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Traffic Safety  
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# **Alcohol Involvement in Fatal Traffic Crashes 1986**

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# EXECUTIVE SUMMARY

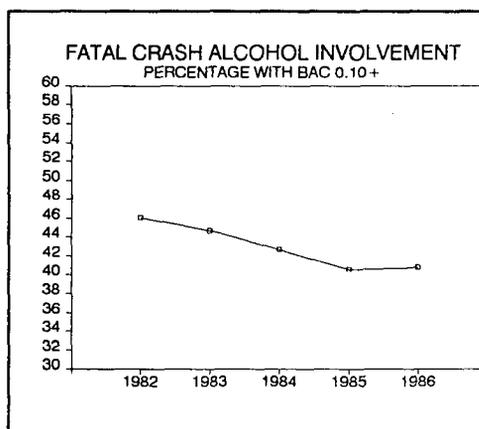
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This report presents estimates of alcohol involvement in fatal traffic crashes that occurred during 1986. Several comparisons of alcohol involvement for the period 1982-1986 are presented to investigate changes and trends. The data are abstracted from the Fatal Accident Reporting System (FARS) and represent a combination of actual blood alcohol concentration (BAC) test results and estimated BAC distributions for those drivers and non-occupants for whom no BAC test results are available. The estimates are made using a model developed by the National Highway Traffic Safety Administration.

In 1986, 41.1% of all fatalities involved a driver or non-occupant with BAC of 0.10 or greater (in this report, this BAC level is synonymous with intoxication). This represents an 11% reduction compared to 1982, when 46.1% of all fatalities involved an intoxicated active participant. Occupant fatalities resulting from crashes involving an intoxicated driver or non-occupant totalled 15,726. Almost 51% of the occupant fatalities in single-vehicle crashes involved an intoxicated driver, compared with 31.9% of the occupant fatalities in multi-vehicle crashes. Forty percent of the fatalities in non-occupant crashes involved an intoxicated driver or non-occupant.

More than two-thirds (69.3%) of the fatally-injured drivers in single-vehicle fatal crashes on weekend nights were drunk, compared to 3.2% of the surviving drivers in multi-vehicle fatal crashes during the weekday daytime hours. Overall, male drivers involved were almost twice as likely as female drivers to be drunk (28.5% vs. 14.9%, respectively). Drivers of age 21-24 years exhibited the highest rates of intoxication (36.0%) followed by drivers of age 25-29 (34.6%). Drivers of age 16-20 years were intoxicated 23.7% of the time.

As shown in the figure below, the overall trend in fatal crash alcohol involvement shows a general decline from 46.1% in 1982 to 40.7% in 1986.



The greatest reductions in high-BAC driver involvement from 1982-1986 can be found during the daytime hours on weekdays and weekends, among drivers of age 16-20 years and 45 + years, and among female drivers. Reductions in fatal crash alcohol involvement of 15% have been experienced among drivers of passenger cars, light trucks and vans, and medium trucks. However, drivers of motorcycles continue to exhibit a high rate of intoxication in fatal crashes, 41.0% in 1986 compared with 40.7% in 1982.

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# INTRODUCTION

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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 one's ability to operate a vehicle safely.

This report presents data obtained from the Fatal Accident Reporting System (FARS) and analyzed using a procedure to estimate the BAC level for drivers and non-occupants 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.

## Method of Presentation

### I. 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. These blood-alcohol concentration (BAC) tests form the basis of the statistics reported here. However, no State reports a BAC value for every driver, for various technical, practical or economic reasons. 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 from about 25% to 71% for fatally-injured drivers and from almost zero to

22% for surviving drivers during the past seven years, there are still too many unknown BAC values to ignore. Alcohol involvement for drivers with unknown BAC values must be estimated before valid statistics on the role of alcohol in fatal crashes can be determined.

### 2. Estimation

Several methods have been used previously to estimate BAC values for drivers who had not been tested. Each method has substantial limitations. To overcome many of these limitations, and in particular to estimate BAC values for surviving drivers, the National Center for Statistics and Analysis 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 Reference 2. Briefly, the method estimates unknown BACs from the known BAC data of drivers with similar characteristics (such as sex, crash time, police alcohol indication, and vehicle type). This method was used to produce all statistics in this report.

### 3. Presentation

BAC test results range from 0.00 to more than 0.30. The numbers represent the amount of alcohol, by weight, per amount of blood, by volume. 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 is classified into three groups which tell the story of drunk driving in a concise and directly accessible way:

- the 0.00 group of drivers whose blood contains no alcohol;
- the 0.01-0.09 group of drivers whose blood contains some alcohol, but less than 0.10 percent; and
- the 0.10+ group of drivers whose BAC is at or above the usual level of legal intoxication.

In the tables of this report, alcohol involvement is shown 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. Note that disaggregated tables may not sum to the aggregate total, due to missing data. For example, the total of day and night crashes is less than the total of all crashes since crash time is unknown for a few crashes.

#### **4. Interpretation of Estimates**

The procedure used throughout this report produces estimates, not exact counts. The possible error of these estimates is not known precisely. However, 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 section on trends.

In addition, it is necessary to emphasize that none of the tabulations presented 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.

#### **5. Reporting Level**

Alcohol involvement in motor vehicle crashes is customarily reported for crashes or for participants. For persons, the BAC status of each active participant (driver, pedestrian, or bicyclist) in the crash is reported individually. For crashes, the entire crash is classified at the highest BAC level of any active participant. Thus, a 0.00 crash is one in which all drivers and non-occupants are sober, a 0.01-0.09 crash has at least one driver or non-occupant at this level but none higher, and a 0.10+ crash has at least one driver or non-occupant at this level.

In this report, Section I presents data on fatalities; Section II presents data on crashes; Section III presents data on drivers and non-occupants; and Section IV presents selected trends in alcohol involvement between 1982 and 1986.

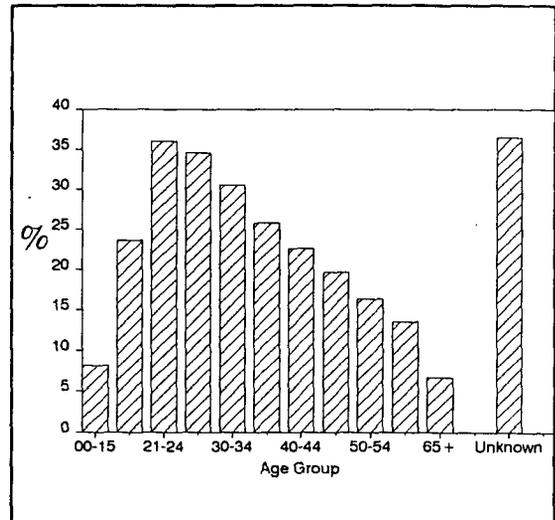
# SECTION I - FATALITIES

Traffic crashes killed 46,056 persons in 1986. Forty-one percent (18,929) of these fatalities occurred in crashes in which a driver or non-occupant was drunk. An additional 11% (5,112) of these fatalities involved a driver or non-occupant who had been drinking but whose BAC was below 0.10.

Tables 1 and 2 show the age distribution of these fatalities: Table 1 for motor vehicle occupants and Table 2 for non-occupants.

| Table 1<br>Occupant Fatalities<br>By Person Age and Crash BAC<br>1986 |              |              |              |                  |
|---|--------------|--------------|--------------|------------------|
| Person Age  | 0.00         | 0.01-0.09    | 0.10 +       | Total Fatalities |
| 00-15   | 67.1%        | 11.3%        | 21.5%        | 2,250            |
| 16-20   | 44.9%        | 16.6%        | 38.5%        | 7,230            |
| 21-24   | 31.6%        | 13.2%        | 55.2%        | 5,668            |
| 25-29   | 32.4%        | 11.3%        | 56.3%        | 5,228            |
| 30-34   | 35.7%        | 10.5%        | 53.8%        | 3,692            |
| 35-39   | 42.2%        | 9.5%         | 48.3%        | 2,730            |
| 40-44   | 46.0%        | 8.7%         | 45.3%        | 1,838            |
| 45-49   | 47.9%        | 10.9%        | 41.2%        | 1,356            |
| 50-54   | 56.6%        | 9.5%         | 33.9%        | 1,259            |
| 55-64   | 63.5%        | 8.1%         | 28.4%        | 2,506            |
| 65 +  | 81.3%        | 6.4%         | 12.3%        | 4,415            |
| <b>Total</b>  | <b>47.4%</b> | <b>11.4%</b> | <b>41.2%</b> | <b>38,169</b>    |

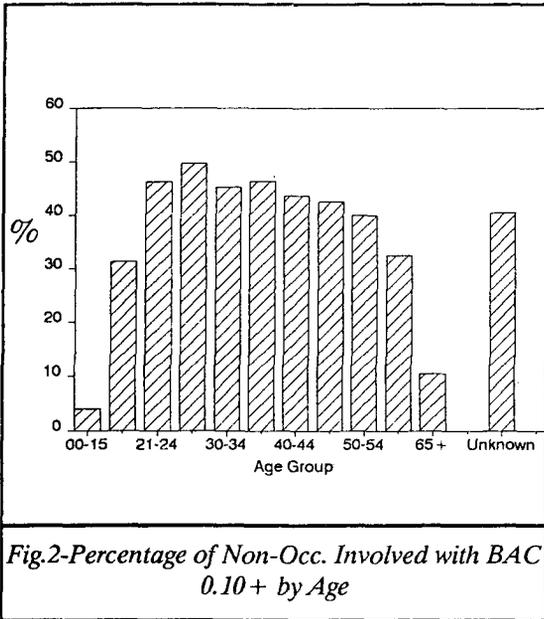
The occupant fatality age-alcohol pattern of Table 1 is similar to the pattern for drivers involved in fatal crashes as depicted in Figure 1, though the occupant pattern peaks a bit later and drops more slowly than the driver pattern.



*Fig. 1-Percentage of Drivers Involved with BAC 0.10+ by Age*

| Table 2<br>Non-Occupant Fatalities<br>By Person Age and Crash BAC<br>1986 |              |             |              |                  |
|---|--------------|-------------|--------------|------------------|
| Person Age  | 0.00         | 0.01-0.09   | 0.10 +       | Total Fatalities |
| 00-15   | 78.8%        | 6.9%        | 14.3%        | 1,591            |
| 16-20   | 38.7%        | 11.8%       | 49.6%        | 641              |
| 21-24   | 28.0%        | 11.2%       | 60.7%        | 589              |
| 25-29   | 26.1%        | 10.6%       | 63.3%        | 707              |
| 30-34   | 30.7%        | 8.8%        | 60.5%        | 523              |
| 35-39   | 30.3%        | 9.7%        | 60.0%        | 473              |
| 40-44   | 32.3%        | 10.6%       | 57.0%        | 348              |
| 45-49   | 36.5%        | 9.4%        | 54.1%        | 344              |
| 50-54   | 40.0%        | 8.8%        | 51.3%        | 316              |
| 55-64   | 47.5%        | 9.2%        | 43.3%        | 621              |
| 65 +  | 71.6%        | 9.4%        | 19.0%        | 1,480            |
| <b>Total</b>  | <b>50.8%</b> | <b>9.3%</b> | <b>39.9%</b> | <b>7,633</b>     |

For all fatalities age 16 and above, alcohol levels are higher in non-occupant than in occupant crashes. This is due to the incidence of intoxication among non-occupants as shown in Figure 2.



| Sex    | 0.00  | 0.01-0.09 | 0.10+ | Total Fatalities |
|--------|-------|-----------|-------|------------------|
| Male   | 42.7% | 11.5%     | 45.8% | 32,850           |
| Female | 60.4% | 10.1%     | 29.4% | 13,192           |
| Total  | 47.7% | 11.1%     | 41.1% | 46,056           |

Table 4 presents the BAC distribution of male vs. female fatalities that occurred in 1986. Of the 32,850 male fatalities, 45.8% occurred in accidents in which a driver or non-occupant had a BAC of 0.10 or greater, compared with 29.4% of the 13,192 female fatalities.

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

| Crash Type     | 0.00  | 0.01-0.09 | 0.10+ | Total Fatalities |
|----------------|-------|-----------|-------|------------------|
| Single-Vehicle | 37.8% | 11.4%     | 50.8% | 18,810           |
| Multi-Vehicle  | 56.7% | 11.4%     | 31.9% | 19,360           |
| Non-Occupant   | 50.4% | 9.4%      | 40.1% | 7,886            |

# SECTION II - CRASHES

In 1986, each of 41,062 traffic crashes resulted in the death of one or more persons. In 40.7% of these crashes, at least one driver or non-occupant (pedestrian or bicyclist) was at or above the level of intoxication (0.10) as shown in Table 5.

| 0.00  | 0.01-0.09 | 0.10 + | Total<br>Crashes |
|-------|-----------|--------|------------------|
| 48.4% | 10.9%     | 40.7%  | 41,062           |

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 this understanding, the summary data of Table 5 can be disaggregated to reveal relationships between alcohol and other fatal crash attributes. Note that the disaggregated data may not add up to the crash total of 41,062 due to unknown values for some variables.

## 1. Day and Time

Alcohol is more prevalent in fatal crashes at night than during the day, and on weekends compared to weekdays. The

following tables summarize these BAC distributions.

| Time  | 0.00  | 0.01-0.09 | 0.10 + | Total<br>Crashes |
|-------|-------|-----------|--------|------------------|
| Day * | 75.1% | 7.7%      | 17.2%  | 17,495           |
| Night | 28.5% | 13.3%     | 58.2%  | 23,215           |

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

| Period   | 0.00  | 0.01-0.09 | 0.10 + | Total<br>Crashes |
|----------|-------|-----------|--------|------------------|
| Weekday* | 58.5% | 9.4%      | 32.0%  | 22,700           |
| Weekend  | 36.2% | 12.7%     | 51.1%  | 17,504           |

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

Table 8 classifies fatal crashes by both variables simultaneously. During the day on weekdays, 14% of all fatal crashes involve at least one drunk driver or non-occupant. On weekends, during the day, this percentage almost doubles; on weekend nights, almost two-thirds of all

fatal crashes involve one or more drunk drivers or non-occupants.

| Period           | 0.00  | 0.01-0.09 | 0.10 + | Total<br>Crashes |
|------------------|-------|-----------|--------|------------------|
| <b>Daytime</b>   |       |           |        |                  |
| -Weekday         | 79.1% | 6.8%      | 14.1%  | 12,497           |
| -Weekend         | 65.2% | 9.9%      | 24.9%  | 4,998            |
| <b>Nighttime</b> |       |           |        |                  |
| -Weekday         | 33.4% | 12.7%     | 53.9%  | 10,092           |
| -Weekend         | 24.5% | 13.9%     | 61.6%  | 12,346           |

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

## 2. Crash Type

Fatal crashes may be classified into three broad types:

- Single vehicle crashes, not involving a non-occupant (pedestrian or bicyclist),
- Multi-vehicle crashes, involving two or more vehicles;
- Non-occupant crashes, involving a vehicle and a non-occupant (almost always a single vehicle and a single fatally-injured non-occupant).

Table 9 shows the BAC distributions for these crash types.

| Crash Type | 0.00  | 0.01-0.09 | 0.10 + | Total<br>Crashes |
|------------|-------|-----------|--------|------------------|
| Single-veh | 37.9% | 11.3%     | 50.8%  | 17,114           |
| Multi-veh  | 58.3% | 11.2%     | 30.6%  | 16,244           |
| Non-occup  | 50.8% | 9.4%      | 39.9%  | 7,704            |

Here again, a breakdown by day and time is quite revealing, as shown by Tables 10 through 12.

| Period           | 0.00  | 0.01-0.09 | 0.10 + | Total<br>Crashes |
|------------------|-------|-----------|--------|------------------|
| <b>Daytime</b>   |       |           |        |                  |
| -Weekday         | 72.6% | 6.3%      | 21.1%  | 3,474            |
| -Weekend         | 58.4% | 9.3%      | 32.4%  | 2,000            |
| <b>Nighttime</b> |       |           |        |                  |
| -Weekday         | 26.6% | 12.3%     | 61.1%  | 4,786            |
| -Weekend         | 21.9% | 13.8%     | 64.3%  | 6,543            |

Note from Table 10 that 67% (11,329/16,803) of the single-vehicle crashes occur after dark, when alcohol involvement is relatively high. In contrast, Table 11 indicates that 56% (9,072/16,235) of the multi-vehicle fatal crashes occur during daytime when alcohol involvement is relatively low.

**Table 11**  
Fatal Crash BAC Distribution  
By Time of Day and Period of Week  
Multi-Vehicle Crashes  
1986

| Period    | 0.00  | 0.01-0.09 | 0.10 + | Total Crashes |
|-----------|-------|-----------|--------|---------------|
| Daytime   |       |           |        |               |
| -Weekday  | 81.0% | 7.2%      | 11.8%  | 6,730         |
| -Weekend  | 69.3% | 10.8%     | 19.9%  | 2,342         |
| Nighttime |       |           |        |               |
| -Weekday  | 39.2% | 14.6%     | 46.2%  | 3,174         |
| -Weekend  | 28.6% | 15.4%     | 56.0%  | 3,989         |

**Table 12**  
Fatal Crash BAC Distribution  
By Time of Day and Period of Week  
Non-Occupant Crashes  
1986

| Period    | 0.00  | 0.01-0.09 | 0.10 + | Total Crashes |
|-----------|-------|-----------|--------|---------------|
| Daytime   |       |           |        |               |
| -Weekday  | 83.5% | 6.2%      | 10.3%  | 2,293         |
| -Weekend  | 71.1% | 8.5%      | 20.4%  | 656           |
| Nighttime |       |           |        |               |
| -Weekday  | 39.8% | 10.9%     | 49.3%  | 2,132         |
| -Weekend  | 25.9% | 11.1%     | 63.0%  | 2,578         |

The alcohol-involvement level of a crash is defined as the highest BAC found among the active participants in the crash. In two-vehicle crashes, this means either of the two drivers; in non-occupant crashes, it means either the driver or the non-occupant. The higher rate of alcohol involvement in non-occupant crashes (Table 12) at almost all time periods, compared to multi-vehicle crashes (Table 11), suggests a

high frequency of intoxication among fatally-injured pedestrians and bicyclists.

Table 13 shows the BAC distribution for drivers and non-occupants (mostly pedestrians) in non-occupant fatal crashes. Row and column totals in Table 9 show plainly that non-occupants are legally intoxicated (29.9%) more frequently than are vehicle drivers (17.7%) in non-occupant fatal crashes.

**Table 13**  
BAC Distribution  
For Drivers and Non-Occupants in  
Non-Occupant Crashes  
1986

| Non-Occ BAC | Driver BAC |           |        | Total |
|-------------|------------|-----------|--------|-------|
|             | 0.00       | 0.01-0.09 | 0.10 + |       |
| 0.00        | 50.8%      | 4.1%      | 8.4%   | 63.3% |
| 0.01-0.09   | 4.4%       | 0.9%      | 1.6%   | 6.9%  |
| 0.10 +      | 18.8%      | 3.4%      | 7.7%   | 29.9% |
| Total       | 74.0%      | 8.4%      | 17.7%  |       |

### 3. Crash Environment

Fatal crash BAC distributions differ by crash location within each crash type, as shown in Table 14.

Note that urban drunk driving percentages are higher than rural for single- and multi-vehicle fatal crashes, while the situation is reversed for non-occupant crashes.

Alcohol involvement in non-occupant fatal crashes increases as the crash roadway's speed limit increases, as shown in Table 15.

**Table 14**  
**Fatal Crash BAC Distribution**  
**By Crash Type and Land Use**  
**1986**

| Crash Type/<br>Land Use | 0.00  | 0.01-0.09 | 0.10 + | Total<br>Crashes |
|-------------------------|-------|-----------|--------|------------------|
| <b>Single-Veh.</b>      |       |           |        |                  |
| -Urban                  | 35.4% | 11.7%     | 52.9%  | 5,748            |
| -Rural                  | 39.1% | 11.1%     | 49.7%  | 11,353           |
| <b>Multi-Veh.</b>       |       |           |        |                  |
| -Urban                  | 55.2% | 11.6%     | 33.3%  | 7,173            |
| -Rural                  | 60.8% | 10.8%     | 28.4%  | 9,055            |
| <b>Non-Occup.</b>       |       |           |        |                  |
| -Urban                  | 52.3% | 9.4%      | 38.4%  | 5,153            |
| -Rural                  | 47.6% | 9.4%      | 43.0%  | 2,546            |

**Table 16**  
**Proportion of High-BAC (0.10 +)**  
**Fatal Crashes**  
**By Posted Speed Limit and**  
**Crash Type**  
**1986**

| Speed<br>Limit | Single<br>Vehicle | Multi-<br>Vehicle |
|----------------|-------------------|-------------------|
| 25 mph         | 50.6%             | 31.0%             |
| 30             | 51.5%             | 31.2%             |
| 35             | 55.1%             | 33.3%             |
| 40             | 56.3%             | 33.0%             |
| 45             | 58.0%             | 31.3%             |
| 50             | 55.9%             | 27.8%             |
| 55             | 48.1%             | 29.6%             |

**Table 15**  
**Fatal Crash BAC Distribution**  
**By Posted Speed Limit**  
**Non-Occupant Crashes**  
**1986**

| Speed<br>Limit | 0.00  | 0.01-0.09 | 0.10 + | Total<br>Crashes |
|----------------|-------|-----------|--------|------------------|
| 25 mph         | 68.1% | 7.7%      | 24.2%  | 741              |
| 30             | 59.6% | 10.4%     | 30.0%  | 1,160            |
| 35             | 51.8% | 9.0%      | 39.2%  | 1,350            |
| 40             | 50.2% | 9.6%      | 40.2%  | 656              |
| 45             | 42.9% | 8.7%      | 48.4%  | 861              |
| 50             | 44.6% | 9.9%      | 45.5%  | 363              |
| 55             | 43.2% | 9.9%      | 46.9%  | 2,167            |

About half of the single-vehicle fatal crashes occur on major rural collectors and local urban and rural roads, where alcohol involvement is highest. In contrast, non-occupant crashes have their highest alcohol involvement level on interstate highways, although their number is relatively small.

There is no apparent relationship between alcohol involvement and speed limit for single- or multi-vehicle crashes (Table 16).

Alcohol involvement in fatal crashes also varies as a function of roadway type. Table 17 gives crash counts and high-BAC (0.10 +) percentages for the principal roadway types.

**Table 17**  
**Proportion of High-BAC (0.10 +)**  
**Fatal Crashes**  
**By Crash Type and**  
**Roadway Function Class**  
**1986**

| Roadway<br>Fct. Class | Single<br>Vehicle |      | Multi-<br>Vehicle |      | Non-<br>Occupant |      |
|-----------------------|-------------------|------|-------------------|------|------------------|------|
|                       | Count             | Pct  | Count             | Pct  | Count            | Pct  |
| Interstate            | 1,825             | 36.9 | 1,219             | 34.6 | 668              | 49.3 |
| Principal Arterial    | 2,775             | 50.6 | 5,357             | 30.3 | 2,300            | 43.2 |
| Minor Arterial        | 2,900             | 52.6 | 3,927             | 30.0 | 1,577            | 40.4 |
| Major Rural Collector | 3,162             | 55.5 | 2,365             | 29.4 | 594              | 42.4 |
| Local Street/Road     | 4,216             | 50.9 | 1,752             | 28.8 | 1,531            | 29.8 |

# SECTION III - DRIVERS AND NON-OCCUPANTS

## 1. Overview

In 1986, 60,297 drivers were involved in fatal crashes. Of these drivers, 65.7% were sober, 8.5% fell in the 0.01-0.09 group, and 25.7% were at or above a 0.10 BAC. Similarly, of the 7,770 fatally-injured non-occupants, 64.2% were sober, 6.9% fell in the 0.01-0.09 group, and 28.9% were at or above a 0.10 BAC.

| Person<br>Type     | 0.00  | 0.01-0.09 | 0.10 + | Total<br>Persons |
|--------------------|-------|-----------|--------|------------------|
| All Drivers        | 65.7% | 8.5%      | 25.7%  | 60,297           |
| Fat.-Inj. Drivers  | 51.8% | 9.4%      | 38.7%  | 26,613           |
| Surv. Drivers      | 76.7% | 7.8%      | 15.5%  | 33,684           |
| Fat.-Inj. Non-Occ. | 64.2% | 6.9%      | 28.9%  | 7,770            |

Table 18 shows that, on the average, drivers surviving a fatal crash are much less frequently drunk 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 alcohol underreporting, some bias may still remain.

| Crash Type/<br>Person Type    | 0.00  | 0.01-0.09 | 0.10 + | Total<br>Persons |
|-------------------------------|-------|-----------|--------|------------------|
| <b>Single-Vehicle Crashes</b> |       |           |        |                  |
| All Drivers                   | 37.9% | 11.3%     | 50.8%  | 17,049           |
| Fat.-Inj. Drivers             | 35.8% | 9.8%      | 54.4%  | 13,041           |
| Surv. Drivers                 | 44.8% | 16.2%     | 39.0%  | 4,008            |
| <b>Multi-Vehicle Crashes</b>  |       |           |        |                  |
| All Drivers                   | 77.1% | 7.2%      | 15.7%  | 35,059           |
| Fat.-Inj. Drivers             | 67.5% | 9.0%      | 23.5%  | 13,498           |
| Surv. Drivers                 | 83.2% | 6.1%      | 10.7%  | 21,561           |
| <b>Non-Occupant Crashes</b>   |       |           |        |                  |
| Drivers                       | 75.0% | 8.2%      | 16.8%  | 8,189            |
| Non-Occupants                 | 64.2% | 6.9%      | 28.9%  | 7,770            |

| Crash<br>Outcome               | Day/<br>Time | 0.00  | 0.01-0.09 | 0.10 + | Total<br>Drivers |
|--------------------------------|--------------|-------|-----------|--------|------------------|
| Fatally-<br>Injured<br>Drivers | Daytime      |       |           |        |                  |
|                                | Wkday        | 85.3% | 5.4%      | 9.3%   | 5,647            |
|                                | Wkend        | 77.3% | 8.5%      | 14.2%  | 1,850            |
|                                | Nighttime    |       |           |        |                  |
| Surviving<br>Drivers           | Wkday        | 53.0% | 11.5%     | 35.5%  | 2,735            |
|                                | Wkend        | 43.1% | 13.5%     | 43.4%  | 3,259            |
|                                | Daytime      |       |           |        |                  |
|                                | Wkday        | 94.3% | 2.5%      | 3.2%   | 9,138            |
| Surviving<br>Drivers           | Wkend        | 88.9% | 4.3%      | 6.8%   | 3,239            |
|                                | Nighttime    |       |           |        |                  |
|                                | Wkday        | 75.0% | 8.9%      | 16.1%  | 4,002            |
|                                | Wkend        | 66.3% | 11.3%     | 22.4%  | 5,172            |

Fatally-injured drivers show higher alcohol levels than surviving drivers in all crash types and periods, as shown in Tables 19-21.

In multi-vehicle fatal crashes, about twice as many fatally-injured drivers as surviving drivers are drunk, in each day and time class. The absolute differences range from 6 percentage points (week-day daytime) to 21 percentage points (weekend nighttime). In single-vehicle crashes, the proportion of drunk fatally-injured drivers exceeds the proportion for surviving drivers by 8 to 19 percentage points for each day and time class. Because drunk driving levels are higher in single-vehicle crashes than in multi-vehicle crashes, the proportionate increase is not as great, however.

## 2. Driver Sex

Table 22 shows that male drivers are drunk considerably more frequently than are female drivers. Table 23 shows that this conclusion holds for all day and time periods.

Table 22  
BAC Distribution of Drivers  
Involved in Fatal Crashes  
By Driver Sex  
1986

| Driver Sex | 0.00  | 0.01-0.09 | 0.10 + | Total Drivers |
|------------|-------|-----------|--------|---------------|
| Male       | 62.5% | 9.0%      | 28.5%  | 47,361        |
| Female     | 79.1% | 6.1%      | 14.9%  | 12,936        |

Table 21  
BAC Distribution of Drivers  
By Crash Outcome, Day and Time  
Single-Vehicle Fatal Crashes  
1986

| Crash Outcome           | Day/Time  | 0.00  | 0.01-0.09 | 0.10 + | Total Drivers |
|-------------------------|-----------|-------|-----------|--------|---------------|
| Fatally-Injured Drivers | Daytime   |       |           |        |               |
|                         | Wkday     | 70.7% | 6.1%      | 23.2%  | 2,694         |
|                         | Wkend     | 56.4% | 8.9%      | 34.6%  | 1,447         |
|                         | Nighttime |       |           |        |               |
| Surviving Drivers       | Wkday     | 24.9% | 10.1%     | 65.0%  | 3,807         |
|                         | Wkend     | 19.0% | 11.7%     | 69.3%  | 4,799         |
|                         | Daytime   |       |           |        |               |
|                         | Wkday     | 79.3% | 6.8%      | 13.9%  | 769           |
| Surviving Drivers       | Wkend     | 63.5% | 10.1%     | 26.4%  | 547           |
|                         | Nighttime |       |           |        |               |
|                         | Wkday     | 33.5% | 21.1%     | 45.4%  | 963           |
|                         | Wkend     | 29.8% | 19.7%     | 50.5%  | 1,715         |

Table 23  
BAC Distribution of Drivers  
Involved in Fatal Crashes  
By Sex, and Crash Day and Time  
1986

| Driver Sex     | Day/Time  | 0.00  | 0.01-0.09 | 0.10 + | Total Drivers |
|----------------|-----------|-------|-----------|--------|---------------|
| Male Drivers   | Daytime   |       |           |        |               |
|                | Wkday     | 81.8% | 5.3%      | 12.9%  | 19,552        |
|                | Wkend     | 66.4% | 8.8%      | 24.8%  | 8,485         |
|                | Nighttime |       |           |        |               |
| Female Drivers | Wkday     | 44.5% | 11.9%     | 43.7%  | 7,748         |
|                | Wkend     | 37.7% | 13.8%     | 48.5%  | 10,573        |
|                | Daytime   |       |           |        |               |
|                | Wkday     | 90.1% | 3.4%      | 6.5%   | 6,503         |
| Female Drivers | Wkend     | 84.5% | 5.5%      | 10.0%  | 2,517         |
|                | Nighttime |       |           |        |               |
|                | Wkday     | 57.6% | 9.5%      | 32.9%  | 1,591         |
|                | Wkend     | 55.3% | 12.3%     | 32.4%  | 2,066         |

Alcohol involvement differences between the sexes show up even more markedly for fatally-injured drivers, as shown in Table 24.

| Driver Sex     | Day/Time  | 0.00  | 0.01-0.09 | 0.10+ | Total Drivers |
|----------------|-----------|-------|-----------|-------|---------------|
| Male Drivers   | Daytime   |       |           |       |               |
|                | Wkday     | 77.0% | 6.5%      | 16.5% | 5,938         |
|                | Wkend     | 63.7% | 9.5%      | 26.7% | 2,543         |
|                | Nighttime |       |           |       |               |
|                | Wkday     | 34.2% | 11.0%     | 54.8% | 5,436         |
|                | Wkend     | 25.7% | 12.3%     | 62.1% | 6,757         |
| Female Drivers | Daytime   |       |           |       |               |
|                | Wkday     | 89.3% | 3.6%      | 7.1%  | 2,430         |
|                | Wkend     | 83.0% | 6.0%      | 11.0% | 760           |
|                | Nighttime |       |           |       |               |
|                | Wkday     | 48.3% | 9.4%      | 42.3% | 1,129         |
|                | Wkend     | 44.7% | 13.4%     | 41.9% | 1,314         |

### 3. Driver Age

The overall distribution of alcohol involvement by driver age is shown in Table 25. Even about 8% of the drivers aged 15 or less involved in fatal crashes were found to be drunk. The percentage of drunk drivers is highest at ages 21-24, and decreases steadily to about 7% for drivers 65 years or older.

The age-alcohol pattern shown here for all drivers in fatal crashes -- a rapid increase to a peak in the 21-24 age group, followed by a slow decrease -- remains unchanged when specific groups are con-

sidered, for example driver fatalities or drivers in single-vehicle crashes.

| Age Group | Total Drivers | BAC 0.10+ Count | BAC 0.10+ Percent |
|-----------|---------------|-----------------|-------------------|
| 00-15     | 502           | 41              | 8.2%              |
| 16-20     | 10,161        | 2,403           | 23.7%             |
| 21-24     | 9,120         | 3,285           | 36.0%             |
| 25-29     | 9,158         | 3,173           | 34.6%             |
| 30-34     | 7,005         | 2,141           | 30.6%             |
| 35-39     | 5,436         | 1,404           | 25.8%             |
| 40-44     | 3,799         | 860             | 22.6%             |
| 45-49     | 2,761         | 543             | 19.7%             |
| 50-54     | 2,309         | 379             | 16.4%             |
| 55-64     | 4,017         | 548             | 13.6%             |
| 65+       | 4,881         | 329             | 6.7%              |
| Unknown   | 1,148         | 418             | 36.4%             |

### 4. Driver Age Groups

To highlight the differences between ages, driver age has been classified into three groups: 15-20, 21-44, and 45 or older. Drivers of age 15-20 years cannot legally purchase alcohol in many States. Table 26 gives the BAC distribution of all drivers for these groups.

Two observations from Table 26 merit special mention.

- The percentages of legally drunk drivers in the three age groups differ markedly from each other.
- The percentage of persons with BAC 0.01 - 0.09 decreases with these age

groups. This is important since, regardless of the statutory BAC limit, it is widely believed that impairment due to alcohol may become appreciable at a BAC level as low as 0.05.

| Driver Age | 0.00  | 0.01-0.09 | 0.10  | Total Drivers |
|------------|-------|-----------|-------|---------------|
| 15-20      | 64.1% | 12.7%     | 23.3% | 10,467        |
| 21-44      | 59.9% | 8.6%      | 31.5% | 34,518        |
| 45 +       | 82.4% | 4.7%      | 12.9% | 13,968        |

Tables 27 and 28 break out the distribution of Table 26 by crash type, day, and time. To simplify the presentation, only the percentage of fatally-injured drivers in the high-BAC (0.10 +) group is given.

| Period    | Driver Age Groups |       |       |
|-----------|-------------------|-------|-------|
|           | 15-20             | 21-44 | 45 +  |
| Daytime   |                   |       |       |
| -Weekday  | 21.4%             | 42.6% | 20.0% |
| -Weekend  | 32.7%             | 55.7% | 32.4% |
| Nighttime |                   |       |       |
| -Weekday  | 55.2%             | 73.7% | 58.8% |
| -Weekend  | 57.0%             | 77.6% | 68.9% |

| Period    | Driver Age Groups |       |       |
|-----------|-------------------|-------|-------|
|           | 15-20             | 21-44 | 45 +  |
| Daytime   |                   |       |       |
| -Weekday  | 8.3%              | 16.9% | 8.1%  |
| -Weekend  | 12.8%             | 29.2% | 9.0%  |
| Nighttime |                   |       |       |
| -Weekday  | 31.8%             | 46.9% | 28.3% |
| -Weekend  | 18.2%             | 55.0% | 35.3% |

For single-vehicle fatal crashes, drivers of age 21-44 years have the highest alcohol involvement in each day and time class. For multi-vehicle fatal crashes, drivers of age 21-44 years also have the highest alcohol involvement, but older drivers have the lowest in all but one day and time class.

## 5. Vehicle Class

All but 3% of the vehicles involved in fatal crashes fall into one of the following types:

- Motorcycles,
- Passenger cars,
- Light trucks and vans,
- Medium trucks, or
- Heavy trucks.

Table 29 shows the number of vehicles of

each type involved in fatal crashes in 1986, together with the BAC distribution of their drivers.

| Vehicle Type  | 0.00  | 0.01-0.09 | 0.10 + | Total Vehicles |
|---------------|-------|-----------|--------|----------------|
| Motorcycles   | 45.5% | 13.5%     | 41.0%  | 4,447          |
| Pass. Cars    | 63.5% | 9.0%      | 27.5%  | 30,665         |
| Lt. Trks/Vans | 61.2% | 7.8%      | 30.9%  | 10,781         |
| Med. Trucks   | 90.0% | 3.7%      | 6.2%   | 878            |
| Heavy Trucks  | 94.9% | 2.4%      | 2.6%   | 3,901          |

## 6. Vehicle Age

Drivers of older vehicles are more likely to have been drinking when their fatal crash occurred than are drivers of newer vehicles.

| Model Year     | 0.00  | 0.01-0.09 | 0.10 + | Total Vehicles |
|----------------|-------|-----------|--------|----------------|
| Older than '76 | 58.9% | 9.4%      | 33.8%  | 13,168         |
| 1976-1979      | 65.0% | 8.2%      | 26.7%  | 15,441         |
| 1980-1983      | 69.3% | 8.0%      | 22.7%  | 14,584         |
| 1984-1987      | 70.3% | 7.9%      | 21.8%  | 15,579         |

The vehicle-age effect shown in Table 30 holds true for all driver age groups 25 years of age and older (Table 31).

| Driver Age | Older than '76 | 1976-1979 | 1980-1983 | 1984-1987 |
|------------|----------------|-----------|-----------|-----------|
| 15-19      | 22.2%          | 21.1%     | 20.9%     | 19.4%     |
| 20-24      | 40.2%          | 35.1%     | 33.4%     | 32.0%     |
| 25-29      | 42.4%          | 36.6%     | 30.8%     | 29.5%     |
| 30-44      | 36.1%          | 29.1%     | 22.7%     | 22.0%     |
| 45-59      | 23.0%          | 18.9%     | 15.2%     | 13.3%     |
| 60 +       | 12.7%          | 10.9%     | 7.7%      | 6.8%      |

## 7. Restraint Use

Sober drivers in fatal crashes are considerably more likely to use seat belts than are drunk drivers.

| Crash Outcome           | 0.00  | 0.01-0.09 | 0.10 + |
|-------------------------|-------|-----------|--------|
| Fatally-Injured Drivers | 19.9% | 11.3%     | 6.5%   |
| Surviving Drivers       | 35.8% | 23.8%     | 15.3%  |

Table 32 presents the proportion of fatally-injured and surviving drivers reported to have used belts for each BAC group. Note that sober drivers are belted about twice as frequently as are drivers in the

0.01-0.09 group, who in turn are belted about twice as often as are drunk drivers. Also, surviving drivers are belted about twice as frequently as are fatally-injured drivers, in each BAC group. Table 33 presents the same data in a different way, and presents BAC distributions for the four driver classes: fatally injured and surviving, belted and unbelted.

| Crash Outcome           | Belt Use | 0.00  | 0.01-0.09 | 0.10 + | Total Drivers |
|-------------------------|----------|-------|-----------|--------|---------------|
| Fatally-Injured Drivers | Yes      | 75.8% | 7.4%      | 16.8%  | 2,338         |
|                         | No       | 50.3% | 9.5%      | 40.2%  | 14,195        |
| Surviving Drivers       | Yes      | 85.6% | 6.5%      | 7.9%   | 6,089         |
|                         | No       | 70.4% | 9.5%      | 20.1%  | 13,296        |

## SECTION IV - ALCOHOL TRENDS, 1982-1986

Alcohol involvement in fatal crashes decreased between 1982 and 1986. The decrease was not uniform; alcohol involvement dropped more for some crash types than for others. This section presents some of the major changes.

| Year | 0.00  | 0.01-0.09 | 0.10 + | Total<br>Accidents |
|------|-------|-----------|--------|--------------------|
| 1982 | 43.3% | 10.6%     | 46.1%  | 39,092             |
| 1983 | 45.0% | 10.3%     | 44.7%  | 37,976             |
| 1984 | 46.7% | 10.6%     | 42.7%  | 39,631             |
| 1985 | 49.3% | 10.1%     | 40.6%  | 39,168             |
| 1986 | 48.4% | 10.9%     | 40.7%  | 41,062             |

Tables 35-37 display several facts of special interest. The reduction in alcohol involvement is especially large for drivers under 21 years of age, and is seen in all time periods. For the 21-44 year age group the average reduction is much smaller, especially during nighttime driving, when alcohol involvement is notoriously high. For drivers of age 45 years or older there is a large reduction in drunk driving during the day as well as on weekday nights.

| Period           | 1982  | 1986  | Reduction |
|------------------|-------|-------|-----------|
| <b>Daytime</b>   |       |       |           |
| Weekday          | 13.1% | 8.7%  | 34%       |
| Weekend          | 22.8% | 17.3% | 24%       |
| <b>Nighttime</b> |       |       |           |
| Weekday          | 43.2% | 34.8% | 19%       |
| Weekend          | 48.4% | 37.3% | 23%       |

| Period           | 1982  | 1986  | Reduction |
|------------------|-------|-------|-----------|
| <b>Daytime</b>   |       |       |           |
| Weekday          | 17.4% | 14.2% | 18%       |
| Weekend          | 32.6% | 27.4% | 16%       |
| <b>Nighttime</b> |       |       |           |
| Weekday          | 52.2% | 47.5% | 9%        |
| Weekend          | 55.6% | 52.0% | 6%        |

Table 37  
Reduction in High-BAC (0.10+) Drivers  
By Fatal Crash Day and Time  
for Age Group 45 Years and Older  
(Excluding Non-Occupant Crashes)  
1982 vs. 1986

| Period           | 1982  | 1986  | Reduction |
|------------------|-------|-------|-----------|
| <b>Daytime</b>   |       |       |           |
| Weekday          | 10.9% | 7.5%  | 31%       |
| Weekend          | 17.5% | 11.9% | 32%       |
| <b>Nighttime</b> |       |       |           |
| Weekday          | 35.1% | 26.0% | 26%       |
| Weekend          | 37.6% | 32.6% | 13%       |

Table 38 shows the reduction in drunk driving by vehicle type. Although alcohol involvement is generally low for drivers operating commercial vehicles (medium

Table 38  
Reduction in High-BAC (0.10+) Drivers  
in Fatal Crashes  
By Vehicle Type  
1982 vs. 1986

| Vehicle Type      | 1982  | 1986  | Reduction |
|-------------------|-------|-------|-----------|
| Motorcycles       | 40.7% | 41.0% | - 1%      |
| Passenger Cars    | 36.7% | 27.5% | 25%       |
| Light Trucks/Vans | 36.3% | 30.9% | 15%       |
| Medium Trucks     | 7.2%  | 6.2%  | 14%       |
| Heavy Trucks      | 4.2%  | 2.6%  | 38%       |

and heavy trucks), sizeable reductions occurred for drivers of these vehicle types between 1982-1986. In contrast, the high involvement rate for motorcycle drivers remained virtually unchanged.

Female drivers are not only less frequently drunk than are males but also show a greater reduction in alcohol involvement from 1982-1986.

Table 39  
Reduction in High-BAC (0.10+) Drivers  
in Fatal Crashes  
By Driver Sex  
1982 vs. 1986

| Driver Sex  | 1982  | 1986  | Reduction |
|-------------|-------|-------|-----------|
| Male        | 32.4% | 28.5% | 12%       |
| Female      | 18.9% | 14.9% | 21%       |
| All Drivers | 29.8% | 25.8% | 13%       |

A different aspect of alcohol trends is shown in Table 40, which presents the 1982-1986 reduction at the crash level.

**Table 40**  
Reduction in High-BAC (0.10 +) Drivers  
By Fatal Crash Type and Land Use  
1982 vs. 1986

| Land Use | Crash Type | 1982  | 1986  | Reduction |
|----------|------------|-------|-------|-----------|
| Urban    | Single.    | 56.3% | 52.9% | 6%        |
|          | Multi.     | 38.5% | 33.3% | 14%       |
|          | Non-Occ.   | 42.3% | 38.4% | 9%        |
| Rural    | Single.    | 55.2% | 49.7% | 10%       |
|          | Multi.     | 34.4% | 28.4% | 17%       |
|          | Non-Occ.   | 51.0% | 43.0% | 16%       |

Overall, the proportion of high BAC fatal crashes dropped 14% in rural areas and 10% in urban areas.

**Table 41**  
Reduction in High-BAC (0.10 +) Drivers  
For Groups of States with Various Minimum  
Legal Drinking Age Status  
By Age Group  
1982 vs. 1986

| Age Group | MLDA Status    | 1982  | 1986  | Reduction |
|-----------|----------------|-------|-------|-----------|
| 16-20     | Always. 21     | 30.6% | 23.8% | 22%       |
|           | Never. 21      | 33.2% | 26.9% | 19%       |
|           | Changed to. 21 | 29.8% | 21.0% | 30%       |
| 21-44     | Always. 21     | 40.3% | 36.9% | 8%        |
|           | Never. 21      | 43.9% | 40.3% | 8%        |
|           | Changed to. 21 | 36.3% | 32.1% | 12%       |
| 45 +      | Always. 21     | 28.1% | 24.0% | 15%       |
|           | Never. 21      | 30.4% | 27.0% | 11%       |
|           | Changed to. 21 | 24.6% | 22.0% | 11%       |

Always 21: AR,CA,IL,IN,KY,MI,MO,NV,NM,ND,OR,PA,UT,WA,WY.

Never 21: CO,DC,HI,ID,IA,LA,MN,MT,NC,OH,SC,SD,TX,VT,WV,WI

Changed: AL,AK,AR,CT,DE,FL,GA,KS,ME,MD,MA,MS,NE,NH,NJ,NY,OK,RI,TN,VA

Table 41 presents the trends in driver intoxication for three groups of states:

- those whose Minimum Legal Drinking Age (MLDA) was 21 years old during the 1982-1986 period;
- those whose MLDA was never 21 years during the 1982-1986 period; and
- those whose MLDA increased to 21 years from 18, 19, or 20 years, during the 1982-1986 period.

Estimates of high BAC involvement are presented for three age groups: age 16-20, age 21-44, and age 45 and older. The data indicate that the group of states which increased their MLDA to 21 experienced the greatest reduction in high-BAC driver involvement among drivers of age 16-20 years (30%) compared with the other two state groups. This pattern also is evident for the 21-44 year old age group. In both cases, the group of states which increased their MLDA exhibited an almost 50% larger reduction in high-BAC driver involvements. This was not the case for drivers of age 45 years and older, wherein the three groups of states exhibited fairly equal reductions in high-BAC driver involvement.

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