Utah Trauma Update:
Over/Under Triage in Utah

January 1, 2007 | **Under-Triage** | **Utah Department of Health**

Introduction

Trauma systems are designed to facilitate the transport of injured patients to hospitals certified to provide the necessary services and expertise to treat a patient's specific injuries. An important component should ensure that seriously injured patients are treated in hospitals certified as Level I or Level II trauma centers (the highest level of trauma care available).

Using information from the Utah Statewide Trauma Registry, this fact sheet describes patients with serious injuries presenting to local hospitals and *not* transported to a Level I or Level II trauma center (referred to as "under-triage") and patients with less severe injuries presenting to local hospitals *who were* transported to a Level I/II trauma center (referred to as "over-triage"). Both situations represent a potentially inappropriate use of resources that may affect patient outcomes.

For the purposes of this fact sheet, trauma patients are considered *seriously injured* if they present with injuries characterized by an Injury Severity Score (ISS) greater than 15 and *less severely injured* if they present with an ISS score less than (or equal to) 15. An ISS score defines a patient's injuries by ranking the severity of the three most prominent injuries for each patient.

Under-Triage of Trauma Patients in Utah

Between 2001 and 2003, 43% (315/727) of patients with serious injuries (ISS>15) presenting to local hospitals were *not* immediately transferred to a Level I/II trauma center. **Figure 1** indicates that most patients were admitted to the floor (51%), ICU (26%) or operating room (14%). Among these patients admitted to local hospitals (n = 315), 9% were eventually transferred to a Level I/II trauma center and 10% died during their hospital stay (**Figure 2**). The in-hospital death rate for similarly injured patients immediately transferred to a Level I/II trauma center is 7%.

It is interesting to note that among the 32 seriously injured patients who died during their hospital stay in non-designated hospitals, 91% had suffered an injury to the head (i.e., closed head injury [see **Figure 3**]) and were on average quite seriously injured (average ISS = 29 ± 17). The bulk of fatal injures were due to a fall (59%) or motor vehicle crash (34%).

Figure 1. Admission status after initial treatment in the emergency department, ISS > 15, Utah, 2001-2003.

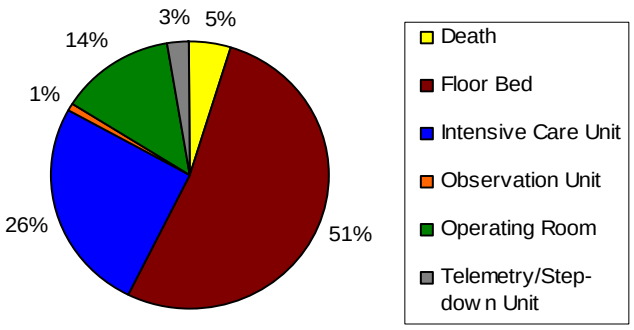


Figure 2. Discharge status from non-designated hospital, ISS > 15, Utah, 2001-2003.

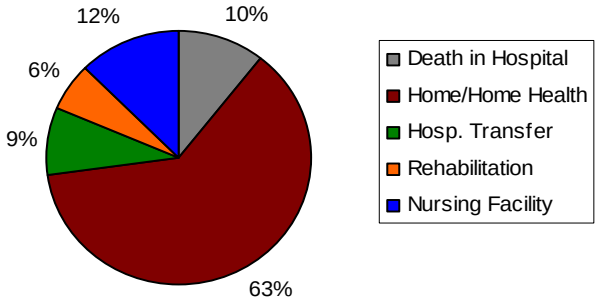
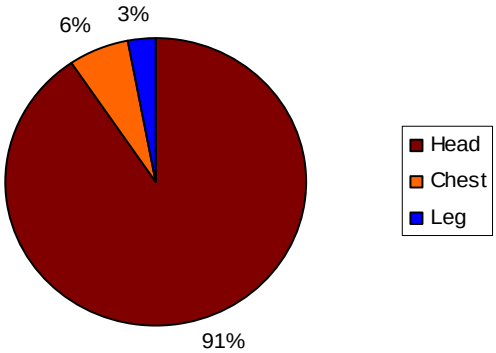


Figure 3. Site of injury among patients who died in non-designated hospitals, ISS > 15, Utah, 2001-2003.



Over-Triage of Trauma Patients in Utah

While under-triage of trauma patients can directly affect patient outcomes, over-triage of trauma patients may lessen trauma center effectiveness by saturating Level I and II trauma centers with patients suffering less severe injuries. Most importantly, over-triage robs local hospitals of valuable experience and needed revenue. These factors can indirectly affect the quality of care received by all trauma patients across the state, regardless of injury severity.

Between 2001 and 2003, 14% (2,134/15,532) of patients with less severe injuries (ISS $\leq$ 15) presenting to local hospitals were then transferred to a designated trauma center (over-triage). This number (2,134) suggests that almost seven times the number of patients are over-triaged than are under-triaged (315).

The map in **Figure 4** illustrates the number of patients with less severe injuries (per 1,000) that are over-triaged in each county. The map also identifies the location of local hospitals (red dots) and the location of Level I/II trauma centers in Salt Lake and Weber counties. Interestingly, many counties with higher rates of over-triage are geographically distant from designated trauma centers, suggesting lengthy ground or air transports for less severe injuries.

Among the patients over-triaged to designated trauma centers (n = 2,134), 8% were discharged from the emergency department and another 57% spent less than one day in a general floor or observation bed. Almost 95% of all over-triaged patients were transported to a Level I facility. **Figure 5** suggests that 40% of patients arriving at a Level I facility were discharged to home within one day of arrival.

Conclusions:

These findings suggest that improvements in transfer decision-making could ensure that injured patients receive timely treatment in appropriate facilities with improved outcomes, resource savings, and reduced costs to patients. Two programs that may aid in transfer decision-making include: 1) standardized pre-hospital triage and transport guidelines (helping EMS determine the appropriate hospital to treat the patient) and; 2) hospital inter-facility transfer agreements, defining when and under what circumstances a stabilized patient should be transferred to a higher level of care.

Figure 4. Average over-triage rate (by county) of less-severely injured patients per 1000 trauma registry patients per year, 2001-2003

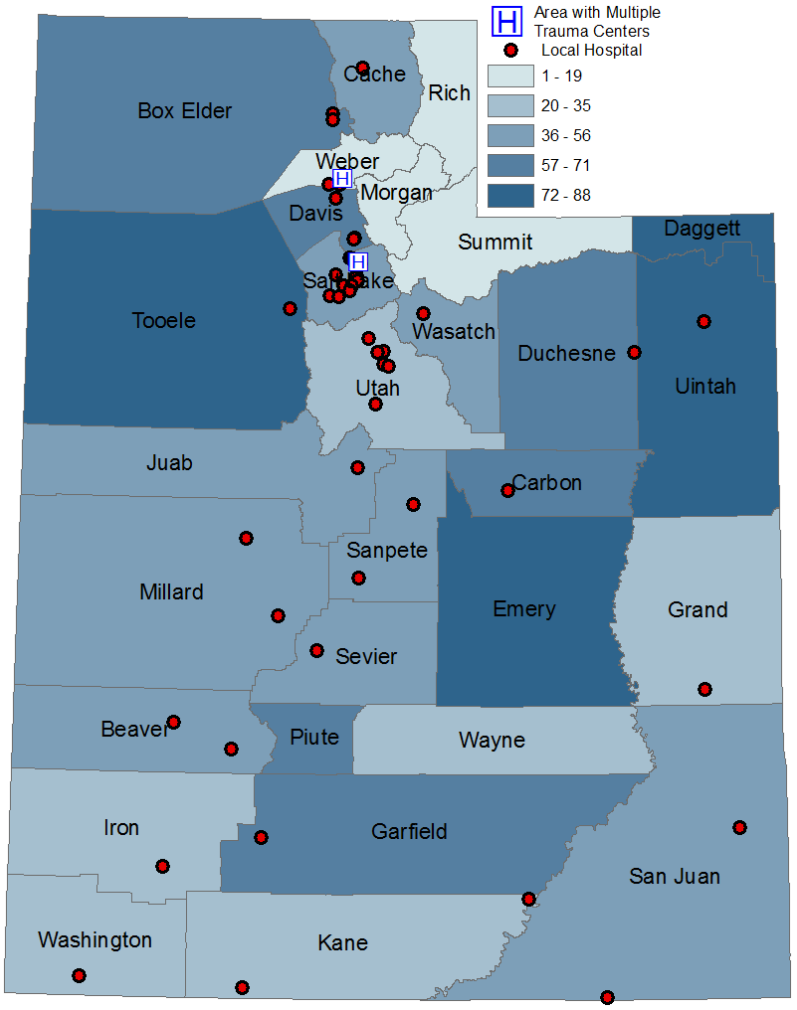


Figure 5. Length of stay for patients with minor injuries transferred to Level-1 trauma centers, Utah, 2001-2003.