

FINAL REPORT

DRINKING-DRIVING PATTERNS AT NIGHT
Baseline Roadside Survey of the Fairfax Alcohol Safety Action Project

by

Thomas J. Smith
Highway Research AnalystA Report Prepared by the Virginia Highway Research Council Under the Sponsorship
of the Highway Safety Division of Virginia

"Prepared for the Department of Transportation, National Highway Traffic Safety
Administration, under the Contract No. DOT-HS-067-1-087.

The opinions, findings, and conclusions expressed in
this publication are those of the author and
not necessarily those of the
National Highway Traffic Safety Administration. "

Charlottesville, Virginia

February 1974
VHRC 73-R34

ACKNOWLEDGEMENTS

It is difficult to acknowledge the contributions of all those who assisted in the Fairfax Roadside Survey. It was only through the joint efforts of many people and organizations that the survey was completed so successfully.

Special thanks go to those members of the police departments of Fairfax County, Fairfax City, Falls Church, Vienna, and Herndon who assisted in site selection and traffic control.

A word of thanks also goes out to the volunteers from the local Jaycees who were on hand to drive home the drunken drivers detected on the survey.

Thanks are also due Reed Rodman, Wayne Ferguson, William Howard, Bruce Kimble, and Robert Coakley of the Virginia Highway Research Council, who acted as the survey coordinators and whose job it was to secure a motorist's participation in the survey. Special thanks go also to Edward G. Modell, a graduate legal assistant at the VHRC, who assisted in data analysis and preparation.

Thanks go also to the ASAP Project Manager and his staff, whose vital support contributed to the success of the survey.

Finally, perhaps the most important people deserving acknowledgement are the 1,577 drivers who relinquished a few minutes of their time to participate in the survey. It is only through this citizen concern and commitment that community projects will be able to succeed in combatting the menace of the drunken driver and thereby make the highways safer for us all.

ABSTRACT

As part of the Fairfax Alcohol Safety Action Project (ASAP), staff members of the Virginia Highway Research Council, acting in their role as evaluators of the project, conducted a baseline survey of the nighttime drinking-driving patterns in Fairfax, Virginia. The ASAP concept recognizes the major role alcohol plays in fatal and serious highway crashes, and the project consists of countermeasures designed to identify drunken drivers and remove them from the road into proper educational or rehabilitative programs. The ultimate objective of the project is to reduce the number of fatal, personal injury, and property damage accidents caused by the drinking driver.

The purpose of the nighttime roadside survey is to provide a secondary measure of the effectiveness of the ASAP in reducing the incidence of driving while under the influence of alcohol. The baseline survey was the first of four annual surveys which will be used to measure changes in the nighttime levels of drinking by drivers in Fairfax County. It was conducted during eleven nights in January 1972, and at three sites each night. The time periods were from 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). At each site motorists were stopped at random and asked to answer a short questionnaire and to provide a breath sample for a determination of their blood alcohol concentration (BAC). A total of 1,577 drivers were sampled; 838 on weekday nights and 739 on weekends (Friday, Saturday).

SUMMARY OF FINDINGS

1. Drinking and Drunken Driving Among The Total Sample

From the 1,577 drivers who were sampled, the following drinking pattern emerged:

- (a) 83.4% do drink alcoholic beverages
- (b) 26.4% registered positive BAC's on their breath test
- (c) 4.2% registered BAC's greater than or equal to Virginia's presumptive level for "impaired driving" of .10% BAC
- (d) 1.5% registered BAC's greater than or equal to Virginia's presumptive level for drunken driving of .15% BAC

2. Drinking and Drunken Driving by Time Period

- (a) For the time period from 7:00 p.m. to 9:20 p.m., the following characteristics were observed:
 - (1) 80.8% do drink
 - (2) 19.1% registered positive BAC's
 - (3) 1.6% were above .10% BAC
 - (4) A drunken driver passed the survey site every 5.9 minutes
- (b) For the time period from 9:50 p.m. to 12:10 a.m., the following characteristics were observed:
 - (1) 82.6% drink
 - (2) 28.5% registered positive BAC's
 - (3) 2.6% were above .10% BAC
 - (4) A drunken driver passed the survey site every 12.8 minutes
- (c) For the time period from 12:40 a.m. to 3:00 a.m., the following characteristics were observed:
 - (1) 90.8% do drink
 - (2) 51.2% registered positive BAC's
 - (3) 12.4% were above .10% BAC
 - (4) A drunken driver passed the survey site every 4.0 minutes

These characteristics were compared among the three time periods, and it was found that the third time period (12:40 a.m. to 3:00 a.m.) was significantly different at the 99% confidence level from the first two time periods for all three characteristics.

3. Weekends Compared With Weeknights

- (a) There was significantly more drinking on weekends than on weeknights.
- (b) Surprisingly enough, there was no significant difference in the percentages of drunken drivers on weekends and weeknights.

4. Survey Population Characteristics

- (a) The average age of drivers was 32.5 years with the largest single category being in the 20-29 age group, which represented 32.3% of all drivers.
- (b) Of the drivers surveyed, 80.6% were male and 19.4% were female.
- (c) Of the drivers surveyed, 94.3% were white, 4.6% were black, and 1.1% were other races.
- (d) Only 19% of the drivers were able to pick out the presumptive limit for driving while intoxicated, and perhaps half of those who selected the right answer did so by chance alone.

5. Drunken Driver Characteristics (BAC above .10%)

- (a) The age group of drivers under 20 was significantly underrepresented in terms of drunken drivers, and the age group of drivers 30-39 was significantly overrepresented. The age distributions of drunken drivers and non-drunken drivers were significantly different at the 99% confidence level.
- (b) Of the male drivers, 5.1% were drunk (BAC's above .10%) compared to only 0.7% of the females who were surveyed. The difference in drunken driving was significantly different at the 99% confidence level.
- (c) There were 3.9% of all white drivers who were drunk compared with 11.0% of all black drivers who were drunk. The difference in drunken driving was significantly different at the 99% confidence level.
- (d) The more miles a person drove each year, the more likely he was to be drunk.
 - (1) 2.9% of those driving less than 10,000 miles per year were drunk

- (2) 3.7% of those driving 10,000 to 19,999 miles per year were drunk
- (3) 5.0% of those driving 20,000 to 29,999 miles per year were drunk
- (4) 7.7% of those driving more than 30,000 miles per year were drunk
- (e) The number of times a person had moved in the last four years had no significant relationship to his being drunk.

6. ASAP Residents Versus Non-ASAP Residents

- (a) ASAP residents were less likely to be drinkers than were the non-ASAP residents who were surveyed. The percentages of 82.0% and 86.9% were significantly different at the 95% confidence level.
- (b) The ASAP residents were less likely to register a positive BAC than were the non-ASAP residents. The percentages of 24.6% and 30.5% were significantly different at the 95% confidence level.
- (c) Of the ASAP residents 4.0% had BAC's above .10% compared with 4.9% of the non-ASAP residents. This difference was not significant at the 95% confidence level.
- (d) Only 19.5% of the ASAP residents knew the presumptive limit for drunken driving compared with 18.3% for non-ASAP residents. This difference was not significant at the 95% confidence level.

7. BAC By Beverage Type

- (a) Beer drinkers were more likely to be drunk than were either wine drinkers or liquor drinkers, and liquor drinkers were more likely to be drunk than were wine drinkers (all significant at the 95% confidence level).
- (b) 7.3% of the beer drinkers were drunk (BAC above .10%)
- (c) 4.0% of the liquor drinkers were drunk.
- (d) Only 0.5% of the wine drinkers were drunk.

DRINKING-DRIVING PATTERNS AT NIGHT
Baseline Roadside Survey of the Fairfax Alcohol Safety Action Project

by

Thomas J. Smith
Highway Research Analyst

BACKGROUND

In 1972, motor vehicle accidents accounted for some 56,300 deaths throughout the United States. 1/ The abuse of alcohol has been determined to be the leading cause of these traffic fatalities. The United States Department of Transportation has determined that alcohol is a major causative factor in about 50% of all traffic fatalities. Of these alcohol-related fatalities, problem drinker-drivers and problem drinker-pedestrians are responsible for about two-thirds, and young people inexperienced in combining drinking and driving and mature social drinkers, driving while impaired or intoxicated, cause about one-third. 2/

To combat the menace of the drinking driver, the Department of Transportation has appropriated funds for experimental Alcohol Safety Action Projects. These projects consist of increased police enforcement against drunken driving, new methods of screening by professional probation staff workers, new judicial procedures, educational and alcohol treatment programs, and public information campaigns. Their primary goal is to achieve a significant reduction in the number of deaths and the severity of personal injury and property damage accidents. Secondly, the ASAP's seek to correlate this reduction with the goal of reduced incidences of "driving while intoxicated," or DWI. 3/

The presumptive limit for drunken driving in Virginia was .15% at the time of the baseline survey. A driver operating his vehicle while his blood alcohol concentration (BAC) was between .10% and .15% was presumed to be guilty of impaired driving. Because of the existence of the impaired driving statute at the time of the survey, and the fact that the presumptive limit for drunken driving was reduced to .10% on July 1, 1972, thus replacing the need for the impaired driving statute, the value of .10% will be used throughout this report as the basis for designating whether or not a driver is considered to be drunk.

The Alcohol Safety Action Project in Fairfax County, Virginia, became operational on February 1, 1972. In order to measure the impact of the new operational procedures, it was desirable to determine the normal levels of nighttime drinking by the driving population prior to the implementation of the project. Therefore, the initial survey, which is called the "baseline survey," was conducted in January 1972. The results of this survey will be used to measure any changes which might be reflected in the three annual roadside surveys during the three-year course of the project.

The survey was conducted during a period of eleven consecutive nights from Thursday, January 5, 1972, through Saturday, January 15, 1972. Three sites were used each night for a total of 33 separate sites surveyed. The survey time periods were 7:00 p.m. - 9:20 p.m., 9:50 p.m. - 12:10 a.m., and 12:40 a.m. - 3:00 a.m. Since there were five police jurisdictions assisting in the survey, the number of sites was roughly proportioned among the jurisdictions on the basis of the resident population and number of police officers in each jurisdiction.

During the survey two mobile vans were rented for use by the interviewers. These vans provided the mobility necessary to move between sampling sites, as well as the roominess, heat, and electrical accommodations necessary for administering the breath test and questionnaires with as much speed and comfort to the motorist as could be expected. The survey procedure consisted of setting up the equipment at each site and then having the two coordinators from the Virginia Highway Research Council notify the police officers to stop the appropriate vehicles. The police would stop a vehicle and simply direct it to pull over to the two research coordinators who were wearing white lab coats. It was the job of the research coordinators to explain briefly the purpose of the survey and secure the motorists' cooperation. Although the survey was strictly voluntary, the participation rate among the motorists who were stopped was 90.6%. The 9.4% who did not participate all were asked for excuses which could be recorded by the researchers. It is strongly believed that the nonparticipating group did not differ greatly from the group which participated. Any reluctant driver that a coordinator thought had been drinking was almost invariably convinced that his participation in the survey was in the best interest of preserving his anonymity.

After a motorist had agreed to participate, a coordinator would lead him to a door of the van where he was greeted by an interviewer, a data recorder, and a breath-test operator. He was asked to provide a breath sample on a gas chromatograph Intoximeter - Mark II, which would yield his BAC reading in approximately two minutes. While the machine was calculating the BAC reading, the interviewer administered the questionnaire, which consisted of 25 questions (see Appendix A).

METHODOLOGY

The basic procedures were patterned after the procedures outlined in the U. S. Department of Transportation's report titled Methodological Considerations in Conducting and Evaluating Roadside 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 the 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." ^{4/}

Sampling Frequency

There will be a total of four roadside surveys during the Fairfax Alcohol Safety Action Project. The first survey 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 conduct the survey prior to implementation of the enforcement countermeasures on February 1, 1972, and after the contracts with the five police agencies had been signed so that police assistance could be secured on the baseline survey. The three subsequent surveys are planned to be made during the month of October each year. By having the surveys during October, the annual changes can be measured without worrying about seasonal variations in drinking patterns. In addition the results of the surveys would be available in time for analysis and inclusion in the annual evaluation report. In a more practical nature, the weather during October would seem to be more conducive to the taking of an outdoor survey.

Sample Size and Day of the Week

The U. S. Department of Transportation guidelines specify a minimum sample size of 640. The guidelines also suggest that the samples be taken on Friday and Saturday nights. However, due to the fact that the ASAP's in North Carolina and Michigan 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, ⁵/ it was believed to be important to test both periods in Fairfax. By testing both periods the information would be available to allow the Fairfax ASAP to focus increased police patrol hours on the periods which showed the greatest number of drunken drivers. Thus the Fairfax survey was scheduled to run for 12 consecutive nights from Thursday, January 5, through Sunday, January 16, 1972.*

With minimum sample sizes set at 640 for both week nights and weekends (Friday, Saturday), a total of three sets of statistics will be available. The levels of drinking by nighttime drivers can be measured on weekends, on week nights, and in the aggregate.

* The nighttime period of Sunday, January 16, 1972, was contributed to conducting the survey on the military installation of Fort Belvoir in response to their great interest in the ASAP concept. Since the incidence of drinking and driving on a military installation was not thought to be representative of that of a population with the demographic characteristics of the Fairfax area at large, it was decided that the Fort Belvoir results would not be included with the rest of the statistics. Of course, any soldier driving off the post had had a chance to be sampled during the preceding 11 nights.

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 time periods in which the interviews were conducted, with the additional hour serving as the travel time 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 frames 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 general locations for survey sites would be roughly proportioned among the five police jurisdictions on the basis of their resident populations and number of police officers. This decision was made to provide representative samples of the various driving conditions existent in Fairfax as well as to get all of the police departments involved from the very beginning of the ASAP project. 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 Research Council reviewed the list of sites. Sites were selected which seemed to be a representative mixture of the rural and urban areas in Fairfax as well as being dispersed throughout the county. The final determination of which site should be sampled at what time was made under the condition that the actual travel time between sites would be under twenty-five minutes. Thus the site and sampling period combinations were made randomly within a subset of the entire Fairfax ASAP area of which the subsets were chosen so that no travel time between sites would exceed twenty-five minutes.

Questionnaire

The standard U. S. Department of Transportation questionnaire for roadside surveys was used. This questionnaire consisted of questions dealing 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 Instrument

The breath-testing device was the Intoximeter — Mark II manufactured by Intoximeters, Inc. of St. Louis, Missouri.

Administrative Procedures

The five participating police departments provided the necessary patrolmen for traffic control. The coordinators were staff members of the Safety Section of the Virginia Highway Research Council. The interviewers and data recorders were provided under a subcontract to the Stoneland Corporation of Chesapeake, Virginia. The breath-test operators were ASAP lab technicians provided by Fairfax County.

The coordinators selected the vehicles to be stopped by the policemen. The police simply directed the motorist out of the line of traffic and over to the coordinators, who were identified by their white lab coats. It was the job of the coordinators to secure a motorist's cooperation in the survey. After securing a motorist's cooperation, the coordinator led him to one of the two vans where he was greeted by the lab technician, who immediately administered the breath test. Then the driver was given the questionnaire, and by the time the questionnaire was finished, his BAC reading had been calculated and was recorded on the questionnaire. The coordinator thanked the motorist for his cooperation, and he was allowed to proceed on his way if his BAC reading was under .10%. Those drivers whose BAC was .10% or above were given options of being driven by a sober passenger when available, or by a member of the local Jaycees. Subjects who were only slightly above .10% were given the option of remaining at the site for a long enough period of time such that their BAC had dropped below .10% upon retesting.

There were no incidents which would have reflected unfavorably on the Fairfax Alcohol Safety Action Project, and there were no arrests made.

DISCUSSION OF QUESTIONNAIRE RESULTS

1. Number of people in the car including the driver.

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
1	734	46.7%
2	529	33.6%
3	165	10.4%
4	105	6.7%
5	28	1.8%
6	8	0.5%
7 or More	5	0.4%

Question 1 asks for the number of people in the car selected to participate in the survey. There were 1,574 responses to this question with 46.7%, or almost half, of all the vehicles containing only the driver.

- 2a. First, what city or town do you live in?
- 2b. What county is that? (Asked if necessary)
- 2c. And what state?

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
Fairfax ASAP Area	1,109	70.5%
Other Virginia	373	23.7%
Out-of-State	92	5.8%

Question 2 asks for the place of residence of the driver. The responses to questions 2a, 2b, and 2c were combined to code the responses in three categories. The survey revealed that 70.5% of the drivers were from the ASAP area, with an additional 23.7% from elsewhere in Virginia and 5.8% from out-of-state. This categorization might prove useful in the subsequent surveys as a means of comparing changes in BAC readings of ASAP area residents with those of the non-ASAP area drivers.

- 3. How long have you lived in _____ county?

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
Less than 1 month	34	2.2%
1-6 months	141	9.0%
7-11 months	71	4.5%
1-2 Years	235	14.9%
3-4 Years	161	10.2%
Over 4 Years	932	59.2%

Question 3 asks how long the driver has lived in his current county of residence. The survey showed that 15.7% of the drivers had lived in their county of residence less than a year, 25.1% had lived there from one to four years, and 59.2% had lived there for over four years.

- 4. About how many miles do you yourself drive in a year?

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
Less than 10,000	362	23.0%
10,000 - 19,999	680	43.2%
20,000 - 29,999	323	20.5%
30,000 or more	209	13.3%

Question 4 asks how many miles the motorist normally drives in a year. The largest number of responses came in the category of 10,000 - 19,999 miles per year. The average number of miles driven per year was approximated from the distribution as 18,000 miles. This question will be useful in looking at the drinking patterns in relation to the driving patterns.

5. In a typical week how many days do you drive?

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
Every day	1,215	77.2%
6 days	119	7.5%
5 days	108	6.9%
4 days	43	2.7%
3 days	39	2.5%
2 days	33	2.1%
1 day	11	0.7%
None in a typical week	6	0.4%

Question 5 asks how many days in a typical week the motorist was likely to drive. By far the largest number of responses came in the category in which a respondent said he drives every day.

6. Drinking is an accepted part of business and social activity for many people. Do you ever drink beer, wine, or liquor such as whiskey, gin, or vodka?

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
Yes	1,313	83.4%
No*	261	16.6%

* If answer is no, the interviewer skipped to question 10.

Question 6 asks the motorist if he ever drinks alcoholic beverages. The responses indicate that 83.4% of the drivers do drink some form of alcoholic beverages. This percentage seemed to be a little higher than the percentage of drinkers quoted from various national surveys, so it was checked against the results of the Fairfax Household Survey. The two surveys were surprisingly close on this particular question as 83.5% of the 489 respondents to this question on the Household Survey indicated that they drank alcoholic beverage. It is evident that drinking is very much a normal way of life in Fairfax, and it is not the purpose of ASAP to change the percentage of people who drink. ASAP will focus its efforts on making those people who choose to drink become more responsible drinkers.

7. Which of these do you drink most often — beer, wine, or liquor?

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
Beer	665	50.7%
Wine	196	14.9%
Liquor	452	34.3%

Question 7 asks which the driver drinks most often among beer, wine, or liquor. About half (50.7%) of the respondents most often drink beer, approximately one third (34.4%) drink liquor, and only 14.9% drink wine most often. This categorization will be used later to test for differences in BAC levels among the different beverage users.

8. At the present time do you consider yourself to be a:

1. Very light drinker
2. Fairly light drinker
3. Moderate drinker
4. Fairly heavy drinker
5. Heavy drinker

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
Very light drinker	559	42.6%
Fairly light drinker	392	29.9%
Moderate drinker	338	25.7%
Fairly heavy drinker	21	1.6%
Heavy drinker	3	0.2%

Question 8 asks the driver to categorize his perception of his own drinking pattern. Almost three-fourths of the respondents categorized themselves as being either very light or fairly light drinkers. About one-fourth categorized themselves as moderate drinkers, and only 1.8% of the respondents viewed their drinking as either fairly heavy or heavy. In view of the findings on other questions, such as the number of drinks a respondent had had each day of the preceding week and his BAC reading, this question demonstrates that many people underestimated their alcohol consumption.

9. About how many days during this past week did you drink the number of drinks shown below? (By drink we mean a glass of wine, a bottle or can of beer, or a single shot of liquor.) Just read me the number of days of each line.

Note: The driver was handed a card with the following information:

8 or more drinks ?	_____	Line 1
5-7 drinks ?	_____	Line 2
3-4 drinks ?	_____	Line 3
1-2 drinks ?	_____	Line 4
No drinks ?	_____	Line 5

<u>Category</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
8 or more	1,461	69	20	9	0	5	0	10
5-7 drinks	1,448	75	26	10	2	2	1	10
3-4 drinks	1,265	158	65	27	20	7	4	28
1-2 drinks	845	311	146	83	52	35	25	77
None	422	25	66	88	133	210	325	304

From the distribution of answers to this question a number of types of drinker profiles can be drawn. There were 304 people (19%) who had not had a drink during the week preceding their participation in the survey. At the other extreme there were 422 people (27%) who did not let a day pass without having at least one drink. At the upper drinking levels, there were 10 people who claimed to have had 8 or more drinks every day during the preceding week, and an additional 10 people claimed to have had 5-7 drinks every day. The average number of drinks per week among the 1,270 people who had been drinking was 6.4, or less than one drink per day.

10. What do you think the term Blood Alcohol Concentration or Blood Alcohol Level means ?

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
Answer completely correct	17	1.1%
Answer substantially correct	1,058	67.2%
Answer wrong	499	31.7%

Question 10 asks for an interpretation of blood alcohol concentration. Only 1.1% of the drivers gave answers that were completely correct, but about two-thirds were able to describe the term well enough that their answers were recorded as being substantially correct. Only 31.7% of the respondents gave the wrong answer or did not know. It is believed that this question gives a superficially high reading to the actual understanding of the relationship between blood alcohol content and driving. The educational levels of the Fairfax residents are substantially higher than those throughout Virginia, and it is believed that many people were able to guess the definition of the term the first time they heard it.

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?

Note: The respondents were handed a card with the information presented in the column under category.

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
Any trace	29	1.8%
.05%	182	11.5%
.08%	98	6.2%
.10%	161	10.2%
.12%	81	5.1%
.15%	299	19.0%
.20%	48	3.1%
Don't know	676	43.0%

Question 11 asks the respondent what he thinks the BAC limit is for drunken driving in Virginia. At the time of the survey the limit was .15%. Only 19% of the drivers either knew or were able to guess correctly the right answer. Of the people who ventured a guess, more responded with the right answer than any other. But this finding is overshadowed by the 43% who admitted they did not know. Thus a minimum of 81% of the respondents did not know the correct answer, and some of those who gave the right answer probably picked it by chance alone. An interesting observation made by the research coordinators was that there seemed to be two groups of drivers who generally knew the right answer. One of these groups consisted of nurses who had some experience with blood alcohol testing. The other group consisted of intoxicated drivers who had probably had some previous experience with blood alcohol testing on a more personal level, perhaps from previous scrapes with the law.

12. How many drinks do you think you would have to reach the level where you would be considered legally drunk?

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
1 or less	85	5.4%
2	136	8.6%
3	207	13.2%
4	202	12.8%
5	125	7.9%
6	131	8.3%
7	47	3.0%
8	58	3.7%
9	23	1.5%
10 or more	122	7.8%
Don't know	438	27.8%

Question 12 asks the driver how many drinks he thinks he would have to drink to reach the presumptive limit. The blood alcohol content is dependent on a number of variables, among which the main ones are the individual's weight, his rate of alcohol metabolism, the length of time over which the alcohol is consumed, and of course, the amount of alcohol consumed. Taking a short drinking period of only one hour and using the figures for a 140 lb. person as shown on the Virginia Highway Safety Division's "Blood-Alcohol Chart," it would take 6 drinks for this person to reach the presumptive level of .15%. Using this information to analyse the responses points out four prominent classes of responses. The first class consists of those drivers who answered from 1 to 5 drinks and who underestimated the amount they could legally drink before reaching the presumptive level. This is by far the largest class with 47.9% of all the drivers. The second largest class consisted of the drivers who said they didn't know. This class accounts for another 27.8% of the drivers. Thus more than three-fourths of the drivers either underestimated the amount or didn't know. On the other hand, there was a small class of 16.5% of the drivers who were in the general area of the right answers as they answered from 6 to 9 drinks. And at the extreme, the smallest, but probably the most significant, of the four classes consists of the 7.8% of all the drivers who answered that they could drink 10 or more drinks before reaching the presumptive level.

13. Now, I'd like you to blow into this tube. This is part of the procedure for gathering data for this survey.

<u>Category</u>	<u>Number of BAC's</u>	<u>Percent of BAC's</u>
Negative	1,158	73.6%
.01-- .015	108	6.9%
.02 - .04	140	8.9%
.05 - .09	101	6.4%
.10 - .14	43	2.7%
.15 - .20	18	1.1%
Over .20	6	0.4%

Question 13 asks the driver to take the breath test by blowing into the tube of the Intoximeter. Because of the waiting period during which the machine was analyzing the breath before reading out the results, a backlog was created in which drivers who had finished the questionnaire had to wait for their BAC readings. Also the breath test in the middle of the questionnaire tended to break the continuity of the questioning and confused the drivers being interviewed. After this situation was observed, the decision was made to have the driver blow into the breath-testing machine before starting the interview. This method worked better in two respects. It eliminated the backlog created by waiting for the breath test results before allowing a driver to leave, and it seemed to elicit more accurate and honest answers from drinking drivers who knew generally that the machine would reveal they had been drinking.

The distribution of BAC readings showed that 73.6% of the drivers tested negative and 26.4% tested positive. The distribution of positive readings showed that there were an additional 15.8% of the drivers in the relatively safe region between .01% BAC and .04% BAC. Thus 89.4% of the drivers, or almost 9 out of 10, were found to be driving with either safe levels of blood alcohol or none at all. The more interesting part of the sample consists of those 10.6% of all the drivers who were operating their vehicles while at BAC's of .05% or higher. Of this small group of drivers, more than half had BAC's between .05% and .09% so that there was no presumption about their being intoxicated. There were 6.4% of all the drivers in this range, and there were 4.2% of all the drivers who had BAC's above .10% (impaired driving in Virginia at the time of the survey and subsequently the level for drunken driving). This percentage of drivers who were above .10% BAC is similar to the percentages found in Washtenaw County, Michigan, and Mecklenberg County, North Carolina, where the percentages were 4.0% and 4.2% respectively. ^{6/} It is this group of drivers who operate their vehicles while they have BAC's above .10% that will be the focal point of the Fairfax ASAP efforts.

14. Have you drunk any beer, wine, or liquor in the last two hours ?

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
Yes*	427	27.1%
No	1,147	72.9%

* If the answer to question 14 was "yes," the respondent was asked question 15 as stated below:

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 ?

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
0	0	0
1	180	42.2%
2	110	25.8%
3	58	13.6%
4	37	8.7%
5	12	2.8%
6	15	3.5%
7	4	0.9%
8	4	0.9%
9	0	0
10 or more	7	1.6%

Question 14 asks the driver if he had drunk any alcoholic beverage in the previous two hours, and question 15 asks how many drinks he had during those two hours. A comparison of questions 13 and 14 showed that 27.1% of the drivers said that they had drunk some alcoholic beverage in the previous two hours and that 26.4% of the drivers registered positive BAC readings. This close relationship lends credibility to the honesty of the answers to the question about drinking, if not to the entire questionnaire. The distribution of the estimations of the number of drinks a person had had, however, showed only 15 people, or less than 1% of the total sample, who admitted to having had more than 6 drinks in the previous two hours. With the knowledge of the distribution of BAC readings and the number of drinks necessary to reach a particular level, a general conclusion can be drawn that the drinking driver either underestimated the amount of alcohol he had consumed or was not willing to admit the actual amount he had consumed.

16. During the past four years, how many times have you moved from one address to another ?

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
1 move*	368	23.4%
2 moves*	173	11.0%
3 or more*	265	16.8%
No move	768	48.8%

* If the answer to question 16 was that a person had moved at least once, he was asked question 17 as stated below:

17. How many of these moves from one county to another ?

<u>Category</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
1	311	38.6%
2	98	12.2%
3 or more	146	18.1%
None	244	30.3%
Don't know	7	0.8%

Question 16 asks the motorist how many times he had moved from one address to another in the preceding four years. If the motorist had moved at least once, he was asked question 17 to find out how many of the moves were from one county to another. The responses to question 16 indicate that more than half (51.2%) of the respondents had moved at least once. The responses to question 17 indicate that of all those who had moved, 68.9% had moved at least once from one county to another. However this should not be interpreted that most respondents were newcomers to the Fairfax ASAP area, since the surveyed group was

not limited to drivers with Fairfax ASAP addresses. The group of drivers who were surveyed were selected from all of the drivers who were using the Fairfax ASAP area roads during the survey period, of whom 70.6% were ASAP area residents. The categorization of drivers by the number of moves may provide some insight into the differences among the groups when these data are cross-tabulated with the responses to other survey questions.

18. Which of these comes closest to your weight? Just give the letter.

Note: The respondent was handed a card with the information listed under the categories below.

<u>Categories</u>	<u>Number of Responses</u>	<u>Percent of Responses</u>
Less than 100 lb.	8	0.5%
100 - 119 lb.	88	5.6%
120 - 139 lb.	225	14.3%
140 - 159 lb.	358	22.8%
160 - 179 lb.	397	25.2%
180 - 199 lb.	298	18.9%
200 - 219 lb.	128	8.1%
220 - 239 lb.	38	2.4%
240 lb. or more	34	2.2%

Question 18 asks the driver to list his weight category. The distribution of answers yielded an average weight of 166 pounds with the largest weight category being the 160 - 179 range in which 25.5% of the respondents fell. The distribution of weights was cross-tabulated against the number of drinks a person said he thought was necessary to reach the presumptive level. This cross-tabulation will be discussed later in the report.

19. In what 10-year age group do you fall?

<u>Category</u>	<u>Number of responses</u>	<u>Percent of Responses</u>
Under 20 years	319	20.2%
20 - 29	508	32.3%
30 - 39	338	21.5%
40 - 49	231	14.8%
50 - 59	143	9.1%
60 or over	35	2.2%

Question 19 asks the motorist in which 10-year age category he falls. The average age of the drivers was determined from the distribution of responses to be 32.5 years. The largest single age category for drivers was the 20-29 group, which included 32.3% of all the drivers. The nighttime driving population, or "population-at-risk," appears to be younger than the general population of adults from the age of 16 and over. The following comparison shows the distribution of ages for the general adult population in the ASAP area with the age distribution of drivers interviewed during the survey. ^{7/} The categorization by age will be examined to determine if age has any significant relationships with other questions on the survey.

<u>Age Category</u>	<u>Road Survey (Percent)</u>	<u>ASAP Area Population (Percent)</u>
Under 20	20.2%	11.0%
20 - 29	32.3%	22.7%
30 - 39	21.5%	21.6%
40 - 49	14.7%	23.3%
50 - 59	9.1%	13.5%
60 or over	2.2%	7.9%

20. Sex

<u>Category</u>	<u>Number</u>	<u>Percent</u>
Male	1,268	80.6%
Female	306	19.4%

Question 20 asked the data recorder to record the driver's sex. The nighttime driving population in the ASAP area was predominantly male, with 80.6% of the drivers who were surveyed being male and only 19.4% female. This categorization by sex will be used later in cross-tabulations against other questions to determine if there were any significant differences in the questionnaire responses between the sexes.

21. Race

<u>Category</u>	<u>Number</u>	<u>Percent</u>
White	1,485	94.3%
Black	73	4.6%
Oriental	6	0.4%
Latin	9	0.6%
American Indian	1	0.1%
Other	0	0

Question 21 asked the data recorder to record the driver's race. The 1970 census data for Fairfax County showed that 95.8% of the population were white, 3.5% were black, and 0.7% were of other races. ^{8/} Thus the surveyed drivers seem to represent the general racial mixture in Fairfax County. This categorization by race will be examined in cross-tabulation against other questions to determine if there are any significant variations between races in the questionnaire responses.

22. Location Number

<u>Category</u>	<u>Number</u>	<u>Percent</u>
1 (7:00 p. m. - 9:20 p. m.)	697	44.3%
2 (9:50 p. m. - 12:10 a. m.)	539	34.2%
3 (12:40 a. m. - 3:00 a. m.)	338	21.5%

Question 22 asked the data recorder to record the location number. The location numbers were coded 1, 2, or 3 to correspond with the time periods of 7:00 p. m. to 9:20 p. m., 9:50 p. m. to 12:10 a. m., and 12:40 a. m. to 3:00 a. m., respectively. As had been expected, the traffic volume was reduced as the time grew later. As a consequence, the traffic volume was usually sufficient to sustain a high volume of interviewing during time period 1, and the traffic was able to sustain an adequate number of interviews during time period 2. However, the traffic volume during time period 3 was often so low that there were lulls during the interviewing in which the interviewers had to wait for drivers. Thus the differences in traffic volume largely accounted for the differences in the number of people interviewed during the three time periods.

It is important for the reader to keep in mind that the aggregate statistics discussed in this report are influenced by the percentage of interviews in the three time periods. More specifically, it is important to remember that more than twice as many interviews were conducted during the first time period than during the third time period. It was found that the percentage of respondents who had been drinking increased sharply in relation to the time period, and that the third group represented only 21.5% of all the respondents compared with the 44.3% for the first time period, when there was considerably less drinking. This categorization by time period will be examined in detail in subsequent cross-tabulations to determine if differences do exist between these time periods in the various questionnaire responses.

23. Time of Day

The time of day was recorded but was not used except to cross-check the categorization of the interview into the three main time periods corresponding to sites 1, 2, and 3. (See Question 22.)

24. Date

01459

The date on which the survey started each night was recorded so that the third site on any night was recorded as the same date as the first two sites. This was done to provide a logical grouping of drivers who started their drinking on the same night. After the date was recorded, it was used to keypunch the day of the week with the following results.

<u>Category</u>	<u>Number</u>	<u>Percent</u>
Sunday	97	6.1%
Monday	167	10.6%
Tuesday	153	9.7%
Wednesday	167	10.6%
Thursday	254	16.1%
Friday	358	22.7%
Saturday	381	24.2%

<u>Combined Categories</u>	<u>Number</u>	<u>Percent</u>
Weeknight	838	53.1%
Weekend (Friday, Saturday)	739	46.9%

25. Interviewer's Signature

The interviewer was asked to sign each answer sheet. It was believed to have been helpful in ensuring that an interviewer or recorder gave the proper care and attention to an interview by associating his name with the answer sheet. Also, when mistakes in filling out the interview were noticed by the research coordinator, these mistakes were traced to the appropriate data recorder for on-the-spot corrections.

DISCUSSION OF SIGNIFICANT CROSS-TABULATIONS

1. Time Period Analysis

The three times to be examined for differences in characteristics are the periods 7:00 p.m. to 9:20 p.m., 9:50 p.m. to 12:10 a.m., and 12:40 a.m. to 3:00 a.m., and may subsequently be referred to as periods 1, 2, and 3, respectively.

A. Traffic Volume and Percentage of Vehicles Sampled

	<u>Period 1</u>	<u>Period 2</u>	<u>Period 3</u>
Total Vehicles	8,127	2,315	1,558
Vehicles Sampled	696	541	340
Percentage Sampled	8.6%	23.4%	21.8%

The traffic volume passing the survey sites dropped sharply after the first time period. As a consequence, the percentage of passing vehicles which were sampled increased after the first period in order to support the interviewing operations.

B. Percentage of Drivers Who Drink Alcoholic Beverages

	<u>Period 1</u>	<u>Period 2</u>	<u>Period 3</u>
Drink	80.8%	82.6%	90.8%
Do Not Drink	19.2%	17.4%	9.2%

The test for the differences in the percentages of drinking drivers yielded a Z-value of .81, which is considerably short of the 1.96 value necessary to show statistical differences at the 95% confidence level.* The Z-value for the comparison between the second and third sites was 3.36, which means that the percentage of people who drink was statistically different at the 99% confidence level. Thus in conclusion, it appeared that there was no difference in the percentage of people who drink between the first and second time periods, but the third time period had a significantly greater percentage of people who drink.

C. Percentage of Drivers Who Registered a Positive BAC

	<u>Period 1</u>	<u>Period 2</u>	<u>Period 3</u>
Percentage Positive	19.1%	28.5%	51.2%
Percentage Negative	80.9%	71.5%	48.8%

The percentages of drivers who registered a positive BAC on their breath test were compared between the sites. The percentages were all found to be significantly different from each other at the 99% confidence level. Thus it can be concluded that the percentage of drivers who have been drinking is correlated very closely with the time period, and that this percentage increases significantly from one period to the next latest period.

* See explanation of mathematical formulas in Appendix B.

D. Percentages of Drivers Above .10% BAC

	<u>Period 1</u>	<u>Period 2</u>	<u>Period 3</u>
Percentage Above .10%	1.6%	2.6%	12.4%

There was no statistical difference between the percentages of drivers above .10% in the first two periods. However, the percentage of drivers at the third time period who were above .10% was significantly different at the 99% confidence level from those found in the first two time periods.

E. Total Number of Drunken Drivers (Estimated)

	<u>Period 1</u>	<u>Period 2</u>	<u>Period 3</u>
Passing Vehicles	8,127	2,315	1,558
Percentage Above .10%	1.6%	2.6%	12.4%
Number Above .10%	130	60	193

As the night progressed, there was a greater percentage of drivers above .10% BAC. At the same time, the number of vehicles passing the survey sites decreased. In order to estimate the total number of drunken drivers, the percentage of drunken drivers was multiplied by the number of passing vehicles. The estimated numbers of drunken drivers (above .10% BAC) were 130 for Period 1, 60 for Period 2, and 193 for Period 3. These represented only the traffic volumes and drunken drivers passing from one direction. The rates at which drunken drivers passed the survey sites from one direction were calculated to be one drunk every 11.8 minutes for Period 1, one drunk every 25.7 minutes for Period 2, and one drunk every 8.0 minutes for Period 3. It is conceivable that a similar number of drunken drivers were traveling in the opposite direction from that of the surveyed drivers. Thus at Period 3, an observer at the survey site could have counted a drunken driver every 4 minutes, or if the observer drove a car at the average speed of the traffic, he would have met a drunken driver every 4 minutes.

II. Weekend Versus Weeknights

The distributions of BAC's for weekends (Friday and Saturday nights) and weeknights (Sunday, Monday, Tuesday, Wednesday, and Thursday) were compared to determine if there were any significant differences between the two periods in terms of their BAC distribution (see Appendix C). The calculated chi-square value of 12.33 was significant at the 95% confidence level when the total weekend sample was compared to the total weeknight sample. It can be concluded from this result and observation of the BAC distribution that there was significantly more drinking on the weekend than on weeknights. The weekends were compared with the weeknights for the three time periods, but no significant differences were found at any of the three time periods when taken individually.

The percentages of drivers above .10% BAC were compared between weekends and weeknights. There were no significant differences found between the percentages of drivers above .10% BAC for any of the time periods and for the total sample. Thus a tentative conclusion can be reached that drinking increases on the weekend, although the percentage of drunken drivers does not increase. However an increase in traffic volume on the weekends would mean that the total number of drunken drivers would increase on weekends.

III. Drunken Driver Characteristics (BAC above .10%)

A. Age Distribution

<u>Age Category</u>	<u>Drunken Drivers</u>	<u>Percent</u>	<u>Non-Drunken Drivers</u>	<u>Percent</u>
Under 20	5	7.5%	314	20.9%
20 - 29	21	31.3%	487	32.3%
30 - 39	26	38.8%	312	20.7%
40 - 49	9	13.4%	222	14.7%
50 - 59	6	9.0	137	9.1%
60 +	0	0	35	2.3%
Totals	67	100%	1,507	100%

It appeared from comparing the percentages of drivers in each age category that drivers under 20 were greatly underrepresented and that drivers 30-39 were greatly overrepresented in terms of the number of drunken drivers. The two distributions of BAC's were compared and yielded a chi-square value of 15.90, which was significant at the 99% confidence level. Thus it can be conclusively stated that the age group of drivers from 30 to 39 had significantly more drunken drivers than any other age group in terms of their being overrepresented by 1.87 times their expected number. On the other hand, the group of drivers under 20 was significantly underrepresented in terms of their having only 36% of the expected number of drunken drivers. This is not too surprising since many of the drivers in the latter group were under the legal drinking age.

B. Sex

	<u>Drivers Surveyed</u>	<u>Drunken Drivers</u>	<u>Percent Drunken Drivers</u>
Male	1,268	65	5.13%
Female	306	2	0.65%

There were 65 male drunken drivers and only 2 female drunken drivers, representing 5.13% and 0.54% of the drivers of their respective sexes who were surveyed. The percentage of males who were drunk was significantly greater than the percentage of females who were drunk, even at the 99% confidence level.

C. Race

<u>Category</u>	<u>Drivers Surveyed</u>	<u>Drunken Drivers</u>	<u>Percent Drunk</u>
White	1,485	58	3.9%
Black	73	8	11.0%
All Other	16	1	6.2%

The percentage of whites who were drunk was 3.9%, and the percentage of blacks who were drunk was 11.0%. These two percentages were significantly different at the 99% confidence level. Thus it can be concluded that the percentage of blacks who were drunk was significantly greater than the percentage of whites who were drunk.

D. Miles Driven Per Year

<u>Category</u>	<u>Number Surveyed</u>	<u>Number Drunk</u>	<u>Percent Drunk</u>
Less than 10,000	362	10	2.8%
10,000 - 19,999	680	25	3.7%
20,000 - 29,999	323	16	5.0%
30,000 or More	209	16	7.7%

From the survey results, it appeared that the more miles a person drove each year, the more likely he was to be drunk. The percentage of drunken drivers ranged from 2.8% for those driving less than 10,000 miles to 7.7% for those driving more than 30,000 miles. These two percentages were significantly different at the 99% confidence level.

E. Moves in the Last 4 Years

<u>Category</u>	<u>Number Surveyed</u>	<u>Number Drunk</u>	<u>Percent Drunk</u>
None	768	34	4.4%
One Move	367	11	3.0%
Two Moves	174	11	6.3%
Three or More Moves	265	11	4.2%

The percentage of drunken drivers was highest for those having two moves in the last four years, but there were no significant differences between the categories.

IV. ASAP Residents Versus Non-ASAP Residents

A. Drinking Habits

<u>Category</u>	<u>Number Surveyed</u>	<u>Drinkers</u>	<u>Percentage of Drinkers</u>
ASAP Residents	1,109	909	82.0%
Other Virginia Residents	373	322	86.3%
Out-of-State Residents	92	82	89.1%

The percentage of ASAP residents who stated that they do drink alcoholic beverages was compared with the percentage of other Virginia residents who drink. This difference was significant at the 90% confidence level, but not at the 95% confidence level. The percentage of out-of-state residents who drink was significantly greater at the 95% confidence level than the percentage of ASAP residents who drink. The percentage of non-ASAP residents who drink was also significantly greater at the 95% confidence level than the percentage of ASAP residents who drink.

<u>Category</u>	<u>Number Surveyed</u>	<u>Positive BAC</u>	<u>Percentage with Positive BAC</u>
ASAP Residents	1,109	273	24.6%
Non-ASAP Residents	465	142	30.5%

The percentage of ASAP residents who registered a positive BAC was 24.6% compared with 30.5% for the non-ASAP residents. These percentages were tested and found to be significantly different at the 95% confidence level. Thus it can be concluded that a non-ASAP resident is more likely to be drinking than would be an ASAP resident.

<u>Category</u>	<u>Number Surveyed</u>	<u>Number Above .10% BAC</u>	<u>Percentage Above .10% BAC</u>
ASAP Residents	1,109	44	3.97%
Non-ASAP Residents	465	23	4.95%

The percentage of ASAP residents who were above .10% BAC was 3.97%, which is somewhat lower than the 4.95% of non-ASAP residents who were above .10% BAC. However, this slight difference was not significant at the 95% confidence level and could have occurred by chance alone.

B. Knowledge of the Presumptive Limits

<u>Category</u>	<u>Number Surveyed</u>	<u>Number Correct</u>	<u>Percentage Correct</u>
ASAP Resident	1,109	215	19.4%
Non-ASAP Resident	465	85	18.3%

The percentage of ASAP residents who selected the correct presumptive limit was 19.4% compared with 18.3% for non-ASAP residents. This difference was not significant at the 95% confidence level.

V. BAC By Beverage Type

<u>BAC</u>	<u>Beer</u>		<u>Wine</u>		<u>Liquor</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Negative	419	63.1%	169	86.2%	322	71.1%
01 - 04	135	20.3%	23	11.8%	79	17.4%
05 - 09	62	9.3%	3	1.5%	34	7.5%
10 - 14	31	4.7%	1	0.5%	11	2.4%
15 +	17	2.6%	0	0	7	1.6%
Total	664	100%	196	100%	453	100%

The BAC distribution for beer drinkers was compared to that for liquor drinkers and found to be significantly different at the 90% confidence level, but not at the 95% confidence level. The BAC distribution for beer drinkers was significantly different from that of wine drinkers at the 99% confidence level. It was apparent that wine drinkers had by far the lowest BAC readings, and that beer drinkers had the highest BAC readings, with liquor drinkers between the two extremes.

The percentage of beer drinkers who were above .10% BAC was 7.3%, compared with 4.0% for liquor drinkers and only 0.5% for wine drinkers. The percentage of beer drinkers who were drunk was significantly greater at the 95% confidence level than the percentage of liquor drinkers who were drunk, and it was significantly greater at the 99% confidence level than the percentage of wine drinkers who were drunk. It can be conclusively stated that a beer drinker was more likely to be drunk than was either a liquor drinker or a wine drinker, and that a liquor drinker was more likely to be drunk than a wine drinker.

REFERENCES

1. National Safety Council, Accident Facts (Preliminary Condensed Edition), February 1973, p. 1.
2. National Highway Traffic Safety Administration, TSP Newsletter, February 1972, p. 13.
3. T. J. Smith, A Comparison of Blood Alcohol Levels as Determined by Breath and Blood Tests-Taken in Actual Field Operations (Virginia Highway Research Council), August 1972, p. 1.
4. M. W. Perrine, Methodological Considerations in Conducting and Evaluating Roadside Research Surveys (National Highway Traffic Safety Administration), February 1971, pp. 1-5
5. National Highway Traffic Safety Administration, TSP Newsletter, 1972.
6. HIT-LAB Reports, Comparison of Drinking Patterns in Washtenaw County, Michigan, and Mecklenburg County, North Carolina, December 1971, p. 2.
7. T. J. Smith, "Age of Drivers Arrested for DWI in Fairfax," Fairfax ASAP Quarterly Report, Appendix "B", September 1972, p. 2.
8. Detailed Project Plan of the Fairfax Alcohol Safety Action Project, Community Description, December 1971, p. 2.
9. S. B. Richmond, Statistical Analysis (Second Edition), New York, New York, The Ronald Press Company, pp. 204-206 (1964).

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 (Specify): _____

2c. And what state? State: 1 (SURVEY) STATE
 2 OTHER (Specify): _____

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 yourself drive in a year?
 1 LESS THAN 10,000
 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 you drive?
 7 EVERY DAY
 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 and social activity for many people. Do you ever drink beer, wine, or liquor such as whiskey, gin, or vodka?
 1 YES
 2 NO → SKIP TO Q. 10

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

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

HAND RESPONDENT CARD "E"

9. About how many days during this past week did you drink the number of drinks shown below? (By drink we mean a glass of wine, a bottle or can of beer, or a single shot of liquor)? Just read me the number of days of each line.

8 OR MORE DRINKS?	_____	LINE 1
5 - 7 DRINKS?	_____	LINE 2
3 - 4 DRINKS?	_____	LINE 3
1 - 2 DRINKS?	_____	LINE 4
NO DRINKS?	_____	LINE 5

INTERVIEWER: CHECK THAT DAYS TOTAL 7 DAYS

10. What do you think the term Blood Alcohol Concentration or Blood Alcohol Level means?
- 1 RESPONDENT'S ANSWER COMPLETELY CORRECT
 - 2 RESPONDENT'S ANSWER 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.

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. During the past four years, how many times have you moved from one address to another?

- 1 ONE MOVE
2 TWO MOVES
3 THREE MOVES OR MORE
4 NO MOVE - AT SAME ADDRESS DURING PAST 4 YEARS

(IF ANY MOVES IN THE PAST 4 YEARS, ASK):

17. How many of these moves were from one county to another?

- 1 ONE
2 TWO
3 THREE OR MORE
4 NONE
5 DON'T KNOW

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. 9 240 LBS. OR more
5 160-179 LBS.

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

MATHEMATICAL FORMULAS

The Difference Between Two Percentages 9/

$$1. \text{ Expected percentage, } P_e = \frac{n_1 p_1 + n_2 p_2}{n_1 + n_2} = \frac{a_1 + a_2}{n_1 + n_2} \cdot 100$$

where: n_1 = number of observations in sample 1

n_2 = number of observations in sample 2

p_1 = percentage in sample 1

p_2 = percentage in sample 2

a_1 = number of successes in sample 1

a_2 = number of successes in sample 2

2. Standard error of the difference between two percentages,

$$s_{p_1-p_2} = \sqrt{p_e(100-p_e) \left[\frac{(n_1+n_2)}{n_1 n_2} \right]}$$

$$3. \text{ Number of standard deviations, } Z = \frac{p_1 - p_2}{s_{p_1-p_2}}$$

APPENDIX C

0-1471

BAC DISTRIBUTION BY TIME PERIODS

BAC Distributions For Period 1

<u>BAC</u>	<u>Weekend</u>	<u>Weeknight</u>	<u>Total</u>
Negative	228	335	563
01 - 04	46	53	99
05 - 09	9	14	23
10 - 14	3	4	7
15 +	<u>0</u>	<u>4</u>	<u>4</u>
Totals	286	410	696

BAC Distributions For Period 2

<u>BAC</u>	<u>Weekend</u>	<u>Weeknight</u>	<u>Total</u>
Negative	166	221	387
01 - 04	47	58	105
05 - 09	16	19	35
10 - 14	5	5	10
15 +	<u>3</u>	<u>1</u>	<u>4</u>
Totals	237	304	541

BAC Distributions For Period 3

<u>BAC</u>	<u>Weekend</u>	<u>Weeknight</u>	<u>Total</u>
Negative	100	66	166
01 - 04	61	28	89
05 - 09	27	16	43
10 - 14	15	11	26
15 +	<u>13</u>	<u>3</u>	<u>16</u>
Totals	216	124	340

Total Sample

<u>BAC</u>	<u>Weekend</u>	<u>Weeknight</u>	<u>Total</u>
Negative	494	622	1,116
01 - 04	154	139	293
05 - 09	52	49	101
10 - 14	23	20	43
15 +	<u>16</u>	<u>8</u>	<u>24</u>
Totals	739	838	1,577

