

Characteristics of Fatally Injured Drivers with High Blood Alcohol Concentrations (BACs)

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Abstract

Blood alcohol concentrations (BACs) of fatally injured passenger vehicle drivers in the United States were used to examine the current and historical distributions of BACs and the characteristics of fatally injured drivers by BAC categories, including those with very high BACs. All categories of illegal BACs (0.08 percent or higher) declined substantially from 1982 to 2002, and declines were similar across BAC categories. Among illegally impaired drivers, the prevalence of several driver and crash characteristics increased systematically, but gradually, with increasing BACs. This study does not support the claim that “hard core drinking drivers” have become a larger part of the problem and have been unaffected by general deterrent approaches.

Introduction

Some characteristics of alcohol-impaired drivers are well known. Male drivers ages 21-40 have the highest rates of involvement in fatal crashes with high blood alcohol concentrations (BACs).¹ Alcohol-impaired drivers tend to exhibit other high-risk driving behaviors such as not using seat belts.² It also is known that many alcohol-impaired drivers have serious problems with alcohol in other aspects of life. Decades of research have indicated that 30-50 percent of alcohol-impaired drivers can be classified as problem drinkers or alcoholics,³ depending on the specific populations examined and the definitions of problem drinking applied.

During the past decade, there has been increasing focus among highway safety researchers, policymakers, and others on “hard core drinking drivers.” The term refers to people who repeatedly drive while impaired and are resistant to changing their behavior despite previous sanctions, treatments, or education. The underlying premise is that this resistance is due to the fact that many, if not most, hard core drinking drivers are problem drinkers.⁴ Two operational measures for this concept are commonly used: evidence of repeated driving while impaired by alcohol, such as repeated convictions for driving while impaired (DWI), and a “high” BAC. Recently, three organizations in the United States — MADD, the Century Council, and the National Transportation Safety Board — agreed to define a high BAC as 0.15 percent or higher in defining hard core drinking drivers.⁵

Defining the hard core drinking driver population is not merely an academic exercise. It is argued that hard core drinking drivers have not been affected by the general deterrent approaches credited with the dramatic reductions in alcohol-impaired driving in the 1980s and early 1990s. It is asserted that these drivers are now the primary problem group and that resources should be shifted to specific deterrent approaches, particularly treatment, directed at this group.⁶ In response, many U.S. states have enacted tougher or different sanctions for repeat offenders and for offenders with high BACs, most commonly defined as 0.15 percent or higher.⁷ Critics counter that the enhanced sanctions may be equally effective for lower BAC offenders and that support for initiatives aimed at hard core drinking drivers comes at the expense of support for other, more broadly applicable approaches.⁵

Those who propose classifying offenders according to BAC cite evidence that drivers with higher BACs are more likely than drivers with lower BACs to be involved in crashes,⁸ to recidivate,⁹ and to have an alcohol dependency problem.¹⁰ However, there is little, if any, empirical evidence that a BAC of 0.15 percent is the appropriate threshold. A common argument is that BACs of this magnitude represent “excessive” drinking that “social drinkers” are not capable of reaching.

The present study uses information on the BACs of fatally injured drivers to address the following questions: What is the distribution of BACs among fatally injured drivers, and has this distribution changed during the past two decades? Are the characteristics of drivers with high BACs (0.15 percent or greater, 0.20 percent or greater, and 0.25 percent or greater) markedly different from the characteristics of other drinking drivers?

Methods

Characteristics of fatally injured drivers of passenger vehicles were studied based on the Fatality Analysis Reporting System (FARS). FARS is a computer database maintained by the National Highway Traffic Safety Administration (NHTSA); it contains driver, vehicle, and environmental information on virtually all motor vehicle-related fatalities occurring on public roads in the United States.

The FARS database includes two types of information on driver BAC: the BAC value resulting from a blood alcohol chemical test or, if test results are missing, a BAC value imputed by NHTSA. The imputed values can be combined with actual BAC values to classify BACs of all fatally injured drivers. In this study, a data file of these imputed BACs along with actual BACs was used to track nationwide trends among various BAC groups from 1982 to 2002.

NHTSA’s imputed BAC values are based on characteristics typically associated with alcohol-impaired drivers, so it would be invalid to derive driver attributes from these values. Thus, only the BAC values from alcohol tests were used to examine the characteristics of fatally injured drivers by BAC category. These analyses used data from the 27 states that in each of the 3 years 2000-02 conducted alcohol tests on at least 70 percent of fatally injured drivers. This is considered to be an acceptably high level of testing that reduces the bias that could exist if, for example, only those suspected of having consumed alcohol were tested. The 27 states represent 44 percent of the adult U.S. population and include large and small states from all regions.

Results

BAC results were available for 84 percent of the 25,546 passenger vehicle drivers killed in the 27 states with good reporting in 2000-02. Based on known BACs, 26 percent of the entire group (and 65 percent of those with positive BACs) had BACs of 0.15 percent or higher (Table 1). Drivers with BACs of 0.15-0.19 percent and drivers with BACs of 0.20-0.24 percent each represented 9 percent of all drivers, and drivers with BACs of 0.25 percent or higher were 7 percent of the total.

Table 2 presents driver and crash characteristics that varied significantly by BAC category (chi-square statistic, $p < 0.001$). In most respects, the characteristics varied systematically as BACs increased. Generally there were large differences between drivers with zero BACs and drivers with any positive BAC. For example, drivers with positive BACs were much more likely to be male, ages 21-40, unbelted, driving without a valid license, driving between midnight and 5:59 a.m., and involved in a single-vehicle crash. There also were

Table 1
Distribution of BACs among Fatally Injured Passenger Vehicle Drivers
in 27 States with Good Alcohol Test Reporting, FARS 2000-02

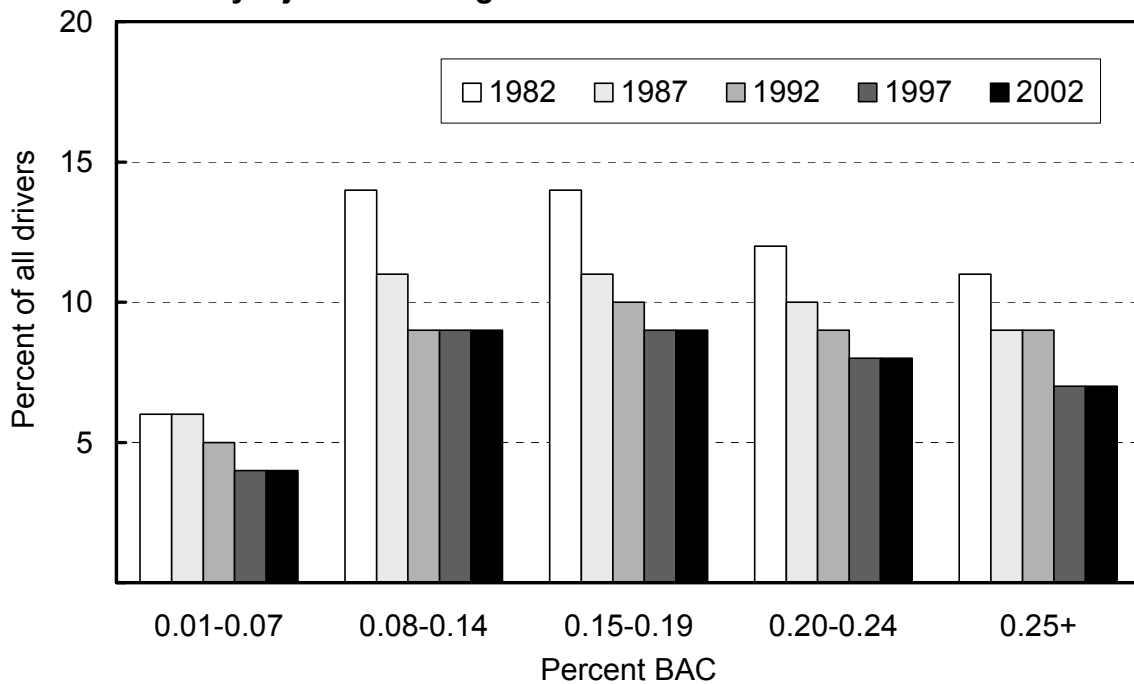
BAC (%)	N	(%)
Zero	12,878	(60)
0.01-0.07	1,139	(5)
0.08-0.14	1,836	(9)
0.15-0.19	2,016	(9)
0.20-0.24	1,990	(9)
0.25+	1,606	(7)
Total	21,465	(100)

Table 2
BACs of Fatally Injured Drivers in Relation to Personal and Crash
Characteristics in 27 States with Good Alcohol Test Reporting, FARS 2000-02

	Percent BAC					
	Zero	0.01-0.07	0.08-0.14	0.15-0.19	0.20-0.24	0.25+
Male	64	79	81	83	82	82
Age (year)						
16-20	17	19	20	14	10	6
21-40	30	46	54	60	62	55
41-60	27	23	21	23	24	36
61+	26	13	5	4	4	4
Unbelted	46	61	72	77	77	80
Invalid License	9	19	22	23	25	29
Prior DWI Conviction	1	4	7	10	12	16
Prior License Suspension	9	19	23	28	27	30
Driving Alone	68	64	65	70	76	80
Time of Day						
Midnight to 5:59 a.m.	12	31	45	47	45	34
6 to 11:59 a.m.	30	13	9	6	6	6
Noon to 5:59 p.m.	38	25	13	11	11	18
6 to 8:59 p.m.	12	15	15	13	16	19
9 to 11:59 p.m.	9	16	18	23	22	22
Vehicle Type						
Car	72	66	68	62	59	58
Pickup	18	23	21	27	29	29
SUV	10	12	11	11	12	13
Single Vehicle	35	54	71	74	76	71

some striking differences between drivers with BACs of 0.01-0.07 percent and drivers with BACs of 0.08-0.14 percent. For example, the percentage of drivers involved in single-vehicle crashes increased from 54 percent for BACs of 0.01-0.07 percent to 71 percent for BACs of 0.08-0.14 percent. Among drivers with illegal BACs (0.08 percent or higher), characteristics generally varied systematically with increasing BACs. However, in most cases the differences between BAC categories were not large. Notably, drivers with BACs of 0.25 percent or higher were much more likely to be 41-60 years old and to be driving between noon and 9 p.m. Having a prior DWI increased from 7 percent of drivers with BACs of 0.08-0.14 percent to 16 percent of drivers with BACs of 0.25 percent or higher.

Figure 1
Percent Distribution of Actual and Imputed BACs of
Fatally Injured Passenger Vehicle Drivers FARS 1982-2002



Based on actual and imputed BACs for fatally injured passenger vehicle drivers from all states, Figure 1 depicts trends in BAC categories in 5-year increments from 1982 to 2002. There were similar declines in the percentage of drivers in all BAC categories. The percentage point declines from 1982 to 2002 were 5 percent for BACs of 0.08-14 percent and 0.15-0.19 percent; declines were 4 percent for BACs of 0.20-0.24 percent and 0.25 percent or higher.

When trends were analyzed based on the 17 states with good alcohol test reporting during 1982-2002, similar patterns were evident. Percentage point declines were 5 percent for BACs of 0.15-0.19 percent and 0.25 percent or higher; declines were 3 percent for BACs of 0.20-0.24 percent.

Discussion

In general, fatally injured drinking drivers differed from zero BAC drivers on most variables, and drivers with illegal BACs differed from those with lower BACs. The prevalence of several driver and crash characteristics — including being unbelted, having an invalid license, driving alone, being 21-40 years old, driving a pickup, and having a prior DWI — systematically increased with increasing BACs.

The relationship between an individual’s drinking history and his or her BAC — as measured once in a traffic stop, in a sobriety checkpoint, or subsequent to a crash — has not been established. The most informative contemporary study of drivers’ drinking histories was based on information obtained from spouses and other relatives of fatally injured drivers.¹¹ The study found that about one-third of drivers with BACs of 0.15 percent or higher and about the same percentage of drivers with BACs of 0.10-0.14 percent could be labeled as problem drinkers.

Other than BACs, little information in the FARS database is useful for identifying drivers who could be classified as hard core drinking drivers. Prior DWI is the only indicator of drinking history. In the present study, prior DWIs were recorded for 10 percent of drivers with BACs of 0.15-0.19 percent, 12 percent of drivers with BACs of 0.20-0.24 percent, and

16 percent of drivers with BACs of 0.25 percent or higher. However, there are limitations in this FARS data element, as it includes only convictions occurring within the past 3 years. Some alcohol offenses would not be on driver records because of diversion programs that withhold a judgment of conviction.¹² Thus, the actual incidence of prior alcohol offenses is likely to be substantially higher than the 10-16 percent reported here. It also should be noted that many impaired drivers may have had a long history of impaired driving but had not been arrested. Thus, the extent to which the fatal crashes of drivers with high BACs were a culmination of an established pattern of driving with high BACs cannot be answered from this study.

Results of the present study do not indicate that the population of drivers with BACs exceeding 0.15 percent has been more resistant to changing behavior than other drinking drivers. All categories of illegal BACs, even BACs of 0.25 percent or higher, have declined substantially since 1982. Thus, this study does not support the claims that a “hard core group” has become a larger part of the problem or that general deterrent methods have not been successful with this group. Further, a review of the characteristics of fatally injured drivers at higher BACs did not indicate large differences between BAC categories, but rather gradual changes. Thus, it is unclear what BAC threshold should be considered indicative of hard core drinking. Nor is it clear from this study or other research why the types of enhanced sanctions (e.g., license plate impoundment, mandatory screening for alcohol problems, longer license suspension) applied to high BAC offenders would not be as effective for lower BAC offenders.

The notion of the incorrigible multiple, high-BAC offender looms large in the public mind. It seems likely, however, that some fatally injured drivers with BACs of 0.10-0.14 percent are problem, or hard core, drinkers and that many with BACs of 0.15 percent or higher are not, although the higher the BAC the more likely there is a problem. The hard core group often is characterized as a stable group continuously cycling through the system — a small percentage of the population that causes most of the problem.¹³ Presumably, however, people may shift in and out of this group, and little is known about the progression of drinking and driving among individuals.

There are multiple targets in combating alcohol-impaired driving, and better and more current information is needed about who the drinking drivers are, their drinking histories, and the drinking/social occasions that preceded their fatal events. Without this knowledge, the ability to address the problem is hampered, and concepts that have little empirical basis become intuitively appealing.

References

1. Insurance Institute for Highway Safety. Fatality facts: alcohol, 2002. Arlington, VA; 2003. Available: http://www.highwaysafety.org/safety_facts/fatality_facts/alcohol.htm.
2. Williams AF, Wells JK. Factors associated with high blood alcohol concentration among fatally injured drivers in the United States, 1991. *Alcohol, Drugs, and Driving* 1993;9(2):87-96.
3. Vingilis E. Drinking drivers and alcoholics: Are they from the same population? *Research Advances in Alcohol and Drug Problems*, vol. 7, pp. 299- 342 (eds. Smart R, Glasser F, and Israel Y). New York, NY: Plenum Press; 1983.
4. Simpson HM, Mayhew DR. The hard core drinking driver. Ottawa, Ontario: Traffic Injury Research Foundation; 1991.
5. Hedlund JH, McCartt AT. Drunk driving: seeking additional solutions. Washington DC: AAA Foundation for Traffic Safety; 2002.

6. Robertson RD, Simpson HM. DWI system improvements for dealing with hard core drinking drivers: adjudication and sanctioning. Ottawa, Ontario: Traffic Injury Research Foundation; 2002.
7. McCartt AT, Shabanova VS. Enhanced sanctions for higher BACs: evaluation of Minnesota's high-BAC law. Report no. DOT HS-809-677. Washington DC: National Highway Traffic Safety Administration; 2004.
8. Compton RP, Blomberg RD, Moskowitz H, Burns M, Peck RC, Fiorentino D. Crash risk of alcohol impaired driving. *Proceedings of the 16th International Conference on Alcohol, Drugs, and Traffic Safety* (eds. Mayhew DR, Dussault C), vol. 2, pp. 673-678. Quebec, Canada: Société de l'assurance automobile du Québec; 2002.
9. Peck RC, Helander CJ. Repeat DUI offenders: analysis of research needs and countermeasures development strategies. *Alcohol and Other Drugs in Transportation: Research Needs and Priorities, Transportation Research Circular 502*, pp. 92-109. Washington DC: Transportation Research Board; 2001.
10. Snow RW. Characteristics of convicted drinking drivers who attended the Mississippi Alcohol Safety Education Program, 1992-1994: a statistical summary. Starkville, MS: Mississippi State University; 1996.
11. Baker SP, Braver ER, Chen LH, Li G, Williams AF. Drinking histories of fatally injured drivers. *Injury Prevention* 2002;8(3):221-226.
12. McCartt AT, Solomon MG. Tracking traffic citations through court adjudications to posting to public driver records. *Traffic Injury Prevention*; in press.
13. Simpson, HM. Drunk, dangerous, and deadly: Who are hard core drunk drivers and what should be done to get them off the nation's roads. *Vital Speeches of the Day* 1999;65(2).