The Effectiveness of the «Checkpoint Tennessee» Program

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ABSTRACT

A sobriety checkpoint demonstration program was conducted in the State of Tennessee between April 1994 and March 1995. Prior to this period, the state typically conducted 10-15 checkpoints on an annual basis. During the experimental checkpoint demonstration period, a total of almost 900 checkpoints were conducted involving close to 150,000 drivers checked and resulting in almost 800 arrests for driving under the influence (DUI) or driving while intoxicated (DWI). The checkpoint program was highly publicized over TV, on the radio and in the newspapers throughout the state. Surveys of drivers throughout the state indicated awareness of the enforcement program. An interrupted time series was used to analyze the traffic safety impact of the program. The results showed a 21.6% reduction in the number of drunk driving fatal crashes that would have occurred without the checkpoint program.

INTRODUCTION

Sobriety checkpoints have long been known to be an effective impaired driving enforcement method. In a review of the literature, it was concluded that the accumulation of positive findings for visible and well-publicized checkpoints provide support for the proposition that sobriety checkpoints are capable of reducing the extent of drunk driving and of deaths and injuries on the highways [Ross, 1992a]. However, until recently, checkpoints have generally been implemented in the United States (US) on a local level. A well-publicized sobriety checkpoint program held in Binghamton, New York, resulted in a 39 percent decrease in the number of drinking drivers on the roads at night according to roadside surveys and a 23 percent reduction in late-night crashes in the months the checkpoints were held [Wells, et al, 1991]. In New Jersey, checkpoints were associated with a drop of 10 to 15 percent in single vehicle nighttime crashes (a commonly used measure of alcohol-impaired driving) [Levy, et
A year-long checkpoint program in Charlottesville, Virginia was associated with a 13 percent reduction in the proportion of crashes that were alcohol-related [Voas, et al, 1985]. Similar results were obtained from a checkpoint program in Clearwater and Largo, Florida, which experienced a 20 percent decrease following checkpoint operations [Lacey, et al, 1986].

While these results have been encouraging, for various reasons [Ross 1992b] very few states in the US have embarked on statewide sobriety checkpoint programs. Based upon their potential effectiveness, and the strong evidence from Australia on their random breath testing (RBT) program [Homel, 1990], the National Highway Traffic Safety Administration (NHTSA) decided to conduct a demonstration project in a state that was willing to change its philosophy about checkpoints.

METHODS

In 1993, NHTSA entered into a cooperative agreement with the State of Tennessee to conduct a highly publicized sobriety checkpoint program throughout the state and evaluate the effects of that program. In March 1994, Tennessee initiated a statewide impaired driving checkpoint program labeled «Checkpoint Tennessee.» With equipment purchases, some logistics, and the evaluation funded by NHTSA, but personnel provided through diversion of existing resources in the Tennessee Highway Patrol, four sets of three checkpoints were conducted throughout the state every weekend using specially equipped vans with generators, lights, cones, signs, video taping and evidential breath testing equipment. Passive alcohol sensors in flashlights were also used to assist officers in detecting impaired drivers. Periodically, checkpoints were scheduled on the same night in each of the 95 counties in the state. These, necessarily, did not involve as many officers or as much equipment per checkpoint as was typical during other weekends but served to reenforce the «blitz» concept.

The checkpoints were coordinated and conducted primarily by the Tennessee Highway Patrol with support from local law enforcement agencies. Publicity in support of the program was stimulated by obtaining the special cooperation of a single television station in each of the four major markets in the state. They each broadcast «Checkpoint Tennessee» as a special project. This publicity was enhanced by «hard news» coverage from other outlets, a statewide
billboard campaign and press releases announcing individual checkpoints, followed up by reports of their results in terms of arrests, etc.

Two waves of a paper and pencil survey were administered in several driver’s license renewal offices to measure knowledge and attitudes about the program. The first wave was administered in March 1994 prior to the formal announcement and initiation of the Checkpoint Tennessee program. The second wave was administered in the summer of 1994, four months after program initiation. The first wave yielded 1,305 respondents while the second wave yielded 1,071. The results of several questions indicated increased awareness of the «Checkpoint Tennessee» program.

The driver license office survey data indicated overwhelming public support of checkpoint programs with 88.1% of respondents supporting the use of checkpoints at wave 1 and 91.6% at wave 2. There seemed to be a slight improvement in self-reported drinking driving behavior with 8.6% of respondents admitting to having driven after having too much to drink at wave 1 and 7.3% at wave 2. Similar changes were observed in reported drinking within two hours of drinking even though the perceived risk of arrest eroded slightly between waves.

Between April 1, 1994 and March 31, 1995, a total of 882 checkpoints were held. This compares to the typical 10-15 checkpoints conducted on an annual basis for the 5 years prior to the demonstration project, yielding quite a contrast in programs. A total of 144,299 drivers passed through these checkpoints with 773 arrested for driving under the influence of alcohol (DUI) or driving while intoxicated (DWI). An additional 201 drivers were arrested for drug violations, 84 for youth offender violations, 35 felony arrests were made, 49 weapons were seized, 1,517 were cited for safety belt or child restraint violations and 7,351 were given other traffic citations. Television, radio and print media coverage was extensive during the 12 month operations phase of the program.

EVALUATION APPROACH

An interrupted time series approach was used in analyzing the traffic-safety impact of the checkpoint program. In this approach, a time series of the data of interest is studied to see if an «intervention» occurring at some point in the series is a statistically significant factor in a
mathematical model of the series. The intervention analyzed here is the «Checkpoint Tennessee» program.

The independent variable and measure of effectiveness in the model was «drunk driving fatal crashes.» A drunk driving fatal crash was defined as a fatal crash in which one of the involved drivers had a blood alcohol concentration (BAC) of 0.10% or more either through direct BAC test results or through an algorithm developed by NHTSA [Klein, 1986]. Ideally, all classifications would be through direct BAC tests, however no state as yet obtains a BAC test of all drivers in fatal crashes and this approach is considered to be the best available alternative. The data used in the model were retrieved from NHTSA’s Fatal Accident Reporting System (FARS). The data covered the period 1988 through 1995.

Two techniques were used to guard against attributing any changes in drunk driving fatal crashes to the program when they might have been due to some other events that just happened to coincide with the program. First, a model of drunk driving fatal crashes in five states surrounding Tennessee (Kentucky, Georgia, Alabama, Mississippi, and Louisiana) was developed using the same procedures to see if an effect occurred coincident with Tennessee intervention. Such an effect might be indicative of a regional or, possibly, a national factor having nothing to do with the intervention. All fatal crashes were also included as an explanatory variable in the model for Tennessee and the model for the five surrounding states. Fatal non-drunk driving crashes were also considered as an explanatory variable but the resulting model did not provide as good a fit to the data.

Nominally, it was assumed a program start date of April 1, 1994, but we also studied the effect of assuming several other start dates to account for a possible lag between the time the program was started and the time an impact occurred. It was assumed that a step-function intervention was appropriate for the majority of the analyses, and the effect of interventions of other time profiles, for example, a ramp function, was studied.

The ARIMA analysis method developed by Box and Jenkins in the 1970s, and incorporated in the SAS® statistical package as PROC ARIMA was used.
RESULTS

The best fit to the Tennessee series was obtained through a model using all drunk-driving fatal crashes as the dependent variable. All fatal crashes was used as an input series. The transfer function for the input series was a simple scalar of value equal to 1. The model showed a significant effect for the intervention variable (a step function coincident with the checkpoint program start date) amounting to a reduction of about nine drunk-driving fatal crashes per month (t ratio=6.30). This was a 21.6% reduction over the number of drunk-driving fatal crashes that would have occurred with no intervention. The results are depicted graphically in Figure 1. The model for the comparison series used 12-span differencing of the dependent variable (drunk-driving fatal crashes), and used the same differencing of the dependent variable (all fatal crashes). Again, the transfer function was equal to 1. The model showed an insignificant increase in drunk-driving fatal crashes coincident with the Tennessee intervention (t ratio=1.02, Figure 2), lending support to the hypothesis that the checkpoint program was responsible for the positive results observed in Tennessee.

DISCUSSION

While other statewide sobriety checkpoint programs have recently been initiated in the US (in North Carolina and New Mexico, to name two) this demonstration in Tennessee is of interest because it resulted in a significant decrease in alcohol-related traffic fatalities with relatively low implementation costs. The total cost of the two year demonstration project was only $927,594, with federal funding at $452,255 and state funding at $475,339 in the cooperative agreement. The state contribution covered police salaries, publicity costs and other program expenses. The police salary contribution was accomplished by a reallocation of effort to this endeavor rather than through additional funding from other sources. NHTSA funding covered design, equipment and program evaluation.

The State of Tennessee has elected to continue with the checkpoints on a weekly basis, although not at the same frequency or intensity as the 12 month operational phase described in this paper. That is also considered a successful outcome with federal funding stimulating the continuation of a program the state deems to be effective. Further analyses including cost-benefit and impact on non-fatal crashes are underway.
Many of the logistical reasons for the non-use of sobriety checkpoints (e.g., they are too expensive, require too much manpower, do not yield enough DWI arrests) [Ross, 1992b] are being overcome by the results of this program and of those in North Carolina and New Mexico [Lacey, et al, 1995]. A recent study [Stuster, et al., 1995] shows that sobriety checkpoints yield greater public awareness of the program and greater decreases in alcohol-related crashes than an enforcement program involving roving patrols. The premise of highly visible, highly publicized, frequent sobriety checkpoints conducted on a statewide basis appears to be a viable, effective deterrent to impaired driving. Other states where DWI checkpoints are legal should consider implementing statewide programs and states where they are not permitted should undertake measures to remove those legal barriers.

REFERENCES


**ACKNOWLEDGMENT**

This demonstration program and evaluation was funded by the National Highway Traffic Safety Administration (NHTSA) and the State of Tennessee. The opinions and conclusions are those of the authors and not necessarily those of NHTSA or the State of Tennessee.