

FINAL REPORT

TRENDS IN DRINKING-DRIVING AT NIGHT

A Comparison of the First Five Roadside Surveys of the Fairfax
Alcohol Safety Action Project

by

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ABSTRACT

This report outlines the findings of the first five annual roadside surveys conducted in conjunction with the Fairfax Alcohol Safety Action Project (ASAP). The baseline survey was conducted in January of 1972 with the four subsequent surveys being conducted in October of each year. The primary purpose of the roadside surveys is to provide an indication of total project impact which would be manifested in changes in blood alcohol concentrations (BAC's) among night drivers. Secondly, the surveys provide information as to the effectiveness of the Public Information and Education (PI & E) countermeasure in disseminating knowledge of the drunk driving laws in Virginia.

Distributions of blood alcohol concentrations among night drivers were found to have changed significantly across time, in that proportionally fewer drivers registered low or negative BAC's and more registered higher BAC's in the most recent survey than in the earlier ones. Thus, there is no evidence from the roadside surveys to indicate that the Fairfax ASAP has been successful in reducing the incidence of drunken driving as measured by the percentage of drivers above the presumptive limit. In terms of drinking habits, there was a discrepancy between increased drinking just prior to the survey and both increases in admitted drinking behavior and the driver's perceptions of their drinking status (light vs. moderate vs. heavy drinker). Also, fewer than 10% of the respondents knew how many drinks they would have to drink in order to achieve a BAC over a 10%, the presumptive limit in Virginia.

SUMMARY OF FINDINGS AND CONCLUSIONS.

The summary of findings from the first five roadside surveys are outlined below in the order in which they appear in the report.

1. DESCRIPTION OF THE SAMPLE — Drivers participating in the baseline (January 1972) survey were significantly different from drivers responding to the fifth survey (1975) in relation to such demographic and driving related variables as age, sex, race, place and length of residence, and miles driven per year. Also, in the fifth survey larger percentages of interviews were conducted on weekends and at late night than were made during the previous surveys. The reader is cautioned that findings of the report must be interpreted in light of these changes.

2. TRENDS IN BLOOD ALCOHOL CONCENTRATIONS (BAC'S) AT NIGHT — The distribution of BAC's changed significantly across time. On the fifth survey, proportionally fewer respondents registered negative BAC's while a larger proportion registered high BAC's. These changes resulted in the weighted BAC index for the 1975 survey being higher than that for any previous study. Thus, a larger proportion of respondents were drinking during the fifth survey than during previous surveys, and among these drinking drivers, BAC's tended to be higher than during previous surveys.

To assist future enforcement efforts, an attempt was made to determine which time periods accounted for the increase in BAC levels, and which demographic groups were responsible for the increase. While some increase in the percentage of positive BAC's and drunk driving occurred during the second time period, the largest increase in both weeknight and weekend drunk driving occurred during the third time period. The major portions of these increases were attributable to white, male respondents between either 20-39 or 50-59 years of age. Increases were equally distributed among residents and nonresidents of the ASAP area, and among the three drinker preference groups. However, BAC level was somewhat related to length of residence in the ASAP area. Those long-term residents, who would have felt the full impact of ASAP, were more likely to have lower BAC's than were nonresidents. This relationship approached significance.

Based on these findings, it would seem beneficial for police officers to keep these demographic characteristics in mind and for additional enforcement efforts to be concentrated from 12:00 midnight to 3:00 a.m. on weeknights and from 9:30 p.m. to 3:00 a.m. on Fridays and Saturdays.

In terms of accident potential, both the estimated numbers of drunken drivers passing the interview site and the frequency with which a vehicle would meet drunken drivers increased with time and were higher for the fifth survey than during any previous one. These statements also are true of the Index of Accident Probability. These increases support the conclusion that accident potentials have risen along with average BAC levels in spite of the ASAP efforts.

3. DRINKING HABITS AMONG RESPONDENTS — The drinking behaviors of the respondents in the fifth roadside survey were significantly different from those of the people interviewed in the previous surveys. While drinking in general and drinking during the two-hour period preceding the administration of the survey questionnaire increased significantly, driver perception of drinking status (very light to heavy drinker) shifted toward the less serious categories. This discrepancy between actual drinking behavior and perceived drinker type could be addressed by the Public Information and Education countermeasure. The candidness exhibited by respondents was deemed acceptable, although 7.8% of them either over- or underestimated the numbers of drinks they had had in the preceding two hours, based on their blood alcohol concentrations.

4. KNOWLEDGE OF DRINKING AND DRIVING — While most questions asked during the roadside survey are aimed at assessing total project impact, a few address the effectiveness with which the Public Information and Education countermeasure has disseminated knowledge of Virginia's drunk driving laws. The percentage of respondents who could correctly define blood alcohol concentration was found to have increased, while knowledge of the presumptive limit for drunk-driving decreased slightly. In addition, a majority of the subjects underestimated the number of drinks necessary to achieve a BAC .10% or over, while only 9.2% were able to answer correctly. This real world interpretation of the drunk driving laws should be addressed through public information campaigns. Findings of the survey indicate that these campaigns could be fruitful, since those respondents who were drinking but who were not over the legal limit scored higher on overall alcohol knowledge than did survey non-drinkers or those respondents who were over the legal limit. Additionally, ASAP area residents, who would have felt the full impact of the Public Information countermeasure, did not score any differently than did nonresidents in terms of knowledge of drunken driving.

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INTRODUCTION

The Fairfax Alcohol Safety Action Project (ASAP) was initiated in January 1972 as one of a number of three-year, federally funded demonstration projects designed to implement and evaluate the concept of the use of comprehensive community alcohol countermeasures to combat the problem of drunken driving. Also, the program was one of ten in the country chosen for a two-year extension, which makes the total life of the federally funded portion of the project five years. The ultimate objective of the ASAP is to reduce the number of motor vehicle crashes which result in fatalities, personal injuries, and property damage by concentrating its efforts on reducing the incidence of drunken driving. It has been demonstrated that drunken drivers account for a disproportionately large share of serious and fatal accidents. If the ASAP is successful in intervening in the normal drinking patterns of drunken drivers so that their incidence of drunken driving is significantly reduced, it follows that the number of alcohol-related accidents would be reduced.(1)

PURPOSE

The purpose of the nighttime roadside surveys is to provide a measure of the project's effectiveness in reducing the incidence of drunken driving. In addition, they provide some information concerning the effectiveness of the public information and education countermeasure. The first roadside survey, hereinafter called the baseline survey, was conducted in January 1972, prior to the implementation of the ASAP countermeasures. The baseline survey results were established as the base from which changes in drinking habits could be measured by the subsequent yearly surveys during the course of the project.

METHODOLOGY

The basic survey procedures were patterned after the procedures outlined in the U. S. Department of Transportation's report entitled Methodological Considerations in Conducting and Evaluating Roadside Research Surveys, by M. W. Perrine of the University of Vermont. The two primary functions of the roadside surveys as stated in the Perrine report are: "(1) to provide data for describing the basic problem in terms of identification and specification of assumedly relevant parameters, and (2) to provide data for evaluating results of any changes in circumstances surrounding the basic problem, whether they are the result of unplanned natural events, on the one hand, or controlled premeditated countermeasures, on the other."⁽²⁾

Sampling Frequency

Five roadside surveys have been conducted during the Fairfax ASAP. The first was conducted each night from January 5, 1972, through the early morning hours of January 16, 1972. The baseline survey had to be conducted in January because of the need to establish comparative data prior to implementation of the enforcement countermeasure on February 1, 1972, and after contracts with the five cooperating police agencies in the area had been signed so that police assistance could be secured for this survey. The second survey was conducted in October 1972, the third was in October 1973, the fourth was in October 1974, and the final survey was in October 1975. By conducting the surveys during October, the annual changes in BAC levels can be measured without the influence of seasonal variations in drinking patterns.

Sample Size and Day of the Week

U. S. Department of Transportation guidelines specify a minimum sample size of 640 drivers. The guidelines also suggest that the samples be taken on Friday and Saturday nights. However, since ASAP's in North Carolina and Michigan had found positive readings of 22.2% and 19.0%, respectively, when they surveyed throughout the week compared with the positive reading percentage of 42.0% reported by the Oregon ASAP, which surveyed only on Fridays and Saturdays, it was believed to be important to test both periods in Fairfax. By testing throughout the week, data would be available to allow the Fairfax ASAP to focus increased police patrols on the periods which showed the greatest number of drunken drivers. With minimum sample sizes set at 640 for both weeknights and weekends (Friday, Saturday), three sets of statistics are available such that the levels of drinking by nighttime drivers can be measured on weekends, on weeknights, and in the aggregate.

Hour of Day

The hours of 7 p.m. to 3 a.m. were used for sampling the drinking driving patterns in Fairfax. This eight-hour period was divided into three 2-hour-and 20-minute periods, which allowed time for the interviews and an hour for total travel between sites. The time periods were 7:00 p.m. — 9:20 p.m. (Site 1), 9:50 p.m. — 12.10 a.m. (Site 2), and 12:40 a.m. — 3:00 a.m. (Site 3). The three time periods were used rather than the four suggested by the U. S. Department of Transportation guidelines in order to increase the amount of interview time in relation to travel time by reducing the travel time between sites by 33%.

Site Selection

It was determined that the distribution of survey sites was roughly proportioned among the five participating police jurisdictions on the basis of their resident populations and number of police officers. This decision was made in order to achieve representative samples of the various driving conditions in Fairfax as well as getting all of the local police departments involved from the very beginning of the ASAP. After asking the police departments for a list of sites which conformed to the U. S. Department of Transportation guidelines, a staff member of the Virginia Highway and Transportation Research Council reviewed the lists. Sites were selected which seemed to provide a representative mixture of the rural and urban areas in Fairfax and which were dispersed throughout the county. The final determination of which site would be sampled at what time was made under the condition that the travel time between sites would be under twenty-five minutes.

Questionnaire

The standard U. S. Department of Transportation questionnaire for roadside surveys was used. This questionnaire administered as a structured interview, dealt with the respondent's place of residence, driving habits, drinking habits, drinking attitudes and knowledge, demographic data, and, most importantly, the BAC reading on the breath test. A copy of the questionnaire is shown in Appendix A.

Breath Test Instruments

The breath testing device for the baseline survey was the Intoximeter-Mark II, manufactured by Intoximeters, Inc. of St. Louis, Missouri. Both the Intoximeter and a breath testing

machine called the HALT model manufactured by Borg-Warner Corporation were used on the second survey. The instrument for the third, fourth and fifth surveys was the Breathalyzer, model 900A.

Administrative Procedures

The five participating police departments provided the necessary patrolmen for traffic control. The principal coordinators were members of the Safety Section of the Virginia Highway and Transportation Research Council. The interviewers and one coordinator were provided under a subcontract to M. G. Wagner and Company. The breath test equipment operators were ASAP lab technicians and Breathalyzer certified police officers provided by Fairfax County.

The coordinators selected the vehicles to be stopped by the policement, designating the first eligible vehicle whenever a vacancy existed within the mobile vans used for interviews. The policement simply directed the motorists out of the line of traffic and over to the coordinators. It was the coordinator's responsibility to secure the motorists' cooperation in the survey. The percentages of motorists who participated were 91%, 90%, 95%, 95%, and 92% respectively, for the five surveys. It is strongly believed that the few who did not participate were not overrepresentative of drinking drivers in that any reluctant driver that a coordinator thought had been drinking was almost invariably convinced that his participation was in the best interest of preserving his anonymity.* After securing the motorists' cooperation, the coordinator led them to one of the two interview vans where they were greeted by a lab technician, who immediately administered the breath test.** Then the questionnaire was

*A large portion of the motorists not participating in the survey were not conversant in English, and thus refused for language related reasons. Due to this, foreign drivers may be underrepresented in these samples in relation to the ASAP area.

**Under state law, an officer making an arrest for drunk driving must hold the suspect for 20 minutes before administering the breath test. This is done to nullify the effects of very recent drinking of alcoholic beverages which would inflate the BAC readings. Since no arrests were being made at the survey site and since this waiting period would have been inconvenient for respondents, this procedure was not used. Thus, BAC's taken during the survey may be slightly higher than BAC's generated through arrest.

administered and by the time the interview was finished, the BAC reading had been calculated and was recorded on the questionnaire. If the respondent's BAC was less than .10%, the coordinator thanked the motorist for his cooperation, and he was allowed to proceed on his way. Those drivers whose BAC was a .10% or above were given options of being driven by a sober passenger when available, by a member of the local Jaycees, by volunteers from the military, or by volunteers from the ASAP program. Subjects who were only slightly above .10% were also given the option of remaining at the site for a long enough period of time for their BAC to drop below a .10% upon retesting.

ANALYSIS

The results of the first five roadside surveys are presented here in four sections; namely, (1) description of the sample, (2) examination of BAC trends at night, (3) examination of drinking habits, and (4) analysis of drinking-driving knowledge. The first section presents a demographic picture of survey respondents; the second and third provide an indication of total project impact. The last section, which deals with knowledge of drinking and driving, gives a partial evaluation of aspects of the Public Information and Education countermeasure.

Description of the Sample

In this section, the sample of 1975 roadside survey respondents is compared to the samples of respondents drawn for the baseline (1972) and the 1974 surveys on the basis of such demographic variables as age, sex, race, residence, driving habits, and time participating in the survey. The purpose of these comparisons is to detect changes in demographic and driving related characteristics across time in Fairfax, and to provide some background for changes in more substantive variables. While there are overall trends in the data across time, the 1975 sample is basically similar to the 1974 sample. In general, however, the most current sample is significantly different from the baseline sample in almost all aspects.

In terms of the distribution of interviews over the three time periods, a larger percentage of interviews were conducted during the later time periods in 1975 than in 1971 (see Table 1). In 1972, 44% of the interviews were conducted during the first time period, while 21% were conducted during the last time period. In 1975, 29% were conducted during the third time period while only 37% were conducted during time period 1. This difference is significant at the .01 level ($X^2 = 28.85$).

TABLE 1

DISTRIBUTION OF INTERVIEWS BY TIME PERIOD

<u>Time Periods</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
1	697 (44.3%)	490 (33.1%)	539 (35.4%)	1094 (39.0%)	638 (36.9%)
2	539 (34.2%)	581 (39.3%)	556 (36.5%)	940 (33.5%)	590 (34.2%)
3	338 (21.5%)	409 (27.6%)	429 (28.1%)	770 (27.5%)	499 (28.9%)

The distributions of interviews over the days of the week for all five surveys are shown in Table 2. The 1975 distribution was not only different from that of the baseline survey but also different from that of the 1974 survey. There was a significantly larger proportion of weekend interviews during the 1971 survey than during the 1975 survey ($\chi^2 = 165.09$, $p < .01$). The differences in day of week between the 1974 and 1975 surveys followed no systematic pattern.

TABLE 2

DISTRIBUTION OF INTERVIEWS BY DAY OF WEEK

<u>Day of Week</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Sunday	97 (6.1%)	243 (16.4%)	282 (18.5%)	493 (17.6%)	300 (17.4%)
Monday	167 (10.6%)	225 (15.2%)	208 (13.6%)	248 (8.8%)	149 (8.6%)
Tuesday	153 (9.7%)	72 (4.9%)	88 (5.8%)	146 (5.2%)	81 (4.7%)
Wednesday	167 (10.6%)	186 (12.6%)	217 (14.2%)	447 (15.9%)	251 (14.5%)
Thursday	254 (16.1%)	145 (9.8%)	202 (13.3%)	432 (15.4%)	325 (18.8%)
Friday	358 (22.7%)	301 (20.3%)	259 (17.0%)	507 (18.1%)	351 (20.3%)
Saturday	381 (24.4%)	308 (20.8%)	268 (17.6%)	531 (18.9%)	270 (15.6%)
Weeknight	838 (53.1%)	871 (58.9%)	997 (65.4%)	1866 (63.0%)	1105 (64.0%)
Weekend (Fri. & Sat.)	739 (46.9%)	609 (41.1%)	527 (34.6%)	1038 (37.0%)	621 (36.0%)

The place of residence of respondents also changed across time (see Table 3). A significantly higher percentage of the sample consisted of ASAP area residents in 1975 than in the baseline survey ($X^2 = 22.68$, $p < .01$). Additionally, the mobility of the sample changed over the same time interval (see Table 4). While no significant difference in length of residence was found between the 1974 and 1975 samples, the baseline sample was slightly, but significantly, less transient ($X^2 = 30.05$, $p < .01$).

TABLE 3

PLACE OF RESIDENCE OF SURVEY RESPONDENTS

<u>Place of Residence</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Fairfax ASAP	1,109 (70.5%)	691 (46.7%)	1,011 (66.3%)	2,131 (76.1%)	1331 (77.1%)
Other Va.	373 (23.7%)	684 (46.2%)	408 (26.8%)	461 (16.4%)	295 (17.1%)
Out-of-State	92 (5.8%)	105 (7.1%)	105 (6.9%)	209 (7.5%)	101 (5.8%)

TABLE 4

LENGTH OF RESIDENCE OF SURVEY RESPONDENTS

<u>Time at Current Address</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Less than 1 Mo.	34 (2.2%)	74 (5.0%)	86 (5.7%)	87 (3.1%)	51 (3.0%)
1-6 Mo.	141 (9.0%)	148 (10.0%)	185 (12.1%)	299 (10.7%)	202 (11.7%)
7-11 Mo.	71 (4.5%)	98 (6.7%)	85 (5.6%)	85 (3.0%)	51 (3.0%)
1-2 Yrs.	235 (14.5%)	207 (14.1%)	220 (14.4%)	482 (17.2%)	328 (19.1%)
3-4 Yrs.	161 (10.2%)	83 (5.6%)	105 (6.9%)	279 (10.0%)	192 (11.2%)
Over 4 Yrs.	932 (59.2%)	862 (58.6%)	843 (55.3%)	1,567 (56.0%)	895 (52.0%)

While no difference was found between the demographic characteristics of the 1974 respondents and those in the 1975 survey, there was a significant trend across time. The distribution of ages of the most recent sample was significantly different

not only from the age distribution for the baseline sample but also from the distribution among the driving population as a whole (see Table 5). During the 1975 survey, respondents tended to be drawn from the middle age groups, with less representation of very young and older drivers than in the baseline survey ($X^2 = 18.50$ $p < .01$). This finding could be due to changes in the driving population, since many of the drivers who fell into the under 20 age group five years ago are now young adults. It could also be due to changed patterns of night driving. The fact that young drivers are overrepresented among respondents based on their representation in the driving population, as is the 20-29 age group, indicates that the night driving habits of young people differ from those of other groups. Another possible change in driving habits involves the sex of the respondent (see Table 6).

TABLE 5

DISTRIBUTION OF AGES AMONG RESPONDENTS

<u>Age of Respondent</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>	<u>Driving Age Population</u>
Under 20	319 (20.2%)	278 (18.8%)	252 (16.5%)	453 (16.2%)	280 (16.2%)	11.0%
20-29	508 (32.3%)	495 (33.5%)	563 (36.9%)	1009 (36.1%)	635 (36.8%)	22.7%
30-39	338 (21.5%)	306 (20.7%)	312 (20.5%)	623 (22.3%)	367 (21.3%)	21.6%
40-49	231 (14.8%)	247 (16.7%)	229 (15.0%)	390 (13.9%)	280 (16.2%)	23.3%
50-59	143 (9.1%)	111 (7.5%)	140 (9.2%)	240 (8.6%)	120 (7.0%)	13.5%
60 or over	35 (2.2%)	41 (2.8%)	28 (1.9%)	81 (2.9%)	43 (2.5%)	7.9%

TABLE 6

SEX OF SURVEY RESPONDENTS

<u>Sex of Respondent</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Male	1,268 (80.6%)	1,166 (78.8%)	1,207 (79.2%)	2,139 (77.1%)	1,284 (75.2%)
Female	306 (19.4%)	314 (21.2%)	317 (20.8%)	635 (22.9%)	424 (24.8%)

In 1972 only 19% of the respondents were women, whereas in 1975 women made up 25% of the sample ($X^2 = 13.72$, $p < .01$). This finding, too, may reflect changes in the sex distribution of the driving population as a whole, or changes in the driving habits of women. Also, significantly more nonwhites were included in the 1975 sample than in the baseline sample (see Table 7). During the initial survey, 94% of the respondents were white, 5% black, and 1% of other racial origins. In 1975 the proportion of whites in the sample was 92%, 6% was black, and 2% of other racial origins ($X^2 = 10.04$, $p < .01$). While no significant difference in racial distribution was found between the 1974 and 1975 surveys, the racial composition of the 1975 sample seems to resemble that of the baseline survey more than it does that of the most recent sample.

TABLE 7
RACE OF SURVEY RESPONDENTS

<u>Race of Respondent</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
White	1,485 (94.3%)	1,381 (93.3%)	1,400 (91.9%)	2,490 (90.7%)	1,543 (91.7%)
Black	73 (4.6%)	79 (5.3%)	106 (6.9%)	181 (6.6%)	106 (6.3%)
Other	16 (1.1%)	20 (1.4%)	18 (1.2%)	73 (2.7%)	34 (2.0%)

The driving habits of respondents have also changed since the baseline survey (see Table 8 and 9). In both the 1974 and 1975 samples, a larger proportion of drivers drove fewer miles per year and fewer days per week ($X^2 = 7.76$, $p < .06$ and $X^2 = 24.34$, $p < .01$, respectively). In 1972, 23% of the respondents drove less than 10,000 miles per year; 77% of the respondents drove their vehicles every day. In 1975, 27% drove less than 10,000 miles and 70% drove every day. Again, the finding could be a reflection of overall changes in driving habits, perhaps due to the effects of the energy shortage in Virginia.

TABLE 8

DISTRIBUTION OF MILES DRIVEN PER YEAR

<u>Miles Driven Per Year</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Less than 10,000	362 (23.0%)	418 (28.2%)	418 (27.4%)	777 (27.8%)	462 (26.9%)
10,000 - 19,999	680 (43.2%)	570 (38.5%)	666 (43.7%)	1,199 (43.0%)	727 (42.3%)
20,000 - 29,999	323 (20.5%)	287 (19.4%)	242 (15.9%)	444 (15.9%)	312 (18.2%)
30,000 - or more	209 (13.3%)	205 (13.9%)	198 (13.0%)	372 (13.3%)	217 (12.6%)

TABLE 9

DISTRIBUTION OF DAYS OF DRIVING PER WEEK

<u>Days of Driving in A Typical Week</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Everyday	1,215 (77.2%)	1,097 (74.1%)	1,229 (80.6%)	2089 (74.5)	1,212 (70.2%)
6	119 (7.5%)	122 (7.6%)	68 (4.5%)	209 (7.5%)	151 (8.7%)
5	108 (6.9%)	144 (9.7%)	80 (5.3%)	205 (7.3%)	153 (8.9%)
4	43 (2.7%)	35 (2.4%)	35 (2.3%)	93 (3.3%)	59 (3.4%)
3	39 (2.5%)	46 (3.1%)	49 (3.2%)	87 (3.1%)	63 (3.6%)
2	33 (2.1%)	30 (2.0%)	34 (2.2%)	77 (2.7%)	59 (3.4%)
1	11 (0.7%)	15 (1.0%)	25 (1.6%)	28 (1.0%)	23 (1.3%)
None	6 (0.4%)	1 (0.1%)	4 (0.4%)	16 (0.6%)	6 (0.4%)

In summary, the types of drivers surveyed and their driving habits changed significantly between the baseline and subsequent surveys, but basically were not significantly different from the sample drawn last year. It could be argued that because the different survey samples have been found to exhibit differences in inherent demographic characteristics they are not comparable; however, it is still possible to interpret results of comparisons of ASAP-related variables in terms of both countermeasure intervention and change in demographic distributions.

Examination of BAC Trends at Night

The ultimate purpose of the roadside survey is twofold: (1) To assess overall project impact by taking representative BAC's during target drinking hours, and (2) to assess the effectiveness of the Public Information and Education counter-measure by polling drivers randomly selected during target drinking hours concerning their knowledge of alcohol. This section deals primarily with the first objective, establishing project effectiveness. Toward this end, data were examined in an attempt to detect changes across the life of the project and to isolate changes related to the efforts of the ASAP. Secondly, the section attempts to identify those groups of drinking drivers most in need of alcohol information and/or rehabilitation by demographic characteristics and by the time of the day they drink and drive.

As seen in Table 10, the distributions of blood alcohol concentration (BAC's) of respondents changed significantly across time ($X^2 = 51.68$, $p < .001$). In 1975, fewer respondents tended to fall in the negative to .015% BAC category after the baseline study (with the exception of the 1973 survey), and more tended to fall within the higher BAC categories. The middle categories exhibited some variability but showed no definite trend across years. It is significant to note that as with previous surveys, during 1975 a declining proportion fell into the lowest category and, a larger proportion of respondents were shown to have higher BAC's. Also, the weighted BAC index, shown here for comparative purposes only, was higher for the 1975 roadside survey than for any previous study. It is apparent, then, that a larger proportion of persons were drinking (had a positive BAC) than before and that these positive BAC's tended to be higher than during previous surveys. It would be beneficial in terms of enforcement to determine during which time periods and among which drivers these increases occurred.

TABLE 10

DISTRIBUTION OF BLOOD ALCOHOL CONCENTRATIONS (BAC) AMONG RESPONDENTS

<u>BAC</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Neg.-.015	1,266 (80.4%)	1,161 (78.4%)	1,281 (84.1%)	2,134 (77.6%)	1,313 (77.3%)
.02-.04	140 (8.9%)	138 (9.3%)	113 (7.4%)	286 (10.4%)	162 (9.5%)
.05-.09	101 (6.4%)	119 (8.1%)	84 (5.5%)	203 (7.4%)	123 (7.2%)
.10-.14	43 (2.7%)	44 (3.0%)	33 (2.2%)	103 (3.7%)	64 (3.8%)
.15-.20	18 (1.1%)	10 (0.7%)	8 (0.5%)	21 (0.8%)	28 (1.6%)
Over .20	<u>6 (0.4%)</u>	<u>8 (0.5%)</u>	<u>5 (0.3%)</u>	<u>3 (0.1%)</u>	<u>8 (0.5%)</u>
Index	.0192	.0201	.0166	.0202	.0221

BAC by Time Period — When are the target drinking hours?

In order to pinpoint new target drinking periods, BAC data from the 1975 roadside survey were arrayed by time period, day of week, and weeknight vs. weekend.

Figure 1 depicts the BAC levels by the three time periods (period 1 — 7:00 p.m. to 9:20 p.m., period 2 — 9:50 p.m. to 12:10 a.m., and period 3 — 12:40 a.m. to 3:00 a.m.). There was very little difference noticeable between the BAC levels for periods 1 and 2. However, the BAC levels for period 3 were about twice as high for each of the three categories when compared to the first two periods. As seen in Figures 2 and 3, most of the increase in blood alcohol concentration over time occurred during the third, or latest, time period. During time periods 1 and 2, little or no increase was noted. However, both the percentage of positive BAC's and BAC's over the .10% presumptive limit have steadily increased during the third time period since the third roadside survey. The third time period then would seem to be a logical time frame for increasing selective enforcement by the ASAP police patrols because of the increasingly higher level of drunken driving during this period.

Figure 4 depicts the BAC levels by the days of the week. The graph shows that there were more drinking drivers and more drunken drivers on Fridays and Saturdays when compared to the other days of the week, except Tuesday. This phenomenon of a single weeknight registering a higher proportion of positive BAC's than even weekend nights is unprecedented in the survey. The difference, however, may be attributable to a required change in survey location on one of the Tuesday sites, rather than to an actual change in Tuesday drinking habits.* These same data are arrayed by weekend vs. weekday in Figure 5. In spite of the proportional increase in higher BAC's on Tuesdays, drinking and driving was still found to be more prevalent on weekends than on weeknights.

*The first site on Tuesday, October 21, 1975, was originally scheduled to use a school parking lot. However, as several meetings were to be held at the school that night, the school administration requested that the site be changed. The site was moved approximately three-quarters of a mile southeast along the same road and used a shopping center parking lot.

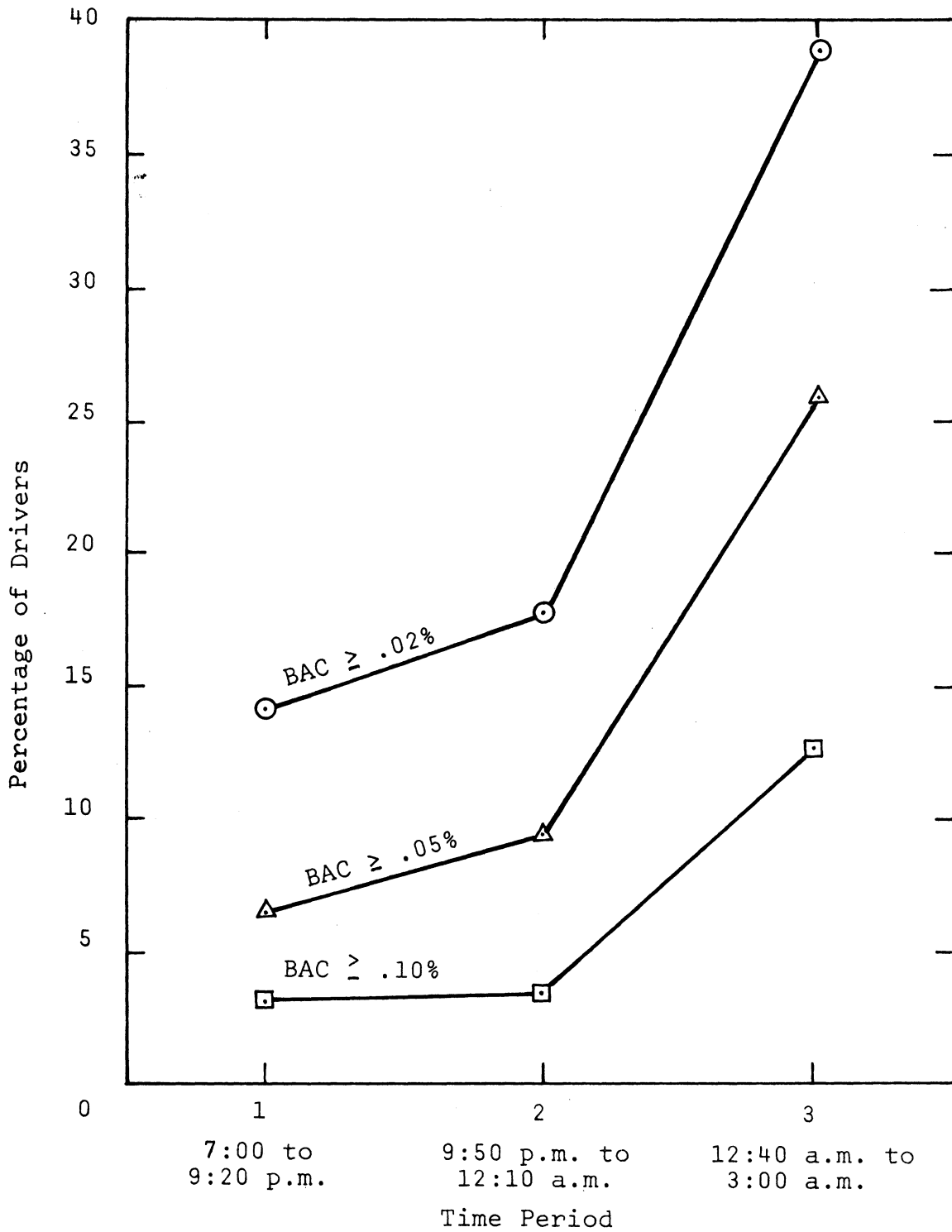


Figure 1. BAC by time period, 1975.

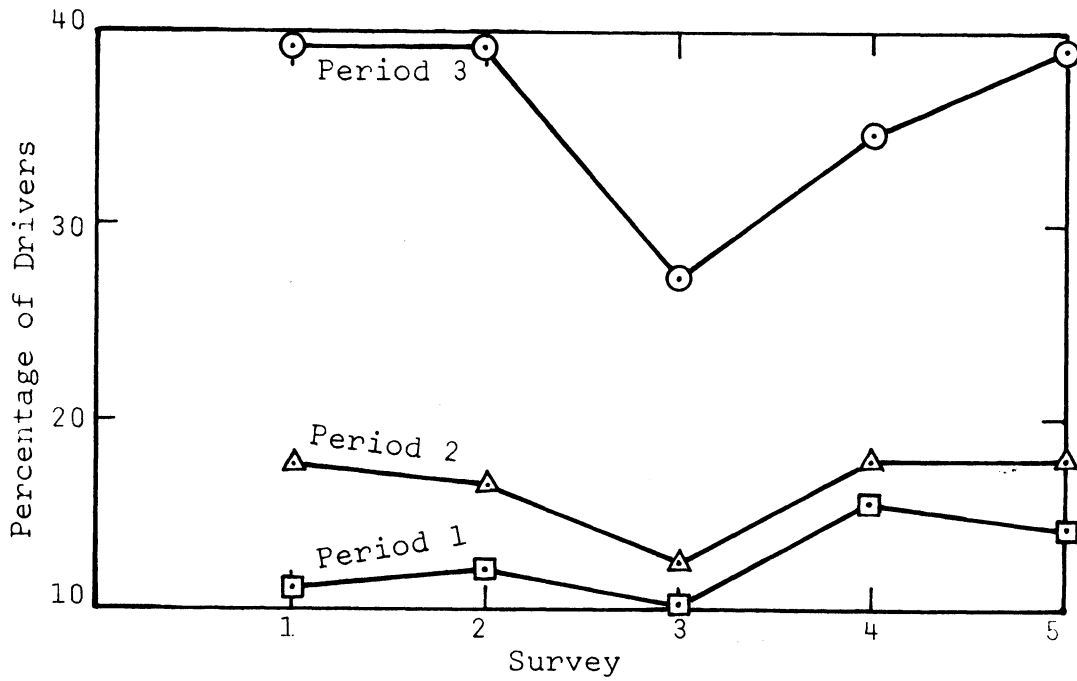


Figure 2. Percentage of positive BAC's $\geq .02\%$ by time period by survey.

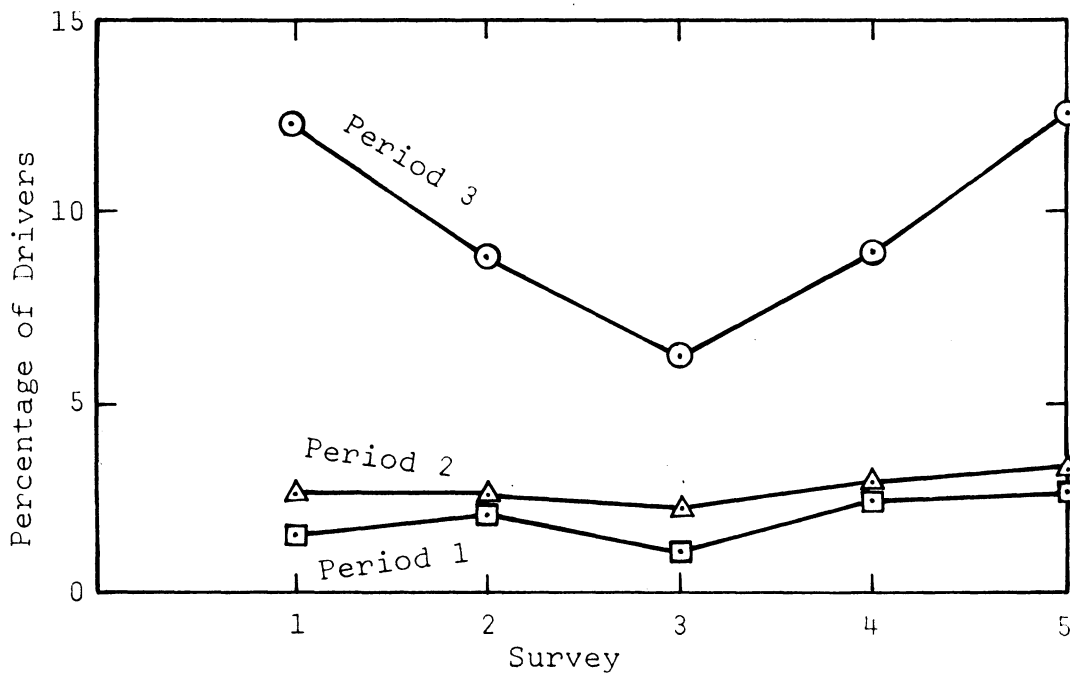


Figure 3. Percentage of BAC's $\geq .10\%$ by time period by survey.

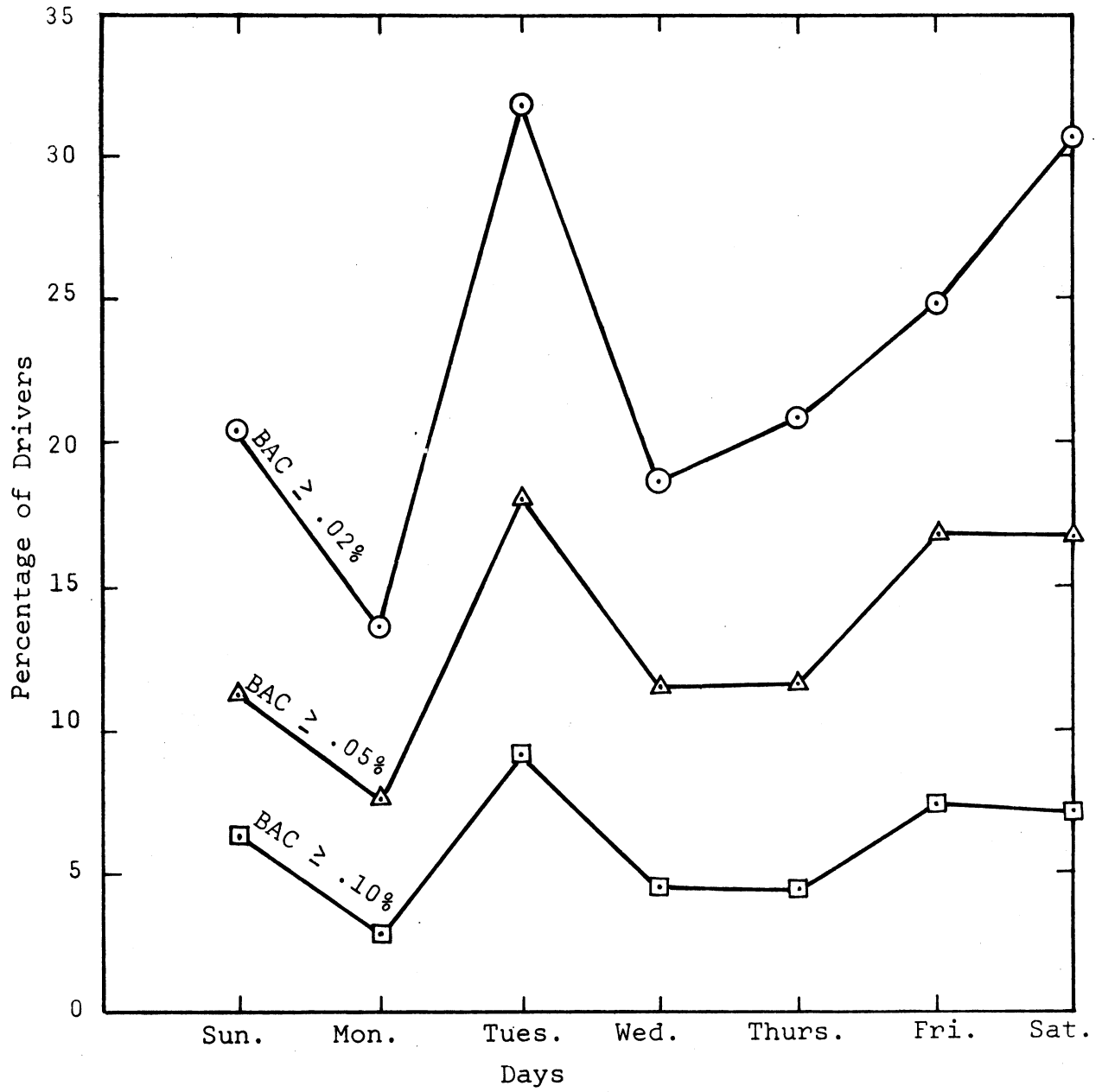


Figure 4. Percentage of BAC's by level and day of week, 1975.

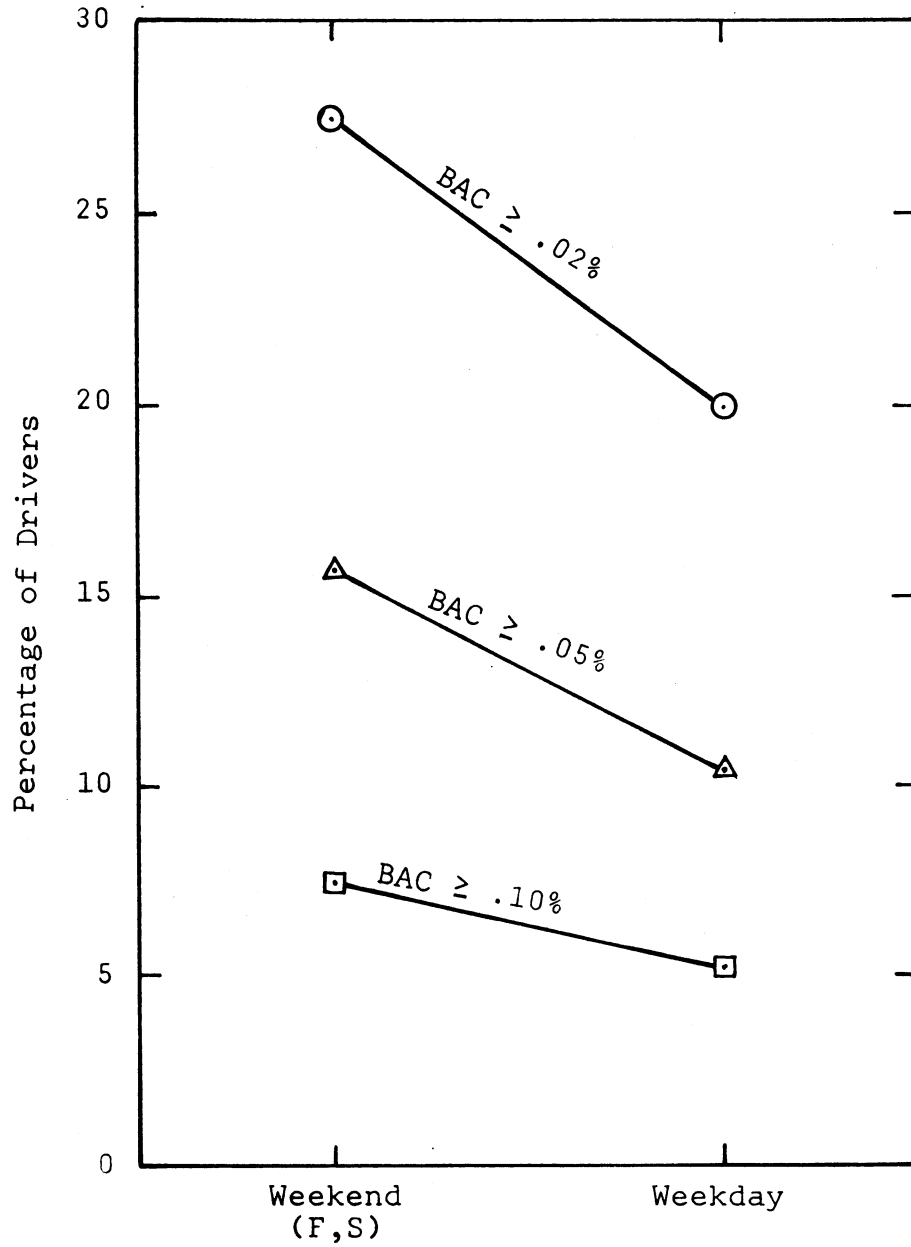


Figure 5. Percentage of BAC's by level and day of week (weekday vs. weekend), 1975.

In order to determine during which specific periods drinking and driving had increased, proportions of drivers registering positive BAC's were compared among time periods and days of the week for each of the five surveys, (see Table 11). For the baseline survey, there were no statistically significant differences between weekend nights (Friday, Saturday) and weeknights for any of the three time periods. For the second survey, only the first time period had a significant difference in that weekend nights were statistically higher ($p < .05$). For the third, fourth, and fifth surveys, both the first ($p < .05$) and third time periods ($p < .01$) showed significantly more drinking on weekend nights. These findings are displayed graphically in Figures 6, 7, and 8.

TABLE 11

PERCENTAGE OF POSITIVE BAC'S BY TIME PERIOD AND WEEKDAY VS. WEEKEND

<u>Time Period 1</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Weekend	11.5%	17.0%	14.4%	18.8%	16.4%
Weeknight	11.2%	9.4%	8.4%	14.1%	12.8%
<u>Time Period 2</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Weekend	19.0%	15.7%	16.1%	20.0%	25.6%
Weeknight	16.4%	17.2%	10.5%	17.3%	14.1%
<u>Time Period 3</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Weekend	38.0%	41.1%	36.2%	47.4%	48.1%
Weeknight	41.9%	38.0%	22.5%	30.9%	35.7%

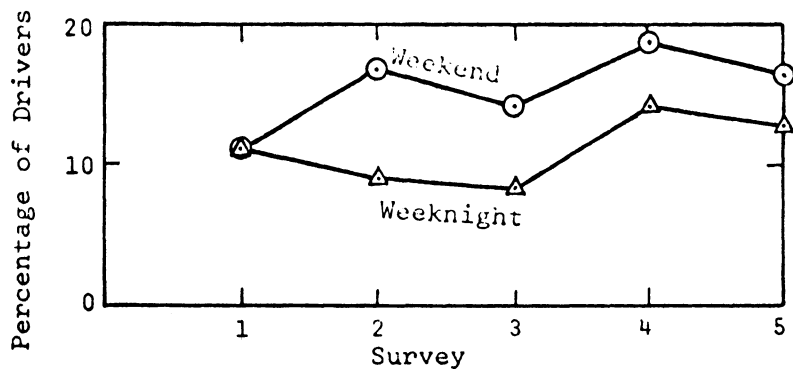


Figure 6. Percentage of positive BAC's $\geq .02\%$ by survey - Period #1.

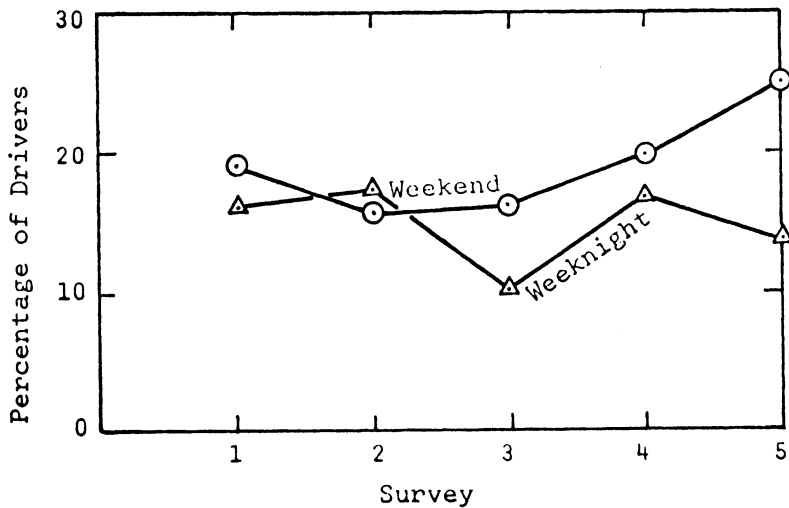


Figure 7. Percentage of positive BAC's $\geq .02\%$ by survey - Period #2.

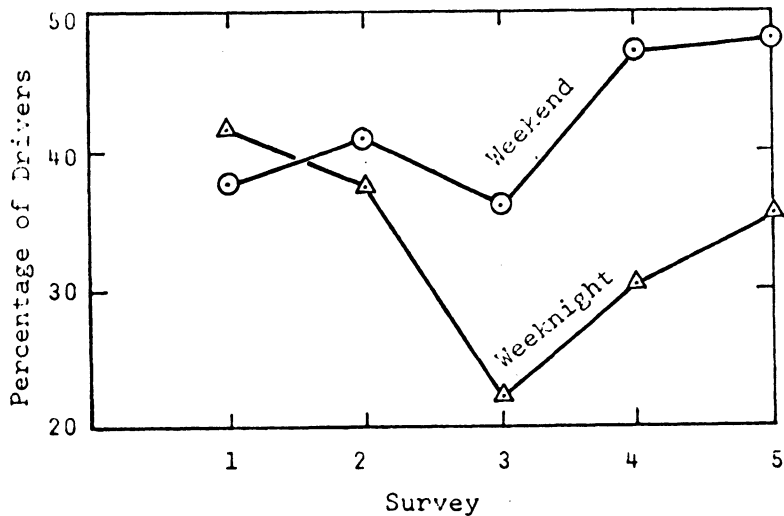


Figure 8. Percentage of positive BAC's $\geq .02\%$ by survey - Period #3.

The percentage of drivers registering BAC's of .10% or higher was compared between weekend nights and weeknights for each time period of each survey (see Table 12). During time period 1, both weekend and weeknight drunk driving increased slightly, while during period 2, weekend drunk driving increased while that for weeknight decreased. Finally, during the third time period, both weekend and weeknight drunk driving increased radically (see Figures 9, 10, and 11). From these data, it can be seen that while some increase in the percentage of positive BAC's and drunk driving occurred during the second time period, the largest increase in both weeknight and weekend drunk driving occurred during the third time period. It would seem appropriate, then, for additional enforcement efforts to be concentrated from 12:00 p.m. to 3:00 a.m. on weeknights and from 9:30 p.m. to 3:00 a.m. on Fridays and Saturdays in an attempt to restrict these increases.

TABLE 12

PERCENTAGE OF BAC'S ABOVE .10% BY TIME PERIOD AND WEEKEND VS. WEEKDAY

<u>Time Period 1</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Weekend	1.05%	2.43%	1.71%	3.66%	3.82%
Weeknight	1.95%	2.11%	0.82%	2.34%	2.14%
<u>Time Period 2</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Weekend	3.38%	1.96%	3.05%	3.01%	4.19%
Weeknight	1.97%	3.07%	1.67%	3.20%	2.88%
<u>Time Period 3</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Weekend	12.96%	7.66%	8.96%	12.31%	17.09%
Weeknight	11.29%	10.00%	5.37%	7.16%	10.88%

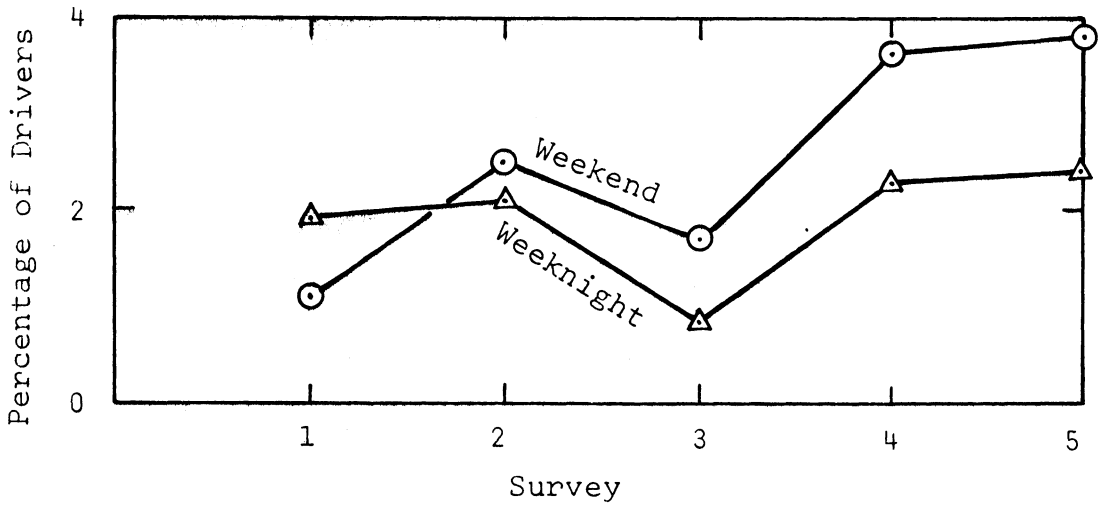


Figure 9. Percentage of BAC's $\geq .10\%$ by survey — Period #1.

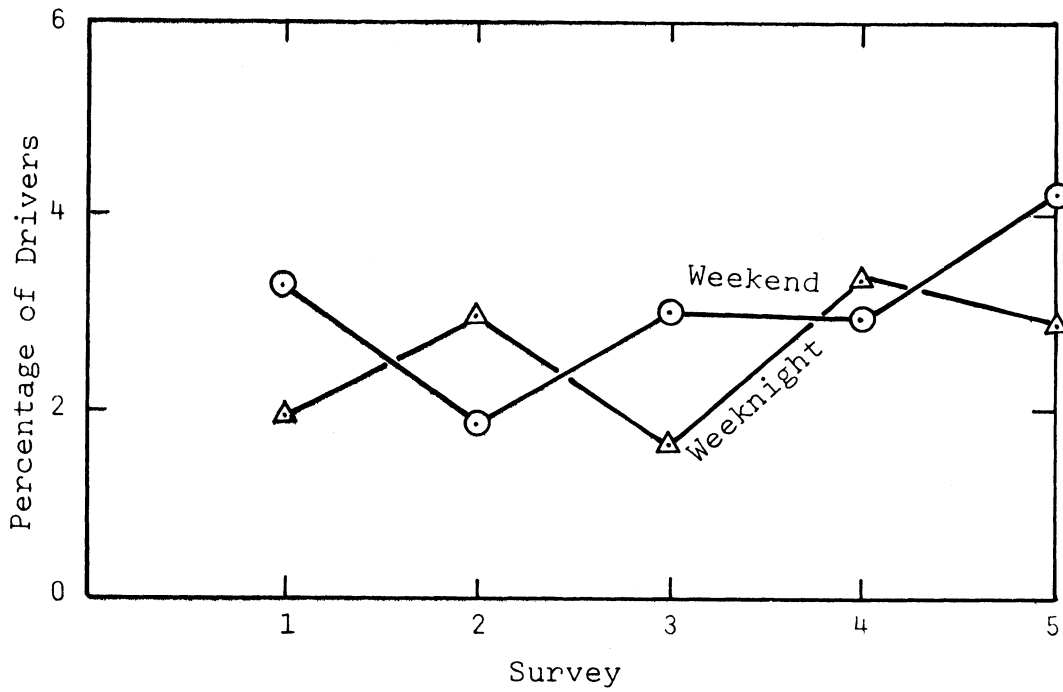


Figure 10 Percentage of BAC's $\geq .10\%$ by survey — Period #2.

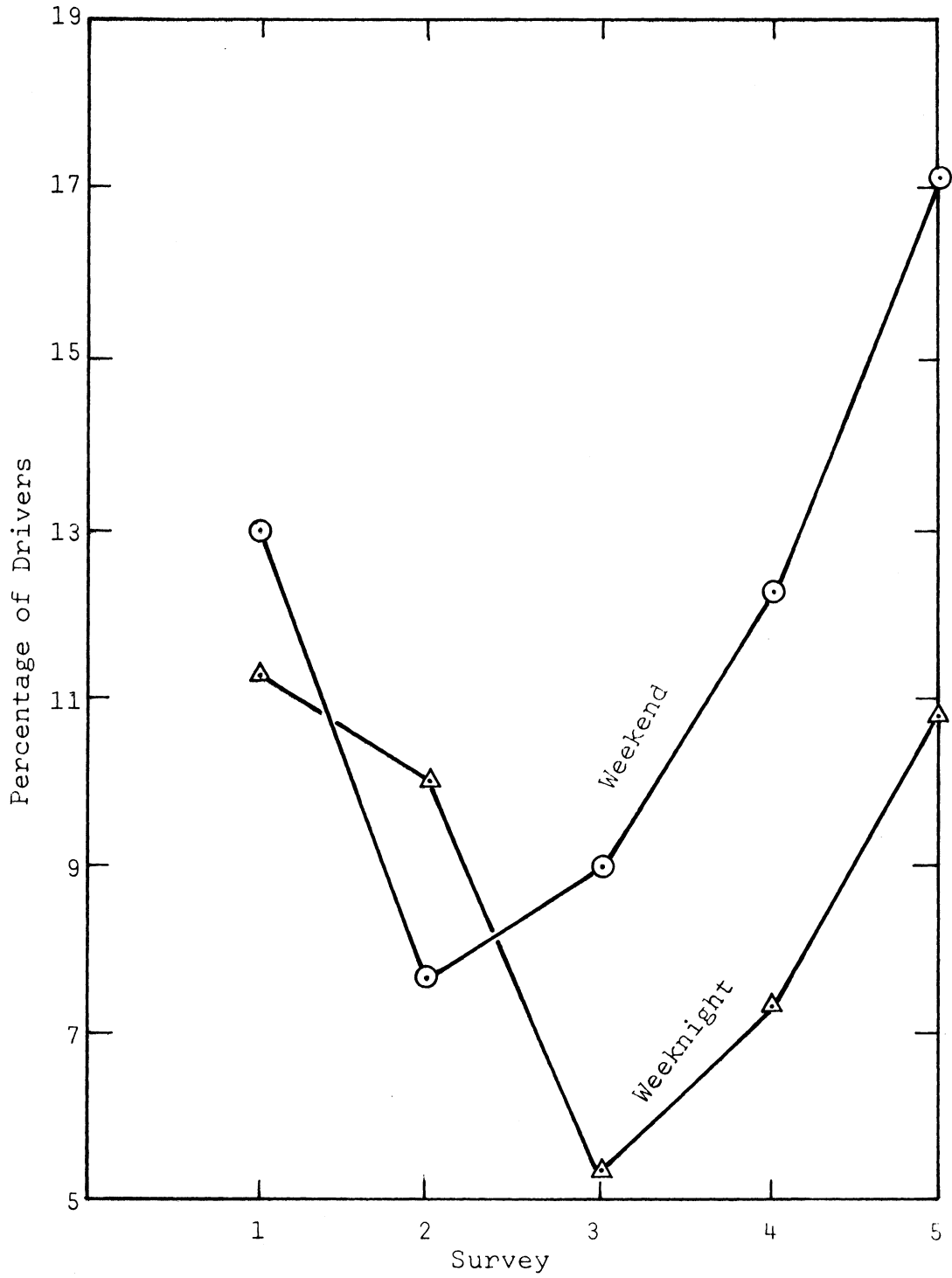


Figure 11. Percentage of BAC's \geq .10% by survey - Period #3.

Demographic Characteristics by BAC — Who are the drinking drivers?

To adequately describe the target population of drinking drivers, available demographic characteristics of respondents were examined. These characteristics included age, race, sex, miles driven per year, place of residence and length of residence.

The percentages of drinking drivers and drunken drivers in each age category appear in Figure 12. Both of these distributions differ from those found in the 1974 roadside survey. While the "under 20" and "60 and over" age groups are still least likely to be drinking or drunk, the "40-49" age group also has a relatively low probability of drinking and driving. These age distributions were generally bimodal, with the "20-39" and "50-59" age groups exhibiting higher BAC's, while the 1974 distributions were unimodal.

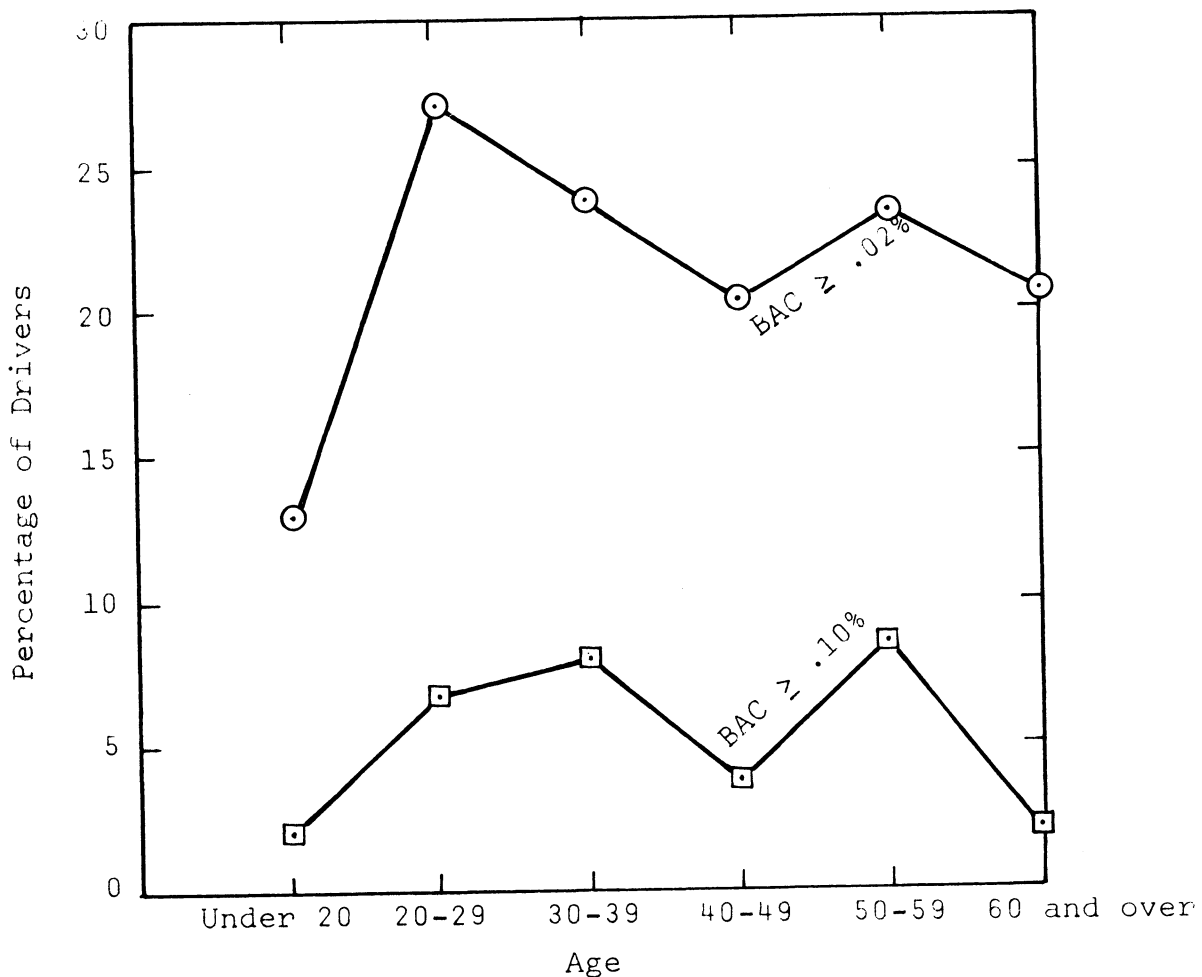


Figure 12. BAC level by age, 1975.

Since overall BAC levels increased in 1975 over 1974 and over the baseline survey, it was felt appropriate to identify the age groups most responsible for these changes. It could be possible to alert police officers to the prevalent demographic characteristics of drunken drivers to assist them in their enforcement efforts. The percentage of respondents in each age category who were above the legal limit is shown in Table 13.

TABLE 13

PERCENTAGE OF RESPONDENTS WITH BAC'S OVER .10% BY AGE

<u>Age</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Under 20	1.57%	2.16%	0.79%	2.69%	2.17%
20-29	4.13%	4.03%	2.66%	4.44%	6.89%
30-39	7.69%	4.23%	4.49%	6.87%	8.06%
40-49	3.90%	6.88%	4.80%	5.28%	3.96%
50-59	4.20%	3.60%	2.86%	2.53%	8.70%
60 +	0%	4.88%	0%	3.80%	2.33%

The distribution of ages among drunken drivers changed across years and was especially different during the fifth survey. These changes are depicted graphically in Figure 13. The "20-29," "30-39" and "50-59" age groups accounted for the increase in BAC noted during the fifth survey, while the percentage of respondents in the "under 20," "over 60" and "40-49" age groups who were over the limit decreased slightly.

In terms of the racial composition of respondents who were over the legal limit, the largest proportion of drinking drivers were white (see Figure 14). A smaller percentage of blacks were found to be driving while intoxicated, followed by respondents of other racial backgrounds. The percentage of drivers in each racial category who were driving drunk appears in Table 14. As with age, the distributions for the fifth survey were different from those for both the baseline and the fourth surveys (see Figure 15). In general, while the percentage of white respondents who were intoxicated increased slightly across time, the percentage of black drunken drivers dropped. Due to the small numbers of nonwhites sampled, especially in the "other" category, these figures may be somewhat less than reliable.

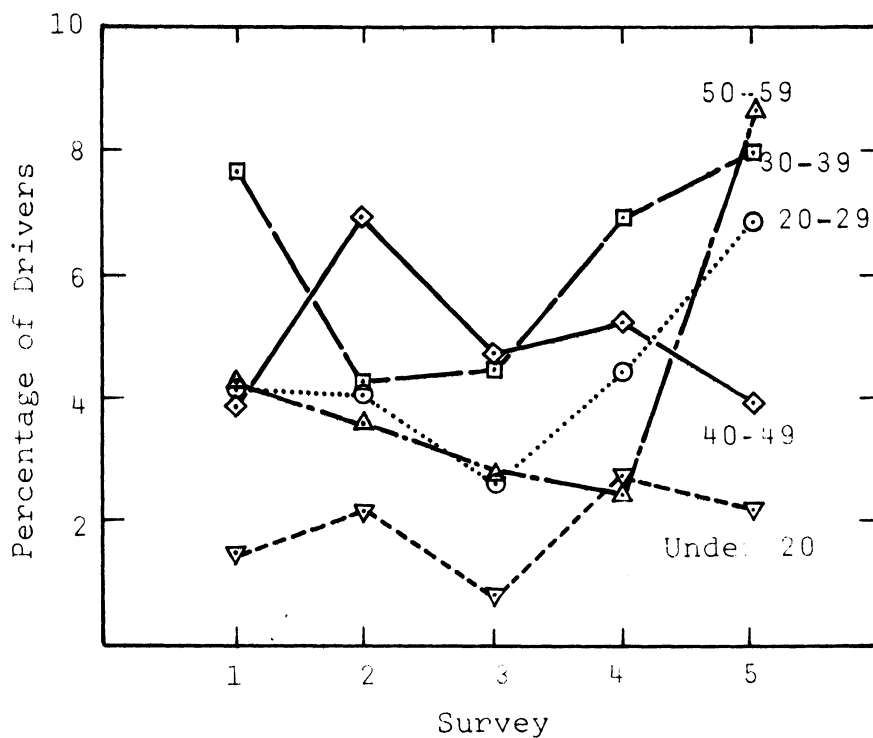


Figure 13. Percentage in each age category over .10% BAC by survey.

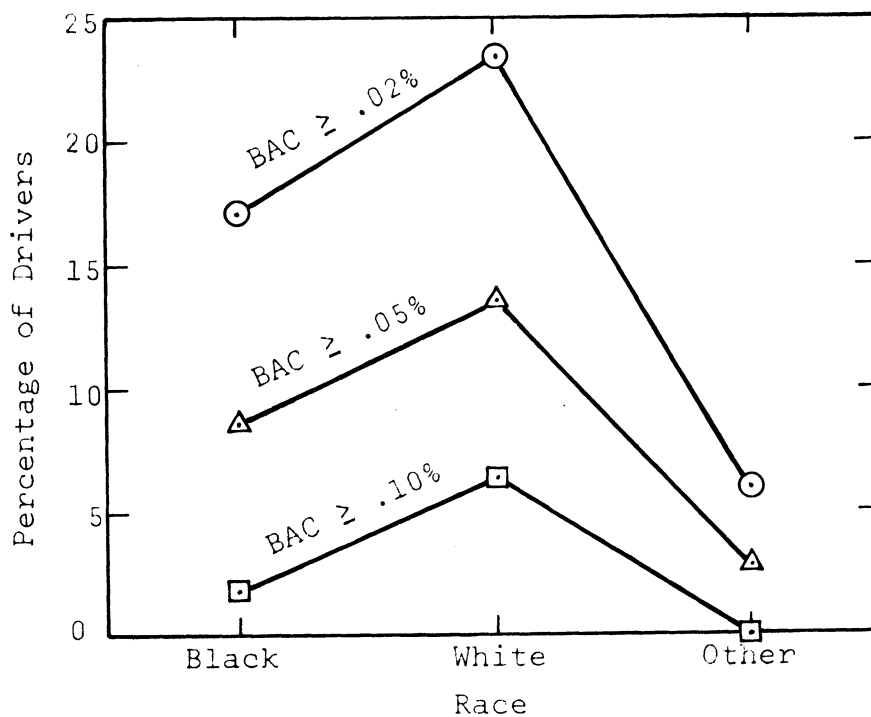


Figure 14. BAC level by race, 1975.

TABLE 14

PERCENTAGE OF RESPONDENTS WITH BAC'S OVER 100% BY RACE

<u>Race</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
White	3.9%	4.0%	2.9%	4.6%	6.33%
Black	11.0%	8.9%	3.8%	5.6%	1.92%
All Other	6.2%	0%	5.6%	2.8%	0.00%

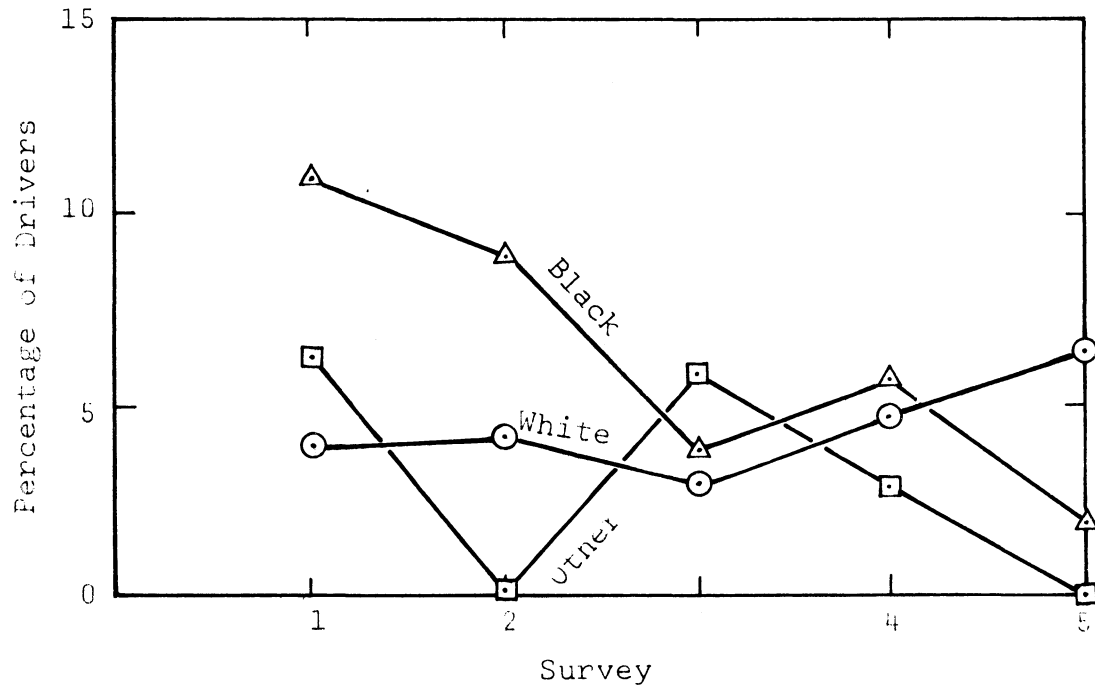


Figure 15. Percentage in each racial category over .10% BAC by survey.

Figure 16 depicts the sexual makeup of the drinking drivers sampled during the 1975 survey. Consistent with other surveys, a larger percentage of male drivers were drinking and/or drunk than were female drivers. Changes across years in these categories are shown graphically in Figure 17 and numerically in Table 15.

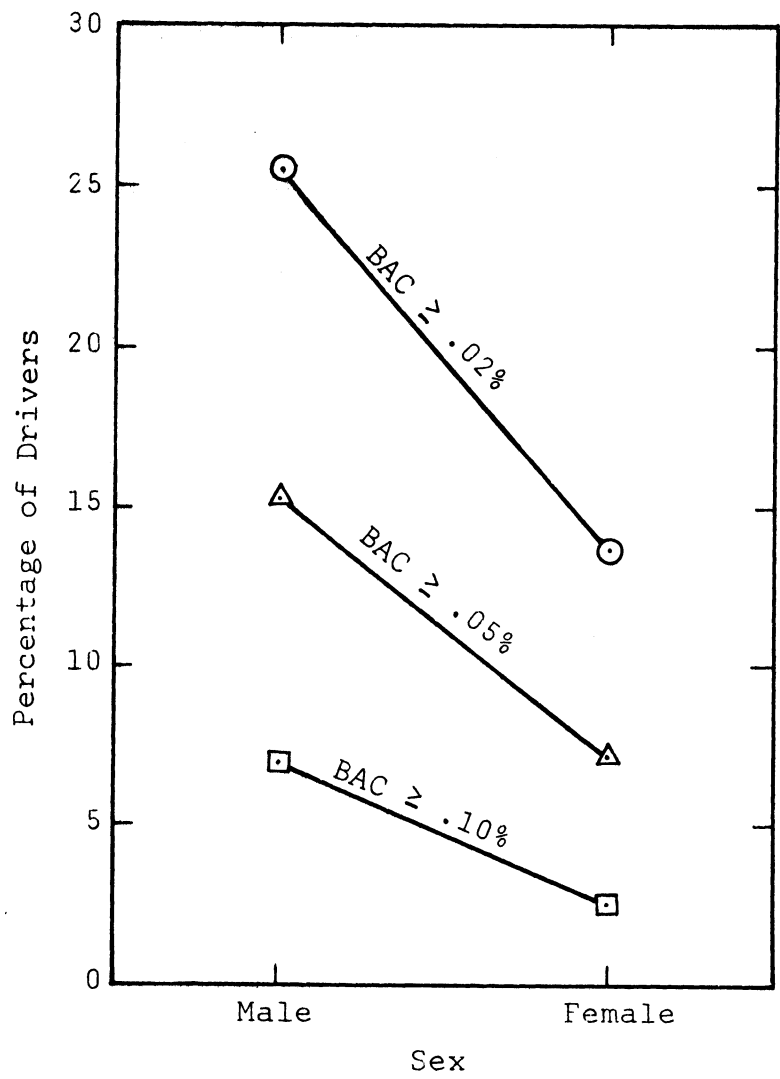


Figure 16. BAC level by sex, 1975.

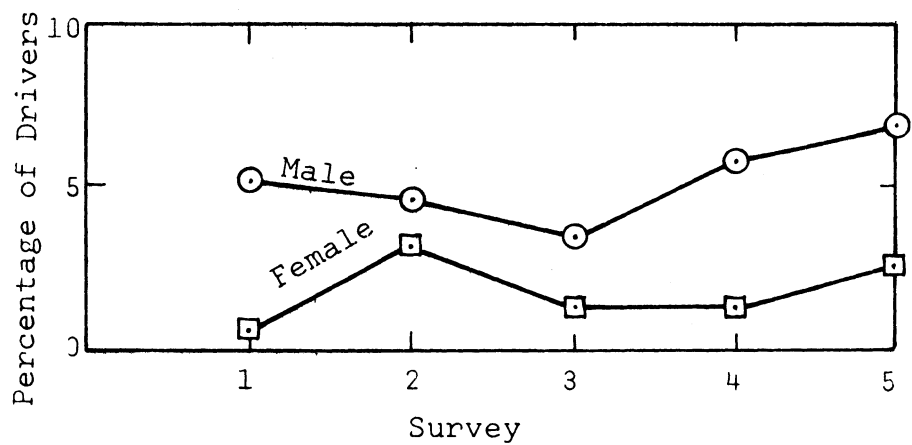


Figure 17. Percentage of each sex over .10% BAC by survey.

The percentage of males with BAC's over the legal limit has been increasing since the third roadside survey, and is now higher (but not significantly higher) than the percentage for the baseline survey. The percentage of female drunken drivers has increased slightly across time, possibly as a result of increased exposure to drinking/driving situations.

TABLE 15

PERCENTAGE OF RESPONDENTS WITH BAC'S OVER .10% BY SEX

<u>Sex</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Male	5.13%	4.46%	3.48%	5.71%	6.97%
Female	0.65%	3.18%	1.26%	1.13%	2.63%

Within each sex, different patterns of BAC readings are apparent for different age categories, as seen in Figure 18. While a smaller proportion of females in all age groups exhibited BAC's over the legal limit, the BAC patterns tended to parallel those for men. The lowest proportion of BAC's greater than or equal to .10% was found in the "under 20", "40-49" and "60 or over" age categories, while the highest proportions were found in the "30-39" and "50-59" age groups.

In relation to numbers of miles driven per year, a larger percentage of drivers with low exposure (less than 10,000 miles per year) were found to be drunken drivers (see Table 16). While on the baseline survey 7.7% of the drivers who travelled 30,000 miles or more per year were found to be over the legal limit, only 4.7% of the people in this category were drunken drivers during the fifth survey. On the other hand, while only 2.8% of the low mileage drivers had BAC's greater than or equal to .10% on the baseline survey, this figure had risen to 7.1% by 1975. This rise could suggest less hazard to the rest of the driving population because of reduced exposure to risk. It could, however, simply mirror the trend of less driving among the general population.

Blood alcohol concentrations among ASAP and non-ASAP area residents are presented in Table 17 and illustrated in Figures 19 and 20.

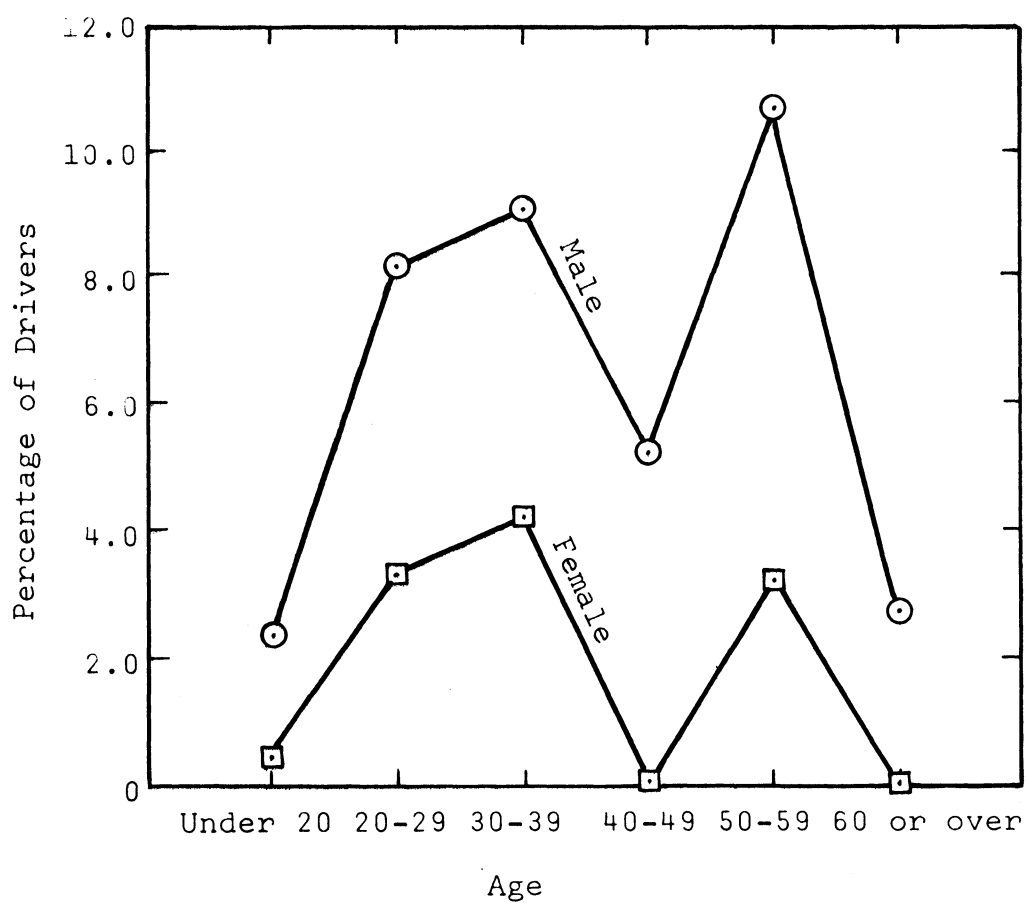


Figure 18. Percentage in each sex and age category over .10% BAC.

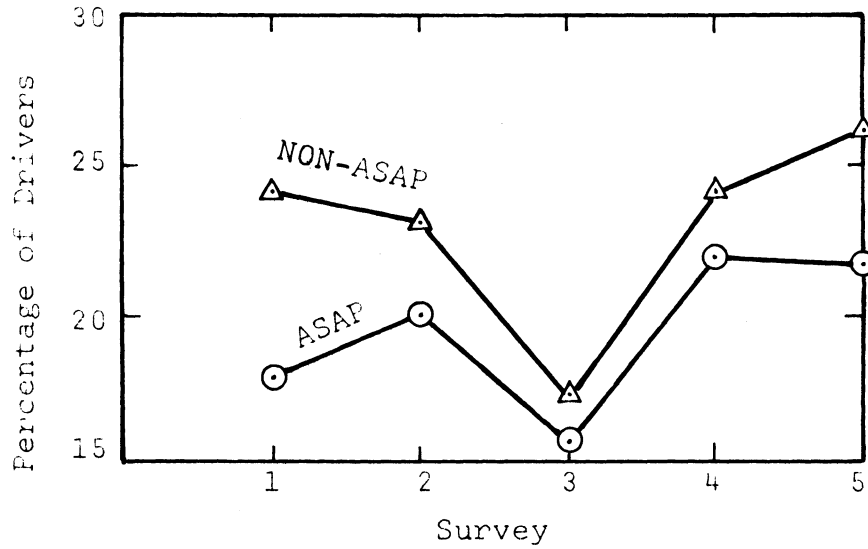


Figure 19. Percentage of ASAP and non-ASAP area residents with positive BAC's by survey.

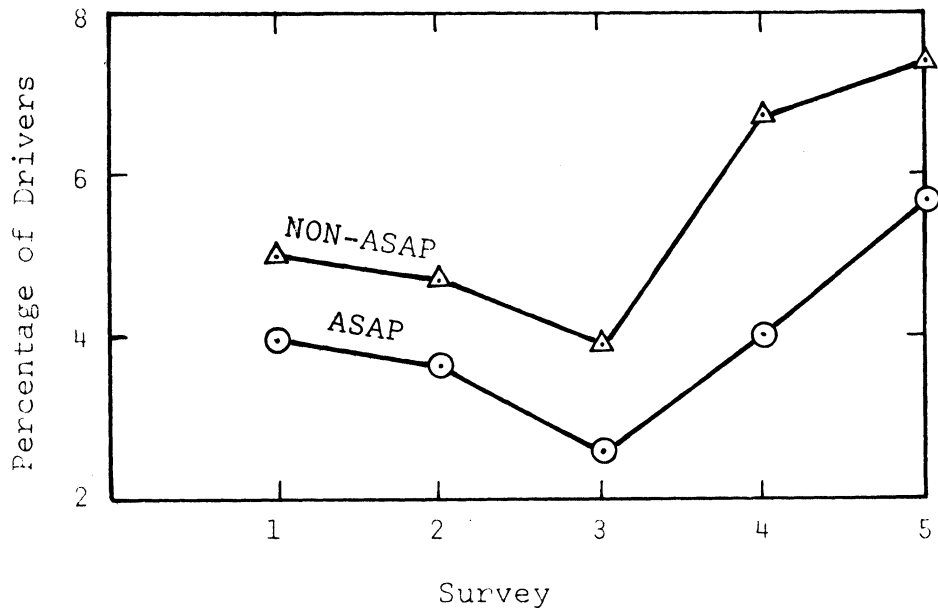


Figure 20. Percentage of ASAP and non-ASAP area residents with BAC's over .10% by survey.

TABLE 16

PERCENTAGE OF RESPONDENTS WITH BAC'S OVER .10%
BY MILES DRIVEN PER YEAR

<u>Miles Driven</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Less than 10,000	2.8%	3.6%	2.4%	4.9%	7.1%
10,000 - 19,999	3.7%	4.6%	2.3%	4.5%	5.5%
20,000 - 29,999	5.0%	4.9%	5.0%	4.2%	5.8%
30,000 or More	7.7%	4.4%	4.5%	5.2%	4.7%

TABLE 17

PERCENTAGE OF RESPONDENTS WITH BAC'S \geq .02%
AND
BAC'S \geq .10% BY PLACE OF RESIDENCE

<u>Residence</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Percentage Above .10% BAC					
ASAP	3.97%	3.61%	2.57%	3.97%	5.56%
Non-ASAP	4.95%	4.70%	3.90%	6.71%	7.32%
Percentage Postive BAC (BAC \geq .02%)					
ASAP	17.9%	20.0%	15.8%	21.8%	21.6%
Non-ASAP	24.1%	23.2%	16.2%	24.2%	26.2%

In terms of positive BAC's, while the percentage of non-ASAP area respondents with BAC's greater than or equal to .02% increased from 1974 to 1975, the percentage of ASAP area residents who had been drinking decreased slightly. However, this positive indication must be interpreted in relation to the general parallelism of the two trend lines indicating either that the non-ASAP residents were reacting to some kind of ASAP spillover or that something besides the ASAP was affecting both groups. A similar interpretation is applied to the percentages of drunken drivers among residents and non-residents. The trend lines are basically parallel and in this case, the percentages increased for both groups.

Thus, there is a tentative indication that drinking and driving (not necessarily drunk driving) has been slightly reduced among ASAP area residents when compared to levels for respondents living outside the area. These findings should be reexamined in 1976 based on the sixth roadside survey to determine if these indications manifest themselves in quantifiable trends.

The relationship between length of residence and blood alcohol concentration was also examined (see Table 18). If the Fairfax ASAP is effective in reducing drunk driving, those persons who are longtime residents of the area should have felt the maximum impact of the program while short-term residents should feel minimal or no impact. This reasoning is reflected somewhat in the BAC data. Using categorical data, a chi-square test was run to test the relationship between BAC and length of residence. The result of 11.05 was not significant at the .05 level but approached significance ($p < .09$), suggesting the ASAP influence. Again, this observation is tentative and bears retesting.

Respondents were also polled concerning their preference for drinking beer, wine or liquor. The BAC's of drivers in each preference group are shown in Table 19. A larger percentage of beer drinkers registered BAC's .02% during the 1975 survey than previously (see Figure 21). The proportion of positive BAC's also increased slightly among wine drinkers, but decreased among those who preferred liquor. In terms of drunk driving, the proportion of respondents with BAC's $\geq .10\%$ increased among all three preference groups (see Figure 22).

In summary, most of the increases in BAC experienced between 1974 and 1975 were attributable to white male respondents either between 20 to 39 years of age or 50-59 years of age. Increases were equally distributed among residents and non-residents of the ASAP area, and among the three drinker preference groups.

TABLE 18
BAC BY LENGTH OF RESIDENCE
1975

BAC	Residence					
	<u>Less Than 1 Month</u>	<u>1-6 Months</u>	<u>7-11 Months</u>	<u>1-2 Years</u>	<u>3-4 Years</u>	<u>Over 6 Years</u>
.00-.015	33(82.5)	102(67.5)	28(77.8)	202(78.0)	108(77.7)	552(80.8)
.02-.04	2(5.0)	19(12.6)	4(11.1)	22(8.5)	17(12.2)	57(8.3)
.05-.09	4(10.0)	18(11.9)	1(2.8)	16(6.2)	10(7.2)	40(5.9)
.10-.14	0(0.0)	10(6.6)	2(5.6)	11(4.2)	4(2.9)	22(3.2)
.15-.20	1(2.5)	1(0.7)	1(2.8)	6(2.3)	0(0.0)	11(1.6)
Over .20	0(0.0)	1(0.7)	0(0.0)	2(0.8)	0(0.0)	1(.01)

TABLE 19
PERCENTAGE OF DRINKING AND DRUNKEN RESPONDENTS
BY DRINKING PREFERENCE

<u>Baseline Survey</u>	<u>Beer</u>	<u>Wine</u>	<u>Liquor</u>
Positive (.02% +)	29.2%	6.1%	22.1%
Above .10%	7.3%	0.5%	4.0%
<u>Second Survey</u>			
Positive (.02% +)	30.1%	16.4%	23.2%
Above .10%	7.0%	1.5%	4.4%
<u>Third Survey</u>			
Positive (.02% +)	22.1%	13.0%	17.3%
Above .10%	4.2%	1.0%	4.2%
<u>Fourth Survey</u>			
Positive (.02% +)	30.6%	15.7%	23.5%
Above .10%	7.4%	0.9%	3.9%
<u>Fifth Survey</u>			
Positive (.02% +)	32.7%	16.1%	18.4%
Above .10%	9.3%	2.2%	4.6%

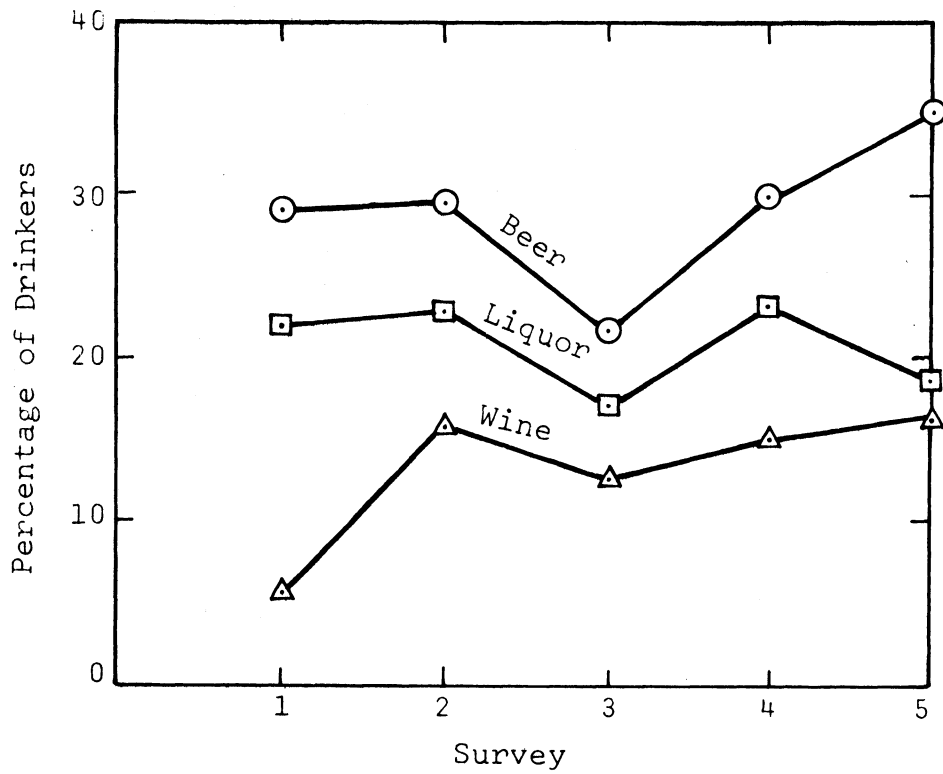


Figure 21. Percentage of positive BAC's by drinking preference by survey.

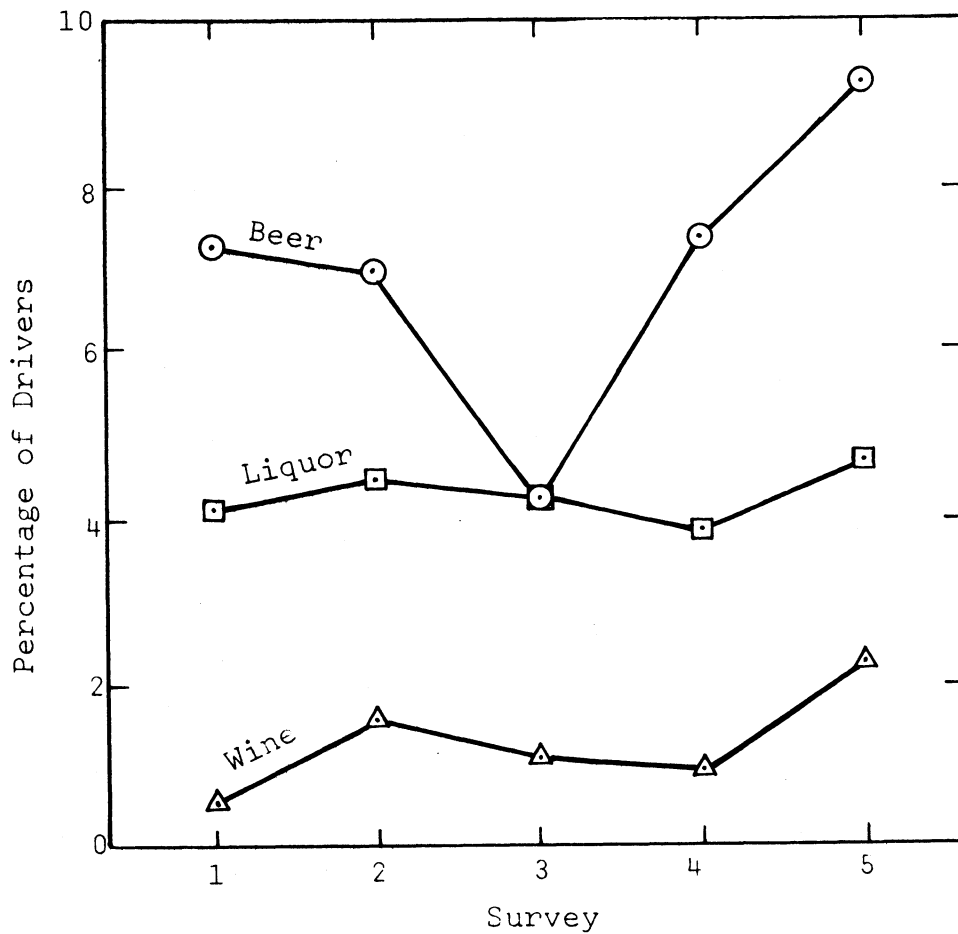


Figure 22. Percentage of BAC's $\geq .10\%$ by drinker preference by survey.

The Risk Involved in Night Driving

Assuming that this sample of drinking and nondrinking drivers is representative, some characteristics of the population from which it was drawn can be estimated. Among these is the frequency at which drunken drivers pass the sites sampled (and possibly given points in the general vicinity of the sites).

The volume of traffic passing the survey site and the percentage of vehicles sampled are shown in Table 20. During the early, high volume sites, the percentages sampled remained small. As the volume of traffic passing the site decreases, the percentage of drivers who could be sampled increases. The percentage of respondents who were driving under the influence of alcohol (BAC \geq .10%) during each time period is shown in Table 21. By applying the percentages to the total traffic volume, an estimated number of drunken drivers can be computed (see Table 22). In general, the numbers of drunken drivers were lowest during time period 2 and as high or higher during time periods 1 and 3. The fourth survey was somewhat unusual in this regard. However, the unusual estimates may be due to unusually high percentages of drivers sampled (see Table 20). During time period 1, the estimated numbers of drivers over the legal limit were much higher than during the same time period during the first three surveys, but somewhat smaller than during the fourth survey (see Figure 23). This was also true for time period 2. During time period 3, however, the 1975 estimate was much higher than that during any preceding survey, as was the total number of estimated drunken drivers. Finally, a weighted percentage of drunken drivers sampled was prepared and adjusted for differences in traffic volumes (see Table 23). The adjusted percentage of drunk driving during the 1975 roadside survey was much higher than that during any of the preceding surveys.

TABLE 20

TRAFFIC VOLUMES AND PERCENTAGES OF VEHICLES SAMPLED

<u>Time</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Period 1	8,127	5,562	8,304	9,464	7,977
Period 2	2,315	3,490	4,464	4,586	4,238
Period 3	1,558	2,335	2,540	2,800	3,033

TABLE 20 (continued)

<u>Percentage Sampled</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Period 1	8.6%	8.8%	6.5%	11.5%	8.0%
Period 2	23.4%	16.6%	12.5%	20.5%	13.9%
Period 3	21.8%	17.5%	16.9%	27.5%	16.4%

TABLE 21

PERCENTAGE OF DRIVERS ABOVE .10% BAC

<u>Time Period</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Period 1	1.6%	2.2%	1.1%	2.8%	2.9%
Period 2	2.6%	2.6%	2.3%	3.1%	3.3%
Period 3	12.4%	8.9%	6.3%	9.0%	12.8%

TABLE 22

TOTAL NUMBER OF DRUNKEN DRIVERS (ESTIMATED)

<u>Time Period</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Period 1	130	122	91	265	231
Period 2	60	91	103	142	140
Period 3	193	208	160	252	388
Total	383	421	354	659	759

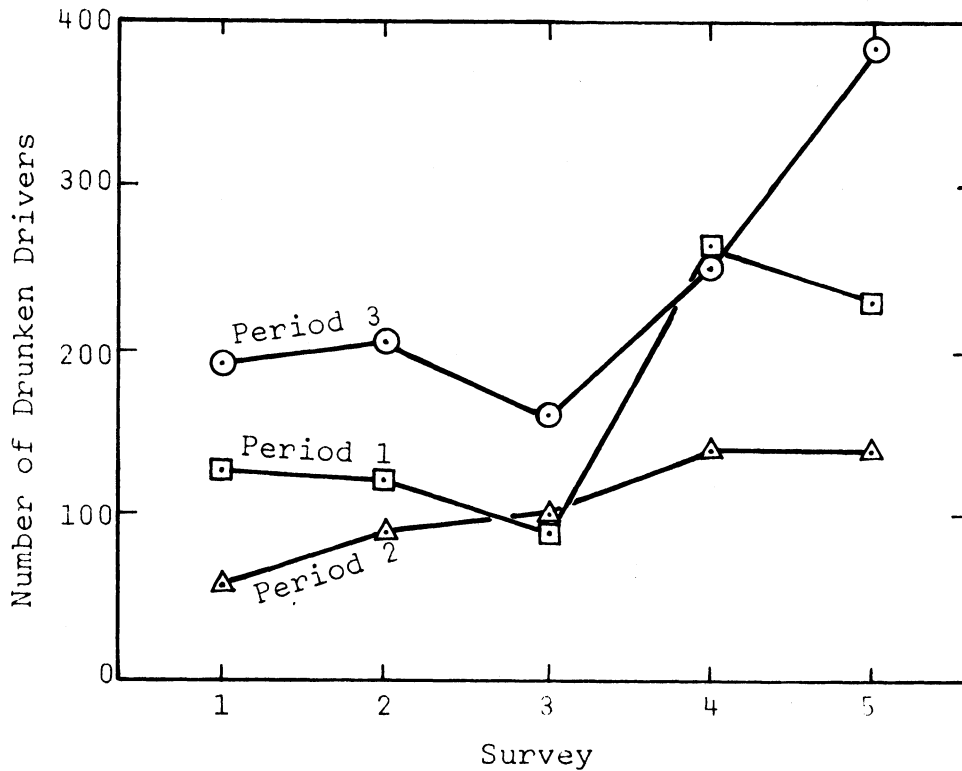


Figure 23. Estimated number of drunken drivers by survey.

TABLE 23

PERCENTAGE OF DRIVERS ABOVE .10% BAC
ADJUSTED FOR DIFFERENCES IN TRAFFIC VOLUME

	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Weighted Percentage	3.19%	3.70%	2.31%	3.91%	4.98%

What does this increase in high blood alcohol concentrations mean in terms of the average person's probability of accident involvement? First, it means that a motorist travelling at the average speed of approaching traffic would meet a drunken driver more frequently than during any earlier survey, which indicates that the chance of a nondrinking driver being involved in a crash

with a drunken driver has increased. In terms of the drinking driver's crash potential, the index of accident probability (IAP), which takes into consideration the risk of a driver having an accident if his BAC is at a given level, was computed (see Table 24).⁽³⁾ In this computation the percentage of the sample registering a given BAC is weighted by a risk index that represents the probability of having an accident. The IAP for the 1975 survey was 2.107. As can be seen in Figure 24, this is the highest index of accident probability experienced during any of the surveys.

TABLE 24

INDEX OF ACCIDENT PROBABILITY
1975

<u>BAC</u>	<u>Risk Index⁽⁴⁾</u>	<u>Percentage</u>	<u>Value</u>
.00 - .015%	1	.773	.773
.02 - .04%	1	.095	.095
.05 - .09%	3	.072	.216
.10 - .14%	12	.038	.456
.15 +	27	.021	.567
		IAP =	2.107

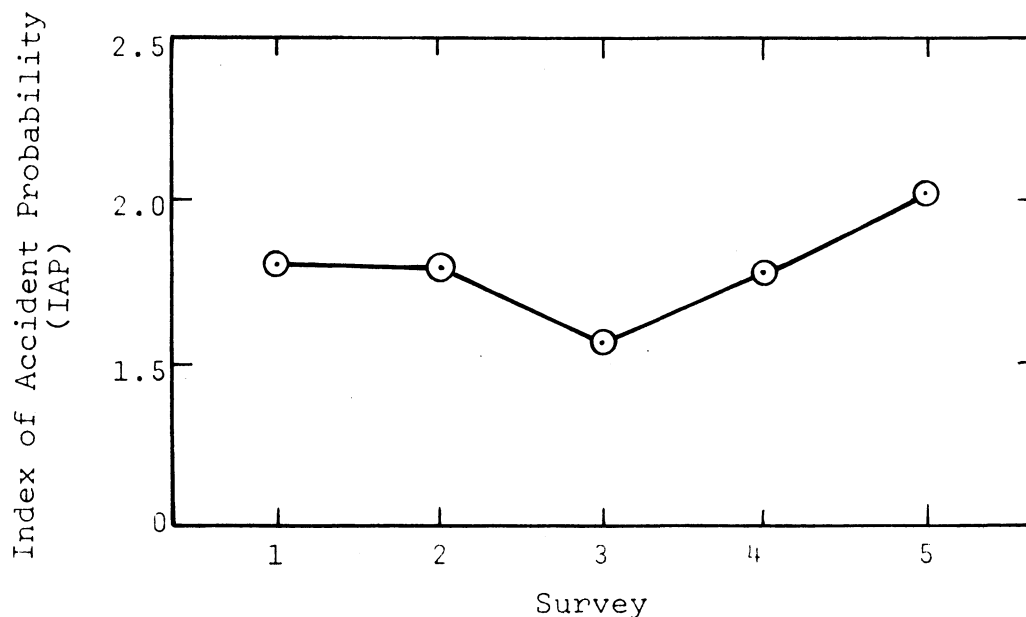


Figure 24. Indices of accident probability, 1971-1975.

Drinking Habits of Respondents

Survey subjects were also polled on several aspects of their drinking behavior. Changes in answers to these questions provide some indication of project impact in that one of the ultimate goals of the ASAP is to change drinking/driving habits. However, these responses can be used to measure several other factors. Not only can these self-reports of drinking behavior among respondents provide a measure of candidness (since objective data are available to confirm or negate self-reports), they can also provide an indication of changes in self-perceptions in drinking status among respondents.

As seen in Table 25, in the fifth survey a significantly larger proportion of respondents answered the question "Do you ever drink beer, wine or liquors" affirmatively than during previous surveys ($X^2 = 18.94$, $p > .01$). Most of this difference was accounted for by increases in affirmative answers since the low of 79.2% encountered during the second survey. Wine drinking increased over both the baseline and fifth survey, while liquor drinking has gradually decreased (see Table 26). While beer drinking increased between the first and third surveys, these increases did not continue into the fifth ($X^2 = 65.6$, $p < .001$).

TABLE 25

RESPONSES TO THE QUESTION "DO YOU EVER DRINK
BEER, WINE, OR LIQUOR?"

<u>Response</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Yes	1,313(83.4%)	1,172(79.2%)	1,272(83.5%)	2,335(83.4%)	1,457(84.6%)
No	261(16.6%)	308(20.8%)	252(16.5%)	464(16.6%)	266(15.4%)

TABLE 26

PREFERENCE AMONG BEER, WINE, LIQUOR

<u>Prefer- ence</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Beer	665(50.7%)	633(54.1%)	744(59.6%)	1,388(59.5%)	847(58.5%)
Wine	196(14.9%)	194(16.6%)	189(15.1)	347(14.9%)	269(18.6%)
Liquor	452(34.4%)	342(29.3%)	316(25.3%)	596(25.6%)	333(23.0%)

Respondents were asked to categorize their own drinking behavior (see Table 27). These distributions were also significantly different across time ($X^2 = 35.79$, $p < .001$). In 1975, drinkers were less likely to classify themselves as very or fairly light drinkers than during previous surveys, and more likely to classify themselves as moderate or fairly heavy drinkers. Very few drivers have ever been willing to classify themselves as heavy drinkers.

Finally, drivers were asked whether they had drunk any alcoholic beverages during the two hours previous to being questioned (see Table 28). A larger proportion of drivers admitted to having been drinking in 1975 than during any previous survey ($X^2 = 40.99$, $p < .001$). Thus, it appears that while drinking in general and drinking in the last two hours increased for the fifth survey (as self-reported), the driver's perception of his level of drinking indicated lighter rather than heavier drinking. This finding would seem to point toward a growing dissonance between drinking behavior and perceived drinking status.

TABLE 27

SELF-CATEGORIZATION OF DRINKING

<u>Drinking Category</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Very light	559(42.6%)	586(50.1%)	601(48.5%)	1,060(45.6%)	749(51.2%)
Fairly light	392(29.9%)	286(24.5%)	317(25.6%)	669(28.8%)	391(26.7%)
Moderate	338(25.7%)	270(23.1%)	300(24.2%)	550(23.6%)	299(20.5%)
Fairly heavy	21(1.6%)	15(1.3%)	14(1.1%)	32(1.4%)	19(1.3%)
Heavy	3(0.2%)	12(1.0%)	8(0.6%)	15(0.6%)	4(0.3%)

TABLE 28

RESPONSES TO THE QUESTION "HAVE YOU DRUNK ANY BEER, WINE, OR LIQUOR IN THE LAST TWO HOURS?"

<u>Category</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Yes	427(27.1%)	426(29.1%)	373(24.5%)	862(31.2%)	579(33.7%)
No	1,147(72.9%)	1,039(70.9%)	1,148(75.5%)	1,902(68.8%)	1,138(66.3%)

To test the adequacy of self-reported drinking classifications, BAC's were checked against each classification (see Table 29). A significant relationship was found between a person's BAC and his drinker status ($X^2 = 159.62$, $p < .001$). Light drinkers tended to have negative or low BAC's while fairly heavy and heavy drinkers had higher BAC's. However, 23.8% of very light, fairly light, and moderate drinkers had BAC's above the legal limit. If travelling with a BAC this high is a habit rather than an unusual occurrence, then these respondents are misperceiving their drinking category. Since data from previous surveys are not available to determine whether the proportion of misperception has increased over time, the relative magnitude of these incorrect self-diagnoses is not certain. Should these misperceptions be increasing, they should be addressed through public information and education counter-measure activities.

TABLE 29

BAC BY SELF-REPORTED DRINKING CLASSIFICATION
1975

<u>BAC</u>	<u>Very Light Drinker</u>	<u>Fairly Light Drinker</u>	<u>Moderate Drinker</u>	<u>Fairly Heavy and Heavy Drinker</u>
.00 - .015%	86.6%	68.5%	52.7%	13.0%
.02 - .04%	6.9%	15.5%	15.0%	17.4%
.05 - .09%	3.8%	10.1%	17.0%	21.7%
.10 - .14%	1.5%	3.9%	10.2%	26.1%
.15 - .19%	0.7%	1.9%	4.1%	17.4%
.20% +	0.4%	1.0%	1.0%	4.3%
TOTAL	748	392	299	23

Finally, the respondents' self-reported drinking behavior was checked against their BAC's as a measure of candidness. A majority of respondents who alleged to have not had any alcoholic beverages in the preceding two hours did indeed have negative (.00 - .015%) BAC's (see Table 30). Among the respondents who had been drinking, answers were more evenly dispersed across BAC levels ($X^2 = 622.34$, $p < .001$). Only 4.6% of the respondents who claimed not to have been drinking had positive ($\geq .02\%$) BAC's, and only 0.9% had BAC's over the legal limit. In relation to such personal inquiries, this level of inconsistency could easily have been the result of respondent confusion over time periods, and could be deemed acceptable.

TABLE 30

BAC BY SELF-REPORTED DRINKING IN LAST TWO HOURS — 1975

<u>BAC</u>	<u>Yes</u>	<u>No</u>
.00 - .019%	239 (41.7%)	1,065 (95.4%)
.02 - .04%	135 (23.6%)	27 (2.4%)
.05 - .09%	109 (19.0%)	14 (1.3%)
.10 - .14%	58 (10.1%)	6 (0.5%)
.15 - .19%	23 (4.0%)	2 (0.2%)
.20% +	9 (1.6%)	2 (0.2%)

Among those persons answering that they had been drinking two hours previous to the survey, many tended to underestimate the numbers of drinks they had had (see Table 31). Those persons who admitted to having 4 or more drinks had higher BAC's than those who claimed to have had 1 to 3 drinks, who in turn had higher BAC's than those who had had no drinks ($X^2 = 776.03$, $p < .001$). Of the respondents who claimed to have had 1 to 3 drinks, 12.2% underestimated the number of drinks they had had, assuming that for most respondents 3 drinks would give a maximum BAC of .09% based on weight. Among drinkers claiming to have had 4 or more drinks, 26.6% overestimated the number of drinks, assuming that the lowest BAC 4 drinks would produce was .05%. Again, however, the majority of respondents correctly assessed their drinking behavior in response to the survey questions.

In summary, self-reported drinking habits among respondents as polled by the roadside survey have changed significantly across time. While drinking in general and drinking during the two hour period preceding the administration of the survey questionnaire increased significantly, driver perception of drinking status (very light to heavy drinker) shifted toward the less serious categories. The candidness exhibited by respondents was deemed acceptable, although 7.8% of the total number of respondents over- or underestimated the numbers of drinks they had had in the preceding two hours, based on their blood alcohol concentrations.

TABLE 31

BAC BY NUMBER OF DRINKS IN THE PRECEDING TWO HOURS
1975

<u>BAC</u>	<u>No Drinks</u>	<u>1-3 Drinks</u>	<u>4 or More Drinks</u>
.00 - .015%	1,065 (95.4%)	209 (44.8%)	8 (10.1%)
.02 - .04%	27 (2.4%)	120 (25.8%)	13 (16.5%)
.05 - .09%	14 (1.3%)	80 (17.2%)	28 (35.4%)
.10 - .14%	6 (0.5%)	36 (7.7%)	20 (25.3%)
.15 - .19%	2 (0.2%)	15 (3.2%)	9 (11.4%)
.20% +	2 (0.2%)	6 (1.3%)	1 (1.3%)

Knowledge of Drinking and Driving

While most of the questions contained in the roadside survey questionnaire are aimed at determining total project impact, respondents are also polled on variables of interest to the public information and education countermeasure. Specifically, three questions are aimed at determining the respondent's knowledge of the drinking and driving laws in Virginia and how they relate to drinking. If the countermeasure has been successful, the percentage of respondents who answer these questions correctly should increase over time.

Respondents were first asked to define the term blood alcohol concentration (see Table 32). The distribution of correct and incorrect answers to this question changed significantly across surveys ($X^2 = 88.42$, $p < .001$) and the percentage of correct responses noted during the most recent survey was significantly higher than those noted during the fourth ($X^2 = 23.66$, $p < .001$). However, while the 1975 percentage of correct responses was significantly higher than that during the baseline survey, it was not as high as the percentage answering correctly during the third survey in 1973 (see Figure 25).

After being told the correct definition of blood alcohol concentration, respondents were asked to identify the BAC level which constituted the presumptive limit for drunk driving in Virginia (see Table 33). Again, the distribution of answers was found to have changed significantly over time ($X^2 = 610.91$, $p < .001$). As with the previous item, the peak in the percentage of respondents answering correctly occurred during the third survey and tapered off during the fourth. However, while the knowledge of BAC definition increased between 1974 and 1975, knowledge of the presumptive limit decreased slightly (see Figure 26).

TABLE 32

DEFINITION OF BLOOD ALCOHOL CONCENTRATION

<u>Definition</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Substantially Correct	1,075 (68.3%)	1,066 (72.6%)	1,230 (80.8%)	1,960 (70.3%)	1,312 (76.9%)
Wrong or Don't Know	499 (31.7%)	402 (27.4%)	293 (19.2%)	830 (29.7%)	394 (23.1%)

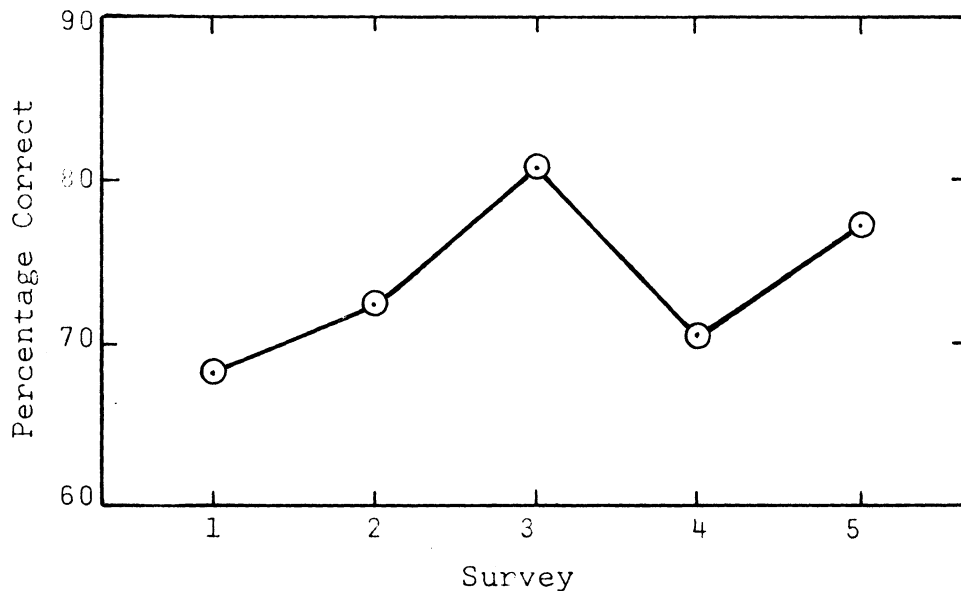


Figure 25. Percentage of correct definitions of blood alcohol concentration by survey.

TABLE 33

PRESUMPTIVE LEVEL FOR DRUNKEN DRIVING IN VIRGINIA
1971-1975

<u>BAC LEVEL</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
Any Trace	29(1.8%)	23(1.6%)	30(2.0%)	34(1.2%)	41(2.4%)
.05%	182(11.6%)	242(16.4%)	212(13.9%)	432(15.4%)	358(20.7%)
.08%	98(6.2%)	159(10.8%)	156(10.2%)	206(7.4%)	207(12.0%)
.10%	161(10.2%)	308(20.8%)*	394(25.9%)*	684(24.4%)*	406(23.5%)*
.12%	81(5.1%)	102(6.9%)	57(3.7%)	85(3.0%)	105(6.1%)
.15%	299(19.0%)*	106(7.2%)	72(4.7%)	120(4.3%)	86(5.0%)
.20%	48(3.1%)	54(3.6%)	40(2.6%)	64(2.3%)	52(3.0%)
Don't Know	676(43.0%)	484(32.7%)	563(37.0%)	1,175(42.0%)	472(27.3%)

*The correct presumptive limit in Virginia changed 1972 from .15% to .10%.

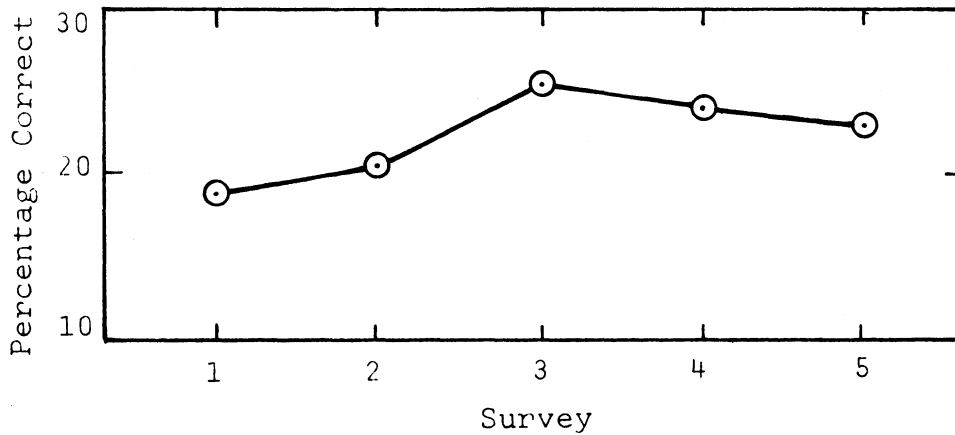


Figure 26. Percentage of correct identification of presumptive limit by survey.

In the third question, respondents were asked how many drinks they would have to consume in order to be above the presumptive limit (see Table 34). The mean estimation for the baseline survey was 4.77 drinks. The estimated number of drinks needed decreased across time until 1974, when it was estimated that 3.54 drinks would put the subject over the legal limit of .10%. During the 1975 survey, essentially the same estimation was made. While this mean estimation is indicative of changes over time, it leaves an additional and unaccounted for source of variance in the responses. Since the question is phrased personally ("How many drinks do you think you would have to have . . ."), the correct answer would be different for each person based on his weight. In order to remove this variance, each respondent's weight was checked and the correct answer calculated and compared to the respondent's answer. These results are shown in Table 35. A majority of the respondents in each category underestimated the number of drinks needed, while very few answered correctly or overestimated the number. The most variance appeared in the respondents' willingness to admit that they didn't know how many drinks were necessary. Although this underestimation may be preferable in terms of avoidance of drinking and driving, the public is still operating under a misconception. This misconception may reduce the ASAP's creditability when the drinker assesses his ability to drive after only 3.5 drinks and is then told that he should be unable to drive when over the legal limit, which he interprets as being after 3.5 drinks.

TABLE 34

DRINKS NECESSARY FOR RESPONDENT TO REACH PRESUMPTIVE LEVEL

<u>Drinks</u>	<u>Baseline Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>	<u>Fourth Survey</u>	<u>Fifth Survey</u>
1 or Less	85(5.4%)	136(9.2%)	112(7.4%)	245(8.7%)	145(8.4%)
2	136(8.6%)	214(14.5%)	221(14.5%)	487(17.4%)	353(20.4%)
3	207(13.2%)	235(16.0%)	245(16.1%)	600(21.4%)	413(23.9%)
4	202(12.8%)	149(10.1%)	197(12.9%)	395(14.1%)	254(14.7%)
5	125(7.9%)	106(7.2%)	87(5.7%)	168(6.0%)	107(6.2%)
6	131(8.3%)	121(8.2%)	88(5.8%)	149(5.3%)	130(7.5%)
7	47(3.0%)	27(1.8%)	24(1.6%)	27(1.0%)	24(1.4%)
8	58(3.7%)	32(2.2%)	52(3.4%)	28(1.0%)	29(1.7%)
9	23(1.5%)	4(0.3%)	12(0.8%)	15(0.5%)	6(0.3%)
10 or More	122(7.8%)	72(4.9%)	56(3.7%)	93(3.3%)	58(3.3%)
Don't Know	438(27.8%)	377(25.6%)	428(28.1%)	597(21.3%)	209(12.1%)
Average =	4.77 drinks	3.94 drinks	3.92 drinks	3.54 drinks	3.59 drinks

TABLE 35

CORRECT NUMBER OF DRINKS NEEDED TO ACHIEVE A BAC \geq .10%
(BY WEIGHT) BY THE CORRECTNESS OF THE RESPONDENT'S ANSWER
1975

RESPONDENT'S ANSWER

<u>Correct Number of Drinks by Weight</u>	<u>Less Than The Correct Number</u>	<u>Correct Number</u>	<u>More Than The Correct Number</u>	<u>Don't Know</u>
4	297(66.3%)	60(13.4%)	49(10.9%)	42(9.4%)
5	531(67.8%)	51(6.5%)	114(14.6%)	87(11.1%)
6	268(65.5%)	45(11.0%)	42(10.3%)	54(13.2%)
7	51(58.6%)	2(2.3%)	8(9.2%)	26(29.9%)
Of The Total	66.4%	9.2%	12.3%	12.1%

To determine the relationship between knowledge of alcohol and such variables as place of residence or BAC, a knowledge scale was constructed from these three knowledge related questions. Items were first ordered so that the correct answer received the maximum score and no answer received a score of zero. Score values for each item were then summed. The range for the knowledge scale was from zero to seven, with the modal score being 4 (see Table 36).

TABLE 36

RESPONDENT'S OVERALL KNOWLEDGE SCORES
1975

<u>Score</u>	<u>Number of Respondents</u>
2	17 (1.0%)
3	299 (17.3%)
4	875 (50.7%)
5	445 (25.8%)
6	87 (4.9%)
7	7 (0.4%)

While there were no significant differences between the sexes on knowledge score, there were racial and age differences (see Tables 37, 38 and 39). Nonwhites were more likely to score lower than whites ($X^2 = 68.09$, $p < .001$). This finding could reflect a general educational difference between these two racial groups. However, due to the small numbers involved, these findings are somewhat unreliable. Younger respondents tended to have higher scores than older respondents ($X^2 = 75.91$, $p < .001$). This finding would indicate that alcohol knowledge may be reaching drivers through driver education, but that the greater the time period since this driver education training is received the less the material is retained. These findings could also be interpreted to mean that techniques of alcohol education in high school classes have improved over time; they may be the outcome of interaction between the two aforementioned factors. Both factors may, of course, influence results.

TABLE 37
 KNOWLEDGE SCORE BY SEX
 1975

<u>Score</u>	<u>Male</u>	<u>Female</u>
2	14 (1.1%)	2 (0.5%)
3	218 (17.0%)	78 (18.4%)
4	642 (50.0%)	225 (53.1%)
5	343 (26.7%)	99 (23.3%)
6	62 (4.8%)	19 (4.5%)
7	6 (0.5%)	1 (0.2%)
Average	4.19	4.14

TABLE 38
 KNOWLEDGE SCORE BY RACE
 1975

<u>Score</u>	<u>White</u>	<u>Black</u>	<u>Other</u>
2	13 (0.8%)	3 (2.8%)	0 (0.0%)
3	230 (14.9%)	43 (40.6%)	10 (55.6%)
4	804 (52.1%)	40 (37.7%)	6 (33.3%)
5	410 (26.6%)	20 (18.9%)	2 (11.1%)
6	79 (5.1%)	0 (0.0%)	0 (0.0%)
7	7 (0.5%)	0 (0.0%)	0 (0.0%)
Average	4.22	3.73	6.68

TABLE 39
 KNOWLEDGE SCORE BY AGE
 1975

Score	<u>Under 20</u>	<u>20-29</u>	<u>30-39</u>	<u>40-49</u>	<u>50-59</u>	<u>Over 60</u>
2	3(1.1%)	5(0.8%)	1(0.3%)	4(1.4%)	1(0.8%)	3(7.0%)
3	35(12.5%)	89(14.0%)	68(18.5%)	57(20.4%)	30(25.2%)	20(46.5%)
4	128(45.7%)	328(51.8%)	199(54.1%)	144(51.4%)	60(50.4%)	15(34.9%)
5	95(33.9%)	168(26.5%)	87(23.6%)	65(23.2%)	25(21.0%)	4(9.3%)
6	19(6.8%)	41(6.5%)	12(3.3%)	10(3.6%)	1(0.8%)	1(2.3%)
7	0(0.0%)	4(0.6%)	1(0.3%)	0(0.0%)	2(1.7%)	0(0.0%)
Average Score	4.33	4.26	4.12	4.07	4.01	3.53

If the public information and education countermeasure is effectively disseminating alcohol information within the ASAP area, there should be a detectable difference between the knowledge scores of area and non-area residents (see Table 40). However, there were no significant differences in the distributions of scores between these groups. While this finding could be the result of a lack of sensitivity within the knowledge scale itself, it could indicate that the countermeasure was not reaching the driving population in the ASAP area during 1975. It is also possible that some segments of the population were absorbing alcohol information, not only from ASAP related sources, but from state and national sources as well (see Tables 41, 42, and 43). The target population, drinkers, have a higher knowledge of BAC related items than do nondrinkers ($X^2 = 29.04$, $p < .001$). In terms of the respondent's self-categorization of drinking type, no one group of drinkers scored significantly higher than the others. However, when driver BAC's were considered, drinker groups were significantly different in terms of the knowledge score ($X^2 = 22.90$, $p < .001$). Drivers with negative BAC's scored very close to the modal score for the sample as a whole. Respondents registering BAC's in the positive to impaired range scored higher than did the negative BAC group. Lastly, the high BAC group, those respondents found to be over the legal limit, had the lowest scores, just under the mode for the sample. Thus, the moderate drinkers scored highest on knowledge of the implications of drunk driving laws. While the effect of increased knowledge on drinking and driving is not entirely understood, it is hoped that knowledge was the causal factor inducing the moderate drinking group to keep their BACs at a reasonable level because they knew their limits and the limits of the law.

TABLE 40
 KNOWLEDGE SCORE BY AREA OF RESIDENCE
 1975

<u>Score</u>	<u>ASAP Area</u>	<u>Other Area in Virginia</u>	<u>Other State</u>
2	12 (0.9%)	4 (1.4%)	1 (1.0%)
3	225 (16.9%)	53 (18.0%)	21 (20.8%)
4	675 (50.7%)	147 (50.0%)	53 (52.5%)
5	351 (26.4%)	72 (24.5%)	21 (20.8%)
6	62 (4.7%)	17 (5.8%)	5 (5.0%)
7	6 (0.5%)	1 (0.3%)	0 (0.0%)
Average	4.18	4.16	4.08

TABLE 41
 KNOWLEDGE SCORE BY DRINKER VS. NONDRINKER STATUS
 1975

<u>Score</u>	<u>Drinker</u>	<u>Nondrinker</u>
2	14 (1.0%)	3 (1.1%)
3	225 (15.4%)	74 (27.8%)
4	744 (51.1%)	127 (47.7%)
5	388 (26.6%)	57 (21.4%)
6	79 (5.4%)	5 (1.9%)
7	7 (0.5%)	0 (0.0%)
Average	4.22	3.95

TABLE 42
 KNOWLEDGE SCORE BY DRINKER CATEGORY
 1975

<u>Score</u>	<u>Very Light Drinker</u>	<u>Fairly Light Drinker</u>	<u>Moderate Drinker</u>	<u>Fairly Heavy to Heavy Drinker</u>
2	9 (1.2%)	2 (0.5%)	3 (1.0%)	1 (4.3%)
3	115 (15.4%)	56 (14.3%)	46 (15.4%)	6 (26.2%)
4	393 (52.5%)	208 (53.1%)	139 (46.5%)	11 (47.9%)
5	191 (25.5%)	103 (26.3%)	90 (30.1%)	3 (13.0%)
6	38 (5.1%)	21 (5.4%)	19 (6.4%)	1 (4.3%)
7	2 (0.3%)	2 (0.5%)	2 (0.7%)	1 (4.3%)
Average	4.19	4.23	4.27	4.00

TABLE 43
 KNOWLEDGE SCORE BY BAC
 1975

<u>Score</u>	<u>BAC</u>		
	<u>Negative</u>	<u>.02 - .09%</u>	<u>Over the Legal Limit</u>
2	10 (0.8%)	5 (1.7%)	1 (1.0%)
3	214 (16.3%)	47 (16.5%)	34 (34.0%)
4	684 (52.1%)	133 (46.7%)	38 (38.0%)
5	338 (25.7%)	80 (28.1%)	23 (23.0%)
6	65 (5.0%)	17 (6.0%)	2 (2.0%)
7	2 (0.2%)	3 (1.1%)	2 (2.0%)
Average	4.18	4.23	3.97

REFERENCES

1. Smith, Thomas J., "Trends in Drinking Driving at Night — A Comparison of the First Four Roadside Surveys of the Fairfax Alcohol Safety Action Project," Virginia Highway Research Council, Charlottesville, Virginia (May 1975).
2. Perrine, M. W., Methodological Considerations in Conducting and Evaluating Roadside Research Surveys, National Highway Traffic Safety Administration, Washington, D. C. (February 1971).
3. Smith, Thomas J., "Trends in BAC Levels of Drivers at Night — Comparison of BAC Levels Determined in the First Two Roadside Surveys of the Fairfax Alcohol Safety Action Project," Virginia Highway Research Council, Charlottesville, Virginia (May 1975).
4. Borkenstein, R. F., et al., The Role of the Drinking Driver in Traffic Accidents, Indiana University Press (1964).

APPENDIX A
VOLUNTARY ROADSIDE SURVEY

1. Interviewer Observation: Number of people in the car

1 2 3 4 5 6 7 8 9 10 OR MORE

2a. First, what city or town do you live in? _____
(CITY OR TOWN)

(INTERVIEWER: ASK 2b AND 2c ONLY IF NECESSARY: BE SURE TO ENTER ANSWERS FOR 2b AND 2c)

2b. What county is that? County: 1 SURVEY COUNTY
 2 OTHER

2c. And what state? State: 1 SURVEY STATE
 2 OTHER

3. How long have you lived in _____ county? 1 LESS THAN 1 MONTH
 2 1 - 6 MONTHS
 3 7 - 11 MONTHS
 4 1 - 2 YEARS
 5 3 - 4 YEARS
 6 OVER 4 YEARS

4. About how many miles do you 1 LESS THAN 10,000
yourself drive in a year? 2 10,000 - 19,999
 3 20,000 - 29,999
 4 30,000 MILES OR MORE

5. In a typical week how many days do 7 EVERY DAY
you drive? 6 SIX DAYS
 5 FIVE DAYS
 4 FOUR DAYS
 3 THREE DAYS
 2 TWO DAYS
 1 ONE DAY
 0 NONE IN A TYPICAL
 WEEK

6. Drinking is an accepted part of business 1 YES
and social activity for many people. Do 2 NO → SKIP TO Q. 10
you ever drink beer, wine, or liquor such
as whiskey, gin, or vodka?

7. Which of these do you drink most often -- 1 BEER
beer, wine, or liquor? 2 WINE
 3 LIQUOR

8. At the present time do you consider yourself 1 VERY LIGHT DRINKER
to be a: 2 FAIRLY LIGHT DRINKER
 3 MODERATE DRINKER
 4 FAIRLY HEAVY DRINKER
 5 HEAVY DRINKER

9. (deleted)

10. What do you think the term Blood 1 RESPONDENT'S ANSWER TECHNICALLY
Alcohol Concentration or Blood CORRECT
Alcohol Level means? 2 RESPONDENT'S ANSWER SUBSTANTIALLY
 CORRECT
 3 RESPONDENT'S ANSWER WRONG

HAND RESPONDENT CARD "A"

11. The Blood Alcohol Concentration is based on a chemical test, such as a breath test, and is used to determine if a person is legally drunk or intoxicated. Which of these do you understand is the legal definition of being drunk in this state?
- | | |
|---|------------|
| 1 | ANY TRACE |
| 2 | .05% |
| 3 | .08% |
| 4 | .10% |
| 5 | .12% |
| 6 | .15% |
| 7 | .20% |
| 8 | DON'T KNOW |
12. How many drinks do you think you would have to have to reach the level where you would be considered legally drunk?
- | | | | |
|---|-------------|---|-------------|
| 1 | ONE OR LESS | 7 | SEVEN |
| 2 | TWO | 8 | EIGHT |
| 3 | THREE | 9 | NINE |
| 4 | FOUR | 0 | TEN OR MORE |
| 5 | FIVE | X | DON'T KNOW |
| 6 | SIX | | |
13. Now, I'd like you to blow into this tube. This is part of the procedure for gathering data for this survey.

 RECORD RESULTS

14. Have you drunk any beer, wine, or liquor in the last two hours?
- | | |
|---|-----|
| 1 | YES |
| 2 | NO |

(IF "YES" ON Q. 14, ASK):

15. How many drinks have you had in the last two hours, counting a bottle or can of beer, or a 4-ounce glass of wine, or 1½ ounces of liquor each as one drink?

 NUMBER

X NONE

16. On how many days did you have something to drink in the past week? # _____
17. What was the most you had on any one day? # _____

HAND RESPONDENT CARD "B"

18. Which of these comes closest to your weight? Just give the letter. (INTERVIEWER: ESTIMATE IF NECESSARY)
- | | | | |
|---|--------------------|---|------------------|
| 1 | LESS THAN 100 LBS. | 6 | 180-199 LBS. |
| 2 | 100 - 119 LBS. | 7 | 200 - 219 LBS. |
| 3 | 120 - 139 LBS. | 8 | 220 - 239 LBS. |
| 4 | 140 - 159 LBS. | | |
| 5 | 160 - 179 LBS. | 9 | 240 LBS. OR MORE |
19. In what 10-year age group do you fall?
- | | |
|---|----------------|
| 1 | UNDER 20 YEARS |
| 2 | 20 - 29 |
| 3 | 30 - 39 |
| 4 | 40 - 49 |
| 5 | 50 - 59 |
| 6 | 60 OR OVER |
20. Sex (OBSERVE AND RECORD)
- | | |
|---|--------|
| 1 | MALE |
| 2 | FEMALE |
21. Race (OBSERVE AND RECORD)
- | | | | |
|---|----------|---|-----------------|
| 1 | WHITE | 4 | LATIN |
| 2 | BLACK | 5 | AMERICAN INDIAN |
| 3 | ORIENTAL | 6 | OTHER (Specify) |
-
22. LOCATION NO.: _____ 23. TIME OF DAY: _____
24. DATE _____ 25. INTERVIEWER'S SIGNATURE: _____

APPENDIX B

The knowledge score used in the roadside survey was constructed using the responses from three separate knowledge type items. The first involved the subjects' knowledge of the definition of Blood Alcohol Concentration (Question 10), their knowledge of the presumptive limit in Virginia (Question 11), and their knowledge of the number of drinks necessary for them to reach the presumptive limit (Question 12). The answers to these items were scored as follows:

- Question 10: 3 - Technically Correct
 2 - Substantially Correct
 1 - Incorrect or Don't Know
 0 - No Answer
- Questions 11, 2 - Correct
 12: 1 - Incorrect
 0 - No Answer

