The Severity of Pedestrian Injuries in Alcohol-Related Collisions

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The California Statewide Integrated Traffic Reporting System (SWITRS) database categorizes pedestrian injuries into four broad categories: fatal, severe, visible injury, and complaint of pain. “Fatal” denotes death within 30 days of the incident. For the purposes of this study, visible injury and complaint of pain were grouped together under the designation “Minor Injury.” “DUI collisions” denote those incidents in which the driver was cited for driving while intoxicated. “Alcohol-related” refers to incidents in which the reporting officer suspected either the driver or pedestrian victim of being intoxicated, and recorded this under a “had been drinking” designation.

The purpose of the study was to assess how much alcohol and substance use increase severity of injury among affected pedestrians and to compare the strength of such contributions. Using the two severity designations, “Fatal” and “Minor,” in which severe but not fatal injuries are excluded, odds ratios (from a multivariate analysis) were calculated for incidents involving various types of driver and pedestrian behaviors, including DUI and pedestrian intoxication. Odds ratios show the magnitude of risk for either a “fatal” or “minor” injury in each situation, relative to the baseline category of “Other pedestrian violation,” which is given the odds ratio of one.

Report partially abstracted from:
San Francisco pedestrian injury surveillance: mapping, underreporting, and injury severity in police and hospital records. Stanley Sciortino, MPH, PhD; Mary Vassar, RN, MS; Michael Radetsky, MPH; M. Margaret Knudson, MD. Accident Analysis and Prevention, 2005, In Press.

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RESULTS:

DUI Violations:

- Collisions that occurred when the driver was under the influence of drugs or alcohol were nearly 3 times as likely to result in fatal injury to the pedestrian when compared to incidents involving a pedestrian violation (See Figure 1, Table 1). In collisions where the driver was speeding or driving under the influence, or where the pedestrian was intoxicated, injury to the pedestrian tended to be more severe compared to incidents involving other types of traffic violations.

Odds Ratio of Fatal Injury vs. Minor Injury by Type of Violation

From logistic model, controlling for victim age & sex, lighting, and vehicle movement.

Figure 1
Table 1. SWITRS 1990-2003 for San Francisco

<table>
<thead>
<tr>
<th>Violation Category</th>
<th>Fatal vs. Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>Ped. right-of-way violated</td>
<td>0.8</td>
</tr>
<tr>
<td>Driver violates sign/signal</td>
<td>0.9</td>
</tr>
<tr>
<td>Driver speeding</td>
<td>1.7</td>
</tr>
<tr>
<td>Other driver violation</td>
<td>0.5</td>
</tr>
<tr>
<td>DUI</td>
<td>2.9</td>
</tr>
<tr>
<td>Pedestrian intoxicated</td>
<td>5.4</td>
</tr>
<tr>
<td>Other pedestrian violation</td>
<td>1</td>
</tr>
</tbody>
</table>

*Violation controlled by age, sex, race, lighting, vehicle movement in a multivariate logistic regression model.

Pedestrians Under the Influence:

- Collisions involving pedestrians who were under the influence of drugs of alcohol were strongly correlated with pedestrian fatalities; in such cases, the odds of pedestrian fatality vs. minor injury were 5 times greater than for incidents involving other types of violations (See Figure 1, Table 1).

However, it is likely that intoxication among pedestrians in non-fatal incidents may be underreported; while the San Francisco Office of the Chief Medical Examiner tests a high proportion of the deceased for the presence of drugs or alcohol, non-fatally injured pedestrians are infrequently tested.

- The San Francisco Office of the Chief Medical Examiner often tests for the presence of drugs or alcohol in the deceased. Among 66 pedestrian fatalities in 2000 and 2001, 19% were found to have drugs present in their blood. A Blood Alcohol Concentration (BAC) equal to or exceeding 0.08%, the legal threshold for a DUI, was found in 12% of the victims. Additionally, three pedestrians, or 4% of the total deceased, were found to have both alcohol and drugs in their bodies (See Figure 2).
All Alcohol-Related Collisions:

- Pedestrians were more likely to die in collisions involving alcohol. Among all pedestrian fatalities, 24% were caused by incidents involving alcohol, including either DUI or intoxicated pedestrians, while among non-fatal pedestrian injuries, 11% resulted from accidents involving alcohol (See Figure 3).

- In collisions involving alcohol, including either DUI or intoxicated pedestrians, pedestrians were more likely to die. Pedestrian fatalities occurred in 6% of accidents involving alcohol, compared to 2% in accidents in which no alcohol was involved (See Figure 4).

- In collisions where alcohol was involved, including either DUI or intoxicated pedestrians, pedestrians made up 44% of all traffic fatalities (including drivers, passengers, and pedestrians) and only 17% of survivors (See Figure 5).
Pedestrian Fatalities and Non-Fatal Injuries in Collisions Involving Alcohol 1992 through 2003

Fatal Injuries (n = 328)
- Alcohol 24%
- No Alcohol 76%

Non-Fatal Injuries (n = 12,240)
- Alcohol 11%
- No Alcohol 89%

Source: California Statewide Integrated Traffic Reporting System

Figure 3

Pedestrian Fatalities in Collisions Involving Alcohol* 1992 through 2003

Alcohol Involved (n = 1382)
- Fatal 6%
- Non-Fatal 94%

No Alcohol (n = 11,186)
- Fatal 2%
- Non-Fatal 98%

•Includes Intoxicated Pedestrians

Source: California Statewide Integrated Traffic Reporting System

Figure 4
Drivers, Passengers vs. Pedestrian Survival in Collisions Involving Alcohol* 1992 through 2003

<table>
<thead>
<tr>
<th>% of Fatalities/Non-Fatalities</th>
<th>Fatal</th>
<th>Non-Fatal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrians</td>
<td>99</td>
<td>6311</td>
</tr>
<tr>
<td>Driver/Passengers</td>
<td>78</td>
<td>1304</td>
</tr>
</tbody>
</table>

*Includes intoxicated pedestrians or drivers.

Source: California Statewide Integrated Traffic Reporting System

Figure 5

Conclusion:

Motor vehicle-pedestrian collisions in which the driver is driving under the influence of alcohol or drugs present a higher likelihood that the pedestrian will be killed compared to accidents that do not involve alcohol or drugs, even those in which the driver is speeding.

Collisions in which the pedestrian is intoxicated are also likely to result in a fatality, but this result may be biased. Due to thorough reporting of intoxication in fatally injured pedestrians compared with underreporting of intoxication in pedestrians who survive a collision, we don't know how often survivors were intoxicated.

The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of the State of California, the National Highway Traffic Safety Administration, or the Federal Highway Administration.