



U.S. Department of Transportation  
**National Highway Traffic Safety  
Administration**

DOT HS 809 102

# **Alcohol Involvement in Fatal Crashes 1997**

**August 2000**

**NHTSA**  
**People Saving People**  
[www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)

**National Center for Statistics and Analysis  
National Highway Traffic Safety Administration  
U.S. Department of Transportation**



# Contents

<b>Executive Summary</b> . . . . .	<b>iii</b>
<b>1. Introduction</b> . . . . .	<b>1</b>
Data . . . . .	1
Estimation . . . . .	1
Presentation . . . . .	1
Interpretation of Estimates . . . . .	2
Reporting Level . . . . .	2
<b>2. Fatalities</b> . . . . .	<b>3</b>
<b>3. Crashes</b> . . . . .	<b>5</b>
Day and Time . . . . .	5
Crash Type . . . . .	6
Crash Environment . . . . .	7
<b>4. Drivers and Nonoccupants</b> . . . . .	<b>9</b>
Overview . . . . .	9
Driver Sex . . . . .	10
Driver Age . . . . .	10
Driver Age Groups . . . . .	11
Vehicle Class . . . . .	11
Vehicle Age . . . . .	12
Restraint Use . . . . .	12
<b>5. Alcohol Trends, 1982-1997</b> . . . . .	<b>13</b>

## Tables

1. Occupant Fatalities by Person Age and Crash BAC, 1997 . . . . .	3
2. Nonoccupant Fatalities by Person Age and Crash BAC, 1997 . . . . .	3
3. Fatalities by Crash Type and BAC, 1997 . . . . .	4
4. Fatalities by Sex and BAC, 1997 . . . . .	4
5. Fatal Crash BAC Distribution, 1997 . . . . .	5
6. Fatal Crash BAC Distribution by Time of Day, 1997 . . . . .	5
7. Fatal Crash BAC Distribution by Period of Week, 1997 . . . . .	5
8. Fatal Crash BAC Distribution by Time of Day and Period of Week, 1997 . . . . .	5
9. Fatal Crash BAC Distribution by Crash Type, 1997 . . . . .	6
10. Fatal Crash BAC Distribution for Single-Vehicle Crashes by Time of Day and Period of Week, 1997. . . . .	6
11. Fatal Crash BAC Distribution for Multi-Vehicle Crashes by Time of Day and Period of Week, 1997. . . . .	6
12. Fatal Crash BAC Distribution for Nonoccupant Crashes by Time of Day and Period of Week, 1997. . . . .	6

## Tables (Continued)

13. Driver and Nonoccupant BAC Distribution for Nonoccupant Crashes by Time of Day and Period of Week, 1997. . . . .	6
14. Fatal Crash BAC Distribution by Crash Type and Land Use, 1997 . . . . .	7
15. Fatal Crash BAC Distribution for Nonoccupant Crashes by Posted Speed Limit, 1997. . . . .	7
16. Percentage of High BAC (0.10+) Fatal Crashes by Posted Speed Limit and Crash Type, 1997 . . . . .	7
17. Percentage of High BAC (0.10+) Fatal Crashes by Roadway Function Class and Crash Type, 1997. . . . .	7
18. BAC Distributions for Drivers and Nonoccupants in Fatal Crashes, 1997 . . . . .	9
19. BAC Distributions for Drivers and Nonoccupants in Fatal Crashes by Crash Type, 1997 . . . . .	9
20. BAC Distributions for Drivers in Single-Vehicle Fatal Crashes by Crash Outcome, Time of Day, and Period of Week, 1997. . . . .	9
21. BAC Distributions for Drivers in Multi-Vehicle Fatal Crashes by Crash Outcome, Time of Day, and Period of Week, 1997. . . . .	10
22. BAC Distributions for Drivers in Fatal Crashes by Sex, 1997. . . . .	10
23. BAC Distributions for Drivers in Fatal Crashes by Sex, Time of Day, and Period of Week, 1997 . . . . .	10
24. BAC Distributions for Fatally Injured Drivers by Sex, Time of Day, and Period of Week, 1997 . . . . .	10
25. Drivers with BAC 0.10+ in Fatal Crashes by Person Age, 1997. . . . .	11
26. BAC Distributions for Drivers in Fatal Crashes by Age Group, 1997. . . . .	11
27. Distribution of Fatally Injured Drivers with BAC 0.10+ in Single-Vehicle Crashes by Time of Day, Period of Week, and Age Group, 1997 . . . . .	11
28. Distribution of Fatally Injured Drivers with BAC 0.10+ in Multi-Vehicle Crashes by Time of Day, Period of Week, and Age Group, 1997 . . . . .	11
29. BAC Distributions for Drivers in Fatal Crashes by Vehicle Type, 1997 . . . . .	12
30. BAC Distributions for Drivers in Fatal Crashes by Vehicle Model Year, 1997 . . . . .	12
31. Drivers with BAC 0.10+ in Fatal Crashes by Person Age and Vehicle Model Year, 1997 . . . . .	12
32. Safety Belt Use Rates for Fatally Injured and Surviving Drivers of Passenger Vehicles in Fatal Crashes by BAC Group, 1997 . . . . .	12
33. BAC Distributions for Fatally Injured and Surviving Drivers of Passenger Vehicles in Fatal Crashes by Safety Belt Use, 1997. . . . .	12
34. Fatal Crash BAC Distributions, 1982-1997 . . . . .	13
35. Reduction in High-BAC (0.10+) Drivers 16 to 20 Years Old in Fatal Crashes by Time of Day and Period of Week, 1982-1997 . . . . .	14
36. Reduction in High-BAC (0.10+) Drivers 21 to 44 Years Old in Fatal Crashes by Time of Day and Period of Week, 1982-1997 . . . . .	14
37. Reduction in High-BAC (0.10+) Drivers 45 Years and Older in Fatal Crashes by Time of Day and Period of Week, 1982-1997 . . . . .	14
38. Reduction in High-BAC (0.10+) Drivers in Fatal Crashes by Vehicle Type, 1982-1997 . . . . .	14
39. Reduction in High-BAC (0.10+) Drivers in Fatal Crashes by Sex, 1982-1997 . . . . .	15
40. Reduction in High-BAC (0.10+) Drivers in Fatal Crashes by Land Use and Crash Type, 1982-1997 . . . . .	15

## Figures

ES1. Trend in Fatalities from Crashes Involving an Intoxicated Participant, 1982-1997 . . . . .	iii
1. Percentage of Drivers with BAC 0.10+ by Age, 1997. . . . .	4
2. Percentage of Nonoccupants with BAC 0.10+ by Age, 1997 . . . . .	4
3. Estimated Proportion of Drivers in Fatal Crashes Who Were Drunk or Impaired, 1982-1997 . . . . .	13
4. Estimated Proportion of Drunk Drivers (BAC 0.10+) in Fatal Crashes by Vehicle Type, 1982-1997. . . . .	15

## Executive Summary

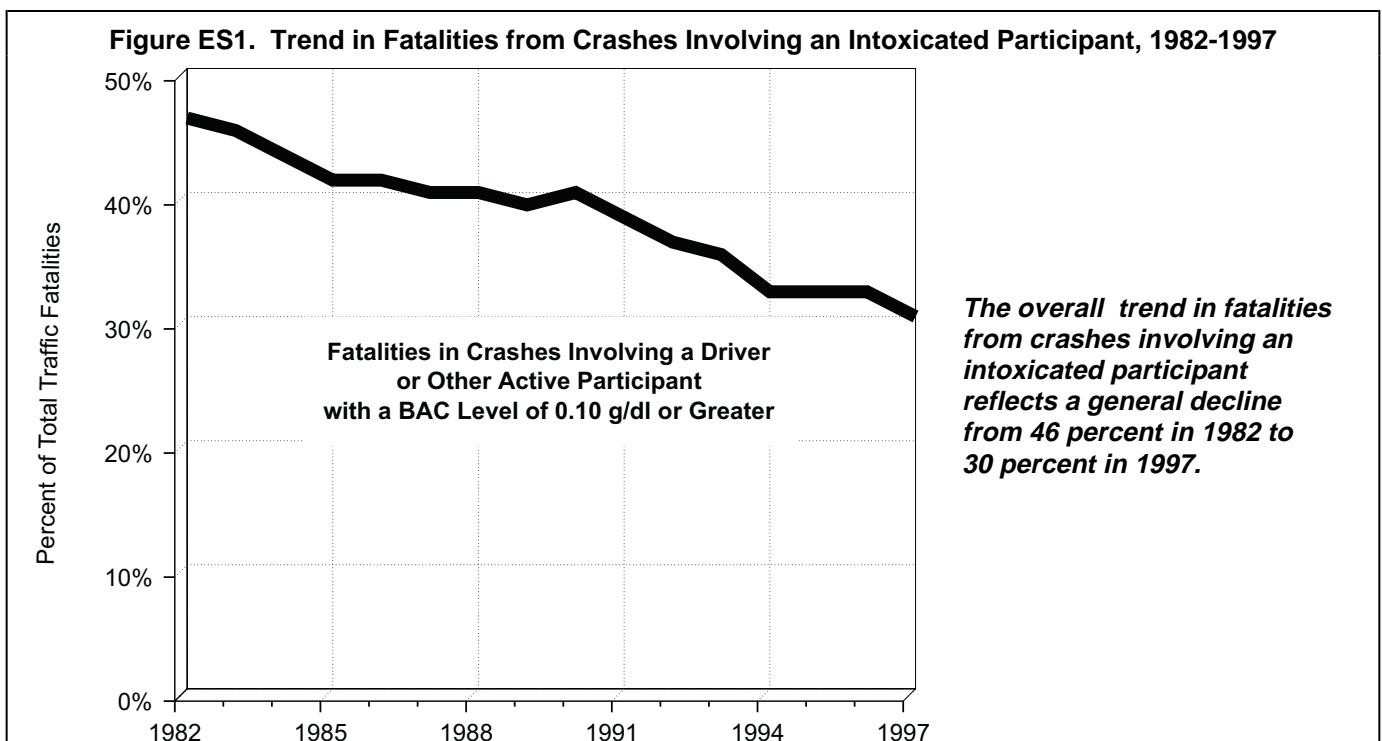
This report presents estimates of alcohol involvement in fatal traffic crashes that occurred during 1997. Several comparisons of alcohol involvement for the period 1982-1997 are presented to illustrate changes and trends. The data are abstracted from the Fatality Analysis Reporting System (FARS) and represent a combination of actual blood alcohol concentration (BAC) test results and estimated BAC distributions for those drivers and nonoccupants for whom no BAC test results are available. The estimates are made using a model developed by the National Highway Traffic Safety Administration.

In 1997, 30 percent of all traffic fatalities involved at least one driver or nonoccupant with BAC of 0.10 or greater (in this report, a BAC of 0.10 or greater is synonymous with intoxication). This represents a reduction of 35 percent from 1982, when 46 percent of all fatalities occurred in crashes that involved an intoxicated active participant. Occupant fatalities resulting from crashes involving an intoxicated

driver or nonoccupant totaled 10,496 in 1997. Less than one-half (40 percent) of the fatalities in single-vehicle crashes involved an intoxicated driver or nonoccupant, compared with 20 percent of the fatalities in multi-vehicle crashes. An estimated 35 percent of the fatalities in nonoccupant crashes involved an intoxicated driver or nonoccupant.

Almost two-thirds (64 percent) of the fatally injured drivers in single-vehicle fatal crashes on weekend nights were drunk. Overall, male drivers involved in fatal crashes were twice as likely as female drivers to be drunk (20 percent and 10 percent, respectively). Drivers between 21 and 24 years old had the highest rates of intoxication (26 percent), followed by those between 25 and 39 years old (24 percent). Drivers 16 to 20 years old were intoxicated 14 percent of the time.

Between 1982 and 1997, estimated reductions in the proportion of intoxicated drivers in fatal crashes are 42 percent for drivers of passenger cars, 43 percent



for light trucks and vans, 40 percent for medium trucks, 75 percent for heavy trucks, and 32 percent for motorcycles. Drivers of motorcycles continue to exhibit a high rate of intoxication in fatal crashes, with 28 percent having levels of at least 0.10 in 1997, compared with 20 percent for drivers of light trucks and vans and 18 percent for drivers of passenger cars.

The following comparisons can be made for the 1996 and 1997 data:

- In 1997, 30 percent of all fatal crashes involved a driver or nonoccupant with BAC 0.10 or greater—a decrease from 32 percent in 1996.
- Alcohol involvement (i.e., a driver or non-occupant with BAC 0.01 or greater) decreased for single-vehicle, multi-vehicle, and non-occupant crashes in both rural and urban areas.
- Alcohol involvement decreased for both male and female drivers in fatal crashes; however, female drivers continue to have much lower rates of alcohol involvement in fatal crashes (43 percent lower in 1996 and 48 percent lower in 1997).

# 1. Introduction

It is a well-established fact that drunk driving plays a major role in fatal crashes. Research has demonstrated that alcohol in a driver's bloodstream greatly impairs the driver's ability to operate a vehicle safely.

This report presents data obtained from the Fatality Analysis Reporting System (FARS) and analyzed using a procedure to estimate blood alcohol content (BAC) levels for drivers and nonoccupants involved in fatal crashes. The report describes the magnitude of the drunk driving problem in the United States, highlights the circumstances under which fatal crashes are frequently associated with alcohol, and shows recent trends in alcohol involvement in fatal crashes.

## Data

FARS contains data on all fatal traffic crashes from each of the states. The data include the results of chemical blood alcohol tests of drivers involved in fatal crashes when they are available. BAC tests form the basis for the statistics reported here; however, for a variety of technical, practical, and economic reasons, no state reports BAC values for all the drivers and nonoccupants involved in fatal crashes. The missing data rate ranges from a few percent in some states to nearly complete absence of testing in others.

Although the nationwide BAC reporting rate has risen over the past 16 years from about 54 percent for fatally injured drivers and 16 percent for surviving drivers to 68 percent and 26 percent, respectively, there are still too many unknown BAC values to ignore. Alcohol involvement for drivers with unknown BAC values must therefore be estimated before valid statistics on the role of alcohol in

fatal crashes can be determined. The same is true for nonoccupants.

## Estimation

Several methods have been used in the past to estimate BAC values for drivers who were not tested. Each method has substantial limitations. To overcome many of the limitations and, in particular, to estimate BAC values for surviving drivers, the National Center for Statistics and Analysis (NCSA) has developed a method based on discriminant analysis to estimate BAC values for all drivers involved in fatal crashes. The method is documented completely in a 1986 report from the National Highway Traffic Safety Administration (NHTSA).<sup>1</sup>

Briefly, the method estimates unknown BACs from the known BAC data for drivers with similar characteristics (such as sex, time of the crash, police alcohol indication, and vehicle type). This method was used to produce all the statistics in this report.

## Presentation

BAC test results range from 0.00 grams per deciliter (g/dl) to more than 0.30. The numbers represent the amount of alcohol, by weight (grams), per amount of blood, by volume (deciliters). In practice, BAC test results measure the percentage of alcohol contained in the blood. For the purposes of this report, it is impractical to treat BAC as a continuous variable. Instead, BAC values are classified into three groups that tell the story of drunk driving in a concise and directly accessible way:

- the 0.00 group of drivers (sober drivers), whose blood contains no alcohol

<sup>1</sup>Klein, T.M., *A Method for Estimating Posterior BAC Distributions for Persons Involved in Fatal Accidents*, DOT HS 807 094 (July 1986).

- the 0.01 to 0.09 group of drivers, whose blood contains some alcohol but less than 0.10 percent (the legal threshold for intoxication in many states)
- the 0.10+ group of drivers (intoxicated or drunk drivers), whose BAC is at or above the usual level of legal intoxication.

Alcohol involvement is shown in the tables of this report by listing either the percentages of drivers in each of the three groups or the percentage of drivers in the high BAC (0.10+) group only, together with the total number of crashes or drivers as appropriate. Because some data are missing or unknown, totals from the disaggregated tables may not add up to the aggregated totals in summary tables. For example, the total of daytime and nighttime crashes is less than the total of all crashes, because the crash times for a few crashes are not known.

### **Interpretation of Estimates**

The procedure used throughout this report produces estimates, not exact counts. The possible error of the estimates is not known precisely, but extensive validation tests suggest that the error of any one estimate is relatively small and, more importantly, does not appreciably affect comparisons such as those in the trends section.

In addition, it is necessary to emphasize that none of the tabulations presented here can be interpreted as implying a direct causal relationship between alcohol use and any other attribute of fatal crashes.

Inferences concerning causality can only be made on the basis of additional information that is independent of the FARS data.

### **Reporting Level**

Alcohol involvement in motor vehicle crashes is customarily reported for crashes or for the persons involved in crashes. For persons, the BAC status of each active participant (driver, pedestrian, or pedalcyclist) in the crash is reported individually. For crashes, the entire crash is classified at the highest BAC level of any active participant.

In crashes in which individual BACs are known, the crash is given a count of 1 at the appropriate BAC level. Thus, a 0.00 crash is one in which all drivers and nonoccupants were sober; a 0.01-0.09 crash is one in which at least one driver or nonoccupant had a BAC level between 0.01 and 0.09 but none had a higher BAC level; and a 0.10+ crash is one in which at least one driver or nonoccupant was intoxicated.

For crashes in which not all individual BACs are known, the count of 1 is distributed among the three BAC levels according to the probability distributions for alcohol involvement of each active participant. In crashes with only one active participant, the crash-level BAC distribution will be identical to that of the one participant. Where two or more persons were actively involved, joint probabilities are calculated from the individual BAC probability distributions to arrive at the crash-level BAC distribution.



## 2. Fatalities

In 1997, 42,013 persons were killed as a result of traffic crashes. Of those fatalities, 30 percent (12,710) occurred in crashes in which a driver or nonoccupant was intoxicated. An additional 8 percent (3,480) involved a driver or nonoccupant who had been drinking but whose BAC was below 0.10. Overall, 39 percent (16,189) of all traffic fatalities involved a driver or nonoccupant with a BAC of 0.01 or above.

Tables 1 and 2 show age distributions for occupant (driver or passenger) and nonoccupant fatalities, respectively. The pattern of intoxicated occupant fatalities by age group (Table 1) is similar to that for nonoccupants (Table 2). The highest rates of intoxication in 1997 were in the 35 to 39 year old age group for occupant fatalities and the 30 to 34 year old age group for nonoccupant fatalities.

Overall, the proportion of nonoccupants who died in crashes involving at least one intoxicated participant (35 percent) was greater than that for occupants (29 percent). In addition, the proportion of nonoccupant fatalities in BAC 0.10+ crashes was higher than the proportion for occupant fatalities in all the age groups over 15 years old.

Figures 1 and 2 show age distributions for the percentages of intoxicated drivers and intoxicated nonoccupants in these crashes in 1997. Again, the proportion of intoxicated nonoccupants was higher than the proportion of intoxicated drivers for all age groups over 15 years old. The peak involvement rate in fatal crashes for intoxicated drivers also occurred at an earlier age and dropped more sharply than the involvement rate for intoxicated nonoccupants.

**Table 1. Occupant Fatalities by Person Age and Crash BAC, 1997**

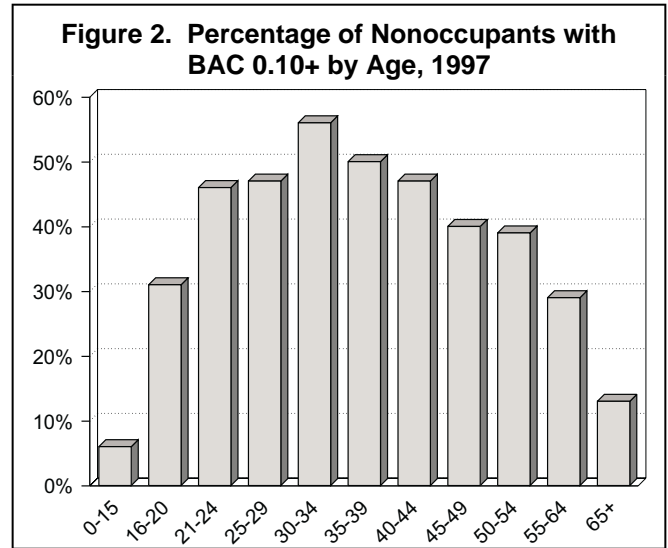
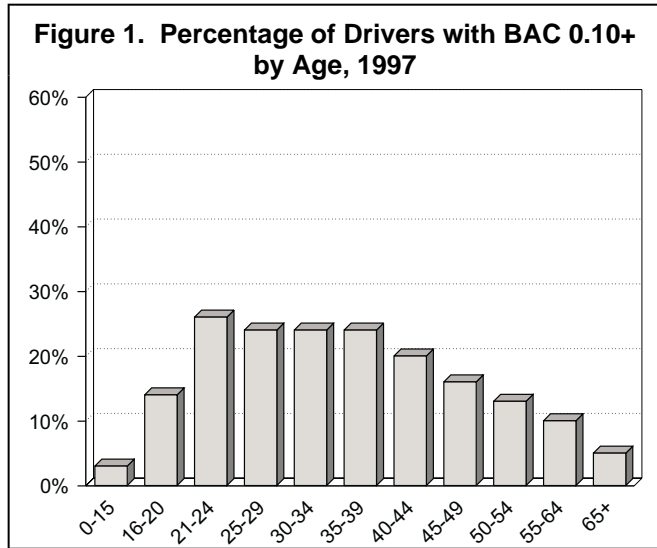
Person Age (Years)	Percent of Fatalities with Crash BAC			Total Fatalities
	0.00	0.01-0.09	0.10+	
0-15 . . . . .	78	8	14	2,222
16-20 . . . . .	64	10	25	5,393
21-24 . . . . .	46	12	43	3,509
25-29 . . . . .	47	10	43	3,506
30-34 . . . . .	46	10	44	3,018
35-39 . . . . .	47	8	45	2,889
40-44 . . . . .	52	8	40	2,494
45-49 . . . . .	61	7	32	2,119
50-54 . . . . .	66	7	27	1,772
55-64 . . . . .	73	7	20	2,609
65+ . . . . .	87	4	9	6,139
<b>Total . . . . .</b>	<b>62</b>	<b>8</b>	<b>29</b>	<b>35,725</b>

**Table 2. Nonoccupant Fatalities by Person Age and Crash BAC, 1997**

Person Age (Years)	Percent of Fatalities with Crash BAC			Total Fatalities
	0.00	0.01-0.09	0.10+	
0-15 . . . . .	82	6	12	935
16-20 . . . . .	54	9	37	392
21-24 . . . . .	41	9	51	288
25-29 . . . . .	40	8	52	394
30-34 . . . . .	32	8	60	482
35-39 . . . . .	37	9	54	556
40-44 . . . . .	41	9	51	523
45-49 . . . . .	46	10	45	463
50-54 . . . . .	47	9	44	331
55-64 . . . . .	61	8	31	550
65+ . . . . .	79	7	15	1,254
<b>Total . . . . .</b>	<b>57</b>	<b>8</b>	<b>35</b>	<b>6,221</b>

As shown in Table 3, there were almost as many fatalities in single-vehicle crashes as in multi-vehicle crashes in 1997. However, the frequency of alcohol occurrence in single-vehicle crashes was much higher.

Table 4 shows the BAC distributions for male and female fatalities in 1997. Of the 27,827 male fatalities, 35 percent occurred in BAC 0.10+ crashes, as compared with only 20 percent of the 14,168 female fatalities.



**Table 3. Fatalities by Crash Type and BAC, 1997**

Crash Type	Percent of Fatalities with Crash BAC			Total Fatalities
	0.00	0.01-0.09	0.10+	
Single-Vehicle . .	51	9	40	16,581
Multi-Vehicle . . .	72	8	20	19,200
Nonoccupant. . .	57	8	35	6,232

**Table 4. Fatalities by Sex and BAC, 1997**

Sex	Percent of Fatalities with Crash BAC			Total Fatalities
	0.00	0.01-0.09	0.10+	
Male . . . . .	56	9	35	27,827
Female . . . . .	72	7	20	14,168
<b>Total . . . . .</b>	<b>61</b>	<b>8</b>	<b>30</b>	<b>42,013</b>

### 3. Crashes

In 1997, 37,324 traffic crashes resulted in the death of one or more persons. In 30 percent of those crashes, at least one driver or nonoccupant (pedestrian or pedalcyclist) had a BAC at or above the level of intoxication (0.10+), as shown in Table 5.

The development of effective countermeasures depends on the ability of safety experts and government agencies to understand the conditions under which drunk driving is particularly prevalent. To assist in that understanding, the summary data in Table 5 can be disaggregated to reveal relationships between alcohol and other fatal crash attributes. Again, because some data are missing or unknown, totals from the disaggregated tables may not add up to the total number of crashes (37,324) shown in Table 5.

#### Day and Time

Alcohol is more prevalent in fatal crashes at night than during the day and more prevalent on weekends than on weekdays. Tables 6 and 7 summarize the BAC distributions for fatal crashes by time of day and period of week.

Table 8 classifies fatal crashes simultaneously by time of day and period of week. In 1997, 9 percent of all fatal crashes that occurred during the daytime hours on weekdays involved at least one intoxicated driver or nonoccupant. The percentage was almost twice as high during the daytime hours on weekends, and on weekend nights more than one-half (54 percent) of all fatal crashes involved one or more intoxicated drivers or nonoccupants.

It is apparent from these tables that drunk driving is far more prevalent during non-working hours than during the business day.

Percent of Crashes with Crash BAC			Total Crashes
0.00	0.01-0.09	0.10+	
62	8	30	37,324

Time	Percent of Crashes with Crash BAC			Total Crashes
	0.00	0.01-0.09	0.10+	
Day* . . . . .	83	5	11	18,554
Night . . . . .	40	11	49	18,431

\*Day is defined as 6:00 a.m. to 5:59 p.m.

Period	Percent of Crashes with Crash BAC			Total Crashes
	0.00	0.01-0.09	0.10+	
Weekday* . . . . .	71	7	22	21,816
Weekend . . . . .	48	10	42	15,417

\*Weekday is defined as Monday 6:00 a.m. to Friday 5:59 p.m.

Time and Period	Percent of Crashes with Crash BAC			Total Crashes
	0.00	0.01-0.09	0.10+	
<b>Day</b>				
Weekday . . . . .	86	5	9	13,392
Weekend . . . . .	75	7	17	5,162
<b>Night</b>				
Weekday . . . . .	47	10	43	8,318
Weekend . . . . .	35	11	54	10,113

## Crash Type

Fatal crashes can be classified into three broad types:

- single-vehicle crashes not involving a non-occupant (pedestrian or pedalcyclist)
- multi-vehicle crashes (involving two or more vehicles)
- nonoccupant crashes involving a vehicle and a pedestrian or pedalcyclist (almost always a single vehicle and a single fatally injured nonoccupant).

Table 9 shows the BAC distributions for the three crash types (see “Reporting Level” in Chapter 1 for a discussion of how alcohol-related crashes are counted). Here again, a breakdown by day and time is revealing, as shown in Tables 10 through 12.

Crash Type	Percent of Crashes with Crash BAC			Total Crashes
	0.00	0.01-0.09	0.10+	
Single-Vehicle . .	51	9	40	15,147
Multi-Vehicle . . .	73	8	19	16,067
Nonoccupant. . .	57	8	35	6,110

Table 10 shows that 59 percent (8,877 out of 15,147) of the single-vehicle crashes in 1997 occurred at night (between 6 p.m. and 5:59 a.m.), when alcohol involvement is relatively high. In contrast, Table 11 indicates that only 37 percent (5,867 out of 16,067) of the multi-vehicle crashes during the year occurred during nighttime hours. The majority of multi-vehicle crashes (63 percent) occurred during the daytime, when alcohol involvement is relatively low.

The higher rate of alcohol involvement in non-occupant crashes (Table 12) compared to multi-vehicle crashes (Table 11) during all time periods warrants a closer look at alcohol involvement for both drivers and nonoccupants. Table 13 shows the BAC distributions for drivers and nonoccupants (most of whom are pedestrians) in nonoccupant fatal crashes. The row and column totals in Table 13 show clearly that nonoccupants were legally intoxicated more frequently (28 percent) than were vehicle drivers (12 percent) in nonoccupant fatal crashes.

**Table 10. Fatal Crash BAC Distribution for Single-Vehicle Crashes by Time of Day and Period of Week, 1997**

Time and Period	Percent of Crashes with Crash BAC			Total Crashes
	0.00	0.01-0.09	0.10+	
<b>Day</b>				
Weekday . . . .	82	4	14	3,954
Weekend . . . .	69	8	24	2,024
<b>Night</b>				
Weekday . . . .	39	10	51	3,790
Weekend . . . .	30	11	59	5,087

**Table 11. Fatal Crash BAC Distribution for Multi-Vehicle Crashes by Time of Day and Period of Week, 1997**

Time and Period	Percent of Crashes with Crash BAC			Total Crashes
	0.00	0.01-0.09	0.10+	
<b>Day</b>				
Weekday . . . .	89	5	6	7,597
Weekend . . . .	81	7	12	2,591
<b>Night</b>				
Weekday . . . .	57	11	32	2,742
Weekend . . . .	42	13	45	3,125

**Table 12. Fatal Crash BAC Distribution for Nonoccupant Crashes by Time of Day and Period of Week, 1997**

Time and Period	Percent of Crashes with Crash BAC			Total Crashes
	0.00	0.01-0.09	0.10+	
<b>Day</b>				
Weekday . . . .	85	5	10	1,841
Weekend . . . .	75	6	19	547
<b>Night</b>				
Weekday . . . .	46	10	44	1,786
Weekend . . . .	35	9	56	1,901

**Table 13. Driver and Nonoccupant BAC Distribution for Nonoccupant Crashes by Time of Day and Period of Week, 1997**

Nonoccupant BAC	Percent of Crashes with Driver BAC			Percent of Total Crashes
	0.00	0.01-0.09	0.10+	
0.00 . . . . .	58	3	6	67
0.01-0.09 . . . . .	4	1	1	5
0.10+ . . . . .	20	3	5	28
Total . . . . .	81	7	12	100

## Crash Environment

A comparison of fatal crash BAC distributions for the three crash types in urban and rural crash locations is shown in Table 14. For single-vehicle and multi-vehicle crashes, alcohol involvement was higher in urban than in rural crashes. For non-occupant fatal crashes, alcohol involvement was higher in rural crashes.

Alcohol involvement in nonoccupant fatal crashes tends to be higher on roadways with higher speed limits, as shown in Table 15. Roads with posted limits of 65 mph and above, most of which are in rural areas, appear to be an exception. There is no apparent relationship between alcohol involvement and speed limit for either single-vehicle or multi-vehicle crashes (Table 16). Estimates for roads with a posted limit of 60 mph are based on very small samples.

Alcohol involvement in fatal crashes also varies as a function of roadway type. Table 17 shows crash count and BAC 0.10+ percentages for the principal roadway types. The percentage of crashes involving an intoxicated participant varies both as a function of the type of crash and by type of roadway. For example, the highest percentages of single-vehicle fatal crashes in which a participant was intoxicated were on major rural collectors, whereas for multi-vehicle fatal crashes the highest percentage was on Interstate highways. Interestingly, the highest percentage of BAC 0.10+ nonoccupant fatal crashes was also on Interstates.

**Table 14. Fatal Crash BAC Distribution by Crash Type and Land Use, 1997**

Crash Type and Land Use	Percent of Crashes with Crash BAC			Total Crashes
	0.00	0.01-0.09	0.10+	
<b>Single-Vehicle</b>				
Urban . . . . .	49	9	42	4,649
Rural . . . . .	52	8	39	10,484
<b>Multi-Vehicle</b>				
Urban . . . . .	71	8	21	6,616
Rural . . . . .	74	8	18	9,433
<b>Nonoccupant</b>				
Urban . . . . .	57	8	35	4,221
Rural . . . . .	56	7	37	1,875

**Table 15. Fatal Crash BAC Distribution for Nonoccupant Crashes by Posted Speed Limit, 1997**

Speed Limit (Miles per Hour)	Percent of Crashes with Crash BAC			Total Crashes
	0.00	0.01-0.09	0.10+	
25 . . . . .	71	7	23	560
30 . . . . .	63	8	28	780
35 . . . . .	58	9	33	1,112
40 . . . . .	55	9	36	629
45 . . . . .	53	7	40	821
50 . . . . .	51	6	42	249
55 . . . . .	51	8	41	1,087
60 . . . . .	40	9	51	110
65 . . . . .	50	8	42	319
70 . . . . .	58	6	35	109
75 . . . . .	53	7	40	32

**Table 16. Percentage of High BAC (0.10+) Fatal Crashes by Posted Speed Limit and Crash Type, 1997**

Speed Limit (Miles per Hour)	Percent of Crashes With BAC 0.10+	
	Single-Vehicle	Multi-Vehicle
25. . . . .	41	23
30. . . . .	43	19
35. . . . .	48	21
40. . . . .	44	21
45. . . . .	46	18
50. . . . .	40	20
55. . . . .	43	18
60. . . . .	42	23
65. . . . .	30	21
70. . . . .	24	16
75. . . . .	12	23

**Table 17. Percentage of High BAC (0.10+) Fatal Crashes by Roadway Function Class and Crash Type, 1997**

Roadway Function Class	Single-Vehicle		Multi-Vehicle		Nonoccupant	
	Number	Percent	Number	Percent	Number	Percent
<u>Interstate</u>						
2,340	24	1,644	21	558	42	
<u>Principal Arterial</u>						
2,648	38	5,852	19	2,174	39	
<u>Minor Arterial</u>						
2,142	43	3,602	19	1,206	34	
<u>Major Rural Collector</u>						
2,683	46	2,149	19	385	34	
<u>Local Street/Road</u>						
3,774	42	1,793	19	1,330	30	



## 4. Drivers and Nonoccupants

### Overview

In 1997, 56,688 drivers were involved in fatal crashes. Of those drivers, 76 percent were sober, 6 percent had BAC levels between 0.01 and 0.09, and 18 percent were intoxicated (BAC 0.10+). Similarly, of the 6,221 fatally injured nonoccupants, 68 percent were sober, 5 percent were in the 0.01 to 0.09 group, and 27 percent were intoxicated.

Table 18 shows that, on average, drivers who survive fatal crashes are intoxicated much less frequently than are fatally injured drivers. Some of the difference may be due to reporting. BAC levels are known more frequently for fatally injured drivers than for survivors. While the alcohol estimation methodology attempts to correct for alcohol under-reporting, some bias may still remain.

Person Type	Percent with BAC			Total Persons
	0.00	0.01-0.09	0.10+	
All Drivers . . . .	76	6	18	56,688
Fatally Injured Drivers . . . . .	65	7	28	24,667
Surviving Drivers . . . . .	85	5	10	32,021
Fatally Injured Nonoccupants . .	68	5	27	6,221

Fatally injured drivers show higher alcohol levels than surviving drivers in all crash types and time periods (Tables 19, 20, and 21). In single-vehicle fatal crashes in 1997 (Table 20), the proportion of fatally injured drivers with BAC 0.10+ exceeded the proportion for surviving drivers by 9 to 12 percentage points during the weekday and weekend daytime hours and by 18 to 20 percentage points during the weekend and weekday nighttime periods.

In multi-vehicle fatal crashes (Table 21), fatally injured drivers were more than twice as likely as

**Table 19. BAC Distributions for Drivers and Nonoccupants in Fatal Crashes by Crash Type, 1997**

Person Type	Percent with BAC			Total Persons
	0.00	0.01-0.09	0.10+	
<b>Single-Vehicle Crashes</b>				
All Drivers . . . .	51	9	40	15,077
Fatally Injured Drivers . . . . .	49	7	44	11,536
Surviving Drivers . . . . .	59	12	28	3,541
<b>Multi-Vehicle Crashes</b>				
All Drivers . . . .	86	5	9	35,120
Fatally Injured Drivers . . . . .	79	6	15	13,125
Surviving Drivers . . . . .	90	4	6	21,995
<b>Nonoccupant Crashes</b>				
All Drivers . . . .	82	6	11	6,491
Fatally Injured Drivers . . . . .	61	20	18	6
Surviving Drivers . . . . .	82	6	11	6,485
Fatally Injured Nonoccupants . .	68	5	27	6,221

**Table 20. BAC Distributions for Drivers in Single-Vehicle Fatal Crashes by Crash Outcome, Time of Day, and Period of Week, 1997**

Time and Period	Percent with BAC			Total Drivers
	0.00	0.01-0.09	0.10+	
<b>Fatally Injured Drivers</b>				
<b>Day</b>				
Weekday . . . .	80	4	16	3,064
Weekend . . . .	66	7	27	1,468
<b>Night</b>				
Weekday . . . .	37	8	55	2,934
Weekend . . . .	27	9	64	3,809
<b>Surviving Drivers</b>				
<b>Day</b>				
Weekday . . . .	88	5	7	876
Weekend . . . .	75	9	15	547
<b>Night</b>				
Weekday . . . .	48	15	37	841
Weekend . . . .	40	16	44	1,256

**Table 21. BAC Distributions for Drivers in Multi-Vehicle Fatal Crashes by Crash Outcome, Time of Day, and Period of Week, 1997**

Time and Period	Percent with BAC			Total Drivers
	0.00	0.01-0.09	0.10+	
<b>Fatally Injured Drivers</b>				
<b>Day</b>				
Weekday . . . .	91	3	5	6,351
Weekend . . . .	85	6	9	1,998
<b>Night</b>				
Weekday . . . .	66	8	26	2,302
Weekend . . . .	55	10	35	2,462
<b>Surviving Drivers</b>				
<b>Day</b>				
Weekday . . . .	97	2	2	10,508
Weekend . . . .	94	3	4	3,663
<b>Night</b>				
Weekday . . . .	84	6	10	3,555
Weekend . . . .	76	9	16	4,257

surviving drivers to have BAC levels of 0.10 or above in each day and time class. The absolute differences ranged from 3 to 5 percentage points (weekday and weekend daytime) to 16 to 19 percentage points (weekday and weekend nighttime).

### Driver Sex

Table 22 shows that male drivers involved in fatal crashes are much more likely to be intoxicated than are female drivers. Table 23 shows that the same is true for all day and time periods. The differences in alcohol involvement for male and female drivers are even more marked for fatally injured drivers (Table 24).

### Driver Age

The overall distribution of alcohol involvement by driver age is shown in Table 25. The percentage of drunk drivers is highest at ages 21 through 24, decreasing to 5 percent for drivers 65 years or older. The age-alcohol pattern seen for all drivers in fatal crashes—a rapid increase to a peak in the 21 to 24 age group followed by a slower decrease—remains unchanged when specific groups are considered (for example, fatally injured drivers or drivers in single-vehicle crashes).

**Table 22. BAC Distributions for Drivers in Fatal Crashes by Sex, 1997**

Sex	Percent with BAC			Total Drivers
	0.00	0.01-0.09	0.10+	
Male . . . . .	73	6	20	40,954
Female . . . . .	86	4	10	14,954

**Table 23. BAC Distributions for Drivers in Fatal Crashes by Sex, Time of Day, and Period of Week, 1997**

Time and Period	Percent with BAC			Total Drivers
	0.00	0.01-0.09	0.10+	
<b>Male Drivers</b>				
<b>Day</b>				
Weekday . . . .	92	3	5	15,641
Weekend . . . .	82	5	12	5,764
<b>Night</b>				
Weekday . . . .	63	8	29	8,699
Weekend . . . .	51	10	39	10,598
<b>Female Drivers</b>				
<b>Day</b>				
Weekday . . . .	94	2	3	6,973
Weekend . . . .	92	3	5	2,430
<b>Night</b>				
Weekday . . . .	75	6	19	2,615
Weekend . . . .	69	8	23	2,875

**Table 24. BAC Distributions for Fatally Injured Drivers by Sex, Time of Day, and Period of Week, 1997**

Time and Period	Percent with BAC			Total Drivers
	0.00	0.01-0.09	0.10+	
<b>Male Drivers</b>				
<b>Day</b>				
Weekday . . . .	86	4	10	6,136
Weekend . . . .	72	7	21	2,397
<b>Night</b>				
Weekday . . . .	46	9	45	4,054
Weekend . . . .	35	9	56	5,075
<b>Female Drivers</b>				
<b>Day</b>				
Weekday . . . .	92	3	5	3,278
Weekend . . . .	88	4	8	1,070
<b>Night</b>				
Weekday . . . .	63	6	31	1,182
Weekend . . . .	53	9	38	1,197



**Table 25. Drivers with BAC 0.10+ in Fatal Crashes by Person Age, 1997**

Person Age (Years)	Total Drivers in Fatal Crashes	Drivers with BAC 0.10+	
		Number	Percent
0-15 . . . . .	345	12	3
16-20. . . . .	7,719	1,106	14
21-24. . . . .	5,705	1,501	26
25-29. . . . .	6,507	1,553	24
30-34. . . . .	5,946	1,402	24
35-39. . . . .	5,880	1,396	24
40-44. . . . .	5,024	1,015	20
45-49. . . . .	4,140	668	16
50-54. . . . .	3,382	444	13
55-64. . . . .	4,394	419	10
65+. . . . .	6,715	324	5

### Driver Age Groups

To highlight the differences among drivers of different ages, driver age can be classified into three groups: 15 to 20 years, 21 to 44, and 45 or older. (In all the states, drivers 15 to 20 years old are now legally prohibited from purchasing alcohol.) Table 26 shows the BAC distribution for the three age groups.

**Table 26. BAC Distributions for Drivers in Fatal Crashes by Age Group, 1997**

Age Group (Years)	Percent with BAC			Total Drivers
	0.00	0.01-0.09	0.10+	
15-20. . . . .	79	7	14	7,936
21-44. . . . .	70	7	24	29,062
45+. . . . .	87	3	10	18,631

Two observations from Table 26 merit special mention:

- The percentages of legally intoxicated drivers in the three age groups differ markedly.
- The percentage of drivers with BAC 0.01-0.09 is significantly lower for drivers over 44 years old.

Tables 27 and 28 show the distribution of fatally injured drivers with BAC 0.10+ in single-vehicle and multi-vehicle crashes by time of day on weekdays and weekends for the three age groups. For both single- and multi-vehicle fatal crashes, drivers in the 21 to 44 year age group had the highest rate of intoxication in each time period.

**Table 27. Distribution of Fatally Injured Drivers with BAC 0.10+ in Single-Vehicle Crashes by Time of Day, Period of Week, and Age Group, 1997**

Time and Period	Percent of Drivers with BAC 0.10+ by Age Group (Years)		
	15-20	21-44	45+
<b>Day</b>			
Weekday . . . . .	8	22	13
Weekend . . . . .	15	36	22
<b>Night</b>			
Weekday . . . . .	33	65	45
Weekend . . . . .	47	71	57

**Table 28. Distribution of Fatally Injured Drivers with BAC 0.10+ in Multi-Vehicle Crashes by Time of Day, Period of Week, and Age Group, 1997**

Time and Period	Percent of Drivers with BAC 0.10+ by Age Group (Years)		
	15-20	21-44	45+
<b>Day</b>			
Weekday . . . . .	2	8	4
Weekend . . . . .	7	16	5
<b>Night</b>			
Weekday . . . . .	15	35	17
Weekend . . . . .	21	43	26

### Vehicle Class

All but about 2 percent of the vehicles involved in fatal crashes fall into one of the following types:

- motorcycles
- passenger cars
- light trucks and vans (including sport utility vehicles)
- medium trucks
- heavy trucks.

Table 29 shows the number of vehicles of each type involved in fatal crashes in 1997, together with the BAC distribution of their drivers. The highest rate of driver intoxication is seen for motorcycles, followed by light trucks and vans and passenger cars.

**Table 29. BAC Distributions for Drivers in Fatal Crashes by Vehicle Type, 1997**

Vehicle Type	Percent of Drivers with BAC			Total Vehicles
	0.00	0.01-0.09	0.10+	
Motorcycles . . .	61	11	28	2,159
Passenger Cars .	76	6	18	29,896
Light Trucks* . . .	74	6	20	18,502
Medium Trucks. .	97	1	3	547
Heavy Trucks . .	98	1	1	4,312

\*Includes pickup trucks, vans, and sport utility vehicles.

### Vehicle Age

Drivers of older vehicles involved in fatal crashes in 1997 were more likely than drivers of newer vehicles to have been drinking when the crashes occurred (Table 30). As shown in Table 31, this was true for drivers of all ages.

**Table 30. BAC Distributions for Drivers in Fatal Crashes by Vehicle Model Year, 1997**

Model Year	Percent of Drivers with BAC			Total Vehicles
	0.00	0.01-0.09	0.10+	
Older than 1982 .	67	7	26	5,327
1982-1985 . . . .	72	6	22	6,748
1986-1989 . . . .	76	6	19	13,539
1990-1998 . . . .	80	5	15	30,035

**Table 31. Drivers with BAC 0.10+ in Fatal Crashes by Person Age and Vehicle Model Year, 1997**

Person Age (Years)	Percent of Drivers with BAC 0.10+ by Vehicle Model Year			
	Older than 1982	1982-1985	1986-1989	1990-1998
15-19 . . . . .	15	12	12	12
20-24 . . . . .	30	27	27	23
25-29 . . . . .	32	30	26	20
30-44 . . . . .	35	31	24	17
45-59 . . . . .	23	18	16	10
60+ . . . . .	9	6	7	4

### Restraint Use

Sober drivers in fatal crashes are considerably more likely to be reported as wearing their seat belts at the time of the crash than are intoxicated drivers. Table 32 shows the proportions of fatally injured and surviving drivers in the three BAC groups who were reported to have been using safety belts at the time of the crash.

Drivers in the 0.01-0.09 group were belted 31 percent less often than were sober drivers (BAC 0.00), and intoxicated drivers were restrained much less often than those in either of the other BAC groups. Similarly, Table 33 shows that drivers who were using their safety belts at the time of a fatal crash were much less likely to have been drinking than were unrestrained drivers, regardless of whether or not they were fatally injured.

**Table 32. Safety Belt Use Rates for Fatally Injured and Surviving Drivers of Passenger Vehicles in Fatal Crashes by BAC Group, 1997**

Drivers	Percent of Drivers Using Safety Belts by BAC Group		
	0.00	0.01-0.09	0.10+
Fatally Injured . .	48	32	18
Surviving . . . . .	79	60	45

**Table 33. BAC Distributions for Fatally Injured and Surviving Drivers of Passenger Vehicles in Fatal Crashes by Safety Belt Use, 1997**

Drivers	Belt Use	Percent of Drivers with BAC			Total Drivers
		0.00	0.01-0.09	0.10+	
Fatally Injured. .	Yes	81	5	14	7,573
	No	54	7	39	12,354
Surviving . . . . .	Yes	90	4	6	17,740
	No	70	9	22	5,932

## 5. Alcohol Trends, 1982-1997

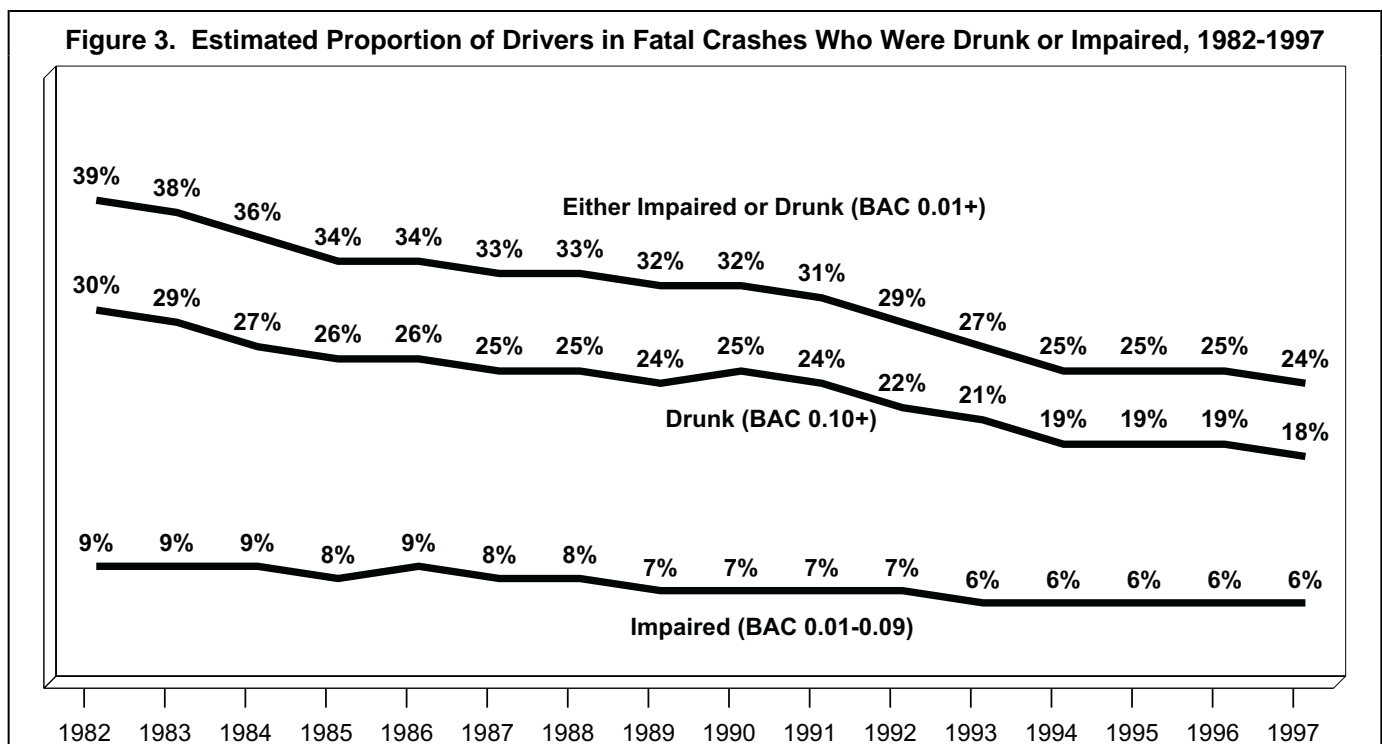
Alcohol involvement in fatal crashes decreased between 1982 and 1997. The decrease was not uniform; alcohol involvement dropped more for some crash types than for others. This chapter describes some of the major changes.

Table 34 shows the year-to-year distribution of alcohol involvement in fatal crashes. Figure 3 shows the year-to-year BAC distributions for drivers in fatal crashes.

Tables 35, 36, and 37 illustrate several facts of special interest. The reduction in alcohol involvement for drivers under 21 years of age (Table 35) is especially large and is seen for all times of day and all periods of the week. For drivers 21 to 44 years old (Table 36) the average reduction is much smaller, especially for nighttime driving, when alcohol involvement is notoriously high. For drivers 45 years and older there is a large reduction in drunk driving during the day, as well as a smaller but substantial reduction for nighttime driving.

**Table 34. Fatal Crash BAC Distributions, 1982-1997**

Year	Percent of Crashes with Crash BAC			Total Crashes
	0.00	0.01-0.09	0.10+	
1982 . . . . .	43	11	46	39,092
1983 . . . . .	45	10	45	37,976
1984 . . . . .	47	11	43	39,631
1985 . . . . .	48	10	41	39,196
1986 . . . . .	48	11	41	41,090
1987 . . . . .	49	11	40	41,438
1988 . . . . .	50	10	40	42,130
1989 . . . . .	51	10	39	40,741
1990 . . . . .	51	10	40	39,836
1991 . . . . .	52	9	38	36,937
1992 . . . . .	54	9	36	34,942
1993 . . . . .	57	9	35	35,780
1994 . . . . .	59	8	32	36,254
1995 . . . . .	59	9	33	37,241
1996 . . . . .	59	9	32	37,494
1997 . . . . .	62	8	30	37,324



**Table 35. Reduction in High-BAC (0.10+) Drivers 16 to 20 Years Old in Fatal Crashes by Time of Day and Period of Week, 1982-1997**

Time and Period	Percent of Drivers with BAC 0.10+		Percent Reduction, 1982-1997
	1982	1997	
<b>Day</b>			
Weekday . . . . .	9	3	67
Weekend . . . . .	15	7	53
<b>Night</b>			
Weekday . . . . .	40	21	48
Weekend . . . . .	47	29	38

Note: Data do not include nonoccupant crashes.

**Table 36. Reduction in High-BAC (0.10+) Drivers 21 to 44 Years Old in Fatal Crashes by Time of Day and Period of Week, 1982-1997**

Time and Period	Percent of Drivers with BAC 0.10+		Percent Reduction, 1982-1997
	1982	1997	
<b>Day</b>			
Weekday . . . . .	12	6	50
Weekend . . . . .	24	14	42
<b>Night</b>			
Weekday . . . . .	48	37	23
Weekend . . . . .	53	45	15

Note: Data do not include nonoccupant crashes.

**Table 37. Reduction in High-BAC (0.10+) Drivers 45 Years and Older in Fatal Crashes by Time of Day and Period of Week, 1982-1997**

Time and Period	Percent of Drivers with BAC 0.10+		Percent Reduction, 1982-1997
	1982	1997	
<b>Day</b>			
Weekday . . . . .	9	4	56
Weekend . . . . .	14	7	50
<b>Night</b>			
Weekday . . . . .	30	19	37
Weekend . . . . .	34	28	18

Note: Data do not include nonoccupant crashes.

Table 38 shows reductions in drunk driving by vehicle type. Although alcohol involvement is generally low for drivers operating commercial vehicles (medium and heavy trucks), sizable reductions occurred for those drivers between 1982 and 1997. Motorcycle drivers had not only the highest percentage of alcohol involvement in 1997 but also the smallest reduction in drunk driving from 1982 to 1997.

**Table 38. Reduction in High-BAC (0.10+) Drivers in Fatal Crashes by Vehicle Type, 1982-1997**

Vehicle Type	Percent of Drivers with BAC 0.10+		Percent Reduction, 1982-1997
	1982	1997	
Motorcycles . . . . .	41	28	32
Passenger Cars . . . . .	31	18	42
Light Trucks* . . . . .	35	20	43
Medium Trucks . . . . .	5	3	40
Heavy Trucks . . . . .	4	1	75

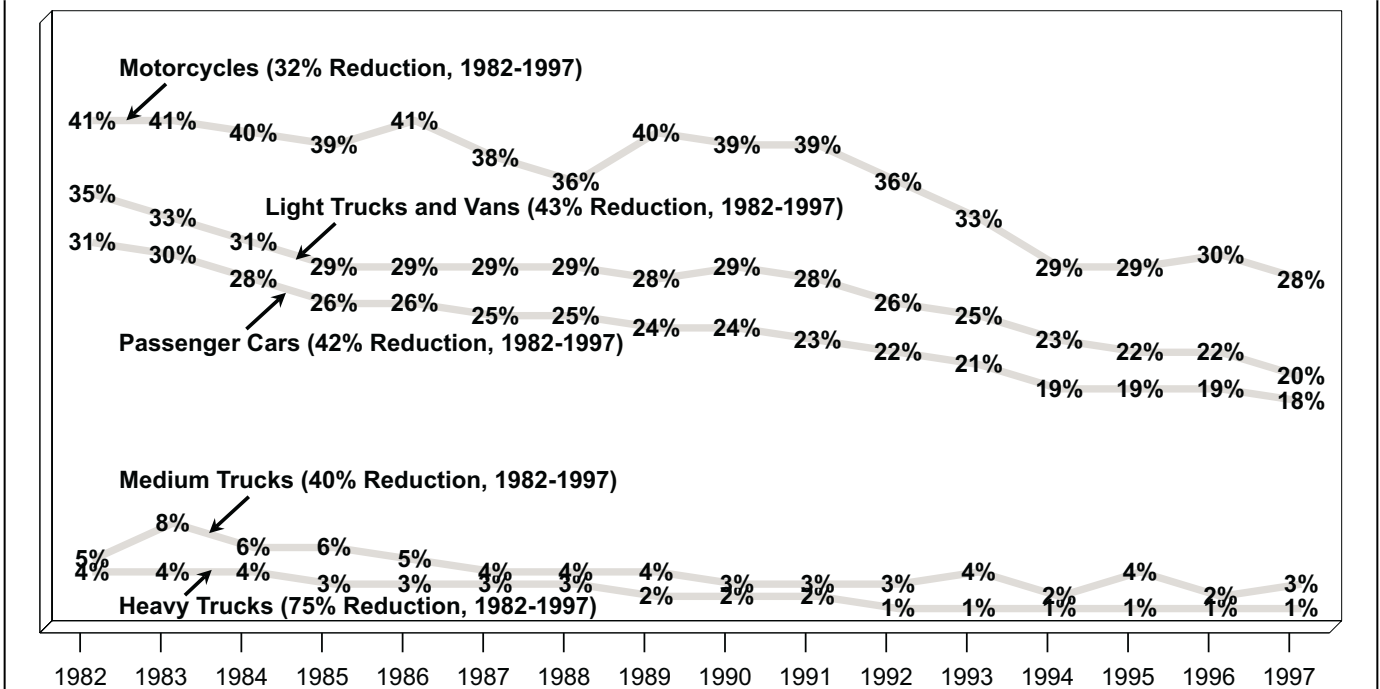
\*Includes pickup trucks, vans, and sport utility vehicles.

Figure 4 shows that the alcohol involvement rate for motorcycle drivers remained fairly constant between 1982 and 1986, dropped sharply in 1987 and 1988, and rose again in 1989. In contrast, the involvement rate for passenger car drivers declined steadily over the entire period.

For drivers of light trucks and vans, there was a sharp drop in the involvement rate from 1982 to 1985, after which it fluctuated at around the same level before beginning a sharp decline in 1991. Drivers of medium and heavy trucks continue to have low rates of alcohol involvement in fatal crashes.

Female drivers not only are less frequently drunk than males but also show a greater reduction in alcohol involvement in fatal crashes from 1982 to 1997 (Table 39).

**Figure 4. Estimated Proportion of Drunk Drivers (BAC 0.10+) in Fatal Crashes by Vehicle Type, 1982-1997**



**Table 39. Reduction in High-BAC (0.10+) Drivers in Fatal Crashes by Sex, 1982-1997**

Sex	Percent of Drivers with BAC 0.10+		Percent Reduction, 1982-1997
	1982	1997	
Male . . . . .	32	20	38
Female . . . . .	19	10	47
All Drivers. . . . .	30	18	40

**Table 40. Reduction in High-BAC (0.10+) Drivers in Fatal Crashes by Land Use and Crash Type, 1982-1997**

Land Use and Crash Type	Percent of Drivers with BAC 0.10+		Percent Reduction, 1982-1997
	1982	1997	
<b>Urban</b>			
Single-Vehicle . . .	56	42	25
Multi-Vehicle . . .	38	21	45
Nonoccupant . . .	42	35	17
Total . . . . .	46	31	33
<b>Rural</b>			
Single-Vehicle . . .	55	39	29
Multi-Vehicle . . .	34	18	47
Nonoccupant . . .	51	37	27
Total . . . . .	47	30	36

A different aspect of alcohol trends is shown in Table 40, which shows the reductions in high BAC (0.10+) driver involvement in fatal crashes from 1982 to 1997 by land use and crash type. Overall, the proportion of drunk drivers (BAC 0.10+) in fatal crashes dropped by 33 percent in urban areas and by 36 percent in rural areas.



U.S. Department of Transportation  
**National Highway Traffic Safety  
Administration**

DOT HS 809 102  
August 2000