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Technical Summary**

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# **Lower BAC Limits for Youth: Evaluation of the Maryland .02 Law**

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16. Abstract  The purpose of this study was to determine the effects of special drinking driving sanctions aimed at youthful drivers under the age of 21 years. This purpose was accomplished by focusing on a Maryland law which restricts driving by those under 21 to a blood alcohol concentration (BAC) less than 0.02 rather than the 0.10 prevailing limit for older drivers. The specific objectives were to: 1) evaluate the impact of adoption of the sanction; 2) mount a public information and education (PI&E) campaign in selected counties to attempt to potentiate the effects of the sanction; and 3) evaluate any added benefit of the PI&E. Crash data were used statewide and in six experimental counties. The unit of analysis was accident-involved drivers under 21 years of age judged "had been drinking" (HBD) on the police accident report. Box-Jenkins time series analysis of this measure indicated a significant step reduction in crash-involved drivers under 21 judged HBD coincident with adoption of the sanction and an additional significant step reduction in the experimental counties after application of the PI&E. Only the reduction coincident with the sanction adoption was detected in two comparison counties. Survey data in the experimental and comparison counties confirmed that knowledge of the sanction among youth increased significantly after exposure to the PI&E at the experimental sites but not at the comparisons. It was concluded that this special sanction for youth was effective and this effectiveness was significantly potentiated by a public service information program which emphasized the possible penalties for violation of the regulation.					
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## TECHNICAL SUMMARY

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REPORT TITLE	Lower BAC Limits for Youth: Evaluation of the Maryland .02 Law	REPORT DATE	March 1992
REPORT AUTHOR(S)	Richard D. Blomberg		

This is a summary of a study conducted under Contract Number DTNH22-88-C-07012 from the U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA). The primary objective of this study was to determine the effects of special drinking driving sanctions aimed at youthful drivers under the age of 21 years. A secondary objective was to examine the extent to which a public information and education (PI&E) program about the sanction could increase its effectiveness. These objectives were achieved by focusing on a Maryland law which prohibits driving by those under 21 with a BAC of 0.02 or more (in this summary, BAC refers to either blood alcohol concentration, stated as grams per 100 milliliters of blood, or breath alcohol concentration, stated as grams per 210 liters of breath). This is in sharp contrast to the prevailing BAC limits for drivers 21 and over in Maryland and elsewhere, which are typically set at 0.10 or 0.08.

The Maryland 0.02 BAC law was selected for study because it had been in place for some time when the project started, and high quality statewide accident data were available for several years before the enactment of the sanction to establish a suitable baseline for analysis. This permitted an analysis of the impact of the sanction *before* PI&E enhancement as well as an examination of post-PI&E effects.

The specific components of this study were:

- A pre/post evaluation of the statewide impact of the Maryland 0.02 BAC law on the number of accident-involved drivers under 21 judged "Had Been Drinking" (HBD) by the investigating police officer.
- The development of a TV, radio and print PI&E campaign to publicize the existence and nature of the 0.02 BAC law and its associated penalties. This campaign was disseminated in six test counties (four on the Eastern Shore and two in Western Maryland).
- An evaluation of the additive benefits of the PI&E campaign in the six selected experimental counties by comparing their monthly distribution of accident-involved drivers under 21 judged HBD with the distribution in two comparison counties in Southern Maryland which did not receive the PI&E.

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The Maryland 0.02 BAC sanction was enacted in July 1988 and went into effect on January 1, 1989. Legally, it is a license restriction which the Maryland Motor Vehicle Administration (MVA) is required to place on all drivers under 21. The restriction makes it illegal for a young driver to operate a motor vehicle at a BAC of 0.02 or more. Violation of the restriction can be penalized by license suspension, revocation and/or a fine up to \$500. After the law had been in force for six months, an additional legislative requirement was placed on the MVA to imprint the drivers licenses of those under 21 with the words *Under 21 Alcohol Restricted*.

The package of materials produced for the PI&E campaign included five TV PSAs and four radio PSAs. Multiple versions of each TV and radio spot were made using various local police officials from the Eastern Shore and western counties as the spokespersons. A four-color pamphlet and matching poster were also prepared to support the broadcast media. The primary theme of the campaign was that if you are under 21, you *will be fined or your license will be suspended* if you are caught driving after having as little as one drink. In other words, *You Don't Have to be Drunk to Lose Your License in Maryland*.

Copies of the TV and radio spots were distributed to all stations serving the experimental counties. Approximately 25,000 pamphlets and 1,000 posters were initially distributed in the test areas. An additional 20,000 pamphlets were printed and distributed during the course of the project due to strong demand among the cooperating groups.

The PI&E campaign in the six experimental counties was released in February of 1990. Prior to release of the campaign, a survey of the knowledge of youth about the sanction and their exposure to PI&E was conducted in both the experimental and comparison counties by cooperating local universities. The survey was repeated after the campaign had been ongoing for approximately one month. The data from this survey together with the monthly number of drivers under 21 judged HBD for the years 1985 through 1990 as derived from the Maryland State accident files formed the primary evaluation measures examined.

The primary technique chosen for the data analysis of accident-involved drivers judged HBD was the Box-Jenkins time series approach. This approach was selected because of its ability to examine directly the intervention of a countermeasure while accounting for such factors as seasonal cycles and underlying trends which could potentially lead to false conclusions. Specifically, the time series technique was used to examine two hypotheses. The first was that a significant intervention or reduction in the number of accident-involved drivers judged HBD began on January 1, 1989 when the law went into effect. The second was that the release of the PI&E program in the experimental counties on February 1, 1990 produced a significant intervention or reduction in the same measure.

The first analyses were structured to examine the impact of the sanction statewide on the number of accident-involved drivers judged HBD. Several statistically significant time series models were developed based on the statewide data series of accident-involved drivers under 21 judged HBD. The significant model with the most traditional form showed an estimated decrease in the monthly mean number of accident-involved drivers under 21 judged HBD of 14.9 from the mean of 133 per month mean prior to adoption of the sanction. This is a reduction of approximately 11 percent. There was no significant reduction in the statewide data series associated with the introduction of the PI&E in the experimental counties.

Similar statewide analyses of the HBD series for drivers 21 and older and for a series composed of those drivers under 21 who were not judged HBD showed no significant effects of either the sanction or PI&E intervention series. Thus, the introduction of the sanction on January

1, 1989 was associated with a significant drop in crash-involved drivers under 21 years of age who were judged to have been drinking. Further, this reduction was not associated with a general reduction in alcohol-involved crashes or in all crashes involving drivers under 21.

The PI&E program intended to enhance the effectiveness of the sanction was only mounted in the experimental counties on the Eastern Shore (Wicomico, Worcester, Dorchester and Somerset) and in Western Maryland (Allegany and Garrett). The two comparison counties (St. Mary's and Charles) were selected so that there was little chance young drivers in them received any of the developed PI&E materials. Time series models were calculated for the experimental counties examining the intervention of both the sanction adoption and the PI&E. For drivers under 21 judged HBD in the experimental counties, significant intervention effects were found for *both* the sanction and PI&E interventions. The time series models indicated that the sanction intervention was associated with a significant reduction of 3.2 accident-involved HBD drivers per month and the PI&E program coincided with an *additional* reduction of 4.6 accident-involved drivers per month. Thus, the pre-sanction mean monthly level of 15.2 accident-involved drivers judged HBD was reduced by more than 21 percent with the introduction of the sanction and a further 30 percent (of the pre period level) by the PI&E.

In order to shed additional light on the pattern of results in the experimental counties, the youth HBD series for the comparison counties was modeled. As with the statewide series only the intervention associated with the effective date of the sanction on January 1, 1989 was significant. The developed time series model indicated that the pre-law monthly mean of 8.0 HBD accident-involved drivers under 21 was reduced by 26 percent (2.1 accident-involved HBD drivers per month) coincident with the introduction of the sanction on January 1, 1989.

The pattern of results for the statewide, experimental and comparison series show marked similarities at the effective point of the law in January, 1989. The experimental, comparison and statewide data all show a significant drop in accident-involved drivers under 21 judged HBD coincident with the adoption of the 0.02 BAC law, thereby adding strength to the evidence supporting cause and effect. Since only the experimental counties showed a significant intervention effect at the time of the PI&E, there is a strong suggestion that the PI&E resulted in the observed decline.

The results of the survey conducted at high schools, colleges and MVA offices provided further support for the conclusions that the adoption of the law reduced HBD accident involvements of drivers under 21 years of age and that the PI&E program added to the reduction. First, awareness of the law was relatively high even before the start of the PI&E program. Second, knowledge of the law increased in the experimental counties after application of the PI&E program and did not change in the comparison counties. For example, one question asked specifically what blood or breath alcohol concentration would make it illegal for the respondent to drive. For approximately 90 percent of the sample (those under 21 years of age), the correct answer was 0.02. The proportion of the survey sample in experimental counties selecting 0.02 as their response increased by almost 62 percent from before (18.1%) to after (29.3%) the introduction of the PI&E program. At the same time, the proportion of respondents selecting an answer of 0.02 in the comparison counties did not change significantly.

Additional survey questions were devoted to determining if the respondent had been exposed to print, TV or radio materials dealing with alcohol license restrictions. For all three media forms, there was a significant baseline-to-post *increase* in recall of the message in the experimental counties. The observed increases in the percent of respondents who recalled a message about sanctions of 22.6

percent for printed material, 25.0 percent for TV and 25.5 percent for radio are all statistically significant. By contrast, the comparison counties exhibited a *decrease* in recall of an alcohol sanction message for all three media types.

This study leads to the conclusion that the Maryland 0.02 BAC sanction for youth is a highly effective highway safety countermeasure. As initially implemented, the sanction was associated with a statistically significant statewide reduction of accident-involved drivers under 21 judged to have been drinking. This reduction was attributed to the adoption of the sanction, the "normal" publicity attendant to the passage and implementation of the law and the imprinting of new licenses with the words *Under 21 Alcohol Restricted*. There was no reported enforcement "blitz" or change in the adjudication process. A reduction in accident-involved drivers of 11 percent as shown by the more conservative application of the time series analysis technique still represents a major safety benefit to society.

The beneficial effects of the Maryland sanction were enhanced by the PI&E campaign mounted as part of this study. This multi-media campaign used public service time/space for distribution. It was concluded that the combined effects of the sanction and the PI&E campaign were associated with an estimated reduction in accident-involved drivers under 21 years of age judged HBD of approximately 50 percent in six experimental counties. Thus, the addition of localized PI&E *which emphasized the penalties for violation of the law* appeared to increase quite substantially the beneficial effects of the sanction.

Given the extent of benefits documented for the Maryland sanction and the PI&E enhancement, it is reasonable to conclude that a lower BAC restriction for youth is a countermeasure which should be widely implemented. There is no evidence from the present study that Maryland itself or its implementation of the countermeasure were in any way atypical of the U.S. in general. Therefore, there is reason to believe that other locales can achieve safety benefits analogous to those observed in Maryland if they adopt and publicize similar sanctions.