The project staff used tabulated responses from these studies and subjective judgment to devise ways to improve reporting.

1. The most important factor in the quality of accident reporting is the attitude of the police chief. The staff strongly believed that all other factors shrink in significance in comparison. Perhaps the most effective way to improve accident data might be to conduct a strong educational program aimed at chiefs. The program should include the use of Alabama Highway Department summary reports and accident-reduction efforts.
2. Patrolmen do not understand the final use of accident data. Law enforcement academy curricula should be modified to explain such uses. (Academy instructors received additional training in a subsequent project.)
3. The DPS should initiate contact with local entities. This could be in the form of a monthly newsletter reminding cities of their responsibilities, or a series of visits to jurisdictions known to have trouble with accident reporting. The DPS contact would demonstrate concern, would motivate local law enforcement officers to improve the quality of reporting, and would educate new administrators if the high rate of turnover continues.

In summary, there are simple and direct ways in which significant gains may be accomplished through improved communications. They require minimal resources and planning times, and can be put into practice in the near future to improve accident data and thus improve the quality of traffic safety programs.

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Abridgment

Impact Evaluation of Lexington – Fayette County Traffic Alcohol Program

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ABSTRACT

In an attempt to lower the number of alcohol-related accidents, a comprehensive program of countermeasures was implemented in Lexington - Fayette County, Kentucky. The program involved a coordinated effort among the Division of Police, the judicial system, rehabilitation program administrators, educational institutions, and the local news media. Included in the program were (a) officer training to spot driving under the influence (DUI), (b) deployment of officers for DUI enforcement, (c) a public information campaign, and (d) development and implementation of an effective alcohol education program. An evaluation of the Traffic Alcohol Program (TAP) that began on May 1, 1982, is given. Information collected for the analysis included accident data, arrest and adjudication data, and personal opinion data obtained by means of a questionnaire survey. Accident data were collected for 2 years before TAP and 1 year into the program. A 25 percent sample of arrest and adjudication data was collected 1 year before and 1 year during TAP. The questionnaire was sent to 2,500 registered vehicle owners. Results from before-and-after comparisons and time-series analyses indicated that alcohol-related accidents decreased significantly as a result of TAP. The number of DUI arrests increased from 929 in the year before TAP to 4,427 during the first year of TAP. The program as found to be cost effective with a benefit-cost ratio greater than 2. More than half of the respondents of the survey indicated that TAP increased their chance of DUI arrest.

In an attempt to lower the number of fatalities, injuries, and property-damage alcohol-related accidents, a comprehensive program of countermeasures

has been implemented in Lexington - Fayette County, Kentucky. The program involves a coordinated effort among the Division of Police, the judicial system, rehabilitation program administrators, educational institutions, and the local news media. Generally, the program includes the following components: (a) an officer training course on driving under the influence (DUI), (b) deployment of officers for DUI enforcement, (c) a public information campaign, and (d) development and administration of an effective alcohol education program.

Some expected accomplishments and anticipated long-range results of Lexington's Traffic Alcohol Program (TAP) are to

1. Reduce alcohol-related fatality and injury accidents by 25 percent,
2. Decrease the average blood alcohol level of those arrested for DUI from 0.20 to between 0.10 and 0.14,
3. Reduce the number of "Reckless Driving--Had Been Drinking" arrests (this notation is used to identify reckless driving arrests in which alcohol was involved),
4. Increase community awareness of the problems created by drinking drivers, and
5. Increase voluntary compliance to the DUI and implied consent laws.

TAP began in Lexington - Fayette County on May 1, 1982, and is scheduled to continue through September 30, 1984. This enforcement program operates every night of the week except Sunday, and the hours of operation are generally from 10:30 p.m. to 3:30 a.m. The number of police officers on TAP patrol varies from 15 to 25 per night, with higher numbers usually on patrol on weekends. Even though the program is still in operation, only the first year of data was selected for the impact evaluation.

DATA-COLLECTION PROCEDURES

To assess the impact of TAP, three primary types of data were collected for analysis: accident data, arrest and adjudication data, and personal opinion data obtained by means of a questionnaire survey. Data on alcohol-related accidents were collected for the 3-year period from May 1, 1980, through April 30, 1983. Arrest and adjudication data were the second major data element included in the analysis. Data reflecting a complete summary of the arrest and adjudication history for each DUI case were available from the Administrative Office of the Courts, which is part of the judicial system in Kentucky. Arrest and adjudication data were collected for the 2-year period from May 1, 1981, through April 30, 1983. Because of the time required to collect those data, only a 25 percent sample was obtained for inclusion in the analysis. The sample of 25 percent is sufficient to ensure that the confidence level or reliability is 95 percent that the error of the observed values would be between 2 and 3 percent.

To determine public opinion of TAP, a survey of registered vehicle owners in Fayette County was conducted. The number of registered vehicle owners in the county is approximately 100,000; the questionnaire was sent to 2,500. The survey response was sufficient to ensure a confidence level of 95 percent that the error of the results would be near 3 percent.

ANALYSIS OF RESULTS

Accident Data

As noted previously, accident trends and statistics were one of three primary areas of analysis. Included was a 2-year period before TAP and a 1-year period during TAP. It was found there was a 21 percent decrease in alcohol-related accidents between the 2-year period before TAP and the 1 year during TAP. To determine the significance of the accident reduction, the chi-square test was applied and the decrease was found to be significant at the 99.5 percent confidence level (1).

To determine whether the significant decrease in accidents was a result of TAP or a general decrease in accidents, total accidents for the same time period were tabulated; the overall decrease was 7.6 percent. This decrease was also significant at the 99.5 percent confidence level. The question of whether all the decrease in total accidents was attributable to alcohol-related accidents was also addressed. The result was a 6.1 percent decrease in all accidents, excluding those related to alcohol, and a 21.0 percent decrease in alcohol-related accidents. It was found that even though the reductions in both alcohol-related and other accidents were significant at the 99.5 percent confidence level, the magnitude of the reduction in alcohol-related accidents is approximately 3 times greater than for other accidents.

During the hours of TAP enforcement (10:30 p.m. until 3:30 a.m., except Sunday night and Monday morning), the decrease in alcohol-related accidents was 29.7 percent (significant at the 99.5 percent confidence level). This is slightly more than the decrease in alcohol-related accidents for all hours (21.0 percent); however, the impact of TAP extended to hours other than those hours of special enforcement because of increased public awareness and an increased level of enforcement during non-TAP hours.

Alcohol-related accidents for the 3-year study period were classified by the most severe injury. Data from this summary indicate that the percentage of fatal or injury accidents decreased by 22.5 percent when comparing the 2-year before period with the 1-year period during non-TAP hours.

Alcohol-related accidents for the 3-year study period were classified by the most severe injury. Data from this summary indicate that the percentage of fatal or injury accidents decreased by 22.5 percent when comparing the 2-year before period with the 1-year period during TAP.

Additional data for total injuries resulting from alcohol-related accidents during the study period indicated a 25 percent decrease when comparing the 2 years before with the year during TAP.

Time-Series Analysis of Accident Data

Alcohol-related accidents were obtained beginning in January 1980. This gave a total of 173 weeks of accident data that were available to be analyzed for the time period of January 5, 1980, through April 29, 1983. The analysis period started on January 5, 1980, because the TAP program began on a Saturday (May 1, 1982), and January 5 was the first Saturday in 1980. The relationship between number of accidents and time in weeks was analyzed.

The time-series analysis for the weekly accident data was first performed without consideration of a time-series lag. The resultant equation was

$$Y_t = 18.29 - 3.77X_t + \text{error} \quad (1)$$

Both coefficients were significant when the t-statistic was calculated. Based on this equation, the impact due to TAP was a significant reduction of 3.77 accidents per week.

Another equation was developed to assess whether

a time-lag effect affected the overall program. Results of that analysis indicated that the impact was immediate and did not lag the beginning of the Lexington TAP project on May 1, 1982.

Another analysis was performed for the relationship between alcohol-related accidents during TAP hours for each of the 173 weeks. The relationship was similar to that for total alcohol-related accidents. Again, the analysis was first performed without consideration of a time-series lag impact. The resultant equation was

$$Y_t = 8.77 - 2.23X_t + \text{error} \quad (2)$$

The t-statistics for the variable coefficients were significant, and the estimated reduction in alcohol-related accidents during TAP hours was 2.23 accidents per week. Results of the analysis indicated that the impact was immediate and did not lag the beginning of TAP.

Arrest and Adjudication Data

The impact of TAP on the number of DUI arrests occurred immediately after the program began on May 1, 1982. A large increase in the total number of DUI arrests was noted when comparing the before TAP records (929 arrests) with the year during TAP (4,427 arrests).

Another summary of DUI arrests indicated that the number of arrests during TAP hours increased from 141 before TAP to 939 during the first year of TAP. After the beginning of TAP, 84 percent of DUI arrests occurred during TAP hours (10:30 p.m. to 3:30 a.m.). Before TAP, 60 percent of all DUI arrests occurred during those same hours.

The outcome of the adjudication process is a critical element to any alcohol enforcement program. This process serves as the primary means for the judicial system to have an opportunity to rehabilitate or deter the offender. Education is offered in the form of the Alcohol Driver Education (ADE) School. Penalties are generally in the form of fines and jail sentences. A typical sentence for first-time offenders is a fine and mandatory attendance at the ADE School. One unique penalty required by some judges for first-time offenders is the requirement to submit a written report or an article relating to the consequences of drunk driving. More than 60 percent of the sample arrest cases resulted in combined sentences of fines and the ADE School. Almost 95 percent of the arrests resulted in fines for the offender. Cases dismissed or amended were approximately 15 percent before TAP and 11 percent during TAP. Some differences were noted when comparing the sampled data with available statistics from the complete adjudication data, which indicates a conviction rate of 95 percent for DUI arrests.

Another important consideration when attempting to deal with the drunk driving problem is the driving record of those arrested for DUI. Drivers arrested for DUI were found to have a worse prior driving record than the general driving population. This was true for both points and accidents. From a previous study of driver characteristics (2), the number of points per driver per year for a sample of all drivers was 0.22 as compared with 0.80 for those arrested for DUI. From that same study it was determined that all drivers have an average of 0.03 accidents per driver per year as compared with 0.18 for drivers arrested for DUI. Also, the number of violations per driver per year was 0.10 for all drivers as compared with 0.29 and 0.26 for drivers arrested for DUI the year before TAP and the year during TAP, respectively. The percentage of drivers arrested who had a previous DUI arrest was 18 percent for both years of analysis.

A basic skill required by the police officer involved in enforcement of drunk driving laws is the ability to detect those suspected of DUI. During the first year of the program the police officers were given training dealing with the most frequently occurring characteristics to use for detecting drunk drivers at night. To determine which driving characteristics were most frequently observed by the police officer, data were extracted from the arrest report. The most commonly occurring driving characteristic that indicated a potential drunk driver was weaving of the vehicle. Other frequently occurring characteristics were speeding, straddling or crossing the center of a lane marker, almost striking an object or vehicle, or disregarding a traffic signal.

After a driver has been stopped as a potential DUI offender, the officer generally requires the driver to go through a series of field sobriety tests to determine whether the person should be arrested. These tests are critical to the outcome of the case because the credibility of the arresting officer is at stake. An officer does not want to arrest a person unless they are legally drunk. In borderline cases [blood alcohol content (BAC) close to 0.10] the officer needs substantial evidence to support his decision to make an arrest. The most common test given was having the driver place one foot near the bumper to test the person's balance. Other common tests were requiring the driver to (a) touch his nose with his eyes closed and head tilted and (b) walk a line heel-to-toe. As the data indicate, a small percentage of those performing these tests passed. A large number of tests are available for use, and generally several tests are given to each driver. In some cases the driver may pass one but fail others.

Cost-Effectiveness

Data were gathered to make an estimate of the overall cost-effectiveness of the program. For the period of May 1, 1982, through April 30, 1983, total police personnel costs associated with the program were $367,900. In addition to personnel, support costs for such items as administration and vehicle mileage totaled $115,600. Other significant costs were court costs and jail costs. Based on a total of 4,427 DUI arrests during the first year of TAP, court costs were determined to be $114,700. Court costs to handle other traffic violations and public intoxication arrests totaled $99,700. Jail costs were determined to be approximately $497,500 during the first year of the program. The jail costs were calculated by using an average of $25 per day for each day served. Considering all components, the total cost of the program during the first year was computed to be $1,195,400.

Benefits and income were derived from two primary sources: DUI fines and reduced accident costs. Income from TAP was the result of fines assessed to those who were arrested for DUI. During the first year of TAP there were 4,427 arrests; the average fine per arrest was determined to be $194. After subtracting court costs from the total fine, income received from DUI fines was $697,900. A total court cost of $160,900 was paid by the drivers arrested for DUI, yielding an income of $858,800 from DUI fines (including court costs).

While TAP officers were on duty, they gave out a significant number of citations for other traffic violations and made several public intoxication ar-

rests. The revenue from these violations and arrests was estimated to be $245,400 (including court costs).

A commonly used measure of the benefit of a highway safety progam is an estimate of accident costs that will not be incurred as a result of reduced accidents. By using the number of injuries and property-damage accidents before and during TAP and accident costs reported by the National Safety Council (3), the savings resulting from reduced accident costs were determined to be $1,505,000. Therefore, the total benefits and income for a 1-year period resulting from the program were $2,609,200.

A benefit-cost ratio of 2.18 was calculated. This demonstrates that benefits were about 2 times greater than costs during the first year. It is also significant to note that direct revenue from fines and court costs would account for 92 percent of the cost of the program.

Questionnaire Survey

The survey of registered vehicle owners was conducted in the spring of 1983. From the total of approximately 100,000 registered vehicle owners, a random sample of 2,500 was selected and mailed a questionnaire containing 15 questions. Responses were received from 989, or approximately 40 percent of those sent questionnaires. It was found that 96 percent of the respondents knew about the program. More than three-fourths believed that TAP reduced their chances of involvement in an alcohol-related accident. Only 17 percent thought the enforcement program violated their rights as a driver. Eighty-five percent indicated they were in favor of increased enforcement as a means of reducing the number of drunk drivers. Probably the most surprising result was that 65 percent indicated they were willing, as taxpayers, to support increased enforcement after federal funding was discontinued.

One of the primary purposes of the survey was to determine the perceived risk of the drivers while TAP was ongoing. More than half (55 percent) indicated that TAP increased their chance of DUI arrest.

SUMMARY OF FINDINGS

Results from the impact evaluation of the Lexington - Fayette County TAP were analyzed for the following four areas: accidents, arrests and adjudication, cost-effectiveness, and a questionnaire survey. A summary of major findings from each of these analyses is presented.

Accidents

1. Alcohol-related accidents decreased by 21.0 percent when comparing the 2-year period before TAP with the first year of TAP.
2. Other non-alcohol-related accidents decreased by 6.1 percent when comparing the period before TAP with the TAP enforcement period.
3. Alcohol-related accidents decreased by 29.7 percent during the TAP hours of enforcement (10:30 p.m. to 3:30 a.m., except Sunday night and Monday morning).
4. Alcohol-related fatal and injury accidents decreased by 22.5 percent when comparing the 2-year period before TAP with the 1-year period during TAP.
5. Results from the time-series analysis revealed a significant reduction in the number of alcohol-related accidents after TAP began.

Arrest and Adjudication

1. DUI arrests increased from 929 in the year before TAP to 4,427 during the first year of TAP.
2. DUI arrests during TAP hours were 84 percent as compared with 60 percent during an equivalent time the year before TAP.
3. The most common types of adjudication were a fine or attendance at the ADE School or both.
4. Slightly more than 95 percent of those arrested and charged with DUI during the first year of TAP were convicted. For all of Kentucky, the conviction rate was 52 percent in 1980. The national average for 1978 through 1980 was 56 percent (4).
5. A significant drop in BAC level has occurred when comparing the year before TAP and the first year of TAP.
6. The number of points per driver per year was 0.22 for all drivers as compared with 0.80 for those arrested for DUI during the study period.
7. The percentage of drivers arrested for DUI who were male or young (younger than 25 years old) was much higher than the percentages of male or young drivers in the general driving population.
8. It was found that 18 percent of drivers arrested during the study period had a previous DUI arrest.
9. Drivers arrested for DUI during the study period were found to have a worse prior driving record than the general driving population. This was true for both points and accidents.

Cost-Effectiveness

1. Total cost of TAP during its first year was determined to be $1,195,400.
2. Benefits resulting from reduced accident costs and income from DUI totaled $2,609,200.
3. The first year benefit-cost ratio of the program was determined to be 2.18.
4. Direct revenue from fines and court costs would account for 92 percent of the cost of the program.

Questionnaire Survey

1. Responses were received from 989 (40 percent) of those mailed questionnaires.
2. It was found that 96 percent of the respondents previously knew about the program.
3. Seventy-eight percent believed that TAP reduced their chances of involvement in an alcohol-related accident.
4. Only 17 percent thought the enforcement program violated their rights as a driver.
5. Eighty-five percent indicated they were in favor of increased enforcement as a means of reducing the number of drunk drivers.
6. Almost two-thirds indicated they were willing, as taxpayers, to support increased enforcement after federal funding was discontinued.
7. More than half (55 percent) responded that TAP increased their chance of DUI arrest.

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