

# Research Note

From the WSDOT  
Research Office  
February 2008



## Managing Pedestrian Safety I: Injury Severity

Each year an average of 85 pedestrians are involved in fatal collisions in Washington. In 2007, the Governor set a goal for traffic accidents called [Target Zero](#) and developed strategies to minimize and hopefully, eliminate fatalities. This study is part of the effort to better understand the cause of accidents by examining the relationships between road (state route only), community characteristics, and risk of collisions occurring between pedestrians and motor vehicles.

### **Understanding pedestrian collisions is a key to reducing the risk of injuries and death**

To be effective, safety programs and policies aimed at reducing the risk of pedestrian injuries and deaths need to be based on solid research that tells us where, why, how, and when collisions occur. For this study, we focused on the severity of collisions involving pedestrians and motor vehicles; looked at environmental

characteristics; and took into account land use at or near the collision site to determine how those factors correlate. We geo-coded pedestrian-collision data to indicate its location, and plotted the collision sites on a map. This allowed us to identify trends and collision “hot spots” and to examine land use near these locations. Hot spots are locations with higher than average risk of collision in a concentrated area. The report also included a thorough review of previous research and literature on the subject.

### **We focused on King County, which has the highest pedestrian collision rate in the state**

For our analysis of pedestrian injury severity, our study focused on pedestrian-vehicle collisions on state routes within King County. King County accounts for approximately 28 percent of the state’s population, and yet it has 44 percent of the state’s pedestrian collisions, 34 percent of pedestrian fatalities, and 41.7

percent of disabling pedestrian injuries. Data came from police records processed by the Washington State Department of Transportation (WSDOT) from 1999 to 2004. Those records included data on road characteristics, traffic conditions, and land uses at or near collision sites. The study also considered variables at the individual level including information related to age and sobriety of the pedestrian, when available.

### **Two strong associations emerged in severe injury and fatal collisions**

The result of this analysis showed that fatal and high-injury pedestrian collisions were strongly and significantly associated with two factors:

1. Severe injuries were more likely to occur with vehicles moving straight ahead on the roadway, versus turning vehicles and all other types of vehicle actions. This study established a connection between speed and severity of pedestrian



collisions by demonstrating that vehicles moving straight ahead are typically moving faster, and therefore collisions are more likely to be severe.

2. Pedestrians crossing at unmarked and unsignalized intersections were almost four times more likely to be injured or die than when crossing at walk ways, signalized intersections or walking along the roadway. This is especially true in multi-lane roadway settings with nearby retail attractions.

#### **The researcher's recommendations**

There was a lack of association between injury severity and collision frequency. This result suggests that locations with high severity of injuries are not necessarily the same locations as those with high collision frequency. Therefore, safety programs that are intended to reduce the number of collisions and those intended to reduce the risk of severe injury and death should use different approaches.

We've learned that there are a series of treatments that should be applied at crossings on multiple-lane roads in urban areas where there are retail areas such as groceries, restaurants and other retail outlets. Those treatments go beyond placing a striped crossing and may include such things as medians, lighting and pedestrian-activated signals.

Vehicle speeds data are not recorded in pedestrian crashes as a standard. Better reports and data on vehicular speed at the time of collision, and on the type of vehicles involved in pedestrian collisions, would help to inform effective future safety programs, policies, and standards.

#### **Summary of implementation:**

The information gained from this research will aid the Washington State Department of Transportation as it updates its [State Bicycle and Pedestrian Plan](#) and builds a prioritized list of non-motorized projects. Pedestrian collision "hot spots" will be considered as part of the prioritization process.

WSDOT is currently using the research to select hot spots for further study and to develop treatments that reduce collisions.

Knowledge gained will contribute to future traffic safety programs, policies and standards.

#### **Report Title and WARD #**

Managing Pedestrian Safety I: Injury Severity - WA-RD 671.1  
<http://www.wsdot.wa.gov/research/reports/fullreports/671.1.pdf>

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