EXECUTIVE SUMMARY

AN EVALUATION OF THE EFFECT
OF RAISING THE MINIMUM LEGAL
DRINKING AGE FROM 18 TO 19

by

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Background

In the 1970s, there was a dramatic increase across the nation in the number of young drivers who were seriously injured or killed in alcohol-related motor vehicle accidents. In response to this phenomenon, a number of states passed legislation to raise the minimum legal purchase age for alcoholic beverages. Texas implemented a law that raised the legal limit for the purchase and consumption of alcohol from 18 to 19 years of age on September 1, 1981. The primary purpose of this study was to evaluate the effectiveness of this legislation at reducing alcohol-related accidents for 18-year-old drivers. A second objective was to assess the appropriateness of the single-vehicle, nighttime, male (SVNM) surrogate for alcohol-related accidents in Texas.

Methodology

Two study used two sources of data: Texas accident data files for the period 1975-1985, and blood alcohol concentration (BAC) data for a sample of 1742 Texas driver fatalities. The BAC test results for fatally-injured drivers have been collected since 1983 as part of an on-going Texas Transportation Institute (TTI) study for the Texas State Department of Highways and Public
Transportation (Hatfield, Pendleton, and Chan, 1986). These toxicological data provided objective criteria against which to measure the accuracy of different surrogates at identifying DWI drivers in the sample.

For the evaluation of the effect of the law, a multiple time series design was used to compare the accident experience of 18-year-old drivers to accidents involving drivers 16-17, 19-20, and 21-25 years of age.

Results and Conclusions

The first task in the analysis was to assess the appropriateness of the SVNM surrogate. Based on numerous comparisons with other potential variables, as well as variable category combinations, an alternate surrogate (the TTI surrogate) was developed. Both surrogates include male drivers involved in single-vehicle accidents. The only difference in the two measures is the time of day variable. Whereas the SVNM surrogate uses 9:00 PM - 6:00 AM to identify alcohol-related accidents, the TTI surrogate uses the period from 8:00 PM - 4:00 AM.

It should be emphasized that the fact that the two surrogates varied only slightly in their composition attests to the validity of the SVNM surrogate. This is especially noteworthy, given the vastly different data from which each was developed. TTI's surrogate was based on a sample of fatally-injured drivers in Texas, whereas the SVNM surrogate was developed from a more representative sample of motor vehicle accidents in the state of Michigan. The results of this phase of
the analysis suggest that the two surrogates are functionally equivalent as indirect measures of alcohol-related accidents.

In terms of each surrogate's ability to correctly identify legally intoxicated drivers with known BAC test results, differences in the predictive ability of the two measures were virtually nonexistent (Tables 1 and 2). Furthermore, the surrogates proved to be more accurate at identifying alcohol intoxication than were DWI citations, as recorded on traffic accident report forms (Table 3). Whereas 50 percent of the fatally-injured drivers in the BAC sample were legally intoxicated, only 31 percent of these drunk drivers had DWI cited on their accident reports. The fact that alcohol intoxication is often seriously underreported by investigating officers emphasizes the need for other measures of alcohol-involvement in evaluation studies.

The evaluation of the effectiveness of legislation that raised the minimum legal drinking age from 18 to 19 revealed that alcohol-related accidents were more favorably affected by the legislative action than were non-alcohol-related accidents for 18-year-old drivers. This finding was based on comparisons of 18-year-olds to drivers in the three comparison age groups.

Figures 1 through 4 provide a general overview of the data collected for this study. In each figure, the data were smoothed using a weighted 13-month moving average. For minor, non-alcohol-related accidents, accident rates for the 18-year-olds were consistently higher than the rates for the comparison groups both before and after the change in the minimum legal drinking
Table 1. Identifying Blood Alcohol Level (<.10 vs. >.10) with the TTI Surrogate

<table>
<thead>
<tr>
<th>Surrogate Status</th>
<th>BAC Test Result</th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BAC &lt;.10</td>
<td>BAC &gt;.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not in TTI Surrogate</td>
<td>759 (.87)</td>
<td>446 (.52)</td>
<td>1205 (.69)</td>
<td></td>
</tr>
<tr>
<td>TTI Surrogate</td>
<td>114 (.13)</td>
<td>417 (.48)</td>
<td>531 (.31)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>873</td>
<td>863</td>
<td>1736</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Identifying Blood Alcohol Level (<.10 vs. >.10) with the SVNM Surrogate

<table>
<thead>
<tr>
<th>Surrogate Status</th>
<th>BAC Test Result</th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BAC &lt;.10</td>
<td>BAC &gt;.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not in SVNM Surrogate</td>
<td>747 (.86)</td>
<td>450 (.52)</td>
<td>1197 (.69)</td>
<td></td>
</tr>
<tr>
<td>SVNM Surrogate</td>
<td>126 (.14)</td>
<td>413 (.48)</td>
<td>539 (.31)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>873</td>
<td>863</td>
<td>1736</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Identifying Blood Alcohol Level (<.10 vs. >.10) on the Basis of DWI Citation by Investigating Officers

<table>
<thead>
<tr>
<th>Accident Report</th>
<th>BAC Test Result</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BAC &lt;.10</td>
<td>BAC &gt;.10</td>
<td>Total</td>
</tr>
<tr>
<td>Not DWI</td>
<td>821 (.94)</td>
<td>595 (.69)</td>
<td>1416 (.81)</td>
</tr>
<tr>
<td>DWI</td>
<td>855 (.06)</td>
<td>271 (.31)</td>
<td>326 (.19)</td>
</tr>
<tr>
<td>Total</td>
<td>876</td>
<td>866</td>
<td>1742</td>
</tr>
</tbody>
</table>
Figure 1. Smoothed Accident Rates by Age Group for Minor, Non-Alcohol-Related Accidents
Figure 2. Smoothed Accident Rates by Age Group for Critical, Non-Alcohol-Related Accidents
Figure 3. Smoothed Accident Rates by Age Group for Minor, Alcohol-Related Accidents
Figure 4. Smoothed Accident Rates by Age Group for Critical, Alcohol-Related Accidents
age (Figure 1). This was also true when critical, non-alcohol-related accidents were examined (Figure 2).

For alcohol-related accidents, it was found that the 18-year-olds had monthly accident rates that were most similar to those of the 19 to 20-year-old drivers. For minor, alcohol-related accidents, the 18-year-olds had consistently higher accident rates than did the 19 to 20-year-olds throughout the before period of the study (Figure 3). However, after the minimum legal drinking age was raised in 1981, the 18-year-old monthly accident rates dropped below those of the 19 to 20-year-olds for the first time. Shortly thereafter, the 18-year-old accident rates rose higher than the 19 to 20-year-old rates, but the differences between the two series were much less pronounced than before the implementation of the law. Furthermore, the 18-year-old accident rates were considerably lower after the law, than they were during the preceding five years.

For critical, alcohol-related accidents, the 18-year-olds again evidenced accident rates comparable to the 19 to 20-year-olds (Figure 4). Observed differences between the two age groups were extremely small in the before period of the analysis. After the implementation of the law, however, the 18-year-old accident rates began a sharp decline that resulted in monthly rates that were well below those of the 19 to 20-year-olds from the latter half of 1982 through 1985. Based on these four figures, the change in the minimum legal drinking age appeared to have a beneficial effect on the alcohol-related accident experience of
the 18-year-olds, relative to their 19 to 20-year-old counterparts.

The consistently higher accident rates for persons 18 to 20 years of age emphasize the magnitude of the highway safety problem for young drivers, and verify the need for increased efforts directed at individuals in this age group. Legislative actions to increase the minimum drinking age to 21, and other accident countermeasures aimed at young drivers, appear warranted based on the results of this analysis.

Supplemental analyses revealed that observed differences in accident rates between 18-year-olds and the three comparison groups before and after the law took effect were generally small. Overall, however, it appeared that the alcohol-related accidents for the affected age group were positively affected by the change in the law.

Ideally, a change in the minimum legal drinking age would have a dramatic effect on the alcohol-related accident experience of those drivers in the affected age group. Previous research has confirmed this hypothesis, although the magnitude of the decreases in alcohol-related accidents that coincided with raising the legal drinking age varied across studies.

This evaluation produced results that were consistent with previous studies, although the apparent effect of the law was not as strong as might have been expected. One possible explanation may be that because the minimum drinking age was raised by only one year (i.e., from 18 to 19 years of age), the size of the
treatment group was limited and the magnitude of the effect being evaluated may have been reduced.

An evaluation of a more recent change in the minimum legal drinking age (i.e., raising the minimum age from 19 to 21) will be undertaken in the coming year. The effect of this two-year increase on the alcohol-related accidents of young drivers may be more easily detected. In addition, the forthcoming phase of the study will allow for the examination of two more years of after data, which will provide greater feedback on the long-term effects of the 1981 legislative change.