Child endangerment: differences across racial and ethnic groups in the U.S. in driver alcohol use and restraint of child passengers

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Abstract

This study linked comprehensive, national fatal crash data with information on race and ethnicity to examine differences across groups in rates of driver alcohol use and failure to restrain children among cases of child passenger fatalities. Differentials in alcohol-related motor vehicle fatality risk were identified for children of some racial and ethnic groups, as well as on the basis of driver gender and victim age.

Introduction

In 1995, motor vehicle crashes (MVCs) were the single greatest cause of all deaths among children ages 1-14 in the United States, accounting for 18 percent of all deaths and 37 percent of all injury deaths for these children (Fingerhut & Warner, 1997). A recent study suggests that motor vehicle occupant death rates for youth vary across racial and ethnic groups. Baker et al. (1998) found that among 5 to 12 year olds, African Americans had the highest exposure-based death rates, while among adolescents 13 to 19 years old, death rates were highest among Hispanic Americans. Two important risk factors for MVC-related death and injury among children are alcohol impairment by drivers carrying child passengers and the failure of drivers to ensure that child passengers are restrained using occupant protection devices.

Over the past two decades, American drinking and driving legislation has been increasingly oriented toward protecting underage youth through laws that raised the minimum legal drinking age to 21 and established zero tolerance and graduated licensing. This politically popular trend to enact legislation that protects young people has also included the passage by all 50 states and the District of Columbia of child restraint laws. These laws require young children (usually up to age 3 or 4) to travel in approved child restraint devices (e.g., child safety seats), and some permit or require older children to use adult safety belts (Insurance Institute for Highway Safety, 1999, online).

In most cases drivers who are not compliant with child restraint laws are assessed a fine, although the specific provisions of these laws vary by state including the age at which safety belts can be used instead of child restraints, which drivers are subject to the laws (usually all drivers, but in some cases only parents or guardians), and so forth.

Recently, a new element in protecting underage vehicle occupants has emerged—child

endangerment laws. Child endangerment laws create a separate offense or enhance existing driving under the influence/driving while intoxicated (DUI/DWI) penalties for offenders who drive under the influence with a minor child in the vehicle. Such laws have been enacted in 27 states in the United States (Mothers Against Drunk Driving, no date). Once convicted of DUI/DWI, adult drivers who were carrying a child passenger may be subject to, in most cases, an additional fine although other penalties may be used such as community service. Child endangerment laws raise at least two issues:

1) how much of a risk is presented to children by adult drinking drivers?
2) do certain ethnic groups face disproportionately greater application of the law because they tend to drive more with child passengers (i.e., have greater exposure)?

The purpose of this study is to examine differences across racial and ethnic groups in the proportion of child fatalities killed in crashes where their driver had been drinking, and in the proportion that had been restrained.

Materials and methods

Data used for this study came from the Fatality Analysis Reporting System (FARS) maintained by the National Highway Traffic Safety Administration (NHTSA). FARS is perhaps the world's best record system for fatal crashes, containing considerable detail about roadways, vehicles, road users, weather, time of day, and other factors about each fatal crash (defined as a crash causing a death within 30 days of the event). The information contained in FARS comes from numerous sources including police, hospital, medical examiner/coroner and Emergency Medical Services reports; state vehicle registration, driver licensing, and highway department files; and vital statistics documents and death certificates.

Alcohol involvement. The most direct measure of alcohol involvement in fatal crashes is the blood alcohol concentration (BAC) of active participants in the crash (i.e., drivers and nonoccupants–pedestrians or pedalcyclists–who could have caused the crash) based on either breath tests administered by police or blood tests. (Passengers are not considered active participants as they are assumed not to have contributed to crash causation.) Because ascertainment of BAC in fatal crashes, however, is incomplete, NHTSA uses the Klein imputation model to estimate the probability that a particular driver or nonoccupant had a BAC of 0.00 (no alcohol), 0.01 to 0.09 (some alcohol), or 0.10 and greater (generally considered legally intoxicated in most states) based on several factors such as the day and time of the crash, type of vehicle driven, and personal characteristics (e.g., age, gender, possession of a valid driver's license) (Rubin, Schafer & Subramanian, 1998). Thus, for each active participant in a fatal crash recorded in FARS, either the actual BAC or an estimated BAC is provided. Consistent with our focus on child endangerment, we examined alcohol involvement based on the BAC status of the driver of the car in which the child was riding.

Use of safety belts and child safety seats. Information on the use of occupant restraint devices in FARS comes directly from police accident reports. Some police reports are based on direct observations of use; however, more often police obtain this information by interviewing survivors of the crash or by inference from other evidence (NHTSA, 1989).

Race and ethnicity. Prior to 1987, ethnicity was not one of the data elements in the FARS system. Over the past decade, however, NHTSA has worked with the National Center for Health Statistics

to match the records of road users killed in MVCs with their death certificate information. Race and ethnicity information recorded on death certificates in the United States is taken from funeral directors' reports which often rely on reports by next of kin, but may also be derived from other sources such as coroners' records. Despite the fact that some racial and ethnic designations may be in error, they appear to be sufficiently accurate for a general analysis of differences between racial and ethnic groups in alcohol-related fatalities and restraint use. Five racial and ethnic groups are included in these analyses: Caucasian American, African American, Native American, Asian-Pacific Islander (API) American, and Hispanic American.

The study covers 8,536 child passengers under age 16 and 115,305 drivers killed in crashes in the United States between January 1, 1990 and December 31, 1994, the most recent 5 years for which there are FARS race and ethnicity data. Race and ethnicity data are available only for fatally injured road users.

We present the data in two ways. For some analyses, child fatalities are the unit of analysis (Tables 2 and 3). In these cases, race and ethnicity information is that of the children, while gender and BAC status are available for the drivers of the cars in which the children were riding. For other analyses, killed drivers are the unit of analysis (Table 1); thus, race and ethnicity are tied to drivers and not to any children who may have been in the car at the time of the crash.

Preliminary Analyses. Because fatal crashes are caused by many factors that are likely to vary across racial and ethnic groups (e.g., number of miles driven, type of vehicle driven and roadway traveled, etc.), it is difficult to compare the absolute number of alcohol-related crashes across groups. To reduce the influence of these variables and provide a reasonable measure for cross-group comparisons, we calculated the percentage of fatal crashes that were alcohol-related per group. This way, each group's alcohol-related crashes were compared against its non-alcohol-related crashes. Although this percentage does not correct perfectly for all such influences, it is the best measure for producing a reasonable basis for comparison.

Results

Alcohol-related fatalities. We first examined the risk of alcohol-related fatality for children by analyzing killed drivers and the percentages that had at least one child in the car with them at the time of the crash (Table 1). First, the likelihood of having a child passenger varied significantly across racial and ethnic groups. Among sober drivers, the percentages of African American, API American, and Hispanic American drivers having a child passenger were significantly greater than the percentage of Caucasian Americans (8.2%); the percentages of all four of these groups were significantly lower than that of Native Americans (21.9%), all p-values $< .001$ (Bonferroni-adjusted for multiple comparisons). Among drinking drivers, the percentages of African American and Hispanic American drivers having a child passenger were significantly higher than that of Caucasian American drivers (3.1%); all three of these groups had significantly lower percentages than Native Americans (8.2%), all p-values $<.001$ (Bonferroni-adjusted for multiple comparisons). Second, across all racial and ethnic groups, drivers who were alcohol-positive were less likely to have a child passenger than were those who were sober; all odds ratios (shown in last column) are significantly less than 1, $p <.001$. Third, the relative probability of having a child in the car when the driver was alcohol-positive compared to when the driver was sober was similar across groups, with no two odds ratios being significantly different, all p-values $> .05$

Table 1. Killed Drivers with Children Passengers under age 16, by Driver Alcohol Involvement

Driver Ethnicity	Alcohol Negative			Alcohol Positive			odds of alcohol positive driver having child passenger compared to alcohol negative drivers	
	no child	w/ child	PCT with child passgr.	no child	w/ child	PCT with child passgr.	odds ratio	*prob.*
Caucasian American	48,854	4,389	8.24%	35,720	1,159	3.14%	.36	*<.001*
African American	5,588	723	11.46%	4,308	236	5.19%	.42	*<.001*
Native American	267	75	21.93%	786	70	8.18%	.32	*<.001*
Asian-Pacific Islander American	1,096	157	12.53%	401	22	5.20%	.38	*<.001*
Hispanic American	4,769	717	13.07%	5,636	332	5.56%	.39	*<.001*

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Table 2 presents data on the ethnicity of alcohol-involved child passenger fatalities by victim age and gender of the driver of the car in which the child was riding. The percentages in each cell

Table 2. Percent of Child Passenger Fatalities that were Alcohol Involved, by Age and Race/ethnicity of Child and Driver Gender

Child's Ethnicity	Driver Sex	Age of Killed Child Passenger					all kids <16
		0-2	3-5	6-8	9-11	12-15	
Caucasian American	male	24.7%	22.0%	18.4%	17.8%	23.4%	22.2%
	female	11.4%	13.5%	13.1%	9.0%	10.8%	11.6%
African American	male	25.9%	33.7%	33.7%	14.9%	23.2%	25.9%
	female	14.6%	17.2%	17.5%	14.6%	19.2%	16.3%
Native American	male	36.0%	38.3%	62.3%	19.3%	48.4%	42.9%
	female	18.2%	30.1%	24.4%	22.4%	15.0%	20.4%
Asian-Pacific Islander American	male	8.1%	14.5%	15.4%	3.5%	6.8%	8.7%
	female	8.5%	6.5%	1.6%	1.2%	4.0%	4.8%
Hispanic American	male	23.3%	28.8%	25.4%	15.9%	32.7%	26.9%
	female	14.1%	15.6%	12.3%	12.2%	9.5%	13.0%

indicate the percentage of child fatalities where the child's driver was alcohol-positive (including cases where other active road users were also drinking).

For all youth under age 16 (last column), alcohol use by the driver of the killed child ranged from 4.8% to 42.9%, depending on ethnicity and driver gender and driver BAC status. With the exception of African Americans, rates of alcohol use by male drivers were about twice those of female drivers. For both genders, drivers of cars in which a Native American child was killed were most likely to have been drinking (42.9% males, 20.4% females), whereas drivers of cars in which an API American child was killed were least likely to have been drinking (8.7% males, 4.8% females). There was substantial variability both within and across racial and ethnic groups regarding the ages at which children suffered the highest alcohol-related fatality rates when their drivers had been drinking. For example, among African American child fatalities, rates of driver alcohol involvement were highest at ages 3-5 and 6-8 when the driver was male, but at ages 12-15 when the driver was female. Among Hispanic Americans, the pattern was the opposite with respect to driver gender; driver alcohol involvement rates were highest at ages 3-5 with a female driver and at ages 12-15 with a male driver.

Use of child restraint devices. Information on the use of safety belts or child safety seats by killed child passengers is presented in Table 3. Across all groups, the majority of child fatalities were not using occupant restraints at the time of the crash that killed them. This is not surprising

as safety belts and child safety seats provide significant protection in the event of a crash.

Table 3. Use of Child Restraint Devices, by Race/ethnicity of Child and Gender and BAC Status of Driver

Child's Ethnicity	Driver's Gender	Percent of Children Using Safety Restraint Driver's Alcohol negative	positive	odds of child NOT wearing safety belt, if riding w/alcohol positive driver odds-ratio	*prob.*
Caucasian American (n=5,584)	male	30.9%	18.6%	1.96	*.000*
	female	43.1%	26.1%	2.15	*.000*
African American (n=1,294)	male	17.4%	13.0%	1.40	*.221*
	female	26.8%	17.4%	1.74	*.032*
Native American (n=161)	male	19.8%	10.7%	2.07	*.260*
	female	12.8%	13.0%	0.98	*.983*
Asian-Pacific Islander American (n=199)	male	21.1%	4.0%	6.44	*.204*
	female	27.4%	13.3%	2.47	*.644*
Hispanic American (n=1,234)	male	16.3%	10.5%	1.65	*.047*
	female	25.4%	19.6%	1.39	*.338*
All non-Caucasian (n=2,888)	male	17.4%	11.2%	1.66	*.004*
	female	25.5%	17.6%	1.60	*.018*

Pooled across gender, rates of child restraint varied from 15.8% (Native Americans) to 37.1% (Caucasian Americans) among sober drivers, with African American, API American and Hispanic American rates clustered in the low 20s. Among drinking drivers, child restraint rates varied from 5.4% (API Americans) to 21.0% (Caucasian Americans), with Native Americans, African Americans, and Hispanic Americans from 11.4% to 15.0%; the only significant difference was between Caucasian Americans and Hispanic Americans (12.5%). In general, children were more likely to be restrained when the driver was sober than when s/he had been drinking (see odds ratios in last column); the only exception to this finding being among Native American female drivers. Also true for all groups except Native Americans, children were more likely to be restrained when they were riding with a female driver regardless of driver BAC status.

Discussion

This study provides important information about the differential risk for motor vehicle fatality among children of different racial and ethnic groups. Analyses by killed drivers indicate that the likelihood of having a child passenger differs significantly among the groups. Across all groups, drinking drivers were less likely to have a child passenger with them than were those who were sober; however, in some groups, the percentages of alcohol-positive drivers with child passengers was considerable (8.2% among Native Americans). Among child fatalities, analyses also suggested that Native American children are at heightened risk, with higher percentages killed in crashes with an alcohol-positive driver than children in other groups. With respect to child restraint, the majority of killed children were not using child safety seats or safety belts. In general, children were more likely to be restrained when the driver was sober and when the driver was female. Among drinking drivers, Caucasian American drivers were more likely than Hispanic American drivers to have restrained the killed child.

This study offers several strengths. First, it uses a comprehensive national data set, FARS, that provides a census of all fatal crashes in the United States and many factors related to them. Second, we have matched race and ethnicity information with the FARS data, allowing us to conduct unique analyses across racial and ethnic groups. Finally, the analytic procedure we used comparing each group's alcohol-related crashes to its non-alcohol-related crashes helps to

eliminate confounds across groups such as socioeconomic status, differences in amount of driving, and so forth.

Despite its strengths, the study also has some limitations. First, for analyses based on child fatalities (proportion that are alcohol-related, use of occupant restraints), we did not have information on the race of the drivers. Although in a limited number of cases where the driver was also killed, the records of both fatalities could be matched and the driver's race and ethnicity ascertained, race and ethnicity would still not be available for the majority of the drivers who were crash survivors. For consistency, the comparisons among child fatalities were based on the child's race and ethnicity. Thus, while we can determine differentials in risk for children of various racial and ethnic groups, we do not know the level at which drivers of those groups are implicated in the risk experienced by the children (i.e., we do not know the extent to which the children killed were riding with drivers of their same racial and ethnic group). The degree of correspondence between the child's and the driver's race and ethnicity is likely to vary by age of the child, with infants and young children more likely to be riding with parents or other relatives than are older children.

Second, information on race and ethnicity comes primarily from next of kin, via funeral directors, and may be subject to some error. However, when an individual is not able to self-report, family members are likely to be the next best available source of information compared to other methods of assessment such as direct observation or primary language spoken.

Third, because only 5 years of FARS data were available that were matched with race and ethnicity, the number of cases in some groups was small (e.g., Native and API Americans). Therefore, the reliability of some of the findings is uncertain and awaits future research.

Fourth, estimates of the use of occupant protection devices may be biased. Because failure to use safety belts and child safety seats is a traffic offense in most states, self-reports of passenger restraints are likely to be somewhat inflated and unreliable.

Despite these issues, these data provide the most valid basis for assessing the relative involvement of driver alcohol use in child fatalities across racial and ethnic groups. The findings reported here are consistent with other studies of ethnicity and motor vehicle fatality risk (NHTSA, 1998) and alcohol involvement in crashes (Campos-Outcalt et al, 1997; Voas, Tippetts & Fisher, in press).

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