips Nowata Health Center	238
Pawhuska Hospital Inc	70
Fairfax Memorial Hospital Inc	21

Region 4 (East Central)	
FACILITY	N
Okmulgee Memorial Hospital	104
Muskogee Regional Medical Center	331
Tahlequah City Hospital	107
Henryetta Medical Center	32
Haskell County Hospital	72
Memorial Hospital-Stilwell	61
Community Hospital Lakeview	53
Sequoyah Memorial Hospital	34
Drumright Memorial Hospital	5
St John Sapulpa Inc	82
Bristow Memorial Hospital	61

Region 5 (SW)	
FACILITY	N
Medical Center of Southeastern Oklahoma	151
McAlester Regional Health Center	255
Eastern Oklahoma Medical Center	188
Integrus Marshall Memorial Hospital	82
Mary Hurley Hospital	15
Holdenville General Hospital	93
Creek Nation Community Hospital	78
Choctaw Memorial Hospital	81
Latimer County General Hospital	24
McCurtain Memorial Hospital	179
Pushmataha Town of Antlers Hospital Authority	69
Seminole Medical Center	80
Atoka Memorial Hospital	98

Region 7 (Tulsa County)	
FACILITY	N
St Francis Tulsa	3648
St John Medical Center Inc.	1560
St Francis Hospital at Broken Arrow	195
Hillcrest Medical Center	279
SouthCrest Hospital	114
Tulsa Regional Medical Center	282

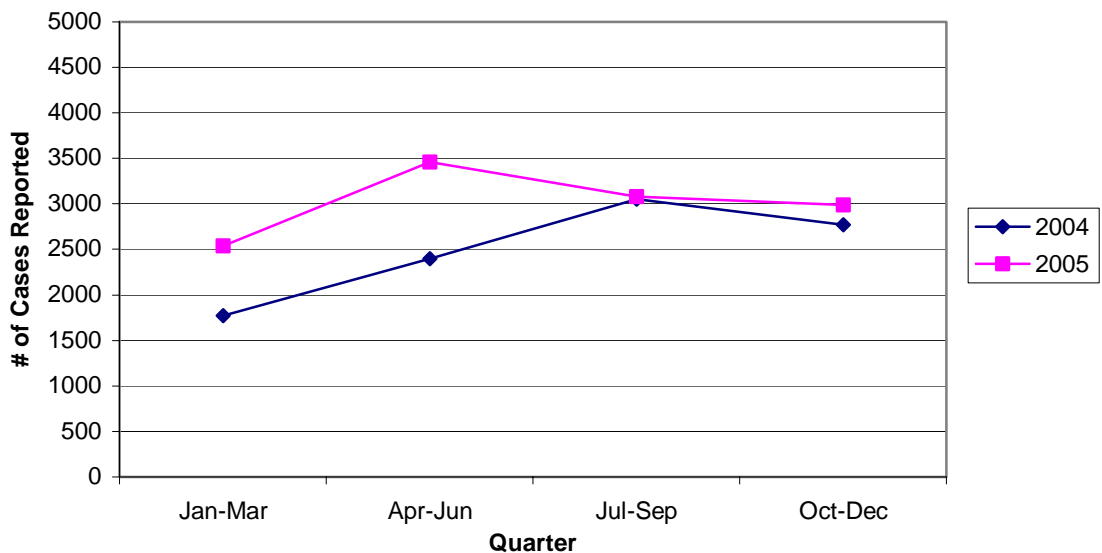
Region 6 (Central)	
FACILITY	N
Unity Health	330
Logan Hospital and Medical Center	290
Park View Hospital	55
Purcell Municipal Hospital	147
Stroud Municipal Hospital	23
Prague Municipal Hospital	28

Region 8 (Oklahoma County)	
FACILITY	N
Integrus Canadian Valley	60
Moore Medical Center	16
St Anthony OKC	230
Midwest Regional Medical Center	317
Mercy Health Center	402
Integrus Southwest Medical Center	446
Integrus Baptist Medical Center	594
Deaconess Hospital	178
OU Medical Center	4235
Edmond Medical Center	130
Norman Regional Hospital	489
Bone and Joint Hospital	49
Physicians Hospital of Oklahoma	6

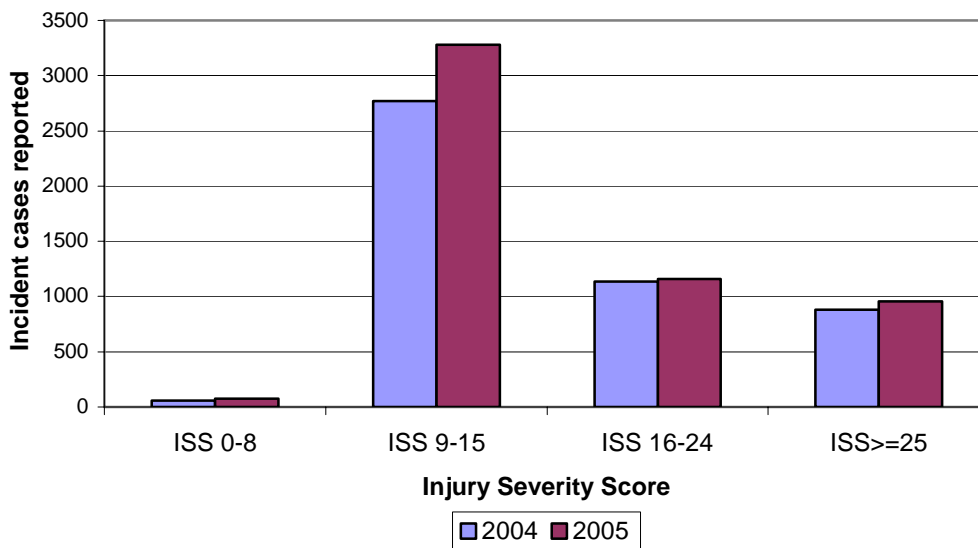
Number of Reporting Hospitals by Region and Level of Trauma Care, Oklahoma Trauma Registry 2004-2005

TRAUMA CARE LEVEL	REGION								Total
	1	2	3	4	5	6	7	8	
1								1	1
2							2		2
3	4	5	6	1	1	1	4	8	30
4	16	11	12	10	12	5		4	70
Total	20	16	18	11	13	6	6	13	103

**Overall Trauma Reporting By Quarter,
Oklahoma Trauma Registry, 2004-2005**



**Major Trauma Reporting By Injury Severity Score,
Oklahoma Trauma Registry, 2004-2005**

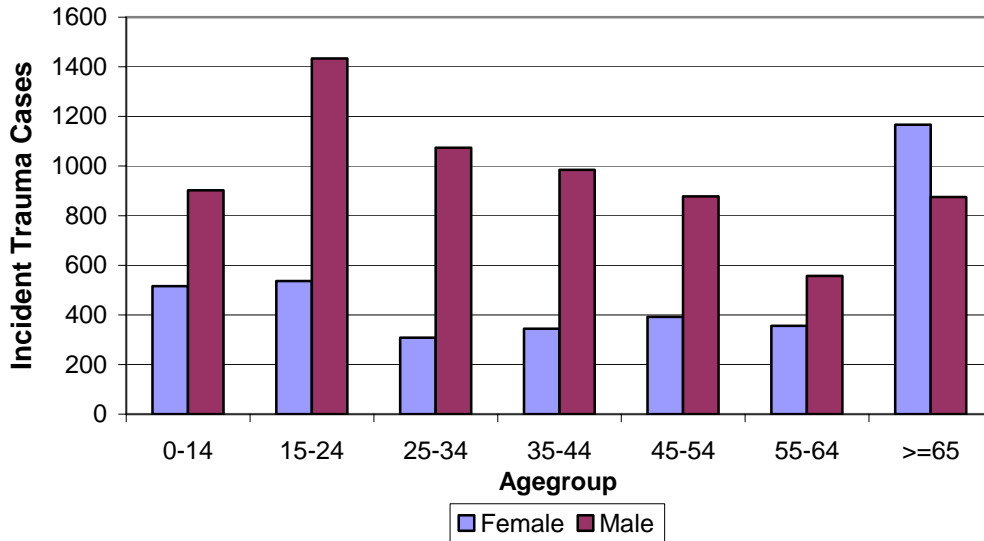


Major trauma reporting in the ISS 9-15 group increased by 18.4% from 2004 to 2005. There was also a slight increase in the number of cases reported in the ISS >=25 group.

Demographic Characteristics

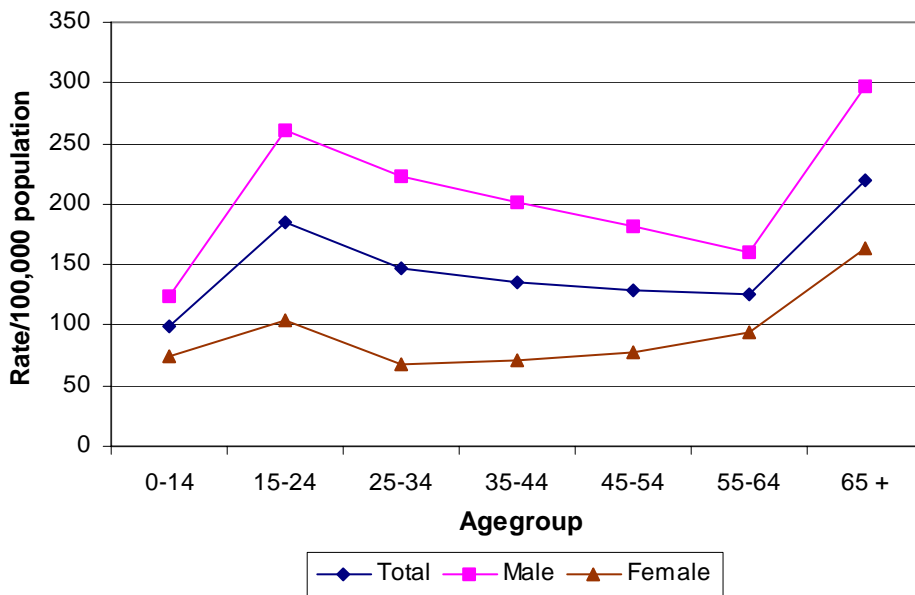
A total of 10,328 incident major trauma cases were reported to the State Trauma Registry from 2004-2005.

Oklahoma Major Trauma by Gender and Agegroup, 2004-2005



The number of major trauma cases was 2.4 times higher for males than females until age 64, thereafter females predominated the 65 years and older age group.

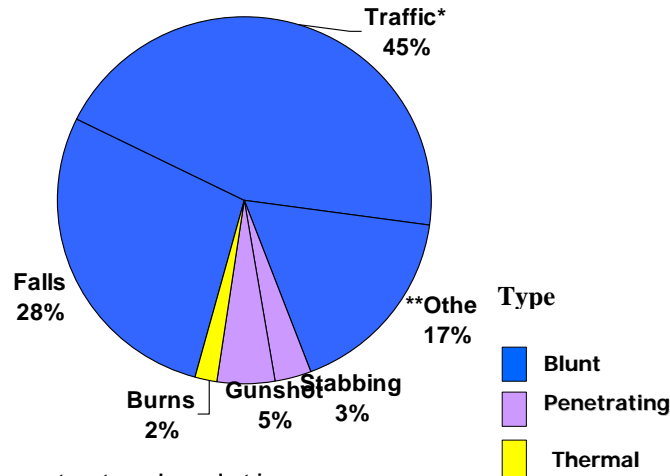
Age-Specific Rates by Gender, Oklahoma Major Trauma, 2004-2005



The highest injury rates were observed in the 65 and older age group in both genders, followed by the 15-24 year age group.

Mechanism of Injury

**Mechanism and Type of Injury
Oklahoma Major Trauma, 2004-2005**



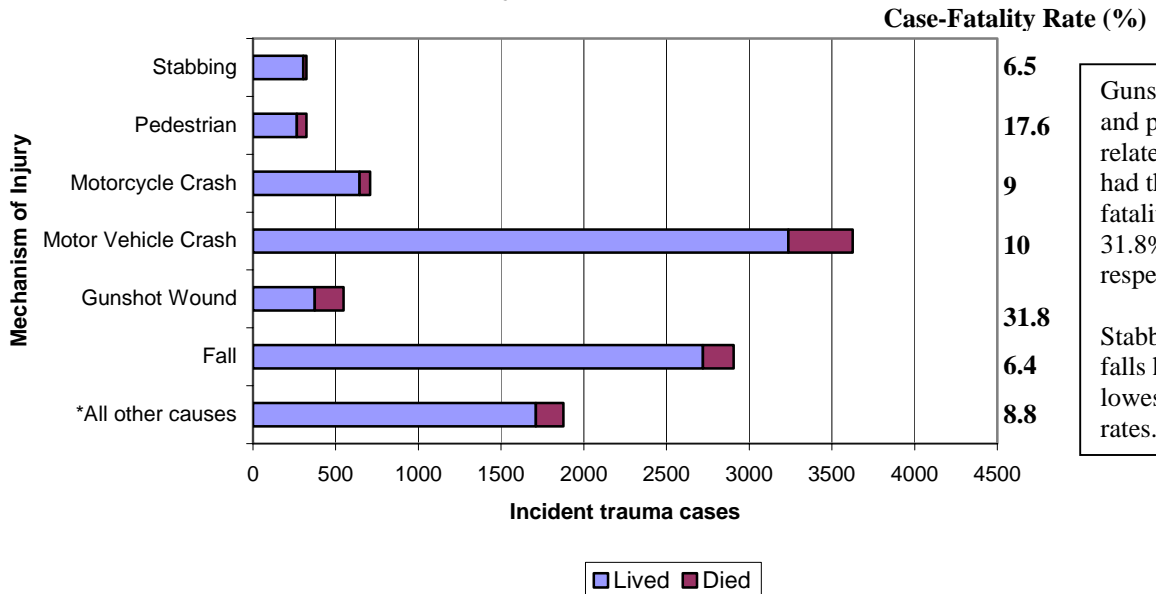
90% of injuries were blunt trauma, 8% penetrating and 2% burns.

Nearly half (45%) of major trauma was attributable to traffic-related incidents, followed by falls (28%).

*Includes motor vehicle occupant, motorcycle, pedestrian

**All other causes include: sports, animal-related, pedal cycling, machinery accidents, unarmed fights, aircraft, etc

**Mechanism of Injury by Outcome,
Oklahoma Major Trauma, 2004-2005**



Gunshot wounds and pedestrian – related injuries had the highest fatality rates at 31.8% and 17.6%, respectively.

Stabbings and falls had the lowest fatality rates.

N = 10,314; Excludes unknown = 14; Deaths at the scene not included.

*All other causes include: sports, animal-related, pedal cycling, machinery accidents, unarmed fights, aircraft, boat accidents, etc.

**Frequency and Percent of Mechanism of Injury (etiology) by Region,
Oklahoma Major Trauma, 2004-2005**

Etiology	REGION, n (%)							
	1	2	3	4	5	6	7	8
MVC	102 (39)	138 (31)	142(24.5)	79 (41.6)	60 (47)	29 (23)	1390 (37)	1687 (35)
Motorcycle	12 (4.6)	25 (5.7)	21(3.6)	8 (4.2)	2 (1.7)	*	298 (7.9)	342 (7.1)
Pedestrian	8 (3.1)	5 (1.1)	6 (1)	3 (1.6)	3 (2.3)	*	135 (3.6)	162 (3.4)
Gunshot	6 (2.3)	15 (3.4)	16 (2.8)	12 (6.3)	10 (7.8)	*	226 (6)	262 (5.4)
Stabbing	4 (1.5)	8 (1.8)	20 (3.5)	10 (5.3)	6 (4.7)	*	102 (2.7)	173 (3.6)
Falls	82 (31.5)	168(38.2)	301 (52)	59 (31)	30 (23.4)	77 (60.6)	910(24.1)	1280 (26.6)
All Other	46 (17.7)	81 (18.4)	74 (12.8)	19 (10)	17 (13.3)	17 (13.3)	712 (18.9)	910 (19)
TOTAL	260	440	580	190	128	127	3773	4816

* Numbers too small

Motor vehicle crashes (MVCs) and falls were the most common causes of injury in all trauma regions:

-MVCs were the leading cause of injury in Regions 1(NW), 4 (East Central), 5 (SE), 7(Tulsa), and 8 (OKC).

-Falls were the leading cause of injury in Regions 2 (NE), 3 (SW), and 6 (Central).

-A higher proportion of penetrating injuries (gunshot and stabbings) were reported for Regions 4 and 5.

**Top 3 Leading Causes of Major Trauma by Age group,
Oklahoma 2004-2005**

	0-14	15-24	25-34	35-44	45-54	55-64	>64
1	Falls	MVC	MVC	MVC	MVC	MVC	Falls
2	MVC	GSW	M-cycle	Falls	Falls	Falls	MVC
3	Ped	M-cycle	GSW	M-cycle	M-cycle	M-cycle	Ped

Ped-Pedestrian; MVC-Motor Vehicle Crashes; GSW-Gunshot Wound; M-cycle-Motorcycle

MVCs accounted for 35% of injuries and were the leading cause of major trauma for ages 15-64 years.
-51.5% of cases aged 15-24 years were involved in MVCs.

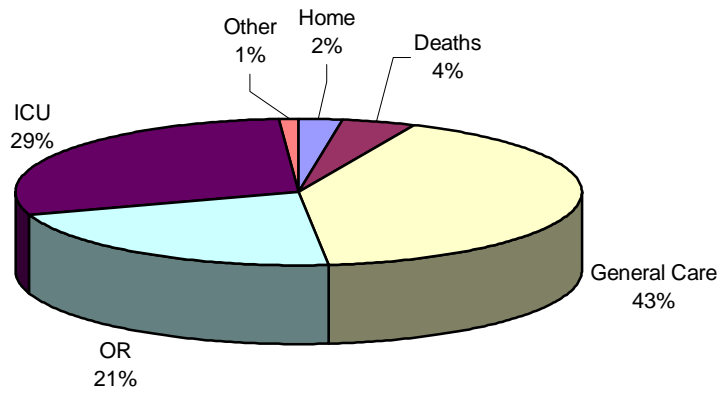
Falls were leading cause of major trauma in pediatrics (0-14 years) and persons age 65 years and older.
-Falls accounted for 67% of patients aged 65 years and older and 35% of pediatric injuries.

About 7% of persons aged 0-4 years had pedestrian-related injuries

Emergency Department (ED) And Hospital Disposition

The graph and table summarize the proportional distribution of patients treated in the ED before admission or death. General care defined as: ED observation, floor, step down, and telemetry. Other defined as discharge to a SNF, unable to complete treatment.

ED Disposition, Oklahoma Major Trauma, 2004-2005



Almost one-third (29%) of major trauma cases went to the intensive care unit (ICU) from the ED.

4% of patients died in the ED.

Close to half (43%) of ED patients went to general care.

ED Disposition	Number of Patients	% of ED Disposition
Home	254	2
Deaths	429	4
General Care	4322	43
OR	2213	21
ICU	3006	29
Other	104	1
Total	Total	100%

ED Disposition	REGION (%)							
	1 (NW)	2 (NE)	3 (SW)	4 (EC)	5 (SE)	6 (Central)	7 (Tulsa)	8 (OKC)
Home	5.4	9.1	4.5	2.1	0	0	1.1	2.7
Deaths	11.2	9.3	6.9	19	32	8.6	2.9	2.6
General Care	47.3	55.4	54	48	39.8	67	39.7	39.6
OR	15.4	14.7	16	11.6	8.6	11.7	24.4	21.7
ICU	18.9	8.8	17.6	18.4	15.6	9.4	31.5	32.4
Other	1.9	2.7	1	0.5	3	3	0.5	1.1
Total # of Cases	260	442	581	190	128	128	3776	4823

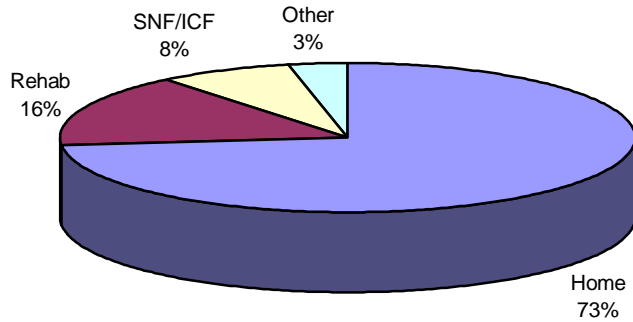
Disproportionately higher ED mortality rates were observed for Regions 3 (SE) and 4 (East Central regions) at 32% and 19%, respectively.

Over 50% of ED admissions in the OKC and Tulsa region went to OR/ICU from ED.

Hospital Disposition

A total of 1050 (10%) of cases died in the hospital. The following graph and table summarize the discharge destination for the surviving patients.

Discharge Destination, Oklahoma Major Trauma, 2004-2005



73% of surviving trauma patients were discharged home from the hospital.

Nearly one-quarter of major trauma patients required long-term care (discharged to a rehabilitation facility or a Skilled Nursing Facility (SNF), Intermediate Care facility (ICF).

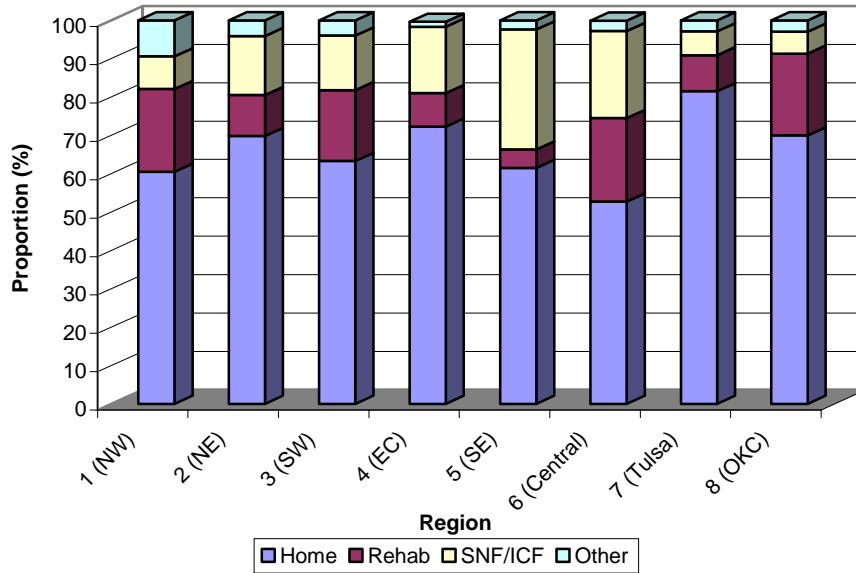
-Over half (55%) of patients aged 65 years and older were discharged to a rehab/SNF facility.

-93% of surviving pediatric patients were discharged home from the hospital.

Discharge Destination	Number of Patients	% of Discharge Destination
Home	6804	73.3
Rehab	1484	16
SNF/ICF	691	7.5
Other	299	3.2

Graph below summarizes regional variations in patient discharge destination.

**Hospital Discharge Destination by Region,
Oklahoma Major Trauma, 2004-2005**

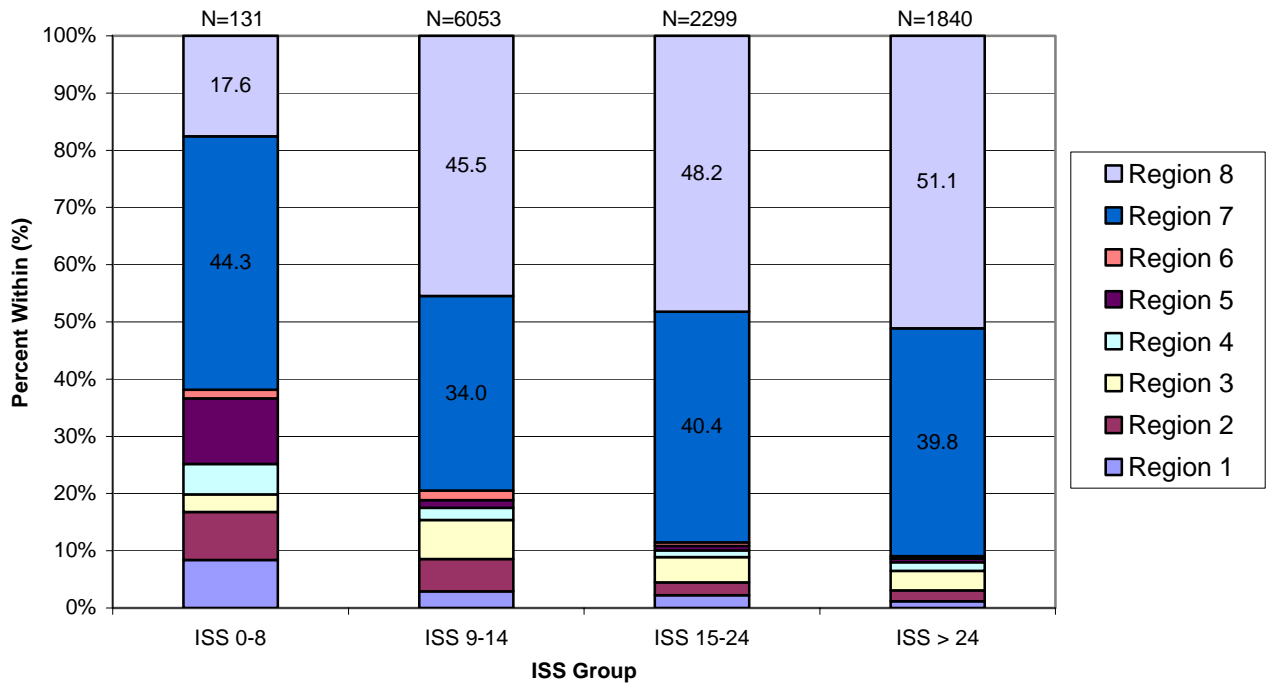


Slightly over one-fifth of the patients in regions 1 (NW), 6 (Central), and 8 (OKC) were discharged to a rehabilitation facility from the hospital.

About one-third of patients in the Southeast region were discharged to a SNF/ICF from the hospital.

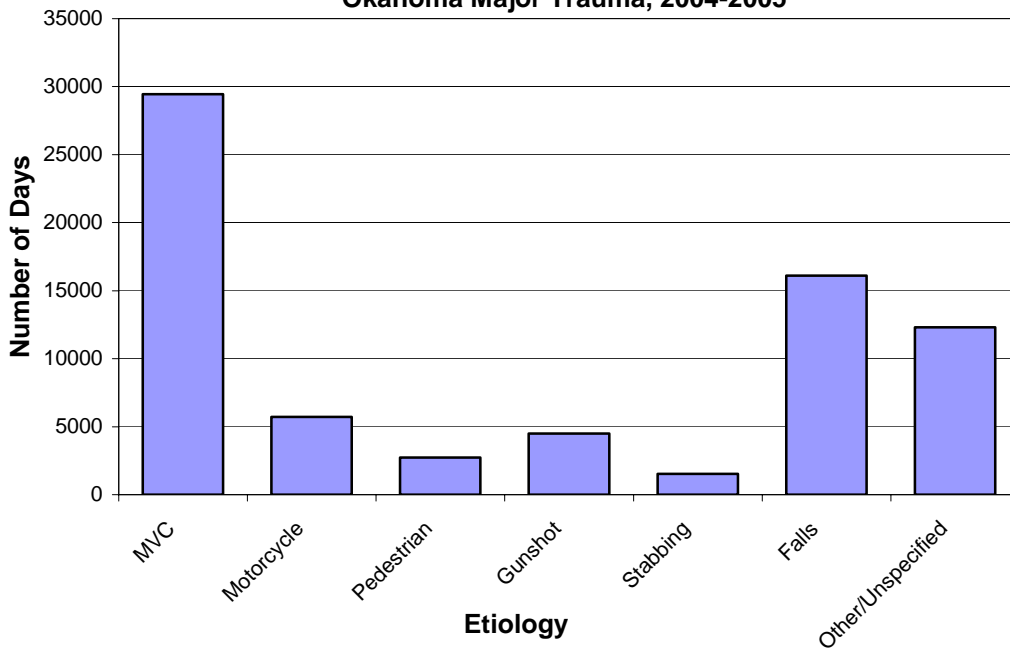
	Region, (%)							
Hospital Disposition	1 (NW)	2 (NE)	3 (SW)	4 (EC)	5 (SE)	6 (Central)	7 (Tulsa)	8 (OKC)
Home	60.5	69.8	63.3	72.3	61.5	52.7	81.5	70
Rehab	21.6	10.7	18.5	8.7	4.8	21.8	9.4	21.3
SNF/ICF	8.5	15.4	14.2	17.3	31.3	22.7	6.2	5.7
Other	9.4	4.1	4.1	1.3	2.4	2.7	2.9	3.1
Total Number Reported	260	442	581	190	128	128	3776	4823

Regional Distribution of Cases Within ISS Group, Major Trauma, 2004-2005



Hospital And ICU Length Of Stay (LOS)

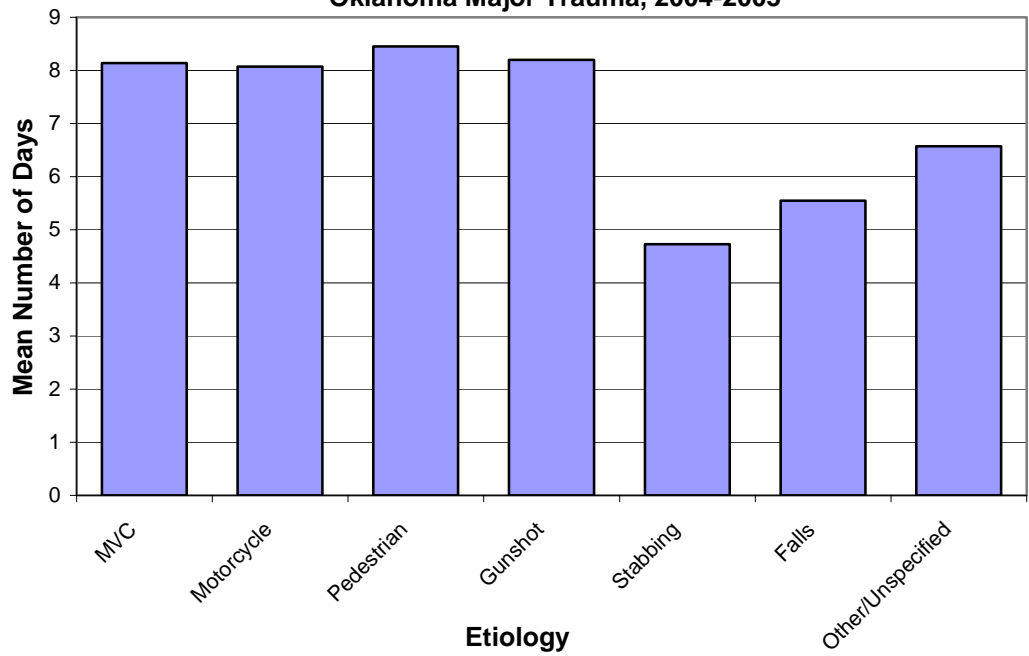
Total Hospital Days by Etiology, Oklahoma Major Trauma, 2004-2005



Highest total number of days were seen for motor vehicle crashes at about 29,000 days and falls with 16,000 days.

Note: MVC and falls are the most frequently seen etiologies.

**Mean LOS in Days by Etiology,
Oklahoma Major Trauma, 2004-2005**

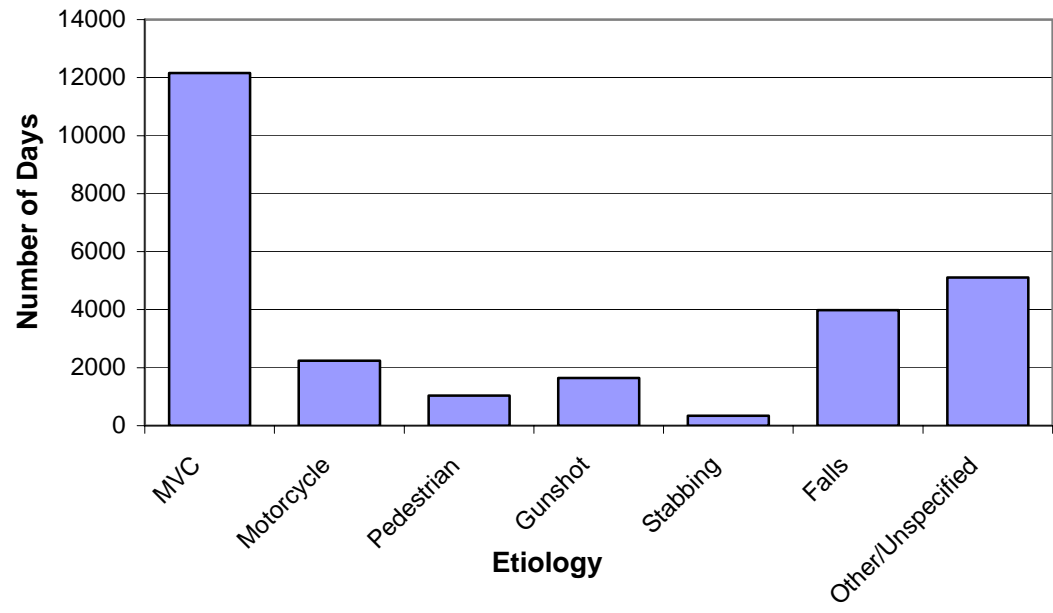


Pedestrian patients had the highest mean length of stay at 8.4 days and stabbings the shortest at about 4.6 days.

Motor vehicle, motorcycle, and gunshot patients had very similar lengths of stay at around 8 days.

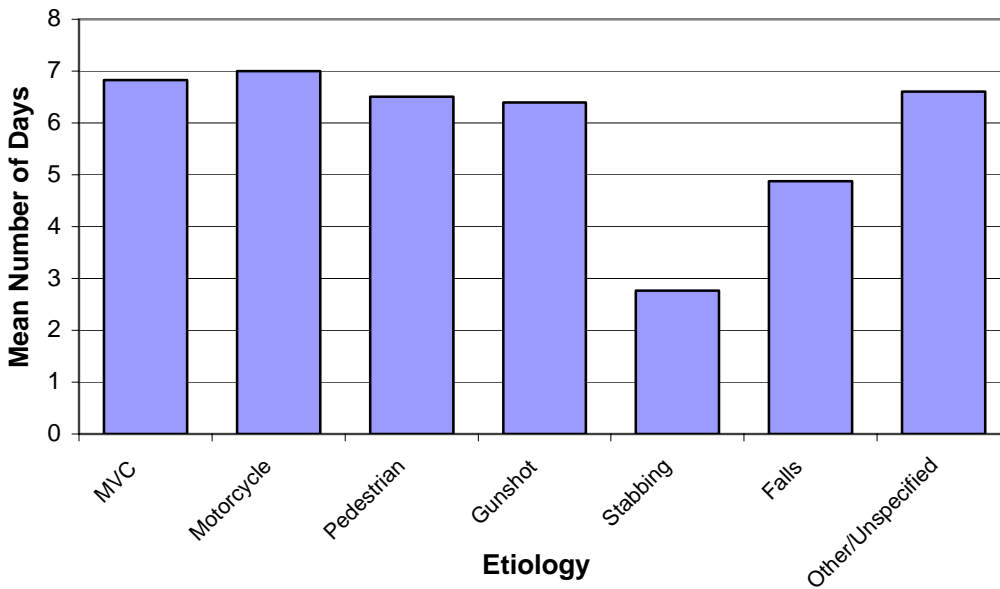
Falls had the second shortest mean length of stay at about 5.5 days.

**Total ICU Days by Etiology for
Major Trauma Patients with ICU Stays**



For patients with ICU stays, motor vehicle crash injured patients had the highest total (12,163) number of ICU days, followed by falls with (3,988). Stabbing had the lowest (338).

Mean ICU Days by Etiology for Patients with ICU Stays

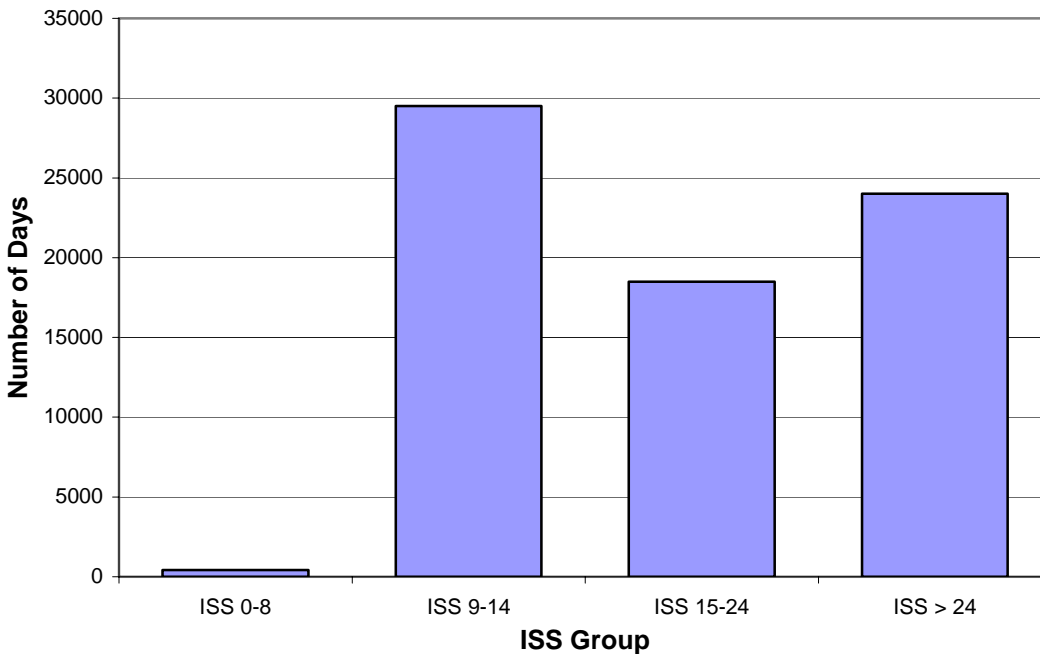


For patients with ICU stays, motor vehicle and motorcycle crash patients had the highest mean ICU stays at approximately 7 days.

Pedestrian, gunshot, and unspecified mechanism patients had similar mean ICU lengths of stay at a little over 6 days.

Stabbings had the shortest mean ICU length of stay at 3 days followed by falls at 5 days.

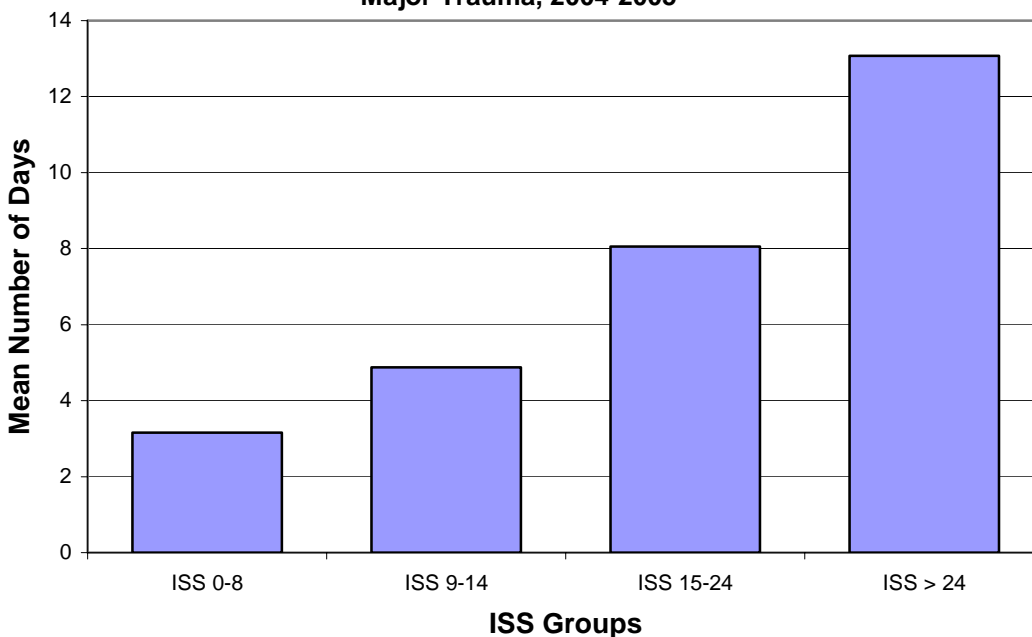
Total Hospital Days by Injury Severity Group, Major Trauma, 2004-2005



Note that the ISS 9-14 group accounts for the greatest number of cases – this explains the higher total days.

There are fewer ISS>24 cases but they had longer stays.

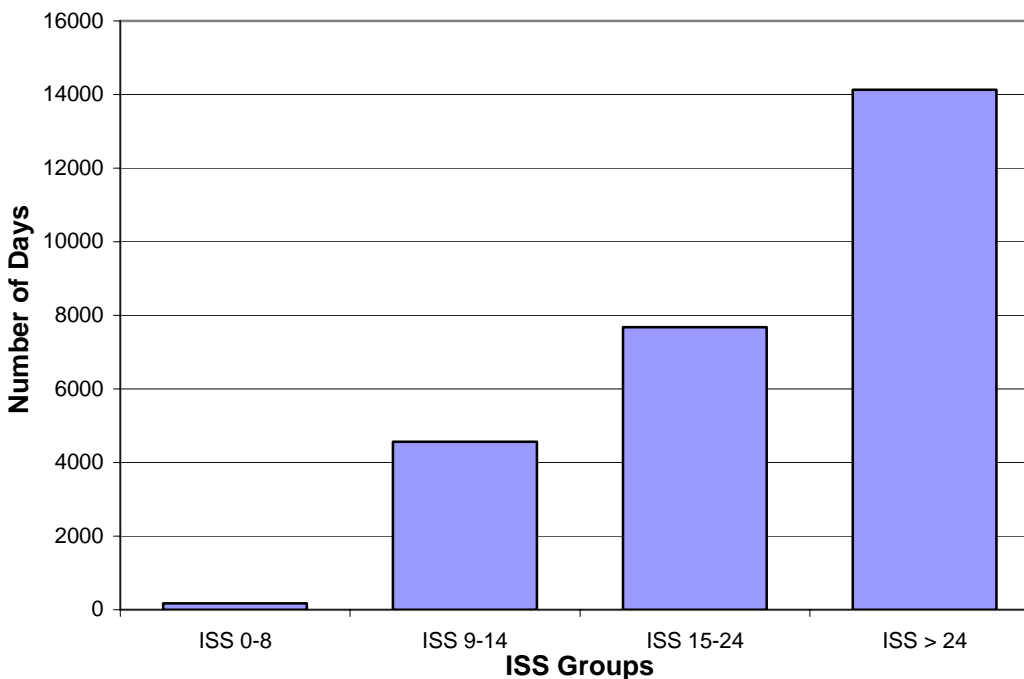
**Mean LOS in Days by Injury Severity Group,
Major Trauma, 2004-2005**



Mean length of stay increases steadily as the injury severity increases – from 3 days for ISS 0-8 to 13 days for the ISS > 24 group.

Note that many of the ISS 0-8 group met major trauma criteria because they died – often very early on in their care making injury coding more difficult. Their ISS is therefore not a true reflection of their injury severity.

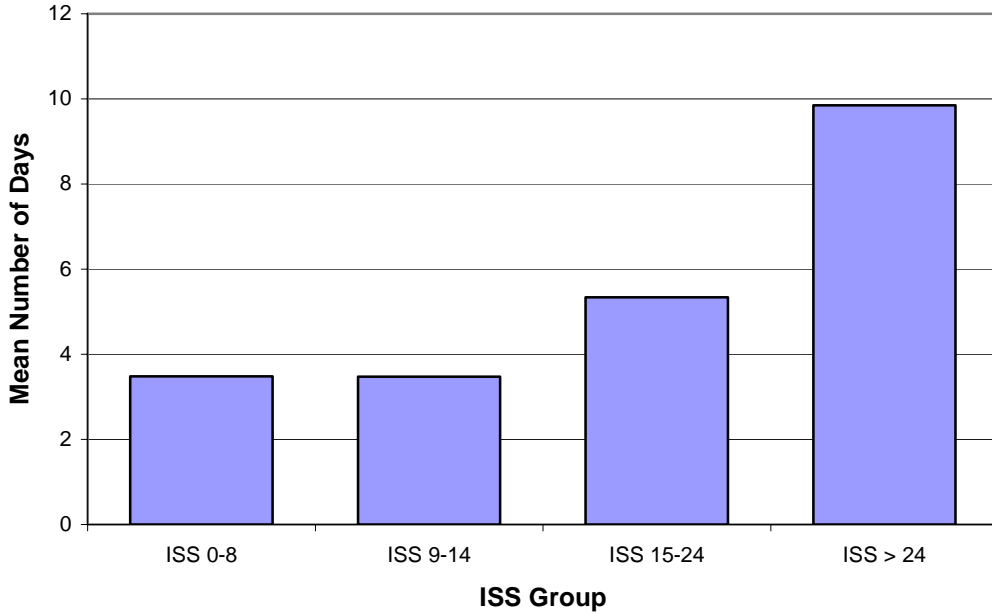
Total ICU Days by Injury Severity for Patients with ICU Stays



Graph shows the total ICU days by injury severity score groups for patients that had ICU stays.

The total ICU days increased with increasing severity from approximately 4,000 days for the ISS 9-14 group to a little over 14,000 for the ISS>24 group.

Mean ICU LOS in Days by Injury Severity for Patients with ICU Stays



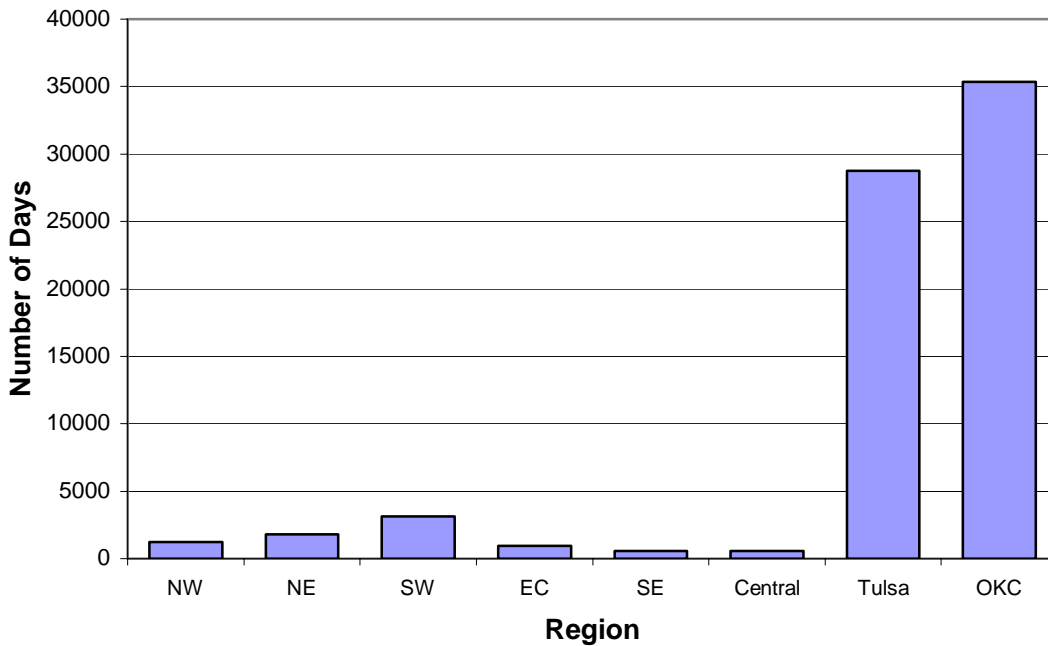
Graph shows the mean ICU length of stay by injury severity groups.

The ISS>24 group had the highest mean ICU length of stay at almost 10 days.

The ISS 15-24 group had a mean length of stay of about 5 days.

The ISS 0-8 and ISS 9-14 groups had mean ICU lengths of stay of about 3.5 days.

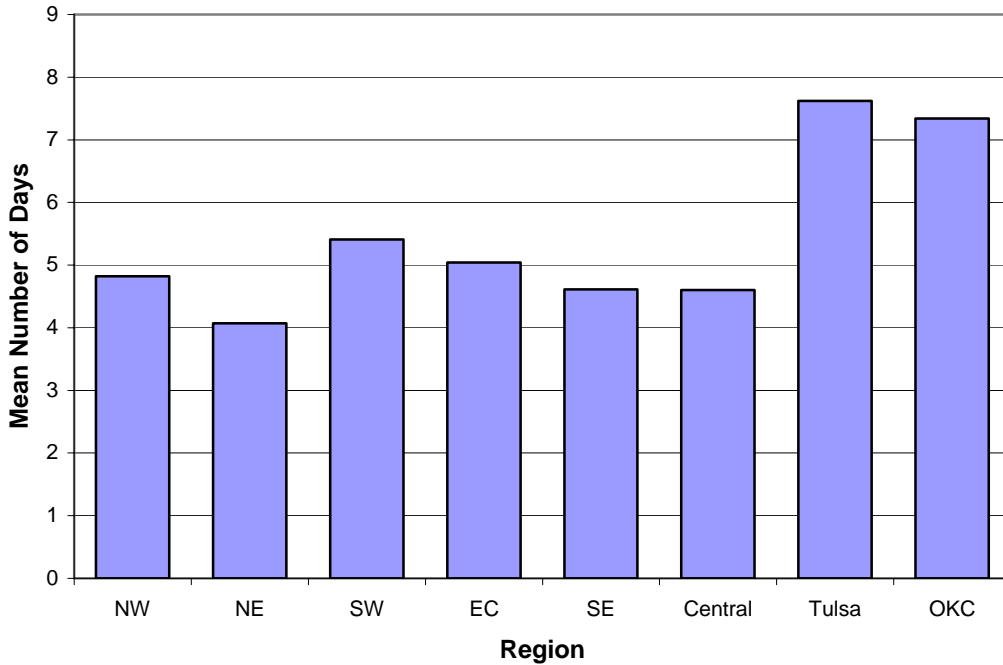
Total LOS in Days by Region, Major Trauma, 2004-2005



Graph shows the total number of hospital days by hospital region where the patient received care.

The Region 8 (OKC) had the highest total number of days at about 35,000 days followed by Region 7 (Tulsa) with roughly 28,500 days.

Mean LOS in Days by Region, Major Trauma, 2004-2005

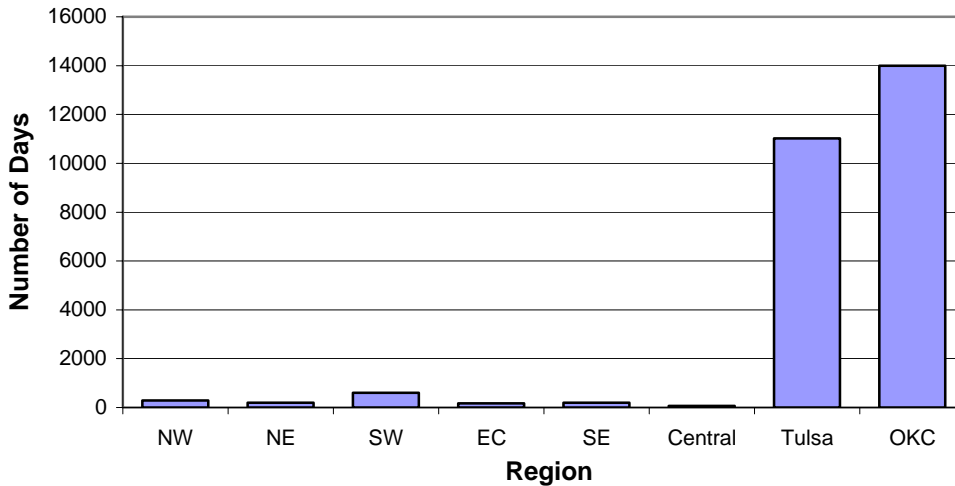


Graph shows the mean length of stay by the hospital region where the patient received care.

Regions 7 (Tulsa) and 8 (OKC) had very similar mean lengths of stay at just over 7 days.

The remaining Regions had lengths of stay of about 4 to 5 days with Region 3 (SW) having the highest at a little over 5 days.

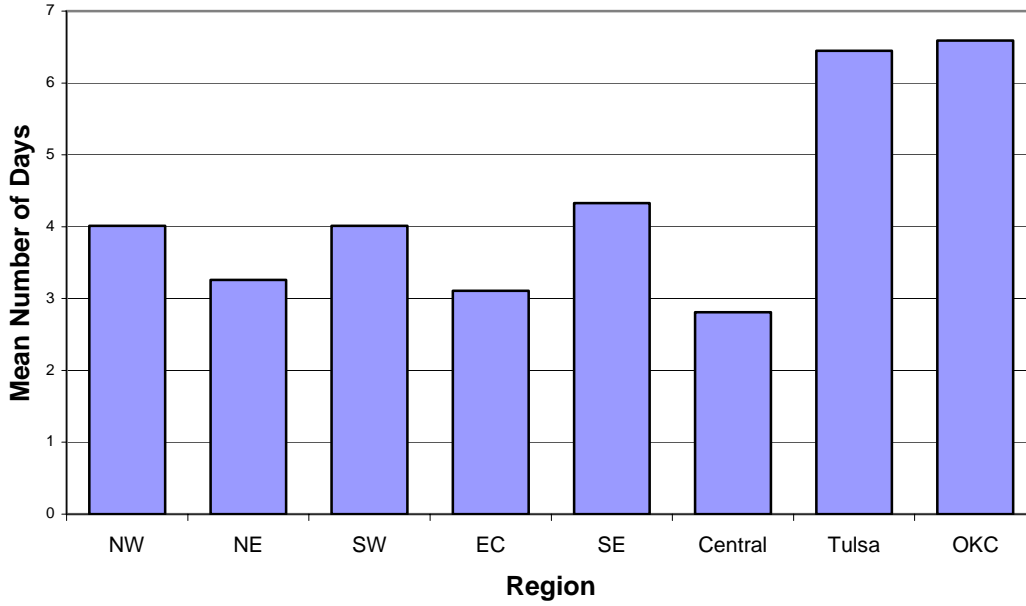
Total ICU Days by Region for Patients with ICU Stays, Major Trauma, 2004-2005



Graph shows the total ICU length of stay days for patients with ICU stays by hospital region where patients received care.

Region 8 (OKC) and 7 (Tulsa) accounted for the vast majority of ICU days together having about 25,000 ICU days.

**Mean ICU LOS in Days by Region for Patients with ICU Stays,
Major Trauma, 2004-2005**



Graph shows the mean ICU length of stay for patients with ICU stays by hospital region where the patient received care.

Tulsa and OKC had similar mean ICU stays of about 6.5 days.

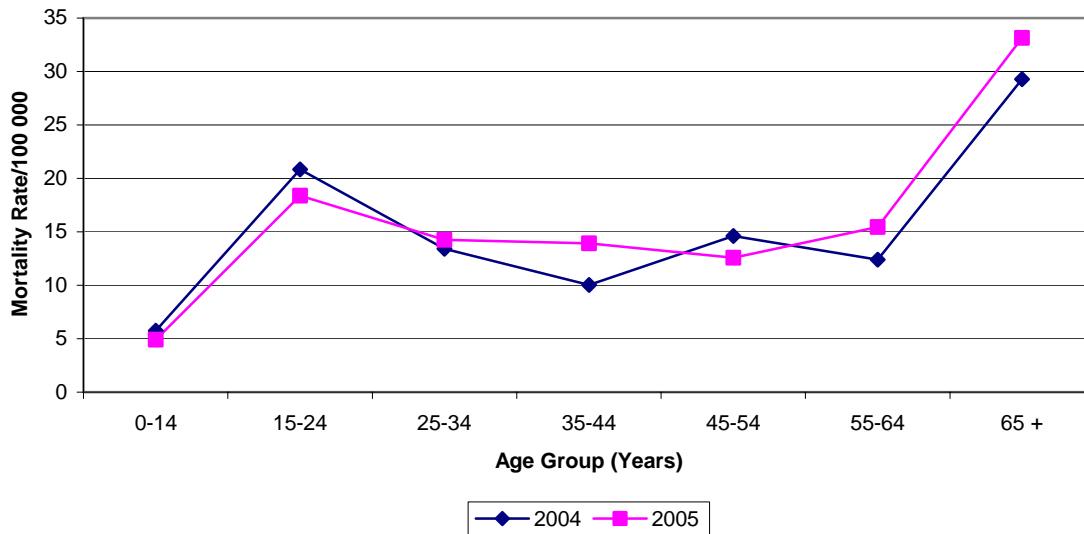
Among the other regions, NW, SW, and SE had similar means of approximately 4 days and NE, EC, and Central regions had the lowest mean ICU stays at about 3 days.

Mortality

A total of 1057 deaths were reported for 2004 and 2005. There was a decrease in mortality proportion from 2004 to 2005, from 10.7% (517/4850) to 9.7% (540/5478), respectively.

The age-adjusted mortality for 2004 was 14.3/100,000 population while that of 2005 was 15/100,000 population, an increase of 5%. This may be an artifact of increased reporting in 2005.

**Age-specific Mortality Rates by Year,
Oklahoma Major Trauma, 2004-2005**

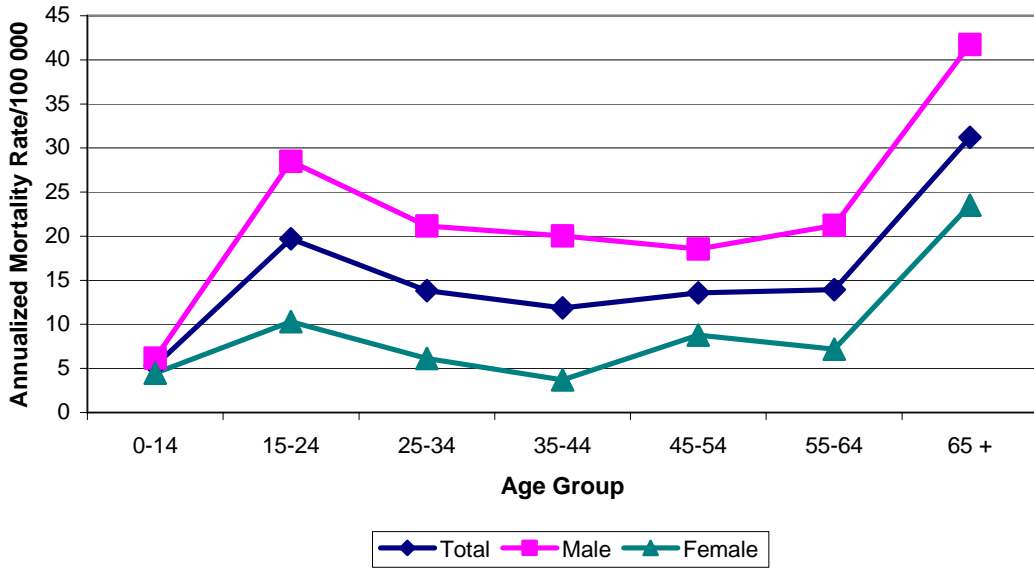


Highest mortality rates were observed in the 65 years and older age group followed by the 15-24 year age group in both 2004 and 2005.

From 2004 to 2005, mortality rates decreased by 11.5% (20.8 to 18.4/100 000 population) in the 15-24 year age group while it increased by 13% (29.3 to 33.2/100 000 population) in the 65 years and older age group. The largest increase (39%) was observed in the 35-44 year age group.

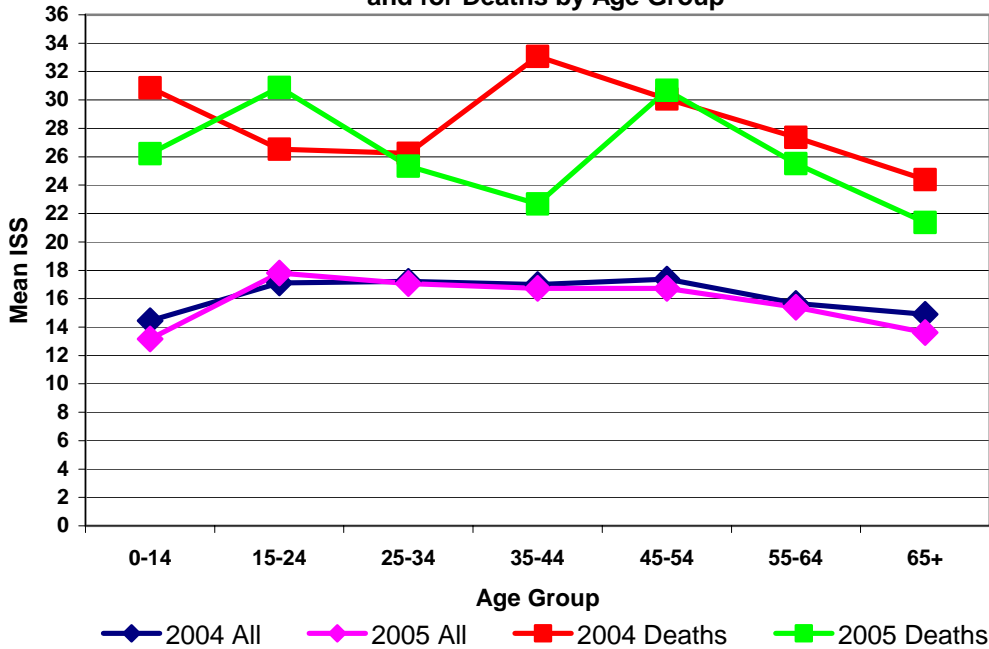
The lowest mortality rate was observed in pediatrics (0-14 years) in both 2004 and 2005.

**Age-Specific Mortality by Gender,
Oklahoma Major Trauma, 2004-2005**



Mortality rate peaked in the 65 years and older age group and 15-24 year age group regardless of gender.

**Mean Injury Severity Score for All Major Trauma
and for Deaths by Age Group**

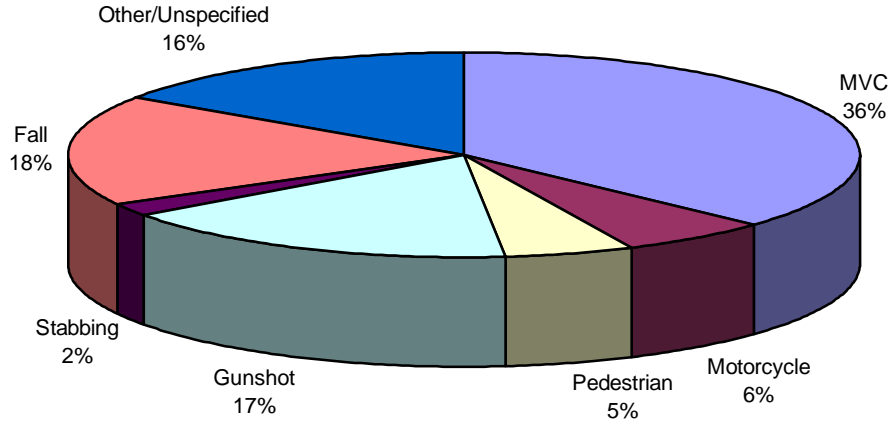


Mean ISS by age group didn't follow the same trend as mortality.

Cases that died early in their care may not be coded properly due to lack of complete diagnoses.

Some variability is reflective of few deaths.

Proportional Distribution of Deaths by Mechanism of Injury, Oklahoma Major Trauma , 2004-2005

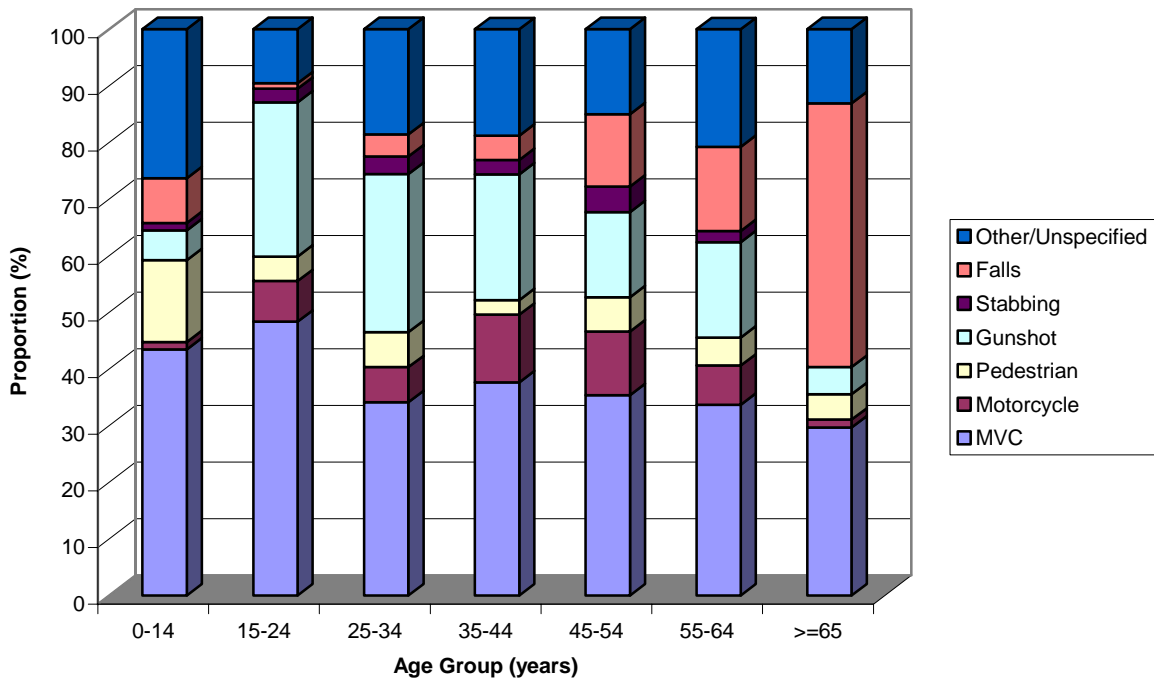


Mechanism of Injury	N (%)
MVC	391 (36)
Motorcycle	64 (6)
Pedestrian	57 (5.4)
Gunshot	174 (16.5)
Stabbing	21 (2)
Fall	185 (17.5)
*Other/Unspecified	165 (15.6)
Total	1057 (100)

*All other causes include: sports, animal-related, pedal cycling, machinery accidents, unarmed fights, aircraft, etc

Motor vehicle crashes accounted for over one-third (36%) of all major trauma deaths reported, followed by falls (17.5%) and gunshot wounds (16.5%).

**Deaths by Age Group and Mechanism of Injury,
Oklahoma Major Trauma, 2004-2005**



Etiology	Age Group (%)						
	0-14	15-24	25-34	35-44	45-54	55-64	>=65
MVC	43.4	48.3	34.1	37.6	35.3	33.7	29.7
Motorcycle	1.3	7.2	6.2	11.9	11.3	6.9	1.4
Pedestrian	14.5	4.3	6.2	2.6	6.0	4.9	4.5
Gunshot	5.3	27.3	27.9	22.2	15.0	16.8	4.8
Stabbing	1.3	2.4	3.1	2.6	4.5	2.0	0
Falls	7.9	0.96	3.9	4.3	12.8	14.9	46.6
Other/Unspecified	26.3	9.6	18.6	18.8	15.0	20.8	13.1
Total Number of Deaths	76	209	129	117	133	101	290

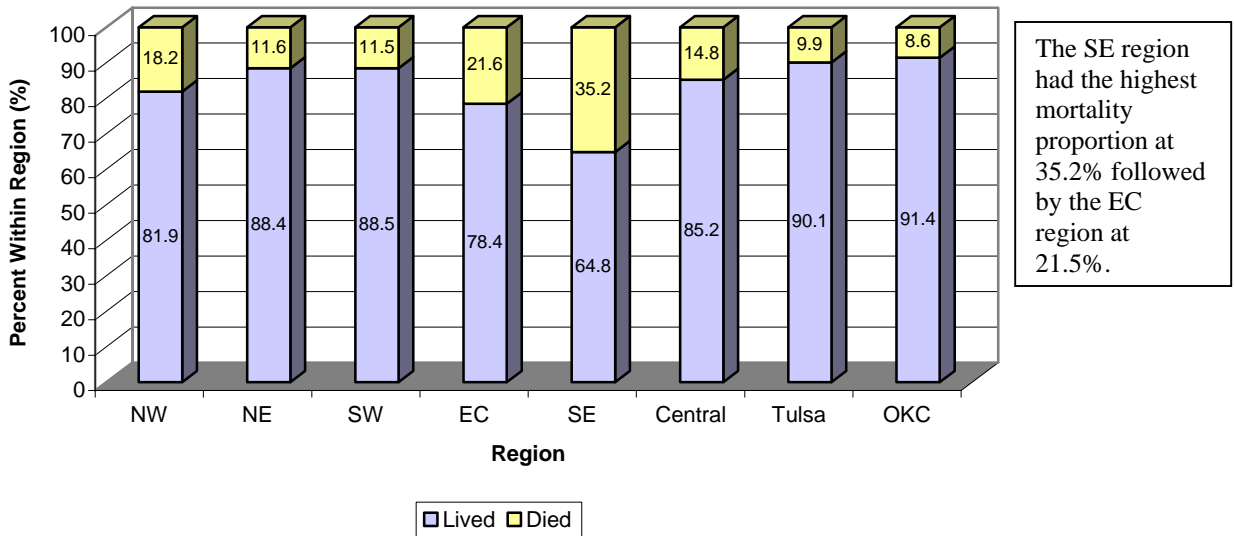
MVCs were the leading cause of death in all age groups except the 65 years and older age group in which nearly 50% of the deaths were attributable to falls.

About 50% of the deaths in the 15 – 24 years age group were due to motor vehicle crashes.

The highest proportions (22-28%) of gunshot wound-related deaths were observed in ages 15-44 years.

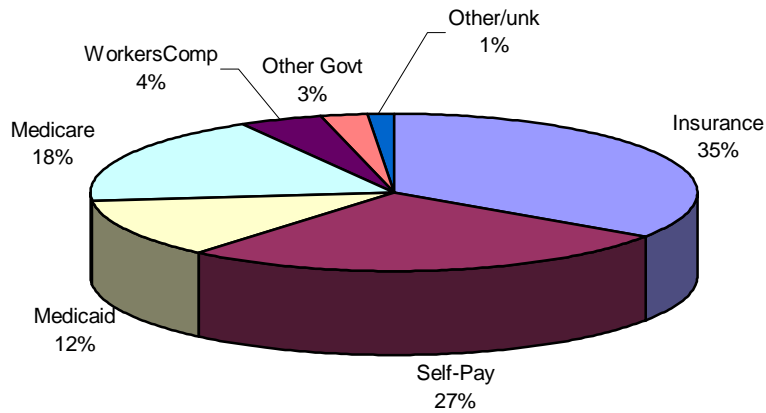
A significantly higher proportion (4.5%) of pedestrian-related deaths were observed in pediatrics (age 0-14 years).
 The following graph summarizes mortality proportion by region for major trauma:

Oklahoma Major Trauma by Outcome and Region, 2004-2005



Primary Payor

Oklahoma Major Trauma by Primary Payor, 2004-2005

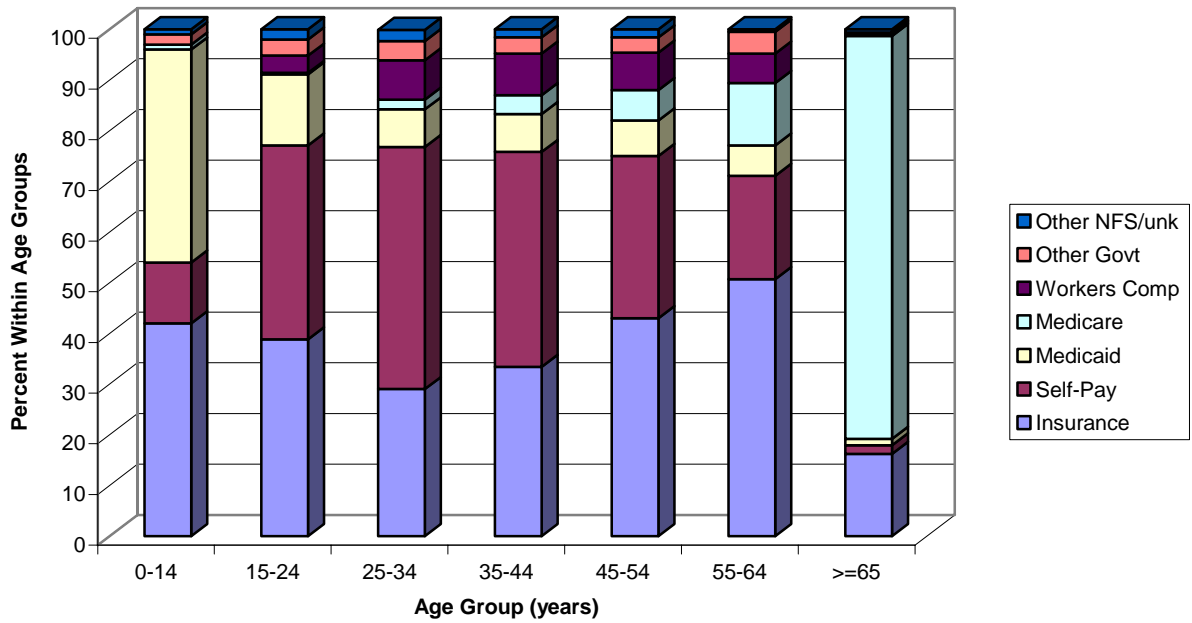


35% of major trauma cases had insurance identified as the primary payor.

Self-Paying patients accounted for at least a quarter of major trauma.

Government-funded patients accounted for at least one-third of cases reported.

Payor Mix by Agegroup, Oklahoma Major Trauma, 2004-2005



Primary Payor	Age Group (%)						
	0-14	15-24	25-34	35-44	45-54	55-64	>=65
Insurance	42	38.8	29	33.4	43	50.7	16.2
Self-Pay	12	38.3	47.8	42.4	32	20.4	1.7
Medicaid	42	14	7.4	7.5	7	6	1.3
Medicare	1	0.3	1.9	3.7	6	12.3	79.5
Workers Comp	0	3.4	7.8	8.2	7.4	5.8	0.4
Other Govt	2	3.2	3.8	3.2	3	4.3	0.3
Other *NFS/unk	1	2.2	2.2	1.6	1.6	0.7	0.6
Total Number	1418	1971	1383	1329	1270	914	2043

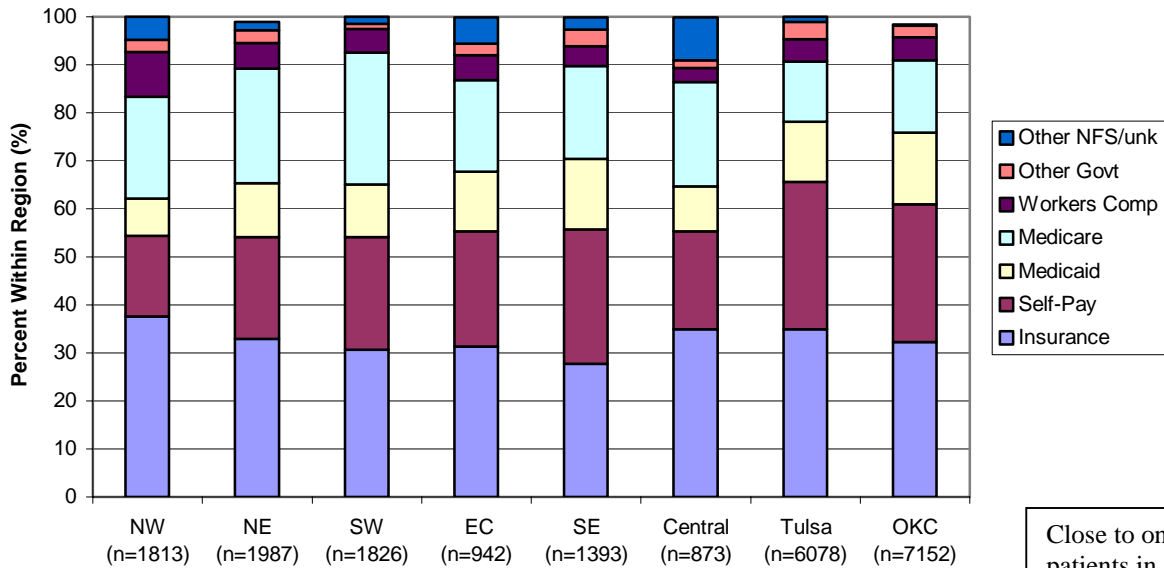
*NFS: Not Further Specified

High proportions of self-pay patients were observed in ages 15-44 years with a peak in the 25-34 year age group (48%).

Highest proportion (50.7%) of insured patients was observed in the 55-64 year age group followed by the 45-54 year and less than 15 year age groups.

There was a disproportionately high Medicaid coverage in pediatric patients (42%); 80% of patients 65 years and older had Medicare coverage.

Proportional Distribution of Primary Payor, All Reported Cases By Region, 2004-2005



	REGION (%)							
Primary Payor	NW	NE	SW	EC	SE	Central	Tulsa	OKC
Insurance	37.6	32.9	30.7	31.4	27.7	34.9	35	32.3
Self-Pay	16.8	21.2	23.4	23.9	28	20.5	30.6	28.7
Medicaid	7.8	11.3	11	12.4	14.7	9.3	12.6	14.9
Medicare	21.2	23.8	27.4	19.1	19.3	21.7	12.5	15
Workers Comp	9.3	5.3	5	5.2	4.2	2.9	4.6	4.8
Other Govt	2.5	2.7	1	2.4	3.5	1.6	3.7	2.4
Other *NFS/unk	4.8	1.76	1.5	5.5	2.4	9	1	0.3
Total Number	1813	1987	1826	942	1393	873	6078	7152

*NFS: Not Further Specified

Close to one-third of patients in all regions were insured except for the SE Region.

OKC, Tulsa and SE Regions had the highest proportions of self-paying patients (28-30.6%) and Medicaid-funded patients (12.6-14.9%).

SW Region had highest proportion of Medicare-funded patients (27.4%).

A somewhat higher proportion of Worker's Compensation-funded patients was observed in the NW region (9.3%).

Inter-Facility Transfers

All hospitals are required to report all trauma transfers to the State Trauma Registry unless the case meets the exclusion criteria. Some hospitals still have gaps in reporting all cases transferred in or out of their facility. For hospitals with significant reporting problems of inter-facility transfers for 2005, please see Appendix 1.

Major Trauma

Of the 10,328 incident major trauma cases reported by definitive care facilities, about 33% (3388) were transferred from one acute care facility to another.

Patient Characteristics by Transport from Scene versus Transfer from Another Acute Care Facility, Major Trauma, 2004-2005

Variable	Direct, n (%)	Transfer, n (%)
Total Number, N	6940	3388
Number of deaths	831 (12)	226 (6.7)
Gender		
Male	4488 (64.7)	2216 (65.4)
Female	2449 (35.3)	1171 (34.6)
Mechanism of Injury		
Motor Vehicle Crash	2519 (36.4)	1108 (32.7)
Motorcycle	520 (7.5)	189 (5.5)
Pedestrian	253 (3.6)	70 (2.1)
Gunshot Wound	450 (6.5)	98 (2.9)
Stabbing	264 (3.8)	60 (1.8)
Falls	1861 (26.8)	1046 (30.9)
Other	1063 (15.3)	813 (24)
Mean Age in years (SD)	42.8 (23.5)	35.8 (25.9)
Mean ISS (SD)	16.3 (10.7)	15.4 (9.2)
Mean SBP (SD)	129.5 (39.6)	133.1 (26.8)
Mean GCS (SD)	12.9 (4.1)	13.2 (3.9)
Mean RR (SD)	18.5 (8.6)	18 (8.5)

Overall, over two-thirds (69%) of major trauma patients were transported directly to a definitive care facility.

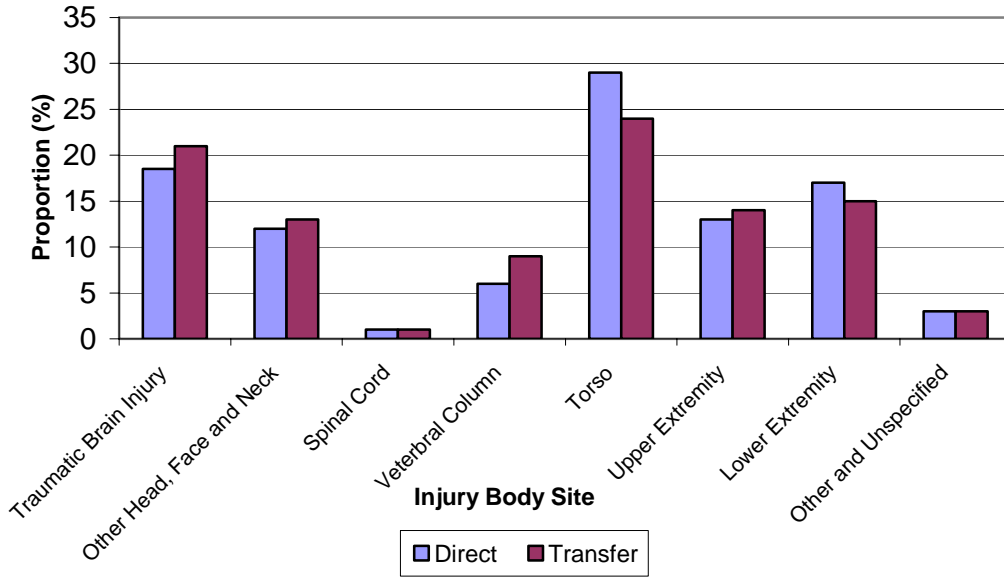
Transferred patients were generally younger and predominantly male.

Motor vehicle crashes accounted for 36% of the directly transported patients and 33% of patients transferred from another facility.

Falls accounted for 31% of transferred patients and 27% of directly transported patients.

Directly transported patients had slightly higher mean ISS, lower mean SBP and GCS.

Direct Transport from Scene versus Transfer from Other Acute Care Hospitals Across Injury Body Site, Oklahoma Major Trauma, 2004-2005

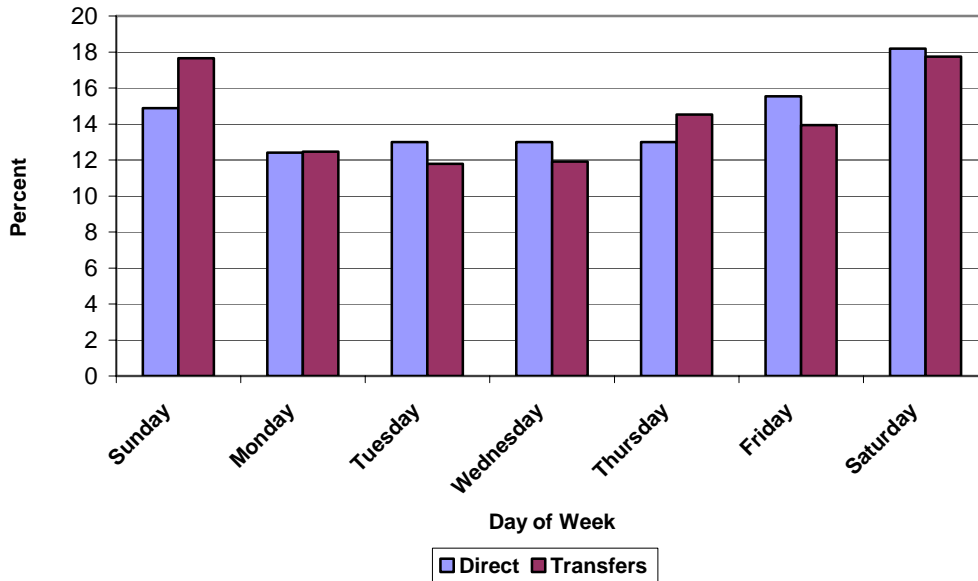


The incidence of traumatic brain injury (TBI) was higher in transferred patients.

Directly transported patients had a higher torso injuries incidence.

Day of Week and Time of Day

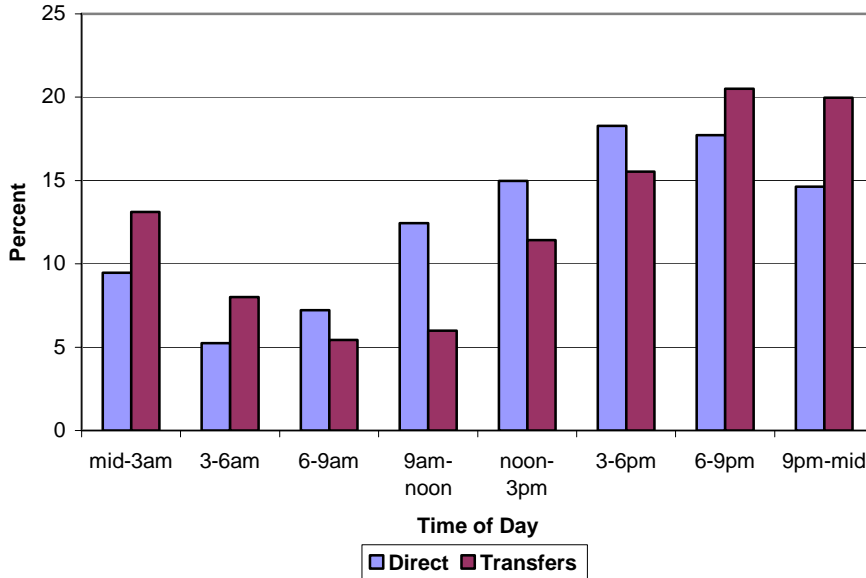
Direct Transport from Scene versus Transfer from Other Acute Care Facility Across Day of Week, Oklahoma Major Trauma, 2004-2005



Monday through Saturday, there was no significant variation between the proportion of trauma patients transported directly from scene and those transferred from another facility.

A higher proportion of transferred patients was generally observed on **Sunday**.

Direct Transport from the Scene versus Transfer from Other Acute Facility Across Time of Day, Oklahoma Major Trauma, 2004-2005



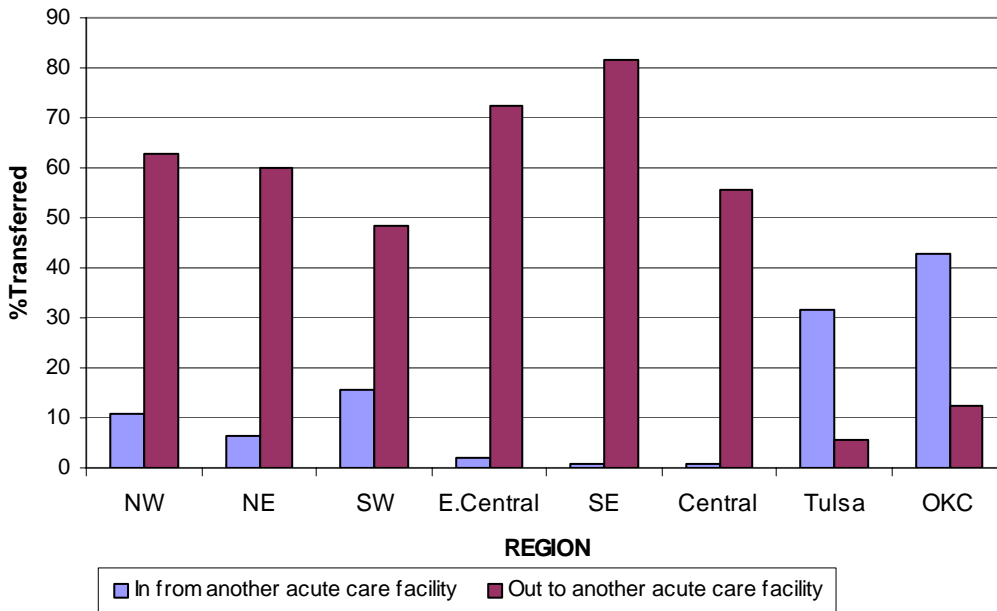
Between 6a.m. and 9p.m., a higher proportion of major trauma patients were **transported directly** to a definitive care facility.

Between 9p.m. and 6a.m., a higher proportion of major trauma patients were **transferred from one facility to another.**

All Trauma Transfers

The following graph shows inter-facility transfers as a proportion of all cases reported for each region.

Inter-facility Transfers by Region Among All Reported Cases, Oklahoma Trauma Registry, 2004-2005



Facilities in **EC, SE and Central** regions transferred almost all their patients to another acute care facility.

OKC and Tulsa Regions received the majority of trauma patients transferred from another facility and to a lesser extent, the **SW, NW, and NE** Regions.

With the exception of a few hospitals, Level IV hospitals generally transferred almost all trauma patients to other hospitals (See Appendix 2). The table below lists Level III facilities that transferred 38-82% of their reported trauma patients (includes all patients, major and minor).

Level III Facilities: Transfer Proportions

Rank	Facility	# of cases reported	% transferred out
1	Claremore Regional Hospital	45	82
2	McAlester Regional Health Center	255	81
3	Woodward Hospital and Health Center	127	80
4	Great Plains Regional Medical Center	168	80
5	Grady Memorial Hospital	117	79
6	Stillwater Medical Center	57	65
7	Unity Health	330	63
8	St Francis Hospital at Broken Arrow	195	62
9	Duncan Regional Hospital	225	52
10	Midwest Regional Medical Center	317	51
11	SouthCrest Hospital	114	46
12	Jackson County Memorial Hospital	177	42
13	Muskogee Regional Medical Center	331	41
14	Mercy Memorial Health Center Inc	372	41
15	Edmond Medical Center	130	40
16	Integrus Southwest Medical Center	446	39
17	Deaconess Hospital	178	38

Oklahoma City- Region 8

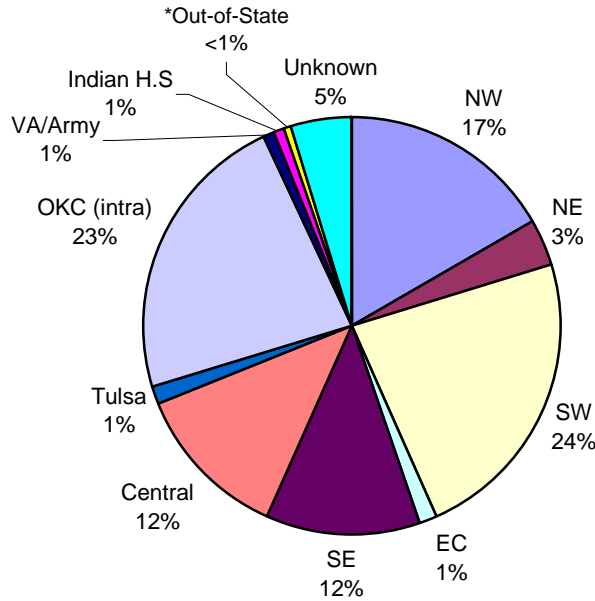
7152 cases were reported for 2004-2005 (includes both major trauma and minor trauma transfers); of these, 77.5% (5545) were major trauma.

43% (3084) were transferred from another facility (includes inter- and intra-regional transfers).

Table below summarizes proportion of transfers (in and out) for all facilities by decreasing transfer proportion, OKC Region 8 in 2004-2005 (includes all trauma patients reported).

Facility	# of cases Reported	% transferred out	% transferred in
Moore Medical Center	16	100	0
Physicians Hospital of Oklahoma	6	67	0
Midwest Regional Medical Center	317	51	5
Edmond Medical Center	130	40	5
Integris Southwest Medical Center	446	39	11
Deaconess Hospital	178	38	7
Integris Canadian Valley Regional Hospital	60	33	2
St. Anthony Hospital	230	27	32
Mercy Health Center - OKC	402	15	35
Norman Regional Hospital	489	14	32
Integris Baptist Medical Center	594	13	49
Bone & Joint Hospital	49	4	61
OU Medical Center	4235	3	55

Source of Trauma Transfers: Trauma Patients Transferred from Another Acute Care Facility, OKC Region, 2004-2005

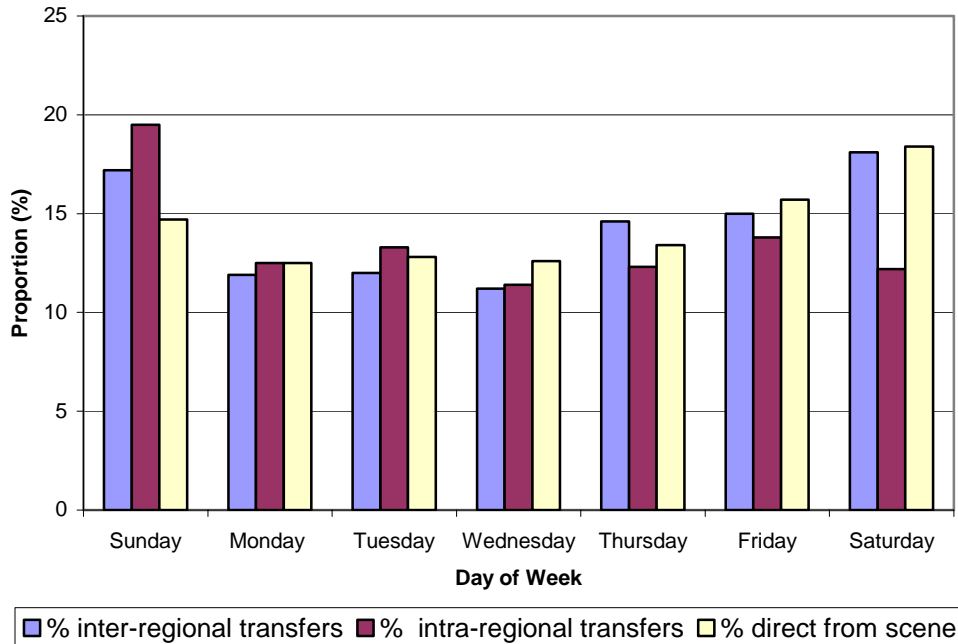


Of the 3,084 trauma patients transferred into the OKC region, nearly one-quarter originated from the OKC Region (**intra-regional transfers**).

OKC Region received the highest proportion of transferred cases from the **SW Region**, followed by the **NW Region** (17%).

The age distribution of transferred patients peaked in the younger age groups representing predominantly males aged 0-24 years.

Source of Trauma System Inclusion Across Day of Week, OKC Region, All Reported Cases, 2004-2005

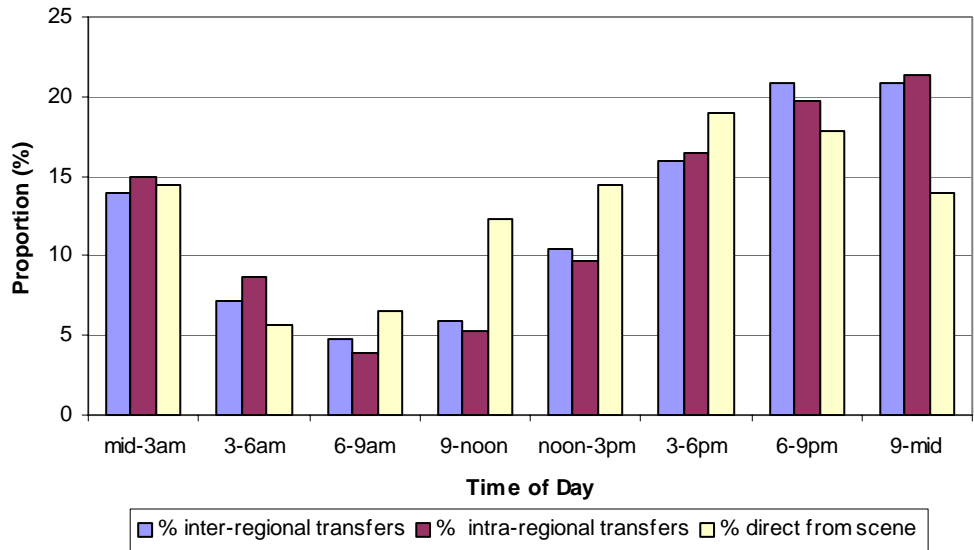


Proportion of patients transferred from another acute care facility varied little Monday through Friday.

Higher proportion of **intra-regional** transfers occurred on Sunday.

A higher proportion of **inter-regional** transfers occurred on Saturday and Sunday.

Direct from Scene versus Transfer from Another Facility Across Time of Day, All Reported Cases, OKC Region, 2004-2005

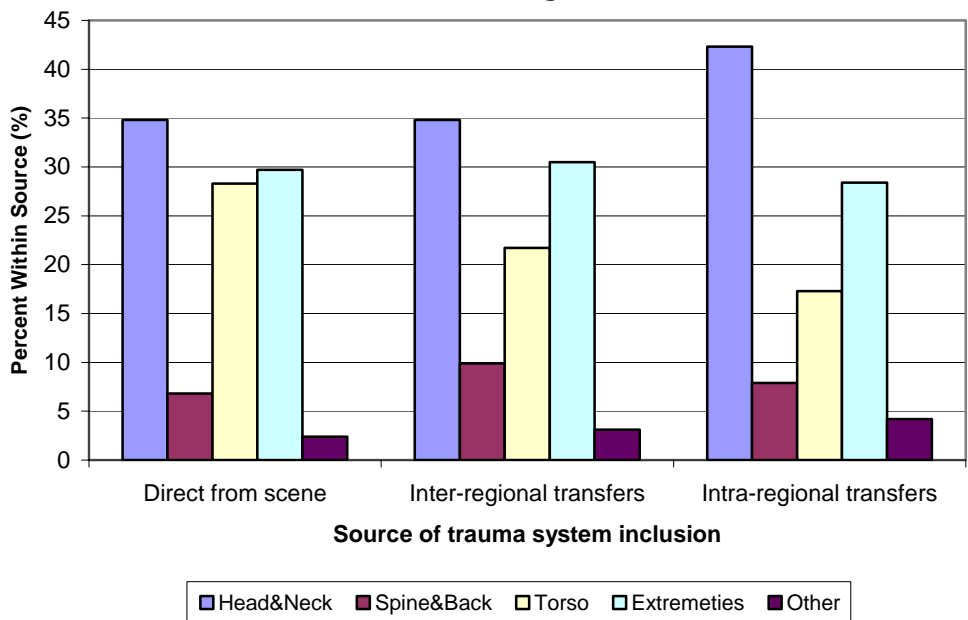


A higher proportion of both inter-regional and intra-regional inter-facility transfers occurred between 6 p.m. and midnight with a marked increase between 9.p.m. and midnight.

A higher proportion of patients transported directly from the scene occurred between 6 a.m. and 6 p.m.

Injury Severity and Site

Source of Trauma System Inclusion by Injury Site and Incidence, OKC Region, 2004-2005

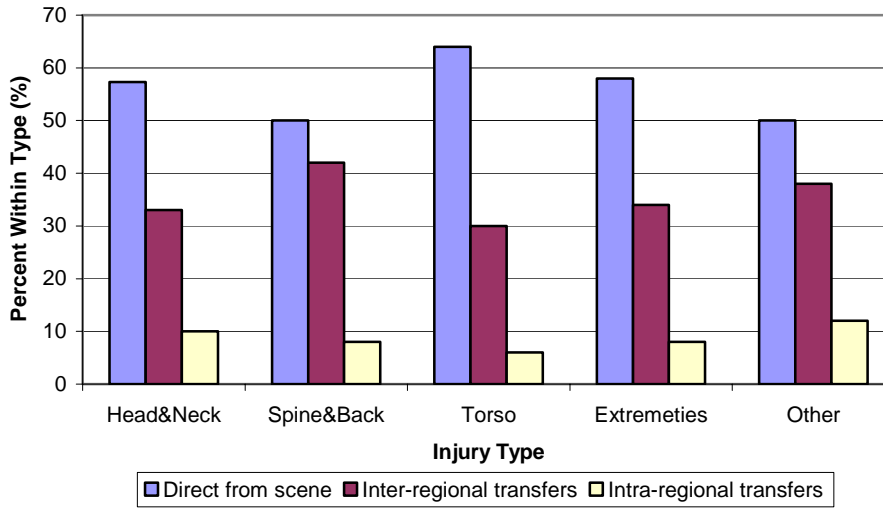


The graph summarizes sites by direct transport from scene/transfer from another acute care facility. Note: one patient may contribute to more than 1 injury site.

There was a **higher incidence of head and neck injuries** regardless of arrival status.

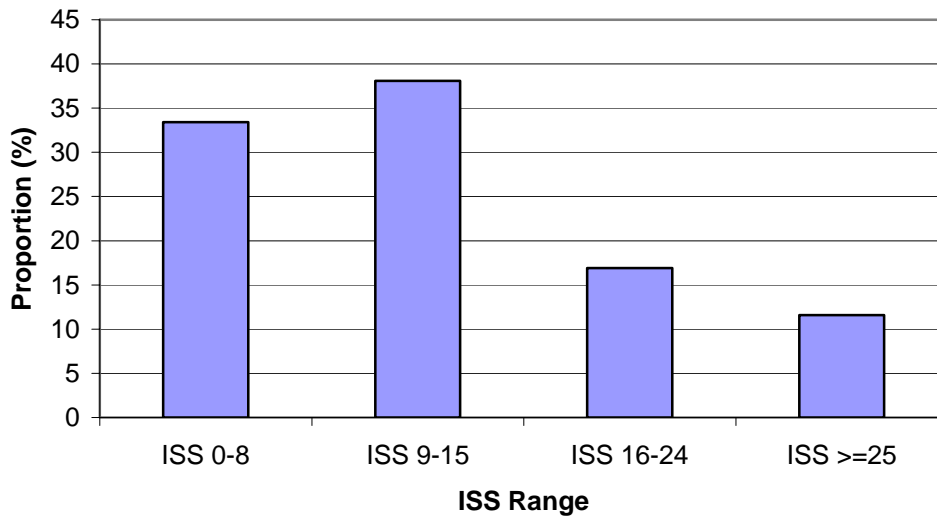
The incidence of **head and neck injuries** was higher in **intra-regional** trauma transfers compared to direct from scene/inter-regional transfers.

**Source of Trauma System Inclusion by Injury Site,
OKC Region, 2004-2005**



In the OKC Region, there is some deviation from the 2:1 direct to transfer ratio that is generally observed:
 Head and Neck: about 57% direct and 43% transfer;
 Spine and Back: 50% direct and 50% transfer;
 Torso: Somewhat resembles the general pattern with 64% direct and 36% transfer; and
 Extremities: 58% direct and 42% transfer.

***ISS Distribution, Patients Transferred from Another Facility,
OKC Region, 2004-2005**



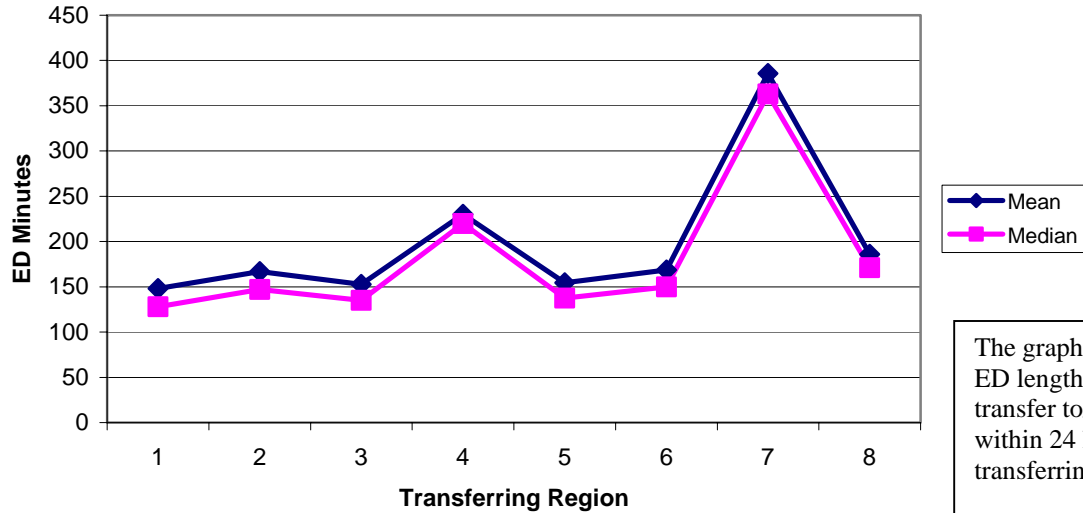
About one-third of all transferred patients were minor trauma (ISS <9).

 Severely injured patients (ISS >15) accounted for 29% of all patients transferred from another facility.

*As reported by definitive receiving facility

ED Length of Stay

**Mean and Median ED Length of Stay*,
Trauma Patients Transferred to OKC Region, 2004-2005**



The graph and table summarize ED length of stay before transfer to/within OKC Region within 24 hours as reported by transferring facility.

All transfers spent at least 2 hours at the transferring facility.

Intra-regional (OKC) transfers, on average, spent at least 3 hours at transferring facility.

Only 10 patients were transferred from Region 7, hence median/mean ED time must interpreted with caution as these may have been special cases.

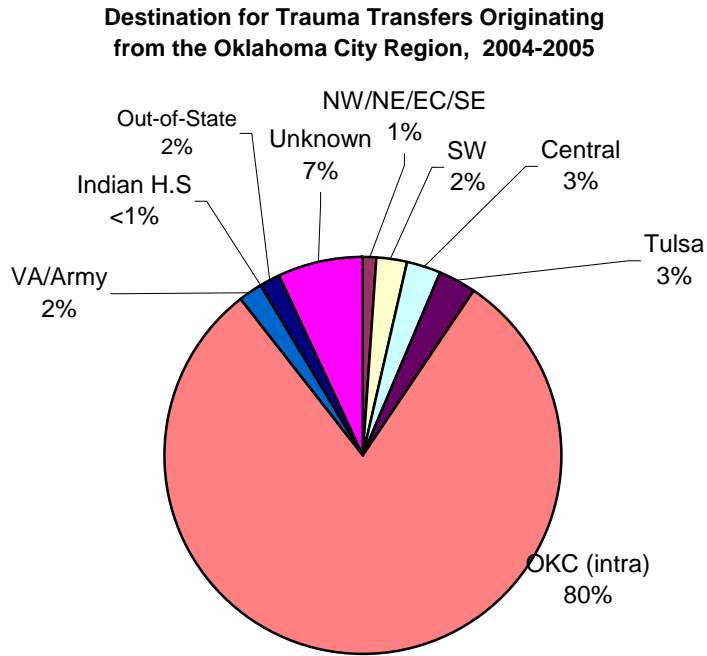
Transferring Region	N	Mean ED Minutes	Median ED Minutes
1 (NW)	516	148.4	128
2 (NE)	59	166.7	147
3 (SW)	561	152.8	135
4 (EC)	26	230.1	220
5 (SE)	298	154.4	137
6 (Central)	407	168.6	150
7 (Tulsa)	10	385.7	363
8 (OKC)	691	186.6	171

**Injury Severity and Selected Initial ED Vital Signs,
Trauma Patients Transferred to/within Region 8 (OKC)**

Variable	N	# missing	Mean	Median	Range
ISS	2549	78	9.11	9	1 - 75
SBP	2412	215	133.84	133	0 - 253
GCS	2280	347	13.98	15	3 - 15
RR	2582	45	20.97	20	0 - 64
RTS	2126	501	7.50	7.84	0 - 7.84
TRISS	2011	616	0.96	0.99	0.01 - 1

On average, patients were physiologically stable at the time of initial ED assessment. The preponderance towards low ISS scores is likely an artifact of incomplete injury diagnosis before patients were transferred.

Patient Destination: Out-Transfers



80% of patients transferred out of an OKC region hospital went to another OKC Region hospital (intra-regional transfers).
2% were transferred out-of-state.

Hospital Trauma Classification of Transferring and Receiving Hospitals, OKC Region, 2004-2005

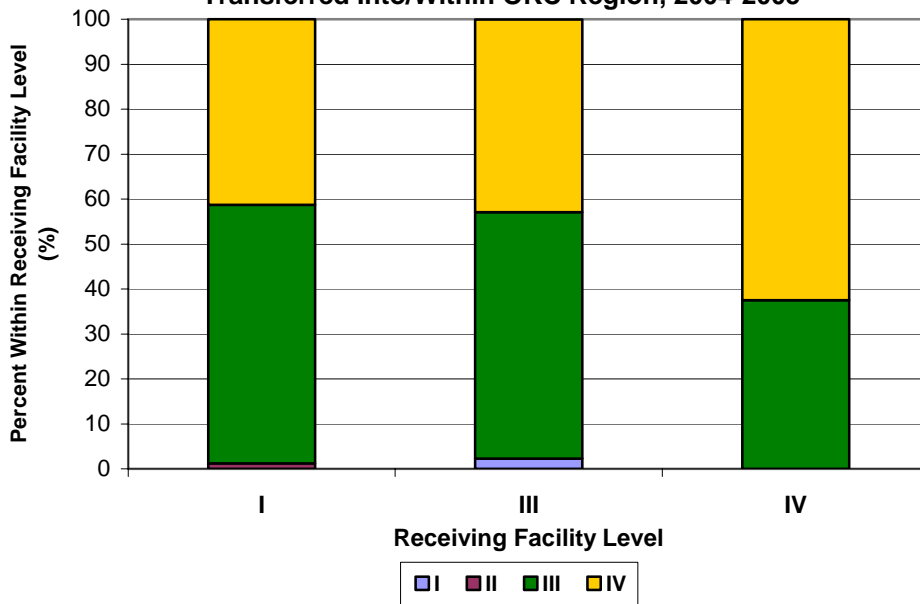
Transferring Trauma Level by Receiving Trauma Level, Region 8				
	Receiving Level			Total
	1	3	4	
Transferring Level	n(%)	n(%)	n(%)	
1	0(0)	11(2.9)	0(0)	11
2	8(0.6)	0(0)	0(0)	8
3	845(58.6)	210(56.9)	3(37.5)	1058
4	590(40.9)	148(40.1)	5(62.5)	743
Total	1443(100)	369(100)	8(100)	1820

	Receiving Level			Total
	1	3	4	
Other Level	n(%)	n(%)	n(%)	
Unknown	27(42.9)	31(93.9)	0(0)	58
Indian Health	11(17.5)	1(3.0)	0(0)	12
Veterans	16(25.4)	0(0)	0(0)	16
Arkansas	2(3.2)	0(0)	0(0)	2
Missouri	2(3.2)	0(0)	0(0)	2
Texas	5(7.9)	1(3.0)	0(0)	6
Total	63(100)	33(100)		96

99% of major trauma patients treated at the Level I trauma center were transferred from Level III (58%) and IV (41%) facilities.

About 57% of major trauma patients treated by Level III facilities came from other Level III facilities.

**Transferring Facility Level by Receiving Facility Level,
Patients (Both Major and Minor)
Transferred Into/Within OKC Region, 2004-2005**



Of all cases transferred to the Level I Trauma Center, close to 60% came from Level III facilities while close to 40% came from Level IV facilities.

Of cases transferred to Level III Trauma Centers, about 55% came from other Level III facilities while about 42% came from Level IV facilities.

Receiving Facility Level (n)	Transferring Facility Level (n)			
	I	II	III	IV
I	0	26	1255	901
III	15	0	364	284
IV	0	0	9	15

Tulsa Region

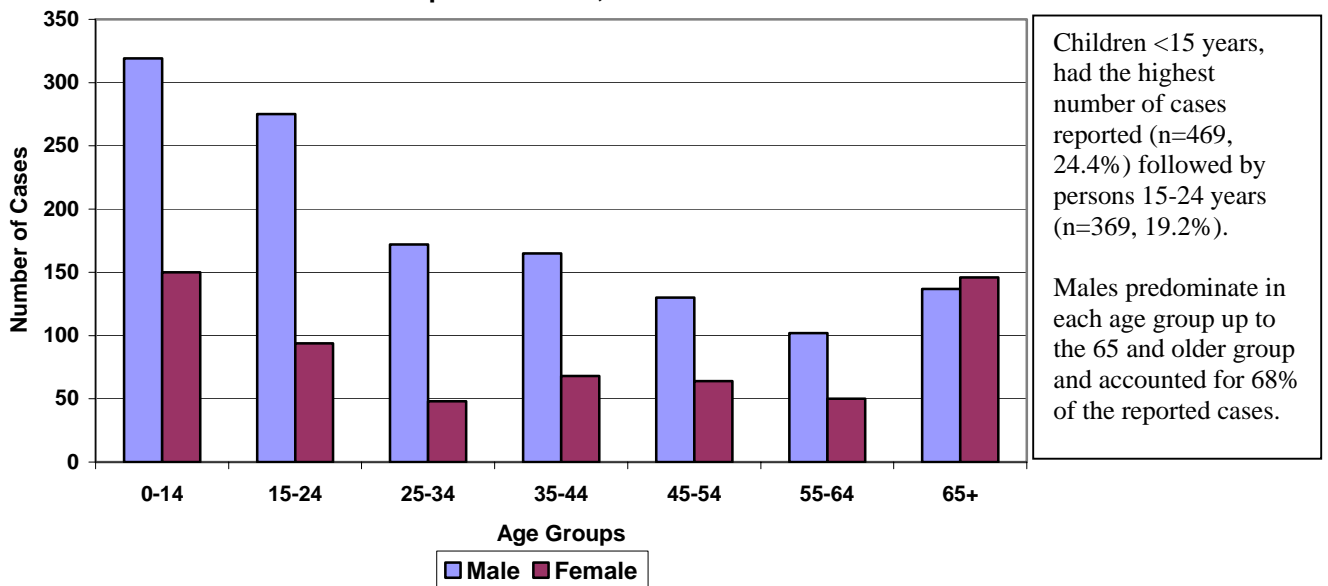
6073 cases were reported in the Tulsa Region for 2004-2005 (includes both major trauma and minor trauma transfers)

Of these 4215 (69%) met the major trauma criteria.

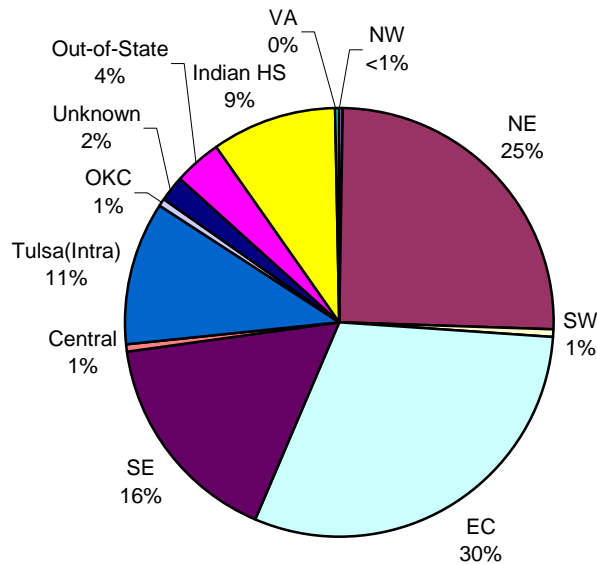
32% (1921) were transferred from another acute care facility (includes both inter- and intra-regional transfers).

Trauma Transfers In and Out for Tulsa Region Hospitals			
Facility	# of cases reported	% transferred out	% transferred in
Saint Francis Hospital at Broken Arrow	195	62	2
SouthCrest Hospital	114	46	10
Tulsa Regional Medical Center	282	13	72
Hillcrest Medical Center, Tulsa	279	11	31
St. John Medical Center	1560	3	19
Saint Francis Hospital, Tulsa	3648	2	36

Gender and Age Group Distribution for Patients Transferred From Another Acute Care Facility, Tulsa Region, All Reported Cases, 2004-2005



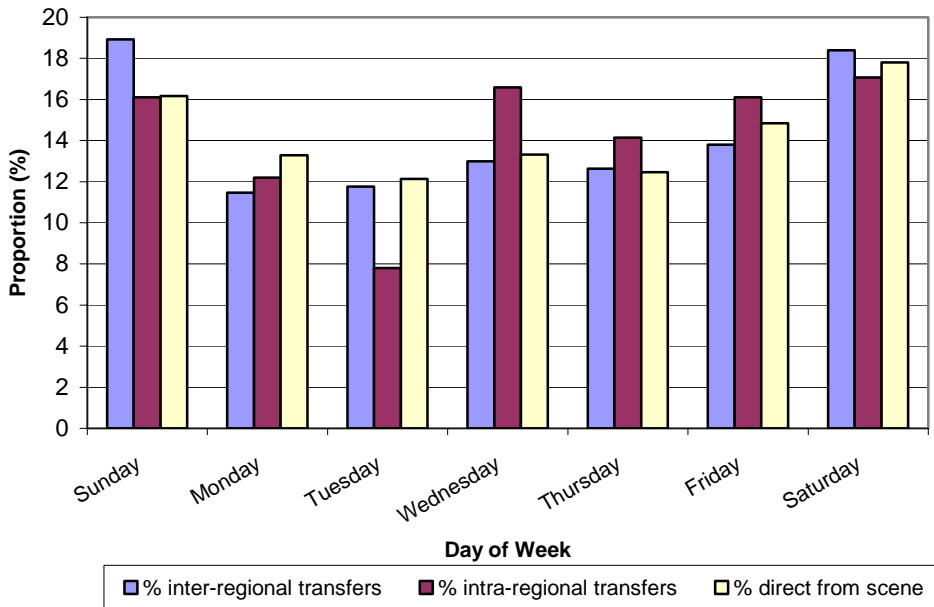
Source of Trauma Transfers: Trauma Patients Transferred from Another Facility, Tulsa Region, All Reported Cases, 2004-2005



Of the 1921 patients transferred into the Tulsa region, 30% came from the EC, 25% from NE, and 16% from the SE.

An additional 11% originated within the Tulsa region and 9% (n=182) patients came from Indian Health facilities.

Source of Trauma System Inclusion Across Day of Week, All Reported Cases, Tulsa Region, 2004-2005

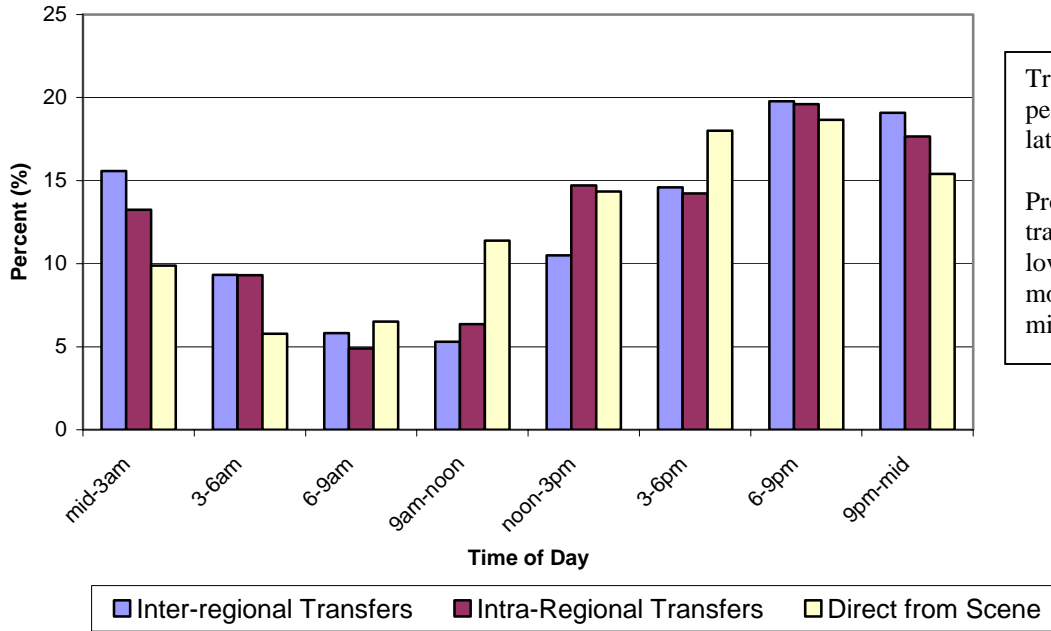


Higher proportions of each type of case occurred beginning on Friday and into the weekend following the overall trauma volume increase over the weekend.

Inter-regional transfers peaked on Saturday and Sunday, with these two days accounting for nearly 40% of this group.

Intra-regional transfers were more frequent on Wednesday, Saturday, Sunday, and Friday.

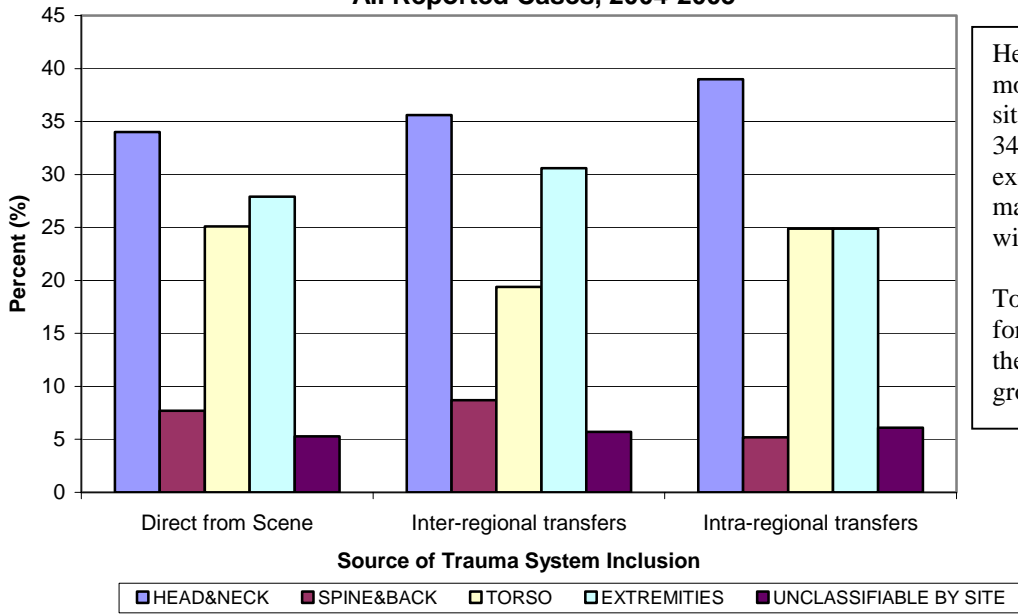
**Source of Trauma System Inclusion Across Time of Day,
All Reported Cases, Tulsa Region, 2004-2005**



Trauma volume peaks in the early to late evening.

Proportion of direct transports was lowest in the early morning hours into mid-morning.

Injury Site Incidence for Patients that Came Direct from Scene or Were Transferred from Another Acute Care Facility, Tulsa Region, All Reported Cases, 2004-2005

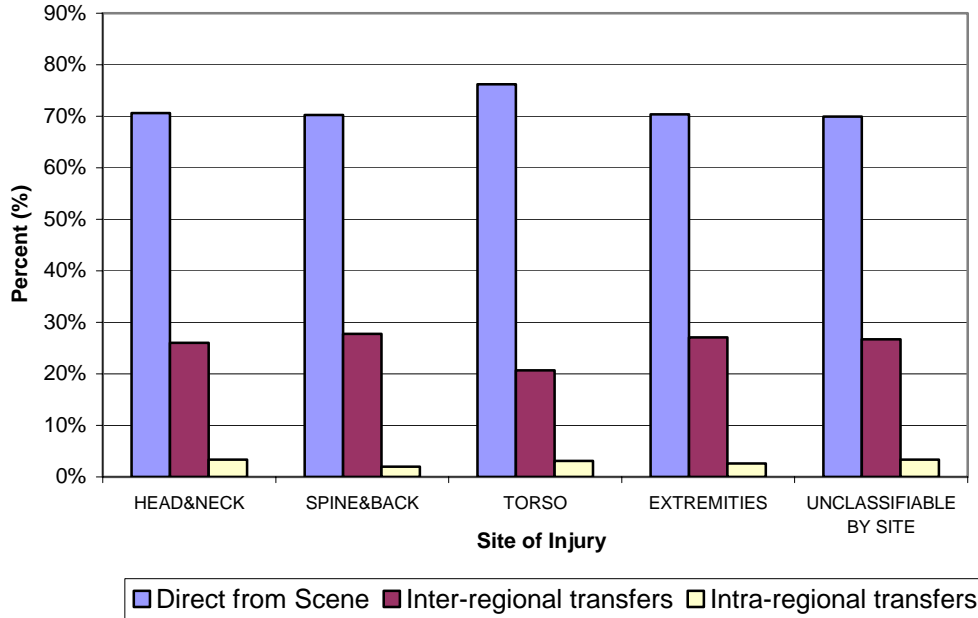


Head and neck is the most frequently injured site in each group (range 34-39%) followed by extremity injuries, which made up 25 to 31% within each group.

Torso injuries accounted for another 20 to 25% of the injuries within each group.

*Note: a patient may contribute more than one injury.

**Source of Trauma System Inclusion by Site of Injury,
All Reported Cases, Tulsa Region, 2004-2005**

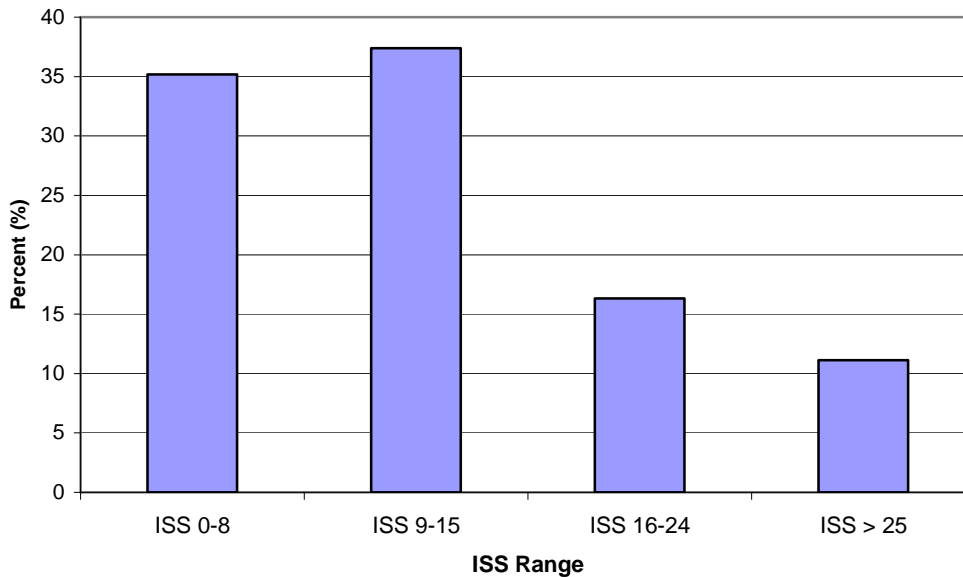


About 70% of cases came direct from the scene.

Another 25% were transferred from other regions and less than 5% were intra-regional transfers.

*Note: a patient may contribute more than one injury.

***ISS Distribution, Patients Transferred from Another Acute Facility,
All Reported Cases, Tulsa Region, 2004-2005**



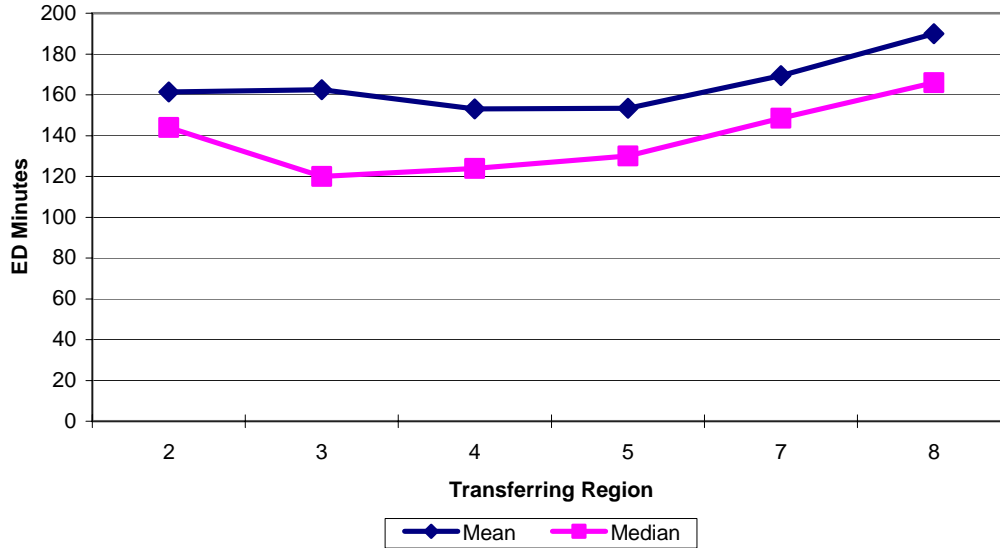
The ISS 9-15 accounted for about 38% of the cases.

Persons with an ISS score of 0-8 accounted for 35% of transfers.

The remaining 27% had injury severity scores of 16 or higher.

* As reported by the receiving facility

**Mean and Median ED Length of Stay at Transferring Facility,
Trauma Cases Transferred Into Tulsa Region,
All Reported Cases, 2004-2005**



ED Minutes at Transferring Facility for Cases Transferred Into/Within Tulsa

Transferring Region	N	Mean ED Minutes	Median ED Minutes	Range
2 (NE)	519	163.1	145	10-790
3 (SW)	9	162.4	120	82-412
4 (EC)	520	153.5	125	10-1015
5 (SE)	284	153.5	130	24-854
7 (Tulsa)	209	170.3	149	7-596
8 (OKC)	8	190.0	166	58-520

The mean time at the transferring facilities was about 2.5 hours overall for cases transferred within 24 hours of arrival.

Region 3 and 8 had very few reported cases here – the estimates must be interpreted with caution.

*Region 1 and 6 had too few cases to report

Injury Severity and Selected Initial Vitals Signs, Trauma Patients Transferred Into/Within Tulsa Region, All Reported Cases, 2004-2005

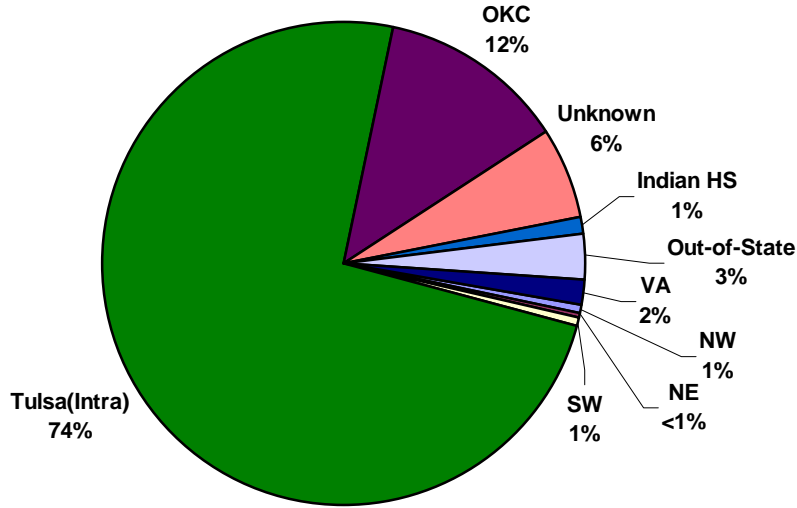
Variable	N	*N Miss	Mean	Median	Range
ISS	1670	88	8.52	8	1-75
SBP	1650	108	135.34	135	0-247
GCS	1546	212	13.95	15	3-15
RR	1707	51	21.08	20	0-68
RTS	1448	310	7.48	7.84	0-7.84
TRISS	1313	445	0.96	0.99	0.02-.999

Overall, the initial vital signs were good at the transferring facility.

Injury severity scoring may be limited here because of the need to rapidly transfer.

*N Miss: Number Missing

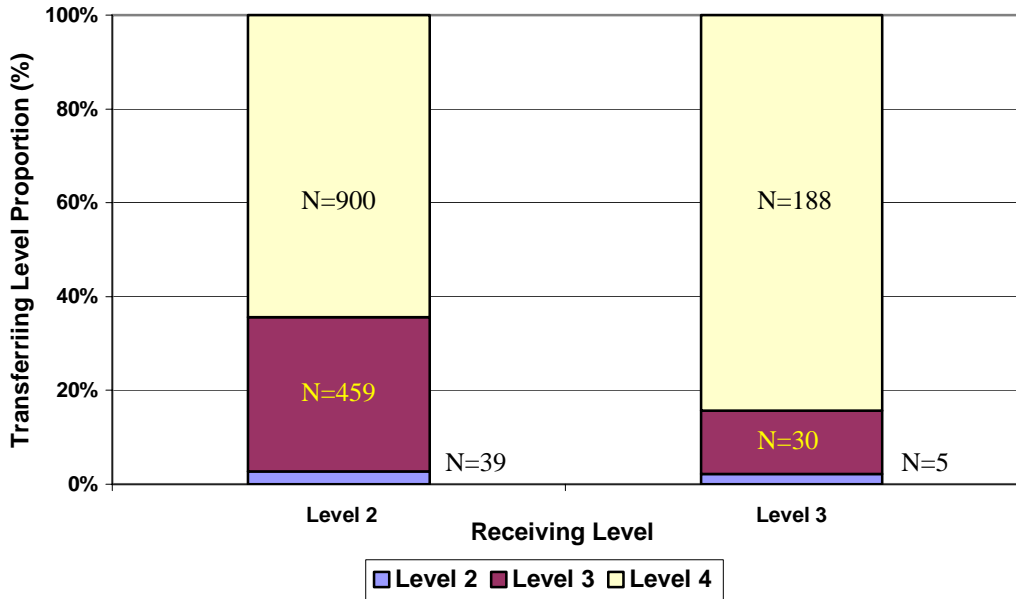
Patient Destination, Interfacility Transfers OUT, All Reported Cases, Tulsa Region, 2004-2005



The vast majority (74%) of patients transferred out of Tulsa facilities were transferred to another Tulsa facility.

Another 12% were transferred to OKC facilities and 3% went out-of-state.

Transferring Facility Level and Receiving Level for Patients Transferred Into/Within the Tulsa Region



Level 4 facilities transferred the greatest proportion of cases to both level 2 (64%) and level 3 (84%) receiving facilities.

The proportion of cases transferred to level 2 facilities from level 3 facilities was over twice that of level 3 to level 3 facilities.

Northwest Region

A total of 1768 cases were reported for 2004-2005 (includes both major trauma and minor trauma transfers).

Of the 1768, 46%(809) met the major trauma criteria.

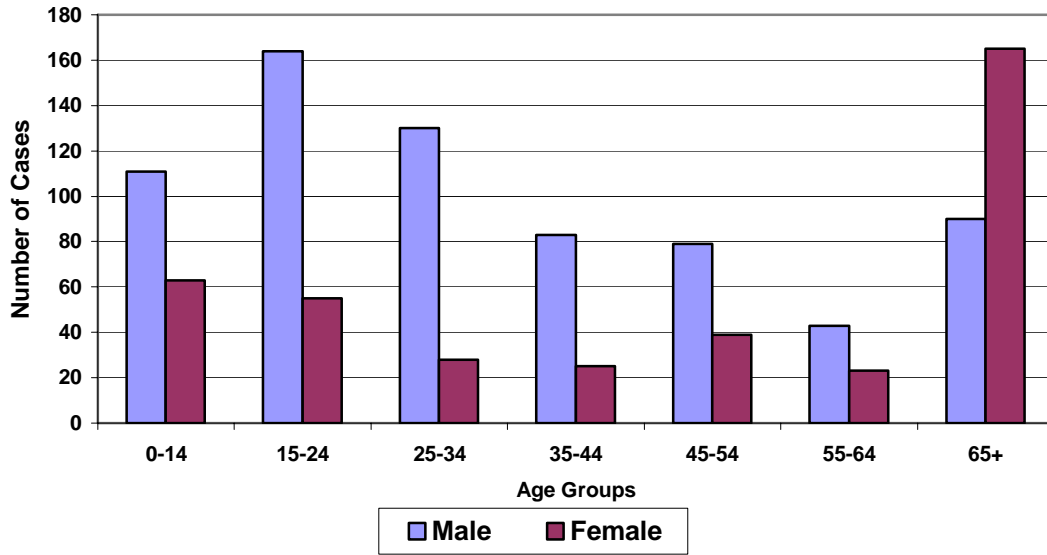
11%(194) were transfers in from another facility; 84.5%(164) of these were transferred from another NW facility, and another 7.7%(15) were transferred from a NE region facility.

62.1%(1098) of the cases were transferred out to another acute care facility; 80% of these transfers were to facilities outside the NW region.

The Table below summarizes the proportion of patients transferred in and out for all facilities in the NW Region (includes all reported major and minor trauma patients).

Facility	# of cases Reported	% transferred out	% transferred in
Southwestern Memorial Hospital, Weatherford	118	100	0
Roger Mills Memorial Hospital	15	100	0
Kingfisher Regional Hospital	31	100	0
Cordell Memorial Hospital	43	98	0
Watonga Municipal Hospital	51	90	0
Cimarron Memorial Hospital	22	86	0
Seiling Municipal Hospital	73	86	0
Share Memorial Hospital	150	82	0
Woodward Regional Hospital	127	80	0
Great Plains Regional Medical Center	168	80	13
Sayre Memorial Hospital	59	78	0
Integrus Clinton Regional Hospital	151	77	1
Memorial Hospital of Texas County	69	75	0
Harper County Community Hospital	26	62	0
Okeene Municipal Hospital	36	56	0
Fairview Municipal Hospital	111	50	0
Newman Memorial Hospital	56	46	0
Beaver County Memorial Hospital	68	44	0
Integrus Bass Baptist Health Center	181	28	29
St. Mary's Regional Medical Center	259	13	46

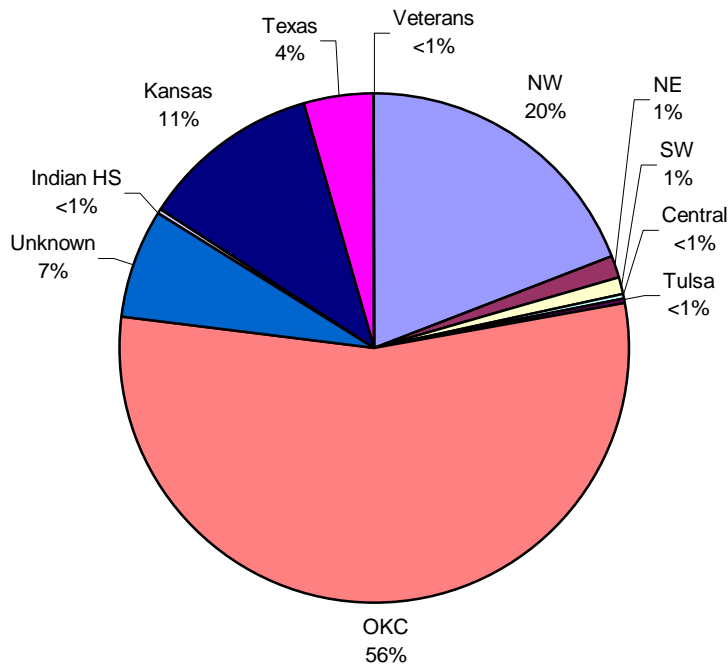
Gender and Age Group for Patients Transferred To Another Acute Care Facility, Northwest Region, All Reported Cases, 2004-2005



Persons 65 years and older accounted for the largest number of transferred patients (n=255, 23.2%).

The number of males outnumbered females at every age group except for the 65+ and accounted for 64% of these patients.

Destination Region for Transfers Out of/Within North West Region, All Reported Cases, 2004-2005

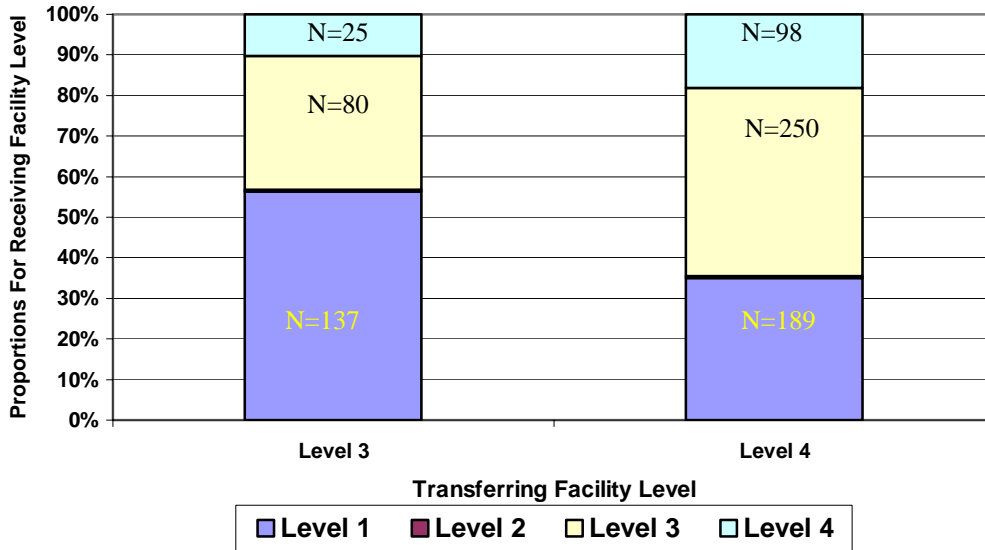


The majority of transfers out went to OKC (56%).

Another 20% were transferred to other NW facilities.

About 15% went to out-of-state facilities – 11% to Kansas and 4% to the Texas Panhandle.

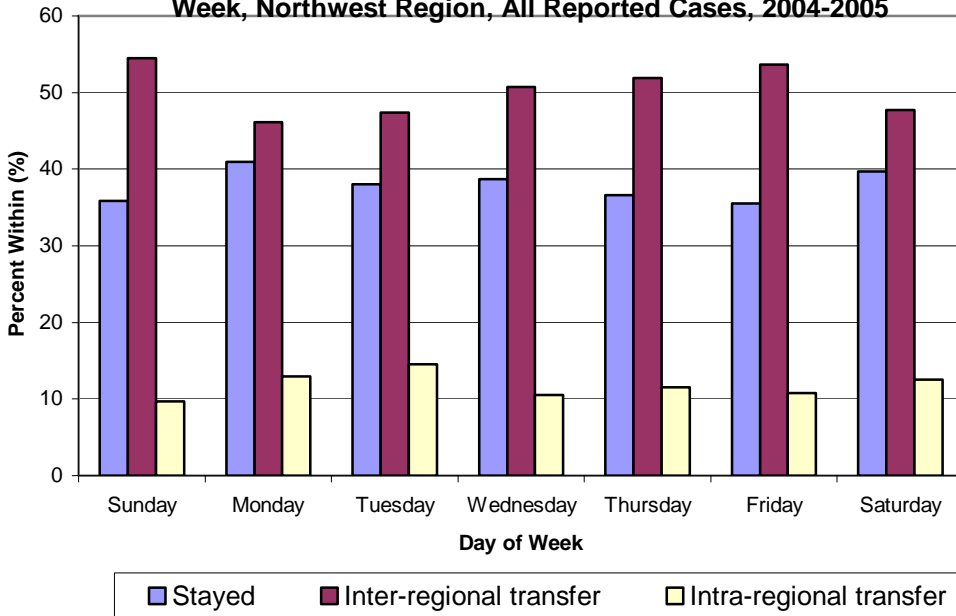
Receiving Facility Level by Transferring Facility Level for Patients Transferred Out of/Within Northwest Region, All Reported Cases, 2004-2005



Most (55%) of the patients transferred from Level 3 facilities went to the Level 1 Trauma Center and a significant number (31%) to other Level 3 facilities.

Level 3 facilities received more of the patients transferred from the Level 4 facilities, but a substantial portion still went to the Level 1 center.

Proportion of Trauma Transfers and Patients Staying in Region by Day of Week, Northwest Region, All Reported Cases, 2004-2005

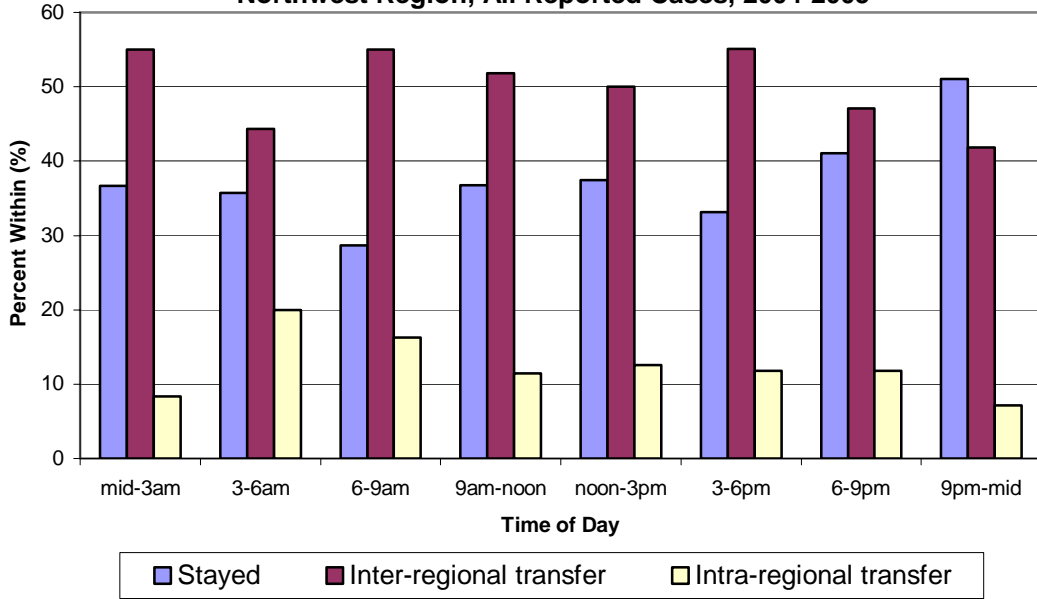


For each day of the week, the highest proportion was for patients transferred out of the NW Region.

About one-third of patients stayed at the reporting NW facility.

Approximately 10% to 14% were transferred to another NW facility.

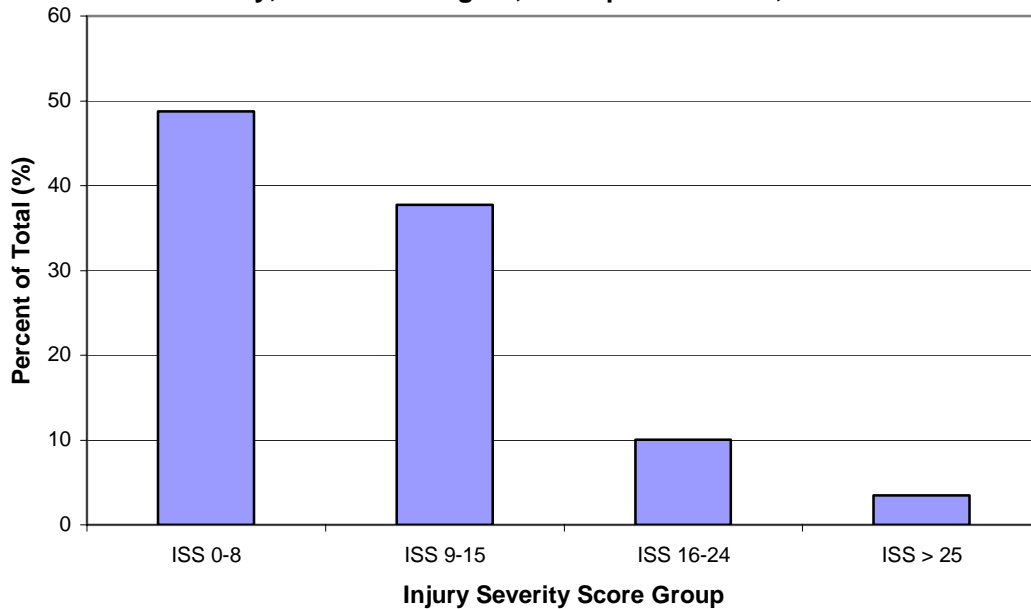
Proportion of Trauma Transfers and Patients Staying In Region by Time of Day, Northwest Region, All Reported Cases, 2004-2005



Forty to more than 50% of trauma cases were transferred out of the region at any given time of day.

From 9 p.m. to Midnight was the only time range in which the proportion of cases that stayed exceeded those transferred out.

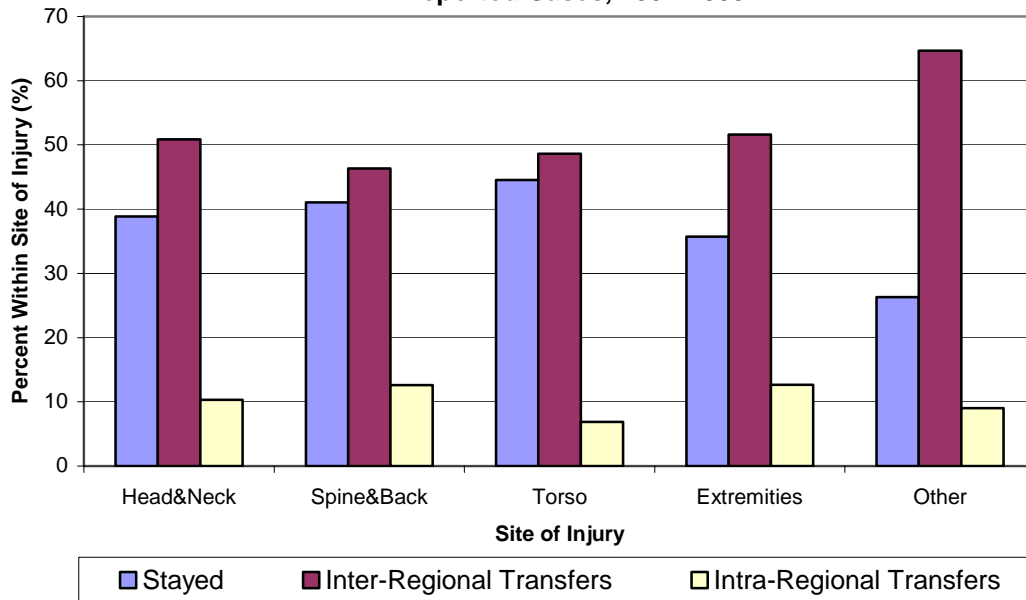
***ISS Distribution, Patients Transferred to Another Acute Care Facility, Northwest Region, All Reported Cases, 2004-2005**



Nearly 50% of persons transferred out had an ISS score of 0-8 followed by 38% for persons with an ISS of 9-15.

*As reported by the transferring facility – ISS may be limited because of need for rapid transfer

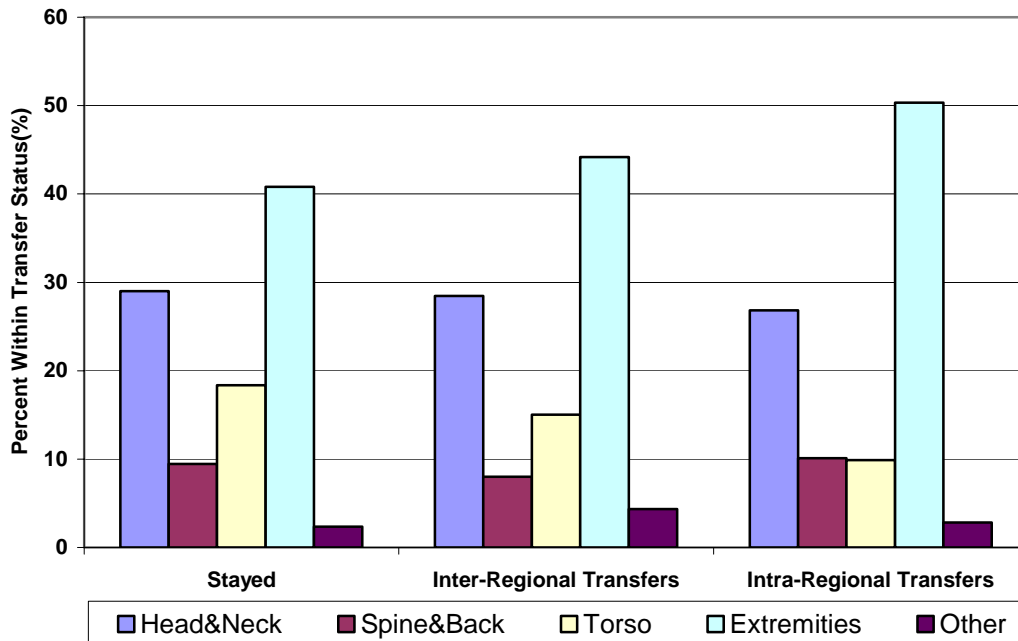
**Transfer Status by Injury Site Incidence, Northwest Region,
All Reported Cases, 2004-2005**



Over 50% of head/neck and extremity injuries were transferred out of the NW Region.

Approximately 45% of torso injuries stayed at the reporting NW facility.

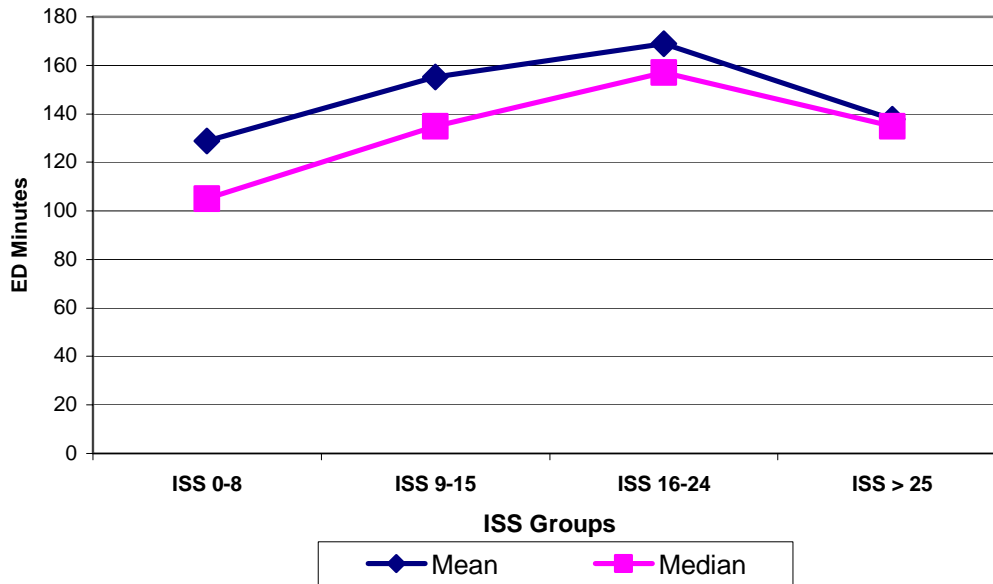
Injury Site Incidence for Patients Who Stayed at Reporting NW Facility or Were Transferred Out, All Reported Cases, 2004-2005



Head/neck and extremity injuries were the most frequent site reported.

The proportions for injury site within each of the groups were similar. Extremity injuries made up a slightly higher proportion (50%) in the intra-regional transfers.

Mean and Median ED Minutes for Patients Transferred Out of/Within NW Region, All Reported Cases, 2004-2005



Minutes in the ED before transfer was longest for persons with an ISS score of 16-24 at about 160 minutes.

Shortest mean times were seen for persons with an ISS of 0-8 at about 125 minutes.

Mean/Median ED Minutes* by ISS Group, Trauma Transfers, Northwest Region, All Reported Cases, 2004-2005**

ISS Group	N	# Missing	Mean ED minutes	Median ED minutes	Range minutes
ISS 0-8	462	0	128.7	105	19-799
ISS 9-15	361	0	155.2	135	28-564
ISS 16-24	90	0	168.8	157	42-408
ISS > 25	33	0	137.9	135	19-268

Persons with ISS scores of 9-24 were in the transferring hospital's ED for an average of 20-40 minutes longer than those with an ISS <9 or >24.

*ED minutes at the transferring facility

**Limited to transfers occurring within 24 hrs of arrival

Injury Severity and Selected ED Vital Signs*, Trauma Patients Transferred Out of/Within Northwest Region, All Reported Cases, 2004-2005

Variable	N	# Missing	Mean	Median	Range
ISS	946	47	7.98	9	1-41
SBP	950	43	138.9	138	0-286
GCS	861	132	14.1	15	3-15
RR	973	20	21.4	20	0-64
RTS	816	177	7.6	7.84	0-7.84
TRISS	755	238	0.97	0.99	0.42-1

The mean RTS (revised trauma score) was 7.6 and reflects good vital signs overall at the transferring facility.

The mean TRISS of 0.97 shows a high predicted probability of survival overall.

*Reflects initial vital signs at the transferring facility

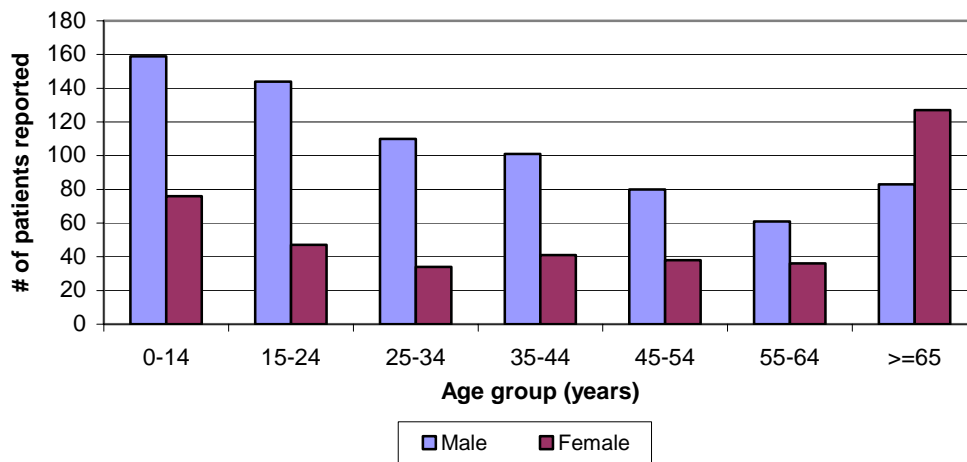
Southeast Region

A total of 1393 cases reported for 2004-2005 (includes both major trauma and minor trauma transfers); of the 1393, 50%(703) met the major trauma criteria

1% (15) were transferred from another hospital (includes inter and intra-regional transfers).

81.5% (1137) of 1393 were transferred to another acute care facility.

Gender and Age distribution, Patients Transferred to Another Facility, SE Region, 2004-2005



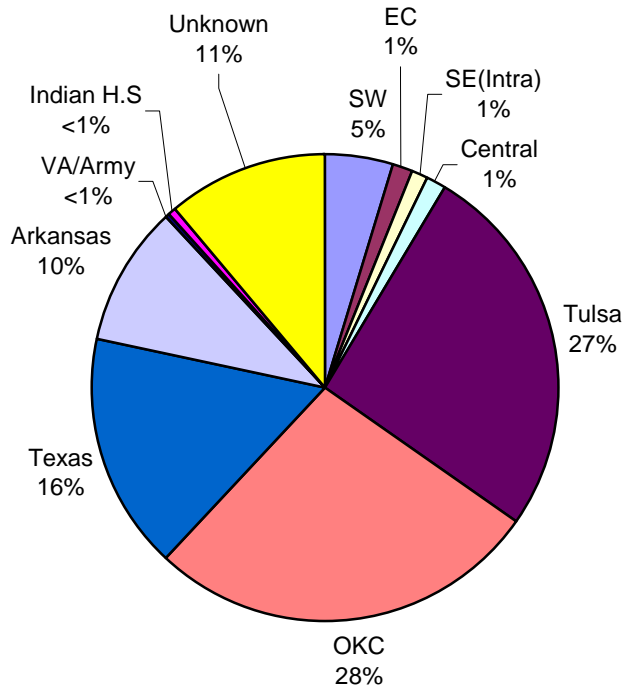
The age distribution of transferred patients peaked in the 0-24 age.

Females accounted for 60.5% of transferred patients in the 65 years and older.

Facility	# of cases Reported	% transferred out	% transferred in
Atoka Memorial Hospital	98	99	0
Creek Nation Community Hospital	78	99	0
Choctaw Memorial Hospital	81	96	0
Holdenville General Hospital	93	96	0
Pushmataha County Hospital	69	90	1
Seminole Medical Center	80	89	0
Latimer County General Hospital	24	83	0
McCurtain Memorial Hospital	179	83	0
McAlester Regional Health Center	255	81	4
Integris Marshall Memorial Hospital	82	79	0
Eastern Oklahoma Medical Center	188	77	1
Mary Hurley Hospital	15	73	0
Medical Center of Southeastern Oklahoma	151	45	1

Patient Destination

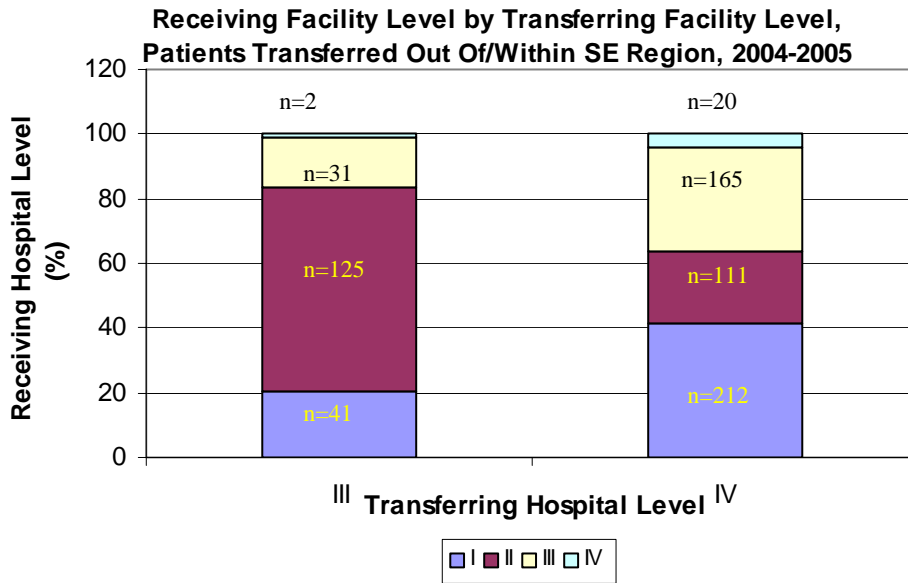
Patient Destination, Trauma Patients Originating from the SE Region, Oklahoma Trauma Registry, 2004-2005



Of all trauma transfers (1137) in the SE Region, about 1% (15) stayed in the SE Region while at least 88% were transferred out of the region.

- 26% of all transfers went to Texas/Arkansas.
- OKC and Tulsa Regions received about the same proportion of transfers from the SE Region.

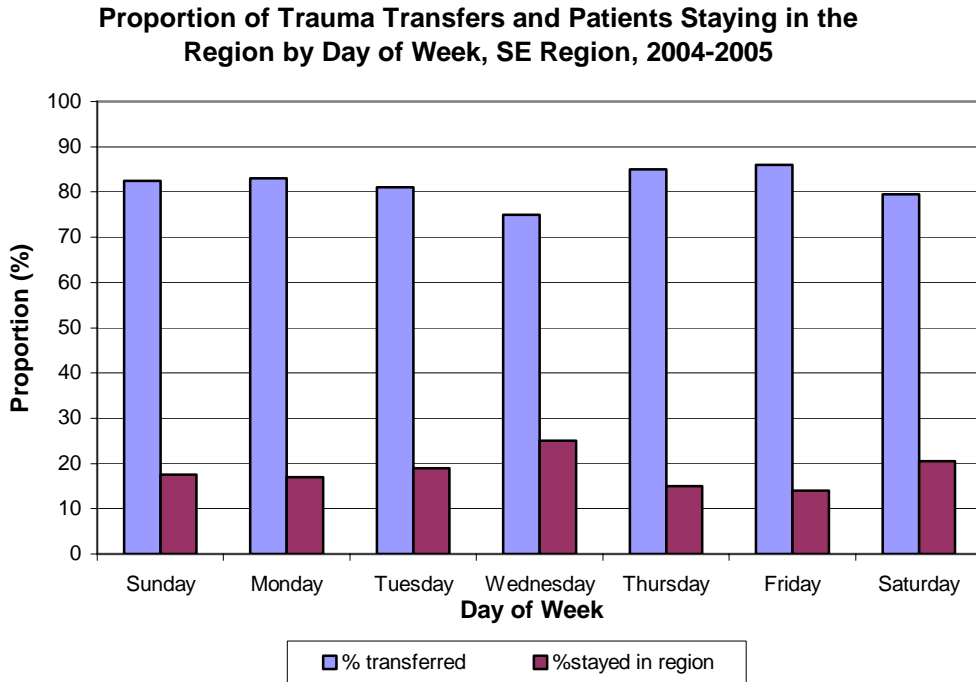
The graph below summarizes the hospital-to-hospital pattern for patients transferred to another facility within state by trauma level classification.



Of the 199 patients transferred from Level III's in the SE Region, about 63% went to Level II facilities and about 15% went to other Level III facilities.

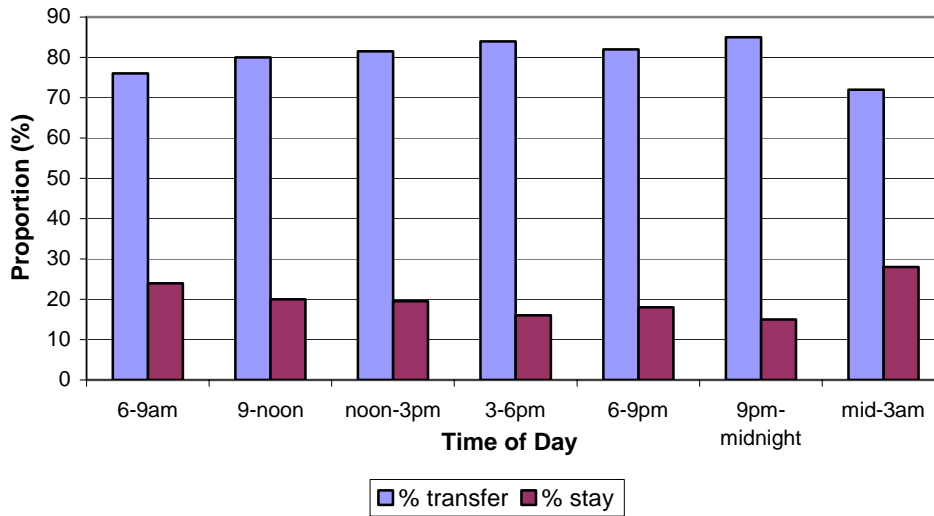
Level IV's transferred a majority (41.7%) of their patients to a Level I facility, while a third (32.5%) went to Level III facilities.

Day of Week and Time of Day



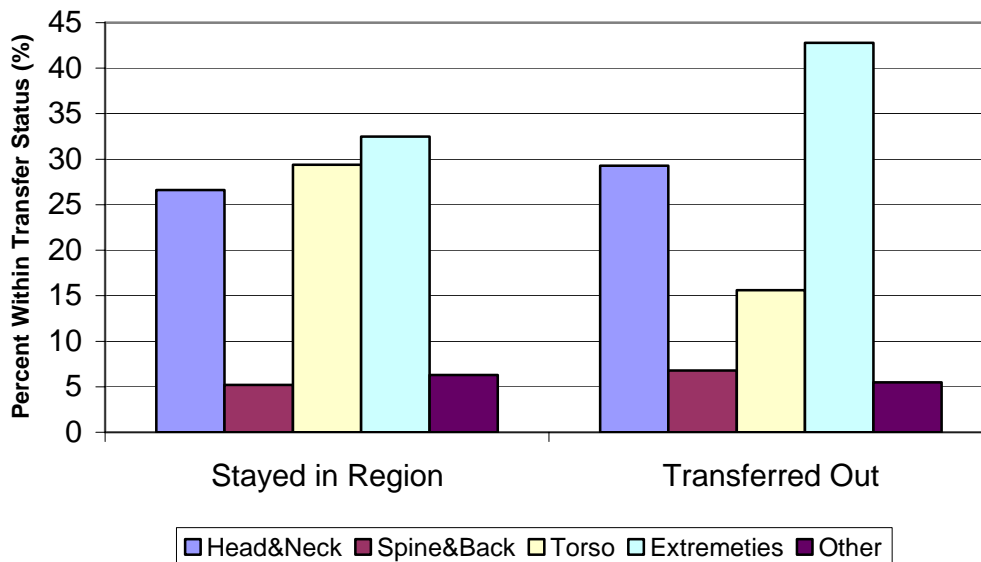
The proportion of trauma transferred ranged from 75% on Wednesdays to about 86% on Thursdays and Fridays.

Proportion of Trauma Patients Transferred and Patients Staying in the Region by Time of Day, SE Region, 2004-2005



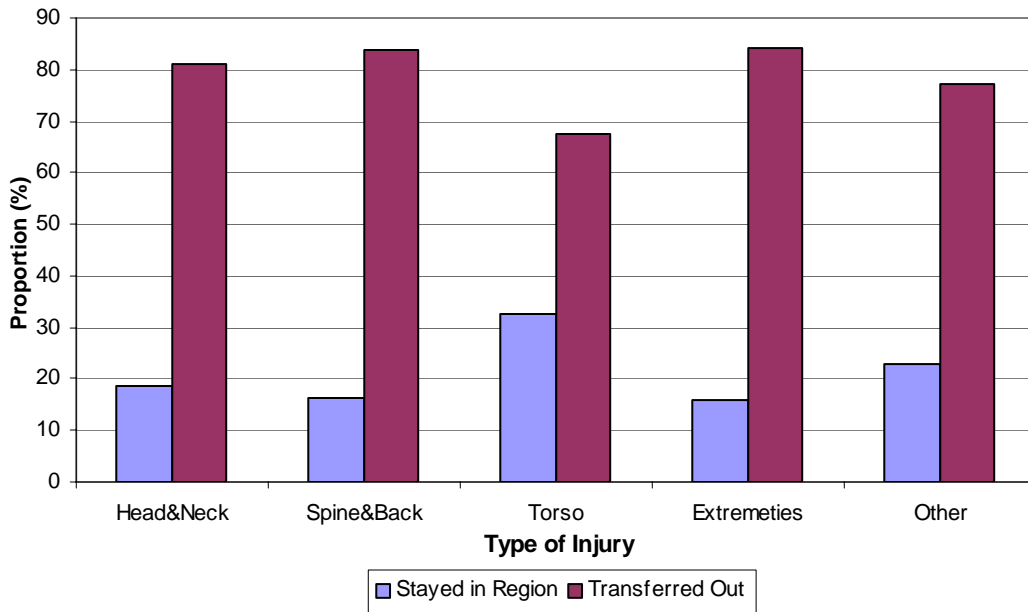
There is little variation by time of day, in the proportion of patients transferred out vs. not transferred out.
 - A slightly higher proportion is observed between 9 p.m. and midnight.

Trauma Patients that Stayed in SE Region and Those Transferred Out of Region by Injury Site, 2004-2005



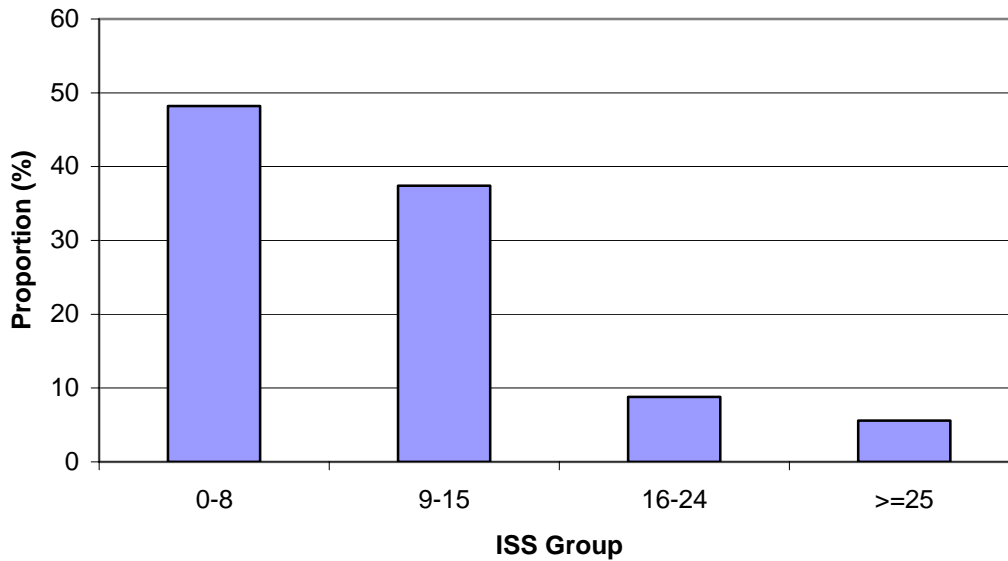
Among persons transferred out of the SE Region, over 40% were extremity injuries and 30% were head and neck injuries.

Transfer Status by Injury Site, SE Region, 2004-2005



With the exception of patients with torso injuries, at least 80% of classifiable (based on ICD-9 codes) injuries were transferred to another facility.

ISS* Distribution, Patients Transferred to Another Acute Care Facility, SE Region, 2004-2005

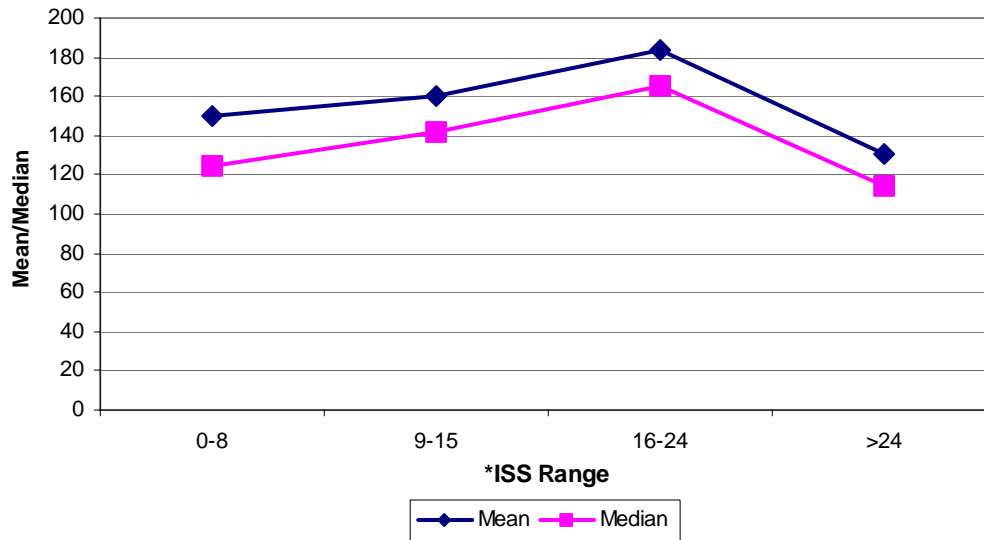


Almost half (48%) of patients transferred out to another facility had ISS <9 (minor trauma).

14% of patients transferred had ISS >15.

*As reported by transferring facility; Injury Severity scoring at time of transfer should be interpreted with caution as it may reflect incomplete diagnosis.

**Mean ED Length of Stay, Trauma Transfers,
SE Region, 2004-2005**



The most severely injured patients (ISS>24), on average had the shortest ED length of stay.

Patients with ISS 16-24 stayed 23 minutes longer in the ED before transfer than persons with ISS 9-15.

* Injury Severity scoring at time of transfer should be interpreted with caution as it may reflect incomplete diagnosis

**Mean/Median ED Minutes by ISS Group, Trauma Transfers,
Northwest Region, All Reported Cases, 2004-2005**

ISS Group	*N Obs	N	# missing ED times	Mean ED Minutes	Median ED Minutes	Range
0-8	503	501	2	150.2	125	0-1328
9-15	387	386	1	160.5	141.5	0-670
16-24	89	89	0	183.2	165	55-456
>24	59	59	0	130.1	114	35-450

*N Obs: Total number of patients in group

Injury Severity and Selected Initial *ED Vital Signs, Trauma Patients Transferred Out/Within SE Region

Variable	N	# Missing	Mean	Median	Range
ISS	1066	51	8.5	9	1-75
SBP	1083	34	134.0	134	0-267
GCS	1007	110	14.0	15	3-15
RR	1109	8	21.8	20	0-52
RTS	978	139	7.5	7.84	0-7.84
TRISS	936	181	1.0	0.99	0.05-1.00

The mean RTS (Revised Trauma Score) was 7.5 and reflects good vital signs overall at the transferring facility.

The mean TRISS of 0.99 shows a high predicted probability of survival overall.

*Reflects initial vital signs at the transferring facility

Northeast Region

A total of 1871 cases were reported for 2004-2005 (includes both major trauma and minor trauma transfers).

Of the 1871, 50% (936) met the major trauma criteria.

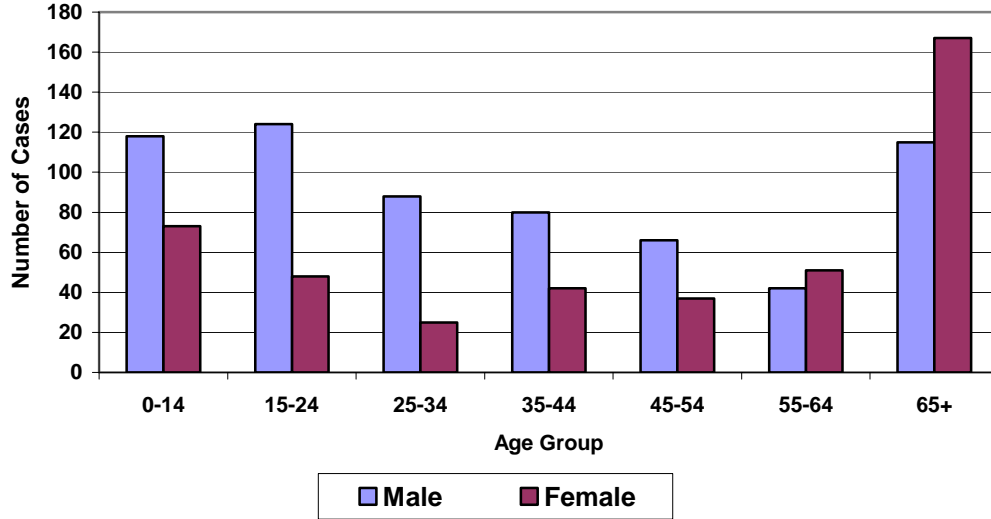
57.7% (1079) of the patients were transferred out to another hospital; of these, 75.7% (817) were transferred to a facility outside of the region; 24.3% (262) were transferred to another facility within the region.

42.3%(792) stayed at the reporting facility in the Northeast Region.

The following table summarizes proportion of transfers (in and out) for all hospitals in the NE Region.

Facility	# of cases reported	% transferred out	% transferred in
Pawhuska Hospital	70	100	0
Jane Phillips Nowata Health Center	238	99	0
Cleveland Area Hospital	75	95	0
Perry Memorial Hospital	49	92	0
Fairfax Memorial Hospital	21	90	0
Integrus Blackwell Regional Hospital	102	87	0
Craig General Hospital	108	86	1
Pawnee Municipal Hospital	20	85	0
Claremore Regional Hospital	45	82	0
Integrus Mayes County Medical Center	240	79	0
Integrus Grove General Hospital	123	77	0
Stillwater Medical Center	57	65	12
Cushing Regional Hospital	71	46	1
Ponca City Memorial Hospital	290	27	1
Integrus Baptist Regional Health Center	93	23	0
Jane Phillips Medical Center	386	16	30

Gender and Age Group Distribution for Patients Transferred To Another Acute Care Facility, Northeast Region, All Reported Cases, 2004-2005

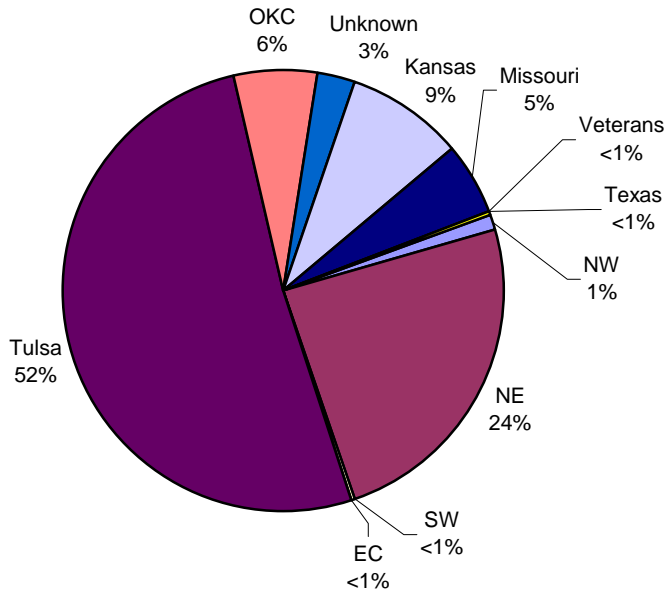


Overall, 65% of patients transferred were male.

For patients aged 0-64, 71% were male.

Among patients 65 years or older, 62% were female.

Destination Region for Transfers Out of/Within Northeast Region, All Reported Cases, 2004-2005, N=1079

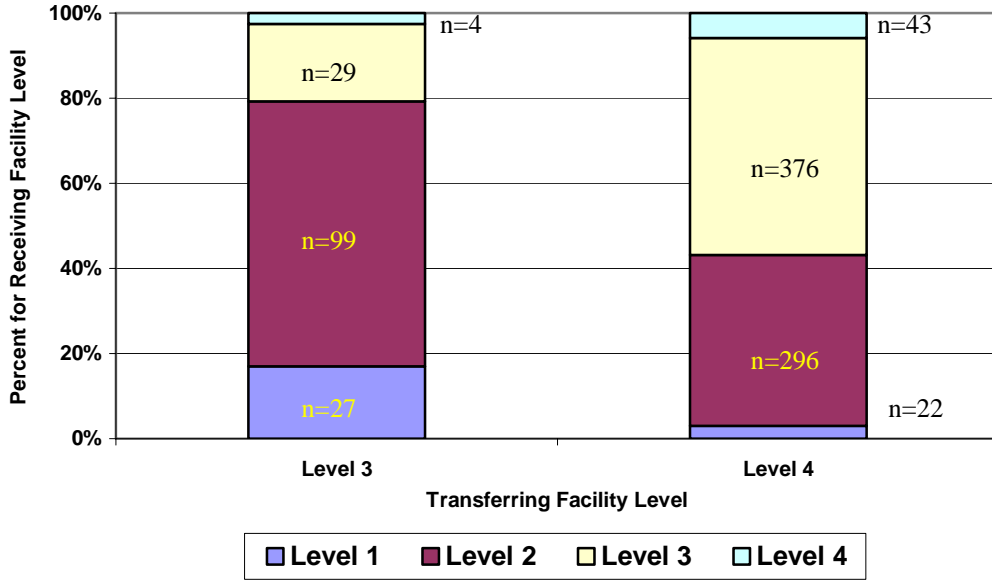


Slightly over half of the patients were transferred to Tulsa.

Twenty-four percent of the patients went to another facility in the NE Region.

Fourteen percent went to out-of-state facilities in Kansas and Missouri.

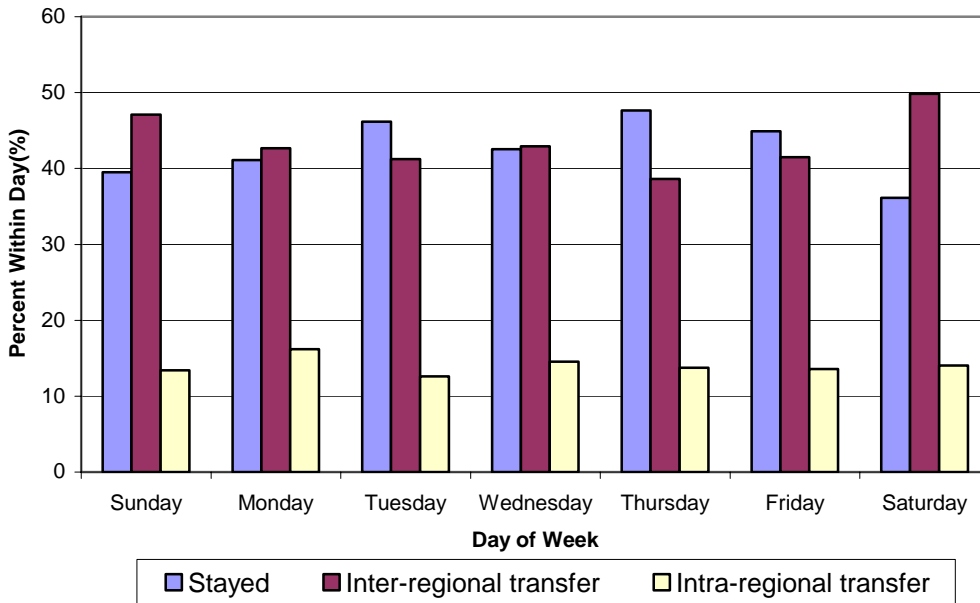
Receiving Facility Level by Transferring Facility Level for Patients Transferred Out of/Within Northeast Region, All Reported Cases, 2004-2005



Level 2 facilities received the greatest proportion of transfers from Level 3 trauma facilities.

Level 3 facilities received slightly more cases from the level 4 trauma facilities in the NE Region.

Proportion of Transfers and Patients Staying at Reporting Facility by Day of Week, Northeast Region, All Reported Cases, 2004-2005

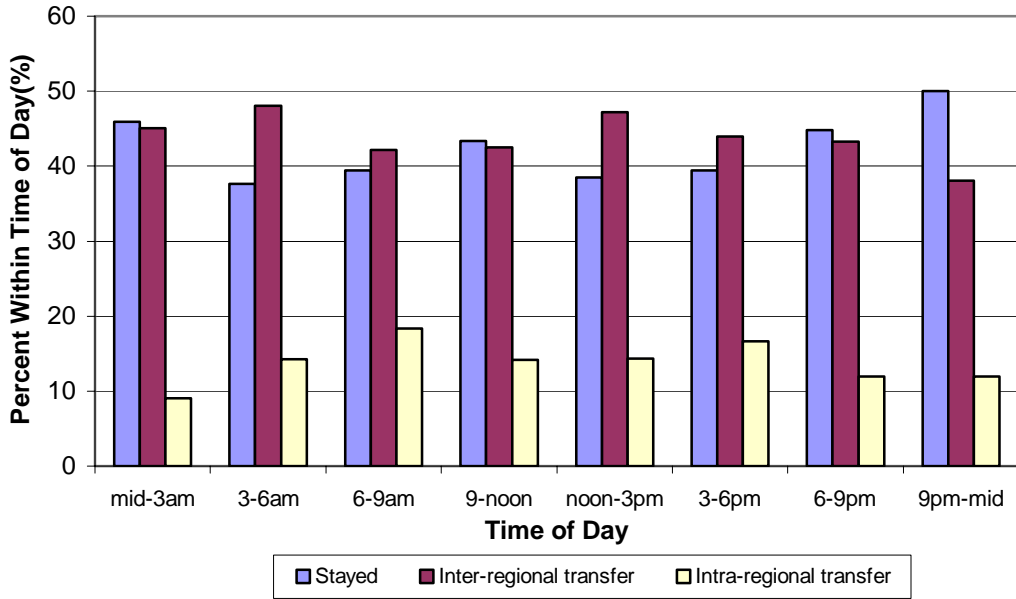


About 36 to 48% of trauma cases stayed at the reporting NE facility.

40% to 50% were transferred to a facility outside the NE region.

Approximately 13% to 15% were transferred to another NE facility.

Proportion of Transfers and Patients Staying at Reporting Facility by Time of Day, Northeast Region, All Reported Cases, 2004-2005

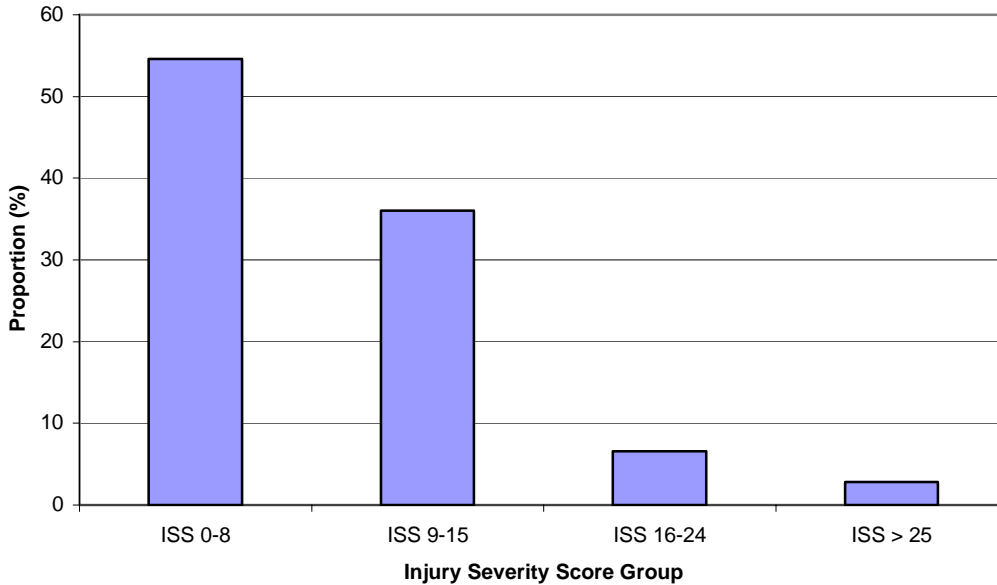


During the hours of 3 to 6 a.m. and noon to 3 p.m., inter-regional transfers made up the highest proportion of all transfers at about 48%.

Approximately 50% of patients arriving 9 p.m. to midnight stayed at the reporting facility.

10% to 18% at different times of day were intra-regional transfers.

***ISS Distribution, Patients Transferred To Another Acute Care Facility, Northeast Region, All Reported Cases, 2004-2005**



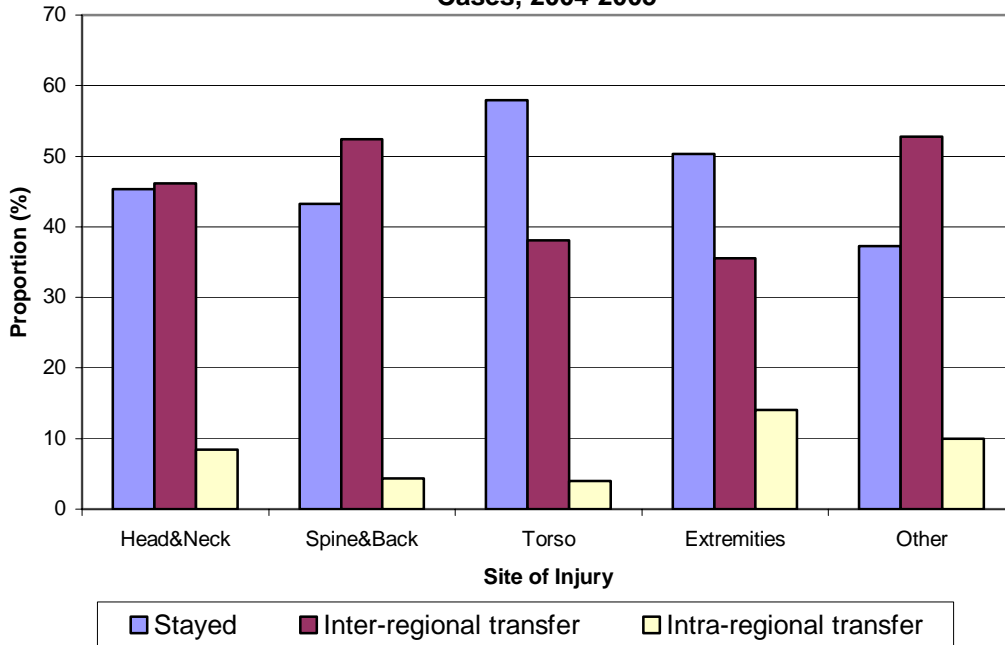
Over 50% of the cases transferred out had ISS scores of less than 8.

36% had ISS scores of 9-15, and 6.6% had scores between 16 and 24.

Only 3% had ISS scores above 24.

*As reported by the transferring facility – ISS may be limited because of need for rapid transfer

Transfer Status by Injury Site Incidence, Northeast Region, All Reported Cases, 2004-2005

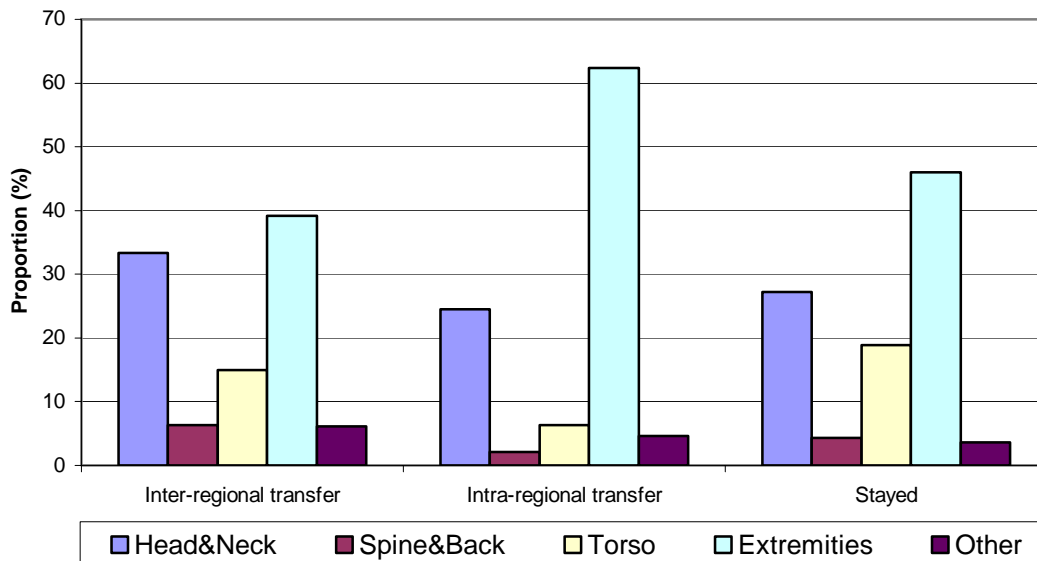


Torso (58%) and extremity (50%) injuries were more likely to stay at the reporting NE facility.

About 52% of spine/back and 'other' injuries were transferred out of the NE Region.

Head/neck had roughly the same proportion that stayed or were transferred out of the NE Region.

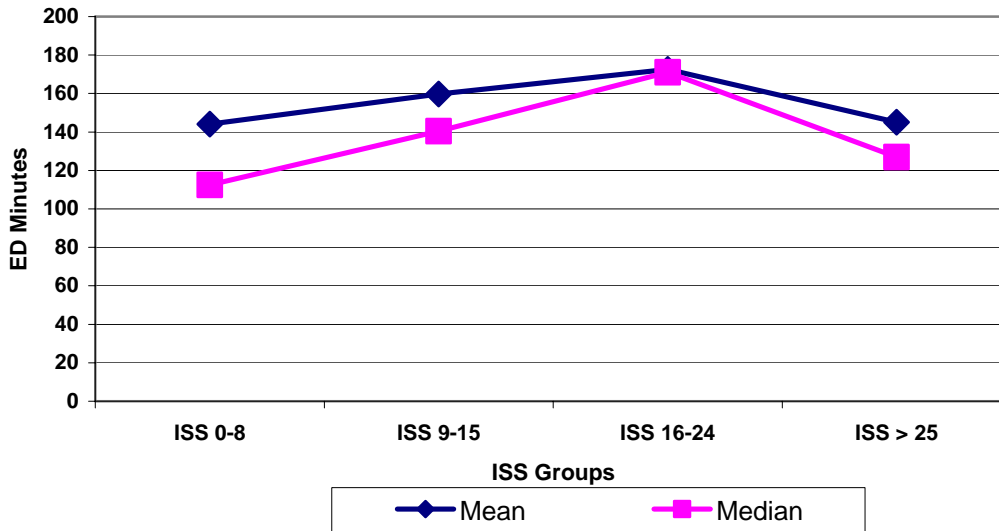
Injury Site Incidence for Patients that Stayed at Reporting NE Facility or Were Transferred Out, All Reported Cases, 2004-2005



Extremity and Head/Neck injuries were most frequent overall, accounting for 45% and 29%, respectively.

62% if the intra-regional transfers had extremity injuries.

Mean and Median ED Minutes for Patients Transferred Out of/Within NE Region, All Reported Cases, 2004-2005



Shortest mean time for transfer out was seen for the least and most severely injured groups at about 140 minutes.

Persons with an ISS of 16-24 stayed in the ED 16-28 minutes longer, on average, than the other ISS groups.

Mean/Median ED Minutes* by ISS Group, Trauma Transfers, Northeast Region, All Reported Cases, 2004-2005

ISS Group	N	# Missing	Mean ED Minutes	Median ED Minutes	Range
ISS 0-8	516	0	144.11	112.5	15-1130
ISS 9-15	344	0	159.78	140.5	20-865
ISS 16-24	63	0	172.6	171	10-441
ISS > 25	28	0	145.07	127	30-394

Persons with ISS scores of 9-24 were in at the transferring hospital ED for and average of 15 to 27 minutes longer than those with an ISS of <9 or >24.

*ED Minutes at the transferring facility

*Limited to transfers occurring within 24 hrs of arrival

Injury Severity and Selected ED Vital Signs*, Trauma Patients Transferred Out of/Within Northeast Region, All Reported Cases, 2004-2005

Variable	N	# Missing	Mean	Median	Range
ISS	951	53	7.02	5	1-45
SBP	936	68	140	139	0-267
GCS	840	164	14.27	15	3-15
RR	972	32	21.04	20	0-56
RTS	777	227	7.63	7.84	1.47-7.84
TRISS	699	305	0.97	0.99	0.10-1

The mean RTS (Revised Trauma Score) was 7.63 and reflects good vital signs overall at the transferring facility.

The mean TRISS of 0.97 shows a high predicted probability of survival overall.

*Reflects initial vital signs at the transferring facility

East Central Region

A total of 938 cases were reported for 2004-2005 (includes both major trauma and minor trauma transfers).

493 (52.6%) met major trauma criteria.

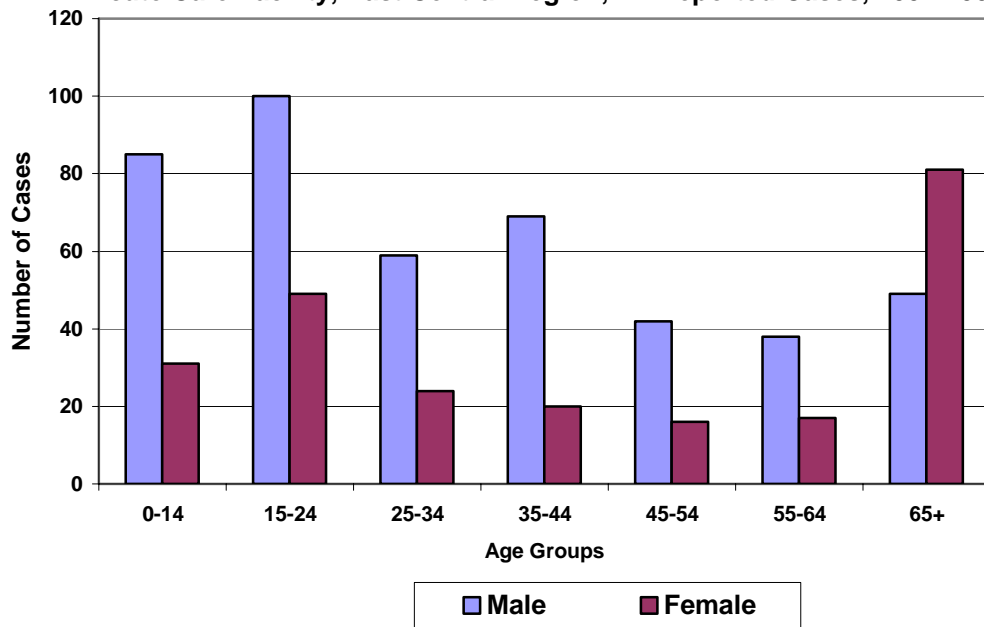
680 (72.5%) were transferred out to another facility; of these 651 (95.7%) were transferred to a facility outside the region, the remaining 29 (4.3%) were transferred to another facility within the region.

258 (27.5%) of the cases stayed at the reporting facility within the East Central Region.

Table below summarizes the proportion of transfers (in and out) for all hospitals in the East Central Region.

Facility	# of cases Reported	% transferred out	% transferred in
Drumright Regional Hospital	5	100	0
Bristow Medical Center	61	98	0
Okmulgee Memorial Hospital	104	98	0
St. John Hospital Sapulpa	82	96	0
Community Hospital Lakeview	53	96	0
Memorial Hospital, Stilwell	61	92	2
Henryetta Medical Center, Inc	32	88	0
Sequoyah Memorial Hospital	34	82	0
Tahlequah City Hospital	107	78	0
Haskell County Healthcare System	72	76	0
Muskogee Regional Medical Center	331	41	5
Wagoner Community Hospital	0	0	0

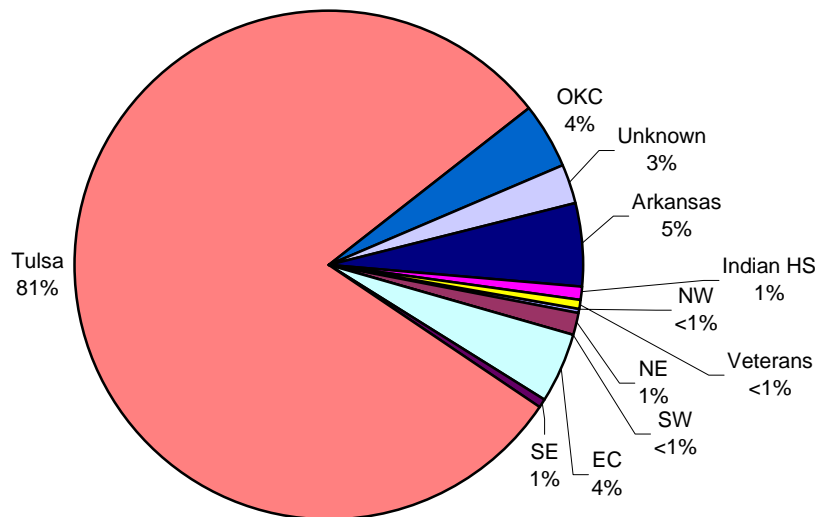
Gender and Age Group Distribution for Patients Transferred To Another Acute Care Facility, East Central Region, All Reported Cases, 2004-2005



Males accounted for 59% of all transfers out.

Females accounted for 59% of the transfers out among those 65 or older.

Destination Region for Transfers Out of/Within East Central Region, All Reported Cases, 2004-2005

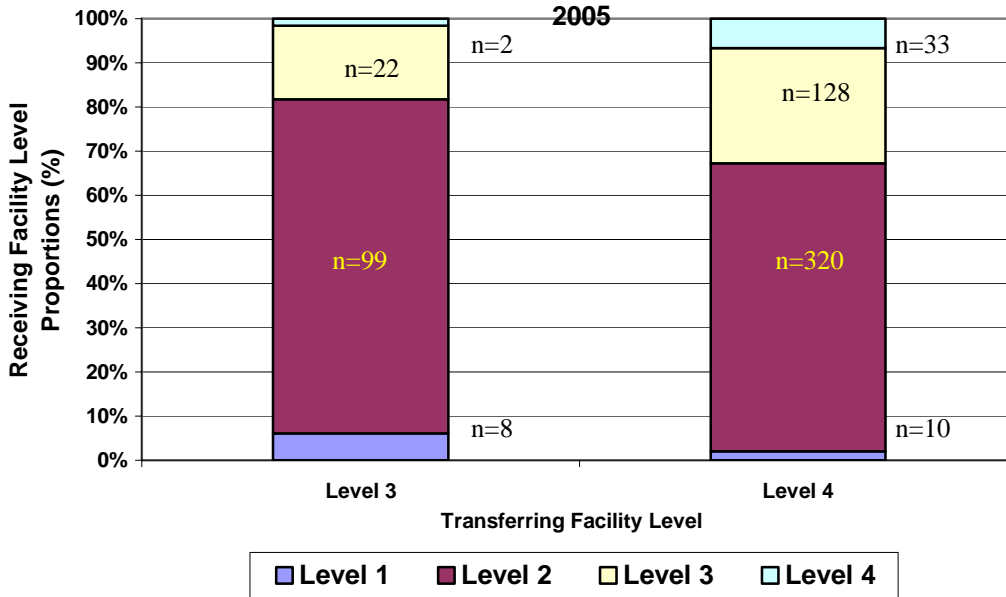


Over 80% of patients transferred out of East Central region facilities went to Tulsa facilities.

5% of transfers out went out-of-state to Arkansas.

4% went to OKC and 4% were transferred to another East Central facility.

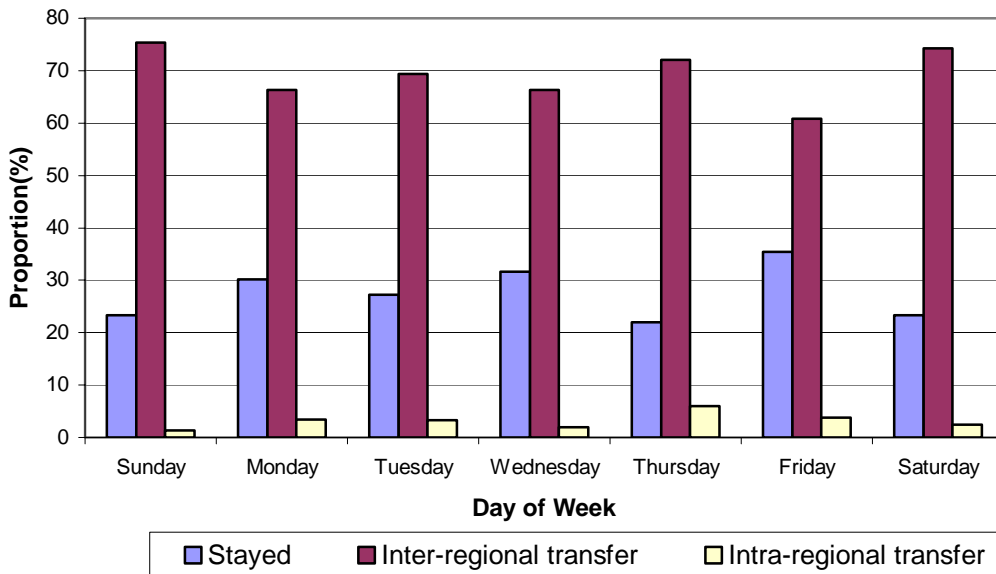
Receiving Facility Level by Transferring Facility Level for Patients Transferred Out of/Within East Central Region, All Reported Cases, 2004-2005



Sixty-five to 76% of patients transferred out of East Central facilities, either Level 3 or 4, went to Level 2 facilities in Tulsa.

About 26% of patients went to Level 3 facilities from Level 4 transferring facilities.

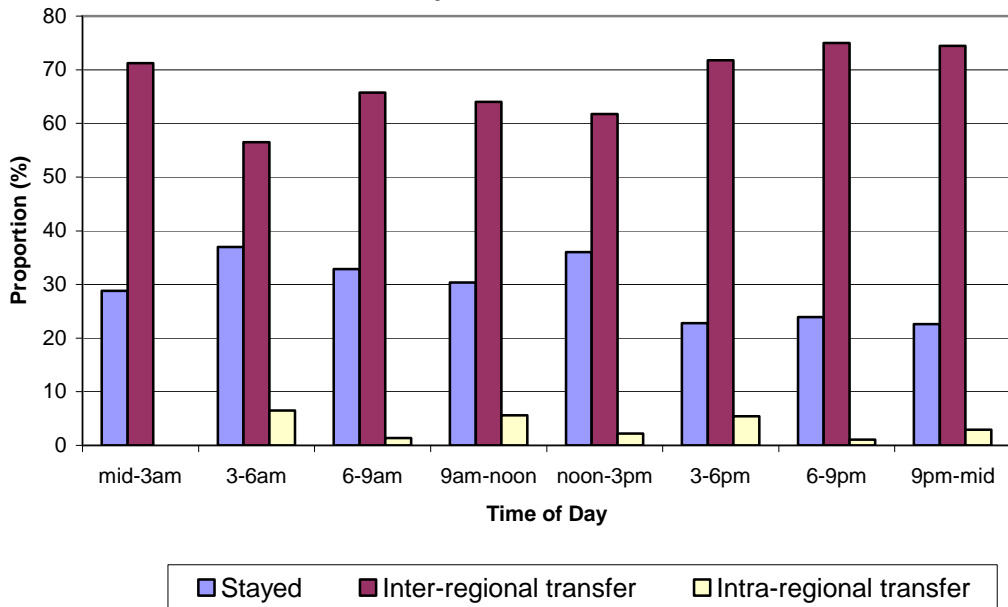
Proportion of Trauma Transfers and Patients Staying at Reporting Facility by Day of Week, East Central Region, All Reported Cases, 2004-2005



About 70% of cases in the EC Region were transferred out of the region; 25% stayed at the reporting facility, and 5% were intra-regional transfers.

On Saturday, Sunday, and Thursdays, more than 70% were inter-regional transfers.

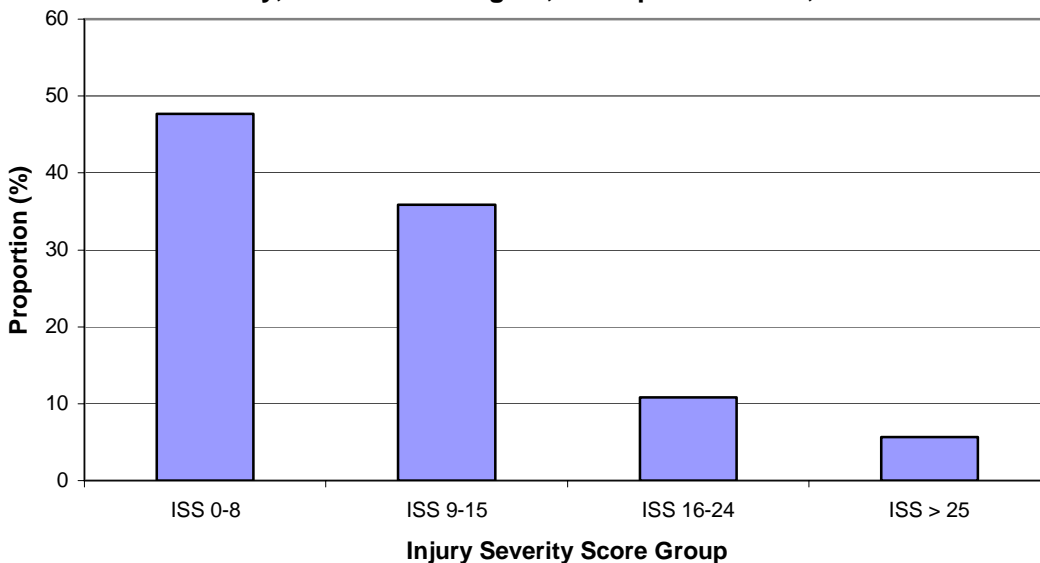
Proportion of Trauma Transfers and Patients Staying at Reporting Facility by Time of Day, East Central Region, All Reported Cases, 2004-2005



Over 70% of persons arriving 3 p.m. to 3 a.m. were transferred to another region.

From 3 a.m. to 3 p.m., over 30% of patients stayed at the reporting facility.

***ISS Distribution, Patients Transferred To Another Acute Care Facility, East Central Region, All Reported Cases, 2004-2005**

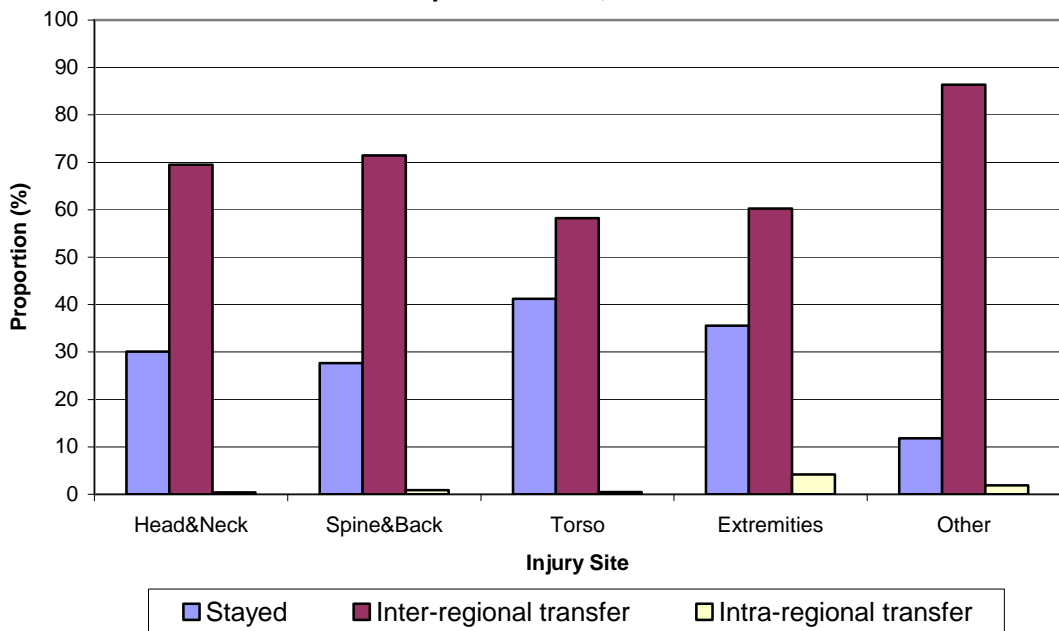


Nearly 50% of the transferred patients had an ISS score less than 9.

16% of the transferred patients had ISS scores above 15.

*As reported by the transferring facility – ISS may be limited because of need for rapid transfer.

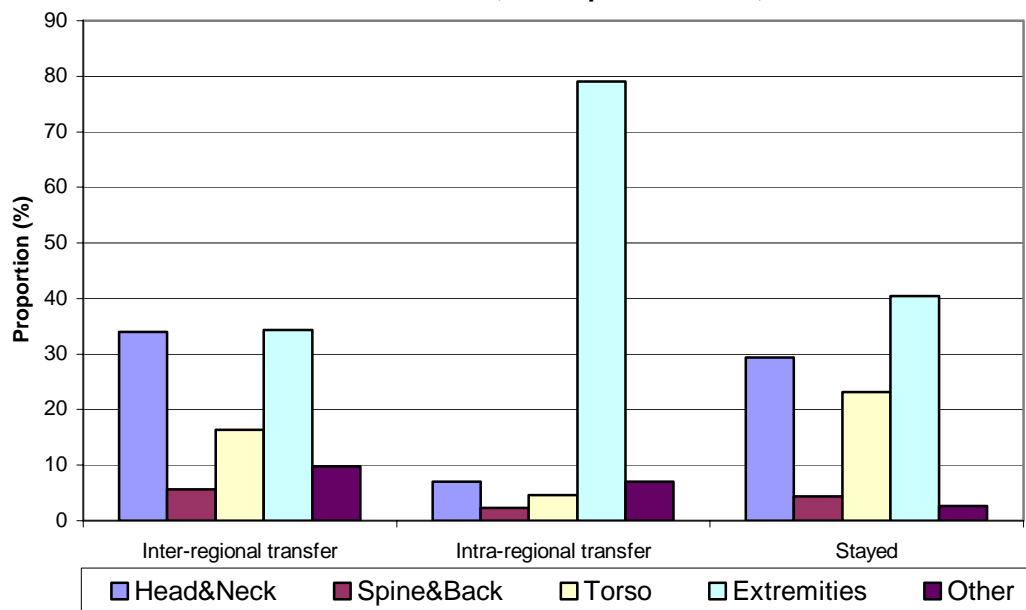
**Transfer Status by Injury Site Incidence, East Central Region,
All Reported Cases, 2004-2005**



Over 70% of head/neck, spine/back, and 'other' were transferred out of region.

Approximately 40% of torso and extremity injuries stayed at the reporting facility.

**Injury Site Incidence for Patients that Stayed at Reporting EC Facility or
Were Transferred Out, All Reported Cases, 2004-2005**

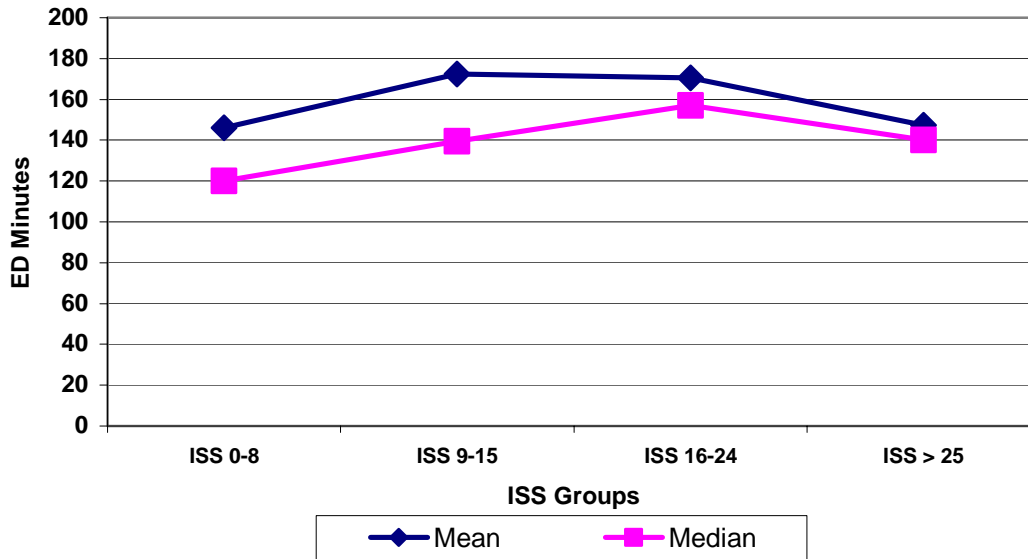


Extremity and head/neck made up 37% and 32% of the total injuries.

40% of persons that stayed at the reporting facility had extremity injuries and 30% had head/neck injuries.

Among the 43 intra-regional transfers, 79% were extremity injuries.

Mean and Median ED Minutes for Patients Transferred Out of/Within EC Region, All Reported Cases, 2004-2005



Time in the initial ED was longest for patients with an ISS between 9 and 24 at about 170 minutes.

For persons with an ISS <9 or >24 the mean minutes was about the same at 146.

Mean/Median ED Minutes* by ISS Group, Trauma Transfers, Northeast Region, All Reported Cases, 2004-2005**

ISS Group	N	# Missing	Mean ED Minutes	Median ED Minutes	Range
ISS 0-8	366	0	146.13	120	10-630
ISS 9-15	178	0	172.41	139.5	29-1015
ISS 16-24	64	0	170.64	157	35-401
ISS > 25	21	0	147.33	140	33-310

Persons transferred with an ISS of 9 to 24 stayed in the initial ED an average of 25 minutes longer than persons with ISS <9 or >24.

*ED minutes at the transferring facility

**Limited to transfers occurring within 24 hrs of arrival

Injury Severity and Selected ED Vital Signs*, Trauma Patients Transferred Out of/Within Northeast Region, All Reported Cases, 2004-2005

Variable	N	# Missing	Mean	Median	Range
ISS	629	27	7.12	5	1-34
SBP	618	38	135.8	134	0-247
GCS	580	76	13.98	15	3-15
RR	632	24	21.01	20	0-61
RTS	541	115	7.55	7.84	0-7.84
TRISS	485	171	0.97	0.99	0.20-1

The mean RTS (Revised Trauma Score) was 7.55 and reflects good vital signs overall at the transferring facility.

The mean TRISS of 0.97 shows a high predicted probability of survival overall.

*Reflects initial vital signs at the transferring facility

Southwest Region

A total of 1826 cases were reported for 2004-2005 (includes both major trauma and minor trauma transfers).

1093 (59.9%) met major trauma criteria.

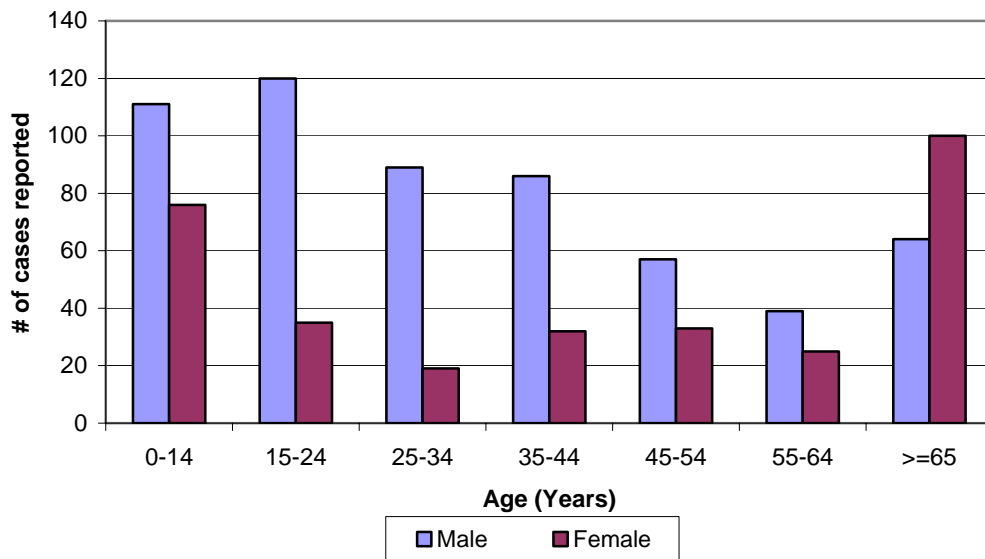
887(48.5%) were transferred to another facility.

Of the 887 transferred to another facility, 212 (24.9%) went to facilities within the Southwest region.

The following table summarizes proportion of transfers (in and out) for all hospitals in the SW Region.

Facility	# of cases reported	% transferred out	% transferred in
Arbuckle Memorial Hospital	36	97	0
Carnegie Tri-County Municipal Hospital	41	95	0
Healdton Municipal Hospital	41	95	0
Pauls Valley General Hospital	144	93	0
The Physicians Hospital in Anadarko	46	89	0
Memorial Hospital & Physician Group	18	89	0
Valley View Regional Hospital	36	96	0
Jefferson County Hospital	39	85	0
Harmon Memorial Hospital	15	80	0
Grady Memorial Hospital	117	79	9
Mangum City Hospital	9	78	0
Mercy Health - Love County	11	73	0
Duncan Regional Hospital	225	52	0
Elkview General Hospital	47	43	0
Jackson County Memorial Hospital	177	42	5
Mercy Memorial Health Center	372	41	35
Comanche County Memorial Hospital	431	8	32
Southwestern Medical Center, Lawton	21	5	0

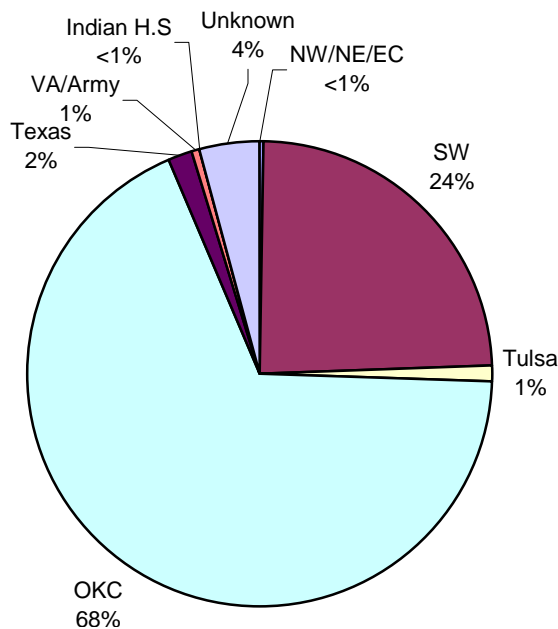
Age and Gender Distribution, Patients Transferred to Other Facilities, SW Region, 2004-2005



Age distribution of transfers peaked in the 0-24 and in the 65 years and older age groups.
 - 82% of transferred persons aged 15-24 years were male.
 - 61% of persons 65 years and older transferred were female.

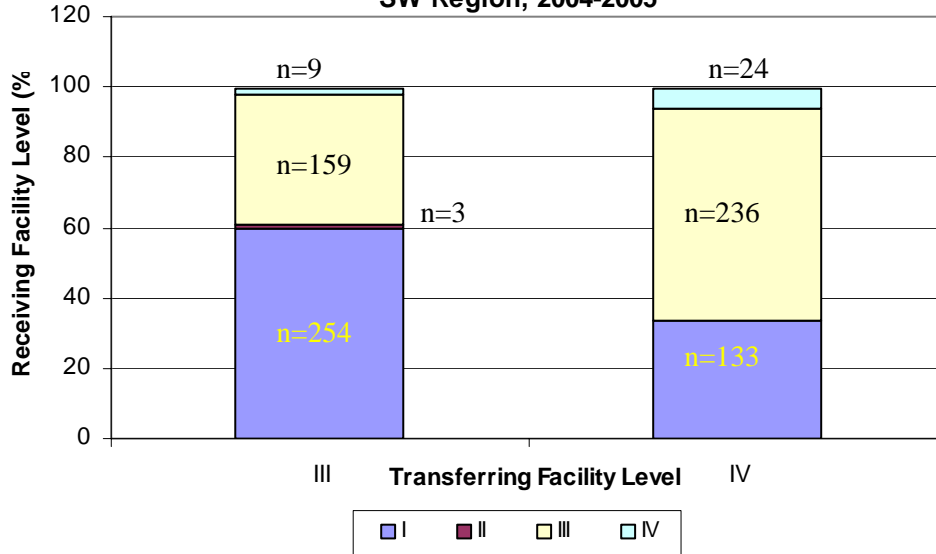
Patient Destination

Patient Destination, Trauma Patients Originating from the SW Region, 2004-2005



Of the 887 patients transferred to other facilities, at least two-thirds (68%) went to the OKC Region while 24% stayed in the Region.

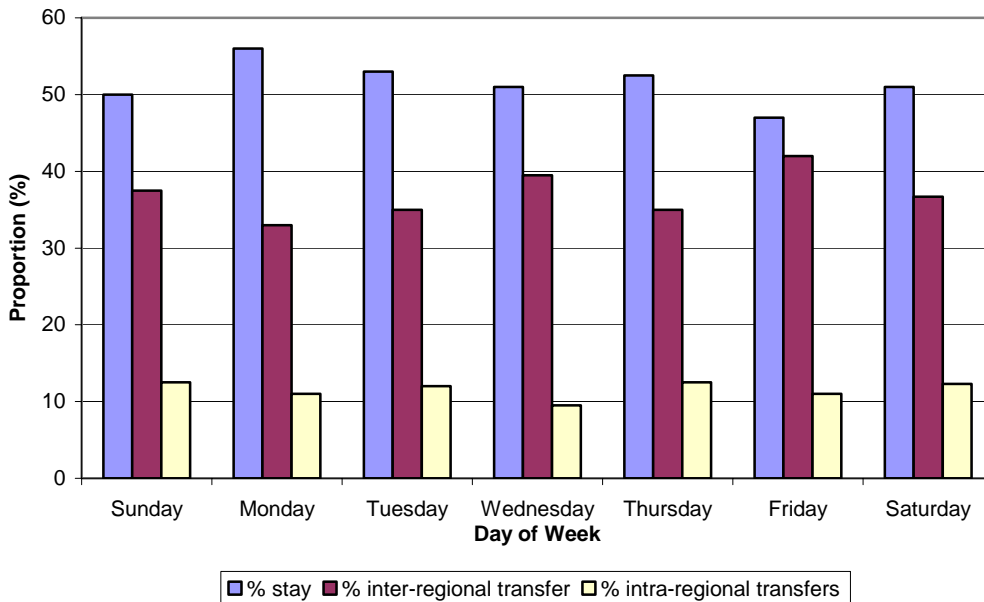
**Receiving Facility Level by Transferring Facility Level
Trauma Patients Transferred Out of/within
SW Region, 2004-2005**



Of the 425 transferred cases reported by Level III facilities, 60% were transferred to a Level I trauma center, while 37.4 % were transferred to other Level III trauma centers.

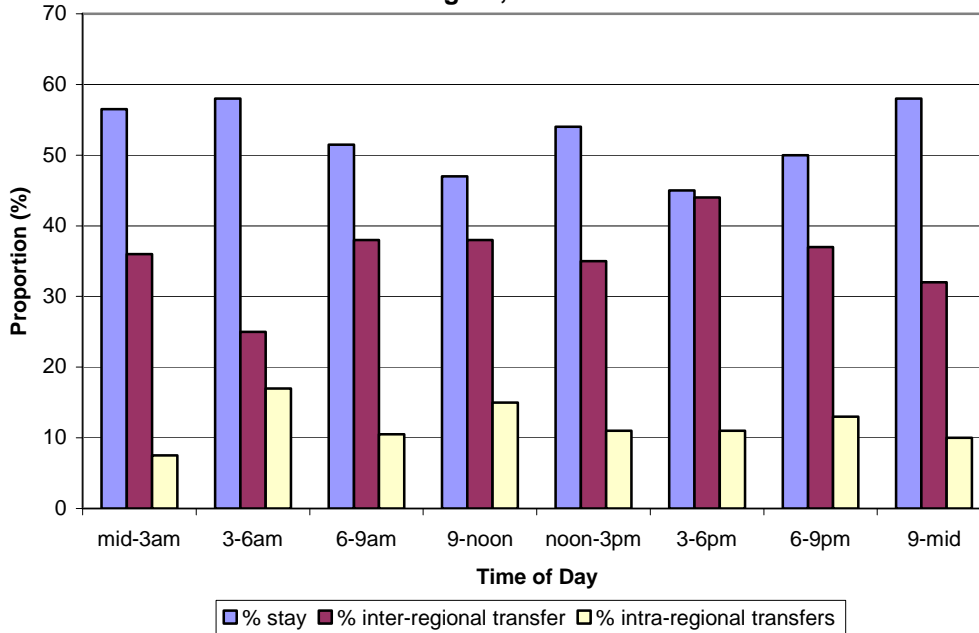
Level IV facilities transferred about 60% of their cases to Level III Trauma Centers and 34% to the Level I Trauma Center.

**Proportion of Trauma Transfers and Those Staying in the SW Region
by Day of Week 2004-2005**



About 50% of patients stayed in the SW Region except for Friday, where the proportion of transferred cases (both intra and inter-regional) was 53%.

Proportion of Trauma Transfers and Those Staying in the SW Region, 2004-2005

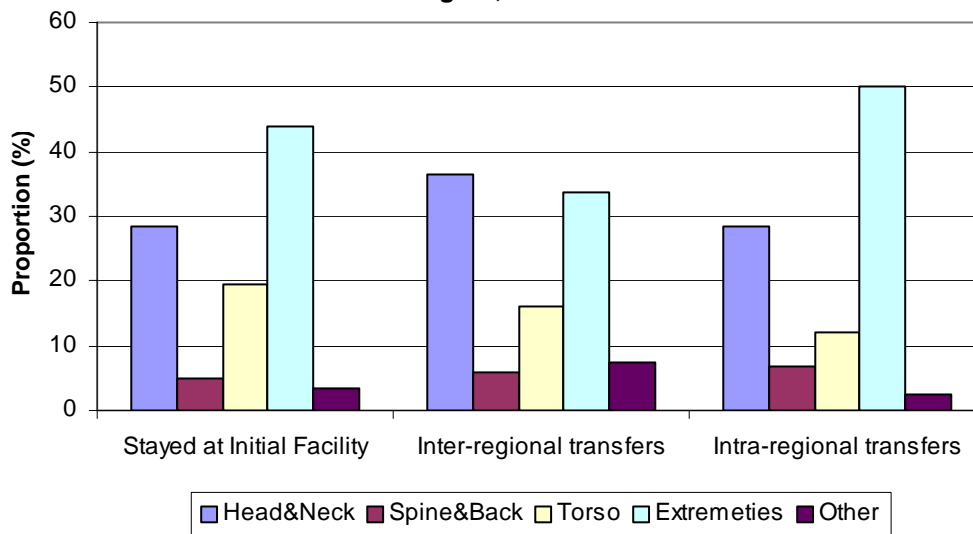


55% of trauma transfers occurred between 9 a.m.- 9 p.m. with a peak between 3 p.m.- 6 p.m.

Over 50% of patients stayed at the hospital from 9 p.m.- 9 a.m.

Injury Site and Severity

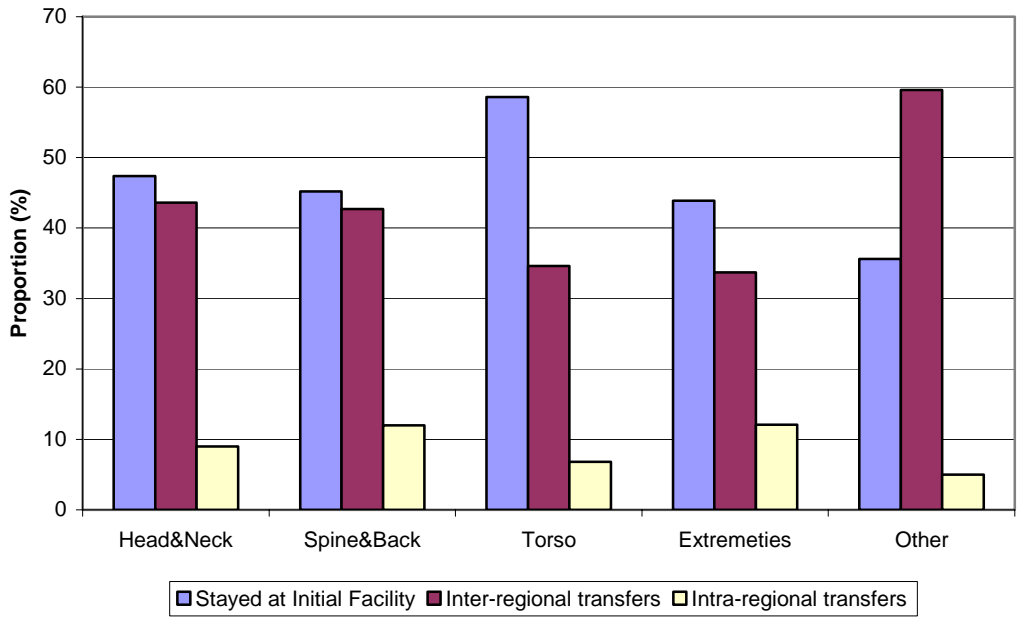
Injury Site and Incidence for Patients that Stayed at Initial Facility or were Transferred to Another Facility, SW Region, 2004-2005



Among trauma patients that were transferred to another region, there was a higher incidence (36%) of head and neck injuries and extremity injuries.

A 50% incidence of extremity injuries was observed in intra-regional transfers.

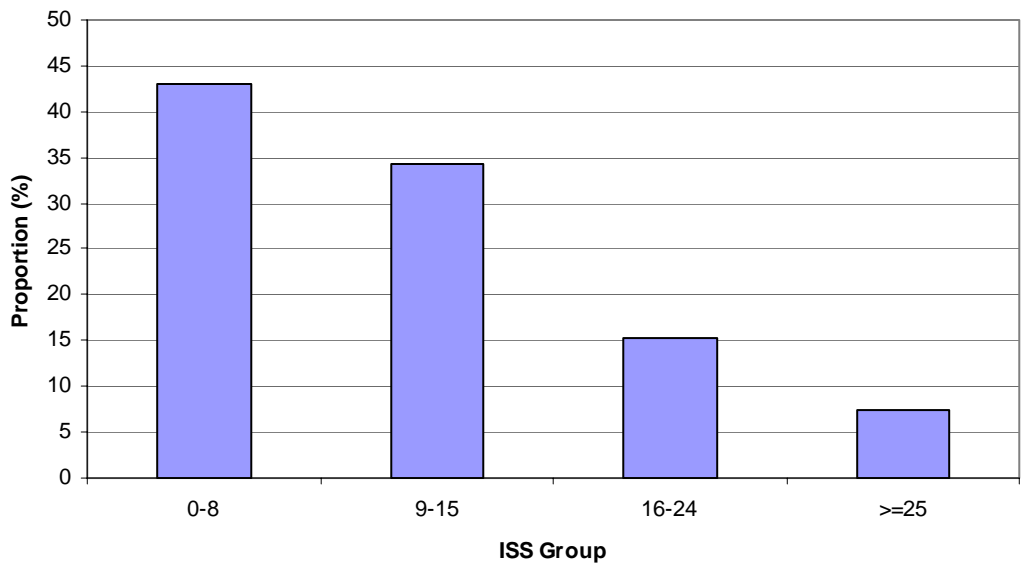
**Transfer Status by Injury Incidence and Site,
SW Region, 2004-2005**



Nearly 60% of all torso injuries stayed in the region.

Over 40% of the head and neck and spine and back were transferred out of the region.

**ISS* Distribution, All Trauma Transfers,
SouthWest Region, 2004-2005**

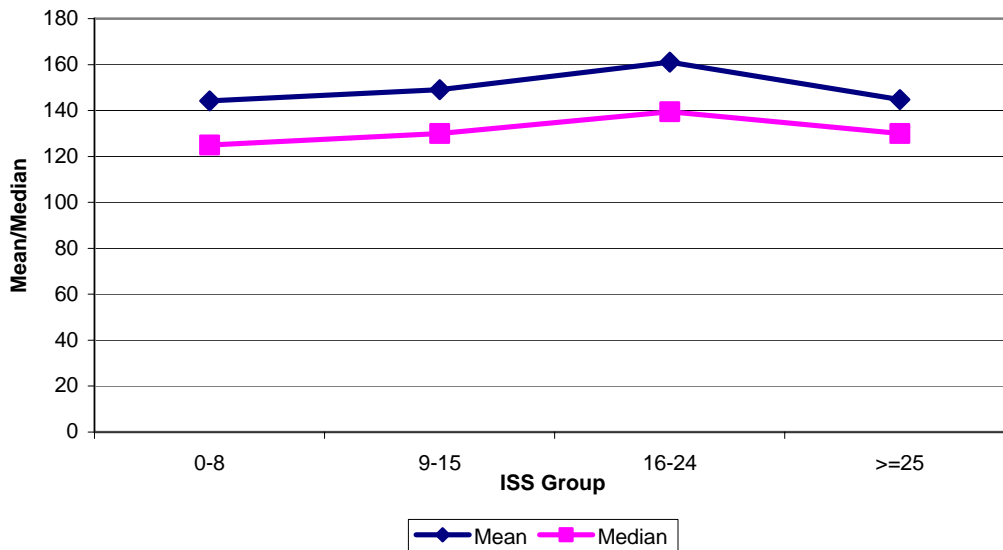


43% of patients transferred out to other facilities had an ISS <9 (minor trauma).

23% of transfers had an ISS >15.

*As reported by transferring facility; Injury Severity scoring at time of transfer should be interpreted with caution as it may reflect incomplete diagnosis.

Mean and Median ED Length of Stay* before Transfer by ISS Group, All Trauma Transfers, SW Region, 2004-2005



Based on median time, patients with ISS 0-8 spent the least amount of time (median of 125 minutes) in the ED before transfer.

There were only 14-minute variations of median time in the ED among all levels of ISS.

* The ISS reported by transferring facilities may not completely reflect the extent of the injury severity due to incomplete definitive diagnosis at time of transfer.

Mean/Median ED Minutes by ISS Group, Trauma Transfers, SW Region, 2004-2005

ISS Group	N	# missing	Mean ED Minutes	Median ED Minutes	Range
0-8	349	0	144.2	125	1 - 471
9-15	279	0	149.0	130	22 - 435
16-24	122	0	161.1	139.5	30 - 615
>=25	61	0	144.7	130	45 - 363

Mean Injury Severity and Selected ED Initial Vital Signs*, Inter-facility Transfers, SW Region, 2004-2005

Variable	N	# missing	Mean	Median	Range
ISS	839	20	9.9	9	1-75
SBP	800	59	135.5	135	0 - 250
GCS	766	93	13.9	15	3 - 15
RR	837	22	20.6	20	0 - 48
RTS	716	143	7.5	7.84	0 - 7.84
TRISS	671	188	0.9	0.99	0.001 - 0.997

On average, patients were physiologically stable at the time of initial ED assessment.

* As reported by transferring facility; the preponderance towards low ISS scores may be an artifact of incomplete injury diagnosis before patients are transferred.

Central Region

A total of 873 cases were reported for 2004-2005 (includes patients meeting major trauma criteria and all minor trauma transfers).

373 (42.7%) met major trauma criteria.

32% (278) were discharged home with no need for home healthcare.

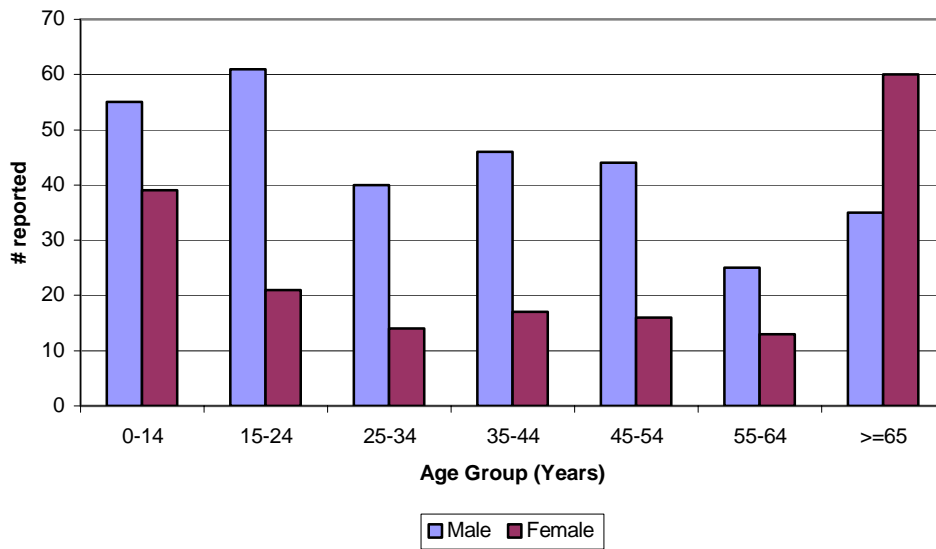
484 (55.6%) were transferred to another facility.

6% (29) of all transfers went to facilities within the region.

The table below summarizes proportion of transfers (in and out) for all hospitals in the Central Region, 2004-2005.

Facility	# of cases reported	% transferred out	% transferred in
Prague Municipal Hospital	28	96	0
Purcell Municipal Hospital	147	94	0
Stroud Regional Medical Center	23	74	4
Park View Hospital	55	65	0
Unity Health Center	330	63	3
Logan Hospital and Medical Center	290	20	0

Age and Gender Distribution, Patients Transferred to Other Facilities, Central Region, 2004-2005

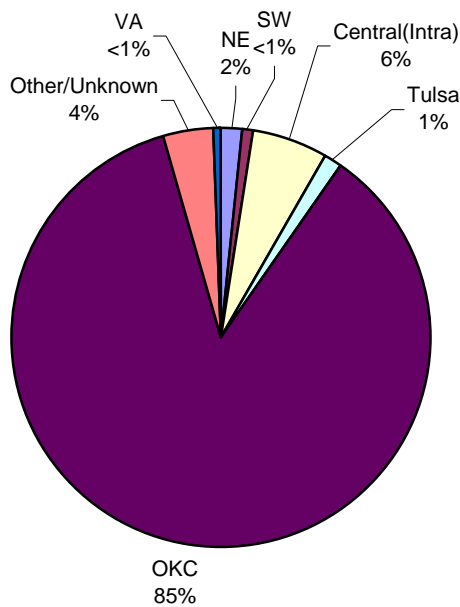


Overall, 63% of transferred patients were male.

In the 15-24 years age group for patients transferred to other facilities in the Central Region, males outnumbered females by a 3:1 ratio while in the 65 years and older age group, females outnumbered males by ratio of about 2:1.

Patient Destination: Inter-Facility Transfers

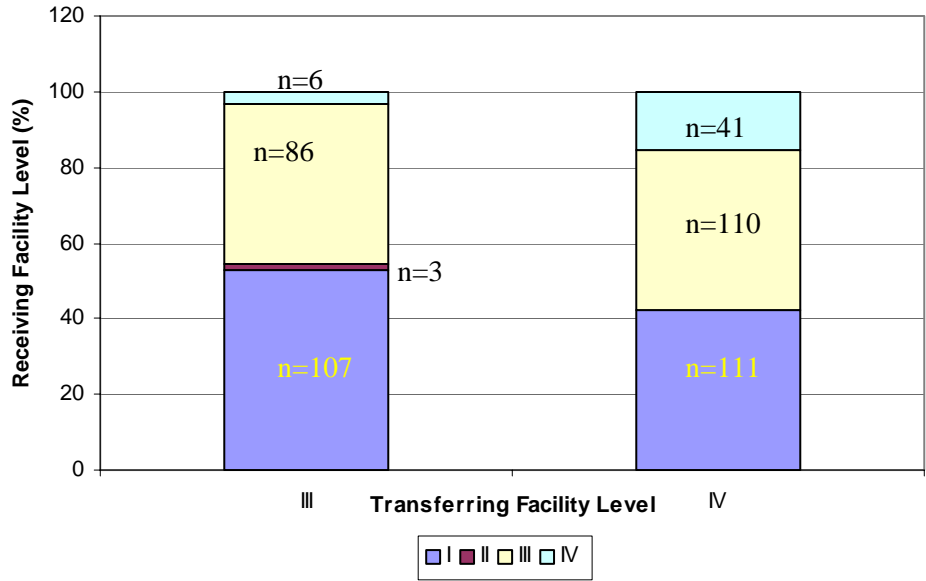
Patient Destination, Trauma Patients Transferred to Other Acute care facilities, Central Region, 2004-2005



Of the 484 patients transferred to other facilities, 85% went to the OKC Region.

Intra-regional transfer rate was 6% with 23/29 patients going to Logan Medical and Unity Health Center.

Receiving Facility Level by Transferring Facility Level, Trauma Transfers Central Region, 2004-2005

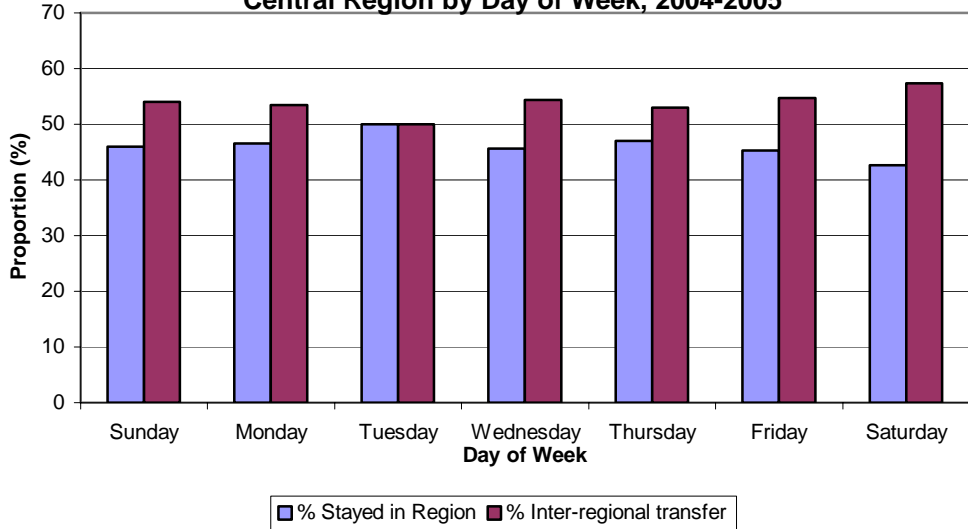


Level III facilities in the Central Region transferred 52.9 % of their cases to the Level 1 Trauma Center and 42.6% to other Level III hospitals.

Level IV facilities in the Central Region transferred 42% of their cases to the Level 1 Trauma Center, 43% to Level III hospitals and about 16% to Level IV hospitals.

Time of Day and Day of Week

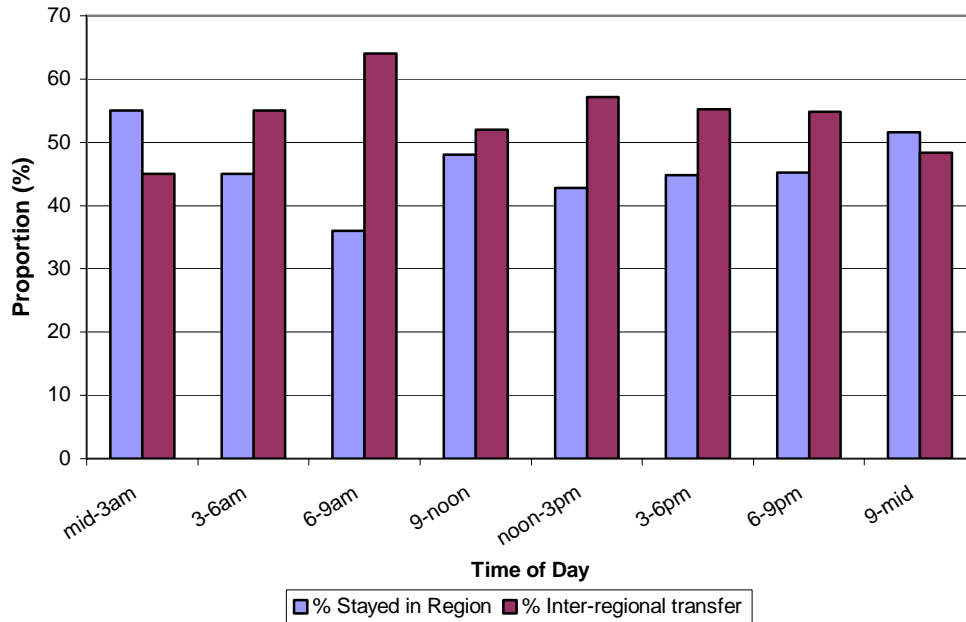
Proportion of Trauma Transfers* and Patients Staying in the Central Region by Day of Week, 2004-2005



Except for Tuesdays, more 50% of patients were transferred out of region; 58% of patients were transferred on Saturdays.

*Excludes intra-regional transfers - only 4 patients (<1%) were transferred to facilities within the Central Region

Proportion of Trauma Transfers* and Those Staying in the Central Region by Time of Day, 2004-2005



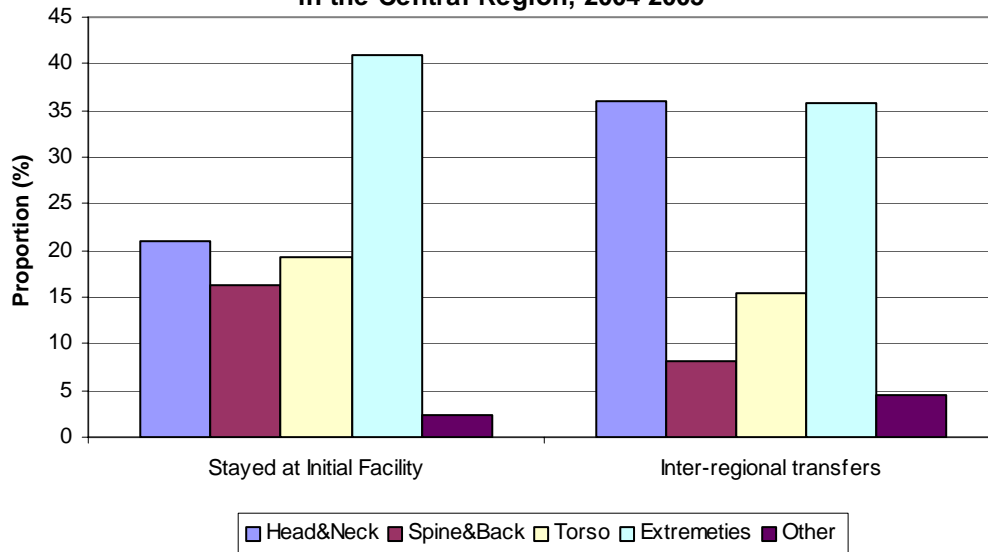
Less than 50% of patients seen between 9 p.m. and 3 a.m. were transferred out of the Central Region.

At least 50% of patients seen between 3am and 9pm were transferred out of region with the highest proportion of transfers (64%) observed for patients admitted between 6-9 a.m.

*Excludes intra-regional transfers - only 4 patients (<1%) were transferred to facilities within the Central Region

Injury Site and Severity

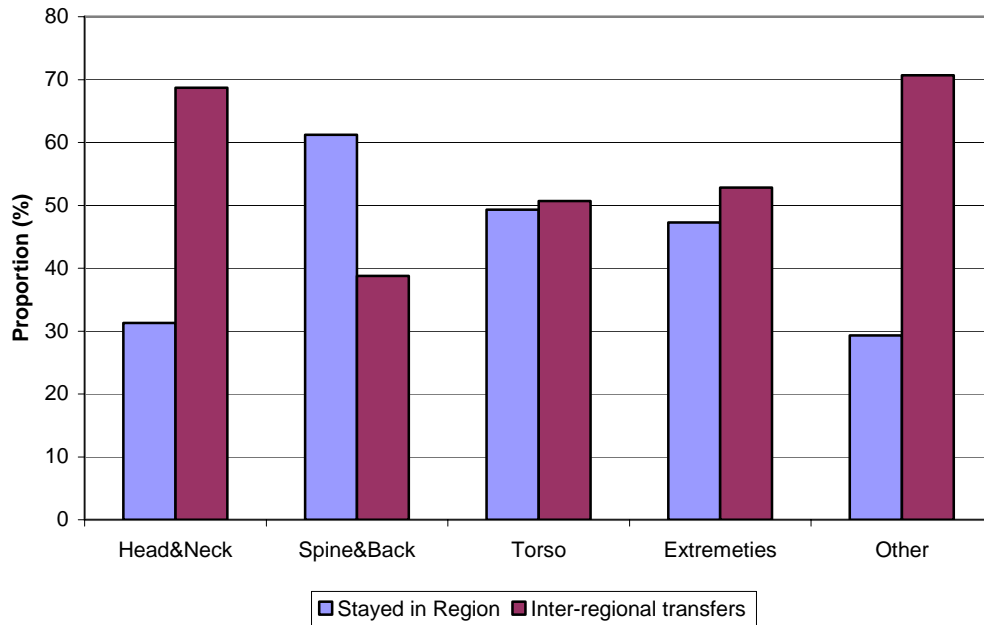
Injury Site and Incidence for Patients Transferred Out or Stayed in the Central Region, 2004-2005



Over 40% of patients that stayed in the region had extremity injuries.

Over 35% of patients transferred to other regions from the Central region had head/neck or extremity injuries, respectively.

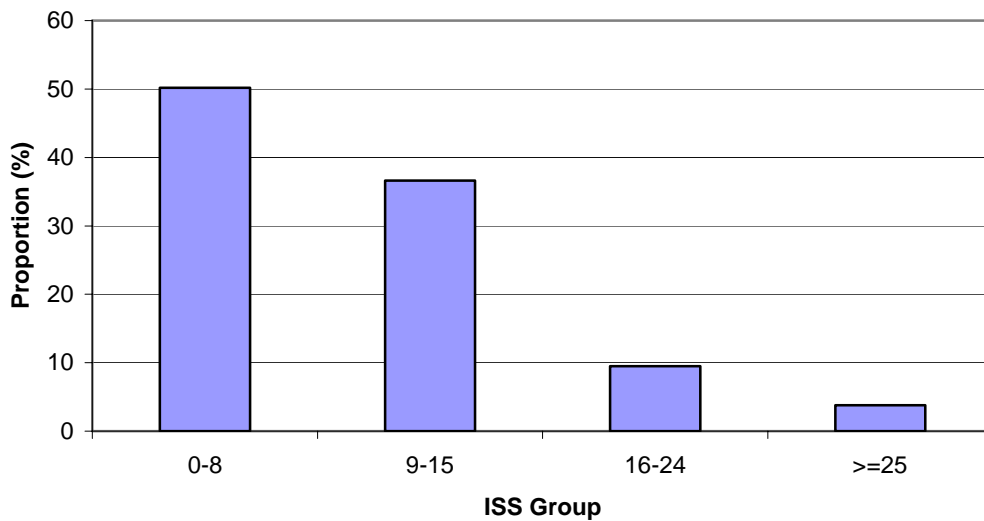
**Transfer Status by Injury Site and Incidence,
Central Region, 2004-2005**



69% of the head injuries were transferred out of the region.

Over 50% of the torso and extremity injuries were also transferred out of the region.

**ISS* Distribution, All Trauma Transfers,
Central Region, 2004-2005**

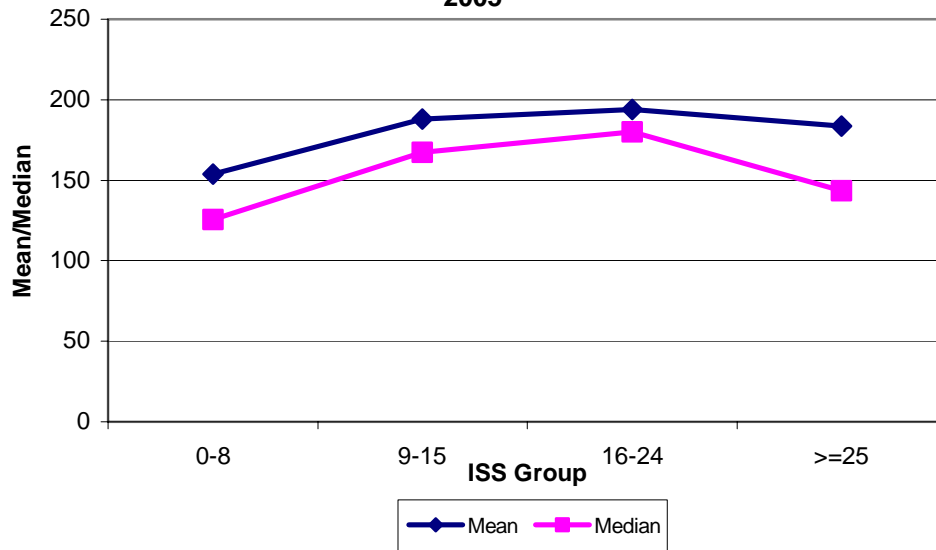


50% of patients transferred to other facilities had ISS < 9 at the time of transfer.

13.5% of transfers had an ISS > 15.

*As reported by transferring facility

**Mean and Median ED Length of Stay by Injury Severity*,
Trauma Patients Transferred Out of Central Region, 2004-2005**



The ISS 0-8* group spent the least amount of time (median time of 125 minutes) in the ED before transfer.

* ISS may reflect incomplete definitive diagnosis at time of transfer

Mean/Median ED Minutes by ISS Group, trauma transfers, Central Region, 2004-2005

ISS Group	N	# missing	Mean ED Minutes	Median ED Minutes	Range
0-8	227	1	153.9	125.5	0-650
9-15	164	0	188.0	167.5	0-597
16-24	44	1	194.1	180	47-410
>=25	18	0	183.7	143.5	0-448

Injury severity and selected initial ED vital signs, patients transferred to another facility, Central Region, 2004-2005

Variable	N	# missing	Mean	Median	Range
ISS	472	9	7.9	8	1-41
SBP	460	21	136.0	136	0-219
GCS	423	58	14.4	15	3-15
RR	478	3	20.2	20	0-50
RTS	405	76	7.7	7.84	0-7.84
TRISS	388	93	0.98	0.99	0.3-0.99

Generally, transferred patients had good vital signs.

*Reflects initial vital signs at the transferring facility

APPENDIX I. Hospitals with at Least 25% discrepancy in 2005 Inter-facility Transfer Data Reporting.

1. Valley View Regional Hospital
2. Wagoner Community Hospital
3. Lindsay Municipal Hospital
4. Okmulgee Hospital
5. Southwestern Medical Center – Lawton
6. Stillwater Medical Center
7. Claremore Regional Hospital
8. Cleveland Area Hospital
9. Cimarron Memorial Hospital
10. Roger Mills Memorial Hospital
11. Fairview Hospital
12. Kingfisher Regional Hospital
13. Cushing Regional Hospital
14. Integris Baptist Regional Health Center
15. Jane Phillips Nowata Health Center
16. Physicians Hospital – Anadarko
17. Community Hospital Lakeview
18. Henryetta Medical Center
19. ParkView Hospital
20. Hillcrest Medical Center
21. Bone and Joint Hospital
22. Integris Canadian Valley – Yukon
23. Mercy Health -Love County
24. Integris Marshall Memorial Hospital
25. Johnston Memorial Hospital
26. Creek Nation Community Hospital

APPENDIX II. Level IV Transfer Proportions, 2004-2005

	Facility	# of cases reported	% transferred out
1	Moore Medical Center	16	100
2	Southwestern Memorial Hospital	118	100
3	Roger Mills Memorial Hospital	15	100
4	Pawhuska Hospital Inc	70	100
5	Kingfisher Regional Hospital	31	100
6	Drumright Memorial Hospital	5	100
7	Atoka Memorial Hospital	98	99
8	Jane Phillips Nowata Health Center	238	99
9	Creek Nation Community Hospital	78	99
10	Bristow Memorial Hospital	61	98
11	Okmulgee Memorial Hospital	104	98
12	Cordell Memorial Hospital	43	98
13	Arbuckle Memorial Hospital	36	97
14	Prague Municipal Hospital	28	96
15	St John Sapulpa Inc	82	96
16	Choctaw Memorial Hospital	81	96
17	Community Hospital Lakeview	53	96
18	Holdenville General Hospital	93	96
19	Carnegie Tri-county Municipal Hospital	41	95
20	Healdton Municipal Hospital	41	95
21	Cleveland Area Hospital Inc	75	95
22	Purcell Municipal Hospital	147	94
23	Pauls Valley General Hospital	144	93
24	Perry Memorial Hospital	49	92
25	Memorial Hospital-Stilwell	61	92
26	Fairfax Memorial Hospital Inc	21	90
27	Watonga Municipal Hospital	51	90
28	Pushmataha County Town of Antlers Hospital Authority	69	90
29	Anadarko Municipal Hospital	46	89
30	Memorial Hospital & PG-Frederick	18	89
31	Seminole Medical Center	80	89
32	Henryetta Medical Center	32	88
33	Integrus Blackwell Regional Hospital	102	87
34	Cimarron Memorial Hospital	22	86
35	Seiling Municipal Hospital Authority	73	86
36	Valley View Regional Hospital	36	86
37	Craig General Hospital	108	86
38	Pawnee Municipal Hospital	20	85
39	Jefferson County Hospital	39	85
40	Latimer County General Hospital	24	83
41	McCurtain Memorial Hospital	179	83
42	Share Memorial Hospital	150	83
43	Sequoyah Memorial Hospital	34	82
44	Harmon Memorial Hospital	15	80
45	Integrus Marshall Memorial Hospital	82	80
46	Integrus Mayes County Medical Center	240	79

	Facility	# of cases reported	% transferred out
47	Sayre Memorial Hospital	59	78
48	Mangum City Hospital	9	78
49	Tahlequah City Hospital	107	78
50	Integrus Grove General Hospital	123	77
51	Eastern Oklahoma Medical Center	188	77
52	Integrus Clinton Regional Hospital	151	77
53	Haskell County Hospital	72	76
54	Memorial Hospital of Texas County	69	75
55	Stroud Municipal Hospital	23	74
56	Mary Hurley Hospital	15	73
57	Mercy Health Love County	11	73
58	Physicians Hospital of Oklahoma	6	67
59	Park View Hospital	55	65
60	Harper County Community Hospital	26	62
61	Okeene Municipal Hospital	36	56
62	Fairview Hospital	111	50
63	Cushing Regional Hospital	71	46
64	Newman Memorial Hospital	56	46
65	Medical Center of Southeastern Oklahoma	151	45
66	Beaver County Memorial Hospital	68	44
67	Elkview General Hospital	47	43
68	Integrus Canadian Valley	60	33
69	Logan Hospital and Medical Center	290	20
70	Bone and Joint Hospital	49	4