

# Utah Trauma Update: *Medical Helicopter Use in Salt Lake County*

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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 is due, in part, to longer response times for an ambulance to arrive and transport a patient to the hospital. In rural areas, medical helicopters save lives by transporting patients more quickly to an appropriate hospital.<sup>1</sup>

However, the effectiveness of medical helicopter use in urban areas is less clear. Research suggests that patients injured relatively close to a hospital may not benefit from an air transport compared to a ground transport to the hospital.<sup>2</sup>

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

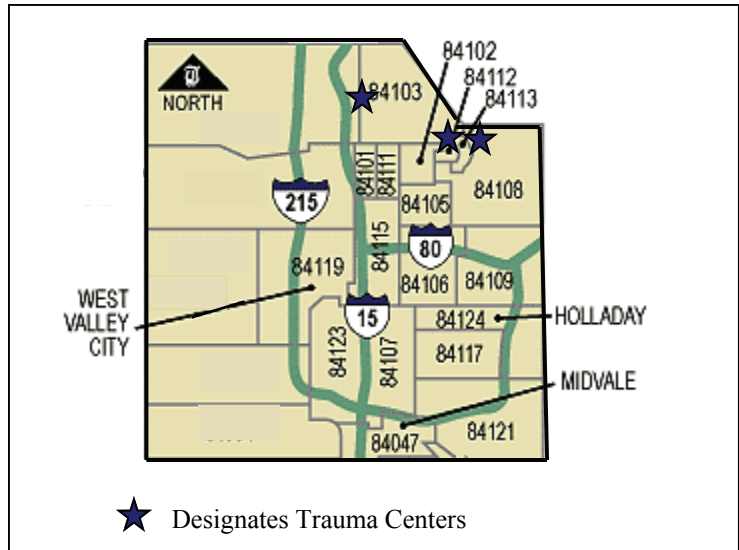
## How Often Are Helicopters Used in Nearby ZIP Codes?

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 using a helicopter.

## Do Helicopters Get to the Hospital Faster?

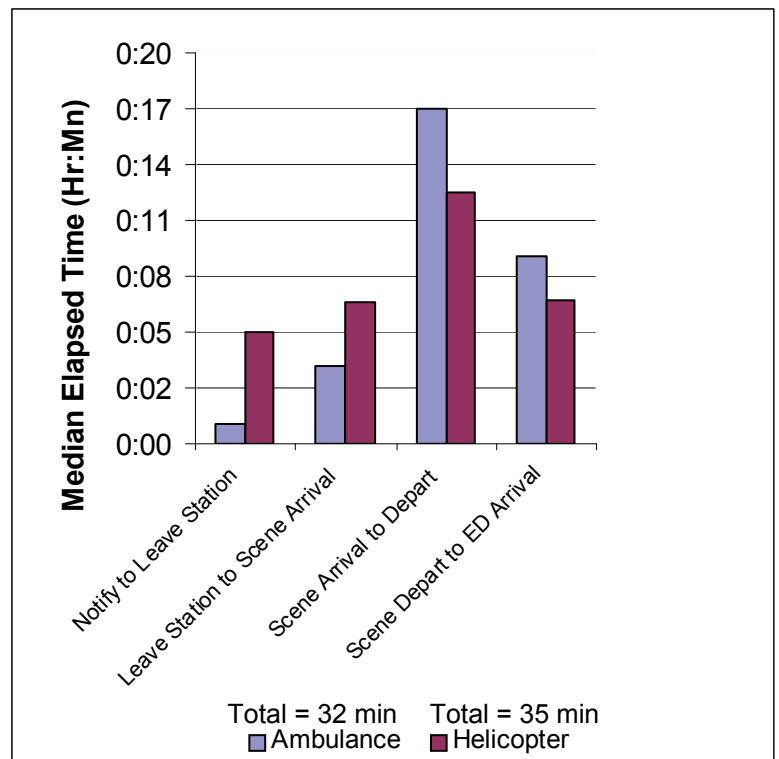
Because elapsed times are poorly represented by averages, we use median values. A median is simply the middle number in a group of ordered numbers, half are bigger and half are smaller. Using the same patients from the 18 ZIP codes, Figure 2 compares elapsed time periods reported by

**Figure 1** ZIP Codes including areas  $\leq$  15 miles from the Level-1 Trauma Center in Salt Lake County.



Note: Outlying ZIP codes may include some locations greater than 15 miles from a Level-1 Trauma Center. These locations could not be specifically identified and were, therefore, included in the analysis.

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



emergency responders. Time information is drawn directly from ambulance and helicopter run sheets. The Figure suggests that ground ambulances often required less time to reach a patient compared to helicopters, probably because helicopters need an additional 5+ minutes to warm up, lift off the ground and are then traveling only short distances. Helicopters spent less time on the scene. However, in most cases, other emergency responders have already stabilized and prepared the patient for air transport. Thus, Figure 2 under-estimates actual patient scene time for helicopter transports and over-estimates scene time for ambulance crews who often wait for the helicopter to arrive. Once the patient was prepared 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 slightly longer compared to ground transport (32 min.) for incidents within 15 miles of a trauma center.

### Do Patients Have Better Outcomes With Helicopter Transport?

It is interesting to note that patients transported to the hospital by helicopter were treated in the emergency department (ED) much quicker, compared to patients transported by a 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).

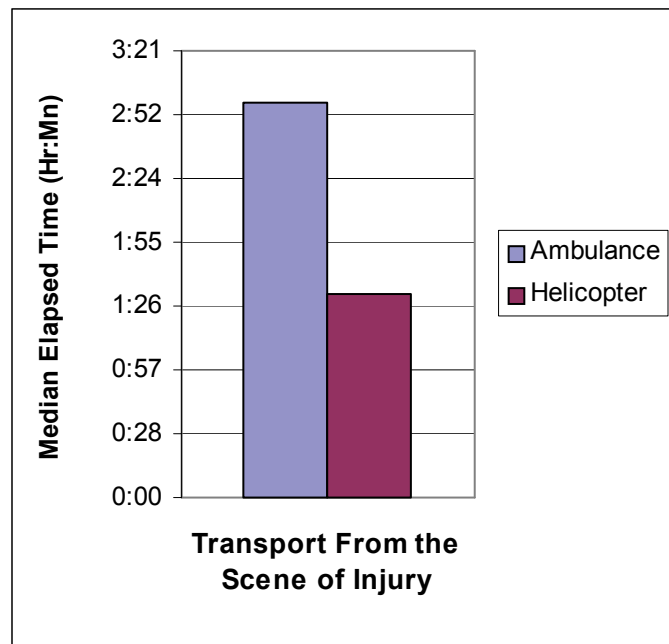
### Conclusion

Past research indicates that medical helicopter transport of severely injured patients from rural areas to trauma centers saves lives. However, helicopter use in urban areas of Salt Lake City (within 15 miles of a trauma center) may not be beneficial to injured patients. Our findings suggest that helicopter transports in 18 ZIP code areas were not faster than ground transport. In addition, a cursory look at patient outcome does not suggest a benefit to survival with helicopter transport.

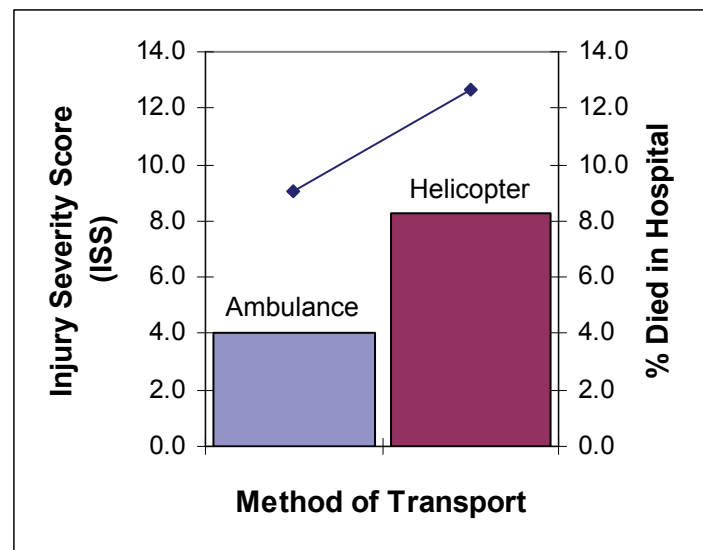
#### References:

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.

**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



*Footnotes:*

- a) 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.
- b) Figure 2 defines four patient care response times: 1) the time from 911 call to leaving the EMS station; 2) the time from leaving the EMS station to arriving on the scene; 3) the time from arrival on scene to leaving the scene and; 4) the time from leaving the scene to arriving at the trauma center.