



Figure 1: Components of Prehospital Time

### INTRODUCTION

There were 34,439 fatal motor vehicle collisions in the United States in 2016.<sup>1</sup> A significant proportion of these fatalities could possibly have been prevented by faster response times and better emergency medical care. Therefore, the Towards Zero Deaths Steering Committee, comprised of highway safety stakeholders, identified improvements to emergency medical services as a key area in its national safety strategy.<sup>2</sup>

Prehospital time is the time between a motor vehicle collision and arrival of the patient at the hospital. It consists of several components, as shown in Figure 1.

### IMPORTANCE OF PREHOSPITAL TIME

There is widespread belief in the significance of the ‘golden hour’ immediately following an injury, during which time resuscitation, stabilization and transport to a medical facility offer the greatest chance of survival for a patient.<sup>3</sup>

By reducing prehospital time, more advanced medical care can be provided sooner, with the goal of reduced mortality. However, there is a lack of conclusive research on whether the golden hour is important for all types of injuries.

In some cases in which patients must be treated prior to transfer to a hospital or trauma center, reduced prehospital time may have a negative impact on their health outcomes, especially if necessary treatment is deferred for the sake of getting the patient to the hospital as quickly as possible.

It is likely that reducing prehospital time below a certain threshold will lead to diminishing returns for patient survival. For example, patient outcomes may be similar for prehospital times below 15 minutes—meaning that a reduction in prehospital time from 15 minutes to 10 minutes may not change patient outcomes enough to justify the cost of the reduction.

### FACTORS AFFECTING PREHOSPITAL TIME

#### Incident Notification and Dispatch

- Traditional incident notification requires a witness or someone involved in the collision to make a 911 call. If no one is capable of making an emergency call, the discovery time can be dangerously long.
- Traditional 911 systems can identify a caller’s location automatically only in calls made from landlines.<sup>2</sup> Enhanced 911 systems have the ability to accurately locate calls made from cell phones, and can identify the nearest emergency call center. However, this system has not yet been fully implemented nationwide.

#### Differences in Rural/Urban Accessibility

- Only 19 percent of the United States population resides in rural areas, yet over half of all traffic fatalities involve rural motor vehicle collisions. In 2011, a total of 75 percent of drivers who were injured in motor vehicle collisions and died during transport to the hospital were in rural areas.<sup>4</sup> This could be due to the relative inaccessibility of trauma centers in rural areas.

#### Land Use

- Urban sprawl is associated with longer EMS response time.<sup>5</sup>

### FACTORS AFFECTING PREHOSPITAL CARE

Without proper triage, EMS agencies cannot effectively prioritize which resources to provide to which patients. The EMS vehicle closest to the scene may lack the necessary equipment to address a particular emergency. Although sending the closest vehicle may result in the shortest response time, comprehensive telephone triage that identifies the tools needed for the situation prior to deciding which vehicle to send could improve patient survival, even while increasing prehospital times.<sup>6</sup>

Telemedicine—the provision of medical services via information and communication technologies to remotely located healthcare workers and patients—may improve the quality of care that a patient receives at the scene. However, there is little research on the impact of telemedicine on trauma management.

### RECOMMENDATIONS

- Conduct more research on whether prehospital time is significantly related to patient outcome following a motor vehicle collision.
- Reduce time between collision and EMS notification by implementation of automatic crash detection technologies in vehicles with the ability to accurately estimate injury severity and directly communicate with EMS dispatchers. This could also improve triage by notifying dispatchers when specialized services such as vehicle extraction are necessary.
- Investigate the impact of telemedicine on triage and on-scene patient treatment.
- Reduce response time by positioning EMS vehicles for better access to potential collisions
- Strategically locate trauma centers within one hour of any location in the nation, thus reducing transport time.

### CONCLUSION

Although further research is necessary, reducing prehospital time may improve patient outcomes following a motor vehicle collision. Prehospital time consists of the time between the incident and EMS notification, the time between EMS dispatch and arrival on scene, the time spent at the scene, and the time spent traveling from the crash scene to the hospital. Each of these time periods can be reduced, although the benefit relative to the cost of doing so has not yet been determined.

### REFERENCES

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