The Impact of Lowering the Illegal BAC Limit to .08 in Five States in the U.S.

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ABSTRACT

It is illegal per se to have a certain blood alcohol concentration (BAC) while driving a motor vehicle in most states of the United States (U.S.). The majority of these states have set the illegal BAC limit at .10g/dl for drivers aged 21 and over. However, eleven states have lowered the limit to .08g/dl. An analysis was conducted using fatal crash data to determine the impact of lowering the per se limit to .08 in five of those states which had the law for at least two years. The results of the analyses revealed statistically significant reductions of driver involvement in alcohol-related fatal crashes after .08 legislation took effect in four of the five states, ranging from 4% in California to 40% in Vermont. This assessment appears to indicate that the implementation of .08 laws and other related activities (i.e. public information about the law) are associated with reductions in fatal crash driver alcohol involvement.

INTRODUCTION

Forty-six States plus the District of Columbia in the U.S. have passed laws making it illegal per se to have a certain blood alcohol concentration (BAC) while driving a motor vehicle. Zador, et al (1988) analyzed the impact of these per se laws in several states and concluded that they resulted in a 6 percent reduction in fatal crashes during hours of low to moderate alcohol involvement. Another study (Klein, 1989) concluded that 6 out of 26 states which implemented illegal per se laws exhibited significant reductions in the rate of driver fatal crash alcohol involvements. Most of these states set the illegal per se limit at .10 grams per deciliter (g/dl) (or .10 BAC).

In 1983, two states, Oregon and Utah, lowered their illegal per se limit from .10 to .08 BAC. Since then, nine other states have lowered the illegal per se limit to .08. In a 1991 Report to Congress, the National Highway Traffic Safety Administration (NHTSA) recommended that if states are considering lowering their illegal per se limit, it should be .08 for drivers aged 21 and older (NHTSA, 1991). Later in 1991, NHTSA released a study of the effects following the implementation of a .08 BAC limit and an administrative license revocation (ALR) law in California (Research and Evaluation Associates, 1991). The two laws and their publicity were reported to have reduced alcohol-related traffic fatalities by 12 percent in California during 1990. Following that study, NHTSA issued a second Report to Congress on Alcohol Limits (NHTSA, 1992). This second Report to Congress recommended that states be encouraged to enact .08 as the illegal per se BAC limit. NHTSA’s rationale behind recommending a .08 BAC limit includes the following:
Virtually all drivers are substantially impaired at .08 BAC. Laboratory and test track research shows that the vast majority of drivers, even experienced drinkers, are impaired at .08 with regard to critical driving tasks. Performance decrements in some of these tasks are as high as 60%-70% at .08 BAC according to studies (Moskowitz and Robinson, 1988).

The risk of being involved in a crash increases substantially by .08 BAC. The risk of being in a crash gradually increases at each BAC level, but rises very rapidly after a driver reaches or exceeds .08 BAC compared to drivers with no alcohol in their blood systems. The relative risk of being killed in a single vehicle crash at BACs between .05 and .09 is 11 times that of drivers at .00 BAC (Zador, 1991).

Lowering the Per Se limit is a proven effective countermeasure which will reduce alcohol-related traffic fatalities. There was a 12% reduction in alcohol-related fatalities in California in 1990, the year .08 and an administrative license revocation law went into effect (Research and Evaluation Associates, 1991). The decrease in alcohol-related fatalities occurred at both high and low BAC levels, even drivers with BACs of .20 or greater.

.08 is a reasonable level to set the limit. A .08 BAC is not reached with a couple of beers after work or a glass or two of wine with dinner. The average 170 pound male would have to consume more than 4 drinks within 1 hour on an empty stomach to reach .08 BAC. The average 137 pound female would need 3 drinks in one hour on an empty stomach to reach that level (NHTSA, 1992).

The public supports levels below .10 BAC. NHTSA surveys all show that most people would not drive after consuming 2 or 3 drinks in an hour (NHTSA, 1992).

Most other industrialized nations have set BAC limits at .08 or lower and have had these laws for many years. For example, Canada and Great Britain are at .08--so is Austria and Switzerland. The states in Australia range from .05 to .08 (NHTSA, 1991).

In early 1994, as more states were considering the adoption of .08 BAC, NHTSA decided to conduct an assessment of the changes in alcohol-related fatal crashes in the states that had passed laws lowering the BAC limit to .08. At that time, a total of five states had their .08 BAC legislation in effect for at least two years. These five states had legislation lowering the BAC limit in place for a time period long enough to determine if possible changes had occurred in crash-related measures. The purpose of this paper is to describe the findings of an assessment of the impact of .08 BAC legislation on reducing driver involvement in alcohol-related fatal crashes in these five states. A more in-depth study has recently begun that will investigate the effect of .08 BAC legislation, and consider other programs, legislation and outside factors that may affect the findings reported herein. The results documented in this assessment focus only on the presence of .08 BAC legislation.

DATA

Data from NHTSA’s Fatal Accident Reporting System (FARS) were used to analyze the level of driver involvement in alcohol-related fatal crashes comparing time periods before vs. after the .08 BAC legislation became effective in each state. FARS began in 1975 and
contains a census of the most severe traffic crashes, i.e., those resulting in a fatality. FARS data for each of the five states used in this study were extracted from the file using equal periods of time to represent crashes occurring before and after the .08 BAC law became effective. The particular time periods were chosen based on several considerations: (1) using the latest available year of FARS data at the time of the analysis (1992); (2) using at least two years of FARS data before vs. after, where possible; (3) the earliest available year of FARS data for which it was possible to make reliable estimates of alcohol involvement (1982) and (4) the effective date of the legislation.

Six different measures of driver involvement in alcohol-related fatal crashes were examined for changes in the level of crashes when the “before” time periods were compared to the “after” time periods in each state. Each of these measures has been examined in the literature and is considered indicative of the occurrence of drinking and driving. For each of the six measures that follow, all drivers of age 21 and older who were involved in fatal crashes in FARS were included:

1. any alcohol (BAC ≥ .01) (Klein, 1986);
2. intoxicated (BAC ≥ .10) (Klein, 1986);
3. police-reported driver [PRD] alcohol involvement;
4. single-vehicle nighttime [SVN] driver involvement;
5. single-vehicle nighttime male [SVNM] driver involvement; and
6. estimated alcohol involvement [PRD, positive BAC result, alcohol violations].

The data extracted from FARS for the purposes of this study were limited to drivers of age 21 and older. Each state that has passed legislation to set the BAC limit at .08 has done so for drivers over the age of 21. [As of 1988, all of the fifty states and the District of Columbia had legislation in place which set the minimum legal drinking age at 21.] While the FARS data include the results of blood alcohol tests of drivers involved in fatal crashes, test results are not reported for every driver, for a number of economic, practical, or technical reasons. For the U.S. overall, BAC test results are reported for 75 percent of the fatally injured drivers and 25 percent of the surviving drivers. To determine the level of alcohol involvement for all drivers in FARS, Klein (1986) refined a method based on discriminant analysis to estimate unknown BAC values using the known BAC data. This methodology estimates unknown BACs using a statistical model based on known BACs. Measures (1) and (2) listed above were developed using this methodology. The remaining measures were extracted from FARS, using information from police reporting (measure 3), the circumstances of the crash (measure 4), and other available driver information (measures 5 and 6).

ANALYTICAL METHOD

FARS data for the six measures were examined for the selected time periods for each of the five .08 BAC states and the rest of the nation (in each comparison, omitting all five .08 states). Using each of the six measures, the proportion of alcohol involvement that was experienced “before” the .08 law was compared to the proportion of alcohol involvement
that was experienced “after” the .08 law, by calculating the percentage change. In other words, if:

\[
\frac{\text{Alcohol}_{Bi}}{\text{Total}_{Bi}} = p_{Bi} \quad \text{and} \quad \frac{\text{Alcohol}_{Ai}}{\text{Total}_{Ai}} = p_{Ai};
\]

where \(i = 1, 2, 3, 4, 5, \text{or} 6\) for each of the six measures and B is Before .08 and A is After .08, then the percentage change for measure \(i\) is calculated as:

\[
\text{Percentage Change}_i = \left[ \frac{(p_{Ai} - p_{Bi})}{p_{Bi}} \right] \times 100
\]

A decrease in the level of driver involvement in alcohol-related fatal crashes would yield a negative value for the percentage change, comparing the before .08 BAC period to the after .08 BAC period. An increase would yield a positive value for the percentage change.

Calculating the percentage change to compare the differences between \(p_{Bi}\) and \(p_{Ai}\) for each of the six measures in each of the five states yielded thirty comparisons of the level of driver involvement in alcohol-related fatal crashes before vs. after the .08 BAC legislation. A difference in two proportions may be found to be statistically significant using the methods shown in Fleiss (1981). The test statistic employed for the difference in proportions is distributed as \(X^2\). For this study, the percentage change was considered statistically significant at the \(a = 0.10\) level (This is equivalent to a one-tailed t-test at the \(a = 0.05\) level of significance).

**Table 1**

Summary of Significant Decreases in Driver Involvement in Alcohol Related Crashes After 0.08 BAC Legislation

<table>
<thead>
<tr>
<th>State</th>
<th>Measure</th>
<th>Percentage Decrease</th>
</tr>
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<tbody>
<tr>
<td>California</td>
<td>Alcohol &gt; .10</td>
<td>-4 %</td>
</tr>
<tr>
<td>Oregon</td>
<td>Any Alcohol</td>
<td>-9 %</td>
</tr>
<tr>
<td></td>
<td>Alcohol &gt; .10</td>
<td>-11 %</td>
</tr>
<tr>
<td></td>
<td>PRD Alcohol Involvement</td>
<td>-13 %</td>
</tr>
<tr>
<td></td>
<td>Estimated Alcohol Involvement</td>
<td>-11 %</td>
</tr>
<tr>
<td>Utah</td>
<td>PRD Alcohol Involvement</td>
<td>-30 %</td>
</tr>
<tr>
<td>Vermont</td>
<td>Any Alcohol</td>
<td>-36 %</td>
</tr>
<tr>
<td></td>
<td>Alcohol &gt; .10</td>
<td>-31 %</td>
</tr>
<tr>
<td></td>
<td>Estimated Alcohol Involvement</td>
<td>-40 %</td>
</tr>
</tbody>
</table>

**RESULTS**

Table 1 summarizes the findings of significant decreases by state and measure. Nine of the thirty comparisons of the measures were found to be statistically significant reductions. None of the comparisons using the same measures for the rest of the nation were found to be statistically significant reductions. Significant decreases in the level of driver involvement in alcohol-related fatal crashes were found most often for Oregon (4 of the six measures).
No significant decreases were found for any of the measures for Maine. Nine of the thirty measures examined were statistically significant decreases, ranging from a 4 percent decrease in the level of driver involvement in alcohol related fatal crashes at .10 BAC to a 40 percent decrease in the level of driver involvement in fatal crashes estimated to be alcohol involved (measure 6).

The remaining 21 measures were not statistically significant at the 0.10 level. Of these, 16 measures, showed decreases in the level of driver involvement in alcohol-related fatal crashes. Five of the 21 measures that were not statistically significant showed increases in the level of driver involvement in alcohol-related fatal crashes.

CONCLUSIONS

Comparisons between measures of driver involvement in alcohol-related fatal crashes for the five states with .08 BAC legislation suggest that significant decreases occurred following implementation of the legislation. While some of the measures employed failed to exhibit statistically significant declines, significant decreases were found for nine of the thirty measures of driver involvement in alcohol-related fatal crashes in four of the five states with .08 BAC studied in this analysis. For Oregon and Vermont, significant reductions were noted for several measures of driver alcohol involvement, while for California and Utah, each exhibited one measure achieving a significant reduction. The current analysis does not account for other potentially important factors, e.g., other alcohol legislation, that could influence the impact of the .08 BAC legislation. Additional and more in-depth analytical work is underway to further understand and determine if significant changes in the level of alcohol involvement in crashes have occurred with the passage of .08 BAC legislation.

This assessment appears to indicate that the implementation of .08 BAC laws and other associated activities (such as public information campaigns drawing attention to the change) are associated with reductions in fatal crash driver alcohol involvement.

DISCUSSION

While further analyses are warranted on the impact of .08 legislation, this analysis still provides strong evidence of its effectiveness. Coupled with the comprehensive study in California, this analysis provides some proof that legislation that gets tougher on impaired drivers has a general deterrent effect. Lowering the illegal limit to .08 sends a message to the driving public that impaired driving is unacceptable and laws against it will be enforced.

States considering .08 legislation should consider all the facts, including the rationale behind .08, as described earlier in this paper, and the potential impact. Opposition to .08 legislation generally includes the following:

- .08 legislation will not affect high BAC problem drinker drivers.
- .08 legislation will affect alcohol consumption and, therefore, affect the economy.
- .08 legislation is the first step in lowering the limit even further.

There is evidence that .08 legislation reduced the proportion of fatally injured drivers who had BACs greater than or equal to .20 (NHTSA, 1992). There is no evidence that per capita
alcohol consumption was affected in any of the five states examined in this paper by the .08 legislation (NHTSA, 1995). NHTSA has no plans to recommend a per se limit below .08 for adult drivers. The exceptions, of course, are the zero tolerance limits (.02) recommended for all drivers under the age of 21 (since they are not supposed to legally drink alcohol anyway in the U.S.) and the .04 limit for commercial drivers. The .08 limit is reasonable and has the potential of saving thousands of lives and many more injuries on the highways if it is implemented by more states in the U.S.

REFERENCES


