

**Low-Manpower Checkpoints: Can They
Provide Effective DUI Enforcement in
Small Communities?**

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March 2005

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ABSTRACT

Objective: When well publicized, sobriety checkpoints can be a highly effective means to reduce alcohol-impaired driving and its associated crashes. One reason checkpoints are underutilized is that police departments commonly believe a large number of officers are required, placing checkpoints beyond the resources of small police agencies. Studies have shown that checkpoints can be conducted successfully and safely with as few as three to five officers. The objective of the present study was to evaluate the impact of conducting small-scale checkpoints in rural communities on impaired driving and perception of enforcement.

Methods: Law enforcement agencies in two rural counties in West Virginia agreed to conduct weekly checkpoints in their communities for one year. These counties were paired with two non-adjacent counties that did not undertake additional checkpoints. The impact of checkpoint operations was evaluated by conducting public awareness surveys at driver licensing offices as well as roadside surveys (including blood alcohol concentration (BAC) measurements) of weekend nighttime drivers in experimental and comparison counties before program initiation and one year later.

Results: The percentage of nighttime drinking drivers in the experimental counties was lower following implementation of the enforcement program. The primary effect was among people with higher BACs. Relative to drivers in the comparison counties, the proportion of drivers in the experimental counties with positive BACs was only 5 percent lower; however, the proportion with BACs of 0.05 percent or more was 70 percent lower, and the proportion with BACs of 0.08 percent or more was 64 percent lower. Compared with drivers in the comparison counties, drivers surveyed at driver's license offices in the experimental counties after program implementation were more likely to report seeing or passing through a checkpoint and were more aware of publicity on DUI enforcement. Consistent with the small reduction in drinking drivers in the roadside survey, self-reported driving after drinking did not change during the enforcement period.

Conclusions: The study demonstrated that small rural communities can safely and effectively conduct low-manpower sobriety checkpoints on a weekly basis. Such programs can be expected to result in large reductions in drivers operating at higher BACs.

INTRODUCTION

Enforcement of alcohol-impaired driving (e.g., driving under the influence (DUI)) in the United States falls into three broad categories: regular patrols, special or dedicated patrols, and sobriety checkpoints. During regular patrols arrests are made as a result of contacts with drinking drivers by officers conducting normal traffic patrol operations. Regular patrols are the basic enforcement system in most communities across the nation. Dedicated patrols consist of officers with special training or experience in DUI enforcement who are employed during high DUI risk periods such as weekend nights.

A small number of officers working part-time on weekend evenings can double the number of DUI arrests in a community (Levy et al., 1977); however, most department budgets do not include funding for such extra enforcement efforts. Sobriety checkpoints generally are short-term operations conducted only on special occasions. At checkpoints all drivers passing a given location are stopped and interviewed by the police and, if they are suspected of having been drinking, are pulled over for further testing. As currently employed, checkpoints generally involve as many as 15-20 officers, usually on overtime status, and thus are expensive to conduct both financially and in terms of police resources. This normally limits their implementation in most communities to a few national holidays.

Sobriety checkpoints are one of the most effective approaches to deterring impaired driving (Lacey et al., 1999; Ross, 1992; Shults et al., 2001; Stuster and Blowers, 1995; Voas et al., 1985). Stuster and Blowers (1995) compared the effectiveness of checkpoints with dedicated patrols and found that checkpoints were more effective in reducing alcohol-related crashes. Shults et al. (2001) reviewed 12 studies evaluating the effectiveness of sobriety checkpoints and concluded that, if well-implemented and publicized, they can reduce alcohol-related fatal and injury crashes by about 20 percent.

Despite this evidence, Fell et al. (2003) found in a survey of U.S. states that sobriety checkpoints rarely are used by law enforcement agencies in many states. At the time the survey was conducted in 2000, 13 states did not employ sobriety checkpoints, mainly because court rulings determined that checkpoints did not comply with state constitutions. Of the remaining 37 states, only 11 reported conducting checkpoints as frequently as once a week on a statewide basis. Cost and the large number of officers necessary were among the most frequently cited reasons for not conducting checkpoints. However, Stuster and Blowers (1995) found that checkpoints involving small numbers of officers (four to six) were as effective in reducing alcohol-related crashes as those employing a dozen officers or more. Thus, it should be possible for communities with relatively small numbers of patrol officers to conduct effective sobriety checkpoints. This is important because more than half of all alcohol-related traffic fatalities occur on rural roadways (National Highway Traffic Safety Administration, 2004), suggesting that small communities experience significant impaired driving problems.

The present study was conducted to evaluate this concept in two rural counties in West Virginia. The intent was to establish a sustainable, low-manpower DUI checkpoint enforcement program that would overcome the persistent objections of personnel requirements and cost. The study evaluated both the feasibility and effectiveness of such a program. West Virginia, a largely rural state, was identified as an appropriate venue for the study. Two experimental counties and two comparison counties were recruited to participate. Existing police policies in the communities under study called for a minimum staffing level of eight officers to legally conduct sobriety checkpoints. However, inquiries revealed that there was no legal basis for this assumption, so police procedures/general orders were revised to permit checkpoints operated by fewer officers.

METHODS

Research Design

Raleigh and Greenbrier counties, in the southern part of the state, were recruited as experimental counties. Harrison and Monongalia, in the northern part of the state, were identified as comparison counties. The primary criterion for the comparison counties was sufficient geographic separation to minimize contamination by public information efforts in the experimental counties. Officials in the comparison counties also indicated they would not dramatically change DUI enforcement activity during the test period.

In spring 2003, baseline data on public awareness and self-reported behavior, as well as driver blood alcohol concentrations (BACs), were gathered in the experimental and comparison counties. Drivers were surveyed when renewing or applying for their driver's licenses at departments of motor vehicles (DMVs) and at the roadside on weekend nights. Beginning in August 2003, weekly sobriety checkpoints were conducted in the experimental counties (continuing for one year), while basic DUI enforcement strategies remained unchanged in the comparison counties. One year after the baseline surveys, in spring 2004, follow-up surveys to measure driver BACs, public awareness, and self-reported behavior were conducted at the roadside and at DMVs in all four counties.

The surveys of drivers at DMVs addressed their perceptions of the intensity of DUI enforcement as well as drinking and driving behaviors. Drivers in roadside surveys were asked similar questions in addition to being asked to provide a breath sample to measure BAC.

Program

Low-manpower checkpoints were to be conducted in each of the experimental counties once a week for a one-year period beginning August 1, 2003, for a total of 104 checkpoints. A few checkpoints were cancelled because of inclement weather, but overall the schedule was maintained. A total of 90 low-manpower checkpoints were conducted during the study period, 48 in Greenbrier County and 42 in Raleigh County. Checkpoints were conducted in both municipal and rural areas and were staffed by municipal police officers as well as sheriff's deputies. The number of officers involved in each checkpoint varied from three to five. Passive alcohol sensors (PASs) were used during checkpoint operations to aid officers in identifying drinking drivers (Ferguson et al., 1995). Additionally, 16 checkpoints were conducted in the experimental counties during the program year under other auspices, for a total of 106 checkpoints; this compares with 25 checkpoints conducted during the preceding year. In contrast, 19 checkpoints were conducted in the comparison counties during the program year and 13 during the preceding year. The low-manpower checkpoints were relatively inexpensive to conduct, costing from \$350 to \$400 per checkpoint.

The local program coordinator contacted local news outlets about the program, and initiation of the program was covered by both local and statewide electronic and print media. The program also generated letters of support in local newspapers. Throughout the program there were several print, radio, and television stories, but local coverage waned toward the end of the program. An incident early in the enforcement period brought attention to the initiative and heightened its overall profile. A man had carjacked his estranged girlfriend's vehicle, leaping into the back of her pickup, breaking out the rear window, and forcing her to drive to a rural area. When they passed through a checkpoint, officers intervened and made an arrest, averting a potential murder. The checkpoint was in a location where one had not been conducted prior to the program, and the incident was reported widely by local and state press. A congratulatory "thumbs-up" notice appeared in a local newspaper.

Survey Procedures

Researchers worked with a West Virginia Law Enforcement Liaison (LEL) and others in the Governor's Highway Safety Program to recruit assistance from law enforcement agencies in the four counties. Roadside surveys were conducted as a separate data collection activity and not in conjunction with checkpoints. Roadside survey locations were determined in conjunction with the law enforcement agencies, and established survey techniques developed for previous national roadside surveys were used (Voas et al., 2000). The protocol incorporated PASs to screen drivers, preliminary breath test (PBT) devices, and a brief interview. Survey teams of civilian interviewers were selected and trained by a research team member and the LEL. The LEL coordinated and supervised the actual roadside surveys. Surveys were conducted between 10:00 p.m. and 3:00 a.m. on Friday and Saturday nights in spring 2003 and again in spring 2004 at the same locations during the same periods and on the same weeknights and times as in 2003. There were 20 survey evenings in 2003 and 19 in 2004.

An off-duty police officer directed motorists into a safe area off the roadway (e.g., a closed service station lot). Interviewers then approached the vehicle, explained the voluntary nature of the survey to the driver, and obtained informed consent for a brief interview. The 15-item survey lasted about 5 minutes and covered topics such as general demographics, annual mileage information, origin and destination of the trip, drinking, and drinking and driving. Additionally, interviewers recorded the number of passengers, use of seat belts, and driver gender. After the interviews, PBTs were used to obtain BACs from the drivers. The PBTs displayed the BAC results; if a driver registered a BAC at or above 0.05 percent, either a sober passenger drove the vehicle home or a ride home was provided. PAS readings were used to provide a qualitative measure of drinking for drivers who refused the breath test.

The DMV surveys were short paper and pencil surveys administered to driver's license applicants after they had completed their applications and while they waited for their photo licenses to develop.

Applicants were questioned after they knew they would receive their licenses to avoid undue biases in their responses. This type of convenience survey has been used frequently to obtain a sample of licensed drivers in the DMV locality (Lacey et al., 1999). Experience has shown that a reasonably representative sample of motorists in the area is obtained provided the surveys are available throughout the time the office is open for business.

RESULTS

Table 1 shows sample sizes for baseline and post-intervention roadside surveys for the experimental and comparison counties. In the experimental counties, data were collected from a larger number of respondents to increase statistical power. Overall, the participation rate was very high; only 106 (2.4 percent) of the 4,389 drivers approached refused to participate. However, there was some further attrition in obtaining breath samples through issues such as insufficient breath sample, failure to match breath sample with other survey data, equipment error, or insufficient time. These missing data reduced the data set to 3,571 cases (81 percent) with valid BAC readings.

Table 1
Roadside Survey Sample Sizes for Experimental and Comparison Counties

	Experimental Counties (n = 3,128)		Comparison Counties (n = 1,261)		Total
	Greenbrier	Raleigh	Harrison	Monongalia	
	Baseline	665	576	403	
Post-intervention	1,141	746	423	266	2,576
Total	1,806	1,322	826	435	4,389

There were no significant gender differences among respondents in the experimental and comparison counties at baseline ($\chi^2(1) = 0.72, p > 0.10$) or post-intervention ($\chi^2(1) = 0.11, p > 0.10$). There were, however, significant differences in the race of respondents at baseline and post-intervention (race was coded as Caucasian, African-American, and other; baseline: $\chi^2(2) = 18.97, p > 0.001$; post-intervention: $\chi^2(2) = 37.97, p > 0.001$). A one-way analysis of variance revealed no significant age difference among respondents in the experimental and comparison counties at baseline ($F(1, 1684) = 2.30, p > 0.10$), but the post-intervention mean age for respondents was significantly higher in the experimental counties than in the comparison counties (37.6 vs. 34.3 years; $F(1, 2484) = 23.90, p < 0.001$).

Because of the race and age differences among respondents, subsequent analyses controlled for these factors. Logistic regression models were used to compare changes over time in the experimental and comparison counties with respect to the proportion of drivers with positive BACs, BACs at or above 0.05 percent, and BACs at or above 0.08 percent. Analysis also examined responses to the various survey questions.

Roadside Surveys

The proportion of drivers with positive BACs, BACs at or above 0.05 percent, and BACs at or above 0.08 percent were examined separately (Table 2). Based on the logistic regression models the proportion of drivers with positive BACs was reduced by 5 percent in the experimental counties relative to the comparison counties. However, this difference was not statistically significant (odds ratio (OR) = 0.95, $p > 0.10$).

The proportion of drivers with BACs at or above 0.05 percent was lower in the experimental counties post-intervention (1.6 vs. 1.0 percent) but went up in the comparison counties (1.4 vs. 2.8 percent). After controlling for sample differences, a 70 percent reduction was estimated in the proportion of drivers with BACs at or above 0.05 percent in the experimental counties relative to the comparison counties (OR = 0.30, $p < 0.05$). This difference was significant. For drivers with BACs at or above 0.08 percent, the estimated decline was 64 percent, although the effect did not reach statistical significance (OR = 0.36, $p = 0.18$).

Table 2
Percentages with Various BACs in Experimental and Comparison Counties

Percent BAC	Experimental Counties		Comparison Counties	
	Baseline	Post-Intervention	Baseline	Post-Intervention
≥0.01	4.6%	3.6%	5.1%	4.5%
≥0.05	1.6%	1.0%	1.4%	2.8%
≥0.08	1.1%	0.7%	0.9%	1.5%

DMV Surveys

Table 3 shows the number of DMV survey respondents in the experimental and comparison counties at baseline and post-intervention. There were significant gender differences among respondents in the experimental and comparison counties at baseline ($\chi^2(1) = 3.94$, $p < 0.05$) and post-intervention ($\chi^2(1) = 4.93$, $p < 0.05$). There were no significant race differences among respondents in the experimental and comparison counties at baseline ($\chi^2(4) = 7.73$, $p > 0.10$), but differences were apparent post-intervention ($\chi^2(4) = 46.94$, $p < 0.001$) (Table 3). There also were significant differences in the self-reported age of respondents at baseline ($\chi^2(4) = 67.05$, $p < 0.001$). Because of the sample differences, these factors were controlled for in all subsequent analyses.

Table 3
DMV Surveys: Respondents in Experimental and Comparison Counties

	Experimental Counties (n = 1,994)		Comparison Counties (n = 1,956)		Total
	Greenbrier	Raleigh	Harrison	Monongalia	
	Baseline	499	500	483	
Post-intervention	500	495	474	499	1,968
Total	999	995	957	999	3,950

Table 4 (see page 8) presents the survey questions and responses for respondents in the experimental and comparison counties during the baseline and post-intervention periods. Binary logistic regression was used to analyze most data because the items had dichotomous outcomes. Respondents were asked whether during the past 30 days they had seen or heard about a police checkpoint. After the intervention, respondents in the experimental counties were significantly more likely to say they had (41 vs. 62 percent), whereas respondents in the comparison counties were less likely to say they had (42 vs. 38 percent; OR = 2.64, $p < 0.001$).

After the intervention, respondents in the experimental counties were significantly more likely to report they had gone through a police checkpoint during the past 30 days (experimental: 13 vs. 25 percent; comparison: 13 vs. 11 percent; OR = 2.40, $p < 0.001$). Similarly, there was an increase in the percentage of respondents in the experimental counties reporting they had recently read, seen, or heard news about impaired driving (experimental: 52 vs. 66 percent; comparison: 46 vs. 49 percent; OR = 1.51, $p < 0.01$).

Respondents were asked about their drinking and driving practices during the past 30 days. Fewer than 5 percent of respondents in either the experimental or comparison counties admitted to drinking and driving after having too much to drink. There was little change in the responses to this question from respondents in the experimental and comparison counties between baseline and post-intervention (3.9 vs. 3.6 percent). The percentage of respondents in the comparison counties admitting to drinking and driving declined from 3.0 to 1.6 percent, not significantly different from the change in the experimental counties (OR = 1.53, $p > 0.10$).

Respondents were asked whether enforcement of drinking and driving laws in their communities was too strong, too weak, or about right. There was a significant interaction of the treatment effects (OR = 1.19, $p > 0.05$). The proportion of respondents answering “too weak” decreased in the experimental counties between baseline and post-intervention, whereas responses of “about right” and “too strong” increased. This change did not occur in the comparison counties. Finally, respondents in the experimental counties reported after the intervention that they felt they had a higher likelihood of being stopped (OR = 0.76, $p < 0.001$). Results of ordinal logistic regressions were used for these two analyses because the outcomes had more than two levels and were not normally distributed.

DISCUSSION AND CONCLUSIONS

This study demonstrated that a sobriety checkpoint enforcement program using only three to five police officers can be a very effective deterrent against drinking and driving in jurisdictions that are much more rural in nature. These checkpoints can be maintained over a long period of time without outside funding. Because of the simplicity and ease with which these checkpoints were conducted, police

Table 4
DMV Survey: Responses of Drivers in Experimental and Comparison Counties

	Experimental Counties						Comparison Counties					
	Baseline			Post-Intervention			Baseline			Post-Intervention		
	No	Yes		No	Yes		No	Yes		No	Yes	
In the past 30 days, have you seen or heard about a police checkpoint?	587 (59.0%)	408 (41.0%)		373 (37.8%)	613 (62.2%)		565 (57.9%)	411 (42.1%)		592 (61.7%)	367 (38.3%)	
In the past 30 days, have you gone through a police checkpoint?	860 (86.8%)	131 (13.2%)		745 (75.3%)	244 (24.7%)		843 (86.8%)	128 (13.2%)		852 (88.7%)	109 (11.3%)	
Have you recently read, seen, or heard any news on impaired driving?	474 (47.7%)	520 (52.3%)		332 (33.6%)	656 (66.4%)		530 (54.2%)	448 (45.8%)		488 (50.8%)	472 (49.2%)	
Compared with 3 months ago, do you see police on the roads you normally drive?	Same/less often	More often		Same/less often	More often		Same/less often	More often		Same/less often	More often	
	640 (66.5%)	323 (33.5%)		570 (59.8%)	383 (40.2%)		667 (71.0%)	272 (29.0%)		632 (67.4%)	306 (32.6%)	
In the past 30 days, how many times have you driven within 2 hours after drinking?	1 or more	None		1 or more	None		1 or more	None		1 or more	None	
	76 (9.0%)	767 (91.0%)		86 (9.5%)	817 (90.5%)		87 (9.6%)	823 (90.4%)		76 (8.9%)	778 (91.1%)	
In the past 30 days, how many times did you drive when you had too much to drink?	1 or more	None		1 or more	None		1 or more	None		1 or more	None	
	32 (3.9%)	788 (96.1%)		31 (3.6%)	837 (96.4%)		27 (3.0%)	865 (97.0%)		13 (1.6%)	808 (98.4%)	
Is enforcement of drinking and driving laws in your community too strong, too weak, or about right?	Too weak	About right	Too strong	Too weak	About right	Too strong	Too weak	About right	Too strong	Too weak	About right	Too strong
	453 (49.9%)	414 (45.6%)	41 (4.5%)	370 (42.6%)	415 (47.8%)	83 (9.6%)	378 (43.1%)	435 (49.6%)	64 (7.3%)	365 (42.0%)	434 (49.9%)	70 (8.1%)

administrators in the experimental communities have embraced the concept and continued the program after the conclusion of the formal research study. This is particularly important in more rural communities with fewer staff resources, but it also may be appropriate on certain roadways in more urban areas.

Roadside surveys, conducted after the program had been in place for about 10 months, revealed large reductions in the proportions of drinking drivers with higher BACs (above 0.05 percent) at the experimental sites, although the overall proportion of drivers who had been drinking declined only a little (5 percent). This is consistent with self-reported data, as drivers from the experimental counties interviewed at DMVs did not report lower levels of drinking and driving. This suggests that the checkpoints reduced heavier drinking but did not affect the overall likelihood of drinking and driving.

Survey data collected at the local DMVs confirmed that drivers in the experimental counties were aware of the increased enforcement. There was widespread publicity at the beginning of the checkpoints that waned toward the end of the program. The lack of paid media may be less important in a rural community where information can be spread by word of mouth. After the program had been under way for some time, more of the respondents reported having recently read, seen, or heard about checkpoints, and more of them said they actually had been through one. There was no change in the perception or experience of enforcement during the same period in the comparison counties.

Though checkpoints are known to be effective, they are not as widely employed in the United States as they should be. Police administrators often contend they are reluctant to conduct checkpoints because of the drain on both personnel and financial resources. This project has demonstrated that low-manpower checkpoints can have the desired effect of reducing impaired driving without unduly taxing the financial or human resources of even small agencies. Many jurisdictions that conduct checkpoints on a more regular basis, because they tend to involve many more officers, are more dependent on government funding to maintain them. Low-manpower checkpoints could serve to expand DUI enforcement in jurisdictions where additional funds are not available and police administrators perceive them as too costly or difficult to implement, regardless of the size of the jurisdiction.

ACKNOWLEDGMENTS

Law enforcement activities were partially funded by the West Virginia Governor's Highway Safety Program. Enforcement and field data collection activities were coordinated by Retired Captain J.D. Meadows. This research was supported by the Insurance Institute for Highway Safety.

REFERENCES

Fell, J.C.; Ferguson, S.A.; Williams, A.F.; and Fields, M. 2003. Why are sobriety checkpoints not widely adopted as an enforcement strategy in the United States? *Accident Analysis and Prevention* 35:897-902.

Ferguson, S.A.; Wells, J.K.; and Lund, A.K. 1995. The role of passive alcohol sensors in detecting alcohol-impaired drivers at sobriety checkpoints. *Alcohol, Drugs, and Driving* 11:23-30.

Lacey, J.H.; Jones, R.K.; and Smith, R.G. 1999. An evaluation of Checkpoint Tennessee: Tennessee's statewide sobriety checkpoint program. Final Report no. DOT-HS-808-841. Washington, DC: National Highway Traffic Safety Administration.

Levy, P.; Voas, R.B.; Johnson, P.; and Klein, T. 1977. Evaluation of the ASAPs. *Journal of Safety Research* 10:162-76.

National Highway Traffic Safety Administration. 2004. Traffic safety facts, 2002: A compilation of motor vehicle crash data from the Fatality Analysis Reporting System and the General Estimates System. Report no. DOT-HS-809-620. Washington, DC: National Highway Traffic Safety Administration.

Ross, H.L. 1992. The deterrent capability of sobriety checkpoints: summary of the American literature. Report no. DOT-HS-807-862. Washington, DC: National Highway Traffic Safety Administration.

Shults, R.A.; Elder, R.W.; Sleet, D.A.; Nichols, J.L.; Alao, M.O.; Carande-Kulis, V.G.; Zaza, S.; Sosin, D.M.; Thompson, R.S.; and Task Force on Community Preventive Services. 2001. Reviews of evidence regarding interventions to reduce alcohol-impaired driving. *American Journal of Preventive Medicine* 21(4 suppl.):66-88.

Stuster, J.W. and Blowers, M.A. 1995. Experimental evaluation of sobriety checkpoint programs. Report no. DOT-HS-808-287. Washington, DC: National Highway Traffic Safety Administration.

Voas, R.B.; Rhodenizer, A.E.; and Lynn, C. 1985. Evaluation of Charlottesville checkpoint operations. Report no. DOT-HS-806-989. Washington, DC: National Highway Traffic Safety Administration.

Voas, R.B.; Wells, J.K.; Lestina, D.C.; Williams, A.F.; and Greene, M.A. 2000. Drinking and driving in the United States: the 1996 National Roadside Survey. Final Report no. DOT-HS-809-019. Washington, DC: National Highway Traffic Safety Administration.