TRAUMA REGISTRY REPORT 2011

UTAH DEPARTMENT OF HEALTH

Bureau of Emergency Medical Services and Preparedness

Trauma Registry Report—2011

Annual report based on Utah's Statewide Trauma Registry data

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Acknowledgments

This report was developed under the direction of 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 Department of Health gratefully acknowledges the participation of Utah hospitals and their staff in providing trauma registry data as well as the support of the Intermountain Injury Control Research Center and their dedicated staff.

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Section I—Introduction

The Trauma Registry Report—2011 contains information concerning traumatic injuries in Utah. This report is released by the Bureau of Emergency Medical Services and Preparedness (BEMSP), Utah Department of Health (UDOH).

Organization and Scope

While an in-depth report of a trauma system would include data relating to all components of the continuum of care of a trauma patient from pre-hospital to rehabilitation, this report focuses on the data culled from the Utah Trauma Registry. The report contains seven sections:

- Section I—Introduction
- Section II—Background: includes a brief discussion of trauma systems in general
- Section III—Utah's Trauma System: includes a detailed discussion of Utah's inclusive trauma system
- Section IV—Summary of Findings: consists of summary highlights and charts describing the trauma system data, including the combined data on all encounters in the state trauma registry
- Section V—Data: presents information about data collection, submission, and editing routines, and a discussion of privacy, confidentiality, and access to data
- Section VI—Technical Notes and Limitations: presents information useful for interpreting the data as well as a discussion of the limitations of the data.
- Section VII—Appendices: provides additional reference materials including an excerpt from the Utah Emergency Medical Services System Act, a membership list of the Trauma System Advisory Committee, a list of trauma centers within the state, and a list of the required data elements in the trauma registry

Section II—Background

The magnitude of traumatic injury as a public health problem is enormous. In terms of years of productive life lost, prolonged or permanent disability, and cost, traumatic injury is now recognized as one of the most important threats to public health and safety in the United States. As such, the prevention of traumatic injury and the provision of trauma care are regarded as public services central to the mission of public health agencies (Resources, 2006).

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 by assuring that emergency medical resources are ready and able to deliver the right patient to the right facility at the right time.

The Health Resources and Services Administration's (HRSA) "Model Trauma System Planning and Evaluation" document provides the framework by which trauma systems throughout the United States have been developed. This landmark document defines a trauma system as "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" (Model Trauma System, 2006).

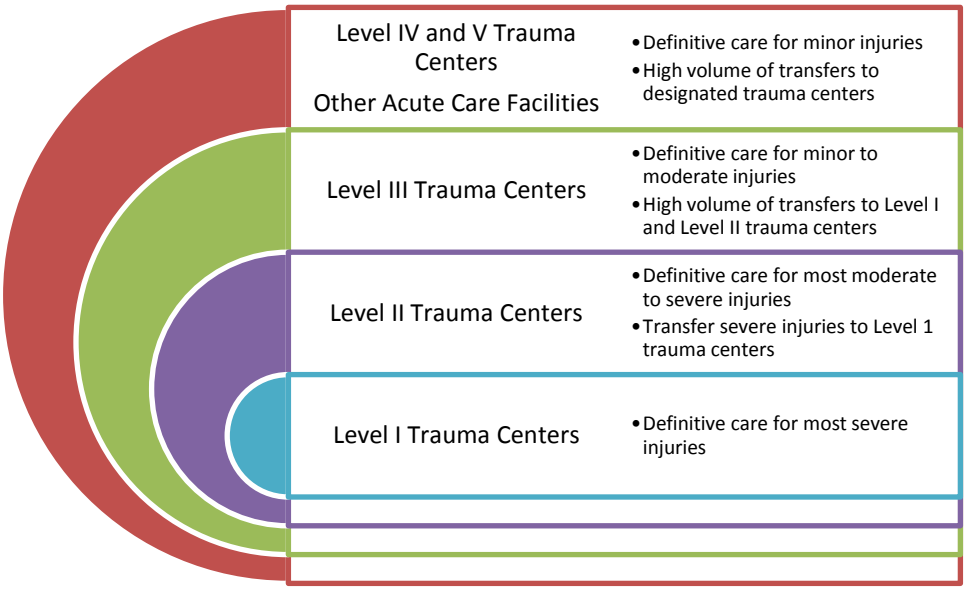


Figure 1. The Inclusive Trauma System

Trauma Centers

The state designates trauma centers based upon national standards and best practices. State designation of Level I and Level II trauma centers requires current verification by the America College of Surgeons (ACS). Level III, IV and V trauma centers do not require ACS verification, but must meet criteria for designation as outlined in rule. The level of trauma designation is dependent on the size, medical staff resources, the ability of the trauma center to provide definitive care and the depth of ancillary resources available to care for the trauma patient. The following table outlines the comparative resources required for trauma center designation.

Dimension		Level I	Level II	Level III	Level IV	Level V
Trauma System Role		Comprehensive tertiary care. Minimum of 1,200 trauma patients per year.	Comprehensive trauma care. Lead trauma facility to other hospitals in service area.	Community hospital with capabilities to provide some operative intervention to the trauma patient.	Initial resuscitation, stabilization, and transfer to a higher level of care.	Initial resuscitation, stabilization and transfer to a higher level of care.
Care Provided		Definitive comprehensive care for complex multi-system trauma provided within a defined critical care program. Residency program affiliation.	Definitive care for complex and severely injured patients with multi-system abdominal, orthopedic or neurological injury.	Initial resuscitation and immediate operative intervention to control hemorrhage and uncomplicated, multi-system trauma care.	Licensed hospital in rural areas or in close proximity of Level I or II trauma center. ATLS and TNCC required.	Licensed hospital, typically a small rural facility or Critical Access Hospital. ATLS and TNCC required.
Leadership		Professional and community education, trauma prevention, research, rehabilitation, and system planning	Professional and community education. Resource for Level III, IV and V trauma centers.	Community resource and collaboration with Level IV and V trauma centers. Networks with Level I and II trauma centers.	Community resources for education and coordination with EMS agencies. Networks with higher level trauma centers.	Community resources for education and coordination with EMS agencies. Networks with higher level trauma centers.
Staffing	**24-hour**	Full time ED staffed 24/7 by board certified ED physicians. 24/7 in- house radiology and anesthesia.	Full time ED staffed 24/7 by board certified ED physicians. Staffed ICU.	Full time ED staffed 24/7 by board certified ED physician. Staffed ICU.	24/7 RN coverage of the ED.	24/7 RN coverage of the ED may be shared with other duties in the hospital.
	On-Call	24/7 trauma surgeon in-house. Neurosurgeons, Anesthesiologists. Sub-specialists including plastic surgery and trauma orthopedics.	24/7 trauma surgeon coverage within 15 minutes of notification. Neurosurgery, Anesthesia. Sub-specialists on call.	24/7 general surgeon coverage within 30 minutes of notification. Anesthesia coverage for traumatic airways. Sub-specialists on call.	General surgeon in the community, but not required to have 24/7 surgical coverage.	ED may be staffed by mid-level providers.
	Ancillary	24/7 staffed OR and PACU. 24/7 in-house CT, lab, and blood bank. Full-time trauma program manager.	24/7 in-house CT, staffed OR, and 24/7 lab and blood bank in-house. Full-time trauma program manager.	24/7 in-house CT, OR staff on call. 24/7 lab; blood bank on call; part-time trauma coordinator.	May have on call CT 24/7; lab and blood bank on call; part-time trauma coordinator	May have on call CT 24/7; lab and blood bank on call; part-time trauma coordinator

Table 1. Comparison of Trauma Level Center Designation Criteria

Trauma Registry

Operated through the American College of Surgeons, the National Trauma Data Bank (NTDB) contains injury information from patients presenting to hospitals from across the nation. All Level I and II centers are required to submit data on a regular basis; others may do so voluntarily.

In conjunction with the NTDB, the National Trauma Data Standard (NTDS) defines required data elements and provides guidance on acceptable data sources, element parameters and usage. Additionally, to ensure consistent data collection across states into the NTDB, a trauma patient is defined as a patient sustaining a traumatic injury and meeting the following criteria:

- Injuries that fall into 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) and 930–939.9 (foreign bodies)) AND

- One of the following:
  - Hospital admission of at least 24 hours
  - Patient transfer via EMS transport (including air ambulance) from one hospital to another hospital
  - Any transfer by air ambulance
  - Death resulting from the traumatic injury (independent of hospital admission or hospital transfer status)

Trauma System Components

It is generally recognized that public health is responsible for three core functions within a trauma system:

- Assessment, including the regular and systematic collection and analysis of injury-related information to determine the status of the system (e.g., related resources, causative factors, and the identification of potential opportunities for intervention).
- Policy development designed to meet the overall goals of the system and improve outcomes.
- Assurance, including the evaluation and monitoring of system components, resources, organization, processes, and adherence to policies and standards to ensure the provision of necessary services.

Section III—Utah's Trauma System

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. To that end, and in direct response to state law, the bureau is responsible for the supervision of a statewide trauma system.

As specified in the Utah Emergency Medical Services System Act (Utah Code Title 26 Chapter 8a Section 250), the purposes of this system are to:

- Promote optimal care for trauma patients
- Alleviate unnecessary death and disability from trauma and emergency illness
- Inform health care providers about trauma system capabilities
- Encourage the efficient and effective continuum of patient care, including prevention, prehospital care, hospital care and rehabilitative care
- Minimize the overall cost of trauma care

The system includes EMS agencies, acute-care hospitals, and designated trauma centers. In 2011, these entities provided care for 11,448 trauma cases.

Trauma Centers

Of the 45 licensed acute care hospitals in the state, nineteen (42%) are designated trauma centers. Figure 2 shows the geographic location of all Utah licensed hospitals with designated trauma centers color-coded by level. A complete list of trauma centers can be found in Appendix D.

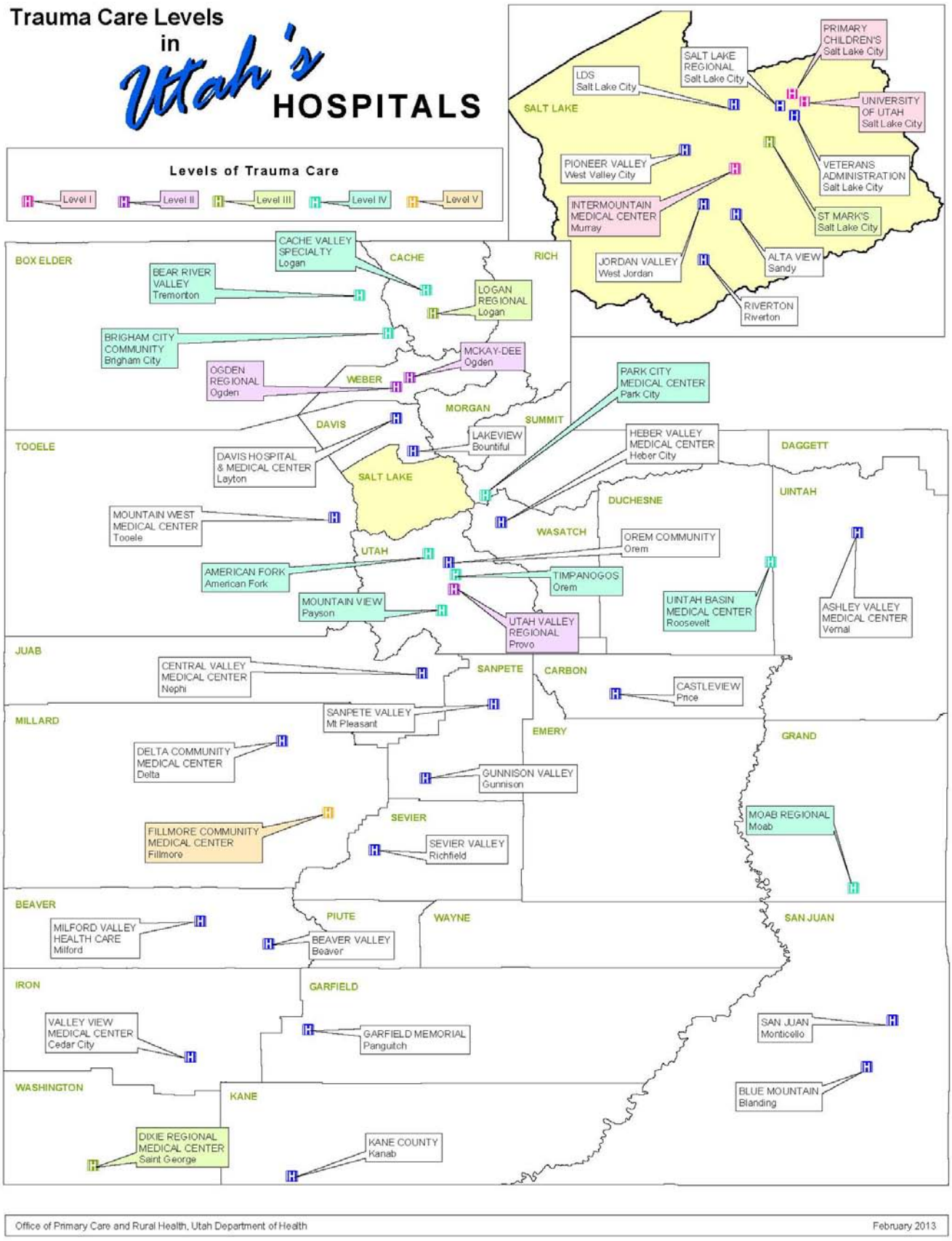


Figure 2. Acute Care Hospitals and Trauma Centers in Utah

The state trauma system is also divided into geographic regions based upon referral patterns and existing health care preparedness which also coincide with local health department boundaries. This structure facilitates collaboration between EMS Agencies and hospitals in addition to providing an administrative framework for training, performance improvement, etc. Table 2 lists the counties in each of the seven regions with Figure 3 offering a graphic of the region boundaries.

Region	Counties
SST	Salt Lake, Summit, Tooele
Northern	Box Elder, Cache, Davis, Rich, Morgan, Weber
Central	Juab, Millard, Piute, Sanpete, Sevier, Wayne
Southwest	Beaver, Garfield, Iron, Kane, Washington
Southeast	Carbon, Emery, Grand, San Juan
Utah/Wasatch	Utah, Wasatch
Tri-County	Daggett, Duchesne, Uintah

Table 2. State Trauma Regions

Figure 3. State Trauma Region Boundaries

Trauma Registry

The Utah Emergency Medical Services System Act authorizes BEMSP to establish a statewide trauma registry to collect and analyze information on the incidence, severity, causes and outcomes of trauma. The trauma registry is maintained through a contract with the Intermountain Injury Control Research Center (IICRC) at the University of Utah.

Administrative Rule R426-5-7 requires all Utah licensed acute care hospitals (regardless of whether they are designated trauma centers) to report information on trauma encounters. The rule also defines the data elements which hospitals are required to submit to BEMSP for the purpose of constructing a statewide trauma registry.

- Data Submission: Patient data records are to be submitted to the Bureau quarterly. In general, entries for a given calendar quarter are due no later than the end of the following quarter. A complete list of state-required data elements can be found in Appendix E.
- System Edits: Data are validated through a process of automated editing and report verification. Each record is subjected to a series of edits for accuracy, consistency, completeness, and conformity with the definitions specified. Records failing any edit are returned to the data supplier for correction and/or comment.
- Inclusion Criteria: As a matter of policy, BEMSP has adopted the inclusion criteria established by the NTDS; however, it is slightly more inclusive in that any patient requiring air transport is automatically included in the trauma registry. While we also adhere to the data element set of the NTDB, the state has identified additional data elements to be collected. Additionally, all licensed hospitals in the state are required to submit data, whereas the NTDB only requires submission by Level I and II centers.

Core Functions

- Assessment: Trauma data are collected from a variety of sources. The trauma registry is the primary data source for hospital-based services; however, other sources are critical in providing data along the continuum of care as well as context for data analysis. Routinely accessed data sources include the following:
  - Utah Trauma Registry
  - Emergency department data
  - Prehospital data
- Policy Development: Under the direction of the Emergency Medical Services (EMS) Committee and the Trauma System Advisory Committee (TSAC), administrative rules are maintained and implemented within the scope of established statutes. Administrative Rule R426-5 of the Utah Administrative Code defines the state Trauma Standard and can be accessed through this link: http://www.rules.utah.gov/publicat/code/r426/r426-005.htm.
- Assurance: BEMSP has been directed by the legislature to develop and implement a trauma performance improvement system. To that end, audit filters have been identified to measure the quality of trauma care delivered in the state. The results are reviewed by TSAC annually and serve as one trigger for performance improvement initiatives. The performance improvement team meets monthly to identify, develop, and manage these initiatives.

Utah's trauma system is still developing, but great strides are being made in creating an integrated and inclusive statewide trauma system. Included within this report is a summary of the trauma cases treated in Utah hospitals during 2011.

Section IV—Summary of Findings

Trauma Event Count

In 2011, a total of 11,448 incidents met the inclusion criteria for the trauma registry. The distribution of cases by trauma regions is shown in Figure 4. Predictably, the highest concentration of cases is found along the Wasatch Front where over 69 percent of the state's population reside.

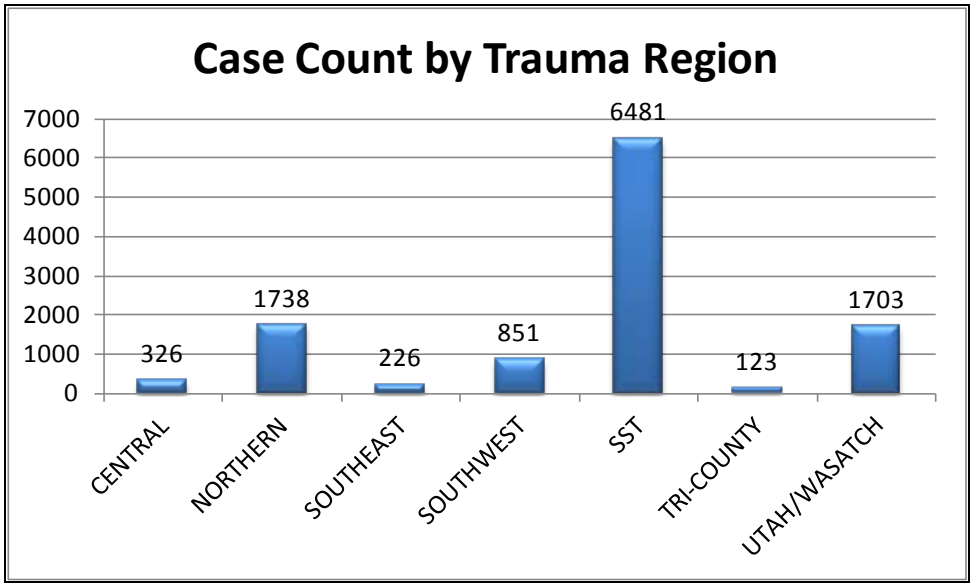


Figure 4. Trauma Distribution by Region in Utah: 2011

As shown in Figure 5, the number of trauma cases per year has grown predictably over the past four years. It is worth noting that the significant increase between 2007 and 2008 incidents is attributed to a change in the inclusion criteria. Prior to 2008, ground level falls for individuals over the age of 65 were excluded from the trauma registry. Traumatic co-morbidities, such as inter-cranial hemorrhage resulting from falls, made it expedient that ground level falls be included in the trauma registry.

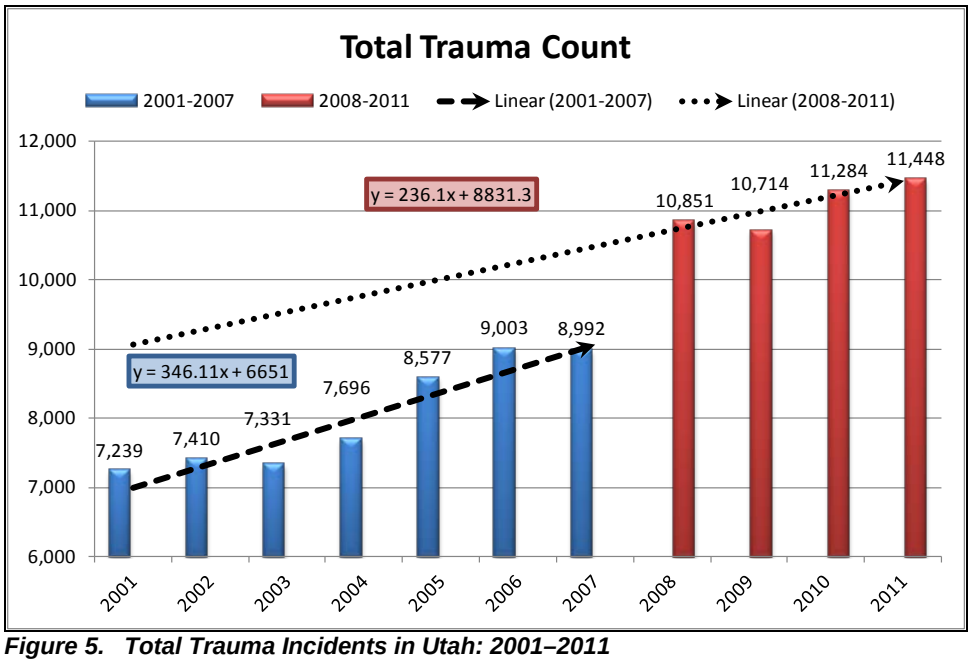


Figure 5. Total Trauma Incidents in Utah: 2001–2011

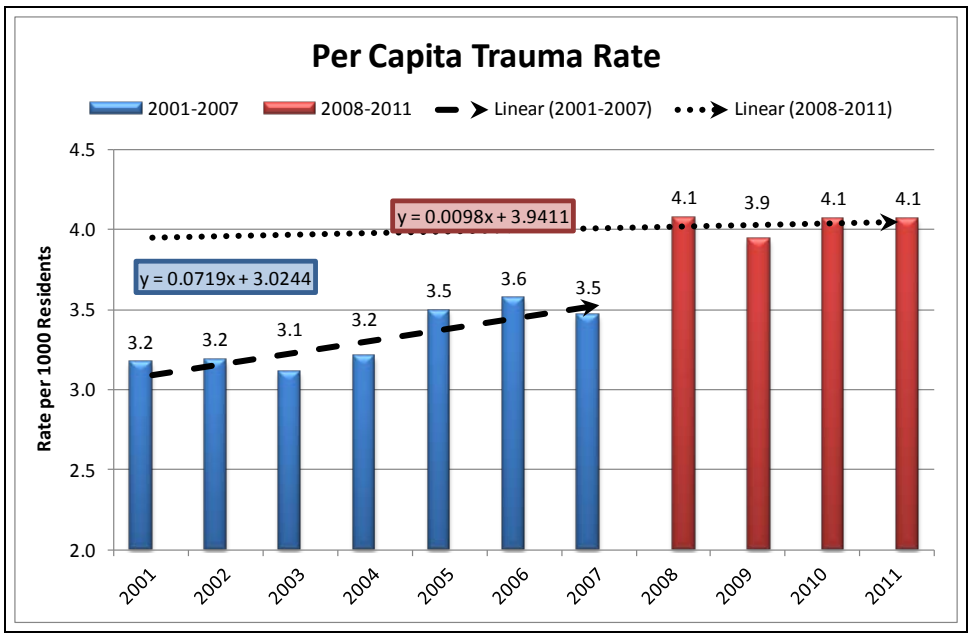


Figure 6. Per Capita Trauma Rates in Utah: 2001–2011

Utah's population has increased from approximately 2.3 million in 2001 to 2.8 million in 2011. That growth in population correlates to the increased number of trauma cases. The per capita rate per thousand residents is shown in Figure 6.

Both Figures 5 and 6 include two separate trend lines: one for 2001–2007 and one for 2008–2011. The purpose of two trend lines in each chart is to illustrate the difference in projected growth with the change in inclusion of ground level falls. The linear equation for each trend line is also shown.

Patient Characteristics

Gender

Males accounted for 55.2% of reportable trauma cases in 2011, representing 6,319 cases. Females accounted for 44.7%, representing 5,129 trauma cases. Figure 7 illustrates how the 2011 gender distribution compares to the average for years 2001-2007 as well as the average for years 2008-2010. The averages were split into two groups due to the change in inclusion criteria previously discussed.

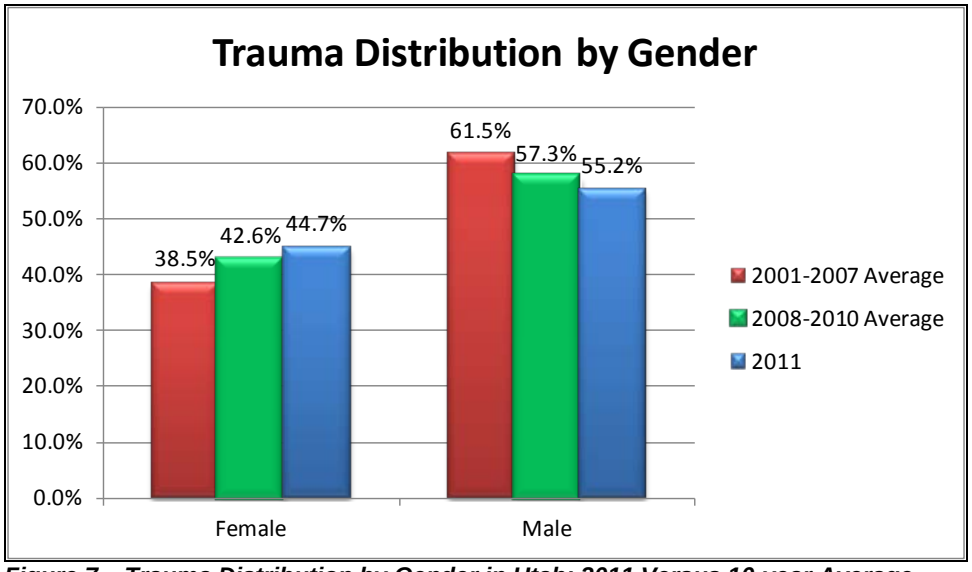
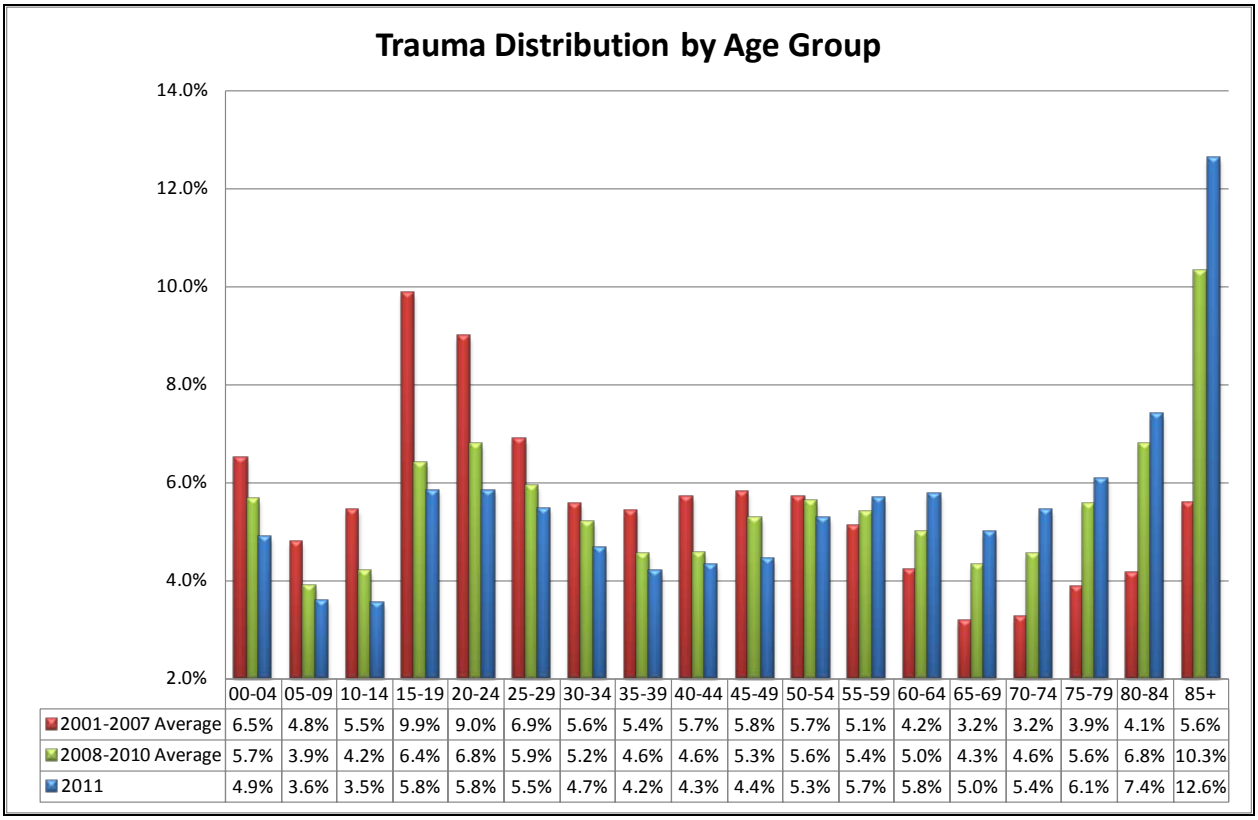


Figure 7. Trauma Distribution by Gender in Utah: 2011 Versus 10-year Average

Age Group

As shown in Figure 8, the number of trauma cases involving patients over the age of 65 has steadily increased since the inclusion criteria were changed in 2008. In 2011, there was a dramatic increase in the number of traumatic injuries in the population older than 85. In 2011, 1,445 such cases were recorded in the trauma registry. Six hundred and twenty-two of those (43%) involved fractures of the hip and/or femur.



	00-04	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
2001-2007 Average	6.5%	4.8%	5.5%	9.9%	9.0%	6.9%	5.6%	5.4%	5.7%	5.8%	5.7%	5.1%	4.2%	3.2%	3.2%	3.9%	4.1%	5.6%
2008-2010 Average	5.7%	3.9%	4.2%	6.4%	6.8%	5.9%	5.2%	4.6%	4.6%	5.3%	5.6%	5.4%	5.0%	4.3%	4.6%	5.6%	6.8%	10.3%
2011	4.9%	3.6%	3.5%	5.8%	5.8%	5.5%	4.7%	4.2%	4.3%	4.4%	5.3%	5.7%	5.8%	5.0%	5.4%	6.1%	7.4%	12.6%

Figure 8. Trauma Distribution by Age Group in Utah: 2011 Versus 10-year Average

Resident Status

In 2011, 87.4% of all trauma cases involved residents of the state, with 12.6% (1,437) of cases involving non-residents. Based on 2010 emergency department data (the last year for which data are available), 95% of encounters involved state residents. These figures indicate a higher incidence of traumatic injury involving non-residents.

Case Characteristics

Although the incidence of traumatic injuries remains somewhat stable from month to month, there is a slight increase during the summer months of June, July and August. Holidays do not pose a significant increase in occurrence, and while rates are generally stable across the week, there is a slight increase in trauma events on Saturdays, as shown in Figure 9.

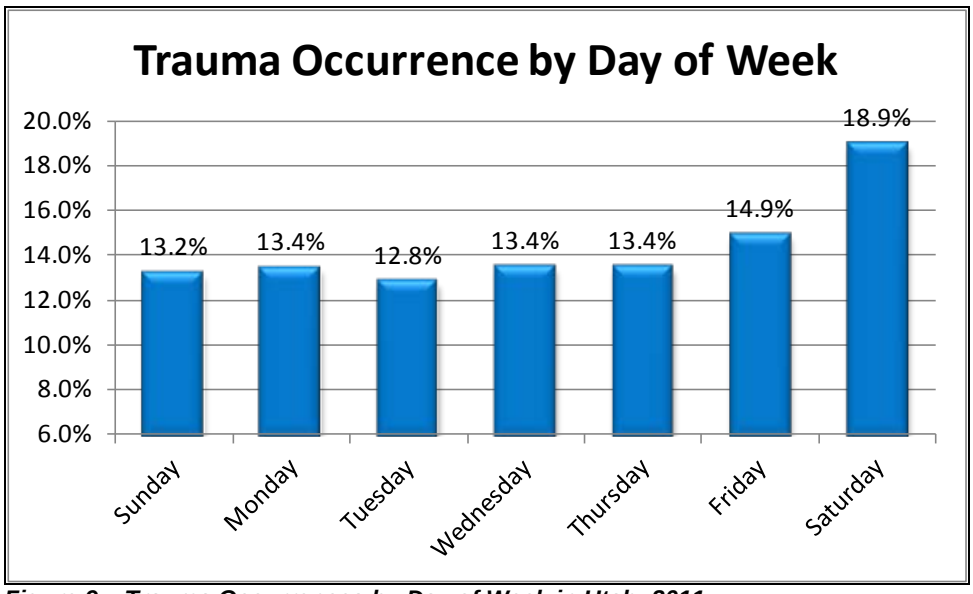


Figure 9. Trauma Occurrences by Day of Week in Utah: 2011

Causes

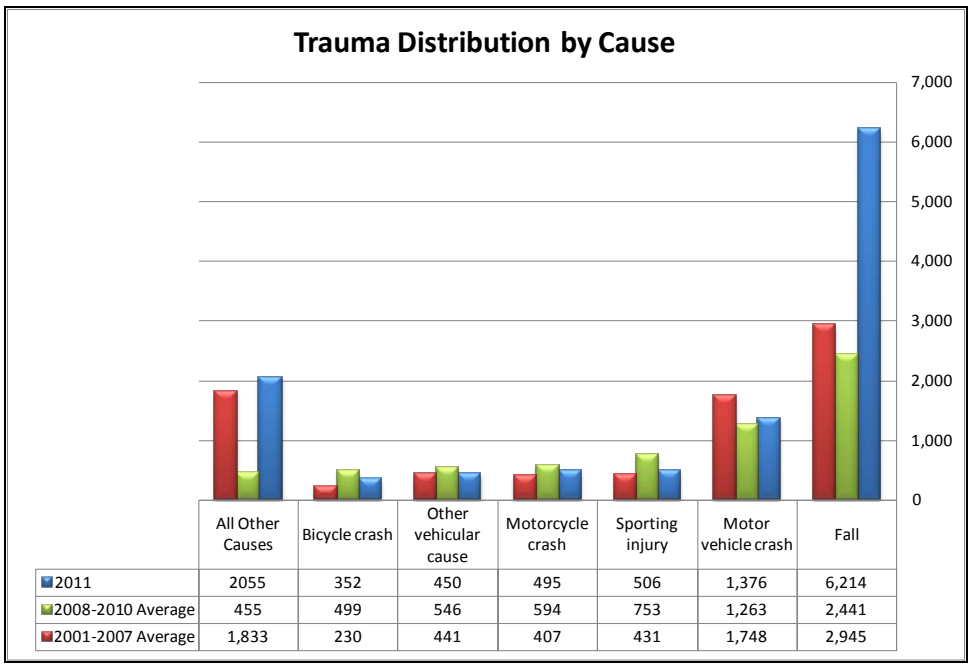
Based upon the primary qualifying diagnosis code, there were 25 different causes of traumatic injury in Utah during 2011. These ranged in prevalence from one case (smoke inhalation) to 6,214 cases (falls). For ease of reporting, the top six causes are shown in Figure 10 along with the total of all other causes. Data are shown for both 2011 values and the 10-year average.

Note the following:

- "Fall" includes all falls, whether from one level to another or ground-level.
- "Motorcycle crash" includes motorcycle with motor vehicle incidents.
- "Other vehicular cause" includes three- and four-wheel ATVs.
- "Bicycle crash" includes bicycle with motor vehicle incidents.

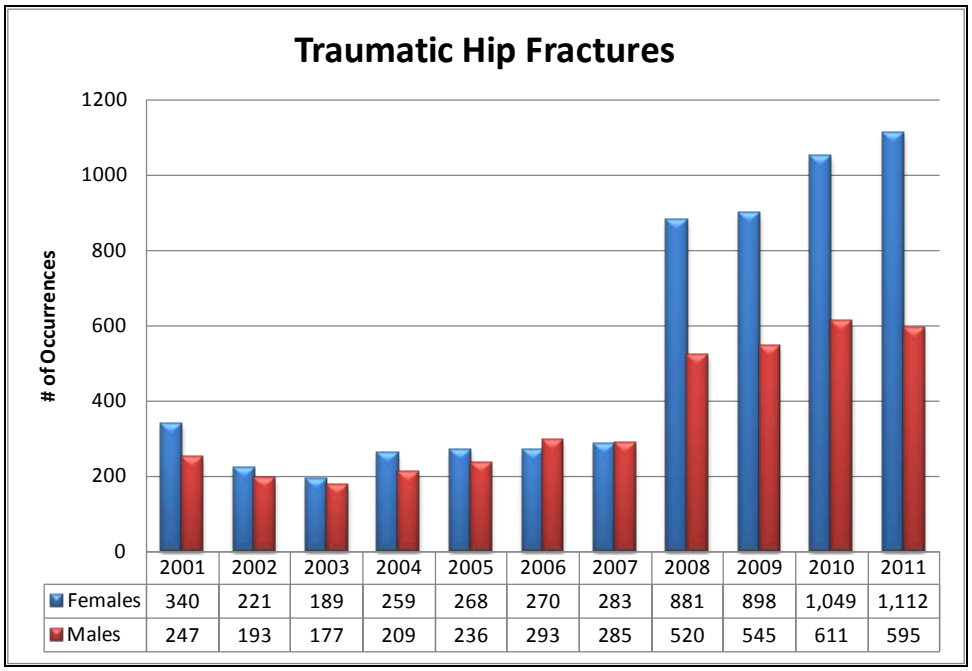
The dramatic increase in falls warrants special attention. Since 2008, the trauma registry has included ground level falls in the elderly resulting in traumatic injuries. This change in inclusion criteria is reflected in the variance between 2011 data and the 10-year average.

There is a strong correlation between falls in the elderly and hip fractures. The average number of hip fractures included in the registry between 2001 and 2007 was 261 females and 234 males per year. Since the change in inclusion criteria, those averages have increased to 1,553 females and 568 males per year. This dramatic change also helps explain the narrowing of the gender gap noted in Figure 5, since significantly more women than men have been treated for hip fractures since 2008, as shown in Figure 11.



	All Other Causes	Bicycle crash	Other vehicular cause	Motorcycle crash	Sporting injury	Motor vehicle crash	Fall
2011	2055	352	450	495	506	1,376	6,214
2008-2010 Average	455	499	546	594	753	1,263	2,441
2001-2007 Average	1,833	230	441	407	431	1,748	2,945

Figure 10. Trauma Distribution by Primary Cause in Utah: 2011 Versus 10-year Average

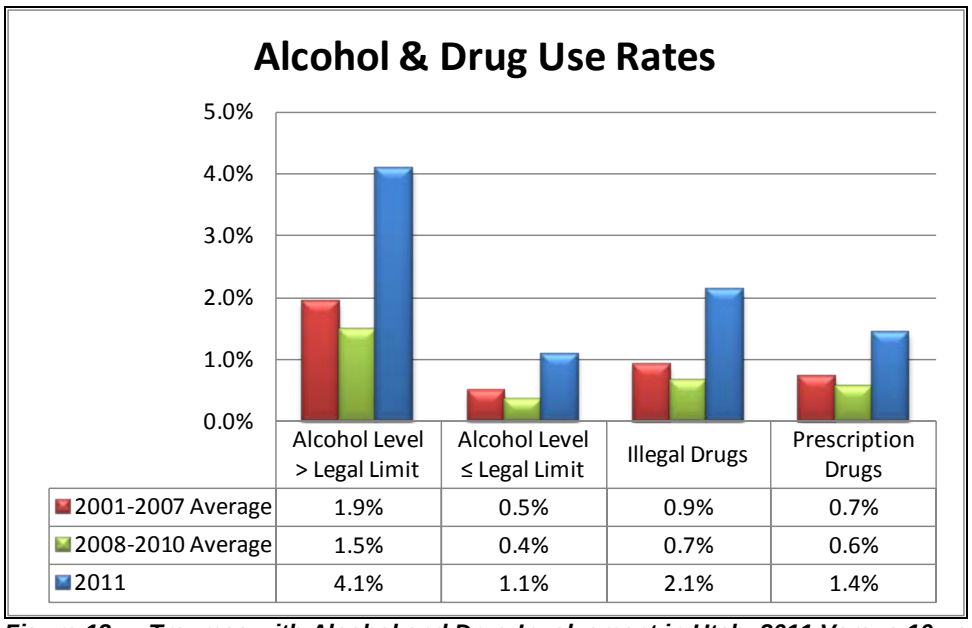


	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Females	340	221	189	259	268	270	283	881	898	1,049	1,112
Males	247	193	177	209	236	293	285	520	545	611	595

Figure 11. Hip Fractures in Trauma Registry in Utah: 2001–2011

Alcohol & Drug Involvement

When compared to the 10-year average, trauma in 2011 was associated with an increase of alcohol and drugs. Nearly nine percent (8.7%) of all trauma patients tested positive for alcohol and/or drugs upon arrival in the emergency department, which is more than double the 10-year average of 4.1%. The most significant increase was in alcohol levels above the legal limit, as illustrated in Figure 12. The increased rate may reflect efforts by trauma centers to provide screening and documented interventions for patients using drugs and alcohol.



	Alcohol Level > Legal Limit	Alcohol Level ≤ Legal Limit	Illegal Drugs	Prescription Drugs
2001-2007 Average	1.9%	0.5%	0.9%	0.7%
2008-2010 Average	1.5%	0.4%	0.7%	0.6%
2011	4.1%	1.1%	2.1%	1.4%

Figure 12. Traumas with Alcohol and Drug Involvement in Utah: 2011 Versus 10-year Average

Injury Severity

An injury severity score (ISS) is calculated for each trauma case as a function of the Abbreviated Injury Score (AIS). This score provides an overall score for patients with multiple injuries. Each injury is assigned an AIS for each of six body regions: head, face, chest, abdomen, extremities, or external. The AIS for any given region ranges from one (minor injury) to six (maximum injury). Only the highest AIS scores for each region are used in calculating the ISS. The three most severely injured body regions' AIS scores are squared and totaled to produce the ISS.

The ISS can range from zero to 75. Any AIS of six will automatically result in an ISS of 75. The ISS is the only anatomical scoring system in use and correlates linearly with mortality, morbidity, hospital stay, and other measures of severity. The following table will assist the reader in understanding the ISS Groups.

AIS	DESCRIPTION
1	Minor
2	Moderate
3	Serious
4	Severe
5	Critical
6	Maximum injury, virtually unsurviveable

Table 3. Abbreviated Injury Score Descriptions

It may be beneficial to consider injury severity in distinct groups from relatively minor injuries to progressively more severe, with greater severity correlating to greater threat to life. Figure 13 shows the distribution of trauma cases by ISS group for 2011. Almost 69% of all traumatic injuries are relatively minor, while the most severe injuries account for just 4%.

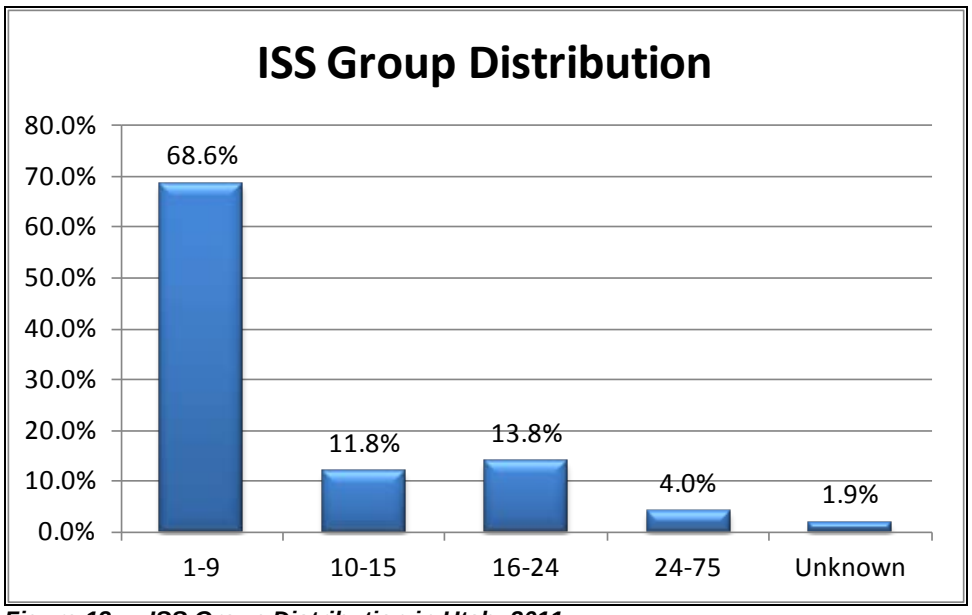


Figure 13. ISS Group Distribution in Utah: 2011

In any inclusive trauma system, one would expect to see the most severe injuries treated at Level I or II trauma centers. Indeed, such is the case in Utah. Figure 14 shows the average ISS by level designation for Utah hospitals in 2011.

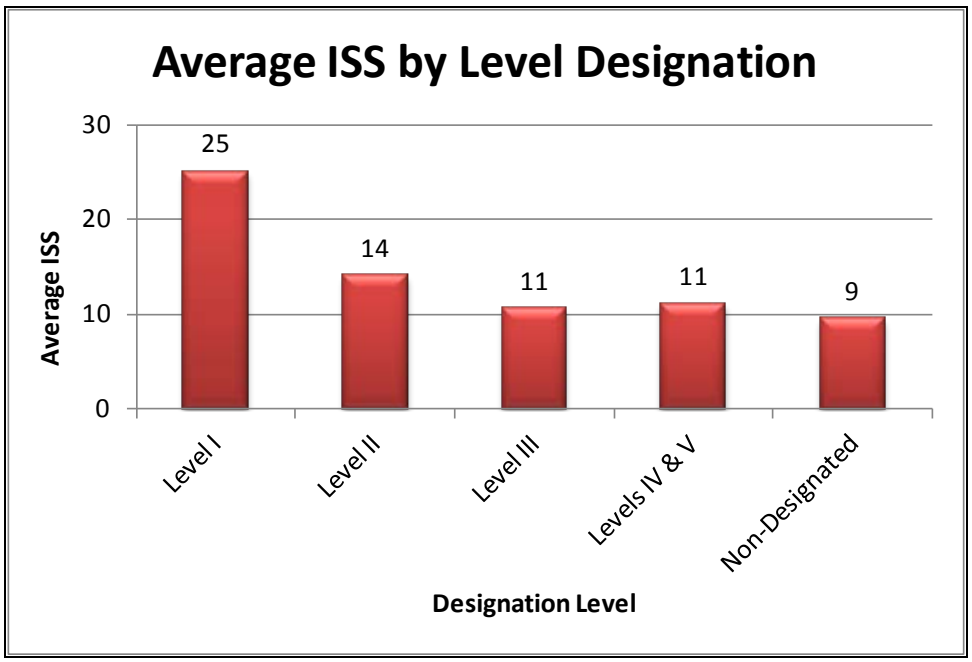


Figure 14. Average ISS by Level Designation in Utah: 2011

In general, the most severe injuries occurred in patients between the ages of 15 and 54, with an average ISS for these age groups of 22.4. Figure 15 shows the average ISS for all age groups in 2011. Statewide, the 2011 average ISS was 18.

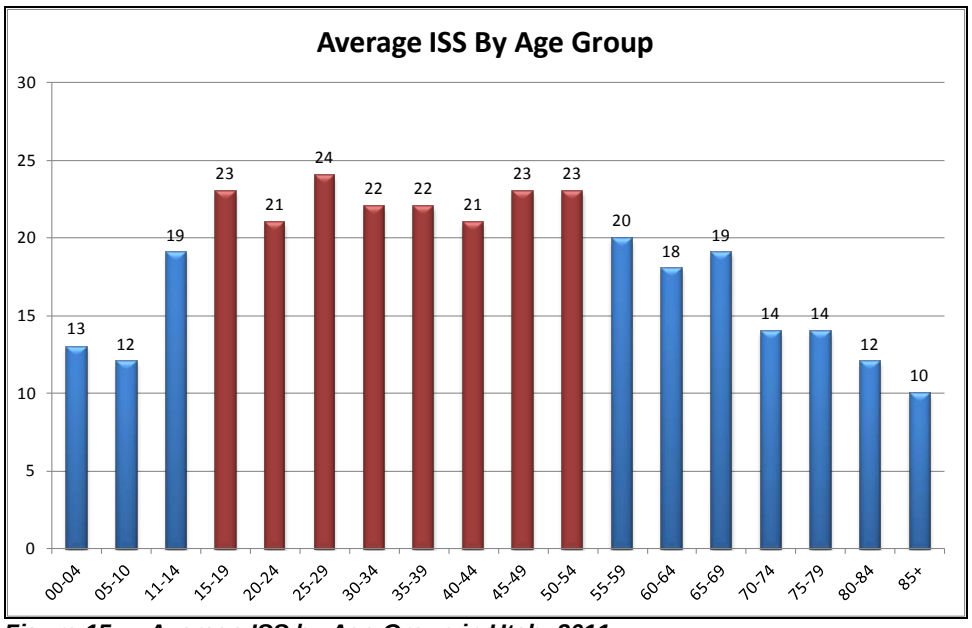


Figure 15. Average ISS by Age Group in Utah: 2011

Length of Stay

The length of hospital stay is tracked for each trauma. The following charts examine the average length of stay (LOS) across gender, age group and average ISS.

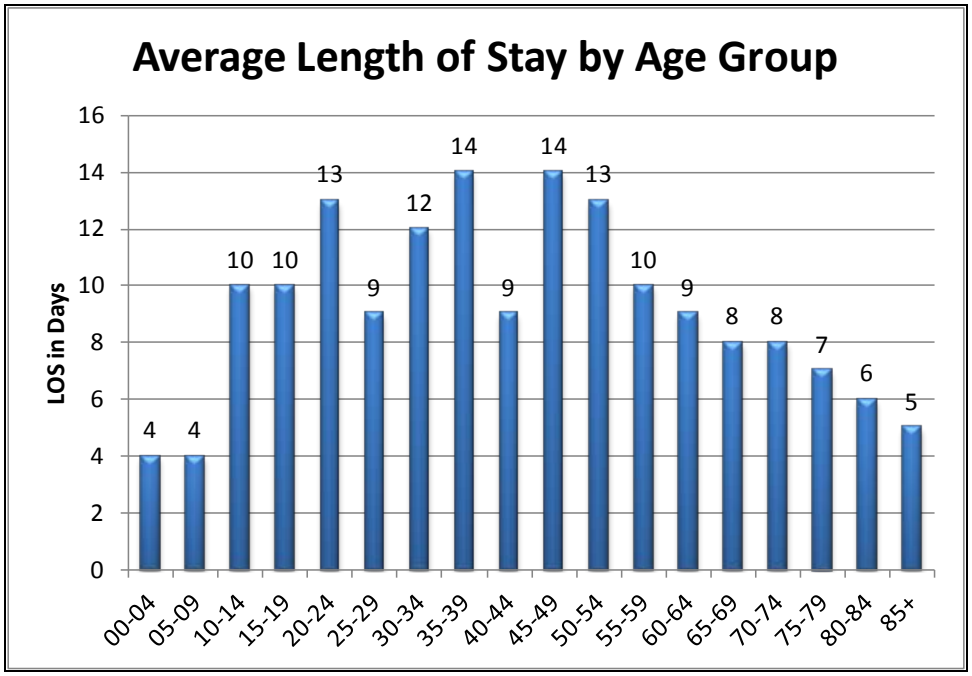


Figure 16. Average LOS by Age Group in Utah: 2011

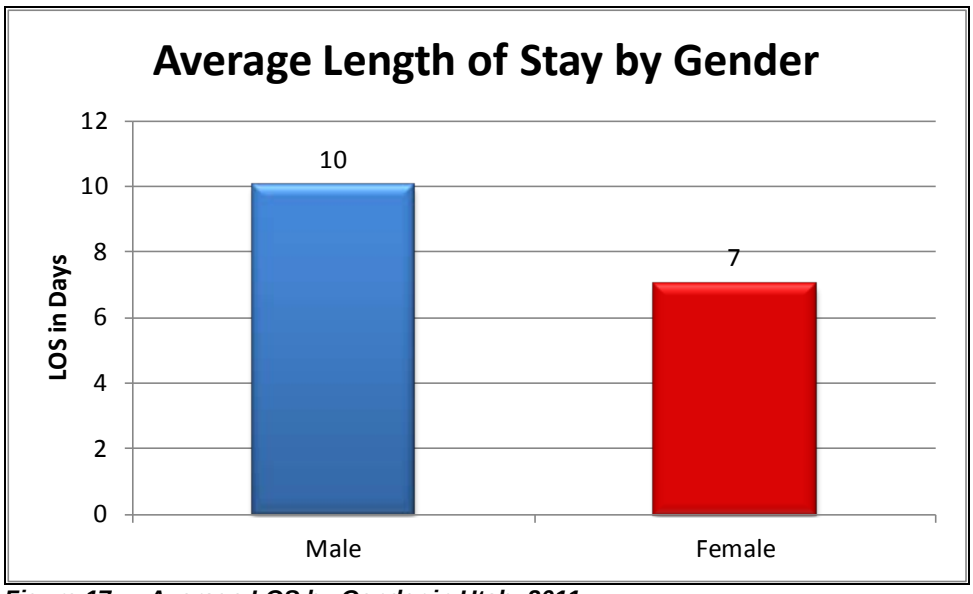


Figure 17. Average LOS by Gender in Utah: 2011

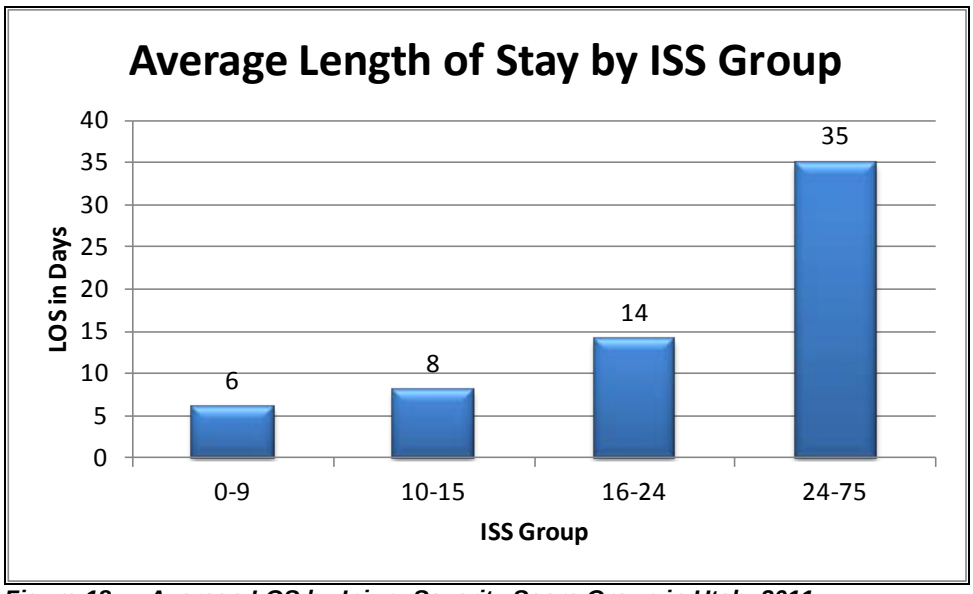


Figure 18. Average LOS by Injury Severity Score Group in Utah: 2011

Transportation Mode

Attention is also given to the modes by which patients suffering traumatic injuries arrive at the initial facility. Figure 19 shows the distribution pattern for 2011. The two predominant modes were ground ambulance (via EMS agency) and other non-commercial vehicle. In fact, these two categories account for more than 89% of all cases. If the patient subsequently requires transfer for definitive care, EMS agencies are always involved, whether by ground ambulance, fixed wing aircraft, or helicopter. In 2011, some 2,756 patients required such transfers.

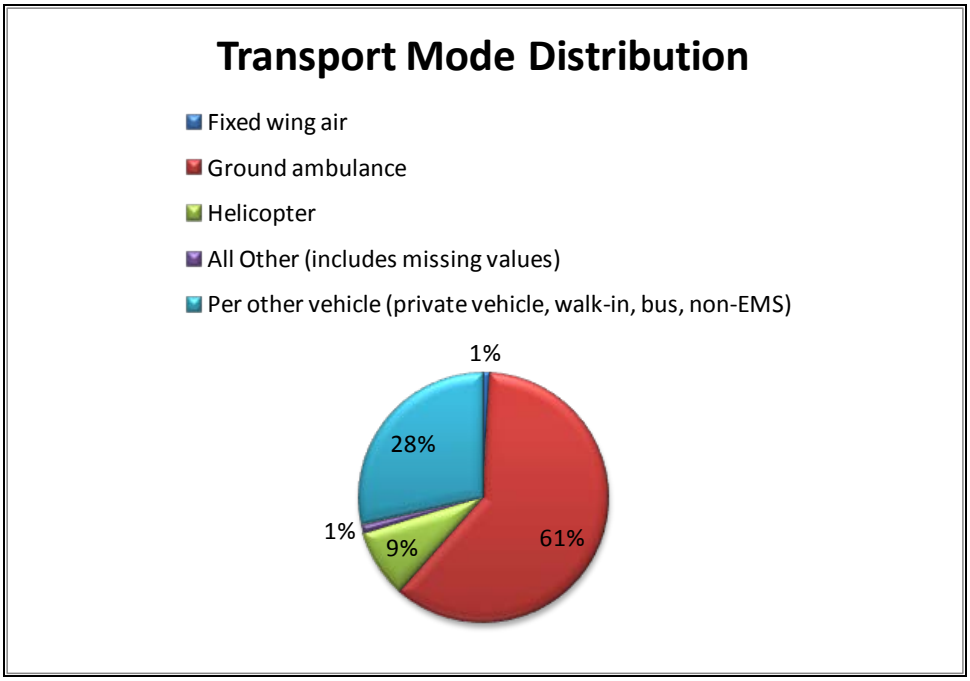


Figure 19. Transportation Mode for Trauma Patients to Initial Facility in Utah: 2011

Event Outcomes

Ninety-eight percent of all trauma cases survived if they were alive upon arrival at the hospital, which is on par with national statistics (NTDB Annual Report, 2008*).*

A patient is considered discharged from the emergency department when he/she is no longer under the care of the ER physician; therefore, discharge is not necessarily the end of treatment but may result in a transfer to another facility, admission as an inpatient, etc. Table 4 shows the discharge disposition of all trauma cases in 2011.

Trauma Case ED Discharge Disposition	Count
Floor Bed (general admission, non specialty unit hospital bed)	5,504
Transferred to another hospital	1,804
Intensive Care Unit	1,633
Operating Room	1,148
Other	1,129
Home without services	138
Death (in ED or DOA)	92
TOTAL	11,448

Table 4. Trauma Case Emergency Department Discharge Disposition in Utah: 2011

Seventy-two percent of trauma cases (8,285) were admitted to the reporting hospital as an inpatient, to either a floor bed, the ICU, or the operating room. Table 5 lists the hospital discharge dispositions for those individuals.

Trauma Case Hospital Discharge Disposition	Count
Transferred to an inpatient rehabilitation facility	702
Returned home, requiring home health services and/or outpatient rehabilitation	624
Other	340
Death in hospital	233
Transferred to another acute care hospital	117
TOTAL	8,285

Table 5. Trauma Case Hospital Discharge Disposition in Utah: 2011

In total, 329 patients died from their injuries after they reached the hospital. The following charts examine the cases resulting in death in greater detail.

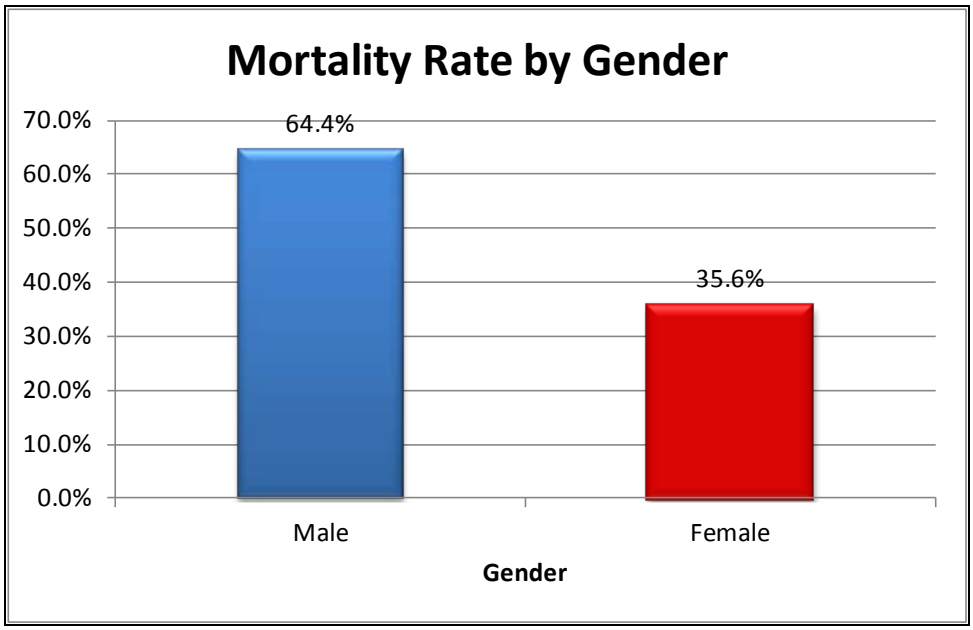


Figure 20. Trauma Case Mortality by Gender in Utah: 2011

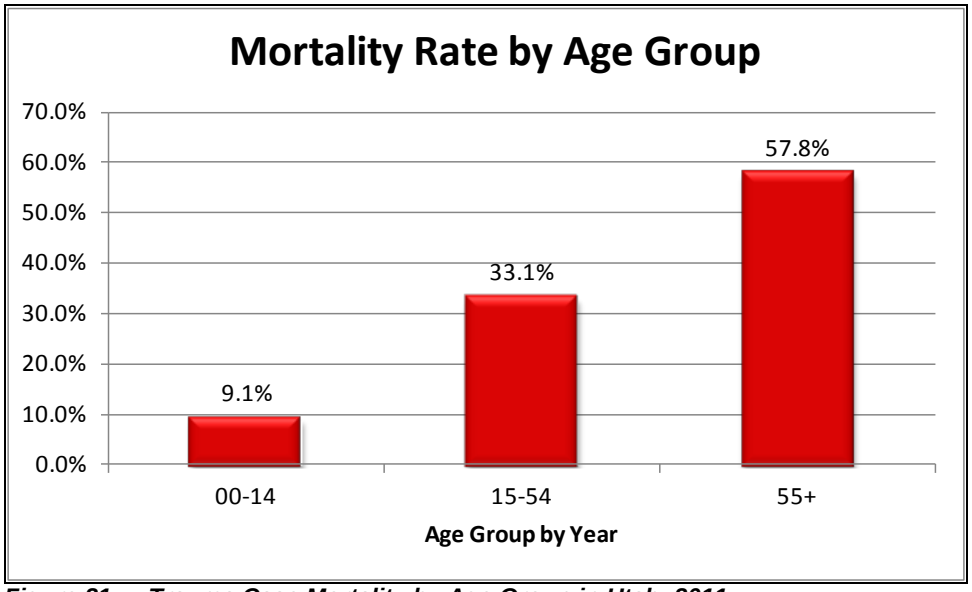


Figure 21. Trauma Case Mortality by Age Group in Utah: 2011

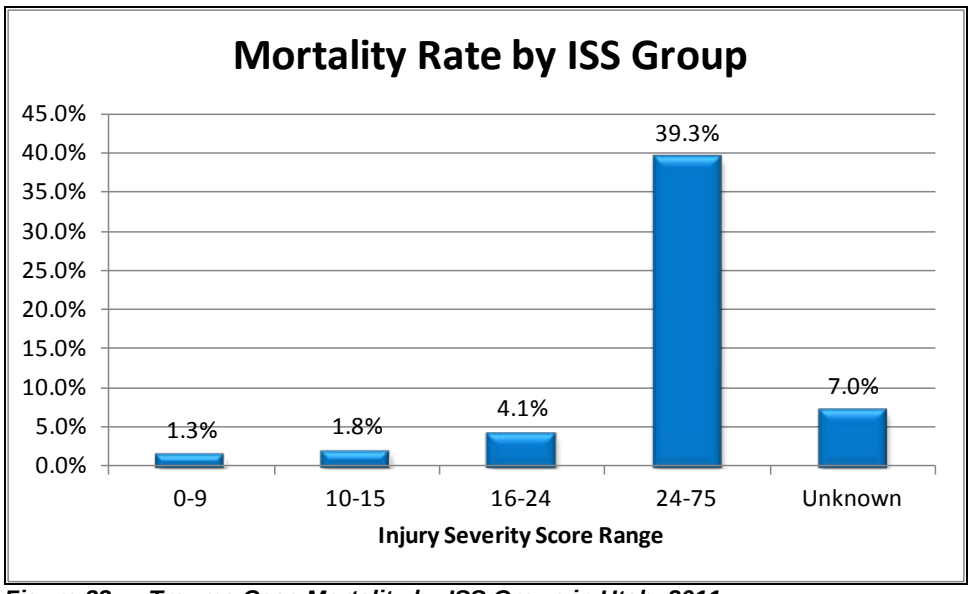


Figure 22. Trauma Case Mortality by ISS Group in Utah: 2011

Section V—Data Security

Privacy, Confidentiality, and Access

- **Privacy:** The individual's right to privacy refers to a patient's capacity to control identifiable information about him/her that could be disclosed under certain conditions. Ensuring patient privacy is carefully considered in the management of BEMSP data files.

  Public disclosure of individual hospital data is carefully guarded by use of calculated or aggregated values. Release of identifiable data occurs only if the hospital is allowed time to verify the accuracy of the information, submit corrections with supporting evidence, and submit comments or alternate interpretations to the release; and BEMSP has corrected any data records found to be in error.

- **Confidentiality:** Care is taken to ensure that access to BEMSP raw data files is by authorized personnel only. BEMSP and the Utah Department of Health (UDOH) manage all data files in compliance with statute and protective policies and procedures. All personnel having access to BEMSP data files are required to sign a Confidentiality Pledge, which outlines their responsibilities and notifies them of the possible penalties for breach of the agreement.

- **Access:** It is the policy of BEMSP to support legitimate access to trauma data while protecting the patient and the hospital's right to privacy. This policy governs the administration of confidential data in the custody of BEMSP.

Section VI—Technical Notes and Limitations

Technical Notes

Data summarized in this report were collected from the Utah Trauma Registry.

Limitations

This report contains data related only to victims of traumatic injury transported to a hospital for treatment of that injury. Individuals pronounced dead at the scene are, by definition, not included in the registry. Additionally, it must be noted that in reporting discharge disposition, some actual deaths may have been entered as "unknown." For the purpose of this report, the total reported deaths was derived by a separate data element, "Outcome," which only allows for three values: alive, dead, or unknown.

The data dictionary for the Utah Trauma Registry is a living document in that changes are regularly made to reflect national standards. Therefore, values for some data elements may not be collected for every year. Additionally, some data elements are required only by the state, thus limiting national comparisons for those elements.

Timeliness of data is always a concern. The most current data available from the NTDB is from 2008, cited in one instance.

The authors appreciate appropriate comments and constructive criticism to help shape future reports.

Additional Trauma Data Resources

Future Reports—The bureau published a five-year summary report in 2012 for the years 2006–2010. Beginning with 2011 data, the bureau will publish an annual report each spring.

Electronic Data—BEMSP supports legitimate access to its trauma registry while protecting the patient and hospital right of privacy.

Public Data Sets (PDS) are available with minimal control. Different data files are designed to provide general health care data to a wide spectrum of users. Interested individuals can access trauma registry data through the Department of Health's Web site at http://ibis.health.utah.gov/.

Special Data Requests are subject to review and approval by BEMSP. Please send requests for special data sets to:

Shari Hunsaker, MHA
Bureau of Emergency Medical Services and Preparedness
Utah Department of Health
PO Box 142004
Salt Lake City, UT 84114-2004
(801) 273-6667
email: sharihunsaker@utah.gov

Section VII—Appendices

Appendix A: Acronyms

Acronym	Definition
ACS	American College of Surgeons
AIS	Abbreviated Injury Scale
ATLS	Advanced Trauma Life Support
BEMSP	Bureau of Emergency Medical Services and Preparedness
CT	Computed tomography
EMS	Emergency Medical Services
GCS	Glasgow Coma Score
HRSA	Health Resources and Services Administration
IICRC	Intermountain Injury Control Research Center
ISS	Injury Severity Score
NTDB	National Trauma Data Bank
NTDS	National Trauma Data Standard
PACU	Post Anesthesia Care Unit
TNCC	Trauma Nurse Core Course
TSAC	Trauma System Advisory Committee
TSAR	Trauma System Annual Report
UDOH	Utah Department of Health
UTR	Utah Trauma Registry

Appendix B: Excerpt from Utah Emergency Medical Services Act

26-8a-250. Establishment of statewide trauma system.

The department shall establish and actively supervise a statewide trauma system to:

(1) promote optimal care for trauma patients;

(2) alleviate unnecessary death and disability from trauma and emergency illness;

(3) inform health care providers about trauma system capabilities;

(4) encourage the efficient and effective continuum of patient care, including prevention, prehospital care, hospital care, and rehabilitative care; and

(5) minimize the overall cost of trauma care.

26-8a-251. Trauma system advisory committee.

(1) There is created within the department the trauma system advisory committee.

(2) (a) The committee shall be comprised of individuals knowledgeable in adult or pediatric trauma care, including physicians, nurses, hospital administrators, emergency medical services personnel, government officials, consumers, and persons affiliated with professional health care associations.

(b) Representation on the committee shall be broad and balanced among the health care delivery systems in the state with no more than three representatives coming from any single delivery system.

(3) The committee shall:

(a) advise the department regarding trauma system needs throughout the state;

(b) assist the department in evaluating the quality and outcomes of the overall trauma system;

(c) review and comment on proposals and rules governing the statewide trauma system; and

(d) make recommendations for the development of statewide triage, treatment, transportation, and transfer guidelines.

(4) The department shall:

(a) determine, by rule, the term and causes for removal of committee members;

(b) establish committee procedures and administration policies consistent with this chapter and department rule; and

(c) provide administrative support to the committee.

26-8a-252. Department duties.

In connection with the statewide trauma system established in Section 26-8a-250, the department shall:

(1) establish a statewide trauma system plan that:

(a) identifies statewide trauma care needs, objectives, and priorities;

(b) identifies the equipment, facilities, personnel training, and other things necessary to create and maintain a statewide trauma system; and

(c) organizes and coordinates trauma care within defined geographic areas;

(2) support the statewide trauma system by:

(a) facilitating the coordination of prehospital, acute care, and rehabilitation services and providers through state regulation and oversight;

(b) facilitating the ongoing evaluation and refinement of the statewide trauma system;

(c) providing educational programs;

(d) encouraging cooperation between community organizations, health care facilities, public health officials, emergency medical service providers, and rehabilitation facilities for the development of a statewide trauma system;

(e) implementing a quality assurance program using information from the statewide trauma registry established pursuant to Section 26-8a-253;

(f) establishing trauma center designation requirements in accordance with Section 26-8a-254; and

(g) developing standards so that:

(i) trauma centers are categorized according to their capability to provide care;

(ii) trauma victims are triaged at the initial point of patient contact; and

(iii) trauma patients are sent to appropriate health care facilities.

26-8a-253. Statewide trauma registry and quality assurance program.

(1) The department shall:

(a) establish and fund a statewide trauma registry to collect and analyze information on the incidence, severity, causes, and outcomes of trauma;

(b) establish, by rule, the data elements, the medical care providers that shall report, and the time frame and format for reporting;

(c) use the data collected to:

(i) improve the availability and delivery of prehospital and hospital trauma care;

(ii) assess trauma care delivery, patient care outcomes, and compliance with the requirements of this chapter and applicable department rules; and

(iii) regularly produce and disseminate reports to data providers, state government, and the public; and

(d) support data collection and abstraction by providing:

(i) a data collection system and technical assistance to each hospital that submits data; and

(ii) funding or, at the discretion of the department, personnel for collection and abstraction for each hospital not designated as a trauma center under the standards established pursuant to Section 26-8a-254.

(2) (a) Each hospital shall submit trauma data in accordance with rules established under Subsection (1).

(b) A hospital designated as a trauma center shall submit data as part of the ongoing quality assurance program established in Section 26-8a-252.

(3) The department shall assess:

(a) the effectiveness of the data collected pursuant to Subsection (1); and

(b) the impact of the statewide trauma system on the provision of trauma care.

(4) Data collected under this section shall be subject to Chapter 3, Health Statistics.

(5) No person may be held civilly liable for having provided data to the department in accordance with this section.

26-8a-254. Trauma center designations and guidelines.

(1) The department, after seeking the advice of the trauma system advisory committee, shall establish by rule:

(a) trauma center designation requirements; and

(b) model state guidelines for triage, treatment, transportation, and transfer of trauma patients to the most appropriate health care facility.

(2) The department shall designate as a trauma center each hospital that:

(a) voluntarily requests a trauma center designation; and

(b) meets the applicable requirements established pursuant to Subsection (1).

Appendix C: Trauma System Advisory Committee

Committee Chair:	Tom White, MD
Committee Members:	Holly Burke, RN (ED Manager)
	Nancy Chartier, RN (ED Manager)
	Craig Cook, MD (Level II Trauma Surgeon)
	Mark Dalley (UHA member, rural)
	Hilary Hewes, MD (Pediatric MD)
	Jason Larson, MD (EMS Medical Director)
	Clay Mann, PhD (Epidemiologist)
	Kevin McCarthy, EMT-P (EMS Coordinator—Paramedic)
	Stephen Morris, MD (Surgeon)
	Tom White, MD (Trauma Surgeon)
	Deanna Wolfe, RN (Trauma Center Administrator)

Meetings are held the third Monday of the third month of each quarter and are open to the public. Links to meeting minutes can be found at http://health.utah.gov/ems/trauma.

Appendix D: Designated Trauma Centers

Hospital	Level	Designation Date	Expiration Date
Intermountain Medical Center 5121 S Cottonwood Dr Murray UT 84157	I	10/25/2007	09/09/2014
Primary Children's Medical Center 100 N Medical Dr Salt Lake City UT 84113		01/01/2004	02/28/2013
University of Utah Hospital 50 N Medical Dr Salt Lake City UT 84132		01/01/2000	02/28/2013
McKay Dee Hospital Center 4401 Harrison Blvd Ogden UT 84405	II	09/01/1995	06/19/2014
Ogden Regional Medical Center 54475 S 500 E Ogden UT 84405		10/26/1983	09/09/2014
Utah Valley Regional Medical Center 1034 N 500 W Provo UT 84604		12/23/2008	11/11/2013
Dixie Regional Medical Center 1380 E Medical Center Dr St George UT 84790	III	12/17/2008	12/14/2013
Logan Regional Hospital 1400 N 500 E Logan UT 84341		10/15/2004	12/31/2013
St. Mark's Hospital 3900 S 1200 E Salt Lake City UT 84124		11/26/2012	11/25/2015
American Fork Hospital 170 N 1100 E American Fork UT 84003	IV	01/05/2012	01/04/2015
Bear River Valley Hospital 905 N 1000 W Tremonton UT 84337		08/04/2006	08/31/2015
Brigham City Community Hospital 950 S Hospital Way Brigham City UT 84302		08/19/2010	07/31/2013
Cache Valley Specialty Hospital 2380 N 400 E North Logan UT 84341		05/23/2011	05/22/2014
Moab Regional Hospital 719 W 400 N Moab UT 84532	IV	12/18/2008	12/14/2013

Hospital	Level	Designation Date	Expiration Date
Mountain View Hospital 1000 E 100 N Payson UT 84651		01/01/2012	01/03/2016
Park City Medical Center 900 Round Valley Dr Park City UT 84060		10/23/2010	10/22/2013
Timpanogos Regional Hospital 750 W 800 N Orem UT 84057		09/20/2011	09/19/2014
Uintah Basin Medical Center 250 W 300 N Roosevelt UT 84066		12/15/2007	12/14/2013
Fillmore Community Medical Center 674 S Hwy 99 Fillmore UT 84631	V	01/26/2012	01/25/2015

Appendix E: Trauma Registry Data Elements

For a complete description of these elements, please visit the Utah Trauma Registry's Web site at http://www.utahtrauma.org/.

Category	Data Element
Demographic Data	Database Record Number Institution ID Number Medical Record Number Social Security Number Sex Date of Birth Age Number and Units Patient's Home Country Patient's Home State Patient's Home County Patient's Home City Patient's Home Zip Code Alternate Home Residence Race Ethnicity
Event Data	Date of Injury Time of Injury Trauma Type (Blunt, Penetrating, or Burn Injury) Cause of Injury Code Work Related Patient's Occupational Industry Patient's Occupation Primary E-Code Location E-Code Additional E-Code Incident Location Zip Code Incident State Incident County Incident City Protective Devices Child Specific Restraint Airbag Deployment
Referring Hospital	Hospital Transfer Referring Hospital Referring Hospital Arrival Date Referring Hospital Arrival Time Referring Hospital Discharge Date Referring Hospital Discharge Time Transport Mode into Referring Hospital Referring Hospital Admission Type Referring Hospital Procedures Referring Hospital Pulse Rate Referring Hospital Respiratory Rate Referring Hospital Systolic Blood Pressure Referring Hospital GCS - Eye Movement

Category	Data Element
	Referring Hospital GCS - Verbal Response Referring Hospital GCS - Motor Response Referring Hospital GCS Assessment Qualifiers Referring Hospital GCS - Total
Pre-Hospital Information	Transport Mode into Hospital Other Transport Mode EMS Agency EMS Origin EMS Notify Time EMS Notify Date EMS Respond Time EMS Respond Date EMS Unit Arrival on Scene Time EMS Unit Arrival on Scene Date EMS Unit Scene Departure Time EMS Unit Scene Departure Date EMS Destination Arrival Time EMS Destination Arrival Date EMS Destination EMS Trip Form Received Initial Field Pulse Rate Initial Field Respiratory Rate Initial Field Systolic Blood Pressure Initial Field Oxygen Saturation Initial Field GCS - Eye Movement Initial Field GCS - Verbal Response Initial Field GCS - Motor Response Initial Field GCS Assessment Qualifiers Initial Field GCS - Total
Emergency Department/ Hospital Information	Admit Type Admit Service ED/Hospital Arrival Date ED/Hospital Arrival Time ED Admission Time ED Admission Date ED Discharge Time ED Discharge Date ED Discharge Disposition Transfer Reason ED Transferring EMS Agency ED Discharge Destination Hospital Inpatient Admission Time Inpatient Admission Date Hospital Discharge Time Hospital Discharge Date Hospital Discharge Disposition Hospital Discharge Destination Hospital Hospital Discharge Transferring EMS Agency Outcome Initial ED/Hospital Pulse Rate Initial ED/Hospital Temperature

Category	Data Element
	Initial ED/Hospital Respiratory Rate Initial ED/Hospital Respiratory Assistance Initial ED/Hospital Oxygen Saturation Initial ED/Hospital Supplemental Oxygen Initial ED/Hospital Systolic Blood Pressure Initial ED/Hospital GCS-Eye Initial ED/Hospital GCS-Verbal Initial ED/Hospital GCS-Motor Initial ED/Hospital GCS Assessment Qualifiers Initial ED/Hospital GCS-Total Revised Trauma Score Total Alcohol Use Indicator Drug Use Indicator Inpatient Length of Stay Total ICU Length of Stay Total Ventilator Days Primary Method of Payment Hospital Complications
Hospital Procedure Information	Hospital Procedures Hospital Procedure Start Date Hospital Procedure Start Time
Diagnosis Data	ICD9 Diagnosis Codes Co-Morbid Conditions
Injury Severity Information	Abbreviated Injury Scale (AIS) Score AIS Predot Code ISS Body Region AIS Version Locally Calculated ISS

Reference List

American College of Surgeons. (2006). Resources for optimal care of the injured patient. Chicago, IL.

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Health Resources and Services Administration. (2006). Model Trauma System Planning and Evaluation. Washington, D.C.