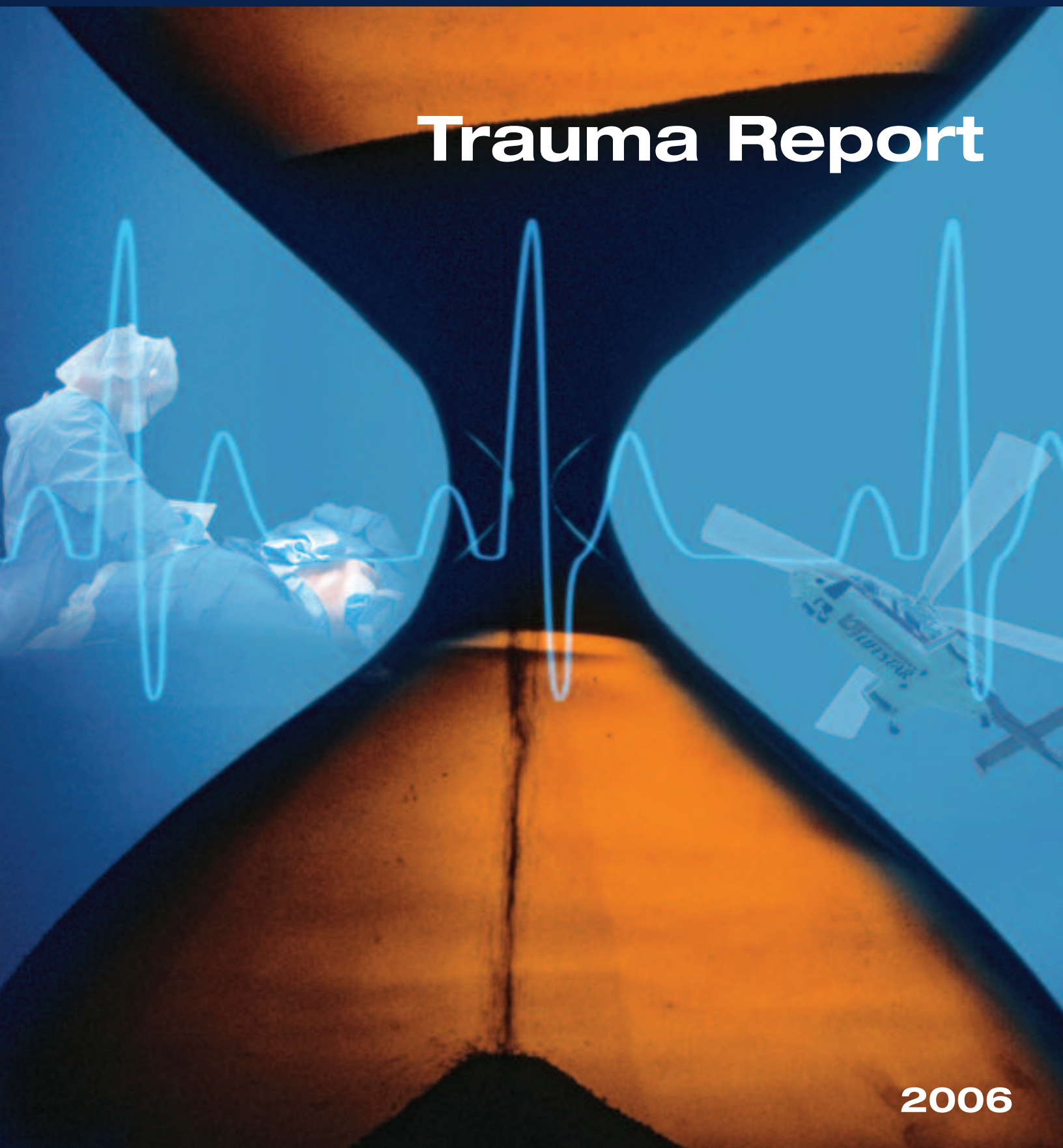
THE UNIVERSITY OF TENNESSEE MEDICAL CENTER

EMERGENCY AND TRAUMA SERVICES

Trauma Report



2006

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Trauma Program Profile

Trauma Medical Director's Introduction

The University of Tennessee Medical Center, like other Level I Trauma Centers, serves as the center of a regionalized system of healthcare. We provide education for caregivers, patients, and the public. We do research to ensure that we are always providing state-of-the-art care. And, we are available to provide care for the most critically ill and injured patients 24-hours-a-day, every day. The Medical Center provides these services for a region which includes much of East Tennessee, as well as portions of several surrounding states.

Several issues continue to face all regional referral centers; for example, the "costs of preparedness"—that is, the cost of having all of the people and equipment necessary to care for these patients available 24-hours-per-day. Another issue is the ability to transfer patients who need rehabilitation to facilities that are more appropriate once the patient's acute care needs are met. Finally, with more severely injured and ill patients arriving and not leaving as quickly, access and space becomes an issue, leading to the need for more careful triage of patients and a potential limitation of surge capacity, or the ability to handle patients in times of crisis.

These problems are being recognized, both at the state and federal level, but much work remains to be done. This report shows how The University of Tennessee Medical Center continues to provide regionalized care for injured patients. We invite you to read this report, taking a tour of the trauma center and meeting some of the people who are there, every hour of every day, waiting to care for severely injured patients.

Thank you,

Blaine L. Enderson, MD, MBA, FACS, FCCM
Professor of Surgery and Chief
Division of Trauma/Critical Care
General Surgery, Trauma and Critical Care

Forward

The University of Tennessee Medical Center's 2006 Annual Trauma Services Report is designed to give an overview of our region's trauma patient demographics, volume, acuity, and outcomes. Data is aggregated and reported on calendar year of admissions.

This report also includes specific sections on surgical procedures, injuries received, referral base, and financial statistics. All data in this report is provided by the Medical Center's Trauma Registry Data Base (NTRACS). Trauma Services at the Medical Center is continually striving to improve patient outcomes through various performance improvement initiatives and research activities. As a Level I Trauma Center, we are committed to provide outreach education to our rural healthcare providers and to sponsor injury prevention initiatives for all ages.

Emergency, trauma, and critical care services recognize the dedication of our physicians, nurses, and ancillary personnel who strive to care for the injured on a daily basis. We greatly appreciate your dedication to our patients, our facility, and UT Medical Center's Level I Trauma Center.

Sincerely,

Rhonda McAnally, RN, BSN
Trauma Program Manager
Trauma Services

Acknowledgements

Blaine L. Enderson, MD, MBA, FACS, FCCM
Trauma Medical Director
Division Chief of Trauma/Critical Care

Sandi Madden, RN, BSN
Vice President, Emergency and Trauma Services

Rhonda McAnally, RN, BSN
Trauma Program Manager

Jan Armstrong, RN, BSN
Trauma Data Analyst

Becky Thompson, RHIT
Data Analyst

Trauma Services Data

Trauma Surgeons

The director of trauma services is a board certified general surgeon who oversees administrative aspects of the trauma program. The general surgeon is the leader of the trauma team and is responsible for the overall care of the trauma patient, including coordinating care with other specialties and maintaining continuity of care. General surgeons caring for the trauma patient must meet certain requirements such as board certification, clinical involvement, education, and regional/national commitment and must be in compliance with these requirements. Surgical residents also compliment the trauma team in providing care in a vast majority of settings such as the emergency department, critical care, medical-surgical floors, and clinic. Educational and clinical opportunities are supported and required by the Department of Surgery and the Graduate School of Medicine. Courses required and maintained throughout residency include ATLS, ACLS, PALS, FCCS, and FAST Ultrasound Course. The residents are also involved in performance improvement initiatives with the trauma program and conduct research to improve the care delivered to our trauma patients.

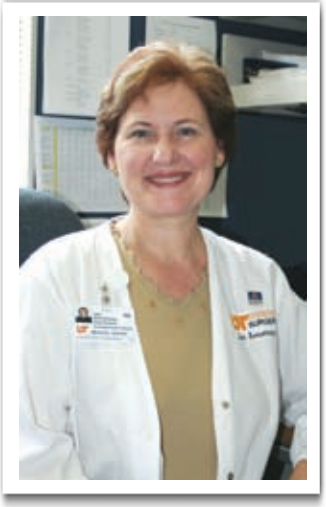



Trauma Surgeons

Blaine L. Enderson, MD, MBA, FACS, FCCM
Brian J. Daley, MD, MBA, FACS, FCCP, CNSP
Stanley J. Kurek, DO
Todd A. Nickloes, DO
Lou M. Smith, MD, FACS
Dana A. Taylor, MD


Trauma Program Manager

The trauma program manager is fundamental to the development, implementation, and evaluation of the trauma program. In addition to administrative responsibilities, the trauma coordinator must show evidence of educational preparation, certification, and clinical experience in the field of trauma care. Key responsibilities include the organization of performance improvement activities and management of the trauma registry. Outreach education and injury prevention activities within the community, state, and national levels are also a priority of the trauma program. The coordinator also is involved with research, analysis, and facilitating protocol development within the trauma program. The trauma program manager represents the trauma program on many hospital committees to enhance optimal trauma care delivery and management to our patients.



Trauma Data Analyst

The trauma data analyst has many functions within our service. Duties include the generation of various reports for use in surgical residency requirements, research projects for publications and presentations at national meetings, and providing information in the assistance of supporting legislative bills which impact the safety of the community. The trauma data analyst is responsible for maintaining an accurate and current data registry. Trauma Registry data is used in the performance improvement process, reported to the National Trauma Data Bank, and the state trauma center site inspection process.

Regional Area of Service

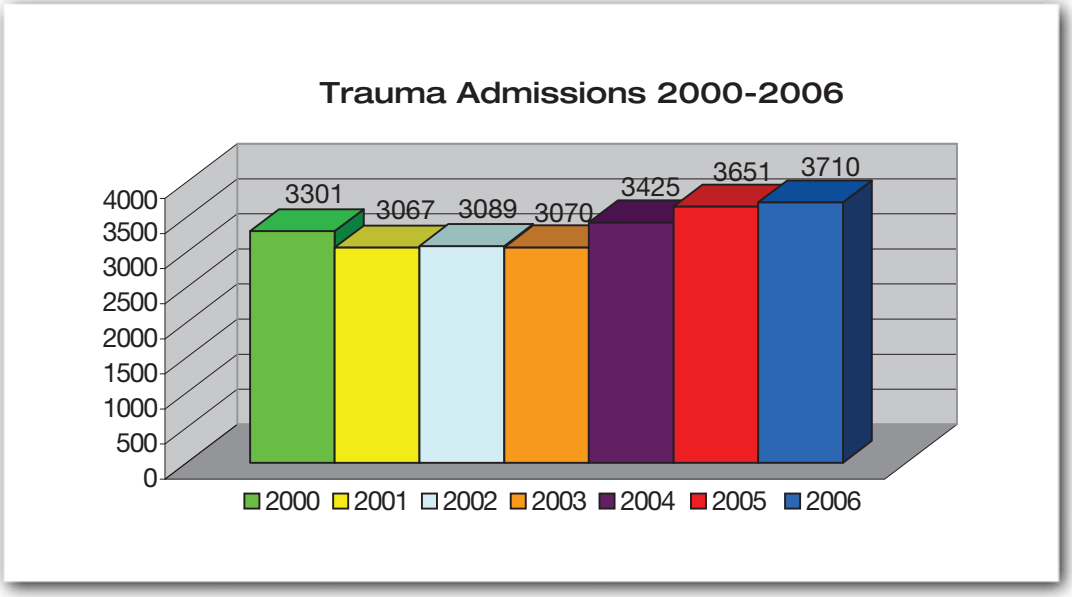
The University of Tennessee Medical Center serves the region of East Tennessee and parts of North Carolina and Kentucky. This area is a favorite destination for tourists because of the Great Smoky Mountains and the beautiful lakes. Many sporting events and conventions are held here each year, increasing the visiting population to our region during the spring, summer, and fall.

Definition of a Trauma Patient

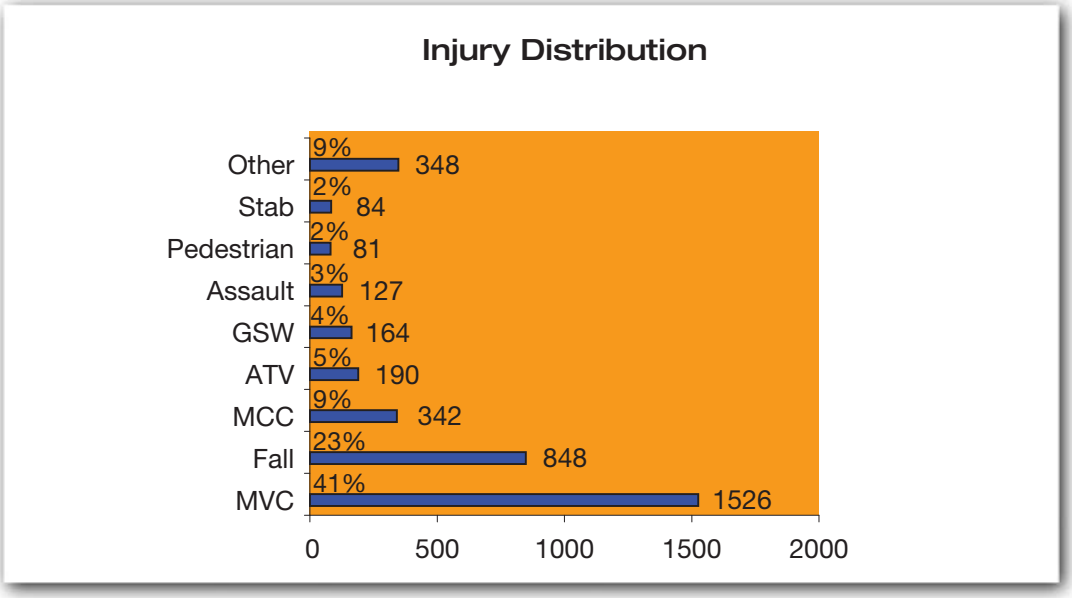
The "trauma patient" is defined as a person who has sustained acute injury. We use a standardized field triage criteria (anatomic, physiologic, and mechanism of injury) to judge the patient at significant risk of mortality and morbidity.

Admissions per Year

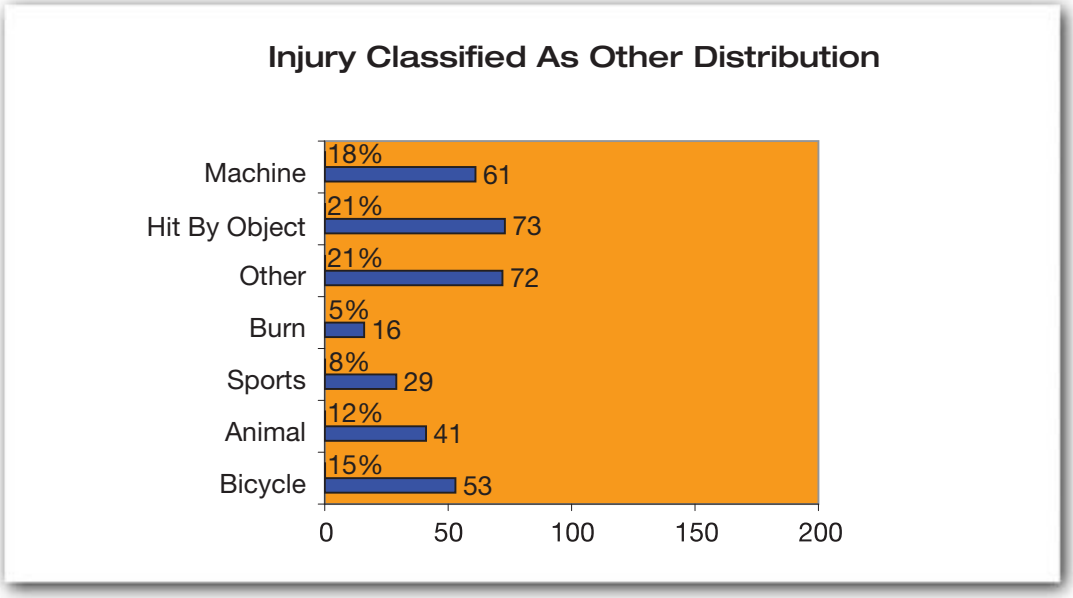
The following graph summarizes the University of Tennessee Medical Center trauma registry data of patient admissions for the years 2000-2006.



Demographic Profile

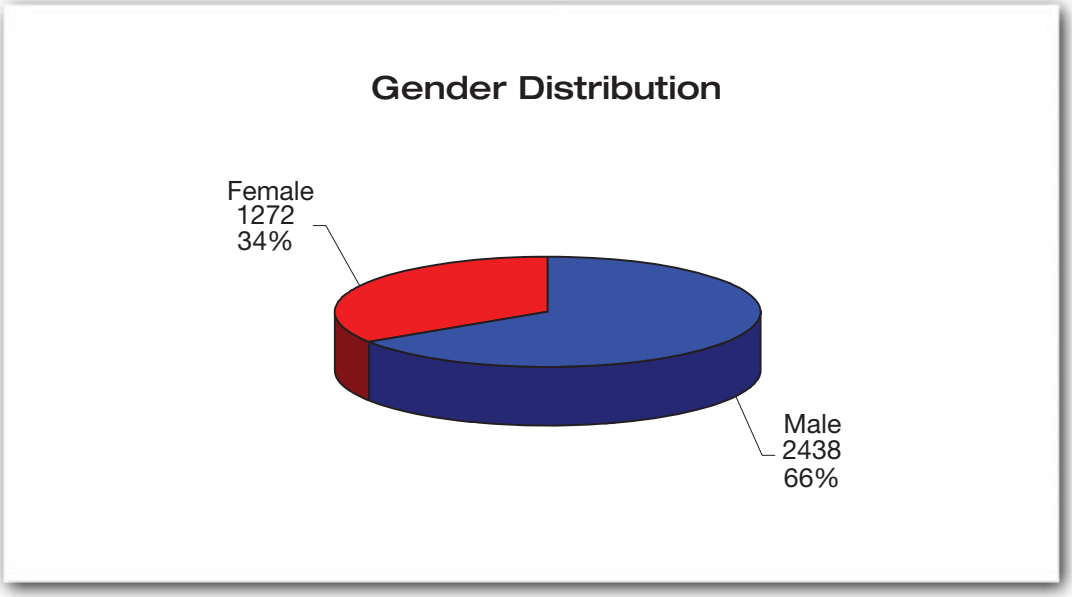


Trauma in East Tennessee is usually classified as blunt trauma, resulting from either motor vehicle crashes or falls. Forty-one percent of injured patients cared for by the trauma service team at the Medical Center are the result of motor vehicle crashes. Twenty-three percent of the total trauma patient admissions are due to falls. Other mechanisms of injury include burns, sports activities, and machinery as defined in the graph below.



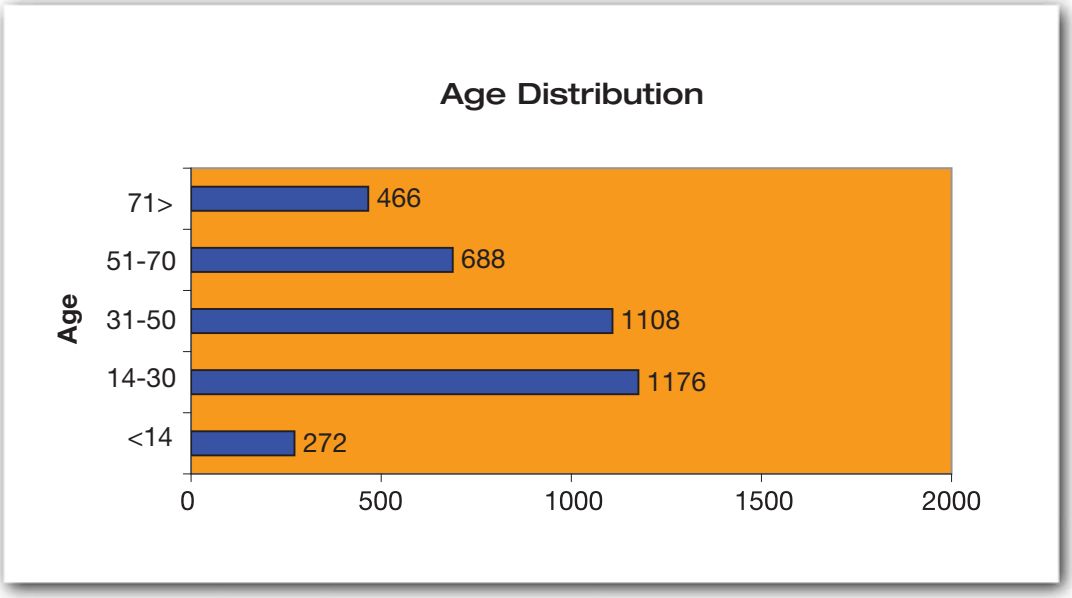
Gender Distribution

The gender distribution follows national trends as traumatic injury tends to be a male dominated problem. Almost two-thirds of patients admitted to the hospital as a result of trauma are males.



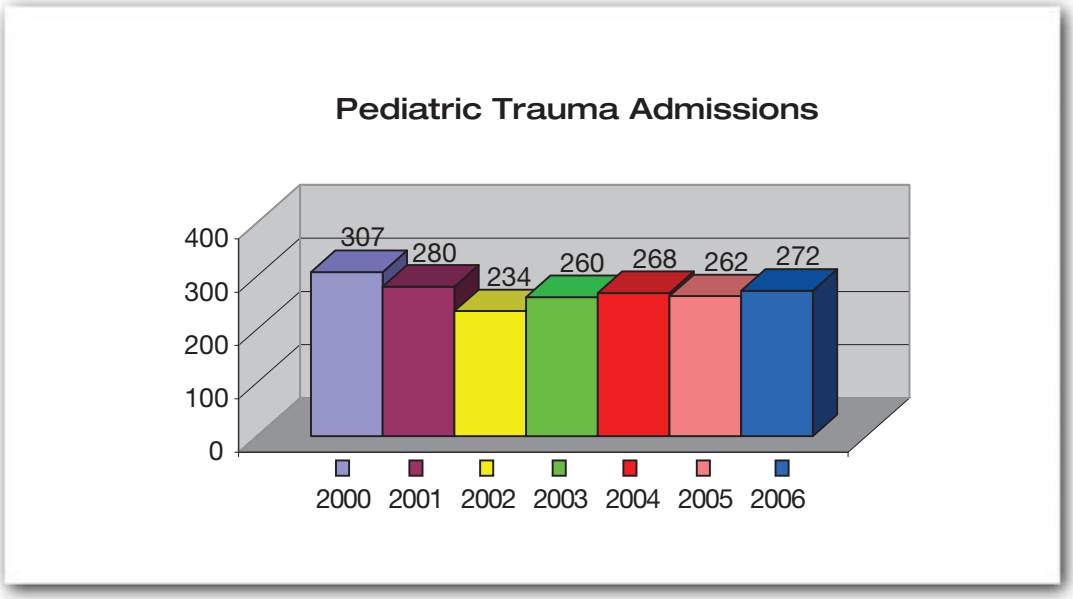
Age Distribution

At The University of Tennessee Medical Center, patients 14 years of age and older are treated by the adult trauma service. Trauma has been known as the disease of the young, with most trauma admissions being patients 40 years old or younger. Changing demographics have led to an increased number of injuries in older patients.



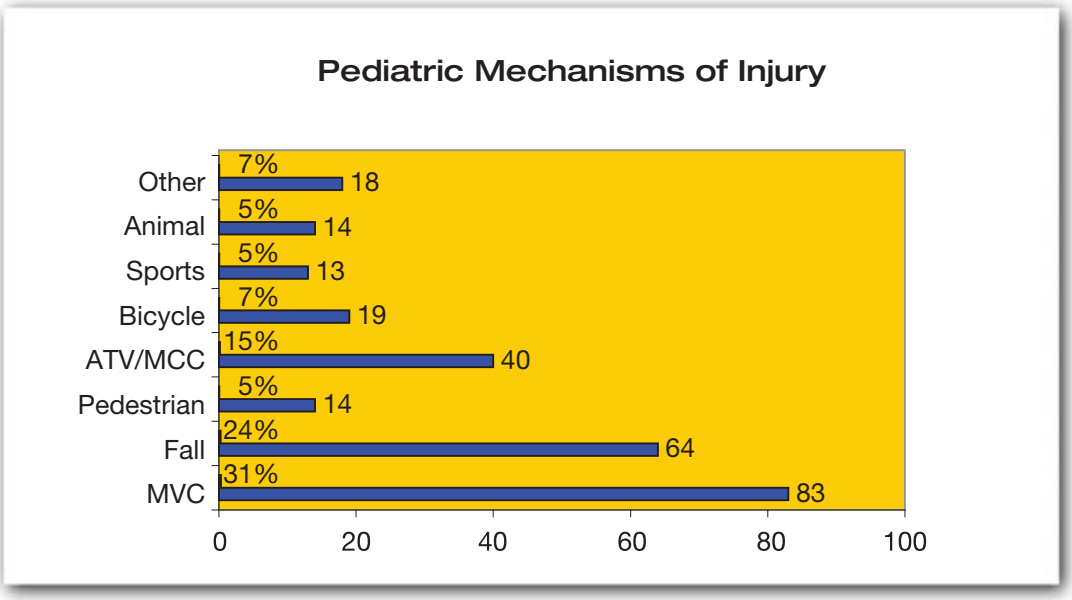
Pediatric Trauma Admissions

Pediatric trauma patients are defined as those less than 14 years old. Pediatric trauma comprises 7% of admitted patients and an average of 272 pediatric trauma admissions per year.



Specific Causes of Pediatric Injury

The majority (31%) of the Medical Center's pediatric trauma admissions are the result of motor vehicle crashes. Falls are second highest at 24% percent. Motorcycle and ATV crashes are responsible for 17% of pediatric trauma admissions. The other categories represent sports related injuries, pedestrian crashes, animal bites and penetrating trauma.

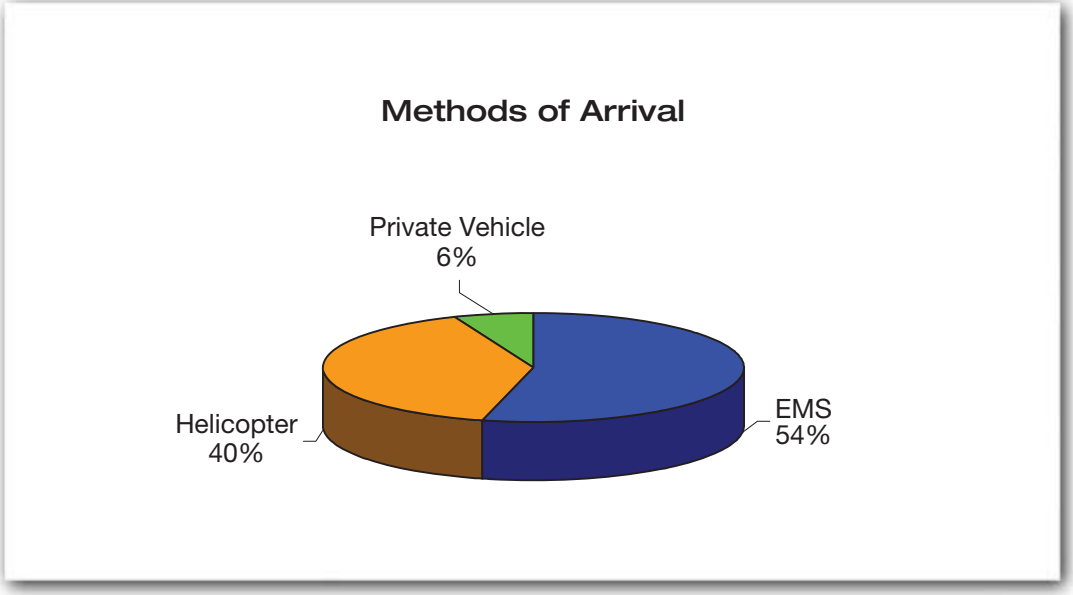


Top Three Mechanisms of Injury by Age Range

AGE RANGES	#1	#2	#3
0-18	MVC	FALLS	ATV
	270	96	54
19-40	MVC	FALLS	MCC
	645	164	133
41-65	MVC	FALLS	MCC
	431	254	162
>66	FALLS	MVC	MCC
	334	180	13

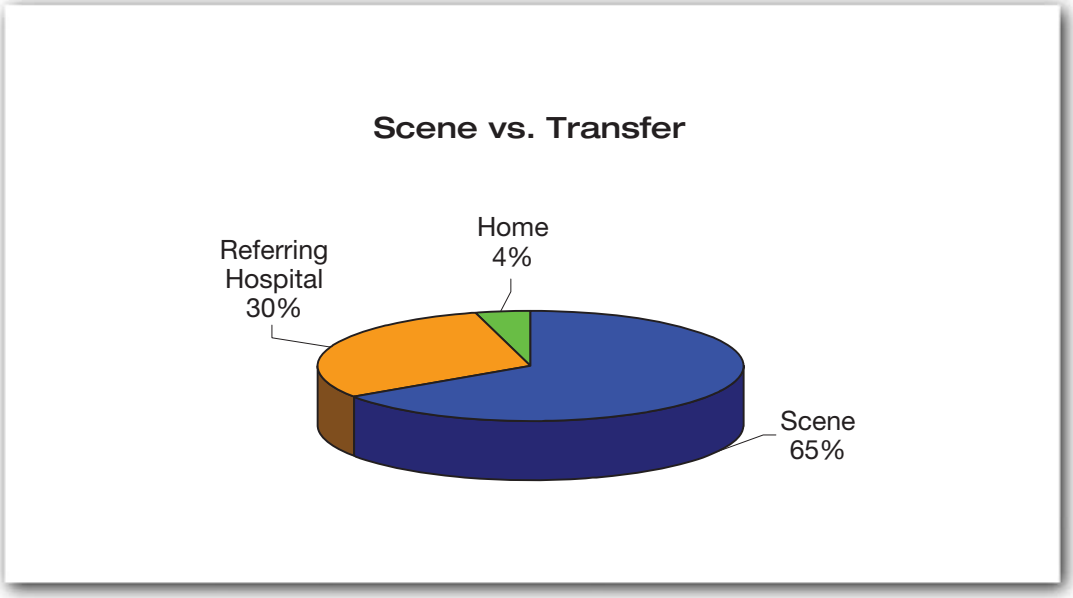
Methods of Arrival

Expedient life-saving care in the field can prolong the “golden hour” and improve the injured patient’s chance of survival. Fifty-four percent of injured patients arrive by ambulance while 40% arrive by helicopter. Only 6% arrive by private vehicle or are ambulatory to the emergency department.

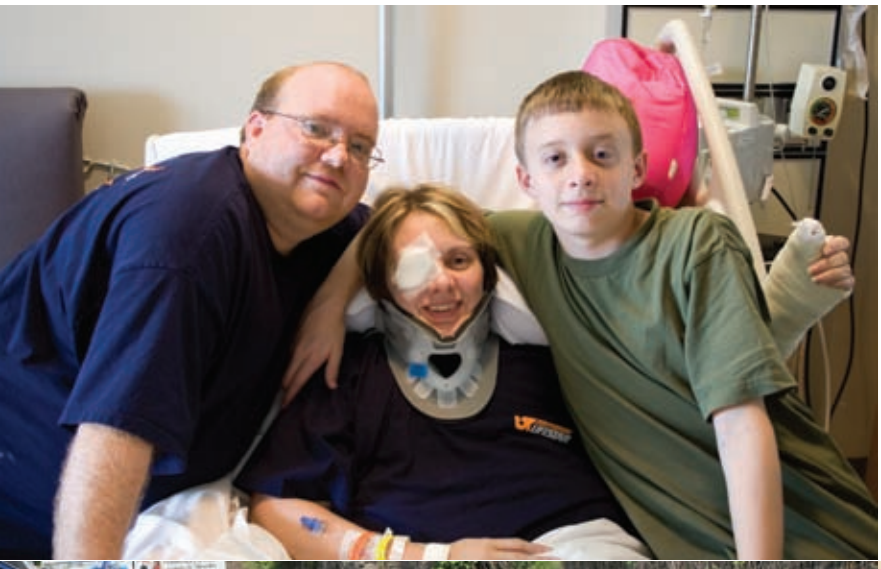


Scene vs. Transfer

Rapid transport to definitive care at the trauma center is important for optimal outcomes, but East Tennessee's rural terrain may require the injured patient be taken to a referring hospital for initial stabilization. Sixty five percent of the Medical Center's trauma patients are brought to the trauma center directly from the scene of their injury. Thirty percent are transferred from other facilities after initial stabilization. Only 4% of total patients come directly from their residence.



A Trauma Survivor Amy Brumbach's Story



May 10, 2007 is a day Amy Brumbach and her family will always remember. That was the day Amy and her 13 year-old son, Jacob, were traveling from home when they were struck by a large metal object that fell off a flatbed semi truck going the opposite direction. The impact of the object tore the driver's side front tire off Brumbach's SUV and sent her out-of-control across the median into the back end of another passing semi. The driver's side of her vehicle was destroyed, the airbags didn't deploy, and when the SUV came to rest, Jacob found his mother trapped, severely injured, and unconscious. He didn't know if she was alive because when he touched her head, she didn't respond. Jacob, knowing a little about emergency situations through his parent's occupations—both paramedics—immediately phoned his father, Robbie.

When emergency crews arrived on scene, Amy had regained consciousness but was in severe pain. She realized the extent of her injuries and told her husband and other EMS

workers on scene to call LIFESTAR and to take her to UT Medical Center. It took more than an hour for rescue squad members to free her from the wreckage and during this time Amy was fearful she wouldn't make it because she was losing blood and fading out of consciousness.

Amy was transported to the Medical Center via LIFESTAR and arrived in the Trauma Center more than one and a half hours after the crash.

She was assessed with multiple injuries:

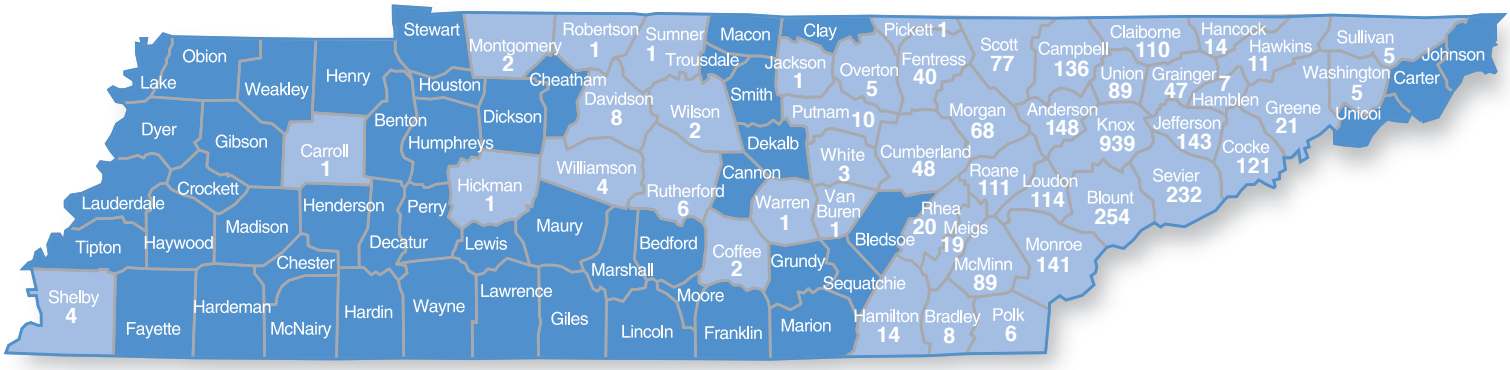
- Cervical spine fracture
- Multiple rib fractures
- Collapsed lungs
- Multiple pelvic fractures
- Left lunbar spine fractures
- Grade III liver laceration
- Left open femur fracture
- Right ankle fracture
- Right knee fracture
- Left hand fracture
- Right foot fracture

Although Amy is expected to recover, she has had six surgeries and is expected to need several more to repair the damage to her body from the crash. Timely transport to a Level I trauma center was key to saving her life. "Had it not been for the EMS crews and staff of the UT Medical Center, I don't think I would be here today," says Brumbach.

The University of Tennessee Medical Center works closely with many referring hospitals in surrounding counties and states to provide Level I Trauma Care to care for the critically injured.

Anderson County		**Knox County**	
Methodist	52	Baptist - East Tenn.	5
		Baptist - West	5
Blount County		East Tenn. Children's	12
Blount Memorial	100	Ft. Sanders Regional	14
		Parkwest	5
		St. Mary's	22
Bradley County		**Loudon County**	
Bradley	4	Ft. Sander's Loudon	15
Campbell County		**McMinn County**	
Jellico Community	28	Athens Regional	36
St. Mary's- LaFollette	53	Woods Memorial	26
Carter County		**Monroe County**	
Sycamore Shoals	1	Sweetwater	47
Claiborne County		**Overton County**	
Claiborne County	49	Livingston	3
Cocke County		**Putnam County**	
Baptist-Cocke Co.	87	Cookeville	2
Cumberland County		**Rhea County**	
Cumberland Medical Center	75	Rhea County	3
Fentress County		**Roane County**	
Jamestown Regional	26	Roane Medical Center	62
Greene County		**Scott County**	
Laughlin Memorial	9	Scott Co.	69
Takoma Adventist	3		
Hancock County		**Sevier County**	
Hancock	4	Ft. Sanders - Sevier	72
Hamblen County		**Washington County**	
Lakeway	11	Bristol	1
Morristown Hamblen	62		
Jefferson County			
Jefferson Memorial	26		
Georgia Hospital	1		
Kentucky Hospitals	76		
North Carolina Hospitals	9		
Virginia Hospitals	5		

Trauma Patient Origin by County



Trauma Patient Origin by State

Alabama	13	Nebraska	2
Arkansas	3	North Carolina	59
Arizona	2	New Jersey	4
California	4	New Mexico	1
Colorado	1	New York	5
Florida	42	Ohio	12
Georgia	37	Oregon	1
Iowa	1	Pennsylvania	3
Illinois	13	South Carolina	8
Indiana	17	South Dakota	1
Kentucky	190	Tennessee	3186
Louisiana	6	Texas	7
Maryland	2	Virginia	8
Massachusetts	1	Washington	22
Michigan	14	Wisconsin	2
Missouri	5	Wyoming	2
Mississippi	6	Unknown	1
		Canada	2

The Level I Trauma Center Difference

Traumatic injuries can happen any time – at home, at work, at play, or anywhere in between. Seconds can truly mean the difference between life and death. In fact, chances of survival and quality of life are significantly higher for trauma patients who receive surgical intervention within the "golden hour," the first 60 minutes after a traumatic injury occurs. Trauma centers are not emergency rooms. They offer expertise and care beyond that of a typical emergency department.

The stylized accidents, gruesome victims, and dramatic saves on television shows like ER and Grey's Anatomy make for great television but what happens when it's real life and it's you?"

The medical personnel of the University of Tennessee Medical Center that care for critically injured people are part of a unique team. They see people hanging on to life every day. "The trauma bay can be a very emotional place and it can be stressful to the medical personnel," said one nurse.

So why do they still come back to work day after day?

"You're going to make a difference in someone's life today and that's why you come back to work each day. It can be as simple as bringing someone a blanket, but you've made a difference," said Sherrie Lyons, RN.

The University of Tennessee Medical Center's Level I trauma center employs some of the best doctors and nurses in the country as well as

other heathcare staff like social workers and pastoral care. This team helps make sure the patient as well as their family members are cared for.

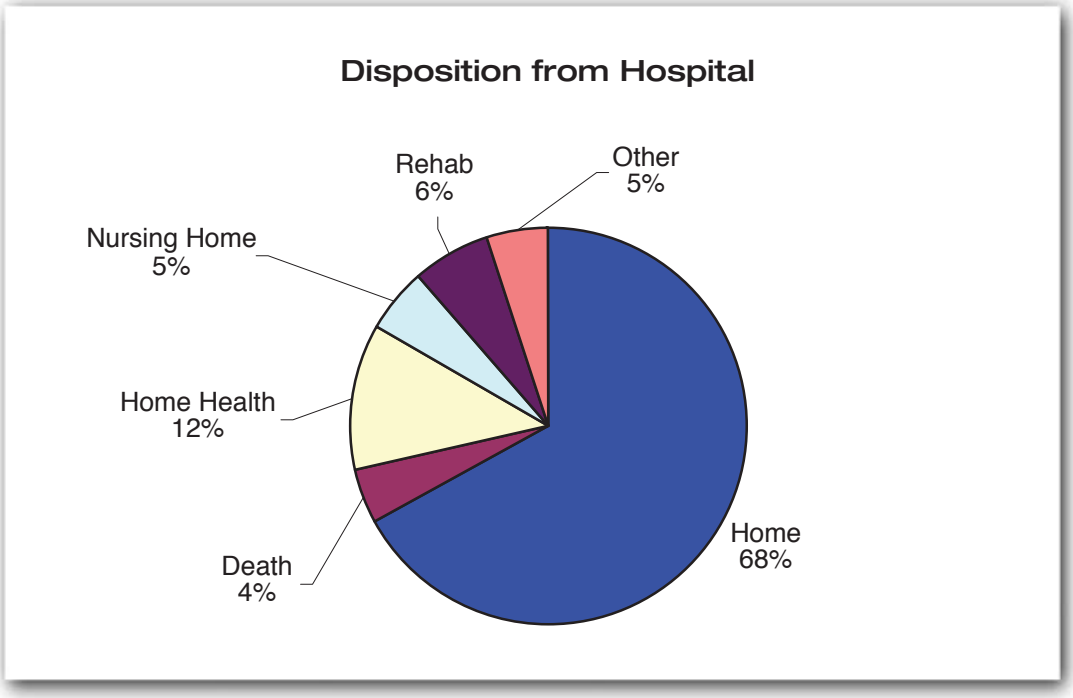
"Taking care of the family is very important because I was a family member once," said Jeanie Myers, RN. "My son was killed in a car accident when he was 13 and I decided that if I couldn't save him then I would help take care of others."

"You do what you can to save someone, but sometimes the injuries are just too great," said Christy Lawson, MD, a surgical resident. "However, on the positive side, there's a patient you don't think will make it and somehow they pull through. All of these emotions can be difficult to deal with."

The staff of the University of Tennessee Medical Center may not be able to save every patient, but they employ a heroic effort to help those affected by tragic circumstances…everyday…one patient at a time.

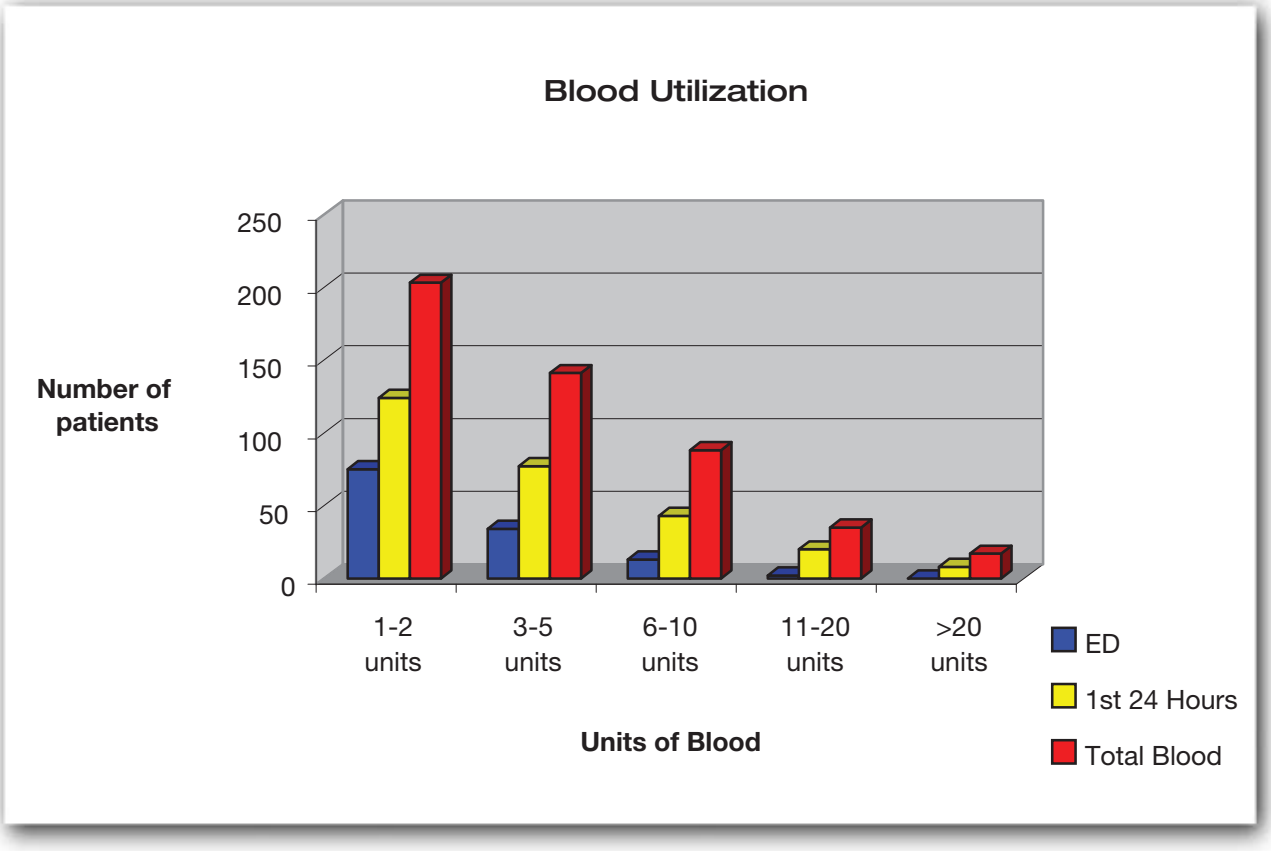
Patient Outcome Distribution

Discharge disposition can provide an estimate of functional outcome from trauma. Discharge home is associated with a reasonable return to normal function. Home with home health care and rehabilitation indicates a longer recovery period, but still have an excellent chance to return to a good functional life. The majority of adult trauma patients (68%) are discharged to home. Twelve percent require treatment or physical therapy modalities, which can be provided in the patient's home or at an outpatient facility upon discharge from the hospital. Five percent are transferred to a skilled facility or long-term acute care facility that specialize in continued treatment modalities such as tracheostomy care with supplemental oxygen, ventilator weaning, tube feedings, and aggressive wound care. Six percent are transferred to rehabilitation facilities that specialize in brain injury rehabilitation and aggressive physical therapy. Four percent of trauma patients expire.



Utilization of Blood

Multiple fractures, injuries to solid organs, and severe lacerations are sources where blood loss can occur in the trauma patient. Many of the trauma patients who come to the trauma center require transfusion of blood to sustain life and to recover from injuries. The graph below illustrates the number of patients in a given year who received blood in the resuscitation phase in the emergency department, the patients who received blood in the first twenty-four hours of admission, and the patients who received blood during their recovery phase during their hospitalization. The graph colors represent the number of units received by each patient.



Operations and Procedures per Body System 2006

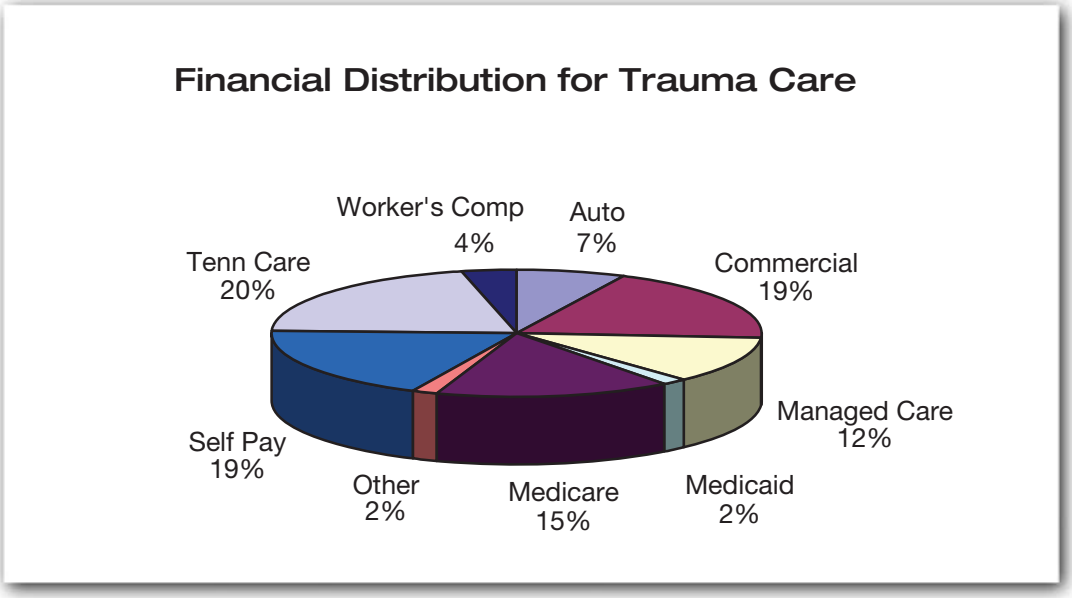
Bowel Repair	49
Bronchoscopy	123
Endotracheal Intubations	17
Diaphragm repair	243
Fasciotomies	71
High Flow Lines	384
IVC Filters	35
Laparotomies	218
Liver Repair	19
PEG Tube placement	82
Splenectomy	43
Tracheostomy	138
Thoracostomy	371
Thoracotomy	25
Thoracentesis	6

Specific Body Regions Injured 2006

Eye	127
Ear	37
Nose, Mouth, and Pharynx	219
Respiratory System	357
Cardiovascular	376
Hemic and Lymphatic	45
Digestive	255
Urinary	20
Musckuloskeletal	1441
Nervous System	178
Integumentary	746

Financial Distribution

Financial costs for trauma care across the nation exceed 400 billion each year. Each year more than 60 million injuries occur in the U.S., with 30 million requiring medical services and 3.6 million requiring hospitalization. The graph below is a sample of how trauma institutions receive reimbursement for services rendered. The payment sources listed represents a percentage by which the Medical Center is reimbursed for care in a given fiscal year.



Injury Prevention

"Injury does not occur by accident"

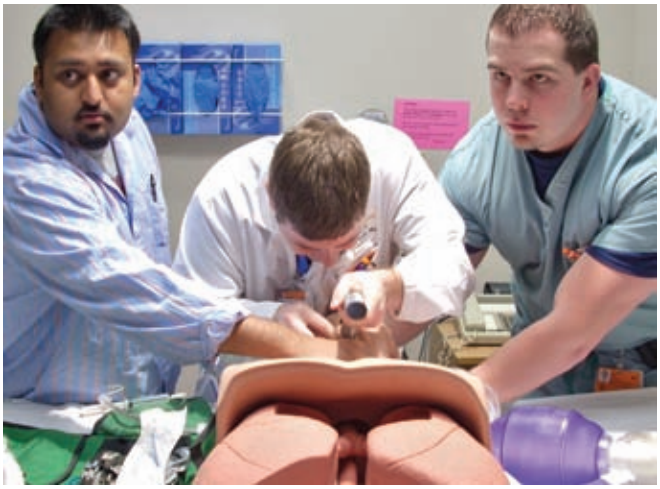
Trauma centers, working together with pre-hospital providers, rehabilitation experts, local community groups, governmental agencies, national organizations, private foundations, and schools of public health, can have a significant impact on lessening the morbidity and mortality of trauma.

Trauma Centers have an important role in reducing the impact of injury by participation in prevention efforts. These efforts are based on identification of specific injuries and risks factors in patients, families, and the community. For many injuries, prevention is often the only, if not the best, means of dealing with this health care problem.

Outreach

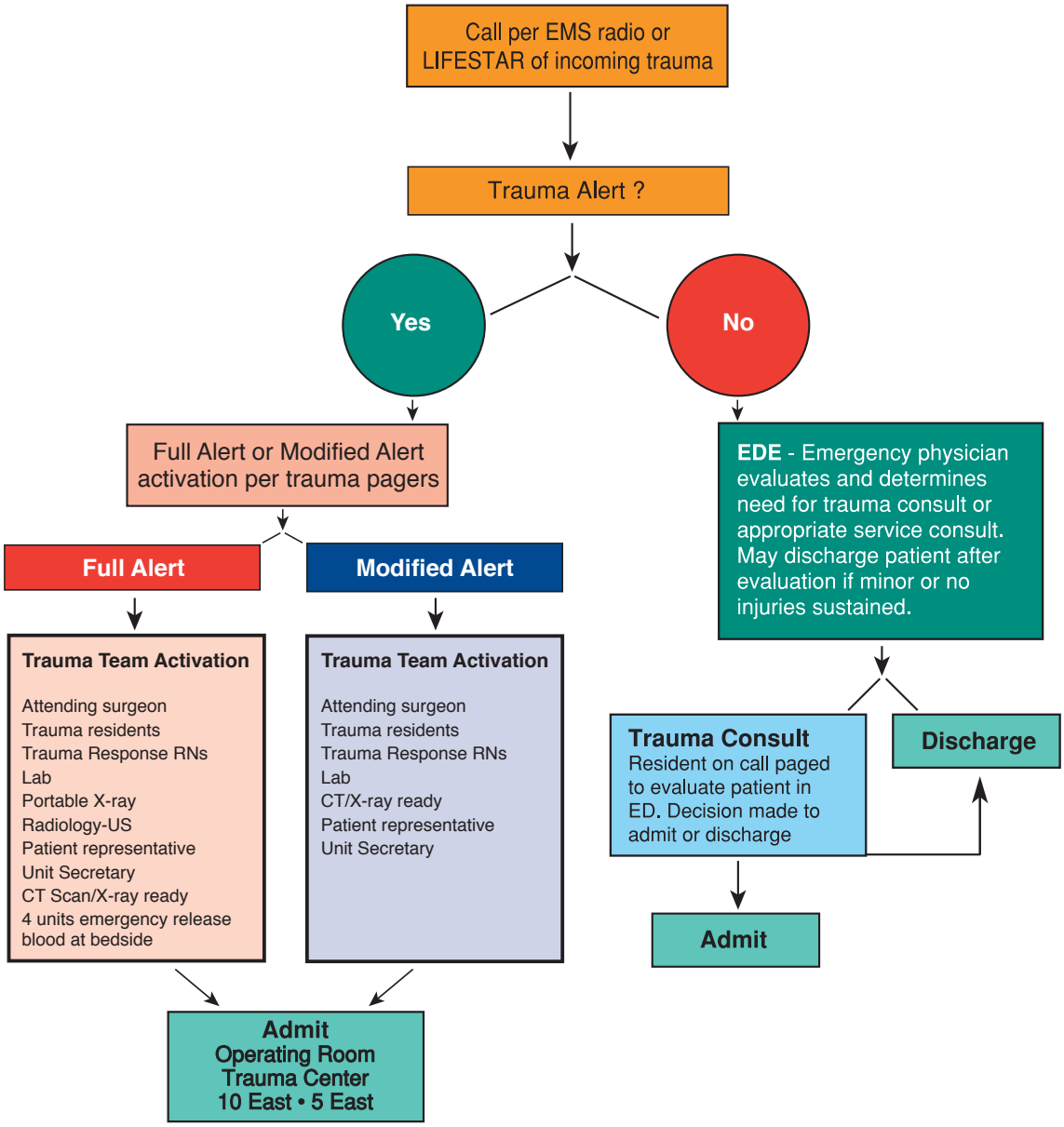
Outreach education is an integral part of trauma center services and is designed to help improve outcomes from trauma through public and professional dissemination of information and by facilitating access to the clinical and educational resources of a trauma center. As a Level I Trauma Center, the Medical Center is committed to serving our region as an educational resource for emergency healthcare professionals by supporting advanced certifications in trauma care such as Advanced Trauma Life Support (ATLS), Pre-hospital Trauma Life Support (PHTLS), Trauma Nurse Core Curriculum (TNCC), and Advanced Trauma Care for Nurses (ATCN). These courses provide guidelines and assessment skill techniques necessary to promote a systematic care delivery approach to the injured patient.






TENNESSEE TRAUMA ALLIANCE
Ready when you need us.

Trauma Activation Chart



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THE UNIVERSITY OF TENNESSEE MEDICAL CENTER

Affiliated with University Health System UHS

The University of Tennessee Medical Center comprises the University Memorial Hospital and the Graduate School of Medicine. Together, these entities embody the Medical Center's philosophy and mission through the spirit of exploration, the passion for teaching, and the compassion to restore.

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