Utah Trauma Update

Urban Transport Times: Air vs. Ground EMS

October 8, 2008 **Utah Department of Health**

Introduction

Death rates from injury are higher in rural areas of Utah when compared to urban areas. This increased death rate may be due, in part, to longer response times for an ambulance to arrive and transport a patient to a hospital. In rural areas, medical helicopters can save lives by transporting patients more quickly to an appropriate hospital.[1]

However, the ability of medical helicopters to reduce transport times for injured patients in urban areas is less clear. Research done in California suggests that patients injured relatively close to a hospital may not arrive faster when transported by helicopter compared to a ground ambulance.[2]

The purpose of this fact sheet is to compare helicopter and ambulance transport times for patients injured within 15 miles of a Level-1 trauma center in Salt Lake County. Only patients injured in 18 ZIP codes (within 15 miles of a Level-1 trauma center) were included in the study (see Figure 1). Various elapsed times from injury to arrival at a trauma center are compared for patients transported by helicopter and ground ambulance.

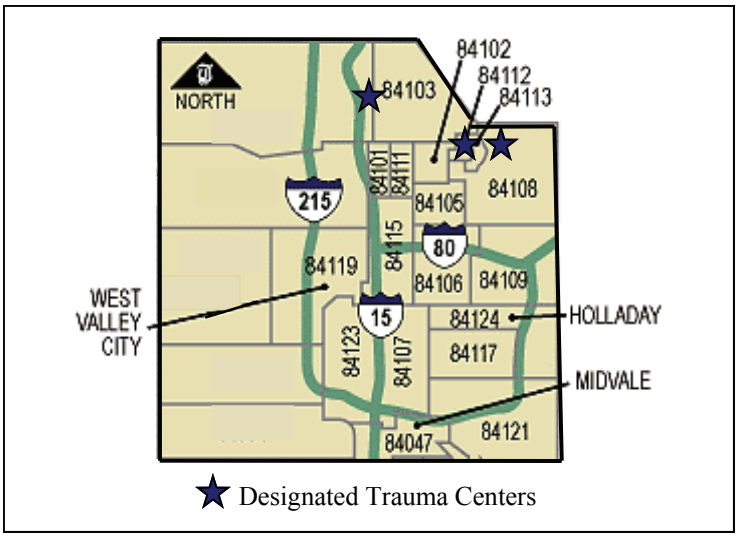
Helicopter Use Within 15 Miles of a Trauma Center

The Utah Trauma Registry includes information for 2,933 patients seriously injured in 18 ZIP codes within approximately 15 miles of a Level-1 trauma center from 2001 through 2005. Of these patients, 25% (726) were transported from the scene of injury to a hospital using a helicopter.

Ground and Air EMS Response Time

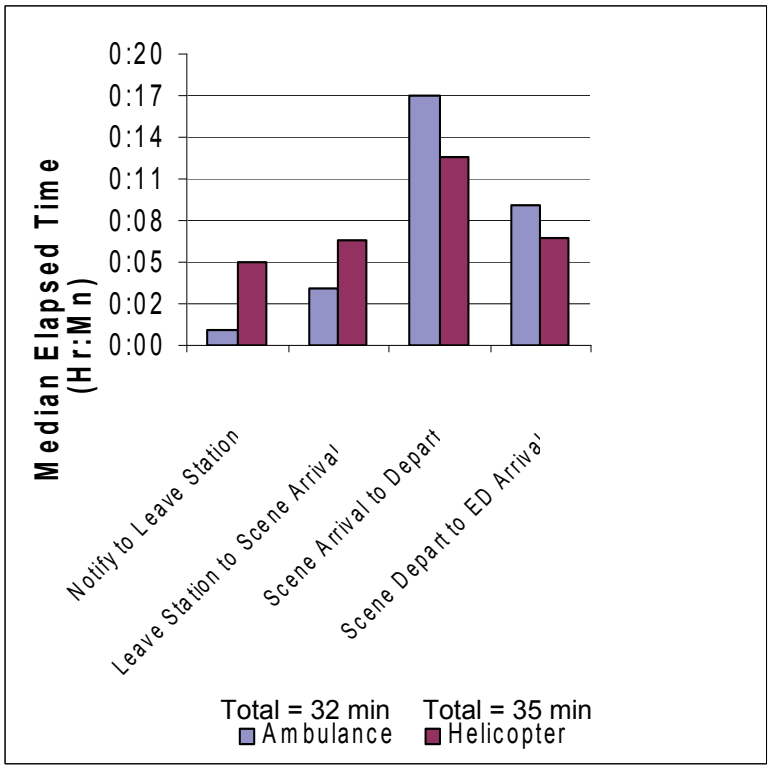
Because elapsed times are poorly represented by averages, we use median values. Using the same patients from the 18 ZIP codes, Figure 2 compares elapsed time periods reported by emergency responders. Time information is drawn directly from ambulance and helicopter run sheets. The data suggest that ground ambulances, which are stationed at many locations around the valley and are very quickly dispatched, often required less time to

Figure 1 ZIP codes including areas ≤ 15 miles from a Level-1 Trauma Center in Salt Lake County.



Note: Included ZIP codes may incorporate some locations greater than 15 miles from a Level-1 Trauma Center. Exact injury addresses were not available. Thus, entire ZIP code areas were included in the analysis.

Figure 2 Comparison of patient care transport times from the scene of injury by ambulance or helicopter



reach a patient compared to helicopters, which are stationed at only two locations and require more time to launch after dispatch.

Helicopters appear to spend less time on the scene. However, scene times are difficult to assess since helicopters may not be dispatched until after the patient is assessed and care is initiated by a ground EMS crew. Once the patient was ready for transport, helicopters did deliver the patient to the hospital about 2 minutes faster, compared to ground transport. Considering all time segments, the median time of helicopter transport (35 min.) was essentially equal to that of ground transport (32 min.) for incidents within 15 miles of a trauma center.

Patients' Injury Severity

It should be noted that patients transported to the hospital by helicopter were treated in the emergency department (ED) much more quickly when compared to patients transported by ambulance ($p < 0.001$, see Figure 3). Patients transported by helicopter were more severely injured and were also twice as likely to die during hospitalization compared to patients transported by ambulance ($p < 0.001$, Figure 4). In addition, helicopter teams can provide advanced airway and trauma care at the scene of the injury.

Limitations

Factors affecting transport decisions (traffic congestion, weather, access to interstate ramps, and exact injury location) were not available for consideration in this fact sheet. Also, it should be noted that the data were gathered prior to the moving of one of the helicopter services to Intermountain Medical Center, located centrally in the Salt Lake Valley.

Conclusion

Past research indicates that medical helicopter transport of severely injured patients from rural areas to trauma centers reduces overall transport time. In urban areas of Salt Lake County (within 15 miles of a trauma center), a look strictly at transportation times demonstrates little difference between helicopter and ground transport times. Multiple factors, including injury severity and the need for advanced medical care at the scene of the injury, contribute to the decision to call for helicopter transport of trauma patients.

Figure 3 Elapsed time spent in the emergency department after transport from the scene of injury

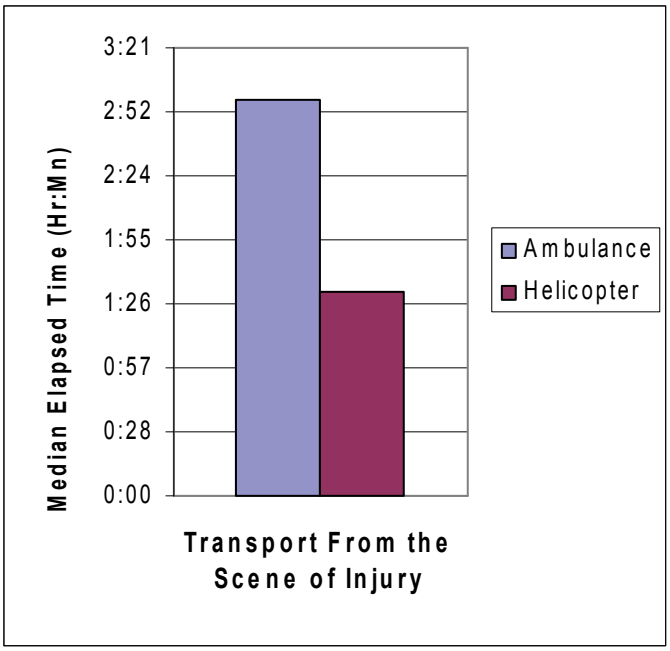
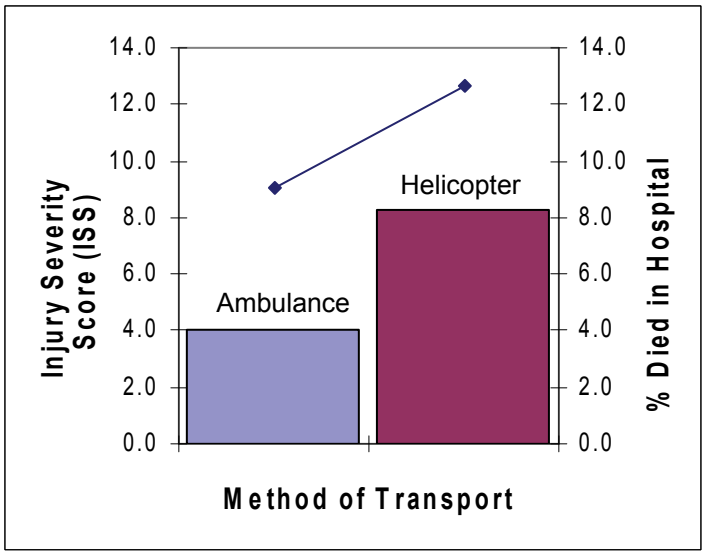


Figure 4 Comparison of injury severity (line) and in-hospital deaths (bars) by type of transport from the scene



Footnote:
An ISS score defines a patient's injuries by ranking the severity of the three most prominent injuries for each patient. A score greater than 15 is considered moderate to severe injuries.

References:
1. Cunningham P, Rutledge R, Baker CC, Clancy TV. A comparison of the association of helicopter and ground ambulance transport with the outcome of injury in trauma patients transported from the scene. *J Trauma*. 1997;43:940-6.

2. Diaz MA, Hendey GW, Bivins HG. When is the helicopter faster? A comparison of helicopter and ground ambulance transport times. *J Trauma*. 2005;58:148-53.