Utah's Five Year Trauma Report: 2006–2010

Utah's Five Year Trauma Report: 2006–2010
Five Year Trauma Report based on Utah's Statewide Trauma Registry data

Released by:

Utah Department of Health
Bureau of Emergency Medical Services and Preparedness
PO Box 142004
Salt Lake City UT 84114-2004

health.utah.gov/ems

Suggested Citation

Bureau of Emergency Medical Services & Preparedness (2012). *Utah's Five Year Trauma Report: 2006–2011.* (2006–11 Utah Trauma Registry Data). Salt Lake City, Utah: Utah Department of Health.

Acknowledgments

This report was developed by the Bureau of Emergency Medical Services and Preparedness, Utah Department of Health. The mission of the Bureau of Emergency Medical Services and Preparedness is to promote a statewide system of emergency and trauma care to reduce morbidity and mortality through prevention, awareness and quality intervention.

Numerous individuals contributed to the report. The participation of Utah hospitals and their staff in providing trauma registry data is gratefully acknowledged.

Division of Family Health and Preparedness

Marc E. Babitz, MD, Director

Bureau of Emergency Medical Services & Preparedness

Paul R. Patrick, Director
Jolene Whitney, MPH, Deputy Director
Joshua Legler, MS, Data Manager
Diane Hartford, MS, Emergency Health Systems Analyst

This report was developed and written by:

Diane Hartford, MS, Emergency Health Systems Analyst
Joshua Legler, MS, Data Manager

Table of Contents

Figures and Tables

Introduction

Research indicates that a systematic approach to trauma care can provide the best means of protecting the public from death and disability. Trauma care systems reduce death and disability by identifying causes of injury and promoting activities to prevent injury from occurring, and assuring that emergency medical resources are ready and able to "deliver the right patient to the right facility at the right time."

Concentrating trauma care in facilities where specialized services are immediately available is essential to providing optimal care to the trauma patient. An organized approach to trauma care allows for rapid assessment (triage), transport and treatment of an injury patient.

Utah's Trauma System

The Health Resources and Services Administration's (HRSA) "Model Trauma System Planning and Evaluation" document defines a trauma system as follows:

> A trauma system is a pre-planned, comprehensive, and coordinated statewide and local injury response network that includes all facilities with the capability to care for the injured. It is the system's inclusiveness, or range of pre-planned trauma center and non-trauma center resource allocation, that offers the public a cost-effective plan for injury treatment. In such an effective system, trauma care delivery is organized through the entire spectrum of care delivery, from injury prevention to prehospital, hospital, and rehabilitative care delivery for injured persons. The system begins with a State's authority to designate various levels of trauma and burn centers and, through data collection and analysis processes, demonstrates its own effectiveness time and time again.

Utah's trauma system is still developing, but great strides are being made in creating an integrated and inclusive statewide trauma system. Below, you'll find information about the progress that has been made in developing our trauma system, followed by information about trauma in Utah culled from our statewide trauma registry.

Legislation and System Development

In 1981, the Utah State Legislature established the Emergency Medical Services (EMS) System Act. This statute enabled the Department of Health to categorize facilities and designate trauma centers. Four trauma centers were designated in 1985. With no funding or infrastructure to further develop the trauma system, the facilities were self-designated until 1992.

The early 1990s brought federal guidance and funding to the state. These grant funds allowed the Department of Health to hire a consultant to facilitate the development of the 1995 Utah Trauma System Plan. In 1997, the trauma rules were revised to update terms and revise the designation criteria from the 1986 American College of Surgeons (ACS) criteria to the modified ACS criteria established in the Trauma System Plan. By 2002, using the 1995 criteria and the revised verification process which included an ACS verification site visit for Level I and II Trauma Centers, five facilities had been designated as trauma centers.. Currently, eleven hospitals are designated trauma centers using the ACS "Green Book" criteria for Level I, II, and III hospitals and the ACS "Gold Book" criteria for Level IV and V hospitals.

During the 2000 Utah Legislative session, the EMS System Act was updated and modified to include the development of a statewide inclusive trauma system. The statute and rules require the department to:

- Establish a statewide trauma system
- Establish a trauma system advisory committee
- Develop a state system plan
- Support the system by providing oversight, ongoing evaluation, educational programs, encouraging cooperation between community organizations and health care providers
- Implement a quality assurance program
- Establish trauma center designation requirements
- Develop standards that categorize trauma centers, that triage trauma victims at the initial point of contact and ensure that trauma patients are sent to the appropriate health care facility
- Establish and fund a statewide trauma registry
- Designate by rule, trauma centers requesting voluntary designation
- Establish by rule, model state guidelines for triage, treatment, transport and transfer of trauma patients
- Regularly produce and disseminate reports

Leadership

Several groups have been established to fulfill the responsibilities outlined in the trauma system legislation. Within the Bureau of Emergency Medical Services (BEMS), the Emergency Health Systems section was created. Additional groups include the Trauma System Advisory Committee (TSAC), a Trauma Users Group, and various task forces to address specific issues.

The Bureau of Emergency Medical Services and Preparedness is the lead agency responsible for the development and enforcement of administrative rules governing ambulance licensure, EMS personnel certification, data collection, EMS grants program and trauma system development.

The Trauma System Advisory Committee is a statutory multi-disciplinary group established to assist the Department in evaluating the quality and outcomes for the overall trauma system, reviewing and commenting on rules and proposals, and providing expert advice and recommendations regarding trauma system needs and the development of trauma guidelines. One of the projects that the TSAC has prioritized is facilitating a state trauma process improvement (PI) program.

Additionally, a Trauma Users Group (TUG) was also convened to assist hospital personnel with the data collection process. Trauma registry personnel at hospitals utilizing electronic data submission meet quarterly to discuss data quality, data consistency, and trauma registry software issues.

Human Resources

Within the statewide Utah EMS System, there are a total of 191 licenses and designations held by 136 provider agencies serving every area of the state. The agencies are categorized as follows:

- 141 licensed ground ambulance and paramedic rescue services, and
- 50 designated quick response services providing various levels of prehospital care.

An applicant for licensure or designation can apply to provide any of the following levels of service. The list also includes the current number of licensed and designated providers within Utah at each level of service.

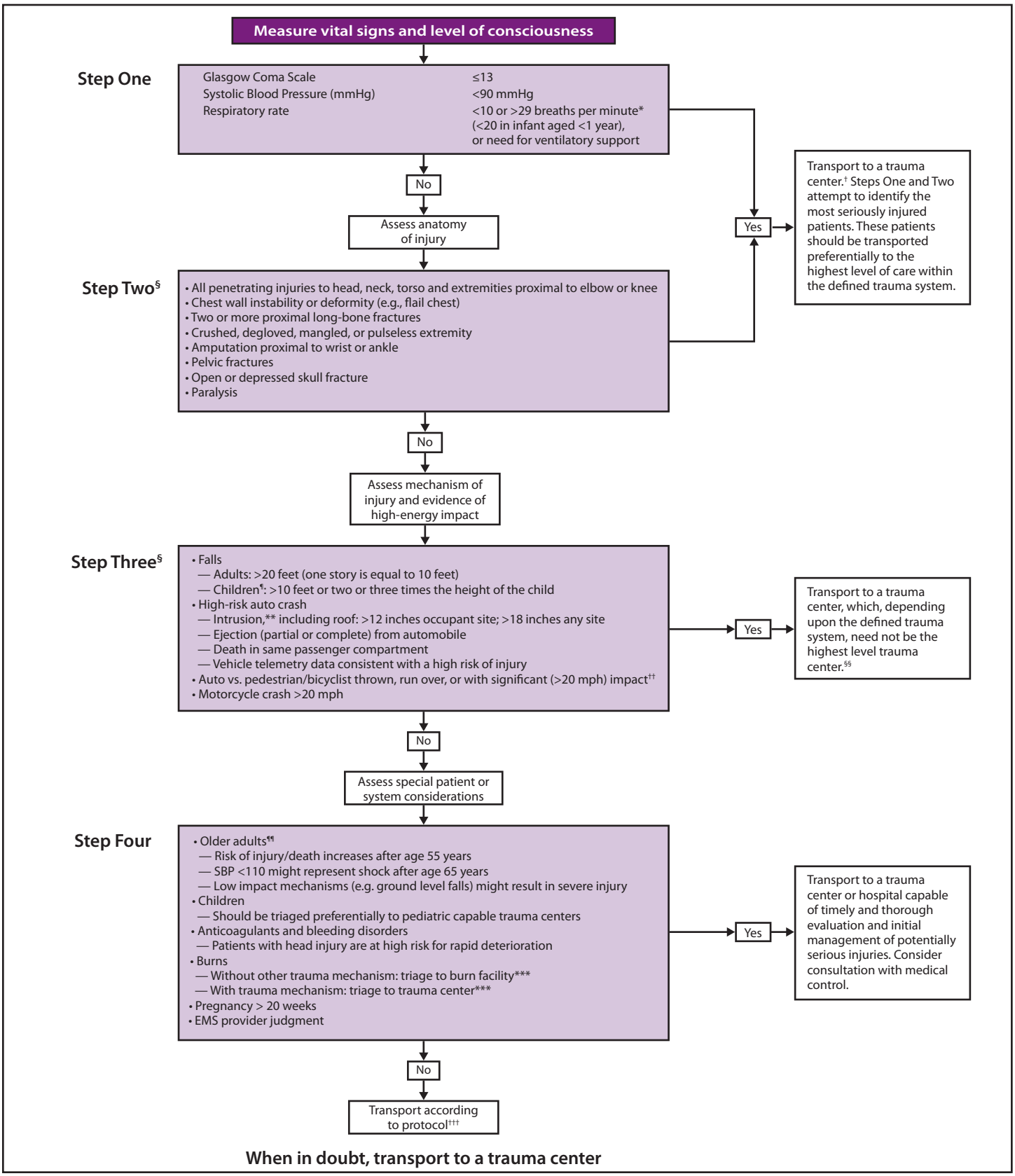
Transporting licenses:	
Basic ambulance	8
Intermediate ambulance	69
Intermediate advanced ambulance	2
Paramedic ambulance	28
Air ambulance	12
Non-transporting licenses:	
Paramedic rescue	22
Non-transporting designations:	
Basic quick response unit	33
Intermediate quick response unit	17
EMS dispatch center	32

The EMS personnel affiliated with these licensed agencies are either part-time paid or full-time paid employees or volunteers. There are six levels of certification for EMS personnel: Emergency Medical Dispatcher, Emergency Medical Responder (introduced in 2009), EMT-Basic (replaced by EMT in 2012–2015), EMT-Intermediate (replaced by Advanced EMT in 2011–2013), EMT-Intermediate Advanced, and Paramedic. Each level has a specific scope of practice and hours of training.

Triage and Transfer Guidelines

In July 2009, BEMS added to administrative rule, Utah's Triage and Transfer Guidelines for EMS Personnel. These guidelines were the culmination of a collaborative process which included input from trauma program managers at designated trauma centers, EMS and trauma medical directors, the Trauma System Advisory Committee (TSAC), and the EMS Committee. The trauma patient field triage schema can be found below. The document is available in its entirety on the BEMS website: http://health.utah.gov/ems/trauma/triage_transfer_guidelines.pdf. The guidelines are based on the American College of Surgeons Committee on Trauma (ACSCOT) and the Centers for Disease Control and Prevention (CDC) field triage guidelines.

Utah Trauma Field Triage Guidelines



Reference: MMWR, January 13, 2012, Vol. 61 No. 1.

4/25/2012

UTAH DEFINITIVE CARE/FACILITY STANDARDS

The following chart shows facility standards allowing health care facilities to determine the level of trauma care they wish to provide and identify current capabilities. The criteria are voluntary. Designation as a trauma center affords health care providers a means of recognizing the various levels of service capabilities, within their own facility, thus allowing them to make informed decisions as to the care and treatment of their injured patients. In urban areas, designation may assist with determining patient destination. Designation is not intended to provide a means of determining hospital capabilities by the lay public.

LEVEL I

- Acts as a regional tertiary care facility in the trauma system.
- Provides definitive and comprehensive care for the injured adult and/or pediatric patient with complex, multi-system trauma.
- Provides leadership in professional and community education, trauma prevention, research, rehabilitation and system planning.
- Board certified surgeons, neurosurgeons and anesthesiologists are on-call and promptly available.
- A broad range of sub-specialists (cardiac surgery, hand surgery, microvascular [replantation], infectious disease) are on-call and promptly available to provide consultation or care to the patient.
- ICU physician coverage 24 hours/day, full time Trauma Coordinator, OR suites staffed in-house 24 hours/day, cardiopulmonary bypass.

Level I Regional Pediatric Trauma Centers have separate standards specific to the care of pediatric trauma patients.

LEVEL II

- Provides definitive care for complex and severely injured pediatric and adult trauma patients.
- Physicians are ATLS trained and experienced in caring for trauma patients. Nurses and ancillary staff are in-house and immediately available to initiate resuscitative measures and stabilization for the trauma patient.
- Board certified surgeons, neurosurgeons and anesthesiologists are on-call and promptly available.
- A broad range of sub-specialists (critical care, cardiology, orthopedic surgery) are on-call and promptly available to provide consultation or care to the patient.
- Serves as a regional resource center for definitive care, quality assurance, community education, outreach and injury prevention.

For more specific details, refer to Resources for Optimal Care of the Injured Patient, 2006. American College of Surgeons

LEVEL III

- Provides initial resuscitation and immediate operative intervention to control hemorrhage and to assure maximal stabilization prior to referral to a higher level of care.
- Comprehensive medical and surgical inpatient services are available to those patients who can be maintained in a stable or improving condition without specialized care.
- Works collaboratively with other trauma centers to develop transfer protocols and a well-defined transfer sequence.
- An in-house multi-disciplinary trauma resuscitation team is available to assess, resuscitate, stabilize and initiate transfer, if necessary, upon arrival of the patient to the emergency department.
- A board certified general surgeon trained in ATLS is on-call and available to the patient.
- Level III trauma centers work with level I and II facilities to develop and implement outreach programs for level IV and V facilities in their region.
- Provides community education, outreach and injury prevention programs.

LEVEL IV

- Generally licensed, small rural facility with a commitment to the resuscitation of the trauma patient.
- Provides initial resuscitation, evaluation, stabilization, diagnostic capabilities and written transfer protocols in place for major trauma patients to be transferred to a higher level of care.
- Staffed with a physician on call from outside the hospital and also requires a general surgeon to be on call outside of the hospital.
- May provide immediate operative surgical intervention to control hemorrhage to assure maximum stabilization prior to transfer.
- Trauma trained nursing personnel are immediately available to initiate life-saving maneuvers and critical care services as defined in the service's scope of trauma care.

LEVEL V

- Provides initial evaluation, stabilization and transfer to a higher level of care.
- Generally licensed, small rural facilities with a commitment to the resuscitation of the trauma patient.
- May or may not be staffed with a trauma-trained physician but rather a physician's assistant, or nurse practitioner.
- Major trauma patients are resuscitated and transferred.

UTAH TRAUMA CENTERS

Trauma Center	Level	Program Manager	Trauma Center	Level	Program Manager
Intermountain Medical Center 5121 South Cottonwood Dr. Murray, Utah 84157-7000 Date: 5/1/12 Exp: 4/30/15	I	Sue Day, RN MA Trauma Program Manager Work: (801) 507-6689 sue.day@imail.org	**Ogden Regional Medical Center** 54475 South 500 East Ogden, Utah 84405 Date:9/10/11 Exp: 9/9/14	II	Deanna Wolfe, RN BSN Trauma Program Manager Work: 801-479-2318 deanna.wolfe@ mountainstarhealth.com
Primary Children's Medical Center 100 North Medical Drive Salt Lake City, Utah 84113 Date: 12/1/09 Exp: 11/30/12	I	Sharon Chow, RN, MSN Trauma Program Manager Work: (801) 662-2990 sharon.chow@imail.org	**Utah Valley Regional Medical Center** 1034 North 500 West Provo, Utah 84604 Date: 11/12/10 Exp: 11/11/13	II	Jean Lundquist, RN, BSN Trauma Program Manager 801-357-7555 jean.lindquist@imail.org
University of Utah Hospital 50 North Medical Drive Salt Lake City, Utah 84132 Date: 3/1/10 Exp: 2/28/13	I	Janet Cortez, RN MS Trauma Program Manager Work: 801-581-2622 janet.cortez@hsc.utah.edu	**McKay-Dee Hospital Center** 4401 Harrison Blvd. Ogden, Utah 84405 Date: 12/8/11 Exp: 12/7/14	II	Shawn Nalder, RN Trauma Program Manager 801-387-2045 shawn.nalder@imail.org

Trauma Center	Level	Program Manager	Trauma Center	Level	Program Manager
Dixie Regional Medical Center 1380 E. Medical Center Drive St. George, Utah 84790 Date: 12/15/10 Exp: 12/14/13	III	Leanne Landon, RN BC-NPD BSN Trauma Coordinator Work: 435-251-1074 leanne.landon@imail.org	**Bear River Valley Hospital** 905 North 1000 West Tremonton, Utah 84337 Date: 1/1/09 Exp: 8/31/12	IV	Curtis Hughes, RN Trauma Coordinator Work 435-207-4500 curtis.hughes@imail.org
Logan Regional Hospital 1400 North 500 East Logan, Utah 84341 Date: 1/1/10 Exp: 12/31/13	III	Stephanie Tennantt, RN Trauma Coordinator Work: 435-716-5617 stephanie.tennant@imail.org	**Brigham City Community Hospital** 950 South Hospital Way Brigham City, Utah 84302 Date: 8/1/10 Exp: 7/31/13	IV	Karen Glauser, RN Trauma Coordinator Work-435-734-4350 karen.glauser@ mountainstarhealth.com
American Fork Hospital 170 North 1100 East American Fork, Ut 84003 Date: 1/5/2012 Exp. 1/4/2015	III	Jaime Smith, RN Trauma/Stoke Coordinator 801-855-4616 jaime.smith@imail.org	**Cache Valley Specialty Hospital** 2380 North 400 East North Logan, Utah 84341 Date: 5/15/11 Exp: 15/14/14	IV	Niki Walker, RN Trauma Coordinator Work 4335-713-9583 nwalker@cvsh.com
Moab Regional Hospital 450 West Williams Way Moab, Utah 84532 Date: 12/15/10 Exp: 12/14/13	IV	Douglas Caylor, RN, CEN Trauma Coordinator dougc@MRHMoab.org Work: 435-719-3573	**Park City Medical Center** 900 Round Valley Drive Park City, Utah 84060 Date: 10/23/10 Exp: 10/22/13	IV	Nathalie Odernheimer, RN Trauma Coordinator Work 435-658-7536 nathalie.odernheimer@ imail.org
Timpanogos Regional Hospital 750 West 800 North Orem, Utah 84057 Date: 10/1/11 Exp: 9/30/14	IV	Brett Kay, RN Trauma Coordinator brett.kay@ mountainstarhealth.com 801-714-6484	**Uintah Basin Medical Center** 250 West 300 North Roosevelt, Utah 84066 Date: 12/15/10 Exp: 12/14/13	IV	Chona P. Dart, RN, BSN Trauma Coordinator Work: 435-722-4691 x1480 cdart@ubmc.org
Mountain View Hospital 1000 East 100 North Payson, Utah 84651 Date 1/4/2012 Exp 1/3/2015	IV	Lauri Wall Trauma Coordinator Work: 801-465-7043 laura.wall@ mountainstarhealth.com	**Fillmore Community Medical Center** 674 South Highway 99 Fillmore, Utah 8463 Date: 1/26/12 Exp: 1/25/15	V	James Dalebout, RN,CEN ED Manager Work: 465-743-1564 james.dalebout@imail.org

Prehospital and Trauma Data Integration Project

The bureau integrates prehospital data with trauma registry data. The linked data allows for analysis of patient care and outcomes throughout the spectrum of care that patients receive from the scene of injury to the hospital. Eventually, the linkages will also allow prehospital and hospital personnel to import portions of their data from the source rather than entering the data manually. Long-term plans include linking other data sources to the prehospital and trauma registry data warehouse.

Emergency Medical Services for Children (EMSC)

The purpose of the Utah EMSC project is to promote an integrated EMS and Trauma Response system in order to reduce the morbidity and mortality of Utah's pediatric population. Housed within the Utah Department of Health, Bureau of EMS, Utah EMSC officially began as a program in 1990 as a result of an EMSC implementation grant. The grant was used to increase the availability of pediatric education, establish a pediatric data resource system and improve care for Native Americans in Utah. Later that same year, a public/private partnership was formed between the Bureau of EMS (BEMS) and Primary Children's Medical Center (PCMC).

In 1999, BEMS established a certification/recertification requirement through administrative rule for paramedics to maintain current provider status in pediatric advanced life support. In addition, BEMS also established a requirement for all EMS provider levels to complete pediatric continuing medical education hours in order to recertify. To support this rule, Utah EMSC committed to coordinate and teach courses statewide. This past year, Utah EMSC conducted 130 classes to provide education and training in Pediatric Education for Prehospital Professionals (PEPP) and Pediatric Advanced Life Support (PALS). The EMSC program also conducts injury prevention programs. These programs include the bike rodeo program as well as the Buckle Tough program. This year EMSC will also join efforts with Highway Safety to conduct an EMS track at the Zero Fatalities conference.

In order to ensure that children's needs are covered during a public health or terrorism emergency, Utah EMSC has developed four pediatric strike teams. There are two pediatric strike team trailers to support the teams. Each trailer is estimated to care for 100 pediatric patients. Besides basic and advanced life support treatments, the trailers are equipped to provide minor medical care such as splinting and suturing. The two teams comprise pediatric-trained physicians, registered nurses, respiratory therapists and EMS providers. All pediatric strike team members have completed training on the specific needs of children in a disaster. This year the team participated in a full scale exercise for the Utah ShakeOut.

Utah Trauma System Patient Profile: The Critically Injured

Data collection efforts for a statewide trauma registry in Utah began in 2001. All 44 acute care hospitals in the state contribute data to the registry on a quarterly basis. Depending on hospital size and designation, data is submitted electronically or copies of medical records are submitted for data abstraction and entry into the registry.

In total, 82,680 records have been entered in the trauma registry since its inception. For inclusion into the Utah Trauma Registry a patient must meet the following inclusion criteria:

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

905-909.9 (late effects of injury)

910-924.9 (superficial injuries, including blisters, contusions, abrasions, and insect bites)

930-939.9 (foreign bodies)

and must include one of the following in addition to ICD-9-CM 800–959.9:

Hospital admission lasting for at least 24 hours; or

Patient transfer via EMS transport from one hospital to another hospital; or

Death resulting from the traumatic injury (independent of hospital admission, transfer, or hospital transfer status); or

Patient transport by air ambulance (including death in transport and patients flown in but not admitted to the hospital)

This report examines trauma registry data collected from 2006 through 2010. Analysis of the data allows the bureau to understand patterns in injury type, guides injury prevention efforts and informs trauma system assessment and development.

Over 50,000 records were submitted to the trauma registry from 2006–2010. Fifty-nine percent of records in the trauma registry are male.

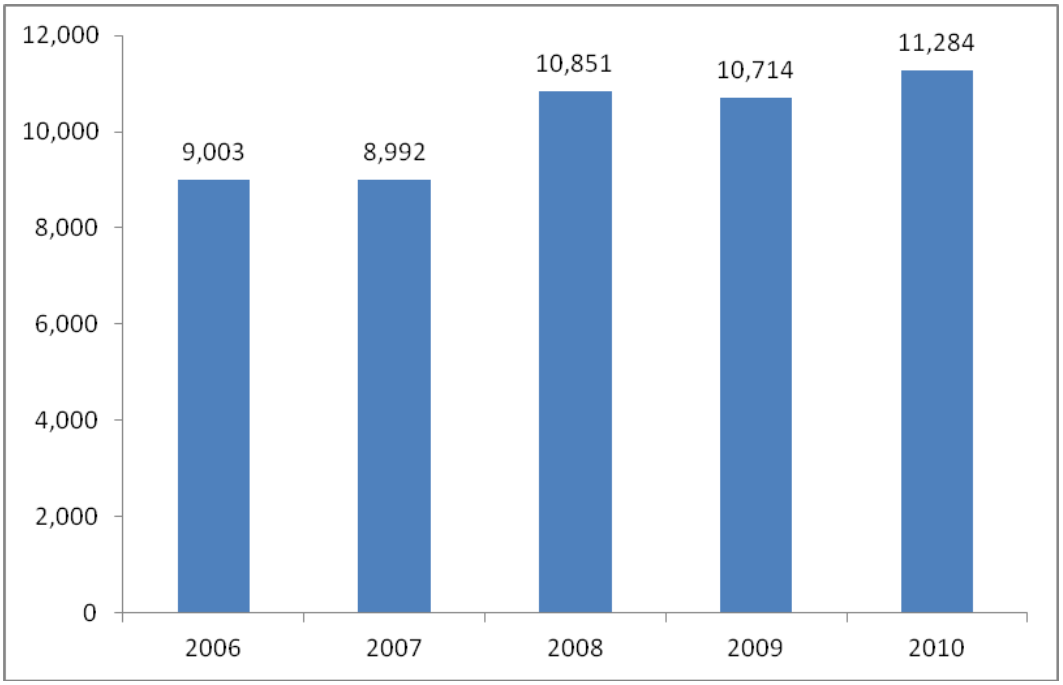


Figure 1. Trauma registry records, by year, 2006–2010.

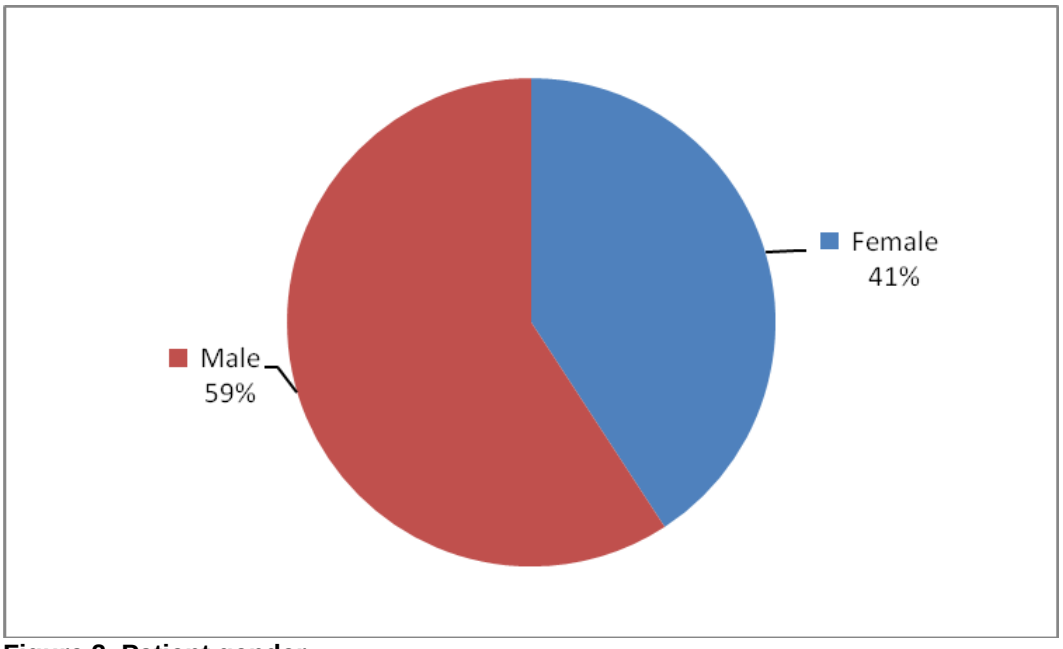


Figure 2. Patient gender.

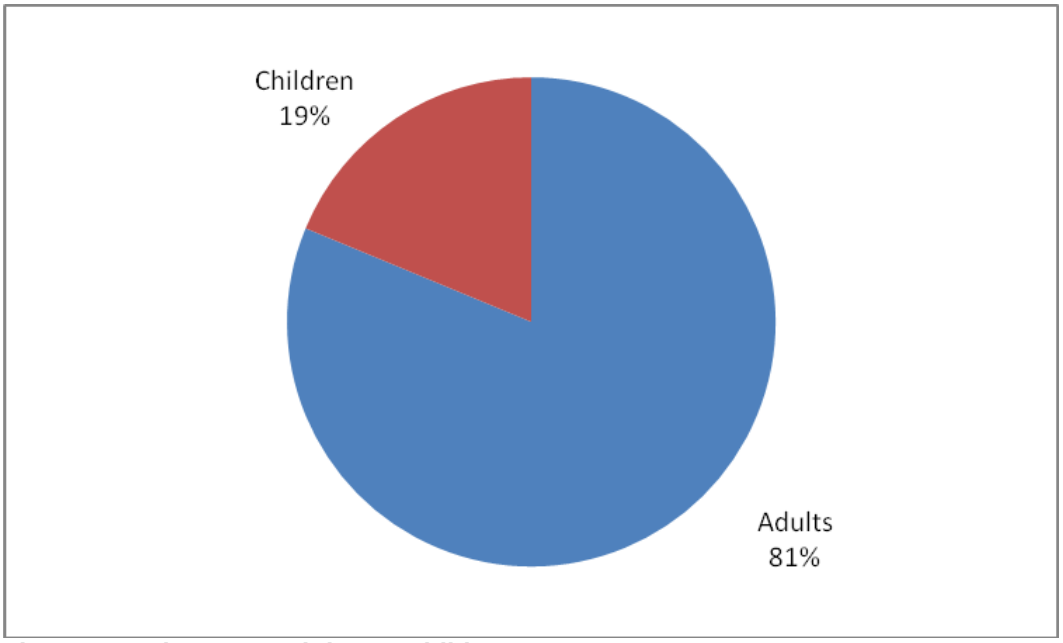


Figure 3. Patient age, adults vs. children.

Adult patients are 81 percent of the trauma registry population and pediatric patients make up 19 percent. Young people between the ages of 15 and 24 experience more traumatic injury than any other age group. In the analysis below, elderly patients 85 and older were combined and thus are a larger group compared to the groups comprising five year age groupings in all the other age categories.

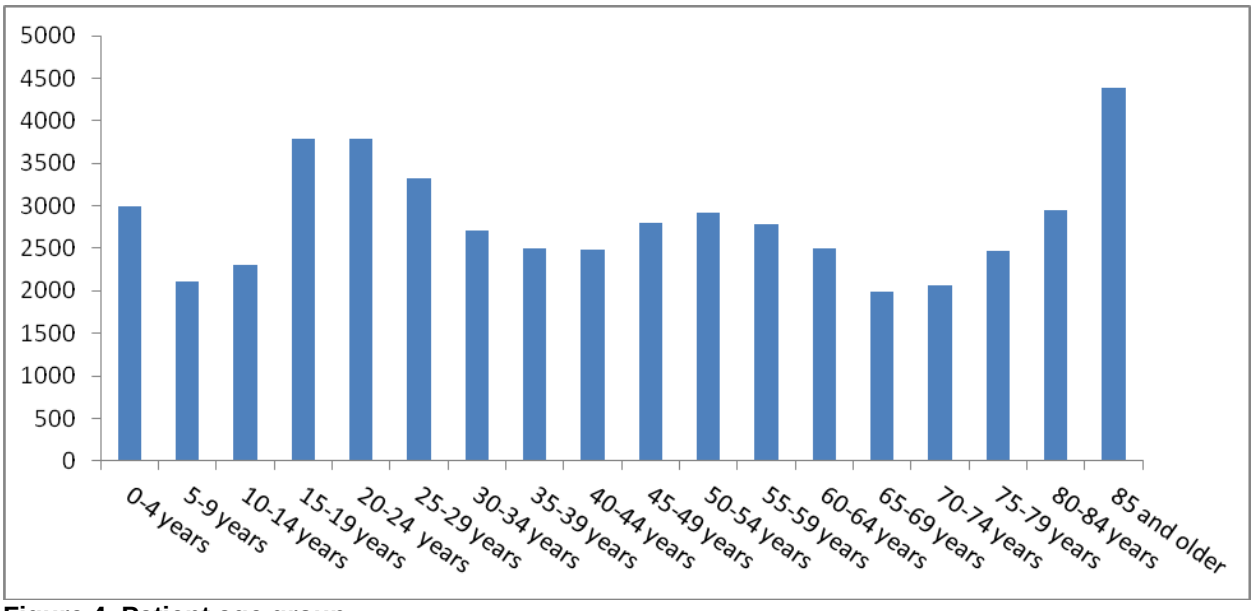


Figure 4. Patient age group.

Males are more likely than females to get injured in every age group within the trauma registry except for patients 70 and older.

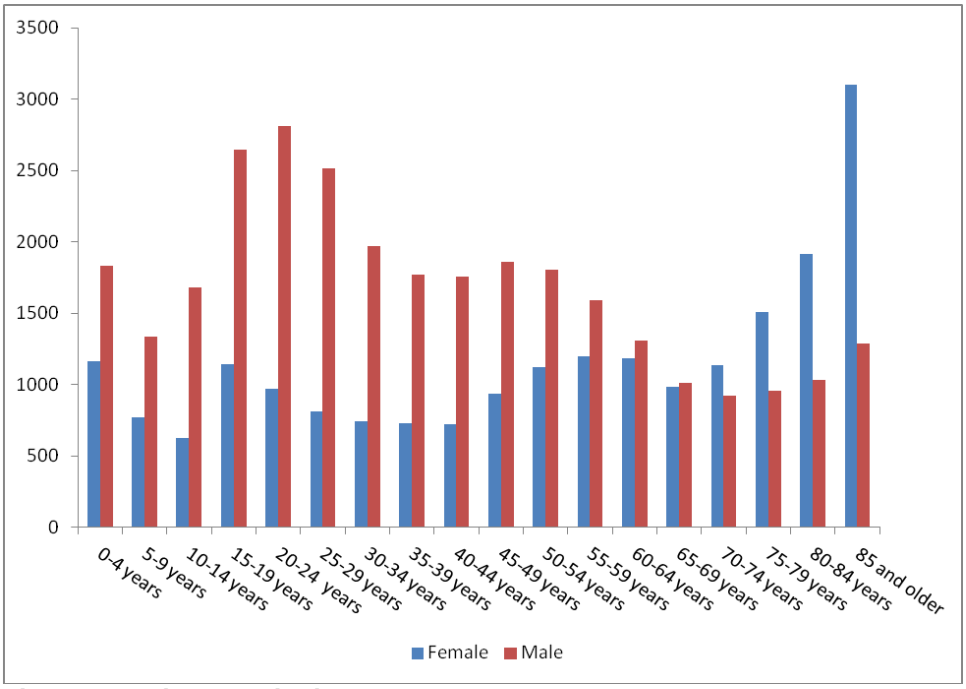


Figure 5. Patient gender by age group.

Most injuries recorded in the trauma registry are caused by blunt injuries. These injury types are characterized by injuries caused by diffuse force. Some examples of blunt injuries are injuries caused by motor vehicle crashes, motorcycle crashes, bicycle crashes, and falls. Penetrating injuries refer to injuries sustained by a foreign object intruding into a region of the body. Examples include stabbing, gunshot wounds, and impalement. Burn injuries are caused by chemical, electrical, or thermal burns.

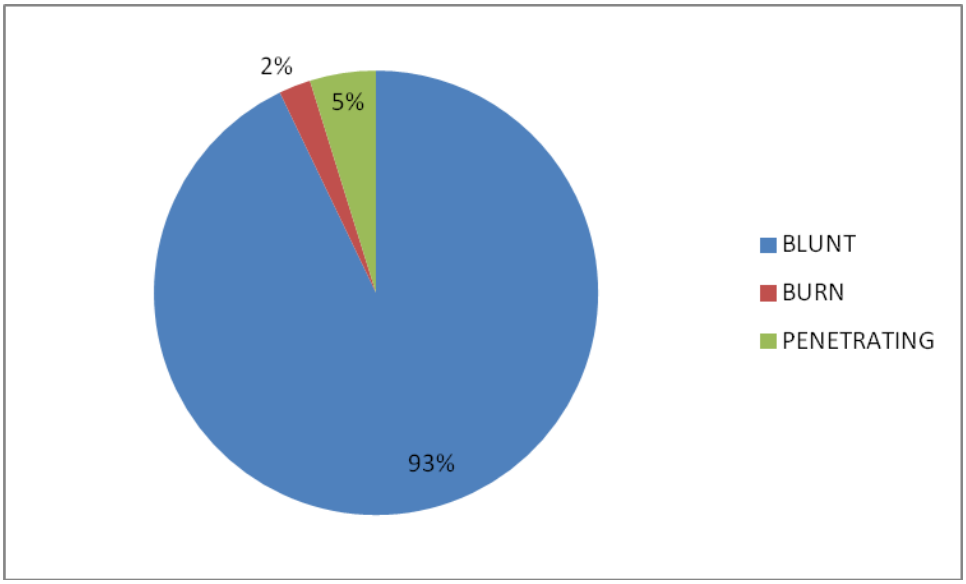


Figure 6. Mechanism of injury.

Falls and motor vehicle crashes are the most common causes of traumatic injury, with falls outnumbering motor vehicle crashes by nearly double. Most falls are preventable. The Violence and Injury Prevention Program within the Utah Department of Health identifies age, gender, certain health conditions and medications, lifestyle choices, and environmental hazards as the risk factors in falls among older adults. More information on these factors can be found at http://health.utah.gov/vipp/olderAdults/falls.html.

Table 1. Top 10 causes of injury.

Injury	Count
Fall	36,299
Motor Vehicle	17,068
Other Vehicle	4,850
Sport	4,845
Motorcycle	4,468
Bike	2,646
Animal	2,528
Struck Against	2,406
Burn	2,401
Pedestrian	2,132

Some types of injuries tend to be fatal more often than other types of injuries. Hangings and gunshot wounds proved to be the most fatal injuries in Utah's trauma registry. Twenty-two percent of the gunshot wound injuries in the trauma registry resulted in the patient's death. Injuries sustained from hangings proved fatal one-third of the time.

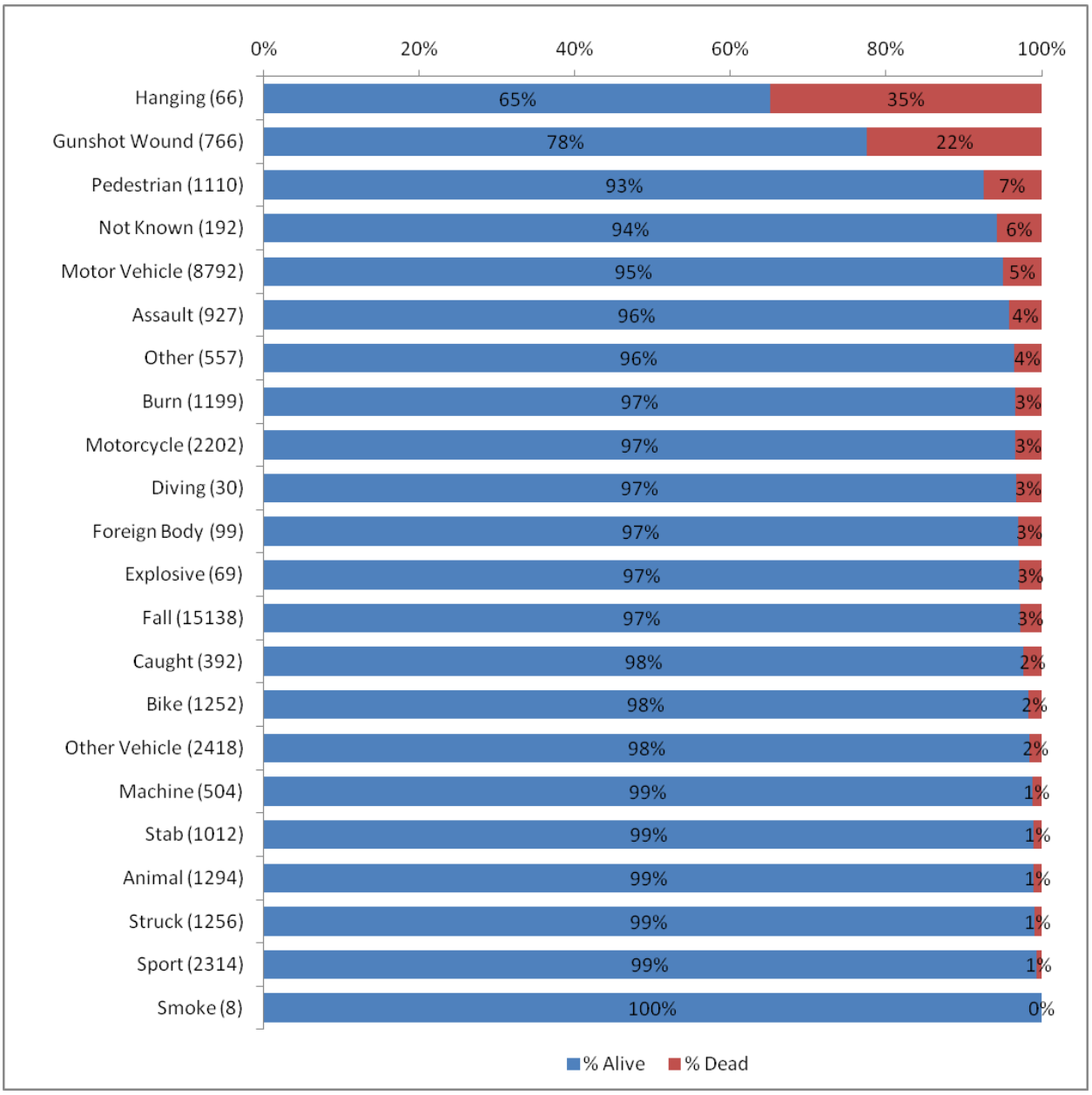


Figure 7. Patient outcome by cause of injury (record counts in parentheses).

Not only do 15- to 24-year-olds endure the most injuries, they also experience the most severe injuries. Similarly, males experience more severe injuries than females. Injury Severity Scores (ISS) are based on the Abbreviated Injury Scale (AIS). AIS categorizes the severity of traumatic injury to one of six regions of the body using a six-point scale:

AIS SCORE	INJURY
1	Minor
2	Moderate
3	Serious
4	Severe
5	Critical
6	Not Survivable

ISS is calculated by squaring and then adding together the AIS scores for the three most injured regions of the body. Injuries that are assigned an ISS of 15 or less are considered mild/moderate injuries, and an ISS over 15 suggests severe/critical injury.

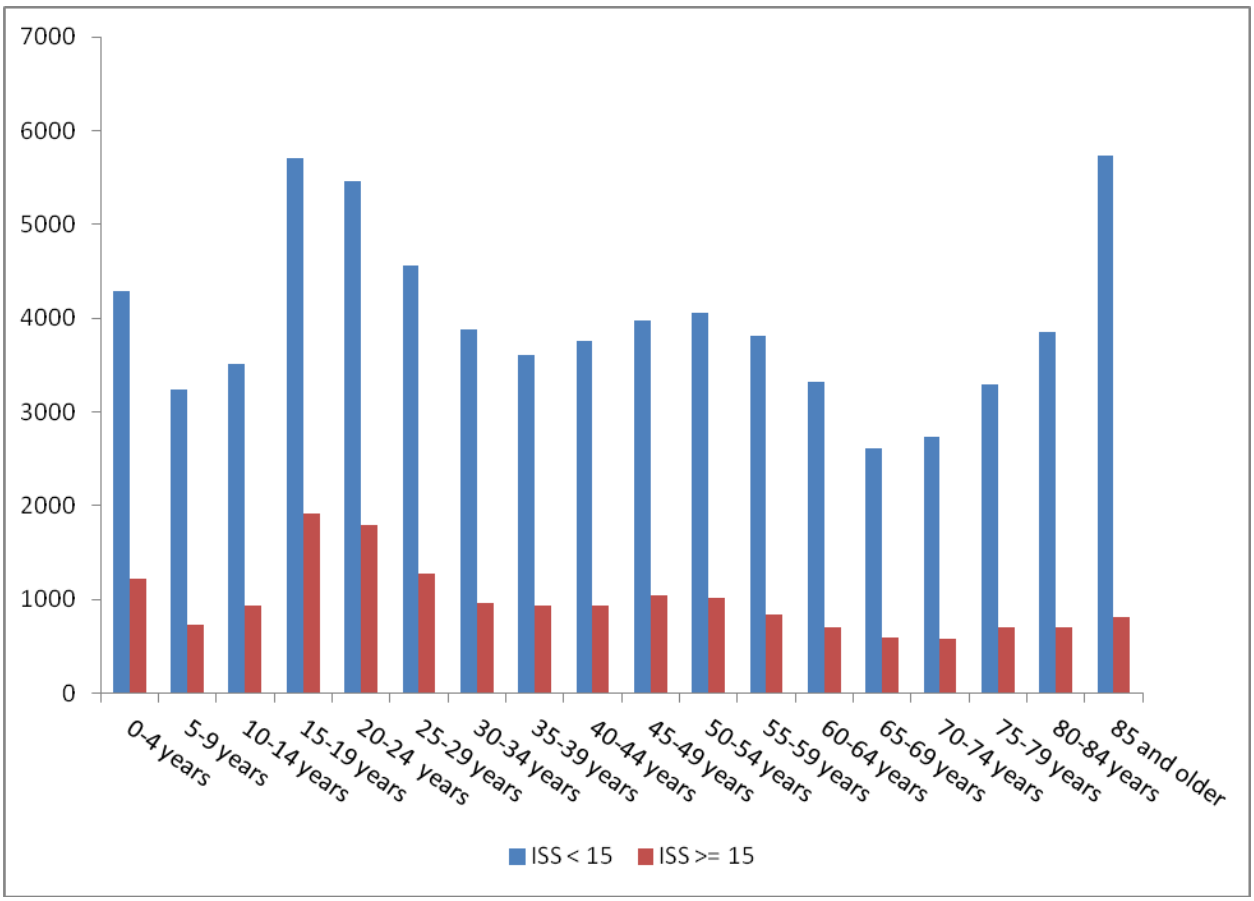


Figure 8. Injury severity by age group.

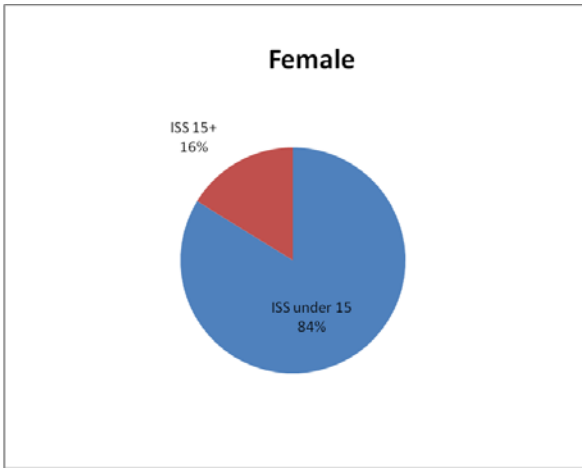


Figure 9. Injury severity, female.

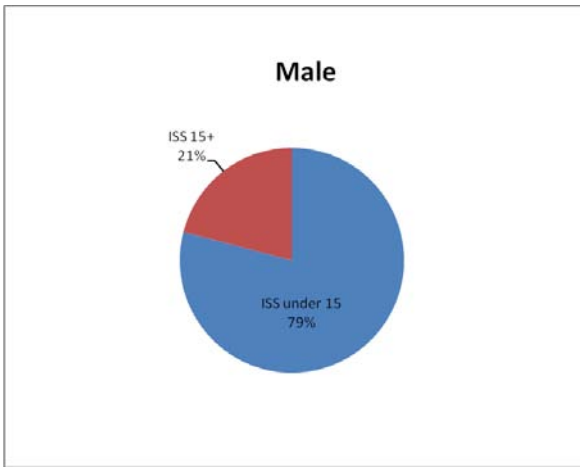


Figure 10. Injury severity, male.

A similar analysis looks at the number of fatalities by age in the first chart and then gender in the second chart. As you'd expect, the patterns are consistent to what we see with injury severity. The most severely injured patients are the most likely to die from their injuries.

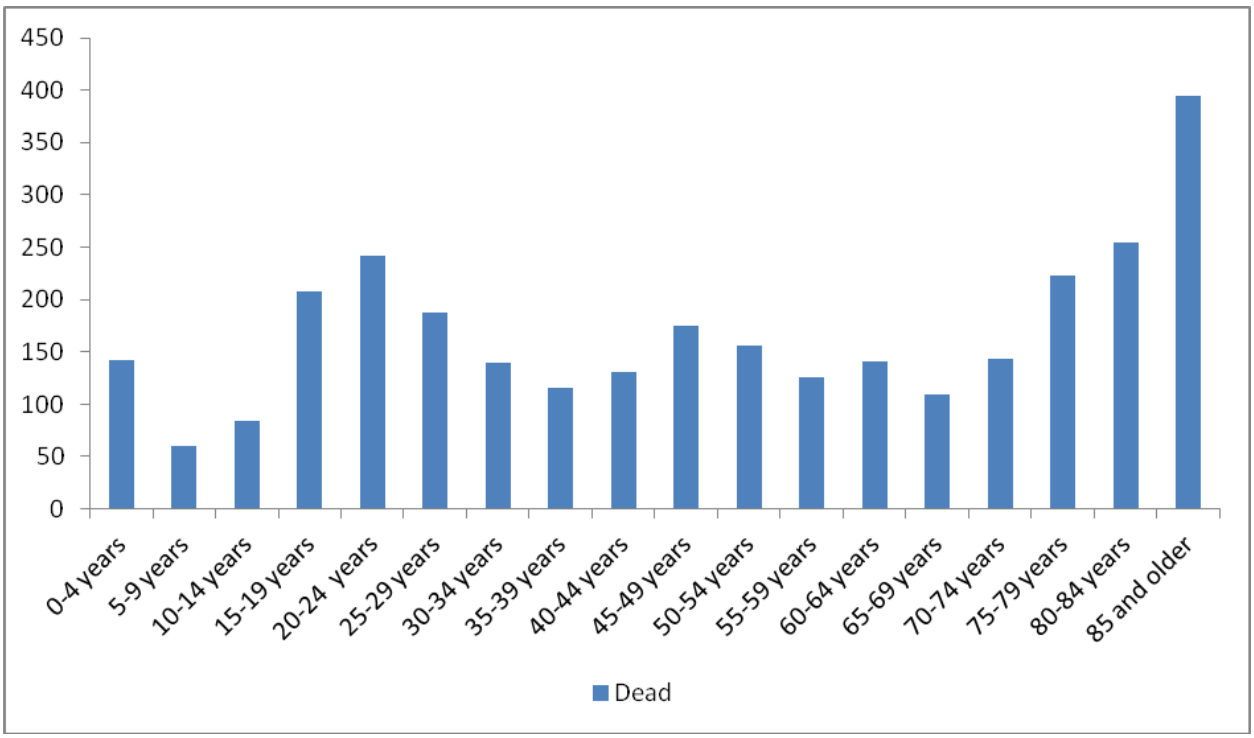


Figure 11. Fatalities by age group.

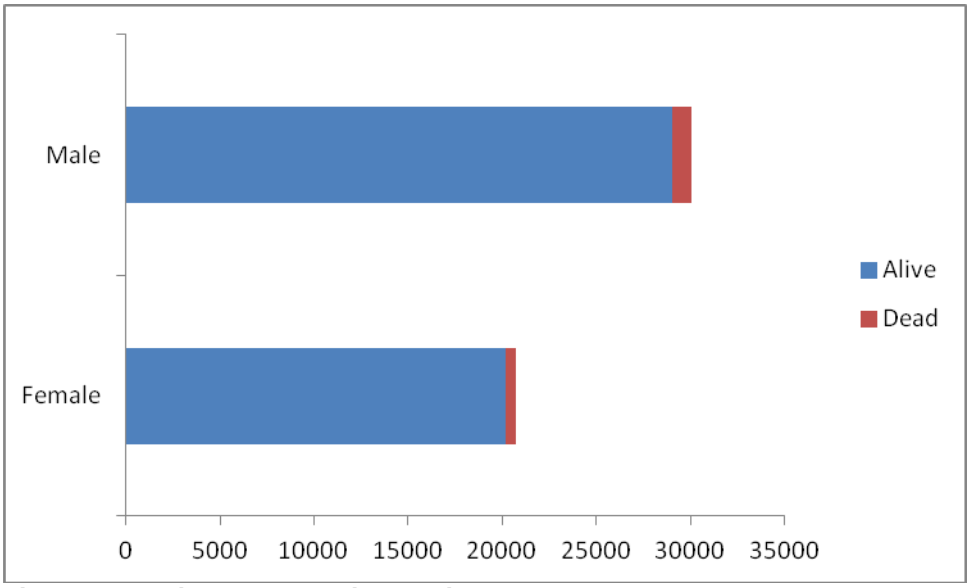


Figure 12. Patient outcome by gender.

One surprising finding is how evenly split the outcome of death is between genders. We've discussed findings showing males being severely injured more often than females. It seems reasonable to expect that more males had died as a result of their injuries. But, when we compare the percentage of the outcomes of "alive" or "dead" by gender we see that they are very nearly the same.

The table below lists the most common causes of traumatic injury for pediatric patients and adults. Injuries sustained by falls and motor vehicle crashes were the two most common causes for both age groups. Beyond that, motorcycle crashes and other vehicle crashes (e.g., ATVs) were the next two most common injuries for adults. For children, injuries sustained while playing sports or biking were the most common after falls and motor vehicle crashes.

Table 2. Cause of injury and patient age, adult vs. pediatric.

Cause of Injury	Age 0-17	Age 18+	Total
Fall	2,788	19,314	22,102
Motor Vehicle	1,354	7,100	8,454
Sport	1,079	1,866	2,945
Other Vehicle	716	2,159	2,875
Motorcyle	290	2,348	2,638
Bike	628	927	1,555
Struck	553	852	1,405
Animal	341	1,058	1,399
Assault	316	948	1,264
Burn	458	785	1,243
Stab	108	921	1,029
Pedestrian	416	604	1,020
Gunshot Wound	108	725	833
Machine	65	513	578
Other	101	413	514
Caught	55	290	345
Not Recorded	49	128	177
Explosive	11	131	142
Hanging	23	40	63
Foreign Body	14	19	33
Diving	5	23	28
Smoke	2	6	8
Total	9,480	41,170	50,650

We know that the use of protective devices like helmets and seat belts can prevent or reduce the severity of injury. Yet, analyses of trauma registry data reveal that protective devices aren't widely utilized by patients included in the trauma registry. For patients injured severely enough in a motor vehicle accident to be included in the trauma registry, 62 percent were not wearing a seat belt.

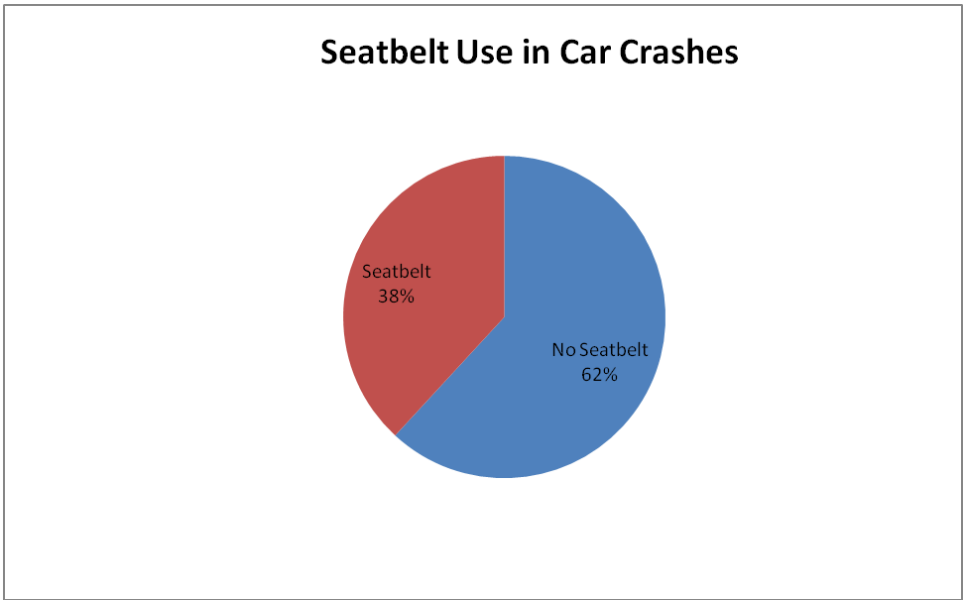


Figure 13. Seatbelt use in car crashes.

Additionally, the vast majority of patients severely injured in bicycle accidents weren't wearing helmets either. Fortunately, fatalities from bicycle crashes are rare, but it seems likely that patient outcomes could improve if more bicyclists donned helmets for their rides.

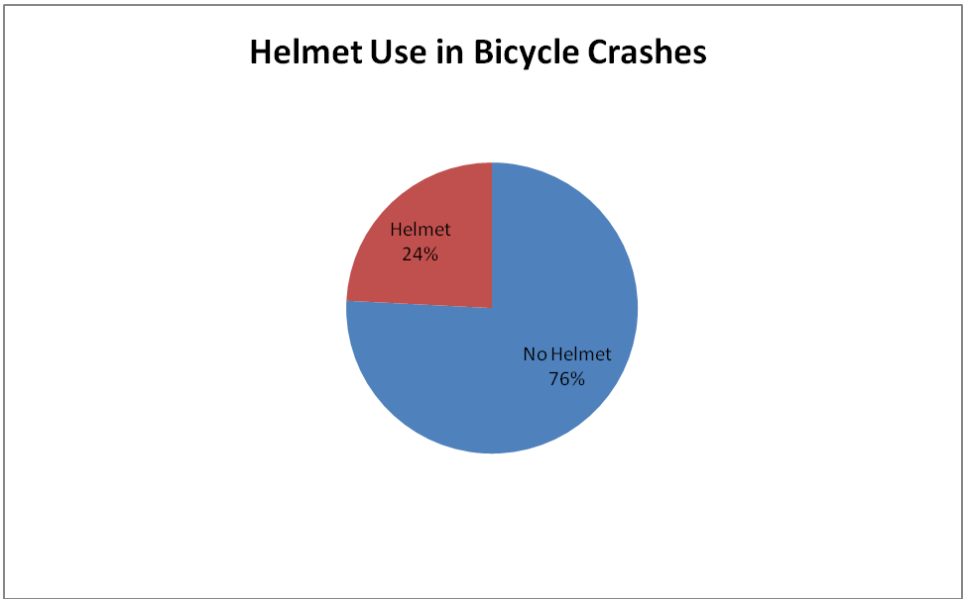


Figure 14. Helmet use in bicycle crashes.

More than half the patients in the trauma registry who were injured in motorcycle crashes weren't wearing helmets either.

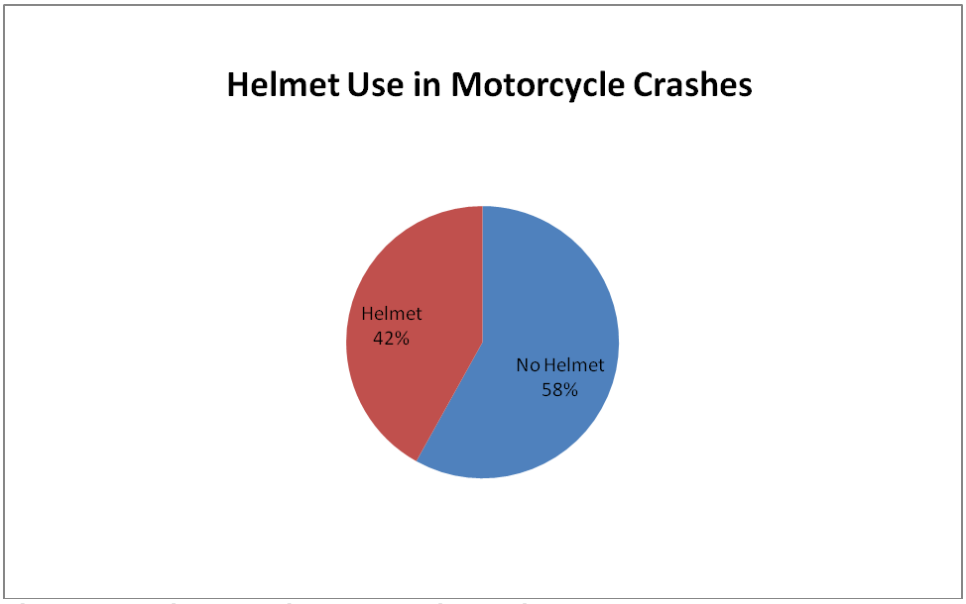


Figure 15. Helmet use in motorcycle crashes.

Trauma Hospital Resource Utilization

When trauma registry patients present to the emergency department, 46 percent of them are admitted to the hospital, 19 percent are transferred to another hospital and 17 percent go to the intensive care unit (ICU).

Table 3. Patient disposition from emergency department.

ED Disposition	Frequency	Percent
Floor Bed	22,589	48%
Transferred to Another Hospital	8,542	18%
Intensive Care Unit	8,063	17%
Operating Room	5,498	12%
Home without Services	968	2%
Telemetry/Step-down	725	2%
Observation Unit	663	1%
Floor Bed	233	0%
Dead on Arrival	137	0%
Death in ED After Failed Resuscitation Attempt	89	0%
Left Against Medical Advice	1	0%
Home with Services	1	0%
Total	47,509	100%

Nearly three quarters of trauma registry patients admitted to the hospital presented to the emergency department first. Seventeen percent were seen in the emergency department and then transferred by emergency medical services (EMS) to another hospital.

Table 4. Source of admission to hospital.

Admission Type	Count	Percent
Admitted Through ED	37,736	74%
Seen in ED then transferred out by EMS	8,472	17%
Direct Admission	3,213	6%
Seen in ED then Released	954	2%
Died in ED or DOA	469	1%
Total	50,844	100%

Thankfully, the vast majority of trauma registry patients survive their injuries. In fact, less than four percent succumb to death.

Table 5. Patient outcome.

Outcome	Count	Percent
Alive	49,193	96.8%
Dead	1,644	3.2%
Total	50,837	100%

Three quarters of trauma registry patients arrive at the hospital by EMS (56 percent by ground ambulance and 19 percent by air transport). Twenty-five percent arrive by a private vehicle, likely without any medical intervention prior to hospital arrival.

Table 6. Mode of transport to hospital.

Transport Mode	Frequency	Percent
Ambulance	27,777	56%
Private Vehicle	12,582	25%
Helicopter	7,511	15%
Fixed Wing	2,008	4%
Law Enforcement	30	0%
Commercial (Non-EMS)	12	0%
Total	49,920	100%

The following chart depicts the various sources of payment that trauma registry patients used while hospitalized for their trauma care. Private insurance pays the majority of claims for trauma patients. A combination of government programs makes up the next largest group of payers in trauma care.

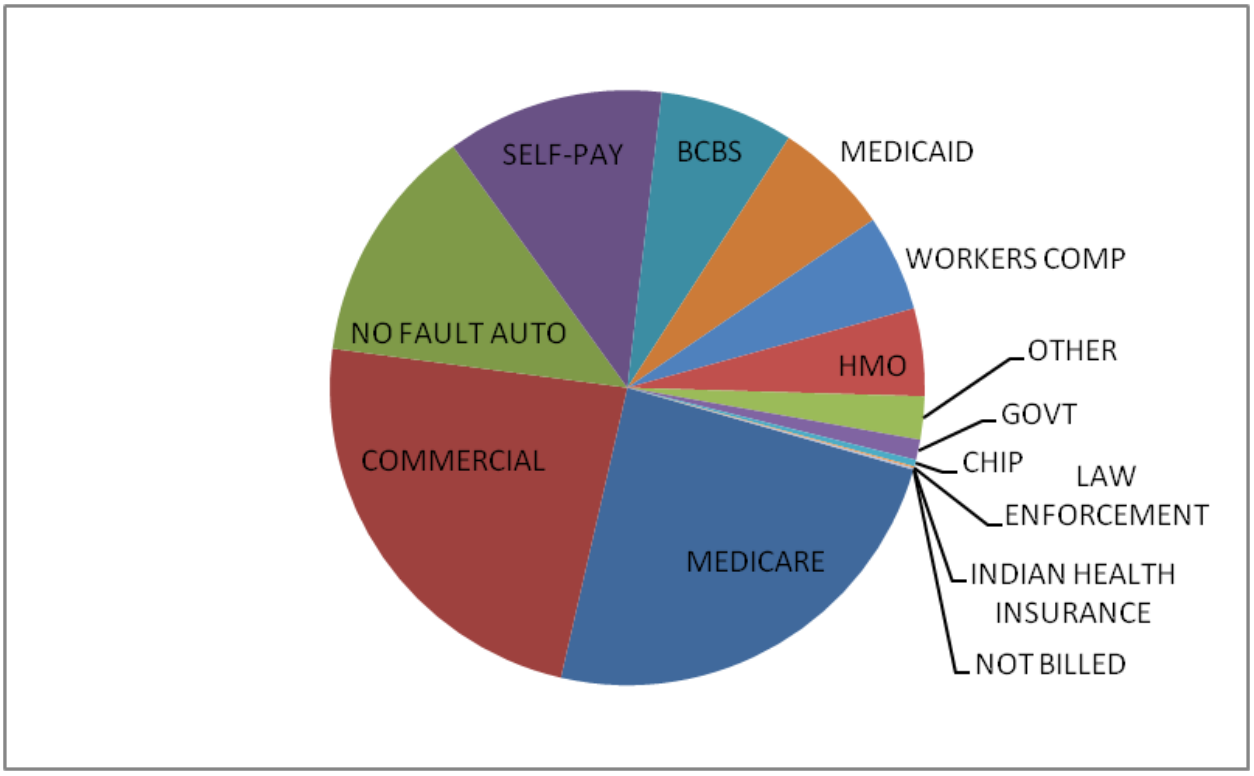


Figure 16. Primary source of payment.

Summary

Data collected by all acute care hospitals within the state of Utah provide the Bureau of Emergency Medical Services and Preparedness with a wealth of information. Analysis of trauma registry data allows for data-driven decisions and policy-making, evaluation of trauma resource utilization, and development of outcome measures.

More information about Utah's Trauma Registry is available at www.utahtrauma.org. If you are interested in using trauma registry data for research purposes contact:

Joshua Legler, MS
Data Manager
Bureau of Emergency Medical Services and Preparedness
Utah Department of Health
801-273-6667
jlegler@utah.gov