Characteristics of Child Passenger Deaths and Injuries Involving Drinking Drivers

Kyran P. Quinlan, MD, MPH
Robert D. Brewer, MD, MSPH
David A. Sleet, PhD
Ann M. Dellinger, PhD, MPH

Motor vehicle–related injury is the leading cause of death for children and young adults aged 1 to 24 years in the United States. From 1985-1996, 24% of motor vehicle–related deaths among children involved alcohol; 68% of these alcohol-related deaths involved motor vehicle occupants. While the relation of alcohol to the traffic deaths of teenaged drivers is well established, there is little information on the role of alcohol in the traffic deaths of younger passengers. In a summary of 1997 traffic safety statistics, the National Highway Traffic Safety Administration (NHTSA) reported that nearly half of the alcohol-related child traffic deaths involved child passengers riding with drivers who had been drinking alcohol. However, this analysis did not separately consider the alcohol-related deaths of child passengers, pedestrians, and bicyclists.

Our recent brief report used national crash data to examine alcohol involvement in the deaths of child passengers, pedestrians, and bicyclists. However, we did not specifically evaluate the characteristics of drinking driver–related child passenger deaths. The only other work we have found that provides any detail on alcohol-related child passenger deaths involved a drinking driver; 67.0% of these drinking drivers were old enough to be the child’s parent or caregiver. Of these deaths, 3556 (64.0%) occurred while the child was riding with a drinking driver; 67.0% of these drinking drivers were old enough to be the parent or caregiver of the child. Of all drivers transporting a child who died, drinking drivers were more likely than nondrinking drivers to have had a previous license suspension (17.1% vs 7.1%) or conviction for driving while intoxicated (7.9% vs 1.2%). Child restraint use decreased as both the child’s age and the blood alcohol concentration of the child’s driver increased. In 1988-1996, an estimated 149000 child passengers were nonfatally injured in crashes involving a drinking driver. Of these, 58000 (38.9%) were riding with a drinking driver when injured in the crash.

Conclusions These data indicate that the majority of driving–related child passenger deaths in the United States involve a child riding unrestrained in the same vehicle with a drinking driver. Typically, the drinking driver transporting the child is old enough to be the child’s parent or caregiver.

Context Motor vehicle–related injury is the leading cause of death for children and young adults aged 1 to 24 years in the United States. Approximately 24% of child traffic deaths involve alcohol.

Objective To examine characteristics of crashes involving child passenger deaths and injuries associated with drinking drivers to identify opportunities for prevention.


Main Outcome Measures Child passenger death or injury by driver characteristics (eg, driver age, blood alcohol concentration, and driving history).

Results In 1985-1996, there were 5555 child passenger deaths involving a drinking driver. Of these deaths, 3556 (64.0%) occurred while the child was riding with a drinking driver; 67.0% of these drinking drivers were old enough to be the parent or caregiver of the child. Of all drivers transporting a child who died, drinking drivers were more likely than nondrinking drivers to have had a previous license suspension (17.1% vs 7.1%) or conviction for driving while intoxicated (7.9% vs 1.2%). Child restraint use decreased as both the child’s age and the blood alcohol concentration of the child’s driver increased.

METHODS

For deaths, we analyzed 1985-1996 data from the Fatality Analysis Reporting System. This database is maintained by the NHTSA and is a census of all police-reported motor vehicle crashes on public roadways that result in the death of at least 1 occupant or nonmotorist, such as a pedestrian or bicyclist, within 30 days of the crash. For drivers without available alcohol test results, the NHTSA estimates the distribution of blood alcohol concentrations in 1 of 3 categories (<2.17 mmol/L, 2.17-21.6 mmol/L, and ≥21.7 mmol/L). We used these estimates to calculate the proportion of child passenger deaths involving a drinking driver. We then used these estimates to calculate the proportion of child passenger deaths involving a drinking driver.

For crashes, we analyzed 1996 data from the Fatality Analysis Reporting System. This database is maintained by the NHTSA and is a census of all police-reported motor vehicle crashes on public roadways that result in the death of at least 1 occupant or nonmotorist, such as a pedestrian or bicyclist, within 30 days of the crash. For drivers without available alcohol test results, the NHTSA estimates the distribution of blood alcohol concentrations in 1 of 3 categories (<2.17 mmol/L, 2.17-21.6 mmol/L, and ≥21.7 mmol/L). We used these estimates to calculate the proportion of child passenger deaths involving a drinking driver. We then used these estimates to calculate the proportion of child passenger deaths involving a drinking driver.

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Table 1. Driver Blood Alcohol Concentration and Driver Status in Crashes Involving Child Passenger Deaths, United States, 1985-1996

<table>
<thead>
<tr>
<th>Driver Blood Alcohol Concentration, mmol/L†‡</th>
<th>Status of Drinking Driver in Fatal Crash</th>
<th>Total Child Passenger Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.17-21.6‡</td>
<td>Transporting Child, No. (%)</td>
<td>1757</td>
</tr>
<tr>
<td></td>
<td>Not Transporting Child, No. (%)</td>
<td></td>
</tr>
<tr>
<td>2.17‡</td>
<td>1274 (35.8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>483 (24.2)</td>
<td></td>
</tr>
<tr>
<td>≥21.7‡</td>
<td>2282 (64.2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1516 (75.8)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3556</td>
<td>1999</td>
</tr>
<tr>
<td></td>
<td>3798</td>
<td>5555</td>
</tr>
</tbody>
</table>

*Data from the Fatality Analysis Reporting System of the National Highway Traffic Safety Administration.† Refers to the highest driver blood alcohol concentration when there was more than 1 drinking driver in a fatal crash.‡12.1 mmol/L (100 mg/dL) is the legal blood alcohol limit in most states.

RESULTS

Deaths

From 1985-1996, 17678 child passengers aged 0 through 14 years died in crashes in the United States. Of these, 5555 (28.1%) involved a drinking driver (a driver with a measurable blood alcohol concentration ≥2.17 mmol/L [10 mg/dL]). Of all child passenger deaths, the proportion that involved a drinking driver decreased from 30.9% (470/1520) in 1985 to 23.2% (395/1701) in 1996.

Of the 5555 child passenger deaths that involved a drinking driver, 3556 (64.0%) occurred while the child was riding with a drinking driver (TABLE 1). Of the 3556 child passengers who died while riding with a drinking driver, 2085 (58.6%) died in single-vehicle crashes and 1471 (41.4%) died in multiple-vehicle crashes. A total of 1999 child passengers died in multiple-vehicle crashes in which the child’s driver had not been drinking, but another driver had been drinking alcohol.

Fatality rates for child passengers killed while being transported by a drinking driver declined from 1985 through 1996. In each of these 12 years, approximately two thirds of the child passengers whose deaths involved a drinking driver were riding with such a driver when they died (FIGURE 1).

We examined the age groups of the pairs of drinking drivers and their child passengers who were killed. Combinations of drivers aged 21 years and older with passengers younger than 5 years (35.5%), drivers aged 25 years and older with passengers aged 5 through 9 years (22.4%), and drivers aged 35 years and older with passengers aged 10 through 14 years (9.1%) made up more than two thirds of the total. The combination of drivers aged 15 through 20 years with passengers aged 10 through 14 years made up just 12.5% of the driver-passerenger pairs.

Of the drivers involved in a crash in which a child passenger in their vehicle died, drinking drivers were more likely than nondrinking drivers to have been previously convicted of driving while intoxicated or to have had their license suspended or revoked (TABLE 2). Overall, 7.9% of the drinking drivers and 1.2% of the nondrinking drivers had 1 or more prior convictions for driving while intoxicated during the 3 years prior to the date of the fatal crash (prevalence ratio, 6.6). Similarly, 17.1% of the drinking drivers and 7.1% of the nondrinking drivers had their driver’s license suspended or revoked during the 3 years before the fatal crash (prevalence ratio, 2.4).

For all child passenger deaths (including those not related to drinking drivers) from 1985 through 1996, child passenger restraint use decreased as both the child’s age and the blood alcohol concentration of the child’s driver increased (FIGURE 2). Of the 3246 child passengers with known restraint information who died while being transported by a drinking driver, just 584 (18.0%) were restrained in the fatal crash. For comparison, of the 14772 children with known restraint information who...
died while being transported by a non-
drinking driver, 4508 (30.5%) were re-
strained. Of the 3063 cases for which re-
straint use was known for both the 
driving driver and the child passenger 
who died, both used a restraint in 345 
cases (11.3%). In 398 fatal crashes 
(13.0%), the driving driver was 
restrained, but the child who died was not.

Nonfatal Injuries
An estimated 2,322,000 child passen-
gers were nonfatally injured from 1988 
through 1996. Of these injuries, 1,490,000 
(6.4%) involved a drinking driver. Of 
these 1,490,000 injured child passengers, 
58,000 (38.9%) were being transported 
by a drinking driver at the time of the 
crash. Of the child passengers injured 
while riding with a drinking driver, 33.2% were restrained; of all children in-
jured while riding with a nondrinking 
driver (whether in alcohol-related 
crashes or not), 66.0% were restrained.

COMMENT
In the United States, the majority of the 
driving driver–related child passenger 
deaths involve a child riding unrestrained 
in the same vehicle as a drinking driver. 
Typically, the drinking driver transport-
ing the child is old enough to be the child's 
parent or caregiver. This is different than 
what might be assumed from the popular 
media reports of children who are 
killed when the vehicle in which they are 
riding is hit by a drinking driver.10,11

Our findings are generally consistent 
with an analysis of traffic injuries and 
deaths among children in North Caro-
lina that found that of the 51 child pas-
sengers killed in alcohol-related crashes 
from 1979 through 1982, 36 (70.6%) were 
riding with drinking drivers.

We found that among drivers involved 
in a crash in which their child passenger 
died, drinking drivers were over 6 times 
more likely than nondrinking drivers to 
have prior convictions for driving while 
impaired. This finding underscores the 
serious risk that persons arrested for alcohol-
impaired driving pose to others and to 
themselves. Drivers who have been ar-
rested for driving while impaired are 
known to be at substantially increased risk

of future death in an alcohol-related mo-
tor vehicle crash compared with drivers 
who have not been arrested for this of-
fense.13 In addition, studies have shown 
that over half of the drivers arrested for 
driving while impaired are alcoholics.14

Taken together, these findings emphasize 
the importance of aggressively interven-
ing with persons convicted of driving 
while impaired, including evaluating and 
treating them for alcohol problems, to 
prevent future deaths in alcohol-related 
crashes.

Our ability to characterize alcohol in-
volvement in child passenger deaths 
was somewhat limited by the lack of 
complete alcohol testing on drivers in-
volved in fatal crashes. However, the 
discriminant analysis used in the Fa-
tality Analysis Reporting System to es-
timate the distribution of blood alco-
hol concentrations when test results are 
available consistently estimates blood 
alcohol distributions within 3 percent-
age points of the actual distribution.7 
Moreover, restricting this analysis to 
drivers with known test results did not 
change the findings of our study.

Our study probably underestimates 
the actual number of child passenger 
deaths involving drinking drivers and 
overestimates restraint use. For the cases 
in which a child's driver survived, driver 
alcohol use was probably underre-
ported because alcohol testing is more 
complete among fatalities.15 Therefore, 
the proportion of drinking driver-
related child passenger deaths in which 
a child was in the same vehicle with a 
driving driver may be even greater than 
we report. In addition, the Fatality Analy-
sis Reporting System data we analyzed 
contains information only on crashes 
that occur on public roadways; therefore, 
the system, and consequently our study, do 
not include data for fatal crashes that oc-
cur on private roads or off-road areas. Fi-
nally, our estimate of restraint use is 
based on police crash reports, which have 
a bias toward overreporting.16

The data on nonfatal injuries from the 
General Estimates System were also sub-
ject to limitations. Up to one half of mo-
tor vehicle crashes in the United States

Table 2. Characteristics of Drinking and Nondrinking Drivers Involved in Crashes in Which a Child Passenger in Their Vehicle Died, United States, 1985–1996

<table>
<thead>
<tr>
<th>Driver Characteristic</th>
<th>Drinking Drivers, No. (%)</th>
<th>Nondrinking Drivers, No. (%)</th>
<th>Prevalence Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>2070 (65.7)</td>
<td>6895 (48.2)</td>
<td>1.4</td>
</tr>
<tr>
<td>Age 25-34 y</td>
<td>1342 (42.6)</td>
<td>4840 (33.8)</td>
<td>1.3</td>
</tr>
<tr>
<td>Driving record</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conviction for driving while intoxicated</td>
<td>250 (7.9)</td>
<td>172 (1.2)</td>
<td>6.6</td>
</tr>
<tr>
<td>License suspension or revocation</td>
<td>539 (17.1)</td>
<td>1011 (7.1)</td>
<td>2.4</td>
</tr>
<tr>
<td>Previous crash</td>
<td>463 (14.7)</td>
<td>1719 (12.0)</td>
<td>1.2</td>
</tr>
<tr>
<td>Speeding conviction</td>
<td>704 (22.3)</td>
<td>2599 (18.2)</td>
<td>1.2</td>
</tr>
</tbody>
</table>

*Data from the Fatality Analysis Reporting System of the National Highway Traffic Safety Administration. Driver character-
istic data were missing for a number of drinking and nondrinking drivers, respectively, as follows: sex (7, 17), age (13, 34), conviction for driving while intoxicated (119, 438), license suspension or revocation (118, 438), previous 
crash (139, 517), and speeding conviction (119, 438).

†Drivers with a blood alcohol concentration of less than 2.17 mmol/L (10 mg/dL) at the time of fatal crash.

Figure 2. Restraint Use Among Child Passenger Fatalities by Child’s Age and Blood Alcohol Concentration of Child’s Driver, United States, 1985–1996 (N = 18,018)

Does not include 1999 children for whom restraint use was unknown and 151 children for whom driver in-
formation was unknown.

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are never reported to police; presumably, most of these involve property damage only.6 However, some crashes that result in injuries, such as single-vehicle crashes involving a drinking driver, are likely to be underreported to police. Furthermore, among crashes that are reported, alcohol involvement is underreported by police.15 Therefore, our data on nonfatal injuries probably underestimate both the total number of child passenger injuries and the number that are alcohol related. As for fatalities, restraint use information for nonfatal injuries is from police crash reports, which tend to overestimate restraint use.16

We recommend a combination of aggressive interventions to prevent alcohol-impaired driving. Effective general policies include administrative license suspension17 and mandatory substance abuse assessment and treatment for driving-under-the-influence offenders,18,19 lowering the legal blood alcohol limit to 17.4 mmol/L (80 mg/dL) or lower for adults,20,21 and zero tolerance for alcohol use by drivers younger than 21 years.22 However, while these interventions have been shown to be effective in reducing alcohol-impaired driving in the general driving population, it is possible they are somewhat less effective in preventing this behavior among drinking drivers who transport children.

Strategies to specifically deter individuals from drinking and driving with children in the vehicle might include lower legal blood alcohol limits for drivers transporting children and child endangerment laws. There are 2 types of child endangerment laws. Currently, 27 states have statutes that create special sanctions for cases of driving under the influence in which the convicted driver was transporting a child at the time of the offense. Two additional states have applied child abuse or neglect statutes in such situations.23 These strategies should be evaluated for their effectiveness in reducing drinking-driver–related deaths and injuries. If effective, other states should consider adopting such laws. In addition, we encourage families to adopt a personal policy of zero alcohol tolerance when transporting children to decrease their risk of a fatal crash and serve as positive role models for their children. Furthermore, we recommend that health care providers in various settings (eg, outpatient clinics and emergency departments) screen adult patients for alcohol problems and provide them with brief interventions, refer them for specialized treatment, or both depending on the severity of the drinking problem.24-26

Health providers treating adults can also include information on the risk to child passengers when counseling their patients about the risk of driving while impaired. We also encourage health providers treating children to include advice against drinking and driving in discussions of caregiver behaviors that affect a child’s injury risk (eg, proper car seat use).27 Finally, to increase restraint use among child passengers, we recommend stricter enforcement of child safety seat laws (which currently exist in all 50 states) and the passage of primary seat belt laws that cover all children in all seating positions in the vehicle. Through these legal, medical, and educational interventions, we can further reduce the unacceptable risks of child passenger injury and death associated with alcohol-impaired drivers.


Acknowledgment: This work is dedicated to the memory of Leo A. Parker, MD. We thank Tonja Lindsay, BS, from the National Center for Statistics and Analysis of the National Highway Traffic Safety Administration for providing the data for this report, Marcejoie Kresnow, MS, for statistical assistance; Jeffrey Sacks, MD, MPH, and Gwen Ingraham, BA, for their thoughtful reviews of the manuscript; and Julie Bolen, PhD, for inspiring this investigation.

REFERENCES


