

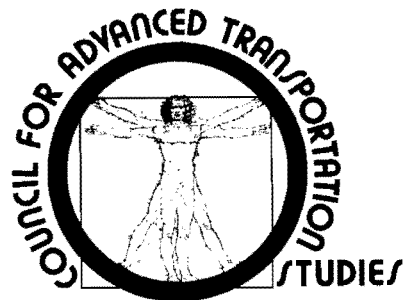
ALCOHOL COUNTERMEASURES

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RESEARCH REPORT 50

JULY 1977

TEXAS OFFICE OF TRAFFIC SAFETY



The University of Texas at Austin

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RESEARCH REPORT 50

July 1977

Prepared by

Council for Advanced Transportation Studies
The University of Texas at Austin
Austin, Texas 78712

For

Texas Office of Traffic Safety
State Department of Highways and Public Transportation
Austin, Texas

This report was developed by the Council for Advanced Transportation Studies in cooperation with the Texas Office of Traffic Safety in the interest of information exchange. The University of Texas at Austin and the Texas State Department of Highways and Public Transportation assume no liability for its use.

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle ALCOHOL COUNTERMEASURES		5. Report Date July 1977	6. Performing Organization Code
		8. Performing Organization Report No. RR-50	
7. Author(s) Gary Hales, Martha S. Williams, and Robert K. Young		10. Work Unit No. (TRAIS)	11. Contract or Grant No. (77) 7200-02 B
9. Performing Organization Name and Address Council for Advanced Transportation Studies The University of Texas at Austin Austin, Texas 78712		13. Type of Report and Period Covered	
		14. Sponsoring Agency Code	
12. Sponsoring Agency Name and Address Texas Office of Traffic Safety State Department of Highways and Public Trans. Austin, Texas		15. Supplementary Notes	
16. Abstract This paper discusses the variety of mechanisms and methods that have been used for the purpose of either preventing or at least lessening the seriousness of automobile accidents due to DWI (driving while intoxicated). Examination is made of the unique contribution to this problem by the young driver and the lowering of the drinking age to 18. General descriptive statements about the DWI driver including probable times of arrest and socioeconomic background are made. An examination of possible countermeasures considers legislative, legal, and interpersonal methods. The authors conclude that an agreed upon measure of effectiveness is necessary to evaluate countermeasures and that the public needs to be convinced of the possibility of their drinking contributing to an accident.			
17. Key Words Driving, Drinking, Driving While Intoxicated, Youthful DWI, 18 Year Old Drinking Laws, DWI Countermeasures		18. Distribution Statement This document is available through Council for Advanced Transportation Studies, The University of Texas at Austin, Austin, Texas 78712	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 55	22. Price

EXECUTIVE SUMMARY

This paper is one in a series being prepared under the auspices of the Texas Office of Traffic Safety investigating the socio-psychological aspects of traffic safety. In particular, this report presents a review of relevant studies dealing with the various methods that have been employed to reduce DWI (Driving While Intoxicated) and the accidents associated with this condition. The concept of a countermeasure can be defined as any device, legislation, law enforcement procedure, educational campaign, or psychological technique which can be used either directly or indirectly to attempt to reduce DWI associated accidents.

A major problem in decreasing DWI accidents and deaths is that of identifying the DWI driver and thereby isolating a specific population(s) for which alcohol countermeasures can be designed. The known alcoholic is too easily blamed for a majority of DWI involvements, an action which may ignore a large, potentially dangerous population of drivers who drink only occasionally. A second major target group for DWI involvement includes the young, novice drinking driver. The inexperienced teenaged driver who also drinks while operating her/his vehicle burdens her/himself with two societal roles, both of which require maturity of judgment, emotional stability and physical acumen. There are laws designed as countermeasures limiting the legal drinking age in an attempt to deter the temptation to engage in these relatively unfamiliar activities simultaneously. However, accident statistics do not uniformly document a higher DWI involvement in accidents in areas where the drinking age has been lowered to include 18-year-olds. The most influential measure designed to reach this young population may prove to be educational methods which attack the problem before the young driver starts to drink.

Other potentially effective countermeasures deal with the improvement of safe vehicle operation on roadways. Efforts are being made to update inspection requirements to effectively reduce the number of operating vehicles with mechanical malfunctions. Secondly, research is in progress involving the concept of the vehicle itself as a screening device for DWI drivers via the use of safety interlock devices which would prohibit an intoxicated driver from operating the vehicle.

If, however, an intoxicated driver chooses to operate a vehicle, he/she does so with the knowledge that he/she stands a low chance of apprehension. If arrested, he/she knows how legal counsel can circumvent prosecution in many cases. Variability in adjudication and interpretation of the law surrounding DWI makes enforcement and effective implementation difficult.

Prospective DWI drivers could be deterred by the intervention of friends or the general public before driving, but this countermeasure is often ignored. When professional psychological counseling is indicated, DWI drivers may respond with improvement in overall job productivity.

An evaluation of these suggested countermeasures is necessary to determine whether or not their implementation is effective. Ultimately, though, the driving public must be convinced of the real and present danger that DWI presents to roadway safety. Primary prevention techniques such as public education programs designed to prevent people from driving at all while drinking, coupled with secondary techniques such as better methods of apprehension and rehabilitation would be an effective counterattack strategy.

PREFACE

This is the third in a series of research reports describing activities and findings on accident research as part of the work conducted by the Council for Advanced Transportation Studies at The University of Texas at Austin under the auspices of the Texas Office of Traffic Safety, State Department of Highways and Public Transportation.

This report describes the literature relevant to countermeasures used to reduce the drinking-driver problem. A review of the literature in this area is made and conclusions and recommendations of the authors are noted.

ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the research assistance of Deborah Valentine and Kay Schauer and the secretarial assistance of Helen McGinty and Sandy Bannister whose contributions to this report were invaluable. We would also like to commend Del Ervin and Mildred Martin for library assistance and Art Frakes for editorial assistance. We appreciate the efforts and contributions of these talented individuals.

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I. INTRODUCTION

Quite clearly the place to start in the search for countermeasures to prevent or alleviate any problem is to understand the cause of the problem in the first place. It is hoped that the first booklet in this series has given the reader some points to consider regarding causes of alcohol related accidents.¹ By now the reader should be in the process of forming some inferences concerning the relationship of alcohol to automobile accidents. This is not to say that the reader should have reached a definitive answer on this subject. No one, at this point, claims such an answer.

This booklet presents a sampling of information about alcohol countermeasures but is by no means an exhaustive examination of all possible devices and methods. Rather the goal is to suggest to the reader current major directions of work in this area with the sincere desire that the reader will then continue the investigation. This paper examines the drinking laws for 18 year-olds, prisons for drivers, use of breathalyzers and presumptive limits, and other programs or devices designed to facilitate identification and inhibition of drunk drivers.

Finally, as the reader proceeds through this booklet the following should be kept in mind. It would appear that both alcoholics and social drinkers contribute to the DWI problem. Countering the influence of the first group will involve identification and extensive rehabilitation. Simple fines, jail sentences, or mass media programs will have doubtful corrective effects. Countermeasures described in this booklet are given with the idea that DWI problems and alcoholism problems, while related, are not the same. Generally, the techniques and devices would be most efficacious with the social drinker who might be more willing to temper his/her pleasure seeking. Alcoholism in DWI is a disease that requires intensive treatment just like alcoholism in any other phase of life.

¹R. Young, D. Valentine, and M. Williams, Alcohol and Accidents, (Austin, Texas: Council for Advanced Transportation Studies, The University of Texas at Austin, 1977).

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II. THE DWI (DRIVING WHILE INTOXICATED) DRIVER

One problem in investigating the relationship between alcohol consumption and driving is the difficulty in determining how often people who have passed the presumptive limit for driving while intoxicated, a legal definition (Blood Alcohol Content ranging from .08 percent to .15 percent depending on locale), are involved in accidents or fatalities. The fact that drinking and driving are often associated with accidents is not really debatable but the establishment of an accurate estimation of frequency and determination as to the extent of cause-effect versus symptomatic relationship is vital to an effective attack on the problem.

It is known that alcoholism contributes to violent deaths² and to suicides and murder.³ The connection that can be made between DWI and suicide/murder is that the alcoholic condition of the person leads to depressed self-image and destructive feelings. These destructive impulses may lead to a condition where the person uses the automobile as a weapon with which to attack society. There is an interaction taking place between alcohol and psychological state where the disinhibiting effect of alcohol allows the person to release the tensions and frustrations normally held in check. The result of this has been labeled "ego-expressive" driving.⁴ Ego-expressive driving is also exemplified by the emphasis placed on power, speed, and design in the manufacture of the automobile. Other findings which give correlations between cirrhosis of the liver and both automobile accidents and suicides support the contention that alcohol is a factor in psychological causation of accidents.⁵ As one author describes it, alcoholism is simply

²P. W. Haberman and M. M. Baden, "Alcoholism and Violent Death," Quarterly Journal of Studies on Alcohol, 35, Part A (1974), pp. 221-231.

³D. W. Goodwin, "Alcohol in Suicide and Homicide," Quarterly Journal of Studies on Alcohol, 34, Part A (1973), pp. 144-156.

⁴J. R. Adams, "Psychosocial Factors and Accidents in the Highway Transportation System" in T. W. Forbes (ed.), Human Factors in Highway Traffic Safety Research, (New York: Wiley Interscience, 1972).

⁵J. R. Adams and S. Rosenblatt, Traffic Accidents and Other Symptoms of Social Pathology, (New York: Columbia University, 1966.)

a kind of slow suicide.⁶

Little, also, discusses the problem of alcoholism as opposed to simple social drinking.⁷ He argues that effective counterattack programs must recognize the fact that alcoholism in the DWI program is a very serious problem. He states, however, that currently there are no effective questionnaires for determining the alcoholic driver or the high risk driver. The need for some kind of questionnaire or test administered in the licensing situation is critical if screening of drivers vis-a-vis the alcoholic and high risk driver is going to take place.

Not all researchers, however, agree that emphasis placed on alcoholic drivers will be cost effective. Zylman indicates that given the percentage of alcoholics in the population, targeting this group, while beneficial, would not seem to be the best way to reduce fatalities.⁸ The point being made here is that by choosing only alcoholics as DWI countermeasures targets, many DWI drivers who are not alcoholics would be overlooked. At this time the exact proportion of alcoholics involved as drivers in DWI-related accidents relative to the frequency of involvement by non-alcoholic drivers has not been determined. It is conceivable that DWI accidents may be more attributable to the social drinker who lets himself/herself get carried away once in a while than to an alcoholic who always lets this happen. Until some more definitive evidence is collected on this topic the reader is advised to cautiously question assertions of need to target either alcoholics or social drinkers exclusively.

Another problem that one encounters is the drinking mores of our culture. It is part of "maturing and growing up" in most areas to indulge in alcohol, often to the point of intoxication. A national survey found that of 3,954 subjects sampled (18 years and older) 79 percent of the males and 62 percent

⁶Adams, op. cit.

⁷J. W. Little, "Who is the Deadly Drinking Driver?" Journal of Criminal Law, Criminology, and Police Science, 59 (1968), pp. 619-623.

⁸R. Zylman, "DWI Enforcement Programs: Why Are They Not More Effective?" Accident Analysis and Prevention, 7 (1975), pp. 179-190.

of the females had drunk some kind of alcoholic beverage.⁹ The drinkers tended to be young, lived in large communities, lived where sale of alcohol was the least restricted, and where there were minimal religious or abstaining influences. They concluded that increasing urbanization was associated with drinking and that the best predictor of drinking was degree of religious involvement followed by income, parental abstinence, and sex. Such findings are interesting in light of accident statistics from the state of Texas for 1976 (see Tables 1 - 5). Notice that the statistics (Tables 1 and 2) show large numbers of total fatalities and DWI casualties in the age group 15-24. Thirty-two percent of the total fatalities were in this group. Of those casualties in DWI involved accidents, 37 percent were in this group. Considering that individuals 24 and under account for only 23.5 percent of the total driving population in Texas, the representation of young drivers in these accident categories suggests further investigation of the accident rates of young drivers relative to their exposure.

The reader should be aware of the fact that DWI involved accidents are those in which any driver of the "accident party (ies)" is intoxicated. Thus it is possible for one or all drivers to be DWI in an accident recorded as DWI involved. This cautionary note is especially relevant to Tables 2 and 3. Also note that Table 3 refers only to the drivers involved in DWI accidents. Table 5 represents DWI drivers only and gives their accident records as a listing. Thus in Table 5 all three people in the 15 and younger age group who died were DWI. In Table 3, in the 16-year-old group six people died but it may be that none of them was drunk. In each case it may have been that the other driver was the one who was DWI.

In a study of younger males and females, Kane and Patterson found that of about 20,000 who completed a questionnaire (median age 15.5 years), 45 percent were non-drinkers; 27 percent drank over twice a year, 18 percent twice or more a month, and 31 percent several times a week.¹⁰ The reader will

⁹J. G. Wallace, "Drinkers and Abstainers in Norway: A National Survey," Quarterly Journal of Studies on Alcohol, 6 (1972), Supplement, pp. 129-151.

¹⁰R. L. Kane and E. Patterson, "Drinking Attitudes and Behavior of High School Students in Kentucky," Quarterly Journal of Studies on Alcohol, 33 (1972), pp. 635-646.

note that the categories are not mutually exclusive. That is, some people were apparently counted in more than one category. The picture that emerges is one of a population of young people that accepts drinking and is involved in a large percentage of automobile accidents while drinking.

TABLE 1

AGES OF DRIVERS INVOLVED
IN ALL REPORTED ACCIDENTS

Age of Driver	Total	Fatal	Injury
15 and younger	1146	15	450
16	2659	18	841
17	16724	67	3658
18 to 19	70074	274	13949
20 to 24	171515	927	35616
25 to 34	203005	965	41550
35 to 44	103977	517	20768
45 to 54	82021	436	15940
55 to 64	60724	356	11595
65 to 74	37435	193	6980
75 & older	17075	136	3104
Unknown	63939	96	4365
Total Drivers	830294	4000	158816

LICENSED DRIVERS (TEXAS)

25 and over = 6,166,795
 24 and under = 1,904,829
 8,071,624

Courtesy of Texas Department of Public Safety, 1977

TABLE 2

AGES OF CASUALTIES
IN DWI INVOLVED ACCIDENTS

Age of Casualty (Years)	Total	Male *	Female *
0 to 4	267	134	132
5 to 9	282	143	138
10 to 14	392	189	199
15 to 19	2640	1773	858
20 to 24	3397	2578	807
25 to 34	3584	2644	933
35 to 44	1853	1300	542
45 to 54	1409	980	424
55 to 64	821	586	231
65 to 74	322	219	103
75 & older	71	40	31
unknown	222	120	84
Total Drivers	15260	10706	4482

* Sex of all casualties not indicated by Table

LICENSED DRIVERS (TEXAS)

25 and over = 6,166,795
 24 and under = 1,904,829
 8,071,624

Courtesy of Texas Department of Public Safety, 1977

TABLE 3

AGES OF ALL DRIVERS
INVOLVED IN DWI ACCIDENTS

Age of Driver	Total	Fatal	Injury
15 & younger	64	3	32
16	306	6	112
17	891	23	339
18 to 19	3141	71	1193
20 to 24	7827	177	3106
25 to 34	9521	186	3747
35 to 44	5677	98	2101
45 to 54	4667	100	1603
55 to 64	2725	64	953
65 to 74	921	16	324
75 & older	134	3	53
Unknown	680	6	143
Total Drivers	36554	723	13706

LICENSED DRIVERS (TEXAS)

25 and over = 6,166,795
 24 and under = 1,904,829
 8,071,624

Courtesy of Texas Department of Public Safety, 1977

TABLE 4

SEX OF ALL DRIVERS
INVOLVED IN ACCIDENTS

Sex of Driver	Total	Fatal	Injury
Male	30658	660	11476
Female	5373	86	2112
Not Stated	523	7	118
Total Drivers	36554	753	13706

LICENSED DRIVERS (TEXAS)

25 and over = 6,166,795
 24 and under = 1,904,829
 8,071,624

Courtesy of Texas Department of Public Safety, 1977

TABLE 5

AGES OF DRIVERS
INVOLVED IN ACCIDENTS
(DWI ONLY)

Age of Driver	Total	Fatal	Injury
15 & younger	45	3	20
16	180	4	62
17	536	18	213
18 to 19	2184	52	865
20 to 24	5375	120	2233
25 to 34	6425	132	2594
35 to 44	4081	72	1509
45 to 54	3438	65	1135
55 to 64	1986	46	669
65 to 74	628	5	202
75 & older	77	0	21
Unknown	517	2	89
Total Drivers	25472	519	9612

LICENSED DRIVERS (TEXAS)

25 and over = 6,166,795
 24 and under = 1,904,829
 8,071,624

Courtesy of Texas Department of Public Safety, 1977

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III. THE YOUNG DWI DRIVER

The vehicle is more than just a means of transportation to the teenager and young driver. The car is also a social instrument with which the young person interacts with other members of his/her peer group. Both driving and drinking are related in part to satisfaction of basic needs of young people.¹¹ The car provides a unique opportunity to be absent from the scrutiny of parents and to be alone with members of the opposite sex. In addition, the automobile is a convenient "vehicle" by which young people can drink alcoholic beverages in relative seclusion. The availability of cars and infrequently travelled roads provides the makings of an impromptu party. Another interesting social facet of the automobile is that it allows the young male to take command of the situation. Since he is providing the transportation the control is his regarding "going parking," etc. The societally influenced active-male role plays a large part in this process. It is for this reason that appeals to young male drivers to let their dates drive if the boys are intoxicated may fall on deaf ears. Borckenstein *et al.* suggest that any method used for a countermeasures program must take into account the role that drinking and driving play in the social interaction chain.¹²

The automobile is also a means of obtaining the economic base from which the weekend social outings may be launched. The fact that so many young people need transportation to their jobs must also be considered when instituting countermeasures. Across the board licensing restrictions without recognition of this fact would introduce unnecessary and counterproductive hardships on the young driver and his/her family, who would have to taxi the young person.

One way the problem of young drinking drivers can be attacked is by legally limiting the use of alcohol and/or other drugs by age. If such a law-based measure could be enforced there is some possibility that it could reduce the

¹¹R. F. Borckenstein, *et al.*, The Perception of DWI Laws: A Study of the General Awareness and Attitudes of Public and Official Groups Towards the Drinking Laws, (Washington, D. C.: U. S. Department of Transportation, 1971).

¹²Ibid.

number of young persons drinking and driving. The difficulty with such a procedure, however, is that young people will quite often ask their friends or in some cases total strangers to buy them alcohol. Another problem arises in that due to variation of drinking laws from state to state it is possible for youths to obtain liquor by interstate commerce. It is the authors' experience that if young people want beer or other alcoholic beverages, and in spite of the fact that they are underage, ways will be found to obtain them. Indeed it would seem that one of the incentives for drinking is that some adventure is involved in obtaining liquor in the first place. Besides the obvious physical "benefits" attributed by the youths to alcohol, the chase involved provides the framework for story-telling and the discussion of legendary exploits.

Instead of increasing the age limit at which youths can legally purchase alcohol many areas of the United States have participated in the movement to reduce the legal drinking age to eighteen years. This has occurred in spite of recent studies that have linked motor vehicle accidents of 15-24 year olds to increased driving and drinking behavior. The actions of the states in reducing the legal limit has thus become a source of controversy.

Michigan reduced its legal drinking age from 21 to 18 and it was found that the number of crashes involving people 21 years of age or younger in which the driver was judged to have been drinking increased.¹³ Such findings have been criticized, however, because the reporting procedures of the police may have been influenced more by the publicity of the new law than by actual incident increase.^{14, 15, 16, 17} Zylman also feels that the increase could

¹³R. B. Voas, Alcohol, Drugs and Young Drivers, (Washington, D.C.: U. S. Department of Transportation, 1974).

¹⁴R. Zylman, "When It Is Legal to Drink at 18: What Should We Expect?" Journal of Traffic Safety Education, 20 (1973), pp. 9-10.

¹⁵R. Zylman, "Fatal Crashes Among Michigan Youth Following Reduction of Legal Drinking Age," Quarterly Journal of Studies on Alcohol, 35, Part A (1974), pp. 283-286.

¹⁶R. Zylman, "When It Became Legal to Drink at 18 in Michigan: What Happened," Journal of Traffic Safety Education, 21, Part B (1974), pp. 15-16.

¹⁷R. Zylman, "When It Became Legal to Drink at 18 in Massachusetts and Maine: What Happened?" The Police Chief, 63 (1976), pp. 56-59.

be due simply to normal year-to-year fluctuations. Williams, Rich, Zader and Robertson¹⁸ support Zylman in this hypothesis and suggest that the increase is negligible.

Voas reports a study of this situation by the Department of Transportation which covered thousands of crashes.¹⁹ Quoting from Voas,

The focus of the study was upon three states, Michigan, Maine, and Vermont, which changed their legal drinking age from 21 to 18 within the last two years. For comparison, two other groups of states were chosen. The first group, consisting of New York and Louisiana, were states which have for many years permitted 18-year-olds to drink. Thus it was possible to compare the crash experience for drivers in the 18-20 year old group for states which had never allowed such drivers to drink, states which have always allowed such drivers to drink, and states which have recently changed.

When a detailed statistical analysis of the crash involvement of 18-20 year olds before and after the change of laws was made, the study indicated that there was a statistically significant increase in crashes for this age group in Michigan. Maine also appeared to show an increase. On the other hand, lowering of the drinking age in the State of Vermont had no noticeable impact on youth crash experience.

The most interesting feature of this study is that the scientist who conducted it believes that they have developed a method for predicting whether a given state will or will not show an increase in crashes for young drivers upon reduction of the drinking age. They noted that the State of Vermont which did not show a significant change already had a crash distribution across age groups similar to the State of New York which has always permitted 18-year-olds to drink. On the other hand, both Michigan and Maine which did show a change, had an age distribution of alcohol-related crashes among young people which was similar to that of Pennsylvania which has never allowed liquor sales to individuals below age 21. They made the guarded prediction that if Pennsylvania were to lower its

¹⁸A. F. Williams, et al., "The Legal Minimum Drinking Age and Fatal Motor Vehicle Crashes," The Journal of Legal Studies, 4 (1975).

¹⁹Voas, op. cit.

drinking age there would be an increase in alcohol-related crashes among teenagers. On the other hand, they predicted that Texas which does not have a 21-year-old law would not show this change since despite this law, their teenage drinking/driving data is similar to New York rather than Pennsylvania.

This study is significant. It provides objective data on what is currently a sensitive and controversial issue. Its results seem to make sense. In those states where teenagers have access to an adjacent state which permits serving alcohol to 18-year-olds they develop a pattern of drinking and driving similar to a state which permits 18-year-olds to drink, no change would be expected and no change occurs with a reduction in the drinking age. In those states, however, that are somewhat isolated from 18-year-old drinking states and which have developed a significantly different pattern of teenage drinking and driving, a change should be expected and does indeed occur.²⁰

The reader should note that in the description of the study, random chance was not accounted for. Thus differences might possibly be due to periodic fluctuations. The suggestion that events and circumstances peculiar to particular states affect the results of implementing legal drinking for 18 year olds should, however, be considered in an analysis of such law changes.

Such ability to offer some rationale for the changing accident patterns casts some doubt on the assertions of Whitehead²¹ and Ferrence and Whitehead²² that lowering the legal drinking age has been counter productive and will probably be so if continued. The particular differences between states appear to be significant in determining the effectiveness of age restrictions on legal drinking age. This would perhaps also account for some of the discrepancies of estimation of alcohol-related accidents which ranges from 30

²⁰Voas, op. cit.

²¹P. C. Whitehead, "Effects of Liberalizing Alcohol Control Measures," Addictive Behaviors, 1 (1976), pp. 197-203.

²²R. G. Ferrence and P. C. Whitehead, "Fatal Crashes Among Michigan Youth Following Reduction of the Legal Drinking Age," Quarterly Journal of Studies on Alcohol, 36 (1975), pp. 171-177.

percent²³ to 50 percent.²⁴ While recognizing that youth may account disproportionately for the number of accidents, investigation of the particulars of each situation should be made at least on a state-by-state basis. In those situations where raising the drinking age may be thought to reduce drinking in the targeted age group consideration should be made of "spillover" effects. That is, raising the legal drinking age may reduce the availability of alcohol to those people whose age puts them just below the current drinking age. Thus if the drinking age was 21, alcohol would more likely filter to 20 and 19-year olds, where the 18-year-old drinking laws may have alcohol reaching 16 and 17-year-olds.²⁵

Voas suggests a number of other means of counterattack such as restricting the amount of liquor available to young drinker/drivers. In such a case the responsibility would fall to the barkeeper to restrict the alcohol intake. The difficulty of enforcement would be getting the cooperation of the tavern owners, who may feel this is added work asked of their employees for which no monetary compensation is provided. The ability or willingness of a barkeeper to hold an obviously intoxicated person at a bar is also doubtful. Such a task could be supplemented by more adequate supervision of drinking establishments by alcoholic beverage control units. Strict penalties would need to be imposed on those places where laxity in adherence to the law allows underage persons to drink or allows drinks to be served to any obviously intoxicated person.

In addition to limiting the alcohol intake, restrictions may also be placed on driving. The young driver is often involved in nighttime accidents but thus far no effective means of limitation in this area has been shown. Legally prohibiting a certain class of drivers, in this case young drivers, from the road at night would be difficult to enforce, in part because of the large volume of drivers. Prohibiting high speeds by young inexperienced drivers might also be effective except for the difficulties in enforcement. Use of governors or

²³R. Zylman (1975), op. cit.

²⁴"Alcoholism: New Victims, New Treatment," Time, (1974), pp. 75-81.

²⁵P. G. Whitehead and R. G. Ferrence, "Young Drivers' Involvement In Traffic Accidents with Specific Relation to Alcohol and Other Drugs," Journal of Safety Research, 8 (1976), in press.

other mechanical devices is not yet practical due to cost of installation, inspection, and maintenance and also due to the ease with which car-wise young people could tamper with such devices.

Use of legal restrictions, such as extended probationary periods of 12-18 months and temporary license loss for even minor offenses, may have some positive effect in reducing collision rates among young drivers. The heightened threat may induce greater caution.²⁶ Voas argues, however, that fines, license revocations, and jail sentences may help rehabilitate the driver who has his drinking under control.²⁷ Since problem drinking is a significant factor in drinking and driving for some young persons, some type of special treatment would be indicated for such drinkers who have lost control over their drinking behavior.

Further suggestions include mass media programs aimed at changing the attitudes of young persons about drinking and driving, better driver education programs, and a reduced BAC level for presumptive intoxication. Such media effects should be carefully constructed lest the public be alienated by the approach. "Preaching" to people about how remiss they are will probably be ineffective and could possibly cause acts of righteous defiance. There is also the possibility that some kind of practical interlock system which would mechanically restrain the intoxicated young person could be developed.

The young driver is potentially a high risk due to inexperience in driving and due to distractability. When such factors are coupled with intoxication a very dangerous situation can result.

²⁶Whitehead and Ferrence, op. cit.

²⁷Voas, op. cit.

IV. VEHICLE AND ENVIRONMENT COUNTERMEASURES

Given that it may not be feasible to reduce the population of illegally intoxicated drivers on the highways and roadways to zero, some countermeasures take the form of addressing specific problems of the vehicle and the roadway.

In some cases the roadway presents a definite challenge even to the sober experienced driver. Curves that are not banked correctly, or have designated speed limits which may be too fast for safety, are not uncommon. Signs which are difficult for all drivers to read are especially hazardous for DWI drivers or young inexperienced drinking drivers.²⁸ According to a Department of Transportation report, state conformance with Federal highway standards was fairly high but not complete.²⁹ For instance, compliance with standards to reduce skidding has shown a national average compliance rating of 77.5 percent. Some recommendations that have been made for safer roadways include

- (1) right turn on red,
- (2) signs and marking for low volume roads,
- (3) development of procedures for identifying hazardous locations, and
- (4) evaluation of speed control devices for school zones and small towns.³⁰

The point being suggested here is that by increasing roadway safety for all drivers, the situation for the DWI driver is made safer also. If the demands made on the driver are more realistic and acceptable then perhaps the intoxicated driver will be better able to maneuver effectively enough to avoid accident situations.

It can also be argued that having an effectively operating vehicle may also reduce accident probabilities. Thus, a malfunctioning steering or braking system, while always dangerous, could be further aggravated by the situation

²⁸J. A. Hicks, III, "An Evaluation of the Effect of Sign Brightness on the Sign Behavior of Alcohol-Impaired Drivers," Human Factors, 18, No. 1 (1976), pp. 45-52.

²⁹U. S. Department of Transportation, Traffic Safety '74, (Washington, D. C.: U. S. Department of Transportation, 1974).

³⁰Ibid.

that exists when an intoxicated person is behind the wheel. In spite of the fact that the driver may have learned to compensate for defective mechanical units, this will be just one more obstacle to an already impaired driver. A secondary countermeasure regarding this hazard would be a strictly enforced and extensive vehicle inspection program. Given that the current inspection programs fulfill neither of the above mentioned qualifications, existing programs are not envisioned as being particularly helpful in impacting the situation. To determine the compliance of vehicle makes with construction/safety standards, input should be encouraged, on a voluntary basis, from drivers and other public and private sources.³¹

The vehicle can also be used as a screening device by the implementation of some type of interlock system. A safety interlock system that an intoxicated individual would be unable to operate could be designed. It should have the capacity to:

- (1) sense blood alcohol level,
- (2) sense the deterioration of the driver's performance,
- (3) sense the identity of the driver, thereby keeping the previously identified problem drinker from driving, and
- (4) sense the time of day, thereby preventing driving at night when the danger of accidents is greater.³²

The interlock devices to be used should also be difficult to circumvent. Thus the construction of such devices should be planned in such a way that they can be located in a secure area of the car accessible only by trained authorized personnel with special tools. The enforcement of such rigid construction standards and the ability to keep unauthorized people from tampering would, however, be very difficult to actually implement. While there has been progress in research and development of alcohol safety interlock systems, much work remains to be done.³³ Part of the task coming with use of

³¹U. S. Department of Transportation, Traffic Safety '73, (Washington, D. C.: U. S. Department of Transportation, 1973.)

³²M. Buttiglieri, A. J. Brunse and H. W. Case, "Effects of Alcohol and Drugs on Driving Behaviors" in T. W. Forbes (ed.), Human Factors in Highway Traffic Safety Research, (New York: Wiley Interscience, 1972).

³³C. N. Abernathy, III, Laboratory Evaluation of Second Generation Behavioral Alcohol Safety Interlock Systems, (Washington, D. C.: Department of Transportation, Transportation Systems Center, March 1974).

the interlock system is the need for design and implementation of a program which persuasively introduces the public to this concept and convinces them of the need for this device. In addition, any interlock system would have to be developed so as to minimize the frequency and number of "false positives," i.e., preventing a sober driver from starting his/her car. One tack that might be useful in the above regard is a media approach which emphasizes that such a device is necessary to protect the driver from the "other guy." Since it seems that most drivers are well aware of what the other drivers are doing to make life more hazardous for them such an approach might find the drivers receptive. It would, however, also be useful to research an approach that would emphasize the knowledge possessed by official sources regarding driving and drinking. In this way we are saying, "It's up to you, the driver, to make some changes yourself. If you don't, you will have to accept passive restraint."

The concept of passive restraint is of course connected to safety device use. This is another area that is important in prevention of serious accidents due to DWI. A high proportion of all drivers refrain from using their seat-belts.³⁴ A DWI driver, who is disoriented to begin with, is unlikely to use safety belts unless he/she is in a habit of doing so. In this case the need for passive restraint systems, e.g., air bags, is even more critical than for the general public. One method by which installation could take place would be as a result of court action. The procedure in DWI cases could be structured so as to require installation of an interlock system or some kind of passive restraint system in the car of any convicted driver. The automobile could be impounded until such time as work was completed and paid for. However, this would protect the alcoholic driver but not her/his victims.

The modifications of the vehicle and the roadway for DWI counterattack purposes are perhaps less visible to the public than are the countermeasures such as increased police patrols and stiffer jail sentences. Such modifications are beneficial, however, since a poorly operating vehicle on a dangerous stretch of roadway merely accentuates the difficulties experienced by a DWI driver. While the design of both vehicle and roadway should always be conducive to safe driving, this becomes a critical variable in the case of the inebriated driver.

³⁴ C. W. Schmidt, Jr., et al., "Characteristics of Drivers Involved in Single Car Accidents," Archives of General Psychiatry, 27 (1972), pp. 800-803.

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V. APPREHENSION OF THE DWI DRIVER

As we have seen above, keeping DWI drivers off the road and/or making it easier for them to avoid accidents may be very difficult. Thus arrest and removal of these drivers seems on the surface to be a practical way to reduce the number of accidents occurring. The question remains, how many accidents would be prevented? A study by Carlson et al. found that in a sample of nighttime drivers, 75 percent of the subjects given alcohol breath tests had not been drinking, and about 10 percent had a BAC greater than or equal to .05 percent.³⁵ Note that this is a study with a sample which may not be indicative of the population in general. Generalizing these results to other areas of the country and to the total driving public should be done with caution. It was also found that 14 percent of the drivers on medium volume roads had BAC's greater than or equal to .05 percent, while this held true for only 8 percent of drivers on high volume roads. Thus, given that only 10 percent of the drivers may have BAC's of greater than or equal to .05 percent and that they travel roads which are less patrolled, how effective can DWI enforcement be?

A study conducted by Beitel, Sharp, and Glanz addressed the question of the likelihood of apprehending the DWI driver. This is an important facet of the whole DWI counterattack program since it involves the allocation of monies.³⁶ If it is found that increasing patrols would be effective in apprehending more DWI drivers, perhaps this is where funds should be expended. (Note that subsequent judicial procedures may negate the higher arrest rate.) Based on their research findings, Beitel, Sharp and Glanz produced the probability chart shown in Table 6.³⁷

³⁵W. L. Carlson, et al., Washtenaw County BAC Roadside Survey Report, (Ann Arbor, Michigan: Highway Safety Research Institute, The University of Michigan, 1971).

³⁶G. A. Beitel, M. C. Sharp and W. D. Glanz, "Probability of Arrest While Driving Under the Influence of Alcohol," Journal of Studies on Alcohol, 36 (1975), pp. 109-116.

³⁷Beitel, et al., op. cit.

TABLE 6

ARREST PROBABILITIES FOR
INEBRIATED DRIVERS

The probability of arrest has been reported as:

BAC (%)	Estimated Vehicles	Observed Arrests	Computed $P(A_1/B_j)$
0	40,000	0	.000000055
0.01-0.04	11,800	0	.0000013
0.05-0.09	3,540	0	.000124
0.09-0.14	2,360	7	.00244
0.15-0.19	890	6	.0105
0.20-0.24	240	6	.0195
0.25-0.29	50	1	.0258
0.30-0.34	6	0	.0565
0.35-0.39	1	0	.029
≤ 0.10	3,547	22	.0058
≤ 0.15	1,187	15	.0133

Source: :G. A. Beitel, M. C. Sharp, and W. D. Glanz, "Probability of Arrest While Driving Under the Influence of Alcohol," Journal of Studies on Alcohol, 36 (1975), pp. 109-116.

The reader should note some interesting aspects of these probabilities. First, in some individuals, impairment could occur before the .10 percent BAC used as a presumptive level of DWI. Recognition of this fact has prompted reduction of the presumptive BAC in some areas (e.g., Great Britain -- .08 percent). The probability of arrest with a BAC of .30 - .34 percent is .0565. In this case the driver ought to be fairly easy to spot. What about the drivers who are at or below the presumptive level of .10 percent? The probability of arrest for such drivers is only .0058 or 1/200. (Note .0058/1000 equals approximately 1/200). Of those drivers with a BAC less than or equal to .15 percent, the probability of arrest is still only .0133 or 13/100. Again these statistics are based on limited and localized data and broad generalization should be done only with limitations in mind. While it would seem that the driver who has reached the .10 percent level might be easy to spot due to erratic reckless driving behavior, just the opposite may be true. The Texas Department of Public Safety manual for DWI arrest instructions includes a list of recognition factors for an "intoxicated car," which include

- (1) exceptionally slow or fast driver,
- (2) slowing down and refusing to pass Highway Patrol Unit when overtaking from behind,
- (3) overly cautious driver, and
- (4) wide slow turns when it is not necessary.

Inebriation can, of course be indicated by jerky gear shifting, weaving, driving down the center lane and the like. Quite often, however, arrest is complicated by the compensating behavior of the driver. The driver who has been drinking may be exercising greater caution than would normally be employed. This is not to indicate that drinking may cause safe driving, however, since such compensatory driving may only partially restore normal driving skills.

The older, more experienced driver will often take moderately travelled roads and drive as normally as possible if he has been drinking. The younger driver is less likely to take such precautions and thus is more likely to be apprehended.

One other additional difficulty that may confront the officer or the public official who is attempting to implement a DWI enforcement program is ethnicity. Zylman concludes that non-whites may be overrepresented in DWI arrests because of the propensity of the lower socio-economic class to drive

after drinking and the preponderance of non-whites in the lower socio-economic class.³⁸ He suggests that one reason that this relationship exists is that typically lower economic class individuals live and find recreation in more congested areas and drive on more heavily travelled streets in these congested areas. Both of these facts would increase the probability of DWI arrests. The results of the study by Hyman, Helrich and Besson suggest that there is no police bias but that minority and disadvantaged groups are more often represented in the drinking population and are thus more liable to be arrested.³⁹ Bruce in his work with lower class alcoholics found some indication of greater tendencies toward alienation in the alcoholics as compared to a non-alcoholic group.⁴⁰ This finding coupled with Zylman's would support the picture of the high-risk driver who has been drinking, attacking an unjust society with her/his automobile.⁴¹ The direction to look for answers must include recognition of the social conditions that influence the drinking driver.

One of the main thrusts of all current DWI programs has been the apprehension of the intoxicated driver. Although studies have shown that 48 to 57 percent of drivers fatally injured in one-car crashes had BAC's in excess of .10 percent, only about one to four percent of drivers on the road, according to one study⁴², have such high BAC's. This rather low statistic does not take into account the specific danger of night driving where the possibility of discovering drivers with BAC's in excess of .10 percent is greater. Still it would appear that too massive a concentration of funds and personnel in this area would not be as cost effective as primary prevention programs (discussed below). This is not to suggest that DWI arrests

³⁸R. Zylman, "Race and Social Status Discrimination and Police Action in Alcohol-Related Collisions," Journal of Safety Research, 4 (1972), pp. 75-84.

³⁹M. H. Hyman, A. R. Helrich and G. Besson, "Ascertaining Police Bias in Arrests for Drunken Driving," Quarterly Journal of Studies on Alcohol, 33 (1972), pp. 148-159.

⁴⁰J. D. Bruce, "Alienation and the Labeled Deviant: The Case of the Lower Class Alcoholic Offender," Case Western Reserve Journal of Sociology, 3 (1969), pp. 39-51.

⁴¹Zylman (1975), op. cit.

⁴²Buttiglieri, op. cit.

should be slighted or that counterattack programs emphasizing arrests for DWI should be halted. It is necessary to view such programs in perspective and realize just what can be expected, namely, trying to lessen the deleterious effects of a bad situation.

The police officer must be in the right place at the right time to effectively implement the DWI laws. As we have seen, however, the chances of arrest are very low. Also, there are no consistent, valid data showing that enforcement improves the problem. It is possible, too, that enforcement may cause drivers to shift their driving to less well patrolled areas.

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VI. LEGISLATIVE AND LEGAL MECHANISMS

One aspect of the police officer's problem vis-a-vis DWI arrest is the legal structure that backs her/him up. In spite of the fact that the probability of arrest is low, when DWI drivers are arrested, those who are convicted must be dealt with in such a way as to reduce the likelihood of the offense recurring. It would seem, in the authors' opinion, that the law must have "teeth" in it to be aversive to the DWI drivers.

The enactment of the Road Safety Act in Great Britain in 1967 imposed severe penalties for illegal intoxication (BAC greater than or equal to .08 percent). The arrest procedure involves repeated testing and fines for refusing an initial screening test. In addition, even if the driver refuses the initial test he/she can still be arrested and taken in if the constable believes circumstances warrant this. The new law was widely publicized including the extensive testing procedure. The passage of the law was followed by a 42 percent drop in nighttime road accidents in London in the first month.⁴³ Following the passage of a similar law in Canada, however, a study by Smart cast some doubt on the longevity of such actions.⁴⁴ Smart observed tavern patrons before and after passage of the act on the following dimensions:

- (1) number of cars in a tavern lot (between the hours of 6 p.m. - 10 p.m.),
- (2) average number of people per car, and
- (3) number of drinks per unit of time taken by driver in the tavern (estimate made of BAC by estimating body weight of driver and coupling that with number of drinks taken).

He found that over a four-month period, while there was a drop in the above dimensions immediately following the law, the levels of all three had climbed

⁴³M. F. Goodwin, "Great Britain Cracks Down on Drinking Drivers: A Report on the New Road Safety Act," Traffic Digest and Review, (1968), pp. 3-8.

⁴⁴R. G. Smart, "Observation of Tavern Patrons Before and After the Compulsory Breath Test Law in Canada," Quarterly Journal of Studies on Alcohol, 33 (1972), pp. 1122-1128.

to pre-law levels within three months after passage. There was apparently some reduction in the number of heavy drinkers after the law although the amount of beer drunk did not decrease.

The generalizing of these results to the American driving patterns must be considered in the light of cultural differences. Attitudes about law enforcement agencies, disposition to obey traffic laws, and the like would very likely interact with the conditions of any law. The authors believe that such results can, however, be useful in indicating general trends. Applications of different kinds of sanctions were studied by Ross and Blumenthal.⁴⁵ They compared sentencing first time DWI drivers to giving fines, probation or a variety of clinical/education programs. There were no significant between-group differences in subsequent accident/violation records. They caution, however, that due to incomplete cooperation by the sentencing judges the procedures were not studied as they should have been.

Jail sentences for DWI drivers have also been suggested as a deterrent. Seven-day jail sentences for DWI were instituted in Chicago and widely publicized. The only significant change was a decrease in the percentage of convictions for those arrested for DWI and not administered a breath test. The authors conclude that countermeasures that increase probability of apprehension would seem more likely to act as a deterrent than strictly punitive measures such as the seven-day sentence.⁴⁶ The Scandinavian countries have had presumptive laws for some time, along with strict sentencing. Ross points out that there is no adequate proof that Scandinavian "per se" laws deter drinking and driving.⁴⁷ Dijksterhuis cites a study of prisons designated specifically for drunk drivers.⁴⁸ His findings indicate that while

⁴⁵ H. L. Ross and H. Blumenthal, "Sanctions for the Drinking Driver: An Experimental Study," Journal of Legal Studies, 3 (1974), pp. 53-61.

⁴⁶ L. S. Robertson, R. F. Rich and H. L. Ross, "Jail Sentences for Driving While Intoxicated in Chicago: A Judicial Policy that Failed," Law and Society Review, 8 (1973), pp. 55-67.

⁴⁷ H. L. Ross, "The Scandinavian Myth: The Effectiveness of Drinking and Driving Legislation in Sweden and Norway," Journal of Legal Studies, 4 (1975) pp. 285-310.

⁴⁸ F. P. H. Dijksterhuis, "The Specific Preventative Effect of a Prison for Drunken Drivers," Sociologia Neerlandica, 10 (1974), pp. 194-201.

the drunk drivers said the special prison was a more positive experience, it did not reduce subsequent convictions. In fact DWI drivers sent to traditional prisons (N=33) had a lower, (though not significantly) number of subsequent instances in which they drank and drove, compared to those in the special prisons (N=40).

There has been a connection shown between demerit points and collisions. As the average number of convictions increases so does the risk of involvement in at least one accident. This is especially pertinent to young drivers who often have high numbers of demerit points. Chipman and Morgan suggest that by sensitizing the young driver to this relationship we may be able to decrease collisions.⁴⁹ That is, a young driver who keeps her/his demerit points down is less likely to have an accident. A problem with this approach is that the goal of safety programs is to reduce the accidents which would cause the driver to be assessed demerit points. If we could do this we would already be on the way to reducing collisions and thus their argument would appear to be somewhat circular.

When discussing facts such as those cited above with drivers, it is well to consider just exactly what drivers believe and how they act on this information. Little asked drivers a number of questions concerning accidents, the probability of arrest, etc.⁵⁰ Table 7 presents the questions and a partial list of answers given by different groups of drivers, i.e., teenagers, males, females, drivers 20-25, drivers 26 and over, and drivers who said that they sometimes drink before driving.⁵¹ What is interesting to note here and what should be of concern is that in some cases, particularly with teenagers, the current program of mass education about the dangers of drinking and driving has apparently had little effect. Thus 60 percent of teens questioned indicated that even if a friend had had too much to drink they would allow her/him to

⁴⁹ M. L. Chipman and P. Morgan, "The Role of Driver Demerit Points and Age in the Prediction of Motor Vehicle Collisions," British Journal of Preventive and Social Medicine, 29 (1975), pp. 190-195.

⁵⁰ J. W. Little, "A Theory and Empirical Study of What Deters Drinking Drivers, If, When and Why," Administrative Law Review, 23 (1971), pp. 169-195.

⁵¹ Ibid., p. 169.

TABLE 7

RESPONSES TO QUESTIONS CONCERNING
DRIVING AND DRINKING

The following terms have been used:

"Males" - Male drivers (141 in number)
 "Females" - Female drivers (61 in number)
 "Teens" - Teenage driver (70 in number)
 "20-25" - Drivers of ages 20 through 25 (31 in number)
 "26+" - Drivers of ages 26 and older (101 in number)
 "D.D." - Drivers who said they sometimes drink before driving (91 in number)

<u>Question</u>	<u>All</u>	<u>D.D.</u>	<u>Males</u>	<u>Females</u>	<u>Teens</u>	<u>20-25</u>	<u>26+</u>
Do you believe there is any danger in driving after drinking if you are careful?							
%age answering <u>negatively</u>	6%	9%	9%	2%	10%	6%	4%
Do you think drinking causes more accidents than speeding or vice versa?							
%age answering <u>drinking</u>	43%	37%	43%	43%	41%	48%	43%
%age answering <u>speeding</u>	35%	36%	37%	31%	46%	29%	30%
Have you ever been drinking with friends and found that the driver had too much to drink?							
%age answering <u>affirmatively</u>	64%	82%	69%	46%	60%	71%	66%
What did you do when you discovered the driver had too much to drink?							
%age answering <u>was not concerned</u>	8%	9%	11%	0%	14%	9%	4%
%age answering <u>let him drive anyway</u>	44%	47%	44%	42%	60%	41%	35%
%age answering <u>suggested someone else drive</u>	56%	63%	56%	57%	45%	55%	64%
%age answering <u>refused to ride with him</u>	35%	27%	32%	42%	26%	18%	45%
%age answering <u>called a cab</u>	3%	1%	1%	9%	0%	5%	4%

TABLE 7 (continued)

<u>Question</u>	<u>All</u>	<u>D.D.</u>	<u>Males</u>	<u>Females</u>	<u>Teens</u>	<u>20-25</u>	<u>26+</u>
Do you sometimes have an occasion to have some drinks before driving? %age answering <u>affirmatively</u>	45%	100%	55%	23%	26%	61%	44%
Did you ever worry about having an accident when you were doing this? %age answering <u>affirmatively</u>	43%	43%	42%	50%	43%	32%	45%
Have you ever decided not to drive after you'd been drinking? %age answering <u>affirmatively</u>	84%	67%	83%	86%	105%	79%	96%
How well do you feel you know the laws about drinking and driving? %age answering <u>well or average</u>	70%	74%	74%	62%	80%	64%	66%
Do you know what proposed implied consent laws refer to? %age answering <u>affirmatively</u>	33%	42%	38%	21%	23%	36%	39%
What do you feel about the possibilities of getting your license back on appeal following a drunk driving conviction? %age answering <u>good or fair</u>	54%	63%	62%	36%	39%	55%	65%
Do you think that being arrested for drunk driving would be bad for: a) your job or school? b) your respect from your family? c) your respect from your friends? total %age answering <u>affirmatively</u>	76%	76%	72%	84%	64%	63%	87%
Do you think it would be worse than being arrested for speeding? %age answering <u>negatively</u>	7%	8%	9%	3%	10%	13%	3%

TABLE 7 (continued)

<u>Question</u>	<u>All</u>	<u>D.D.</u>	<u>Males</u>	<u>Females</u>	<u>Teens</u>	<u>20-25</u>	<u>26+</u>
Do you ever worry about the possibility of arrest when driving after drinking? %age of those answering they did sometimes drive after drinking answering affirmatively	24%	24%	27%	7%	50%	21%	20%
Have you ever driven after drinking against your own or anyone else's judgment? %age of members earlier admitting to driving after drinking answering affirmatively	24%	22%	27%	7%	39%	16%	27%

Source: D. Denberg and R. G. Smart, "Recidivism and Collision Involvement of Impaired Drivers: Some Implications for Countermeasures," The Proceedings of the Fourth Annual Alcoholism Conference of the National Institute of Alcohol Abuse and Alcoholism, U.S. Department of Health, Education and Welfare.

drive anyway. Forty-five percent of all drivers in the sample said that they sometimes drank and drove and only 24 percent were concerned about arrest because of drinking before driving. Yet 76 percent of all drivers felt that a DWI would cause a loss of respect and 70 percent felt they knew the law about driving and drinking. (Note that in some cases the percentage of persons answering a particular question is greater than 100 percent. No explanation was provided by the authors). It is apparent that effective countermeasure programs should include accurate communication of accident-related information in such a fashion that it is believable.

In a number of studies the comparison used to determine effectiveness of a program is recidivism. Denberg and Smart indicate that very few of those arrested in their study were recidivists.⁵² Ten percent repeat within a year, 17 percent within two years. Secondary prevention programs are not as important, they believe, as primary prevention programs. The rate of recidivism that they found should be considered when comparing effectiveness of programs by means of subsequent convictions.

The Smith and Wesson "Breathalyzer"[®] tests used by many states and some foreign countries have also been suggested as effective countermeasures. These instruments can be considered as a countermeasure to the extent that the drivers are aware of their accuracy. This approach was taken in the implementation of the 1967 British Road Act.⁵³ One advance in the field of instrumentation would be a portable testing device that is as accurate as the breathalyzer. Currently work is proceeding in this area but thus far accurate portable screening devices are not available.^{54,55}

⁵²D. Denberg and R. G. Smart, "Recidivism and Collision Involvement of Impaired Drivers: Some Implications for Countermeasures," The Proceedings of the Fourth Annual Alcoholism Conference of the National Institute of Alcohol Abuse and Alcoholism, U. S. Department of Health, Education and Welfare.

⁵³H. L. Ross, D. T. Campbell and G. V. Glass, "Determining the Social Effects of a Legal Reform: The British 'Breathalyzer' Crackdown of 1967," American Behavioral Scientist, 13 (1970), pp. 493-509.

⁵⁴R. W. Provty and B. O'Neill, An Evaluation of Some Qualitative Breath Screening Tests for Alcohol, (Washington, D. C.: Insurance Institute for Highway Safety, 1971).

⁵⁵G. Brown, Personal Communication, March 29, 1977.

In addition to the above mentioned legal programs there are the ASAPs (Alcohol Safety Action Programs) and the Phoenix program.

A number of ASAPs have been instituted in cities throughout the United States. The function of the ASAP approach is discussed by Driessen and Bryk and by Sefkow and includes the following points:^{56,57}

- (1) increases identification of the problem drinker through selective enforcement, improved evidence and court records;
- (2) enhances decisions on courses of actions by prosecutors, courts, and licensing agencies concerning treatment, driver reeducation, relicensing, etc; and
- (3) reduces driving after drinking, reduces drinking to safe levels, and evaluates the effectiveness of countermeasures.

Driessen and Bryk indicate that in general there seem to be four phases to a successful regulatory approach:

- (1) establishment of adequate laws,
- (2) enforcement,
- (3) penalization of violators, and
- (4) perception by the public that violators will be penalized.⁵⁸

While the ASAP approach is promising, current research is not unequivocally supportive and in general a "no significant results" pattern often emerges when ASAP programs are examined. Martin compared two ASAP demonstration counties with two control counties and found that the alcohol-related accidents did not decrease in the ASAP counties.⁵⁹ He concludes that the effectiveness of Public

⁵⁶ G. J. Driessen and J. A. Bryk, "Solid Rock and Shifting Sands: Alcohol Countermeasures," Journal of Safety Research, 5 (1973), pp. 108-129.

⁵⁷ R. J. Sefkow, Judicial Disposition of Alcohol-Related Traffic Arrests, (Madison, Wisconsin: Institute of Governmental Affairs, 1973).

⁵⁸ Driessen and Bryk, op. cit.

⁵⁹ J. A. Martin, Project Impact on Alcohol-Related Traffic Crashes, (Madison, Wisconsin: Institute of Governmental Affairs, 1973).

Information and Education (PIE) and rehabilitation in reducing alcohol-related accidents was not substantiated. Zador also found no clear evidence of program effectiveness.⁶⁰ Driessen and Bryk on the other hand indicate that there was a decrease of 9.7 percent in fatal accidents and 8.6 percent for fatalities in ASAPs compared to other programs.⁶¹ An evaluation of ASAP projects concludes that increases in arrests could be made by heavier patrolling in the midnight to 4 a.m. period and that further increases in efficiency could result from use of mobile breath-testing vans and roadside pre-test devices.⁶²

Another approach is educating DWI's not to drink and drive again. This is done in the Phoenix programs. Whitehead examined one such program and concluded that ". . . in a given year, the largest group of persons arrested for DWI offenses are being formally processed for the first time."⁶³ Aiming programs at recidivists may thus not be that effective. Whitehead recommends combining lower BAC (.04 percent) with more stringent consistent reinforcement.

One of the problems that confronts the enforcement and effective implementation of DWI is the variability that exists in prosecution and adjudication, as discussed by Blumenthal.⁶⁴ This may result in confusion about local laws and subsequent inadvertent violation. Additionally, there exists the problem of interpretation of the law by the public officials charged with its execution. If judge A imposes drastically different sentences, say

⁶⁰P. Zador, Statistical Evaluation of the Effectiveness of "Alcohol Safety Action Programs," (Washington, D. C.: Insurance Institute for Highway Safety, 1974).

⁶¹Driessen and Bryk, op. cit.

⁶²U. S. Department of Transportation, Alcohol Safety Action Projects: Evaluation of Operations - 1972, 1 (1972), Summary.

⁶³P. C. Whitehead, "DWI Programs: Doing What's In or Dodging What's Indicated?" Journal of Safety Research, 3 (1975), pp. 127-134.

⁶⁴M. Blumenthal, "Human Factors in Control and Modification of Driving Behavior by the Legal System" in T. W. Forbes (ed.), Human Factors in Highway Traffic Safety Research, (New York: Wiley Interscience, 1972).

much lighter, than judge B, two problems are immediately apparent. First there will be legal maneuvering by legal counsel to get the defendant into the court of judge A. Secondly, it will not be possible to critically evaluate the law and its efficiency in reducing DWI driving. Uniformity of prosecution and adjudication is an important facet of effective enforcement.

One further difficulty with DWI counterattack programs is effective implementation of implied consent laws. Texas implied consent laws contain a serious loophole which makes effective implementation of the law difficult. If a driver refuses to take a breath test, in theory the license will be suspended. In actual practice, suspension of the license is contingent on the outcome of the DWI trial. Since the person has refused the breath test, however, there is no scientific evidence for the DWI charge so the person will usually not be convicted, and thus the license is available for his/her use from the point of arrest on. The license is usually suspended only if the trial ends in a conviction.

VII. INTERPERSONAL APPROACHES TO COUNTERMEASURES

A countermeasures program conducted by Barmack and Payne at Lackland Air Force Base was designed to change the basic attitudes of young males toward drinking and driving.⁶⁵ The thrust of the program was that driving while intoxicated was "sick" rather than manly behavior. This theme was supported by an active mass media campaign and by administrative action under which airmen involved in drinking-driving offenses or accidents were referred to a psychiatrist and considered for a medical discharge from the service. The results of this program were startling in that during the first year of the implementation of this countermeasure program, crashes by airmen stationed at this base declined dramatically in comparison to a nearby base and throughout the state. The system of military discipline and control possible in this program would be difficult to reproduce in the private sector, however, this program provides an illustration of a systematic approach to developing a countermeasure system.

Another type of countermeasure which is not frequently considered is the intervention of friends or others. Of drivers in one study, 75 percent reported that they had been drinking in the company of others who could have prevailed upon them to quit drinking, yet only 10 percent of these drivers remembered anyone having done so.⁶⁶ The longstanding habits of drinking at parties or at bars will be difficult to change. Indeed, Schwartz and Romanucci-Ross state that the inebriate senses group expectations that there will be drunkenness at a drinking party and may be influenced to fulfill this expectation.⁶⁷ Given this, the difficulty in getting others to intervene to make someone "slow down" is apparent.

⁶⁵ J. E. Barmack and D. E. Payne, "The Lackland Accident Countermeasures Experiment," Highway Research Board Proceedings, 40 (1961), pp. 513-522.

⁶⁶ R. D. Yoder, "Prearrest Behavior of Persons Convicted of Driving While Intoxicated," Quarterly Journal of Studies on Alcohol, 36 (1975), pp. 1573-1577.

⁶⁷ T. Schwartz and L. Romanucci-Ross, "Drinking and Inebriate Behavior in the Admiralty Islands, Melanesia," Ethos, 2 (1974), pp. 213-231.

In addition to the preventative countermeasures concepts presented above, there are therapeutic programs which have been designed to help remedy the drinkers' problems subsequent to apprehension. Prison sentences for DWI as was discussed earlier have not functioned adequately to prevent further offenses. Of course, it must be remembered that given the chances of apprehension for DWI (.0058) and the low recidivism rate, rehabilitation probably ought to be considered primarily a secondary weapon. With these cautions in mind a few sample programs are examined.

Meeks and Kelly report on the use of family therapy with the families of recovering alcoholics.⁶⁸ After a period of one year, five of five families showed increases in communication, healthy relating, and increased mutual support. Alcoholics in three of five families showed substantial improvement and two were able to remain abstinent. A similar approach, group discussions, was discussed by Alterman, Gottheil, Skoloda, and Grasberger.⁶⁹ They found that groups of alcoholics who had discussions encouraging abstinence drank less than a control group over a four-week period. The effect of social influence was also found to be a powerful determinant of alcohol consumption by Goldman, Taylor, Carruth and Nathan.⁷⁰ Less hopeful, however, are results indicated by Skipper and McCaghy, who found no significant differences between a control group and various experimental groups (e.g., weekly alcohol education health sessions, AA meetings three times a week, weekly religious meetings, informational "antibuse" /disulfiram - a drug which causes nausea if present when alcohol is ingested / meetings, and prerelease assistance) in reduction of drinking in a one year follow up.⁷¹ Those over 37 years of age who were in the

⁶⁸D. E. Meeks and C. Kelly, "Family Therapy with the Families of Recovering Alcoholics," Quarterly Journal of Studies on Alcohol, 31 (1970), pp. 399-413.

⁶⁹A. I. Alterman, et al., "Social Modification of Drinking by Alcoholics," Quarterly Journal of Studies on Alcohol, 35, Part A (1974), pp. 917-924.

⁷⁰M. S. Goldman, et al., "Effects of Group Decision-Making on Group Drinking by Alcoholics," Quarterly Journal of Studies on Alcohol, 34, Part A (1973), pp. 807-822.

⁷¹J. K. Skipper, Jr., and C. H. McCaghy, "An Evaluation of a Short-Term Treatment Program for Police Case Inebriates," Social Science, 49 (1974), pp. 220-227.

experimental treatment groups did show fewer alcohol-related arrests, though.

Even if programs are available, however, what can be done with people who don't voluntarily attend such programs? Smart studied two groups of people in alcohol treatment programs.⁷² One group voluntarily entered the program and the other group was coerced by its employers. The voluntary patients showed significant improvement in behavior while mandatory (coerced) patients did not exhibit better overall behavior or decrease their drinking rates. Of those "mandatory" employees investigated in a follow-up, however, there was improvement over pretreatment behavior in dependability, productivity, overall performance, drinking on the job, lateness and absenteeism. Although the coerced employees did not improve more than the voluntary ones, they did probably benefit from early intervention.

Woodruff, Guze and Clayton looked at the alcoholic who seeks professional care voluntarily and found that the major reason given for the clinic visit was depression.⁷³ This was the only major difference between those who sought treatment and those who did not. No significant differences were found in age, education, socio-economic status, family ties, medical history, severity of alcoholism, or incidence of socially disruptive events (i.e., job loss, marital problems, etc.).

It would appear then that two facts emerge. First, the people who are with the drinker should take some responsibility to prevent his/her drinking. Secondly, if we are to treat DWI, some psychological approach seems indicated along with better detection systems.

⁷²R. G. Smart, "Employed Alcoholics Treated Voluntarily and Under Constructive Coercion: A Follow-Up Study," Quarterly Journal of Studies on Alcohol, 35, Part A (1974), pp. 195-209.

⁷³R. A. Woodruff, S. B. Guze and P. J. Clayton, "Alcoholics Who See a Psychiatrist Compared with Those Who Don't," Quarterly Journal of Studies on Alcohol, 34, Part A (1973), pp. 1162-1171.

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VIII. EVALUATION OF COUNTERMEASURES

One of the possible explanations for the lack of really effective DWI countermeasures is that often good clear evaluations are not conducted. Thus it is more likely that people will spend time "reinventing the wheel" because they are not convinced a specific kind of program will not work. Programs should be implemented in different areas and the subsequent evaluation work should investigate not only whether a program works or fails but what specific variables cause the program to at some times succeed and at other times fail. Thus if we find that, overall, Program A performs less well than Program B but that in lower socio-economic status group areas it excels, there is a clear indication of where it should be used. One recent study⁷⁴ suggests that the effect of a countermeasures program for the reduction of alcohol-related traffic accidents may be determined based on the following points:

- (1) a reduction in fatal, personal injury, and property damage accidents following the introduction of the countermeasure;
- (2) a reduction in the presence of alcohol in drivers involved in fatal and other traffic accidents (either at fault or not);
- (3) an overall reduction in average BAC levels in the road using public at risk, i.e., those using the roads but not necessarily involved in accidents;
- (4) a reduction in those higher BAC levels considered to be critical in contributory effect to traffic accidents;
- (5) an increase in the public's knowledge of the dangers associated with high BAC levels;
- (6) an increase of the public's knowledge of the laws (regulations and penalties); and
- (7) an increase in the public's acceptance of these laws.

When evaluation of a program takes place, of course, consideration should be made of other variables that are impacting the situation. Whether a program

⁷⁴North Atlantic Treaty Organization, Committee on the Challenges of Modern Society, Alcohol and Highway Safety: Road Safety Pilot Study, Part I, (1974).

fails or succeeds it is possible that other legislation, public communication/ education, increased strictness in adjudication or any number of other variables may also be exerting influence. Weather conditions, economic conditions, and simple cyclic fluctuations in the accident rates may also confuse the issue. The study cited above sets forth the merits of C and D since they are not limited only to accident situations.

Whatever the criteria one uses and whatever the design, it should be apparent that some kind of evaluation technique is a requirement of any complete countermeasures program.

IX. CONCLUSION AND RECOMMENDATIONS

The authors would like, at this point, to recommend that the reader consider the countermeasures discussed in this report in light of the present situation that exists on the roadway and in light of the current literature, particularly evaluation studies. The view of the authors after examining the materials is that the most promising area for future work to be done in the countermeasures area is in primary prevention. By the time the accident has occurred, the war may already be lost. Thus, while the necessity for stricter enforcement of existing laws by both police and courts remains, it is felt that the concentration of time and effort will be most effective in continued research into the ways of preventing the accident in the first place; attitude change is one way. Too little work has been done along the lines of changing the public attitude about drinking and driving. It would appear, however, in view of Madison Avenue and the millions spent in successful advertising every year that this is a viable technique.

One possibility to investigate is the pertinence of cognitive dissonance theory as described in psychology (see for example Newcomb, Turner and Converse).⁷⁵ The public quite often seems not to be affected at all by pronouncements of the danger of DWI. Perhaps this is because they in fact simply ignore the propaganda. Research ought to be undertaken to determine the dangers involved. Working with the person who is behind the wheel of the car will undoubtedly be more difficult than working with the machine and the road, but the human factor, it is felt, should be the primary target, since, no matter what changes are made in vehicle and environment short of total automation, the person will find ways, either consciously or unconsciously, to circumvent the changes. The authors feel that primary prevention techniques designed to educate the public to the potential outcomes of DWI will be the most effective countermeasure in the long run. While such techniques are being developed, and

⁷⁵ T. W. Newcomb, R. H. Turner and P. E. Converse, Social Psychology: The Study of Human Interaction, (New York: Holt-Rinehart and Winston, 1965).

while research continues in accident causation, continual emphasis must be placed on the strengthening of existing programs since some temporary remedy, while not supplanting the cure, is needed to check the condition as much as possible.

REFERENCES CITED

- Abernathy, C. N., III. Laboratory Evaluation of Second Generation Behavioral Alcohol Safety Interlock Systems. (Report No. PM-T-13), Washington, D. C.: U. S. Department of Transportation, Transportation Systems Center, March 1974.
- Adams, J. R. "Psychosocial Factors and Accidents in the Highway Transportation System" in T. W. Forbes (ed.). Human Factors in Highway Traffic Safety Research. New York: Wiley Interscience, 1972.
- Adams, J. R. and S. Rosenblatt. Traffic Accidents and Other Symptoms of Social Pathology. New York: Safety Research and Education Project, Columbia University, 1966.
- "Alcoholism: New Victims, New Treatment." Time, (1974), 75-81.
- Alterman, A. I., E. Gottheil, T. E. Skoloda and J. C. Grasberger. "Social Modification of Drinking by Alcoholics." Quarterly Journal of Studies on Alcohol, 35, Part A (1974), 917-924.
- Barmack, J. E. and D. E. Payne. "The Lackland Accident Countermeasures Experiment." Highway Research Board Proceedings, 40 (1961), 513-522.
- Beital, G. A., M. C. Sharp and W. D. Glanz. "Probability of Arrest While Driving Under the Influence of Alcohol." Journal of Studies on Alcohol, 36 (1975), 109-116.
- Blumenthal, M. "Human Factors in Control and Modification of Driving Behavior by the Legal System" in T. W. Forbes (ed.). Human Factors in Highway Traffic Safety Research. New York: Wiley Interscience, 1972.
- Borkenstein, R. F., H. G. Klette, J. T. Joiner and S. G. Picton. The Perception of DWI Laws: A Study of the General Awareness and Attitudes of Public and Official Groups Towards the Drinking Laws. Washington, D. C.: U. S. Department of Transportation, November 1971.
- Brown, G. Personal Communication, March 29, 1977.
- Bruce, J. D. "Alienation and the Labeled Deviant: The Case of the Lower Class Alcoholic Offender." Case Western Reserve Journal of Sociology, 3 (1969), 39-51.
- Buttiglieri, M., A. J. Brunse and H. W. Case. "Effects of Alcohol and Drugs on Human Behavior" in T. W. Forbes (ed.). Human Factors in Highway Traffic Safety Research. New York: Wiley Interscience, 1972.

- Carlson, W. L., M. M. Chapman, C. D. Clark, L. D. Filkins and A. C. Wolfe. Washtenaw County BAC Roadside Survey Report. Ann Arbor, Michigan: Highway Safety Research Institute, The University of Michigan, 1971.
- Chipman, M. L. and P. Morgan. "The Role of Driver Demerit Points and Age in the Prediction of Motor Vehicle Collisions." British Journal of Preventative and Social Medicine, 29 (1975), 190-195.
- Denberg, D. and R. G. Smart. "Recidivism and Collision Involvement of Impaired Drivers: Some Implications for Countermeasures." The Proceedings of the Fourth Annual Alcoholism Conference of the National Institute of Alcohol Abuse and Alcoholism. Washington, D. C.: U. S. Department of Health, Education and Welfare.
- Dijksterhuis, F. P. H. "The Specific Preventative Effect of a Prison for Drunken Drivers." Sociologia Neerlandica, 10 (1974), 194-201.
- Driessen, G. J. and J. A. Bryk. "Solid Rock and Shifting Sands: Alcohol Countermeasures." Journal of Safety Research, 5 (1973), 108-129.
- Ferrence, R. G. and P. C. Whitehead. "Fatal Crashes Among Michigan Youth Following Reduction of the Legal Drinking Age." Quarterly Journal of Studies on Alcohol, 36 (1975), 171-177.
- Goldman, M. S., H. A. Taylor, M. L. Carruth and P. E. Nathan. "Effects of Group Decision-Making on Group Drinking by Alcoholics." Quarterly Journal of Studies on Alcohol, 34, Part A (1973), 807-822.
- Goodwin, D. W. "Alcohol in Suicide and Homicide." Quarterly Journal of Studies on Alcohol, 34, Part A (1973), 144-156.
- Haberman, P. W. and M. M. Baden. "Alcoholism and Violent Death." Quarterly Journal of Studies on Alcohol, 35, Part A (1974), 221-231.
- Hicks, J. A., III. "An Evaluation of the Effect of Sign Brightness on the Sign-Reading Behavior of Alcohol-Impaired Drivers." Human Factors, 18 Number 1 (1976), 45-52.
- Hyman, M. H., A. R. Helrich and G. Besson. "Ascertaining Police Bias in Arrests for Drunken Driving." Quarterly Journal of Studies on Alcohol, 33 (1972), 148-159.
- Kane, R. L. and E. Patterson. "Drinking Attitudes and Behavior of High School Students in Kentucky." Quarterly Journal of Studies on Alcohol, 33 (1972), 635-646.
- Little, J. W. "A Theory and Empirical Study of What Deters Drinking Drivers: If, When and Why." Administrative Law Review, 23 (1971), 169-195.

- Little, J. W. "Who is the Deadly Drinking Driver?" Journal of Criminal Law, Criminology, and Police Science, 59 (1968), 619-623.
- Martin, J. A. Project Impact on Alcohol-Related Traffic Crashes. Madison, Wisconsin: Institute of Governmental Affairs, 1973.
- Meeks, D. E. and C. Kelly. "Family Therapy with the Families of Recovering Alcoholics." Quarterly Journal of Studies on Alcohol, 31 (1970), 399-413.
- Newcomb, T. W., R. H. Turner and P. E. Converse. Social Psychology: The Study of Human Interaction. New York: Holt Rinehart and Winston, 1965.
- North Atlantic Treaty Organization. Committee on the Challenges of Modern Society. Alcohol and Highway Safety: Road Safety Pilot Study, Part I. Prepared by Road and Motor Vehicle Traffic Safety Branch of the Canadian Ministry of Transport, 1974.
- Provty, R. W. and B. O'Neill. An Evaluation of Some Qualitative Breath Screening Tests for Alcohol. Washington, D. C.: Insurance Institute for Highway Safety, 1971.
- Robertson, L. S., R. F. Rich and H. L. Ross. "Jail Sentences for Driving While Intoxicated in Chicago: A Judicial Policy that Failed." Law and Society Review, 8 (1973), 55-67.
- Ross, H. L. "The Scandinavian Myth: The Effectiveness of Drinking and Driving Legislation in Sweden and Norway." Journal of Legal Studies, 4 (1975), 285-310.
- Ross, H. L. and H. Blumenthal. "Sanctions for the Drinking Driver: An Experimental Study." Journal of Legal Studies, 3 (1974), 53-61.
- Ross, H. L., D. T. Campbell, and G. V. Glass. "Determining the Social Effects of a Legal Reform: The British 'Breathalyzer' Crackdown of 1967." American Behavioral Scientist, 13 (1970), 493-509.
- Schmidt, C. W., Jr., S. Perlin, W. Towns, R. S. Fisher and J. W. Schaffer. "Characteristics of Drivers Involved in Single Car Accidents." Archives of General Psychiatry, 27 (1972), 800-803.
- Schwartz, T. and L. Romanucci-Ross. "Drinking and Inebriate Behavior in the Admiralty Islands, Melanesia." Ethos, 2 (1974), 213-231.
- Sefkow, R. J. Judicial Disposition of Alcohol Related Traffic Arrests. Madison, Wisconsin: Institute of Governmental Affairs, 1973.
- Skipper, J. K., Jr. and C. H. McCaghy. "An Evaluation of a Short Term Treatment Program for Police Case Inebriates." Social Science, 49 (1974) 220-227.
- Smart, R. G. "Employed Alcoholics Treated Voluntarily and Under Constructive Coercion: A Follow-Up Study." Quarterly Journal of Studies on Alcohol, 35, Part A (1974), 195-209.

- Smart, R. G. "Observation of Tavern Patrons Before and After the Compulsory Breath Test Law in Canada." Quarterly Journal of Studies on Alcohol, 33 (1972), 1122-1128.
- U. S. Department of Transportation. Alcohol Safety Action Projects: Evaluation of Operations - 1972, 1 (1972), Summary.
- U. S. Department of Transportation. Traffic Safety: 1973. Washington, D. C.: U. S. Department of Transportation, 1973.
- U. S. Department of Transportation. Traffic Safety: 1974. Washington, D. C.: U. S. Department of Transportation, 1974.
- Voas, R. B. Alcohol, Drugs and Young Drivers. Washington, D. C.: U. S. Department of Transportation, 1974.
- Wallace, J. G. "Drinkers and Abstainers in Norway: A National Survey." Quarterly Journal of Studies on Alcohol, 6 (1972), 129-151.
- Whitehead, P. C. "DWI Programs: Doing What's In or Dodging What's Indicated?" Journal of Safety Research, 3 (1975), 127-134.
- Whitehead, P. C. "Effects of Liberalizing Alcohol Control Measures." Addictive Behaviors, 1 (1976), 197-203.
- Whitehead, P. C. and R. G. Ferrence. "Young Drivers' Involvement in Traffic Accidents with Specific Relation to Alcohol and Other Drugs." Journal of Safety Research, 8 (1976), in press.
- Williams, A. F., R. F. Rich, P. L. Zador and L. S. Robertson. "The Legal Minimum Drinking Age and Fatal Motor Vehicle Crashes." Journal of Legal Studies, 4 (1975).
- Woodruff, R. A., S. B. Guze and P. J. Clayton. "Alcoholics Who See a Psychiatrist Compared with Those Who Don't." Quarterly Journal of Studies on Alcohol, 35, Part A (1973), 1162-1171.
- Yoder, R. D. "Prearrest Behavior of Persons Convicted of Driving While Intoxicated." Quarterly Journal of Studies on Alcohol, 36 (1975), 1573-1577.
- Young, R., D. Valentine, and M. Williams. Alcohol and Accidents. (Research Report 49). Austin, Texas: Council for Advanced Transportation Studies, The University of Texas at Austin, 1977.
- Zador, P. Statistical Evaluation of the Effectiveness of "Alcohol Safety Action Programs". Washington, D. C.: Insurance Institute for Highway Safety, 1974.
- Zylman, R. "DWI Enforcement Programs: Why Are They Not More Effective?" Accident Analysis and Prevention, 7 (1975), 179-190.

Zylman, R. "Fatal Crashes Among Michigan Youth Following Reduction of Legal Drinking Age." Quarterly Journal of Studies on Alcohol, 35, Part A (1974), 283-286.

Zylman, R. "Race and Social Status Discrimination and Police Action in Alcohol Related Collisions." Journal of Safety Research, 4 (1972), 75-84.

Zylman, R. "When It Became Legal to Drink at 18 in Massachusetts and Maine: What Happened?" The Police Chief, 63 (1976), 56-59.

Zylman, R. "When It Became Legal to Drink at 18 in Michigan: What Happened?" Journal of Traffic Safety Education, 21, Part B (1974), 15-16.

Zylman, R. "When It is Legal to Drink at 18: What Should We Expect?" Journal of Traffic Safety Education, 20 (1973), 9-10.

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SUPPLEMENTARY BIBLIOGRAPHY

ASAP and Beyond: A Final Report to the Community on the Utah Alcohol Safety Action Program, February 1976.

Ferrence, R. G. and P. C. Whitehead. Impaired Driving and Public Policy: An Evaluation of Proposed Countermeasures. A Paper presented to the Eleventh Annual Conference of the Canadian Foundation on Alcohol and Drug Dependence, Toronto, Canada, June 1976.

McFarland, R. A., J. D. Daugherty, E. A. Arees and J. J. Gud. Laboratory Evaluation of Alcohol Safety Interlock Systems, Volume II. Instrument Screening Experiments, Guggenheim Center for Aerospace Health and Safety, September 1973.

Pepinsky, H. E. "Police Patrolman's Offense Reporting Behavior." Journal of Research in Crime and Delinquency, 1976, 32-47.

Selzer, M. L. and P. L. Clayton. "Available Techniques for Analyzing Impairing Drugs in Blood and Urine." Journal of Safety Research, 4 (1972), 179-188.

Shaw, J. I. and J. A. McMartin. "Perpetrator or Victim? Effects in an Automobile Accident on Judgmental Strictness." Social Behavior and Personality, 3 (1975), 27-30.

Shaw, J. I. and P. Skolnick. "Attribution of Responsibility for a Happy Accident." Journal of Personality and Social Psychology, 8 (1971), 380-383.

Stinchcombe, A. L. "A Parsonian Theory of Traffic Accidents." Sociological Inquiry, 45 (1975), 27-30.

Waldron, I. and E. Joseph. "Socioeconomic Causes of the Recent Rise in Death Rates for 15-24 Year Olds." Social Science and Medicine, 9 (1975), 383-396.

Zylman, R. "Debunking the 'Just Beery Myth'." Traffic Safety, 1 (1974), 18-19.

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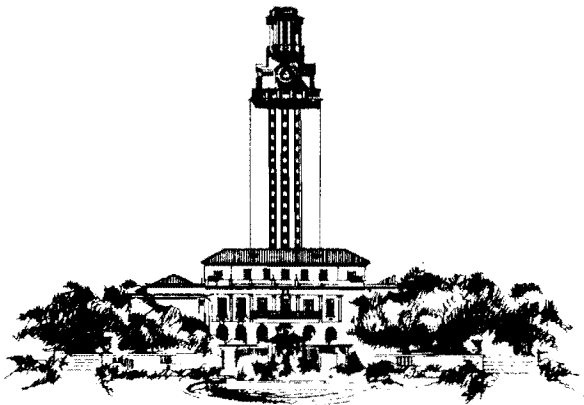
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