DIFFERENCES IN ALCOHOL INVOLVEMENT IN FATAL MOTOR VEHICLE ACCIDENTS RELATED TO AGE OF DRIVERS

H. Malin, M.A.*, N. Verdugo, M.A.**, and T. Zobeck, Ph.D.**

SYNOPSIS

Data from FARS for 1977-1981 were analyzed to identify the relationship between BAC levels and age of drivers involved in fatal motor vehicle accidents. The data for BAC results were divided into 5 age groups and their distributions plotted. Results for 1981 indicate that disproportionately more younger than older drivers involved in fatal alcohol-related motor vehicle accidents have a positive BAC test result. However, these younger drivers have, on average, a lower BAC level. Results for all 5 years indicate that the 1981 pattern represents a consistent trend. Three possible explanations for these results are discussed: (a) this trend is an artifact of BAC testing; (b) younger drivers may be at greater risk of becoming involved in fatal accidents at lower BAC levels than older drivers; (c) the age differences in BAC level may reflect actual differences in the levels of alcohol use in the general population.

INTRODUCTION

Alcohol is a major factor in many traffic accidents involving serious injury and death (NHTSA, 1981). Yet, estimates as to the percentage of intoxicated or impaired drivers involved in such accidents vary widely. The most reliable means of determining alcohol involvement is through the administration of a test for blood alcohol content (BAC) to drivers involved in fatal accidents. Generally, a reading of 0.01% and higher is indicative in fatal accidents. Generally, a reading of 0.01% and higher is indicative of alcohol involvement, with most states recognizing a reading of 0.10% and higher as legal intoxication. However, because the administration of BAC tests is neither routine nor consistent throughout the country, estimates of the number of drinking drivers, pedestrians, and others involved in fatal accidents are unreliable.

* National Institute on Alcohol Abuse and Alcoholism, Washington, D.C. 20005, U.S.A.

** CSR, Incorporated, 805 15th Street, N.W., Suite 500, Washington, D.C. 20005, U.S.A.
The only source of national data on the extent of alcohol involvement in fatal motor vehicle accidents is the Fatal Accident Reporting System (FARS) of the National Highway Traffic Safety Administration (NHTSA), Department of Transportation. The FARS database contains extensive information collected annually by NHTSA on every accident occurring on public roads in the United States and Puerto Rico in which at least one person died within 30 days of the date of the accident.

In a recent Alcohol Epidemiological Data System (AEDS) study of 1981 FARS data collected on drivers involved in fatal accidents, Malin et al. (1982) showed that for single vehicle accidents there was a steady, inverse relationship between driver age and involvement in fatal accidents, regardless of alcohol use. Of the 25,095 fatal single vehicle accidents in 1981, 41% were attributable to young drivers (age 16 to 24 years) whereas only 11% were attributable to drivers 55 years or older. Furthermore, of the 7,158 fatal, alcohol-related single-vehicle accidents occurring in 1981, 45% were attributable to young drivers, compared with 5.5% attributable to drivers 55 and older. A more detailed analysis of FARS data from 1977-1981 (Lowman et al., 1983) indicated that drivers in the 2 age groups, 16-19 and 20-24 years, were involved disproportionately more often in alcohol-related fatal accidents than drivers aged 25 years and older.

The relationship between BAC levels and age is one aspect of the youthful drunk driver problem that has not yet been addressed. Specifically, the question is whether or not the distributions of driver BAC levels are uniform over all age categories and, if not, whether factors can be identified to account for age-specific BAC distributions. The purpose of the present analysis was to examine the relationship between BAC levels and age for drivers involved in fatal accidents and to review several factors that may account for any observable trends in this relationship.

**METHODS**

In the present analysis we examined data from the FARS files from 1977-1981 in order to identify any consistent trends in the relationship between driver BAC test results and age. For the sake of consistency and comparability with similar studies, fatal accidents from Puerto Rico were excluded from the present study. Also, because drivers are the most frequently and consistently tested of all
participants involved in fatal accidents, the present analysis was confined to them. It also should be noted here that although reporting is relatively complete for many FARS data elements, the reporting of BAC test data is neither complete nor uniform.

BAC data are not available for about 55 percent of all drivers involved in fatal accidents, and for about 30 percent of the fatally injured ones... [Users] should be very cautious before drawing conclusions from these data. In particular, this high missing data rate and the dependency of BAC data on police reporting and testing practices may produce large year to year variations (Cerrelli, 1983; p. 11).

These inconsistencies are addressed in the discussion which follows.

For analytical purposes, the continuous variable Age was divided into 5 categorical classes: 16-19, 20-24, 25-34, 35-44, and 45+ years. All frequency counts and tabulations were obtained with the frequency procedures of SAS (SAS Institute, 1982).

The BAC Test results for 1981 were first plotted for each age group in order to determine if age-specific BAC distributions exist. Second, for each age group BAC Test results for each year (1977-1981) were plotted to determine the consistency of the age-specific BAC distributions over the 5-year period sampled by the present study. Third, for each age group testing rates were calculated for each year (1977-1981) to identify any trends in the actual administration of BAC tests.

RESULTS

The distribution of FARS data for 1981 BAC Test results for each of the 5 age groups indicates that each age group has a distinctive distribution with the peak BAC level increasing with age (Figure 1).

The yearly BAC test results for 16-19 year-old drivers (analyses of all other age groups produced similar results) appear to be consistent over the 5-year period of the present study (Figure 2). For the 16-19 year-old drivers, the percentage of the age group reported to have positive BAC tests (vertical axis) fluctuated between 26% and 29%, yet the peak BAC level remained at 0.12%.
The percentages of drivers given a BAC Test for each age group for the years 1977-1981, inclusive (Table 1), suggest that the testing rate for each age group increased in each succeeding year; more significantly, for each year younger drivers (defined as 16-24 years old) were being administered BAC tests at a higher percentage than were older drivers (defined as 30+ years old).

Table 1: Percentage of Drivers Within Age Groups Given BAC Tests, 1977-1981*

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<tbody>
<tr>
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<td>34.0</td>
<td>34.7</td>
<td>37.7</td>
<td>39.1</td>
<td>39.1</td>
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<td>38.1</td>
<td>40.6</td>
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<td>37.6</td>
<td>38.8</td>
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<td>33.0</td>
<td>35.3</td>
<td>37.1</td>
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<tr>
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<td>33.0</td>
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<td>28.8</td>
<td>29.4</td>
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* Includes persons given BAC tests, but whose test results were not recorded by FARS.

DISCUSSION

Results from the present analysis demonstrate that among drivers involved in fatal alcohol-related accidents between the years 1977 and 1981, inclusive, a positive relationship exists between peak BAC level and age. Several factors may account for such a relationship.

First, it may be that this trend is simply an artifact of the BAC tests produced by conditions underlying the administration of the tests. That younger drivers were being administered BAC tests at a higher rate than were older drivers (see Table 1) means that, statistically, the more drivers that were tested in the younger categories, the
greater was the probability that lower test scores would have been included (especially 0 scores) in these calculations, potentially lowering their peak score. For example, in 1981 43% of the 20-24 year-old drivers were administered tests, as compared to 31% of the drivers 45 years of age and older. The age-specific BAC distributions might have appeared more similar had comparable percentages of older drivers been tested.

A second possible explanation for the lower BAC levels observed among young drivers is that these drivers may be at greater risk of becoming involved in fatal accidents at relatively lower BAC levels than older drivers. There is some evidence to support this. Although a test result of 0.10% blood alcohol concentration is the minimum level necessary to legally define a person as being intoxicated in most states, even lower BAC levels "...increase the likelihood of an accident—especially for teenagers, the elderly, and others particularly sensitive to alcohol" (U.S. DHHS, 1979). The lower BAC levels for younger drivers involved in fatal accidents may indicate their inexperience in both drinking and driving.

A third possible explanation for the observed age-specific BAC patterning is that it may reflect actual differences in the levels of alcohol use in the general population. However, the reporting inconsistencies in BAC data make this difficult to assess. The BAC level distributions presented in Figures 1 and 2 represent only those drivers with a reported BAC level of 0.01% or greater. Since numerous unknown cases of fatal accidents involving drinking drivers are excluded (non-tested or tested but not reported) from the BAC distributions, it is difficult to assess how alcohol use among fatally-involved drinking drivers compares with alcohol use in the general population. Indeed, alcohol use patterns in the general population are incompletely understood.

CONCLUSIONS

The FARS database is an excellent tool for researchers in the transportation field, but limitations with regard to BAC reporting make FARS a less than ideal tool for researchers in the alcohol use and abuse field. Until there is more complete, consistent, and uniform BAC testing and reporting, it will be difficult to develop epidemiologic explanations with predictive value. Additionally, until BAC testing is administered routinely in all fatal accidents in every state, the magnitude and age patterning of the drunk driving problem will remain a matter for speculation only.
REFERENCES


Figure 1. BAC levels for drivers involved in fatal motor vehicle accidents, by age (1981). *Percentage was computed only for those drivers within an age group having positive BAC levels. **BAC values represent the midpoints of ranges.

Figure 2. BAC levels for 16-19 year-old drivers involved in fatal motor vehicle accidents (1977-1981). *Percentage was computed only for those 16-19 year-old drivers having positive BAC levels. **BAC values represent the midpoints of ranges.